U.S. NAVY
U.S. MARINE CORPS

NWP 3-04.1
MCWP 3-24.1

HELICOPTER OPERATING PROCEDURES FOR AIR-CAPABLE SHIPS

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DEPARTMENT OF THE NAVY
NAVAL DOCTRINE COMMAND
1540 GILBERT STREET
NORFOLK VA 23511-2785

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February 1998

PUBLICATION NOTICE

ROUTING

1. NWP 3-04.1/MCWP 3-24.1, HELICOPTER OPERATING PROCEDURES FOR AIR-CAPABLE SHIPS, is available in the Naval Warfare Publications Library. It is effective upon receipt.

2. Summary of revision:

   a. Subject areas that are rewritten include night vision devices, handling of aviation ordnance, helicopter rope suspension training, and LPD 4/AGF 11 expanded flight deck operations.

   b. The launch and recovery wind envelopes in Appendix B are completely redone.

   c. Numerous other additions and corrections are made to improve the usefulness of the manual.

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Naval warfare publications must be made readily available to all users and other interested personnel within the U.S. Navy.

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Bibliography

NAVAIRINST 10340.3, Maintaining Quality and Limiting Contamination of Aircraft Fuels

NAVAIRINST 13800.2, Aircraft Landing and Recovery Equipment, Including Visual Landing Aids and Aircraft Support Systems; Procedures and Responsibilities for Certification of

NAVOCEANCOMINST 3140.1 Series, U.S. Navy Oceanographic and Meteorological Support System Manual

NAVORDSYSCOMINST 10345.4, Aircraft Ground Refueling Hose, Preparation for Use; Procedures for

OPNAVINST 3120.28, Certification of Aviation Facilities in Naval Ships Operating Aircraft

OPNAVINST 3120.32, Standard Organization and Regulations of the U.S. Navy

OPNAVINST 3120.35, Helicopter Certification Requirements for Air Capable Ships

OPNAVINST 3710.7, General Flight and Operating Instructions

OPNAVINST 3750.6, Navy Aircraft Accident, Incident, and Ground Accident Reporting Procedures

OPNAVINST 4630.25 (DOD REG 4515.13), Air Transportation Eligibility

OPNAVINST 4631.2, Management of Department of Navy (DOD) Airlift Assets

OPNAVINST 4790.2, Naval Air Maintenance Program

OPNAVINST 8600.2, Naval Airborne Weapons Maintenance Program

APP 2, Helicopter Operations From Ships Other Than Aircraft Carriers (HOSTAC)

APP 2 Supp 1, Helicopter Operations From Ships Other Than Aircraft Carriers (HOSTAC) — Pilot's Handbook

ATP 1, Vol. I, Allied Maritime Tactical Instructions and Procedures

ATP 1, Vol. II, Allied Maritime Tactical Signal and Maneuvering Book

ATP 10, Search and Rescue

ATP 16, Replenishment at Sea

ATP 17, Naval Arctic Manual

AXP 5, NATO Experimental Tactics and Amplifying Tactical Instructions

EXTAC 1000, Maritime Maneuvering and Tactical Procedures

EXTAC 1001, International HOSTAC

EXTAC 1002, International HOSTAC, Technical Supplement

EXTAC 1003, Replenishment at Sea

NATOPS Flight Manuals (available for specific type aircraft)

NAVAIR 00-80R-14, NATOPS Aircraft Firefighting and Rescue Manual

NAVAIR 00-80T-105, CV NATOPS Manual

NAVAIR 00-80T-106, LHA/LPH/LHD NATOPS Manual

NAVAIR 00-80T-110, NATOPS Air Refueling Manual

NAVAIR 00-80T-112, NATOPS Instrument Flight Manual

NAVAIR 00-80T-113, Aircraft Signals NATOPS Manual

NAVAIR 51-50AAA-1, Installation Details for Flight Deck Lighting, Visual Landing Aids (VLA) Components

NAVAIR 51-50ABA-1, Visual Landing Aids on Air Capable Ships

NAVAIR 51-50ABA-3, Visual Landing Aids on LHA Class Ships

NAVAIR 51-50ABA-4, Visual Landing Aids on LPH Class Ships

NWP 6-01, Basic Operational Communications Doctrine

NWP 1-11.1, Characteristics and Capabilities of U.S. Navy Combatant Ships

NWP 4-01.4, Replenishment at Sea

Joint Pub 3-50, National Search and Rescue Manual

NWP 3-50.1, Navy Search and Rescue (SAR) Manual

NWP 3-02.1, Ship-to-Shore Movement

NWP 3-15 series, Mine Countermeasures Operations

NWP 3-51.1, Electronic Warfare Coordination

NWP 55-8-SAR, Navy Search and Rescue Information Document (SAR TACAID)

Amphibious Assault Ship Aviation Facilities Bulletin No. 1

Air-Capable Ships Aviation Facilities Bulletin No. 1

General Specifications of Ships of the Navy

NAEC-ENG-7576, Shipboard Aviation Facilities Resume

NAVORD OD 44617, Underway Replenishment Ordnance Handling Equipment and Transfer Units

NAVSHIPS Technical Manual (Aviation Fuel System), Chapter 9130

NAVSUPPUB 505, Preparation of Hazardous Materials for Military Air Shipment

USCG COMDTINST M3710.2, Shipboard Helicopter Operational Procedures

Glossary

A

airborne stores. Items intended for carriage internally or externally by aircraft, including racks, launchers, adapters, and detachable pylons, which are not normally separated from the aircraft in flight, such as tanks, pods, nonexpendable training weapons, and targets.

airborne weapons. Items intended for carriage internally or externally by aircraft, which are normally separated from the aircraft in flight, such as missiles, rockets, bombs, mines, torpedoes, pyrotechnics, ammunition, and guns.

air-capable ship. All ships other than CV/CVN or LPH/LHA/LHD from which aircraft can take off, be recovered, or routinely receive and transfer logistic support.

air-capable ship certification. Requirement for air-capable ships to be formally inspected and certified to be able to provide proper, adequate, and safe aviation facilities and to meet the applicable requirements of Air-Capable Ships Aviation Bulletin No. 1.

air operations. A section of the operations department that is responsible for coordinating all matters pertaining to flight operations, including the proper function of AOCC/HDC.

air operations control center (AOCC). Collocated with HDC in an LPH/LHA/LPD and responsible for air operations when not in an amphibious objective area.

air tasking order (ATO). A daily order prepared by a task force or joint air commander that details the operations of all aviation units under his command.

alternate marshal. A marshal established by AOCC/HDC and given to each pilot prior to launch with an altitude and an EAT.

ambient temperature. Temperature outside at any given pressure altitude, preferably expressed in degrees centigrade.

amphibious assault aviation ship. An LPH/LHD or LHA.

approach control. A control station in AOCC/HDC that is responsible for controlling air traffic from marshal until handoff to final control.

arming. An operation in which a weapon is changed from a safe condition to a state of readiness for initiation.

arming area. An area in which a weapon is armed; when forward-firing weapons are armed, an area ahead of the aircraft must be cleared and maintained clear until after launch.

aviation ship. A CV or CVN.

B

base recovery course (BRC). The ship's magnetic heading for aircraft recovery.

bingo. An order to an aircraft to proceed immediately to a divert field. Bearing, distance, and destination will be provided. Also, a term used by pilots to denote the point at which fuel becomes critical and return is imperative.

bridge information display system (BIDS). A visual means of communication by light between the LSO, bridge, CIC, and HCO.

buster. An order used by a ship controller to direct a helicopter to proceed at maximum speed.

C

CHARLIE. A signal for aircraft to land aboard the ship. A number suffix indicates time delay before landing.

clear-deck recovery. Conventional landing on a RAST-equipped ship that does not use the hauldown cable or the RSD.

compressor stall. Loss of turbine engine power commonly associated with FOD and/or encrustation due to extended exposure to salt spray.

control area. A circular airspace around an LPH LPD/LHA/LHD with a radius of 50 nm that extends upward from the surface to unlimited altitude and is under the cognizance of HDC/AOCC for TACC.

control (radar)

advisory. The tactical control of aircraft by a designated control unit in which the aircraft receives directions and recommendations, but the aircraft commander is not relieved of the responsibility for his own safety and navigation.

close. The tactical control of aircraft by a designated control unit, whereby the aircraft receives orders affecting its movements. The pilot will not deviate from instructions given him unless given permission or unless unusual circumstances require him to take immediate action for the safety of the flight. In either case, the pilot will inform the controller of the action taken. This type of control requires two-way radio communications and radar contact. The controller is responsible for the safety of the aircraft, and the pilot must be informed whenever he is not held on the radarscope for periods in excess of 1 minute or five sweeps of the radar and, as a result, is being dead reckoned. The ultimate safety of the aircraft is the primary responsibility of the pilot.

positive. The tactical control of aircraft by a designated control unit, whereby the aircraft receives orders affecting its movements which immediately transfer responsibility for the safe navigation of the aircraft to the unit issuing such orders.

control zone. A circular airspace with a radius of 5 nm around the ship that extends upward from the surface to, and includes, 2,500 feet, unless otherwise specified for special operations, and which is under the cognizance of the air officer during VMC. The air officer/HCO/FDO/LSO, as appropriate, shall exercise control over aircraft arriving and departing and shall provide clearance over all aircraft entering.

D

dearming (safing). An operation in which a weapon is changed from a state of readiness for initiation to a safe condition.

dearming area. That area in which a weapon is dearmed; when forward firing weapons are dearmed, the area ahead of the aircraft must be cleared and maintained clear until weapons are dearmed.

deck status light. A three-colored light (red, amber, green) controlled from PriFly. The light displays the status of the ship to support flight operations.

DELTA. A signal for aircraft to hold and conserve fuel at altitude and position indicated.

density altitude. Pressure altitude in feet MSL corrected for temperature. The higher the ambient air temperature, the higher the density altitude, resulting in a decrease in helicopter performance.

departure control. A control station in AOCC/HDC that is responsible for the orderly flow of departing traffic.

downloading. An operation that removes airborne weapons or stores from an aircraft.

E

emissions control (EMCON). Tactical restriction on RF, microwave, or acoustic transmissions.

emergency expected approach time (EEAT). The future time, assigned prior to launch, at which an aircraft is cleared to depart inbound or penetrate from a preassigned fix under lost communications conditions.

emergency final bearing. A magnetic bearing, extension of landing lineup line for emergency recovery.

emergency low visibility approach (ELVA). An emergency procedure used with air-capable ships when approach minimums are less than 200-foot ceiling and 1/2-mile visibility.

emergency marshal. A marshal established by AOCC/HDC and given to each pilot prior to launch with an altitude and an EEAT. The emergency marshal radial shall have a minimum of 30° separation from the primary marshal.

expected approach time (EAT). The future time at which an aircraft is cleared to depart inbound from a preassigned fix. Aircraft shall depart and commence approach at assigned time if no further instructions are received.

F

father. A brevity code for tacan.

feet dry. Over land.

feet wet. Over water.

final bearing. The magnetic bearing assigned by AOCC/HDC for final approach; an extension of the landing area centerline.

final control. The station that is responsible for controlling traffic to the approach minima.

flight deck director (FDD). The FDD is responsible for on-deck handling of SH-60B helicopters.

flight deck status and signaling system (FDSSS). A visual means of communication by deck status light between the LSO and the bridge, CIC, HCO, and helicopter.

flight level. Altitude expressed in hundreds of feet determined by setting 29.92 in the aircraft pressure altimeter; that is, FL 230 equals 23,000 feet in relation to the standard atmospheric pressure of 29.92.

free-deck recovery. Recovery to a RAST-equipped ship using the RSD without the use of the hauldown cable.

G

ground resonance. A condition of geometric imbalance in helicopters caused by offset dynamic forces when the helicopter makes improper contact with the deck. If allowed to continue, destruction of the helicopter is imminent. Improper tiedowns aggravate the onset of ground resonance.

H

helicopter control station (HCS). A shipboard aircraft control tower, or, on ships not equipped with a control tower, the communications installation which serves as such.

helicopter direction center (HDC). The controlling agency in an LPD/LHA/LPH/LHD that is responsible for dispatch and control of aircraft in an amphibious force.

helicopter emergency egress lights system (HEELS). A self-contained battery-powered system of luminous strips outlining emergency exits designed to aid in emergency egress of passengers.

helicopter landing system (HLS). A system installed on some ships to assist with helicopter recovery. Includes: BIDS, FDSSS, and RAST system.

HERO safe ordnance. Any ordnance item that is sufficiently shielded or otherwise protected so that all EEDs/CADs contained by the item are immune to adverse effects (safety or reliability) when the item is employed in its expected shipboard RF environments, provided that the general HERO requirements are observed.

HERO susceptible ordnance system. Any ordnance system proven (by tests) to contain EEDs and CADs that can be adversely affected by RF energy to the point that the safety and/or reliability of the system is in jeopardy when the system is employed in expected shipboard RF environments.

HERO unsafe ordnance. Any ordnance item is defined as being HERO unsafe when its internal wiring is physically exposed; when tests are being conducted on the item that result in additional electrical connections to the item; when EEDs/CADs having exposed wire leads are present, handled, or loaded; when the item is being assembled/disassembled; or when the item is in a disassembled condition. Ordnance items that fall into the above classification may be exempted from being classified as HERO unsafe ordnance as the result of HERO tests conducted to determine specific susceptibility.

hover. A condition of flight in which all relative or actual movement has ceased.

hung ordnance. Airborne weapons that cannot be fired or dropped because of weapon, rack, or circuit malfunction.

I

instrument meteorological conditions (IMC). Meteorological conditions expressed in terms of visibility, distance from cloud, and ceiling, less than the minima specified for VMC. Under IMC, IFR must be complied with.

inbound bearing. The magnetic heading assigned by AOCC/HDC that will ensure interception of the final bearing at a specific distance from the ship.

K

KILO report. A pilot-coded report indicating aircraft mission readiness.

L

landing force operational reserve material (LFORM). A package of contingency supplies prepositioned on amphibious warfare ships consisting of Class I (rations), Class III (trioxade), Class III (A) (aviation fuel), Class III (W) (petroleum, oil, and lubricants (POL)), and Class V (W) (ground ammunition) designated to support operations of embarked landing force and Navy support element (NSE).

landing safety officer (LSO). The officer responsible for RAST operations, normally a LAMPS Mk III qualified naval aviator.

lift off. To take off or leave the deck in a controlled condition of flight.

loading. An operation that installs airborne weapons and stores on or in an aircraft and may include fuzing of bombs and stray voltage checks.

loading area. That area in which replenishment of airborne weapons or stores and other armament items on or in an aircraft is conducted. When handling weapons in this area, all fuzes and initiators shall remain safe and all gun chambers clear.

M

marshal. A bearing, distance, and altitude fix designated by AOCC/HDC from which pilots will orient holding and from which initial approach will commence.

marshal control. A control station in AOCC/HDC that is responsible for the orderly flow of inbound traffic.

mission load allowance (MLA). A pre-positioned contingency package of V Class V (A) (aviation ammunition) that is Navy-controlled material designated to support aviation operations of the embarked landing force.

mother. Commonly used term to define ship of origin or ship providing control.

N

night vision device (NVD). Any device (NVG, FLIR, low-light Tc, etc.) that aids an individual's vision at night.

night vision goggles (NVG). An image intensification system worn by an individual in order to enhance or improve vision at night.

nonprecision approach. Radar-controlled approach or an approach flown by reference to navigation aids in which glideslope information is not available.

O

operational necessity. This term applies to missions associated with war or peacetime operations in which the consequences of an action justify the risk of loss of aircraft and aircrew.

optimum wind

optimum wind for normal operations. Winds down the lineup line at approximately half the maximum speed allowed by the applicable wind envelopes in Appendix B.

optimum wind for a single-engine landing. Relative wind as close as possible to being down the lineup line at the maximum windspeed allowed by the appropriate wind envelope in Appendix B.

optimum wind for up-the-stern approaches (SH-60B). Winds 10° to 20° off the port bow at one-half the maximum speed allowed.

optimum wind for AFCS/SAS/BOOST or any flight control failure or degradation. Winds in the appropriate emergency wind envelope giving the most stable deck.

P

parrot. A brevity code for aircraft transponder.

pigeons. Vectors provided by ships' aircraft controllers or ASTACs to a specified destination.

pilots landing aid television (PLAT). A closed-circuit TV presentation of air operations on a flight deck.

P/M/C. Passengers, mail, and cargo.

pogo. A brevity code used in communication frequency change assignments to "return to ________."

POPEYE. A pilot term used to indicate that his aircraft has entered IMC.

precision approach. A radar approach in which range, azimuth, and glideslope information is provided to the pilot.

pressure altitude. The indicated altitude of a pressure altimeter at an altimeter setting of 29.92 inches of mercury.

primary flight (PriFly) control. The controlling agency on aviation ships, amphibious assault aviation ships, and air-capable ships that is responsible for ATC around the ship.

R

rapid securing device (RSD). A part of the RAST system that secures the SH-60B helicopter to the deck. It also provides a means of traversing the helicopter to/from the hangar/flight deck.

Raspberry. A ship-to-shore HF radio net, used for flight following and administrative traffic concerning aircraft.

recovery assist (RA) recovery. Recovery to a RAST-equipped ship using both the hauldown cable and the RSD portions of the RAST system.

recovery, assist, securing, and traversing (RAST) system. The RAST system is used in LAMPS Mk III capable ships.

T

tactical direction. A form of nonradar control in which tactical information is passed to an aircraft by the controlling unit, but the aircraft commander is responsible for navigation and safety.

unexpended weapons. Airborne weapons that have not been subjected to attempts to fire or drop, are presumed to be in normal operating condition, and can be fired or jettisoned if necessary.

V

vertical onboard delivery (VOD). Logistics movement of high-priority passengers/mail/cargo to/from aviation and air-capable ships, normally by the CH-53E helicopter.

vertical replenishment (VERTREP) control. The station responsible for controlling the movement of cargo, passengers, and mail by VERTREP.

visual meteorological conditions (VMC). Weather conditions in which VFR apply, expressed in terms of visibility, ceiling height, and aircraft clearance from clouds along the path of flight. When these criteria do not exist, IMC prevails and IFR must be complied with.

W

wave-off. An action to abort a landing, initiated by the bridge, primary flight control, the LSO/LSE, or the pilot at his discretion. The response to a wave-off signal is mandatory.

winchester. Out of ammunition or stores.

Z

ZIPLIP. A condition which may be prescribed during flight operations during VMC conditions under which positive communications control is waived and only radio transmissions required for flight safety are permitted.

List of Abbreviatons and Acronyms

A

ACU. Aircraft control unit.

ADF. Automatic direction finder.

AFFF. Aqueous film-forming foam.

AIC. Air intercept controller.

AMCM. Airborne mine countermeasures.

AOCC. Air operations control center.

AOSS. Aviation ordnance safety supervisor.

APP. Auxiliary power plant.

APU. Auxiliary power unit.

ASM. Antiship missile.

ASO. Acoustic sensor operator, aviation safety officer.

ASR. Air surveillance radar.

ASST. Antiship surveillance and targeting.

ASTAC. Antisubmarine warfare/antisurface warfare tactical air controller.

ATACO. Air tactical control officer.

ATC. Air traffic control.

ATD. Actual time of departure.

ATO. Air tasking order, air transfer officer, air transportation officer, airborne tactical officer.

AVWX. Aviation route weather forecast.

B

BIDS. Bridge information and display system.

BRC. Base recovery course.

C

CAD. Cartridge-actuated device.

CATF. Commander amphibious task force.

CC. Control console.

CCO. Combat cargo officer.

CCR. Closed circuit refueling.

CCTV. Closed circuit television.

CDC. Combat direction center.

CIC. Combat information center.

CLF. Commander landing force.

COMSEC. Communications security.

CSAR. Combat search and rescue.

D

DCA. Damage control assistant.

DCC. Damage control central.

DCO. Damage control officer.

DR. Dead reckoning.

E

EAC. Expected approach clearance.

EEAT. Emergency expected approach time.

EED. Electro-explosive device.

EMCON. Emission control.

EMI. Electromagnetic interference.

EOB. Electronic order of battle.

EOD. Explosive ordnance disposal.

ES. Electronic warfare support measures.

ESMO. Electronic support measures operator.

ETA. Estimated time of arrival.

ETR. Estimated time of recovery.

F

FAF. Final approach fix.

FDD. Flight deck director.

FDO. Flight deck officer.

FDSSS. Flight deck status and signaling system.

FLIR. Forward-looking infrared.

FOD. Foreign object damage.

H

HCO. Helicopter control officer.

HCS. Helicopter control station.

HDC. Helicopter direction center.

HERO. Hazards of electromagnetic radiation to ordnance.

HERP. Hazards of electromagnetic radiation to personnel.

HIFR. Helicopter in-flight refueling.

HLS. Helicopter landing system.

HRS. Horizon reference set.

HRST. Helicopter rope suspension training.

HTP. Hydraulic test panel.

I

IAF. Initial approach fix.

IFF. Identification friend or foe.

IFR. Instrument flight rules.

ILS. Instrument landing system.

IMC. Instrument meteorological conditions.

IMRL. Individual material readiness list.

LAMPS. Light airborne multipurpose system.

LFORM. Landing force operational reserve material.

LOI. Letter of instruction.

LOX. Liquid oxygen.

LSE. Landing signalman enlisted.

LSO. Landing safety officer, landing signal officer.

M

MAD. Magnetic anomaly detector.

MAP. Missed approach path.

MCM. Mine countermeasures.

MDA. Minimum descent altitude.

MEDEVAC. Medical evacuation.

MET. Mobile environment team.

MEU. Marine expeditionary unit.

MLA. Mission load allowance.

MOU. Memorandum of understanding.

MSC. Military Sealift Command.

MSL. Mean sea level.

MWB. Motor whale boat.

N

NATOPS. Naval air training and operating procedures standardization.

NHC. NATO high capacity.

NI. North Island.

NSW. Naval special warfare.

NVD. Night vision device.

NVG. Night vision goggles.

O

OCE. Officer conducting the exercise.

OIC. Officer in charge.

OMI. Operation and maintenance instruction.

OOD. Officer of the deck.

OPAREA. Operating area.

OPSEC. Operational security.

OTC. Officer in tactical command.

P

PIM. Position and intended movement.

PLAT. Pilot's landing aid television.

PMS. Planned maintenance system.

PQS. Personnel qualification standards.

R

RADHAZ. Radiation hazard.

RAST. Recovery assist, securing, and traversing.

REMRO. Remote radar operator.

RHIB. Rigid hull inflatable boat.

ROE. Rules of engagement.

RRF. Ready reserve force.

RSD. Rapid securing device.

S

SAM. Surface-to-air missile.

SAR. Search and rescue.

SBO. Steering bar operator.

SCR. Self-controlled radar.

SE. Support equipment.

SEAL. Sea-air-land.

SENAV. Senior naval aviator.

SGSI. Stabilized glideslope indicator.

SIF. Selective identification feature.

SLCP. Ship's loading characteristics pamphlet.

SO. Sensor operator.

SOP. Standard operating procedure.

SPIE. Special purpose insertion and extraction.

SPINS. Special instructions.

SPR. Single-point pressure refueling.

SSTG. Ship's service turbine generator.

SUW. Surface warfare.

T

TAO. Tactical action officer.

TOAS. Tactical oceanographic atmospheric summary.

TPO. Transfer petty officer.

TYCOM. Type commander.

U

UNREP. Underway replenishment.

USCG. U.S. Coast Guard.

USW. Underwater warfare.

V

VERTREP. Vertical replenishment.

VFR. Visual flight rules.

VLA. Visual landing aids.

VLF. Very low frequency.

VMC. Visual meteorological conditions.

VOD. Vertical onboard delivery.

VOR. VHF omnidirectional range.

PREFACE

NWP 3-04.1/MCWP 3-24.1 sets forth the mandatory operational procedures and training requirements for helicopter operations from air-capable ships. Much of the information has been extracted from existing tactical publications covering specific operations in which helicopter operations are an integral part. This manual is intended to provide shipboard personnel with a ready reference for all helicopter operations. Where this manual differs from the applicable aircraft NATOPS flight manual, the NATOPS flight manual shall take precedence.

It is recognized that tactical situations not specifically addressed in this publication may arise. In these cases, local procedures must be developed or related procedures contained herein modified to ensure a safe, efficient evolution.

In developing this publication, every effort has been made to incorporate the most recent fleet-developed methods and procedures and naval systems commands' materials and equipment. However, the specifying herein of new or different materials and equipment does not constitute either a procurement, alteration, or installation directive.

Throughout this publication, references to other publications imply the effective edition.

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REMARKS: (USE ADDITIONAL SHEETS IF NEEDED)

____________________ (PRA POINT OF CONTACT) ____________________ (PHONE - IDENTIFY DSN OR COMM)

CONFERENCE DATE: ____________________ **CONFERENCE AGENDA ITEM NO.:** __________

PAGE _______ OF _______

(CLASSIFICATION)

FM ORIGINATOR

TO COMNAVAIRPAC SAN DIEGO CA//JJJ//

INFO COMNAVDOCCOM NORFOLK VA//N3/N34//

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SUBJ/URGENT CHANGE RECOMMENDATION FOR NWP 3-04.1/MCWP 3-24.1//

REF/A/DOC/NWP 1-01//

POC/*(Command Representative)*//

RMKS/

1. IAW REF A URGENTCHANGE IS RECOMMENDED FOR NWP 3-04.1/MCWP 3-24.1
2. PAGE ______ PARA NO ______ LINE NO ______ FIG NO ______
3. PROPOSED NEW TEXT *(Include Classification)*

4. JUSTIFICATION

Message provided for subject matter; ensure that actual message conforms to MTF requirements.

and

Commander
Naval Air Systems Command
Code 551
Washington, DC 20361

URGENT CHANGE RECOMMENDATIONS

When items for changes are considered to be urgent (as defined in NWP 1-01, and including matters of safety), this information shall be sent by message (see accompanying sample message format) to Commander, Naval Air Force, U.S. Pacific Fleet, with information copies to Naval Doctrine Command, Naval Air Systems Command, Navy Tactical Support Activity, and all other commands concerned, clearly explaining the proposed change. Information addressees should comment as appropriate. See NWP 1-01.

URGENT CHANGE NUMBERING SYSTEM

Urgent changes will bear a sequence number for identification purposes. Urgent change sequence numbers will be continued in order over the life of this manual and will not be returned to "one" each time a revision is issued.

CHANGE SYMBOLS

Revised text in changes is indicated by a black vertical line in either margin of the page, like the one printed next to this paragraph. The change symbol shows where there has been a change. The change might be material added or information restated. A change symbol in the margin by the chapter number and title indicates a new or completely revised chapter.

WARNINGS, CAUTIONS, AND NOTES

The following definitions apply to "WARNINGS," "CAUTIONS," and "Notes" found throughout the manual.

WARNING

An operating procedure, practice, or condition that may result in injury or death if not carefully observed or followed.

CAUTION

An operating procedure, practice, or condition that may result in damage to equipment if not carefully observed or followed.

Note

An operating procedure, practice, or condition that is essential to emphasize.

WORDING

The concept of word usage and intended meaning which has been adhered to in preparing this publication is as follows:

"Shall" has been used only when application of a procedure is mandatory.

"Should" has been used only when application of a procedure is recommended.

"May" and "need not" have been used only when application of a procedure is optional.

"Will" has been used only to indicate futurity, never to indicate any degree of requirement for application of a procedure.

CHAPTER 1

Responsibilities and Training Requirements

1.1 RESPONSIBILITIES

The information within this chapter is intended to assist staffs, ship commanding officers, squadron commanding officers, helicopter squadron/detachment personnel, and ship personnel in the training and preparation for safe and effective helicopter operations. Commanding officers shall ensure that key personnel are familiar with the information contained herein and in OPNAVINST 3120.32.

1.1.1 Command Relationships. The commanding officer/OIC of a Navy helicopter squadron/detachment shall report to the ship's commanding officer or air wing commander as directed by the appropriate TYCOM. Organized aviation units, regularly attached to and embarked in a ship, shall retain their basic organization and shall be assigned to the air department or air wing as appropriate. On ships not having an air department or air wing, the helicopter detachment OIC shall have department head status (see Figure 1-1). For command relationships for MCM unit, see Chapter 12.

1.1.2 Command Relationship With Marine Helicopter Squadron/Detachment. Marine helicopter squadrons/detachments are normally embarked in amphibious air-capable ships for amphibious operations. Joint Pub 3-02 sets forth the principles governing the command relationship. The command relationship normally applies from initial embarkation until final debarkation.

Specific command relationships for individual operations and exercises should be defined in the applicable governing directive, operation order, or operation plan.

A Marine helicopter squadron/detachment may embark to conduct special operations, such as disaster relief, rescue, and evacuation operations. When the commanding officer/OIC of a Marine helicopter squadron/detachment is directed to embark aboard an amphibious air-capable ship for such a special operation, he reports to the officer who is directed to conduct the special operation. That is, he shall act in the same capacity as a CLF, and shall be responsible to the commander of the special operation for the conduct of assigned tasks in the same manner as a CLF in the CATF/CLF relationship in an amphibious operation.

In addition, the following specific relationships between the commanding officer of the amphibious air-capable ship and the commanding officer/OIC of a Marine helicopter squadron/detachment, as set forth in NWP 3-02.1, will apply at all times when Marine helicopters are embarked on the ship.

1. U.S. Navy Regulations set forth the authority of the ship's commanding officer with respect to the aircraft embarked in or operating from his ship. During amphibious operations, the helicopter units are under the command of the CLF and are not under the operational control of the ship's commanding officer. However, the ship's commanding officer retains certain authority over the embarked helicopter units, which includes, as applicable, those items listed in paragraph 1.1.3.

2. To ensure efficient operations, the following matters relating to the operation of Marine helicopters from a ship must be coordinated by the helicopter unit commander and the ship's commanding officer:

   a. Pilot qualifications and limitations

   b. Aircraft limitations

   c. Scheduling of helicopters, pilots, and crewmen

   d. Pilot briefings

   e. Arrival/departure and en route position reports

   f. Fuel status reports

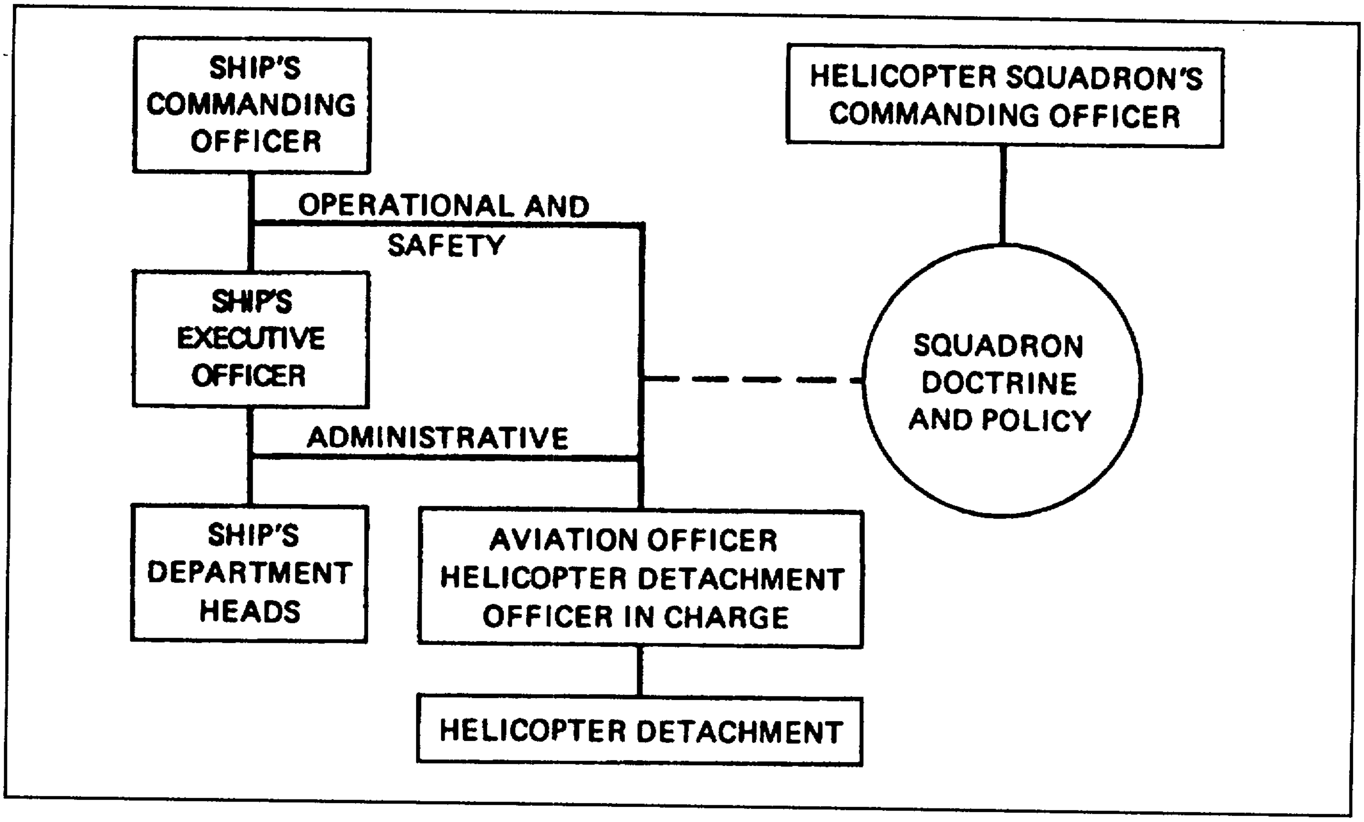


Figure 1-1. Chain of Command

g. Maintenance status reports.

Final resolution of any difference that may arise in connection with the foregoing rests with the commander of the special operation.

1.1.3 Ship's Commanding Officer. The ship's commanding officer is responsible for safe helicopter operations involving his ship. U.S. Navy Regulations set forth the authority of the ship's commanding officer with respect to the aircraft operating from his ship. This authority and responsibility includes, but is not limited to, the following:

1. Launch/recovery control
2. Air traffic control in the vicinity of the ship
3. Landing signal control
4. Control of flight deck operations
5. Control of hangar deck operations (where applicable)
6. Servicing helicopters as required
7. Ship's responsibilities in the manifesting, briefing, and loading of personnel
8. Ship's responsibilities in the loading of equipment and cargo
9. Handling and loading of ammunition and bulk fuel in the vicinity of helicopters
10. Knowledge of aircraft limitations
11. Arrival/departure and en route position reports
12. Informing helicopter pilot of ship's aviation fuel status/capability and providing a fuel sample prior to any helicopter refueling operation
13. Ensuring that aviation fuel system is flushed, sampled, and tested on a daily basis when underway or whenever flight operations are anticipated while anchored or pierside
14. Ensuring that all flight deck personnel comply with physical standards contained in the Manual of the Medical Department, U.S. Navy
15. Ensuring that the immediate operational commander is cognizant of any degradation in helicopter facilities certification or deficiencies in properly trained and/or qualified flight quarters personnel

16. Ensuring that the agency from which helicopter services are requested is informed of the ship's certification level and class, if different from those listed in NAEC-ENG-7576, and any degradation to the facility that would affect safe operations

17. OPSEC/COMSEC posture.

1.1.3.1 Commanding Officers of Ships With an Embarked Helicopter Detachment. Commanding officers of ships with an embarked helicopter detachment shall be additionally responsible for:

1. Instructing or reviewing pilots and crews in safety of flight operations related to shipboard operations

2. Ensuring pilots are current in their NATOPS/ instrument rating and are currently qualified on day/night shipboard launch/recovery operations

3. Providing for servicing and repairing helicopters on board ships

4. Heavy weather protection of helicopters

5. Being aware of pilot limitations and pilot/crew fatigue factors

6. Pilot briefings

7. Maintaining status reporting.

1.1.3.2 Helicopter Detachment Personnel Assigned to Air-Capable Ships. Helicopter detachment personnel assigned to air-capable ships shall not be assigned additional or collateral duties. The requirement of the helicopter to fly or to be immediately ready to fly around the clock puts the helicopter detachment personnel on a 24-hour call basis. The OIC must have sufficient flexibility to schedule meals, work, rest, and training periods to meet this commitment. Similarly, liberty for the detachment personnel should be controlled in accordance with the ship's policy by the detachment OIC, who is cognizant of the full workload of the detachment.

1.1.3.3 Command Responsibilities on Air-Capable Ships. The helicopter detachment manning, as provided by the air TYCOM, is normally only to the level necessary to perform the detachment mission and to maintain the assigned helicopters and related equipment. As such, helicopter detachment personnel shall not be assigned additional or collateral ship duties that will conflict with their primary duties of flying and maintaining a 24-hour readiness posture while underway.

Berthing for helicopter detachments aboard air-capable ships should be as follows.

1. Officers — embarked pilots shall be assigned staterooms commensurate with their rank.

2. Chief petty officers — CPO quarters.

3. Enlisted personnel — berthed in a common compartment located as near the helicopter facility as possible and feasible, located so as to be undisturbed by other personnel carrying out the ship's normal routine. Berthing is to be in accordance with the latest OPNAV instruction.

Organization for air-capable ships is given in Figure 1-1. Except for AMCM squadrons, the OIC is placed under the operational command of a ship's commanding officer and is responsible to that commanding officer for the accomplishment of specific missions. At the same time, the OIC is directly responsible to his parent command to ensure that squadron policies and doctrine are carried out. A ship's commanding officer should ensure that any organizational or operational problems that may arise are handled with this understanding. The ship's administrative responsibility to the detachment includes officer and enlisted records, medical and dental records, pay records, and other administrative tasks essential to the function of the detachment.

Because of limited facilities and space aboard ship, normal maintenance will be limited to routine inspections, minor repairs, and replacement of parts that do not require special tools or equipment. Heavy maintenance (i.e., changing major components and conducting major inspections) normally will be performed in port where the helicopter and maintenance crew can be flown to an air station to take advantage of more complete maintenance facilities.

1.1.4 Officer of the Deck. The OOD shall coordinate ship and helicopter operations. Helicopter control responsibilities of the OOD include the following:

1. Keep the commanding officer and executive officer informed on the status of helicopter operations.

2. Inform all departments concerned of expected receipt or delivery of personnel, mail, freight, or HIFR operations.

3. Ensure that a qualified lookout is assigned/tasked to maintain a constant visual watch on the helicopter while airborne and within visual range of the

ship (normal underway bridge watch may be used). Such lookouts shall be provided with an approved signal device to drop in the water in the event of a man overboard or aircraft mishap during helicopter operations.

WARNING

Pyrotechnic devices should not be used in marking aircraft accident sites to preclude igniting aviation fuel.

4. Display required signals (see Chapter 4).

5. Ensure that the rescue boat is fully prepared and that the boat crew is detailed and available at short notice for launch, if required.

6. Maintain communications with the flight operations area, CIC, rescue boat stations, and DCC.

7. Maneuver the ship to provide favorable relative wind conditions (see Appendix B for wind limitations).

8. Maintain a steady course and speed during rotor engagement/disengagement and launch/recovery operations, or at any time an aircraft is being moved/repositioned on the flight deck until the helicopter is clear of the ship or properly secured to the deck.

Note

See Chapters 9 and 10 for maneuvering restrictions when conducting flight operations.

9. Maintain the flight deck in readiness for an emergency helicopter landing.

10. Ensure that obstructions such as guns, antennas, cranes, flagstaffs, and lifelines are lowered, trained clear, or unrigged, as appropriate.

11. Ensure the status of auxiliary equipment exhaust discharging in the vicinity of the flight deck is not altered and tubes are not blown while the helicopter is in proximity to the ship. The aircraft commander shall be notified of the current status of operating equipment that may affect the aircraft.

12. Pass permission to move, engage, disengage, launch, or recover the helicopter.

13. Notify the HCO prior to course and speed changes during all phases of helicopter deck and over-deck operations.

14. Grant permission to commence flight operations when HCO reports "Manned and ready" and permission has been obtained from the commanding officer as appropriate.

15. Ensure completion of the OOD air operations checklist. (Appendix A provides a sample checklist.)

16. Ensure that the HCO is advised in a timely manner of all information that might affect the safety and efficiency of flight deck operations.

17. Provide surface summary plot information and updates to the VERTREP control officer during all VERTREP evolutions.

18. Sound flight quarters as per paragraph A.1.1 (Appendix A) and ensure the word is passed periodically as indicated therein regarding restrictions on smoking, dumping trash, etc.

1.1.5 Ship's Operations Officer/Combat Systems Officer. The operations officer is responsible for mission assignment and control of airborne helicopters. The operations officer's responsibilities include:

1. Prepare an EOB as required by embarked units with ES capability.

2. Provide complete mission briefing sheets to the pilot and air tactical control officer as required.

3. File flight plans with the local ARTCC or appropriate agency in accordance with OPNAVINST 3710.7, and provide positive control of flight following and handoff procedures.

4. Ensure all personnel are briefed on OPSEC and COMSEC.

5. Establish communications between the helicopter and air controller in CIC. This circuit should be monitored on the bridge.

6. Ensure that all personnel assigned to a helicopter firefighting team or to a billet that places them on the helicopter deck during flight quarters receive training in helicopter firefighting via a CNO-approved course of instruction.

7. Ensure that designated emergency air distress frequencies are monitored at all times during helicopter operations.

The operation officer shall provide pilots and OOD with:

1. Time of takeoff and estimated time of return.

2. Mission of flight.

3. PIM of the ship and other ships as pertinent at the time of takeoff.

4. Bearing and distance of destination at time of launch. (Bearings passed must be specified as magnetic or true.)

5. Bearing and distance of nearest land or other ships capable of operating aircraft. (Bearings passed must be specified as magnetic or true.)

6. Recognition signals and procedures.

7. Environmental data.

8. Communications frequencies to be employed.

9. Magnetic variation in the operating area.

10. Certification status or restrictions of own and destination ship(s).

11. Minimum and maximum altitudes and altitude separation, if required.

12. Low-visibility operating procedures.

13. Hostile, potentially hostile, or unfriendly forces in the area of operations.

14. ROE applicable to the mission, as required.

15. Any data on flight restrictions (e.g., buffer zones, sensitive areas, restricted prohibited airspace, nonfree flying areas, hazards to flight, etc.) in the planned area of operations.

1.1.6 Combat Information Center Officer. The CIC officer on an air-capable ship shall be responsible for the control of aircraft while airborne, except during actual launching and recovery, when the helicopter is under the control of the HCO/LSO. He/she shall ensure completion of the CIC air operations checklist. (Appendix A provides a sample checklist.) In addition, he/she shall ensure the proper training of air controllers and lookouts.

1.1.7 Chief Engineer. The chief engineer on air-capable ships (air officer, when assigned) shall be responsible for the maintenance and operation of the ship's aviation fueling system and shall ensure that safety precautions are observed during fueling operations (see Chapter 4). He/she shall ensure that fuel quality standards and surveillance thereof are maintained and that adequate safety precautions are observed during fueling operations. On ships equipped with the RAST system, the chief engineer shall be responsible for all associated equipment. As DCO, he/she shall ensure only qualified personnel are assigned to the helicopter firefighting team.

1.1.8 Damage Control Assistant. The DCA on air-capable ships is responsible for supervision of all firefighting evolutions concerning helicopter operations.

1.1.9 Air Officer. In air-capable ships that have an air department, the head of that department shall be designated the air officer. This officer is normally a naval aviator, usually a designated helicopter pilot. In addition to those duties prescribed elsewhere by regulations, he/she will be responsible for the supervision and direction of launch and recovery operations, and for the servicing and handling of aircraft.

The air officer shall ensure that, in addition to the formal training required by the type commander, all required personnel receive the training necessary to acquaint them with peculiarities of the specific aircraft models being deployed. Particular emphasis shall be placed on both special aircraft handling requirements and flightcrew rescue procedures.

1.1.9.1 Specific Duties. The air officer will be responsible for the proper performance of the functions of his department, which include:

1. Aircraft launch and recovery, servicing, and handling, including visual traffic control related to these operations

2. Crash salvage and aircraft firefighting as appropriate

3. Operation, daily inspection, and care of aircraft handling equipment, including tractors, towbars, and firefighting vehicles

4. The care, stowage, and issue of aviation fuels and lubricants; the operation, maintenance, and security of the systems pertaining thereto; and the keeping of

fuel records and the daily submission of a fuel report to the commanding officer

5. Control of aircraft in the landing pattern and on launching until control is assumed by the operations officer or other aircraft control authority.

1.1.9.2 Safety Precautions. In those parts of the ship in which aircraft and flammables assigned to the air department are stowed or handled, the air officer will ensure that applicable safety precautions are posted in conspicuous places and that personnel concerned are instructed and drilled frequently and thoroughly in these safety precautions.

1.1.9.3 Organizational Relationships. The air officer reports to the commanding officer for the conduct of flight operations and to the executive officer for all administrative matters.

1.1.9.4 Assistants to the Air Officer. The assistant air officer, when there is one, reports to the air officer. The following officers report to the air officer, or through the assistant, as appropriate:

1. Flight deck officer
2. Hangar deck officer
3. Aviation fuels officer.

1.1.10 Aviation Officer. On air-capable ships that have a Navy helicopter detachment embarked, an aviation department will be organized. The OIC of the helicopter detachment will be the department head and will be designated the aviation officer. In addition to those duties prescribed elsewhere by regulations, he/she will be responsible for the specific missions of embarked aircraft.

1.1.10.1 Specific Duties. The aviation officer will be responsible for the proper functions of his department, which include:

1. Safety of aircraft, flight deck, and aviation department personnel
2. Maintaining and servicing the helicopters and associated equipment assigned to his department
3. Supervising helicopter operations
4. Training personnel involved in helicopter operations and aircraft support
5. Advising the commanding officer on the state of training and readiness of the aviation department
6. Coordinating maintenance, cleanliness, and preservation of assigned spaces
7. Briefing appropriate personnel on proper helicopter rescue techniques and helicopter rescue equipment that may be employed
8. Advising the commanding officer on the conduct of flight operations, including flight schedules, and on improvements in all facets of air operations
9. Morale, discipline, and welfare of assigned personnel
10. Maintaining custody and ensuring replacement of detachment IMRL equipment
11. Providing all required aircraft accounting reports in accordance with air TYCOM directives.

1.1.10.2 Organizational Relationships. The aviation officer is responsible to the commanding officer for the accomplishment of specific missions. He/she is responsible to the executive officer in administrative matters. The aviation officer reports to the squadron commanding officer through the ship's commanding officer. He/she is also responsible to his/her parent command for carrying out squadron policies and doctrine.

1.1.10.3 Assistants to the Aviation Officer. In ships that have an aviation department, the aviation coordinator, HCO, FDO, LSO, and LSE shall be responsible to the aviation officer for the performance of assigned duties. Officer members of the helicopter detachment shall be responsible to the aviation officer for the performance of assigned duties as provided in OPNAVINST 3120.32.

1.1.11 Aviation Coordinator. On ships where no air officer is assigned, an aviation coordinator shall be designated. The aviation coordinator is a member of ship's company who is the primary point of contact for coordinating routine aviation matters including training/qualifications of flight quarter personnel and maintenance and upkeep of the aviation facility and equipment. He/she advises and assists the aviation officer (when embarked), helps coordinate maintenance and training with departments responsible for support of flight quarters, and keeps the commanding officer advised of the condition of the aviation facility and any degradation to the ship's readiness to conduct air operations. He/she coordinates with the helicopter detachment to ensure smooth integration with the ship during embarkation. The aviation coordinator shall be thoroughly familiar with this publication, Air-Capable Ship Aviation Facilities Bulletin No. 1, and TYCOM directives concerning air operations and readiness.

1.1.12 Helicopter Control Officer. On air-capable ships that have no aviation department, the HCO shall be designated in writing by the commanding officer. HCOs shall be graduates of the appropriate helicopter indoctrination course, unless they are designated helicopter pilots.

The HCO is responsible for all aircraft operating under VFR in the ship's control zone. In VMC, this responsibility may be extended beyond the control zone to include all aircraft that have been switched to the HCO's control frequency in preparation for a visual descent and approach to landing. For special operations such as post-maintenance or flight demonstrations, the HCO may exercise control outside the ship's control zone. Additionally, he/she is the control zone clearing authority, and agencies desiring to operate aircraft within the control zone shall obtain the HCO's approval prior to entry, except in emergency or tactical USW operations. The clearance shall include:

1. Operating instructions as required for avoiding other traffic

2. Information concerning hazardous conditions

3. Altitude and distance limitations to which aircraft may be operating.

1.1.12.1 Specific Duties. The HCO shall be responsible for the following:

1. Supervise all transmissions from the HCS to the bridge, CIC, LSE, and helicopter.

2. Supervise all flight operations.

3. Man the HCS during flight quarters.

4. Originate all transmissions from the HCS to the bridge and helicopter.

5. Ensure that the flight deck checkoff list is completed.

6. Obtain "Manned and ready" reports from the LSE, crash party, and fueling team and report ready for launch, recovery, or refueling operations to the bridge.

7. Ensure that safe flight deck procedures are observed and that all flight deck personnel are properly attired in accordance with paragraph 2.1.1.

8. Exercise control over the helicopter during launch and recovery and over-deck operations.

9. Ensure that only those personnel essential for a particular evolution are present on the flight deck.

10. Ensure that an FOD prevention walkdown is completed prior to commencement of each flight evolution.

11. Ensure that passengers to be embarked in the helicopter are manifested and briefed, have proper cranial protection and emergency flotation devices, and have received a flight emergency briefing with a copy of the pertinent helicopter emergency diagram from Appendix H.

12. Ensure proper completion of the HCO checklist. (Appendix A provides a sample checklist.)

13. Coordinate all movement, permission to start engines, rotor engagements/disengagements, and launch/recovery of the helicopter with the OOD on the bridge.

1.1.12.2 Organizational Relationships. The HCO (FDO if assigned) shall be responsible for training and qualifications to the aviation officer or to the weapons officer/first lieutenant/combat systems officer when the aviation officer is not embarked.

1.1.13 Landing Safety Officer. The LSO shall be qualified in accordance with the model NATOPS and designated in writing by the commanding officer of the ship. He/she is normally a naval aviator. During RAST flight deck evolutions, the LSO controls flight operations with the HCO acting as a safety observer. LSO responsibilities shall include:

1. Manning the RAST control station during RAST launch and recovery and originating all transmissions to the bridge, CIC, HCO, FDD, and helicopter

2. Ensuring that all RAST preoperational checks are completed

3. Ensuring that all safety precautions applicable to the ship and aircraft are enforced.

Note

Enlisted personnel may be qualified as RAST operators (traverse only) for moving the helicopter in and out of the hangar.

1.1.14 Flight Deck Officer. On air-capable ships on which the physical location of the flight deck and the HCS are such that the safety of flight operations would be enhanced by an additional supervisor on the flight deck, an FDO should be designated. In this case, the FDO shall be responsible to the HCO for assigned duties and shall provide a safety backup for the LSE.

1.1.15 Landing Signalman Enlisted. The LSE is responsible for visually signaling to the helicopter, thus assisting the pilot in making a safe takeoff and/or approach and landing to the ship. He is responsible for directing the pilot to the desired deck spot and for ensuring general safety conditions of the flight deck area, to include control of the flight deck crew. His signals are advisory in nature, with the exception of wave-off and hold, which are mandatory. He is responsible to and performs his duties under the supervision of the air officer, FDO, HCO, aviation officer, or LSO as appropriate. He shall be designated as PQS qualified, in writing, by the commanding officer.

1.1.16 Vertical Replenishment Organizational Responsibilities. The following personnel shall be assigned for VERTREP operations.

1.1.16.1 Vertical Replenishment Control Officer. The VERTREP control officer is responsible to the HCO for cargo organization and supervision of cargo movement relative to the overall VERTREP transfer process. He/she provides necessary directions for cargo spotting, determines the placement of loads on the flight deck, and determines the method of assembly packaging for transfer. The VERTREP control officer will be responsible for the following specific duties aboard the transferring ship.

1. Provide necessary directions for cargo spotting and determine placement of loads on the flight deck and the methods of assembly packaging for transfer.

2. Maintain a surface summary plot of the immediate area.

3. Schedule deliveries to the various ships in accordance with the overall UNREP/VERTREP plan.

4. Advise the HCO to alert each receiving ship via the helicopter control circuit prior to commencing the transfer (when within UHF range).

5. Advise the VERTREP cargo supervisor of the replenishment order and changes thereto so the proper cargo can be brought up to the deck and positioned.

6. Determine from the helicopter pilot or other detachment pilot the maximum load the helicopter can lift, and pass this information to the cargo supervisor. This shall be accomplished prior to takeoff.

7. Assist the HCO in coordinating all helicopter administrative flights and transfers scheduled during the replenishment operation.

8. Keep the bridge informed of the progress and status of the operation, including number of lifts remaining and the estimated completion time.

The HCO or FDO may perform the duties of VERTREP control officer.

1.1.16.2 Vertical Replenishment Cargo Supervisor. The VERTREP cargo supervisor is responsible to the VERTREP control officer (HCO or FDO, as appropriate) for cargo handling, assembly, packaging, as well as accounting for returned handling equipment. The cargo supervisor may be directed to provide assistance for cargo placement on the flight deck. He/she is responsible for weighing and marking all loads and shall ensure load weights are within the limits dictated by the VERTREP control officer.

1.1.16.3 Vertical Replenishment Hookup Man. For VERTREP operations, the hookup man is the only person on the flight deck near the helicopter while it is hovering to pick up cargo. His/her primary responsibility is to ensure that the load to be hooked up is rigged correctly and that the pendant end is placed on the helicopter cargo hook. Amphibious external cargo procedures are contained in Chapter 7 and NWP 4-01.4.

1.1.16.4 Vertical Replenishment Load Spotter. The receiving ship may provide a load spotter. The load spotter's responsibility is to indicate the desired drop location to the pilot and crew of the VERTREP helicopter. The LSE shall not act as load spotter.

1.1.16.5 Static Discharge Grounding Man. During external cargo/VERTREP operations with the H-53E helicopter, the static discharge grounding man shall assist the hookup man on the flight deck by grounding the cargo hook with the approved static discharge wand. Grounding will be made prior to the hookup man contacting the cargo hook with the pendant/external sling eye.

1.1.17 Aviation Safety Officer. All ships that routinely operate aircraft shall designate one naval aviator/naval flight officer as ASO. One or more assistants may be designated if the size and nature of operations warrant. The ASO shall be the direct representative of the commanding officer for all aviation safety matters, except in those commands that have a separately designated safety officer who is responsible for all safety matters in accordance with OPNAVINSTs 3120.32 and 3750.6.

On air-capable ships, the commanding officer shall assign an appropriate officer to perform the duties of the ASO and to be a member of the ship's safety council. When a helicopter detachment is embarked and an aviation department is formed, an appropriate member shall act as ASO.

The ship's safety program shall be administered and function in accordance with OPNAVINST 3120.32.

1.1.18 Ship's Medical Officer/Independent Duty Corpsman. The ship's medical officer/corpsman shall ensure that personnel involved in shipboard helicopter operations meet the physical requirements outlined in the Manual of the Medical Department, U.S. Navy.

1.1.19 Ship's Supply Officer. Prior to deployment, the supply officer will review all material requirements of the detachment. He/she shall ensure at least one individual has received training on aviation helicopter detachment supply support.

1.2 TRAINING

Maximum operational effectiveness and flight safety require extensive training for both ship's company and detachment personnel, especially in the areas of command and control, CIC, aircraft coordination, and flight deck procedures.

Atlantic and Pacific fleet commanders will establish, through their TYCOMs, training and readiness standards for ships and helicopter detachments, including predeployment training. Coordinated training in primary and secondary missions will be included. Readiness standards and exercises will be established to ensure effective use of the ship and detachment.

1.3 TRAINING SHIP'S PERSONNEL

A training program shall be established on each ship that will ensure thorough training and a high degree of readiness for all personnel concerned with helicopter operations. The specific training listed in this manual represents the minimum requirements that shall be met by these personnel prior to a ship engaging in helicopter operations. In areas of aviation-related training that are beyond the ship's capability, the TYCOM shall coordinate with the appropriate naval air TYCOM to ensure that the required training is provided. All TYCOM staffs whose units are directly involved in helicopter operations shall have an aviator assigned to monitor aviation training. Air TYCOMs shall provide a helicopter operating procedures training school that has courses for both officer and enlisted personnel who are involved in helicopter operations. Refer to NAVEDTRA 10500 (CANTRAC) for a listing of pertinent shipboard helicopter training courses.

Note

Designated helicopter pilots are not required to attend the helicopter indoctrination course.

1.3.1 Commanding Officers/Executive Officers. Commanding officers/executive officers of all ships required to embark helicopter detachments in the accomplishment of assigned missions shall attend a CNO-approved helicopter indoctrination course as established by the appropriate air TYCOM. Commanding officers/executive officers of other ships shall attend a helicopter indoctrination course when required by their TYCOM.

1.3.2 Air Officer/Helicopter Control Officer

1. Shall attend the helicopter indoctrination course (HCO only, not required for designated helicopter pilots)

2. Shall be thoroughly familiar with the contents of this manual

3. Shall have other training as established by the appropriate TYCOM

4. Shall be familiar with the control and operation of the VLA system

5. Shall be PQS qualified

6. Shall be a graduate of an approved aircraft firefighting school.

1.3.3 Flight Deck Officer and VERTREP Cargo Supervisor

1. Shall attend the helicopter indoctrination course (FDO only, not required for designated helicopter pilots)

2. Shall be graduates of an appropriate aircraft firefighting school

3. Shall be thoroughly familiar with the contents of this manual

4. Shall have other training as established by the appropriate TYCOM

5. Shall be PQS qualified (FDO only).

1.3.4 Officer of the Deck (OOD)

1. Shall be thoroughly familiar with the provisions of this manual

2. Shall have other training as established by the appropriate TYCOM.

1.3.5 Tactical Air Controller

1. Shall be a graduate of the ASW/ASUW tactical air controller course of instruction

2. Shall exercise tactical control and safety of flight for VP/VS and HSL/HS aircraft for which the ship is functioning as ACU.

3. Shall be familiar with the contents of this manual

4. Shall maintain qualification in accordance with OPNAVINST 1211.2 (series).

1.3.6 Chief Engineer

1. Shall be thoroughly familiar with the provisions of this manual that relate to the aviation fuel system and aviation fuel handling

2. Shall ensure VLA system maintenance personnel are thoroughly familiar with the provisions of this manual that relate to the VLA system during helicopter operations

3. Shall ensure VLA maintenance personnel are graduates of a formal VLA system course.

1.3.7 Aviation Fuels Officer

1. Shall be thoroughly familiar with the provisions of this manual that relate to the aviation fuel system and aviation fuel handling

2. Should be a graduate of a formal fuel course for ships with a helicopter refueling capability

3. Shall ensure aviation fuels personnel are PQS qualified for stations assigned

4. Shall ensure at least two graduates of an approved aviation fuels course are on board and assigned to the aircraft refueling detail. Training will be obtained in accordance with TYCOM regulations.

1.3.8 Damage Control Assistant. The DCA on air-capable ships is responsible for the training of the crash and rescue party and for the maintenance of the firefighting and crash equipment. On ships with a designated air officer, the DCA shall assist the air officer as necessary to accomplish these duties with respect to the crash and salvage crew. He/she shall:

1. Ensure crash and rescue and other drills are conducted as necessary (not less than the periodicity specified in NAVAIR 00-80R-14) to maintain the readiness of the crash and rescue party.

2. Ensure all personnel assigned to a helicopter firefighting team or to any billet that places them on the flight deck during flight quarters receive training in helicopter firefighting via a CNO-approved course of instruction.

1.3.9 Crash and Salvage Crew/Crash and Rescue Party and Scene Leader. A shipboard briefing by helicopter squadron personnel shall be conducted prior to all deployments and not less than annually. This briefing shall provide instructions pertinent to helicopter operations and shall be oriented to the specific helicopter types with which the ship can anticipate operating. Arrangements for this briefing may be made through the appropriate air wing commander. The air officer, DCA, crash and salvage crew/crash and rescue party, scene leader, and crew shall be specifically instructed on the helicopter crew location in the helicopter and the emergency access and egress hatches and doors. They also:

1. Shall be thoroughly familiar with the applicable provisions of this manual

2. Shall be graduates of a CNO-approved aircraft firefighting school

3. Shall be thoroughly familiar with the contents of NAVAIR 00-80R-14 and applicable sections of NAVAIR 00-80R-14-1. Crash and salvage crew

(e.g., LPD) personnel shall be familiar with applicable sections of NAVAIR 00-80R-19.

1.3.10 Landing Signalman Enlisted. The LSE shall be highly motivated, possess qualities of mature judgment, have basic reading comprehension skill, and have vision correctable to 20/20, normal depth perception, and normal color vision. He/she shall:

1. Be a graduate of a formal CNO-approved aviation firefighting school.

2. Attend a formal helicopter indoctrination/handling course administered by air TYCOMs. Refer to CANTRAC for curricula.

3. Complete LSE PQS qualification.

1.3.11 Air Tactical Controllers/CIC Personnel. ASTACs/CIC personnel shall be trained and qualified in:

1. Aircraft control and handoff procedures

2. Emergency communications procedures

3. Lost plane procedures

4. Low-visibility launch/recovery procedures

5. SAR/strike rescue procedures

6. Helicopter capabilities, limitations, and employment

7. Normal launch and recovery procedures

8. Instrument approach procedures.

1.3.12 Flight Deck Crews and Hookup Men. Flightdeck crews and hookup men shall be trained in:

1. Helicopter safety procedures and danger areas

2. Responsibilities during launch and recovery for ships with helicopter landing capability

3. Tiedown procedures

4. Hoist and personnel transfer procedures

5. Fueling procedures

6. VERTREP platform cargo handling crew duties (if distinct from VERTREP crew)

7. Appropriate provisions of this manual, as applicable

8. FOD prevention.

1.3.13 VERTREP Cargo Handling Crew. The VERTREP cargo handling crew, if distinct from the flight deck crew, shall be trained in:

1. Helicopter safety procedures and danger areas

2. Areas specified by appropriate TYCOM, to include breakout, strikeup, and preparation of material for VERTREP; material handling on VERTREP platform and prestaging; recovering loads and clearing drop zones; preparation and return of retrograde and VERTREP gear; and the operation and maintenance of VERTREP material handling and ordnance handling equipment.

1.3.14 Ship Search and Rescue Organization

1. The ship's commanding officer will maintain a rescue boat crew and forecastle recovery detail per NWP 3-50.1.

2. Each ship shall have two qualified rescue swimmers who are graduates of a CNO-approved surface rescue swimmer school as members of the rescue organization.

3. The rescue boat crew and forecastle recovery detail will receive initial and proficiency training per CNO and type commander directives.

1.3.15 Ship's Company Brief. Prior to deployment, appropriate ship's company personnel should be briefed by competent personnel on the following subjects:

1. Helicopter airframe limitations

2. Operational limitations

3. Required deck facilities

4. Fueling procedures

5. FOD procedures

6. Communications procedures

7. Helicopter handling and tiedown procedures

8. Helicopter passenger safety

9. Water recovery procedures for downed aircrew and passengers

10. Helicopter salvage procedures

11. Aircraft mishap plan

12. Aircraft entry and exit procedures.

1.3.16 Aviation Personnel Brief. Prior to deployment detachment personnel shall be briefed by competent personnel on the following subjects:

1. Watch quarter and station responsibilities

2. Personal survivor equipment

3. Responsibilities during HERO and EMCON conditions

4. Shipboard safety

5. Damage control.

CHAPTER 2

Safety Considerations

2.1 RESPONSIBILITY FOR SAFETY

The controlling authority (the commanding officer of the ship) has supervisory responsibility for the safety of the helicopter at all times. The helicopter squadron commanding officer/detachment OIC and the individual aircraft pilots are directly responsible for the safety of assigned aircraft and personnel. In questionable circumstances, the squadron commanding officer/detachment OIC shall make final determination concerning flight safety of the aircraft, crew, and passengers.

2.1.1 General Safety Measures. The squadron commanding officer/detachment OIC and ship personnel shall evaluate the hazards involved in all phases of shipboard helicopter operations and develop appropriate safety measures. Shipboard personnel shall be trained in safe operating procedures before commencement of helicopter operations.

During flight operations, only those personnel whose presence is required shall be allowed in the helicopter area. All other personnel shall remain clear or below decks.

WARNING

Under no circumstances shall flash pictures be taken of the helicopter, since the flash may temporarily blind the pilots.

Personnel engaged in flight operations shall wear appropriate cranial protection, sound suppressors, safety goggles, flight deck shoes, approved flotation devices, long-sleeved shirts/jerseys, and long trousers. Reflective tape shall be applied to head gear and/or upper body area of flight deck personnel in accordance with Appendix E. All personnel on exposed decks shall remove their hats (except for approved fastened safety helmets) while helicopter operations are being conducted. All personnel on the flight deck or at the pickup or delivery area must be trained to take cover immediately on command of the FDO, air officer, or LSE. Personnel working near the helicopter must be instructed to observe the aircraft carefully for any sign of malfunction (such as smoke, oil, or hydraulic leaks) and immediately report any such condition to the helicopter pilot or to the VERTREP control officer, FDO, or air officer if the helicopter is airborne. The precautions for VERTREP/VOD cargo transfer operations set forth in Chapters 8 and 13 shall be meticulously observed.

2.1.1.1 Aviation Safety Officer. The ASO shall conduct a safety review prior to scheduled flight operations whenever flight operations have not occurred in the previous 90 days. This review should touch on all relevant areas of safety but should have particular emphasis on flight deck safety.

2.1.2 Hazards of Foreign Object Damage. All weather deck areas, and particularly the flight deck, shall be inspected prior to and monitored throughout all helicopter operations to ensure that they are clear of FOD. FOD-producing materials include rags, pieces of paper, line, ballcaps, nuts and bolts, and other matter that can be caught by air currents and can subsequently cause damage to the aircraft or can injure personnel. Ground support equipment, forklifts, tiedown equipment, and chocks shall be properly secured to prevent missile hazards.

WARNING

The dumping or burning of trash during helicopter operations creates a serious FOD hazard. Therefore, all dumping or burning of trash shall be secured prior to any helicopter operations and shall not be resumed until operations are secured.

2.1.2.1 Engines. Helicopters are powered by gas turbine engines. The high turbine speed makes these engines extremely susceptible to FOD. Any debris in the vicinity of the helicopter can be swept up by rotor wash and ingested by an engine. Ingestion invariably causes the failure of the affected engine, resulting in a possible crash of the helicopter.

2.1.2.2 Rotor Blades. Helicopter main and tail rotor blades are easily damaged by flying objects. This damage can result in catastrophic failure of the blade with the subsequent loss of control of the helicopter.

2.1.2.3 Personnel. Personnel have been blinded by FOD that has been generated by helicopter rotor wash.

WARNING

Because of the hazard from flying objects, all personnel including passengers on the flight deck during helicopter operations shall wear eye protection (goggles or helmet visor).

2.1.3 Rotor Blade Dangers. The danger of personnel being struck by rotor blades is always present during helicopter operations. Passengers shall be escorted to and from a helicopter by a member of the flightcrew or by other designated personnel. No personnel shall approach or depart the helicopter until permission has been given by the LSE. The LSE shall obtain concurrence from the pilot prior to allowing personnel movement.

2.1.3.1 Main Rotor Blades. Although blade flapping can occur at any time, it normally occurs when blades are rotating at low rpm or are stopped. When they are stopped, helicopter personnel shall ensure that blades are properly secured during wind conditions that may result in damage caused by blade flapping.

WARNING

Because of the flexibility of rotor blades, the LSE shall direct the helicopter from a position outside the rotor diameter. No personnel shall walk under the rotors until they have either stopped or come to full speed.

2.1.3.2 Main Rotor Blade Downwash. Rotor downwash is created by the rotor system of all helicopters. Special care should be taken to ensure safety of personnel and equipment when operating in the vicinity of airborne helicopters and, in particular, larger helicopters that have a significant downwash.

WARNING

Rotor downwash created by the H-53E series helicopter is greater than that produced by any other fleet helicopter. Potential downwash hazard may extend as much as 300 feet from a CH-53E or MH-53E. Under zero wind conditions, maximum average velocities occur at 49 feet from the rotor center (1.25 times rotor radius) and can vary from 50 to 95 knots depending on aircraft gross weight. This downwash is sufficient to blow aircraft chocks, tiedown chains, and tow bars about the deck or overboard and can cause possible personnel injury or death. The presence of high relative winds may increase the hazardous effects of turbulence from rotor downwash to personnel and equipment not secured to withstand these wind velocities.

2.1.3.3 Tail Rotor Blades. Helicopters with a single main rotor have a vertical antitorque tail rotor. This type of tail rotor, when turning, is close to the flight deck.

WARNING

Personnel shall not pass under the turning tail rotor of a single main rotor helicopter.

2.2 SHIP MANEUVERING

During helicopter operations, formation steaming courses and helicopter launch courses may be incompatible. Allowances must be made for helicopter operations and the formation turned to proper launch course if necessary, or the helicopter ship must be given the authority to maneuver independently while launching and/or recovering. Particular emphasis is placed on the fact that when signal Hotel/Hotel One is displayed close up by the helicopter ship, this in effect restricts the ship from maneuvering until helicopter operations are completed. Ships undergoing VERTREP with H-46 helicopters may maneuver upon notifying the pilots (see Chapter 8).

CAUTION

During UNREP, wave reinforcement phenomena caused by two ships in proximity may generate disproportionately large waves in moderate sea states. Although wind and deck conditions may be within limits, the possibility of the helicopter being struck by a wave while on deck exists and should be considered before conducting flight operations during UNREP.

Except in extreme emergency situations and with due consideration to the safety aspects involved, the ship shall not change course while a helicopter is being launched or recovered, is engaging or disengaging rotors, is being traversed, or is being towed or pushed about the deck. In these circumstances, the aircraft is readily susceptible to overturning or sliding from the effects of:

1. Tilted deck
2. Centrifugal force causing a tipping in the dangerous period between tiedown removal and takeoff
3. Rapidly changing velocity and direction of the relative wind
4. Limited ability to control the helicopter aerodynamically in order to counter the preceding forces.

CAUTION

Special care should be exercised when maneuvering while helicopters are turning on deck. In high sea states, only maneuvering to maintain a safe navigation course is recommended.

2.2.1 Hovering Helicopters. Hovering helicopters should be considered as ships not under command. Ships shall not pass within 500 yards of a hovering helicopter.

2.3 AIRCRAFT HANDLING

Aircraft handling aboard ship is complicated by the helicopter's high center of gravity and relatively fragile components, combined with the ship's moving decks and confined space. Shipboard handling mishaps can cause serious degradation of readiness as well as personnel injuries. Nearly every shipboard handling mishap is the direct result of lack of attention on the part of supervisors, directors, or other flight deck personnel. All such mishaps are therefore preventable.

2.4 AVIATION FUEL HANDLING

Aviation fuel requires strict quality control in processing and handling. Contamination of aircraft fuel systems with water or particulate matter can lead to in-flight loss of engine power with possible loss of aircraft and personnel. Supervision and attention to detail, coupled with strict adherence to applicable directives, is mandatory.

2.5 HELICOPTER FIRE PARTY

The fire party is comprised of two initial response AFFF hose teams and a backup, as specified in NAVAIR 00-80R-14 and applicable TYCOM directives. The fire party shall be comprised of ship's company personnel providing the equipment commensurate with their responsibilities; however, it may be augmented with detachment personnel (when assigned). Crash and rescue party billets should be filled whenever possible with personnel who are not assigned to other damage control-related general quarters stations.

2.6 MISHAP INVESTIGATION

Mishap investigation procedures are set forth in OPNAVINST 3750.6. If the pilot involved in the mishap is the OIC of the detachment or is senior to the attached OIC, assistance in investigating and reporting the mishap shall be requested from the controlling custodian of the aircraft involved.

2.7 EMERGENCY PROCEDURES

It is realized that each emergency situation is different and that not every contingency can be formulated. However, certain general guidelines are deemed appropriate for shipboard helicopter operations. Refer to Appendix I for ready reference to shipboard procedures for helicopter emergencies.

2.7.1 General Information

1. When an in-flight emergency is declared, a pilot, if available, should immediately be called to CIC.
2. Helicopter emergency information shall be passed to the flight deck crew and fire party either over the general announcing system (1 MC) or the flight deck crew announcing system (5 MC), whichever is quicker.

3. When the flight deck warning signal is sounded, personnel shall clear the flight deck and surrounding area or take cover. Due to the possibility of a fuel fire spreading below decks, consideration should be given to setting material condition ZEBRA in vicinity of flight deck landing area and evacuating adjacent spaces.

4. During any emergency, the first consideration of the ship should be to close the distance to the helicopter and prepare for immediate recovery. If the emergency is a "single engine" or power loss, optimum relative wind for recovery is desired. If a flight control malfunction is involved, a stable flight deck becomes paramount. Specific actions are incorporated in aircraft NATOPS flight manuals.

5. In the event of a flight deck crash or fire, it may be necessary to set general quarters to protect the ship.

2.7.2 Aircraft Emergencies. Airborne emergencies fall into three basic categories: those cases that cause an aircraft to ditch/crash; those that require an immediate landing; and those that require a precautionary shipboard landing.

2.7.2.1 Crashed/Ditched Aircraft

1. Plot position of crash/ditching

2. Close crash site at best speed

3. Call away the rescue boat/rescue helicopter as appropriate

4. Request assistance from/inform accompanying units

5. Station and brief additional lookouts

6. Recover personnel

7. Recover aircraft/debris

8. Act in accordance with NWP 3-50.1.

2.7.2.2 Immediate Emergency Shipboard Landing. An immediate emergency shipboard landing is an emergency in which the aircraft is experiencing major malfunction and must get on deck with absolutely no delay. Only those personnel essential for a safe and rapid recovery should be present on the flight deck. In the event of an immediate emergency shipboard landing, execute the following:

1. Maintain radar contact if possible. If radar contact is lost, proceed as outlined in paragraph 2.7.2.1.

2. Close helicopter at best speed.

3. Obtain amplifying information as to type of emergency and pilot's intentions.

4. Set emergency flight quarters by passing appropriate word on 1 MC; that is "Emergency flight quarters, emergency flight quarters. Helicopter in-flight emergency. All hands not engaged in flight operations stand clear, aft of frame ____. Hold all trash and garbage on station."

Note

Emergency flight quarters entails, as a minimum, stationing both fire parties as expeditiously as possible and increasing the alert condition as appropriate. A minimum alert condition will include stationing the pilot rescue detail and setting condition ZEBRA in the after portion of the ship.

5. Inform the HCO/LSO of the nature of the emergency.

6. Request assistance from/inform accompanying units.

7. Turn to the BRC and adjust speed to provide steady deck 3 nm prior to helicopter arrival (4 nm at night/IMC).

8. HCO shall clear all unnecessary personnel from the flight deck and hangar areas before giving a green deck. The crash/fire party shall move as far away as possible from the flight deck but remain within a quick access distance, ready to use crash/fire equipment as directed.

9. Once the helicopter is safely on deck, chocks and tiedowns will be placed as for a normal recovery.

In the event of the pilot calling for an emergency landing while under ASTAC control, the ASTAC shall:

1. Immediately provide vectors to the nearest deck or to the ship, as appropriate

2. Plot the aircraft position

3. Inform the bridge of the nature of the emergency and position.

2.7.2.3 Precautionary Emergency Shipboard Landing. A precautionary emergency shipboard landing is an emergency in which the aircraft is experiencing a minor malfunction and the pilot desires to terminate the flight in order to troubleshoot the problem. Although it is an emergency when declared, it does not have the urgency of an immediate emergency shipboard landing. The OOD and HCO should be aware that the pilot could upgrade a precautionary emergency shipboard landing to an immediate emergency shipboard landing if the aircraft condition begins to deteriorate. The following procedures should be executed by the OOD for a precautionary emergency shipboard landing:

1. Maintain radar contact if possible

2. Set normal flight quarters (full fire parties) as soon as practical without interfering with urgent ship evolutions

3. Turn to the BRC and adjust speed to recover aircraft at the earliest opportunity.

2.7.2.4 Single-Engine Landing. Generally speaking, dual-engine helicopters can fly safely with one engine, but their ability to hover with one engine is possible only under very limited conditions. Therefore, a helicopter requiring a single-engine landing must be afforded the maximum amount of deck space for a run-on/no-hover landing and the most optimum relative wind. Prompt, proper action shall be taken by the OOD and flight deck crew to expeditiously land the helicopter. It must be realized that in all probability a wave-off will be impossible, and the LSE should make timely advisory corrective signals to facilitate a safe approach and landing. Once the aircraft is safely on the deck and stopped, it shall be chained and chocked immediately.

2.7.2.5 Hung Droop Stops. As helicopter rotor speed decreases during disengagement, centrifugal force diminishes to a point where the blades begin drooping toward the deck. Normally, a mechanical stop on the rotor head engages, preventing the rotor blades from flexing down to the deck. Should a droop stop fail to engage, one or more rotor blades may strike the deck or portions of the helicopter. This condition will undoubtedly result in damage to the helicopter and possible injury to deck personnel.

Should a droop stop fail to engage on shutdown, the LSE will give the signal to reengage rotors. The pilot will then follow appropriate NATOPS procedures in attempting further shutdowns. If the droop stop cannot be engaged, the LSE shall clear the flight deck in the vicinity of the aircraft of all personnel, including himself. The ship will attain minimum wind and turbulence conditions, and the pilot will then make the shutdown.

2.7.2.6 Engine Fires on Deck. The LSE shall be alert at all times for fire. Observing reasonable indications of a fire, the LSE shall inform the pilot by use of an appropriate hand signal. In case of an internal engine fire, the pilot may continue to motor the engine to extinguish the fire. In case of an external fire, the LSE shall direct the flight deck fire watch/party to initiate firefighting procedures in accordance with NAVAIR 00-80R-14.

2.7.3 Flight Deck Emergencies

2.7.3.1 Fires. Shipboard fires are most hazardous and immediate action is necessary to preclude undue damage to aircraft and ship. All steps shall be taken to save the helicopter and personnel in the area of the fire.

2.7.3.2 Jettison Procedures. It is conceivable that a situation may arise that dictates the jettisoning overboard of a damaged or burning helicopter. In such cases, the following action should be attempted:

1. Abandon the helicopter.

2. Clear all unnecessary personnel from the flight deck.

3. LSE orders all chocks and tiedowns removed. On RAST-equipped ships, the RSD beams shall be opened.

Note

The RAST main probe may not clear the RSD when attempting to push the aircraft.

4. Notify Auxiliary 1 to stand by manual controls of fin stabilizers (if applicable). Attain maximum ship speed and, when the aircraft is ready for jettisoning, heel the ship over to one side so as to cause the helicopter to topple over the side.

5. Should this procedure be deemed unsuitable, all attempts shall be made to push the aircraft overboard by any means available. A 3/4-inch cable may be laid around three sides of the periphery of the deck with the bitter end secured at one corner of the deck and the other end attached to a capstan. Taking up the cable will pull the helicopter to the side and overboard.

6. The firefighting team should lay a blanket of AFFF across the jettison path to the edge of the deck before attempting to jettison the helicopter over the

side. This foam blanket will minimize the possibility of reflash of the fire from hot debris or exposed oil, fuel, or other materials as the helicopter is dragged or moved across the deck.

2.7.3.3 Recovery of Aircraft With Damaged/ Malfunctioning Landing Gear. The possibility exists that during the course of flight operations, the recovery of a helicopter with damaged or malfunctioning landing gear will have to be made. Although the procedures will differ slightly for each type of helicopter, they can be accomplished with speed and safety.

Since the initial approach to the ship will be made to establish a low hover in order to determine the actual condition/damage to the landing gear, maintenance personnel for the type helicopter should be notified along with a qualified-in-type helicopter pilot. The ship should be maneuvered as necessary to provide optimum winds and minimum pitch and roll. The flight deck should be cleared of all nonessential personnel. Padded pallets consisting of mattresses, preferably banded together and secured to the flight deck, should be made ready in the event deck personnel are unable to lower the landing gear.

2.7.3.4 Recovery of Aircraft With Hung MAD Bird/Dipping Sonar. Helicopters with hung MAD bird/dipping sonar create special problems for the flight deck crew. The MAD bird/dipping sonar is extremely sensitive equipment and should be handled as such. The helicopter's flight approach should terminate in hover over the flight deck, not allowing the MAD/dipping sonar to touch the deck. A mattress or padded crash dolly should be staged for recovery of the hung equipment. The groundcrew should remove the equipment after dissipating static charge.

WARNING

- Recovery of a hung MAD with an extended cable may result in a high hover over the ship with a significant loss of visual reference. Unless optimum meteorological conditions exist with a visible horizon, a loss of aircraft and crew may result. Consideration should be given to jettisoning the MAD alongside the ship and if possible marking its position with a smoke to aid in recovery by small boat.

- If recovering the MAD towed body and cable by hand, personnel shall wear heavy duty gloves to prevent skin contact. The cable is made of beryllium alloy.

2.7.3.5 Recovery of Aircraft with Extended Data Link Antenna. Helicopters with a data link antenna stuck in the extended position are unable to land since the antenna may puncture the underside of the aircraft damaging fuel cells and lines, electrical equipment, and airframe components. Once the aircraft is positioned in a stable hover, the actuator arm may be disconnected to allow the antenna to swing freely or the antenna may be broken off by striking it with a nonconductive solid object after the aircraft has been grounded with the grounding wand.

2.8 HAZARDS

WARNING

Wave-off lights should not be actuated at night when a helicopter has crossed over the deck edge or is hovering over the deck. Actuation of wave-off lights can cause loss of night vision and situational awareness for the aircrew. The command, "Wave-off," should be communicated to the crew via the radio as an alternative to actuating the wave-off lights.

2.8.1 Weapons/Chaff Hazards. Helicopters parked/ operating in the vicinity of weapons or chaff launchers are subject to damage from rocket blast or gunfire concussion and to FOD from materials scattered when weapons or chaff are fired. All appropriate measures should be taken to preclude the firing of any weapon in the vicinity of the helicopter operating area when the aircraft is parked on deck or when flight operations are in progress.

CAUTION

When ship's weapons firing is anticipated, the aircraft shall be positioned outside the weapons blast/concussion range. If this is not possible, the aircraft should be secured as far as practicable from the firing mounts with its doors and hatches open.

2.8.2 Sonic Boom Concussion. High-performance aircraft shall not be cleared for supersonic low-altitude passes alongside or over ships with embarked helicopters. The resultant concussion produces considerable damage to helicopter structures and hatches in the same manner as gunfire concussion.

2.8.3 Hazardous Operations. A vigilant air search radar watch must be maintained during hazardous operations (e.g., gunnery exercises, missiles, bombing of wake, etc.) and approaching aircraft shall be given an appropriate warning (on UHF guard, if necessary).

2.8.4 Static Discharge Hazard. Helicopters in flight build up static electricity. Hoist cables, external cargo hooks, RAST messenger cables, etc., must be grounded with a grounding wand prior to handling.

WARNING

Handling the cable or cargo hook with bare hands prior to proper grounding may cause injury to personnel.

The grounding wand shown in Figure 5-3 is designed to protect ground personnel from static electrical shock when working with all helicopters. For use with H-53E helicopters, gloves meeting ASTMD 120 84A Type I Class III must be used. (NSN 8415-01-158-9445 is the preferred glove.)

2.8.5 Hazards of Electromagnetic Radiation to Personnel. The following HERP safe separation distances must be maintained for personnel while operating helicopters in the vicinity of CG-47 and DDG-51 Class ships. Personnel in helicopters operating beyond these minimum distances are not exposed to hazardous levels of RF radiation. The following safe HERP separation distances are required:

EMITTER	HERP Minimum Safe Distance (feet)
AN/SPY-1B (High Power)	520
AN/SPY-1B (Low Power)	50
AN/SPG-62 (FCS Mk 99)	1,950

Note

There is no hazard to personnel on the flight deck or on top of the helicopter when positioned on the flight deck.

2.8.6 Electromagnetic Interference. Aircraft systems are susceptible to EMI from SPY-1 emissions. Operational control of SPY-1 radiation can preclude EMI to aircraft systems and minimize potential degradation. The following SPY-1 operational guidance will preclude aircraft damage.

The SPY-1 nonradiation region should be placed in the aft quadrant during launch, recovery, HIFR, VERTREP and hovering helicopter operations. The same nonradiation region should be in effect whenever the helicopter is operating within 2 nm of the ship and the tactical situation allows.

CHAPTER 3

Planning and Preparation for Flight Operations

3.1 INTRODUCTION

This chapter is intended to assist staffs, helicopter squadrons/units, and ship's personnel in planning and preparing for safe and effective shipboard helicopter operations. Personnel concerned with planning and preparing for helicopter operations should refer to the references that are specified throughout this publication and specific aircraft model NATOPS flight manuals.

3.2 HELICOPTER LIMITATIONS

Safe helicopter operations depend, to a large extent, on a knowledge of the aircraft's design restrictions and operating limitations. Appendix B of this manual provides general characteristics of operational helicopters including their dimensions and relative wind requirements for rotor engagement/disengagement. Paragraphs 3.2.1 and 3.2.2 include the general limitations common to all helicopters. Safe helicopter shipboard operation requires the existence and use of the following:

1. A shipboard helicopter facilities certification
2. A rotor engagement/disengagement wind limitations envelope
3. A launch and recovery wind limitations envelope.

Paragraph 4.6.6 further discusses the rotor engagement/disengagement and launch and recovery wind limitations envelopes. Individual NATOPS flight manuals may contain additional information that may further restrict wind limits or operational procedures. Limits may be reduced by the pilot when any of the following conditions exist:

1. Nonstandard ship configuration that affects helicopter/ship clearances, ship motion, or turbulence
2. Unusual factors that affect crew proficiency (e.g., crew fatigue, training, etc.)
3. Use of a general model envelope that may require limit reductions aboard different ship classes (i.e., a general H-3 launch and recovery wind limitations envelope instead of the SH-3H/CG 10 envelope).

3.2.1 Inherent Limitations. Lift capability is a limiting factor in any helicopter flight configuration and is most critical when hovering. It is a variable influenced by:

1. Ambient temperature — lift capability decreases as temperature increases.
2. Relative humidity — lift capability decreases as relative humidity increases.
3. Pressure altitude — lift capability decreases as pressure altitude increases.
4. Relative wind — lift capability decreases as relative wind decreases.
5. Ground effect — lift capability varies with surface stability and decreases as height above deck is increased. The effect is lost when the helicopter passes over the deck edge.
6. Density altitude is a function of pressure altitude, humidity, and ambient temperature. Density altitude should be included in the prelaunch brief in accordance with paragraph 3.9.2.

WARNING

On DD 963/DDG 993/CG 47 Class ships, the number 3 SSTG is located just aft of the flight deck in the normal approach path of a helicopter. This generator, while operating, emits a large volume of hot exhaust that will degrade helicopter engine performance/lift capability. The pilot shall be informed if the generator is operating.

3.2.2 Operational Limitations

3.2.2.1 Radius of Action. Helicopters have a short radius of action because of a relatively low speed and limited endurance. This limited radius of action can be increased with HIFR from appropriately equipped ships. Maximum speeds range from 95 to 190 knots. Endurance varies from 2 to 5 hours without HIFR, depending on aircraft type, mission configuration, and time spent in hover. Other variables, such as weather/winds, navigation aids, ship's PIM, two-way voice communications, escort aircraft, and availability of positive radar control can further affect the radius of action and shall be given due consideration in the preflight planning of all missions. As a general rule, the radius of action, all conditions being optimum, shall not exceed 45 percent of maximum range specified for each type of aircraft listed in Appendix B. The radius of action may be further reduced at night under electronic EMCON or IMC for those aircraft with limited internal DR navigation systems. Fuel cells are available for certain helicopters over and above normal model configuration and can be used to extend range and endurance (see specific aircraft NATOPS flight manual).

3.2.2.2 Payloads. The takeoff weights listed in Appendix B are published for standard sea-level conditions. The lifting capability may be appreciably different from that which is published when atmospheric conditions and aircraft configurations are not standard. Helicopter loading is limited by the allowable fore-aft shift in the center of gravity. Exceeding the manufacturer's specifications compromises flying safety; therefore, the loading of passengers and cargo must be carefully planned and supervised.

3.3 SUPPORT REQUIREMENTS

3.3.1 Logistics. The Commander, Naval Air Force, or Commanding General, Fleet Marine Force, who provides the helicopter squadron/detachment shall ensure that an appropriate aviation support allowance list is developed and that the required material is provided to the ship concerned. The supporting ship is responsible for maintaining appropriate stock levels.

In certain cases, a helicopter detachment will be assigned to a ship for a limited period of time or specific operational assignment wherein the provision of material support can be satisfied by use of a packup kit developed by the parent command of the detachment. Replacement of expended packup kit support items, if a packup kit is required, will be the responsibility of the helicopter detachment's parent command.

3.3.2 Helicopter Maintenance. The scope of shipboard maintenance will vary depending upon the available facilities and the number of aircraft embarked. Ships that operate independently should use the maintenance facilities of aircraft carriers and shore stations whenever possible. If a helicopter is taken to a shore station for maintenance, it will be necessary for personnel to remain ashore to perform maintenance and to provide security of the helicopter.

Daily, preflight, and/or turnaround inspections may require several hours to perform and may have effective periods that are dependent on aircraft type. Many maintenance functions require a functional checkflight to ensure that correct repairs have been completed. Detailed inspection requirements should be solicited from the helicopter OIC to facilitate daily and weekly planning.

3.3.3 Corrosion Control. Saltwater corrosion is one of the major problems encountered when operating helicopters at sea. Most present-day operational helicopters have structural components made of materials that are susceptible to saltwater corrosion. Additionally, gas turbine engines used in helicopters can suffer a critical loss of performance because of saltwater corrosion and salt encrustation. Damage resulting from corrosion can quickly reduce all aircraft to a nonoperational status unless an effective program of corrosion control is rigorously pursued. The ship is responsible for maintaining a suitable stock of corrosion control materials, tailored to the appropriate type of helicopter, when a detachment is embarked.

Air-capable ships should provide sheltered deck space for helicopters whenever possible. Freshwater outlets and hoses shall be available on the flight deck so that the aircraft can be washed down with fresh water. Although creating an additional demand on the water distilling and storing facilities, a daily freshwater washdown is the most effective method of preventing saltwater corrosion. The frequency of washdowns must be determined on an individual ship basis with due consideration given to operating conditions and the availability of fresh water from the ship and from outside sources. Helicopters in unsheltered stowage normally require 500 gallons daily for fresh water washdown purposes. Helicopters in sheltered stowage normally require 100 gallons.

Corrosion control and engine maintenance may require the starting of engines without engaging rotors for those aircraft fitted with rotor brakes. Flight quarters need not be set if helicopter personnel have access to firefighting equipment. The OOD shall be notified before starting engines.

3.4 HELICOPTER FACILITIES CERTIFICATION

3.4.1 Air-Capable Ship Certification. Air-capable ships that are charged with conducting flight operations or evolutions, including land/launch, VERTREP, and HIFR, are required to be certified for operation at the levels and classes directed by CNO. The Air-Capable Ships Aviation Facilities Bulletin No. 1 promulgates procedures for formal inspection and certification of all required aviation facilities and equipments to ensure that they are installed and functioning properly and that all safety requirements are met. Upon meeting inspection requirements, each helicopter facility is granted a certification by the Naval Air Warfare Center Aircraft Division, Lakehurst, NJ. These certification requirements are necessary for the ship to meet the level and class operational capabilities established in the OPNAVINST 3120.35 series. The Shipboard Aviation Facilities Resume (NAEC-ENG-7576) lists the established air-capable ships facilities, operations required, certification granted, last certification inspection, and ships in the class.

3.4.1.1 Certification Waivers. When operational necessity requires that an uncertified ship operate with aircraft, or that a currently certified ship operate with aircraft for which it is not normally certified (but whose operation can safely be conducted), the Fleet Commander in Chief is authorized to issue a waiver in accordance with OPNAVINST 3120.28. If granted, the waiver enables the ship to conduct operations within known limitations and/or deficiencies. The waiver is issued by message containing the following information:

1. Specific levels, classes, and types of helicopters
2. Specific operating procedures
3. Specific mission, geographic location, time, etc.

CAUTION

Care must be exercised when operating aircraft from facilities that do not meet certification requirements. When operating under a waiver, all operating personnel, both air and ship, shall be briefed on the operational limitations and deficiencies.

3.4.2 General Requirements. Aviation facilities include visual landing aids, clearance, deck structure, communications, navigation aids, safety items, and mooring aids. Also included are all equipment and facilities to logistically support, service, and maintain a helicopter.

3.4.3 Levels and Classes. Operating levels and class requirements are directed by CNO with respect to the ship's inherent capability, mission, and facilities. Depending on the ship's capabilities and facilities provided, each certification is categorized by three levels, seven classes, and the types of helicopters to be operated.

3.4.3.1 Levels of Operation. The three levels of operation were established to differentiate between operational requirements. The levels are:

1. Level I — IMC day/night operations
2. Level II — VMC day/night operations
3. Level III — VMC day only operations.

3.4.3.2 Classes of Facilities. Seven classes of facilities were established to delineate those items requiring inspection and certification to support the operations intended:

1. Class 1 — Landing area with support (service and maintenance) facilities for the types of aircraft certified
2. Class 2 — Landing area with service facilities for the types of aircraft certified
3. Class 2A — Landing area with limited service facilities for the types of aircraft certified
4. Class 3 — Landing area for the types of aircraft certified; no service facilities
5. Class 4 — VERTREP/hover area (minimum hover height of 5 feet) for types of aircraft certified

6. Class 5 — VERTREP/hover area (high hover with a minimum of 15 feet authorized) for types of aircraft certified

7. Class 6 — HIFR area for types of aircraft certified.

Note

Within class 4 and class 5, there are four types of VERTREP/hover areas. These areas are distinguished by the marking provided (either type 1, type 2, special type 2, or type 3), which is based on the clearance available. See Air-Capable Ships Aviation Facilities Bulletin No. 1.

3.4.3.3 Maintaining Certification. The ship is responsible for maintaining its certification as listed in OPNAVINST 3120.35 series. If material degradation reduces the level and/or class capability, the ship shall send a message to the immediate superior in command indicating new status.

3.4.4 Hotline Action Desk. For up-to-date certification and ship/aircraft interface information, contact the Certification Hotline Action Desk, Naval Air Warfare Center Aircraft Division, Lakehurst NJ (DSN 624-2592/Commercial 201-323-2592).

3.5 HELICOPTER OPERATIONS ON READY RESERVE FORCE AND COMMERCIAL VESSELS

3.5.1 Training Evolutions. Occasionally unique cases arise where training objectives cannot be met through exercises conducted on U.S. Navy vessels. Helicopter training evolutions on RRF and commercial vessels pose inherently greater risks for flightcrews. These vessels lack certified aviation facilities, standardized training for damage control and medical personnel, and are not bound by the safety procedures described in this manual. Training gains from operations on RRF or commercial ships must be carefully weighed against the associated risks.

Note

- Fleet commanders shall exercise approval authority for USN training exercises on RRF and commercial vessels.

- Direction and approval of USMC training shall be exercised by COMMARFORPAC, COMMARFORLANT, and CG MARFORRES or as otherwise directed by CMC.

3.5.2 Guidelines. The following guidelines are provided for training evolutions on RRF and commercial ships:

1. Safety/site suitability survey shall be conducted prior to all fastrope training. Appendix I checklist provides minimum survey requirements.

2. Boarding agreements for helicopter operations on RRF and commercial ships must clearly identify the limits of government liability. The appropriate Staff Judge Advocate shall be consulted in connection with any arrangement for use of vessels not owned and operated by the U.S. government. An information copy of each boarding agreement shall be forwarded to the Navy Judge Advocate General, Admiralty Division.

3. A visible horizon shall be present for night fastrope training exercises.

4. Commanders at all levels shall ensure established safety procedures are followed for both personnel and equipment.

3.6 OPERATIONS WITH NON-U.S. NAVY SHIPS

Refer to procedures in the International HOSTAC publications.

3.7 NIGHT OPERATIONS

Helicopters without instrument flight capability should not be flown from ships at night. When a night flight is required, optimum wind and pitch and roll conditions should be provided.

3.8 COLD-WEATHER OPERATIONS

The operation of helicopters in cold weather requires special procedures for maintenance, servicing, and operations. Extreme cold-weather operations require advance preparations and special equipment and procedures. The U.S. Navy Cold Weather Handbook for Surface Ships, OPNAV P-03C-01-89, is an excellent resource. It includes information on crew exposure, helicopter icing, and general cold-weather operational guidance.

3.8.1 Environmental Considerations. Adverse climatic and other environmental conditions affecting ships and their equipment that could be experienced during cold-weather operations would include:

1. Low air temperatures

2. Sudden changes in air temperatures

3. High winds

4. Low seawater temperatures

5. Low humidity

6. Ice conditions ranging from slush to solid pack

7. Snow, sleet, freezing rain, and freezing fog

8. Fog and overcast, which are common at the ice/water interface.

9. Heavy seas with attendant spray

10. The possibility of heavy and rapid ice accretion.

3.8.2 Maintenance and Servicing. While routine tasks take longer because of difficulties posed by low temperatures, aircraft and equipment can be maintained and serviced when exposed to temperatures as low as -40 °C. The time required to perform a maintenance task on an aircraft in cold weather is best determined by considering it to be a function of wind chill rather than temperature. Cold-weather operation of helicopters shall be in accordance with the applicable NATOPS manual for each individual aircraft.

The helicopter should be moved into a hangar when aircraft maintenance is required. If a hangar is not available, it may prove worthwhile to erect a shelter and use a heater when the helicopter is on the flight deck during extremely cold weather. Temporary shelters of tarpaulins may be put up over a work area. Erecting a windbreak can reduce wind chill considerably even when no heat is available.

When refueling at low temperatures, care should be taken because objects can become charged with static electricity more readily than at normal temperatures. Refueling should be carried out as soon as possible after shutdown to prevent water condensation inside fuel tanks.

WARNING

Spilled fuel on the skin can result in quick freezing and severe frostbite of the affected area.

3.8.3 Flight Operations. All flight operations should be planned and scheduled with consideration for aircrew/passenger survival time and SAR capability in the area of operations. Personnel transfers to or from ships during cold-weather operations should be kept to a minimum as required by operational necessity. Cold-weather passenger transfers should be performed over the shortest distance possible, preferably within visual range. Transferring and receiving units should establish and maintain UHF communications/radar contact for the duration of the transfer. Refer to OPNAVINST 3710.7 for further amplification.

WARNING

Arctic windchill near a hovering helicopter can freeze exposed flesh in a matter of seconds. Protective measures and frequent rotation of personnel should be considered.

3.8.3.1 Cold-Water Estimated Survival Time. Figure 3-1 displays predicted cold-water survival time (defined as the time required to cool to 30 °C) of lightly clothed, nonexercising humans in cold water. The graph shows a line for the average expectancy and a broad zone that indicates the large amount of individual variability associated with different body size, build, fatness, physical fitness, and state of health. The zone would include approximately 95 percent of the variation expected for adult and teenage humans under the conditions specified. The zone would be shifted downward by physical activity (e.g., swimming) and upward slightly for heavy clothing and/or protective behaviors (e.g., huddling with other survivors or adopting a fetal position in the water). Specialized insulated protective clothing (e.g., survival suits, wet suits, etc.) are capable of increasing survival time from 2 to 10 times (or more) the basic duration shown here. In the zone where death from hypothermia is highly improbable, cold water greatly facilitates death from drowning, often in the first 10 to 15 minutes, particularly for those not wearing flotation devices. Combined sea/air temperature requirements for aircrew donning of exposure suits is defined in OPNAVINST 3710 series.

3.9 AIRCRAFT/CREW ALERT CONDITIONS

Flightcrews assigned alert conditions shall be called away early enough to permit a normal preflight inspection, start, warmup, and completion of takeoff checks by the time specified in the air plan for the condition of readiness to become effective. After the pilot declares the aircraft ready for flight, it shall be placed in the appropriate aircraft alert condition as described in Figure 3-2.

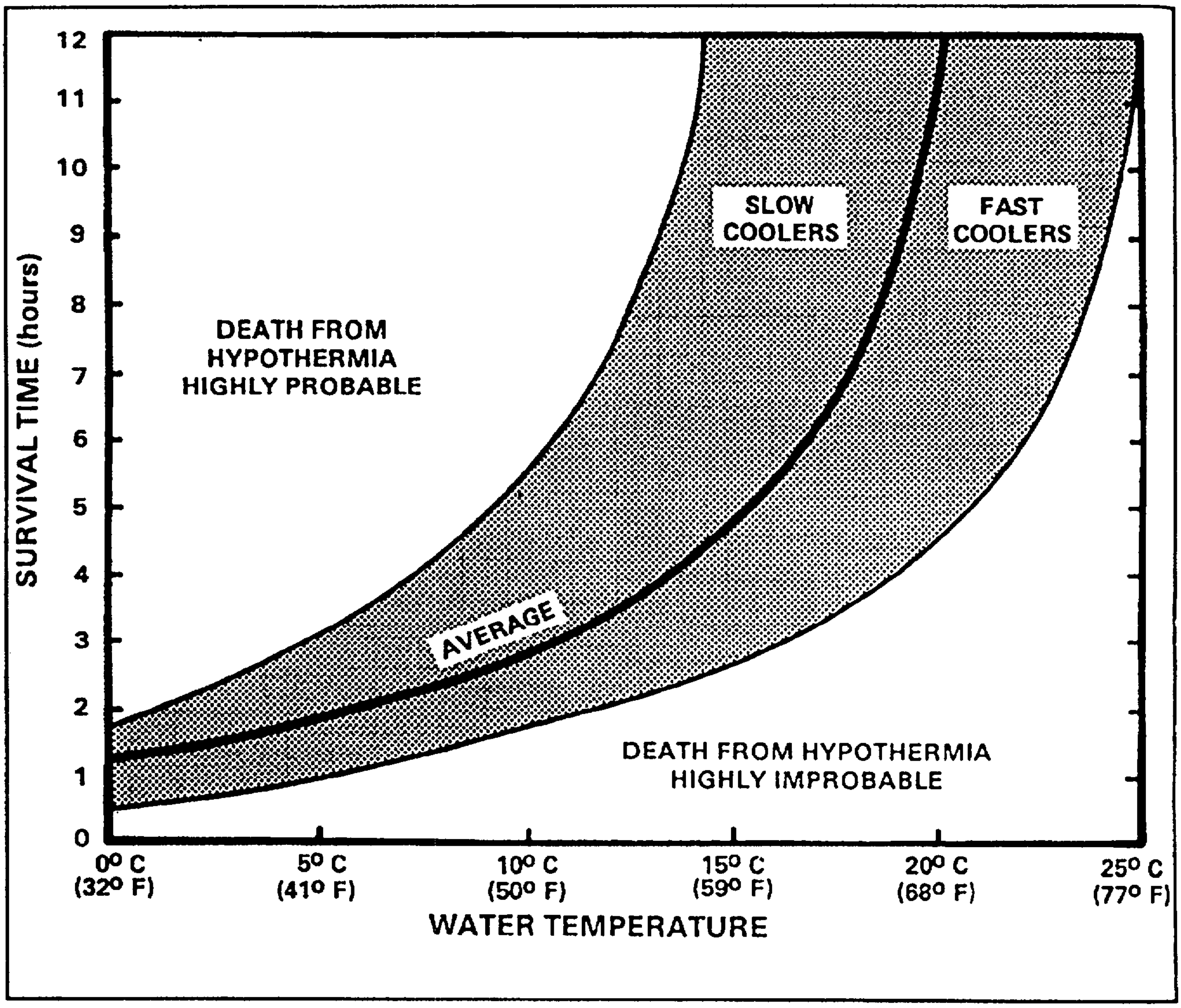


Figure 3-1. Predicted Cold-Water Survival Times

3.10 ADMINISTRATIVE HELICOPTER SUPPORT

Administrative helicopter operations are all those flights conducted for purposes other than tactical operations or training. They include transfer of personnel, material, and mail between ships in company or shore establishments; photography missions; and other special missions as assigned. Administrative helicopter support flights should be scheduled to coincide with planned operations in order to minimize degrading the helicopter's primary mission.

3.10.1 Scheduling and Briefing. The ship's operations officer is responsible for scheduling all flights. Requests for flights should be submitted as early as possible so that adequate preparation may be made and the maximum benefit derived from the flight. Pilots scheduled for flights should be briefed by the operations officer on the mission, frequencies, time en route, and applicable items as listed in the air plan contents (paragraph 3.10.2) plus emergency marshal and EAC time.

3.10.2 Weather Support. On air-capable ships where no organic meteorological/oceanographic support is available, the duty quartermaster will prepare an aviation weather summary for the operation officer's prelaunch briefing. This summary will include (as a minimum) air and water temperatures, barometric pressure, sea and swell wave conditions, dewpoint temperature, wind direction and speed, cloud cover, density altitude, and visibility. The most current AVWX, WEAX, or battle group TOAS messages and/or other forecasts will also be provided. These messages usually

ALERT*	HELICOPTER	AIRCREW	SHIP	MAXIMUM TIME (hr)
5**	Spotted for immediate takeoff, blades spread. Required stores loaded. External power applied. Mission equipment warmed up.	Strapped in. Preflight check list complete up to starting engines.	At flight quarters. Fire party on station.	4
15	Spotted for takeoff, blades spread, required stores loaded.	Briefed for flight. Preflight inspection complete. Standing by on immediate call.	At flight quarters. Fire party in immediate vicinity.	8
30	Rotors may be folded. Aircraft may be on deck or in hangar. Required stores loaded.	Briefed for flight.	Not at flight quarters	18/48***
60	Helicopter in hangar secured for heavy weather. Minor maintenance may be performed.	Designated and available.	Not at flight quarters.	

*Alert times are approximations and shall not be considered mandatory.
**Alert 5 is as fatiguing as actual flight and should normally be used only when launch is imminent.
***Two aircraft detachments manning allows for unlimited alert 30 readiness. Daily and turn around inspections will be required every 24 to 72 hours.

Figure 3-2. Alert Conditions

include forecasts of route and recovery conditions. Helicopter aircrews shall be informed of significant changes in meteorological/oceanographic conditions, as monitored aboard supporting platform(s), via the appropriate air control communications networks.

Independent air-capable ships should request AVWX support from NAVOCEANCOM centers. An AVWX is issued at least every 24 hours or more frequently when specific criteria are met or exceeded; i.e., high winds, heavy seas, or tropical cyclone threats. An AVWX is automatically provided to ships that include the term "VWX" on line 2 of their MOVREP per NWP 1-03.1. In addition, tailored aviation forecasting services are available upon request from NAVOCEANCOM centers per paragraph 2.3.2 of NAVOCEANCOMINST 3140.1.

An air-capable unit operating in company with CV/CVN, LPH, LHA, LHD, or MET-equipped ships should rely upon these ships for flight forecasting services. Generally, weather synopses, terminal forecasts, and tactical prediction services to support helicopter flight operations are available from those sources. When operating in a designated fleet operating area, air-capable units are encouraged to use fleet OPAREA forecasts issued by designated NAVOCEANCOM centers/facilities/detachments in lieu of AVWX. Terminal forecasts (TAF) and runway observations (SA) for nearby bingo airfields are also available from the OPAREA forecast issuing authority. Chapter 2 of NAVOCEANCOMINST 3140.1 contains additional guidance.

3.11 PLANNING FACTORS

3.11.1 Responsibility for the Air Plan. The operations officer is responsible for the collection of all required information and the preparation of the daily air plan. On an air-capable ship, the operations officer shall prepare the ship's air plan in accordance with an ATO and with the assistance and guidance of the detachment OIC. The preparation by the operations officer ensures that the ship's operating schedule will be programmed so as to permit the fulfillment of the air schedule as published, as well as ensuring that any safety or operational considerations detailed in ATO SPINS are taken into account. Unscheduled functional checkflights shall be arranged by the operations officer as soon as practicable after receiving the request from the helicopter unit. The performance of these checks will depend upon scheduled operations. The helicopter unit shall keep the operations officer informed of the current aircraft availability on a continuing basis.

3.11.2 Air Plan Contents. The air plan shall contain as a minimum the following information:

1. Event number
2. Launch time
3. Recovery time
4. Number and model of aircraft
5. Mission
6. Fuel load required
7. Call sign
8. Controlling agency
9. Frequency
10. Date
11. Sunrise, sunset, moonrise, moonset, and phase
12. Tacan channel.

Additional notes should include the following data if appropriate:

1. The ready deck schedule
2. Aircraft alert conditions prescribed by the OTC
3. Flight identification procedures in effect
4. Alert condition of standby aircraft
5. EMCON/HERO conditions
6. Aircraft armament/ordnance loading
7. Percent illumination/lux level
8. Any other information required, including any restrictions or hazards to flight.

Copies of the ship's air plan will be distributed in accordance with the ship's requirements. When the ship conducting helicopter flights is operating in company with other ships or as part of a task group/task force, the air plan should be published by message prior to the day's planned flight operations.

3.11.3 Flight Clearance. Written authorization, either in the form of a published flight schedule or other similar directive shall be a prerequisite for all flights. Unscheduled flights should be kept to a minimum. In addition, the pilot in command is responsible for filing a completed manifest with the ship prior to launch.

Flights originating aboard a ship and terminating at a shore station require the filing of a written flight plan with the ship. Ships shall relay flight plans to appropriate ATC facilities in a timely manner and pilots shall confirm their flight plans with an appropriate ATC facility ashore as soon as practicable.The pilot in command/ flight leader is responsible for submitting the proper flight plan in advance of intended flights. When firm information concerning departure and arrival times is available, the ship shall send a message as soon as possible prior to the ETA of the aircraft. Voice communications with the destination facility are encouraged.

Minimum flight plan information should include those items listed in OPNAVINST 3710.7.

The ship shall send a departure message, including aircraft type, aircraft bureau number, and ATD (ZULU).

If the flight from the ship to shore covers such a distance that communications with the ship are lost before communications with the shore facility are established, then an immediate message shall be sent to the ship upon arrival at the final destination to inform the ship of the aircraft's safe arrival. If communications are established with the shore facility before they are lost with the ship, then flight following is passed to the shore facility, and no further communications with the ship are required. Upon arrival, an immediate message to the ship is recommended, but not required. In any case, the ship shall maintain the original flight schedule for 3 months.

3.11.4 Post-Deployment "Fly-Off" Policy. Post-deployment "fly-offs" have statistically proven to be more hazardous because of the psychological factors involved and, therefore, normally should not be conducted at night or under instrument flight conditions. Fly-off distances shall not exceed 75 percent of maximum range for that particular helicopter.

3.12 U.S. NAVY INTERSERVICE AND INTERNATIONAL HELICOPTER OPERATIONS

Operations between U.S. Navy, Military Sealift Command, and Coast Guard ships and U.S. Navy, Army, Air Force, Coast Guard, and National Guard helicopters may be conducted if the ship's aviation facility is certified for the helicopter operations to be conducted. The certification status of individual ships is listed in NAEC-ENG-7576, Shipboard Aviation Facilities Resume.

Information governing U.S. helicopter/ship interoperability with NATO counterparts is contained in APP 2 and APP 2 SUPP 1. Information on helicopter/ship interoperability with NATO, Partnership for Peace, Inter-American Navies, and Pacific Rim nations is provided in the International HOSTAC publications. For cross-deck operations with non-NATO nations and for operations with U.S. ships that are not currently certified for the particular operation, waiver approval must be granted by fleet commanders.

For planning purposes, the current certification status of all U.S. ships or the capability of foreign ships can be obtained immediately by contacting the Naval Air Warfare Center Aircraft Division, Lakehurst NJ at DSN 624-2592 or commercial (201) 323-2592.

WARNING

Some non-U.S. Navy helicopters have not been tested in the electromagnetic environment of various ship classes. When conducting non-U.S. Navy operations, consideration must be given to potential radiation hazard, electromagnetic interference, and electronic vulnerability effects.

CHAPTER 4

General Helicopter Operations

4.1 FLIGHT DECK MARKINGS

When properly used, flight deck markings ensure adequate obstruction clearance and proper positioning for the specific aviation evolution being conducted. The information herein is intended as a quick reference for common deck markings. Specific dimensions can be found in the current Air-Capable Ships Aviation Facilities Bulletin No. 1 and Shipboard Aviation Facilities Resume (NAEC-ENG-7576). Deck markings are illustrated in Figures 4-1 and 4-2.

4.1.1 Landing Lineup Line and Circle. (See Figure 4-1.) Obstruction clearance is ensured when the helicopter for which the facility is certified lands with the main mounts (tailwheel aircraft), nosewheel, or forward skid crosstube within the landing circle and the fuselage centerline aligned with the landing lineup line.

WARNING

- On DD 963 Class ships configured for centerline approach/landing, the H-3 aircraft is restricted to landing in the touchdown circle with main landing gear forward of the aft limit reference lines (i.e., 3-foot long lines on deck edges, 5 feet from the center of the touchdown circle).

- On CG 47 Class ships the H-3 aircraft is restricted to landing with main landing gear between the RAST hover reference lines and the aft limit reference lines (i.e., 3-foot long lines on deck edges, plus or minus 5 feet from the center of the touchdown circle).

4.1.2 Vertical Replenishment "T" Line. (See Figure 4-2.) Obstacle clearance is ensured when the helicopter for which the facility is certified hovers with its rotor hub(s) on or aft of the line. Where two "T" lines are encountered with the "T"s pointed towards each other, clearance is ensured when the rotor hub(s) are between the two lines. The "T" line is for use with H-1, H-2, H-46, and H-65 series helicopters.

4.1.3 Vertical Replenishment Ball and "T" Line. (See Figure 4-2.) This line will only appear in combination with a "T" line, when the "T" line does not provide enough clearance for larger rotor helicopters. Unless otherwise noted, the ball and "T" line provide clearance for the H-3, H-53, and H-60 series helicopters when the aircraft hover with main and tail rotor hubs over or aft of the line.

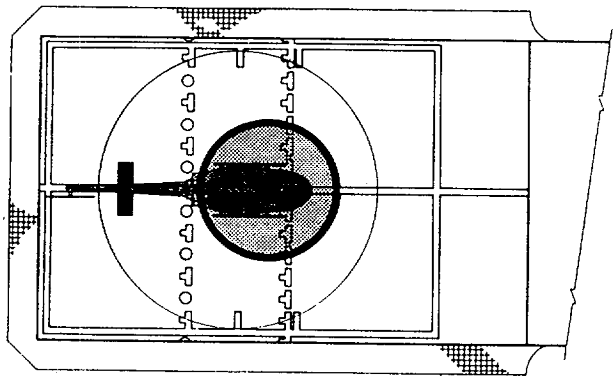
4.1.4 Vertical Replenishment Dash Line. (See Figure 4-2.) Obstacle clearance is ensured only when the helicopter for which the facility is certified hovers with the centerline of the aircraft aligned directly over the line. An obstacle-free approach is ensured only when the approach is made along the dashed line.

4.1.5 Helicopter In-Flight Refueling Marking. (See Figure 4-2.) The HIFR hose pickup point is located on the port side and is designated with a letter "H." Obstacle clearance is ensured when the helicopter for which the facility is certified hovers oriented fore and aft with the hoisting point over the "H" for hose pickup. For the H-46, obstacle clearance is determined based on hoisting through the rescue hatch.

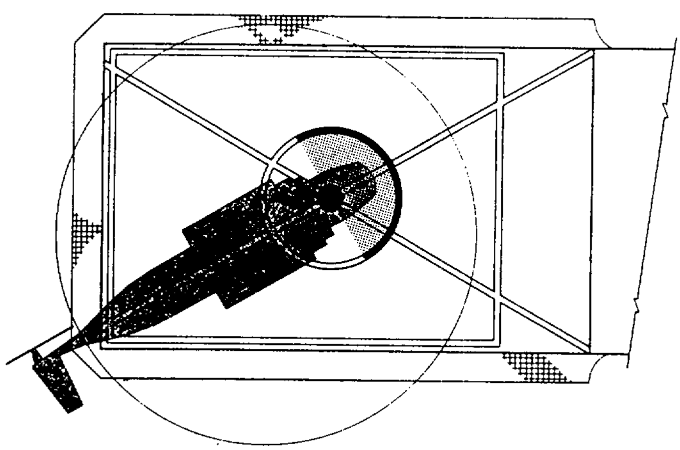
4.2 VISUAL LANDING AIDS

All shipboard VLA lighting equipment should be operative for night/low-visibility operations. Night VMC operations may be conducted in the event of a failure of not more than one of the lighting subsystems required for ship's facility certification, provided a visible natural horizon exists and the ship's commanding officer and the helicopter aircraft commander concur that the failed lighting system is not critical to the scheduled mission.

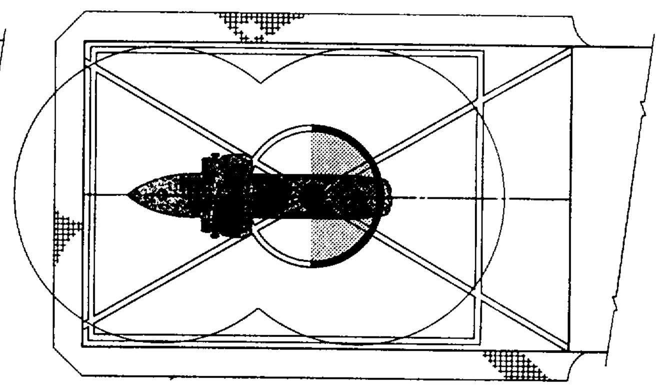
There are four basic categories of VLA lighting equipment installed on board air-capable ships.



TYPICAL FULL-CIRCLE LANDING:
HELICOPTER LANDS PARALLEL TO THE LANDING LINEUP LINE WITH THE FORWARD LANDING GEAR OR SKID SUPPORTS WITHIN THE INNER EDGE OF THE TOUCHDOWN CIRCLE.



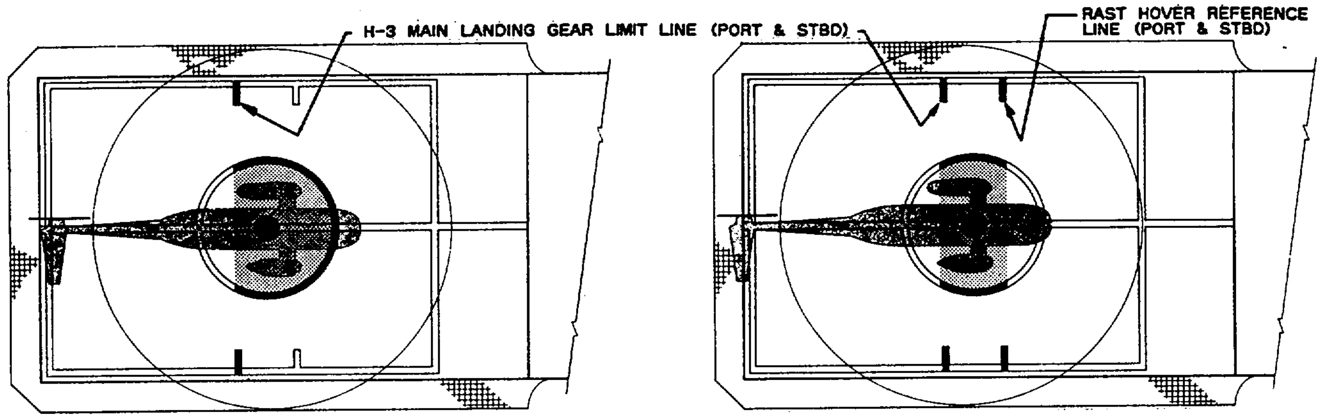
TYPICAL H-46/H-53 FORWARD HALF-CIRCLE LANDING RESTRICTION:
HELICOPTER LANDS PARALLEL TO THE LANDING LINEUP LINE WITH THE NOSE LANDING GEAR WITHIN THE FORWARD HALF OF THE TOUCHDOWN CIRCLE (RELATIVE TO THE LANDING LINEUP LINE) OR ON THE TOUCHDOWN SPOT.



H-46 LANDING RESTRICTION ON LAMPS MK I/DD 963 AND DDG 993 SHIP CLASSES:
HELICOPTER LANDS PARALLEL TO THE SHIP'S CENTERLINE WITH THE NOSE LANDING GEAR WITHIN THE FORWARD HALF OF THE TOUCHDOWN CIRCLE (RELATIVE TO THE SHIP'S CENTERLINE) OR ON THE TOUCHDOWN SPOT.

NOTE: SHADED AREA INDICATES LANDING AREA REFERRED TO IN THE TEXT.

Figure 4-1. Typical Landing Procedures (Sheet 1 of 2)



H-3/H-46 LANDING RESTRICTION ON LAMPS MK III/ DD 963 CLASS SHIPS:
HELICOPTER LANDS PARALLEL TO THE LANDING LINEUP LINE WITH THE MAIN LANDING GEAR WITHIN THE TOUCHDOWN CIRCLE AND FORWARD OF THE MAIN LANDING GEAR LIMIT LINES (H-3)/NOSEWHEEL (H-46) WITHIN THE FORWARD HALF OF THE TOUCH-DOWN CIRCLE.

H-3/H-46 LANDING RESTRICTION ON LAMPS MK III/CG 47 CLASS SHIPS:
HELICOPTER LANDS PARALLEL TO THE LANDING LINEUP LINE WITH THE MAIN LANDING GEAR (H-3)/ NOSEWHEEL (H-46) WITHIN THE TOUCHDOWN CIRCLE, AFT OF THE RAST HOVER REFERENCE LINES AND FORWARD OF THE LANDING GEAR LIMIT LINES.

Figure 4-1. Typical Landing Procedures (Sheet 2 of 2)

1. VERTREP lighting equipment — Required on all ships designated by CNO for Level I/II Classes 4, 5, and/or 6 helicopter operations for the flight deck areas certified only for VERTREP and HIFR

2. Landing-configured lighting equipment — On air-capable ships, with RAST, designated by CNO for Level I/II Classes 1, 2, 2A, and/or 3 helicopter operations

3. LAMPS Mk III lighting equipment — On air-capable ships, with RAST, designated by CNO for Level I/II Classes 1, 2, 2A, and/or 3 helicopter operation

4. Accessory visual aids.

VERTREP lighting equipment includes the following components (see paragraph 4.2.1):

1. Lighting control panel (landing/VERTREP)

2. Homing beacon

3. Deck edge/blue perimeter lights

4. VERTREP approach lineup lights (bidirectional)

5. Overhead/forward structure floodlights

6. HIFR heading lights

7. Deck status light system

8. Rotary beacon signal system.

Landing-configured lighting equipment for helicopter operations includes the following components (in addition to VERTREP lighting equipment) (see paragraph 4.2.2):

1. Deck surface/hangar wash floodlights

2. Maintenance floodlights

3. Extended lineup lights

4. Vertical dropline lights

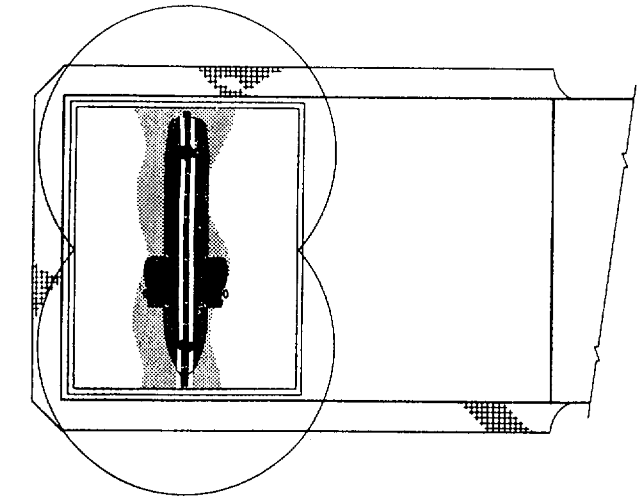
5. Flash sequencer

6. Lighting control panel (LAMPS)

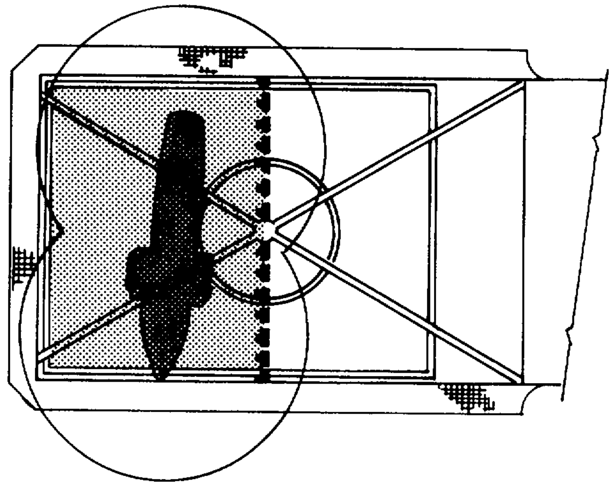
7. Landing approach lineup lights (unidirectional)

8. Stabilized glideslope indicator system

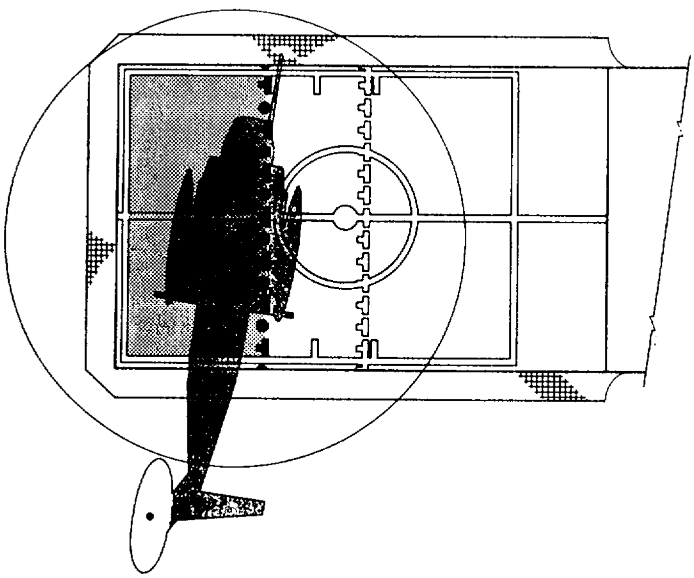
9. Wave-off light system.



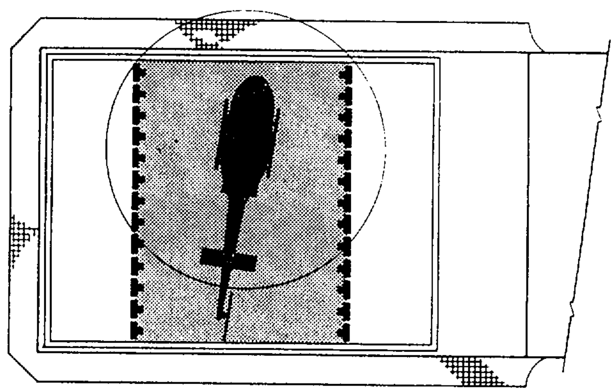
TYPE 1 VERTREP/HOVER OPERATIONS:
HELICOPTER HOVERS WITH CENTERLINE OF AIRCRAFT DIRECTLY ABOVE THE SEGMENTED LINEUP LINE



TYPE 2 VERTREP/HOVER OPERATIONS:
HELICOPTERS HOVER WITH MAIN AND TAIL ROTOR HUBS OVER, OR AFT OF, THE LINE FORMED BY THE "T"S.



SPECIAL TYPE 2 VERTREP/HOVER OPERATIONS:
HELICOPTERS HOVER WITH MAIN AND TAIL ROTOR HUBS OVER, OR AFT OF, THE "T" OR "T-BALL" LINES.



TYPE 3 VERTREP/HOVER OPERATIONS:
HELICOPTERS HOVER WITH MAIN AND TAIL ROTOR HUBS BETWEEN THE TWO "T" LINES.

Figure 4-2. Typical Vertical Replenishment and Helicopter In-Flight Refueling Procedures (Sheet 1 of 2)

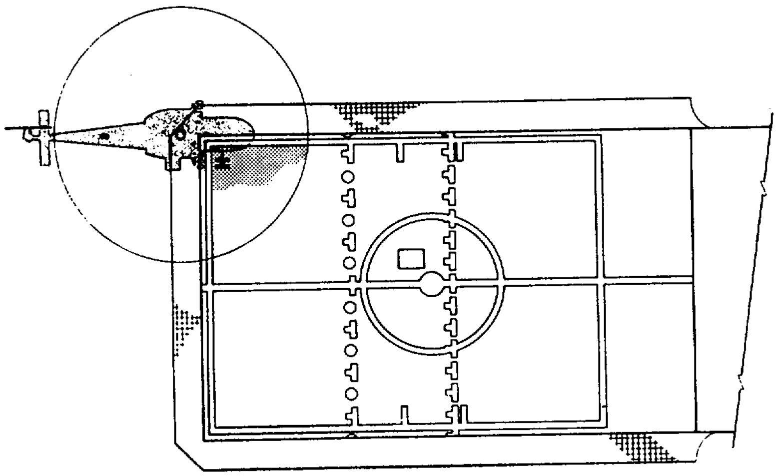


Figure 4-2. Typical Vertical Replenishment and Helicopter In-Flight Refueling Procedures (Sheet 2 of 2)

LAMPS Mk III equipment consists of the following components (in addition to landing-configured lighting equipment) (see paragraph 4.2.3):

1. Flight deck status and signaling system
2. Horizon reference set.

Accessory visual aids include the following items (see paragraph 4.2.4):

1. Signal wands
2. Windsock (optional).

4.2.1 Vertical Replenishment Lighting Equipment

4.2.1.1 Lighting Control Panels. Lighting control panels are installed on air-capable ships equipped with VERTREP VLA lighting equipment. The function of the lighting control panel (bulkhead mounted) is to provide the operator with switches, dimmers, and status indicators to control and monitor the helicopter area lighting during night or foul weather operations.

Note

The lighting control panel (with HIFR operations capability) may be used on ships with a VLA night-landing lighting package, as well as on ships with VERTREP platforms.

4.2.1.2 Homing Beacon Light. The homing beacon light (see Figure 4-3) is provided to give the helicopter pilot a visual guide (flashing white light beam) for homing when he approaches within the optical horizon. The homing beacon is mounted high on the main mast so that the beam is parallel to the horizon and is visible for at least 330° in azimuth. The beacon provides a minimum effective intensity of 1,500 candles over a span of 7° in elevation and produces approximately 90 flashes per minute.

4.2.1.3 Deck Edge Lights. The red deck edge lights (see Figure 4-3) outline the periphery of the obstruction-free helicopter deck area and are installed

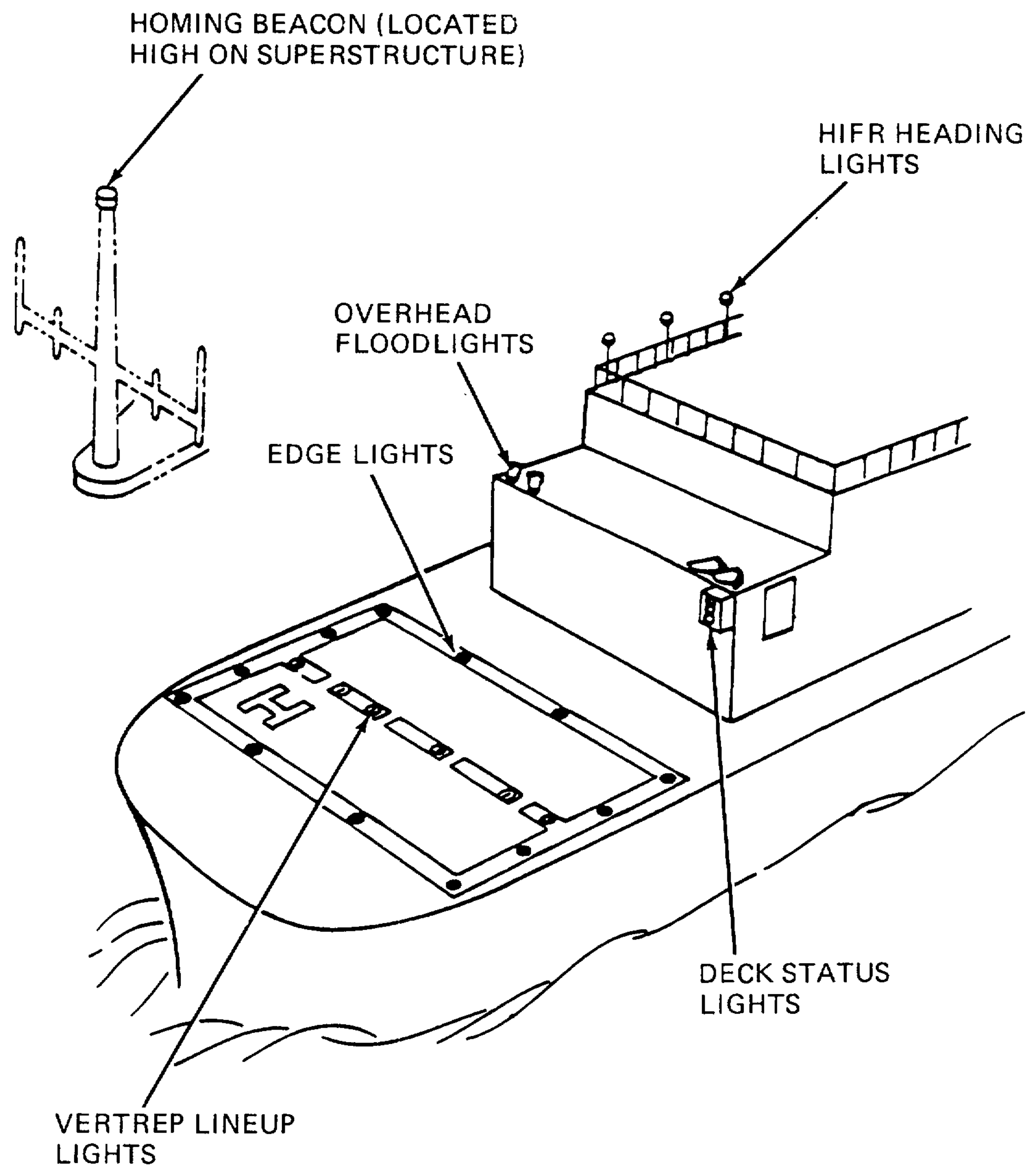


Figure 4-3. Typical Visual Landing Aids Installation for Vertical Replenishment Decks

coincident with the peripheral markings. The lights are installed in such a manner that the helicopter pilot's view of them is not obstructed during the approach.

4.2.1.4 Lineup Lights (Deck). VERTREP approach lineup lights (see Figure 4-3) are installed on the segmented VERTREP lineup line to indicate to the helicopter pilot the line of approach for VERTREP hover operation. The white duplex VERTREP lineup lights provide an athwartship lineup path to the VERTREP area. The lights are bidirectional and are energized for either a port or starboard helicopter approach.

4.2.1.5 Overhead/Forward Structure Floodlights. Red/white/yellow overhead floodlights (see Figure 4-3) are installed to illuminate the flight deck for night helicopter operations. Floodlights are also installed on ships to provide red/white/yellow floodlighting of irregular-shaped structures (e.g., missile launchers) located immediately forward of the helicopter area.

4.2.1.6 Helicopter In-flight Refueling Heading Lights. HIFR heading lights (see Figure 4-3) are required for night HIFR operations. These red/yellow lights give the helicopter pilot a visual indication of the ship's heading and provide a height reference during in-flight refueling operations. All HIFR heading lights are simultaneously visible to the helicopter pilot during the hose pickup and pumping phases of the HIFR operation. During transition from hose pickup to refueling position, one or more of the lights may be momentarily obscured by ship's structures.

4.2.1.7 Deck Status Light System. The deck status light is a three-color flashing light fixture mounted forward of the VERTREP or landing area, usually on the aft face of the hangar. This fixture provides the helicopter pilot and flight deck crew with deck status information. The light, when flashing, indicates the meanings described in Figure 4-12.

Deck status light controls are built into lighting control panels currently approved for air-capable ships. On ships equipped with obsolescent light control panels, a separate panel for control of the deck status light is required.

4.2.1.8 Rotary Beacon Signal System. Three rotating beacons (red, amber, and green) make up the rotary beacon signal system that replaces the deck status lights on many air-capable ships. The system provides visual color signals to indicate to the pilot and flight deck crew the status of the helicopter deck area. The colored beacons, when flashing, indicate the meanings described in Figure 4-12.

4.2.2 Landing-Configured Lighting Equipment

4.2.2.1 Stabilized Glideslope Indicator. The Mk 1 Mod 0 SGSI system is an electro-hydraulic-optical landing aid designed for use on air-capable ships. When used in conjunction with the associated VLA and shipboard radar systems, the SGSI greatly enhances the pilot's ability to execute safe approaches over a broad range of IFR and VFR operating conditions. All assemblies are located on or in the immediate vicinity of the helicopter hangar. With the SGSI, a pilot may visually establish and maintain the proper glideslope for a safe approach and landing. The visual acquisition range is approximately 3 miles at night under optimum environmental conditions. The SGSI provides a single bar of green light (1/2°), amber light (1°), or red light (6-1/2°) as shown in Figure 4-4. The light is projected through 40° in azimuth. The color of the light indicates to the pilot whether he is above (green), below (red), or on (amber) the proper glideslope. By adjusting the aircraft's altitude in order to keep the amber-red interface visible, the pilot can maintain a safe 3° glidepath to the landing platform. By flying in the amber-red transition zone, altitude excursions are minimized because rate information is available to the pilot. Flying in the center of the amber zone requires very large changes in glideslope before the pilot notices his error. An aircraft executing an SGSI approach would normally intercept the glideslope at an altitude of approximately 350 feet and a distance of 1 mile.

4.2.2.2 Wave-Off Light System. The wave-off and wave-off/cut light systems (see Figure 4-5) are electronically controlled signal systems designed for use on air-capable ships. One wave-off light is installed on each side of the SGSI. When these lights are flashing, they provide a visual indication to the helicopter pilot that he is to abort the landing attempt.

4.2.2.3 Deck Surface/Hangar Wash Floodlights. Deck surface/hangar wash floodlights are required on ships to provide white floodlighting on helicopter landing decks and on the aft face of the hangar to provide additional surface detail and depth perception. When red floodlighting is required, the red filter stored within the floodlight housing is used.

4.2.2.4 Maintenance Floodlights. The portable maintenance floodlights are installed on the flight deck to provide red/white/yellow floodlighting on the dark side of the helicopter during preflight or postflight maintenance.

4.2.2.5 Extended Lineup Lights. Extended line-up lights are a fore-and-aft extension of the deck-installed lineup lights to provide the helicopter pilot with additional lineup and depth perception cues during the approach and

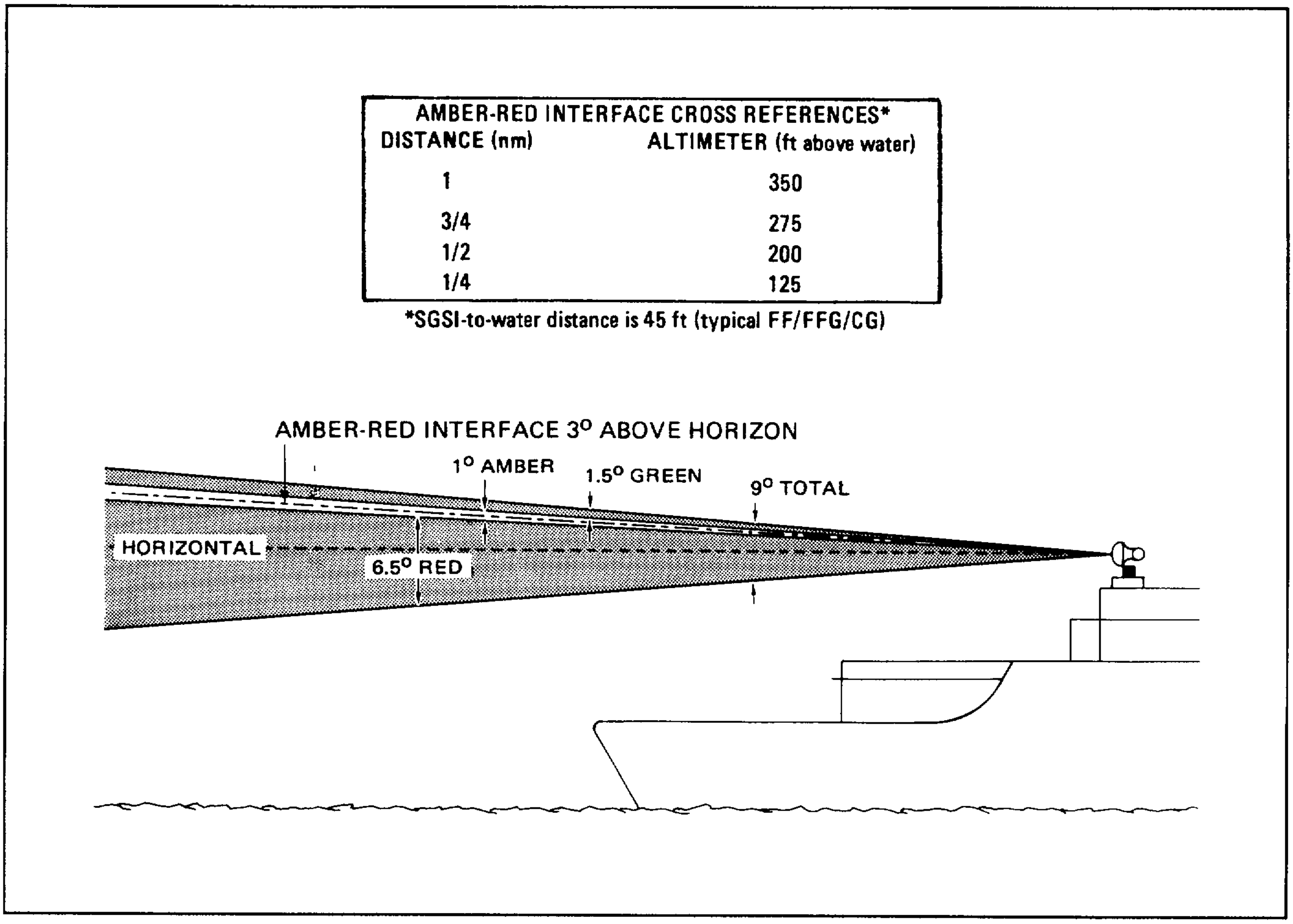


Figure 4-4. Stabilized Glideslope Indicator Tricolor Beam

touchdown maneuver. Forward extended lineup lights are not required on auxiliary, amphibious warfare, or MSC ships that have a flight deck lineup line in excess of 70 feet.

4.2.2.6 Forward Extended Lineup Light Bar Assembly. When the forward end of the lineup line intersects the deck edge (hull) of the ship, the extended lineup light bar assembly is used to provide six additional lineup lights. The extended lineup light bar is hinged at the base and has eight height adjustments from horizontal to vertical position (22° elevation angle) for H-2 helicopter landing operations.

Note

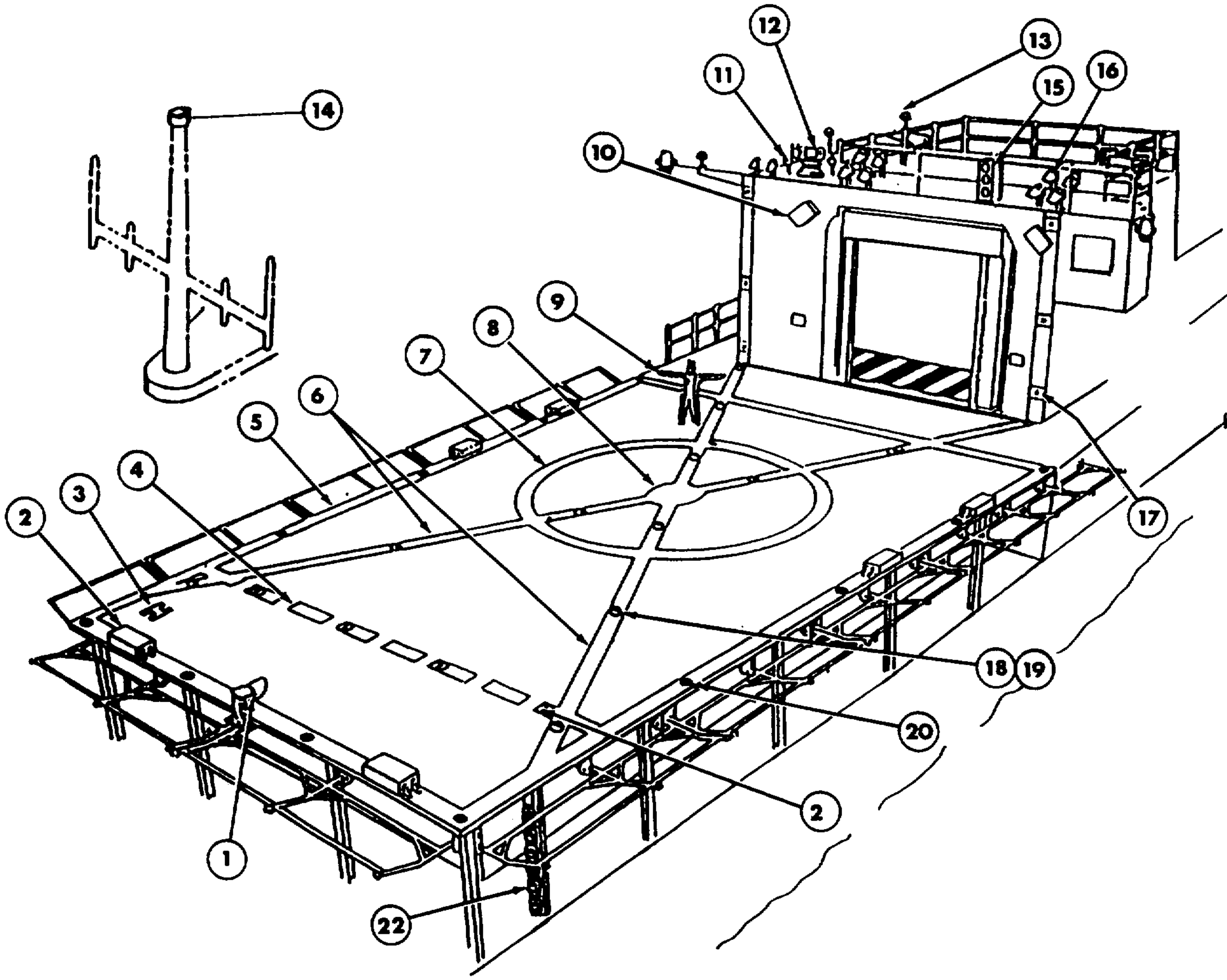
> The adjusted height of the extended lineup light bar assembly shall not violate the helicopter obstruction clearance height.

4.2.2.7 Light Fixture Assembly. When the forward end of the lineup line intersects the aft hangar face (bulkhead or other structure), extended lineup is provided by installing three light fixtures vertically up the face of the hangar at 5-foot intervals from the flight deck.

4.2.2.8 Aft Extended Lineup (Vertical Dropline) Light Bar. Aft extension of the lineup lights is accomplished by installation of the vertical dropline light bar vertically downward at the aft intersection of the lineup line and the ship's hull. The light bar contains three to six red light fixtures that contrast with the white lineup lights in the deck and in the forward extension.

4.2.2.9 Flash Sequencer. The flash sequencer provides the capability of sequentially flashing every deck-installed landing lineup light and alternate lights in the forward extended lineup light bar. (When fixture assembly is installed on the bulkhead/hangar, all three lights will flash.)

4.2.2.10 Obstruction Lights. Obstruction lights are installed at the highest points on the extreme port and starboard sides of the ship to outline the structure forward of the helicopter landing area. They increase the pilot's ability to judge his position relative to forward



1. MAINTENANCE FLOODLIGHT
2. DECK SURFACE FLOODLIGHTS
3. HIFR AREA MARKING
4. VERTREP LINEUP LINE
5. LANDING AREA PERIPHERY LINE
6. LANDING LINEUP LINES
7. TOUCHDOWN CIRCLE
8. LANDING SPOT
9. LSE AIDS
10. FORWARD STRUCTURE FLOODLIGHTS (DECK SURFACE FLOODLIGHT TYPE)
11. WAVE-OFF LIGHTS
12. STABILIZED GLIDESLOPE INDICATOR
13. HIFR HEADING LIGHTS
14. HOMING BEACON
15. DECK STATUS LIGHTS
16. OVERHEAD FLOODLIGHTS
17. EXTENDED LINEUP LIGHTS
18. LANDING LINEUP LIGHTS
19. SEQUENTIALLY FLASHED LINEUP LIGHTS
20. EDGE LIGHTS
21. VERTREP LINEUP LIGHTS
22. VERTICAL DROPLINE LIGHTS

Figure 4-5. Typical Flight Deck With Visual Landing Aids obstructions during approach, takeoff, and transition to forward flight.

4.2.2.11 Lighting Control Panels. The lighting control panels are designed to control VLA lighting equipment addressed under VERTREP lighting equipment (excluding the SGSI and wave-off light systems), plus the following equipment:

1. Flash sequencer
2. Extended lineup lights
3. Vertical dropline light bar
4. Deck surface floodlights
5. Hangar wash floodlights.

4.2.3 Helicopter Landing System Additional Lighting Equipment

4.2.3.1 Flight Deck Status and Signaling System. The FDSSS enables the HCO in the HCS to request and receive launch and recovery authorization from the bridge and/or CIC. The FDSSS also incorporates control of the deck status light at the HCS and provides status indication to the bridge and CIC. Capability to control the wave-off lights is incorporated in all units.

4.2.3.2 Horizon Reference System. The HRS, installed on the ship's centerline just above the hangar face, consists of a 10-foot (3.05 m) electroluminescent bar, gyro-stabilized to remain level in the horizontal plane as the ship rolls. The system is designed to be used to provide the pilot with an artificial horizon and associated visual cues during night shipboard operations.

4.2.4 Accessory Visual Aids

4.2.4.1 Signal Wands. Two signal wands with interchangeable colored filters are used by the LSE to give visual instructions to the helicopter pilot during night operations.

4.2.4.2 Windsock. The windsock is located near the helicopter deck and provides the approaching helicopter pilot with a visual indication of the wind over the deck. This installation is optional.

4.3 OPERATIONAL CONSIDERATIONS

4.3.1 Safety. The safety of personnel and equipment is the primary consideration in all evolutions. Helicopter-handling personnel are specifically charged with the responsibility of reporting to higher authority any unsafe practices or conditions that may affect the safety of personnel or equipment. All helicopter movements shall be controlled by a qualified director/LSE. The director/LSE shall be a graduate of an approved LSE training course in accordance with Chapter 1. Additional handling personnel required for specific type helicopters and/or ships should also be graduates of this course. With concurrence of the ship's commanding officer, a competent designated LSE may be charged with the training of helicopter handling crews.

Helicopters shall be moved only with the express authority of the person in charge of the helicopter deck. The FDO or the person placed in charge of the ship's flight deck crew is responsible for ensuring that all tractors, towbars, chocks, tiedowns, and other equipment, as appropriate, are in satisfactory condition and operating properly. In cases where there is a hangar deck officer, he too is charged with these responsibilities. Defective equipment shall be taken out of service and replaced or repaired. Towbars, chocks, and tiedowns shall be stowed in designated spaces when not in use.

When the ship is at flight quarters, it is imperative that the OOD notify the flight/hangar deck crews of any anticipated ship movements. Because of the top-heavy configuration of helicopters, caution must be observed in all movements to preclude the possibility of damage to the relatively light structural members and rotor blades.

4.3.2 Search and Rescue Requirements. SAR requirements are provided in Figure 4-6.

4.3.2.1 Plane Guard Ship. The plane guard ship shall maintain the rescue detail on deck during flight operations and be positioned as requested by the OCE/CATF to rescue personnel either by boat or ship. The plane guard ship shall monitor the appropriate launch/recovery frequency during flight operations.

4.3.2.2 Search and Rescue Helicopter Equipment

1. Operable hoist with rescue device
2. Operable searchlight (for night SAR)
3. Sufficient liferafts to support passenger rescue equipments.

Note

See NWP 3-50.1 for additional information.

<table>
<tr><th rowspan="2">OPERATION</th><th colspan="2">SHIP AT ANCHOR</th><th colspan="2">SHIP UNDERWAY</th></tr>
<tr><th>DAY</th><th>NIGHT (1)</th><th>DAY</th><th>NIGHT (1)</th></tr>
<tr><td>Troop Lift (2)</td><td>Safety boat readied/crew on station.
or
SAR-equipped helicopter in Alert 5 or airborne. (5)</td><td>Safety boat readied/crew on station (in water).</td><td>Safety boat readied/crew on station
or
Plane guard ship in position.
or
SAR-equipped helicopter in Alert 5 or airborne. (5)</td><td>Safety boat readied/crew on station. Plane guard ship in position.</td></tr>
<tr><td>Single Helicopter</td><td>Safety boat readied/crew on immediate call. (3) .</td><td>Safety boat readied/crew on station.</td><td>Safety boat readied/crew on immediate call for over-the-side rescue (3)</td><td>Safety boat readied/crew on station.</td></tr>
<tr><td>Multiple Helicopters (4)</td><td>Safety boat readied/crew on station.
or
SAR-equipped helicopter in Alert 15 or airborne. (5)</td><td>Safety boat readied/crew on station (in water).</td><td>Safety boat readied/crew on immediate call for over-the-side rescue (3)
or
Plane guard ship in position.
or
SAR-equipped helicopter in Alert 15 or airborne. (5)</td><td>Safety boat readied/crew on station.</td></tr>
<tr><td>V/STOL</td><td>Safety boat readied/crew on station
or
SAR-equipped helicopter in Alert 5 or airborne. (5)</td><td>Safety boat readied/crew on station (in water).</td><td>Plane guard ship in position
or
SAR-equipped helicopter in Alert 5 or airborne. (5)</td><td>Safety boat readied/crew on station. Plane guard ship in position.</td></tr>
</table>

Notes:

(1) If sea state would prevent rescue by ship or boat, a SAR-equipped helicopter with automatic-hover capability must be available in order to conduct flight operations.

(2) Troop lift is any single- or multiple-helicopter operation involving the movement of combat-equipped troops over water.

(3) The ship itself or its rescue boat (RHIB, MWB, zodiac, etc.) are the primary rescue assets during routine operations. If sea state would prevent rescue by ship or boat, a SAR-equipped helicopter in Alert 30 must be available.

(4) Multiple-helicopter operations are non-troop lift evolutions, either more than one helicopter airborne within the task force or one helicopter conducting multiple takeoffs and landings (i.e., DLQs) at a single deck.

(5) SAR-equipped (no automatic-hover capability) helicopter requirements are SAR swimmer, operable hoist, and sufficient liferafts to support passenger rescue requirements.

Figure 4-6. Search and Rescue Requirements

4.4 PREOPERATIONAL PROCEDURES

The mark of a smart ship is the punctuality with which it meets scheduled evolutions. Since delays in launching can be caused by failure of any one link in the organization, every effort must be made to prevent this failure. The following paragraphs outline the preparation and timing necessary to prevent delays.

4.4.1 Time Schedule. All flight preparations shall be completed in sufficient time to permit pilots to inspect, warm up, and check their aircraft prior to scheduled launch time. More time will be allowed for aircraft preparation under night or adverse weather conditions.

4.4.2 Flight Quarters. The OOD shall set flight quarters in time for all personnel to man stations and to complete preparations prior to flight operations. The following stations will report to the OOD/aviation officer when ready:

1. Flight deck
2. Crash crew and firefighters
3. Medical crew
4. Rescue boat detail
5. CIC
6. HCS/LSO
7. PLAT (when installed)
8. MCM launch crew (when embarked)
9. HDC/AOCC
10. Fuel crew.

4.5 STOWAGE OF HELICOPTERS

On those ships possessing a hangar deck, steps should be taken to ensure adequate and proper stowage of helicopters. Proper tiedown padeyes, adequate clearance between helicopter components and obstructions, adequate lighting, proper ventilation, and equipment stowage facilities are considered minimum requirements. Where facilities dictate, a hangar deck officer shall be assigned. He is responsible for all helicopter movements and safety considerations within the hangar. Except when a helicopter is being moved, tiedowns and chocks shall be in place to ensure proper security. Tiedowns shall run from proper tiedown fittings on the aircraft to a padeye on the deck and, if appropriate, high point tiedowns on the bulkheads, without pressing against struts, hydraulic lines, tires, or any other portion of the helicopter. Tiedowns shall be affixed to the aircraft in accordance with NATOPS requirements for that aircraft.

CAUTION

Aircraft shall never be tied down over an expansion joint or partially on an elevator. Chocks should be adjusted to fit snugly on the main mounts with the adjustable end pointing aft on the aircraft.

Note

Skid-configured helicopters do not require chocks.

The air officer/aviation officer may adjust the number of tiedowns required when such action is indicated because of aircraft model. He will order an increase in the number of tiedowns required when such action is indicated due to expected wind, sea state, or ship's maneuvers.

4.5.1 Tiedown Requirements. Tiedowns will be removed only when signaled by an aircraft director. Tiedowns shall be affixed to the aircraft to preclude movement in any direction. This requires that they tend to oppose each other. Tiedowns should be as equally distributed on the aircraft as possible.

Aircraft shall be tied down as directed. Unless otherwise specified, chain tiedowns shall be used exclusively. Tiedowns must run from a proper tiedown fitting on the aircraft to a padeye on the deck without pressing against oleo struts, hydraulic lines, tires, or any other portion of the aircraft. When an aircraft is spotted adjacent to an elevator, tiedowns shall not be attached to the elevator or across the safety stanchions.

4.5.1.1 Initial Tiedown. This configuration is required for all aircraft prior to launch, upon recovery, immediately after an aircraft is respotted, or immediately preceding movement of an aircraft. (Initial tiedown configurations for each aircraft are depicted in Appendix B.)

4.5.1.2 Permanent Tiedown. This configuration is required when not at flight quarters or when an aircraft is not scheduled or expected to be launched or respotted. (Permanent tiedown is applied by the crew chief/plane captain in accordance with NATOPS flight manual and existing maintenance instructions.)

4.5.1.3 Heavy Weather Tiedown. This configuration is required when an increase in aircraft security is required during high winds, heavy seas, or for prolonged periods of heavy maintenance. (Heavy weather tiedown is applied by the crew chief/plane captain in accordance with NATOPS flight manual and existing maintenance instructions.)

4.6 MOVEMENT OF AIRCRAFT

Unless otherwise specified in the individual aircraft NATOPS flight manual, the following deck crew is considered minimum for movement of a helicopter on the flight deck or hangar deck: a qualified director, two chock/tiedown men, and two safety observers (one per side).

WARNING

- Movement of aircraft presents a risk of injury to flight deck personnel. Aircraft pushers, chockmen, and chainmen shall not position themselves in front of aircraft wheels.
- Except in an emergency, movement of the H-60 by hand is prohibited while underway.

In preparing to move an aircraft, the director shall ensure the following occur.

1. The cockpit is manned by a pilot, plane captain, or qualified brakerider (not required for skid-configured helicopters). Aircraft being moved shall have only the designated brakerider aboard. All other personnel shall vacate the aircraft prior to removal of tiedowns and chocks.
2. The towbar is securely attached to the helicopter and to the tractor (if so equipped). If the helicopter is to be moved by hand, the towbar shall be properly tended by another director or specifically designated towbar man.
3. Adequate clearance exists to permit safe movement.

CAUTION

When moving an aircraft into or out of any hangar, ensure that the hangar door is fully open and there is adequate clearance. The retractable hangar should be in the fully retracted position until aircraft movement is completed.

4. Safety men are posted as required to ensure safe clearance when in proximity to other aircraft, bulkheads, or other obstructions.
5. The brakerider shall check the brakes for proper operation.

CAUTION

If an aircraft with inoperative brakes must be respotted, the cockpit shall not be manned and men will remain in position to chock the main wheels instantly if ordered.

6. All tiedowns and chocks are removed.
7. All personnel engaged in the movement of helicopters shall wear appropriate flight deck shoes and approved flotation devices with attached whistle and strobe light.
8. Permission to move the helicopter shall be obtained from the OOD on the bridge.

WARNING

Except for safety of navigation, the OOD shall not execute turns unless flight deck personnel have been notified and given sufficient time to secure the helicopter.

4.6.1 Brakerider. In manning the helicopter to be moved, the brakerider shall:

1. Ensure that safety pins are in place in the landing gear.
2. Adjust seat and rudder pedals to permit proper actuation of the brakes.
3. Conditions permitting, open cockpit windows/doors to facilitate emergency egress. Cranials shall be worn. Sound attenuators shall be "cracked" to allow the brakerider to hear emergency whistles, unless other aircraft are turning on deck.
4. Ensure that windows are sufficiently clean to maintain visual reference with the director.

5. Advise the director of any unusual condition or an aircraft discrepancy that might make any movement hazardous.

6. Use seatbelts and shoulder harness and wear personal inflatable flotation gear.

Before having the chocks removed, the director shall signal for brakes and receive visual or verbal confirmation from the cockpit that the brakes are being held. The helicopter tailwheel or nosewheel shall be unlocked only on signal from the director.

4.6.2 Movement Safety Rules

WARNING

- Personnel shall not enter, exit, or approach the aircraft while traversing except to install chocks or chains.
- Energizing/deenergizing fin stabilizers or major rudder movement can create unanticipated movement of the deck causing loss of control of the helicopter. Any requirement to energize/deenergize fin stabilizers or to maneuver the ship during a helicopter movement evolution shall immediately be transmitted to the flight deck where helicopter movement shall cease and a minimum of six tiedowns shall be applied.

While aircraft are being moved, the following rules shall be observed.

1. Prior to commencing aircraft movement, attempts should be made to minimize deck roll. Should movement be necessary under heavy deck roll conditions, a walk-chain method is advisable.

2. Should a ship maneuver be necessary during an aircraft move, an announcement shall be made over the MC system to allow the move to be suspended before the ship turn commences.

3. Movement shall be slow enough to permit a safe stop to be made within the clear space available, and in no case faster than the chock men can walk.

4. The director shall ensure that he is at all times plainly visible to the brakerider in the cockpit whenever the aircraft is moving.

5. Chock men shall closely tend each main wheel, and brakeriders shall be prepared to apply brakes as necessary to prevent excessive speed.

6. Tractor drivers shall not move aircraft except under the control of a designated director.

7. All personnel involved with aircraft movement shall be equipped with a whistle that they shall hold in their mouth while engaged in aircraft movement. The whistle shall be used to signal for brakes and chocks.

8. Helicopters shall not be towed with rotors engaged.

WARNING

During periods of high winds/sea state or during periods of darkness, extreme care must be exercised in the deck movement of helicopters. Because of the top-heavy and inherent static unstable configuration of the helicopter, extreme rolling or pitching movements may result in injury or death to personnel and severe damage to the helicopter. The inadvertent loss of a helicopter over the side of a ship is a distinct possibility and shall be considered when moving aircraft during adverse conditions. Movement of helicopters into a hangar or to a more sheltered area of the flight deck and securing of aircraft must be accomplished prior to encountering heavy weather.

9. The signals in NAVAIR 00-80T-113 shall be adhered to while moving an aircraft.

In all helicopter movement, safety is paramount. When moving helicopters by hand, the helicopter should be moved against the movement of the deck. This requires that the helicopter always be pushed rather than allowing it to roll with the movement of the ship. None of the foregoing shall be construed to require any individual to place his personal safety in jeopardy. This is particularly applicable at night or during periods of heavy weather. All personnel are to exercise prudence, judgment, and common sense in all helicopter evolutions.

For prolonged periods of storage of helicopters, due consideration shall be given to weather protection, defueling provisions, preservation, proper blade stowage, and fire prevention and firefighting procedures. Individual types of helicopters have peculiar stowage problems.

Note

Movement procedures for SH-60B helicopters on RAST-equipped ships are found in Chapter 10.

4.6.2.1 Report of Damage to an Aircraft. Any damage to an aircraft, no matter how slight, shall be immediately reported to the OOD, who shall immediately report the incident to the air officer/HCO and aviation unit officer in charge. The aircraft shall not be flown until it has been inspected and declared to be in an "up" status by authorized personnel. Reports of these occurrences shall be made in accordance with OPNAVINST 3750.6 series.

4.6.3 Launch Preparation. The following safety precautions shall be heeded during launch preparations.

1. When spotting a helicopter for launch, the director shall ensure that the parking brakes are set, wheels are chocked, tail or nose gear are locked (as applicable), safe rotor clearance exists, and sufficient slack is left in all tiedowns to prevent initiation of ground resonance.

2. Main rotor blades and pylons shall not be spread nor shall rotors be engaged in wind conditions exceeding applicable NATOPS limitations, except in emergency situations.

3. The LSE shall receive permission from the aviation officer/HCO prior to starting engines or engaging rotors.

WARNING

Clearance to engage rotors shall not be granted unless tiedown configuration conforms with the NATOPS flight manual. Failure to comply may result in ground resonance.

4. True wind, relative wind direction and velocity shall be passed to the pilots by a prearranged method (e.g., chalkboard, radio) prior to blade spreading or rotor engagement and immediately prior to launch.

4.6.4 Recovery Tiedown Procedures. Chocks and tiedowns shall be applied after landing upon signal from the LSE when directed by the aircraft commander and will remain attached until the aircraft is ready for launch. Short-duration on-deck times, such as when rapidly loading troops or material, require that the aircraft be chocked only. If high-point tiedowns are required while disengaging or while rotors are turning, the tiedowns should be installed with sufficient slack so that they will not become taut during normal deck evolutions. No tiedowns shall be installed that violate the individual aircraft NATOPS flight manual.

CAUTION

Use of NWC-3 size chocks is required for H-2 helicopters. Use of the larger NWC-4 chocks may cause damage to electrical switches mounted on the main landing gear. When the ship is rolling or pitching significantly, chocks may remain in place during takeoff at the discretion of the plane commander to preclude the helicopter from skidding or sliding. Whenever tiedowns are applied, the pilot shall be notified of the number used. When tiedowns are removed for takeoff, they shall be shown to the pilots by the chock/tiedown men and the number removed shall be indicated to the pilots by the LSE.

The pilot of an aircraft on deck with rotors turning shall be informed by radio of an impending turn. In no case shall the aircraft be moved while the rotors are turning.

On some helicopters, landing gear and ordnance safety pins must be removed after rotor engagement and inserted prior to disengagement. An aircrewman should remove or install all safety pins to ensure proper removal or installation.

Note

When helicopters are to be moved in moderate to heavy seas, consideration should be given to having aircraft fully refueled prior to moving, thereby lowering the aircraft's center of gravity.

4.7 AVIATION FUELING (JP-5)

Aircraft are normally fueled as soon as possible after recovery. It is the responsibility of each plane captain to ensure that his aircraft is refueled after each flight or maintenance turnup.

Fueling/defueling shall be conducted in accordance with the NAVSHIPS Technical Manual, S9086-S P-STM-010/Chapter 542; NAVAIRINST 10340.3; TYCOM instructions; and applicable helicopter NATOPS flight manuals.

CAUTION

To prevent damage to the aircraft's internal fuel system, the ship's primary fuel pressure control system must be configured and adjusted to limit pressure at the refueling nozzle to a maximum of 55 PSIG static/deadhead.

Fuel shall be flushed through the refueling hose and nozzle back into ship's storage tanks for a minimum of 2 minutes prior to refueling aircraft. During this flushing step, a fuel sample shall be taken from the nozzle and inspected in accordance with NAVAIRINST 10340.3B and current PMS.

WARNING

- Aircraft shall not be refueled if fuel is not clear and bright, contains more than 2 mg/L sediment, or contains more than 5 ppm water.
- To prevent damage to the aircraft's internal fuel system, ships must not under any circumstances increase fuel pressure at the deck edge beyond 55 PSIG unless the ship is equipped with both the NHC CCR nozzle and the pressure-regulated D-1 nozzle (i.e., with yellow band) and TYCOM authorization has been obtained.

Note

NAVAIR has authorized use of 55-psi hose-end pressure regulators (identified by a yellow band) on D-1 nozzles for on-deck refueling of all helicopters and HIFR of NATO helicopters. When a ship has both the hose-end pressure regulator installed on the D-1 nozzle and an NHC HIFR assembly, the pumping pressure can be adjusted, with TYCOM authorization, to optimize fuel flow.

Once an aircraft has been defueled, the drained fuel shall be disposed of in a suitable manner. Under no circumstances shall a helicopter be refueled with the same fuel that was withdrawn.

4.7.1 General Safety Precautions. The following safety precautions apply to operations involving aviation fuel.

1. Aviation fuel shall not be handled in open containers.
2. Waste or rags soaked in aviation fuel shall be properly disposed of as soon as possible and shall not be left about the deck.
3. No lights, except safety lights, shall be introduced into any compartment or space where aviation fuel or flammable fumes are present.
4. Transfer of aviation fuel shall not be made without notifying the engineering officer.
5. Aviation fuel shall not be discharged overboard without the permission of the commanding officer.
6. Lighted cigarettes or exposed flames of any kind shall not be permitted in the vicinity of tanks, pipes, or containers carrying aviation fuel.
7. Fuel shall not be issued for any purpose other than fueling.
8. Personnel shall avoid breathing aviation fuel vapors over long periods.
9. If skin or clothing has come in contact with aviation fuel, personnel shall wash with soap and water as soon as possible.
10. Personnel handling fuel shall wear protective goggles to prevent eye injury.
11. All the measures prescribed for quality control of the fuel being transferred shall be complied with prior to fuel delivery.
12. The smoking lamp shall be out in the vicinity of the helicopter during fueling operations.
13. Firefighting stations in the vicinity shall be manned when fueling or defueling is in progress.
14. All personnel are to exercise extreme caution and be on the alert for dangerous situations that may occur.
15. Refueling shall be secured when any fuel spillage is noted and not continued until the spillage has stopped and the residue is cleaned up and necessary repairs have been completed.

WARNING

Any refueling nozzle (SPR, CCR, or gravity) that leaks, works incorrectly, or has broken, damaged, or missing parts shall be immediately removed from service. Continued use may result in a fuel spill, fire, or damage to aircraft.

16. Only those members of the flightcrew, helicopter detachment maintenance crew, and ship's refueling crew considered necessary for the conduct of the fueling operation should be in the vicinity of the aircraft.

17. Fueling operations should be secured during thunderstorm conditions.

18. The aircraft shall be grounded to the deck prior to attaching the fuel nozzle. Upon completion of fueling, disconnect the fuel nozzle prior to removing the aircraft grounding wire.

WARNING

Failure to ground the aircraft to the deck prior to connecting the fuel nozzle could result in injury to the refueling crewmen.

19. During all night fueling operations, the use of fueling signals and signal wands is mandatory by fuel crew personnel.

20. During all refueling/HIFR operations, emissions from radar antennas represent a potential safety hazard. All aircraft-transmitting equipment, including Doppler radar, tacan, and IFF, must be OFF/STANDBY. Ship radars and radio antennas near the refueling areas should not be used.

21. Engine starts/turnups shall not be commenced while the fueling hose is connected to the aircraft.

4.7.2 Fueling On Deck

4.7.2.1 Gravity Fueling Procedures. The supervisor of the fueling operation shall check with the pilot regarding the amount of fuel required. Helicopter detachment personnel shall monitor the fueling operation and shall determine the fuel cutoff quantity if less than a full load is desired.

WARNING

Gravity refueling shall not be conducted while engines or APUs are running.

4.7.2.2 Pressure Refueling Procedures With Aircraft Shut Down. Pressure refueling with aircraft shut down is the normal procedure for refueling a helicopter. The aircraft will be completely shut down and only the aircrew, applicable helicopter detachment personnel, refueling party, and fire party need to remain on station. Additional information on pressure refueling can be found in the applicable aircraft NATOPS flight manual.

CAUTION

Some Army helicopters have 15 PSIG (max) internal fuel systems. U.S. Army and U.S. Air Force CCR nozzles have 15 psi pressure regulators and do not have all the safety features of USN CCR nozzles. Also, USN CCR nozzles have 45-psi pressure regulators. Use of USN CCR nozzle on a 15-psi aircraft system may damage the aircraft's fuel system. Use of the Army/Air Force CCR nozzle is prohibited unless operational necessity requires its use or a waiver is granted by the TYCOM due to the nature of the operations. Gravity refueling of these U.S. Army aircraft is acceptable.

Note

Except for the above, pressure refueling of Army helicopters is preferred over gravity refueling for safety reasons.

4.7.2.3 Hot Refueling (Engines Running) Procedures. Helicopters equipped for pressure refueling may be hot refueled during training, operational, and combat situations. Hot refueling shall be accomplished with the permission of the commanding officer or his duly authorized representative, usually the aviation officer/HCO.

The duties of the LSE during hot refueling operations are:

1. Position himself where he can see the pilots, fueling station operator, nozzleman, and fire party.

2. Make fuel samples available to the flightcrew for inspection prior to the commencement of fueling.

3. Verify with the pilot the intended fuel load.

4. Receive a thumbs-up from the pilot, nozzleman, and fire party leader prior to signaling commencement of pumping.

5. Signal the fueling station operator to commence and cease delivery at appropriate times.

6. Ensure that all refueling personnel, equipment, chocks, and tiedowns are clear. Hold up chocks and chains for the pilot to see before giving the launch signal to the pilot.

4.7.2.4 Hot Refueling Safety Precautions. During hot refueling operations, the following general safety precautions shall be observed.

1. In all cases, the procedures for hot refueling shall be conducted in accordance with the NAVSHIPS technical manual and applicable helicopter NATOPS flight manuals. The aircraft shall be chocked and the initial tiedowns applied as depicted in Appendix B.

WARNING

During hot refueling, ship maneuvering should be minimized to preclude excessive deck motion. Excessive deck motion may cause tiedowns to break with the possible loss of aircraft and crew.

2. All personnel movements from one side of the helicopter to the other shall be via the nose. Under no circumstances should any personnel work near a tail rotor.

3. Any passengers on board the helicopter shall be debarked prior to commencement of hot refueling.

4.7.3 Helicopter In-Flight Refueling. HIFR has become commonplace and has increased helicopter capabilities. All HIFR ships shall be equipped with either a North Island (NI) (Wiggins) rig (see Figure 4-7) or an NHC HIFR assembly (Figure 4-8), both of which allow for rapid emergency breakaway. The NHC HIFR assembly is being phased into the fleet to replace the NI (Wiggins) rig.

WARNING

The two HIFR rigs have different emergency breakaway systems. The NI rig has a manual emergency breakaway that requires a crewman in the helicopter to pull a lanyard to effect release. The NHC HIFR assembly employs an automatic breakaway coupling that will release when a tensile force of 450 pounds is exerted by the helicopter on the coupling.

Note

Until the early 1990s, the HIFR connections installed on all Navy, Marine Corps, and Coast Guard aircraft were the CCR (Wiggins) type, while NATO helicopters used the SPR (compatible with the D-1 nozzle) type. Navy and Marine Corps aircraft are now being procured with the SPR type connection.

A sample fueling station bill is shown in Figure 4-9.

4.7.3.1 North Island (Wiggins) HIFR Rig. The NI HIFR rig is illustrated in Figure 4-7.

CAUTION

The NI rig can be connected backward. Ensure that the long end (i.e., end with grounding plug) of the hose fitting is the free end and delivered to the aircraft. This will allow enough slack in the hose to ensure coupling of the rig to the helicopter HIFR fitting and will ensure proper connections for emergency breakaway capability.

Note

The configuration of the SH-3H helicopter requires a greater length of hose between the HIFR saddle and the aircraft fuel connection than is normally required for other models of the SH-3 helicopter. Prior to any HIFR operations involving SH-3H aircraft, inspect the NI HIFR rig and adjust the saddle as necessary to provide the maximum length of hose available between the saddle and the nozzle.

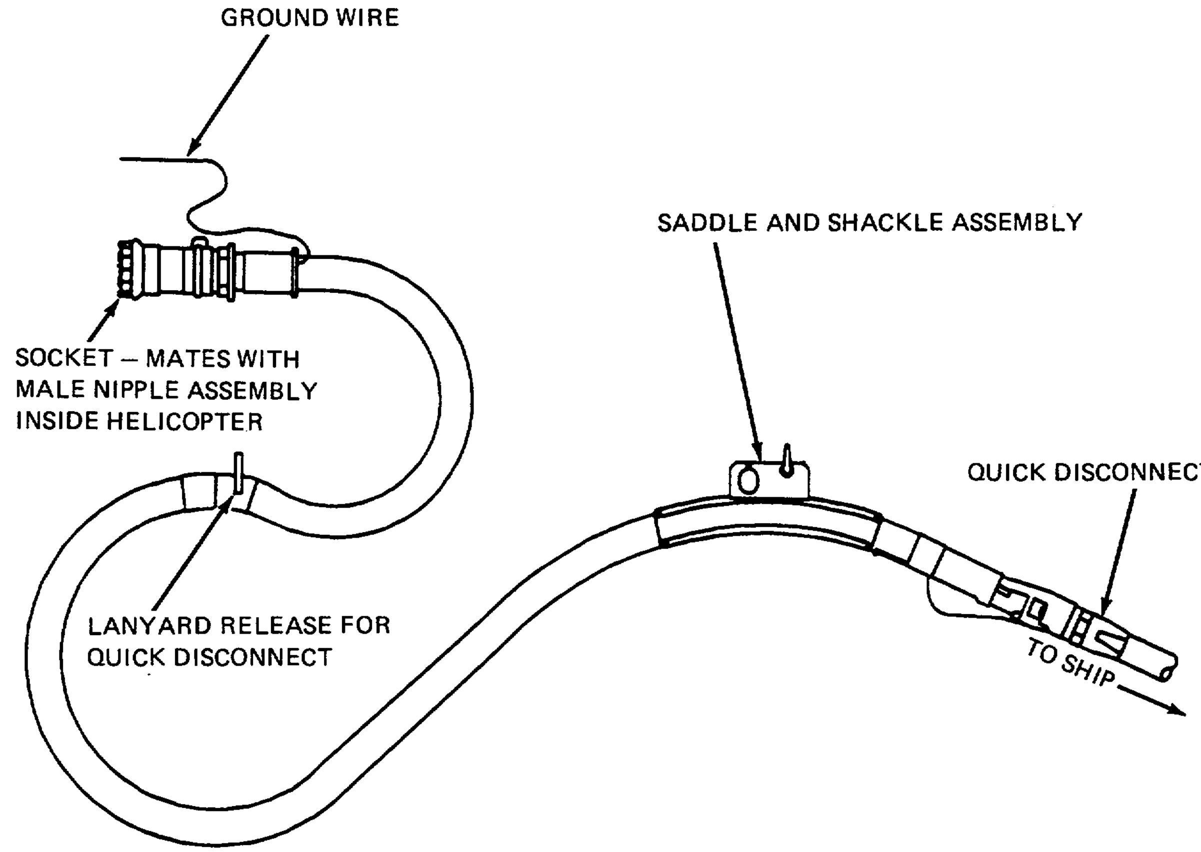


Figure 4-7. North Island (Wiggins) Helicopter In-Flight Refueling Rig

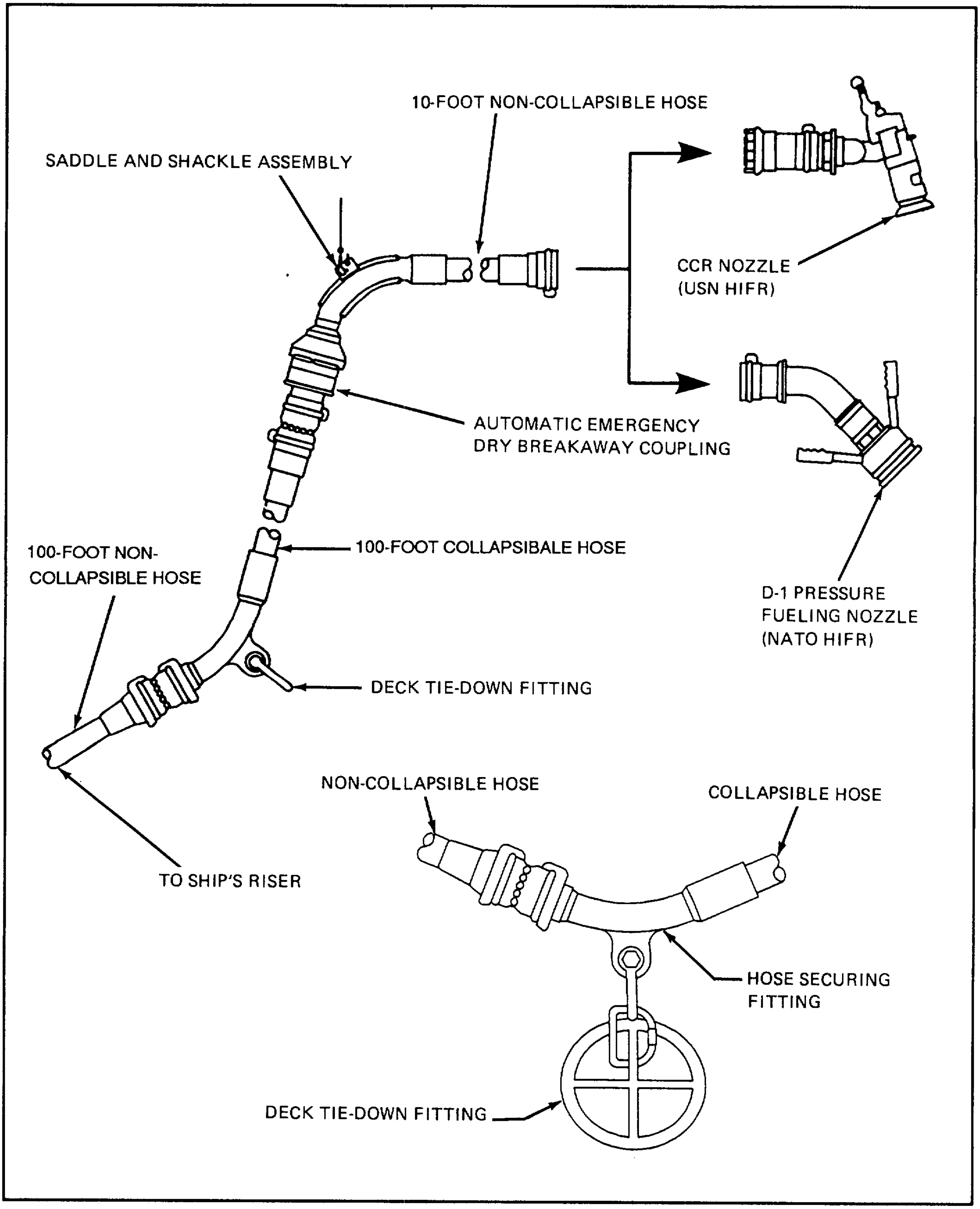


Figure 4-8. NATO High-Capacity Helicopter In-Flight Refueling Assembly in Standard NATO and U.S. Navy Configurations

DIVISION/OFFICER	STATION	PROVIDE	DUTY
FIRST LT	Flight Deck	Day — Red and green paddles Night — Red and green wands	OIC visual signalman
FIRST	Fantail	Night — Red and green wands	Visual signalman
FIRST	Fantail	NI (Wiggins) rig or NHC assembly	Tend fuel line (applicable for overfueling)
ENG/AVIATION FUELS OFFICER	Flight Deck		OIC of fueling system and firefighting party
R	Flight Deck	Sound-powered phones/IVCS	4-JG or 4-JV talkers
R	Pumping Station	Sound-powered phones/IVCS	4-JG or 4-JV talkers
R	Pumping Station		Man purifier and transfer valves
FIRST	Flight Deck	Sound-powered phones	JG JV talkers
R	Flight Deck	Sound-powered phones	Tend fuel outlet valve

Figure 4-9. Sample Fueling Station Bill

In cases of operational necessity when the NHC HIFR assembly is not available, ships that are equipped with the NI (Wiggins) rig can also HIFR NATO helicopters provided they attach an SPR nozzle (or D-1) to a quick-disconnect coupling containing a strainer (screen) and a male Wiggins coupling. With this apparatus coupled to the aircraft end of the HIFR rig, ships may conduct HIFR operations with NATO helicopters. In cases of operational necessity, the H-3 helicopter may be refueled using the D-1 nozzle by connecting it to the refueling port outside the aircraft immediately below the starboard cargo door. Refueling of the AH-1W aircraft using the Wiggins nozzle for pressure fueling is not authorized.

CAUTION

The pilots of NATO aircraft must be informed that the emergency breakaway system is manually activated on this rig and requires aircrewman action.

Since most NATO helicopters do not have a check valve in their system, caution must be exercised to preclude siphoning fuel from the helicopter.

CAUTION

The pilots of NATO aircraft must be informed to monitor their fuel gauges.

4.7.3.2 NATO High-Capacity HIFR Assembly. The NHC HIFR assembly is illustrated in Figure 4-8. A CCR nozzle with manual on-off flow control is provided with this assembly for use during HIFR operations with Navy, Marine Corps, and Coast Guard aircraft. The CCR nozzle provided with the NHC assembly contains a 45-psi pressure regulator to prevent overpressurizing the helicopter's fuel systems. To HIFR NATO helicopters, the CCR nozzle must be replaced with the D-1 nozzle. The NHC assembly is laid out on deck as illustrated in Figure 4-10 in preparation for a HIFR evolution.

WARNING

The two-position unloader valve shall not be placed in the HIFR (override) position when using the NI HIFR rig. If the unloader valve is operated at the high-pressure setting using the NI HIFR assembly, delivery fuel pressure could exceed 55 PSIG.

CAUTION

When the NHC assembly is used, the collapsible hose must be attached between the emergency breakaway fitting and the deck securing fitting. If the noncollapsible hose is installed in place of the collapsible hose, its weight when filled with fuel may overload the aircraft's hoist.

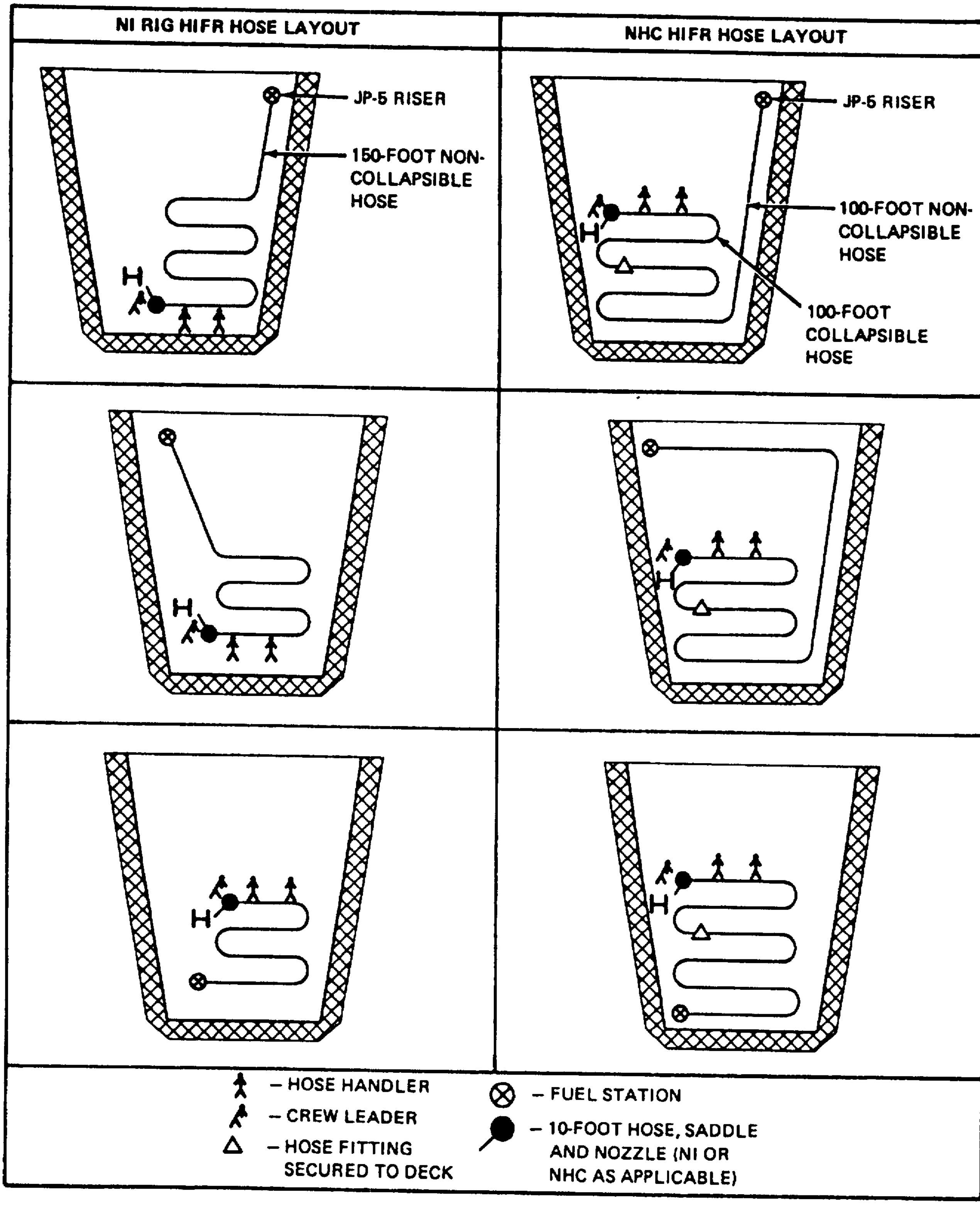


Figure 4-10. NATO High-Capacity and North Island Rig Helicopter In-Flight Refueling Hose Layout

The hose tiedown fitting that connects the two 100-foot lengths of hose must be attached to a helicopter securing deck fitting. Starboard and aft of the HIFR "H," as illustrated in Figure 4-9, is recommended.

WARNING

Since the NHC assembly is fitted with an automatic emergency breakaway coupling vice a manual coupling, the hose must be secured to the deck in order for the breakaway system to function properly.

4.7.3.3 Personnel Duties. Duties of personnel during HIFR are:

1. The aviation officer/HCO shall ensure that a flight deck officer/LSE and the flight deck crew are in position during HIFR operations.

2. The engineering officer/aviation fuels officer on air-capable ships is responsible to the commanding officer for the entire aviation fuel system. This includes care and maintenance of the HIFR system. He/she should ensure that adequate personnel are PQS-qualified and assigned to meet fueling requirements, and that fuel quality control and surveillance standards are maintained in accordance with paragraph 4.5.4.

3. The DCA on air-capable ships shall ensure that the helicopter fire party is properly organized and trained.

4. The FDO/LSE shall ensure that personnel not concerned with the refueling are kept clear of the area.

5. The officer/petty officer in charge of the fueling station shall ensure that the fueling equipment is in a good state of repair and shall notify the FDO when ready for HIFR operations. He/she is responsible for maintaining the fueling equipment and for ensuring that fuel is examined and tested prior to commencement of refueling operations.

6. The HCO shall ensure that HIFR lights are operational and illuminated during HIFR operations.

7. The deck crew must consist of a crew leader and at least two hose handlers. The crew leader is responsible for using the grounding wand to discharge static electricity and ensuring that a hose handler properly attaches the HIFR assembly to the hoist hook. The hose handlers are responsible for minimizing the slack in the HIFR hose during the refueling evolution.

4.7.3.4 HIFR Safety Precautions. The following rules of safety shall be observed by all personnel involved in HIFR operations.

1. The grounding circuits on the jacks, clip, nozzle, hose, and saddle shall be checked for circuit continuity.

2. The pressurized hose shall be checked for leaks during flushing operation by closing ship's adapter cutoff valve.

3. The hose shall be depressurized prior to aircraft pickup.

4. If installed, the HIFR fuel sample fitting shall be closed prior to passing the hose up the hoist to the helicopter.

5. All flight deck safety nets (if applicable) and other obstructions shall be lowered.

6. The entire area of the ship that is subject to helicopter rotor wash shall be inspected for the removal of all FOD.

7. The rescue boat shall be made ready and the boat crew shall be on station.

8. All hatches and scuttles in the refueling area shall be secured.

9. The HIFR hose-handling crew must be positioned on the deck as illustrated in Figure 4-9.

WARNING

To prevent becoming tangled in the HIFR hose when the aircraft moves away from the ship before transferring fuel or when the hose is rapidly played out in an emergency breakaway, the deck crew must not stand between the hose securing point and the HIFR hose saddle pickup point (HIFR "H" deck marking).

10. Personnel must not touch the hoist cable/hook as it is lowered from the helicopter unless it is in contact with the grounding wand.

WARNING

Static electricity discharge may be dangerous. See Chapter 5 for important procedures and equipment to discharge static electricity.

4.7.3.5 Helicopter In-Flight Refueling Procedures

1. The ship will place the relative wind 30° off the port bow at 15 knots or more, or as recommended in Appendix B. This will optimize wave-off conditions should the helicopter experience an inflight emergency. The fueling equipment should be prepared and laid out as shown in Figure 4-9, with the saddle pickup point located near the HIFR "H" deck marking. To facilitate hose handling in the helicopter when using the NHC HIFR assembly, the nozzle must be attached to the pickup saddle, as illustrated in Figure 4-11.

2. The helicopter will make an approach, hover over the HIFR "H" marking, and lower its hoist hook. Ship's refueling personnel shall then use the grounding wand to touch and remain in continuous contact with the helicopter's hoist cable to release the static charge from the aircraft. After the static charge has been released, the hook is attached to the HIFR saddle, which is then hoisted into the aircraft.

WARNING

Under no circumstances shall the helicopter's hoist cable be secured to any part of the ship.

3. If the pilot desires to see the fuel sample, he should request it prior to HIFR hookup and furnish a bag for pickup.

4. The HIFR hose shall be hoisted to the helicopter unpressurized, but full of fuel. Air in the HIFR hose will create an electrical charge on the aircraft's internal fuel filter elements and may damage equipment.

5. When the fueling hose is hoisted, the aircrewman shall first attach the grounding wire to the airframe, and then attach the nozzle to the pressure fueling port. The helicopter will then move clear of the deck to port. The aircrewman will then signal to commence fuel delivery.

WARNING

Ship's personnel must not pressurize the HIFR hose prior to receiving the "Commence fuel delivery" signal from the aircrewman. When using the NI rig, a pressurized hose could prevent hookup between the nozzle and the pressure fueling port and can result in a fuel spill inside the aircraft cabin.

6. The deck crew leader shall signal the pilot when fuel delivery begins.

7. When fueling is completed, the aircrewman shall signal to stop fuel delivery. The helicopter will then be repositioned over the deck. The hose will be disconnected and lowered.

8. The hand signals appropriate for HIFR are given in NAVAIR 00-80T-113.

Note

Radio communications are essential for backup exchange of information.

9. During fueling operations with the helicopter hovering clear of the ship, the fueling hose shall be tended by at least two men to prevent excess slack from developing in the hose.

Note

Both the NI and NHC HIFR assemblies are equipped with an emergency quick-disconnect coupling. Whenever this quick-disconnect feature has to be used, the fuel pump should be shut down immediately. The HIFR assembly remains with the helicopter, while the hose falls to the water. Before the equipment is used again it should be thoroughly flushed with fuel.

10. During HIFR of an H-53E, the deck crewmember manning the grounding wand (NSN 1RW4920-01-192-5535QH) shall wear insulated Class III, Type I (26,500-volt) rubber gloves. He/she shall not be used to tend the fueling hose.

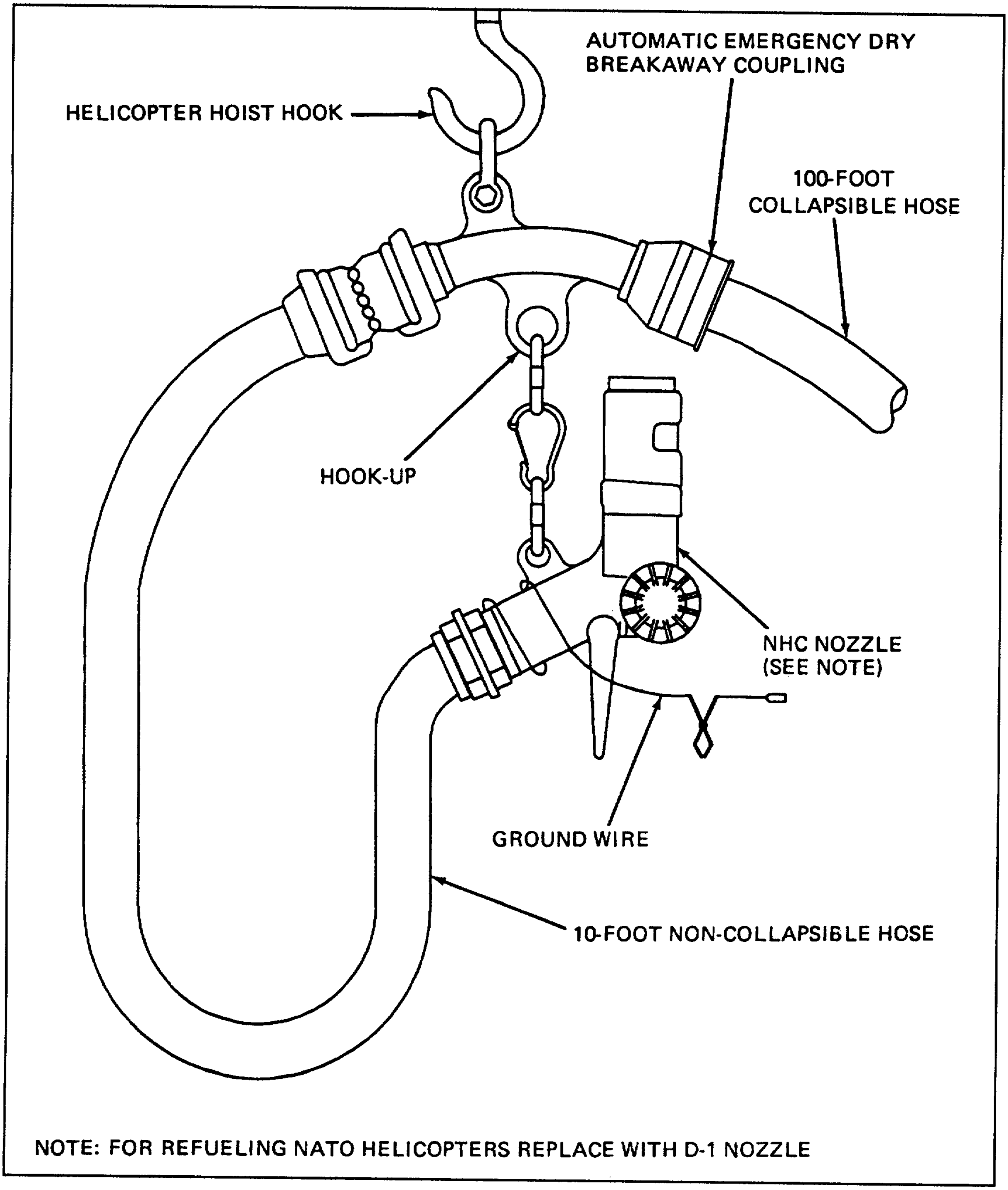


Figure 4-11. NATO High-Capacity Assembly Attached to Helicopter Hoist Hook

4.7.3.6 Additional Procedures/Conditions for Helicopter In-Flight Refueling at Night. Practice night HIFR evolutions should not be performed because of inherently greater risks to aircrew and flight deck crew. In other than cases of operational necessity, the following conditions shall exist:

1. A visible natural horizon as viewed by the pilot.

2. Ship motion should not exceed 5° pitch and 10° roll.

WARNING

Night HIFR evolutions involve inherently greater risk to flightcrews and flight deck personnel. Extreme caution should be exercised in planning and conducting night HIFR evolutions.

3. Turn on the HIFR heading lights and position the LSE with both amber wands at the helicopter control point.

4. Establish radio contact with the helicopter and pass the ship's course and speed, pitch and roll, and relative wind.

4.7.4 JP-5 Fuel Analysis. JP-5 purity, testing, and sampling criteria for acceptance or rejection shall be accomplished in accordance with NAVAIRINST 10340.3 and current PMS procedures. A partial list of laboratories for testing JP-5 is in Appendix G. For a complete list, refer to NAVAIRINST 10340.3.

4.8 LAUNCH/RECOVERY PROCEDURES

4.8.1 Launch Procedures

1. Engagement, launch, and recovery wind envelopes shall be available for use by the OOD/HCO/LSO during flight operations.

2. The 1 JV/JL/JG phone circuits are manned as appropriate.

3. The OOD ensures that the rescue boat is fully prepared and that the boat crew is detailed and available for launch if required.

4. Obstructions such as guns, antennas, cranes, flagstaffs, and lifelines are lowered, trained clear, or unrigged.

5. Ensure that antennas are de-energized prior to lowering or unrigging.

WARNING

Failure to de-energize antennas could cause radiation hazard.

6. Prior to starting engines, conduct a complete FOD walkdown of the flight deck and adjacent topside areas.

WARNING

- Cloverleaf deck tiedown fitting covers are an FOD hazard and shall be removed prior to flight operations.

- Cloverleaf deck tiedown fittings require 5/8-inch shackles and bulb hooks to correctly attach TD-1A tiedown chains to the deck. Installing chains without shackles and bulb hooks substantially reduces breaking strength and working load.

7. Clear the flight deck of all unnecessary personnel. All flight deck personnel shall utilize the appropriate flight deck clothing and required equipment.

8. The firefighting party is stationed.

9. The OOD displays Hotel/Hotel One at the dip and a red deck signal from the bridge to the HCS.

10. The OOD should maneuver the ship to obtain optimum wind conditions. The ship shall maintain a steady course and speed during rotor engagement/disengagement.

11. The helicopter pilot shall be informed of the wind direction and velocity relative to the ship's centerline prior to starting engines.

12. When signaled by the LSE, the helicopter pilot starts engines.

13. The HCO or LSO (on RAST-equipped ships) obtains permission from the bridge to engage rotors. He then displays an amber deck signal and passes "Engage rotors" to the LSE.

14. The pilot signals when he is ready to engage rotors.

15. The LSE ensures that the area is clear, that only required tiedowns are attached, and that tiedowns are slack to prevent instability or ground resonance.

WARNING

- Maintain steady course and speed, within appropriate wind envelope.
- Upon completion of rotor engagement, ship maneuvering must be carefully considered to preclude excessive deck motion causing tiedowns to break, with the possible loss of aircraft and crew.
- Do not walk under the rotors until they have either stopped or come up to full speed.
- Personnel shall stay clear of and not pass under the tail rotor of a single-rotor helicopter.

16. When all prelaunch checks are completed and the pilot is ready for launch, the pilot gives the LSE a thumbs-up signal and transmits his request to HCS, or, at night, the pilot turns the aircraft's navigation lights on to steady dim.

17. HCS or LSO (on RAST-equipped ships) reports to the bridge "Ready for launch."

18. When the ship is on a steady course, the OOD orders "Hotel close up" and gives HCS a visible green deck signal or passes "Green deck" over a sound-powered phone or MC circuit. Immediately prior to launch, the helicopter pilot shall be informed of the true wind, relative wind, and pitch and roll.

19. After the green deck signal is displayed on the flight deck for launch, the tiedowns may be removed. For SH-60B helicopters on RAST-equipped ships, after launch signal obtained from OOD, amber deck is displayed on the flight deck for breakdown, followed by green deck for launch.

20. The LSE signals for tiedown removal when requested by the pilot. The main mount tiedowns and chocks should then be removed as expeditiously as possible. For SH-60B helicopters on RAST-equipped ships, after LSE signals aircraft clear, he/she should leave the flight deck. The pilot shall not commence takeoff until he/she has received green deck and clearance from the LSO.

WARNING

When removing tiedowns from helicopters equipped with tailwheels, the tail tiedowns shall be removed first.

Note

On pitching/rolling decks, pilots may request to take off from the chocks.

21. Tiedowns shall be carried within the field of vision of pilots, and tiedown personnel shall be acknowledged by the pilots. The LSE shall point to the chocks and tiedowns and indicate by fingers the number of tiedowns removed, followed by a thumbs-up signal. The LSE then rechecks that the aircraft is clear of equipment and personnel. The LSE also checks that all airborne aircraft are clear of the launch area, and only then gives the lift signal to the helicopter. The pilot shall not commence takeoff until he has received this signal from the LSE.

22. When the helicopter is safely airborne and it is not returning immediately, the OOD orders "Hotel at the dip" and gives HCS a red deck signal or passes "Red deck" over a sound-powered phone or MC circuit. If appropriate, the OOD may secure from flight quarters after receiving "Operations normal" report from the pilot.

4.8.2 Troubleshooter Signals. The pilot indicates a need for a maintenance troubleshooter by forming a "T" using both hands. The type of maintenance personnel required is then indicated using the following signals:

1. One-finger — AD type (mechanical)
2. Two-finger — AE type (electrical)
3. Three-finger — AM type (airframes)
4. Four-finger — AO type (ordnance)
5. Five-finger — AT type (avionics).

4.8.3 Recovery Procedures. Initial procedures and responsibilities for recovery are the same as for launch.

1. Flight quarters set.

2. Phone circuits manned.

3 Rescue boat prepared.

4. Obstructions cleared.

5. FOD walkdown completed.

6. Flight deck manned and crew appropriately attired.

7. Firefighting party stationed.

8. Hotel/Hotel One at the dip and red deck signal displayed.

9. Ship maneuvered for optimum relative wind.

10. When all preparations are completed, HCS reports to the bridge "Ready for recovery."

11. When the ship is on a steady course, the OOD orders "Hotel close up," and gives HCS a visible green deck signal or passes "Green deck" over a sound-powered phone or MC circuit.

12. HCO or LSO (on RAST-equipped ships) displays a green deck signal on the flight deck and passes "Recover helicopter(s)."

13. HCS passes appropriate environmental information including but not limited to pitch and roll, relative wind, true wind, and barometric altimeter setting to the pilot(s) and receives "Gear down" and "Seat flying the approach" reports from the pilot(s). The aircraft is then given clearance to land.

WARNING

Aircraft recovering aboard an air-capable ship with fuel other than JP-5 shall notify the commanding officer prior to recovery.

14. The LSE takes a position that is clearly visible to the pilot making the approach. In dual-piloted, side-by-side seating helicopters, landings are normally made by the pilot on the right side; however, this does not preclude the pilot on the left side from making the landing. It is necessary for the LSE to shift position to his right in order to maintain visual contact with the left-seat pilot during the critical transition from approach to landing. The LSE should always be in a position that enables him to see the eyes of the pilot making the landing; this eye-to-eye contact will ensure that the LSE and his signals are seen by the pilot. The LSE shall be informed by HCS which pilot is operating the aircraft. Position lights shall be placed on steady if the right-seat pilot is making the landing, and flashing if the left-seat pilot is making the landing. By day, to avoid confusion as to which pilot is flying the approach, the pilot not flying the approach shall wave his arm outside the cockpit as an indication to the LSE. If the LSE is not in position to provide guidance to the pilot actually making the landing prior to the helicopter crossing the deck edge, then the pilot shall execute a wave-off.

15. When the helicopter has landed and when requested by the pilot, insert chocks and attach tiedowns.

16. HCS displays a red deck signal.

17. If a final recovery, the OOD shall maintain a constant relative wind across the deck while rotors are disengaged, display a red deck signal to HCS, and haul down Hotel.

18. When prepared for disengagement/shutdown, the HCO, with concurrence of the OOD, will direct the LSE to signal the aircraft to disengage. The LSE shall ensure that wheels are chocked, personnel are clear of rotors, and that tiedowns are properly installed. The pilot shall disengage rotors only on signal from the LSE.

4.8.3.1 Auxiliary Fuel Tanks. The H-53 and AH-1 auxiliary fuel tanks are capable of being jettisoned. After landing, flight personnel shall remain clear of the aircraft until the auxiliary tank safety pins have been installed. Normally this will be done by the crewchief on the H-53. For the AH-1, this will be accomplished by squadron personnel if they are aboard the ship or by trained flight deck personnel from ship's company. If neither is available, the copilot will pin the tanks after landing and remove the pins prior to takeoff.

4.8.4 Safety Precautions. The following precautions shall be observed when recovering helicopters.

1. Except in cases of emergency, pilots shall not disengage, stop engines, or fold rotor blades without proper signal from LSE.

2. Helicopters shall not be launched or recovered nor shall rotors be engaged or disengaged while ship is turning.

3. Personnel required to be in the area of helicopters that are disengaging rotors shall stand next to the fuselage or well outside the rotor arc.

4. A helicopter shall not be flown over another helicopter when landing.

5. Helicopters shall never be towed or pushed while rotors are engaged or while the ship is turning.

6. The wave-off and hold or stop signals are mandatory and shall be executed immediately.

7. Helicopters shall not be ground taxied on the flight deck.

8. When changing pilots or hot refueling, the aircraft shall be chocked and have tiedowns attached. Aircraft should be chocked (minimum) for passenger loading.

9. Because of the limited size of the landing area, aircraft shall not be loaded/unloaded while an aircraft is landing/launching on an adjacent spot.

10. During combined wet well/flight deck operations, aircraft shall avoid overflying landing craft at low altitude.

11. When staging deck cargo, the air officer/HCO should ensure that sufficient clear space is available for possible emergency landing. Complete staging of the flight deck is permissible, provided another ready deck is available.

12. For special and tactical operations, such as troop assault, SEAL insertion, troop recon operations, etc., members of those parties may be waivered from wearing normal cranial and lifevest protection due to their environmental/situational clothing, the brief duration of the flight, and requirement to debark quickly.

4.8.5 Additional Preparations for Night Operations. Night launching and recovery operations of helicopters are the same as day with the following exceptions.

1. The LSE shall be provided with lighted wands.

2. Flight deck personnel shall utilize clear lens in goggles.

3. The helicopter(s) and rescue boat(s) shall be equipped with night signaling equipment during all night operations.

4. Ship's lighting shall meet certification standards set forth in the Air-Capable Ships Aviation Facilities Bulletin No. 1.

5. At least 1 hour (see Note) and preferably 6 to 12 hours before scheduled helicopter operations, the VLA lighting and approach systems should be energized and checked for proper operation. The SGSI system must be energized in standby mode a minimum of 4 hours before scheduled helicopter operations. The SGSI shall remain on during the entire period of night flight operations. During cold-weather operations, consideration should be given to early activation of the SGSI to provide sufficient warmup time.

Note

One hour will assure only 30 minutes for checkout of the SGSI system, since up to 30 minutes is required for stabilization after the POWER ON button on the SGSI remote control panel (F200) is depressed. Step-by-step startup procedures for the SGSI system are provided in NAVAIR 51-5B-2.

Since the operator at the HCS will not be able to see all of the lights, assistance will be required from shipboard personnel to observe that the lighting and approach systems are functioning properly. Actual lighting control settings are determined by the time of day, weather condition, and personal preference of the helicopter pilot. For startup, intensity controls may be left at the setting used during the previous helicopter operation. However, as a precaution, any controls set at maximum intensity (fully clockwise) should be reset to 50 percent of maximum or as indicated in NAVAIR 51-50ABA-1.

6. Information for operating the various VLA lighting systems and a functional description of controls and indicators are provided in the technical manuals indicated:

   a. SGSI — NAVAIR 51-5B-2

   b. Wave-off light system — NAVAIR 51-5B-3

   c. FFDSSS — NAVAIR AD-400B1-OMI-000

   d. HRS — NAVAIR AD-400A1-OMI-000

   e. Deck status light system, deck edge lights, lineup lights, and all other VLA lighting systems — NAVAIR 51-50ABA-1.

4.8.6 Flight Quarters Clothing. Clothing requirements for flight deck personnel are as shown in Chapter 2. Colors to be used are shown in Appendix E.

4.8.7 Wind and Deck Limitations. Safe helicopter launch/recovery operations require strict adherence to prescribed wind and deck limitations for the type helicopter and class ship involved. Commanding officers should not hesitate to establish more restrictive limitations in the interest of safety. For day/night and IFR launches and recoveries, or recoveries of helicopters with malfunctioning stabilization equipment, compliance with Figure B-1 is mandatory, if not in receipt of a specific launch/recovery wind envelope diagram.

WARNING

> To avoid the possibility of loss or damage to the helicopter, the ship shall not change course or speed during launch/recovery, during rotor engagement/disengagement, or at any time that the aircraft is not tied down on board air-capable ships. Emergency conditions may preclude adherence to the above, in which case immediate notification to the pilot is mandatory.

Wind limitations for rotor engagement/disengagement are provided in Appendix B. The probability of damage increases sharply when wind gusts exceed 10 knots. The maximum safe nonturbulent wind, in conjunction with excessive ship pitch and/or roll, can make operations with helicopters unacceptably hazardous and should be taken into consideration prior to launch/recovery.

Common sources of turbulence are:

1. Stack gases/wash
2. Ship superstructures
3. Deck protrusions
4. Rotor wash caused by the takeoff and landing of adjacent helicopters.

All available launch/recovery wind limits are provided in Appendix B. When the limits for a particular combination of helicopter and ship are not provided, the envelope shown in Figure B-1 is mandatory. In high wind and sea conditions, a downwind heading may provide a more stable platform and optimum relative wind conditions.

Considerable difference exists between the flight deck winds and those measured by bridge-level anemometers. Because of the direct influence of the superstructure and the vertical side of the ship, flight deck/VERTREP platform winds may be slightly less but are usually far more gusty and turbulent than those at the bridge. Wind limits presented in Appendix B are based on winds measured by the installed ships' anemometers.

To afford the pilot who sits in the right-hand seat a good visual reference to the ship, all efforts will be made to use port winds. Normally the OOD will select a course that will place the relative wind on the port bow, which provides the pilot of an approaching helicopter with the proper aspect for acquiring visual references, such as marking and lighting, and the superstructure's configuration and location.

4.9 SHIPBOARD HELICOPTER CONTROL STATIONS

Flight operations shall be controlled from a location that permits maximum coordination between the ship and the operating aircraft. This station should have means for both visual and radio communication with the aircraft. Commands and display signals for various helicopter evolutions are discussed in Figure 4-12. Further information regarding visual landing aids controlled by this station are contained in Chapter 6.

WARNING

> Flight deck wave-off lights should be activated from the bridge only in emergency conditions when time or the operational situation precludes normal communications with the HCS.

4.9.1 Communications. Except for emergencies or when operating under EMCON, radio communication shall be established before commencing helicopter operations. Instructions from the HCS shall be accomplished by an announcement over the radio and a display of the appropriate signals shall be made. Commands and signals for flight deck areas are given in NAVAIR 00-80T-113.

Airborne helicopters shall be kept informed of deteriorating weather, loss of radar contact, and changes in ship's course or speed.

EVOLUTION	COMMAND (1)	PILOT SIGNAL (2)	SHIP DISPLAY	MEANING
1. Prepare to start engines	Check tiedowns, chocks, and all loose gear about deck.	Hand signal to LSE (day)/ upper anticollision light on (night)	Red signal in flight deck area	Verify chocks and tie-downs in place. Boots removed and stowed. Man fire extinguisher.
2. Start engines (3)	Start engines.	Hand signal to LSE	Red signal in flight deck area	Authority for responsible flight deck personnel to signal for starting engines. Ship not ready for flight operations.
3. Engage rotors	Stand clear of helicopter(s) engaging rotors.	Hand signal (day)/flash position lights (night)	Amber signal in flight deck area until rotors are engaged, then red signal	Ship is ready for pilot to engage rotors. Authority for responsible flight deck personnel to signal for rotor engagement if immediate area clear. Ship restricted from maneuvering and winds within engagement limits. Ship not ready for flight operations.
4. Ready for launch	Obtain permission from bridge for green deck.	Thumbs up to LSE (day)/ position lights STEADY BRIGHT (night)	Red signal in flight deck area	HCO/LSO request green deck from bridge. Ship maneuvers to flight course. Pilots finish checklist.
5. Launch	Remove all tiedowns on pilot's signal. Launch helicopter(s).	Hand signal to remove chocks and chains	Red signal in flight deck area	Ship is ready in all respects for flight operations. Ship is established on flight course and restricts maneuvering. Bridge grants green deck. Wind is within launch envelope. Authority granted to pilot in command to signal removal of chocks and chains. Authority for LSE/LSO to launch helicopter when chains are removed.
6. Operations normal report	Secure from flight quarters	Helicopter departs (day)/ turn anticollision light on or flash landing light (night).	As appropriate	Helicopter systems functioning correctly. Commencing assigned mission.
7. Helicopter(s) inbound for landing	Prepare to land helicopter(s)	See Figure 4-14.	Red signal in flight deck area	Prepare designated landing area to land helicopter(s). Ship not ready to recover helicopter(s).
8. Recovery	Land helicopters	None	Green signal in flight deck area	Ship is ready in all respects to land helicopter(s). Wind is within recovery envelope.

Figure 4-12. Command and Display Signals (Sheet 1 of 2)

EVOLUTION	COMMAND (1)	PILOT SIGNAL (2)	SHIP DISPLAY	MEANING
9. Preparation for shutdown	None	Hand signals to disengage (day)/flash position lights (night)	Red signal in flight deck area	Once chocks and chains are installed ship is free to maneuver. Pilot signals when ready to disengage, and ship obtains appropriate winds over deck.
10. Disengage rotors	Stand clear of helicopter. Disengage rotors	None	Amber signal in flight deck area until rotors stopped, then red signal	Authority for responsible flight deck personnel to signal to disengage rotors when area clear. Winds within disengagement envelope. Ship restricted from maveuvering until rotors have stopped.

Notes:

1. Deck status lights convey a condition met throughout the ship in preparation for a certain flight evolution. However, final clearance for a specific task depends upon mutual coordination among pilot, HCO/LSO, and LSE.
2. Pilot hand signals from NAVAIR 00-80T-113.
3. H-1 helicopter engage rotors simultaneously with engine start.
4. See Figure 10-3 regarding deck status lights for RAST operations with an LSO.

Figure 4-12. Command and Display Signals (Sheet 2 of 2)

The ship should have a secondary UHF radio ready to assume communications if the primary unit fails. This is especially true during night operations and during periods of reduced visibility when it is imperative that positive radar control be maintained. During the initial/final phases of departure/approach, or at other times when intensified pilot concentration is required, radio transmissions from ships should be deferred, except in case of emergency, until the aircraft reports "OPS normal" or until it is secured on deck.

Note

Ensure that own ship, or at least one ship in company, guards the military air distress frequency (243.0 MHz) at all times a helicopter is airborne. This is of particular importance when operating independently, as the pilot may attempt to communicate with his survival radio should a communication failure be experienced.

4.9.2 Emission Control. When the use of radio communications is not authorized because of the EMCON condition in effect, routine helicopter operations may be conducted by the use of visual signals. Helicopter control ships shall notify receiving ships by visual means that helicopter operations will be conducted with sufficient lead time to ensure that the receiving ship will be ready for the helicopter's arrival. Large cards displaying the ship's tactical call, communication frequency, and hull number shall be used by the control ship to inform the helicopter pilot of his destination. Signals shown in Figures 4-13 and 4-14 and NAVAIR 00-80T-113 shall be used for helicopter control. Both the helicopter and the controlling ship shall guard the helicopter common circuit, but radio transmissions shall not be authorized unless safety of flight or an emergency requires breaking EMCON.

Visual communications are extremely important. Proper use of the Hotel flag, deck status lights, and Aldis lamp signals are a valuable backup to radio communications. In the event of radio failure, routine helicopter missions can be completed by the use of visual signals. In these instances, responsibility of the ship to conform to safe operating procedures is increased. See Figure 4-15 for emergency visual signals between ships and helicopters.

Use of the radar altimeter for night or IMC flight operations over water shall not be restricted by peacetime EMCON postures. Units directed to secure the

EVOLUTION	SIGNAL FLAG DISPLAY	MEANING
1. Setting helicopter (VERTREP) detail	Hotel (Hotel One) at the dip	Ship is not ready to conduct operations. Display a red signal in helicopter operating area.
2. Ready to conduct helicopter (VERTREP) operations	Hotel (Hotel One) close up	Ship is ready to conduct operations. Display a green signal in helicopter operating area.
3. A delay or interruption of the evolution	Hotel (Hotel One) at the dip	A temporary delay in operations. The LSE shall give a wave-off to the helicopter and a red signal shall be displayed in the helicopter operating area.
4. Helicopter (VERTREP) operations are completed	Hotel (Hotel One) hauled down	Operations (transfer) are completed.

Figure 4-13. Flaghoist Signals

radar altimeter by the EMCON condition set shall advise the OTC of the requirement to use radar altimeters for all night and IMC flights over water in peacetime.

WARNING

An overdue helicopter, unplanned PIM change, rapidly deteriorating weather, or other safety-of-flight factor justifies violation of the prescribed peacetime EMCON condition. The ship shall be prepared to operate radar, tacan, and radios on short notice.

4.9.3 Military Air Distress Frequency. OTCs shall include in their communications plan the requirement that at least one ship in company with ships operating helicopters shall monitor the UHF guard/MAD frequency, because a pilot out of UHF range with his controlling ship may attempt to communicate with any monitoring ship in the event of an emergency.

4.10 AVIATION ORDNANCE

Prior to embarkation, pilots, aircrews, and squadron ordnance personnel shall familiarize themselves with the latest HERO conditions in NAVAIR 16-1-529. Special attention shall be given to ensure that all required ordnance support equipment and necessary safety devices are on board the ship.

Note

A helicopter loaded with live ordnance is a weapons delivery platform and shall not be tasked for collateral missions such as cargo/passenger transfer.

4.10.1 Personnel Certification. Each ship shall certify Navy personnel in accordance with OPNAVINST 8023.2 series. Aircraft squadrons will train and certify squadron/detachment ordnance loading personnel prior to embarkation. Ships will verify ordnance team certification prior to authorization of live ordnance evolutions.

4.10.2 Aviation Ordnance Safety Supervisors. During all aviation ordnance evolutions aboard ships, a certified safety supervisor shall be assigned for the particular evolution and shall strictly enforce safety standards. In the event of joint service aviation ordnance evolutions (other than Marine Corps), a specialized aviation ordnance safety supervisor must be requested from and provided by the cognizant TYCOM. Regardless of the situation, safety supervisors must be thoroughly familiar with this manual and other applicable directives. Safety supervisors have the authority and the responsibility to immediately halt any evolution if, in their judgment, safety is being jeopardized. An evolution so halted shall not be continued until the matter is properly resolved.

4.10.3 Hazards of Electromagnetic Radiation to Ordnance/Radiation Hazards Safety Precautions. Modern radio and radar transmitting equipment produce high-intensity radio frequency fields. Such fields can cause premature actuation of sensitive electroexplosive devices contained in ordnance systems and biological injury to personnel working in the vicinity of the radiating elements. Also, sparks or arcs caused by high-intensity fields are a potential source of ignition for fuel-air mixtures. The most susceptible periods are during assembly, disassembly, loading, or testing in electromagnetic fields. The effect of premature operation of these devices will vary with the function of the device

FROM HELICOPTER TO SHIP	
PILOT'S DESIRES OR INTENTIONS	**VISUAL SIGNAL**
1. I require immediate landing.	Fly close aboard starboard quarter, remaining clear of other traffic, with gear DOWN and floodlight/landing light ON. With complete electrical failure, fire a red flare seaward.
2. I desire to land but can wait for the next recovery or scheduled recovery time.	Fly by or hover on the starboard side of the ship, low and close aboard, with navigation lights BRIGHT and FLASHING and anticollision lights ON. With complete electrical failure, fire a red flare on a safe bearing away from the ship.
3. I desire immediate HIFR.	Fly by and return to hover on the port beam, give hand signal for "Desire HIFR," and fire flare seaward.
4. I desire to establish radio communications with you on primary helicopter control, or alternate, Fleet Common 277.8 MHz.	Fly by slowly on the port side of the ship in low-altitude tight left-hand pattern, or fire flare seaward.

FROM SHIP TO HELICOPTER		
COMMAND/ADVISORY	**ALDIS LAMP**	**BLINKER**
1. Bingo, proceed to alternate landing field.	Flashing red light	M, M — —, — —
2. Charlie, cleared to land aboard.	Steady green light	C — · — ·
3. Delta, delay in landing. Enter Delta pattern and maintain visual contact with the ship.	Steady red light	D — · ·
4. Do not land. Ditch or bail out in the vicinity of the ship.	Z — — · ·	Z — — · ·
5. Jettison ordance.	Q — — · —	Q — — · — —
6. Lower gear.	W · — —	W · — —
7. Establish radio communication on frequency 277.8 MHz.	Flashing green light	R, R · — ·, · — ·
Aircraft with radio failure will continue in standard pattern for final landing, showing a landing light abeam.		

Figure 4-14. Visual Signals Between Ship and Helicopter Under Emission Control or Lost Communication Procedures

initiated. The most likely effects are dudding, loss of reliability, or, in the case of rockets and flares, ignition of the propellant illuminant. In several electromagnetic radiation environments there is a low but finite probability of warhead detonation. It is necessary, therefore, to positively control the ship's electromagnetic environment during the presence, handling, or unloading of HERO-susceptible ordnance. A HERO analysis must be conducted on each ship to determine possible adverse interactions between transmitter/antenna and ordnance systems. Measurements must be made in stowage areas, buildup areas, ordnance work areas, and all routes where ordnance will be handled. Prior to embarkation, pilots, aircrews, and squadron ordnance personnel shall familiarize themselves with the latest HERO conditions in NAVAIR 16-1-529. NAVAIR OP 3565/NAVAIR 16-1-529, Electromagnetic Radiation Hazards (Hazards to Ordnance), prescribe detailed operating procedures and precautions for inclusion in the ship's EMCON bill.

4.10.4 Emergency Procedures. In case of a fire or danger of fire, ordnance shall be moved to a safe area or jettisoned as the situation dictates. EOD personnel or other qualified personnel shall take the necessary on-scene action to dispose of the most hazardous ordnance first.

4.10.5 Weapons Handling and Movement. The presence of airborne weapons outside of designated magazines greatly increases the danger to the ship if a fire or explosion occurs. To minimize this risk, only the quantity of weapons required to sustain operations will be transferred to the hangar or flight deck.

The weapons officer or first lieutenant is responsible for ensuring that required ordnance and handling equipment are delivered to the flight deck by the time aircraft are ready for loading. Appropriate aircraft loading manuals should be consulted prior to any load/unload evolution, and only certified personnel shall handle ordnance.

Breakout and movement of ordnance for assembly requires preplanning and close coordination between the weapons and air departments so the ordnance will be assembled and delivered to the flight deck in sufficient time and quantity to meet the air plan. Backloading requires the same coordination, but timing becomes less critical. Ship's personnel are responsible for movement of ordnance from magazines to assembly areas. Embarked personnel may assist as necessary and are required to handle and move all weapons from the assembly area to buildup areas and to the aircraft. After ordnance is assembled, movement to the aircraft will be via a direct and safe route.

4.10.6 Assembly and Disassembly. Because of the inherent dangers involved, the assembly and disassembly of aviation ordnance must be closely controlled. All weapons unpacking, assembly, disassembly, loading, and unloading shall be done in accordance with NAVORD OP 4, NAVSEA OP 3565, and the appropriate checklists, SRCs, and technical manuals. Ordnance shall be assembled, disassembled, and loaded into launchers/magazines only by personnel properly certified. There shall be a petty officer/noncommissioned officer in charge of each assembly and loading crew and a safety supervisor present whenever ordnance is being assembled, loaded, unloaded, or disassembled. All assembly, loading, unloading, and disassembly shall normally be conducted in the ordnance assembly area. The assembly area shall be maintained RADHAZ safe whenever the ordnance is RADHAZ susceptible. If RADHAZ susceptible ordnance must be moved outside the normal RADHAZ safe assembly area or if assembly must be done in a RADHAZ area, the operations officer shall ensure that the appropriate HERO condition has first been set. A visual display indicating the HERO condition in effect shall be prominently displayed so that assembly personnel can readily ascertain the HERO condition status at all times. All rockets shall be unpacked, assembled, loaded into, and unloaded from launchers in designated safe buildup areas. Ships shall maintain NAVAIR technical manuals for each type of aviation weapon on board.

All weapons systems maintenance is accomplished by squadron aviation ordnance technicians. All personnel involved with unpacking, assembly, and disassembly shall be appropriately certified.

4.10.7 Staging. Ordnance shall be positioned in designated areas and readily available to afford adequate time for safe aircraft loading. Staging areas or assembled weapons shall be restricted to those areas that are:

1. Convenient to jettison locations
2. Accessible by at least two clear routes
3. Covered by the sprinkler system and/or manned firehoses
4. Located as far as practicable from oxygen and fueling stations
5. Manned and with provisions for physically securing weapons.

Use the following priorities when locating staging areas: flight deck, hangar deck, vehicle storage.

Staging areas are used for ready service only, not for protracted stowage. Weapons in staging areas shall be on mobile trucks or skids.

4.10.8 Loading. Compliance with the weapons requirements contained in the air plan requires coordination between the aircraft handling officer/HCO, the ship's weapons officer, and the squadron/detachment ordnance officer. The squadron/detachment maintenance liaison officer is responsible for advising the aircraft handling officer as early as possible of special aircraft handling or tiedown requirements or any considerations that apply to the loading of squadron aircraft. It is particularly important for the aircraft handling officer to be advised of any peculiarities in configuration or status that may make certain aircraft unavailable for particular ordnance loads.

The flight deck is always the preferred area for loading aircraft. Loading on the hangar deck may be authorized by the commanding officer when operational necessity dictates acceptance of the added risk of fire with fuel and explosives both in a confined area. Authorization for loading in the hangar deck shall be limited to those aircraft scheduled for the next launch or in alert condition, and is restricted to the particular weapons listed in Appendix E.

Aircraft to be loaded with rockets and/or missiles shall be positioned so that accidental discharge will not endanger personnel, the ship, or other aircraft. Mechanical latching on aircraft or on racks or launchers shall be completed before aircraft engines are started for launch.

Aircraft loading shall be accomplished in accordance with NAVAIR conventional weapons loading checklists for the specific aircraft and weapons, using trained crews under the direct supervision of a competent petty officer/noncommissioned officer. All loaded aircraft shall be inspected by a designated safety supervisor, who shall signal to the LSE that the inspection is satisfactorily completed.

If the safety supervisor or a pilot notes any deviation between the actual load and the prebriefed load, the aircraft handling officer shall be notified immediately.

WARNING

Aircraft should not be fueled and armed simultaneously. Arming should be accomplished after fueling operations have been completed.

Rapid-response firefighting equipment shall be on station and manned during all ordnance handling, loading, and arming evolutions.

Chain tiedowns and chocks shall be removed from all ordnance-configured helicopters after the ordnance has been loaded, the aircraft rotors have been engaged, and arming is completed.

Aircraft "no-voltage" checks shall be made after normal rotor engagement when the electrical system is on aircraft power. The signal to commence "no-voltage" checks shall not be given until both copilot's hands are in view of the flight deck safety supervisor and acknowledgment by the pilot is received. Any deviations from the above procedure must be in accordance with the authorized weapons checklist concerned.

All detent safety pins, ordnance safety switches, and mechanical safe-arm switches shall be in the safe position except just prior to the aircraft liftoff.

Reloading should be accomplished after all aircraft have been recovered; or, to satisfy cyclic operations, loading in a designated area may be permitted while other flight operations are in progress. Only the minimum quantity of weapons required shall be moved during recovery operations.

WARNING

Tube loading of launchers on aircraft is prohibited except in cases of urgent combat necessity.

4.10.9 Arming. Arming of weapons shall be conducted using the weapons/stores loading checklists/SRCs. Ordnance teams assigned to arm weapons systems shall position themselves so as to accomplish this mission and avoid delaying launch of the aircraft. If an aircraft is downed after weapons have been armed, dearming shall be completed prior to aircraft shutting down.

Arming shall be conducted only after the aircraft rotors are engaged and the aircraft is otherwise ready for launch. Tiedown chains normally will be removed by arming personnel prior to leaving the rotor arc to preclude deck personnel from coming into contact with armed ordnance. Control of the aircraft shall be turned over to the arming crew supervisor.

Arming signals used shall be in accordance with those in NAVAIR 00-80T-113.

WARNING

The area ahead of the aircraft shall be cleared and maintained clear until the launch is completed.

4.10.10 Downloading and Dearming. The same care shall be exercised in dearming aircraft as is used in arming. The ship's operations officer will ensure that the appropriate HERO condition is set and maintained until downloading, dearming, and disposal have been completed.

Only aviation ordnance men and one LSE should be allowed within 30 feet of an aircraft until hung or unexpended ordnance is dearmed and rendered RADHAZ safe. A designated ordnance supervisor shall position himself on the flight deck during recovery operations to ensure that coordination is maintained between flight deck personnel and the arming crew. An ordnance team shall be available to dearm aircraft immediately after landing.

The embarked squadron will ensure that ordnance dearming crews are on station for each ordnance recovery. After aircraft have landed, the signal shall be received from the pilot that the master arm switch is OFF prior to dearming. Chain tiedowns shall be installed on the aircraft prior to dearming and rendering RADHAZ safe. Aircraft flight crews shall remain in the aircraft until hung or unexpended ordnance is dearmed and rendered RADHAZ safe.

WARNING

- Downloading of aircraft shall not commence until the aircraft's engine(s) and rotors are secured.
- Dearming and downloading procedures set forth in NAVAIR conventional weapons checklists shall be utilized.

Dearming (safing) signals used shall be in accordance with NAVAIR 00-80T-113.

4.10.11 Unexpended and Hung Ordnance. Flight leaders shall advise the ship as early as possible of the amount and type of hung or unexpended ordnance. Guidance for recovering aircraft with hung and unexpended ordnance is provided in Appendix E.

Weapon stores not authorized for recovery in Appendix E must be jettisoned. Where this cannot be accomplished, a divert to a shore installation will be made, if feasible.

The following guidelines will be used when recovering aircraft that must return to the ship with nonjettisonable/hung weapons.

4.10.11.1 In-Flight Procedures. Pilots shall accomplish the following prior to entering the ship's control zone.

1. Upon completion of the firing mission, determine if all ordnance has been expended. A visual check between aircraft shall be made of all rocket pods.
2. In the event of hung ordnance, efforts shall be made to fire it.
3. When it becomes apparent that the ordnance must be brought back to the ship, the ship will be notified as early as possible. In no case shall hung ordnance be brought into the ship's control zone without clearance. Initial notification shall include the amount and type of hung ordnance.
4. Properly safe all weapons systems.
5. Prior to entering the landing pattern, secure HF and FM transmitters, radar altimeter, IFF, and tacan.
6. Helicopters with unexpended or hung ordnance should fly shipboard recovery patterns with weapons pointed away from the ship to the maximum extent practicable.

4.10.11.2 Shipboard Procedures

1. The bridge and other appropriate stations must be notified.
2. Set the proper HERO condition.
3. Dearming crews stand by on station.
4. Prior to jettisoning ordnance from the ship, approval must be granted by the commanding officer.

4.10.11.3 Ship's Air Officer/Helicopter Control Officer

1. Clear landing spot for recovery.

2. Prior to recovery, announce: "Stand by to recover helicopter with hung ordnance on (spot). Hung ordnance is (amount and type). All personnel remain well clear of the flight deck area."

3. Ensure that rapid-response firefighting equipment is manned and ready.

4. Ensure that the ordnance safety supervisor and the unit dearming team are on station prior to recovery.

5. As required, ensure that all aircraft on the flight deck and in the landing pattern have secured HF and FM transmitters, IFF, tacan, and radar altimeters.

6. LPDs should choose a landing direction that provides the pilot with an obstruction-free approach path.

WARNING

All flight deck personnel, including LSEs, shall remain clear of the line of fire and/or danger area of an aircraft landing with hung weapons. Only minimum required personnel shall remain in the vicinity of the landing area. The pilot shall not leave the cockpit until he is satisfied that his guns (i.e., 20 mm) are safe.

4.10.12 Aircraft Maintenance and Servicing of Loaded Aircraft

4.10.12.1 Maintenance. General maintenance shall not be conducted on aircraft with loaded weapons; however, routine servicing and minor maintenance to ready an aircraft for the next launch may be conducted, with the following restrictions.

1. Weapons shall be made safe to the maximum degree possible as specified in NAVAIR weapons/stores checklists/SRCs.

2. If a WARNING placard is displayed prominently in the cockpit, maintenance or servicing that requires application of electrical power is limited to:

   a. Refueling

   b. Replacement and checkout of communications and navigation equipment

   c. Engine turnup for checkout

   d. Flight control and hydraulic system checks

   e. Replacement and checkout of engine performance and flight instruments.

3. Maintenance that requires the application of electrical power to armament, or to weapon release and control circuitry, shall not be performed while weapons are being loaded or during loading or downloading.

An aircraft that requires extensive troubleshooting, engine removal, or jacking is not considered to be readily available for flight and shall be downloaded prior to required maintenance. This downloading includes removal of impulse cartridges from ejector racks and breeches and all rounds of ammunition from feed chutes and feed mechanisms of internal guns.

4.10.12.2 Servicing. Loading or downloading, oxygen servicing, and fueling should be conducted as separate evolutions. The commanding officer may authorize simultaneous loading/downloading and fueling when operational commitments dictate that this extraordinary action is required. In such a case, loading shall be limited strictly to the mechanical attachment of the weapon or store to armament suspension equipment and to the connection of electrically fuzed bombs. No other electrical connection to weapons, installation of impulse cartridges, or hookup or plug-in of arming wires shall be done until aircraft fueling is completed. When required, electrical power may be applied during aircraft loading or downloading, but will be held to a minimum consistent with operational requirements. Electrical power shall not be applied to armament, or to weapon release and control circuitry, while weapons are being loaded or during loading or downloading.

4.10.13 Light Airborne Multipurpose System/Undersurface Warfare. Recovery of USW helicopters with unexpended torpedoes is an acceptable procedure, in that the helicopter's release mechanism and circuitry is designed to disarm and prevent accidental release. Strict compliance with procedures contained in the applicable aircraft NATOPS flight manual for landing checklists and in-flight torpedo release control systems will normally preclude an inadvertent release.

In the event of a hung sonobuoy the following procedures are recommended:

1. The pilot shall notify the ship of a sonobuoy problem.

2. The LSE shall ensure that chock and pin men are aware of problems and are instructed not to cross

in front of the launcher when placing chocks, tie-downs, and pins.

3. After the helicopter shuts down, sonobuoys shall be unloaded in accordance with safe dearming procedures.

4.10.14 Hangaring Aircraft With Ordnance. In the event of strikedown (hangaring) of a loaded aircraft, fuzing devices and bomb rack ejector/jettison cartridges shall be removed immediately after the aircraft is spotted and tied down. Prior to hangaring, safety devices must be activated and safety pins put in place. A helicopter may be hangared in an alert condition with the torpedoes, marine markers, sonobuoys, and CADs in place, but safety devices shall not be removed from launchers until the helicopter is ready for takeoff. Airboc chaff should be removed from the aircraft immediately upon final landing.

WARNING

Aircraft shall not be hangared with ALE-39 or Airboc chaff loaded. When the aircraft is in an alert status on the flight deck, chaff may remain loaded with safety pins installed.

4.10.15 Munitions

4.10.15.1 Landing Force Operational Reserve Material Ordnance/Mission Load Allowance. This is a special categorization of support materials and components carried aboard amphibious warfare ships for use by Marine assault forces. The unique character of the ordnance portion of LFORM/MLA stems from its quantity, mix, and special stowage requirements. LFORM/MLA is pre-positioned aboard amphibious warfare ships in amounts specified by TYCOMs to support a MEU. LFORM/MLA ordnance is generally maintained aboard ship continuously, except during a regular overhaul or restricted availability. The ordnance portion of LFORM/MLA is stowed in magazines designated AMMUNITION/LFORM or in approved lockers as appropriate.

4.10.15.2 Stowage Compatibility. For the stowage of LFORM/MLA ammunition, the ammunition compatibility groupings and permissible stowage combinations of 46 CFT 146.29 (formerly CG-108) shall apply whenever practicable. The hazards of each type of LFORM/MLA ammunition have been compared to the hazards of each other type and the resultant mixed hazards considered. The various types of LFORM/MLA ammunition have been consolidated into groups and assigned compatibility symbols as shown in NAVSEA OP 4. When it is not practicable to segregate LFORM/ MLA ammunition to satisfy all requirements of 46 CFT 146.29, then the compatibility symbols of NAVSEA OP 4 may be used for stowage in a magazine or in the subdivision of a magazine. Within the compatibility symbols, however, the various Coast Guard classes shall be stowed in separate stacks in the magazine or subdivision, with the maximum available separation between stacks of Coast Guard incompatible items (applies primarily to compatibility symbols AA). Except as noted in NAVSEA OP 4, no item shall be stowed with ammunition of a different compatibility symbol without the concurrence of the Naval Sea Systems Command. Stowage of Class V chemical munitions over, under, or adjacent to living quarters shall be avoided.

Where a new type of ammunition not listed is encountered, a study of NAVSEA OP 4 should provide a sound basis for stowage action until specific criteria can be obtained from higher authority.

4.10.15.3 Training Ordnance. Stowage compatibility and restrictions for training ammunition allowance shall be the same as for LFORM. If available stowage space necessitates, stowage of basic allowance may be stowed in accordance with the compatibility grouping.

4.11 ENGINE TURNUPS

At times the helicopter will require on-deck engine runs for postmaintenance checks. Normally it will not be necessary for the ship to go to full flight quarters for these engine tests. However, the following minimum precautions shall be taken.

The aviation/air officer shall ensure:

1. A FOD walkdown is completed.

2. Safety nets are down.

3. Appropriate firefighting equipment is on station and ready for use.

4. Permission is obtained from the OOD before the engines are started.

5. All unnecessary personnel are clear of the flight deck.

The OOD shall:

1. Pass the word "All hands stand by for a test of the helicopter engines. All hands not involved in the

test stand clear of the flight deck and main deck aft of frame________. The smoking lamp is out topside. Hold all trash and garbage on station."

2. Advise the HCO prior to any maneuvering.

3. Upon completion of the test, the OOD shall pass the word "Secure from modified flight quarters. The smoking lamp is lighted in all authorized spaces."

4.12 SHIPBOARD NIGHT VISION GOGGLE OPERATIONS

The use of NVG affords pilots, aircrews, and flight deck crews with improved night vision acuity. NVG operations provide increased safety, comfort levels, and operational capabilities over unaided flight operations at night. However, inherent NVG limitations, (i.e., field of view, depth perception, and environmental interference) require comprehensive training, awareness, and strict compliance with established procedures to ensure safe and effective NVG flight operations aboard ship.

4.12.1 Authority For Night Vision Goggle Operations. These procedures apply to all air-capable ship aviation NVG operations involving USN, USMC, USA, USAF, DEA, U.S. Customs, and foreign services. All ships, units, and personnel involved in or anticipating involvement in shipboard aviation NVG operations shall be familiar with and comply with all parent service directives pertaining to NVG flight operations. In the event of conflict, this manual will take precedence except as noted below.

Note

All "special operations" shall be guided by current MOUs and LOIs. If conflict arises concerning shipboard use of NVG a for special operation, the MOU or LOI shall take precedence over guidance/provisions of this manual.

4.12.2 Requirements and Limitations of Night Vision Goggles. Maintenance of flight deck safety is the major concern during shipboard NVG operations. NVG operations shall be conducted only when the following conditions are met.

1. All NVG operations shall be conducted during VMC. Minimum ceiling and visibility shall be no less than 1,000 feet and 3 nm, respectively. LPD NVG operations shall be conducted using Case I and III procedures in accordance with LHA/LPH/LHD NATOPS. NVG may be used in determining the presence of a visible horizon.

2. Minimum illumination for NVG training operations is .0022 lux as determined by the USN/USMC-approved Light Level Planning Calendar computer program. Training operations under light levels of less than .0022 lux may be conducted when aircrew and shipboard NVG currency and proficiency requirements are met and with the approval of the operational commander. Forecast illumination levels may be degraded by cloud cover, humidity, dust, low Moon angle, etc., which are not factored into the computer program output. A decision to fly in conditions that are less than optimal must be tempered with sound judgment and err on the side of safety.

3. The recommended minimum number of shipboard personnel on air-capable ships (less LPD) using NVG is four, distributed as follows:

   a. HCO

   b. LSO

   c. Bridge

   d. LSE.

4. For LPD, the recommended distribution of personnel is as follows:

   a. Primary flight control

   b. Bridge

   c. Flight deck LPO

   d. Safety observer/FDO

   e. LSE — One set of NVG per operating spot.

4.12.3 Training and Qualification for Night Vision Goggles

4.12.3.1 NVG Familiarization. A methodical "building block" approach to training and qualification of ship personnel for NVG operations is essential. Initially, all flight deck personnel shall participate in a static flight deck orientation/demonstration period conducted in an NVG environment prior to NVG flight operations that shall consist of, but not be limited to, the following areas:

1. Lighting profiles/LSE wands

2. LSE without wands

3. Procedural review by all supervisors

4. Flight deck safety brief.

HCO and LSE shall attend formal classroom training provided by a TYCOM-approved HCO/LSE school with an established NVG syllabus or by a USMC squadron night systems instructor. Subject matter shall consist of, but not be limited to, the following areas:

1. NVG introduction
2. Night/NVG physiology
3. Environmental considerations
4. Aircrew tendencies when using NVG
5. LSE signals and procedures (NVG and unaided)
6. Emergency procedures.

Additionally, ship's personnel involved in flight operations (air officer, HCO, LSO, flight deck supervisor, LSE, etc.) shall complete applicable NAVEDTRA Night Vision Goggle Operator PQS.

4.12.3.2 NVG LSE Initial Qualifications. Qualification is achieved by LSEs completing all prerequisites and "stage" training requirements for the specific class of ship. Stages one and two shall be completed for all air-capable ships. Stage three shall be completed for dual-spot ships (LSD 41 Class). Stage four shall be completed for LPD class ships. Training requirements for each stage are described below.

1. Stage one — Formal classroom instruction.

2. Stage two — Single-spot flight deck operations. Prerequisites — static deck orientation, PQS, and stage one. While under the direct supervision of an NVG-qualified LSE, LSEs under instruction will direct five vertical takeoffs and landings and five touch-and-go operations from the pattern under high light-level conditions (.0022 lux or greater). Ships requiring assistance of an NVG-qualified LSE shall make request through their ISIC, who will coordinate with the TYCOM as necessary.

WARNING

On multispot ships (two or more landing spots), operation of aircraft from adjacent spots is not authorized during stage two training.

Note

Ordnance operations are authorized at completion of NVG stage two training and shall be conducted in accordance with published shipboard procedures. Flight deck shall be illuminated sufficiently to conduct loading/downloading and arming/dearming without NVG. On air-capable ships, lighting requirements shall be delineated by the embarked AOSS or, in the AOSS's absence, by the aviation coordinator or the aviation officer/detachment OIC.

3. Stage three — Multispot operations (two or more landing spots). Prerequisites are stages one and two completed. An NVG stage two qualified LSE will direct six takeoffs and landings from the pattern while aircraft are operating from adjacent spot(s) under high light-level conditions (.0022 lux or greater).

WARNING

No landing shall be made forward of an adjacent occupied spot. NVG-limited depth perception and LSE tendencies preclude this operation.

4. Stage four — Multiwave launch and recovery operations. Prerequisites are stages one, two, and three completed. An NVG stage three qualified LSE will direct launch and recovery of a mix of aircraft in multiple waves operating from all spots under high light-level conditions (.0022 lux or greater).

WARNING

No landings shall be made forward of an adjacent occupied spot. Troops shall be escorted to and from aircraft in order to demonstrate capability to move troops, equipment, and ordnance while operating in an NVG environment; however, this shall not be attempted under completely darkened deck conditions.

5. Stage five — NVG launch and recovery operations under low light-level conditions (less than .0022 lux). Prerequisites are (1) For single-spot ships, completion of stage two with a minimum of 11

takeoffs and landings from the pattern under high light-level conditions; (2) For dual-spot ships (LSD-41 Class), completion of stage three; and (3) For LPD ships, completion of stage four.

WARNING

No landings shall be made forward of an adjacent occupied spot.

Note

- Although stage five NVG operations are defined as operations under low light-level conditions (less than .0022 lux) as defined by the USN/USMC Light Level Planning Calendar Computer Program, the immediate shipboard flight deck environment shall be illuminated during troop movement, ordnance operations, aircraft positioning, fueling, etc.

- An NVG-qualified LSE is required for the conduct of all NVG flight operations up through stage four. There is no separate stage five LSE qualification, but rather a ship's qualification to operate under low light-level conditions. An LSE shall be qualified by the stage of operation and shall be employed unless specific deviation from LSE policy is authorized by MOU or LOI.

- The ship's commanding officer shall make the final determination of the ship's ability to support NVG operations (through low light-level stage five) and shall report completion of appropriate stages of qualification to the respective ISIC. Specific maneuvers shall be briefed by aircrews and ship personnel and approved by the ship's commanding officer.

4.12.3.3 Maintaining NVG LSE Qualifications. Periodic NVG LSE training should be conducted during divisional/departmental training periods; however, each NVG LSE will conduct 1 hour of classroom instruction or practical training on the NVG after every 90 days of non-NVG operations. It is the responsibility of the ship's aviation facility coordinator, air officer, or aviation officer to document each NVG LSE's participation in NVG operations and NVG training in the individual LSE's training record. Records should reflect (1) date of event, (2) aircraft type and squadron, (3) type NVG (PVS-5, PVS-7, or ANVIS-6), and (4) time actually spent using NVG in the conduct of NVG operations. Training should consist of, but not be limited to, the following areas:

1. Lighting requirements

2. LSE signals

3. Aircrew tendencies

4. Emergency procedures.

4.12.3.4 Aviation Unit Workup. Aircrews shall train in accordance with pertinent parent service directives and will ensure that all requisite training requirements to operate with NVG are met prior to engaging in shipboard NVG operations.

4.12.4 Night Vision Goggle Equipment

4.12.4.1 NVG Authorized for Flight Operations. Use of AN/PVS-5, AN/PVS-7, and ANVIS-6 NVG for NVG flight operations are authorized for flight deck personnel.

CAUTION

The mixing of NVG generation type three and NVG generation type two (i.e., ANVIS-6 and AN/PVS-5) may be incompatible under some light-level conditions.

4.12.4.2 Eye Protection. Ship personnel using the ANVIS-6 NVG shall wear approved eye protection while operating in the flight deck environment.

4.12.5 Shipboard Lighting Requirements

4.12.5.1 Ship Navigation and Structure Lighting. Ship lighting and light discipline are critical to NVG performance and the safe conduct of NVG flight operations. Lighting configurations and intensities will vary with ambient conditions and aircrew/flight deck personnel proficiency and preference.

CAUTION

Operating navigation lights on DIM or OFF settings does not conform with nautical rules of the road. Close coordination will be necessary, both intraship and intership, when use of navigation lighting requires modification.

All unnecessary lighting, external to or visible from the DLQ pattern, shall be secured during NVG operations. Hangar lights shall be off or appropriate hangar doors closed while conducting NVG operations. Ships with well decks shall ensure that stern gates and eyebrows are closed and that handling lights are out when not conducting simultaneous well deck operations. When conducting simultaneous well deck operations, consideration must be given to minimizing well deck lighting because of the adverse effects of non-NVG compatible lighting. Ships should make 1MC announcements every 30 minutes during NVG operations to remind personnel of required light discipline. For example: "All hands are reminded of night vision device operations in progress, maintain strict light discipline throughout the ship."

To prevent possible NVG interference from support equipment vehicles, all tow tractor, crash tractor, and forklift lights shall remain off during NVG operations. To further maintain NVG light integrity, avoid actuation of brake lights while the rear of the vehicle is oriented towards the flight deck.

Ships in proximity shall be notified by the ship conducting NVG operations upon commencement and completion of NVG operations. Ships in proximity will adjust lighting as necessary dependent on relative position to NVG operation in order to eliminate any interference to the NVG environment.

4.12.5.2 LSE Signaling Devices. Due to the possibility of causing significant NVG washout, all signaling devices used for NVG operations shall be NVG compatible and shall be tested for compatibility with NVG prior to each NVG operation. Examples (not limited to) are:

1. Regular wand cones covered with black shrink/electric tape with 1/8-inch of tip exposed.

2. Regular wand cones painted black with vertical pin scratches.

3. Blue NVG filter inserts for flashlights/wands and cones masked with 4 vertical slits.

4. Red/infrared chemlites.

4.12.5.3 Flight Deck Lighting. NVG-compatible blue flight deck lights allow a minimum amount of interference to aircrew NVG, yet ensure adequate lighting on the flight deck for the flight deck crew. When blue lights are not installed, ship lighting may be used at a minimum safe intensity.

Some shipboard operations may require additional deck lighting to augment NVG-compatible blue lights under some ambient light conditions. The following operations are prohibited on "blacked out" flight decks:

1. Chocking and chaining of aircraft

2. Fueling

3. Ordnance (arming/dearming or uploading/downloading, including sonobuoys)

4. Troop movement

5. Aircrew changes (HOTSEAT)

6. Aircraft movement

7. Vehicle movement.

4.12.5.4 Helicopter Control Station Lighting. All unnecessary lighting is the HCS will be secured. Indicator lights will be taped over or secured to eliminate glare. If lighting is required, use NVG-compatible lighting or very dim installed lighting for critical instruments only (i.e., wind direction/speed and ship course repeaters).

4.12.6 Aircraft Procedures. All shipboard patterns used during normal day/night operations are germane to NVG operations. The pilot on the side of ship obstructions when oriented along the final approach path should be the pilot at the controls. Normally, cross-cockpit landings or takeoffs will not be conducted because of restricted visual cues. Exceptions will be to accomplish required training. Aircraft should minimize use of non-NVG compatible anticollision lights when in proximity to the ship. Prior to conducting NVG operations, ship and aviation units shall conduct a face-to-face brief consisting of, as a minimum, the following:

1. Aviation unit SOP

2. Ship helicopter operations bill

3. Ship and aircraft lighting

4. Type and number of aircraft involved

5. Number of pilots requiring initial qualification and currency

6. Radio frequencies/call signs

7. Inclement weather procedures.

Simultaneous mix of NVG and non-NVG flight operations are prohibited under normal control conditions. If the ship is required to conduct recovery of a non-NVG aircraft during NVG operations, pattern NVG aircraft should be assigned a stand-off position, flight deck lighting will be raised to normal night intensity (SGSI on), and non-NVG aircraft recovered.

Note

Ships modified with NAVAIR-approved NVG-compatible shipboard flight deck lighting, such as blue light filters, are not required to change overhead lighting configuration to launch and recover unaided aircraft. However, deck lighting levels shall be adjusted to provide the unaided aircraft with sufficient lighting for safe takeoff and landing visual references.

During NVG VERTREP operations, the US Navy Mk 105 pendant should be used, if possible, to minimize hover altitude and enhance visual cues for the aircrew; however, use of the Mk 92 reach pendant is authorized. Chemical lights should be used to mark hookup points (pendant and load) and should be securely fastened to minimize FOD potential. Flight deck lighting should be at maximum practical intensity given NVG compatibility and aircrew/flight deck crew comfort level and proficiency.

NVG HRST is authorized given the same lighting concerns as cargo operations. The intended point of landing for personnel exiting the aircraft should be clearly visible.

CHAPTER 5

Helicopter Transfer and General Utility Operations

5.1 SCOPE OF OPERATIONS

This chapter describes helicopter operations that involve the routine transfer of personnel and limited quantities of cargo and other utility operations.

Transfer operations should not be confused with VERTREP, which is described in Chapter 8.

Transfer from ships certified or waivered for VERTREP or HIFR shall only be made from those areas so designated.

WARNING

Helicopter transfers shall not be conducted from surface ships that are not certified or waivered except in extreme situations such as emergency MEDEVAC.

5.2 PREPARING FOR TRANSFER OPERATIONS

Prior to conducting helicopter operations, flight quarters shall be set in accordance with Chapter 4. Personnel/cargo transfers may be effected by either landing the helicopter or by helicopter hoist over the deck/transfer area. The preferred method is to land the helicopter on ships so certified. The same relative wind and deck conditions are required for hovering as are required for launch/recovery operations.

5.2.1 Personnel To Be Transferred. Personnel who are to be transferred from a ship shall be manifested and briefed as discussed in the following paragraphs. Personnel transfers should be completed prior to the aircraft commencing another mission (i.e., USW, VERTREP, etc.).

WARNING

- Transfer of passengers by hoist at night is prohibited except in emergency situations.
- Night helicopter passenger flights to or from air-capable ships shall be limited to situations of an operational necessity to properly certified ships.
- Personnel shall not be hoisted to or from H-53E because of extreme hazards created by the static electricity generated by the helicopter.

Note

- This does not preclude troop movement in support of amphibious, special warfare, and EOD exercises.
- The helicopter briefing officer should be the ATO or the CCO on amphibious air-capable ships. On air-capable ships, the helicopter briefing officer should be an aviation officer, FDO, or assigned petty officer.

5.2.1.1 Passenger Manifesting. Personnel authorized helicopter transportation should report to a designated passenger manifesting area at least 1 hour prior to the scheduled launch. The ship will record the following information:

1. Last name and initials
2. Rank/rate
3. Social security number

4. Organization

5. Destination

6. Priority (if any).

Flights should not be delayed for late passengers except in very unusual cases, nor shall passengers who have not been cleared with the helicopter briefing officer be permitted to embark.

5.2.1.2 Passenger Brief — Standard Transfer Procedures

1. Prior to pickup, passengers shall be fully briefed on emergency procedures applicable to the specific helicopter being used for transport. The briefing shall take place prior to moving to the flight deck area where ear protection devices and engine noise may make detailed instruction impracticable. Door and seating diagrams of U.S. helicopters are provided in Appendix G. A copy of the applicable diagram shall be reproduced locally and made available for viewing during the passenger brief.

2. Inflatable flotation and cranial protection with goggles are normally provided by the helicopter crew and shall be donned prior to departing the sheltered area and exposure to the helicopter flight environment. Inflatable flotation rather than inherently buoyant lifejackets shall be used to allow exit from an inverted or submerged helicopter. Flotation gear shall be worn in a completely donned configuration ready for immediate inflation.

WARNING

Turning rotor blades are deadly. Do not proceed under rotor blades until directed by LSE/director. When entering the helicopter on deck, keep low and enter through the door as directed by the LSE/director and helicopter crewman. When rotors are being engaged or disengaged, personnel shall remain clear until directed to approach or debark.

3. When being hoisted in the rescue strop, the bottom of the rescue strop should be placed under the arms and across the back. The rescue strop should be held with the arms folded in front of the chest enclosing the rescue strop as shown in Figure 5-1. With the rescue strop properly donned, even an unconscious person will not fall out. As the person approaches the door, he should not attempt to climb in or grasp the helicopter. The crewman will face him outboard, hook an arm around his middle or grasp the rescue strop at his back, and draw him into the helicopter.

4. When seated and strapped in, the passenger should orient himself with respect to all emergency exits. The crewman shall ensure that each passenger knows the location of the nearest emergency exit and the proper method of releasing emergency exits.

Note

During personnel hoisting operations with Coast Guard helicopters, the rescue basket (Figure 5-2) will normally be used. Personnel are to be seated at all times while in the rescue basket.

5.2.1.3 Passenger Brief — Procedures in Case of a Crash or Ditching. In addition to the brief on standard procedures for transfer of personnel, passengers are also briefed on procedures to be followed in case of a crash or ditching.

1. Stay strapped in until the rotor blades and aircraft motion have come to a complete stop.

2. If the aircraft remains upright, unstrap and proceed calmly to the nearest exit as directed by the crewman. After entering the water, inflate your lifejacket.

3. If the aircraft rolls to the inverted position, do not panic; grasp some nearby fixed object and note the direction to the nearest exit. Remember that the exit will still be in the same relative position when all motion ceases.

Wait until violent motion stops, then unstrap and move toward the exit, utilizing a hand-over-hand method to maintain orientation; when clear of the aircraft, inflate your lifejacket.

WARNING

Do not inflate your lifejacket inside the aircraft as it may make egress impossible. Maintain a continuous hand reference on a fixed object while proceeding to the nearest exit.

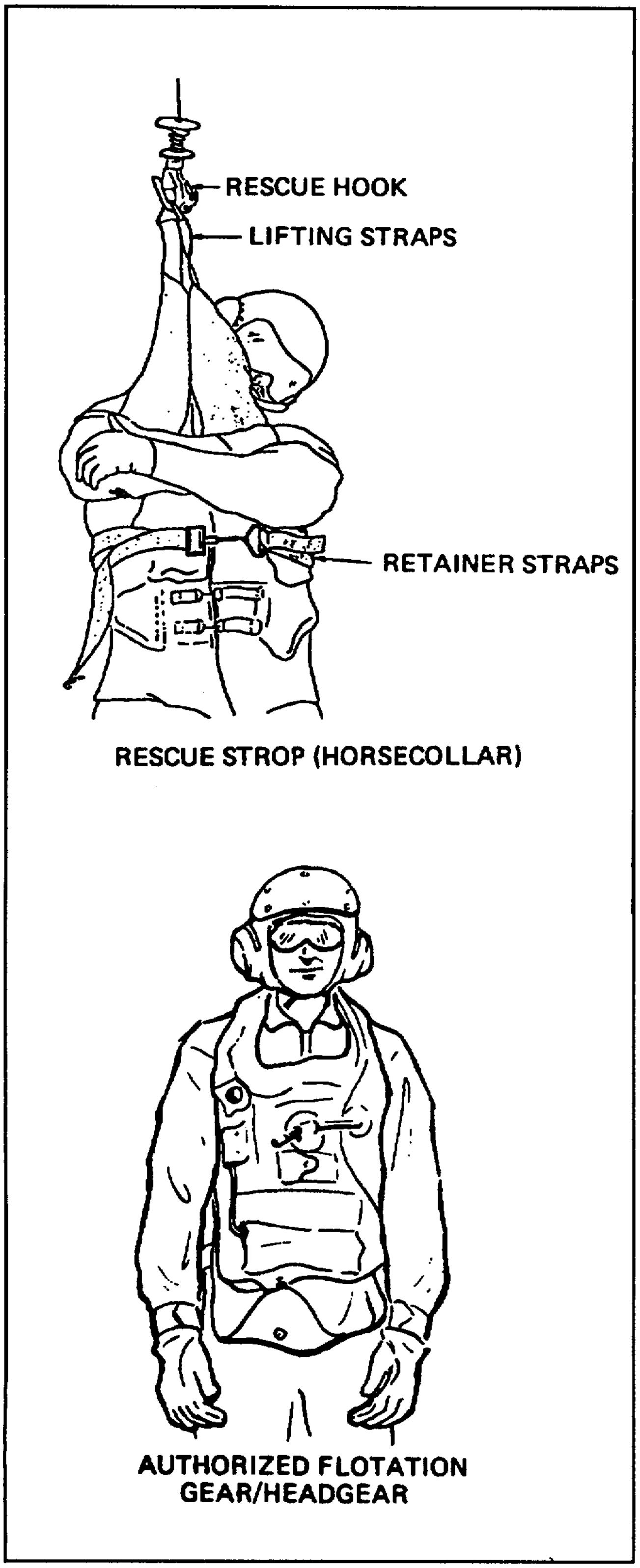


Figure 5-1. Rescue Gear and Flotation Gear/Headgear

Note

Aircraft equipped with HEELS will illuminate all emergency exists when rotors have stopped. The lights are luminous strips that illuminate the outer edge of exits.

4. Once comfortably floating on the surface, follow the directions of the helicopter crew.

5. If the aircraft crashes on land, wait until all motion has stopped, then exit the aircraft and get well clear.

WARNING

Do not attempt to reenter the aircraft once safely exited.

5.2.2 Cargo To Be Transferred. Cargo to be transferred shall be weighed and clearly marked prior to loading. For VERTREP/hoist evolutions, weight of load shall be signaled to crew by radio, chalkboard, or other clearly understood method. The aircraft commander is responsible for ensuring that maximum gross weight for takeoff/hover is not exceeded.

Note

Normally cargo to be hoisted aboard the helicopter should not exceed 200 pounds because of crewman limitations.

5.2.3 Briefing of Handling Crew. The handling personnel shall be briefed concerning:

1. Rotor and engine exhaust danger areas

2. Types of cargo and hoisting hooks to be employed

3. Safety precautions to be observed, including proper grounding procedures

WARNING

When hooking up either passengers or cargo, use care to ensure that the attaching device is set properly in the large hook.

4. Required flight deck clothing.

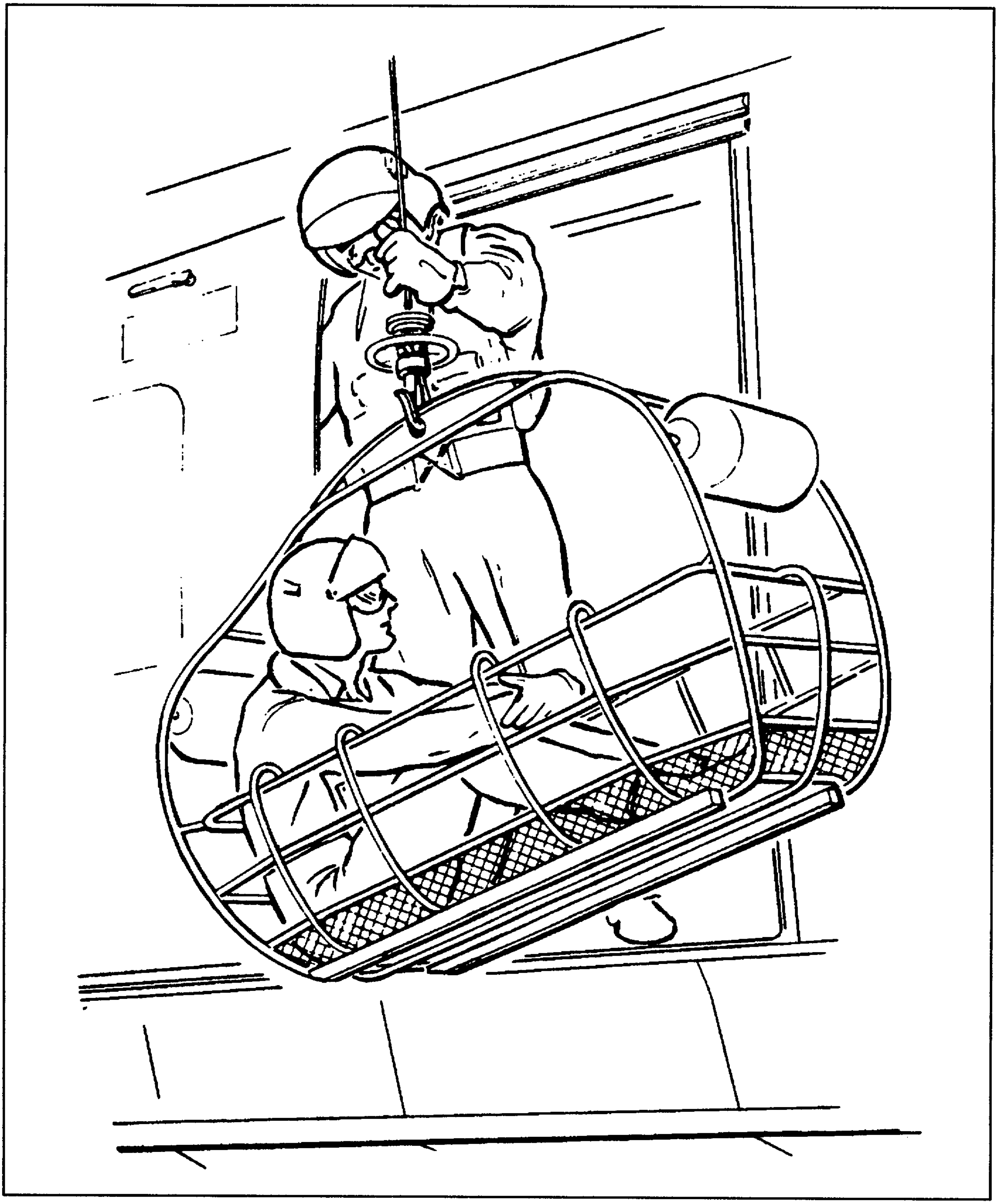


Figure 5-2. U.S. Coast Guard Rescue Basket

5.2.4 Recommended Procedures and Equipment to Discharge Static Electricity. During helicopter hoist/external load operations, static electricity as high as 200,000 volts is generated. The helicopter cable or cargo hook must be grounded to discharge this electricity.

WARNING

Handling the cable or cargo hook with bare hands prior to proper grounding may cause injury to personnel.

The grounding wand shown in Figure 5-3 is designed to protect ground personnel from static electrical shock when working with all helicopters. For use with H-53E helicopters, gloves meeting ASTM D 120 84A Type I Class III must be used. (NSN 8415-01-158-9445 is the preferred glove.) The use of a grounding wand is required for all hoist and H-53E external load operations. (See Figure 5-3 for stock numbers.)

5.2.4.1 Procedures

1. Connect ground clamp to good metallic grounding path through ship's hull.
2. Allow utility hoist to touch deck prior to contacting cable with grounding wand.
3. Once grounded, maintain continuous grounding contact until hoist is retrieved. Continuous grounding is required.

Note

Static charge can rebuild within 1 second.

5.3 TRANSFER PROCEDURES

Exchange of information regarding transfer is normally made by radio. The helicopter and ship shall monitor the established frequency and establish contact prior to the transfer. Unless absolutely necessary, the ship should not communicate with the helicopter during the approach, landing phase, or hovering operation as such communication may interrupt critical control signals between the pilot and the crewman. If radio contact cannot be established, the ship should be alerted for pickup or delivery by the helicopter flying at low altitude across the bow, followed by orbiting the ship clockwise until Hotel or Hotel One is placed at the dip. Helicopter transfers can be made with little or no voice communications by using the flaghoist signals in Figure 4-6.

Note

Routine personnel or cargo hoisting operations shall not be conducted at night.

5.3.1 Transfer of Personnel by Hoist. If landing is not practicable, the transfer will be made by hoist. After the green signal is displayed, the pilot will make his approach into the relative wind and establish a hover over the transfer point.

Passengers in the helicopter shall remain seated with safety belts secured at all times except when otherwise directed by a crewman during the actual hoist transfer.

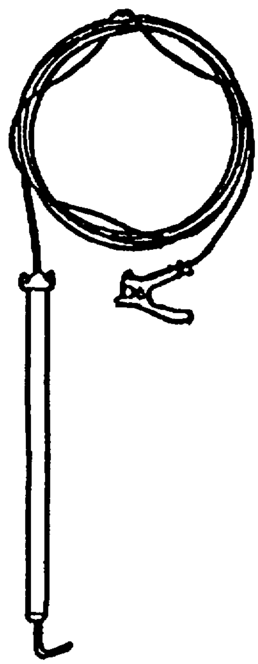
Personnel being transferred shall be provided an inflatable lifejacket and protective headgear with eye protection. Personnel should wear gloves if available. Antiexposure suits shall be provided in compliance with OPNAVINST 3710.7 series.

Personnel shall be briefed on helicopter ditching procedures and the proper position of the hoisting device. They shall be instructed not to carry personal baggage during the hoisting operation.

WARNING

- The rescue seat or rescue net shall not be used for routine personnel transfers. Personnel shall not grab the hoist hook as it is lowered from the helicopter; static discharge may be dangerous. The hook shall be grounded by use of a grounding device (see Figure 5-4).
- Personnel shall not be hoisted to or from H-53E because of extreme hazards created by the static electricity generated by the helicopter.

5.3.1.1 Hoisting From Helicopter to Ship. When the helicopter is over the transfer point, the person to be transferred will be wearing the rescue strop and will be positioned at the hatch as directed by the crewman. As a hover is established, the crewman will raise the hoist slightly to take on the weight of the passenger, dampen cable oscillation, and then lower away. Flight deck personnel shall ground out the helicopter hoist cable prior to the passenger reaching the ship's deck. The crewman will adjust the hoist so that the passenger is not dragged about when leaving the rescue strop. As soon as the passenger is clear, the hoist will be retracted and the helicopter will move off. Shipboard flight deck personnel shall ensure that inflatable lifejackets and protective headgear worn



TO STORE CABLE

TURN WAND UPSIDE DOWN AND COIL CABLE LARIAT-STYLE INTO SEVERAL 12 INCH DIAMETER (APPROX.) LOOPS. WITH LAST REMAINING LOOP, INTERLACE CABLE AROUND LOOPS SEVERAL TIMES AND ATTACH CLAMP TO END PLUG

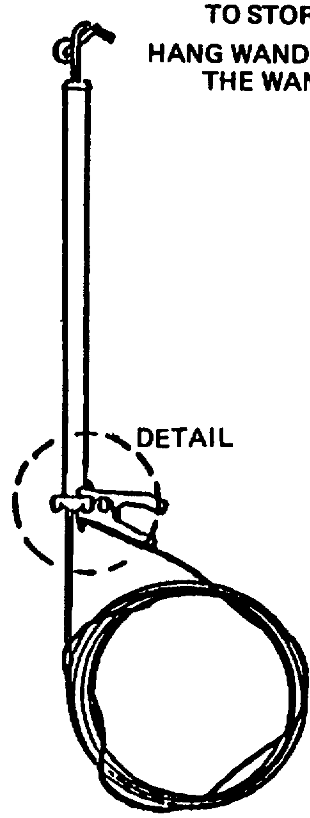
Part Number: 1610AS100-1
NSN: 4920-01-192-5535
NAVAIR Dwg 1610AS100
ALTERNATE
Part Number: 1610AS100-2
NSN: 492-LL-ERD-E048

WARNING

NEVER ATTACH CLAMP JAWS TO GROUNDING CABLE AS PUNCTURE OR CUTTING OF THE CABLE MAY RESULT.

TO STORE WAND

HANG WAND UPRIGHT BY THE WAND HOOK



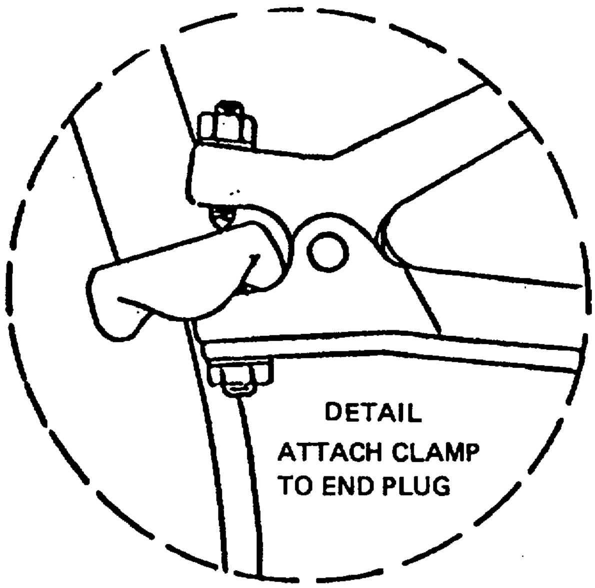


Figure 5-3. Stowage Method for the Grounding Cable and Wand

by passengers are removed and returned by hoist to the helicopter.

WARNING

- Under no circumstances shall a line from an airborne helicopter be secured to a ship.
- The grounding device should never touch the passenger but should be applied to the hoisting cable. Touching the passenger with the grounding device may cause a dangerous electric shock.

5.3.1.2 Hoisting From Ship to Helicopter. When transferring a passenger from a ship to a helicopter, a hover will be established with the cargo door open and cable paid out 6 to 8 feet. An inflatable lifejacket, eye protection, and protective headgear shall be provided by the helicopter crew and should be attached to the rescue strop upon initial lowering. The passenger shall not be lifted from the deck of the ship until the lifejacket, eye protection, and protective headgear are donned. The crewman will assist the pilot in maintaining the hover position and will adjust the cable to help the passenger enter the rescue strop. As soon as the passenger is securely in the rescue strop, the crewman will begin the hoist, informing the pilot as he does so. The passenger must remain securely in the rescue strop until he is completely within the cabin of the helicopter.

WARNING

Any attempt on the part of the passenger to assist in the transfer will only hamper efforts of the helicopter crew and may, in fact, result in a potentially fatal situation.

5.3.1.3 Hoisting of Injured or Sick Personnel. For hoisting of injured or sick personnel, refer to NWP 3-50.1.

5.3.2 Transfer of Material by Hoist. All material transfers shall be made at the discretion of the pilot. Transfer loads shall be weighed individually by the ship, carefully inspected for security, and tagged for destination. The approximate weight of each load shall be provided to the pilot.

Material weighing less than 30 pounds shall be transferred in a weighted bag. The bag will be furnished by the helicopter and be returned immediately after each pickup to be used for the transfer of additional material. Significant amounts of material weighing less than 30 pounds should be combined into one bag or tied together to reduce helicopter hover time. Extended hovering in salt spray may lead to compressor stall and subsequent engine failure.

The transfer of heavier loads must be planned in advance to ensure that the helicopter will have the required lifting capability (refer to Appendixes B and C).

The HCO and FDO shall inform the pilot of any hazardous cargo, such as flammables, toxic agents, compressed gases, ammunition, etc., prior to transfer. Preparation and transfer of hazardous materials shall be in accordance with NAVSUPPUB 505.

5.3.3 Transfers Involving Submarines

5.3.3.1 General. Transfers of personnel to and from submarines by helicopter are inherently dangerous. The combination of a small moving platform, effects of the environment, and the lack of adequate pilot visual reference to the submarine creates a high-risk evolution even under favorable conditions. Because of safety considerations, day helicopter personnel transfers to and from submarines shall be limited to situations of an operational necessity.

A transfer should not be attempted in a sea state above 4. The pilot in command retains at all times the option to abort the mission if, in his judgment, the situation becomes too dangerous. In all transfers, planning, coordination, and communications are essential. Prior to the approach for pickup or delivery, the position for transfer, the relative wind speed and direction, equipment that will be provided by the helicopter and by the submarine, the order in which the transfer will proceed, ambulatory status of the passenger, special arrangements incident to the transfer, and equipment that must be returned after completion of the transfer shall be agreed upon.

WARNING

Mast and antenna exposure by the submarine should be minimized to enhance visibility from the bridge, reduce the risk of injury to transfer personnel, and reduce the chance of entanglement with lines extended from the helicopter.

5.3.3.2 Communications. The submarine may not have a radio communications station available on the bridge, and a delay in radio response may be anticipated.

Operational security considerations may dictate a minimum of radio communications. The submarine, in its rendezvous message, will have assigned UHF/VHF radio frequencies to guard. Short-duration communications should be established to confirm the details of the transfer.

5.3.3.3 Transfer Locations. There are three locations for transfer, presented in decreasing order of preference (see Figure 5-4).

1. Center of main deck (Figure 5-4A) (SSBN only). In this method the submarine positions itself with the relative wind 10° to 40° on the port bow at 15 to 20 knots, and the helicopter takes position heading into the wind.

2. Port sail plane/top of sail (Figure 5-4B) (primary method for SSN). In this method the submarine positions itself with the relative wind 10° to 40° on the starboard bow at 15 to 20 knots. The helicopter takes position on the submarine heading into the wind and conducts the transfer to either the port sail plane or the top of the sail (cockpit area).

3. Starboard sail plane (Figure 5-4C). In this method the submarine positions itself with the relative wind from 160° to 200° relative at 15 to 20 knots with a minimum wind speed of 10 knots. Usually, the submarine maneuvers downwind at slow speed and the helicopter takes position off the submarine's starboard side, maintaining station as necessary.

WARNING

The high risk of injury to personnel being transferred should be evaluated carefully.

Note

The submarine will employ a wind-sock and, upon request, a smoke float to indicate wind direction and speed.

5.3.3.4 Night Submarine Transfers

WARNING

Night transfers to submarines shall not be attempted except in cases of extreme emergency.

If a night transfer is necessary, the relative wind parameters should be the same as those used for daylight operations. The submarine shall attempt to rig lighting that will illuminate the top of the sail, sail planes, and the afterdeck. A small light should be attached to the highest point of the submarine. The helicopter may illuminate flood or hover lights to provide visual reference with the submarine.

5.3.3.5 Transfer Signals. The signals in Figure 5-5 are to be used during transfer to and from submarines.

5.3.3.6 Personnel Transfer Procedures. When the submarine is ready for transfer, the pilot will be informed by radio and/or the appropriate transfer signals. The passenger, tended by a TPO, will take position for the transfer.

Note

- Submarine personnel will normally wear inherently buoyant lifejackets and cranial helmets supplied by the submarine during the transfer and shall wear an inflatable device when inside the helicopter.

- If a submarine-supplied survivor rescue strop (horsecollar) is used, the passenger may be rigged prior to the transfer. The helicopter hoist cable will be grounded by the TPO. The passenger will be released from the submarine's safety track retaining line, and then the helicopter hoist hook will be attached to the horsecollar rings.

- If the helicopter-supplied horsecollar or other rescue device is used, the passenger shall be released from the submarine's safety track retaining line prior to entering the helicopter-supplied horsecollar or other rescue device.

- Personnel transfers from the helicopter to the submarine will follow the same procedures, with the TPO grounding the helicopter hoist cable prior to assisting the passenger.

5.4 MISCELLANEOUS EVOLUTIONS

5.4.1 Radiological Reconnaissance Operations. Because of the capability to hover and fly at slow speeds, helicopters are ideal for reconnaissance flights and should be flown as directed by the OTC with regard to flight altitude, surveillance areas, and personnel radiation dosage limits. In addition to the pilot, the minimum crew shall include at least one qualified monitor

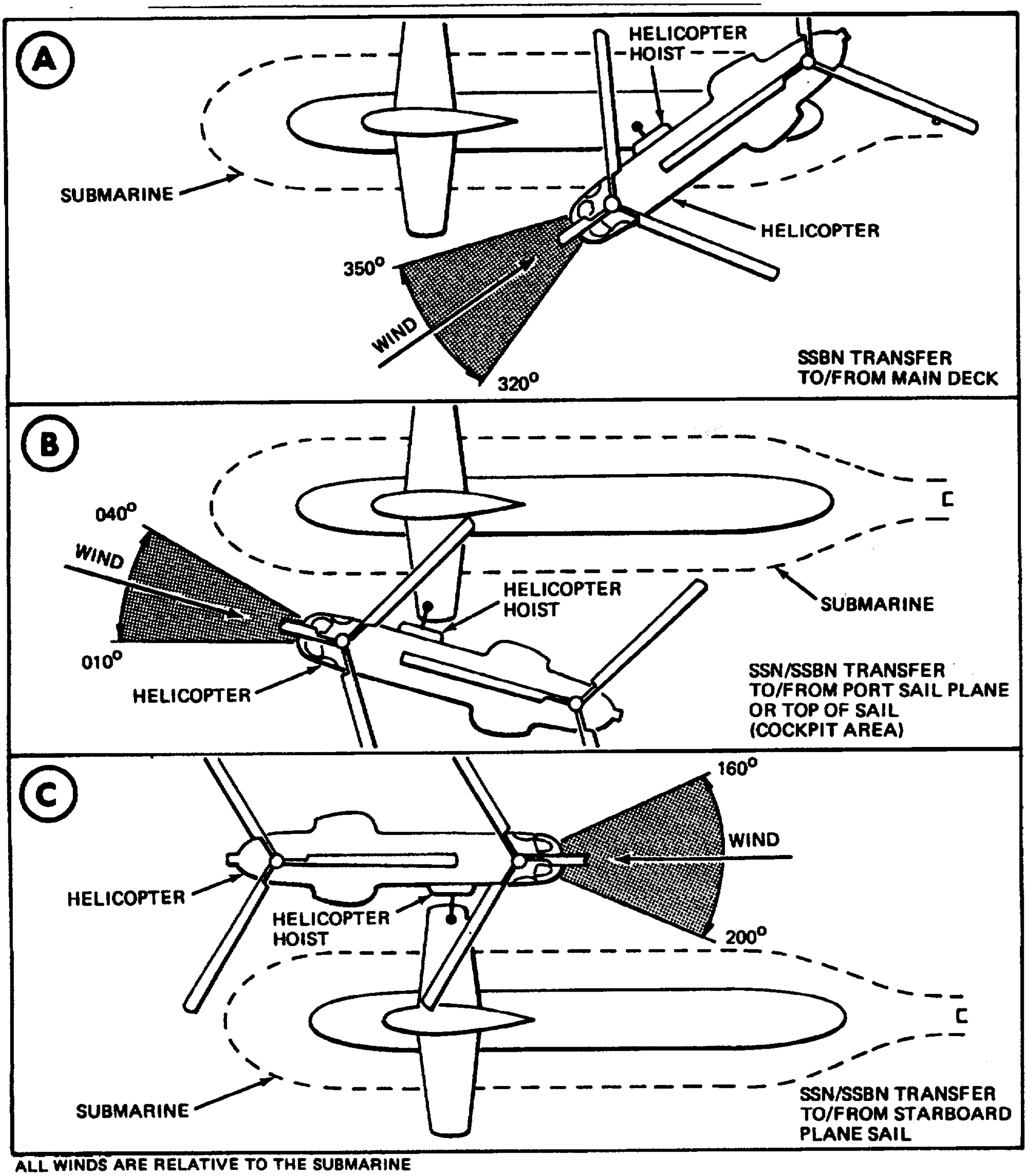


Figure 5-4. Submarine Transfer Locations

	Signal	Meaning
DAY	Red flag or paddle held aloft	Stay clear
	Green flag or paddle held aloft	Ready for transfer
NIGHT	Red wand or light	Stay clear
	Green wand or light	Ready for transfer

Figure 5-5. Submarine Transfer Signals

for reading and recording radiological intelligence data. Windows, hatches, and doors shall be kept tightly closed as much as possible during such flights, and all helicopter occupants shall wear protective clothing.

Landing in contaminated areas shall be made only if the tactical situation dictates. Landings and takeoffs in these areas should be made with a minimum of hovering to avoid excessive dust and the contamination to aircraft and personnel that is caused by this dust.

In addition to regular decontamination procedures, particular attention should be given to control linkage, rotor heads, transmissions, and shafting. The heavy concentration of grease in these areas makes them particularly susceptible to contamination.

5.4.2 Mine Reconnaissance. As a minesweeping component, helicopters may be employed to prevent sweepers from being mined, provide visual intelligence for minesweepers, verify sonar contacts, and locate and mark mines.

When involved in mine demolition operations, helicopters shall maintain a safe position of at least 1,000 feet (slant range) from the mine at an angle of less than 45° horizontal. This position should prevent damage to the aircraft when a mine is exploded.

5.4.2.1 Reporting Procedures. The helicopter shall search ahead of the sweepers and report all mines sighted. If a mine threatens one of the sweepers, the helicopter must immediately warn as follows:

1. Voice call of the ship or hull number

2. Bearing in clock code; range in yards from the sweeper, prefixed by the word "Emergency"

3. "Over" and await receipt.

A continuous flow of information shall be provided until the ship or ships are out of danger, at which time the report "Mine clear" will be made. The phrases "Turn left" or "Turn right" may be used if necessary.

In amplifying reports, the position of mines shall be given in clock code with the range in yards from the lead ship. Marking the mine with small buoys (5-inch ammunition cans) may be useful.

5.4.2.2 Verification of Sonar Contacts. Minesweepers are equipped with sonar designed to detect and locate mines. This equipment, however, does not discriminate between types of contacts; consequently, helicopters may be required to determine the nature of contacts. The minesweeper shall request verification of the contact as follows: "(Voice call of the helicopter) this is (call of ship). Contact (bearing by clock code, distance by yards). Confirm. Over."

Use of the word "Contact" by a minesweeper shall always mean a sonar contact unless preceded by "Visual" to indicate that the object has been sighted. After investigating, the helicopter shall report whether the contact is or is not a mine.

5.4.2.3 Location and Marking of Mines and Minefields. If possible, a helicopter shall search the mined area prior to the minesweeping operation. The position of mines and minefields shall be noted with reference to a known geographic point and shall also be marked by buoys whenever possible. After completion, the report of search to the sweep commander shall include:

1. Position and limits of field by geographic references

2. Orientation of minelines and number of mines

3. Number and position of buoys laid and any other pertinent data.

Chapter 12 contains information on AMCM operations.

5.4.3 Photography. On photographic missions, the pilot shall ensure that all cameramen are equipped with authorized safety belts or straps and that they use them whenever the helicopter is airborne. As the large door abreast of the passenger seats gives good clearance for photography, cameramen will usually position themselves opposite this door when using hand-held cameras.

In the event that large cameras or equipment are mounted in the helicopter hatches, a compromise to emergency egress will be experienced.

5.4.4 Radar Calibration. Because they return excellent radar echoes, helicopters are often employed as targets for the calibration of shipboard radar sets. On these missions, the pilot flies courses and speeds as directed by the ship. Requested target altitudes should be flown at the discretion of the pilot. If an approximate fixed position is desired at a dangerous hovering altitude, the pilot may achieve the required effect by a forward flight in a tight circle or figure eight about a fixed reference point.

5.4.5 Gunfire Spotting. The helicopter provides an excellent platform for gunfire spotting. By flying a tight circle or figure eight, the helicopter can maintain a relatively stationary position from which the pilot and spotter can observe the area between salvo signal and fall of shot. Qualified spotters should be furnished by the activity requesting the spotting service.

5.4.6 Special External Load Operations. Frequently, helicopter services are requested for external lifting of special loads that are beyond the scope of VERTREP and are not covered in the procedures set forth in Chapters 8 and 13. Safety is the primary consideration in these special external lifts, and the entire operation must be carefully preplanned and reviewed. Some of the factors to be considered for safe flight are:

1. Load density
2. Proper sling selection
3. Proper rigging of the load for flight, including inspection of the selected attachment points on the load to ensure that they will withstand the loads applied when the object is lifted
4. The aerodynamic stability of the load
5. Vertical bounce and proper pendant length
6. Arresting load rotation prior to release
7. Population density under the required flightpath
8. Crew protection.

The load, sling, and rigging should be visually inspected by the pilot of the lifting helicopter prior to attempting special external lifting to ensure the optimum configuration for the proposed flight.

5.4.7 Special Recovery Operations

5.4.7.1 Drones and Torpedoes. Drones and torpedoes shall be recovered only by specially configured helicopters with crews trained in drone and torpedo recovery techniques.

5.4.7.2 Gunnery Target Sleeves. Helicopters shall not be used to recover gunnery target sleeves. This is a hazardous operation as the sleeves are frequently filled with water, making it impossible to judge the weight of the load. Additionally, a crash can result if downwash from the main rotor sweeps the sleeve or towline into the rotor system.

5.4.8 Helicopter Rope Suspension Training. The capability to insert highly trained forces to vessels and platforms not otherwise accessible has played a major role in the success of maritime interception operations. HRST includes fastrope, SPIE rig, rappelling, Jacobs Ladder, and McGuire rig operations. HRST operations on U.S. Navy ships are divided into categories I and II.

5.4.8.1 Category I. Category I training evolutions are restricted to flight decks certified level III, class 3 or higher, for the applicable aircraft and are limited to day, VFR conditions. Any flightcrews authorized to conduct operations on U.S. Navy vessels may participate in category I training provided their aircraft has been cleared for HRST operations by NAVAIR and the evolution is approved in advance by the ship's commanding officer.

5.4.8.2 Category II. Category II training evolutions may be conducted to flight decks and/or hover areas certified level II, class 5 or higher, for the applicable aircraft. Category II training may be conducted at night under VFR conditions provided a visible horizon exists. NVG use is authorized for qualified crews. NVG operations shall be conducted in accordance with paragraph 4.2.

Note

Category II HRST training is restricted to:

1. USMC units designated MEU(SOC) or training toward MEU(SOC) designation, or as assigned by COMMARFORPAC, COMMARFORLANT, or CG MARFORRES.
2. Navy units with NSW as a primary or secondary mission or units specifically tasked by their TYCOM or battle group commander.

CHAPTER 6

Air Traffic Control Doctrine

6.1 AIR TRAFFIC CONTROL DOCTRINE (AIR-CAPABLE SHIPS)

This chapter defines the procedures for conducting flight operations with helicopters deployed with or operating from air-capable ships from which aircraft can take off, land, or conduct HIFR or VERTREP operations. This chapter contains sufficient procedural information to provide greater flexibility and operational capability for safe intership helicopter operations. Also described are some of the pertinent details of deck marking, lighting, and procedures for conducting VFR and IFR controlled approaches to air-capable ships. The purpose of this chapter is to familiarize flight personnel with the general appearance and characteristics of facilities that may be encountered in the course of conducting flight operations. Complete and detailed obstruction, clearance, and lighting criteria are contained in the Air-Capable Ships Aviation Facilities Bulletin No. 1. Ship and flight personnel should be familiar with this publication and pertinent documentation, such as the current editions of:

1. Applicable NATOPS flight manuals

2. Shipboard Aviation Facilities Resume, NAEC-ENG-7576

3. APP 2 and APP 2 SUPP 1.

6.2 RESPONSIBILITIES

6.2.1 Pilot. As directed by OPNAVINST 3710.7, the pilot is responsible for the safe and orderly conduct of the flight. Further, the success and safety of flight depend upon his knowledge and adherence to the procedures contained herein. Any necessary deviation from these procedures or from other controlling instructions shall be reported immediately to the controlling agency.

6.2.2 Operations Officer. The operations officer shall be responsible for the control of airborne aircraft, except when control is assigned to other authority. This control refers to all airborne operations not incidental to the actual launch or recovery of aircraft.

6.2.3 Combat Information Center Watch Officer. The CIC watch officer on air-capable ships is responsible for mission control of assigned aircraft. This includes providing separation from other traffic operating in the vicinity of the ship and/or under the ship's radar surveillance, and ensuring that radar air controllers know and follow standard ATC procedures. Additionally, he/she shall ensure that these controllers know their responsibility for traffic advisories to aircraft operating in VMC and for safe separation of aircraft operating in IMC. Upon request, he/she shall provide information concerning areas of special operations.

6.3 CONTROL

6.3.1 Controlled Airspace. Combined flight operations occur when rotary and fixed-wing aircraft are operating in the vicinity of a ship control zone. Unless cleared by the controlling agency, aircraft shall not enter the ship control zone. The OTC or delegated representative is responsible for the coordination of these evolutions and shall at the least provide the following guidance:

1. Communication frequencies to be used

2. Controlling agencies responsible for each evolution

3. Sector/altitude restrictions (if required)

4. Marshal procedures (if required)

5. Lost communications procedures.

Note

Unscheduled launches or recoveries that are due to emergency or operational necessity are permissible, but must be coordinated with the OTC as soon as possible because of the inherent dangers of combined flight operations.

6.3.1.1 Control Zones. The airspace surrounding each air-capable ship that possesses equipment for approved IFR approaches is defined as a circle, 5 nm in radius, extending from the surface to an altitude of 2,500 feet MSL (see Figure 6-1). The following limitations apply:

1. The control zone will not be effective in any portion of the area that extends into, under, or abuts the controlled airspace of aviation ships, amphibious assault aviation ships, or airfields.
2. The control zone is not effective if the area lies within a special-use airspace (restricted area, warning area, MOA, etc.) without the authorization of the designated controlling agency.
3. Where two or more ships are in company, only a single control zone may be established, as directed by the OTC.

WARNING

Utmost vigilance/surveillance is required in areas near airways, airfields, controlled airspace, or special-use airspace. Even in uncontrolled airspace areas, others may not be aware of the ship's presence or conduct of flight operations.

6.3.1.2 Close Proximity Operations. During combined flight operations (fixed-wing or helicopter) with CV/CVN/LPH/LHA/LHD or other air-capable ship, each ship should remain in its assigned operating area in order to reduce air traffic coordination problems. The air-capable ship CDC must closely monitor and coordinate flight patterns to avoid mutual interference. Prelaunch procedures shall include exchange of air plans and notification by air-capable ships and acknowledgment by the CV/CVN/LPH/LHA/LHD prior to any flight operations within 10 nm of the ship.

6.3.2 Control Criteria. Weather in the control zone determines the degree of helicopter control necessary. The type of control to be employed during departure and recovery is determined by the SENAV, unless otherwise specified by higher authority. During periods when ceiling and/or visibility is below VFR minimums, electronic ATC techniques shall be used to provide separation for maximum safety.

6.3.3 Visual Meteorological Conditions Minimums. Helicopter VMC minimums are established by OPNAVINST 3710.7. A 500-foot ceiling and 1-mile visibility are minimum visual operating parameters. More stringent minimums than are found in OPNAVINST 3710.7 may be imposed by the SENAV, and these more stringent minimums are particularly recommended for multihelicopter operations. Mission priority will be a major factor in establishing any operating minimums.

6.3.4 Separation Criteria. The following criteria are provided as guidance for the control of aircraft under IMC. Either lateral or vertical separation shall be provided. These restrictions do not apply to launch and recovery operations or tactical maneuvers such as air intercepts, rendezvous, and close USW action.

6.3.4.1 Lateral Separation

1. Aircraft operating less than 50 miles from the monitoring antenna shall be separated by a minimum of 3 miles.
2. Aircraft operating 50 miles or more from the monitoring antenna shall be separated by a minimum of 5 miles.

6.3.4.2 Vertical Separation

1. Helicopters shall be separated by 500 feet.
2. Fixed-wing aircraft shall be separated by 1,000 feet up to and including FL 290 — 2,000 feet above FL 290.
3. Helicopters shall be separated from fixed-wing aircraft by 1,000 feet.

6.3.5 Electronic Control. All helicopters shall be under positive communications control at sea unless otherwise directed. Pilots shall not shift frequencies without notifying and/or obtaining permission from the controlling agency.

During extended flights, frequent radio checks shall be made and the pilot shall be informed of any changes such as:

1. Deteriorating weather
2. Loss of radar contact
3. Alteration of the ship course or speed
4. Bearing and range of aircraft to ship ("pigeons").

6.3.6 Tactical Direction. In the absence of a full ACU capability, or if the tactical situation precludes

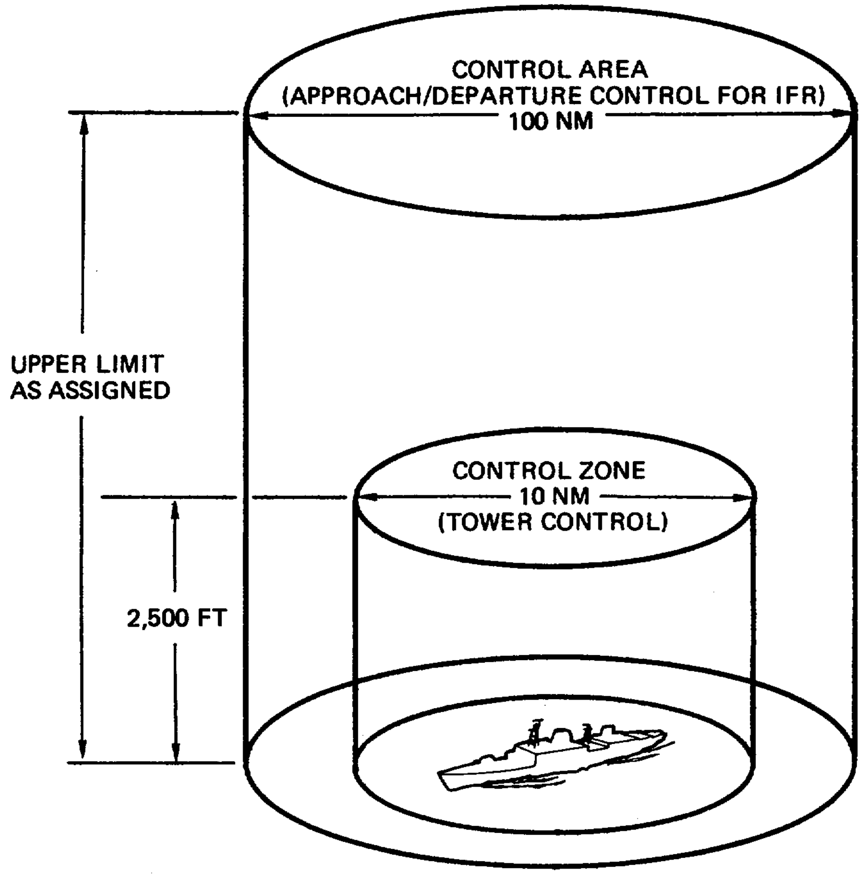


Figure 6-1. Control Area and Control Zone Dimensions

positive or advisory control, an aircraft can be operated under tactical direction. Tactical information is passed to enable an aircraft to accomplish its task. The directing unit, when possible, provides adequate warning of hazards, but the aircraft commander is responsible for aircraft navigation and safety.

Normally, the pilot in command shall be responsible for determining if weather conditions equal or exceed VFR minimums. However, regardless of the pilot's determination, the commanding officer may direct that the close control associated with IMC shall be exercised.

6.3.7 Advisory Control. Advisory control consists of the monitoring of radar and radio channels in order to advise the pilot of other traffic and operational or hazardous areas. It shall be used where traffic density in an operating area requires a higher degree of control for safety of flight than normally required under VMC. Advisory control is normally limited to VMC operations and is recommended for all operations where positive control is not required.

6.3.8 Positive Control. Positive control is a form of ATC in which the controlling agency has radar and radio contact with the aircraft being controlled and published approach or departure procedures are complied with, or where specific assignments regarding heading and altitude are issued by the controller. While altitude separation is provided by pilots maintaining assigned altitude, lateral and time separation is the responsibility of the air controller. Speed changes may be directed by the air controller.

Positive control shall be used under the following conditions:

1. Ceiling less than 500 feet

2. Forward flight visibility less than 1 mile

3. All flight operations between 1/2 hour after sunset and 1/2 hour before sunrise except as modified by the OTC or the commanding officer.

6.3.9 Electronic Emission Control. The operations officer shall be responsible for electronic EMCON in accordance with NWP 6-01, NWP 3-51.1, effective operation orders, and governing directives. Established nonelectronic communications procedures for performing launch, arrival, and recovery operations during EMCON conditions are described in Chapter 4.

Detailed briefings covering mission responsibilities and procedures shall be conducted prior to operating under EMCON conditions. All flight crewmembers, controllers, and aircraft-handling personnel shall attend such briefings and familiarize themselves with all procedures within their area of responsibility.

6.3.10 Control of Radio Circuits

6.3.10.1 Combat Information Center or Air Operations Control Center/Helicopter Direction Center. CIC or AOCC/HDC shall exercise control as follows:

1. Primary control of assigned air control frequencies

2. Secondary control during launch/recovery operations.

6.3.10.2 Ships With PriFly Control. PriFly shall exercise control as follows:

1. Primary control during recovery/launch operations

2. Secondary control of departure and final approach frequencies.

6.3.11 Voice Procedures. Strict radio discipline is mandatory. Voice procedures must be as brief as possible, but should not vary appreciably from standard ATC phraseology as set forth in ACP 165 and OPNAVINST 3721.4.

6.3.12 Flight Clearance Requirements. The requirements for filing flight plans and advisories vary with each operating area and are contained in OPNAVINST 3710.7, flight information publications, and fleet operating directives. As a rule, flight plans (DD 175/ICAO) are required for flights that terminate ashore and/or make passenger stops at shore stations or proceed over land. They shall be filed by message or radio with an appropriate ATC facility ashore, well in advance of the intended flight operations.

6.3.13 Departing Aircraft. Prior to launch, a radio check on the designated frequency, using appropriate aircraft and ship's call, shall be conducted in the following manner:

1. Ships with primary flight control — PriFly

2. All others — CIC.

PriFly and CIC shall acknowledge. The controlling agency shall broadcast the relative wind direction and velocity, density altitude, and altimeter setting.

The operations officer, with the concurrence of the commanding officer, may authorize the launch of an aircraft without radio communications if circumstances warrant and overall safety is maintained. However, except under conditions of extreme emergency or when tactical situations dictate otherwise, two-way communications are mandatory for helicopter operations:

1. At night
2. During periods of low ceiling and visibility
3. For flight beyond visual range of the ship.

6.3.14 Control of Departing Helicopter. The primary responsibility for adherence to the assigned departure instructions rests with the pilot; however, advisory control shall normally be exercised with a shift to positive control as required by weather conditions, upon request, or when the assigned departure instructions are not being adhered to. After the helicopter is airborne, CIC shall:

1. Record data on status boards as required
2. Ensure that communications and positive track are maintained to the extent possible under existing EMCON conditions
3. Request navigation aid checks as necessary
4. Maintain control until control is accepted by another controlling agency and the pilot shifts radio frequency as appropriate
5. Before releasing aircraft to the other controlling agency, give the pilot any pertinent information, such as changes in PIM and mission
6. When transferring control to another agency, give the range and bearing of the aircraft being transferred and ensure that the other control agency acknowledges assumption of control
7. Relay changes to flight plans as necessary.

Do not change type of control in flight unless the pilot is advised and acknowledges the change.

6.4 DEPARTURE PROCEDURES (AIR-CAPABLE SHIPS)

6.4.1 Day Visual Meteorological Conditions. After launch, the helicopter shall depart the ship on the course as established in the prelaunch briefing. Deviations are permitted to preserve the safety of the flight or with the concurrence of the CIC air controller.

6.4.2 Instrument Meteorological Conditions or Night Operations. The helicopter shall depart on the stipulated departure course, climbing to a minimum of 300 feet prior to commencing a turn.

6.4.3 Departure Communications Procedures. The helicopter will be launched on the predetermined frequency and shall be under the control of CIC as soon as the HCO/LSO has received an "Operations normal" report from the pilot and HCO passes control to CIC. This report should include fuel state and souls on board. At night or if in IMC, aircraft shall not be required to change frequencies or IFF codes until at least a 300-foot altitude and cruise configuration have been attained.

Guard channel shall be monitored at all times. The aircraft shall not shift from assigned control frequency except to switch to another control agency with the concurrence of the current control agency.

6.5 ARRIVAL PROCEDURES

When arriving within the control area of the recovery ship, and upon release from the previous control agency, the inbound helicopter shall report to CIC/PriFly/HCS for control. The pilot shall provide the following information:

1. Identification and type helicopter
2. Position
3. Altitude
4. Fuel state (in hours and minutes to splash)
5. Aircraft status
6. Pilot's estimate of weather conditions (VMC or IMC)
7. Souls on board
8. Other pertinent information which may affect the recovery.

The controlling agency shall provide the inbound flight with:

1. Type of approach anticipated (VFR or IFR (radar/tacan/automatic direction finder))
2. Marshal instructions, if required

3. Steering as required

4. Estimated recovery time

5. Altimeter setting, wind, and weather

6. Time check

7. BRC

8. Ship's certification/waiver status as it pertains to the helicopter involved

9. The appropriate range and altitude at which visual contact can be expected to be made with the SGSI.

6.5.1 Approach Criteria (Air-Capable Ships). Based on the pilot's reported estimate of weather as well as observed weather at the ship, the SENAV shall determine the type of approach and required control for the recovery.

6.5.1.1 VFR Descent and Approach. If it has been determined that VMC exists and that the ship is in every respect prepared to recover the helicopter, the pilot shall be directed to close the ship. Control will be passed to PriFly/HCS and the LSE will complete the recovery. If the ship is not prepared, holding instructions shall be issued by CIC until such time as the ship is ready for recovery.

6.5.1.2 IFR Approach Procedure. Helicopter operations are not normally conducted when weather is below a ceiling of 500 feet and/or less than 1 mile visibility, unless a CCA/PAR-equipped facility is available within the operating range of the helicopter.

6.5.1.3 Helicopter Air-Capable Ship Approach Procedures. Procedures contained herein shall be used in IMC. The altitude/distance checkpoints depicted in the approach path profiles in Figures 6-2 and 6-3 are consistent with SGSI use. An aircraft on the depicted flightpath is within the amber zone. The SGSI, if operable, should be used for all night approaches to aid the pilot in the final phase of the approach.

6.5.1.4 Final Approach Courses. The final approach courses shown in Figures 6-2 and 6-3 are typical and apply to most air-capable ships. They may be adjusted as necessary to conform to existing lineup lines.

6.5.2 Marshal

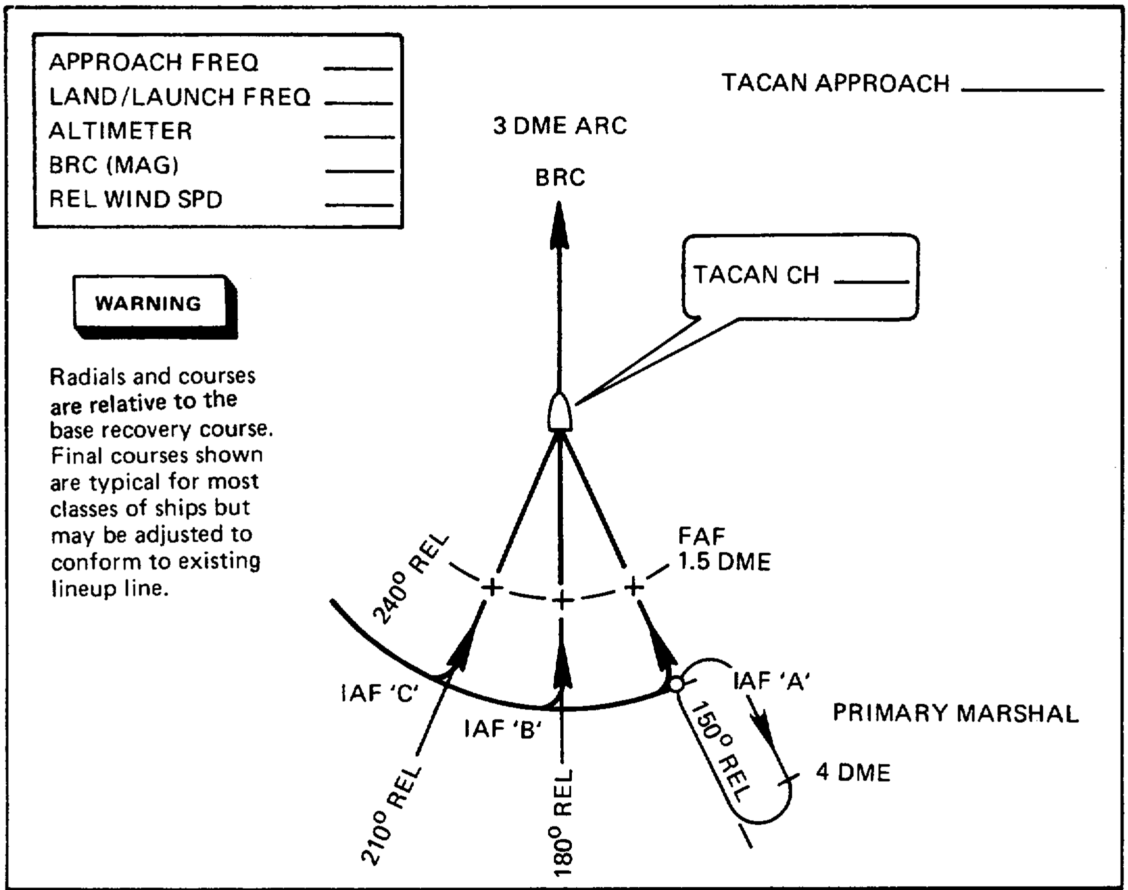
6.5.2.1 Primary Marshal Approach (Tacan-Equipped Ships). Primary marshal is as depicted in Figure 6-2 or as established by the OTC. When the ship is prepared to recover the helicopter, CIC shall clear the aircraft for the approach.

The pilot shall proceed to the IAF using radar vectors, tacan information, or from holding, as depicted in Figure 6-2. If cleared for the approach, the pilot completes his landing checklist, reports "Commencing approach," and secures the lower red anticollision light (night only) to signal the deck that he/she is commencing the approach and to prevent blinding of the LSE/HCO. The pilot proceeds to the FAF, where he reports "Gear down, right/left seat landing." The tower replies with a "Cleared to land" call. The pilot begins descent so as to arrive at the MAP at the MDA. With an SGSI installed, the pilot reports visual acquisition of the SGSI to the ship and completes the approach based on SGSI/VLA and LSE signals.

6.5.2.2 Nondirectional Beacon Approach. Marshal is provided for NDB-equipped ships as depicted in Figure 6-3. When the ship is prepared to recover the helicopter, CIC shall clear the aircraft for the approach.

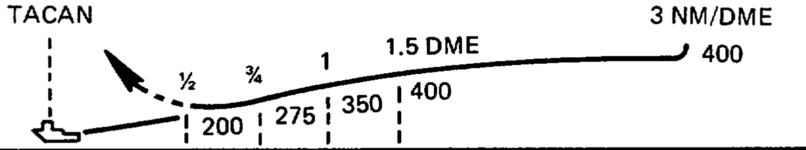
When departing marshal, the pilot reports "Commencing approach." He completes the landing checklist and secures the lower red anticollision light (night only) to signal the deck that he is commencing the approach and to prevent blinding of the LSE/HCO. The pilot proceeds outbound on a heading 30° to the right of the final approach bearing (see Figure 6-3). Following timing outbound, the pilot commences a shallow left turn of approximately 10° to intercept the final inbound bearing. Once established on the final inbound bearing, the pilot proceeds to the FAF, where he/she reports "Gear down, right/left seat landing." The tower replies with a "Cleared to land" call. The pilot begins a descent so as to arrive at the MAP at the MDA. With an SGSI installed, the pilot reports visual acquisition of the SGSI to the ship and completes the approach based on SGSI/VLA and LSE signals.

6.5.3 Air Surveillance Radar or Self-Controlled Radar Approach. The ship's ASR and the SCR on board the helicopter can be used with the approach profile depicted in Figure 6-2. Tacan approach procedures apply, except that the pilot will control his descent based on the range and bearing information received from the ship or from the on-board radar operator. The radar operator will provide a continuous update of range and bearing information until the landing environment/SGSI is acquired visually. The pilot reports "Visual acquisition to the ship" and the radar operator ceases to provide information. The pilot continues the approach to landing based on SGSI/VLA and LSE signals.



MISSED APPROACH

If visual contact is not made at MAP, climb straight ahead to 400 ft for 3 min or 3 DME, proceed to primary marshal and hold.



CATEGORY	MDA - MAP/DISTANCE	CEILING/VIS
TACAN	200' / 1/2 NM	200 / 1/2
*Radar-Monitored (Ship/Helicopter Radar)	200' / 1/2 NM	200 / 1/2

*Minimums when radar provides distance information.

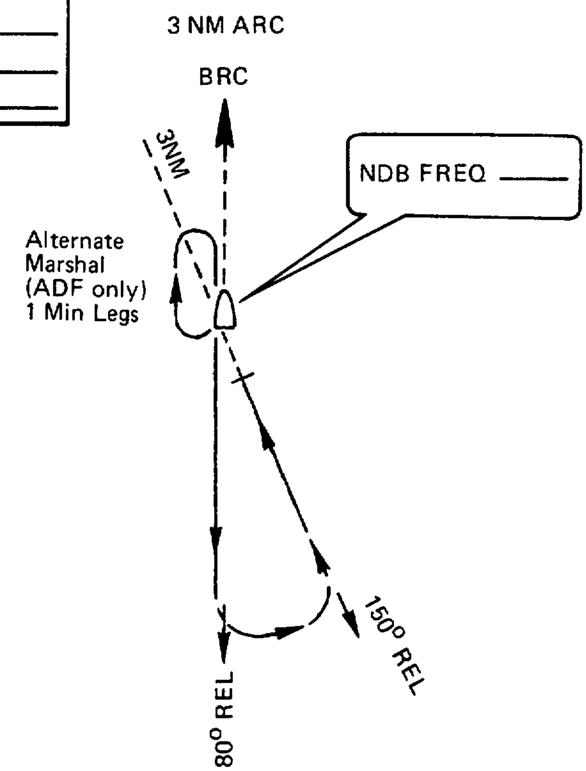
Figure 6-2. Approach Chart Air-Capable Ships Tacan (Helicopter)

APPROACH FREQ	______
LAND/LAUNCH FREQ	______
ALTIMETER	______
BRC (MAG)	______
REL WIND SPD	______

NDB APPROACH _ _ _ _ _

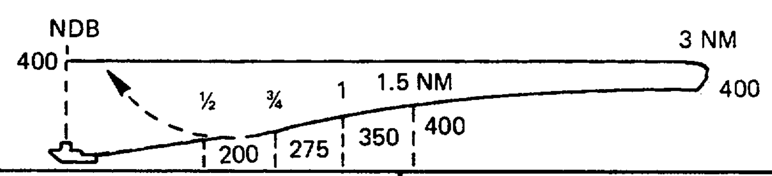
WARNING

Radials and courses are relative to the base recovery course. Final courses shown are typical for most classes of ships but may be adjusted to conform to existing lineup line.



MISSED APPROACH

If visual contact is not made at MAP, climb straight ahead to 400 ft for 3 min. Then proceed to alternate marshal and hold.



CATEGORY	MDA - MAP/DISTANCE	CEILING/VIS
NDB	200' / 1/2 NM	200 / 1/2

NDB APPROACH

Time: High Sta to 3 NM Arc						
Relative Wind Spd		0	5	10	20	30
A/C	70	2:34	2:24	2:14	2:00	1:47
SPD	90	2:00	1:53	1:47	1:38	1:30

Time: 3 NM Arc to MAP (1/2 NM)						
Relative Wind Spd		0	5	10	20	30
A/C	70	2:08	2:16	2:25	2:53	3:30
SPD	90	1:39	1:44	1:50	2:05	2:23

Figure 6-3. Approach Chart Air-Capable Ships Non-Directional Beacon (Helicopter)

6.5.4 Missed Approach and Wave-off (Air-Capable Ships). If the landing environment is not in sight at the MAP and a safe landing cannot be executed, or if the pilot has been in visual contact and proceeded beyond the MAP and then loses contact, an immediate wave-off shall be executed. The helicopter shall climb straight ahead to 400 feet. If no instructions are received prior to reaching 3 nm or within 3 minutes, the pilot shall execute a left turn downwind and proceed to the desired marshal point to attempt another approach. If meteorological conditions are considered to preclude a safe landing and sufficient fuel reserves exist, the helicopter should be diverted to a more suitable landing site.

6.5.5 Helicopter Approach Minimums. The commanding officer, with the advice of the SENAV, may establish more restrictive approach minimums that reflect significant changes in operational capabilities, such as may be occasioned by decreased proficiency of CIC or of the helicopter flightcrews. However, the helicopter ceiling/visibility minimum on the selected approach shall be observed until the conditions of visual contact asserted in the approach descriptions are attained. When a suitable alternate landing platform is available, aircraft shall not commence an approach to the primary landing platform if the reported or observed weather is below the minimums unless it has been determined that the aircraft has sufficient fuel to proceed to the alternate landing platform following a possible missed approach.

6.6 COMMUNICATIONS CONTROL

6.6.1 Voice Communications Procedures. The compulsory arrival, marshal, and approach voice reports required of the pilot are as follows:

1. Arrival within controllable range and release from the previous control agency
2. Receipt of:
   a. Holding/marshal instructions
   b. Estimated recovery time
   c. Altimeter setting, wind, and weather
3. Entering holding
4. Altitude or other assignment changes
5. Commencing approach (fuel state)
6. IAF and FAF (1-1/2 miles)
7. Ship sighted
8. Missed approach/wave-off.

Standard ATC phraseology shall be used with the exception of altitude, which shall be reported as in current tactical doctrine. Fuel state will be reported in hours plus minutes to splash.

6.6.2 Emergency Low-Visibility Approach Procedures. An ELVA to an air-capable ship that is below approach minimums (200-foot ceiling and 1/2-mile visibility) is an emergency procedure. An actual ELVA shall not be attempted unless the helicopter does not have adequate fuel to bingo to a GCA/CCA-equipped airfield or aviation ship.

6.6.2.1 Practice ELVAs. The primary factors that affect the quality of an ELVA are the ability of the controller, accuracy of the information displayed to the controller, and the pilot's instrument flight proficiency. Practice ELVAs in VMC shall be conducted routinely to enhance controller and pilot proficiency.

6.6.2.2 Preparation for Conducting an ELVA. Equipment to be used must be fully operable and accurately calibrated at all times; emergencies may occur at any time and require the use of:

1. Surface search radar
2. Air search radar with IFF
3. Tacan (if so equipped)
4. Gunfire control radar and associated computer
5. NC-2 USW plotter
6. UHF transceivers
7. Anemometers
8. Barometer.

The ship's GFCS provides the most accurate real-time tracking system available in most air-capable ships. For this reason, its use during an ELVA is recommended. The NC-2 plotter, with a final approach pattern overlay, may also be used in conjunction with either the GFCS or the surface search radar.

At least one UHF transceiver should be set up as a backup on the primary air control frequency and at least one transceiver should be set up as a secondary.

Anemometers and the barometer must be accurately calibrated. Bridge personnel must keep the air controller informed of significant changes in either relative wind or barometric pressure during the approach. An error of .05 inch in barometric altimeter setting results in an altitude error of 50 feet, which is critical at the low altitudes at which helicopters operate.

6.6.2.3 Initial Approach Patterns. Initial approach patterns must be executed so that the aircraft reaches the 4-mile gate position, at an altitude of 400 feet and an airspeed of 70 knots, and all required radio transmissions (numbers 1 through 6) are completed (see Figure 6-4).

6.6.2.4 Final Approach Profile

1. The aircraft will commence the final approach at an altitude of 400 feet and airspeed of 70 knots. No matter which initial approach pattern is used, the final approach must be conducted exactly the same.

2. This is the most critical phase of the ELVA. The final controller must have the approach plotted and actually have control of the aircraft prior to reaching the 4-mile gate.

3. For starboard approaches, final approach heading will be BRC minus the flight deck approach angle. For port approaches, final approach heading will be BRC plus flight deck angle. For straight-in approaches, final approach will be BRC.

4. Heading corrections in the final approach should be made in small steps (not more than 5° if possible). Aircraft will use a one-half standard rate turn on final approach. The tendency to over-correct must be avoided. It must also be remembered that the aircraft will be changing speeds during the final approach; therefore, the ship-aircraft relative motion will change.

6.6.2.5 Required Radio Transmissions. Transmissions are keyed to range from ship and must be made at the appropriate time. To avoid confusion, an altitude should also be given whenever a heading is given, and be given at the same point. The normal sequence of voice transmissions is provided in Figure 6-4. These transmissions are the required transmissions and must be given for each approach. They are keyed to the numbers in Figure 6-4.

Corrections to headings must be given as required. "Filler" transmissions may be required to ensure that the maximum time between transmissions (1 minute in the pattern and 15 seconds on final approach) is not exceeded. Filler transmissions should give useful information to the pilot, such as altitude of highest point on the ship, distance from touchdown, dimensions of the flight deck, and so forth. Avoid routine radio checks as filler transmissions and do not continuously transmit, as this removes the ability of the pilot to transmit information on emergency conditions. Whenever a heading is given, ensure an altitude is also given (e.g., "Turn left heading 200, altitude should be 300 feet"). Conversely, never give an altitude without including the heading.

6.6.2.6 Missed Approach Procedures

1. Assume missed approach if the pilot does not have the ship in sight at designated minimums, normally 50 feet altitude and 100 yards visibility. Variables such as radar performance, operator proficiency, aircrew factors, etc., may necessitate that the ship's commanding officer raise these minimums so as not to unduly endanger the ship or helicopter.

2. If a missed approach occurs, the aircraft will make a 30° heading change to the left (right for port approach) and climb to 400 feet. The aircraft should then be vectored back into the ELVA pattern. If equipment malfunctions or limitations preclude ELVA procedures, an emergency smokelight approach or a controlled ditching may be considered.

6.6.3 Smokelight Approach. This approach is used as a last resort when available equipment will not allow ELVA procedures to be used, or when the ship cannot be visually acquired using ELVA procedures. Both the commanding officer and the pilot in command (or detachment OIC) must have agreed to attempt the procedure. The aircraft is positioned 2 miles astern of the ship and proceeds inbound (180° relative bearing from the BRC). The aircraft descends at the pilot's discretion to 40 feet and 40 knots. Ship's personnel drop smoke/matrix lights every 15 seconds (or other prearranged interval), and the pilot is kept informed of the number of smokelights in the water. The pilot at the controls follows the smokelights up the ship's wake, adjusting his closure rate until he holds the ship visually. HCS will receive a "Gear down" report from the pilot prior to the aircraft maneuvering over the deck.

6.7 AIRCRAFT EMERGENCIES

From a control standpoint, aircraft emergencies fall into four categories:

1. Communications failures

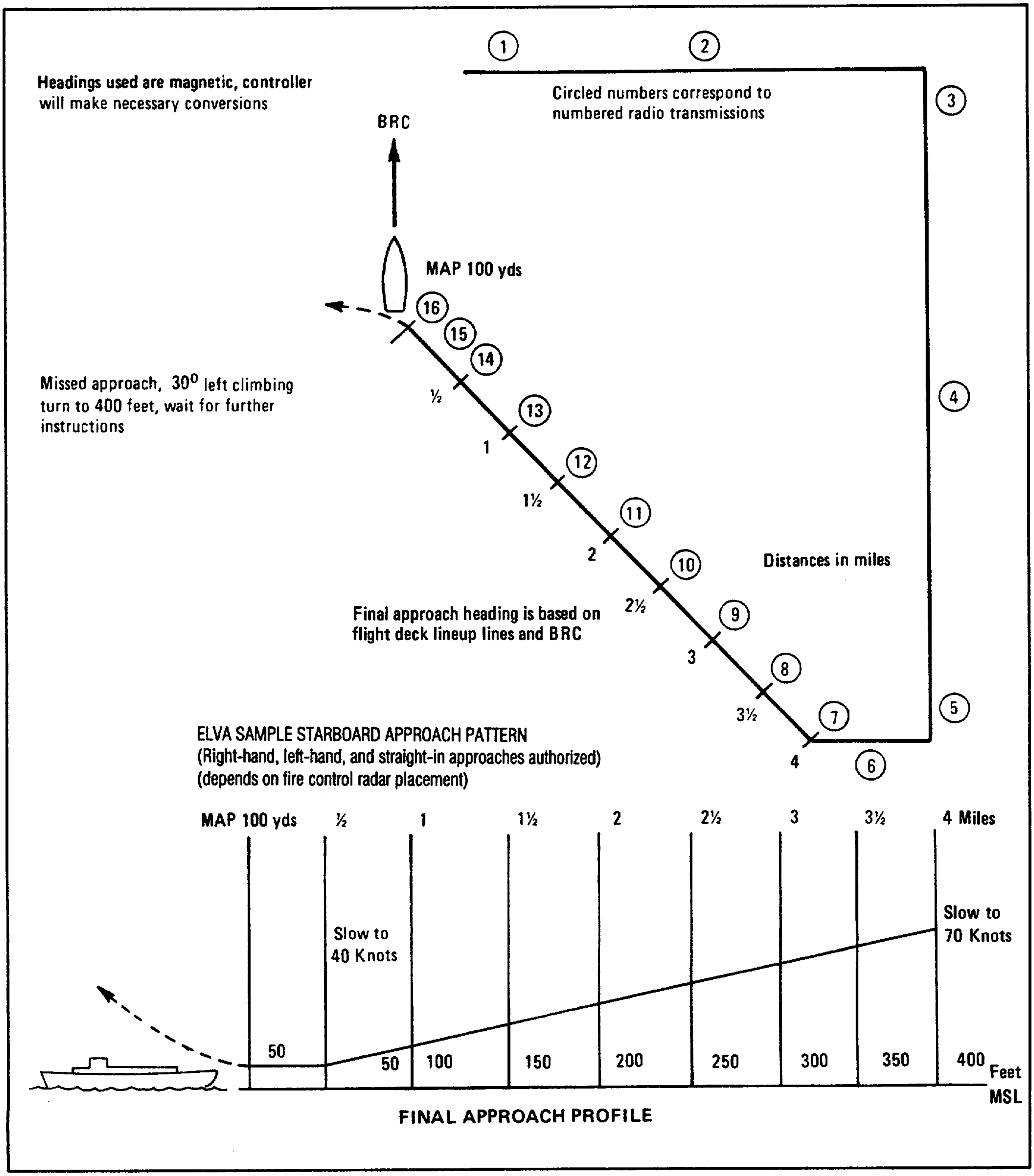


Figure 6-4. Emergency Low-Visibility Approach Pattern (Sheet 1 of 2)

1. (Initial Check-in). This will be a radar-assisted approach. Hold your radar contact on the ___ radial, ___ miles from the ship. Altimeter setting is ___. Weather is ceiling ___, visibility ___. Final approach heading will be ___. Winds are ___ degrees port/starboard at ___ knots. Maximum pitch and roll are ___. Read back altimeter setting.
2. Descend/climb and/or maintain 400 feet. Assigned heading is ___.
3. Lost communications procedures follow: If no transmissions are received for 1 minute in the pattern or 15 seconds in final, climb to and maintain 400 feet. Attempt contact on (Secondary). If unable to make contact, squawk Mode III Code 7600. Alternate approach will be tacan channel ___ commencing at 3 miles and 400 feet on the ___ radial. Acknowledge.
4. Missed approach procedures follow: If ship or wake not in sight at missed approach point, immediately turn left 30 degrees (right for port approach); climb to 400 feet and increase airspeed to 90 knots. Report level and on speed and stand by for further instructions.
5. Perform landing checks. Report gear down and locked.
6. Turn right/left to the final bearing ___, maintain 400 feet and slow to 70 knots.
7. Do not acknowledge further transmissions. On final, 4 miles. Commence gradual rate of descent to arrive at 1/2 mile at 50 feet. Maintain 70 knots. Assigned heading is ___. Report ship in sight.
8. (Call sign) 3-1/2 miles, left/right/on/approaching centerline. Turn left/right (Corrective heading) or assigned heading is ___. Altitude should be 350 feet.
9. (Call sign) 3 miles, left/right/on approaching centerline. Turn left/right (Corrective heading) or assigned heading is ___. Altitude should be 300 feet.
10. (Call sign) 2-1/2 miles, left/right/on approaching centerline. Turn left/right (Corrective heading) or assigned heading is ___. Altitude should be 250 feet.
11. (Call sign) 2 miles, left/right/on approaching centerline. Turn left/right (Corrective heading) or assigned heading is ___. Altitude should be 200 feet.
12. (Call sign) 1-1/2 miles, left/right/on approaching centerline. Turn left/right (Corrective heading) or assigned heading is ___. Altitude should be 150 feet.
13. (Call sign) 1 mile, left/right/on approaching centerline. Turn left/right (Corrective heading) or assigned heading is ___. Altitude should be 100 feet. Slow to 40 knots.
14. (Call sign) 1/2 mile. Assigned heading is ___. Maintain 50 feet and 40 knots.
15. (Call sign) 800/600/400/200 yards. Left/right/on approaching centerline.
16. (Call sign) at missed approach point if ship or wake not in sight, execute missed approach.

Figure 6-4. Emergency Low-Visibility Approach Pattern (Sheet 2 of 2)

2. Navigation aid failures

3. Crewmember injuries

4. Other aircraft systems failure.

Lost communications emergency squawks are listed in Figure 6-5.

The nature of some emergencies requires priority and/or diversionary measures. The ultimate resolution of these emergencies involves a command decision, based upon the type of emergency and weather conditions in the recovery area. It is imperative that all pertinent details be collected that might aid in the evaluation of an emergency and that the command and other interested agencies be kept properly informed. SAR action should be executed when reasonable doubt exists as to the safety of the aircraft.

6.7.1 Basic Emergency Procedures. Emergencies where navigation aids and/or communications are available should be handled according to procedures prescribed in this publication. Emergency procedures for aircraft systems failures are covered in the appropriate NATOPS flight manuals.

6.7.2 Lost Communications and Emission Control. The ship should have a secondary UHF radio ready to assume communications if the primary unit fails. This is especially true during night operations and periods of reduced visibility when positive radar control should be maintained. When the use of radio communications is not authorized because of the EMCON conditions in effect, routine helicopter operations can be conducted by the use of visual signals. See Figures 4-13 through 4-15.

During EMCON, helicopter control ships shall notify receiving ships by visual means that the helicopter operations will be conducted with sufficient lead time to ensure that the receiving ship will be ready for the helicopter's arrival. Large cards displaying ship's name and hull number may be used by the control ship to inform the helicopter pilot of his destination. Flag and hand signals and flaghoist signals may be used for helicopter control, but radio transmission shall not be authorized unless safety of flight or an emergency requires breaking EMCON.

Note

Except when a tactical or emergency situation dictates, two-way communications between the ship and aircraft shall be established before the aircraft goes out of visual range.

6.7.3 Lost Aircraft Procedure. When the position of an aircraft is in doubt, the controller must immediately commence the following procedure.

1. Obtain radar and radio contact as soon as possible. Take control of the circuit in use and utilize relay aircraft. Continue to send information in the blind, and search all IFF modes. Commence communication search and monitor guard channel (243.0 MHz) for emergency aircraft calls.

2. Inform the OTC.

3. Keep an up-to-date estimate of the aircraft's fuel state.

4. Call for tacan and UHF/DF and ES watch to be set immediately.

5. Alert the command for the possible use of other aids to lost aircraft such as black smoke, vertical searchlights, antiaircraft bursts, starshells, fire control tracking balloons, energized prebriefed sonobuoy channel, and other navigation aids.

Once contact is regained:

1. Vector aircraft to nearest airfield or back to the force.

2. Ensure position of aircraft on regaining contact is recorded.

3. Check fuel state.

4. Vector nearest aircraft to act as escort if necessary.

5. If communications are still unsatisfactory, have the aircraft gain altitude if fuel state permits.

6.7.4 Lost Communications During Instrument Flight Rules. If under IFR conditions, the pilot shall follow procedures set forth in the prebriefed assigned marshal/tacan approach and plan his flight in order to commence the approach at the prebriefed recovery time.

6.7.5 Lost Communications While on Filed Flight Plan. Proceed in accordance with prescribed ATC procedures.

6.7.6 Communications or Navigation Aids Failure During Approach. In the event of communications failure, if navigation aids are available, the pilot will continue the approach to the MAP. The missed

Mode III — An aircraft with radio difficulties (transmitter and/or receiver) should squawk Mode III Code 7600 or emergency Code 7700 as appropriate. (Code 7700 first, followed by Code 7600 will assist in alerting approach control.)

Mode I — The following codes will amplify difficulties in conjunction with a Code 7600 or 7700. No receiver shall mean that the primary UHF, auxiliary receiver, and UHF/VHF guard receiver are inoperative. If any receiver is operative, the controller is capable of controlling the aircraft utilizing IFF standby squawks and/or aircraft turns to acknowledge receipt of instructions.

Note

Below 2,500 feet, pilots must be aware of the dangers of changing IFF codes.

1. HEFOE Squawks

Mode I		Mode III
First digit	Second digit	
0 — ok		
1 — Hydraulic	1 — No Rec. Tacan ok	
2 — Electrical	2 — No. Rec. ADF ok	7700/7600 (with HEFOE code, use Code 7700)
3 — Fuel	3 — Rec. ok. No NAVAID(s)	
4 — O_2		
5 — Engine		

2. Assistance Required Squawks
All 7 — Mode I squawks indicate no receiver and no NAVAID(s).

Mode I	Mode III
70 — Desire tanker to join	Fuel on board (up to 7,500 lb)
71 — Intend bingo	
72 — Desire aircraft to assist	

3. Limited Communications Squawks
Require a 1 minute cycling of Mode III from 7600/7700 to desired channel.

Mode I	Mode III
60 — Aux. Rec. (ADF) channel ______	Channel usable (0100-2000, and 2100 = Guard)
61 — No NAVAID(s). Rec. on channel ______	
62 — Tacan ok. Rec. on channel ______	

Figure 6-5. Lost Communications Emergency Squawks

approach will be executed as described in the approach instructions.

If navigation aids failure is experienced, the ship will vector the helicopter for a radar-controlled approach.

If an approach is mandatory, the pilot may execute one of the following procedures, as applicable:

1. Navigation aids failure — The ship will vector the aircraft for a radar-controlled approach, except the pilot will continue his descent until visual contact is achieved with the ship or wake.

2. Communications failure — The pilot will execute the appropriate approach as outlined in Figure 6-2 or 6-3.

Note

Monitor UHF guard frequency as the pilot may attempt to communicate using his personal survival radio.

6.7.7 Emergency Landing. As much deck as possible will be made available for emergency helicopter landings. The senior helicopter squadron or unit officer on board should take station in PriFly/AOCC/HDC or CIC as appropriate. The optimum relative wind should be determined and the ship maneuvered as necessary. Once the aircraft is on final approach, it is imperative that the ship hold a steady course.

Certain types of emergencies may permit use of an LSE, in which case his position should be such as to minimize his exposure to danger. He shall give a wave-off only in case of a fouled deck or if directed to do so by the tower or bridge.

6.7.8 Emergency Signals. (Emergency signals to be used in the landing evolution are delineated in Chapter 4.) The aircraft shall squawk IFF emergency as appropriate. CIC shall be alert for IFF emergency squawk and immediately alert the bridge. Priority shall be given to affected aircraft and all emergency procedures used.

CHAPTER 7

Amphibious Air Operations

7.1 PLANNING REQUIREMENTS

The procedures herein are applicable to air operations from air-capable ships of the amphibious forces (LPD, LST, LSD, etc.). See the LHA/LPH/LHD NATOPS Manual for operation from those particular classes of ships.

7.1.1 Training Responsibilities. The group/squadron/detachment commander shall coordinate, as necessary, predeployment training requirements with ship's personnel and ensure that all applicable training established in Chapter 1 is met.

7.1.2 Personnel Responsibilities. The CCO/ATO is responsible for the safe and orderly flow of passengers, mail, and cargo. His duties include the following:

1. Compile a complete passenger manifest to include:

   a. Last name and initial

   b. Rank/rate

   c. Social security number

   d. Organization

   e. Destination

   f. Priority (if any).

2. Conduct passenger preflight briefing to include:

   a. Flight deck precautions

   b. Primary and alternate routes from loading office to aircraft

   c. Personal survival equipment and its use

   d. Aircraft ditching and emergency egress stations.

3. Ensure that personnel transiting the flight deck do not offer an FOD hazard and are escorted with regard for personal safety.

4. Be familiar with load capacities/restrictions, survival equipment carried, and emergency escape procedures for all aircraft models expected on board for logistic purposes. Inspect cargo prior to loading to ensure it is embarked in accordance with existing instructions.

5. Provide a mission card to helicopters performing logistic missions. The card shall be prepared by operations personnel and will contain the following information:

   a. Order of ships to be visited

   b. Ship name(s), hull number(s), call sign(s), navigation aid(s), and ships' certification and waiver status of ship(s) to be visited

   c. Expected bearing and distance to each ship

   d. Pertinent radio frequencies

   e. Number of passengers to be delivered/picked up with pickup and delivery points

   f. Weight and description of cargo being delivered/picked up

   g. Emergency marshal and EEAT.

6. The CCO is responsible for ship's embarkation planning, preparation of the SLCP, and coordination with unit embarkation officers for tactical/administrative loading and unloading evolutions.

7.1.3 Air Plan. Chapter 3 describes the contents of the air plan. Upon receipt of CATF/CLF fragmentary orders, the ship's air plan and the assigned aviation unit's flight schedule are jointly prepared to implement the following day's operations. Copies of the air plan and flight schedule will be distributed as directed by ship's requirements. Changes to assigned aviation unit's flight schedules that affect the ship's air plan and all changes to the air plan shall be approved by the operations officer. The air officer/HCO is responsible for ensuring that the air plan is carried out.

Post-maintenance check flights shall be scheduled by the air officer/HCO as soon as practicable after receiving the requests. The performance of these tests will depend on scheduled operations.

7.2 INTEGRITY WATCH

Whenever aircraft are embarked, each embarkment is required to provide personnel to stand the aircraft integrity watch. This watch is set while both underway and in port whenever there are aircraft aboard and the ship is not at flight quarters or general quarters. The watch will consist of as many personnel as may be required to ensure complete aircraft security. Integrity watch personnel shall be indoctrinated in equipment and procedures for flight deck/hangar deck firefighting.

7.3 AIRCRAFT FLIGHT OPERATIONS

Note

Amphibious task force operations often require flight operations in close proximity by two or more aviation and/or amphibious aviation assault ships. When this occurs, CVs, LPHs, LHAs, and LHDs should be assigned operating areas of sufficient size to preclude mutual interference. Operational constraints may at times require aviation and/or amphibious aviation ships to operate within 10 nm of one another, creating a conflict of overlapping control zones. To ensure operational safety and efficiency when such operations are anticipated, the OTC shall promulgate the limits of each ship's airspace, as well as the procedures to be used for operations between contiguous control zones.

7.3.1 General. Positive communications shall be maintained between the flight deck, PriFly, and the bridge during all phases of flight operations to ensure that the OOD controls the ship so that wind and deck motion remain within the prescribed envelope.

The ship shall be maintained on a steady course and speed during rotor engagement or disengagement, taxiing, and launch or recovery operations. Deck movement, centrifugal force, or rapidly changing wind direction or velocity affect the ability to control aircraft aerodynamically and may cause rollover. Permission must be obtained prior to the movement, engagement, disengagement, launch, or recovery of any aircraft. As the representatives of the ship's commanding officer, the OOD and the air officer have supervisory responsibility for safe operations at all times.

7.3.2 Flight Quarters. Flight quarters shall be set per Chapter 4 and the ship's helicopter operations bill.

7.3.3 Primary Flight Control. PriFly provides recovery/launch and operational control of aircraft while on the ship and within the ship's control area. It interfaces with the AOCC/HDC in control of airborne aircraft and with the OOD in integrating assault elements with helicopters on the flight deck.

7.3.4 Prelaunch Procedures. As early as possible before launch, the aviation detachment commander and air officer/HCO shall determine the necessary launch wind requirements and make these requirements known to the bridge. The air officer/HCO/flight deck supervisor shall perform the following tasks prior to each launch.

1. Brief key flight and hangar deck personnel on:

    a. Starting and launching sequence

    b. Disposition of downed and unlaunched standby aircraft

    c. Aircraft to be respotted after the launch

    d. Recovery spots (when a recovery is scheduled to follow the launch).

2. Tour the flight deck to ensure that:

    a. Deck is clear of all unauthorized personnel.

    b. Helicopter rotors have sufficient clearance and there is sufficient tiedown slack.

    c. Each aircraft can be safely launched from its spot.

    d. No gear is adrift on the flight deck and FOD walkdown is completed.

e. Deck edge antennas are properly positioned; the jackstaff, bow rails, and stern rails have been removed and stowed as necessary.

WARNING

Ensure that all deck-edge antennas are de-energized prior to raising or lowering.

f. Firefighting equipment is visually inspected, firehoses are flaked out, and communications are established between fog foam stations and the fog foam generator.

g. The aviation fuels officer or a designated representative shall ensure that all aircraft, including standbys, have been fueled as prescribed in the air plan. Discrepancies shall be brought immediately to the attention of the air officer/HCO.

7.3.5 Preflight Inspection. Pilots shall ensure that aircraft are preflighted expeditiously following the order to "Man aircraft." When aircraft are still in the pack with blades folded awaiting deck spotting, preflight inspection will be completed to the maximum extent possible.

7.3.6 Engine Starting. When aircraft are spotted on the flight deck, pilots will proceed with the prestart procedures. The pilot shall signal the LSE for plug-in and energizing of auxiliary power or shall signal for APP start. When ready to start engines, the pilot shall give the LSE the appropriate signal. The HCS will display rotating beacon signals and announce flight deck commands, as indicated in Figure 4-11, when capable. A fire extinguisher will be positioned and manned on the proper side of the engine compartment during all starts. Consideration should be given to providing winds suitable for engagement during engine start, in order to prevent extensive aircraft damage or hazard to flight deck personnel in the event of a rotor brake failure while starting aircraft. Radios will be turned on and set to the launch frequency as soon as possible.

7.4 VISUAL FLIGHT RULE PROCEDURES

Except as specified below, VFR arrival and departure procedures set forth in Chapter 6 apply.

7.4.1 VFR Departure. Helicopters shall clear the control zones at or below 300 feet or as directed by HCS/PriFly. Helicopters shall not cross behind the stern within 1 mile without specific clearance from HCS. When departing for operations within the control zone (i.e., SAR) they shall remain under the control of HCS/PriFly or other designated controlling agency until clear of launching and recovering aircraft.

7.4.2 VFR Descent and Approach. All returning flights shall check in with the appropriate controlling agency when entering the control area, or as soon as they are released from the other controlling agency.

7.4.3 DELTA Patterns. The DELTA pattern is a VFR holding pattern established in the vicinity of the ship.

7.4.3.1 Overhead DELTA. The overhead DELTA is a left-hand racetrack pattern around the ship at 500 feet MSL, oriented on the ship's heading and flown at optimum airspeed.

7.4.3.2 Port/Starboard DELTA. The port/starboard DELTA pattern is a left/right racetrack pattern as depicted in Figure 7-1 at the altitude assigned. Downwind turn will be commenced at the amidships position.

7.5 INSTRUMENT FLIGHT RULE PROCEDURES

IFR procedures will be in accordance with Chapter 6.

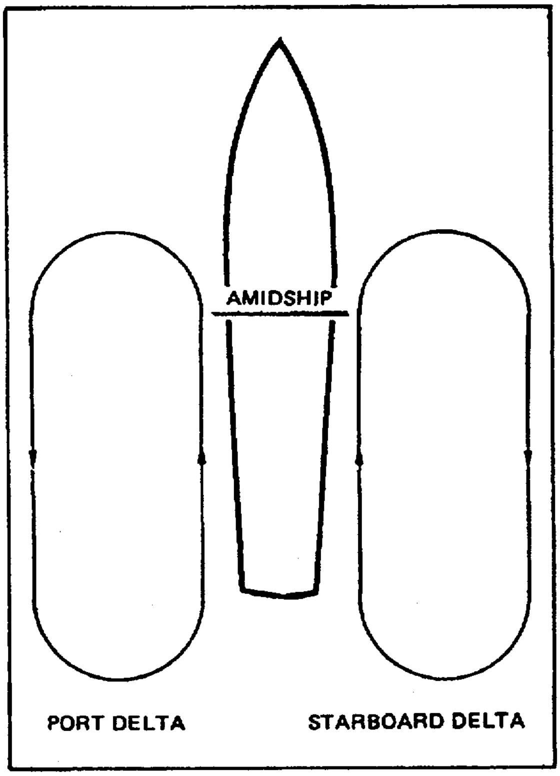


Figure 7-1. Port/Starboard DELTA Pattern

7.6 NIGHT OPERATIONS

At night when two or more helicopters are landing, all navigation lights shall be left on until the succeeding helicopter has landed.

7.6.1 Night Lighting. Night lighting procedures are provided in Figure 7-2.

7.6.2 Night Emission Control Recovery Procedures. This type of recovery is designed for use during periods of EMCON, when ceiling is 500 feet above the highest normally prescribed DELTA pattern, with a minimum of 3 miles visibility and a well-defined horizon. Returning pilots shall plan to be in the DELTA pattern prior to the scheduled recovery time. They shall shift to and monitor PriFly frequency when the ship is in sight. Each aircraft is responsible for maintaining horizontal clearance. Aircraft shall have anticollision lights on and navigation lights bright when within 10 nm of the ship. When cleared to land, the pilot will receive a steady green Aldis light signal at the abeam position in the DELTA pattern and continue with a normal night approach.

HELICOPTER SIGNAL	HELICOPTER LIGHTS	
	SHIP RED DECK LIGHTING	SHIP WHITE DECK LIGHTING
Ready to start APP	Red cockpit dome light on or red lens flashlight.	Red cockpit dome light on or red lens flashlight.
Ready to start engines	External navigation lights on STEADY DIM.	External navigation lights on STEADY DIM.
Ready to engage rotors	External navigation lights on FLASHING DIM.	External navigation lights on FLASHING DIM.
Ready for takeoff	External navigation lights on STEADY DIM.	Anticollision lights on. Navigation lights on STEADY BRIGHT.
After takeoff	Anticollision lights on. Navigation lights on STEADY BRIGHT.	Anticollision lights on. Navigation lights on STEADY BRIGHT.
180° abeam position/right or back seat landing	Forward anticollision lights off. Navigation lights on STEADY DIM.	Navigation lights on STEADY BRIGHT. Anticollision lights on.
180° abeam position/left or front seat landing	Forward anticollision lights off. Navigation lights on FLASHING DIM.	Navigation lights on FLASHING BRIGHT. Anticollision lights on.
After final landing or when on deck for extended period	Anticollision lights off. Navigation lights on FLASHING DIM.	Anticollision lights off. Navigation lights on FLASHING DIM.
Ready to disengage rotor	Red dome light on or red flashlight. Navigation lights on FLASHING DIM.	Red dome light on or red flashlight. Navigation lights on FLASHING DIM.
NOTE: May be modified by PriFly to accommodate weather conditions and aircraft characteristics.		

Figure 7-2. Helicopter Night Lighting Procedures

7.7 AIRCRAFT EMERGENCIES

7.7.1 Basic Emergency Procedures. Aircraft experiencing emergencies where communications and/or navigational equipment failures have occurred shall return to the ship, enter the VMC landing pattern, and watch for standard light signals from the ship. If under IMC, the aircraft shall proceed to emergency marshal, hold until EEAT, and then commence the approach.

7.7.2 Emergency Landings. The type and urgency of the aircraft emergency should dictate specific actions to be taken; information here provides only general guidance. As much flight deck space as possible should be made available for emergency landings. The senior helicopter detachment officer on board should take station in PriFly or as appropriate, and the air officer should request the bridge to maneuver the ship for optimum wind condition. In clearing a helicopter for emergency landing, HCS will designate an area of the flight deck rather than a specific landing spot and shall sound the flight deck warning alarm. All personnel shall take cover. Certain types of emergencies may permit use of an LSE, in which case his position should be such as to minimize his exposure to danger. The pilot shall plan his approach for the center of the specified area. Once the aircraft is on final approach, it is imperative that the ship hold a steady course. Pilots shall be alert for instructions.

7.7.3 Emergency Visual Signals. Emergency visual signals are provided in Chapter 4.

7.7.4 Control Responsibility. The initial control responsibility for an aircraft emergency rests with the agency exercising control of the aircraft when the emergency occurs. Aircraft in distress should not be required to change radio frequencies if satisfactory radio contact is established.

7.7.5 Failure of Communications or Navigation Aids During Approach. If navigation equipment is available, lone aircraft will continue approach. Pilots may utilize emergency survival radio on guard frequency (243.0 MHz) if time and safe control of aircraft permit. If all communication and navigation equipment is lost, the pilot will proceed as follows.

The pilot may elect to continue the approach by dead reckoning until at least 2 minutes past his estimated time of arrival; climb on final bearing to VMC; then fly the appropriate triangular pattern for lost communications, squawk emergency, and conserve fuel. If below the overcast, the pilot may elect to fly a search pattern to locate the ship.

If the pilot elects to discontinue the approach, he will climb on final bearing to VMC and fly two left-hand triangles, conserving fuel. Depending on the weather at the divert field and fuel state, the pilot may elect to proceed directly to the divert field after he has climbed out on the final bearing heading. An aircraft with inoperative navigation and/or communication equipment that is in the company of an escort aircraft with navigation or communication equipment in working order will be handled as a single flight in the recovery procedure. The escort aircraft becomes the flight leader and will visually communicate with the distressed aircraft in accordance with standard aircraft NATOPS procedures. The distressed aircraft will assume a position on the starboard wing of the lead aircraft. When the lead aircraft has the ship in sight, he will visually communicate a lead change and break. The distressed aircraft will complete a visual approach to landing. The escort aircraft will enter the pattern for landing. The ship will develop special procedures to recover airborne aircraft in the event of a casualty to shipboard air traffic control equipment.

7.8 ORDNANCE

7.8.1 Ship and Squadron Responsibilities. Those ships that are required to provide conventional aviation ordnance support for amphibious operations shall provide storage spaces, buildup areas, weapons repair spaces, and equipment for moving ordnance. Embarkation of LFORM and training ordnance and all security measures are responsibilities of the ship. Embarked personnel will assist ship's personnel in handling ordnance from the ship's magazine to the designated assembly areas and accomplish buildup as required. Squadron personnel are tasked to move all aviation ordnance from the assembly area to the flight deck, including loading and downloading.

7.8.1.1 Personnel Certification. Each ship shall certify Navy personnel in accordance with OPNAVINST 8023.2 series. Marine squadrons will train and certify Marine ordnance personnel prior to embarkation. Ships will certify the combined ship/squadron ordnance team prior to authorization of live ordnance evolutions.

7.8.1.2 Aviation Ordnance Safety Supervisors. During all aviation ordnance evolutions aboard ships, a certified safety supervisor shall be assigned for the particular evolution and shall strictly enforce safety standards. In the event of joint service aviation ordnance evolutions (other than Marine Corps), a specialized AOSS must be requested from and provided by the cognizant TYCOM. Regardless of the situation, safety supervisors must be thoroughly familiar with this manual and other applicable directives. Safety supervisors have the authority and the responsibility to immediately halt any evolution if, in their judgment, safety is being jeopardized. An evolution so halted shall not be continued until the matter is properly resolved.

7.8.2 Hazards of Electromagnetic Radiation to Ordnance and Radiation Hazards Safety Precautions. Modern radio and radar transmitting equipment produce high-intensity radio frequency fields. Such fields can cause premature actuation of sensitive EEDs contained in ordnance systems and biological injury to personnel working in the vicinity of the radiating elements. Also, sparks or arcs caused by high-intensity fields are a potential source of ignition for fuel-air mixtures. The most susceptible periods are during assembly, disassembly, loading, or testing in electromagnetic fields. The effect of premature operation of the devices will vary with the function of the device initiated. The most likely effects are dudding, loss of reliability, or, in the case of rockets and flares, ignition of the propellant illuminant.

In several electromagnetic radiation environments there is a low but finite probability of warhead detonation. It is necessary, therefore, to positively control the ship's electromagnetic environment during the presence, handling, or unloading of HERO susceptible ordnance. A HERO analysis must be conducted on each ship to determine possible adverse interactions between transmitter/antenna and ordnance systems. Measurements must be made in stowage areas; buildup areas, ordnance work areas, and all routes where ordnance will be handled. Prior to embarkation, pilots, aircrews, and squadron ordnance personnel shall familiarize themselves with the latest HERO conditions in NAVAIR 16-1-529. NAVAIR OP 3565/NAVAIR 16-1-529, Electromagnetic Radiation Hazards (Hazards to Ordnance), prescribes detailed operating procedures and precautions for inclusion in the ship's EMCON bill.

7.8.3 Emergency Procedures. In case of a fire or a danger of fire, ordnance shall be moved to a safe area or jettisoned as the situation dictates. EOD personnel or other qualified personnel shall take the necessary on-scene action to dispose of the most hazardous ordnance first.

7.8.4 Weapons Handling and Movement. Breakout and movement of ordnance for assembly require preplanning and close coordination between the weapons and air departments so the ordnance will be assembled and delivered to the flight deck in sufficient time and quantity to meet the air plan. Backloading requires the same coordination, but timing becomes less critical. Ship's personnel are responsible for movement of ordnance from magazines to assembly areas. Embarked personnel may assist as necessary and are required to handle and move all weapons from the assembly area to buildup areas and to the aircraft. After ordnance is assembled, movement to the aircraft will be via a direct and safe route.

7.8.5 Assembly and Disassembly. Because of the inherent dangers involved, assembly and disassembly of aviation ordnance must be closely controlled. All weapons unpacking, assembly, disassembly, loading, and unloading shall be done in accordance with NAVORD OP 4, NAVSEA OP 3565, and the appropriate checklists, SCRs, and technical manuals. Ordnance shall be assembled, disassembled, and loaded into launchers or magazines only by personnel properly certified. There shall be a petty officer/noncommissioned officer in charge of each assembly and loading crew and a safety supervisor present whenever ordnance is being assembled, loaded, unloaded, or disassembled. All assembly, loading, unloading, and disassembly shall normally be conducted in the ordnance assembly area. The assembly area shall be maintained RADHAZ safe whenever the ordnance is RADHAZ susceptible. If RADHAZ susceptible ordnance must be moved outside the normal RADHAZ safe assembly area or if assembly must be done in a RADHAZ area, the operations officer shall ensure that the appropriate HERO condition has first been set. A visual display indicating the HERO condition in effect shall be prominently displayed so that assembly personnel can readily ascertain the HERO condition status at all times. All rockets shall be unpacked, assembled, loaded into, and unloaded from launchers in designated safe buildup areas. Ships shall maintain NAVAIR technical manuals for each type of aviation weapon on board. All weapons systems maintenance is accomplished by squadron aviation ordnance technicians. All personnel involved with unpacking, assembly, and disassembly shall be appropriately certified.

7.8.6 Staging. Ordnance shall be positioned in designated areas and readily available to afford adequate time of safe aircraft loading. Staging areas or assembled weapons shall be restricted to those areas that are:

1. Convenient to jettison locations
2. Accessible by at least two clear routes
3. Covered by the sprinkler system and/or manned firehoses
4. Located as far as practicable from oxygen and fueling stations

5. Manned and with provisions for physically securing weapons.

Use the following priorities when locating staging areas: flight deck, hangar deck, vehicle stowage.

Staging areas are used for ready service only, not for protracted stowage. Weapons in staging areas shall be on mobile trucks or skids.

7.8.7 Loading. Compliance with the weapons requirements contained in the air plan requires coordination between the aircraft handling officer/HCO, the ship's weapons officer, and the squadron/detachment ordnance officer. The squadron/detachment maintenance liaison officer is responsible for advising the aircraft handling officer as early as possible of special aircraft handling or tiedown requirements or any considerations that apply to the loading of squadron aircraft. It is particularly important for the aircraft handling officer to be advised of any peculiarities in configuration or status that may make certain aircraft unavailable for particular ordnance loads.

The flight deck is always the preferred area for loading aircraft. Loading on the hangar deck may be authorized by the commanding officer when operational necessity dictates acceptance of the added risk of fire with fuel and explosives both in a confined area. Authorization for loading in the hangar deck shall be limited to those aircraft scheduled for the next launch or in alert condition, and is restricted to the particular weapons listed in Appendix F.

Aircraft to be loaded with rockets and/or missiles shall be positioned so that accidental discharge will not endanger personnel, the ship, or other aircraft. Mechanical latching on aircraft or on racks or launchers shall be completed before aircraft engines are started for launch.

Aircraft loading shall be accomplished in accordance with NAVAIR conventional weapons loading checklists for the specific aircraft and weapons, using trained crews under the direct supervision of a competent petty officer/noncommissioned officer. All loaded aircraft shall be inspected by a designated safety supervisor who shall signal to the LSE that the inspection is satisfactorily completed.

If the safety supervisor or a pilot notes any deviation between the actual load and the prebriefed load, the aircraft handling officer shall be notified immediately.

WARNING

Aircraft should not be fueled and armed simultaneously. Arming should be accomplished after fueling operations have been completed.

Rapid response firefighting equipment shall be on station and manned during all ordnance handling, loading, and arming evolutions.

Aircraft "no-voltage" checks shall be made after normal rotor engagement when the electrical system is on aircraft power. The signal to commence "no-voltage" checks shall not be given until both copilot's hands are in view of the flight deck safety supervisor and acknowledgment by the pilot is received. Any deviations from the above procedure must be in accordance with the authorized weapons checklist concerned.

All detent safety pins, ordnance safety switches, and mechanical safe-arm switches shall be in the safe position except just prior to aircraft liftoff.

Reloading should be accomplished after all aircraft have been recovered; or, to satisfy cyclic operations, loading in a designated area may be permitted while other flight operations are in progress. Only the minimum quantity of weapons required shall be moved during recovery operations.

WARNING

Tube loading of launchers installed on aircraft is prohibited except in cases of urgent combat necessity.

7.8.8 Arming. Arming of weapons shall be conducted using the weapons/stores loading checklists/SRCs. Ordnance teams assigned to arm weapons systems shall position themselves so as to accomplish this mission and avoid delaying launch of the aircraft. If an aircraft is downed after weapons have been armed, dearming shall be completed prior to aircraft shutting down.

Arming shall be conducted only after rotors are engaged and tiedown chains have been removed. Control of the aircraft shall be turned over to the arming crew supervisor. Arming signals used shall be in accordance with NAVAIR 00-80T-113.

WARNING

The area ahead of the aircraft shall be cleared and maintained clear until the launch is completed.

7.8.9 Downloading and Dearming. The same care shall be exercised in dearming aircraft as is used in arming. The ship's operations officer will ensure that the appropriate HERO condition is set and maintained until downloading, dearming, and disposal have been completed.

Only aviation ordnance men and one LSE should be allowed within 30 feet of an aircraft until hung or unexpended ordnance is dearmed and rendered RADHAZ safe. A designated ordnance supervisor shall position himself on the flight deck during recovery operations to ensure that coordination is maintained between flight deck personnel and the arming crew. An ordnance team shall be available to dearm aircraft immediately after landing.

The embarked squadron will ensure that ordnance dearming crews are on station for each ordnance recovery. After aircraft have landed, the signal shall be received from the pilot that the master arm switch is OFF prior to dearming. Chain tiedowns shall be installed on the aircraft prior to dearming and rendering RADHAZ safe. Aircrews shall remain in the aircraft until hung or unexpended ordnance is dearmed and rendered RADHAZ safe.

WARNING

Downloading of aircraft shall not commence until the aircraft's engine(s) and rotors are secured.

Dearming and downloading procedures set forth in NAVAIR conventional weapons checklists shall be used. Dearming (safing) signals used shall be in accordance with NAVAIR 00-80T-113.

7.8.10 Unexpended Weapons. Weapon stores not authorized for recovery in Appendix F must be jettisoned. Where this cannot be accomplished, a divert to a shore installation will be made, if feasible.

The following guidelines will be used when recovering aircraft that must return to the ship with nonjettisonable/hung weapons.

7.8.10.1 In-Flight Procedures. Pilots shall accomplish the following prior to entering the ship's control zone.

1. Upon completion of the firing mission, determine if all ordnance has been expended. A visual check between aircraft shall be made of all rocket pods.

2. In the event of hung ordnance, efforts shall be made to fire it.

3. When it becomes apparent that the ordnance must be brought back to the ship, the ship will be notified as early as possible. In no case shall hung ordnance be brought into the ship's control zone without clearance. Initial notification shall include the amount and type of hung ordnance.

4. Properly safe all weapons systems.

5. Prior to entering the landing pattern, secure HF and FM transmitters, radar altimeter, IFF, and tacan.

6. Helicopters with unexpended or hung ordnance should fly shipboard recovery patterns with weapons pointed away from the ship to the maximum extent practicable.

7.8.10.2 Shipboard Procedures

1. The bridge and other appropriate stations must be notified.

2. Set the proper HERO condition.

3. Dearming crews stand by on station.

4. Prior to jettisoning ordnance from the ship, approval must be granted by the commanding officer.

7.8.10.3 Ship's Air Officer/Helicopter Control Officer

1. Clear landing spot for recovery.

2. Prior to recovery, announce: "Stand by to recover helicopter with hung ordnance on spot. Hung ordnance is (amount and type). All personnel remain well clear of the flight deck area."

3. Ensure that rapid response firefighting equipment is manned and ready.

4. Ensure that the ordnance safety supervisor and the unit dearming team are on station prior to recovery.

5. As required, ensure that all aircraft on the flight deck and in the landing pattern have secured HF and FM transmitters, IFF, tacan, and radar altimeters.

6. LPDs should choose a landing direction that provides the pilot with an obstruction-free approach path.

WARNING

All flight deck personnel, including LSEs, shall remain clear of the line of fire and/or danger area of an aircraft landing with hung weapons. Only minimum required personnel shall remain in the vicinity of the landing area. The pilot shall not leave the cockpit until he is satisfied that his guns (i.e., 20 mm) are safe.

7.8.11 Aircraft Maintenance and Servicing of Loaded Aircraft

7.8.11.1 Maintenance. General maintenance shall not be conducted on aircraft with loaded weapons; however, routine servicing and minor maintenance to ready an aircraft for the next launch may be conducted, with the following restrictions.

1. Weapons shall be made safe to the maximum degree possible as specified in NAVAIR weapons/stores checklists/SRCs.

2. If a WARNING placard is displayed prominently in the cockpit, maintenance or servicing that requires application of electrical power is limited to:

   a. Refueling

   b. Replacement and checkout of communications and navigation equipment

   c. Engine turnup for checkout

   d. Flight control and hydraulic system checks

   e. Replacement and checkout of engine performance and flight instruments.

3. Maintenance that requires application of electrical power to armament or to weapon release and control circuitry shall not be performed while weapons are being loaded or downloaded.

An aircraft that requires extensive troubleshooting, engine removal, or jacking is not considered to be readily available for flight and shall be downloaded prior to required maintenance. This downloading includes removal of impulse cartridges from ejector racks and breeches and all rounds of ammunition from feed chutes and feed mechanisms of internal guns.

7.8.11.2 Servicing. Loading or downloading, oxygen servicing, and fueling should be conducted as separate evolutions. The commanding officer may authorize simultaneous loading/downloading and fueling when operational commitments dictate that this extraordinary action is required. In such a case, loading shall be limited strictly to the mechanical attachment of the weapon or store to armament suspension equipment and to the connection of electrically fuzed bombs. No other electrical connection to weapons, installation of impulse cartridges, or hookup or plug-in of arming wires shall be done until aircraft fueling is completed. When required, electrical power may be applied during aircraft loading or downloading, but will be held to a minimum consistent with operational requirements. Electrical power shall not be applied to armament or to weapon release and control circuitry while weapons are being loaded or downloaded.

7.8.12 Munitions. Data from NAVSEA Op 4, Volume 2, Fifth Revision.

7.8.12.1 Landing Force Operational Reserve Material Ordnance/Mission Load Allowance. This is a special categorization of support materials and components carried aboard amphibious warfare ships for use by Marine assault forces. The unique character of the ordnance portion of LFORM/MLA stems from its quantity, mix, and special stowage requirements. LFORM/MLA is pre-positioned aboard amphibious warfare ships in amounts specified by TYCOMs to support an MEU. LFORM/MLA ordnance is generally maintained aboard ship continuously, except during a regular overhaul or restricted availability. The ordnance portion of LFORM/MLA is stowed in magazines designated AMMUNITION/LFORM or in approved lockers as appropriate.

7.8.12.2 Stowage Compatibility. For the stowage of LFORM/MLA ammunition, the ammunition compatibility groupings and permissible stowage combinations of 46 CFT 146.29 (formerly CG-108) shall apply whenever practicable. The hazards of each type of LFORM/MLA ammunition have been compared to the hazards of each other type and the resultant mixed hazards considered. The various types of LFORM/MLA ammunition have been consolidated into groups and assigned compatibility symbols as shown in NAVSEA OP 4. When it is not practicable to segregate LFORM/ MLA ammunition to satisfy all requirements of 46 CFT 146.29, then the compatibility symbols of NAVSEA OP 4 may be used for stowage in a magazine or in the subdivision of a magazine. Within the compatibility symbols, however, the various Coast Guard classes shall be stowed in separate stacks in the magazine or subdivision, with the maximum available separation between stacks of Coast Guard incompatible items (applies primarily to compatibility symbols AA). Except as noted in NAVSEA OP 4, no item shall be stowed with ammunition of a different compatibility symbol without the concurrence of the Naval Sea Systems Command. Stowage of Class V chemical munitions over, under, or adjacent to living quarters shall be avoided.

Where a new type of ammunition not listed is encountered, a study of NAVSEA OP 4 should provide a sound basis for stowage action until specific criteria can be obtained from higher authority.

7.8.12.3 Training Ordnance. Stowage compatibility and restrictions for training ammunition allowance shall be the same as for LFORM. If available stowage space necessitates stowage of basic allowance ammunition with LFORM, the basic allowance may be stowed in accordance with the compatibility groupings.

7.9 OTHER CONSIDERATIONS

7.9.1 Medical Casualty Handling on the Flight Deck. Medical casualties brought aboard by aircraft will be removed from the aircraft and handled in accordance with the ship's casualty handling bill. The ship's medical department will be notified as far in advance as possible to allow medical personnel to meet incoming aircraft.

7.9.2 Bingo. When a suitable bingo field/deck is available, aircraft shall not commence an IFR approach if the reported weather is below minimum, unless it has been determined that the aircraft has sufficient fuel to proceed to the bingo field/deck in the event of missed approach.

7.10 LPD 4/AGF 11 EXPANDED FLIGHT DECK OPERATIONS

7.10.1 Planning Requirements. A thorough briefing of safety and procedures will be conducted between the ship's air department and the aviation unit prior to commencing simultaneous multispot flight operations.

WARNING

- All personnel involved in expanded flight deck operations shall be briefed on:

  1. Effects/hazards of rotor wash on flight deck personnel and parked/operating aircraft.

  2. Dangers of operating around several tail rotor aircraft, specifically addressing servicing, maintenance, and ordnance evolutions on spots 5 and 6 with tail rotor aircraft operating on all four spots.

- If spot 5 is occupied with a tail rotor helicopter (except H-53), use of the aft starboard catwalk-to-flight deck ladder and platform is prohibited because of proximity of the helicopter tail rotor.

7.10.2 Operating Matrix. Figure 7-3 provides an aircraft operating matrix for LPD 4/AGF 11 expanded flight deck ships. This matrix supplies detailed guidance on deck spotting mixes allowed for simultaneous operations and shall be reviewed prior to multiaircraft operations.

7.10.3 Flight Deck Landing/Parking Restrictions

1. USN/USMC H-53E aircraft shall be lightened to 50,000 pounds or less when landing on spots 1 and 2.

2. USN/USMC H-46, H-53, and H-53E aircraft are restricted to landing in the forward half of the touchdown circle.

3. USA H-47 aircraft are authorized to land on spot 2 only.

4. USA H-47 aircraft shall be lightened to 31,000 pounds or less for parking.

5. USMC/USA/USAF H-60 aircraft shall not be parked in sea states exceeding 5.

6. USN/USAF H-53E and USAF MH-53 aircraft shall be lightened to 40,000 pounds or less when parked at shipboard locations other than on spots 3, 4, 5, or 6.

1. This operating matrix is from NAVAIRWARCENACDNLKE Drawing No. 620061 Rev. G or later and is intended for use in conjunction with the LPD 4/AGF 11 Class expanded flight deck marking plan. Ships conforming to prior revisions of this drawing shall continue to use the matrix in the appropriate revision of the drawing.

2. For purposes of this matrix, an operating aircraft is defined as launching, recovering, landing, turning, or spotted with the main rotor blade (tail rotor for H-53E) untied/unfolded.

3. All expanded spots provide a minimum of 15 feet of rotor clearance when spots are occupied in accordance with the matrix and are predicated on using positioning procedures from NAVAIR 00-80T-106.

   a H-46 aircraft shall land with nose landing gear (NLG) in White 3-foot square.

   b. H-53/H-53E aircraft shall land with nose landing gear (NLG) in Yellow 3-foot square.

   c H-53/H-53E aircraft shall land with main landing gear (MLG) in White 3-foot x 6-foot boxes.

   d. H-60 aircraft shall land with the nose over the Yellow 3-foot square and centered on the fore/aft lineup line.

   e. H-1 aircraft shall land with skid toes on H-1 athwartship line and centered on the for/aft H-1 lineup line.

4. When Spot 1 is occupied with an aircraft, Spots 3, 4, 5, and 6 shall remain vacant.

5. When Spot 2 is occupied:

   a Spots 3 and 4 can be occupied by H-1s.

   b. Spot 3 or 4 (not both) can be occupied by an H-46, H-53, H-53E, or H-60.

6. Additional capability for USCG/USA/USAF helicopters:

   a. Multispot operations shall be in accordance with the LPD 4/AGF 11 class operating matrix with the additional capability as listed below:

      (1) H-1 columns are also applicable to:

         a. USCG H-65 (H-65 aircraft shall land with nose landing gear (NLG) at the intersection of the H-1 fore-aft line and H-1 athwartship line).

         b. USA H-1, H-6, and H-58

         c. USAF H-1.

      (2) H-53 columns are also applicable to USAF H-53.

      (3) H-60 columns are also applicable to USMC, USCG, USA, and USAF H-60.

Figure 7-3. LPD-4/AGF 11 Class Expanded Flight Deck Operating Matrix (Sheet 1 of 3)

7. Instructions for Using Matrix

Step 1 — Under vertical "key" A, select spot occupied with aircraft.

Step 2 — Under vertical "key" B, select type of aircraft under occupied spot.

Step 3 — To determine compatibility of spots and aircraft continue along the horizontal column identified in step 2:

a. Across horizontal "key" C, select type of aircraft.

b. Across horizontal "key" D, select spot under aircraft selected.

c. If the intersection of vertical and horizontal columns selected above contains a (■ or ◆), then the aircraft and spot selected above are compatible with the step 2 occupied spot/aircraft.

8. Examples:

a. With an H-46 on Spot 3, compatible aircraft are:

(1) H-1s on Spots 5 and 6 (3 total aircraft)

(2) H-46 or H-53, or H-53E on Spot 6 (2 total aircraft).

b. With an H-1 on Spot 5, compatible aircraft are:

(1) H-1s on Spots 3, 4, and 6 (4 total aircraft)

(2) H-46 on Spot 3 or 4 (2 total aircraft)

(3) H-53 on Spot 3 or 4 (2 total aircraft)

(4) H-53E on Spot 3 (2 total aircraft).

Figure 7-3. LPD-4/AGF 11 Class Expanded Flight Deck Operating Matrix (Sheet 2 of 3)

KEY		COMPATIBLE SPOTS AND AIRCRAFT																			
	C	H-1				H-46				H-53				H-53E				H-60			
A	B D	3	4	5	6	3	4	5	6	3	4	5	6	3	4	5	6	3	4	5	6
SPOT OCCUPIED WITH AIRCRAFT																					
3	H-1		■	■	■				■				■				■				■
3	H-46			■	■				■			◆	■			◆	■			◆	■
3	H-53			■	■				■			◆	■				■			◆	■
3	H-53E			■	■				■				■				■				■
3	H-60			■	■			◆	■			◆	■			◆	■			◆	■
4	H-1	■		■	■			■				■				■				■	
4	H-46			■	■			■				■	◆			■	◆			■	◆
4	H-53			■				■				■				■				■	◆
4	H-53E			■				■				■				■				■	
4	H-60			■	■			■	◆			■	◆			■	◆			■	◆
5	H-1	■	■		■	◆	■			◆	■			◆	■			◆	■		
5	H-46		■				■				■				■			◆	■		
5	H-53		■			◆	■				■				■			◆	■		
5	H-53E		■				■				■				■			◆	■		
5	H-60		■			◆	■			◆	■				■			◆	■		
6	H-1	■	■	■		■	◆			■				■				■	◆		
6	H-46	■				■				■				■				■	◆		
6	H-53	■				■	◆			■				■				■	◆		
6	H-53E	■				■	◆			■				■				■	◆		
6	H-60	■	■			■	◆			■	◆							■	◆		

LEGEND:

1. Vertical "key" columns A and B.
2. Horizontal "key" rows C and D.
3. ■ Preferred compatible operation.
4. ◆ Optional compatible location. Use only if preferred spot is not occupied by an aircraft.
5. ☐ Blank square denotes spot must remain vacant.

Figure 7-3. LPD-4/AGF 11 Class Expanded Flight Deck Operating Matrix (Sheet 3 of 3)

7. USN/USMC H-53E aircraft operating from spots 3, 4, 5, or 6 shall land with main landing gear in the H-53 main wheel spots.

7.10.4 Flight Operations. The following guidelines are provided for flight operations on LPD 4 expanded flight deck ships.

1. Launch/recovery from expanded spots should be made by the inboard pilot to the maximum extent possible.

CAUTION

Operations to spots 1, 3, and 4 are only authorized when the hangar is retracted beyond the safety/foul deck line

2. Recovery should normally be made to the forward spots first.

3. Air taxi to adjacent spots for landing and/or shutdown is authorized.

CAUTION

Only one aircraft will be launched/recovered at a time (i.e., airborne over the flight deck).

4. Normal recovery will be made by flying up the ship's starboard side, close abeam, at 300 feet and 80 knots, with left break across the bow when cleared by the HCO. Type of approach and expected spot will be provided prior to the break.

   a. Direct approach — Aircraft assigned port spots for landing will set up for an LHA/ LPH/LHD type of approach to spots 4 or 6. Aircraft assigned starboard spots will pass astern and set up for a starboard, angled approach to spots 3 or 5.

   b. Offset approach — Aircraft will conduct approach to spots 1 or 2, as applicable, and slide/air taxi to the assigned spot for landing.

5. Stern approaches are commenced from directly astern the ship. Aircraft will fly the BRC to a position close aboard on the side of the ship corresponding to the assigned landing spot. Once abeam the assigned spot, slide across and land. Direct approach to the spot from astern may be approved normally associated with ordnance recoveries.

6. Day only (with night launch) operations are authorized for spots 3, 4, 5, and 6 without NVD.

7.10.5 Night Operations. The offset approach and should be used for night recoveries to the maximum extent possible.

1. Offset approach is mandatory for all night unaided recoveries.

2. All approach procedures described above are authorized for NVD recoveries.

3. Night recoveries to spots 3 and 4 with operating aircraft on spots 5 and 6 are prohibited.

Note

Parked/folded aircraft on spots 3, 4, 5, or 6 are authorized while operating other expanded spots in accordance with Figure 7-3.

4. Day/night launch/recoveries are authorized for spots 3, 4, 5, and 6 with NVD.

7.10.6 Aircraft Emergencies. Aircraft experiencing in-flight emergencies should be recovered to spots 1 and/or 2.

7.10.7 Ordnance Operations. All approach/recovery procedures described above are applicable for ordnance operations. Aircraft with forward-firing ordnance will normally use the stern approach. Directing of forward firing ordnance at the ship facility shall be minimized.

CAUTION

Ordnance arming crews shall exercise extreme caution when exiting an armed aircraft to avoid exposure to aircraft exhaust, rotors/tail rotors, and weapons line of fire.

7.11 AMPHIBIOUS EXTERNAL CARGO PROCEDURES

Detailed guidance concerning VERTREP/external cargo operations is contained in NWP 4-04.1.

CHAPTER 8

Vertical Replenishment Procedures

8.1 CONCEPT OF VERTICAL REPLENISHMENT

VERTREP provides a capability for augmenting and enhancing alongside replenishment and also permits increased flexibility and considerable latitude in replenishment planning, particularly regarding time and location of the UNREP operation. NWP 4-04.1 shall be reviewed prior to UNREP/VERTREP operations.

The specific advantages of VERTREP that should be considered in determining the method of UNREP are:

1. Reduction in overall time required to replenish the supported forces or units
2. Reduction or elimination of time that screening ships are required to be off station
3. Reduction in personnel involved
4. Capability of replenishing units in a dispersed formation
5. Capability of replenishing units engaged in tasks that make it impossible for them to come alongside
6. Capability of replenishing units in heavy weather conditions when alongside steaming is hazardous or impossible
7. Capability of replenishing units on station in shallow water or at anchor.

VERTREP can be used to distinct advantage by eliminating the approach, hookup, and disconnect time required in alongside transfer. This is particularly true during small-scale replenishments when less than approximately 75 short tons are to be transferred. VERTREP transfer rates of up to 180 short tons per hour or 120 lifts per hour can be achieved with a CV, LHA, or LPH type ship with two helicopters in use. Some smaller types of ships cannot receive loads at this maximum rate because of small or partially obstructed VERTREP platforms. To minimize time alongside for these units, a combination of VERTREP and UNREP can be used.

CAUTION

Concurrent VERTREP/CONREP operations from AE-26 Class ships utilizing stations 9 and 10 are extremely hazardous.

Air-Capable Ships Aviation Facilities Bulletin No. 1 specifies the various requirements for all platforms. For information on certification, refer to NAEC-ENG-7576, APP 2 and APP 2 SUPP 1, and TYCOM directives. For waiver criteria, refer to Chapter 3 and OPNAVINST 3120.28.

8.1.1 Vertical Replenishment Deck Markings.

Common deck markings are described in paragraph 4.1.1 and shown in Figures 4-1 and 4-2. If amplifying information is desired, consult Air-Capable Ships Aviation Facilities Bulletin No. 1 or the Shipboard Aviation Facilities Resume (NAEC-ENG-7576).

8.2 VERTICAL REPLENISHMENT HELICOPTERS

Currently, the H-46 is the most widely used VERTREP helicopter. The H-46 can VERTREP cargo on its external cargo hook or by internal loading. The tandem rotor configuration of the H-46 allows maneuverability without the wind restrictions normally associated with tail rotor helicopters; thus, the ships may vary course and speed while undergoing VERTREP. H-1/H-2/H-3/H-60 series aircraft have a limited VERTREP capability because of configuration and operational limitations.

H-53 helicopters are equipped with external cargo hooks and are utilized by the USMC for vertical lifts and by the USN for VOD operations. The H-53A/D aircraft are heavy-lift capable. H-53E operations are discussed in Chapter 13.

Note

Specific VERTREP external cargo procedures are contained in NWP 4-04.1.

8.2.1 Number of Helicopters Used.

The number of helicopters used during a VERTREP will depend on:

1. Type and number of ships being replenished
2. Distance between ships
3. Number of helicopters available
4. Ability of the receiving ship to keep cargo drop area(s) clear
5. Ability of the transferring ship to provide cargo at a sufficient rate
6. Administrative flights scheduled by the helicopter coordinator
7. Helicopter aircrew proficiency/training requirements.

8.3 FACTORS AFFECTING VERTICAL REPLENISHMENT

8.3.1 Wind.

For VERTREP, the helicopter must hover over both the transferring and receiving ships. Flight characteristics of the aircraft are such that more engine power is required to fly at extremely low air speeds (0 to 15 knots) and high air speeds (90 knots and above) than is required at medium air speeds. The difference between engine power required to hover without a load and the maximum available engine power is the excess power that can be used to carry cargo. A relative wind of 15 to 30 knots is considered ideal. The helicopter should take off, make approaches, and hover into the relative wind. A relative wind of 330° or 030° is optimum for VERTREP.

Other relative winds are acceptable under differing conditions. Under high wind conditions, the sea state is usually severe enough to make ships pitch and roll excessively when headed into the seas. If these conditions exist, it is normally better to steam downsea to provide a steadier deck. Although this course probably will be downwind, the relative wind may still be suitable for VERTREP with the H-46, and cargo handling conditions for the crews on the exposed deck are improved. However, increased rotor downwash from the hovering helicopter because of this downwind condition will create additional hazards for both the helicopter and flight deck personnel in the form of high winds, flying debris, and salt spray.

Note

Pilots conducting VERTREP operations shall be notified prior to any course change. VERTREP operations may be continued through the turn provided the aircraft commander and HCO deem such operations to be safe.

8.3.2 Ship Stationing.

See Figure 8-1 for typical ship stations for VERTREP.

CAUTION

During UNREP, wave reinforcement phenomena caused by two ships in proximity may generate disproportionately large waves in moderate sea states. Although wind and deck conditions may be within limits, the possibility of the helicopter being struck by a wave while on deck exists and should be considered before conducting flight operations during underway replenishment.

Examples of other VERTREP stations and situations are:

1. CV on downwind course between flight operations
2. Receiving ship in alongside UNREP approach phase
3. Receiving ship alongside transferring ship
4. Ships in lifeguard station or proceeding to and from screening stations
5. Receiving ship at anchor or lying to offshore or steaming offshore when involved in combat tasks.

Note

Ship stationing for night VERTREP for an air-capable receiving ship should be abeam at a distance of 300 to 500 yards.

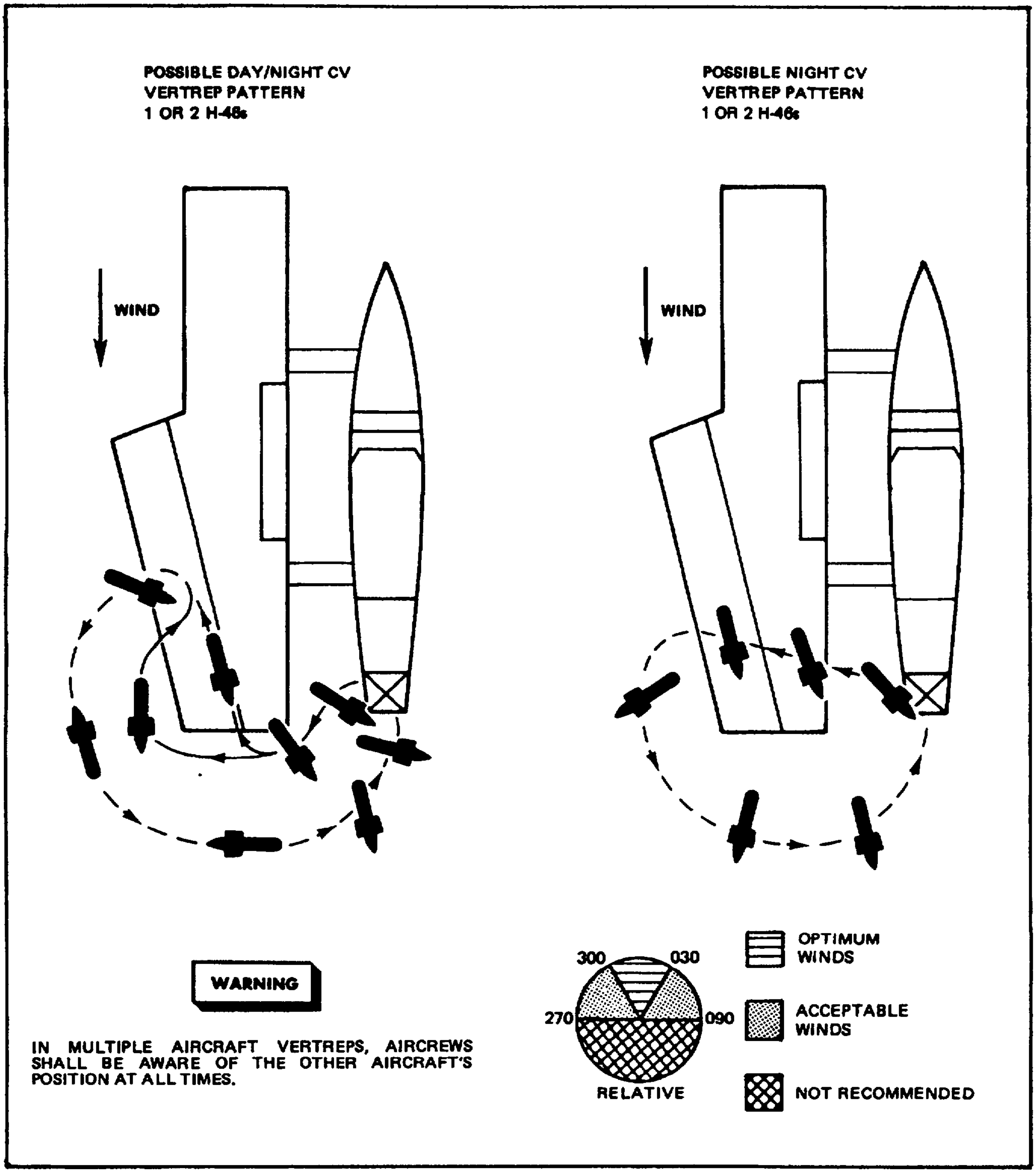


Figure 8-1. Typical Ship Stations and Vertical Replenishment Patterns (Sheet 1 of 3)

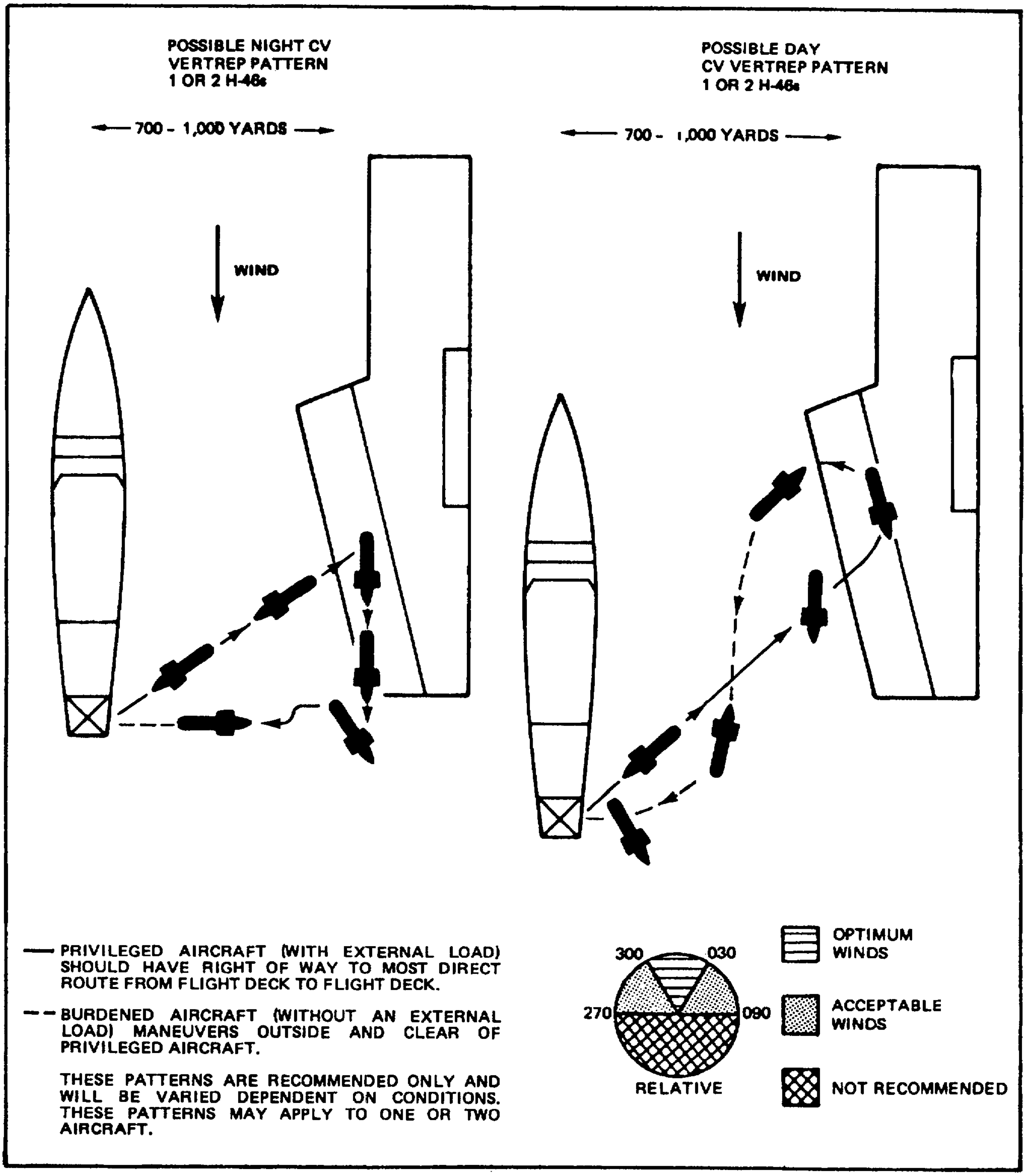


Figure 8-1. Typical Ship Stations and Vertical Replenishment Patterns (Sheet 2 of 3)

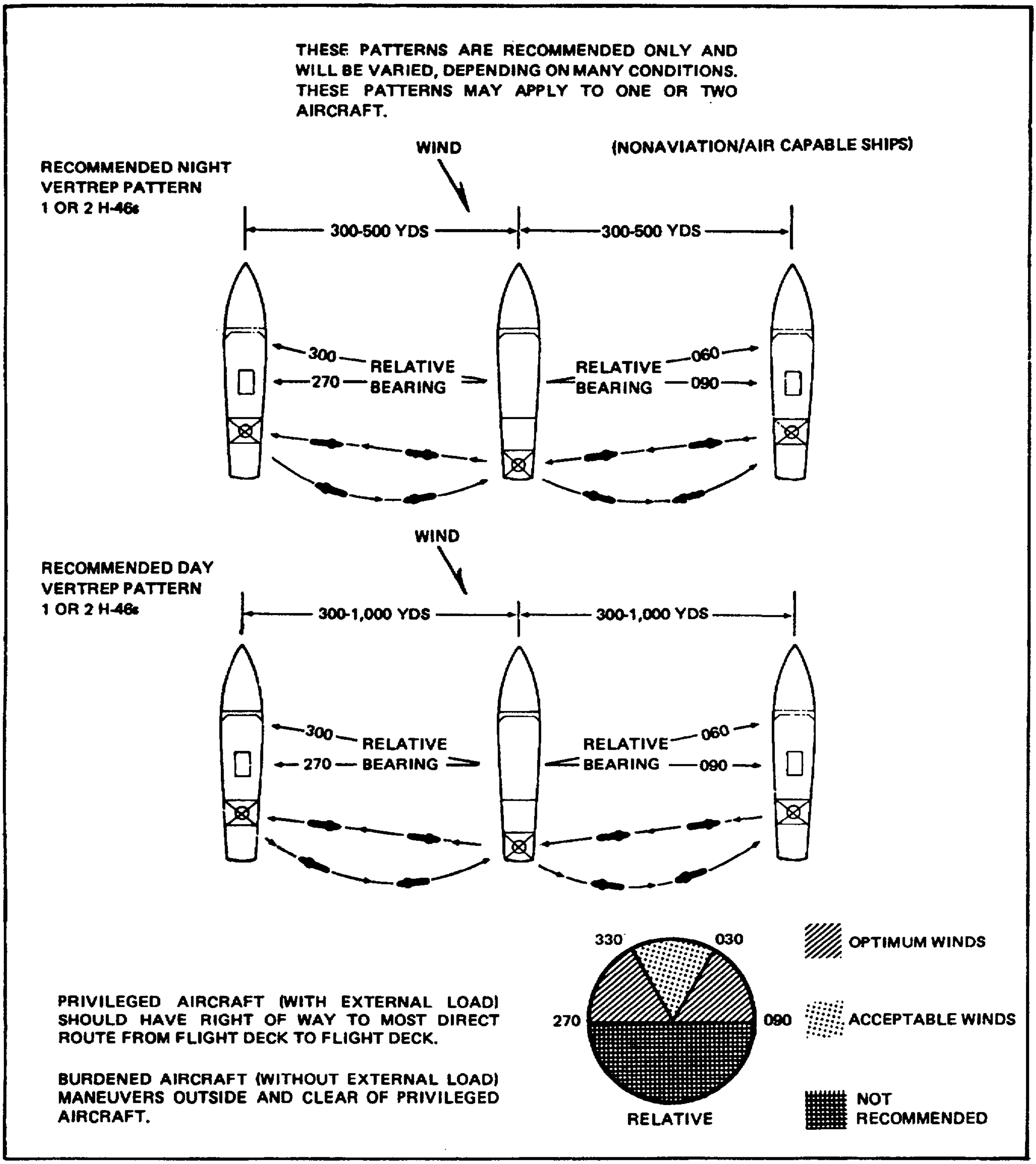


Figure 8-1. Typical Ship Stations and Vertical Replenishment Patterns (Sheet 3 of 3)

There will be times when VERTREP can be conducted well beyond visual range, depending on the following factors:

1. Adequate communications and navigation aids exist between ships and helicopters.
2. Type and number of loads (internal and external).
3. Time required and time available versus operational priority of requirement.
4. Aircraft NATOPS requirements for night VERTREP are met.

Generally, carrying external loads for long distances (over 35 miles for heavy, high-density loads and over 25 miles for light, low-density loads) should not be considered as a standard VERTREP procedure, but rather as a capability that should be reserved for high-priority cargo that justifies the time involved.

8.3.3 Ship-Produced Interference. It is more difficult to conduct VERTREP when either the transferring or receiving ship has another ship alongside that:

1. Creates turbulent air or vents hot stack gas over the helicopter pickup or drop area.
2. Blocks off the wind in the pickup or drop area.
3. May present a physical obstruction to the desired flight pattern necessitating a downwind approach/departure. Downwind approaches/departures with an external load are considered extremely dangerous and should be avoided where possible.

WARNING

Helicopters with an external load shall not overfly ships unless operational necessity so dictates.

8.3.4 Temperature and Atmospheric Pressure. These factors affect the lift capability of helicopters. Any increase in temperature or decrease in atmospheric pressure will decrease maximum lift capability. This loss in lift is a result of reduced engine performance and reduced aerodynamic performance of the rotor blades. Thus, a cold, dry day with high barometric pressure and a strong, steady relative wind is best for VERTREP.

8.3.5 Helicopter Pilot Fatigue. OPNAVINST 3710.7 establishes guidelines for use by commanding officers in determining the maximum number of hours that pilots can fly during any given period. During day VERTREP, 6 to 8 hours are generally accepted as an effective limit of pilot endurance. During night VERTREP, depth perception and visual reference for a pilot are greatly reduced. Pilot/crew fatigue is greatly increased because of the need for extra care and the constant transition from visual flight to instrument flight. The effective limit per pilot may be reduced to as few as 2 to 3 hours. Pilots should be consulted with regard to night endurance based on the current conditions. Factors affecting pilot endurance include:

1. Deck pitch and roll
2. Weather conditions
3. Aircrew experience/currency
4. Number of hours without rest
5. Night operations and reduced visibility.

8.3.6 Helicopter Fuel Loading. A full fuel load adds substantial weight to the helicopter and thereby reduces the amount of cargo load that can be lifted. As the fuel is expended, more cargo can be lifted. However, factors to be considered in determining the fuel load are:

1. Distances to be flown
2. Amount of cargo to be transferred
3. Meteorological conditions.

When conditions are favorable for lifting heavy loads, more fuel generally can be carried.

8.4 ORGANIZATION

VERTREP organizational responsibilities are delineated in Chapter 1.

8.5 VERTICAL REPLENISHMENT OPERATIONS

A VERTREP operation should be planned several days before the actual flight operations. From 3 to 15 days before a scheduled VERTREP, issue documents for receiving ships are distributed to the cargo-hold captains. A replenishment planning conference is held to develop a cargo breakout plan. From 1 to 3 days in advance of the scheduled delivery, the breakout, strike-up, pallet assembly, and prestaging will commence. As much cargo as possible should be staged near the VERTREP area before the actual VERTREP begins.

Note

- VERTREP equipment shall be provided and utilized in accordance with NWP 4-04.1.
- Because of the size of its cargo hook, the H-2 can use only the Mk 128 Mod 0 hoisting sling listed in NWP 4-04.1 and NAVSEA 59571-AA-MMA-010.

External cargo-handling operations can be safely conducted given proper preparation and trained personnel. Supervisory personnel shall ensure that only trained ground crews perform external load operations and that proper protective equipment is worn at all times.

8.5.1 Cargo Staging. Prior to actual flight operations, the maximum possible amount of cargo is staged on the flight deck. Primary considerations in preparing and executing the flight deck cargo plan (staging) are covered in NWP 4-04.1.

CAUTION

A pre-evolution discussion of flight deck cargo-staging requirements is essential. High-velocity and/or gusty winds, combined with ship's pitch and roll, may create a circumstance rendering a normal size landing area inadequate. Consideration must be given to clearing a larger than normal landing area for helicopters experiencing in-flight emergencies.

1. Sufficient clear space should be left on the deck to roll out the helicopter and to provide adequate clearance for takeoff and a landing area for possible emergency landings.
2. Complete staging of the flight deck after VERTREP has commenced is permissible, provided another certified landing area is available that is satisfactory to the helicopter detachment OIC.
3. All staged cargo must be located within the hover area bounded by periphery lines and/or hover limit line(s) to be accessible for pickup by the hovering helicopter.

WARNING

During night VERTREP operations, the cargo-staging plan shall provide for clear and unobstructed use of at least one landing lineup line, including its lights, whenever a certified ready deck is not available in the immediate area. The lights shall be visible through an arc of 15° on either side of the lineup line (see Figure 8-2).

4. Sufficient room shall be left for the hookup man to move about and always have an escape route available. He/she should remain forward or inboard of the load during hookup.
5. Load height will be such that the hookup man can accomplish his/her tasks without climbing on the loads. He/she shall remain on deck at all times, except when the size and shape of an external load to be transported precludes adherence, such as, but not limited to, the movement of USMC tactical equipment.
6. Sufficient room must be left between loads to reduce the possibility of a load snagging or tipping adjacent loads during pickup.
7. During day/night CV VERTREP, the preferred VERTREP area is the fantail. Proper consideration shall be given while planning to allow VERTREP to this area. Substantial increases in VERTREP efficiency can be obtained because of decreases in pattern length and increases in maneuvering area allowing utilization of the sideflare. This also provides for an increased margin of safety with respect to power required and obstacle avoidance.

WARNING

All FOD material shall be removed from the VERTREP area prior to flight operations.

8.5.2 Communications. Ships scheduled to receive material by VERTREP should maintain a continuous guard on the designated helicopter control circuit, which should be activated and tested prior to VERTREP. The helicopter control circuit shall not be used for routine administrative traffic between ships guarding this circuit.

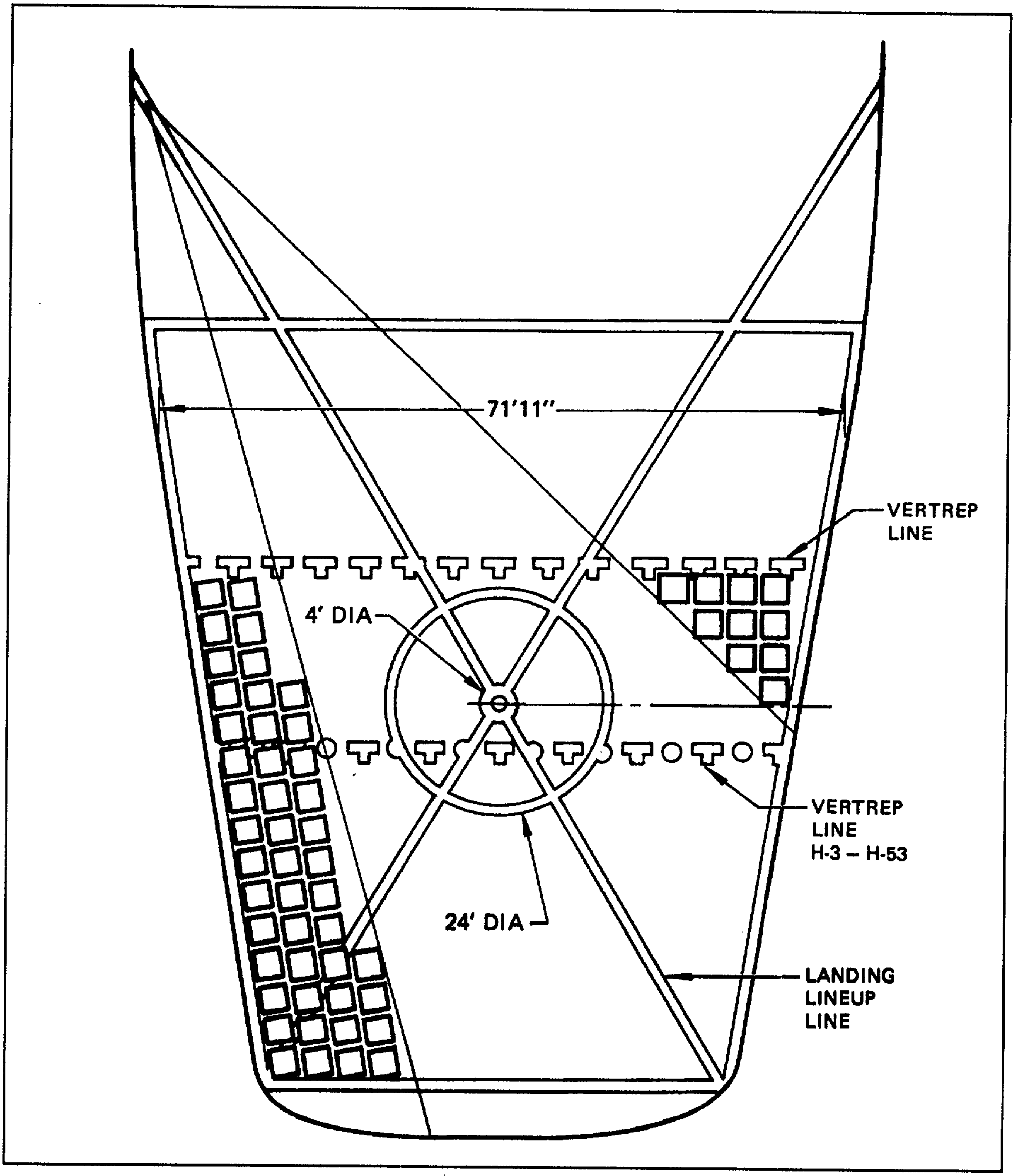


Figure 8-2. Typical Night Vertical Replenishment Cargo Prestaging Diagram (Single Landing Area Available)

Note

Since the pilot depends primarily on internal phone directions from the aircrewman on all cargo pickups and drops, routine transmissions to the pilot should not be made during this maneuver. In most helicopters, the copilot will monitor all transmissions during delivery with the pilot's UHF receiver switch turned off. Transmissions will normally be made while the helicopter is traveling between ships. Circuit discipline shall be maintained at all times.

8.5.2.1 Flag and Hand Signals. The Hotel or Hotel One flag will be used during helicopter operations as specified in ATP 1, Volume II. When carriers are operating fixed-wing aircraft and helicopters simultaneously, they shall display the Foxtrot signal.

A red signal will be displayed in the landing area if the ship is not ready to receive the helicopter. A green signal will be displayed when the ship is ready to receive the helicopter. The LSE will signal the pilot during approach, unloading, and departure, using the hand signals in NAVAIR 00-80T-113. These signals are supplemented by the visual signals contained in ATP 1, Volume II.

8.5.3 Load Transfer Procedures. Internal loads are usually far more time-consuming than external loads and therefore should normally be avoided except for transfers at great distances where a landing area is provided for offloading.

Personnel shall be transferred internally and be lowered by the utility hoist when over the deck. Helicopters have a utility hoist with a capacity of 600 pounds. Waterproof floating containers should be used to transfer movies and mail externally during daylight operations.

WARNING

Do not attach the personnel hoist cable to the ship.

CAUTION

Because of hydraulic brake limitations, SH-3 helicopters can lower only 300 pounds.

8.5.3.1 Load Pickup. Before starting operations, pilots and crewmen shall be provided the name, type of ship, hull number, location in the formation, frequencies, and tactical voice call of all receiving ships. The pilot shall be provided with the weight and destination of each load by appropriate means.

As the helicopter approaches the UNREP ship, its approach is announced over the deck-edge speakers. All personnel clear the landing and pickup zone, except the hookup man, who takes position forward or inboard of the load and holds the pendant up to signal the location of the load to the pilot. Guided by signals from the LSE, the pilot maneuvers the helicopter to hover over the load.

A helicopter crewman, viewing the deck through the open cargo hook access hatch, advises the pilot via the helicopter's internal communications system as to the helicopter's exact position over the load.

There are three methods of load pickup utilized by H-46 helicopters:

1. METHOD I — As the helicopter hovers over the load, the hookup man raises the pendant, slips the eye over the helicopter's hook, then clears the area by moving toward the LSE.

2. METHOD II — The hookup man hands the pendant to the aircrewman positioned in the open cargo access hatch and then clears the area moving toward the LSE. The aircrewman will then slip the pendant over the helicopter's hook, ensuring that the load is secured and ready for lifting.

3. METHOD III — The hookup man holds the pendant up until the aircrewman in the open cargo access hatch guides the pendant onto the helicopter's hook. The hookup man then clears the area by moving toward the LSE.

The aircrewman aboard the helicopter is the primary director of the helicopter once it is in a hover over the pickup or drop area for placement of the load. The LSE shall also continue giving directions in case of internal communications failure or other emergencies of which the pilot or aircrewman is unaware. Radio transmissions to aircraft hovering over the VERTREP zone are distracting to the pilot and should be of an urgent nature only.

WARNING

The hookup man shall never stand on the load or between the load being picked up and another load except when the size and shape of an external load to be transported preclude adherence, such as, but not limited to, the movement of USMC tactical equipment.

The crewman aboard the helicopter then gives the pickup and liftoff directions to the pilot in order to clear the load from the pickup area.

WARNING

The H-53E has the potential for generating in excess of 200,000 volts. Buildup of this shock potential is essentially instantaneous once grounding is removed.

8.5.3.2 Maintaining Contact. When helicopters operate between ships within visual range, both the launching and receiving ships shall maintain visual contact with the helicopter until it has landed or has completed its mission. When the helicopter is dispatched to more than one ship to make pickups or deliveries, responsibility for maintaining visual contact rests with both the last ship from which the helicopter departed and the next succeeding receiving ship. When possible, radar contact on all helicopters will be maintained by the launching and receiving ships. Under conditions of low visibility, positive control is mandatory. Parent ships must be aware of the location of their helicopters at all times. When conducting VERTREP beyond visual range of the parent ship, the CIC shall be responsible for providing voice communications and vectors to the helicopters over the entire route as specified in Chapter 6.

8.5.3.3 Load Delivery. When approaching the receiving ship, the pilot ascertains the drop location by observing the position of the load spotter. The pilot then plans his approach to position the load directly over the intended drop spot. As the approach commences, the pilot is provided obstacle avoidance and clearance information by the LSE and aircrewman. Once over the drop zone, the pilot follows the LSE's advisory signals for general positioning of the helicopter. Precision guidance and lowering of the load are provided by the aircrewman. The aircrewman informs the pilot when the load is on deck and, when the pendant slackens, the load is released. The pilot is informed of hook release verbally by the aircrewman and visually by the LSE's signal.

WARNING

Personnel shall not enter the drop zone nor attempt to steady the load while the helicopter is over the ship. The load spotter shall be clear of the drop zone before the load passes over the deck edge.

8.5.3.4 Clearing the Drop Zone. As soon as the helicopter has departed the drop zone, the load(s) will be cleared from the area by the most expeditious means available.

CAUTION

Nets should never be cut. Because of the abrasive nature of nonskid, dragging netted loads across the flight deck shall only be done as a last resort.

A loaded helicopter shall not be waved off solely because the receiving area has not been completely cleared of the previous load. If space is available for additional drops, the load being worked should be temporarily secured by pulling the net up over the load and threading the hoisting sling leg through the net ends. All personnel shall then clear the area while the next load is being deposited. Forklift trucks may remain in the receiving area if they are properly braked/secured against rolling and space is available for the inbound cargo. Forklift operators shall move toward the LSE, clear of the area, until it is safe to return.

WARNING

Personnel clearing stores must take extra precautions to remove banding strips, paper, and other debris from the receiving area prior to the next helicopter approach to preclude injury to personnel or damage to helicopter engines and rotor blades.

If the drop zone is small, it may be more expeditious to allow the helicopter to drop a number of loads prior to breaking down any loads. The receiving ship shall not remove the nets from any load until the drop zone is filled. The helicopter will then hold off until all loads have been removed.

8.5.3.5 Returning VERTREP Equipment and Retrograde.

As pallets, nets, triwalls, cargotainers, and hoisting slings accumulate on the receiving ship, they are assembled into loads for return to the UNREP ship. In addition to taking up much-needed space on the receiving ship, they are needed back on the UNREP ship to make up new loads for VERTREP schedule.

Load preparation of retrograde cargo and VERTREP equipment for return to the UNREP ship is as important as proper load makeup by the UNREP ship. The maximum retrograde load length shall be limited to two pendants with legs (approximately 35 feet) (see Figure 8-3).

WARNING

Danger to the helicopter or loss of part or all of the load can result if the cargo is not properly secured or if prescribed methods are not followed. When externally transferring hoisting slings as retrograde, the safety hooks at the ends of the slings/legs may engage the ship's lifelines or padeyes causing a hazard to personnel and aircraft.

Note

Retrograde shall be returned at the request of the transferring ship.

If pallet jacks have been furnished by the UNREP ship, return loads consisting of cargotainers or pallets can be made up clear of the drop zone and moved to the drop zone intact when ready for return. Netted pallets are difficult to move with pallet jacks; therefore, it is best to assemble the load on the drop zone between deliveries.

8.5.3.6 Staging and Pickup of Loads for Return.

Any retrograde cargo should be prepared in the same manner as described for the UNREP ship. When the VERTREP platform is of sufficient size to accommodate several loads, the return load should be placed as close to the lineup line as possible on the side of the platform away from the helicopter's approach. This will leave sufficient room for the helicopter to deposit the next incoming load on the approach side of the platform and then to move forward over the load.

If the helicopter starts an approach prior to completion of the return load assembly in the drop zone, pull the net up over the load and temporarily secure it with a hoisting sling leg threaded through the net corners or a safety hook through the net rings. Then clear the area to await the helicopter's departure.

WARNING

The hookup man shall stay clear of the VERTREP platform until the incoming load is on deck and the pendant is clear of the load.

As the helicopter moves over the return load, the LSE will signal the hookup man to pick up the pendant, place it over the helicopter's cargo hook, or hand it to the helicopter aircrewman positioned in the open cargo hook access hatch, and clear the area.

On ships with Class 5 VERTREP platforms, there is insufficient rotor clearance to allow the helicopter to hover low enough to pick up the load in the normal manner. On such ships, the helicopter will hover at a higher altitude and the crewman stationed in the open cargo hook access hatch will hook the eye of a recovery pendant (Mk 92 hoisting sling) to the helicopter's cargo hook. He/she will then lower the recovery pendant down to the hookup man. The hookup man will attach the pendant to the load and clear the area.

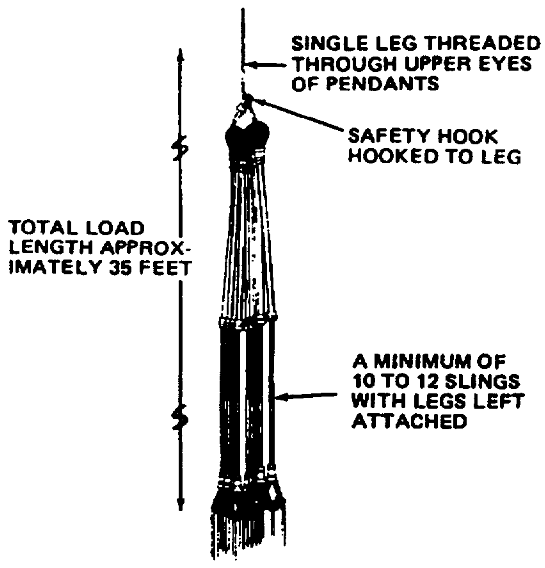


Figure 8-3. Mk 105 Hoisting Slings For Return

VERTREP equipment may be returned internally if the receiving ship has a landing platform. Normally this is time-consuming and is not desired unless distance is greater than approximately 25 miles or the equipment is so light that it will be dangerous to carry externally.

WARNING

Do not hook an empty net to the helicopter without at least four wood or six metal pallets or an equivalent weight in the net. To do so would endanger the helicopter by allowing the net to blow into the helicopter's rotors. In questionable cases, consult the pilot in command.

8.5.4 Fueling. During extended VERTREP, it may become necessary to refuel the helicopter several times. The VERTREP control officer shall always be aware of the helicopter's fuel state by determining endurance prior to takeoff or on arrival from another ship. Multihelicopter VERTREP can be contained with minimum interruption when one helicopter refuels at another ship and the remaining helicopter(s) continues to VERTREP from the UNREP ship. Hot refueling is the most expeditious method for continuing operations. Hot refueling may be accomplished with the permission of the commanding officer or his duly authorized representative, usually the VERTREP control officer. In all cases, aircraft NATOPS hot refueling procedures shall be followed.

8.5.5 Night Vertical Replenishment. Ships that are certified Level I or II or are operating under a waiver (see OPNAVINST 3120.28 and NAVMATINST 3120.1) may conduct VERTREP at night. The primary difference in night VERTREP is a reduction in the speed of the operation because of reduced visibility.

Night VERTREP is carried out in the same manner as day VERTREP subject to the limitations set forth in OPNAVINST 3120.32, OPNAVINST 3710.7, and the appropriate aircraft NATOPS flight manual. The final decision regarding whether a certified ship is to conduct VERTREP at night shall be left to the pilot in command.

Note

One or more of the following conditions shall exist prior to conducting night VERTREP to CV, LHA, LPH, or other appropriately certified ships:

1. A natural horizon is present.

2. The ships are alongside in CONREP position.

3. The drop/pickup zone of the ship to be worked is clearly visible from the aircraft's cockpit when over the drop/pickup zone of the transferring/receiving ship.

8.5.5.1 Weather/Sea State. Adverse weather conditions further reduce night VERTREP capabilities. VERTREP shall be conducted in accordance with appropriate aircraft NATOPS flight manual limitations.

8.5.5.2 Ship Lighting. Ships certified for night VERTREP operations shall display lights in accordance with the Air-Capable Ships Aviation Facilities Bulletin No. 1.

Ships shall be ready at all times to adjust the intensity of all lights in the flight/deck area and shall do so when directed by the pilot.

Ship's forward rigging lights and contour lights should be turned on at the pilot's request to facilitate depth perception. If installed on rigging/stream stations, sodium vapor lights should be used.

WARNING

Under no circumstances shall flash pictures of the helicopter be taken since the flash temporarily blinds the pilots.

Note

The pilot may use red or white landing lights to make a safe approach.

8.5.5.3 Night VERTREP Procedures. Essentially the same procedures are used for night VERTREP as during the day. However, night cargo pickup and delivery require increased care and precision. A wider flight pattern is necessary under low-visibility conditions. Delivery rates, therefore, are lower than during daylight hours.

The OTC is responsible for:

1. Directing all ships in the formation to show aircraft obstruction lights

2. Employing course and speed that will minimize deck motion and, as feasible, keeping stack gases away from the helicopter in the VERTREP area.

8.5.5.4 Signaling and Communications

1. A green flashlight or chemical light secured on the top of the hookup man's/load spotter's helmet will aid in identifying him to the helicopter crewman and indicate the pickup point.

2. Chalkboard information concerning receiving ship identification, bearing and distance, load weight, etc., may be transmitted by radio.

3. Radio communications to airborne helicopters should be minimized to avoid interrupting essential aircrew intercommunication system communications necessary for smooth and safe operations.

4. Positive communications should be maintained between the LSE, HCO, and FDO.

8.5.6 Other Applications. NAVORD OD 44617 shall be consulted for the procedures for attaching adapters to containers and rigging dollies for VERTREP. Large, bulky, or oddly shaped loads that cannot be carried in a pallet or in nets shall be provided with slings or lifting eyes for pendant attachment.

CAUTION

When attaching a special load rigging, carefully inspect the selected attachment points on the load to ensure they will withstand the loads applied when the object is lifted. What appears to be a convenient lifting eye or lifting point may be there for another purpose and not intended to lift the entire weight of the load.

Note

The pilot in command shall always be consulted as to the feasibility of transferring nonstandard loads.

8.6 SUBMARINE VERTICAL REPLENISHMENT

8.6.1 Attack Submarines. VERTREP may be conducted on attack submarines during day VFR conditions. Since submarines do not have standard VERTREP deck markings, the drop zone shall be agreed upon and briefed between the VERTREP control officer and the pilot prior to commencement of the evolution. The final decision as to the feasibility and safety of the operation rests with the pilot in command.

8.6.2 SSBN Submarines. Day VERTREP operations are feasible on a routine basis aboard SSBN 640 Class submarines. Night VERTREP operations are considered feasible on a more limited basis providing that the LSE, the sail, the sail fair-water diving planes, and the VERTREP area are clearly illuminated. Pallet loads up to 2,500 pounds may be transferred using CH-46, SH-60, SH-2, or SH-3G aircraft. During the VERTREP, CH-46 helicopters should be aligned perpendicular to the submarine's longitudinal axis. Tail rotor helicopters should be aligned so that the aircraft heading is either 20° to 60° or 300° to 340° relative to the submarine's longitudinal axis. The combination of sea state and pitch and roll should not wash water over the missile deck. The magnitude of the wind over the deck should be no greater than 20 knots. The wind azimuth may be between 0° to 90° and 270° to 360° relative to the submarine's longitudinal axis as long as the helicopter heading is such that a headwind component exists. Personnel on the missile deck should be hooked into the safety track and positioned next to the sail during the load drop phase of the operation. During retrograde hookup, only one crewman is required to hook up the pendant. Immediately following the hookup, the hookup man should clear the area by moving toward the sail. The AMR 1 hatch should be secured during the load drop and retrograde pickup. The LSE should be in a harness and positioned on the fair-water diving plane that is coincident with the helicopter's approach. The submarine and supply ship should have positive communications with the helicopter. The submarine's IFF/UHF antenna should be raised approximately 1 foot and a handset or headset should be on the bridge to provide submarine/helicopter communications. During both day and night operations, the VERTREP area on the main deck should be clearly outlined with a 4-inch wide, high-visibility tape. The tape should be carried in the helicopter kit aboard the submarine. The outline, rectangular in shape with its center coinciding with the center of the aft four missile hatches, should trace laterally on the missile deck, edge to edge, and 15 feet longitudinally. The markings should be arranged as shown in Figure 8-4.

8.7 SAFETY

Safety is the primary consideration in all VERTREP operations. Commanding officers should obtain the advice of the helicopter detachment OIC on board in all matters relating to the safety of the helicopter transfer. If helicopters are airborne, he/she should ask for advice from the SENAV if operating conditions appear marginal.

A helicopter should be landed, anytime the pilot in command believes that safety is endangered either by his/her own fatigue or by other operational factors. The following precautions must be meticulously observed.

1. ALL PERSONNEL EXCEPT THE LSE AND THE HOOKUP MAN (WHEN REQUIRED) SHALL CLEAR THE LANDING OR DROP AREA DURING A DELIVERY, TAKEOFF, OR LANDING.

2. Ships participating in VERTREP operations shall have a firefighting detail stationed at the transferring or receiving area. Personnel assigned to the helicopter crash/firefighting crew shall be properly clothed and shall not be assigned to any other duties, such as cargo handling.

3. Personnel shall be instructed concerning the shrapnel effect caused when rotor blades strike a solid object. SPECTATORS SHALL BE KEPT CLEAR OF THE PICKUP OR DELIVERY AREA WHILE VERTREP IS IN PROGRESS.

4. All removable objects that might be damaged by swinging loads should be removed from the area.

5. The flight deck drop zone shall be cleared of all objects that can be blown around by rotor wash or ingested into jet intakes.

6. All hatches and covers near the drop zone shall be closed.

7. Ships shall be careful not to blow tubes during VERTREP operations.

8. CARGO HANDLERS SHALL NOT ATTEMPT TO STEADY A LOAD OR RUSH TO THE LOAD BEFORE THE HELICOPTER HAS LEFT THE DROP ZONE.

9. To minimize the danger to personnel and equipment during wet, rough weather, all staging areas, drop zones, and paths leading thereto shall have deck surfaces prepared and maintained to conform with the requirements of applicable directives.

10. To minimize FOD hazard to the helicopters, cardboard boxes (excluding triwall containers) or other lightweight material should not be returned to the delivery ship.

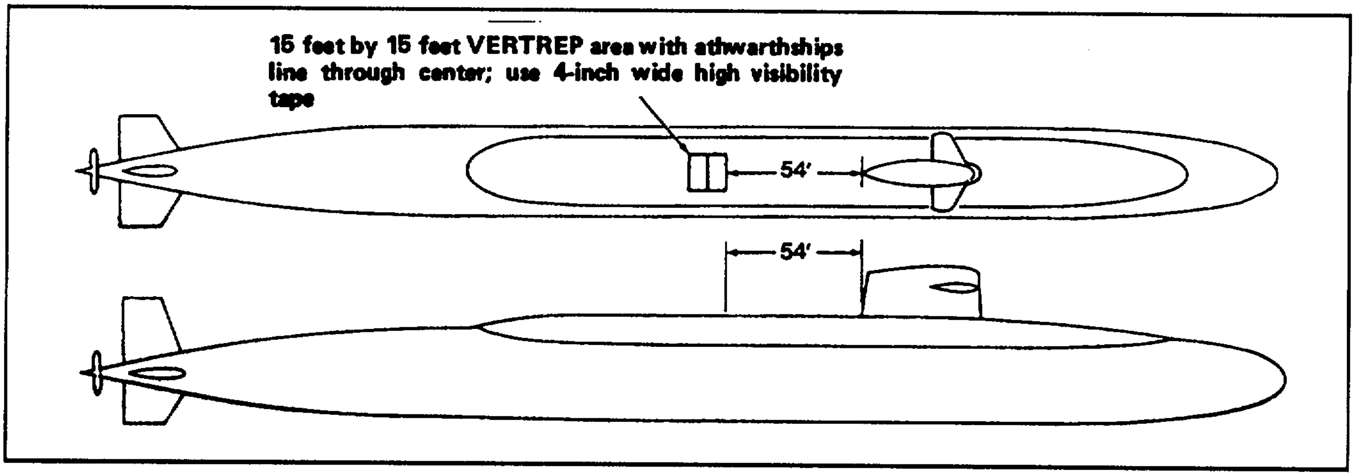


Figure 8-4. SSBN Submarine Vertical Replenishment Markings

CHAPTER 9

Light Airborne Multipurpose System (LAMPS Mk I) Operations

Note

A briefing sheet and all tabular material are located at the end of the chapter.

9.1 SH-2F/G HELICOPTER

LAMPS consists of electronic sensors and weapons systems for ASW and ASST in a day-night, all-weather environment. SH-2F/G helicopters are capable of operating from the flight decks of frigates, destroyers, and cruisers.

SH-2F helicopter equipment includes a search radar, sonobuoy receiver/transmitter suite, MAD, ESM equipment, and related antennas, receivers, monitors, displays, navigation/communications systems, and an acoustic data processing system. The SH-2F helicopter carries active and passive sonobuoys, marine markers, and flares or chaff for self-defense against SAM threats. It can attack targets with lightweight USW homing torpedoes. Launched in response to a submarine contact, the SH-2F helicopter can locate, classify, and attack the target or mark it for other air and/or surface units. In the ASST mission, the SH-2F helicopter extends the detection of targets beyond the radar range of the ship. Additionally, the SH-2F helicopter can be used for SAR, MEDEVAC, personnel transfer, surveillance and reconnaissance, courier, gunfire spotting, and VERTREP.

The maximum time the SH-2G helicopter can remain airborne is 3.3 hours with both fuel tanks installed. This mission length is predicated on the aircraft having a 0.4-hour fuel reserve, visual flight conditions, and a stable flight deck. With one torpedo on board, flight time is decreased by 0.6 hour. Maximum mission time with one torpedo on board is 2.3 hours; with two torpedoes time decreases to 1.6 hours. The dash speed is 120 knots with a 90-knot normal cruising speed. The aircraft is capable of extending its airborne time by HIFR. Hot deck refueling with periodic flightcrew changes is the preferred method of extending flight time. Flights are normally scheduled for 2.5 hours airborne to provide a safety margin, since the SH-2F helicopter has limited divert capability. At present, no capability exists for antiship/antiaircraft weapon delivery. A 50-nm radius of action is the maximum distance the SH-2F helicopter can be expected to prosecute a USW contact; 60 nm is the maximum radius of action for ASST. For further details on the SH-2F/G helicopter, refer to the SH-2F/HH-2D NATOPS Flight Manual.

9.2 AVIATION DEPARTMENT

In ships that have a LAMPS detachment on board, an aviation department will be organized. The OIC of the detachment will be the department head and be designated the aviation officer. LAMPS detachments are formed and trained at the parent squadron. The detachment OIC assumes the responsibilities of reporting custodian for the detachment aircraft and makes all required aircraft accounting reports. The aviation officer is also responsible to the parent squadron commanding officer for numerous aviation details including NATOPS, safety, updating of maintenance procedures, funding reports, and training. Therefore, it is essential that strong lines of communication exist between the aviation officer and the parent squadron commanding officer. The aviation officer reports to the squadron commanding officer through the ship's commanding officer. The parent command's commanding officer communicates with the OIC through the ship's commanding officer on official matters.

Because of the often irregular working hours of an embarked maintenance crew, it is desirable that the aviation department be berthed together in an area easily accessible to the hangar and flight deck facilities. Hangar facilities on all ships that have a LAMPS detachment are limited. Consequently, stowage of gear not directly associated with the LAMPS mission is discouraged when the detachment is embarked. Office space should be provided to the aviation department.

9.3 IN-PORT MAINTENANCE AND TRAINING

When duration of port visits warrant, relocating the detachment to a nearby air facility will, in nearly all instances, offer the crew facilities to meet flight training requirements and perform scheduled maintenance. In some cases the crew will be able to commute to the air facility daily and remain berthed on board the ship. In many cases where distance prohibits this, the ship should prepare TAD orders. The aviation officer will be responsible for preparing TANGO/TEMDU requests to the appropriate funding authority, if necessary, and will submit necessary change of location reports.

9.4 HELICOPTER FIRE PARTY

Refer to paragraph 2.5.

9.5 AIR CONTROL

It is mandatory for the LAMPS ship to plan, direct, and control the LAMPS weapons system in the USW/ASST tactical environment. The ATACO gathers information from the aircraft, ASTAC, acoustic processor operators, sonar operators, NC-2 plotter, and ES station, and provides the interface with the airborne LAMPS helicopter. The ATACO must be capable of supervising LAMPS employment during the prosecution of a submarine contact and/or coordinating an ASST mission. It is essential that a well-trained and experienced officer be placed in this position. He can best accomplish his function working in conjunction with a well-qualified ASTAC.

The ATACO will maintain a plot of sonobuoys, MAD fixes, sonar information, and ES data to use in directing the operation. During ASST missions, or when the helicopter passes ASST information to the ship, the ATACO will relay this information to the ship's ES unit for further analysis and action.

Note

The CIC watch officer shall brief the pilot and ATACO as well as provide them with an accurate briefing sheet.

Debriefings shall be conducted immediately after each flight using all logs and grams to make an analysis of the flight. The debrief will include the entire flightcrew and, if possible, the TAO or CIC watch officer on watch during the flight and other members of the CIC/sonar team (ATACO, ASTAC, sonar watch supervisor, SQR-17 operator, etc.) as the TAO may direct.

9.6 GENERAL OPERATING AND SHIPBOARD PROCEDURES

9.6.1 Movement of Helicopter

9.6.1.1 General. Operational procedures will be standardized and in accordance with Chapter 4. The information contained here is directed primarily at operations from destroyer decks. Operating limitations are depicted in the SH-2F/HH-2D NATOPS Flight Manual. For single-ship LAMPS operations in a peacetime environment, sea states normally will inhibit flight operations before cloud base and visibility. LAMPS flight operations should be curtailed when LAMPS ships are operating singly, if the ship's rescue capability becomes questionable. See Figure 9-1 for ship maneuvering restrictions during flight operations and Figure 9-2 for a typical sequence of events for flight quarters.

CAUTION

Combined wave and swell effects can result in seawater over the flight deck of FFG 7 Class ships, resulting in helicopter damage. Additionally, the wave action created by the Venturi effect between UNREP ships can cause rotor system damage.

9.6.1.2 Flight/Hangar Deck Procedures. Caution must be observed in all movements to prevent damage or loss of a helicopter because of restricted deck space or hangar area and the relative instability of air-capable ships. Movement of a helicopter will not be attempted without prior approval of the OOD. A minimum of nine men is required to move the helicopter safely:

1. One director
2. One brakerider
3. One tailwheel steering bar handler
4. Two main mount chock/chain men
5. Four pushers.

All personnel shall be equipped with a whistle. When a whistle is blown, all movement of the helicopter shall stop, brakes shall be applied, chocks inserted, and tiedowns attached.

One chock man shall be stationed at each main wheel. He shall carry the chocks and be positioned to chock the wheels immediately upon signal. The chock men shall handle the chocks only and not be used to push the aircraft.

More pushers may be added as required. The director is in charge of the evolution and the safe movement of the helicopter. He shall be equipped with a whistle, and his instructions shall be followed explicitly and acknowledged.

In all helicopter deck movement evolutions, safety is paramount. As ship rolling and pitching increase, so do the hazards of aircraft handling. During periods of high winds/sea state or during periods of darkness, extreme care must be exercised. Under these conditions, a flight deck safety observer (flight deck crewmember or LAMPS-experienced senior petty officer) shall supervise and coordinate with the OOD all flight deck aircraft movements requiring the walking chains or progressive chains procedures. The flight deck safety observer shall be in addition to the move director and not a member of the move crew. Movement of an aircraft should not be attempted if sea state/ship movement produce excessive deck motion. The following guidance is provided to enhance safety during helicopter movements:

1. When moving aircraft by hand, chocks and tiedowns shall not be removed until all positions are manned, brakes are checked firm, and deck motion has been stabilized. Sufficient manpower shall be utilized (ship's company if necessary) to safely move the helicopter, as well as handle chocks and chain tiedowns. The helicopter should be pushed against the movement of the deck rather than allowed to roll with the motion of the ship. Movement shall be slow enough to permit a safe stop.

2. Before removing chocks and tiedowns, the director shall call for "Brakes" and receive visual/verbal confirmation from the brakerider that brakes are being held. The tailwheel shall be unlocked only on signal from the director.

3. The director shall maintain direct visual contact with the brakerider.

4. When seas are calm and deck motion is at a minimum (pitch 2° or less and roll 5° or less) tiedown chains shall be in proximity to the aircraft and ready for immediate use.

5. As deck motion increases (pitch 3° to 4° and/or roll 6° to 8°) one end of the tiedown chains shall be attached to the aircraft main outboard wheel tiedown ring and the other end carried continuously poised for rapid padeye hookups (walking chains procedure).

6. If sea conditions are judged to be rough (pitch 5° or higher and/or roll 9° or higher) or when nonperiodic/unusual deck motion is anticipated and it is judged that aircraft movement can be accomplished in a safe manner, the following chain handling procedures apply (progressive chains procedure).

7. Chains shall be attached to both aircraft and deck padeyes with sufficient slack to allow the aircraft to be moved a short distance. Upon reaching chain limits, the aircraft will be chocked and additional chains led to the next padeyes. Initial chains will then be removed and the aircraft moved again when conditions permit. This procedure will be continued until the aircraft is properly secured in the desired position.

Note

The progressive chains procedure will require additional manpower from ship's company and requires prior practice to ensure proficiency and coordination. If the above procedure cannot be accomplished safely, the helicopter shall remain in position with a 16-point heavy-weather tiedown configuration.

9.6.1.3 Officer of the Deck Helicopter Movement Checklist

1. Notify the commanding officer of intent to move helicopter (as required by ship helicopter bill)

2. Establish positive, continuous two-way communications with flight deck

3. Flight deck report "Manned and Ready"

4. Gently maneuver ship if necessary to minimize pitch and roll (pitch exceeds 2° and roll exceeds 5°)

5. Determine method of respot:

   a. No chains (pitch 2°, roll 5° or less)

   b. Walk chains (pitch 3° to 4°, roll 6° to 8°)

   c. Progressive chains (pitch 5°, roll 9° or higher)

Note

If pitch exceeds 2° or roll exceeds 5°, consult flight deck safety observer when determining method.

6. Grant permission to move helicopter

WARNING

Energizing/deenergizing fin stabilizers or major rudder movement can create unanticipated movement of the deck causing loss of control of the helicopter. Any requirement to energize/deenergize fin stabilizers or to maneuver the ship during a helicopter movement evolution shall immediately be transmitted to the flight deck where helicopter movement shall cease and a minimum of six tiedowns shall be applied.

7. Flight deck report "Move complete, aircraft secured"

8. Notify commanding officer (as required).

9.6.1.4 Flight Deck Helicopter Movement Checklist

1. Notify bridge of intent to move helicopter

2. Establish positive, continuous two-way communications with the bridge

3. Muster personnel and assign duties: brakerider, steering bar handler, two chock/chain men (minimum), four pushers (minimum)

4. Inspect personal equipment: safety shoes, flotation gear, whistles, strobe lights

5. Prepare aircraft for movement

   a. Rotor blades folded

   b. Nose doors closed

   c. Steering bar installed

6. Prepare flight deck for movement

   a. Safety nets as appropriate

   b. Hangar door fully open

   c. Hangar tracks clear, hangar fully retracted

7. Report to OOD "Manned and ready"

8. Request permission to move helicopter

9. Receive permission to move helicopter, pitch, roll, and method of respot:

   a. No chains (pitch 2°, roll 5° or less)

   b. Walk chains (pitch 3° to 4°, roll 6° to 8°)

   c. Progressive chains (pitch 5° or higher, roll 9° or higher)

CAUTION

Tiedown chains are designed for steady-state load conditions; during progressive chains procedure, slack shall be kept to a minimum to preclude overstressing chains if aircraft slides.

10. Move helicopter

    a. Remove/slacken chains

    b. Ensure steerable tailwheel unlocked

    c. Unlock parking brake and hold brakes

    d. Remove chocks

    e. Conduct brake check

WARNING

Energizing/deenergizing fin stabilizers or major rudder movement can create unanticipated movement of the deck, causing loss of control of the helicopter. Any requirement to energize/deenergize fin stabilizers or to maneuver the ship during a helicopter movement evolution shall immediately be transmitted to the flight deck where helicopter movement shall cease and a minimum of six tiedowns shall be applied.

11. Secure helicopter

    a. Set parking brake

    b. Insert chocks

    c. Lock tailwheel

    d. Install/tighten chains

12. Notify bridge "Move complete, aircraft secured."

9.6.1.5 Blade Folding and Spreading. The helicopter shall always be chocked and tied down when spotted on the flight deck. Rotor blade folding and spreading operations should be accomplished with caution. The maximum nonturbulent wind for folding/spreading is limited to 35 knots for normal operations and 45 knots for emergencies. This limit is reduced accordingly in turbulent air or when the relative winds are more than 45° from the aircraft heading.

9.6.1.6 Starting the Helicopter. The aircraft tiedowns should not be broken down to prelaunch configuration until flight quarters has been sounded. Starting will normally be accomplished only upon signal from the LSE and under positive control of the HCO. Flight deck personnel shall man fire bottles of adequate size to handle any routine fire. The helicopter normally uses external power for starting.

9.6.1.7 Rotor Engagement. Rotors will be engaged only on signal from the LSE and under the positive control of the OOD. The pilot shall indicate that he is ready to engage rotors by giving the LSE the engage rotor signal. After ensuring that all personnel are clear and that the relative wind is within the prescribed envelope, the HCO shall then signal the LSE. After receipt of this signal, the LSE shall give the pilot the signal to engage rotors.

9.6.2 Engine Turnups. At times, the helicopter will require on-deck engine runs for post-maintenance checks. Normally, it will not be necessary for the ship to go to full flight quarters for these engine tests. However, the following minimum precautions shall be taken.

The OIC (detachment pilot or HCO) shall ensure:

1. The safety nets are down.
2. A FOD walkdown is completed.
3. Appropriate firefighting equipment is on station and ready for use.
4. Permission is obtained from the OOD before the engines are started.
5. All unnecessary personnel are clear of the flight deck.

The OOD shall:

1. Pass the word "All hands stand by for a test of the helicopter engines. All hands not involved in the test stand clear of the flight deck and main deck aft of frame. The smoking lamp is out topside. Hold all trash and garbage on station."
2. Advise the HCO prior to any maneuvering.
3. Upon completion of the test, the OOD shall pass the word "Secure from modified flight quarters. The smoking lamp is lighted in all authorized spaces."

9.6.3 Mandatory Requirements For Engagement of Rotors

1. Flight quarters set (less CIC personnel if only maintenance turnup)
2. Rotor blades unsecured
3. Required deck tiedowns attached and chocks in place.

WARNING

- During rotor engagement, ensure only required tiedowns are attached and there is slack to prevent rig instability or ground resonance.
- Maintain steady course and speed, within appropriate wind envelope.

4. Flight deck area clear of unnecessary personnel
5. Clearance from bridge.

9.7 FLIGHT OPERATIONS

9.7.1 Launch and Recovery Procedures

1. The helicopter may only be launched and recovered utilizing prescribed wind envelopes. Launch and recovery shall not be attempted while the ship is turning.
2. In selecting optimum wind conditions, several factors must be considered: turbulence, ship pitch and roll, and pilot experience. Turbulence over the flight deck can result from an otherwise smooth wind flowing over and around the ship's superstructure. Primary consideration is a stable deck.
3. Notice of pending LAMPS evolutions will be widely disseminated as soon as known. Discussion of alert conditions is contained in paragraph 9.8.
4. LAMPS evolutions will be initiated by 1 MC announcements: "Flight quarters, flight quarters, for

launch/recovery/HIFR/VERTREP/passenger transfer operations."

5. Only those signals listed in NAVAIR 00-80T-113 shall be used by the LSE and aircrew for visual communications.

9.7.2 Communications. Two UHF frequencies normally shall be made available for flight operations (primary and secondary) in addition to a listening watch on 243.0 MHz (guard). When operating in company and in certain tactical situations, it may be necessary to use one net for recovery/launch and a separate net for tactical operations. The following personnel shall monitor the net, as appropriate, during flight operations:

1. Launch/recovery

   a. Aircraft

   b. ASTAC

   c. HCO

   d. Bridge

2. Tactical

   a. Aircraft

   b. ASTAC or ATACO

   c. Bridge

Voice procedures from ACP 165 shall be used.

9.7.3 Instrument Approaches. See Chapter 6 for air-capable ship approaches.

9.8 ALERT CONDITIONS

The alert conditions listed in Figure 3-2 shall apply to the LAMPS aircraft. Because of flight safety and fatigue considerations, time limits must be placed on these conditions. The main concern is the safety of the aircrew, but consideration must also be given to the number of hours that maintenance and flight deck personnel have been on duty. An appropriate period of rest shall be provided each aircrew after having completed a normal maximum time in Alert 5, 15, or 30. Launching the LAMPS aircraft is preferable to placing it in Alert 5.

9.9 EMERGENCY PROCEDURES

The SH-2F is a complex helicopter. The very nature of the helicopter's equipment necessitates that the pilots, LSE, ASTAC/ATACO, and the ship be aware of established emergency procedures should one or more of the aircraft's systems fail. Emergency procedures are contained in NATOPS and also in Chapter 2. LAMPS Mk I emergencies and the ship's reaction to these are contained in Figure 9-3. This figure should be copied and used as part of an indexed, emergency, quick-reference file on both the bridge and in CIC.

9.10 TRAINING AND WORKUP

Optimum use of LAMPS requires extensive training for both ship's company and detachment personnel, especially in the areas of command and control, CIC and aircraft coordination, and flight deck procedures. CINCLANTFLT/CINCPACFLT will establish, through their TYCOMs, training and readiness standards for LAMPS ships and aircraft detachments. This will include training in coordinated USW, ASST, and other secondary missions. Readiness standards and exercises will be established to ensure effective use of LAMPS teams.

LAMPS team at-sea workups shall be conducted as part of the basic LAMPS detachment/ship integration. A typical LAMPS at-sea workup schedule is shown in Figure 9-4. Such a schedule should be developed for each individual unit, taking into account the fleet deployment schedule and services available.

9.11 LAMPS DETACHMENT CROSS-DECK EVOLUTIONS

The issue of cross-deck transfer of LAMPS detachments surfaces as operational commanders perceive the requirement to place detachments on ships that do not have a detachment or to create a two-plane detachment to increase capability. While a cross-deck transfer should never be considered a routine evolution, it is recognized that the operational commander must have the option to transfer LAMPS detachments from one combatant to another to meet operational needs. Cross-deck transfers provide tactical flexibility, which is an integral part of good asset management. However, as the decision is promulgated, the battle group commanders do not always have the HSL expertise assigned to their staffs to completely advise them of the considerations and concerns of such a move. The cost in terms of potential impact on safety and operational readiness and the cost of the move itself must be weighed in the decision process.

If operationally required, a successful cross-deck transfer can be accomplished. The two basic types are one-plane to one-plane cross-deck transfer and one-plane to two-plane cross-deck transfer.

9.11.1 One-Plane to One-Plane Cross-deck Transfer. One-plane to one-plane cross-deck transfer occurs when a detachment is relocated on a ship currently without a detachment. The requirement for a safe move and incorporation into the new host ship should be in the forefront at all times. The following checklist should be used as a guide to prepare for and execute the move.

1. Earliest possible notification of intention to cross-deck (prior to departure from continental U.S. if possible). This will permit the detachment to provide aviation expertise to the new host ship and to establish a working liaison.

2. Precrossdeck liaison visit by detachment OIC. The liaison visit should address:

   a. Flight deck facilities — certification, lighting, power, chains, chocks, communications, tacan, etc.

   b. Berthing requirements.

   c. Qualifications/training of HCOs, LSEs, and ASTACs.

   d. Fuel system/fuel system personnel training.

   e. Ordnance requirements including sono-buoys, CADs, smokes and adapters, and torpedo assets.

   f. Corrosion materials.

   g. SE/IMRL.

   h. Supply procedures/expertise. (Supply support briefs are to be conducted. They should include handling retrograde and parts requisitioning.)

   i. Parts support requirements.

   j. Publications/instructions.

   k. Preembarkation and training plan with the new host ship.

3. Complete safety/integration workup in accordance with current instructions prior to any operational tasking.

4. Full logistic support for actual transfer of the 15,000 pounds of spare parts and support equipment. The preferred method is in port. If at sea, external support must be arranged. Arrangements must also be made to ensure that the normal flow of replacement parts and supplies is not disrupted.

5. Certification by the new host ship that all required training and facilities certifications are complete and that all required materials (corrosion-control supplies, sonobuoys, etc.) are on board.

9.11.2 One-Plane to Two-Plane Cross-deck Transfer. One-plane to two-plane cross-deck transfer occurs when a detachment is relocated onto a ship that already has a detachment. The OIC of the transferring detachment will ensure a safe evolution. The above checklist should be used as a guide, but the quantity of material to be transferred should be considerably less. Close liaison with the new host ship prior to the transfer can identify specific materials that should be transferred, i.e., out-of-cal SE or SASS/PUK parts. The OIC of the host ship should retain responsibility as the air department head and should speak to the ship's commanding officer on aviation matters.

Two-plane operations require increased coordination and workup time. The following is an initial checklist for a two-plane detachment:

1. The precrossdeck liaison visit should include discussion on the following:

   a. Hangar/PUK space

   b. SASS compatibility/content

   c. Increased fuel/freshwater consumption

   d. Flight crew scheduling/launch cycles

   e. Flight deck personnel scheduling/rest

   f. Impact of increased flight operations on ship's company/fire parties

   g. Maintenance management

   h. Bingo requirements

   i. Helicopter movement/spotting on the flight deck or in the hangar

   j. Communications plans

   k. Altitude assignments/ASTAC controls.

2. A complete safety/integration workup prior to any operational tasking. This should include day 1 and day 2 of the LAMPS at-sea workup schedule depicted in Figure 9-4. The workup should conclude with simultaneous two-plane operations.

OCCASION	RESTRICTIONS	REMARKS
Helicopter chained in hangar	None.	Until satisfactory deck and high point tiedowns are built into the hangar, the possibility exists of the helicopter moving.
Traversing in/out	**WARNING** Maintain steady course and speed.	Minimum of 9 men required.
Helicopter chained on deck, blades folded	None.	Helicopter blades must be folded if wind speeds of 65 knots are expected.
Spreading blades	**CAUTION** Maximum wind speed over deck 35 knots (nonturbulent), reduce to 15 knots wind if turbulent or relative winds greater than 45° from aircraft heading.	In an emergency up to 45 knots is acceptable.
Helicopter chained on deck, blades spread	None.	Blade boots will remain fitted if wind over the deck exceeds 25 knots until the aircraft is manned and launch is imminent. Boots will normally be fitted when the aircraft is to remain on deck for an extended period.
Engaging rotors	**WARNING** Maintain steady course and speed, within appropriate wind envelope	None.
Takeoff	**WARNING** Maintain steady course and speed, within appropriate wind envelope.	None.

Figure 9-1. Maneuvering Restrictions During Flight Operations (Sheet 1 of 2)

OCCASION	RESTRICTIONS	REMARKS
Landing VMC	Ship steady on BRC by the time aircraft is at 1/4 nm, wind with appropraite envelope.	None.
Landing IMC	Ship steady on BRC by the time aircraft is at 3 miles on final, wind within appropriate envelope.	None.
Refueling (hot)	Gentle maneuvers only.	Warn aircraft of intentions.
Rotor shutdown	**WARNING** Maintain steady course and speed within appropriate wind envelope, until HCO reports rotors stopped. If winds exceed 25 knots for recovery, postshutdown maneuvering should not cause an increase in relative wind until blade boots are installed.	If wind exceeds 25 knots, boots shall be fitted immediately after shutdown.
HIFR	Wind 330° to 000° relative, minimum 15 knots; gentle maneuver only any speed, ship to remain within appropriate wind envelope (Appendix B).	Ordnance equipment properly trained. Aircraft must be aware of changes of course during HIFR.

Figure 9-1. Maneuvering Restrictions During Flight Operations (Sheet 2 of 2)

Times listed are to be used as a guideline for including steps in individual ship helicopter bills.		
TIME	ACTION	
90 Minutes	CIC:	Check all communication, navigation, and tactical support systems for readiness, report discrepancies to OOD, and report status to the flightcrew. Provide the flightcrew with the tactical mission brief and completed brief sheets.
85 Minutes	Detachment:	Spot helicopter for launch and prepare it for flight operations.
60 Minutes	Bridge:	Commence maneuvering ship to obtain a position that will provide minimum degradation of station when engagement/launch courses are established. Make a 1 MC announcement including intended time of takeoff and team for flight quarters.
	CIC:	Ensure required COMSEC and keyed cryptographic materials are provided.
	Aircrew:	Brief in hangar vicinity, examine helicopter discrepancy log, and gather flight gear.
45 Minutes	Aircrew:	Preflight helicopter.
30 Minutes	Bridge:	Sound flight quarters and commence bridge helicopter operations checklist.
	CIC:	Commence CIC helicopter operations checklist.
	Aircrew:	Man aircraft, complete checklist up to start engines. Make all preparations for flight.
	Helicopter Detail:	Man flight deck in proper equipment.
	HCO:	Man tower. Commence HCO checklist.
	Others:	Lower safety nets.
25 Minutes	Helicopter Detail:	Conduct FOD walkdown.
20 Minutes	Helicopter Detail:	Man all stations and prepare to start engines.
	Aircrew:	Request permission to start engines.
18 Minutes	HCO:	Request engagement winds.
	Aircrew:	Start engines.
15 Minutes	HCO:	Signal engagement clearance (amber light). On UHF pass "Cleared to engage, winds ______, pitch _____, roll _____, altimeter _____."
	Aircrew:	On LSE signal, engage rotors.
	HCO:	Signal red deck; warn flight deck/flightcrew before maneuvering.
3 - 1 Minutes	Aircrew:	Report when ready to launch.
	Bridge:	Gently maneuver to flight CORPEN. Grant permission to launch.
	HCO:	Signal green deck; pass clearance to launch, winds, pitch, roll.
	Detachment:	Remove pins and tiedown chains when directed by aircrew and HCO.
Zero Minutes	Aircrew:	Take off when ready.
	Bridge:	Continue to hold ship steady until after "Operations normal"; then pass the word to "Secure from flight quarters. The ship expects to reman flight quarters at ____."
	CIC:	Assume control after "Operations normal" report for passing of control from HCO.
	Detachment:	Secure as directed by HCO.
	Helicopter Detail:	Secure as directed by HCO.

Figure 9-2. Typical Sequence of Events for Flight Operations

WHEN AN IN-FLIGHT EMERGENCY IS DECLARED A PILOT, IF AVAILABLE, SHOULD IMMEDIATELY BE CALLED TO CIC.

DUAL ENGINE FAILURE

A DUAL ENGINE FAILURE WILL RESULT IN THE PILOT MAKING AN IMMEDIATE AUTO ROTATION INTO THE WATER.

THE SHIP SHOULD SEE TAB A.

LOSS OF TAIL ROTOR THRUST

A LOSS OF TAIL ROTOR THRUST NECESSITATES THE PILOT MAKING AN IMMEDIATE AUTOROTATION IN ORDER TO PREVENT THE HELICOPTER FROM SPINNING OUT OF CONTROL.

THE SHIP SHOULD SEE TAB A.

LOSS OF TAIL ROTOR CONTROL

A LOSS OF TAIL ROTOR CONTROL SEVERELY HAMPERS THE AIRCRAFT'S YAW CONTROLLABILITY. A BINGO FIELD OR CARRIER DECK IS NECESSARY TO MAKE A RUN-ON LANDING FOR A SAFE RECOVERY. HOWEVER, IF NEITHER LANDING SITE IS AVAILABLE, THE PILOT WILL PROCEED TO THE VICINITY OF THE SHIP AND ELECT EITHER TO LAND ON DECK OR DITCH THE AIRCRAFT.

THE SHIP SHOULD SEE TAB B.

FIRE IN FLIGHT

IF THE FIRE IS EXTINGUISHED, THE HELICOPTER WILL RETURN TO THE SHIP. MOST LIKELY SINGLE ENGINE. HOWEVER, IF THE FIRE REMAINS OUT OF CONTROL, THE PILOT WILL DITCH THE AIRCRAFT.

IF DITCHING IS NOT REQUIRED, THE SHIP SHOULD SEE TAB D.

IF DITCHING IS REQUIRED, THE SHIP SHOULD SEE TAB A.

SINGLE ENGINE FAILURE

WITH A SINGLE ENGINE FAILURE THE PILOT WILL RETURN TO THE SHIP AT 70 KNOTS AND AT A SAFE AUTOROTATIONAL ALTITUDE. PILOT WILL JETTISON AUX TANKS/STORES IF NECESSARY. PILOT MAY ATTEMPT TO RESTART FAULTY ENGINE IF FEASIBLE. AIRCRAFT HOVERING CAPABILITY MAY BE IMPAIRED.

THE SHIP SHOULD SEE TAB D.

Figure 9-3. LAMPS Mk I Shipboard Emergency Procedures (Sheet 1 of 12)

ENGINE MALFUNCTIONS

THE HELICOPTER MAY BE EXPERIENCING AN ENGINE OVERSPEED, TORQUE SPLIT, POWER LOSS, OR CHIP LIGHT. THE FAULTY ENGINE MAY HAVE TO BE SECURED. THEREFORE, SINGLE-ENGINE PROCEDURES SHOULD FOLLOW.

THE SHIP SHOULD SEE TAB D.

MAIN OR IAGB TRANSMISSION PRESSURE OR MAIN TRANSMISSION OIL LEVEL CAUTION LIGHT ON/LOW OIL PRESSURE/HIGH OIL TEMPERATURE

WITH THIS TYPE OF EMERGENCY, THE PILOT WILL FLY AT 50 TO 80 KNOTS AND BETWEEN 50 AND 200 FEET TOWARDS THE SHIP. AT THE FIRST SIGNS OF GEARBOX FAILURE THE PILOT WILL DITCH THE AIRCRAFT.

THE SHIP SHOULD SEE TAB B.

IF DITCHING IS REQUIRED, THE SHIP SHOULD SEE TAB A.

#1 OR #2 NOSE GEARBOX OR PRESSURE CAUTION LIGHT ON/LOW OIL PRESSURE/HIGH OIL TEMPERATURE

WITH THIS TYPE OF EMERGENCY, THE PILOT WILL SECURE THE AFFECTED ENGINE AND TURN TOWARDS THE SHIP BETWEEN 70 TO 85 KNOTS AND AT A SAFE AUTOROTATION ALTITUDE. A SINGLE-ENGINE LANDING WILL BE MADE.

THE SHIP SHOULD SEE TAB D.

GEARBOX CHIP CAUTION LIGHT

A GEARBOX CHIP LIGHT INDICATES POSSIBLE METAL PARTICLES IN ONE OF THE GEARBOXES. THE PILOT WILL PROCEED TO THE SHIP AT 50 TO 80 KNOTS AND 50 TO 200 FEET (MAIN OR IAGB) OR 70 KNOTS AND SAFE AUTOROTATION ALTITUDE (INTERMEDIATE OR TAIL ROTOR GEARBOX).

THE SHIP SHOULD SEE TAB B.

IF DITCHING IS REQUIRED, THE SHIP SHOULD SEE TAB A.

FUEL PRESSURE OR FUEL BYPASS CAUTION LIGHT

THE PILOT WILL RETURN TO THE SHIP AT SAFE AUTOROTATION ALTITUDE DUE TO POSSIBLE FUEL STARVATION/CONTAMINATION AND DUAL-ENGINE FAILURE.

THE SHIP SHOULD SEE TAB D.

IF DITCHING IS REQUIRED, THE SHIP SHOULD SEE TAB A.

Figure 9-3. LAMPS Mk I Shipboard Emergency Procedures (Sheet 2 of 12)

ABNORMAL VIBRATION

THE PILOT WILL RETURN TO THE SHIP. IF CONTROL BECOMES MARGINAL, PILOT MAY ELECT TO DITCH THE HELICOPTER.

THE SHIP SHOULD SEE TAB C.

IF DITCHING IS REQUIRED, THE SHIP SHOULD SEE TAB A.

ERRATIC CONTROL INPUTS

THESE ARE USUALLY CAUSED BY A PROBLEM IN THE ASE OR HYDRAULIC SYSTEM. THE PILOT WILL PROBABLY MAKE AN INTENTIONAL ASE-OFF OR HYDRAULIC BOOST-OFF LANDING. IF THIS DOES NOT SOLVE THE PROBLEM, IT IS MECHANICAL AND THE PILOT MAY HAVE TO DITCH THE HELICOPTER.

THE SHIP SHOULD SEE TAB C.

IF DITCHING IS REQUIRED, THE SHIP SHOULD SEE TAB A.

LOSS OF HYDRAULIC BOOST

THE PILOT WILL ABORT THE MISSION AND RETURN TO THE SHIP. THE HELICOPTER CAN BE FLOWN WITHOUT BOOST, HOWEVER MANEUVERING IS EXTREMELY DIFFICULT.

THE SHIP SHOULD SEE TAB C.

THE FOLLOWING EMERGENCIES ARE OF A LESS CRITICAL NATURE AND THE SPECIFIC SHIPBOARD PROCEDURES ARE EXPLAINED FOR EACH. NO REFERENCE TO TABS A TO D IS NECESSARY.

LOSS OF ASE

AT NIGHT OR IN IFR CONDITIONS, THE PILOT WILL ABORT THE MISSION AND RETURN TO THE SHIP. DURING THE DAY, THE PILOT MAY OR MAY NOT ABORT DEPENDING ON MISSION REQUIREMENTS AND URGENCY.

IF THE MISSION IS ABORTED, THE SHIP SHOULD:

1. SET FLIGHT QUARTERS.

2. TURN TO FOXTROT CORPEN AND SET SPEED TO PROVIDE THE STEADIEST DECK POSSIBLE WITHIN THE EMERGENCY WIND ENVELOPE WHEN READY TO RECEIVE AIRCRAFT.

Figure 9-3. LAMPS Mk I Shipboard Emergency Procedures (Sheet 3 of 12)

LANDING GEAR FAILS TO LOWER

IF THE EMERGENCY SYSTEM FAILS TO LOWER THE GEAR, THE PILOT WILL REQUEST ASSISTANCE FROM THE SHIP'S DECK CREW. IF THE GEAR STILL CANNOT BE LOWERED, THE LANDING COULD BE MADE ON THE AUX FUEL TANKS.

THE SHIP SHOULD:

1. SET EMERGENCY FLIGHT QUARTERS.
2. TURN TO FOXTROT CORPEN TO PROVIDE THE MOST STEADY DECK POSSIBLE WHEN READY TO RECEIVE AIRCRAFT.
3. MATTRESSES WILL MOST LIKELY BE NEEDED IN ORDER TO MAKE THE LANDING AS STABLE AS POSSIBLE.

DATA LINK ANTENNA FAILS TO RETRACT

THIS IS A SERIOUS EMERGENCY SINCE THE ANTENNA HANGS BETWEEN THE LANDING GEAR UNDER THE AFT FUEL CELL.

THE SHIP SHOULD:

1. SET EMERGENCY FLIGHT QUARTERS.
2. TURN TO FOXTROT CORPEN TO PROVIDE THE MOST STEADY DECK POSSIBLE WHEN READY TO RECEIVE AIRCRAFT.
3. THE ANTENNA WILL EITHER BE MANUALLY RETRACTED OR THE ENTIRE UNIT WILL BE REMOVED BEFORE LANDING.

GENERATOR FAILURE

IF ONLY ONE GENERATOR HAS FAILED, THE OTHER WILL CARRY THE LOAD. AT NIGHT OR IFR, THE MISSION WILL BE ABORTED. IF BOTH GENERATORS FAIL, THE PILOT WILL SECURE NONESSENTIAL EQUIPMENT AND RETURN TO THE SHIP. ALTHOUGH PILOT WILL BE LIMITING UHF TRANSMISSIONS, SHIP MAY CONTINUE TO TRANSMIT WITHOUT CAUSING AN INCREASED DRAIN ON AIRCRAFT BATTERY. THE PILOT WILL NOT HAVE ASE OR A REMOTE ATTITUDE INDICATOR. THE BATTERY IS THE ONLY SOURCE OF POWER AND WHEN IT DRAINS, A TOTAL ELECTRICAL FAILURE WILL OCCUR. WITH ONLY ONE FAILED GENERATOR, THE SHIP CAN CONDUCT A NORMAL RECOVERY.

IF BOTH GENERATORS FAIL, THE SHIP SHOULD:

1. PROCEED TOWARDS THE HELICOPTER AT FLANK SPEED.
2. SET EMERGENCY FLIGHT QUARTERS.

Figure 9-3. LAMPS Mk I Shipboard Emergency Procedures (Sheet 4 of 12)

3. HOLD HELICOPTER ON RADAR.

4. IF AT NIGHT OR IN IFR, TRY AND LIGHT UP THE SHIP AS MUCH AS POSSIBLE (THIS IS A VERY SERIOUS EMERGENCY).

5. IF COMMUNICATIONS ARE LOST, ASSUME TOTAL ELECTRICAL FAILURE.

6. WHEN WITHIN 3 NAUTICAL MILES OF THE HELICOPTER, TURN TO FOXTROT CORPEN TO PROVIDE THE MOST STEADY DECK POSSIBLE.

7. IF THE HELICOPTER IS LOST FROM RADAR, ASSUME THAT IT HAS DITCHED AND SEE TAB A.

28 VOLT CONVERTER FAILURE

THE AIRCRAFT HAS LOST NORMAL DC POWER AND THE BATTERY IS NOW PROVIDING EMERGENCY DC POWER. WHEN THE BATTERY DRAINS, A TOTAL ELECTRICAL FAILURE MAY OCCUR. THE PILOT WILL SECURE ALL NONESSENTIAL EQUIPMENT AND RETURN TO THE SHIP.

THE SHIP SHOULD SEE GENERATOR FAILURE ABOVE.

HUNG MAD TOWED BODY

IF A SUITABLE BINGO FIELD IS NOT AVAILABLE, RECOVERY OF THE MAD TOWED BODY CAN BE ACHIEVED BY SEVERAL METHODS, SELECTION WILL DEPEND ON:

1. PREVAILING WEATHER.

2. DAY OR NIGHT.

3. AIRCRAFT FUEL STATE.

4. CABLE CUT FAILURE.

WARNING

RECOVERY OF A HUNG MAD BIRD WITH AN EXTENDED CABLE MAY REQUIRE A HIGH HOVER OVER THE SHIP WITH A SIGNIFICANT LOSS OF VISUAL REFERENCE. CONSIDERATION SHOULD BE GIVEN TO JETTISONING MAD BIRD ALONGSIDE SHIP, MARKING ITS POSITION WITH A SMOKE, IF POSSIBLE, TO AID IN RECOVERY BY SHIP/MOTOR WHALE BOAT.

Figure 9-3. LAMPS Mk I Shipboard Emergency Procedures (Sheet 5 of 12)

CAUTION

- THE TOWED BODY IS EXTREMELY SENSITIVE AND CAUTION SHOULD BE EXERCISED DURING ITS RECOVERY TO PRECLUDE DAMAGE.
- GROUNDING ROD SHALL BE USED TO GROUND MAD TOW CABLE BEFORE MAD TOWED BODY IS REMOVED.

LOST COMMUNICATIONS

THE ESSENTIAL ELEMENT IS PROMPT RECOGNITION OF A LOST COMMUNICATIONS SITUATION. LOST COMMUNICATIONS WILL BE ASSUMED WHEN:

1. A MODE III CODE 7600 IFF RETURN IS DETECTED OR APPROPRIATE MODE AMPLIFIES THE SITUATION.
2. A RADAR TARGET TRACK IS DETECTED MAKING 120° TURNS EVERY 2 MINUTES.
3. A RADIO COMMUNICATIONS CHECK OR EXPECTED REPORT IS 15 MINUTES OVERDUE.

CAUTION

TWO-WAY COMMUNICATIONS ARE REQUIRED TO SATISFY THE REQUIREMENTS FOR PERIODIC COMMUNICATIONS CHECKS.

4. THE SHIP AND HELICOPTER DO NOT MAKE CONTACT AT THE BRIEFED RECOVERY TIME. THE SHIP SHALL IMMEDIATELY:

   (A) RADIATE TACAN.

   (B) BEGIN RADAR/IFF SEARCH.

   (C) ATTEMPT UHF COMMUNICATIONS.

   (D) TURN ON UHF HOMER.

   (E) CONDUCT ESM SEARCH FOR LN-66.

Figure 9-3. LAMPS Mk I Shipboard Emergency Procedures (Sheet 6 of 12)

(F) MAN FLIGHT QUARTERS.

(G) AT NIGHT:

(1) TURN ON MASTHEAD GRIMES LIGHT.

(2) IF ALL ATTEMPTS TO CONTACT THE HELICOPTER FAIL, THE USE OF ST SHELLS FIRED AT MINIMUM RANGE SHOULD BE CONSIDERED.

IN THE EVENT OF LOST COMMUNICATIONS, REFER TO ASW TACAID FOR SHIP AND HELICOPTER DESIRED REACTIONS.

SMOKELIGHT APPROACH

PROMPT RECOGNITION OF DETERIORATING WEATHER CONDITIONS AND VISIBILITY IS CRITICAL. BEFORE RESORTING TO A SMOKELIGHT APPROACH, CONSIDERATION SHOULD BE GIVEN TO THE FOLLOWING:

1. MANEUVERING THE SHIP INTO AN AREA OF BETTER VISIBILITY.

2. VECTORING THE AIRCRAFT TO ANOTHER AVAILABLE SHIP WHERE VISIBILITY IS BETTER.

3. VECTORING THE AIRCRAFT TO A SUITABLE ALTERNATE AIRFIELD.

IF THE WEATHER AND VISIBILITY ARE DETERIORATING, THE SHIP SHOULD NOTIFY THE AIRCRAFT AS SOON AS POSSIBLE SO THAT THE AIRCRAFT COMMANDER CAN DETERMINE:

1. IF HE SHOULD RETURN EARLY TO HOMEPLATE.

2. WHETHER TIME AND FUEL EXISTS TO BINGO TO A SUITABLE ALTERNATE.

3. IF HE SHOULD MAKE PREPARATIONS FOR AN ELVA.

4. IF HE SHOULD PREPARE FOR A SMOKELIGHT APPROACH.

IF THE SMOKELIGHT APPROACH OPTION BECOMES NECESSARY, SHIP PERSONNEL SHOULD REFER TO TAB E.

Figure 9-3. LAMPS Mk I Shipboard Emergency Procedures (Sheet 7 of 12)

WHEN AN IN-FLIGHT EMERGENCY IS DECLARED A PILOT, IF AVAILABLE, SHOULD IMMEDIATELY BE CALLED TO CIC.

TAB A

1. PLOT THE AIRCRAFT POSITION.
2. TURN TOWARD THE CRASH SITE, INCREASE TO BEST SPEED IF NECESSARY.
3. INSURE AIR DISTRESS FREQUENCY, 243.0 MHz UHF (GUARD), IS BEING MONITORED.
4. NOTIFY OTHER UNITS STATING SITUATION AND INTENTIONS.
5. MAN LIFEBOAT.
6. BRIEF AND STATION ADDITIONAL LOOKOUTS.
7. COLLECT ALL DEBRIS AT SCENE OF WATER ENTRY.

Figure 9-3. LAMPS Mk I Shipboard Emergency Procedures (Sheet 8 of 12)

WHEN AN IN-FLIGHT EMERGENCY IS DECLARED A PILOT, IF AVAILABLE, SHOULD IMMEDIATELY BE CALLED TO CIC.

TAB B

1. HEAD TOWARD THE HELICOPTER AT BEST SPEED.

2. SET EMERGENCY FLIGHT QUARTERS.

3. WHEN WITHIN 3 NAUTICAL MILES, TURN TO FOXTROT CORPEN.

Figure 9-3. LAMPS Mk I Shipboard Emergency Procedures (Sheet 9 of 12)

WHEN AN IN-FLIGHT EMERGENCY IS DECLARED A PILOT, IF AVAILABLE, SHOULD IMMEDIATELY BE CALLED TO CIC.

TAB C

1. HEAD TOWARD THE HELICOPTER AT BEST SPEED.

2. SET EMERGENCY FLIGHT QUARTERS.

3. WHEN WITHIN 3 NAUTICAL MILES, TURN TO FOXTROT CORPEN AND SET SPEED TO PROVIDE THE MOST STEADY DECK POSSIBLE WITHIN THE EMERGENCY WIND ENVELOPE.

Figure 9-3. LAMPS Mk I Shipboard Emergency Procedures (Sheet 10 of 12)

WHEN AN IN-FLIGHT EMERGENCY IS DECLARED A PILOT, IF AVAILABLE, SHOULD IMMEDIATELY BE CALLED TO CIC.

TAB D

1. HEAD TOWARD THE HELICOPTER AT BEST SPEED.
2. SET EMERGENCY FLIGHT QUARTERS.
3. WHEN WITHIN 3 NAUTICAL MILES, TURN TO FOXTROT CORPEN AND SET SPEED FOR OPTIMUM WINDS FOR A SINGLE ENGINE LANDING.

Figure 9-3. LAMPS Mk I Shipboard Emergency Procedures (Sheet 11 of 12)

WHEN AN IN-FLIGHT EMERGENCY IS DECLARED A PILOT, IF AVAILABLE, SHOULD IMMEDIATELY BE CALLED TO CIC.

TAB E

1. PLACE THE RELATIVE/TRUE WINDS WITHIN A ±15° OF THE BRC.

2. VECTOR THE AIRCRAFT TO A POINT 2 NAUTICAL MILES ASTERN (180° RELATIVE BEARING) HEADING ON BRC. ASAC/ATACO SHALL RECOMMEND THAT THE AIRCREW ENGAGE RADAR ALTITUDE HOLD.

3. RECOVERY SHIP SHALL DROP SMOKE/MATRIX LIGHTS EVERY 15 SECONDS OR AT OTHER PRE-PLANNED INTERVAL AND COMMUNICATE TO THE PILOT THE INTERVAL AND THE NUMBER OF SMOKELIGHTS IN THE WATER.

Figure 9-3. LAMPS Mk I Shipboard Emergency Procedures (Sheet 12 of 12)

Week 1 Day 1		Hours
Event 1	Recover helicopter.	1.0
	a. This evolution shall be proceeded by briefs to all flight deck and tower personnel. Helicopter will shut down upon recovery.	
	b. Walk through hot refuel drill (dry).	
Event 2	Ship/detachment familiarization.	
	a. OOD/CICWO/LAMPS flight quarter (FQ) watch stander briefs.	1.0
	b. HCO/flight deck crew briefs.	1.0
	c. Fire/crash crew briefs.	1.0
		1.0
	d. Walk through aircraft tiedown procedures and crash-on-deck drill.	2.0
	e. Assemble corpsmen, pilots, aircrew and fire party.	1.0
	(1) Assemble SAR utility litter	
	(2) Load a crew member into SAR utility litter	
	(3) Configure aircraft cabin to receive utility litter	
	(4) Attach utility litter to rescue hoist (do not hoist crewmember)	
	(5) Load litter into aircraft cabin and secure for flight	
	(6) Remove and stow utility litter.	
Event 3	Helicopter deck movement (day/night).	

Day 1 Notes:

1. All briefs will include emergency procedures that are associated with the aviation/ship flight interface, i.e. bridge-CIC/control tower/flight deck. They should be attended by ALL those involved with flight operations.

2. Day 1 drills are compatible with at-anchor training and may be conducted as such.

Figure 9-4. Typical LAMPS Mk I At-Sea Workup Schedule (Sheet 1 of 7)

		Hours
Week 1 Day 2 Event 1	(AM) Ship/pilot flight deck training 1 cycle.	2.0

a. Pilot deck landing practice.

b. LSE training.

c. Flight deck crew training.

d. Bridge/CIC watch standers observe flight operations from tower (start, rotor engage, launch, and cyclic flight operations).

e. Actual hot refuel after final landing (Note 1).

f. After shutdown announced crash drill (CO/XO/WEPS/OODs observe).

Event 2	(PM) Ship/pilot flight deck training 1 cycle (Note 2).	2.0

a. Pilot deck landing practice.

b. LSE training for detachment and ship personnel.

c. Flight deck crew training.

Event 3	(Night) Ship/pilot flight deck training 1 cycle.	2.0

a. Pilot deck landing practice.

b. LSE training for detachment and ship personnel.

c. Flight deck crew training.

d. Actual hot refuel after final landing.

e. At completion of hot refuel (Note 3) announced crash drill.

Day 2 Notes:

1. Subsequent hot refuel as necessary.

2. Makeup period for watch stander observations.

3. Subsequent crash drills will be unannounced.

Figure 9-4. Typical LAMPS Mk I At-Sea Workup Schedule (Sheet 2 of 7)

Hours

Week 1
Day 3
Event 1 (AM) Ship/pilot training 1 cycle. 2.0

a. Tacan approaches.

b. Ship-controlled approaches/ELVA.

c. Day ditching drill.

d. Practice smokelight approach.

Event 2 (PM) Ship/pilot training 1 cycle. 2.0

a. Tacan approaches.

b. Ship-controlled approaches/ELVA.

c. Self-controlled approaches/ELVA.

d. Practice smokelight approach.

Event 3 (Night) Ship/pilot training 1 cycle. 2.0

a. Makeup pilot deck landing practice.

b. Approaches (tacan, ship, self-controlled, and ELVA).

c. Night ditching drill.

Day 3 Notes:

1. All OOD/JOOD should observe various approaches from CIC during the week 1 workup.

2. On day 3 an unannounced emergency launch and landing will be conducted from stood down flight quarters. (The unannounced launch should, preferably, commence with the aircraft folded and in the hangar and will be terminated with the request to start engines.)

Week 1
Day 4
Event 1 (AM) Ship/pilot training 1 cycle. 2.0

a. HIFR hookup and pump fuel.

b. Practice passenger transfer, Stokes litter winching, and VERTREP.

Figure 9-4. Typical LAMPS Mk I At-Sea Workup Schedule (Sheet 3 of 7)

		Hours
	c. Miscellaneous pilot training.	
Event 2	(PM) Ship/pilot flight training 1 cycle.	2.0
	a. Basic ASST mission. Simulate flow of information in CIC.	
Event 3	(Night) Ship/pilot training 1 cycle.	2.0
	a. Basic ASW mission. Simulate flow of information in CIC.	

Day 4 Notes:

1. The following unannounced drills will be conducted on day 4:

   a. ELVA.

   b. Day ditching, to include getting boat underway.

   c. Night ship lost power drill.

Week 1		
Day 5		
Event 1	(AM) Ship/pilot training double cycle.	4.0
	a. Rescue demonstration/makeup period.	
Event 2	(PM) Return to port.	

Week 1 Notes:

1. The satisfactory completion of a workup shall be dependent upon the achievement of the following drills and briefs:

   a. All pilots should be day/night qualified by the end of Week 1. As a minimum, both HACS shall be day/night qualified.

   b. Each ASAC (1 ASAC per watch section)/pilot shall have satisfactorily controlled/completed:

      (1) 2 tacan approaches.

      (2) 2 ship controlled approaches.

      (3) 1 ELVA (1 per aircrew).

      (4) 1 ditching drill (1 per aircrew).

Figure 9-4. Typical LAMPS Mk I At-Sea Workup Schedule (Sheet 4 of 7)

(5) 1 lost plane drill (1 per aircrew).

(6) 2 self-controlled approaches per AW.

(7) 1 practice smokelight approach (1 per aircrew).

c. The following unannounced drills (after day 2) shall have been satisfactorily completed:

(1) Crash-on-deck/fire.

(2) In-flight/emergency flight quarters.

(3) Lost plane.

(4) Ditching.

(5) Guard check.

(6) Hangar fire/fuel spill.

d. Minimum 1 torpedo load with ship's practice shape port or starboard (both ship and detachment personnel).

e. All HCO/LSE (both ship and detachment personnel) day/night current.

f. Practice rescue by SAR swimmer (optional).

		Hours
Week 2		
Day 1		
Event 1	(AM) Team training.	2.0
	a. Warmup touch-and-go landings.	
	b. LSE training.	
	c. Exercise crash on deck or ditching away from ship.	
Event 2	(Dusk) Pilot training.	1.0
	Warmup dusk/night landings.	2.0

Figure 9-4. Typical LAMPS Mk I At-Sea Workup Schedule (Sheet 5 of 7)

Event 3	(Night) Pilot training. a. Simulated ASW/ASST. b. HIFR approaches. c. Touch-and-go landings.	

		Hours
Week 2 Day 2	Submarine services.	
Event 1	(AM) Basic ASW familiarization.	2.0 (See FXP-1)
Event 2	(PM) Basic ASW familiarization.	2.0
Event 3	(Night) MAD/active sonobuoy exercises.	2.0 (See FXP-1)

Week 2 Day 3	Submarine services.	
Event 1	(AM) MAD/active sonobuoy exercises.	2.0 (See FXP-1)
Event 2	(PM) CZ operations.	2.0 (See FXP-1)
Event 3	(Night) CZ operations.	2.0 (See FXP-1)

Week 2 Day 4		
Event 1	(AM) Spare for ASW exercises with refueling if submarine services are available.	2.0
Event 2	(PM) ASST exercises — Fleet Electronic Warfare Support Group (FEWSG) services required.	2.0
Event 3	(Night) ASST exercises — FEWSG services required.	2.0

Figure 9-4. Typical LAMPS Mk I At-Sea Workup Schedule (Sheet 6 of 7)

Week 2		
Day 5		
Event 1	Review workup period and helicopter fly-off in AM.	
Event 2	En route; disembark detachment and workup personnel on arrival.	
Planned Flying:		Hours
	Day touch-and-go/team training.	6.0
	Day simulated ASW/ASST.	9.5
	Day ASW with submarine services.	8.0
	Day ASST with submarine services.	1.0
	Day ASST with FEWSG.	2.0
	TOTAL day.	26.5
	Dusk/night touch-and-go/team training.	5.0
	Night simulated ASW/ASST.	4.0
	Night ASW with submarine services.	4.0
	Night ASST with FEWSG.	2.0
	TOTAL dusk/night.	19.0
	TOTAL workup flight time.	45.5
	TOTAL ASW/ASST exercises.	17.0

Notes:

1. Services required by this schedule will be requested at the CINC's Quarterly Scheduling Conference by the appropriate type commander.
2. The PHOTEX (see FXP-1) will be accomplished during the first week of workup when a target is available.
3. A TORPEX (see FXP-1) will be conducted during the attack phase of one of the "I" ASW exercises.
4. If submarine services are available for more than 2 days, "I" ASW exercises as described in FXP-1 will be conducted to perfect tactical deployment of specific sensors in which the crews feel they need more training.
5. The detachment is responsible for training the ship's flight deck crew in chock and chain handling and aircraft movement. Ample opportunity shall be provided for the ship's LSEs to maintain proficiency.
6. One dummy torpedo for loading drills and one Mk 46 exercise torpedo shall be provided for the workup.

Figure 9-4. Typical LAMPS Mk I At-Sea Workup Schedule (Sheet 7 of 7)

CHAPTER 10

Light Airborne Multipurpose System (LAMPS Mk III) Operations

Note

A briefing sheet and all tabular material are located at the end of the chapter.

10.1 SH-60B HELICOPTER

LAMPS Mk III is an interactive, computer-assisted, ship-aircraft weapons system in which the day-night, all-weather, SH-60B helicopter extends the detection and strike capability of the surface combatant. The primary missions of the LAMPS Mk III are USW, ASST, and SUW for suitably equipped aircraft. The SH-60B helicopter is a derivative of the U.S. Army UH-60A helicopter with improved engines, increased capacity fuel tanks, reduced footprint, Mk III mission avionics, and airborne RAST system.

The airborne LAMPS Mk III avionics equipment includes a 160-nm range search radar with integral IFF interrogator capability, programmable ESM equipment, computer-assisted passive and active acoustic processor, computer imagery tactical display, MAD, and automatic clear or secure communications relay equipment. The LAMPS Mk III avionics are fully integrated into the ship's combat system through a two-way, directional, secure data link providing the ship extended real-time command and control. The SH-60B helicopter carries active and passive sonobuoys and can attack submarine targets with the Mk 46 or Mk 50 (Block I upgrade aircraft) torpedoes.

Effective with aircraft 162349 and subsequent, LAMPS Mk III are equipped to employ the AGM-119B Penguin (Mk 2 Mod 7) ASM. Additional capabilities being integrated include the AGM-114B/K Hellfire missile, which includes the AAS-44 FLIR with laser designator. These LAMPS Mk III aircraft are capable of employment as SUW platforms.

In a USW mission, the SH-60B helicopter is launched in response to a contact generated by own-ship sensors or external sensors. LAMPS Mk III is designed to redetect, classify, localize, and attack hostile submarine targets at distances in excess of 100 nm. In an ASST mission, the SH-60B helicopter provides remote radar and ES sensors that can be controlled by, and interfaced through, the ship's radar and ES systems. Thus, the effective surveillance, detection, classification, and targeting ranges of the ship are greatly extended. Penguin missile equipped aircraft may conduct independent or coordinated attack dependent upon the threat and tactical scenario. Additionally, the SH-60B helicopter can be used for SAR, MEDEVAC, personnel transfer, surveillance and reconnaissance, damage assessment, gunfire spotting, VERTREP, and OTH plain or secure UHF communications relay.

The SH-60B helicopter can remain airborne for approximately 3.9 hours with a full USW configuration load of 2 torpedoes and 25 A-size sonobuoys. The mission length is predicated on having a 0.5-hour fuel reserve, operable airborne and ship RAST equipment, and a sea state that will allow recovery within the specified wind/ship dynamics envelope. The dash speed is 150 knots with a 130-knot normal cruising speed. The aircraft is capable of extending its on-station time by HIFR from a forward-deployed surface unit when operational requirements dictate. The maximum theoretical radius of action (maximum distance the SH-60B helicopter can be expected to prosecute a USW contact or perform the ASST mission) is approximately 120 nm because of the maximum data-link range at the current aircraft operational altitude limit of 13,000 feet density altitude, or 10,000 feet MSL without supplemental oxygen. The radius of action can be extended with the helicopter in the autonomous or standalone mode. There is a significant loss of sensor data processing and display options and capabilities available in the aircraft in the independent mode. The actual range at which reliable communication can be maintained depends on data-link propagation conditions. For further details on the SH-60B helicopter, refer to the SH-60B NATOPS Flight Manual.

10.2 AVIATION DEPARTMENT

In ships that have a LAMPS detachment on board, an aviation department will be organized. The OIC of the detachment will be the department head and be designated the aviation officer. LAMPS detachments are formed and trained at the parent squadron. The detachment OIC assumes the responsibilities of reporting custodian for the detachment aircraft and makes all required aircraft accounting reports. The aviation officer is also responsible to the parent squadron commanding officer for numerous aviation details including NATOPS, safety, updating of maintenance procedures, funding reports, and training. Therefore, it is essential that strong lines of communication exist between the aviation officer and the parent squadron commanding officer. The aviation officer reports to the squadron commanding officer through the ship's commanding officer. The parent command's commanding officer communicates with the OIC through the ship's commanding officer on official matters.

Because of the often irregular working hours of an embarked maintenance crew, it is highly desirable that the aviation department be berthed together in an area easily accessible to the hangar and flight deck facilities. Hangar facilities on all ships that have a LAMPS detachment are limited. Consequently, stowage of gear not directly associated with the LAMPS mission is discouraged when the detachment is embarked. Office space should be provided to the aviation department.

10.3 IN-PORT MAINTENANCE AND TRAINING

When duration of port visits warrant, relocating the detachment to a nearby air facility will, in nearly all instances, offer the crew facilities to meet flight training requirements and perform scheduled maintenance. In some cases the crew will be able to commute to the air facility daily and remain berthed on board the ship. In many cases where distance prohibits this, the ship should prepare TAD orders. The aviation officer will be responsible for preparing TANGO/TEMDU requests to the appropriate authority, if necessary, and will submit necessary change of location reports.

10.4 HELICOPTER FIRE PARTY

Refer to paragraph 2.5.

10.5 AIR CONTROL

The primary operating mode of the LAMPS Mk III weapon system is in ship control. The ship-based ATACO, a graduate of the formal LAMPS Mk III operations course, functions as mission coordinator. The ATACO is assisted by the REMRO, who has shipboard control of the aircraft radar; the ASO, assigned the responsibility of acoustic sonar observation and analysis of sonobuoy returns; and the ESMO, who operates and analyzes the ES equipment and data remotely via the two-way data link. The ATACO must be capable of making knowledgeable, expeditious tactical decisions and is the interface between the LAMPS Mk III and other shipboard weapons systems. It is essential that only the most well-trained and experienced operators be placed in this position.

The ATACO uses the tactical picture and data presented on his scope to plan and position fly-to points for the pilot, select which sonobuoys are to be deployed, and launch the sonobuoys, all via remote control through the data link. During the ASST mission, helicopter radar and ES data are remotely controlled by and displayed to the ATACO for analysis and further integration into the ship's fire control system.

The two-way data link system incorporates automatic aircraft tracking. Since the position of the helicopter is continuously updated and presented to the ATACO while in data link contact, the ship's radar is not required for helicopter flight following. EMCON conditions permitting, ship's radar flight following and air traffic separation advisories are desired from the ship's radar operator, relayed through the ATACO or REMRO on the data link, for additional flight safety.

The SH-60B is capable of performing all necessary data collection and analysis functions required to complete a USW or ASST mission in the independent (standalone/helicopter control) mode. In this mode of operation, the ATO performs the functions of the ATACO, assisted by the SO, who is responsible for the operation of the acoustic and nonacoustic sensors carried by the aircraft and interpretation and analysis of the data. The time for resolution of a USW or ASST problem to attack criteria or identification/targeting may increase in the independent mode because of the significant loss of sensor data processing and display option capabilities available.

Operation in the independent mode is usually the result of loss of data link contact because of aircraft descent for fine localization/attack or EMCON conditions. Therefore, radar contact may not be possible. While the helicopter is operating in the independent mode, EMCON conditions permitting and radar contact possible, flight following should be provided by a qualified ASTAC or an AIC. Traffic separation advisories should be made to the pilot over the UHF radio on the assigned tactical frequency.

The ship's combat systems officer is responsible for the mission briefing and debriefing. A complete and accurate briefing sheet (see NWP 55-2-SH60B/LAMPS MK III Tactical Manual brief sheet) shall be provided to the ATACO and ATO prior to each mission. Debriefings shall be conducted immediately after each mission to collect all logs and additional information to make an analysis of the flight.

10.6 SHIPBOARD OPERATING PROCEDURES

10.6.1 General. Operating procedures will be standardized and in accordance with Chapter 4. The information contained here is directed primarily at operations from a RAST-equipped air-capable ship. Operating limitations are depicted in the SH-60B NATOPS Flight Manual. For single-ship LAMPS operations in a peacetime environment, sea states normally will inhibit flight operations before cloud base and visibility. LAMPS flight operations should be curtailed when the ship's ability to rescue ditched aircrew becomes degraded. Figure 10-1 provides ship maneuvering restrictions during flight operations for the LAMPS Mk III system. Figure 10-2 shows a typical sequence for flight operations.

The LAMPS Mk III shipboard communication system incorporates the FDSSS/BIDS at the HCO and LSO stations. The system provides for a positive indication of operational requests (engage, launch, recover, etc.) and positive indication of OOD responses (YES/NO) through illuminated capsules on the bridge, CIC, HCO, and LSO station. The system provides direct communications between the flight deck and bridge without unnecessary communications on the 1JG circuit. The system is designed to provide the OOD with continuous flight deck operation status. When the operation is completed and the associated ship maneuvering restrictions are no longer required, the LSO or HCO will place the request switch on his console to OFF. This will extinguish all capsule lights on the BIDs, providing positive indication to the OOD that the ship is free to maneuver. The utilization of BIDS is necessary during RAST flight operations because the FDSSS lights have different meanings during RAST launch and recovery (see Figure 10-3).

CAUTION

Combined wave and swell effect can result in seawater over the flight deck of FFG-7 Class ships resulting in helicopter damage. Additionally, the wave action created by the Venturi effect between UNREP ships can cause rotor system damage.

10.6.2 Flight/Hangar Deck Procedures. Movement of the helicopter into/out of the hangar is accomplished by the LSO or a traverse-qualified member of the detachment using the traverse function of the RAST system. Movement of the helicopter will not be performed without prior approval of the OOD. Six men are required for the straightening and traversing operations:

1. FDD
2. LSO
3. Brakerider
4. Two chock/chainmen
5. Power cable tender.

The FDD is responsible to the LSO for the safe movement of the helicopter on the flight deck. He shall ensure that all equipment in the hangar and on the flight deck is properly stowed and clear of the aircraft. His instructions shall be followed explicitly and acknowledged.

CAUTION

The FDD shall ensure that a thorough FOD check is completed on the track slot and ensure the RAST cable reeling machine and pulley are free to turn prior to each traversing evolution.

Note

The FDD is not desired or required on the flight deck during LAMPS Mk III SH-60B RAST landings and takeoffs.

The LSO is responsible for the safe movement of the helicopter in the environment of the flight deck/hangar. All aircraft movement will occur under direct vocal control of the FDD. If the LSO has any doubt concerning the director's instructions, or if constant voice communications are lost with the FDD, the aircraft movement shall be stopped until the question has been resolved or communications are restored.

All additional personnel will remain clear of the aircraft until straightening and traversing have been completed.

WARNING

- Under certain conditions in FFG-7 Class ships, a radio frequency (RF) burn hazard to personnel can exist on the exterior of the SH-60B aircraft and arcing may occur at the RAST RSD because of HF radiation from nearby whip antennas. When performing helicopter maintenance on the flight deck or with the helicopter partially in the hangar or when traversing the aircraft while secured in the RSD, restrict power output on the HF whip antennas (designated 2-3 and 2-4) to 250 watts and forward whip antenna (designated 2-2) to 500 watts at certain frequencies below 10 MHz.
- During traverse, certain combinations of pitch and roll may result in the tailprobe unseating from track slot. This may result in uncontrolled aircraft movement. This condition is aggravated at aircraft low-fuel states because of raised center of gravity.

CAUTION

During heavy seas on certain classes of ships, the potential exists for the tail rotor to impact on the hangar door or catwalk because of aircraft roll (in addition to the ship's roll) as the aircraft is traversed through the hangar door. On FFG-7 Class ships, impact may occur with as little as 10° of ship's roll. Extreme caution and close coordination must be exercised by the FDD and LSO to prevent damage to the aircraft.

The following procedures should be applied for all traversing evolutions:

1. Ensure aircraft is folded in accordance with SH-60B NATOPS Flight Manual.
2. Request clearance from bridge via BIDS and request optimum course and speed to produce minimum ship roll. Ship speed should not be less than 6 knots in order to prevent fin stabilizers from becoming ineffective. If any aspects of ship motion are to a degree that might cause injury to personnel or damage to the aircraft, traversing should cease and the aircraft should be chained and chocked.

10.6.3 Hangar Operations. LAMPS avionics operations for either training or maintenance evolutions may be continuously conducted in the hangar in temperatures below 41 °C. The nose, cockpit, and cabin doors should be open when in the hangar. Hearing protection is required in the hangar when the avionics systems are operating, even when acoustic mufflers are installed in the aircraft air exhaust ports.

10.6.4 Blade Folding/Spreading. Main rotor blade spread/fold operations will be performed only after prior approval of the OOD. The spread or fold operation can be performed using the helicopter's APU or ship's deck power. The maximum nonturbulent wind for folding/spreading is limited to 45 knots from any direction. The tail pylon fold/spread operation is performed manually by air detachment personnel. Tail pylon fold/spread operations are limited to a maximum windspeed of 45 knots.

10.6.5 Launch and Recovery Procedures

10.6.5.1 Starting the Helicopter. The APU is used for preflight systems checks and aircraft engine starts. Flight quarters are not normally required for APU start or operation. Flight deck personnel shall man a fire bottle during the APU start sequence. Upon notification of the OOD, the LSO will indicate to the FDD that he has permission to start the APU. The FDD shall ensure that the fire bottle is manned and ready and the flight deck is clear of unnecessary personnel before signaling to the pilot to start the APU.

10.6.5.2 Engine Start. The main engines will not normally be started until flight quarters are called and the fire party reports "Manned and ready." The HCO is responsible for the fire party and will report to the LSO when flight quarters are set. Starting the main engines shall be accomplished only upon signal from the FDD and under positive control of the LSO. Flight deck personnel shall man fire bottles of adequate size to handle aircraft engine fires.

10.6.5.3 Rotor Engagement. The LSO shall notify the bridge when aircraft engines are started and request permission to engage rotors by illuminating the ROTOR capsule on the bridge information display. Upon receiving clearance from the bridge by the illumination of the YES capsule on the bridge information display, the LSO shall ensure the flight deck is clear of all unauthorized personnel, ensure the hangar door is fully closed, and ensure relative wind is within limits before signaling the FDD to engage rotors. The LSO informs the bridge upon completion of engagement by extinguishing the bridge information display capsules.

10.7 EMERGENCY MANUAL DECK HANDLING

In an emergency, the aircraft can be moved in/out of the hangar and onto the flight deck with an inoperative or degraded RAST system.

WARNING

With the exception of inoperative tail guide system, the procedures described are to be used only when moving the aircraft is required by emergency or operational necessity. Danger of the aircraft sustaining damage by remaining on the flight deck, or the necessity of clearing the flight deck for other operations, must be weighed against the risk of loss of aircraft or personnel.

WARNING

The procedures listed are for emergency movement to the SH-60B. Failure to comply with the procedures listed or attempting to move the aircraft during periods of excessive ship's movement may result in loss of aircraft and/or personnel. Manual movement of the aircraft increases the risk of injury to flight deck personnel. Personnel are prohibited from standing between the port main mount and port ordnance stubwing during aircraft movement. Ensure all personnel remain clear of main landing gear at all times.

Note

The procedures listed assume the helicopter has performed a non-RAST landing on the ship. In the event that the helicopter has recovered in the RSD prior to RAST system failure, proceed to paragraph 10.7.3 as appropriate.

10.7.1 Manual Deck Handling Pre-checks

1. Chock and chain aircraft on deck.
2. Secure aircraft systems and conduct applicable shutdown checklists.
3. Safety nets shall be down.
4. Do not fuel the aircraft. This facilitates straightening the aircraft by reducing the load on the tailwheel.
5. Do not fold the main rotor blades or tail pylon. This increases maneuvering room for the SBO and facilitates straightening the aircraft by reducing the load on the tailwheel.
6. The radome may be removed if necessary to provide clearance.

Note

In the event that the helicopter struts are overly compressed because of damage or leakage, it is advisable to either service the struts to the appropriate level or remove the APS-124 radar antenna prior to moving the RSD under the aircraft.

7. Remove the ATO's and pilot's windows. This will provide additional aircraft pushpoints and facilitate aircraft movement.
8. Lower the main RAST probe to within 2 inches of the flight deck to provide visual cues for both SBOs and safety observers.
9. Ensure the tail probe is fully retracted.
10. Ensure the tailwheel is unlocked.
11. Attach the steering bar assembly (P/N 70700-77112-041) to tail landing gear.

12. Ensure that the following personnel are available and positions manned prior to any helicopter movement:

    a. FDD

    b. LSO

    c. Brakerider

    d. Two SBOs, one on each side of the aircraft

    e. Two safety observers, one per side

    f. Chock runners, one per side

    g. Aircraft movers, 10 to 14 personnel

        (1) Pullers using TD-1A tiedown chains.

            (a) Main landing gear tiedown points, one person per chain (two personnel).

            (b) Aft tiedown points, one person per chain (two personnel).

            (c) Forward high point tiedown, one person per chain (two personnel)

        (2) Aircraft pushers (4 to 8 personnel).

WARNING

Personnel shall not man pushpoints that lie in the path of aircraft landing gear (e.g., cockpit pushpoints shall only be manned when pushing aft).

13. Determine over which RAST track the helicopter is to be positioned. Open and pin the appropriate hangar door (remove deck bridge for CG and DD).

14. Ensure that the RSD is clear of the area in which aircraft movement is to occur.

15 Obtain permission from the bridge to move the helicopter and RSD when required. Ensure the ship is on a constant course and speed with ship's pitch 3° or less and roll 5° or less, measured at the LSO station.

16. Position aircraft pullers and pushers, SBOs and brakerider. Aircraft pushpoints include door and window frames, aircraft cabin door frame, nose frame, ordnance stub wings, tail pylon at rib junctions and other reinforced fuselage areas.

CAUTION

Do not push or pull on aircraft stabilator assembly, rotor blades, MAD pylon, hoist assembly, HF antennas, ES antennas, float bag covers, or unreinforced fuselage areas.

17. Remove aircraft high point tiedowns and tail tiedowns. Attach TD-1A chains to the tiedown points listed for aircraft movement.

Note

Ensure that chock and chain personnel are continuously prepared to immediately secure the aircraft in the event aircraft/ship movement becomes excessive.

18. Remove the chocks and chains and release the brakes.

19. Pull/push and steer the aircraft as necessary to get the main RAST probe within 19 inches of the RSD track and the mainmounts aligned sufficiently with track to allow the RSD to pass between them. Positioning of the main probe over the RAST track will greatly facilitate manual straightening. If the tail guide system is inoperative, centering the main probe over the RAST track should be a primary objective.

Note

The initial movement of the helicopter may take the tailwheel across the RAST track over which the helicopter is to be positioned. Referencing the main RAST probe is the best method of determining acceptable aircraft position and can easily be seen by all SBOs and safety observers.

20. Chock and chain the aircraft.

21. Raise the main RAST probe.

22. Continue with appropriate emergency straightening/ traversing handling checklists.

10.7.2 Emergency SH-60B Handling Procedures With Operable Recovery Assist, Securing, and Traversing System

1. Complete SH-60B manual deck handling pre-checks.

2. Ensure sufficient clearance for the RSD exists.

3. Ensure the RAST main probe is retracted.

4. Complete the LSO console pre-operational and traverse checks.

5. Remove the RSD safety bar and open the RSD beams.

6. Under guidance of the FDD, traverse the RSD under the aircraft to a position centered under the RAST main probe.

7. Lower the main probe into the RSD and close the RSD beams.

8. Proceed with normal SH-60B straightening and traversing checklists.

9. Fuel and fold the aircraft for hangaring.

10.7.3 Emergency SH-60B Handling Procedures With Degraded Recovery Assist, Securing, and Traversing System

Note

If the traversing pump is inoperable because of high leakage and there is no other problem with the traversing subsystem, the RSD can be traversed using the tailguide pump by putting the system in fast traverse or by manually activating solenoid valve 2A1L7 (see RAST IPB Figure 37, item 176) in the RAST machinery room. The speed will be as if the system were in slow traverse, and the tailguide system cannot be used simultaneously.

1. Complete SH-60B manual deck handling pre-checks.

2. Ensure sufficient clearance for the RSD exists.

3. Ensure the RAST main probe is retracted.

4. Release friction on RSD traverse system in accordance with the release of traverse system hydraulic lock checklist.

5. Remove the RSD safety bar and open the RSD beams.

6. Utilizing block and tackle, come-along, or air hoist as available, attach the intended RSD movement equipment to the RSD and appropriate deck fixtures. Move the RSD under the RAST probe.

CAUTION

Attach forward and aft tow cables to the RSD by wrapping them around the forward restraint and aft tow bar assemblies (see RAST IPB Figure 74, items 191 and 179) under the RSD frame. When doing this, ship's personnel must avoid wrapping the tow cable around the outside of the lubrication tubing next to the forward restraint assembly. These cables must be a maximum of 7/16 inch in diameter and configured to handle a 10,000 pound tow force. Any block and tackle, come-along or winch utilized shall be rated for a 10,000-pound load. Do not utilize straps or cables wrapped around the front of the "capture area" opening as this can damage the cam brakes.

7. Lower the RAST main probe into the RSD and close the RSD beams.

8. Continue with the aircraft straightening procedures. RSD movement is accomplished through utilization of the appropriate emergency movement equipment. Tail guiding can be accomplished using the TGW cables if operative.

WARNING

All personnel shall remain clear of the tail section when straightening the aircraft to ensure adequate clearance from tail guide cables.

9. Fuel and fold the aircraft for hangaring.

10.7.4 Emergency SH-60B Handling Procedures With Manually Operated Rapid Securing Device

1. Complete SH-60B manual deck handling pre-checks.

c. Two SBOs, one on each side of the aircraft

d. Two safety observers, one per side

e. Chock runners, one per side

f. Aircraft movers, 10 to 14 personnel:

(1) Pullers using TD-1A tiedown chains.

(a) Main landing gear tiedown points, one person per chain (two personnel).

(b) Aft tiedown points, one person per chain (two personnel).

(c) Forward high point tiedowns, one person per chain (two personnel).

(2) Pushers (4 to 8 personnel).

WARNING

Personnel shall not man pushpoints that lie in the path of aircraft landing gear, e.g., cockpit pushpoints shall only be used when pushing aft.

12. Obtain permission from the bridge to move the helicopter when required. Ensure the ship is on a constant course and speed with ship's pitch 3° or less and roll 5° or less, measured at the HCO/LSO station.

13. Position aircraft pullers and pushers, SBOs, and brakerider. Aircraft pushpoints include door and window frames, aircraft cabin door frame, nose frame, ordnance stub wings, tail pylon at rib junctions, and other reinforced fuselage areas.

CAUTION

Do not push or pull on aircraft stabilator assembly, rotor blades, MAD pylon, hoist assembly, HF antennas, ES antennas, float bag covers, or unreinforced fuselage areas.

14. Remove aircraft high point tiedowns and tail tiedowns. Attach TD-1A chains to the tiedown points listed for aircraft movement.

Note

Ensure that chock and chain personnel are continuously prepared to immediately secure the aircraft in the event aircraft/ship movement becomes excessive.

15. Remove the chocks and chains and release the brakes.

16. Push/pull and steer the aircraft as necessary to get the aircraft aligned with the aircraft hangar. Ensure sufficient clearance will exist to fold the tail pylon and rotor blades and to hangar the aircraft.

17. Lock the tailwheel after the aircraft is aligned with the hangar. Apply the aircraft brakes, insert chocks, and chain the helicopter.

18. Fuel the helicopter.

19. Fold the main rotor blades and tail pylon.

20. Release the chocks/chains and brakes.

21. Complete hangaring the aircraft.

10.7.6.1 Release of Traverse System Hydraulic Lock. With the helicopter trapped in the RSD and the traverse system inoperative, the following procedures can be used to facilitate manually maneuvering the helicopter into and out of the hangar. The procedures will eliminate the hydraulic lock in the traverse system and leave only the cable friction and rolling friction of the helicopter and RSD to be overcome. Approximately 2,500 pounds of force will be required to overcome this friction.

1. Establish communications with CC and FDD.

2. Start RAST system in accordance with paragraph 6-5a of RAST OMI.

WARNING

If helicopter is on board and engaged by the RSD, extreme caution must be taken with a disabled traverse system. Assure that a brakerider is aboard and helicopter brakes set, or that the helicopter is chocked and chained to prevent inadvertent movement of the helicopter/RSD.

3. Set solenoid select switch to traverse forward or aft.

4. On HTP, press and hold traverse system pressure gauge isolator pushbutton.

5. Set and hold the by-pass valve's close/off/traverse pressure select switch to the traverse pressure select position.

6. On the HTP, press and hold traverse system pressure gauge isolator pushbutton again.

7. Slowly open traverse system pressure cock and check reading on 0 to 5,000-psi gauge.

8. Release setscrew and turn replenishing valve adjusting handle (see RAST IPB, Figure 119, item 12) counterclockwise until it stops. This will reduce the traverse system pressure to a minimum (note number of turns).

9. Tighten the traverse brake handwheel to release brake.

10. Switch off ship/RAST power.

Note

The RSD/helicopter can now be pulled forward or aft using a come-along or chainfall attached to the RSD.

10.7.6.2 Resetting Traverse System Hydraulic Lock

1. Back off traverse brake handwheel to reset brake.

2. Establish communications with CC and FDD.

3. Start RAST system in accordance with paragraph 6-5a of the RAST OMI.

4. Reset replenishing valve by turning the adjusting handle clockwise to its original position and reset the setscrew. This will set the valve at approximately 3,250 psi; however, this pressure cannot be read on the 0 to 5,000-psi gauge since it will read the system pressure controlled by the relief valve, which is set at 3,000 psi.

5. To accurately set the replenishing valve, complete steps 1-19 of paragraph 6-20 in the RAST OMI.

10.8 COMMUNICATIONS

The LAMPS Mk III system is capable of communications on UHF, VHF, and HF frequencies and on the two-way directional data link. Careful preflight planning is necessary to provide communications required for the specific mission while operating in accordance with the prevailing EMCON condition. A data link channel assignment, an HF frequency, and a UHF frequency shall be made for all USW/ASST mission flight operations in addition to a mandatory listening watch on 243.0 MHz (guard). For other training and non-USW/ASST mission flights, two UHF frequencies (primary/secondary) shall be made available. Flights planned for operations below line of sight should also provide an HF frequency assignment. When operating in company, it may be necessary to use one UHF net for launch/ recovery and a separate UHF net for tactical communications between LAMPS Mk III ships or aircraft and other units. The following personnel shall monitor the UHF net, as appropriate, during flight operations:

1. Launch/recovery
   a. Pilot
   b. ASTAC
   c. LSO
   d. HCO
   e. Bridge
2. Tactical (in company)
   a. Pilot
   b. ASTAC
   c. Bridge (as desired).

The following personnel shall monitor the data link net during USW/ASST mission flight operations:

1. ATO and SO
2. ATACO
3. ASO (as required)
4. REMRO (as required)
5. ESMO (as required)
6. Bridge (as desired).

Voice procedures on UHF nets shall be in accordance with ACP 165.

10.9 ALERT CONDITIONS

The alert conditions listed in Figure 3-2 shall apply to the LAMPS aircraft. Because of flight safety and fatigue considerations, time limits must be placed on these conditions. The main concern is the safety of the aircrew, but consideration must also be given to the number of hours that maintenance and flight deck personnel have been on duty. An appropriate period of rest shall be provided each aircrew after having completed a normal maximum time in Alert 5, 15, or 30. Alert 5 is as fatiguing as actual flight and should normally be used only when launch is imminent.

10.10 EMERGENCY PROCEDURES

The very nature and complexity of any helicopter and its associated equipment necessitates that the pilots, LSO, ASTAC/ATACO, and the OOD be aware of established emergency procedures should one or more of the aircraft's systems fail. Emergency procedures are contained in the SH-60B NATOPS Flight Manual and also in Chapter 2. For LAMPS Mk III unique emergencies and the ship's reaction to these emergencies, refer to Figure 10-4. In all cases, the senior detachment pilot aboard shall be notified.

10.11 TRAINING AND WORKUP

Optimum use of LAMPS requires extensive training for both ship's company and detachment personnel, especially in the areas of command and control, CIC and aircraft coordination, and flight deck procedures. CINCLANTFLT/CINCPACFLT will establish, through their TYCOMs, training and readiness standards for LAMPS ships and aircraft detachments. This will include training in coordinated USW, ASST, and other secondary missions. Readiness standards and exercises will be established to ensure effective use of LAMPS teams.

LAMPS team at-sea workups shall be conducted as part of the basic LAMPS detachment/ship integration. A typical LAMPS at-sea workup schedule is shown in Figure 10-5. Such a schedule should be developed for each individual unit, taking into account the fleet deployment schedule and services available.

10.12 LAMPS DETACHMENT CROSS-DECK EVOLUTIONS

The issue of cross-deck transfers of LAMPS detachments surfaces as operational commanders perceive the requirement to place detachments on ships that do not have a detachment or to create a two-plane detachment to increase capability. While a cross-deck transfer should never be considered a routine evolution, it is recognized that the operational commander must have the option to transfer LAMPS detachments from one combatant to another to meet operational needs. Cross-deck transfers provide tactical flexibility, which is an integral part of good asset management. However, as the decision is promulgated, the battle group commanders do not always have the HSL expertise assigned to their staffs to completely advise them of the considerations and concerns of such a move. The cost in terms of potential impact on safety and operational readiness and the cost of the move itself must be weighed in the decision process. Consideration must also be given to the lot number of each aircraft involved in the cross-deck transfer. Many parts in the LAMPS packup are not interchangeable and the packup is tailored to match the lot number of the embarked aircraft.

In case of operational requirement, a successful cross-deck transfer can be accomplished. The two basic types of cross-deck transfer involve one-plane to one-plane cross-deck transfer and one-plane to two-plane cross-deck transfer.

10.12.1 One-Plane to One-Plane Cross-deck Transfer. One-plane to one-plane cross-deck transfer occurs when a detachment is relocated on a ship currently without a detachment. The requirement for a safe move and incorporation into the new host ship should be in the forefront at all times. The following checklist should be used as a guide to prepare for and execute the move.

1. Earliest possible notification of intention to cross-deck (prior to departure from the continental U.S. if possible). This will permit the detachment to provide aviation expertise to the new host ship and to establish a working liaison.

2. Precrossdeck liaison visit by detachment OIC. The liaison visit should address:

   a. Flight deck facilities — certification, lighting, power, chains, chocks, communications, tacan, RSD, etc.

   b. Berthing requirements.

   c. Qualifications/training of HCOs, LSEs, and ASTACs.

   d. Fuel system/fuel system personnel training.

e. Ordnance requirements including sonobuoys, CADs, smokes and adapters, and torpedo assets.

f. Corrosion materials.

g. SE/IMRL.

h. Supply procedures/expertise. (Supply support briefs are to be conducted. They should include handling retrograde and parts requisitioning.)

i. Parts support requirements.

j. Publications/instructions.

k. Preembarkation and training plan with the new host ship.

3. Complete safety/integration workup in accordance with current instructions prior to any operational tasking.

4. Full logistic support for actual transfer of the 15,000 pounds of spare parts and support equipment. The preferred method is in port. If at sea, external support must be arranged. Arrangements must also be made to ensure that the normal flow of replacement parts and supplies is not disrupted.

5. Certification by the new host ship that all required training and facilities certifications are completed and that all required materials (corrosion control supplies, sonobuoys, etc.) are on board.

10.12.2 One-Plane to Two-Plane Cross-deck Transfer. One-plane to two-plane cross-deck transfer occurs when a detachment is relocated onto a ship that already has a detachment. The OIC of the transferring detachment will ensure a safe evolution. The above checklist should be used as a guide, but the quantity of material to be transferred should be considerably less. Close liaison with the new host ship prior to the transfer can identify specific materials that should be transferred, i.e., out-of-cal SE or SASS/PUK parts. The OIC of the host ship should retain responsibility as the air department head and should speak to the ship's commanding officer on aviation matters. Two-plane operations require increased coordination and workup time. The following is an initial checklist for a two-plane detachment.

1. The precrossdeck liaison visit should include discussions on the following:

   a. Hangar/PUK space

   b. SASS compatibility/content

   c. Increased fuel/freshwater consumption

   d. Flightcrew scheduling/launch cycles

   e. Flight deck personnel scheduling/rest

   f. Impact of increased flight operations on ship's company/fire parties

   g. Maintenance management

   h. Bingo requirements

   i. Helicopter movement/spotting on the flight deck or in the hangar

   j. Communications plans

   k. Altitude assignments/ASTAC controls

   l. RAST malfunctions.

2. A complete safety/integration workup prior to any operational tasking. This should include day 1 and day 2 of the LAMPS at-sea workup schedule depicted in Figure 10-5. The workup should conclude with simultaneous two-plane operations.

OCCASION	RESTRICTIONS	REMARKS	FDSSS	BIDS
Helicopter chained in hangar	None.	None.		
Straightening and traversing in/out	CAUTION Maintain steady course.	Six personnel (LSO, FDD, brakerider, chockmen/chainmen (2), and power cable tender) are required.		TRVS
Helicopter on deck locked in RSD. (Tiedown chains will be applied when normal ship rolls exceed 10° and launch is not imminent.)	None.	If winds of 45 knots or gusts to 60 knots are expected, fold and secure main rotor blades.		
Spreading/folding main rotor blades	CAUTION Maximum windspeed over deck 45 knots from any direction.	None.		SPRD
Spreading/folding tail pylon	CAUTION Maximum windspeed over deck 45 knots from any direction.	None.		SPRD
Engaging rotors	WARNING Maintain steady course. Maximum windspeed over deck 45 knots from any direction.	None.	AMBER (RED after engagement)	ROTR
Launch	WARNING Maintain steady course, wind and ship dynamics within appropriate wind envelope.	None.	GREEN	LNCH

Figure 10-1. Maneuvering Restrictions During Flight Operations and Lamps Mk III Shipboard Communication System Indications (Sheet 1 of 2)

OCCASION	RESTRICTIONS	REMARKS	FDSSS	BIDS
Recovery VMC	Ship steady on base recovery course (BRC) by the time aircraft is at 1/4 nm, wind and ship dynamics within appropriate envelope.	RAST recovery procedures are contained in H-60 NFM. All others	GREEN	RCVR GREEN
Recovery night and IMC	Ship steady on BRC by the time aircraft is at 3 nm on final, wind and ship dynamics within appropriate envelope.	RAST recovery procedures are contained in H-60 NFM. All others	 GREEN	RCVR
Refueling (hot)		Warn aircraft of intentions.	RED	
Rotor shutdown	**WARNING** Maintain steady course. Maximum windspeed over deck 45 knots from any direction.	If maneuvering will cause windspeed over deck to exceed 45 knots, clamps shall be installed immediately after shutdown and prior to maneuver execution.	AMBER	ROTR
HIFR	Wind 300° to 360° relative, 10 to 30 knots.	Deck personnel properly trained. Fuel hoses properly recirculated and fuel samples taken at nozzle. Warn aircraft of changes in course.	GREEN	HIFR

Figure 10-1. Maneuvering Restrictions During Flight Operations and Lamps Mk III Shipboard Communication System Indications (Sheet 2 of 2)

Times listed are to be used as a guideline for including steps in individual ship helicopter bills.		
TIME	ACTION	
90 Minutes	CIC:	Check all communication, navigation, and tactical support systems for readiness, report discrepancies to OOD, and report status to the flightcrew. Provide the flightcrew with the tactical mission brief and completed brief sheets. Light off WHPU.
85 Minutes	LSO/FDD:	Traverse helicopter out and spot for launch.
60 Minutes	Bridge:	Commence maneuvering ship to obtain a position that will provide minimum degradation of station when engagement/launch courses are established. Make a 1 MC announcement including intended time of takeoff and team for flight quarters.
	CIC:	Ensure required COMSEC and keyed cryptographic materials are provided.
	Aircrew:	Brief in hangar vicinity, examine helicopter discrepancy log, and gather flight gear.
45 Minutes	Aircrew:	Preflight helicopter.
30 Minutes	Bridge:	Sound flight quarters and commence bridge helicopter operations checklist.
	CIC:	Commence CIC helicopter operations checklist.
	Aircrew:	Man aircraft, complete checklist up to start engines. Make all preparations for flight.
	Helicopter Detail:	Man flight deck in proper equipment.
	LSO:	Commence LSO checklist.
	HCO:	Man tower. Commence HCO checklist. Energize SGSI and HRS.
	Others:	Lower safety nets.
25 Minutes	Helicopter Detail:	Conduct FOD walkdown.
20 Minutes	Helicopter Detail:	Man all stations and prepare to start engines.
	Aircrew:	Request permission to start engines.
	HCO:	Report manned and ready to LSO.
18 Minutes	LSO:	Request engagement winds.
	Aircrew:	Start engines.
15 Minutes	LSO:	Signal engagement clearance (amber light). On UHF pass "Cleared to engage, winds _____, pitch _____, roll _____, altimeter _____."
	Aircrew:	On FDD signal, engage rotors.
	LSO:	Signal red deck, warn flight deck/flightcrew before maneuvering.
3 - 1 Minutes	Aircrew:	Report when ready to launch.
	Bridge:	Gently maneuver to flight CORPEN. Grant permission to launch.
	LSO:	Signal green deck; pass clearance to launch, winds, pitch, roll.
	Detachment:	Remove tiedown chains (if required).
0 Minutes	Aircrew:	Takeoff on signal from LSO.
	Bridge:	Continue to hold ship steady until after "Operations normal"; then pass the word to "Secure from flight quarters. The ship expects to reman flight quarters at ________."
	CIC:	Assume control after "Operations normal" report for passing of control from LSO.
	Detachment:	Secure as directed by LSO.
	Helicopter Detail:	Secure as directed by HCO.

Figure 10-2. Typical Sequence of Events for Flight Operations

	ACTION	DECK STATUS LIGHTS
LAUNCH	— Upon takeoff LSO reports:	
	All clear	GREEN
	Aircraft fouled	AMBER
RECOVERY	— On final and recovery granted LSO by bridge via BIDS	GREEN
	— Stop lowering helicopter messenger cable	AMBER
	— Raise helicopter messenger cable	GREEN
	— LSO applies hover tension to RA cable	AMBER
	— LSO directs helicopter to land	GREEN
	— Helicopter trapped in RSD	RED
	— Helicopter misses RSD	AMBER

Figure 10-3. Recovery Assist, Securing, and Traversing Flight Deck Status Light Signals

WHEN AN IN-FLIGHT EMERGENCY IS DECLARED A PILOT, IF AVAILABLE, SHOULD IMMEDIATELY BE CALLED TO CIC.

DUAL ENGINE FAILURE

A DUAL ENGINE FAILURE WILL RESULT IN THE PILOT MAKING AN IMMEDIATE AUTOROTATION INTO THE WATER.

THE SHIP SHOULD SEE TAB A.

PLANNED/IMMEDIATE DITCHING

DUE TO AN IMPENDING CATASTROPHIC FAILURE, THE AIRCRAFT MAY BE REQUIRED TO DISCONTINUE FURTHER FLIGHT AND MAKE A WATER LANDING.

THE SHIP SHOULD SEE TAB A.

LOSS OF TAIL ROTOR THRUST

A LOSS OF TAIL ROTOR THRUST NECESSITATES THE PILOT MAKING AN IMMEDIATE AUTOROTATION IN ORDER TO PREVENT THE HELICOPTER FROM SPINNING OUT OF CONTROL.

THE SHIP SHOULD SEE TAB A.

LOSS OF TAIL ROTOR CONTROL

A LOSS OF TAIL ROTOR CONTROL SEVERELY HAMPERS THE AIRCRAFT'S YAW CONTROLLABILITY. A BINGO FIELD OR CARRIER DECK IS NECESSARY TO MAKE A RUN-ON LANDING FOR A SAFE RECOVERY. HOWEVER, IF NEITHER LANDING SITE IS AVAILABLE, THE PILOT WILL PROCEED TO THE VICINITY OF THE SHIP AND ELECT EITHER TO LAND ON DECK OR DITCH THE AIRCRAFT.

THE SHIP SHOULD SEE TAB A OR TAB C AS APPLICABLE.

FIRE IN FLIGHT

A FIRE MAY BE ASSOCIATED WITH EITHER AN ENGINE OR CABIN AIRFRAME COMPARTMENT. IF THE FIRE IS EXTINGUISHED, THE HELICOPTER WILL RETURN TO THE SHIP. HOWEVER, IF THE FIRE IS OUT OF CONTROL, THE PILOT WILL DITCH THE AIRCRAFT.

IF DITCHING IS NOT REQUIRED, THE SHIP SHOULD SEE TAB D.

IF DITCHING IS REQUIRED, THE SHIP SHOULD SEE TAB A.

Figure 10-4. LAMPS Mk III Shipboard Emergency Procedures (Sheet 1 of 11)

SINGLE ENGINE FAILURE

WITH A SINGLE ENGINE FAILURE THE PILOT WILL RETURN TO THE SHIP AT BEST AIRSPEED AND AT A SAFE AUTOROTATIONAL ALTITUDE. PILOT WILL JETTISON FUEL/STORES IF NECESSARY. PILOT MAY ATTEMPT TO RESTART FAULTY ENGINE IF FEASIBLE. AIRCRAFT HOVERING CAPABILITY WILL BE IMPAIRED AND MAY PRECLUDE A RAST RECOVERY.

THE SHIP SHOULD SEE TAB D.

ENGINE MALFUNCTIONS

THE HELICOPTER IS EXPERIENCING AN ENGINE RELATED PROBLEM WHICH MAY CAUSE A TOTAL ENGINE POWER LOSS TO THAT ENGINE, RESULTING IN SINGLE ENGINE FLIGHT.

THE SHIP SHOULD SEE TAB D.

GEARBOX HIGH OIL TEMPERATURE

WITH THIS TYPE OF EMERGENCY, THE PILOT WILL FLY AT 80 KNOTS AND 80 FEET TOWARDS THE SHIP. AT THE FIRST SIGNS OF GEARBOX FAILURE THE PILOT WILL DITCH THE AIRCRAFT.

THE SHIP SHOULD SEE TAB B.

IF DITCHING IS REQUIRED, THE SHIP SHOULD SEE TAB A.

GEARBOX CHIPS CAUTION LIGHT

A GEARBOX CHIP LIGHT INDICATES POSSIBLE METAL PARTICLES IN ONE OF THE GEARBOXES. THE PILOT WILL PROCEED TO THE SHIP. DITCHING MAY BE REQUIRED IF GEARBOX FAILURE IS IMMINENT.

THE SHIP SHOULD SEE TAB B.

IF DITCHING IS REQUIRED, THE SHIP SHOULD SEE TAB A.

DUAL FUEL FILTER /PRESSURE CAUTION LIGHT

THE PILOT WILL RETURN TO THE SHIP AT SAFE AUTOROTATION ALTITUDE AND AIRSPEED DUE TO POSSIBLE FUEL CONTAMINATION AND DUAL ENGINE FAILURE.

THE SHIP SHOULD SEE TAB D.

IF DITCHING IS REQUIRED, THE SHIP SHOULD SEE TAB A.

Figure 10-4. LAMPS Mk III Shipboard Emergency Procedures (Sheet 2 of 11)

ABNORMAL VIBRATION

THE PILOT WILL RETURN TO THE SHIP, IF CONTROL BECOMES MARGINAL, PILOT MAY ELECT TO DITCH THE HELICOPTER.

THE SHIP SHOULD SEE TAB C.

IF DITCHING IS REQUIRED, THE SHIP SHOULD SEE TAB A.

ERRATIC CONTROL INPUTS

THESE ARE USUALLY CAUSED BY A PROBLEM IN THE AUTOMATIC FLIGHT CONTROL SYSTEM (AFCS), HYDRAULIC SYSTEM, OR MECHANICAL LINKAGES. THE PILOT MAY MAKE A LANDING UTILIZING LESS THAN THE COMPLETE AIRCRAFT FLIGHT CONTROL SYSTEM CAPABILITIES. IF AVAILABLE, A SHIP HAVING A LARGER LANDING AREA MAY BE USED. AT WORST CASE, AN AIRCRAFT DITCHING MAY BE REQUIRED.

THE SHIP SHOULD SEE TAB C.

IF DITCHING IS REQUIRED, THE SHIP SHOULD SEE TAB A.

LOSS OF SAS/BOOST

THE PILOT WILL ABORT THE MISSION AND RETURN TO THE SHIP. AIRCRAFT CONTROL WILL BE LESS THAN OPTIMUM AND MANEUVERING IS EXTREMELY DIFFICULT. IF A LARGER DECK IS AVAILABLE, IT MAY BE USED.

THE SHIP SHOULD SEE TAB C.

HYDRAULIC FAILURE

THE HELICOPTER REQUIRES HYDRAULIC PRESSURE TO FLY. THERE ARE THREE REDUNDANT HYDRAULIC SYSTEMS. WITH TWO FAILED, THE HELICOPTER FLIGHT CONTROL MOVEMENT MAY BE RESTRICTED.

THE SHIP SHOULD SEE TAB C.

THE FOLLOWING EMERGENCIES ARE OF A LESS CRITICAL NATURE AND THE SPECIFIC SHIPBOARD PROCEDURES ARE EXPLAINED FOR EACH. NO REFERENCE TO TABS A TO D IS NECESSARY.

MAIN PROBE FAILS TO EXTEND

IF THE MAIN PROBE FAILS TO EXTEND, THEN A NON-RAST LANDING WILL BE REQUIRED USING CHAINS AND CHOCKS FOR FLIGHT DECK SECURING. IF DECK MOTION IS HIGH AND A LARGER DECK IS AVAILABLE, IT MAY BE USED.

Figure 10-4. LAMPS Mk III Shipboard Emergency Procedures (Sheet 3 of 11)

GENERATOR FAILURE

IF TWO GENERATORS HAVE FAILED, THE BACKUP GENERATOR WILL CARRY THE LOAD. AT NIGHT OR IFR, THE MISSION WILL BE ABORTED. IF ALL GENERATORS FAIL, THE PILOT WILL SECURE NONESSENTIAL EQUIPMENT AND RETURN TO THE SHIP. ALTHOUGH THE PILOT WILL BE LIMITING UHF TRANSMISSIONS, SHIP MAY CONTINUE TO TRANSMIT WITHOUT CAUSING AN INCREASED DRAIN ON AIRCRAFT BATTERY. IN THIS SITUATION, THE BATTERY IS THE ONLY SOURCE OF POWER AND WHEN IT DRAINS, TOTAL ELECTRICAL FAILURE WILL OCCUR. WITH ONE GENERATOR, THE SHIP CAN CONDUCT A NORMAL RECOVERY.

IF ALL GENERATORS FAIL, THE SHIP SHOULD:

1. PROCEED TOWARDS THE HELICOPTER AT FLANK SPEED.
2. SET EMERGENCY FLIGHT QUARTERS.
3. HOLD HELICOPTER ON RADAR.
4. IF AT NIGHT OR IN IFR, TRY AND LIGHT UP THE SHIP AS MUCH AS POSSIBLE (THIS IS A VERY SERIOUS EMERGENCY).
5. IF COMMUNICATIONS ARE LOST, ASSUME TOTAL ELECTRICAL FAILURE.
6. WHEN WITHIN 3 NAUTICAL MILES OF THE HELICOPTER, TURN TO FOXTROT CORPEN TO PROVIDE THE MOST STEADY DECK POSSIBLE; A FREE DECK LANDING WILL BE CONDUCTED.
7. IF THE HELICOPTER IS LOST FROM RADAR, ASSUME THAT IT HAS DITCHED AND SEE TAB A.

HUNG DROOP STOP

SHOULD A DROOP STOP FAIL TO ENGAGE ON SHUTDOWN, THE PILOT WILL FOLLOW APPROPRIATE NATOPS PROCEDURES IN ATTEMPTING FURTHER SHUTDOWNS. IF THE DROOP STOP CANNOT BE ENGAGED PERFORM THE FOLLOWING:

1. THE LSE SHALL CLEAR THE FLIGHT DECK OF ALL PERSONNEL INCLUDING HIMSELF.
2. THE SHIP WILL ATTAIN MINIMUM WIND AND TURBULENCE CONDITIONS AND THE PILOT WILL THEN MAKE THE SHUTDOWN PER NFM.

HUNG MAD TOWED BODY

IF A SUITABLE BINGO FIELD IS NOT AVAILABLE, RECOVERY OF THE MAD TOWED BODY CAN BE ACHIEVED BY SEVERAL METHODS, SELECTION WILL DEPEND ON:

1. PREVAILING WEATHER.
2. DAY OR NIGHT.

Figure 10-4. LAMPS Mk III Shipboard Emergency Procedures (Sheet 4 of 11)

3. AIRCRAFT FUEL STATE.

4. CABLE CUT FAILURE.

WARNING

- IF RECOVERING THE MAD TOWED BODY AND CABLE BY HAND, PERSONNEL SHALL WEAR HEAVY DUTY GLOVES TO PREVENT SKIN CONTACT. THE CABLE IS MADE OF BERYLLIUM ALLOY.

- RECOVERY OF A HUNG MAD BIRD WITH AN EXTENDED CABLE MAY REQUIRE A HIGH HOVER OVER THE SHIP WITH A SIGNIFICANT LOSS OF VISUAL REFERENCE. CONSIDERATION SHOULD BE GIVEN TO JETTISONING MAD BIRD ALONGSIDE SHIP AND MARKING ITS POSITION WITH A SMOKE, IF POSSIBLE, TO AID IN RECOVERY BY SHIP/MOTOR WHALE BOAT.

CAUTION

- THE TOWED BODY IS EXTREMELY FRAGILE AND CAUTION SHOULD BE EXERCISED DURING ITS RECOVERY TO PRECLUDE DAMAGE.

- GROUNDING ROD SHALL BE USED TO GROUND MAD TOW CABLE BEFORE MAD TOWED BODY IS REMOVED.

LOST COMMUNICATIONS

THE ESSENTIAL ELEMENT IS PROMPT RECOGNITION OF A LOST COMMUNICATIONS SITUATION. LOST COMMUNICATIONS WILL BE ASSUMED WHEN:

1. A MODE III CODE 7600 IFF RETURN IS DETECTED OR APPROPRIATE MODE AMPLIFIES THE SITUATION.

2. A RADAR TARGET TRACK IS DETECTED MAKING 120° TURNS EVERY 2 MINUTES.

3. A RADIO COMMUNICATIONS CHECK OR EXPECTED REPORT IS 15 MINUTES OVERDUE.

CAUTION

TWO-WAY COMMUNICATIONS ARE REQUIRED TO SATISFY THE REQUIREMENTS FOR PERIODIC COMMUNICATIONS CHECKS.

4. THE SHIP AND HELICOPTER DO NOT MAKE CONTACT AT THE BRIEFED RECOVERY TIME. THE SHIP SHALL IMMEDIATELY:

   (A) RADIATE TACAN. SQUAWK IFF MODE 1/2/3.

Figure 10-4. LAMPS Mk III Shipboard Emergency Procedures (Sheet 5 of 11)

(B) BEGIN RADAR/IFF SEARCH.

(C) ATTEMPT UHF/DATA LINK/HF COMMUNICATIONS. MONITOR UHF GUARD (243.0 MHz). PERIODICALLY SWITCH DATA LINK ANTENNA TO OMNI.

(D) TURN ON UHF HOMER.

(E) CONDUCT ESM SEARCH.

(F) MAN FLIGHT QUARTERS.

(G) AT NIGHT:

(1) TURN ON MASTHEAD GRIMES LIGHT.

(2) IF ALL ATTEMPTS TO CONTACT THE HELICOPTER FAIL, THE USE OF STAR SHELLS FIRED AT MINIMUM RANGE SHOULD BE CONSIDERED.

IN THE EVENT OF LOST COMMUNICATIONS, REFER TO ASW TACAID FOR SHIP AND HELICOPTER DESIRED REACTIONS.

SMOKELIGHT APPROACH

PROMPT RECOGNITION OF DETERIORATING WEATHER CONDITIONS AND VISIBILITY IS CRITICAL. BEFORE RESORTING TO A SMOKELIGHT APPROACH, CONSIDERATION SHOULD BE GIVEN TO THE FOLLOWING:

1. MANEUVERING THE SHIP INTO AN AREA OF BETTER VISIBILITY.
2. VECTORING THE AIRCRAFT TO ANOTHER AVAILABLE SHIP WHERE VISIBILITY IS BETTER.
3. VECTORING THE AIRCRAFT TO A SUITABLE ALTERNATE AIRFIELD.

IF THE WEATHER AND VISIBILITY ARE DETERIORATING, THE SHIP SHOULD NOTIFY THE AIRCRAFT AS SOON AS POSSIBLE SO THAT THE AIRCRAFT COMMANDER CAN DETERMINE:

1. IF HE SHOULD RETURN EARLY TO HOMEPLATE.
2. WHETHER TIME AND FUEL EXISTS TO BINGO TO A SUITABLE ALTERNATE.
3. IF HE SHOULD MAKE PREPARATIONS FOR AN ELVA.
4. IF HE SHOULD PREPARE FOR A SMOKELIGHT APPROACH.

IF THE SMOKELIGHT APPROACH OPTION BECOMES NECESSARY, SHIP PERSONNEL SHOULD REFER TO TAB E.

Figure 10-4. LAMPS Mk III Shipboard Emergency Procedures (Sheet 6 of 11)

WHEN AN IN-FLIGHT EMERGENCY IS DECLARED A PILOT, IF AVAILABLE, SHOULD IMMEDIATELY BE CALLED TO CIC.

TAB A

1. PLOT THE AIRCRAFT POSITION.

2. TURN TOWARD THE CRASH SITE, INCREASE TO BEST SPEED IF NECESSARY.

3. ENSURE AIR DISTRESS FREQUENCY, 243.0 MHz UHF (GUARD), IS BEING MONITORED.

4. NOTIFY OTHER UNITS STATING SITUATION AND INTENTIONS.

5. MAN LIFEBOAT.

6. BRIEF AND STATION ADDITIONAL LOOKOUTS. (USE NO FLARES AS FUEL MAY BE PRESENT.)

7. COLLECT ALL DEBRIS AT SCENE OF WATER ENTRY.

Figure 10-4. LAMPS III Shipboard Emergency Procedures (Sheet 7 of 11)

WHEN AN IN-FLIGHT EMERGENCY IS DECLARED A PILOT, IF AVAILABLE, SHOULD IMMEDIATELY BE CALLED TO CIC.

TAB B

1. HEAD TOWARD THE HELICOPTER AT BEST SPEED.
2. SET EMERGENCY FLIGHT QUARTERS.
3. WHEN WITHIN 3 NAUTICAL MILES (4 NAUTICAL MILES NIGHT/IMC), TURN TO FOXTROT CORPEN.

Figure 10-4. LAMPS III Shipboard Emergency Procedures (Sheet 8 of 11)

WHEN AN IN-FLIGHT EMERGENCY IS DECLARED A PILOT, IF AVAILABLE, SHOULD IMMEDIATELY BE CALLED TO CIC.

TAB C

1. HEAD TOWARD THE HELICOPTER AT BEST SPEED.

2. SET EMERGENCY FLIGHT QUARTERS.

3. WHEN WITHIN 3 NAUTICAL MILES (4 NAUTICAL MILES NIGHT/IMC), TURN TO FOXTROT CORPEN AND SET SPEED TO PROVIDE THE MOST STEADY DECK POSSIBLE WITHIN THE EMERGENCY WIND ENVELOPE.

Figure 10-4. LAMPS III Shipboard Emergency Procedures (Sheet 9 of 11)

WHEN AN IN-FLIGHT EMERGENCY IS DECLARED A PILOT, IF AVAILABLE, SHOULD IMMEDIATELY BE CALLED TO CIC.

TAB D

1. HEAD TOWARD THE HELICOPTER AT BEST SPEED.

2. SET EMERGENCY FLIGHT QUARTERS.

3. WHEN WITHIN 3 NAUTICAL MILES (4 NAUTICAL MILES NIGHT/IMC), TURN TO FOXTROT CORPEN AND SET SPEED FOR OPTIMUM WINDS FOR SINGLE-ENGINE LANDING.

Figure 10-4. LAMPS III Shipboard Emergency Procedures (Sheet 10 of 11)

WHEN AN IN-FLIGHT EMERGENCY IS DECLARED A PILOT, IF AVAILABLE, SHOULD IMMEDIATELY BE CALLED TO CIC.

TAB E

1. PLACE THE RELATIVE/TRUE WINDS WITHIN A ±15° OF THE BRC.

2. VECTOR THE AIRCRAFT TO A POINT 2 NAUTICAL MILES ASTERN (180° RELATIVE BEARING) HEADING ON BRC. ASAC/ATACO SHALL RECOMMEND THAT THE AIRCREW ENGAGE RADAR ALTITUDE HOLD.

3. RECOVERY SHIP SHALL DROP SMOKE/MATRIX LIGHTS EVERY 15 SECONDS OR AT OTHER PREPLANNED INTERVAL AND COMMUNICATE TO THE PILOT THE INTERVAL AND THE NUMBER OF SMOKELIGHTS IN THE WATER.

Figure 10-4. LAMPS III Shipboard Emergency Procedures (Sheet 11 of 11)

Week 1
Day 1
Event 1 (AM) Recover helicopter.

Event 2 (AM) Ship/detachment familiarization.

a. Fire and crash team brief/training.

b. Aircraft safety procedures briefs.

Event 3 (AM) Ship/aircraft training. (4.0 hr)

a. RAST landings.

b. Free deck landings.

c. LSO training.

Event 4 (AM/PM) Deck training. (4.0 hr)

a. Blade folding/spreading.

b. Aircraft traversing.

c. Aircraft wash.

Day 1 Notes:

1. Day 1 drills are compatible with at-anchor training and may be conducted as such.

Week 1
Day 2
Event 1 (AM) Ship/aircraft training. (4.0 hr)

a. RAST landings.

b. Free deck landings.

c. LSO training.

d. Hot refueling on deck.

e. Crash-on-deck drill.

Figure 10-5. Typical LAMPS Mk III At-Sea Workup Schedule (Sheet 1 of 6)

Event 2 (DUSK) Ship/aircraft training. (4.0 hr)

a. RAST landings.

b. Free deck landings.

c. LSO training.

Week 1
Day 3
Event 1 (AM) Ship/aircraft training. (4.0 hr)

a. RAST landings.

b. LSO training.

c. HIFR training.

d. Actual HIFR.

Event 2 (AM) Ship combat training. (4.0)

a. ELVA training.

b. Data link checkout (ASW/ASST).

c. Simulated ASW.

d. Practice smokelight approach.

Event 3 (PM) Ship/aircraft training. (4.0 hr)

a. RAST landings.

b. Free deck landings.

c. LSO training.

d. Crash-on-deck drill.

e. Night traversing.

Figure 10-5. Typical LAMPS Mk III At-Sea Workup Schedule (Sheet 2 of 6)

Day 3 Notes:

1. On day 3, an unannounced emergency launch and recovery will be conducted from stood down flight quarters. (The unannounced launch should commence with the aircraft folded and in the hangar and may be terminated with the request to start engines.)

Week 1
Day 4
Event 1 (AM) Ship/aircraft procedures. (4.0 hr)

a. VERTREP training.

b. MEDEVAC training.

(1) Assemble SAR utility litter

(2) Load a crew member into SAR utility litter

(3) Configure aircraft cabin to receive utility litter

(4) Attach utility litter to rescue hoist (do not hoist crewmember)

(5) Load litter into aircraft cabin and secure for flight

(6) Remove and stow utility litter.

c. Simulated ASST.

d. Hot refuel on deck upon landing.

Event 2 (PM) Ship/aircraft training. (4.0 hr)

a. RAST landings.

b. LSO training.

c. ELVA training.

d. Practice smokelight approach.

Week 1
Day 5
Event 1 (AM) Ship combat training. (4.0 hr)

a. Simulated ASW mission.

b. Hot refuel or HIFR.

c. Simulated ASST mission.

Event 2 (AM/PM) (4.0 hr)

a. Make up lost events (emphasis on full day and night RAST and free deck landing and LSO qualifications).

Figure 10-5. Typical LAMPS Mk III At-Sea Workup Schedule (Sheet 3 of 6)

Week 1 Notes:

1. The satisfactory completion of a workup shall be dependent on the achievement of the following drills and briefs:

   a. All pilots and LSOs should be day/night qualified by the end of Week 1. As a minimum, two HACs and LSOs shall be day/night qualified.

   b. Each ASAC (1 ASAC per watch section)/pilot shall have satisfactorily controlled/completed:

      (1) 2 tacan approaches.

      (2) 2 ship-controlled approaches.

      (3) 1 ELVA (1 per aircrew).

      (4) 1 ditching drill (1 per aircrew).

      (5) 1 lost plane drill (1 per aircrew).

      (6) 1 practice smokelight approach (1 per aircrew).

   c. The following unannounced drills (after day 2) shall have been satisfactorily completed:

      (1) Crash-on-deck/fire (all fire parties).

      (2) In-flight/emergency flight quarters.

      (3) Lost plane.

      (4) Ditching.

      (5) Guard check.

      (6) Hangar fire/fuel spill.

   d. Minimum 1 torpedo load with ship's practice shape port or starboard.

   e. All HCO/FDD (both ship and detachment personnel) day/night current.

Figure 10-5. Typical LAMPS Mk III At-Sea Workup Schedule (Sheet 4 of 6)

Note

It is highly desirable to obtain extensive services for the second week of LAMPS Mk III workups. Week two events are predicated on these services. If limited or no services are available, the week should maximize ASW and ASST simulation.

Week 2
Day 1
Event 1 (AM) Mission training. (4.0 hr)

a. Basic ASW training with appropriate FXP-1 exercises (e.g., W-15-UL, A-21-U, etc.).

b. Hot refuel or HIFR (own ship) upon recovery or landing.

Event 2 (PM) Mission training. (4.0 hr)

a. Same as event 1 above — Hot refuel in lieu of HIFR.

Week 2
Day 2
Event 1 (AM) Mission training. (4.0 hr)

a. Basic ASST training with accompanying surface units.

b. HIFR on other than own ship.

c. Continue with (a.) above.

Event 2 (PM) Mission training. (4.0 hr)

a. Same as event 1 above except no HIFR.

Week 2
Day 3
Event 1 (AM) Mission training. (4.0 hr)

a. Advanced ASW training with appropriate FXP-1 exercise (e.g., W-17-UL, etc.).

b. RAST landings.

c. Free deck landings.

Figure 10-5. Typical LAMPS Mk III At-Sea Workup Schedule (Sheet 5 of 6)

Event 2 (PM) Mission training. (4.0 hr)

a. Same as event 1 above.

b. RAST landings.

c. Free deck landings.

Week 2
Day 4
Event 1 (AM) Mission training. (4.0 hr)

a. Advanced ASST training - accompanying units and Fleet Electronic Warfare Support Group (FEWSG) services required.

b. HIFR on other than own ship.

c. Continue with (a.) above.

Event 2 (PM) Mission training. (4.0 hr)

a. Same as event 1 above except no HIFR.

b. Crash-on-deck drill upon landing.

Week 2
Day 5
Event 1 Make up preceding 2 weeks missed events. (4.0 hr)

Figure 10-5. Typical LAMPS Mk III At-Sea Workup Schedule (Sheet 6 of 6)

CHAPTER 11

HS Detachment Operations

11.1 SH-60F AND HH-60H HELICOPTER

The SH-60F helicopter is designed for ship-based USW operations to detect, identify, track, and destroy enemy submarines; provide logistics support; and to provide a SAR capability. It is a derivative of the U.S. Army UH-60A helicopter with improved engines, increased capacity internal and external fuel tanks, reduced foot print, and RAST systems. The crew consists of a pilot, copilot, and two sensor operators. USW sensors consist of sonobuoys and dipping sonar. Three external stores stations are available and can accommodate up to three torpedoes or two external fuel tanks with one torpedo. When auxiliary fuel tanks are installed, the SH-60F is not compatible with RAST operations. The helicopter is capable of airspeeds up to 180 knots. Endurance without external tanks is 4.5 hours. Each external tank adds 45 minutes endurance. The aircraft can extend its on-station time by HIFR or on-deck refueling. The SH-60F can be equipped for use with the RAST system and will handle all launch, recover, straighten, and traverse evolutions the same as a RAST-equipped SH-60B. For further details concerning the SH-60F, refer to the SH-60F/HH-60H NATOPS Flight Manual.

The HH-60H helicopter is designed for both shore-based and ship-based CSAR operations and support of NSW forces, provide logistics support, and to provide an over-water SAR capability. The crew consists of a pilot, copilot, one crew chief, and one or two gunners. Mission systems consist of two side-mounted M-60 machineguns, engine exhaust suppressors, chaff and flare dispensers, a radar warning receiver, and an IRCM. Two external stores stations are available and can accommodate up to two fuel tanks. Endurance without external tanks is 4 hours. Each external tank adds 45 minutes endurance. HIFR and RAST capabilities are the same as the SH-60F.

11.2 AVIATION DEPARTMENT

In ships that have a LAMPS detachment on board, an aviation department will be organized. The OIC of the detachment will be the department head and be designated the aviation officer. LAMPS detachments are formed and trained at the parent squadron. The detachment OIC assumes the responsibilities of reporting custodian for the detachment aircraft, and makes all required aircraft accounting reports. The aviation officer is also responsible to the parent squadron commanding officer for numerous aviation details including NATOPS, safety, updating of maintenance procedures, funding reports, and training. Therefore, it is essential that strong lines of communication exist between the aviation officer and the parent squadron commanding officer. The aviation officer reports to the squadron commanding officer through the ship's commanding officer. The parent command's commanding officer communicates with the OIC through the ship's commanding officer on official matters. Message traffic from the detachment to the parent squadron will be originated by the detachment OIC and is released by the ship's commanding officer under the ship's identifier. Messages from the parent squadron to the detachment will be addressed to the ship.

Because of the often irregular working hours of an embarked aviation maintenance crew, it is highly desirable that the aviation department be berthed together in an area easily accessible to the hangar and flight deck facilities. Hangar facilities on all ships that have a LAMPS detachment are limited. Consequently, stowage of gear not directly associated with the LAMPS mission is discouraged when the detachment is embarked. Office space should be provided to the aviation department.

11.3 MAINTENANCE AND TRAINING

Cross-deck detachments operate in accordance with squadron SOP. For split-deck operations, the hosting LAMPS Mk III detachment's maintenance personnel supplement the HS detachment to perform normal preventative maintenance as well as corrective maintenance to common airframe and aircraft systems.

Most avionics and mission-specific items should be brought by the HS detachment in order to maintain the aircraft in a full mission-capable status. Any aircraft or specific tools and publications should also be brought by the HS detachment.

Optimum use of the SH-60F and HH-60H aboard air-capable ships requires familiarization training for both ship's company and detachment personnel, especially in areas of command and control, aircraft coordination, and flight deck procedures. An at-sea workup schedule should be developed for each individual unit, taking into account the services available and detachment experience level.

11.4 HELICOPTER FIRE PARTY

Refer to paragraph 2.5.

11.5 AIR CONTROL

Neither the SH-60F nor the HH-60H are equipped with the Hawk Link system. It is mandatory for the air-capable ship to plan, direct, and control the aircraft's weapons system in the USW/ASST tactical environment. The ASTAC gathers information from the aircraft, ASAC, acoustic processor operators, sonar operators, NC-2 plotter, and ES station, and provides the interface with the airborne helicopter. The ASTAC must be capable of supervising aircraft employment during the prosecution of a submarine contact and/or coordinating an ASST mission. It is essential that a well-trained and experienced officer be placed in this position. He can best accomplish his function working in conjunction with a well-qualified ASAC.

The ASTAC will maintain a plot of sonobuoys, MAD fixes, sonar information, and ES data to use in directing the operation. During ASST missions, or when the helicopter passes ASST information to the ship, the ASTAC will relay this information to the ship's ES unit for further analysis and action.

Note

The CIC watch officer shall brief the pilot and ASTAC as well as provide them with an accurate briefing sheet.

Debriefings shall be conducted immediately after each flight using all logs and grams to make an analysis of the flight. The debrief will include the entire flightcrew and, if possible, the TAO or CIC watch officer on watch during the flight and other members of the CIC/sonar team (ASTAC, ASAC, sonar watch supervisor, AN/SQR-17 operator, etc.) as the TAO may direct.

11.6 SHIPBOARD OPERATING PROCEDURES

Because of identical airframes and RAST capability, SH-60F and HH-60H shipboard operations are conducted in accordance with the procedures for SH-60B LAMPS Mk III aircraft described in paragraph 10.6.

11.7 COMMUNICATIONS

The aircraft system is capable of communications on UHF, VHF, and HF frequencies. Careful preflight planning is necessary to provide communications required for the specific mission while operating in accordance with the prevailing EMCON condition. An HF frequency and a UHF frequency shall be made available for all USW/ASST mission flight operations in addition to a mandatory listening watch on 243.0 MHz (guard). For other training and non-USW/ASST mission flights, two UHF frequencies (primary/secondary) shall be made available. Flights planned for operations below line of sight should also have an HF frequency assignment. When operating in company, it may be necessary to use the UHF net for launch and recovery and a separate UHF net for tactical communications between the aircraft/ship team and other units. The following personnel shall monitor the UHF net, as appropriate, during flight operations:

1. Launch/recovery
   a. Pilot
   b. ASTAC
   c. LSO
   d. HCO
   e. Bridge
2. Tactical (in company)
   a. Pilot
   b. ASTAC
   d. Bridge (as desired).

11.8 ALERT CONDITIONS

The alert conditions listed in Figure 3-2 shall apply to the embarked detachment. Because of flight safety and fatigue considerations, time limits must be placed on these conditions. The main concern is the safety of the aircrew, but consideration must also be given to the number of hours that maintenance and flight deck personnel have been on duty. An appropriate period of rest shall be provided each aircrew after having completed a normal maximum time in Alert 5,15, or 30. Alert 5 is as fatiguing as actual flight and should normally be used only when launch is imminent.

11.9 EMERGENCY PROCEDURES

The very nature and complexity of any helicopter and its associated equipment necessitates that the pilots, LSO, ASTAC/ASAC, and the OOD be aware of established emergency procedures should one or more of the aircraft's systems fail. Emergency procedures are contained in the SH-60F and HH-60H NATOPS Flight Manual and also in Chapter 2. In all cases, the senior detachment pilot aboard shall be notified.

11.10 TRAINING AND WORKUP

Optimum use of an embarked helicopter requires extensive training for both ship's company and detachment personnel, especially in the areas of command and control, CIC and aircraft coordination, and flight deck procedures. CINCLANTFLT/CINCPACFLT will establish, through their TYCOMs, training and readiness standards for air-capable ships and aircraft detachments. This will include training in coordinated USW, ASST, and other secondary missions. Readiness standards and exercises will be established to ensure effective use of ship/helicopter teams.

11.11 DETACHMENT CROSS-DECK EVOLUTIONS

The issue of cross-deck evolutions for HS detachments surfaces as operational commanders perceive the requirement to place detachments on ships that do not have a detachment or to create a two-plane detachment to increase capability. While cross-deck evolutions should never be considered routine, it is recognized that the operational commander must have the option to transfer HS detachments from one combatant to another to meet operational needs. Cross-deck transfers provide tactical flexibility, which is an integral part of good asset management. However, as the decision is promulgated, the battle group commanders do not always have the HS expertise assigned to their staffs to completely advise them of the considerations and concerns of such a move. The cost in terms of potential impact on safety and operational readiness and the cost of the move itself must be weighed in the decision process. Consideration must also be given to the lot number of each aircraft involved in the cross-deck transfer. Many parts in the HS packup are not interchangeable and the packup is tailored to match the lot number of the embarked aircraft.

In case of operational necessity, a successful cross-deck transfer can be accomplished. The two basic types involve one-plane to one-plane cross-deck transfer and one-plane to two-plane detachments.

CHAPTER 12

Airborne Mine Countermeasures Operations

12.1 INTRODUCTION

The AMCM squadron is capable of minehunting, bottom conditioning, and sweeping moored, magnetic, and acoustic mines and providing AMCM command and control functions. The mission of the AMCM squadron is to plan and execute MCM operations utilizing the RH-53D and MH-53E helicopters, organic equipment, and additional assigned forces as necessary. AMCM squadrons or detachments can be ship based and/or shore based.

CAUTION

The launch and recovery of AMCM aircraft and equipment is a hazardous evolution requiring precise and complete coordination between AMCM squadron and shipboard personnel. The procedures described in this chapter are introductory only and must be supplemented with thorough liaison/planning between squadron and ship prior to the commencement of AMCM operations. NWP 3-15.22 contains approved procedures for the actual conduct of AMCM operations.

12.2 COMMAND RELATIONSHIPS

Command relationships for MCM operations will be as promulgated in the governing operation order for each given MCM operation/exercise and will be agreed upon during the preplanned phase. The commanding officer of the AMCM squadron shall report to the MCM commander or OTC, as applicable. For a major MCM requirement, the fleet commander in chief may designate an operational MCM task organization, including an MCM staff composed of representatives from the participating activities.

12.3 COMMAND RESPONSIBILITIES

12.3.1 Mine Countermeasure Commander. The MCM commander is responsible for planning and conducting minesweeping and minehunting operations. To accomplish this he/she:

1. Exercises operational control of the AMCM squadron or AMCM squadron detachment

2. Promulgates daily MCM orders that specify type of minesweeping equipment to be used, MCM mission requirements, and the type of navigational control; and determines precise navigational systems sites

3. Ensures that the appropriate navigation system is used for the required operations (precise navigation system/radar)

4. Determines when the mined area has been swept sufficiently to give the percentage of clearance required by the operational commander

5. Conducts MCM tasking briefs

6. Maintains maintenance and operational status reporting.

12.3.2 Airborne Mine Countermeasures Squadron Commanding Officer. The commanding officer of the AMCM squadron is responsible to the MCM commander for helicopter operations and to the functional wing commander for administrative and policy matters. If the AMCM squadron commander has been designated the MCM commander, he/she becomes operationally responsible to the OTC. He/she will:

1. Determine the number and launch/recovery times of MCM missions to meet daily MCM requirements

2. Promulgate the daily flight schedule and modifications thereto, in conjunction with the ship's air officer, upon receipt of the daily MCM order.

12.4 SHIPBOARD OPERATIONS

12.4.1 Airborne Mine Countermeasures Equipment. The AMCM helicopter internally or externally deploys and tows the following major types of equipment.

1. Mk 103 moored-mine sweep gear — A combination of wire cables, cutters, otters, and floats carried in and deployed from the airborne helicopter for sweeping moored mines.

2. Mk 104 acoustic-mine sweep device — A sound generator carried in and deployed from the airborne helicopter for sweeping acoustic mines.

3. Mk 105 magnetic-mine sweep device — A helicopter-towed hydrofoil sled for sweeping magnetic mines. It is deployed from a ship or a shore launch site.

4. Mk 106 combination magnetic/acoustic mine sweep gear — A combination of the Mk 104 and Mk 105. The helicopter tows the Mk 105, which in turn tows the Mk 104. It is used against magnetic/acoustic combination mines and is deployed from a ship or shore launch site.

5. The SPU-1/W magnetic orange pipe (MOP) and A-Mk 2G (rattle bars) — A helicopter-towed device for sweeping magnetic/acoustic mines. It is an extremely simple combination and could be towed by units other than the normal AMCM helicopter.

6. The AN/AQS 14 side scanning sonar — A helicopter-towed device carried in and deployed from the helicopter, used in minehunting and bottom conditioning.

The Mk 103, Mk 104, and AN/AQS 14 are carried internally and normal helicopter launch and recovery procedures are followed.

12.4.2 Airborne Mine Countermeasures Operations From an LPD. It is possible to conduct AMCM operations from an LPD. Refer to NWP 3-15.22 for detailed LPD AMCM operations.

12.4.3 Airborne Mine Countermeasures Operations From an LHA/LPH/ LHD. Refer to NWP 3-15.22 and the LHA/LPH/LHD NATOPS Manual for specific guidance on LHA/LPH/LHD AMCM procedures.

12.5 OPERATIONAL CONSTRAINTS

When involved in AMCM operations, H-53 helicopter maneuverability is very limited because of the equipment that it has in the water, plus the requirement for low-altitude and unbalanced flight. The helicopter is not presently instrumented for AMCM operations at night. When towing the Mk 105, Mk 106, or MOP/A-Mk 2G, the helicopter cannot join the DELTA pattern. It must make a straight-in approach with its gear in tow. Speeds while towing range from 5 to 25 knots. The H-53 cannot tow in sea state 4 or above. Ceiling and visibility minimums are 500 feet and 1 mile, respectively.

CHAPTER 13

Vertical Onboard Delivery Procedures

13.1 CONCEPT OF VERTICAL ONBOARD DELIVERY

VOD with the CH-53E helicopter significantly enhances the air logistics capability of the fleet and supplements the H-46 and C-2 aircraft with logistics and utility services previously not available with those aircraft.

13.2 CH-53E HELICOPTER

The CH-53E helicopter is a day-night, all-weather aircraft capable of landing aboard all aircraft carriers, battleships, and numerous amphibious, Military Sealift Command, and fleet support ships. The helicopter also has a VERTREP capability for a majority of the remaining ships in the fleet. The CH-53E is a three-engine, long-range helicopter capable of air-to-air refueling from KC-130 aircraft and HIFR. On-board avionics include an Omega/VLF worldwide navigation system, tacan, VOR, ILS, ADF, radar beacon, IFF/SIF navigation systems and UHF, VHF/FM secure voice compatible, and HF communication systems. An APP gives the helicopter a self-starting capability. The helicopter normally seats 37 but is capable of carrying up to 55 passengers with centerline seats and cargo winch installed. This capacity may vary between fleet and TYCOM instructions. For MEDEVAC missions, 24 litters can be installed. For internal cargo missions, the aircraft is equipped with a rear ramp loading system, cargo winch, roller conveyers, and cargo tiedown facilities. External cargo up to 36,000 pounds may be carried using either a single- or dual-point suspension system. Normal internal cargo/passenger flight radius of action is 200 nm.

The helicopter is designed to carry 32,000 pounds of cargo externally at a cruise speed of at least 100 KIAS to a range of 50 nm on a sea-level tropical (32 °C) day. At destination, the helicopter can hover for 5 minutes, release its cargo, return 50 nm without payload at speed for best range, and have 20 minutes of fuel in reserve. The helicopter is also designed to be capable of retrieving another CH-53E at a range of 20 nm. For further details, refer to the CH-53E NATOPS Flight Manual.

13.3 PREPARATIONS FOR VERTICAL ONBOARD DELIVERY SERVICES

VOD services should be requested as far in advance as possible through COMNAVAIRLANT, COMNAVAIRPAC, COMFAIRMED, or COMFAIRWESTPAC as appropriate. Specific procedures are promulgated in separate instructions. Standard airlift procedures/format are contained in OPNAVINST 4631.2 series. Liaison with VOD aircraft squadrons is recommended prior to requesting services.

Commanding officers shall ensure that flight deck crews are properly trained and equipped for VOD operations when requesting VOD support. A 19-minute film, "CH-53E Safety Intro," VN 85-049, is available from VOD squadrons to assist in preparing flight deck personnel.

Because of the limited availability of low-speed tanker aircraft, air-to-air refueling will not normally be used to extend the radius of action for logistics missions except for emergencies.

13.4 SUPPORT REQUIREMENTS

13.4.1 Shore-Based Missions. VOD missions will normally be conducted directly between the CH-53E squadron's home airfield and certified air-capable ships. Commanding officers of the supported ship may route or shuttle assigned aircraft to or via any suitable airfield as required to support operations, provided:

1. Safe operating procedures are adhered to.

2. Other scheduled VOD commitments are not hindered.

3. Appropriate liaison has been conducted with the helicopter aircraft commander.

13.4.2 Other Than Home-Field, Shore-Based Detachments. These detachments require extensive advance planning and coordination and should be requested as soon as possible after the requirements become known.

13.4.3 Ship-Based Detachments. Ships hosting VOD detachments should be prepared to provide:

1. Deck room for the helicopter(s) (stowed length is 60 feet 5 inches and width is 28 feet 5 inches with refuel probe removed).

2. For single aircraft detachments, berthing for 4 officers and 23 enlisted personnel; for dual aircraft detachments, 7 officers and approximately 35 enlisted personnel.

3. For detachments greater than 5 days duration, storage for parts packup and extra support equipment as necessary. Detailed requirements vary greatly with mission requirements and locales and will be coordinated on a case basis.

13.5 VERTICAL ONBOARD DELIVERY OPERATIONS

Supported ships shall provide load requirements, PIM/OVHD data, and a communications plan by message to the supporting squadron and Naval air station with an information copy to all concerned. For extended operations, ship beach detachments should be assigned at the attended air station to:

1. Process and handle incoming/outgoing U.S. mail, courier mail, passengers, and cargo.

2. Ensure that unauthorized personnel are not transported; passengers must be manifested prior to every flight per OPNAVINST 4630.25 (DOD Regulation 4515.13).

3. Maintain liaison with the VOD aircrew to inform them of planned shore-to-ship passenger/mail/cargo load requirements.

All flights shall be conducted under positive radar coverage to the maximum extent possible; consideration should be given to approach, control, ship radar, airborne early warning radar, and accompanying ship radar.

The CH-53E is not certified for overwater rescue missions but is an excellent search platform utilizing its Omega navigation system, tacan, and long-endurance time. The aircraft is limited with only one UHF radio but can act as on-scene commander for any SAR effort or conduct active search procedures and provide a raft for the survivors.

13.5.1 Internal Cargo Transport. Internal cargo will normally be banded on standard 40 X 48 inch pallets with a load height not to exceed 60 inches. The roller conveyors limit pallet weight to 2,200 pounds. A maximum of seven pallets can be carried simultaneously. Floor strength limit is 300 pounds per square foot (shoring may be used to distribute the load of heavy items and vehicles). Cabin width is 90 inches. Cabin height varies between 73 and 77 inches. These limits are for general planning only. For detailed guidance, the crew chief, CH-53E NATOPS, or loading manual should be consulted.

It will normally require 20 to 30 minutes to fully offload/onload a CH-53E with properly palletized or other large-item cargo. Cargo consisting of many small items, such as mail, will take longer because of additional manpower/handling requirements.

Because of limited tail boom clearance, a low-profile, 4- to 6-ton forklift is required when loading pallets and heavy/oversized items. The recommended vehicle is a shipboard truck with lift, fork, diesel, low-silhouette, solid rubber tires, 6,000 pounds, 92-inch lift, model number 60-DALS-2.

At no time shall the aircraft be configured to preclude safe emergency egress of passengers and crew.

13.5.1.1 Hazardous Cargo. Hazardous cargo must be prepared, briefed, and shipped per NAVSUPPUB 505.

13.5.1.2 Liquid Oxygen Carts. LOX carts are extremely dangerous to carry in helicopters. LOX carts will not be carried unless directed by the TYCOM or higher authority, and only when required because of operational necessity.

13.5.2 External Cargo Transport. Because of its 18-ton, external-lift capability and single- and two-point suspension systems, the CH-53E is the most capable helicopter for carrying heavy external loads over long distances. External heavy-lift operations with the CH-53E produce unique safety hazards of high static electricity shock and rotor downwash potential discussed in detail in Chapters 2 and 5. For all external cargo operations, the ground hookup/deck crews will be thoroughly briefed on these hazards.

13.5.2.1 Special Handling Equipment. During helicopter hoist/external load operations, static electricity as high as 200,000 volts is generated. The helicopter cable or cargo hook must be grounded to discharge this electricity.

WARNING

Handling the cable or cargo hook with bare hands prior to proper grounding may cause injury to personnel.

The grounding wand shown in Figure 5-3 is designed to protect ground personnel from static electrical shock when working with all helicopters. For use with H-53E helicopters, gloves meeting ASTM D 120 84A Type I Class III must be used. (NSN 8415-01-158-9445 is the preferred glove.)

13.5.2.2 External Cargo Handling Procedures. External operations/VERTREP safety procedures discussed in Chapters 2, 5, 8, and 12 shall be observed. In addition, CH-53E external operations require the following specific precautions:

1. External cargo should be over 2,000 pounds. If under 5,000 pounds and not limited by range, use of an H-46 should be considered.

2. Load position on deck should be aft of the VERTREP ball and "T" line for single-point loads and at least an additional 5 feet aft for clearance of dual-point loads.

3. Class 5 VERTREP ships may require additional pendants from the helicopter to allow sufficient rotor clearance for a pickup or dropoff. Prior planning is required.

4. Dual-point lift operations shall be performed only with approved 7-1/2 foot dual-point pendant and swivel hook assembly.

5. Loads shall never be hooked to only one dual-point hook nor will one or both dual-point hooks be used in conjunction with the single-point hook.

6. For dual-point cargo lifts, the center of gravity of the load should be as equally balanced as possible and shall never exceed a maximum of 60 percent on either hook. A practice dead lift by crane using dynometers on the sling legs should be done on all special loads to determine proper rigging, center of gravity, and flight stability requirements.

7. Ensure that special lifting equipment and attaching points are certified for use with helicopters. Dockside lifting equipment is not recommended for helicopter external operations.

8. Additional information may be found in the CH-53E NATOPS manual.

13.5.3 Aircraft Recovery. Because of its dual-point suspension system, the CH-53E is the primary aircraft recovery helicopter. Aircraft recovery operations require extensive planning, coordination, and preparation. Specific recovery requirements and procedures will be promulgated by cognizant authority.

13.5.3.1 Aircraft Recovery Kit;15,000 Pound. A portable, self-contained package (Part No. AC 600150) contains all the necessary rigging and auxiliary equipment needed to effect rapid and safe aircraft recovery. Not all of the equipment contained in this kit is used in every aircraft recovery. A list of the equipment required for rigging is included in the recovery procedures for each aircraft.

13.5.3.2 Aircraft Recovery Kit;40,000 Pound. This kit (Part No. FE300151-01) may be used with either the single- or dual-point hook system of the CH-53E. The sling and some of the auxiliary equipment are stronger than those in the 15,000-pound kit. Components of different load capacity or type sling assemblies are not interchangeable. Mixing of components of different capacity or type slings can result in unpredictable lifting characteristics or failure of the sling assembly. A list of equipment required for each aircraft is included in that aircraft's recovery procedures.

13.6 SAFETY

Safety is the primary consideration in all VOD operations. Several unique hazards are associated with the CH-53E helicopter and are thoroughly discussed in Chapter 2. These should be thoroughly reviewed and briefed to all flight deck crewmembers prior to any VOD operation. An excellent 19-minute film, "CH-53E Safety Intro," VN84-049, may be obtained from any CH-53E squadron. Also, pilot and aircrew personnel are available to brief any flight deck crewmembers prior to VOD missions. Additional unique safety procedures not previously mentioned include the following:

1. During external load operations, the pilot will hookup and hover without picking up the load (to minimize rotor wash) until the hookup crew is well clear of the area.

2. Recommended action for ground crew who are inadvertently engulfed in high-velocity downwash is to drop to the deck in a sitting or prone position.

3. After landing, the helicopter aircrewman will install auxiliary fuel tank safety pins prior to chocks

and chainmen positioning chocks or attaching chains to the main landing gear.

4. During movement of the aircraft on deck, the APP should be operated. The brake rider should be a qualified APP operator. APP operation pressurizes the utility hydraulic system for more positive braking. A fully fueled aircraft weighs approximately 54,000 pounds, and a tow tractor alone may not be able to control its movements on wet/slick decks in moderate to heavy sea states.

5. Some helicopters are susceptible to electromagnetic interference (e.g., transmissions, radar, etc.). It may be necessary to deenergize this equipment during CH-53E operations.

6. The cockpit visibility of the CH-53E is not as good as most other helicopters. The LSE should be alert to this fact and attempt to maintain eye-to-eye contact with the pilot at the controls at all times.

CHAPTER 14

Coast Guard Operations

14.1 CONCEPT

This chapter contains information pertaining to cross-deck operations of Navy and Coast Guard helicopters and vessels. Where differences exist between Navy and Coast Guard procedures and equipment, the vessel's parent service directives shall govern.

14.2 OPERATIONS WITH COAST GUARD HELICOPTERS

Coast Guard helicopters are capable of shipboard operation and may be landed aboard appropriately certified Navy ships in accordance with current directives. Permission must be obtained via Navy and Coast Guard chains of command prior to conducting any embarked operations. Helicopter specifications and launch and recovery limitations are included in Appendix B. If specific flight deck motion and relative wind limitations are not prescribed, the generic limitation shown in Figure B-1 shall be used. Because some Coast Guard shipboard procedures differ from those used by the Navy, it is essential that the flightcrew have a full understanding of Navy procedures prior to conducting operations. On ships with oblique landing lineup lines, port approaches are not authorized for single-piloted HH-65A helicopters. Poor cross-cockpit visibility hinders the pilot's view of the LSE and superstructure.

14.3 OPERATIONS WITH COAST GUARD CUTTERS

All flight deck equipped Coast Guard cutters participate in the Navy Aviation Facility Certification Program. Accordingly, Navy and Marine Corps helicopters may be landed aboard appropriately certified Coast Guard cutters in accordance with current directives. Permission must be obtained via Navy and Coast Guard chains of command prior to conducting any embarked operations. The governing directive for operations aboard Coast Guard cutters is the Coast Guard Shipboard-Helicopter Operational Procedures Manual, COMDTINST M3710.2. Because some Coast Guard shipboard procedures differ from those used by the Navy, it is essential that the flightcrew have a full understanding of Coast Guard procedures prior to conducting operations. The following is a list of the more notable differences:

1. The HCO is stationed in the pilot house and monitors flight deck evolutions by means of a CCTV system. HCOs are nonaviation personnel.

2. The FDO and LSE duties are performed by the LSO.

3. The LSO does not monitor internal or external communications. A sound-powered phone talker is stationed immediately behind the LSO to relay clearances from the HCO.

4. Radio communications use plain language; Coast Guard personnel are not generally familiar with Navy standard brevity codes.

5. Except during EMCON, clearances are passed both verbally (by radio) and visually using the deck status light (if installed). The Hotel flag is not normally used to convey clearances and remains two-blocked during all flight operations. Visual clearances are as follows:

    a. Deck status light red — Not cleared.

    b. Deck status light amber — Cleared to start/secure engine(s) and engage/disengage rotor(s).

    c. Deck status light green — Cleared to takeoff/land/HIFR/VERTREP.

6. Some classes of Coast Guard cutters utilize catwalks in lieu of safety nets around the perimeter of the flight deck. When catwalks are installed, tiedown personnel may operate out of them.

7. Coast Guard cutters do not have personnel trained in the handling of aviation ordnance.

WARNING

Although a Coast Guard cutter may be certified to conduct certain flight operations, personnel may not be qualified in these operations. Typically, a cutter will not be qualified to conduct IMC operations or to conduct VERTREP or hot refueling. Prior to conducting any operation with a Coast Guard cutter, ensure that it is both certified and qualified to do so.

Note

Coast Guard flight deck crews receive training in and are familiar with various Navy procedures such as “chocks and chains.”

APPENDIX A

Helicopter Operations Checklists

A.1 GENERAL

Checklists are necessary to ensure safe and efficient air operations. The following checklists are provided as a general guide for the manning of flight quarters stations and do not cover all operating stations in detail. Checklists shall be detailed for the individual ship and operating stations and shall be completed prior to making manned and ready reports.

A.1.1 Officer of the Deck Air Operations Checklist

1. Obtain a copy of brief sheet from CIC. ________
2. Notify commanding officer, CIC, engineering, flight personnel, and others of impending flight operations. ________
3. Mission (VERTREP, HIFR, recovery, touch/go, MEDEVAC, personnel transfer, and so forth). ________
4. OOD determines best course for flight operations. ________
   a. True wind. ________
   b. Relative wind direction/speed. ________
   c. Launch/recovery/VERTREP course ________
      CIC Foxtrot Corpen ________
      Bridge Foxtrot Corpen. ________
   d. Ensure pitch and roll are within limits. ________
   e. Energize fin stabilizers 45 minutes prior to flight operations (if fins are to be utilized). ________
5. Ensure that appropriate navigation aids and radios are on and operating. ________
6. Permission received from commanding officer to prepare for helicopter operations. ________
7. Sound flight quarters and pass word: "Flight quarters, flight quarters, all designated personnel man your flight quarters stations to (receive/launch/HIFR/VERTEP/LAMPS/H-3/H-46 helicopter). The smoking lamp is out on all weather decks. Hold all trash and garbage on station. Stand clear aft of frame _____ . Do not blow tubes without permission of the OOD. Now flight quarters." ________
   a. Time flight quarters sounded ________
   b. Notify HCO of all course/speed changes while at flight quarters. ________

8. Display appropriate lights and/or day shapes; Hotel/Hotel One at dip; check wind envelope for rotor engagement/disengagement. ________

9. Radio central confirm radio circuits patched to HCS and other designated spaces. ________

10. Establish S/P telephone communications with and receive manned and ready reports from: ________

Station		Comm	Manned	Ready
Signal bridge	(1 JG)	________	________	________
CIC	(1 JG)	________	________	________
HCS	(1 JG)	________	________	________
DCC	(1 JV)	________	________	________
Boatcrew	(1 JV)	________	________	________

11. Check operation of flight crash alarm and wave-off lights from bridge. ________

12. Brief lookouts. ________

13. Radio communications established with the aircraft. Ensure pilot informed of ship's certification or waiver status (recovery). ________

14. Receive "FOD walkdown complete" report. ________

15. Obtain permission from commanding officer to commence flight operations. ________

16. Turn to Foxtrot Corpen for desired winds and ensure pitch and roll are within limits. ________

17. Grant permission to helicopter control to start engines/engage rotors. ________

18. Helicopter control reports aircraft ready for launch/recovery. ________

19. Hotel/Hotel One flag(s) close up and pass permission to commence flight operations to the HCO. (Display signal required by ATP 1, Vol II.) ________

20. Log — Takeoff, ETR, and recovery times. ________

    a. Pilot's name ________

    b. Passenger's name. ________

21. Inform commanding officer when aircraft has reached destination, or control has passed to another ship or shore station, or completion of flight operations. ________

A.1.2 Combat Information Center Air Operations Checklist

1. Prepare a written tactical flight brief using appropriate portions of designated format (Paragraph A.1.4) (approximately 2 hours prior to scheduled launch). ________
2. Check air plan for any changes. ________
3. Check message traffic concerning operations area. ________
4. Brief aircrew and ATACO on tactical data and provide a copy of the briefing sheet to the aircrew, OOD, and HCO. ________
5. Check wind repeaters for proper operation. ________
6. Obtain a copy of the pilot's flight plan, when applicable. ________
7. Transmit flight plan via immediate message to shore-based destination in the case of flight terminating ashore. ________
8. Check all radio, S/P telephone, radar, and navigation aids for proper operation and frequencies (EMCON permitting). Ensure monitoring of 243.0 MHz (UHF guard "Military Air Distress"). ________
9. Establish communications with shore activities on Raspberry, air defense liaison, and so forth. ________
10. Man appropriate flight quarters stations, including air controller and 1 JG talker. ________
11. Air controller review tacan, LVA, SAR, and lost communications procedures. ________
12. Test intercom and S/P circuits. ________
13. Report manned and ready to OOD. ________
14. Establish communications with helicopter after airborne and inform bridge of "Operations Normal" and "KILO" reports (EMCON permitting). ________
15. Coordinate control of assigned helicopters in accordance with desired tactical employment and safety-of-flight considerations. ________
16. Plot helicopter positions and tactical information and make recommendations for tactical employment when appropriate. ________
17. If in doubt, clarify type of control desired. ________
18. Keep bridge informed of progress of flight. ________

    Provide inbound helicopter with:

    a. Type of approach anticipated (tacan, port or starboard) ________

    b. Marshal instructions ________

    c. ETR ________

    d. Time check ________

e. BRC

f. Relative wind, pitch and roll, and ceiling and visibility

g. Altimeter setting

h. Ship's certification/waiver status (unusual/obstructions)

i. Land/hover specifications

j. Range and altitude SGSI visual contact should be made

k. Height of flight deck above waterline.

19. Provide radar approach information for IMC.

20. Update HCO on altimeter and EMCON conditions.

21. Pass control of helicopter to HCO or other units when appropriate. (Positive acknowledgement by both controlling units and aircrews of controlling agency change is required.)

A.1.3 Helicopter Control/Flight Deck Officer Checklist. All aircraft evolutions require permission of the OOD.

1. Obtain brief sheet from CIC.

2. Check function of deck status lights, then secure.

3. Establish communications with:

   a. Bridge

   b. CIC

   c. Flight deck

   d. AFFF station

   e. JP-5 fuel station

   f. DCC

   g. RAST machinery room (if applicable).

4. Muster, brief all flight deck personnel on operation, and ensure all are in proper uniform:

   a. LSE

   b. Firefighting party

   c. Fuelers

   d. Maintenance personnel

e. Chain/chock/RAST hookup ________

f. Cargo personnel ________

g. Corpsman. ________

5. Test:

a. Crash alarm ________

b. 5 MC ________

c. UHF (EMCON permitting) ________

d. SGSI and HRS ________

e. Lighting. ________

6. Obstructions such as antennas, cranes, guns, lifelines are lowered, trained, or unrigged. ________

7. All required safety equipment donned and functioning. For night operations, check signal wands, flashlights, and clear lenses in goggles. ________

8. Check proper operation:

a. Damage control equipment ________

b. Starting power ________

c. Fueling equipment ________

d. RAST LSO console and associated equipment (if applicable). ________

9. Hangar retracted/extended, door closed. ________

10. Over the 5 MC announce:

a. "Clear flight deck of all unauthorized personnel." ________

b. "Man all flight deck stations." ________

c. "Close all ammunition lockers." ________

d. "Remove all loose gear from flight deck area." ________

e. "Remove all containers with flammable fluids 25 feet from flight deck area." ________

f. "Conduct FOD walkdown on flight deck, weather decks forward, and fantail." (Includes tiedown cloverleaf covers.) ________

g. "All personnel, helmets on and buckled, goggles down, sleeves rolled down, ballcaps and other loose gear about your person secured." ________

11. Check that any cargo to be picked up is properly secured, weighted, placed, and packed for pickup. ________

12. Receive manned and ready from: ________

    a. Handling personnel ________

    b. Firefighting party ________

    c. Fueling crew ________

    d. Corpsman ________

    e. Cargo personnel ________

    f. Helicopter detachment ________

    g. RAST machinery room (if applicable). ________

13. Report to OOD "Manned and ready. FOD walkdown complete." ________

14. Ensure that personnel to be picked up by helicopters are properly briefed, fitted with an inflatable lifevest, goggles, and cranial helmet for pickup, and are manifested. (Helicopter transfer briefing sheet given to each.) ________

15. Update forecasted weather, BRC, nearest land/field/bingo, ship pitch and roll, and true and relative wind. ________

16. Inform aircrew of any changes to previously briefed information and additions, such as restrictions to air operations, mission, cargo, weights, intelligence, and so forth. ________

17. Ensure tiedowns are removed/configured in accordance with applicable helicopter NATOPS manual. ________

18. Receive permission from the bridge to start engines. ________

19. Display red deck status light to inform LSE and aircrew of clearance to start engine(s). ________

20. Establish radio communications with helicopter (EMCON permitting). ________

21. Receive permission from the OOD to engage rotors. Ensure that the ship is within the safe rotor engagement wind and deck roll and pitch envelope. ________

22. Display amber deck status light to inform LSE and aircrew of clearance to engage. ________

23. Display red deck status light after rotors are engaged or in an emergency to interrupt engagement cycle. ________

24. Report to the bridge when helicopter is ready for launch and obtain permission to launch. ________

25. When radio communications are available, provide aircrew with BRC, relative wind direction and speed, and maximum ship roll and pitch. ________

26. Display green deck status light to inform LSE and aircrew of permission to remove tiedown chains and chocks and launch on the LSE's signal. ________

27. Ensure all tiedowns are removed from the helicopter prior to launch. ________

28. When the helicopter is airborne, pass control to CIC (except if helicopter remains in bounce pattern). ______

29. Keep the bridge informed of the progress of operations, takeoffs, landings, status of the flight deck, or any other special situations, and so forth. ______

30. Log flight deck evolutions. ______

31. Keep pilot informed of any required information and changes. ______

32. Keep flight deck, engineering, medical, and safety boat personnel informed of all evolutions to be conducted. ______

33. Stow all gear (as applicable). Secure from flight quarters when the word is passed. ______

A.1.3.1 Recovery Checklist

1. Complete actions above as applicable. ______

2. When helicopter is held visually, obtain control from CIC. ______

3. When helicopter is on final, pass over 5 MC, "Safety goggles down, ears on, sleeves rolled down, hangar door closed. Stand by to recover/HIFR/VERTREP helicopter." ______

4. Tower report to helicopter, "Green deck." ______

5. Receive "Gear down and locked, parking brake set, seat flying approach" report from helicopter. ______

6. Verify gear, report and pass final landing instructions to helicopter "BRC/relative wind/roll/pitch. Cleared to land." ______

7. After the helicopter is on deck, chocked and chained with landing gear pins in, notify the bridge. ______

8. Request permission from the bridge to shut down. ______

9. When granted, pass to LSE and helicopter "Disengage rotors." ______

10. Notify the bridge to secure flight quarters. Set the refuel detail if required. Pass when the ship expects to resume flight operations (if applicable). ______

A.1.4 SAMPLE FLIGHT BRIEFING SHEET

1. **General**
BRF/LNCH/Hot–Pit/RCVR: ________ / __________ / ___________ / ____________ /
Pilot/CP/Crew:_____________ /______________ /______________ /________________ /
2. **Weather**
BRF Time:__________ / FCST Time:________________ /
CIEL/VIS/True Wind:_____________ / _________________ / ________________ /
OAT/DP/SST:__________ / _____________ / __________ /
Sea State:__________ / Wave DIR/HT:_____________ / ____________ /
Sun Rise/Set:_______ / _______ / Moon Rise/Set________ / __________ /
Moon Phase/ILLUM:________ / ____________ /
3. **Navigation**
Time:__________ / MAG VAR:__________ /
Ship POSIT:____ /
EMMERG Marshal:____ /
TACAN:____________________________ /
4. **Sensor/Weapons Policy**
EMCON:___________________________ / MOD: ______________________ /
UHF/RADAR/LINK/RADALT/MAD/SMOKE/SONO/DOPPLER/GUNS
5. **Mission Brief**
____
____
6. **Rules of Engagement**
____
____
7. **Communication Plan**
Call Sign ACFT/Ship:_______________________ / _____________________________ /

BTN/FREQ	IFF
__ / ________ /	1. ______________ /
__ / ________ /	2. ______________ /
__ / ________ /	3. ______________ /
__ / ________ /	4. ______________ /

8. **PIM Plan**

Time/Course/Speed	Card of the Day (base numbers)
___ /_____ /______ /	BRG:_____ / RNG:_________ / Head:_____ /
___ /_____ /______ /	SPD:_____ / LAT:__________ / LONG:____ /
___ /_____ /______ /	Time:______________ / Recall:____________ /

9. **Friendly Units/BINGO Fields/Nearest Land**

Name	Call	TAC/ID	FREQ	Fuel/Land	POSIT
______________ /	______ /	___ / ___ /	______ /	____ / ____ /	________ /
______________ /	______ /	___ / ___ /	______ /	____ / ____ /	________ /
______________ /	______ /	___ / ___ /	______ /	____ / ____ /	________ /

10. **Hostile Units/Hot Areas/Prohibited Areas/Sensitive Areas**

WARNING

DO NOT OVERFLY OR APPROACH CLOSER THAN PUBLISHED DISTANCE

Type	PRI	Threat Radius/Remarks	POSIT
______________ /	______ /	____________________________ /	__________________ /
______________ /	______ /	____________________________ /	__________________ /
______________ /	______ /	____________________________ /	__________________ /

11. **Deck Lighting (If Non-Standard)**
____

APPENDIX B

Navy/Marine Corps/Coast Guard Helicopter Specifications and Launch and Recovery Wind Limitations

B.1 CONTENTS

B.2 LAUNCH AND RECOVERY WIND LIMITATIONS

Note

- Limiting velocities indicated on wind charts represent maximums for steady state, nonturbulent winds. During gusty wind conditions and/or pitching decks, if the gust spread is 10 knots or more, reduce the maximum winds allowed for rotor engagement and disengagement by 10 knots in all quadrants.

- Operations shall be adjusted to minimize excessive ship motion. In addition, launch and recovery should be timed to coincide with quiescent periods of ship motion.

- Localized turbulence may make flight operations hazardous. Common sources of such turbulence are stack gases/wash, ship superstructures, deck protrusions, and rotor wash/jet blast caused by takeoff and landing of adjacent aircraft.

The safe launch and recovery wind limitations for all helicopters aboard air-capable ships are presented in this appendix. The limits present the maximum safe wind over the deck relative to the ship. When the limits for a particular combination of helicopter and ship are not shown, the envelope in Figure B-1 is mandatory. Operations should not be conducted on air-capable ships not certified or waivered. The limits are categorized for day, night, and ship motion. SH-3 helicopter limits are further defined for minimum wind over the deck and maximum gross weight. Unless otherwise specified, night limits are shaded to distinguish them from day limits and are valid only for white lighting. Envelopes surrounded with a striped border depict emergency conditions. Emergency limits are applicable to any single failure of the helicopter (ASE, hydraulic boost, or engine) or ship's visual landing aids.

Although some wind limits are restrictive, they are the only ones presently available based on data tested to date. Comments/questions about the wind envelopes should be addressed to:

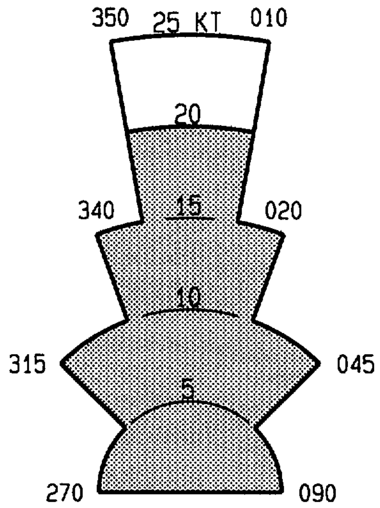
Commander
Naval Air Systems Command (AIR-5311)
Naval Air Systems Command Headquarters
Washington, D.C. 20361-5300

B.3 FLEET HELICOPTERS

Figures B-2 through B-93 provide tiedown, operational, and dimensional information and wind envelopes for U.S. Navy, Marine Corps, and Coast Guard helicopters.

B.4 INTEROPERABILITY MATRICES

Matrices in EXTAC 1001 tabulate feasible ship/helicopter combinations and the capability for landing, VERTREP, and HIFR operations for cross operation between fleet helicopters and ships for NATO, Partnership for Peace, Inter-American Navies, and Pacific Rim nations. Refer to these publications for guidance on the use of the matrices.



NOTES:

Helicopter aligned with ship's lineup line and wind shown relative to aircraft's nose. If the ship's lineup line is not fore\aft then this envelope will be rotated to the angle of the lineup line.

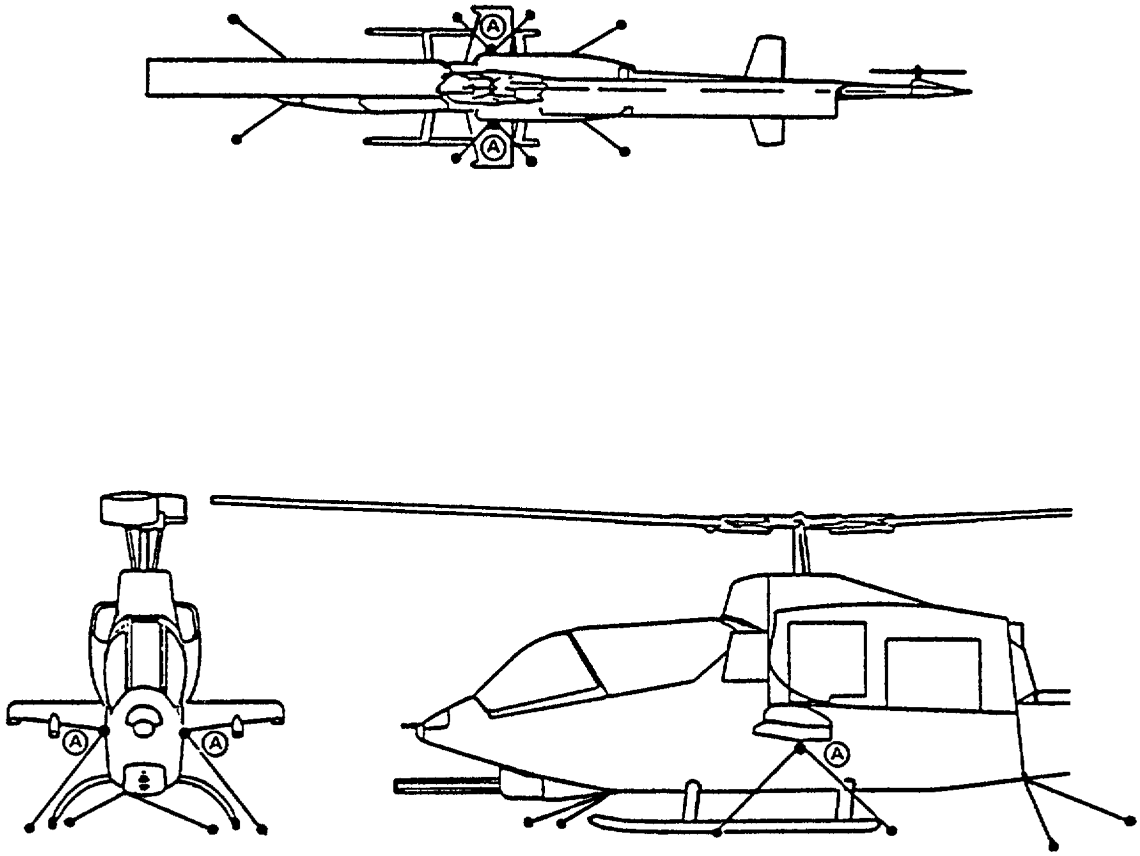
Entire envelope - day operations.

Shaded area - night operations.

This wind envelope is mandatory for all helicopter and ship combinations not listed elsewhere in this appendix

PITCH (+/-) 2
ROLL (+/-) 4

Figure B-1. General Launch and Recovery Envelope



WARNING

Attaching chains to tow rings on skids is not authorized for initial or permanent tiedowns but may be considered if conditions require tiedowns in excess of 12 points.

NOTE:

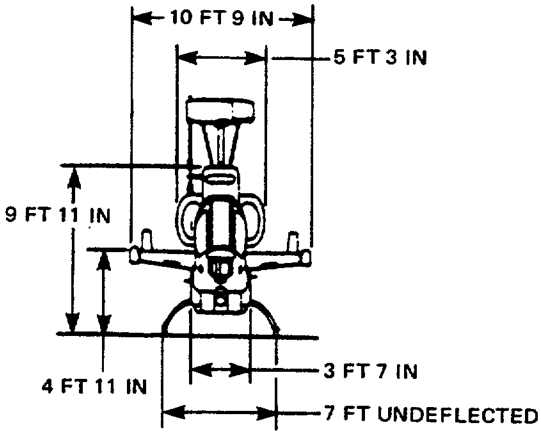
Initial tiedowns are located below stub wings only (A); all others are permanent tiedown points.

Figure B-2. AH-1 Tiedown

MODEL		AH-1W
POWER		2 – T700-GE-401
CREW		2
MAXIMUM RANGE*		323 nm at 130 knots
MAXIMUM SPEED		190 knots
ENDURANCE*		3.3 hr
WEIGHT:	Basic	10,300 lb
	Maximum	14,750 lb
FUEL:	Type	JP-4/JP-5
	Capacity	306 gal*
		354 gal external

CARGO/PASSENGER CAPABILITY:

*Internal fuel only



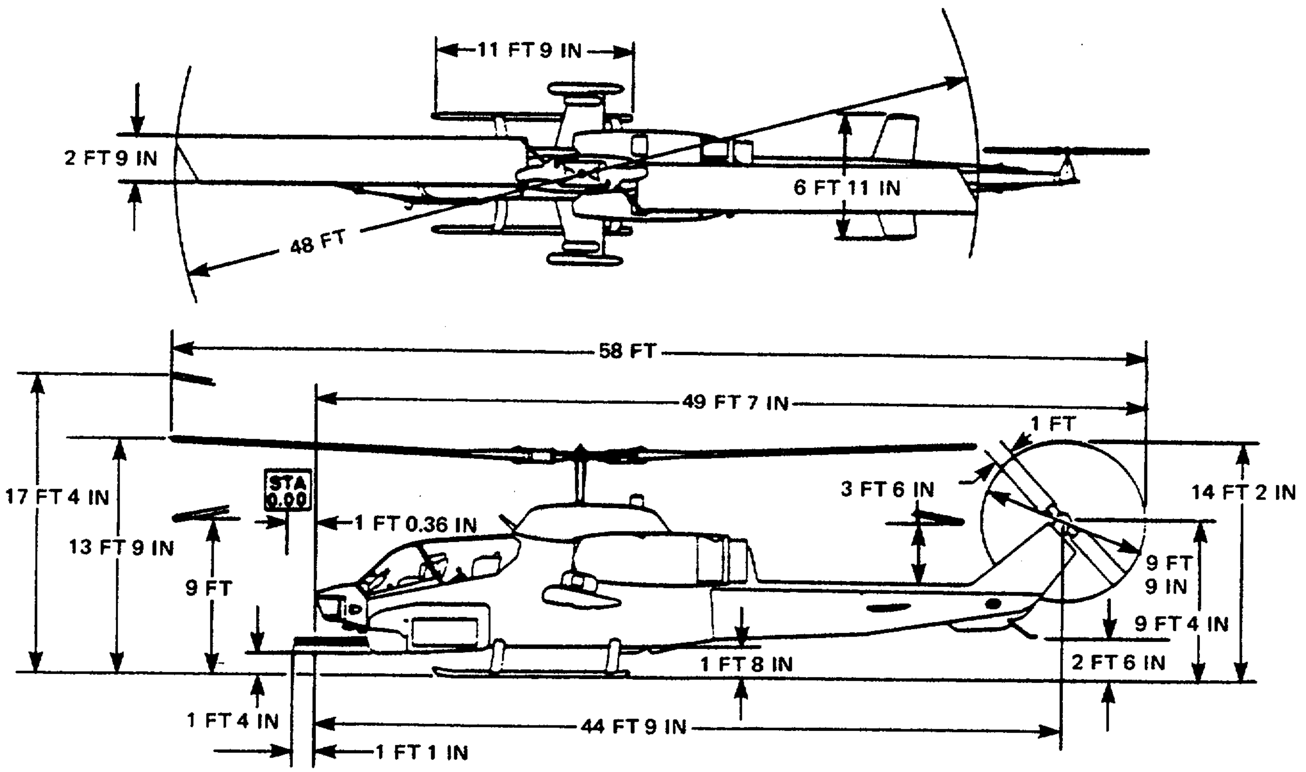
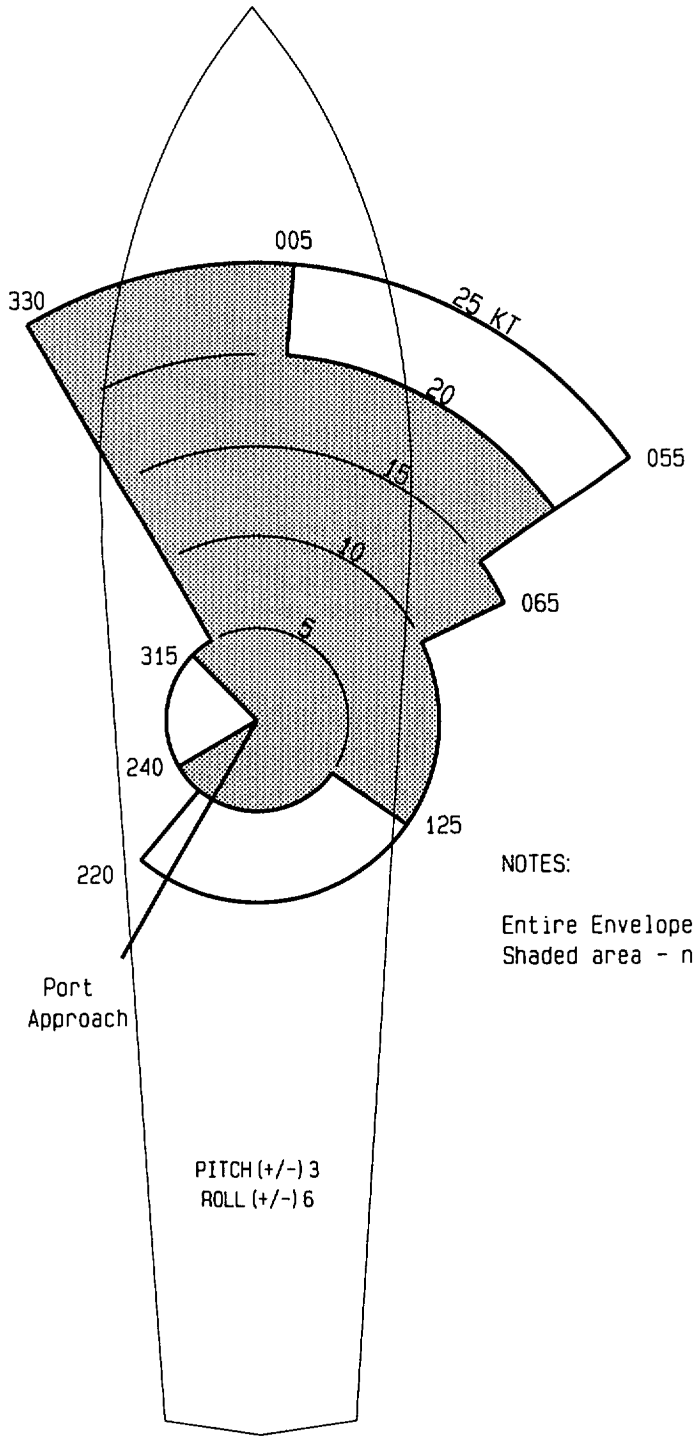


Figure B-3. AH-1W Cobra



NOTES:

Entire Envelope - day
Shaded area - night

Figure B-4. AH-1W Launch and Recovery Envelopes for LPD 4 Class Ships (Sheet 1 of 5)
Sheet 1: Spot 1, Port Approach

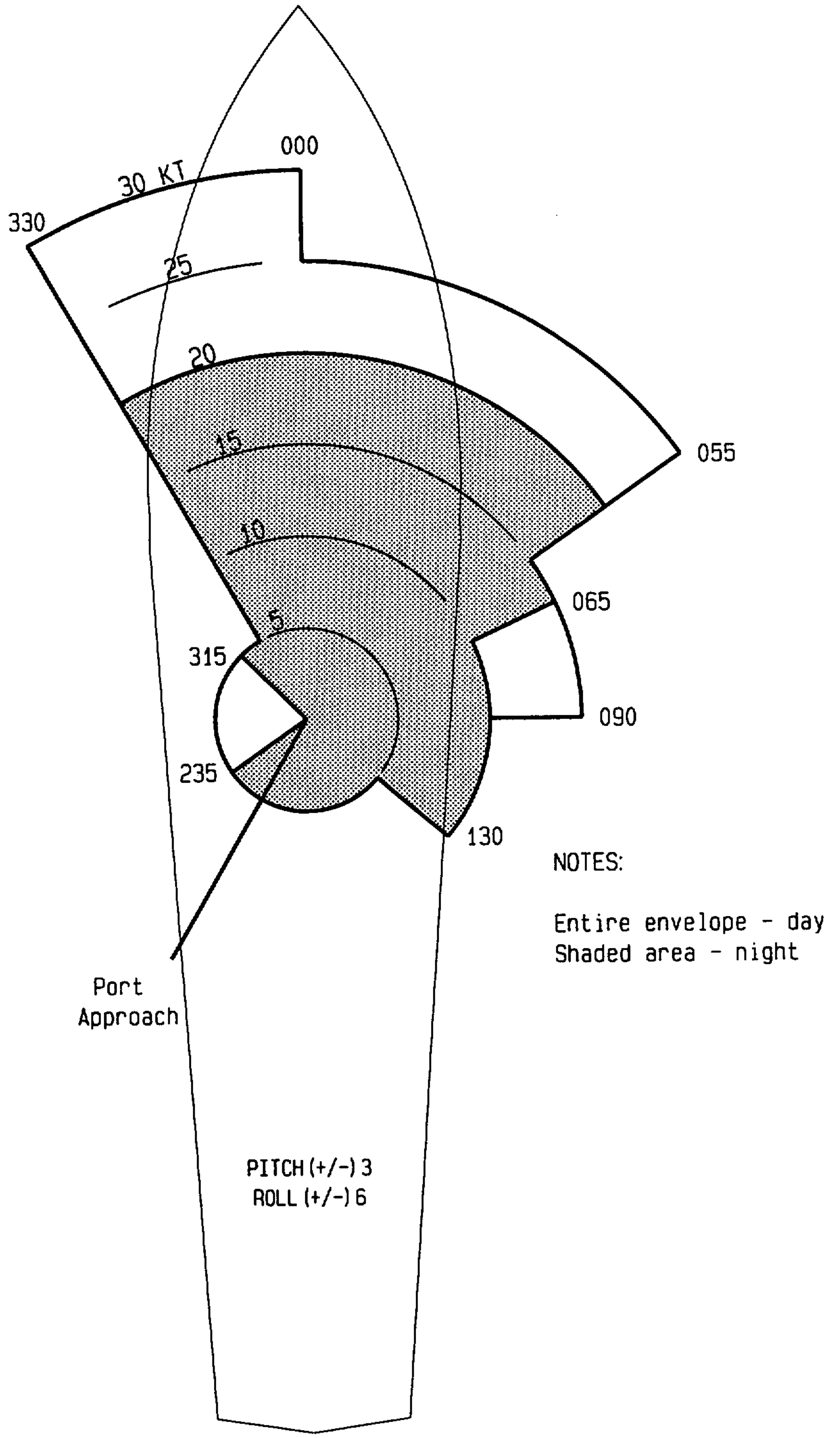
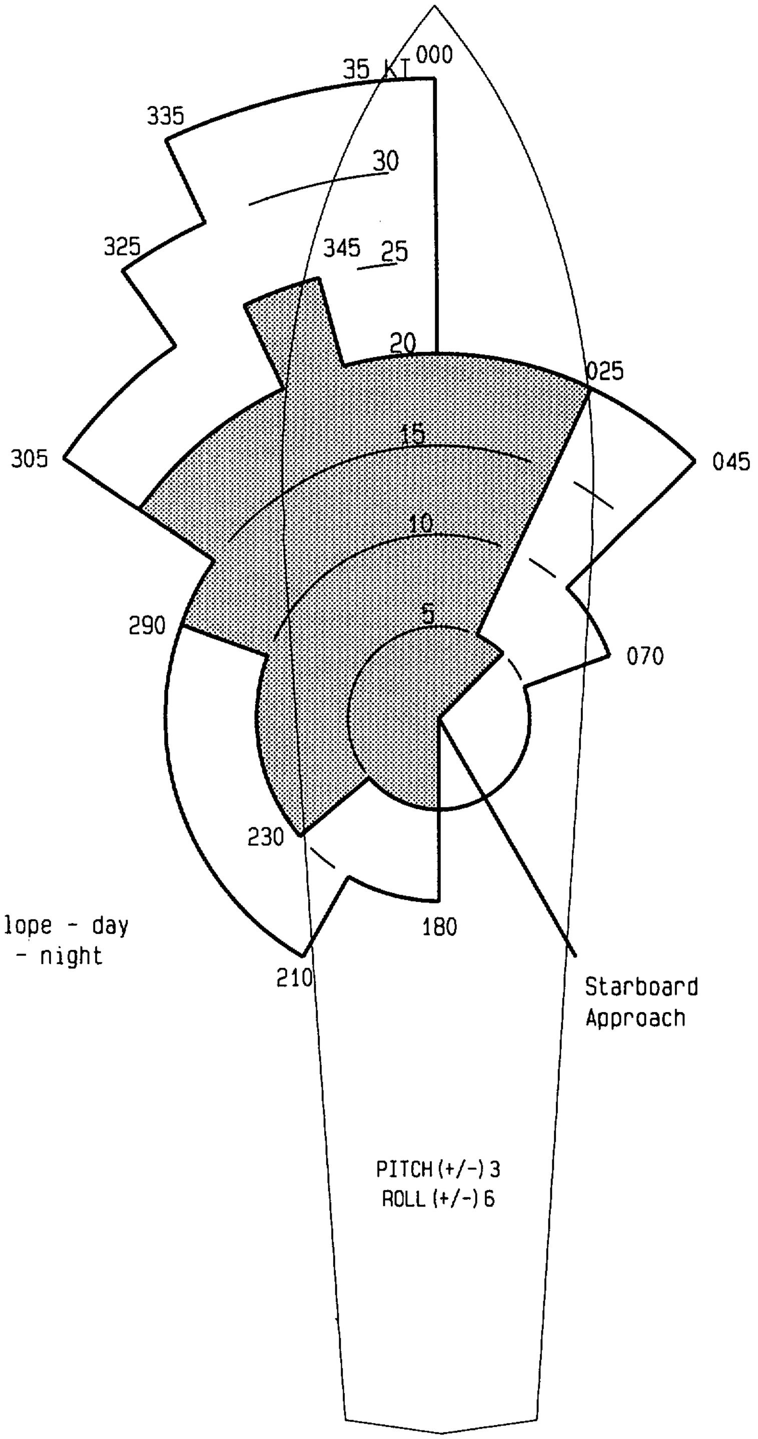


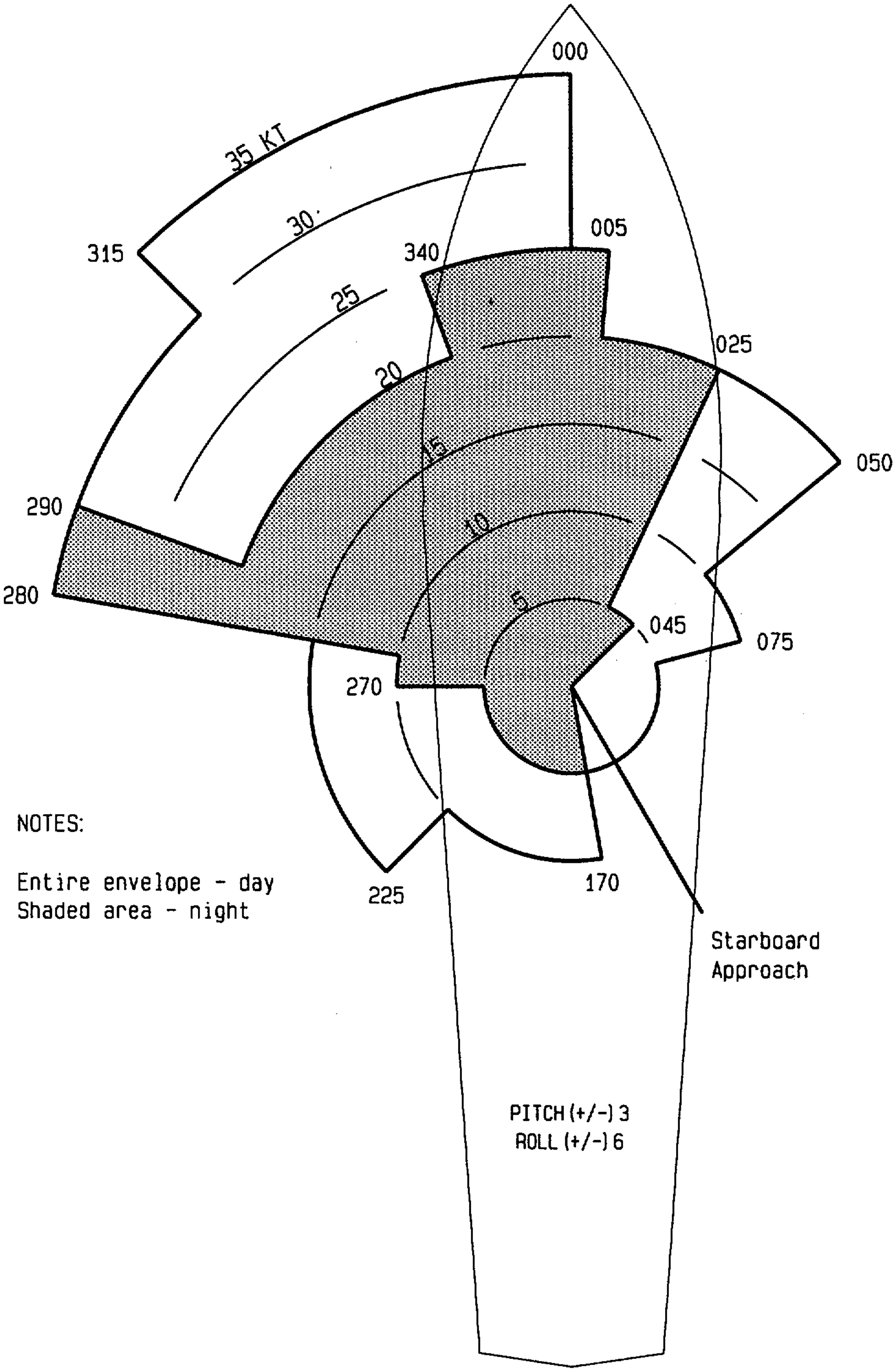
Figure B-4. AH-1W Launch and Recovery Envelopes for LPD 4 Class Ships (Sheet 2 of 5)
Sheet 2: Spot 2, Port Approach



NOTES:

Entire envelope - day
Shaded area - night

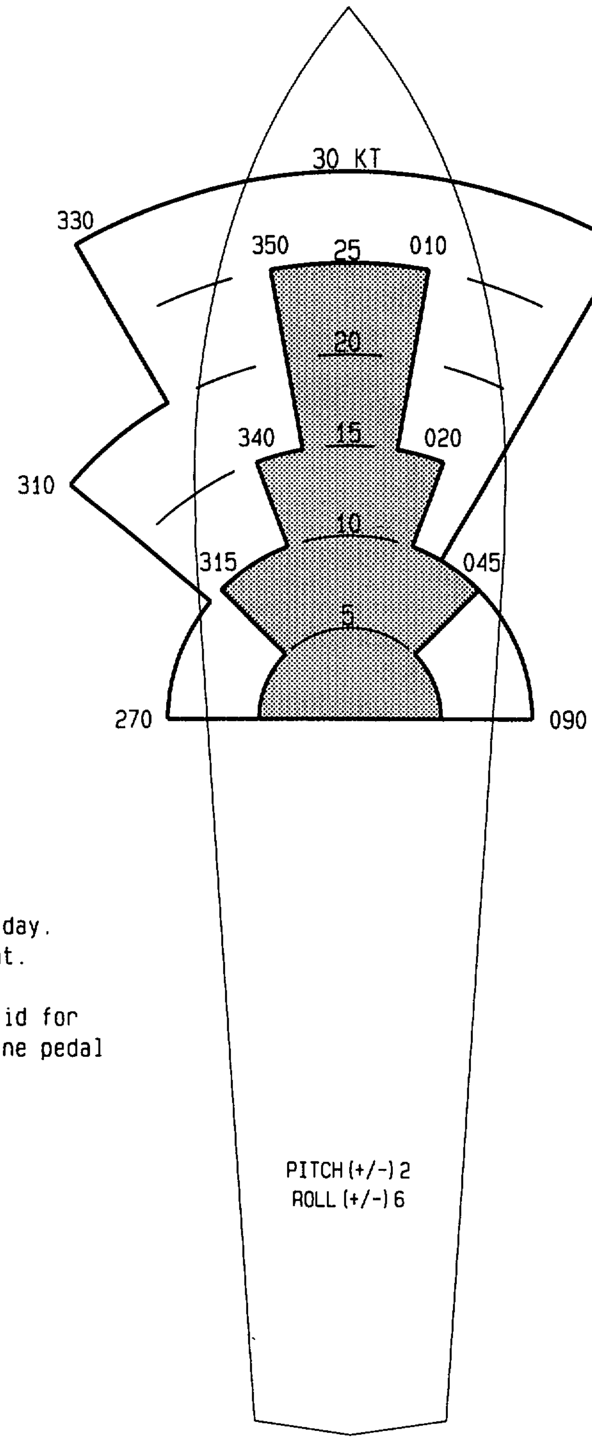
Figure B-4. AH-1W Launch and Recovery Envelopes for LPD 4 Class Ships (Sheet 3 of 5)
Sheet 3: Spot 1, Starboard Approach



NOTES:

Entire envelope - day
Shaded area - night

Figure B-4. AH-1W Launch and Recovery Envelopes for LPD 4 Class Ships (Sheet 4 of 5)
Sheet 4: Spot 2, Starboard Approach



NOTES:

Entire envelope - day.
Shaded area - night.

Envelopes also valid for ordnance lineup line pedal turn maneuvers.

NOTES:

LHA/LPH/LHD-type approach/recovery directly to spot is recommended.

Port Approach - Spots 4, 6.
Stbd Approach - Spots 3, 5.

Figure B-4. AH-1W Launch and Recovery Envelopes for LPD 4 Class Ships (Sheet 5 of 5)
Sheet 5: Spots 3 to 6

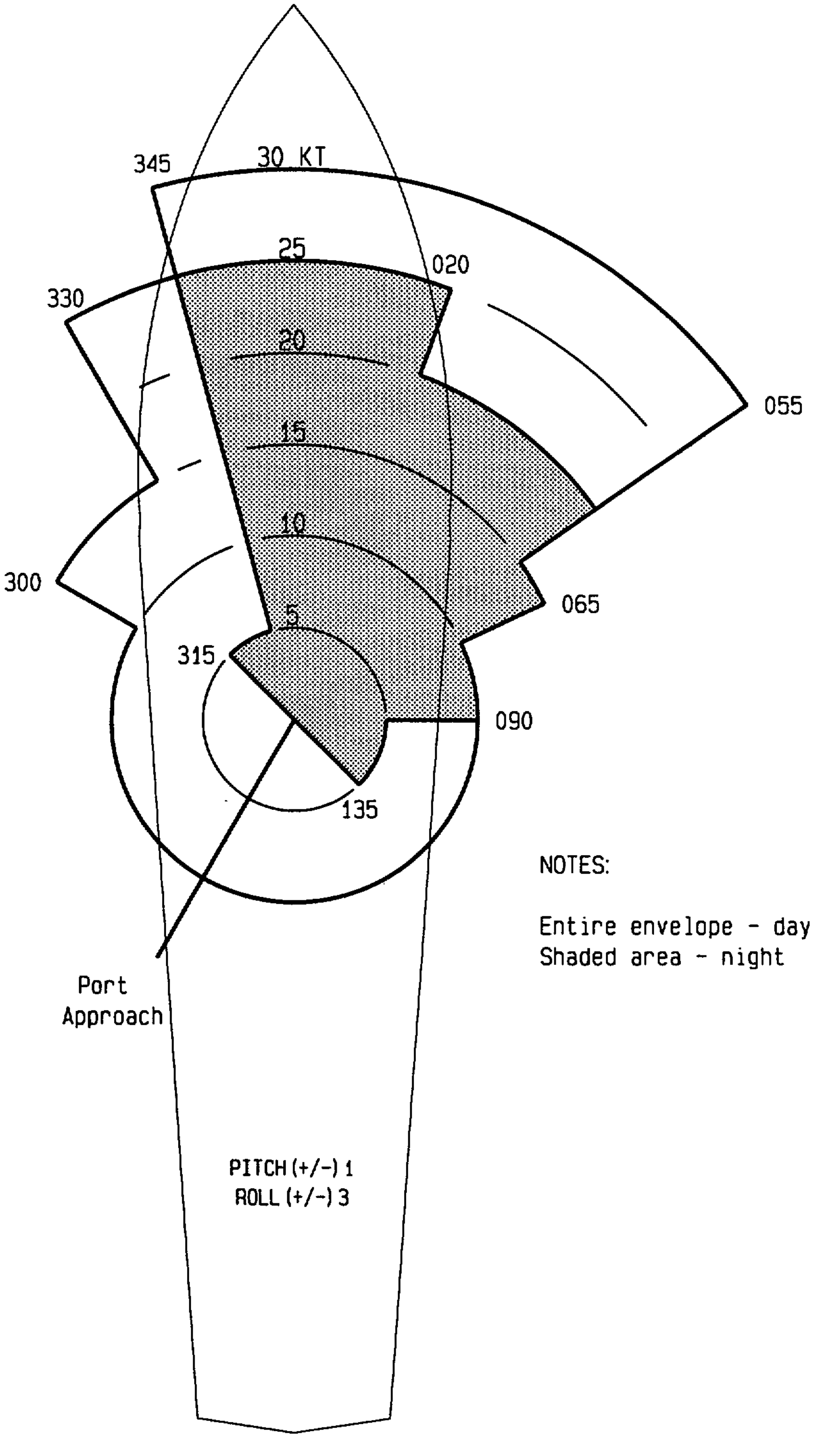
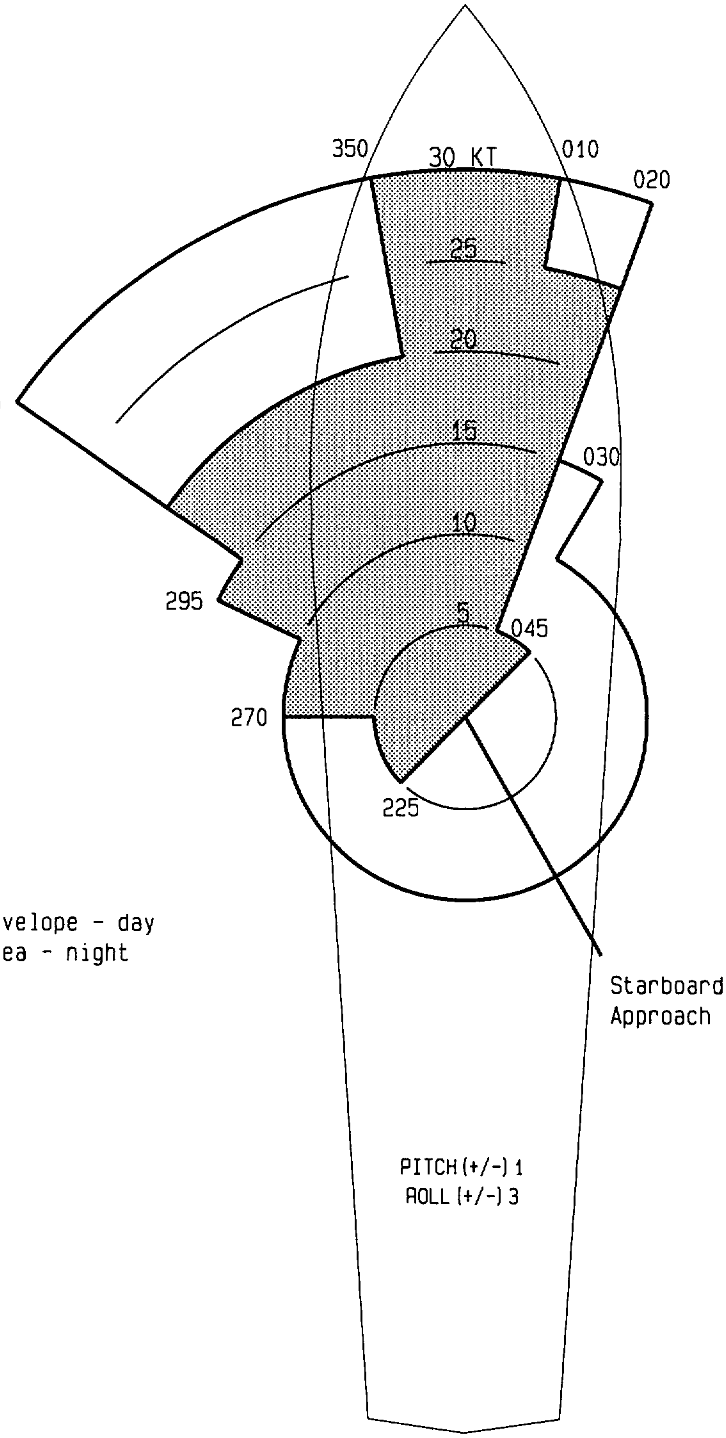


Figure B-5. AH-1W Launch and Recovery Envelopes for LSD 36 Class Ships (Sheet 1 of 3)
Sheet 1: Port Approach



NOTES:

Entire envelope - day
Shaded area - night

Figure B-5. AH-1W Launch and Recovery Envelopes for LSD 36 Class Ships (Sheet 2 of 3)
Sheet 2: Starboard Approach

MAR/96

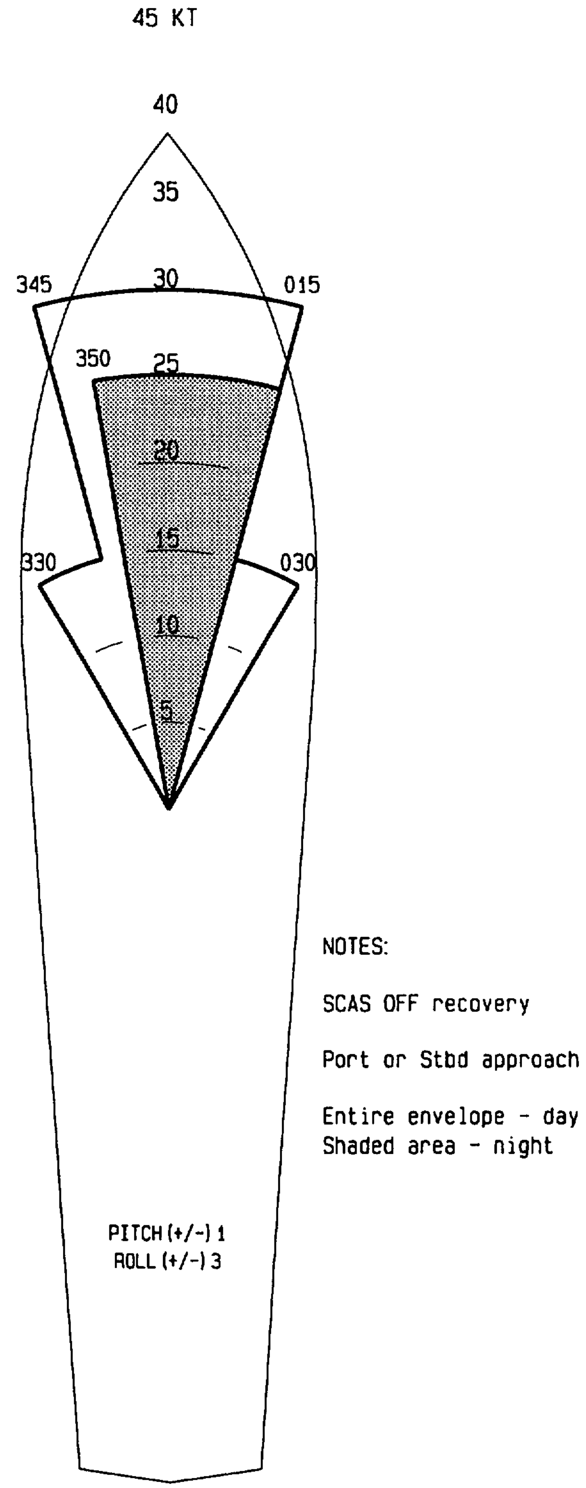
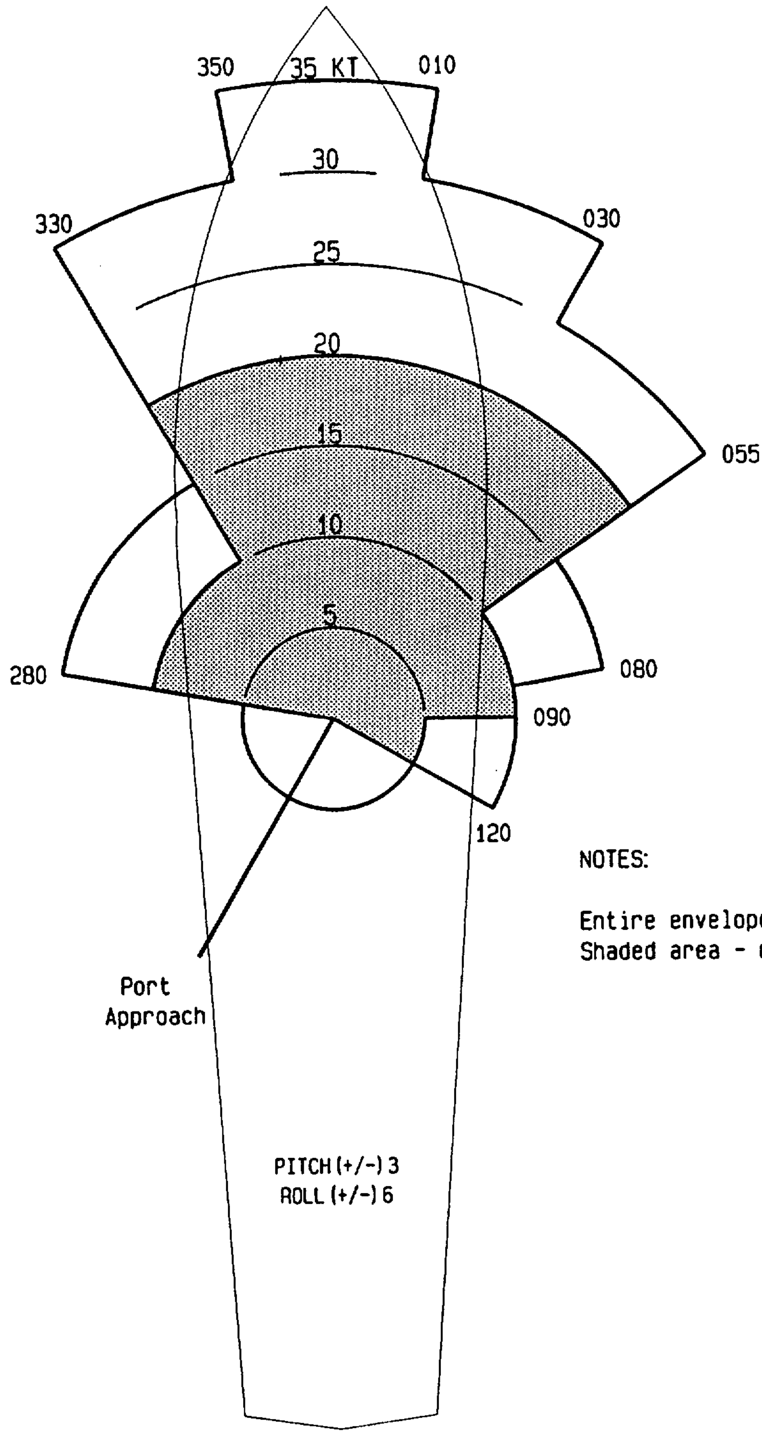


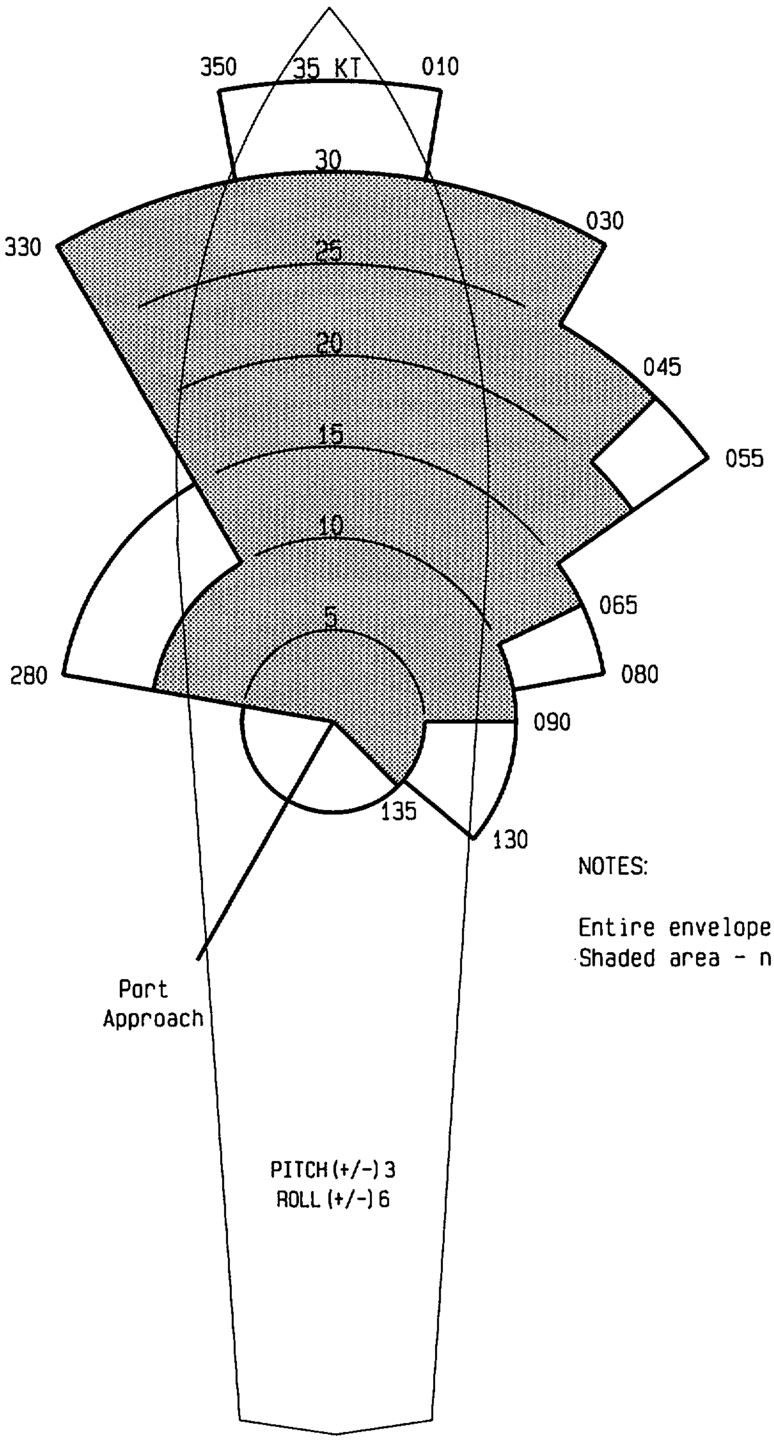
Figure B-5. AH-1W Launch and Recovery Envelopes for LSD 36 Class Ships (Sheet 3 of 3)
Sheet 3: Degraded Recovery Envelope



NOTES:

Entire envelope - day
Shaded area - night

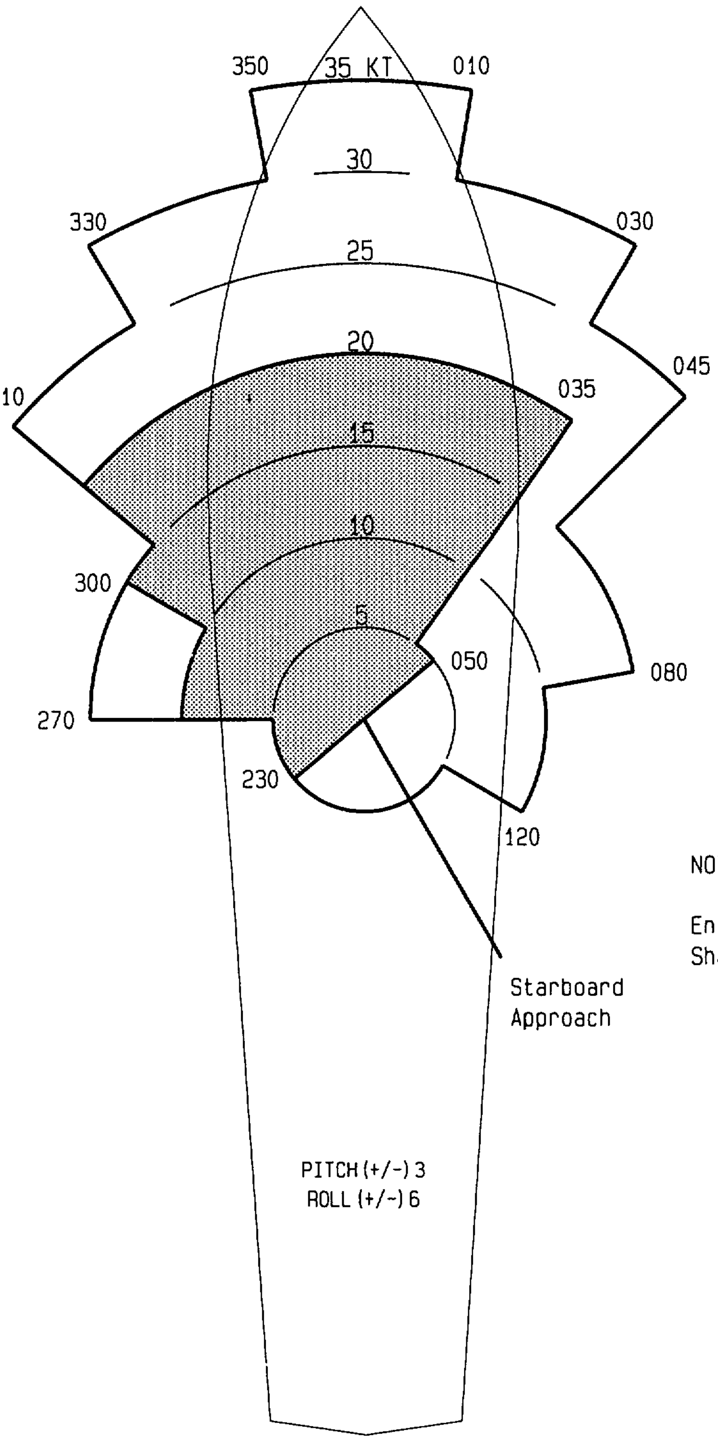
Figure B-6. AH-1W Launch and Recovery Envelopes for LSD 41 Class Ships (Sheet 1 of 4)
Sheet 1: Spot 1, Port Approach



NOTES:

Entire envelope - day
Shaded area - night

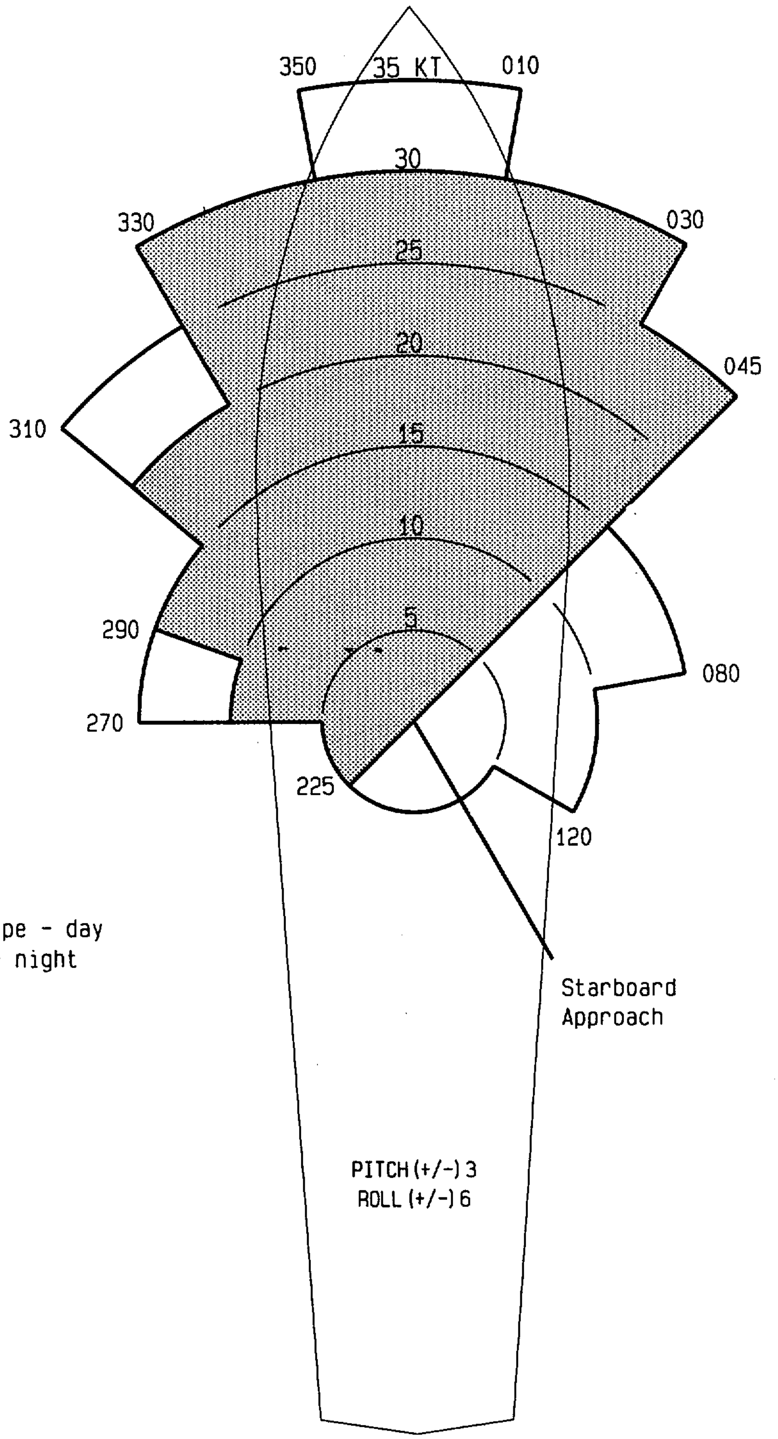
Figure B-6. AH-1W Launch and Recovery Envelopes for LSD 41 Class Ships (Sheet 2 of 4)
Sheet 2: Spot 2, Port Approach



NOTES:

Entire Envelope - Day.
Shaded area - Night.

Figure B-6. AH-1W Launch and Recovery Envelopes for LSD 41 Class Ships (Sheet 3 of 4)
Sheet 3: Spot 1, Starboard Approach



NOTES:

Entire envelope - day
Shaded area - night

Figure B-6. AH-1W Launch and Recovery Envelopes for LSD 41 Class Ships (Sheet 4 of 4)
Sheet 4: Spot 2, Starboard Approach

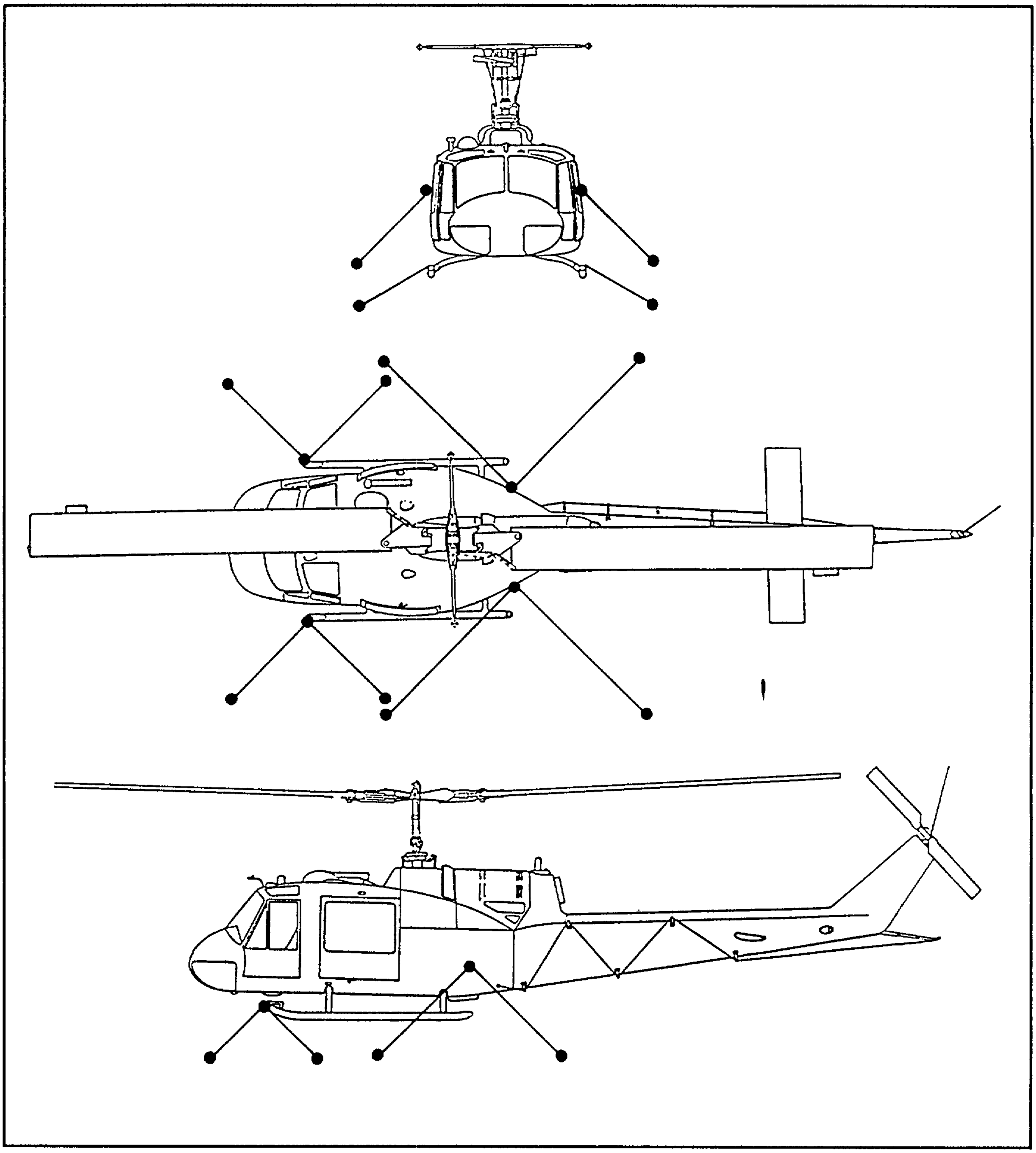


Figure B-7. UH-1 Tiedown

MODEL	UH-1N
POWER	2 – T400-CP-400
CREW	2
MAXIMUM RANGE	250 nm at 118 knots
MAXIMUM SPEED	130 knots
ENDURANCE	2.85 hr at 64 knots
WEIGHT: Basic	6,300 lb
Maximum	10,500 lb
FUEL: Type	JP-4/JP-5
Capacity	212 gal

CARGO/PASSENGER CAPABILITY: 5,000 lb external hook; 600 lb personnel hoist; seats for 13 passengers; 6 litters; 220 ft^3 internal cargo space

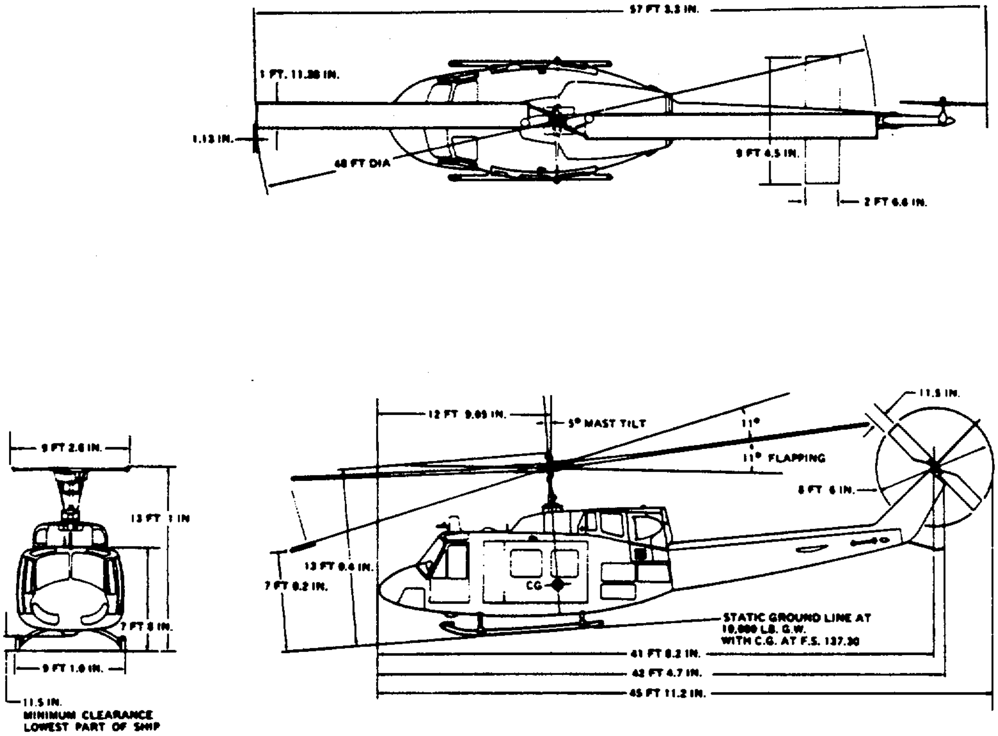


Figure B-8. UH-1N Iroquois

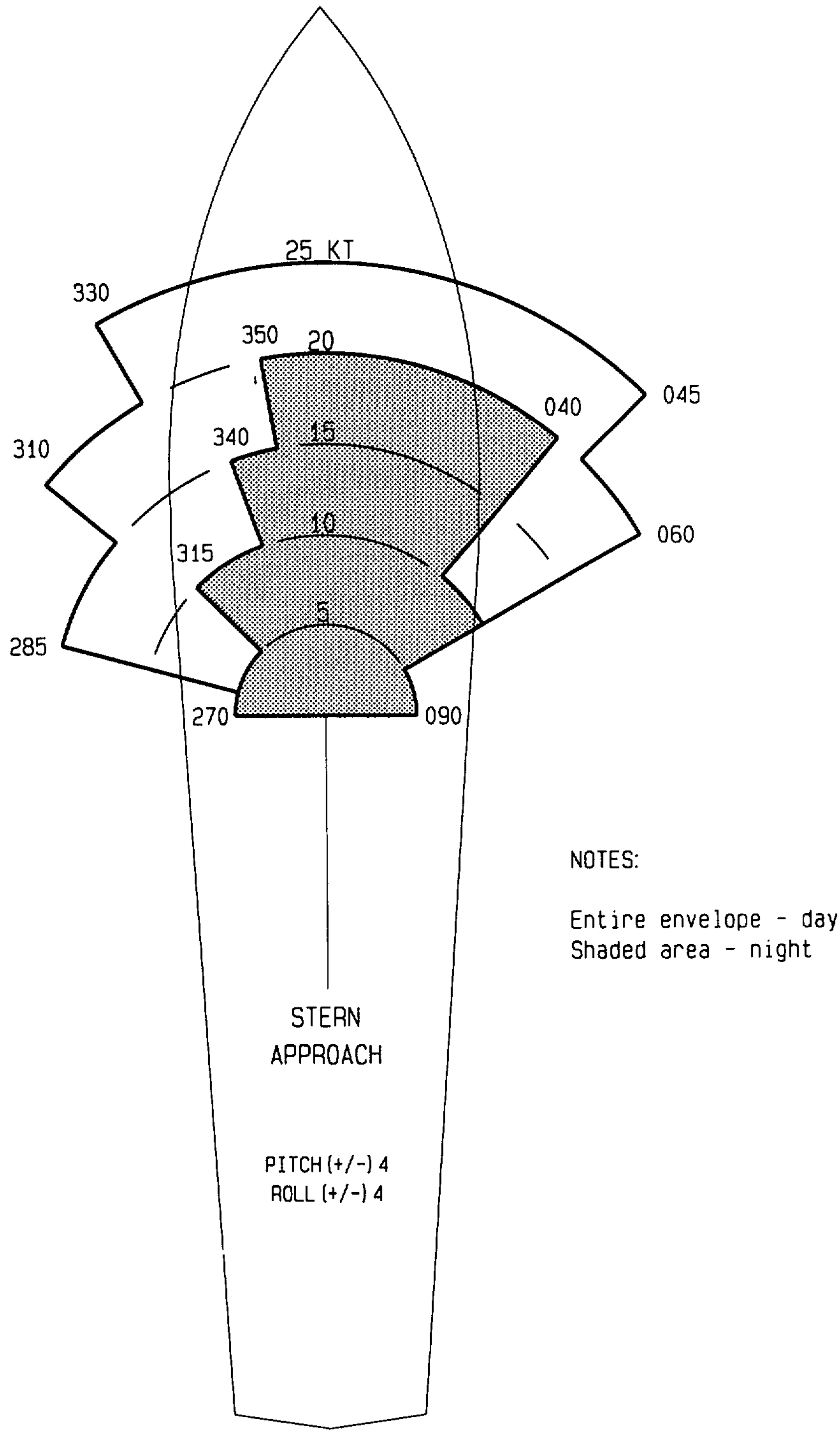


Figure B-9. UH-1N Launch and Recovery Envelope for IX 514 Class Ships

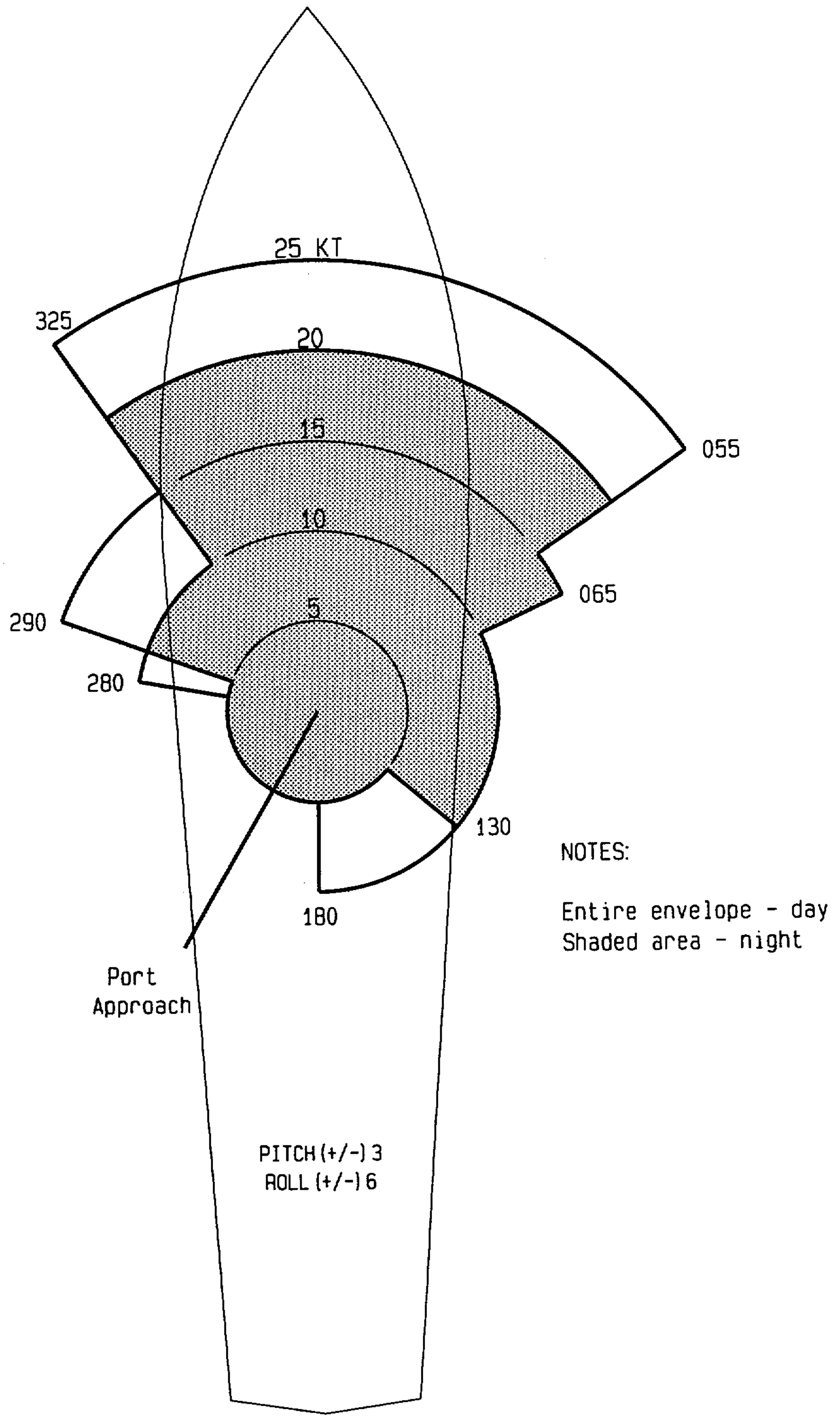


Figure B-10. UH-1N Launch and Recovery Envelopes for LPD 4 Class Ships (Sheet 1 of 8)
Sheet 1: Spot 1, Port Approach

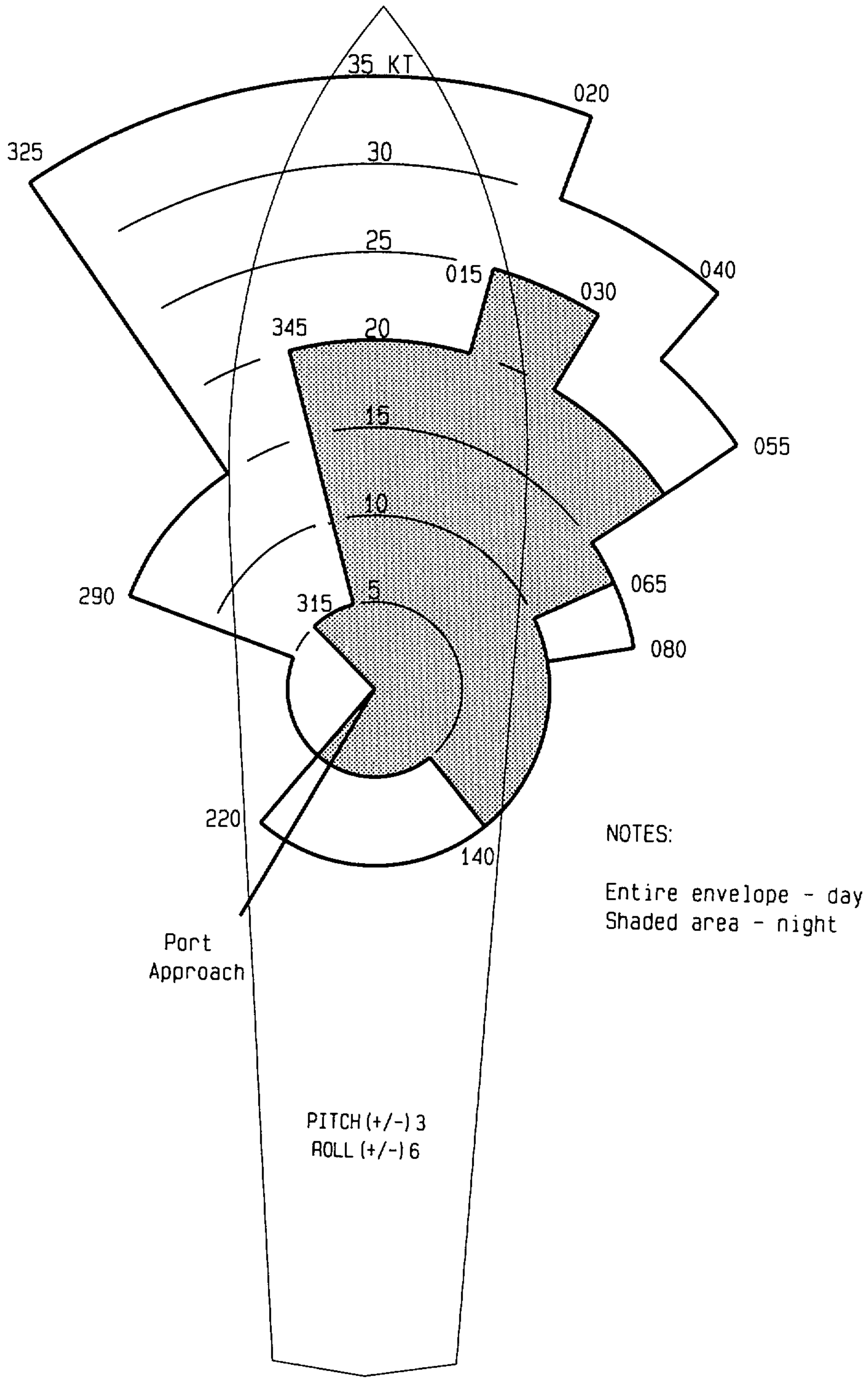


Figure B-10. UH-1N Launch and Recovery Envelopes for LPD 4 Class Ships (Sheet 2 of 8)
Sheet 2: Spot 2, Port Approach

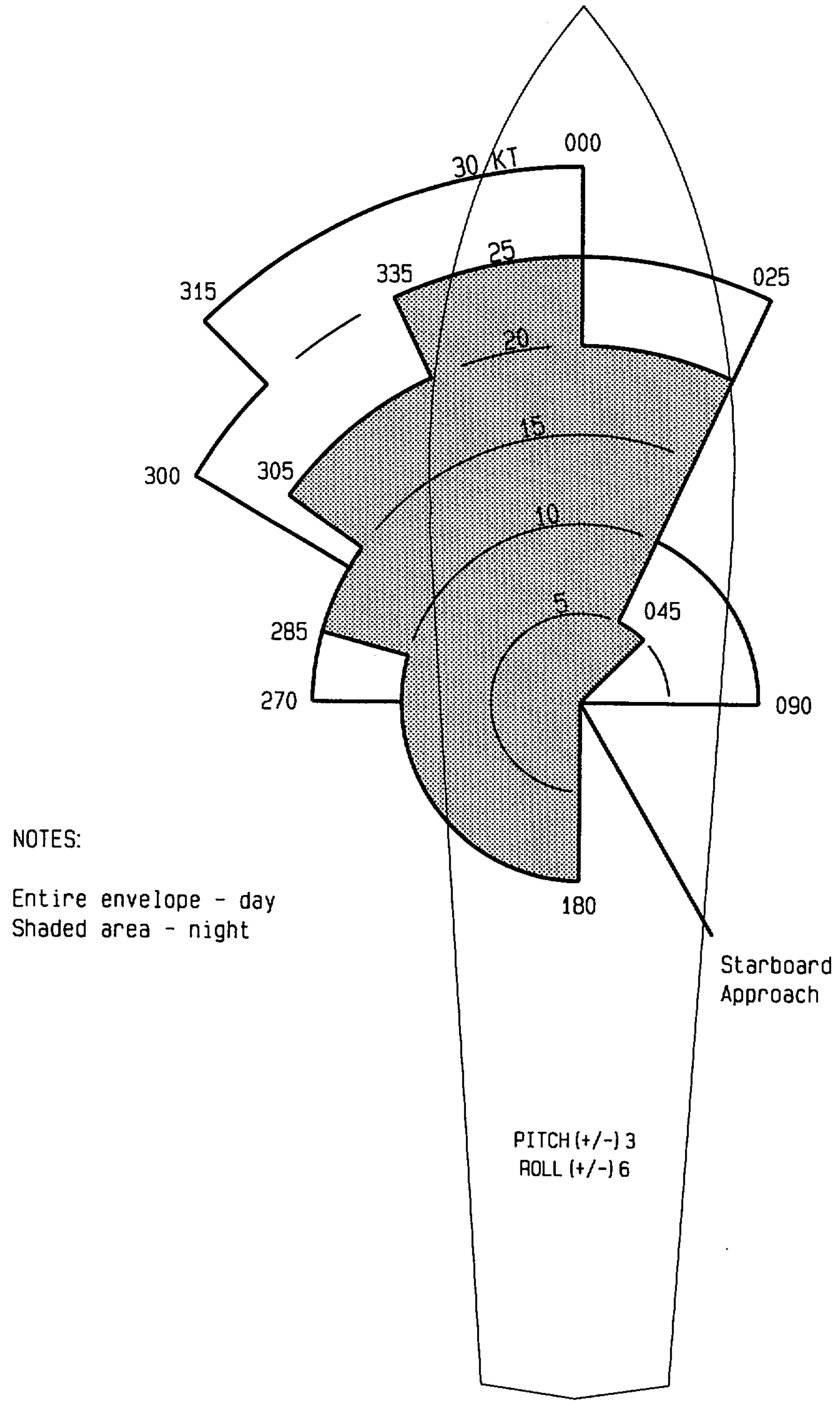
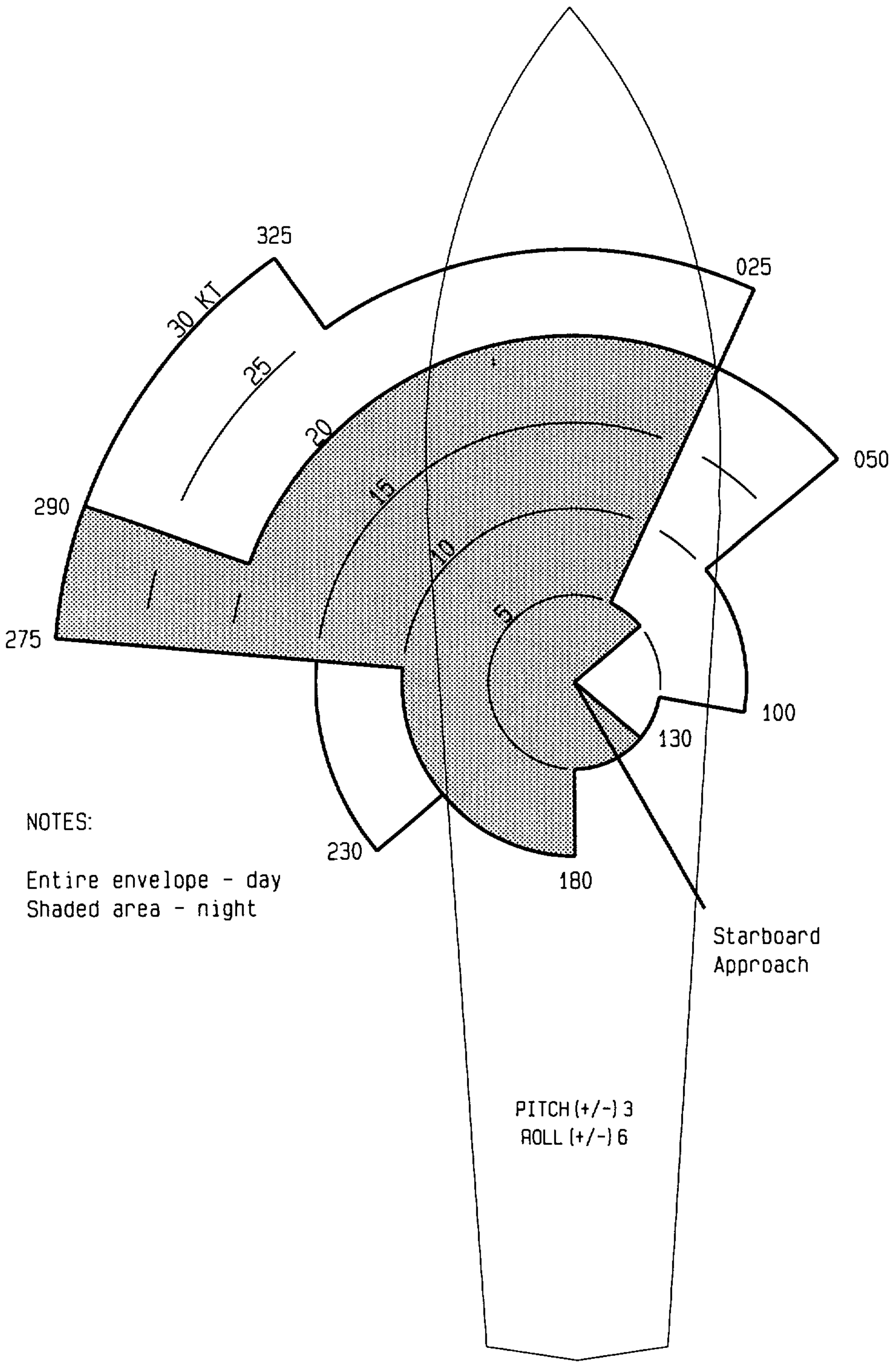


Figure B-10. UH-1N Launch and Recovery Envelopes for LPD 4 Class Ships (Sheet 3 of 8)
Sheet 3: Spot 1, Starboard Approach

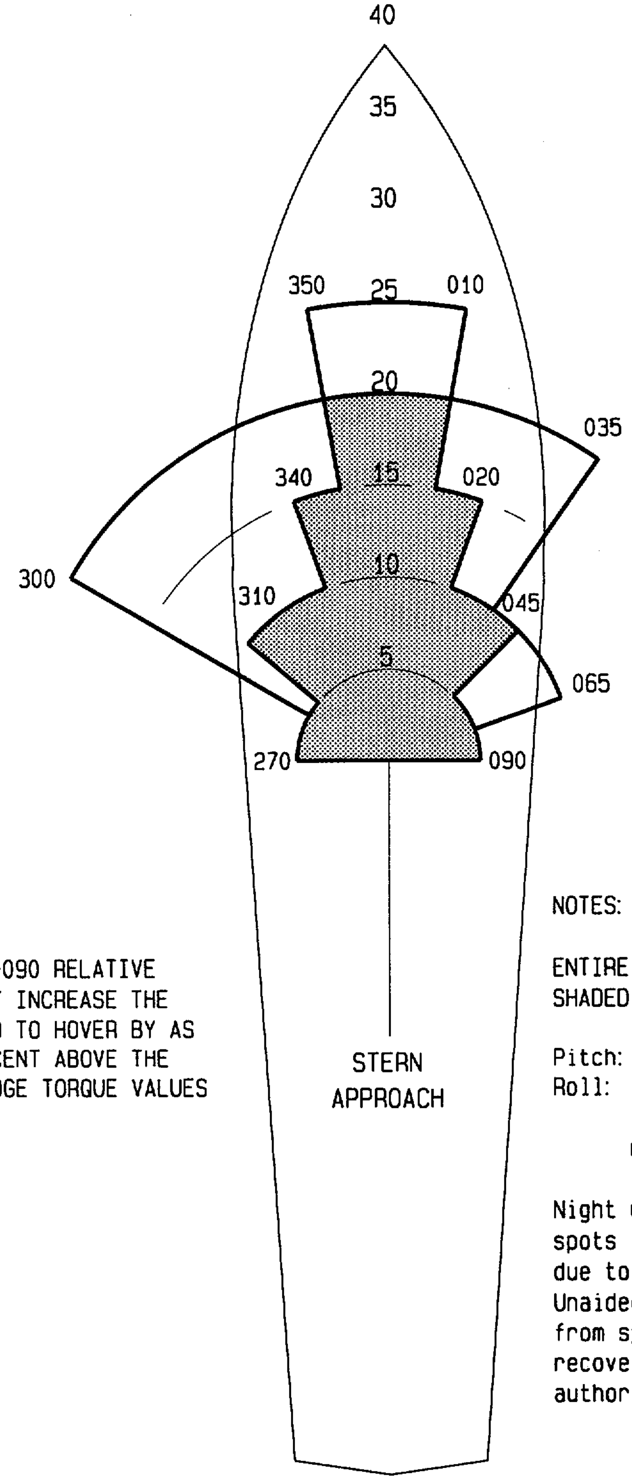


NOTES:

Entire envelope - day
Shaded area - night

Figure B-10. UH-1N Launch and Recovery Envelopes for LPD 4 Class Ships (Sheet 4 of 8)
Sheet 4: Spot 2, Starboard Approach

45 KT



CAUTION:

WINDS FROM 060-090 RELATIVE TO SHIP BOW MAY INCREASE THE TORQUE REQUIRED TO HOVER BY AS MUCH AS 15 PERCENT ABOVE THE UH-1N NATOPS HOGE TORQUE VALUES

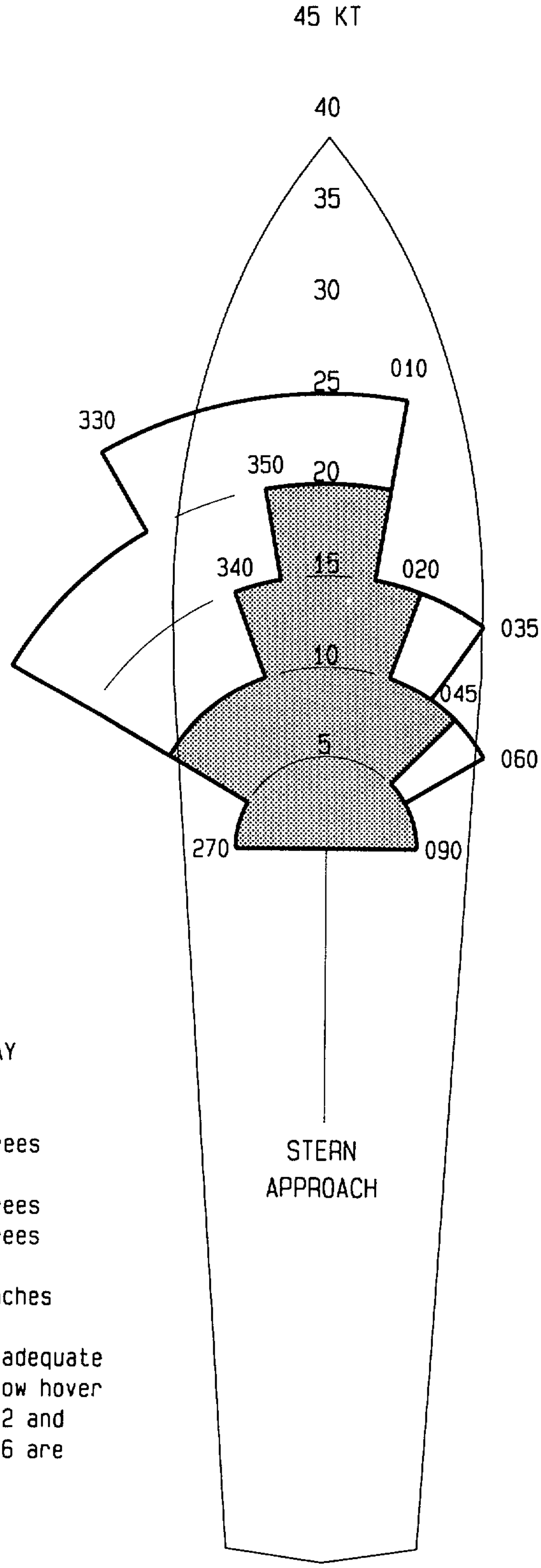
NOTES:

ENTIRE ENVELOPE - DAY
SHADED AREA - NIGHT

Pitch: (+/-) 2 degrees
Roll: (+/-)
day: 6 degrees
night: 4 degrees

Night unaided approaches to spots 3-6 are not authorized due to inadequate lighting. Unaided low hover taxi from spot 1 or 2 and recovery at spots 3-6 are authorized.

Figure B-10. UH-1N Launch and Recovery Envelopes for LPD 4 Class Ships (Sheet 5 of 8)
Sheet 5: Spot 3, Stern Approach



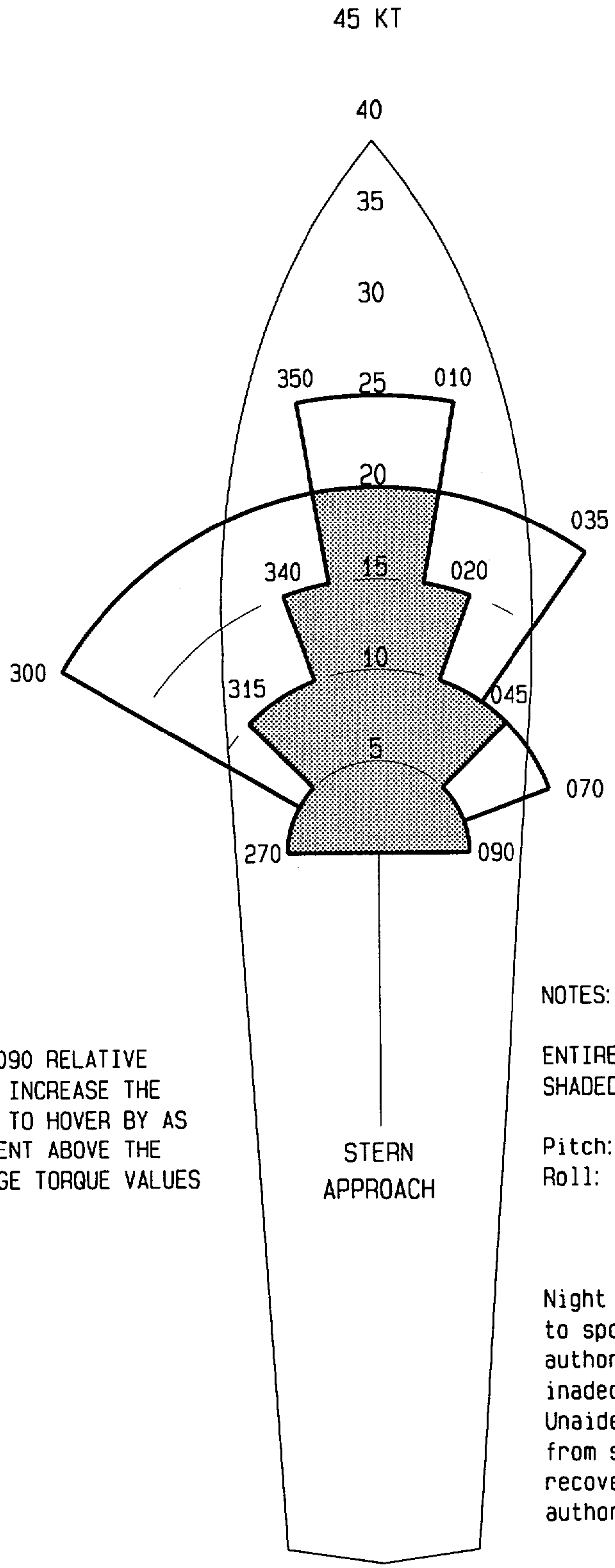
NOTES:

ENTIRE ENVELOPE - DAY
SHADED AREA - NIGHT

Pitch: (+/-) 2 degrees
Roll: (+/-)
day: 6 degrees
night: 4 degrees

Night unaided approaches to spots 3-6 are not authorized due to inadequate lighting. Unaided low hover taxi from spot 1 or 2 and recovery at spots 3-6 are authorized.

Figure B-10. UH-1N Launch and Recovery Envelopes for LPD 4 Class Ships (Sheet 6 of 8)
Sheet 6: Spot 4, Stern Approach



CAUTION:

WINDS FROM 060-090 RELATIVE TO SHIP BOW MAY INCREASE THE TORQUE REQUIRED TO HOVER BY AS MUCH AS 15 PERCENT ABOVE THE UH-1N NATOPS HOGE TORQUE VALUES

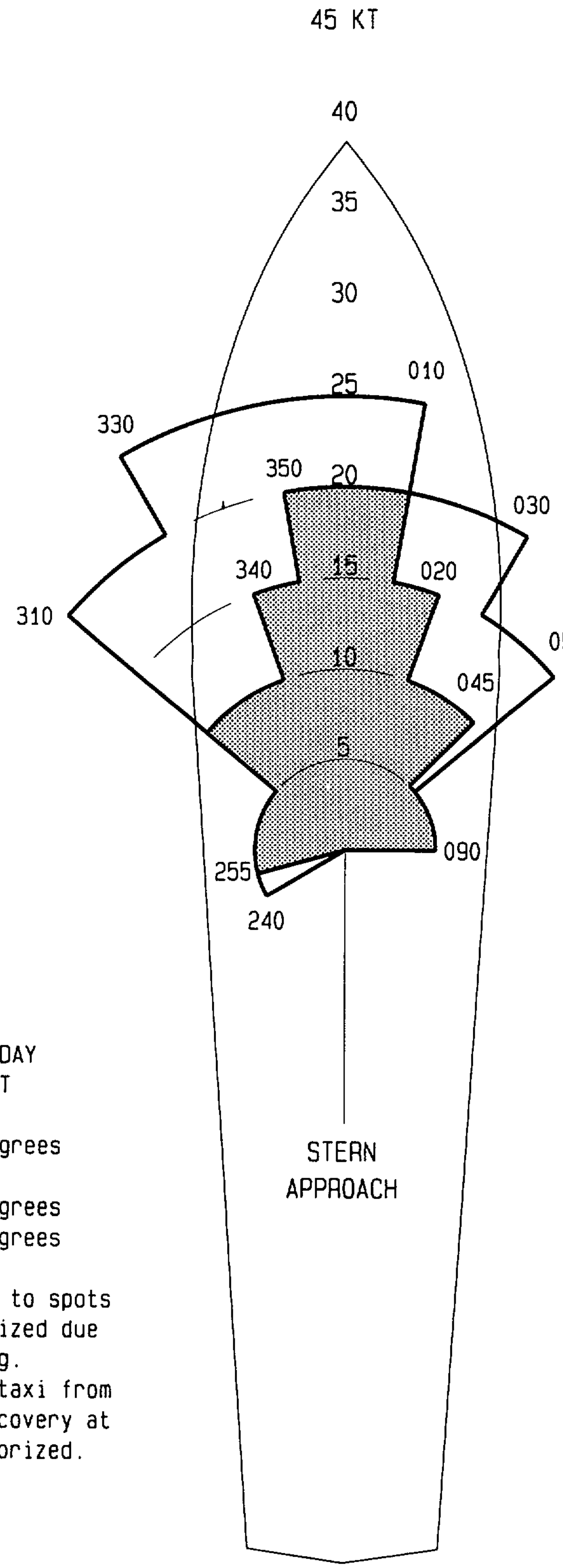
NOTES:

ENTIRE ENVELOPE - DAY
SHADED AREA - NIGHT

Pitch: (+/-) 2 degrees
Roll: (+/-)
day: 6 degrees
night: 4 degreess

Night unaided approaches to spots 3-6 are not authorized due to inadequate lighting. Unaided low hover taxi from spots 1 or 2 and recovery at spots 3-6 are authorized.

Figure B-10. UH-1N Launch and Recovery Envelopes for LPD 4 Class Ships (Sheet 7 of 8)
Sheet 7: Spot 5, Stern Approach



NOTES:

ENTIRE ENVELOPE - DAY
SHADED AREA - NIGHT

Pitch: (+/-) 2 degrees
Roll: (+/-)
day: 6 degrees
night: 4 degrees

Unaided approaches to spots 3-6 are not authorized due inadequate lighting.
Unaided low hover taxi from spot 1 or 2 and recovery at spots 3-6 are authorized.

Figure B-10. UH-1N Launch and Recovery Envelopes for LPD 4 Class Ships (Sheet 8 of 8)
Sheet 8: Spot 6, Stern Approach

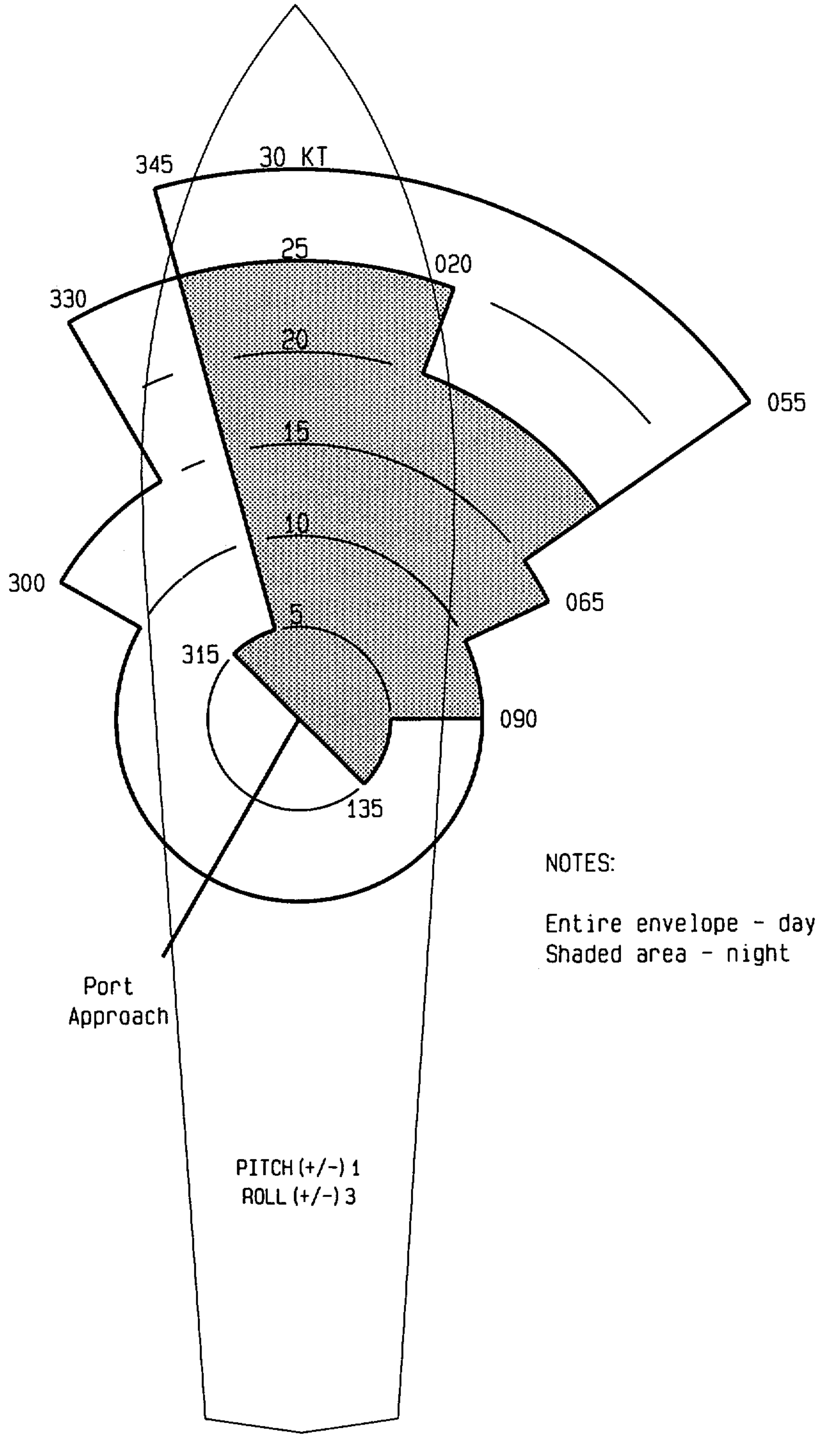
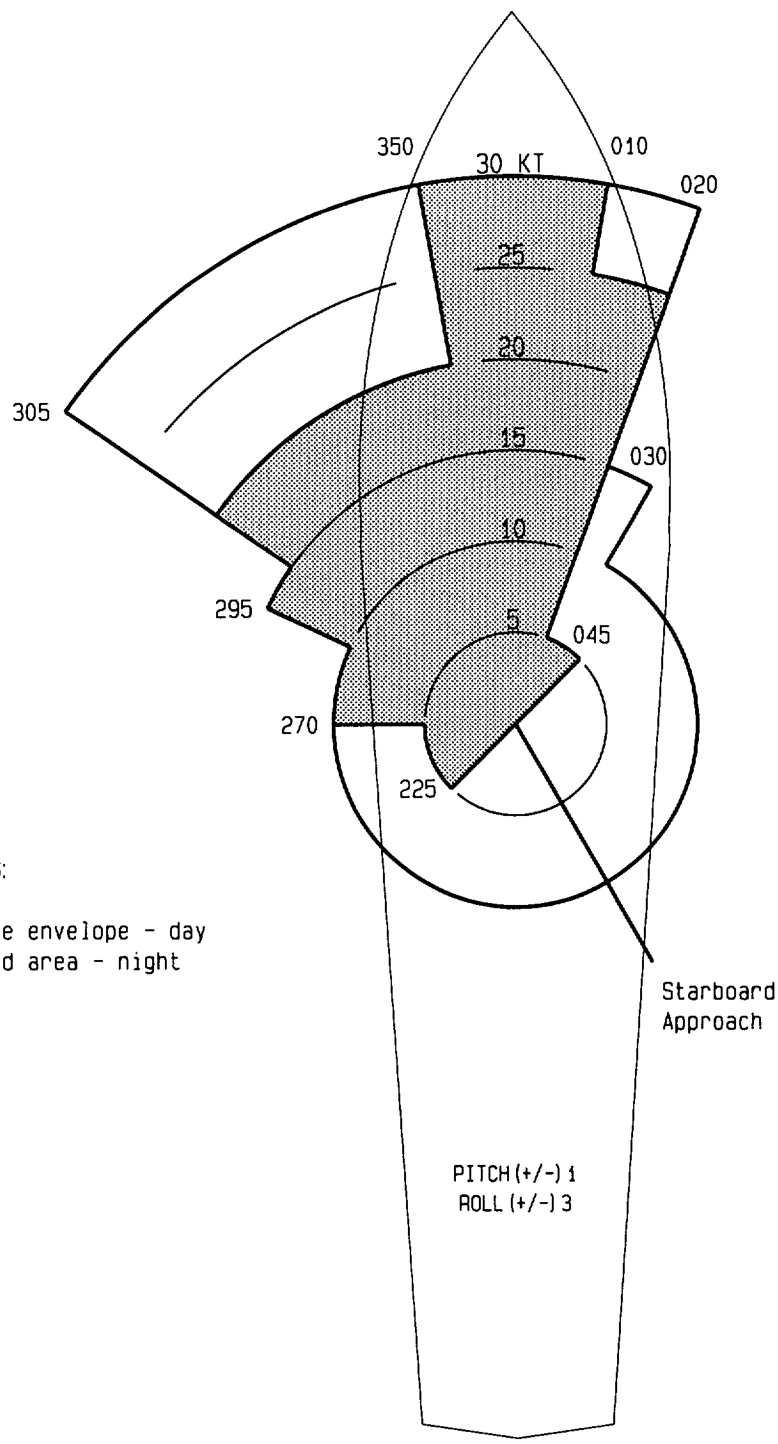


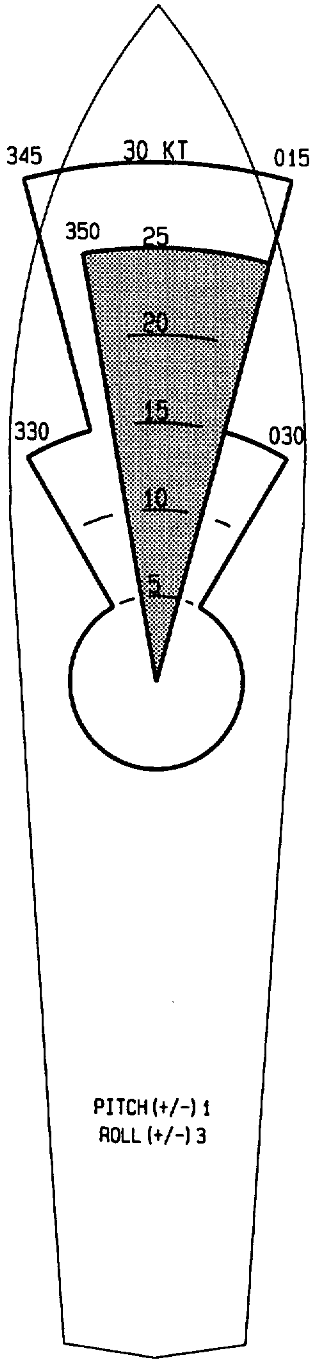
Figure B-11. UH-1N Launch and Recovery Envelopes for LSD 36 Class Ships (Sheet 1 of 3)
Sheet 1: Port Approach



NOTES:

Entire envelope - day
Shaded area - night

Figure B-11. UH-1N Launch and Recovery Envelopes for LSD 36 Class Ships (Sheet 2 of 3)
Sheet 2: Starboard Approach



NOTES:

SCAS OFF recovery

Port or Stbd approach

Entire envelope - day
Shaded area - night

Figure B-11. UH-1N Launch and Recovery Envelopes for LSD 36 Class Ships (Sheet 3 of 3)
Sheet 3: Degraded Recovery Envelope

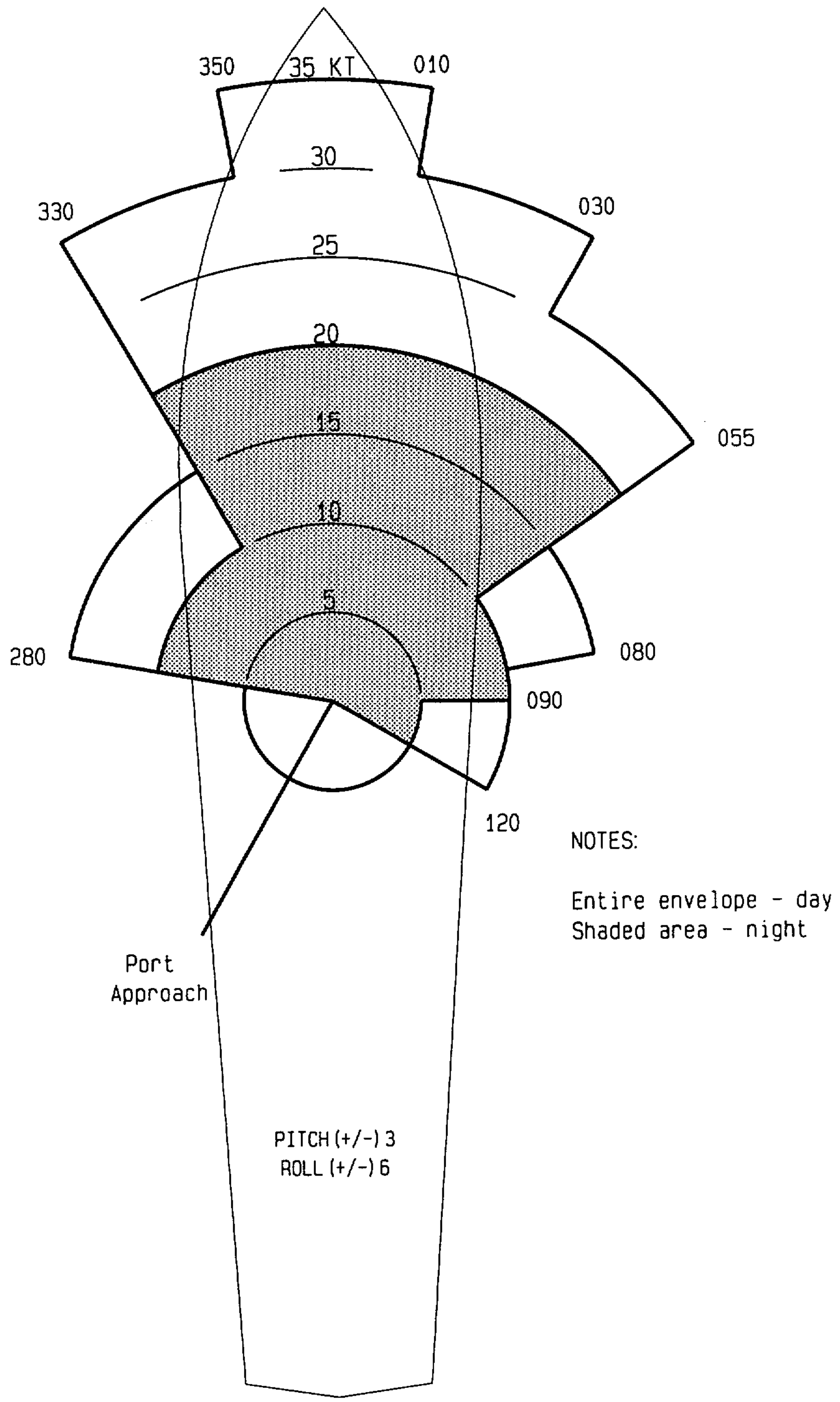
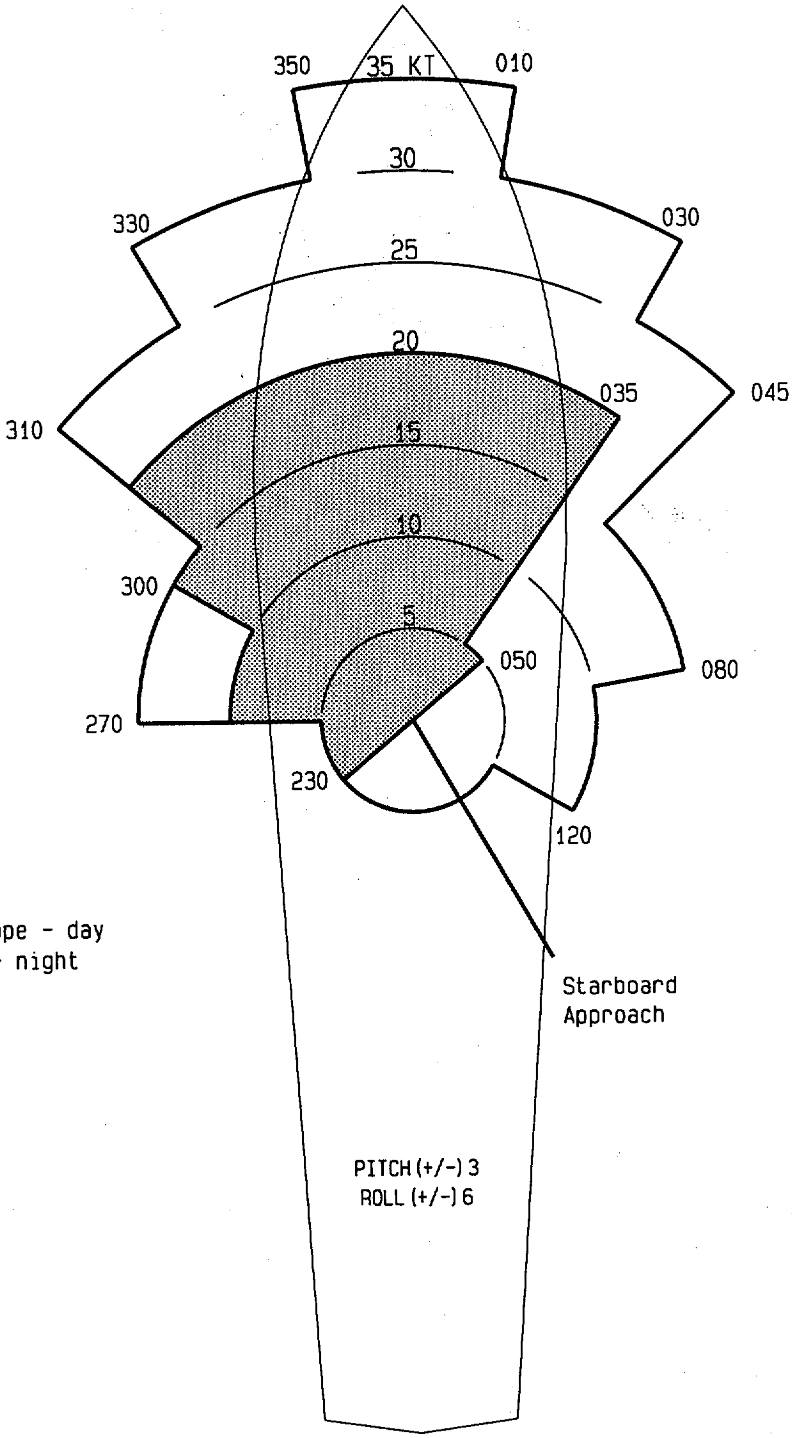


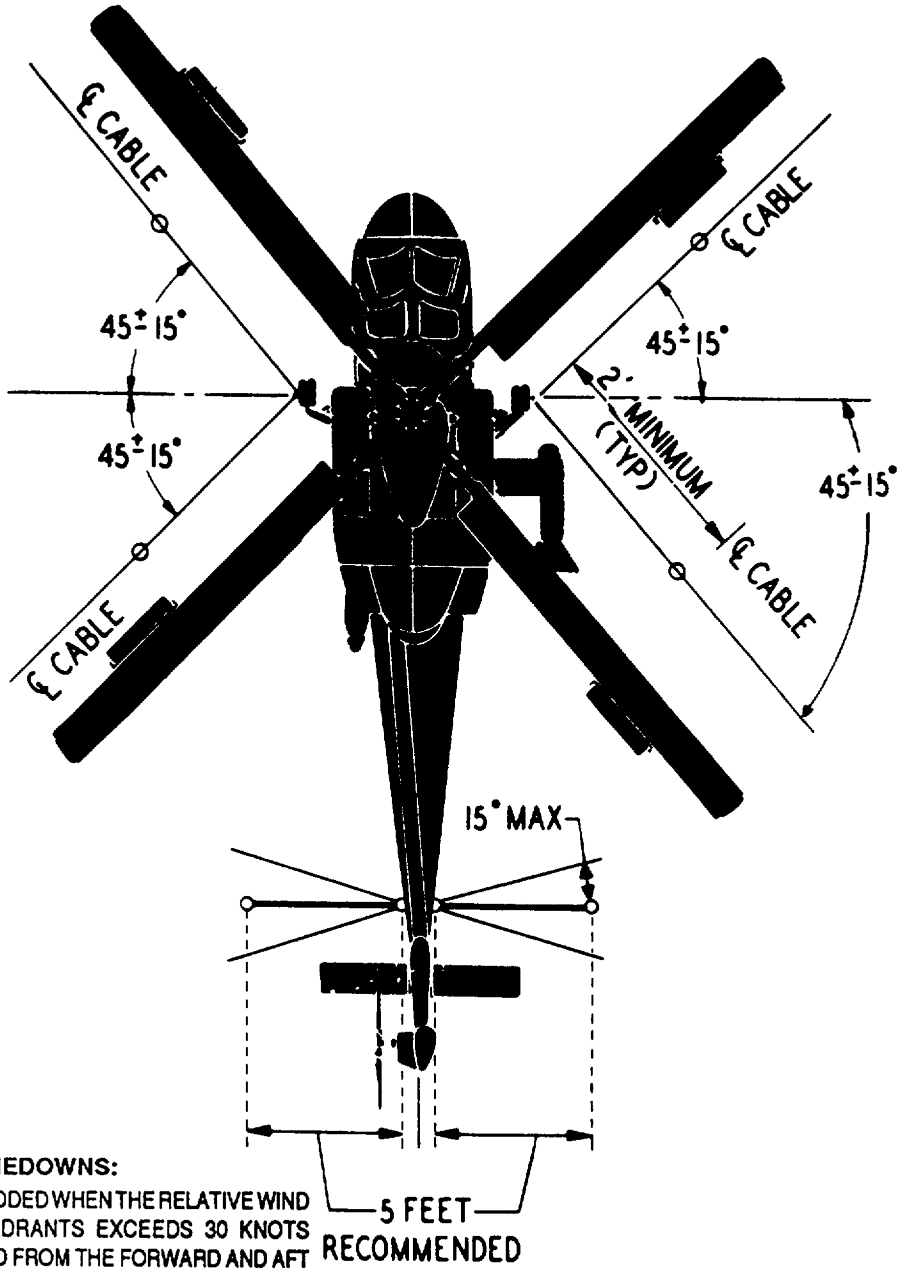
Figure B-12. UH-1N Launch and Recovery Envelopes for LSD 41 Class Ships (Sheet 1 of 2)
Sheet 1: Spots 1 and 2, Port Approach



NOTES:

Entire envelope - day
Shaded area - night

Figure B-12. UH-1N Launch and Recovery Envelopes for LSD 41 Class Ships (Sheet 2 of 2)
Sheet 2: Spots 1 and 2, Starboard Approach



TAIL TIEDOWNS:

TAIL TIEDOWNS SHALL BE ADDED WHEN THE RELATIVE WIND FROM THE LATERAL QUADRANTS EXCEEDS 30 KNOTS AND/OR THE RELATIVE WIND FROM THE FORWARD AND AFT QUADRANTS EXCEEDS 45 KNOTS.

CAUTION

TOW RINGS LOCATED INBOARD OF LANDING GEAR SHOULD NOT NORMALLY BE USED AS TIEDOWN RINGS.

DO NOT RIG TIEDOWN LINES TAUT, BUT DO REMOVE SLACK.

WHEN APPLYING CHOCKS TO H-2 AIRCRAFT ENSURE BRAKE HYDRAULIC LINE DOES NOT BECOME FOULED IN CHOCK.

MAIN LANDING GEAR TIEDOWNS:

1. REQUIRED FOR ALL OPERATIONS.
2. INCLUDED ANGLE BETWEEN THE TWO TIEDOWNS ON EACH MAIN GEAR SHOULD BE APPROXIMATELY 90°.
3. DISTANCE BETWEEN AXLE TIEDOWN RING AND DECK ATTACHMENT IS TO BE AT LEAST 2 FEET.

Figure B-13. H-2 Tiedown

MODEL	SH-2F	SH-2F (WITH AFC 293)
POWER	2-T58-GE-8F	2-T58-GE-8F
CREW	3	3
MAXIMUM RANGE	274 nm at 120 knots	337 nm at 120 knots
MAXIMUM SPEED	150 knots	150 knots
ENDURANCE	3.0 hr at 70 knots (12,800 lb)	3.4 hr at 70 knots (13,500 lb)
WEIGHT: Basic	8,619 lb	8,918lb
Maximum	12,800 lb	13,500 lb
FUEL: Type	JP-5/JP-4	JP-5/JP-4
Capacity	274 gal (392 with auxiliary tanks)	274 gal (472 with auxiliary tanks)

CARGO/PASSENGER CAPABILITY: 4,000-lb external hook; 600-lb personnel hoist; seats for 1 to 3 passengers; space for one rescue litter (if aircraft is not configured with sonobuoy launcher for ASW).

Mission	Fuel Available (hours)	Fuel Available hours (with AFC 293)
ASW (Full sonobuoys and smokes):		
TWO auxiliary tanks	2.5	3.0
ONE auxiliary tanks	2.0	2.3
NO auxiliary tanks	1.5	1.5
ASST		
TWO auxiliary tanks	2.5	3.0
Utility	2.5	3.0

NOTES:

Maximum wind for rotor engagement/disengagement, use wind diagrams in Figure B-13.

Cargo hook capacity is severely limited by gross weight. Considerations: cargo hook is nonstandard; it requires a 1-inch pendant (Mk 128 Mod 0).

Night operating limits apply to either red or white deck lighting unless otherwise stated. Night operations within these limits require all visual landing aid systems to be operative.

Figure B-14. SH-2F/G Sea Sprite (Sheet 1 of 2)

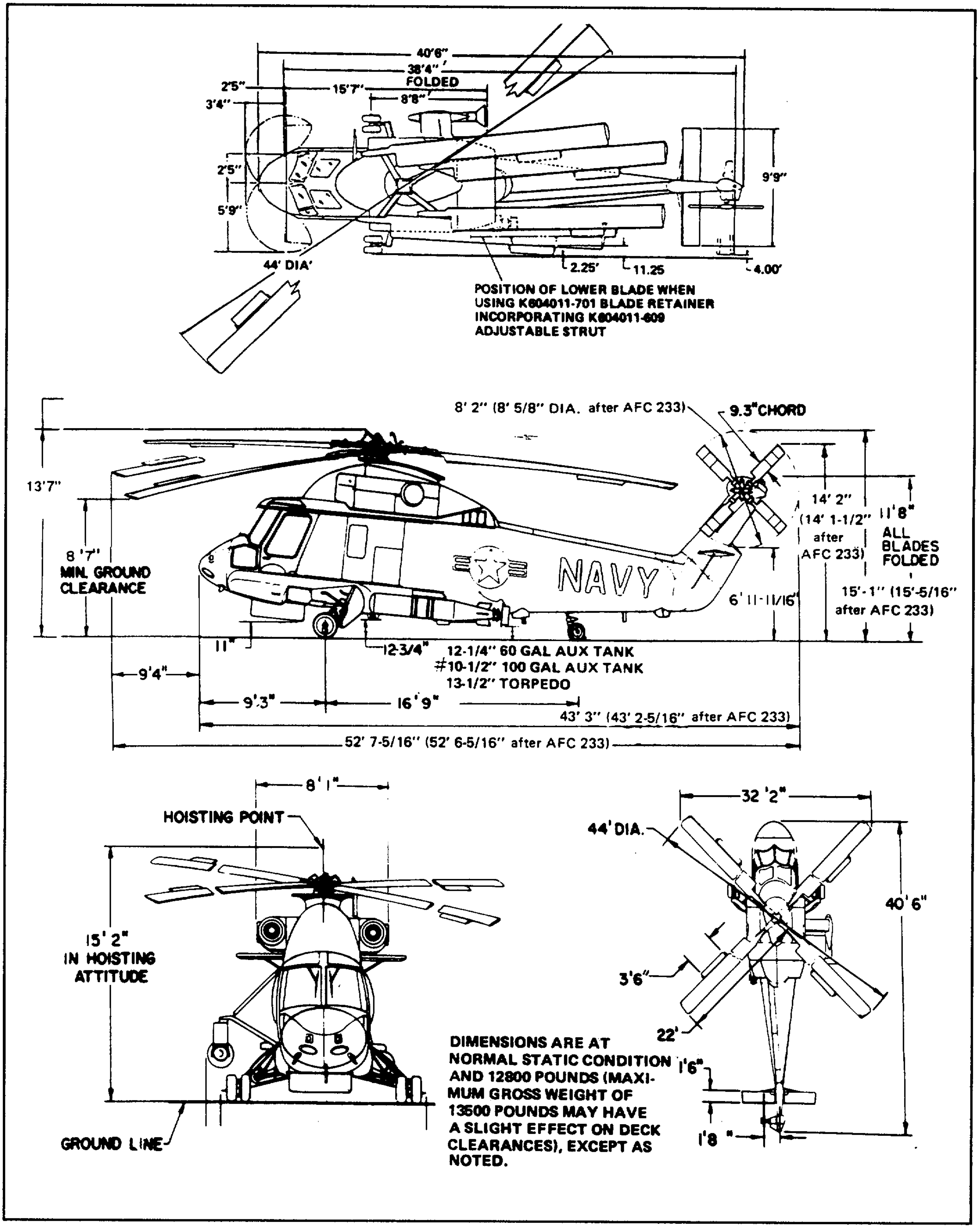
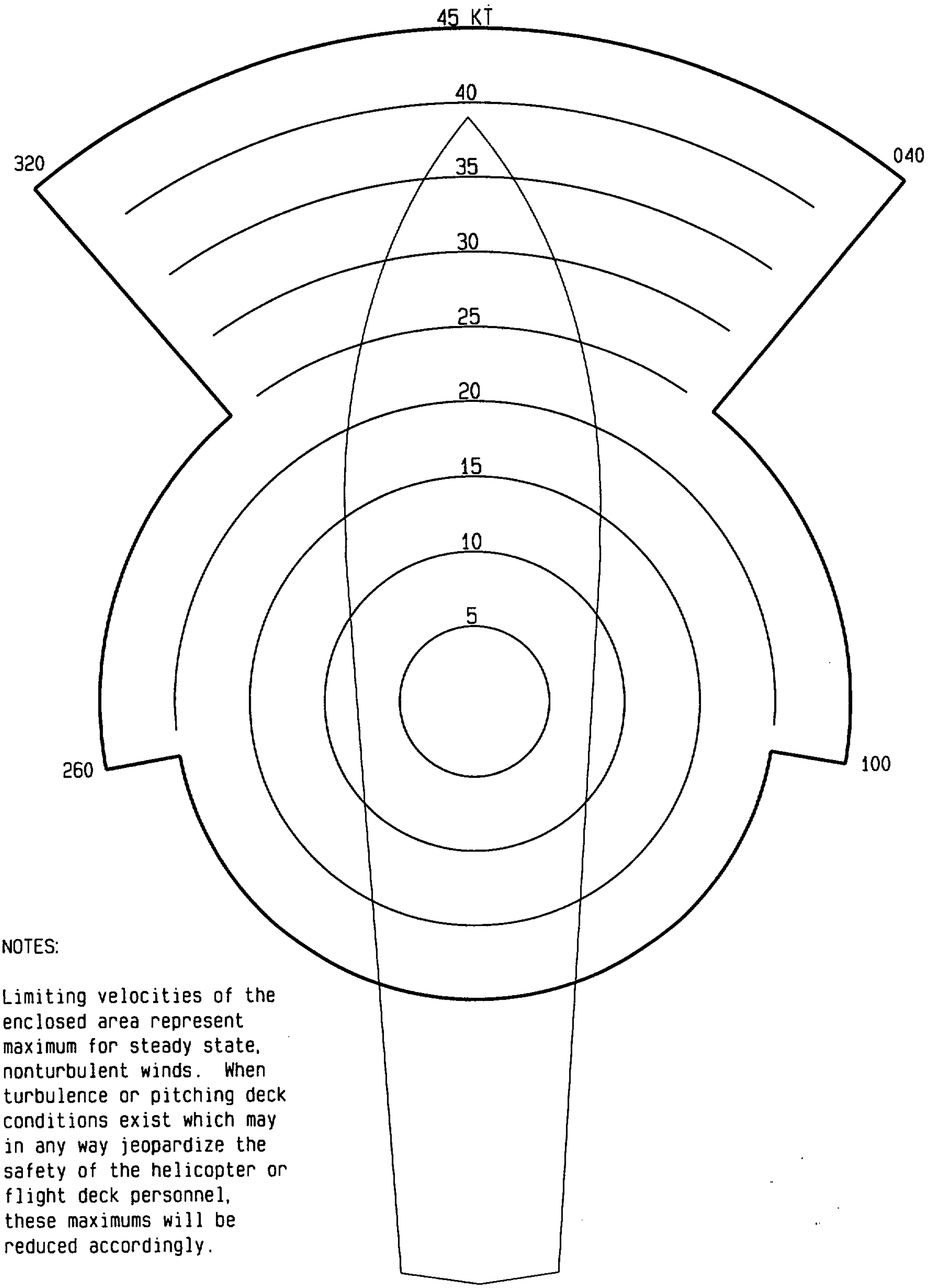


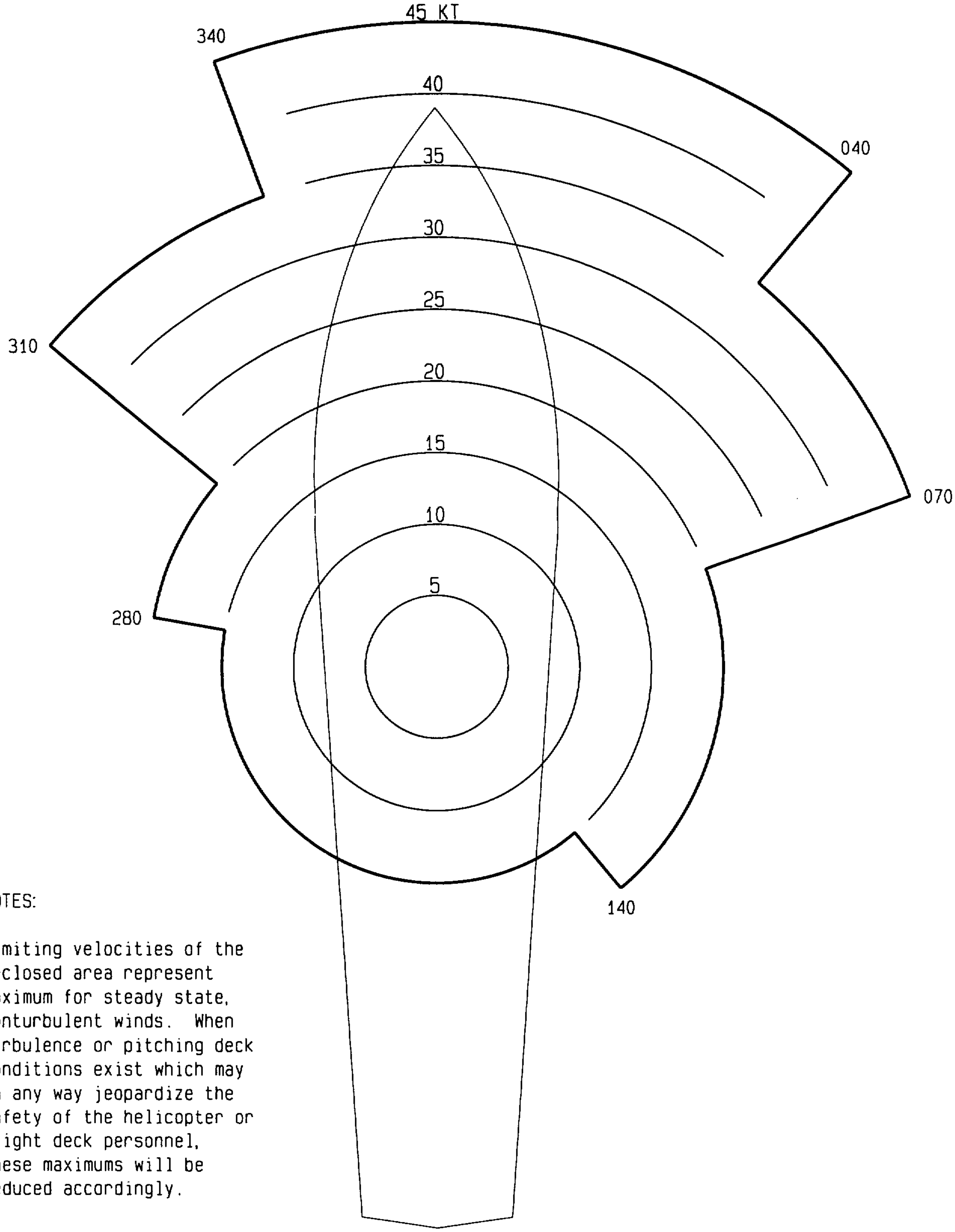
Figure B-14. SH-2F/G Sea Sprite (Sheet 2 of 2)



NOTES:

Limiting velocities of the enclosed area represent maximum for steady state, nonturbulent winds. When turbulence or pitching deck conditions exist which may in any way jeopardize the safety of the helicopter or flight deck personnel, these maximums will be reduced accordingly.

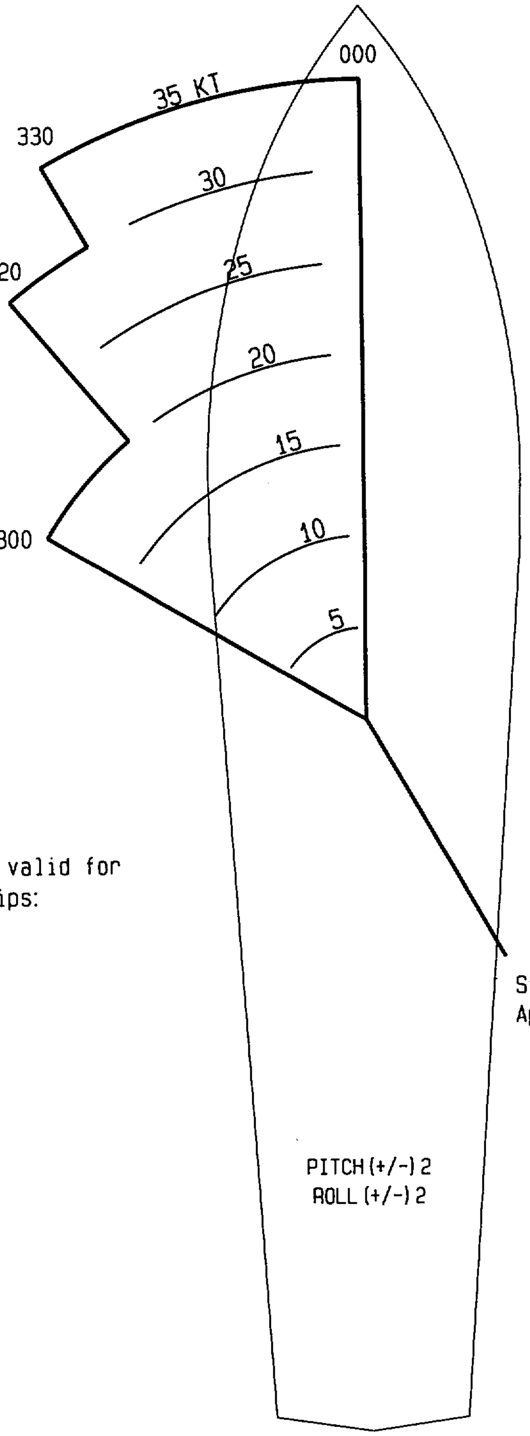
Figure B-15. SH-2F/G Engage/Disengage General Envelope



NOTES:

Limiting velocities of the enclosed area represent maximum for steady state, nonturbulent winds. When turbulence or pitching deck conditions exist which may in any way jeopardize the safety of the helicopter or flight deck personnel, these maximums will be reduced accordingly.

Figure B-16. SH-2F/G Engage/Disengage Envelope for DD 963 Class Ships



This envelope is valid for the following ships:

AD 37-38
LCC 19-20
LPD 4-15
LSD 36-40

NOTES:

Day envelope.

Figure B-17. SH-2F/G Launch and Recovery Envelopes for AD/LCC/LPD/LSD Class Ships

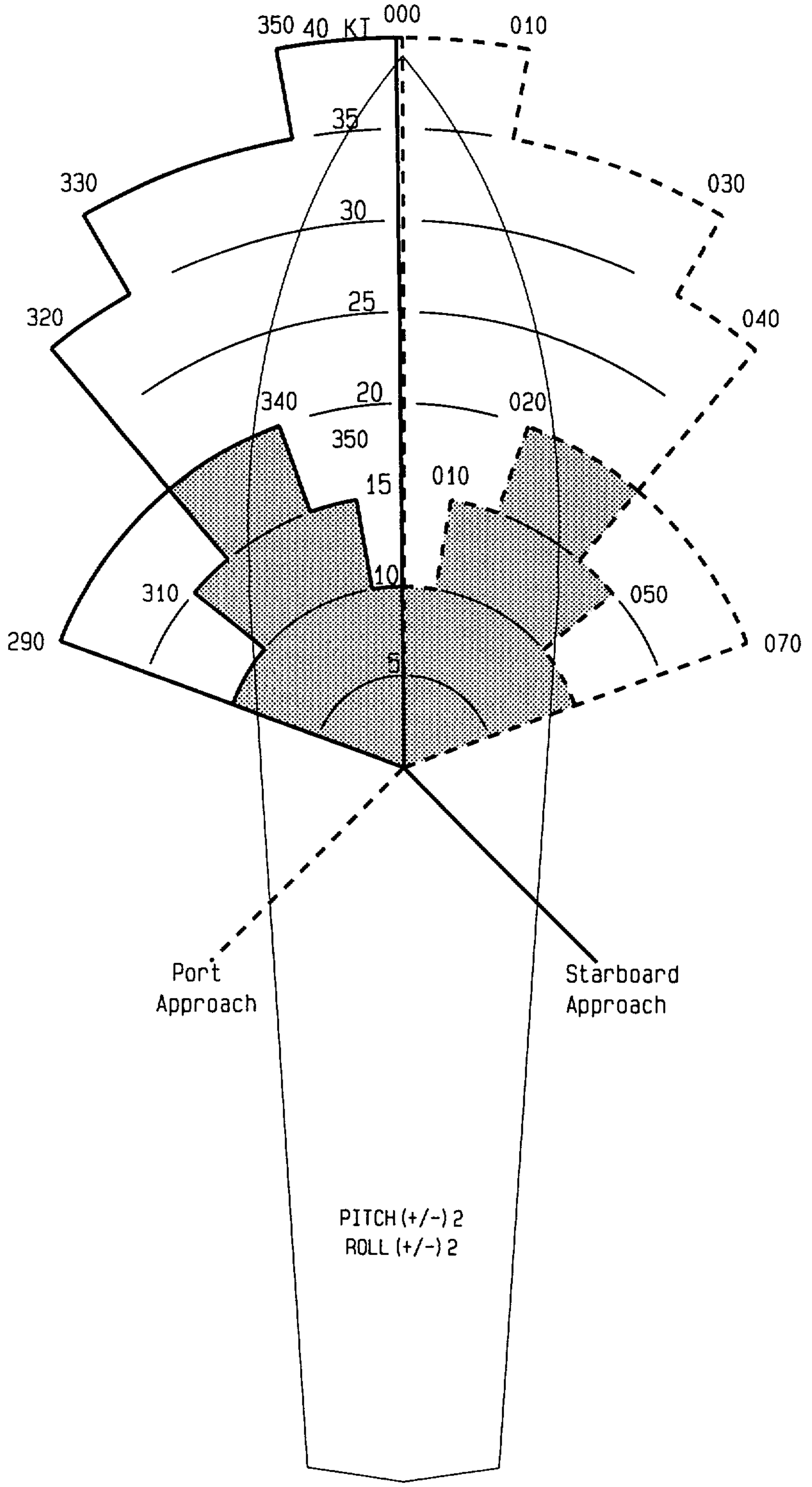
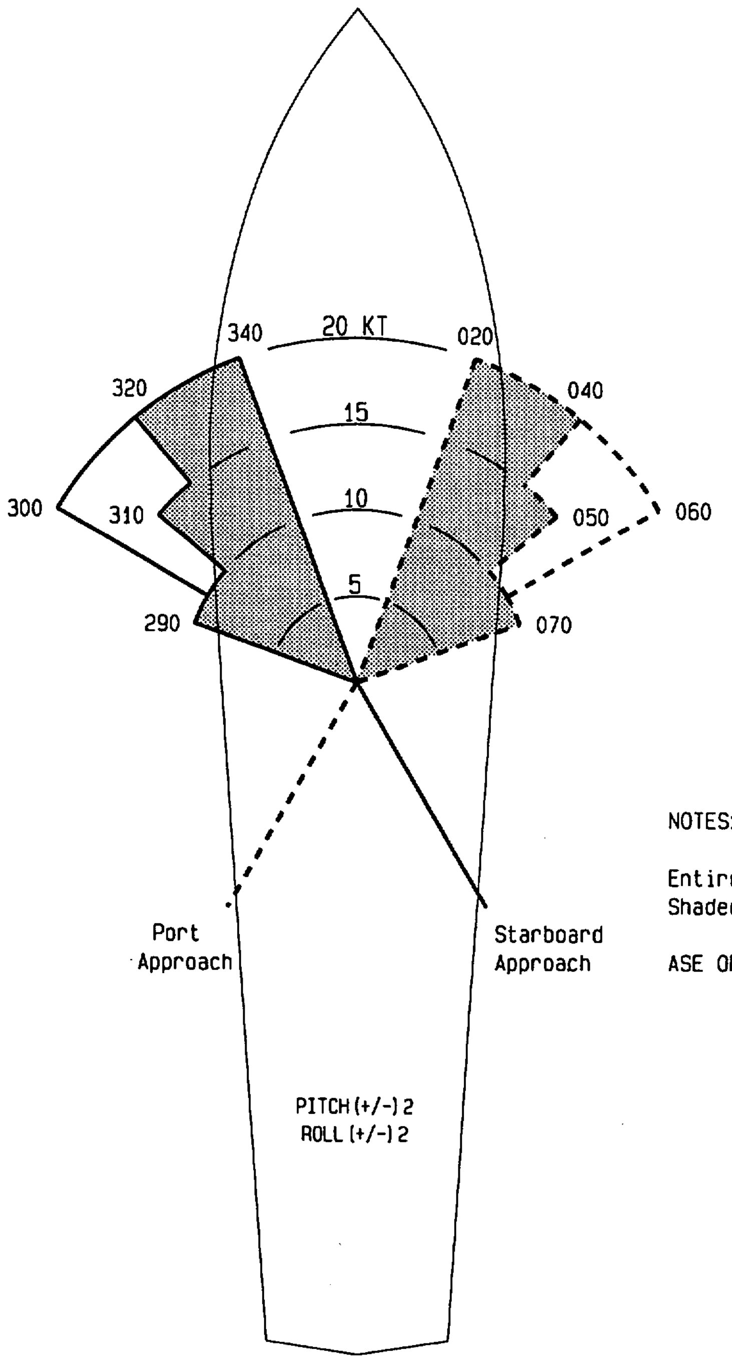


Figure B-18. SH-2F/G Launch and Recovery Envelopes for AE 26 Class Ships (Sheet 1 of 2)
Sheet 1: Port and Starboard Approaches

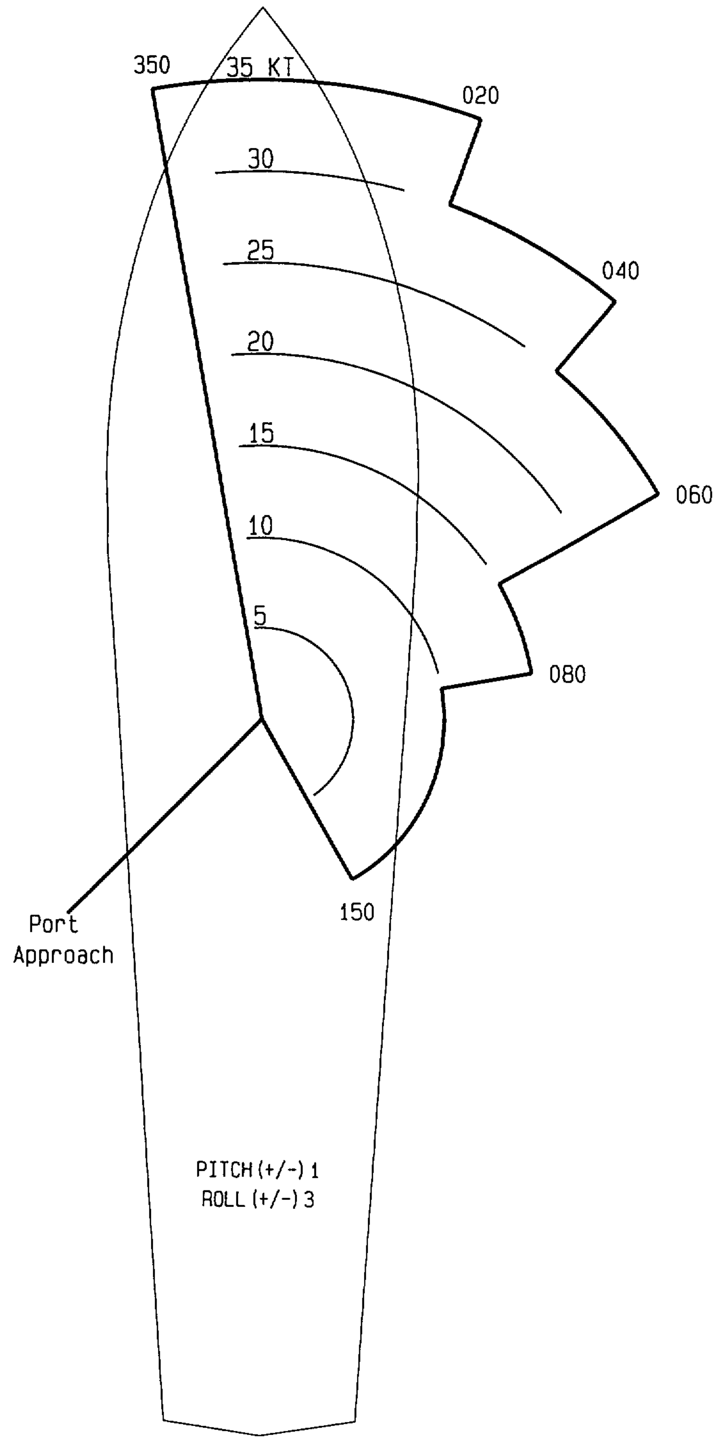


NOTES:

Entire Envelope: Day
Shaded Area: Night

ASE OFF

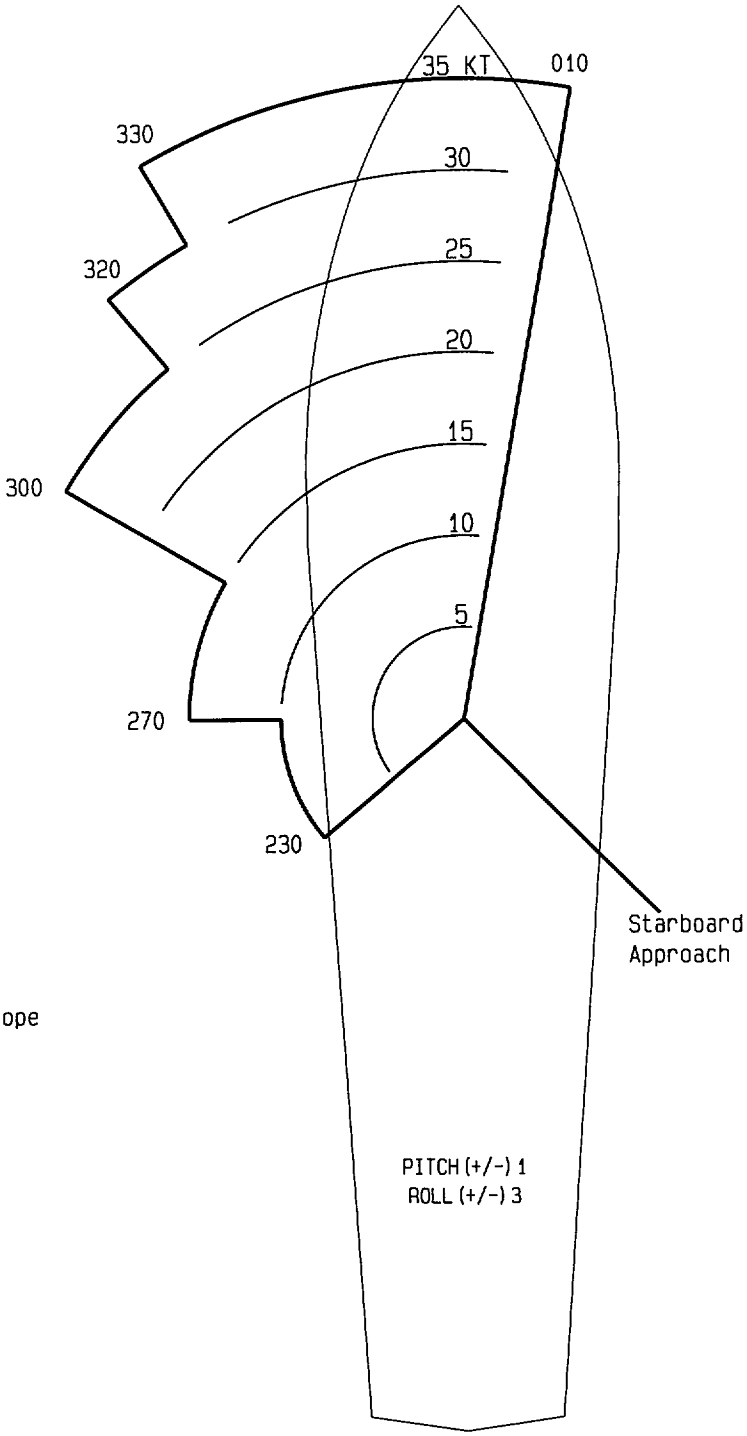
Figure B-18. SH-2F/G Launch and Recovery Envelopes for AE 26 Class Ships (Sheet 2 of 2)
Sheet 2: Degraded Recovery Envelope



NOTES:

Day envelope

Figure B-19. SH-2F/G Launch and Recovery Envelopes for T-AFS 1/AGF/AOR Class Ships (Sheet 1 of 6)
Sheet 1: Port Approach, Daytime



NOTES:

Day envelope

Figure B-19. SH-2F/G Launch and Recovery Envelopes for T-AFS 1/AGF/AOR Class Ships (Sheet 2 of 6)
Sheet 2: Starboard Approach, Daytime

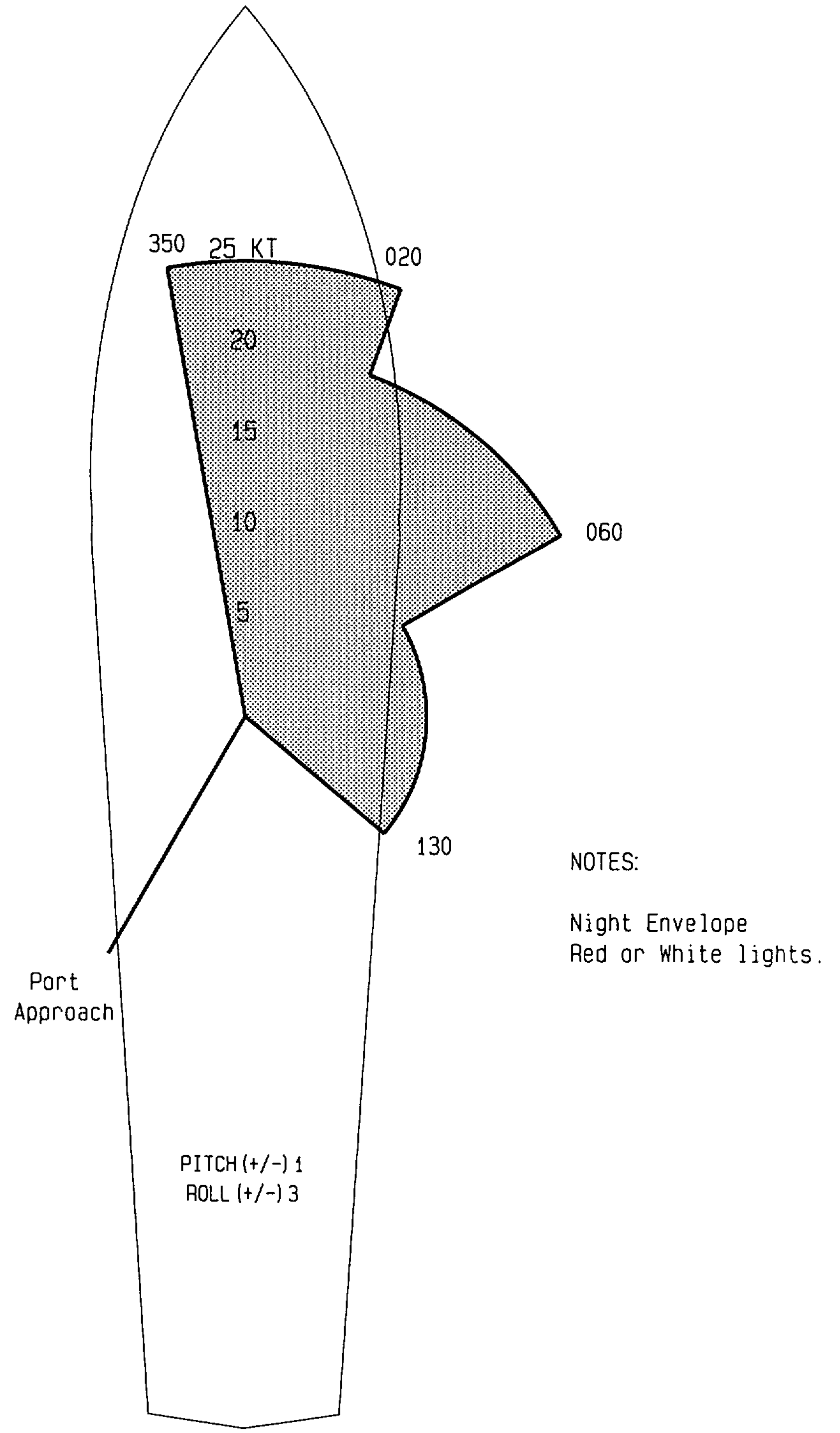
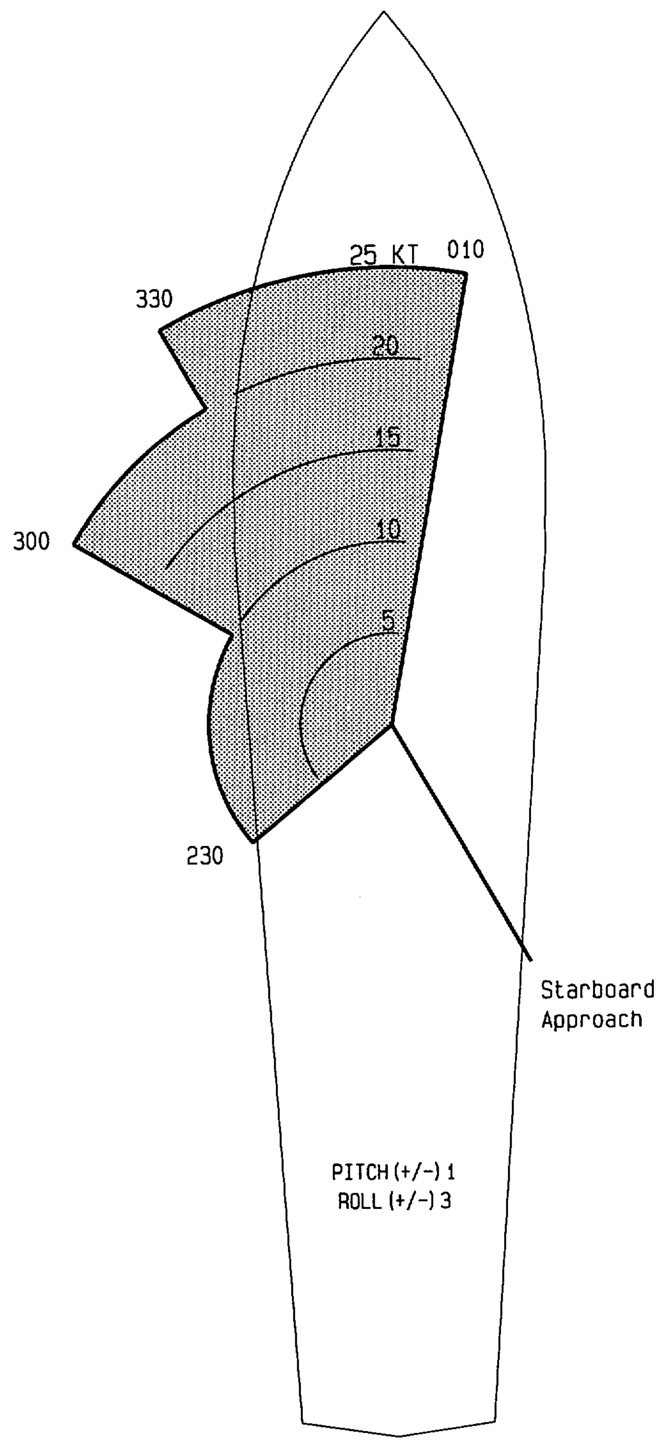


Figure B-19. SH-2F/G Launch and Recovery Envelopes for T-AFS 1/AGF/AOR Class Ships (Sheet 3 of 6)
Sheet 3: Port Approach, Nighttime

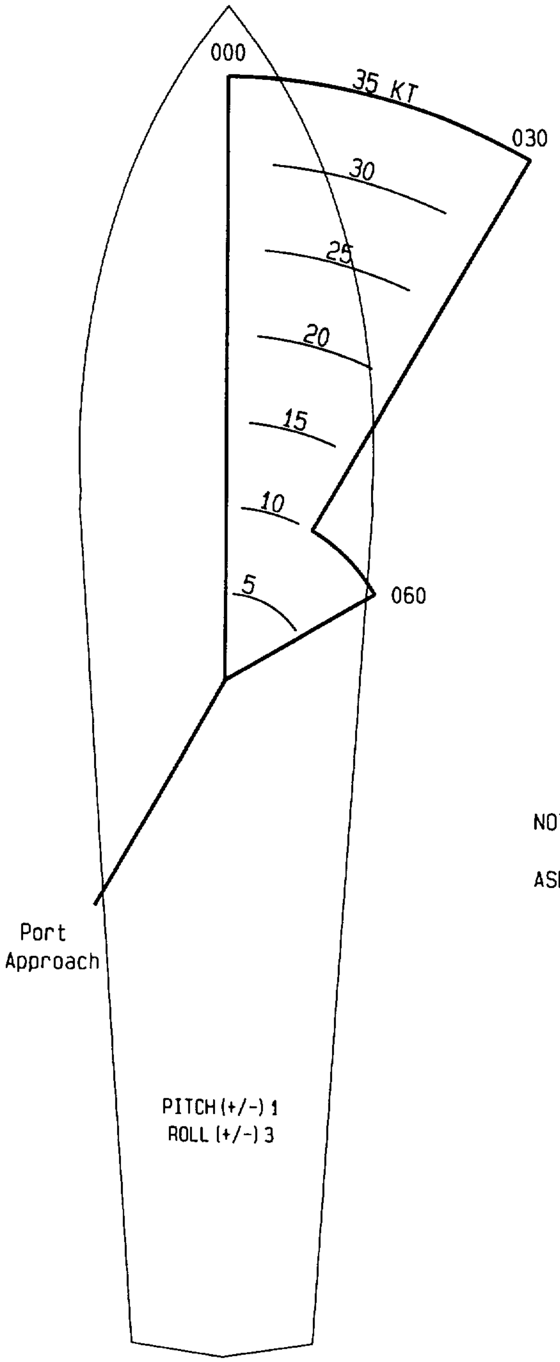


NOTES:

Night Envelope:
Red or White lights.

Figure B-19. SH-2F/G Launch and Recovery Envelopes for T-AFS 1/AGF/AOR Class Ships (Sheet 4 of 6)
Sheet 4: Starboard Approach, Nighttime

MAR/96

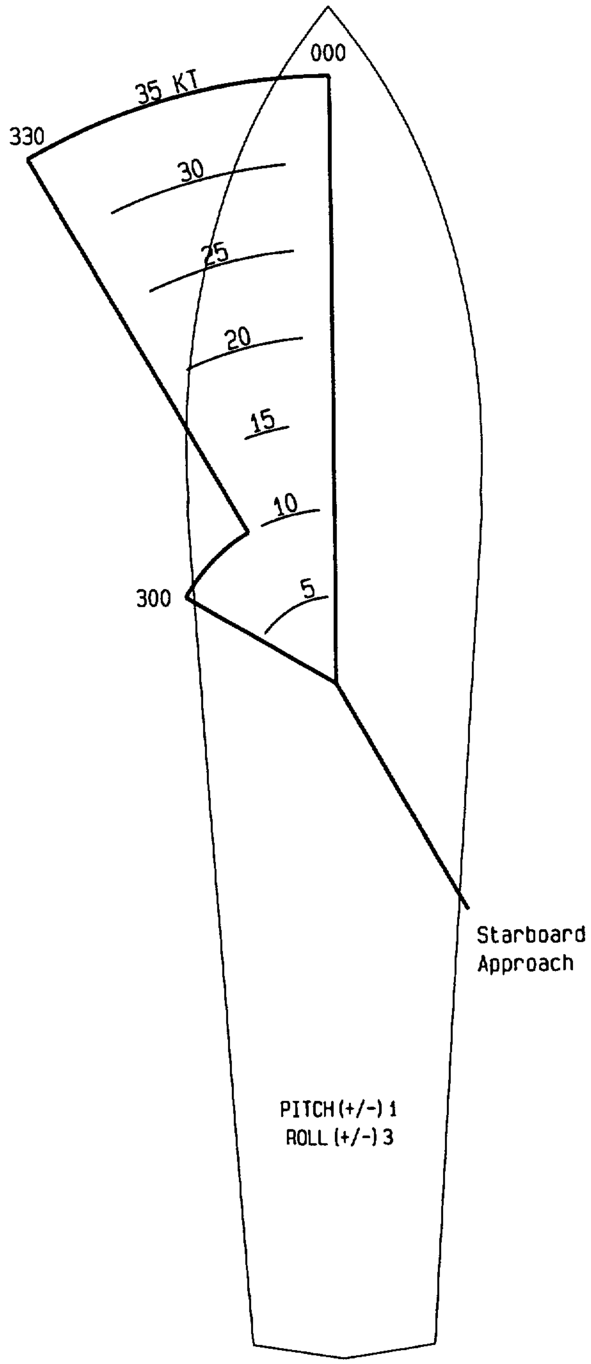


NOTES:

ASE/BOOST OFF

Figure B-19. SH-2F/G Launch and Recovery Envelopes for T-AFS 1/AGF/AOR Class Ships (Sheet 5 of 6)
Sheet 5: Degraded Recovery Envelope, Port Approach

MAR/96



NOTES:

ASE/BOOST OFF

Figure B-19. SH-2F/G Launch and Recovery Envelopes for T-AFS 1/AGF/AOR Class Ships (Sheet 6 of 6)
Sheet 6: Degraded Recovery Envelope, Starboard Approach

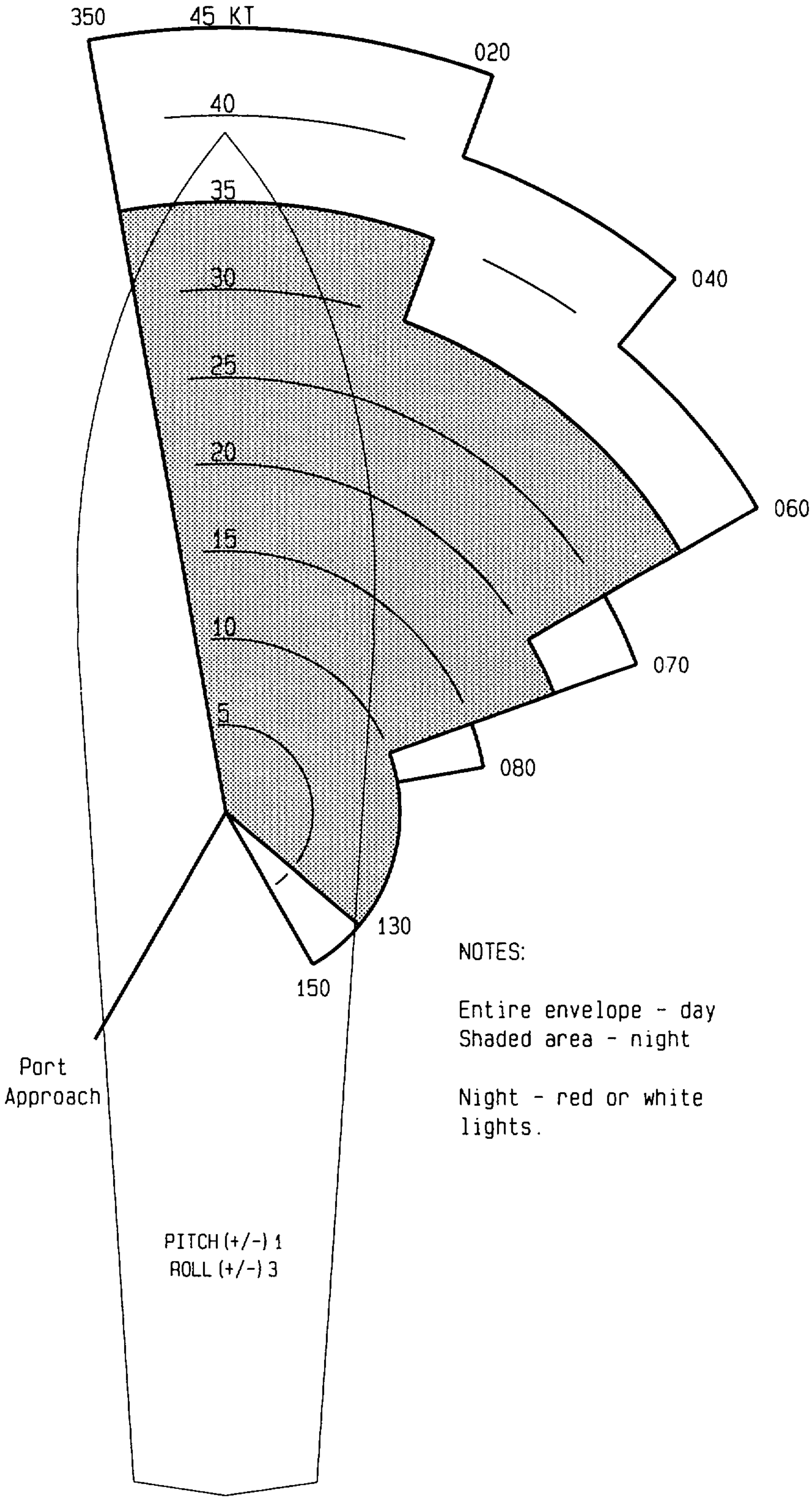
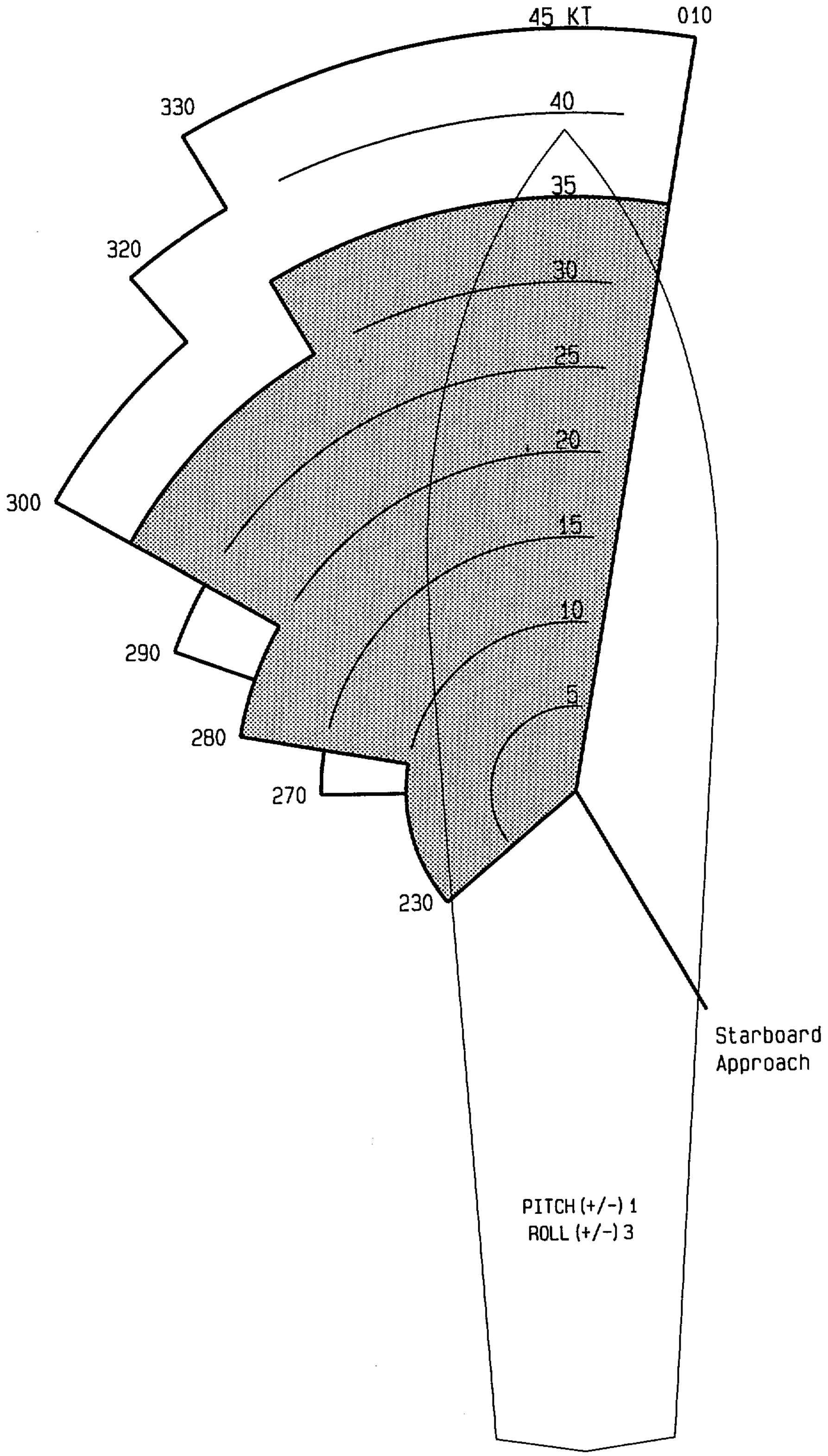


Figure B-20. SH-2F/G Launch and Recovery Envelopes for AOE 1 Class Ships (Sheet 1 of 4)
Sheet 1: Port Approach

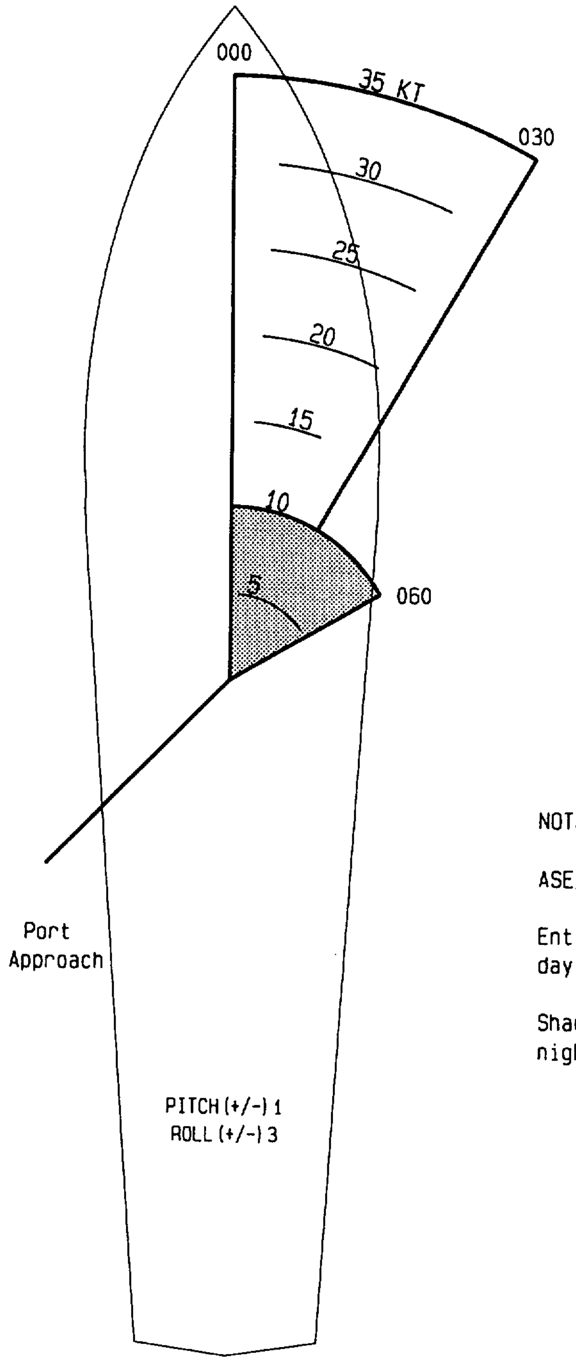


NOTES:

Entire envelope - day
Shaded area - night

Night - red or white lights.

Figure B-20. SH-2F/G Launch and Recovery Envelopes for AOE 1 Class Ships (Sheet 2 of 4)
Sheet 2: Starboard Approach



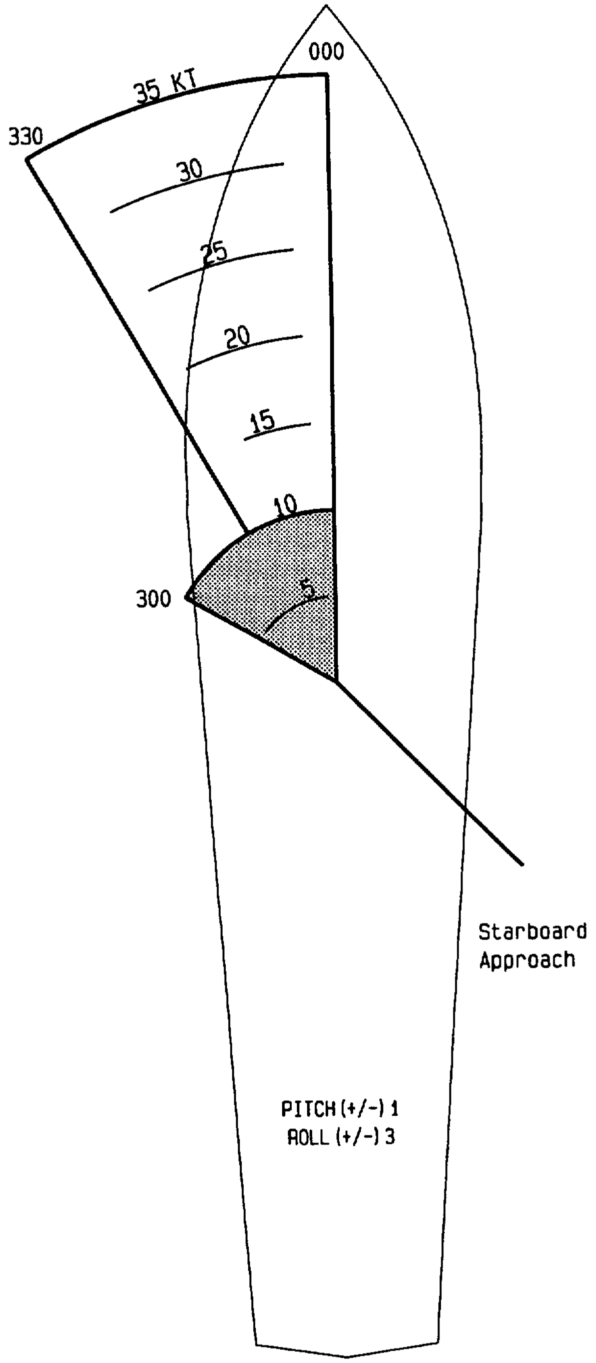
NOTES:

ASE/BOOST OFF

Entire envelope - day operations.

Shaded area - night operations.

Figure B-20. SH-2F/G Launch and Recovery Envelopes for AOE 1 Class Ships (Sheet 3 of 4)
Sheet 3: Degraded Recovery Envelope, Port Approach



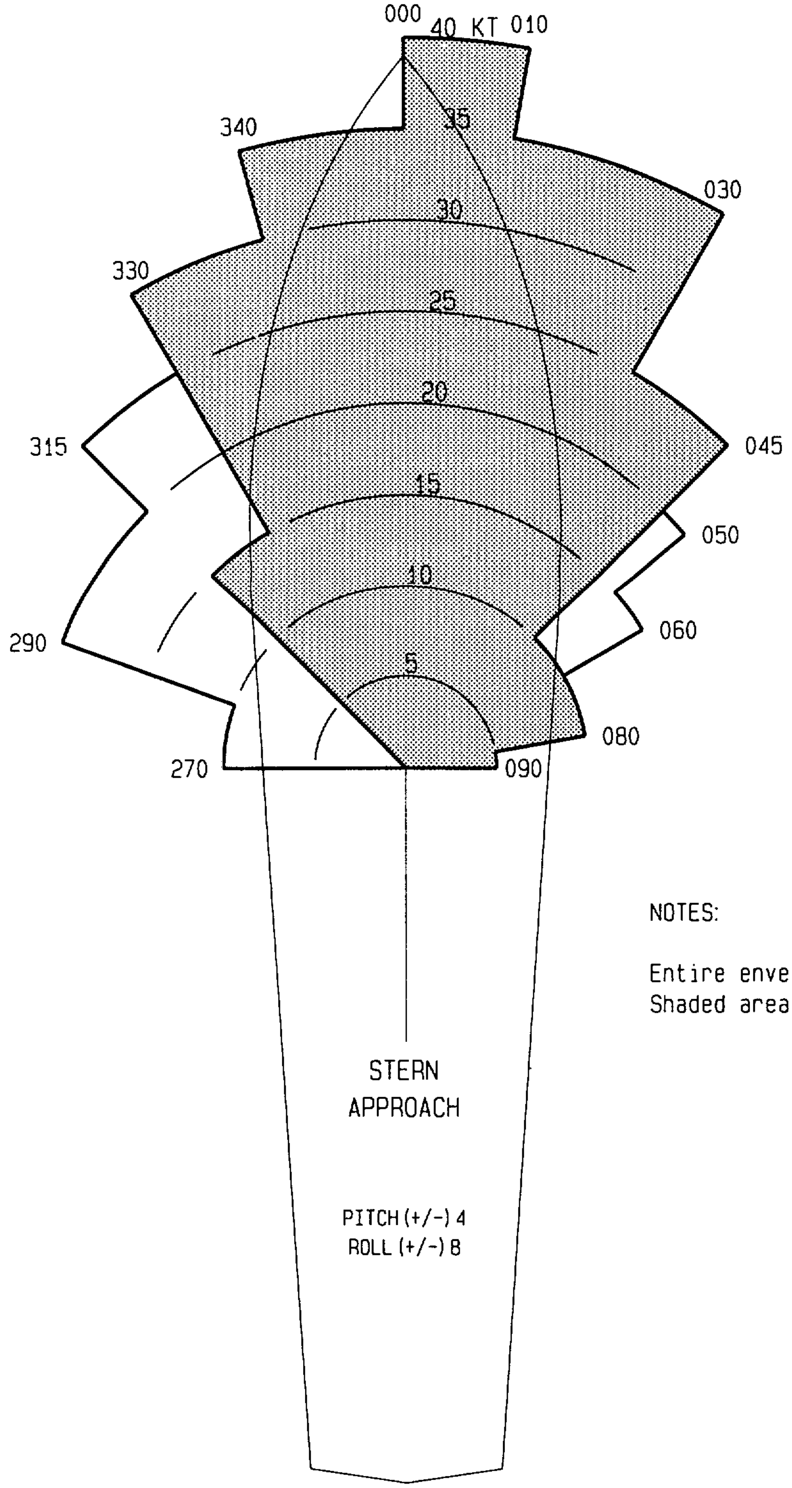
NOTES:

ASE/BOOST OFF

Entire envelope - day operations.

Shaded area - night operations.

Figure B-20. SH-2F/G Launch and Recovery Envelopes for AOE 1 Class Ships (Sheet 4 of 4)
Sheet 4: Degraded Recovery Envelope, Starboard Approach

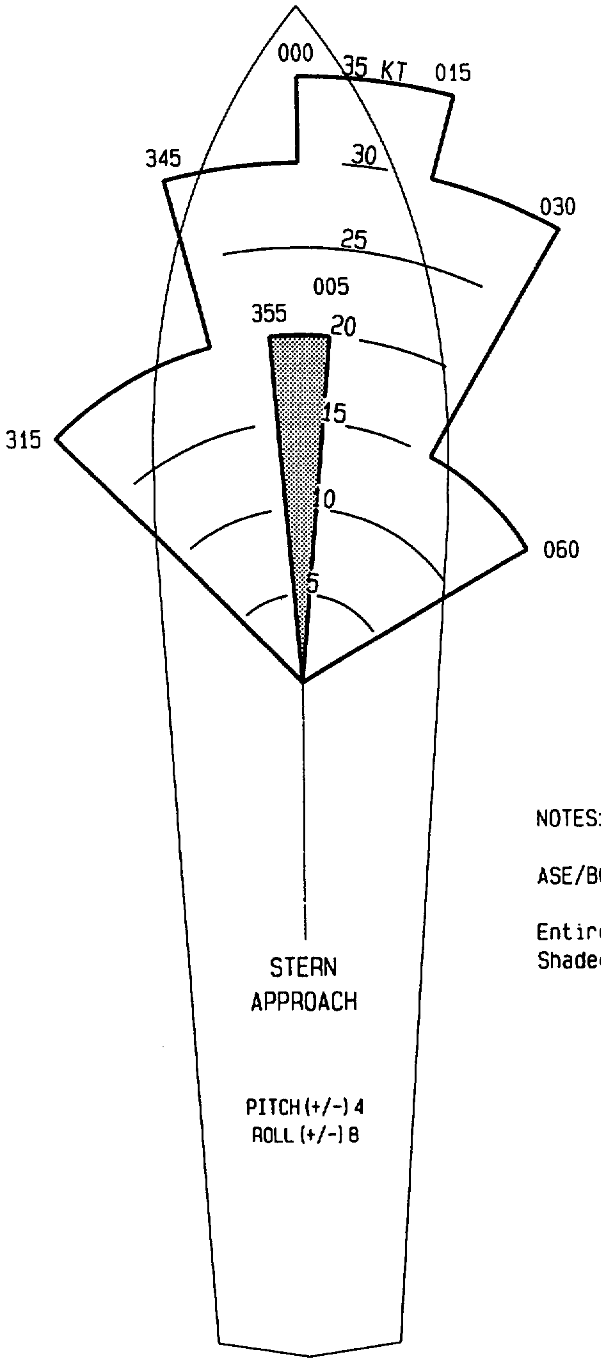


NOTES:

Entire envelope - day operations.
Shaded area - night operations.

Figure B-21. SH-2F/G Launch and Recovery Envelopes for CG 47 Class Ships (Sheet 1 of 2)
Sheet 1: Stern Approach

DEC/84



NOTES:

ASE/BOOST OFF

Entire envelope - day
Shaded area - night

Figure B-21. SH-2F/G Launch and Recovery Envelopes for CG 47 Class Ships (Sheet 2 of 2)
Sheet 2: Degraded Recovery Envelope

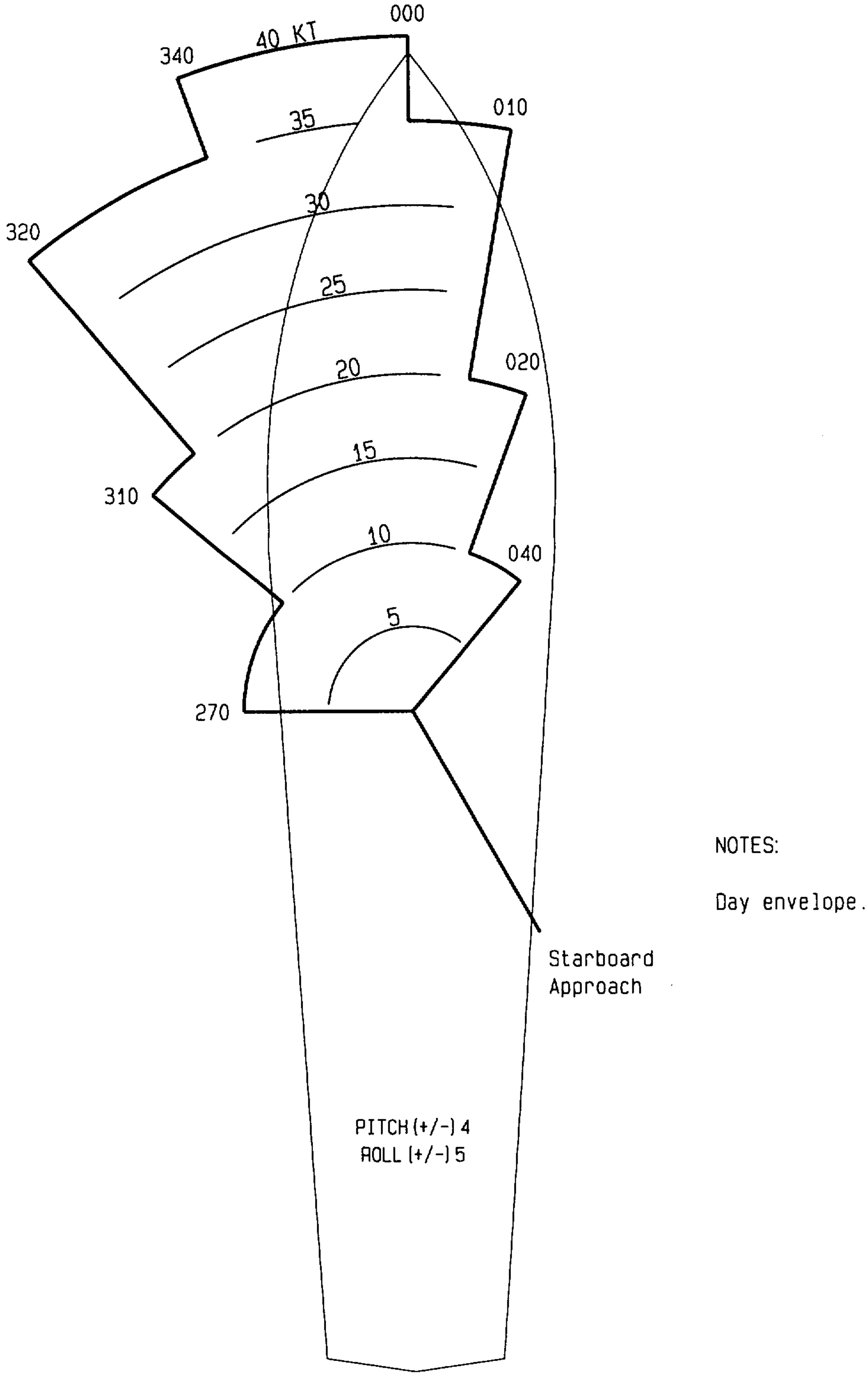
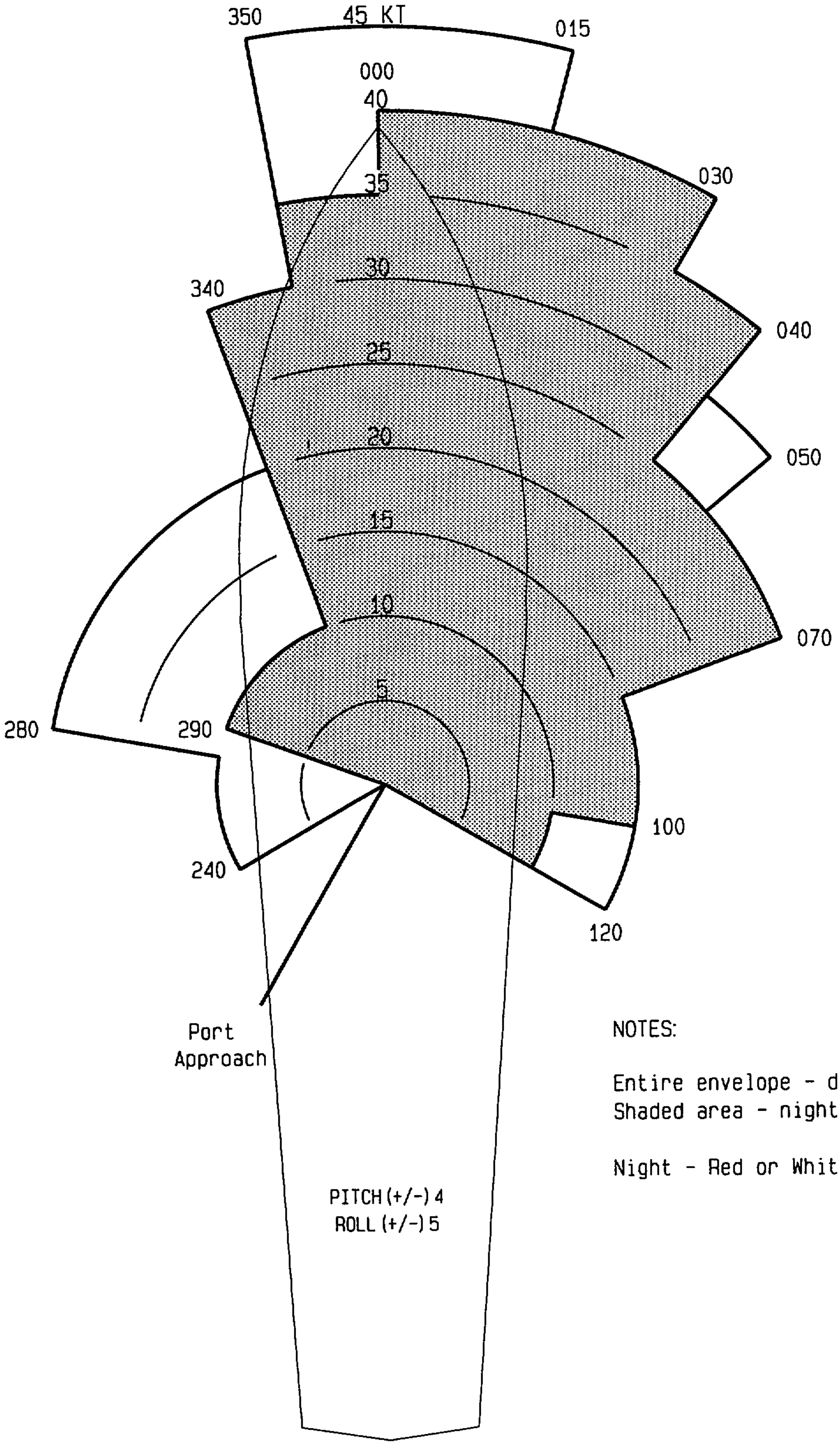


Figure B-22. SH-2F/G Launch and Recovery Envelope for CGN 36 Class Ships

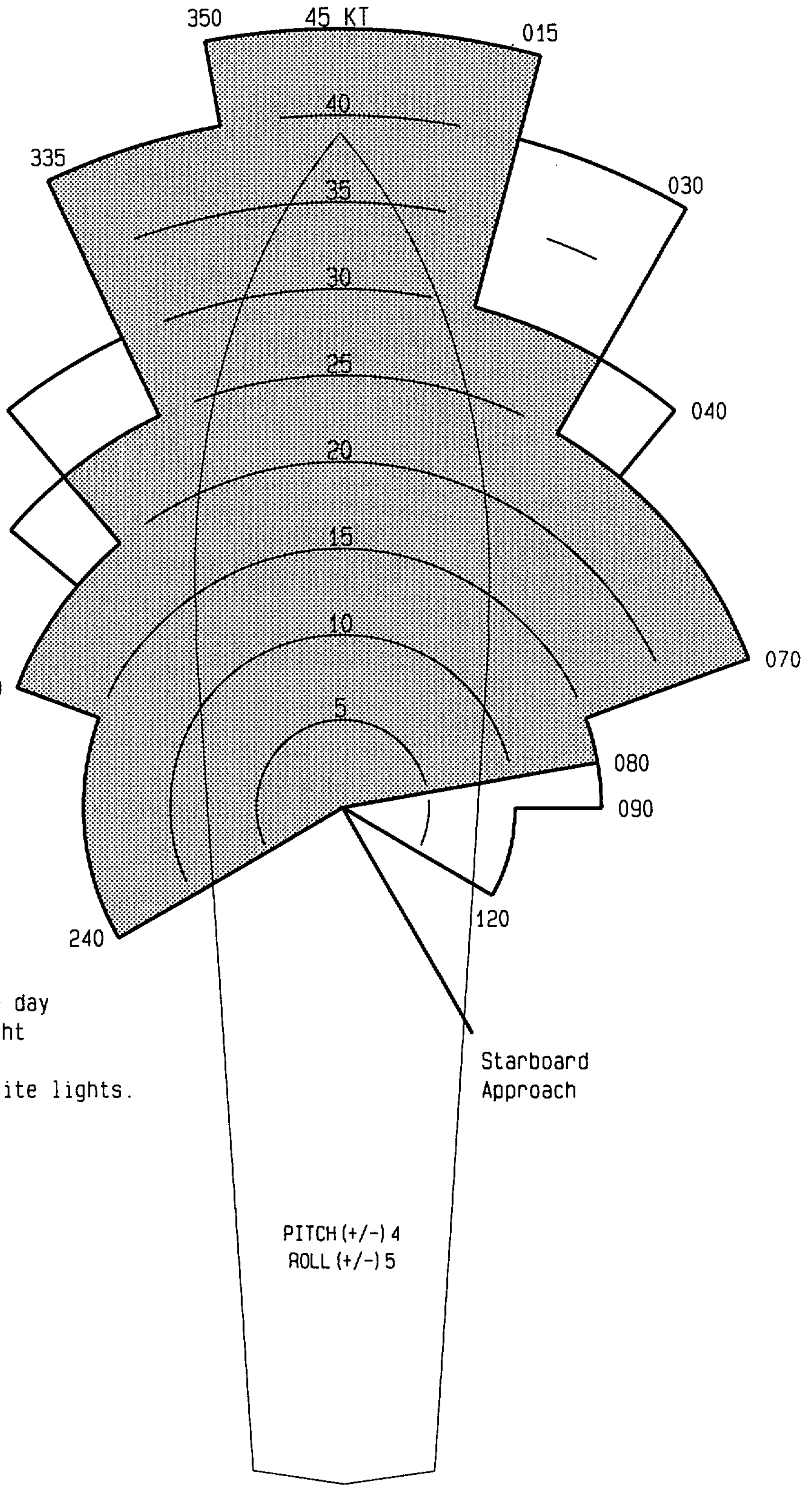


NOTES:

Entire envelope - day
Shaded area - night

Night - Red or White lights.

Figure B-23. SH-2F/G Launch and Recovery Envelopes for DD 963 Class Ships (Sheet 1 of 4)
Sheet 1: Port Approach



NOTES:

Entire envelope - day
Shaded area - night

Night - Red or White lights.

Figure B-23. SH-2F/G Launch and Recovery Envelopes for DD 963 Class Ships (Sheet 2 of 4)
Sheet 2: Starboard Approach

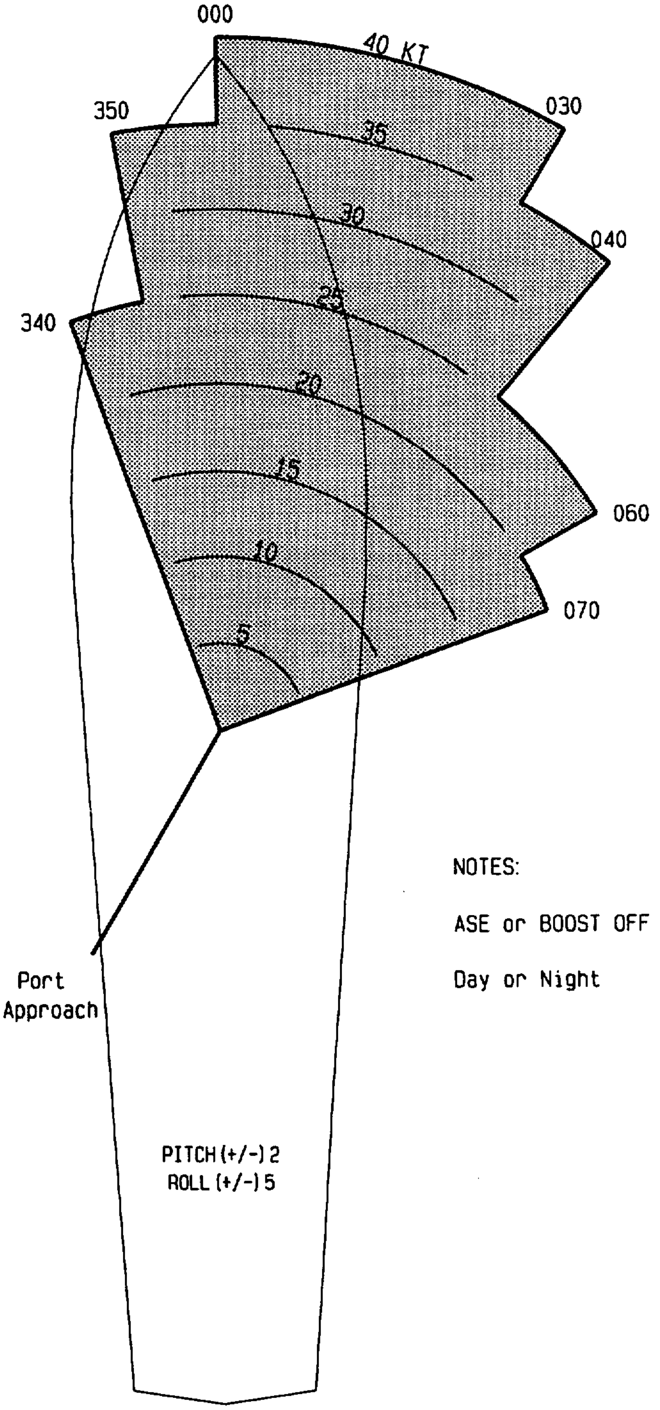


Figure B-23. SH-2F/G Launch and Recovery Envelopes for DD 963 Class Ships (Sheet 3 of 4)
Sheet 3: Degraded Recovery Envelope, Port Approach

MAR/96

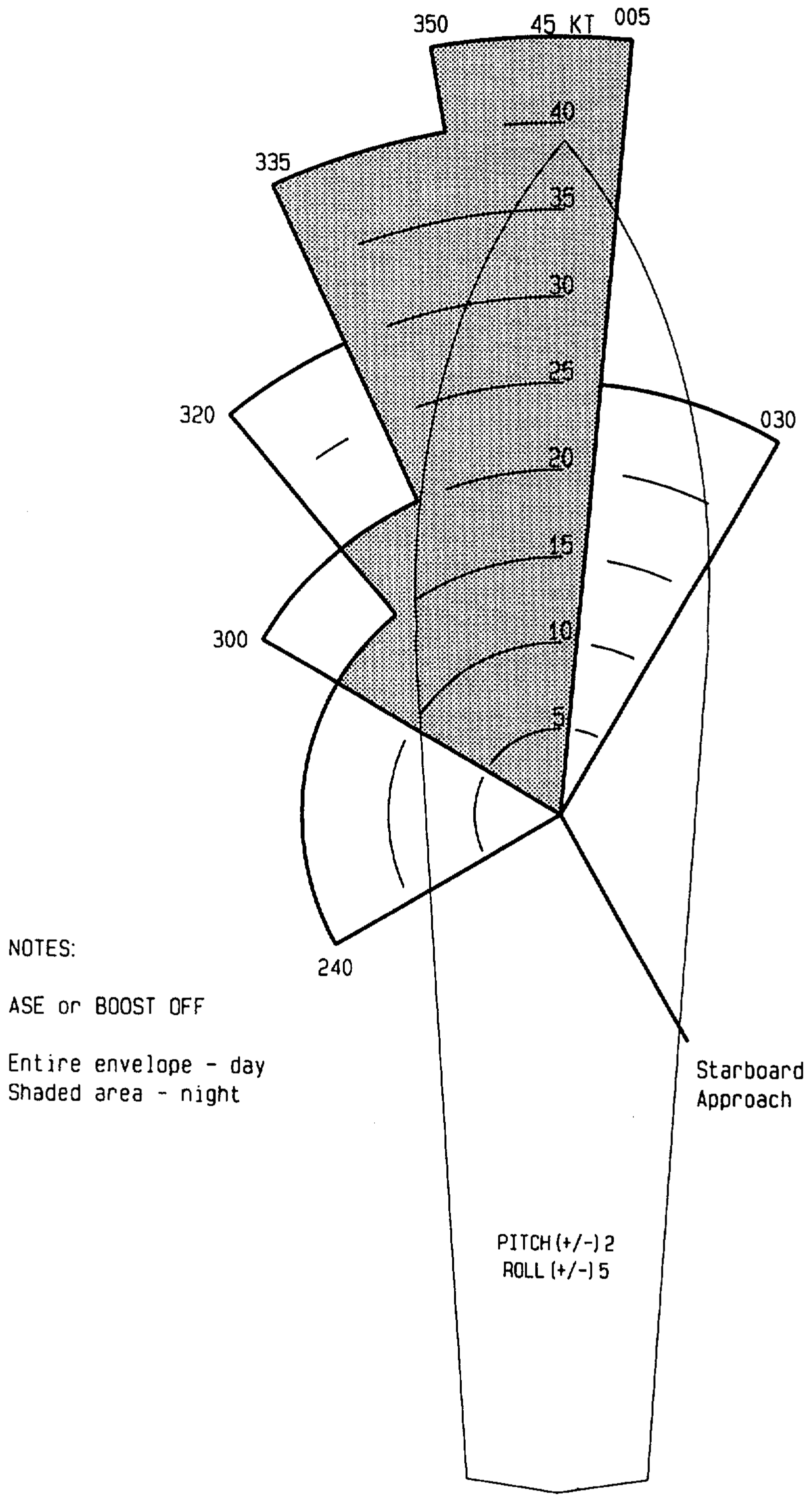
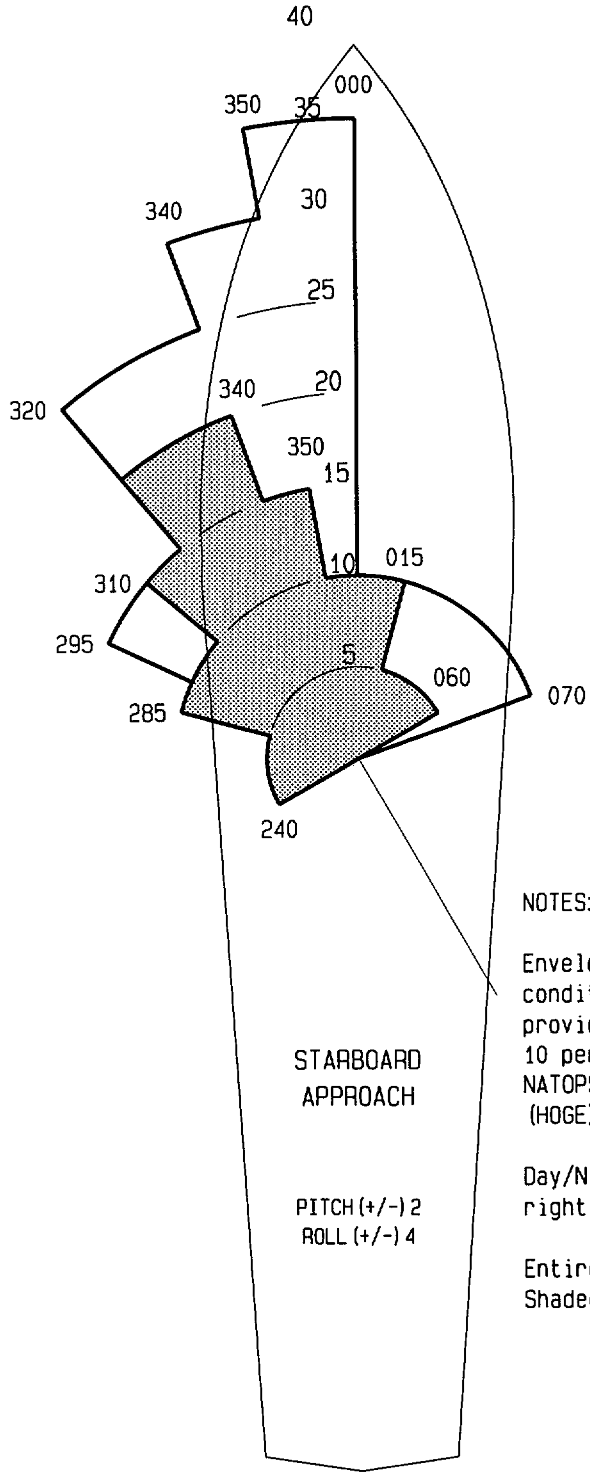


Figure B-23. SH-2F/G Launch and Recovery Envelopes for DD 963 Class Ships (Sheet 4 of 4)
Sheet 4: Degraded Recovery Envelope, Starboard Approach

45 KT



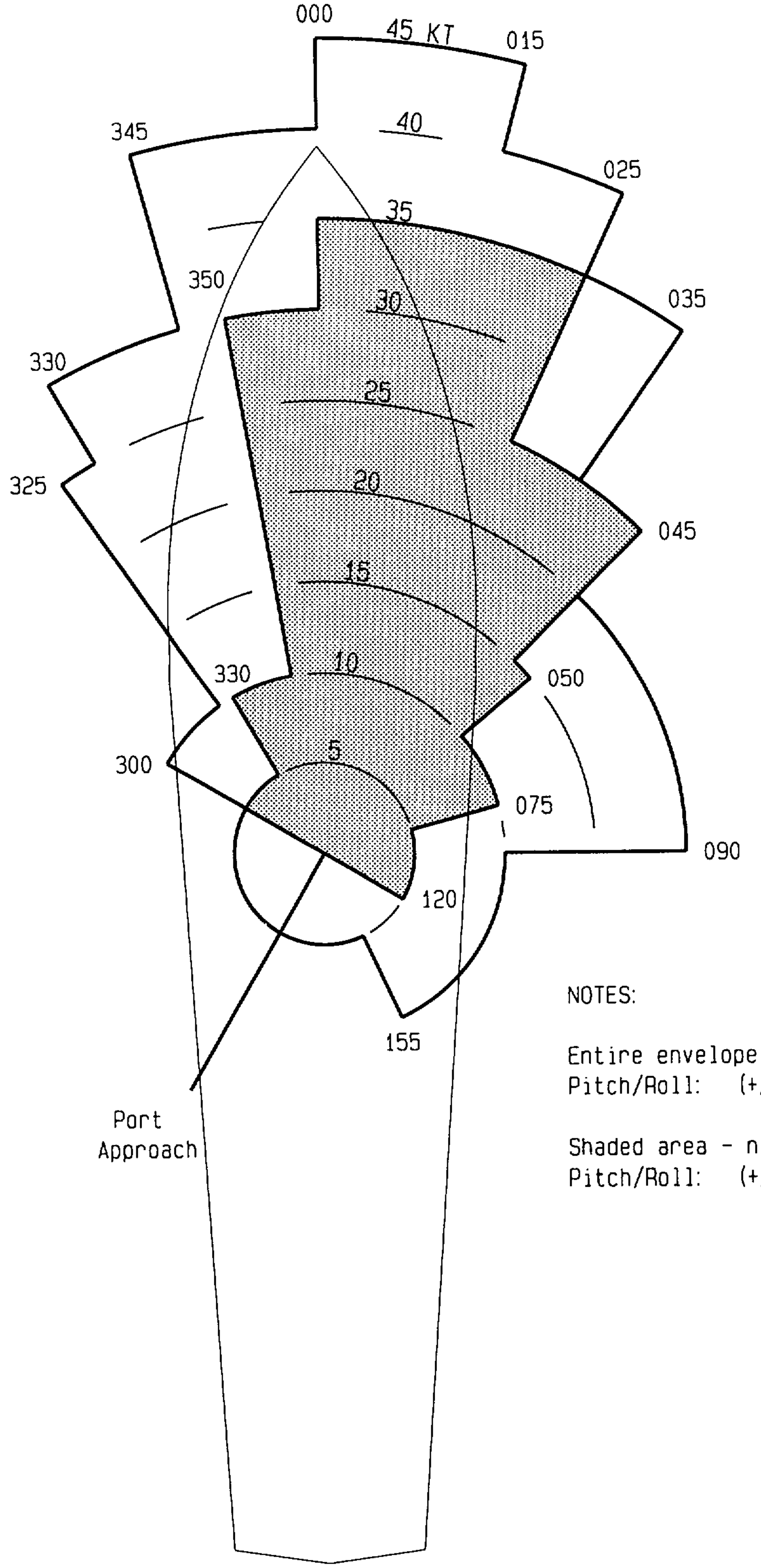
NOTES:

Envelopes valid for all acft GW/CG conditions allowed by NATOPS provided ambient conditions allow a 10 percent torque margin above NATOPS hover out of ground effect (HOGE) required torque predictions.

Day/Night envelopes valid for right and left seat landings.

Entire Envelope - Day
Shaded Area - Night

Figure B-24. SH-2F/G Launch and Recovery Envelope for DDG 51 Class Ships

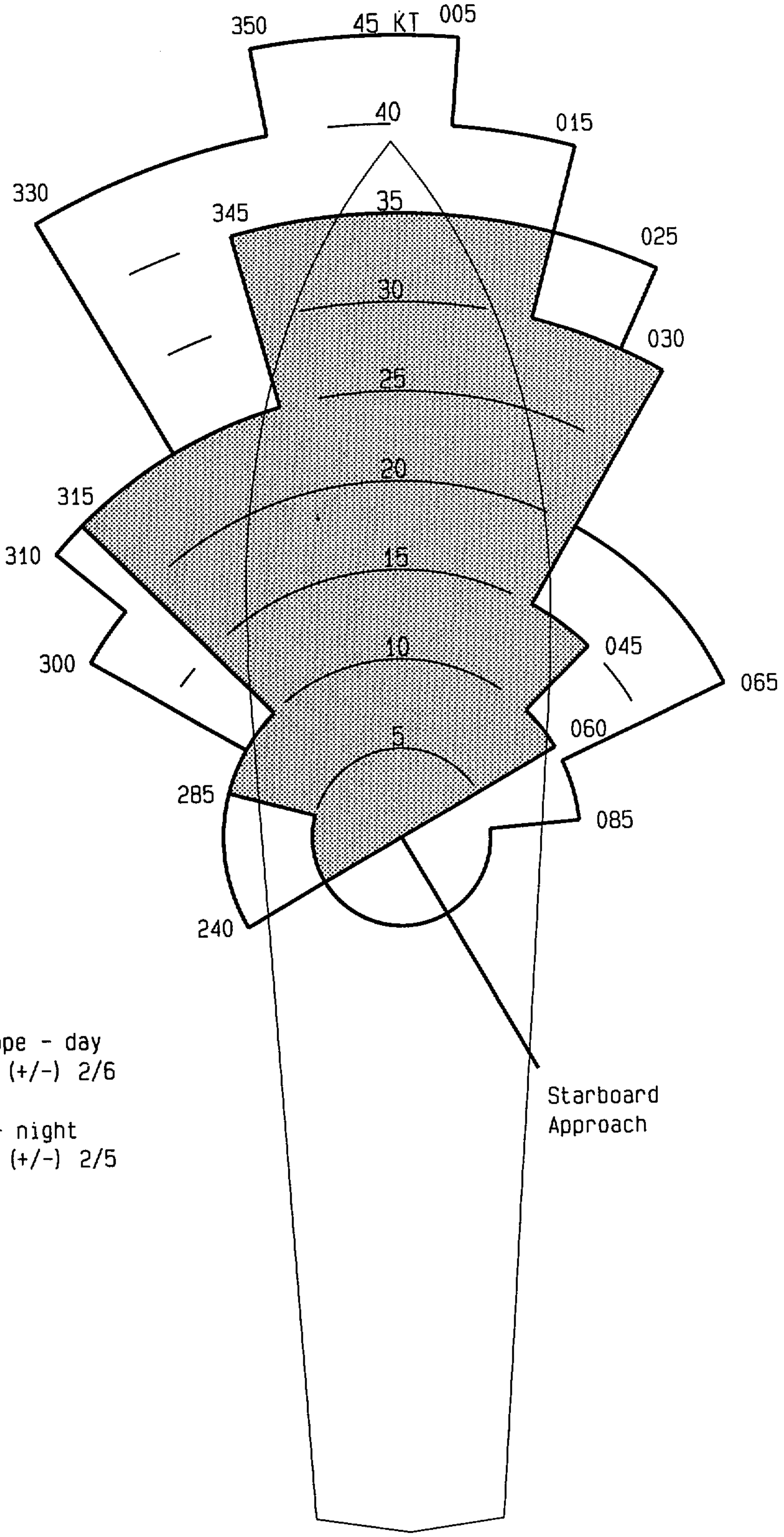


NOTES:

Entire envelope - day
Pitch/Roll: (+/-) 2/6

Shaded area - night
Pitch/Roll: (+/-) 2/5

Figure B-25. SH-2F/G Launch and Recovery Envelopes for DDG 993 Class Ships (Sheet 1 of 5)
Sheet 1: Port Approach



NOTES:

Entire envelope - day
Pitch/Roll: (+/-) 2/6

Shaded area - night
Pitch/Roll: (+/-) 2/5

Figure B-25. SH-2F/G Launch and Recovery Envelopes for DDG 993 Class Ships (Sheet 2 of 5)
Sheet 2: Starboard Approach

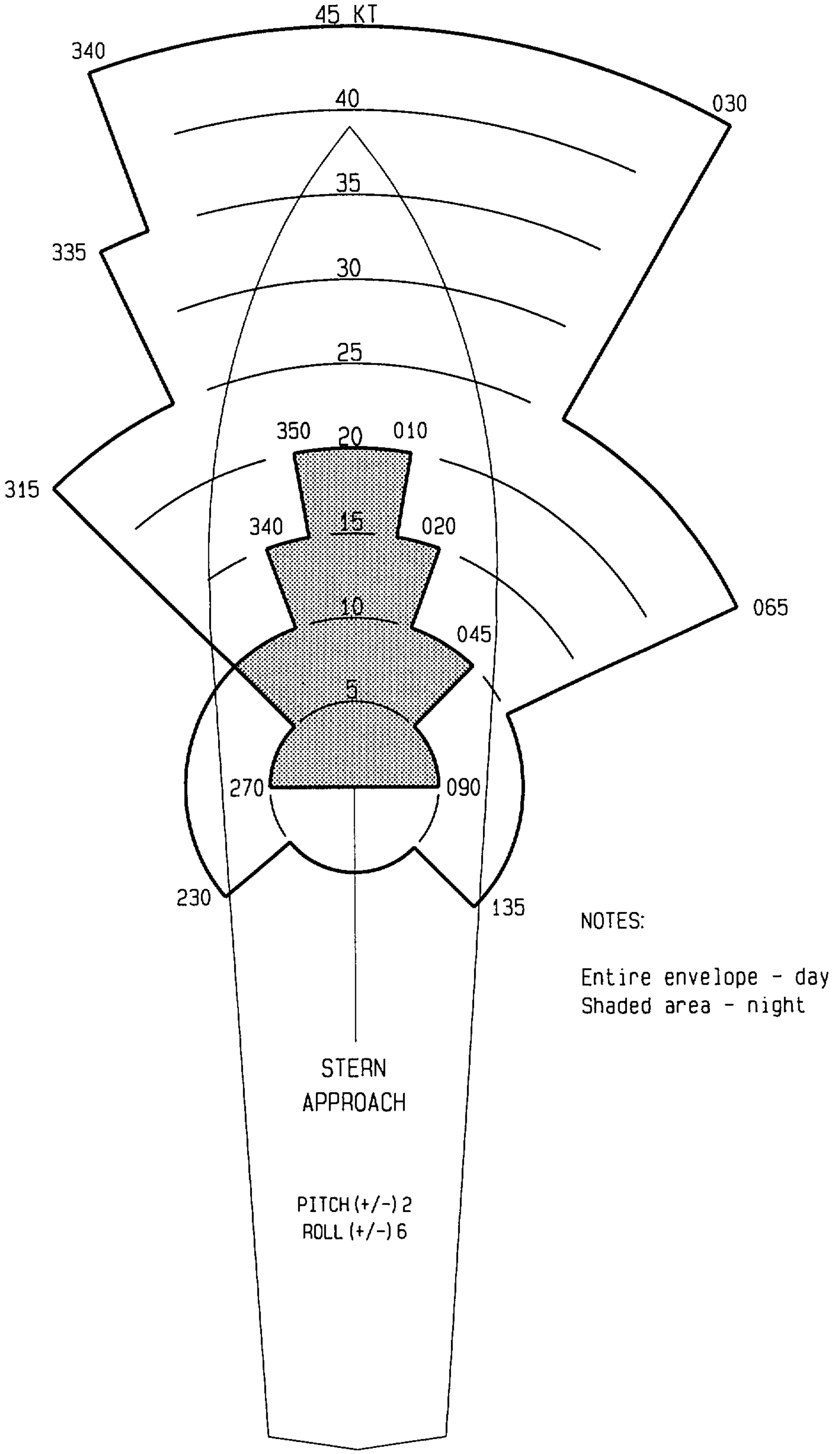
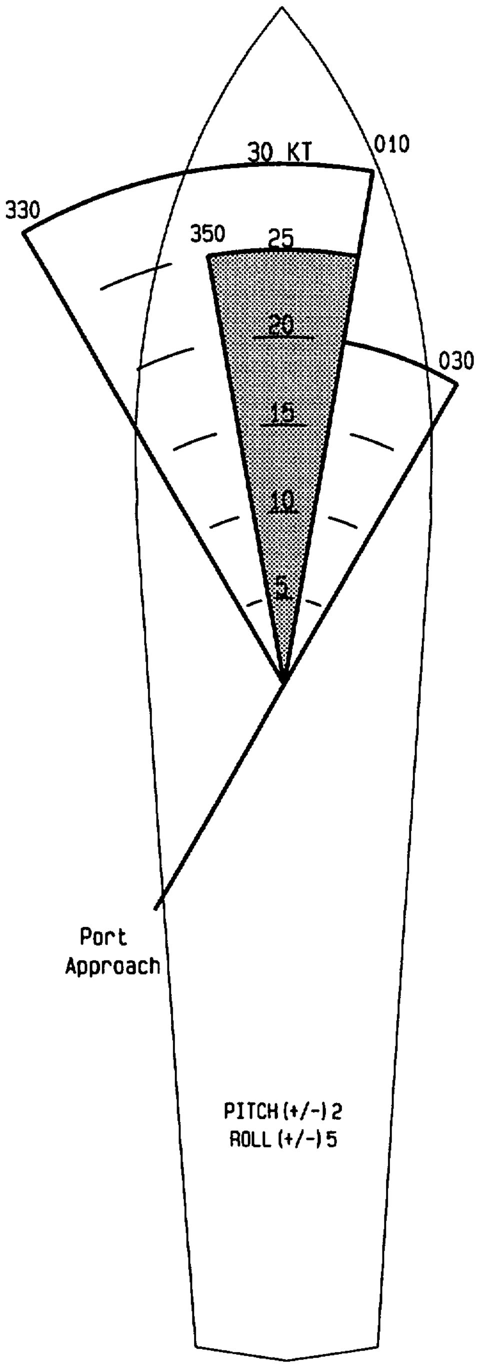


Figure B-25. SH-2F/G Launch and Recovery Envelopes for DDG 993 Class Ships (Sheet 3 of 5)
Sheet 3: Stern Approach

JUL/87



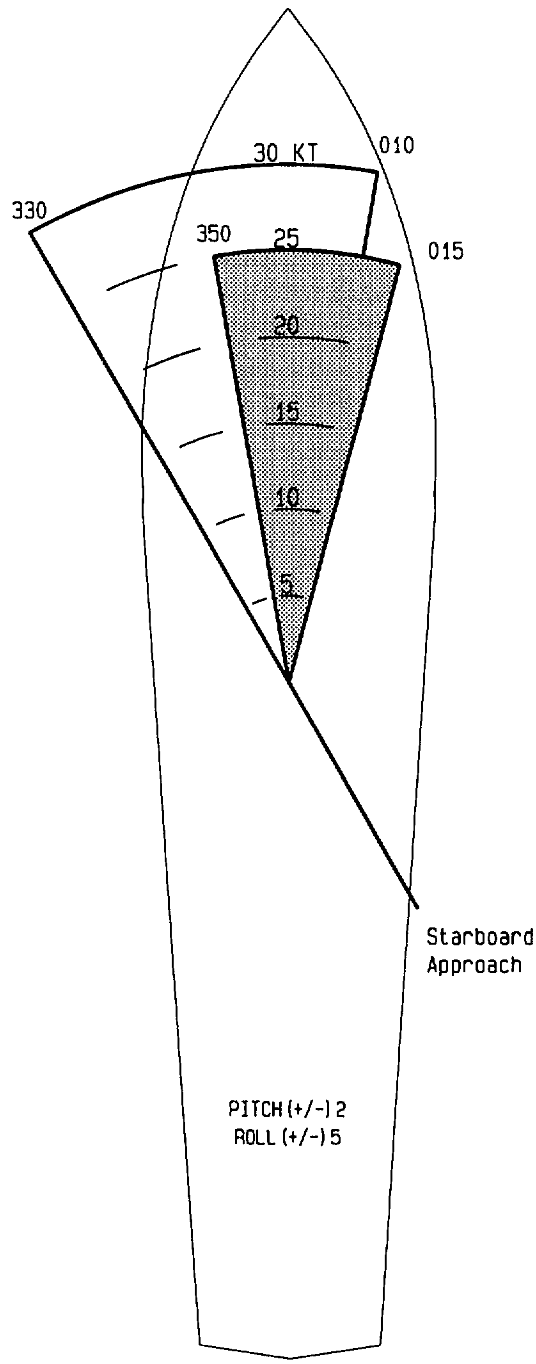
NOTES:

ASE/BOOST OFF

Entire envelope - day
Shaded area - night

Figure B-25. SH-2F/G Launch and Recovery Envelopes for DDG 993 Class Ships (Sheet 4 of 5)
Sheet 4: Degraded Recovery Envelope, Port Approach

JUL/87

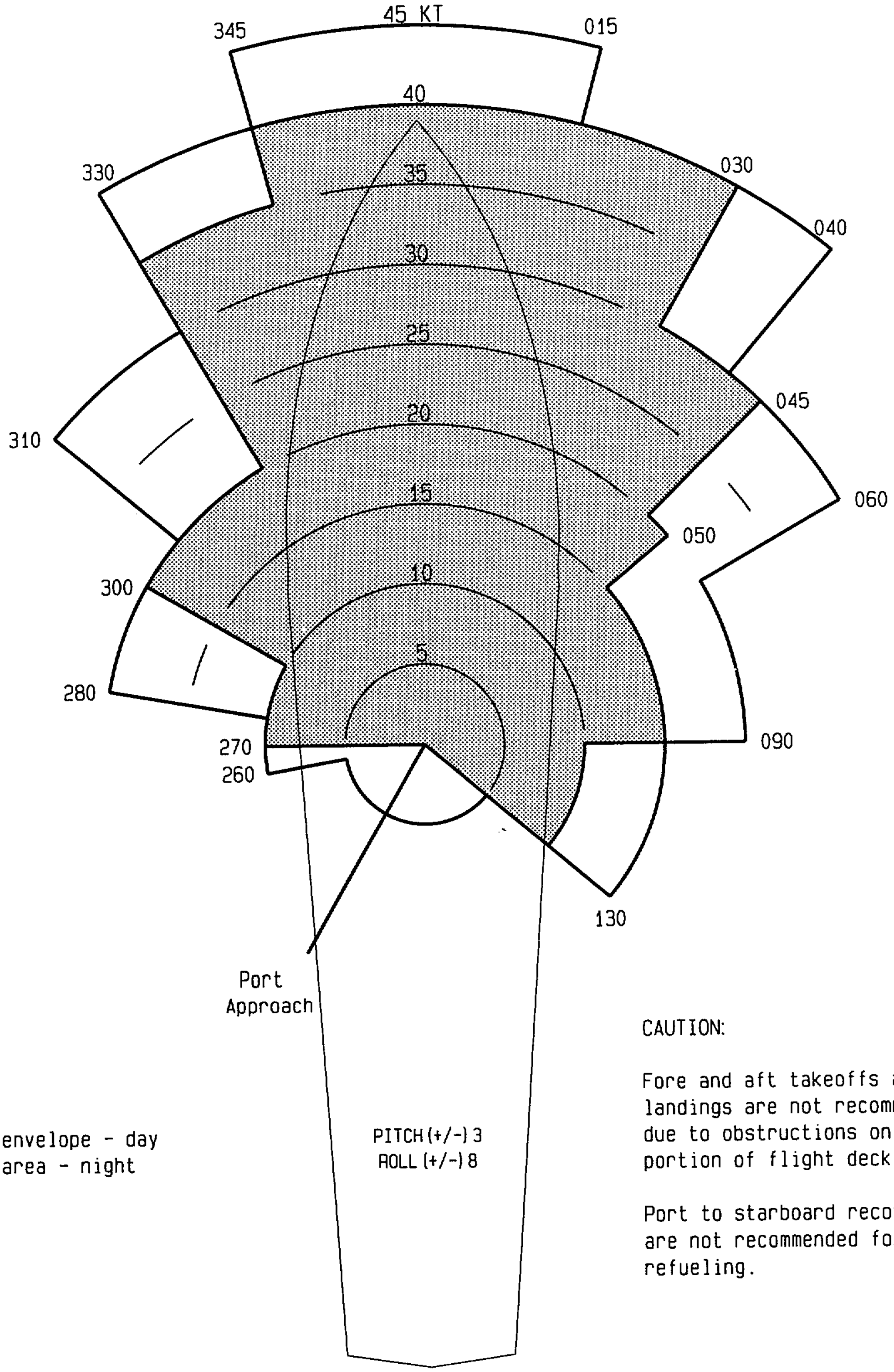


NOTES:

ASE/BOOST OFF

Entire envelope - day
Shaded area - night

Figure B-25. SH-2F/G Launch and Recovery Envelopes for DDG 993 Class Ships (Sheet 5 of 5)
Sheet 5: Degraded Recovery Envelope, Starboard Approach



NOTES:

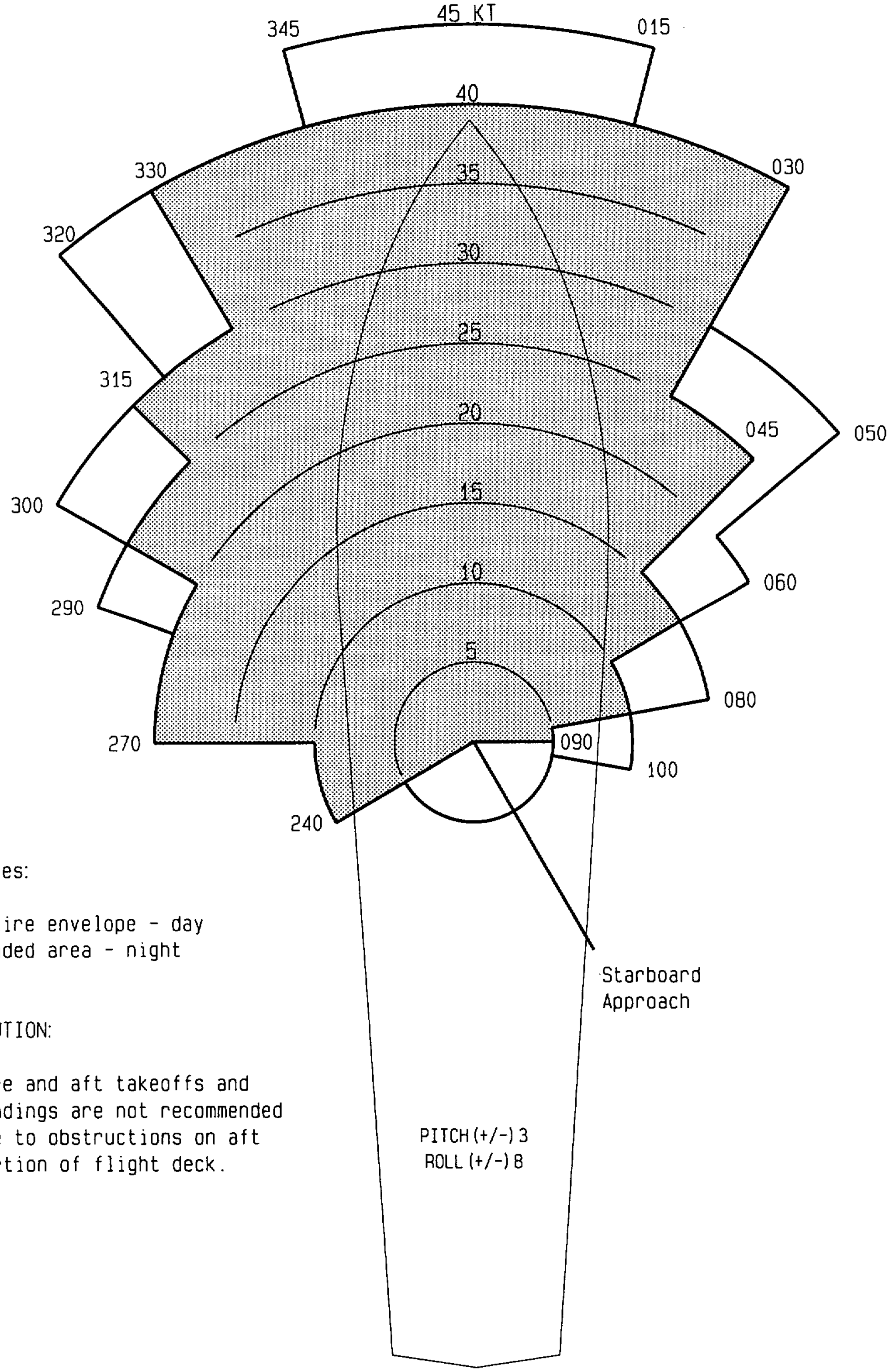
Entire envelope - day
Shaded area - night

CAUTION:

Fore and aft takeoffs and landings are not recommended due to obstructions on aft portion of flight deck.

Port to starboard recoveries are not recommended for hot refueling.

Figure B-26. SH-2F/G Launch and Recovery Envelopes for Non-RAST FFG 7 Class Ships (Sheet 1 of 3)
Sheet 1: Port Approach



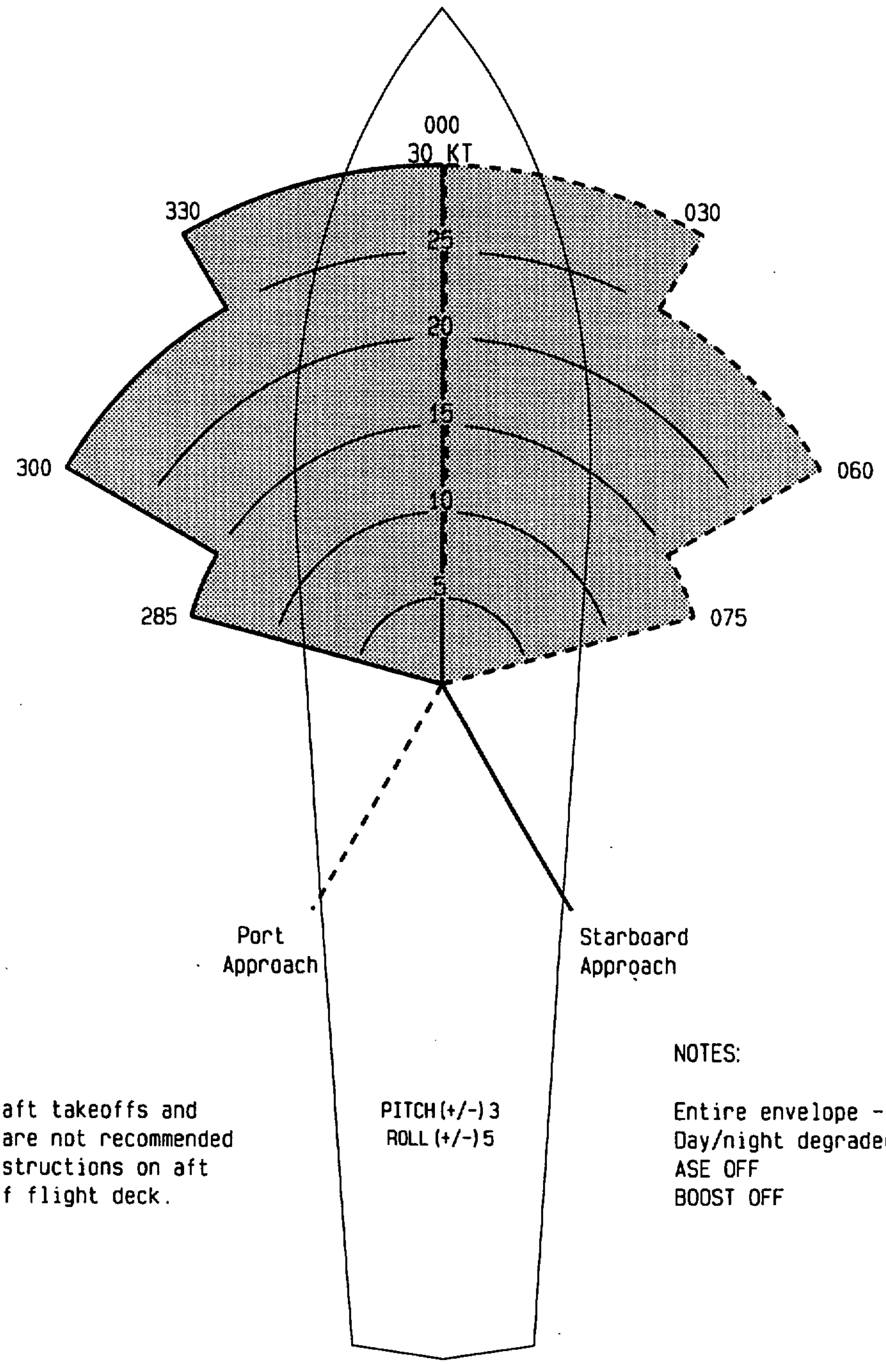
Notes:

Entire envelope - day
Shaded area - night

CAUTION:

Fore and aft takeoffs and landings are not recommended due to obstructions on aft portion of flight deck.

Figure B-26. SH-2F/G Launch and Recovery Envelopes for Non-RAST FFG 7 Class Ships (Sheet 2 of 3)
Sheet 2: Starboard Approach



CAUTION:

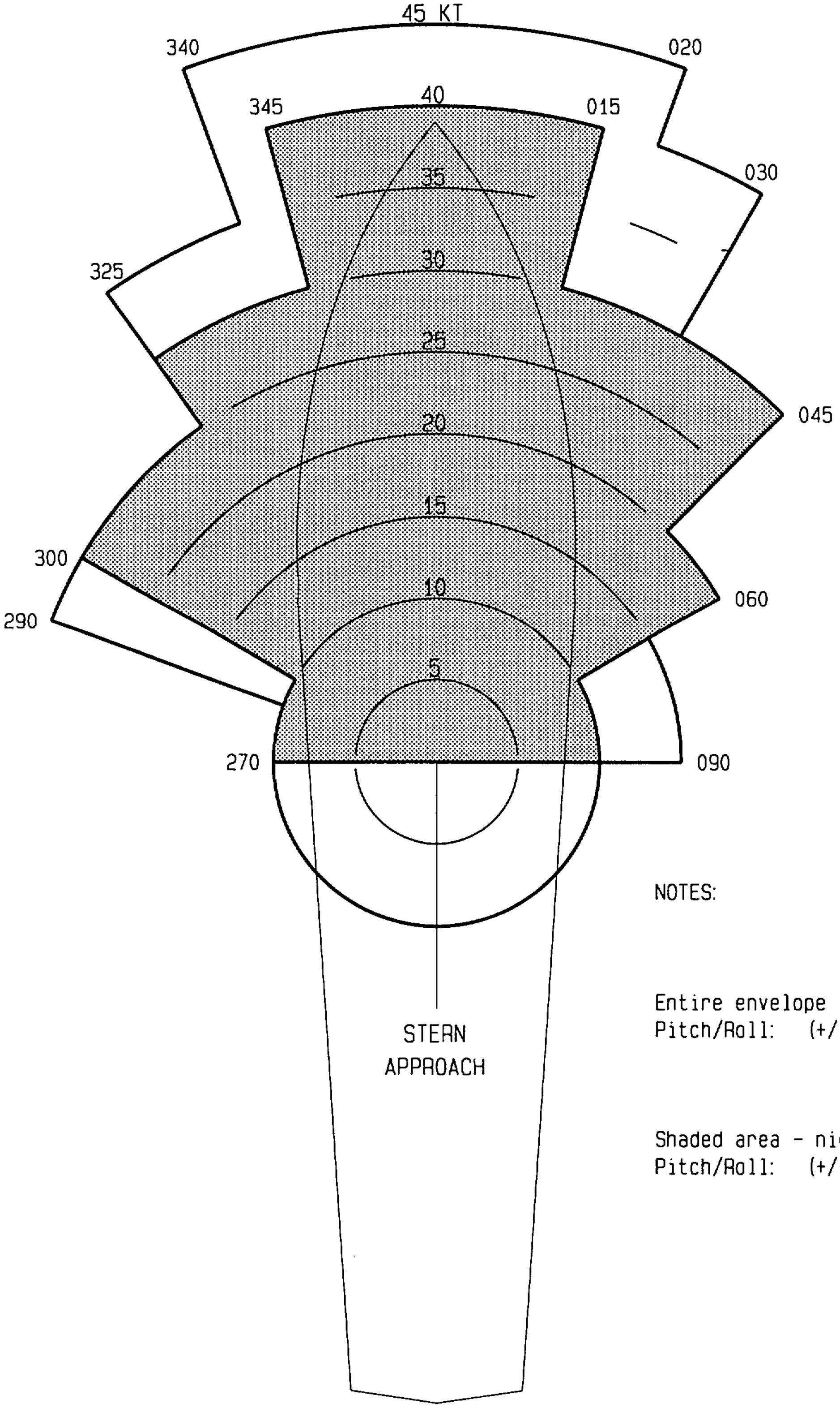
Fore and aft takeoffs and landings are not recommended due to obstructions on aft portion of flight deck.

PITCH (+/-) 3
ROLL (+/-) 5

NOTES:

Entire envelope -
Day/night degraded mode
ASE OFF
BOOST OFF

Figure B-26. SH-2F/G Launch and Recovery Envelopes for Non-RAST FFG 7 Class Ships (Sheet 3 of 3)
Sheet 3: Degraded Recovery Envelope, Port and Starboard Approaches

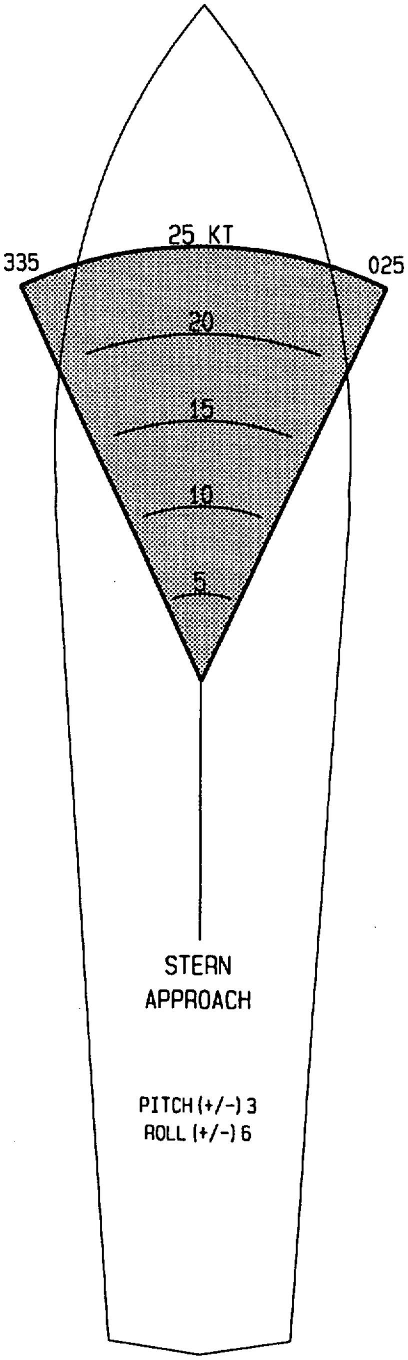


NOTES:

Entire envelope - day
Pitch/Roll: (+/-) 5/8

Shaded area - night
Pitch/Roll: (+/-) 3/6

Figure B-27. SH-2F/G Launch and Recovery Envelopes for RAST-Capable FFG 7 Class Ships (Sheet 1 of 2)
Sheet 1: Stern Approach

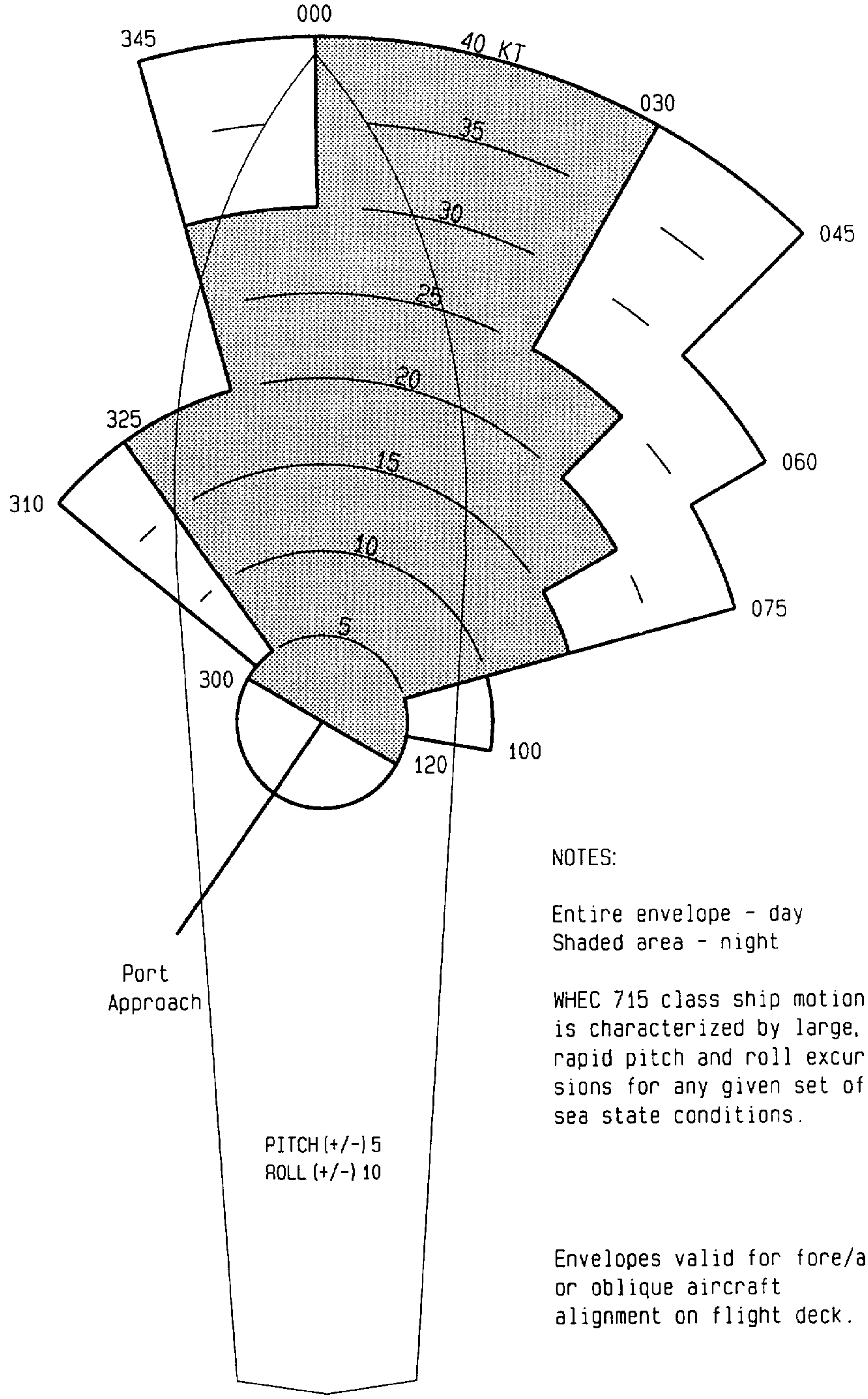


NOTES:

ASE/BOOST OFF

Entire envelope - Day/night

Figure B-27. SH-2F/G Launch and Recovery Envelopes for RAST-Capable FFG 7 Class Ships (Sheet 2 of 2)
Sheet 2: Degraded Recovery Envelope, Stern Approach



NOTES:

Entire envelope - day
Shaded area - night

WHEC 715 class ship motion is characterized by large, rapid pitch and roll excursions for any given set of sea state conditions.

Envelopes valid for fore/aft or oblique aircraft alignment on flight deck.

Figure B-28. SH-2F/G Launch and Recovery Envelopes for WHEC 715 Class Ships (Sheet 1 of 4)
Sheet 1: Port Approach

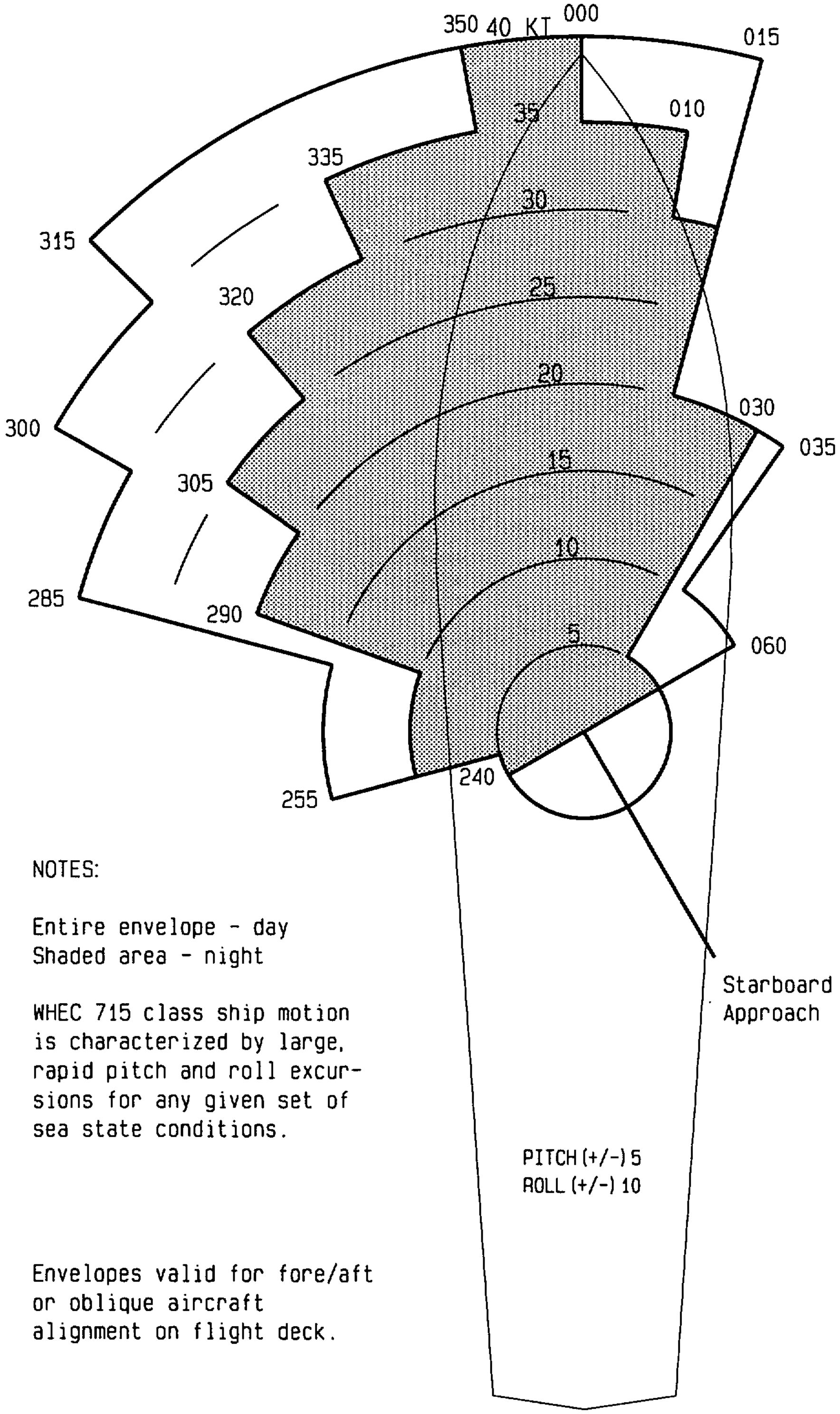
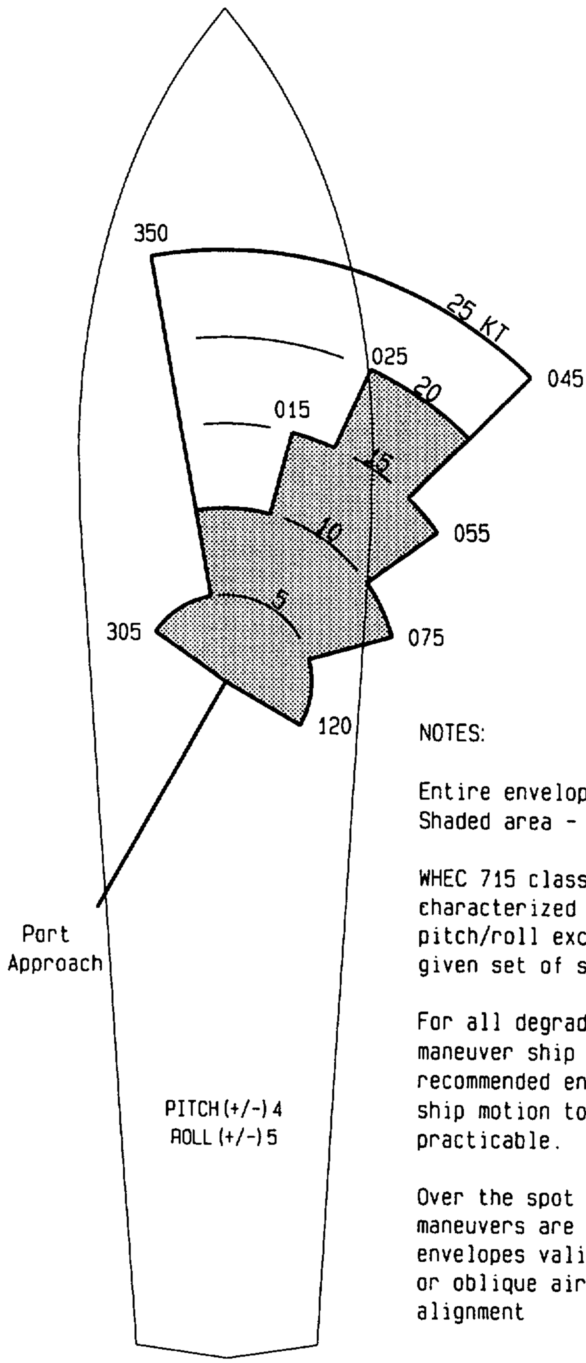


Figure B-28. SH-2F/G Launch and Recovery Envelopes for WHEC 715 Class Ships (Sheet 2 of 4)
Sheet 2: Starboard Approach



NOTES:

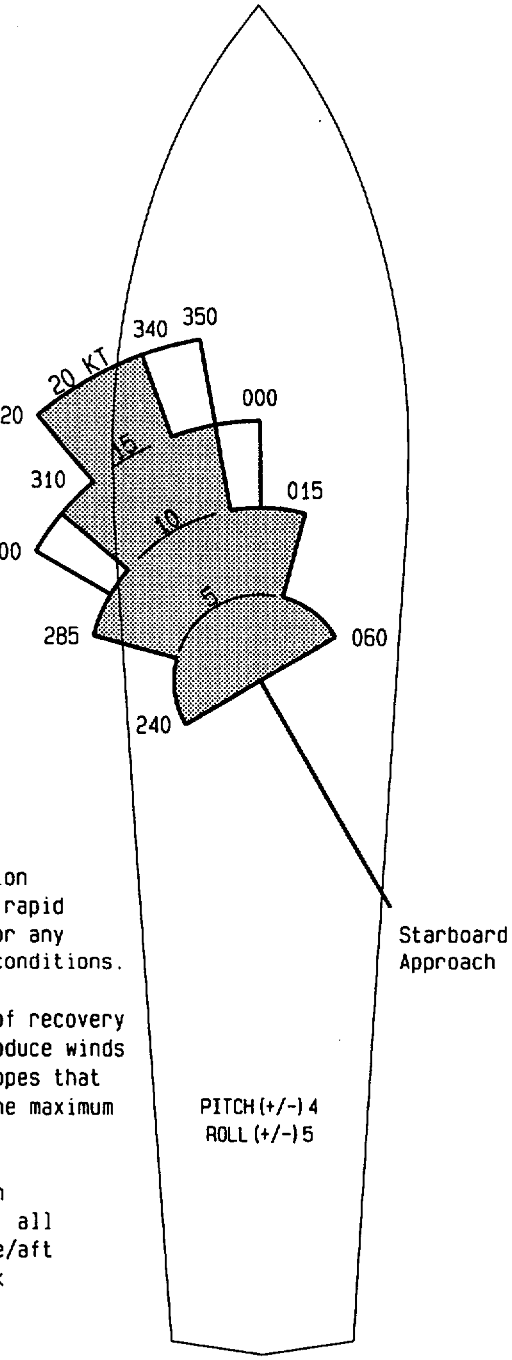
Entire envelope - day
Shaded area - night

WHEC 715 class ship motion characterized by large, rapid pitch/roll excursions for any given set of sea state conditions.

For all degraded modes of recovery, maneuver ship to produce winds within recommended envelope that reduce ship motion to the maximum extent practicable.

Over the spot pedal turn maneuvers are permitted; all envelopes valid for fore/aft or oblique aircraft deck alignment

Figure B-28. SH-2F/G Launch and Recovery Envelopes for WHEC 715 Class Ships (Sheet 3 of 4)
Sheet 3: Degraded Recovery Envelope, Port Approach



NOTES:
Entire envelope - day
Shaded area - night

WHEC 715 class ship motion characterized by large, rapid pitch/roll excursions for any given set of sea state conditions.

For all degraded modes of recovery maneuver the ship to produce winds witin recommended envelopes that reduce ship motion to the maximum extent practicable.

Over the spot pedal turn maneuvers are permitted; all envelopes valid for fore/aft or oblique aircraft deck alignment

Figure B-28. SH-2F/G Launch and Recovery Envelopes for WHEC 715 Class Ships (Sheet 4 of 4)
Sheet 4: Degraded Recovery Envelope, Starboard Approach

WARNING

TO AVOID ENTRY INTO GROUND RESONANCE, ALL TIEDOWNS SHALL BE ATTACHED WITH 2 TO 3 INCHES OF SLACK WHEN THE ROTOR SYSTEM IS ENGAGED.

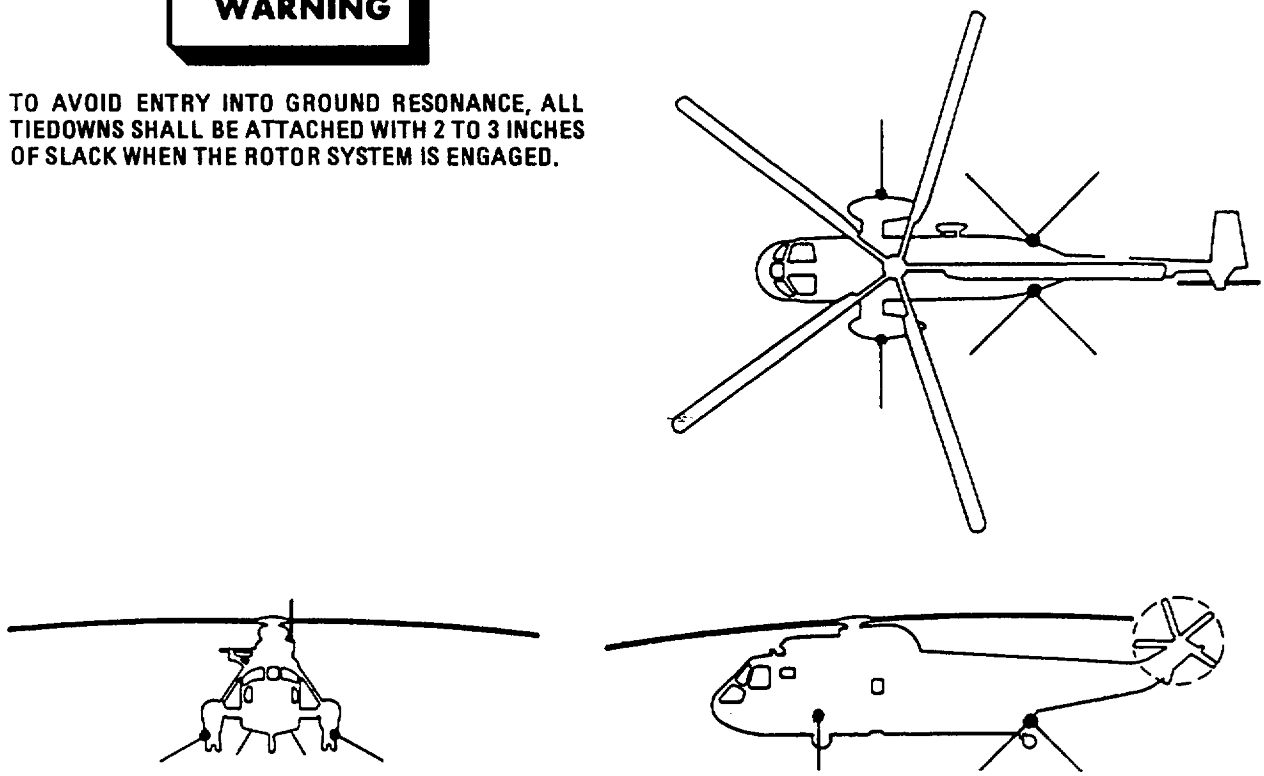
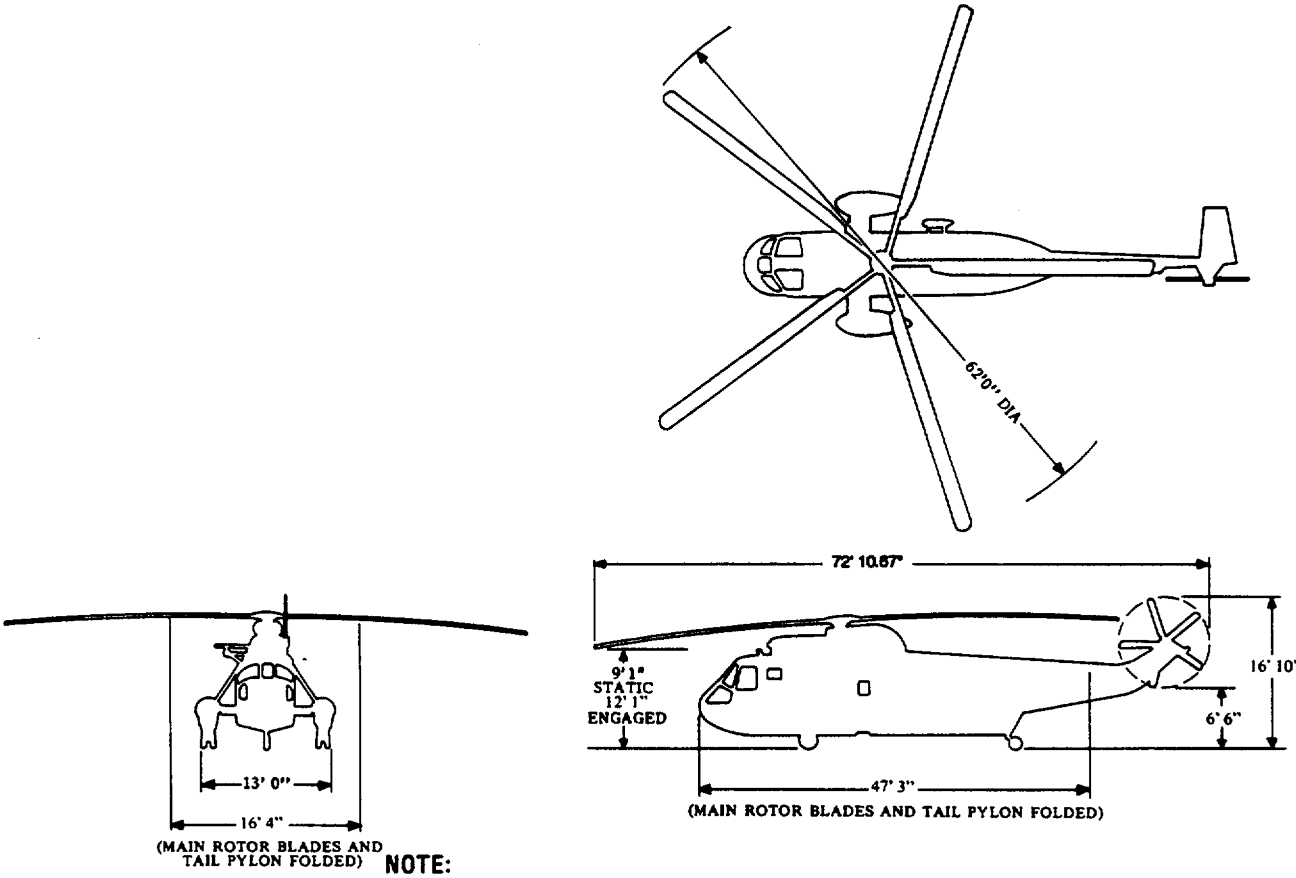


Figure B-29. H-3 Tiedown



NOTE:

Maximum wind for rotor engagement/disengagement, use wind diagram.
Cargo hoist capacity on SH-3G is limited by gross weight considerations.

Figure B-30. H-3 Sea King (Sheet 1 of 2)

MODEL	SH-3G	UH-3A	SH-3D	SH-3H
POWER	2 – T58-GE-8F	2 – T58-GE-8F	2 – T52-GE-10	2 – T58-GE-10
CREW	4	4	4	4
MAXIMUM RANGE	509 nm	508 nm	515 nm	509 nm
MAXIMUM SPEED	120 knots	120 knots	120 knots	120 knots
ENDURANCE	5.5 hr at 60 knots	5.5 hr at 60 knots	5.6 hr at 65 knots	5.5 hr at 65 knots
WEIGHT: Basic	11,800 lb	12, 105 lb	12,850 lb	13,550 lb
Maximum	19,100 lb	19,300 lb	20,500 lb	21,000 lb
FUEL TYPE:	JP-4/JP-5/JP-8	JP-4/JP-5/JP-8	JP-4/JP-5/JP-8	JP-4/JP-5/JP-8
*FUEL CAPACITY:	700 gal	700 gal	848 gal	848 gal

*Gravity refueling.

All performance based on standard day, JP-5 fuel, gravity refueling; SH-3H assumed to be group D or subsequent.

CARGO/PASSENGER CAPABILITY: External hook (not on SH-3D) , 600 lb cargo hoist (SH-3G); seats for 3 passengers (13 on SH-3G, none on UH-3A); no provisions for litters; internal cargo space – 440 ft^3 (SH-3D/G), 450 ft^3 (UH-3A), 600 ft^3 (SH-3H).

MODEL	HH-3A
POWER	2 – T58-GE-8F
CREW	4
MAXIMUM RANGE	350 nm at 130 knots*
MAXIMUM SPEED	120 knots (sea level)
ENDURANCE	3.7 hr at 65-70 knots*
WEIGHT: Basic	13,000 lb (approx)
Maximum	19,100 lb
FUEL: Type	JP-5/JP-4
Capacity	681 gal (without auxiliary tanks)
ARMAMENT:	Armor plating; 1 – GAU-2B (7.62 mm) minigun; 2–M60 (7.62 mm) machine guns

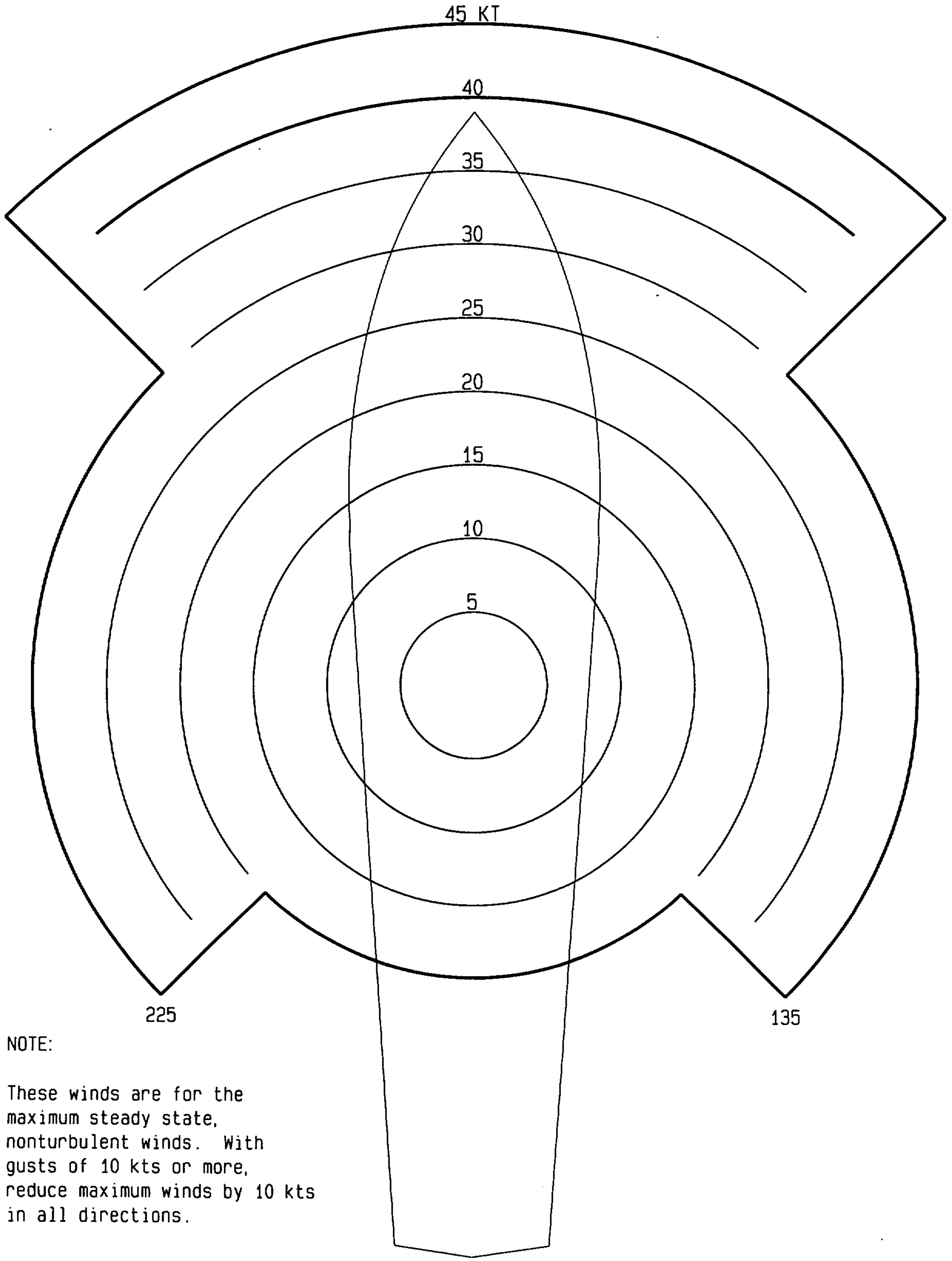
CARGO/PASSENGER CAPABILITY: External hook; 600 lb personnel hoist; seats for 2 passengers; no provisions for litters; 450 ft^3 internal cargo space

*Computed based on normal operating fuel weight of 3,000 lb.

NOTE:

Maximum wind for rotor engagement/disengagement, use wind diagram. These winds are the maximums for steady state, nonturbulent winds. With gusts of 10 knots or more, reduce maximum winds by 10 knots in all directions.

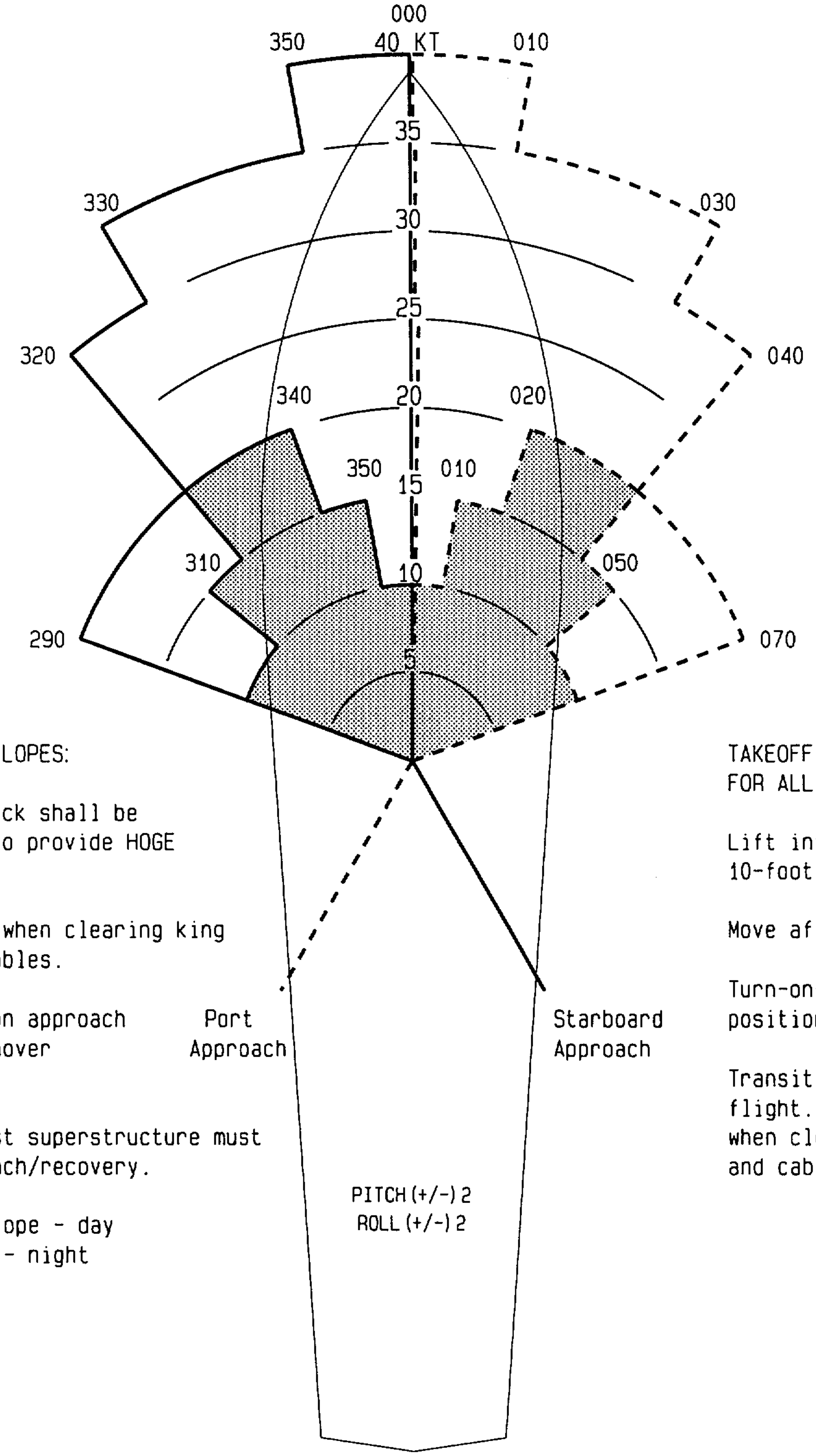
Figure B-30. H-3 Sea King (Sheet 2 of 2)



NOTE:

These winds are for the maximum steady state, nonturbulent winds. With gusts of 10 kts or more, reduce maximum winds by 10 kts in all directions.

Figure B-31. H-3 Engage/Disengage General Envelope



FOR ALL ENVELOPES:

Wind over deck shall be sufficient to provide HOGE capability.

Use caution when clearing king posts and cables.

Use precision approach to 10-foot hover over deck.

Pilot nearest superstructure must perform launch/recovery.

Entire envelope - day
Shaded area - night

TAKEOFF TECHNIQUE FOR ALL ENVELOPES:

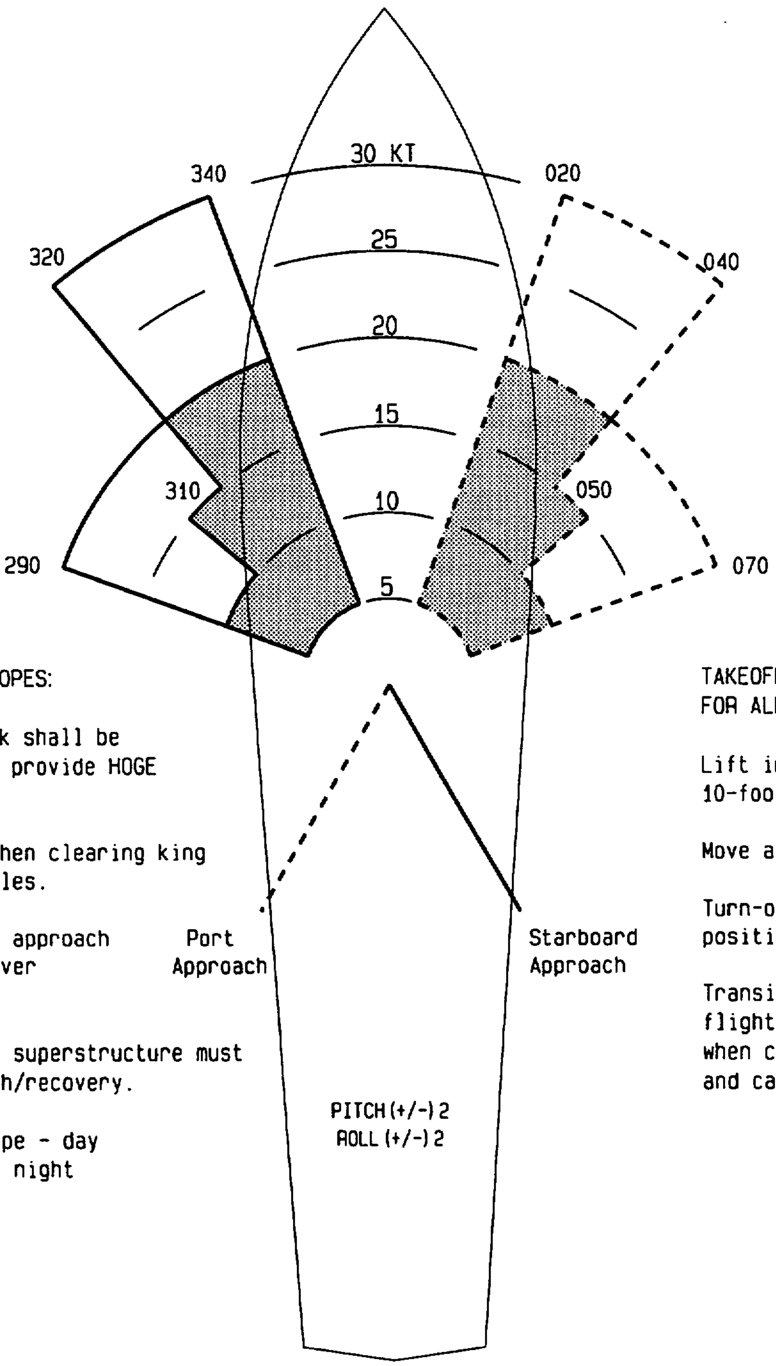
Lift into 5- to 10-foot hover.

Move aft 5 to 10 feet.

Turn-on-spot for positioning into wind.

Transition to forward flight. (Use caution when clearing king posts and cables.)

Figure B-32. H-3 Launch and Recovery Envelopes for AE 26 Class Ships (Sheet 1 of 4)
Sheet 1: Gross Weight of 19,000 lb Maximum



FOR ALL ENVELOPES:

Wind over deck shall be sufficient to provide HOGE capability.

Use caution when clearing king posts and cables.

Use precision approach to 10-foot hover over deck.

Pilot nearest superstructure must perform launch/recovery.

Entire envelope - day
Shaded area - night

TAKEOFF TECHNIQUE FOR ALL ENVELOPES:

Lift into 5- to 10-foot hover.

Move aft 5 to 10 feet.

Turn-on-spot for positioning into wind.

Transition to forward flight. (Use caution when clearing king posts and cables.)

Figure B-32. H-3 Launch and Recovery Envelopes for AE 26 Class Ships (Sheet 2 of 4)
Sheet 2: Gross Weight of 20,000 lb Maximum

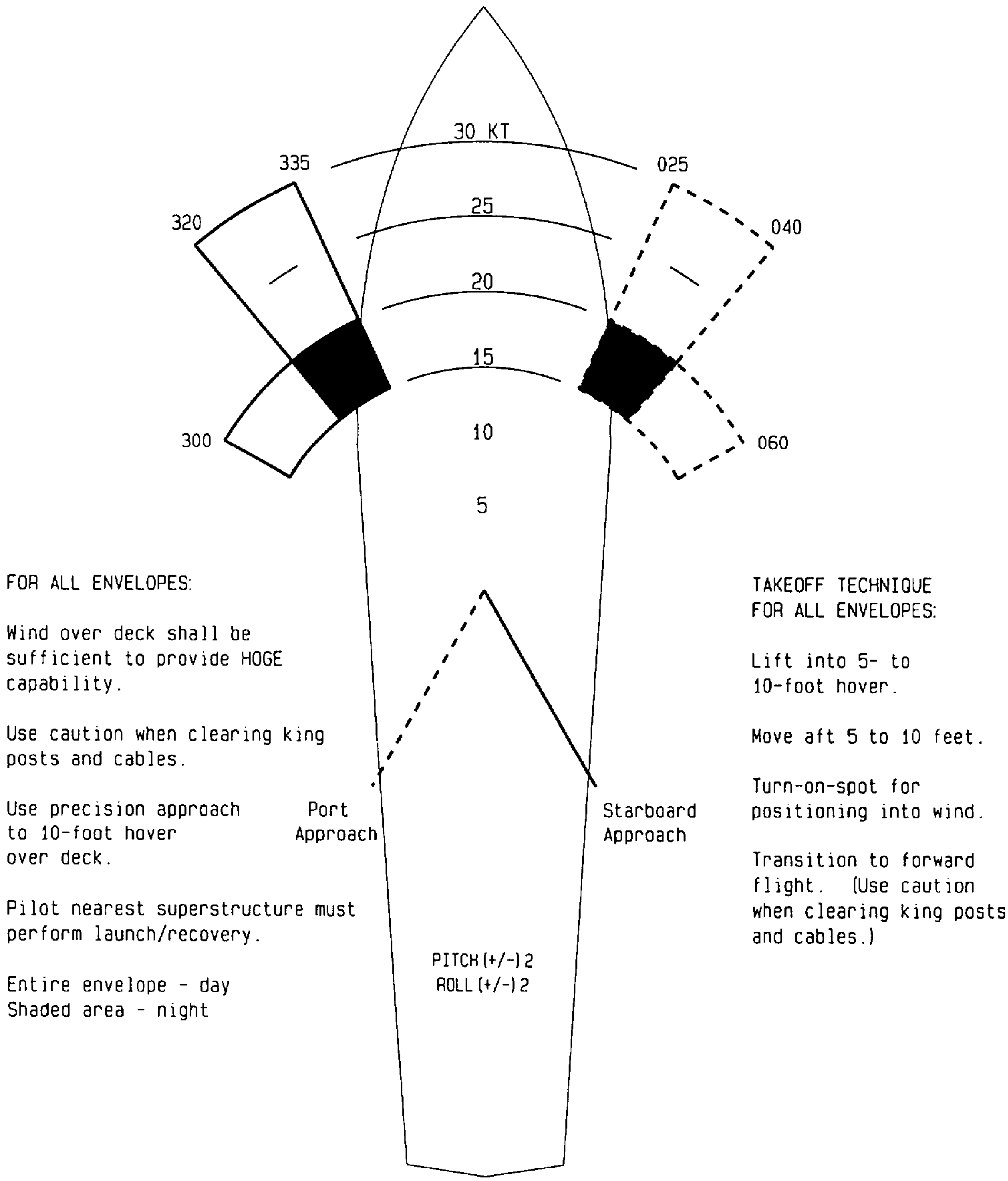
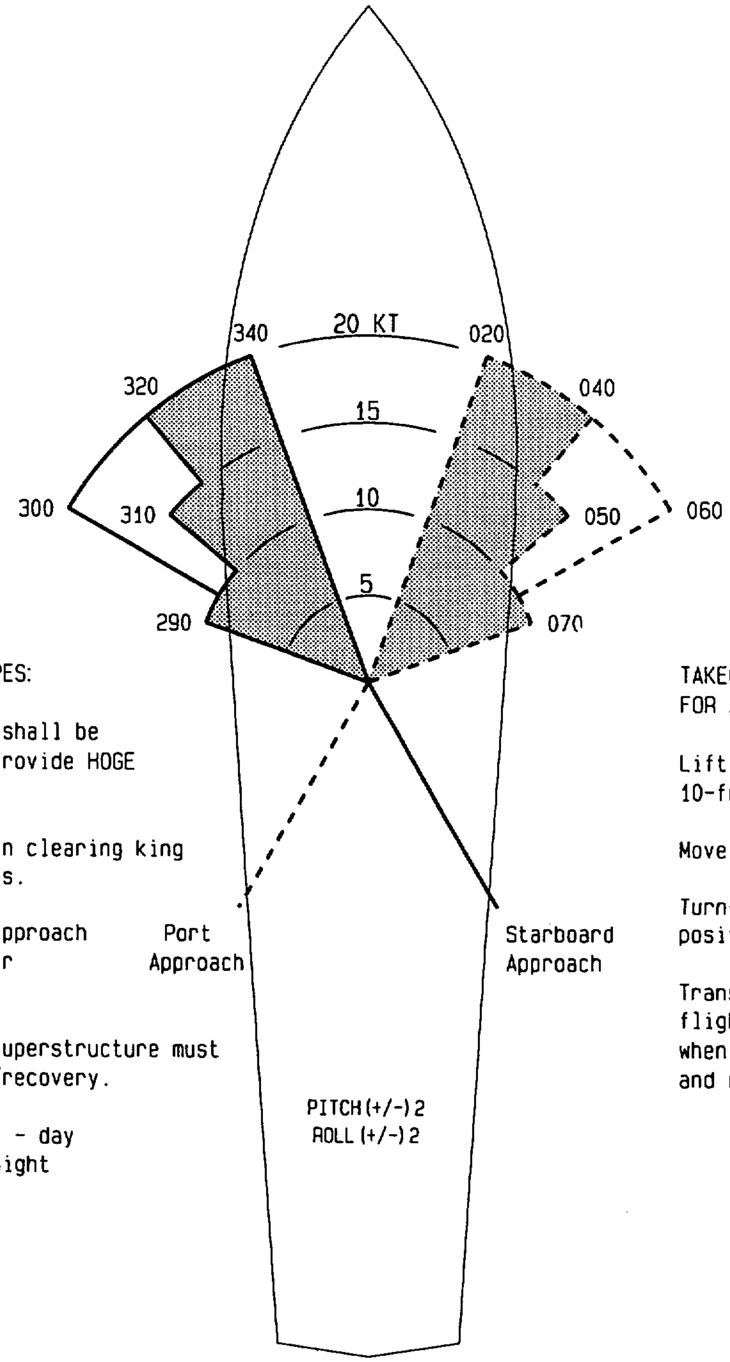


Figure B-32. H-3 Launch and Recovery Envelopes for AE 26 Class Ships (Sheet 3 of 4)
Sheet 3: Gross Weight of 21,000 lb Maximum



FOR ALL ENVELOPES:

Wind over deck shall be sufficient to provide HOGE capability.

Use caution when clearing king posts and cables.

Use precision approach to 10-foot hover over deck.

Pilot nearest superstructure must perform launch/recovery.

Entire envelope - day
Shaded area - night

NOTE:

ASE OFF

TAKEOFF TECHNIQUE FOR ALL ENVELOPES:

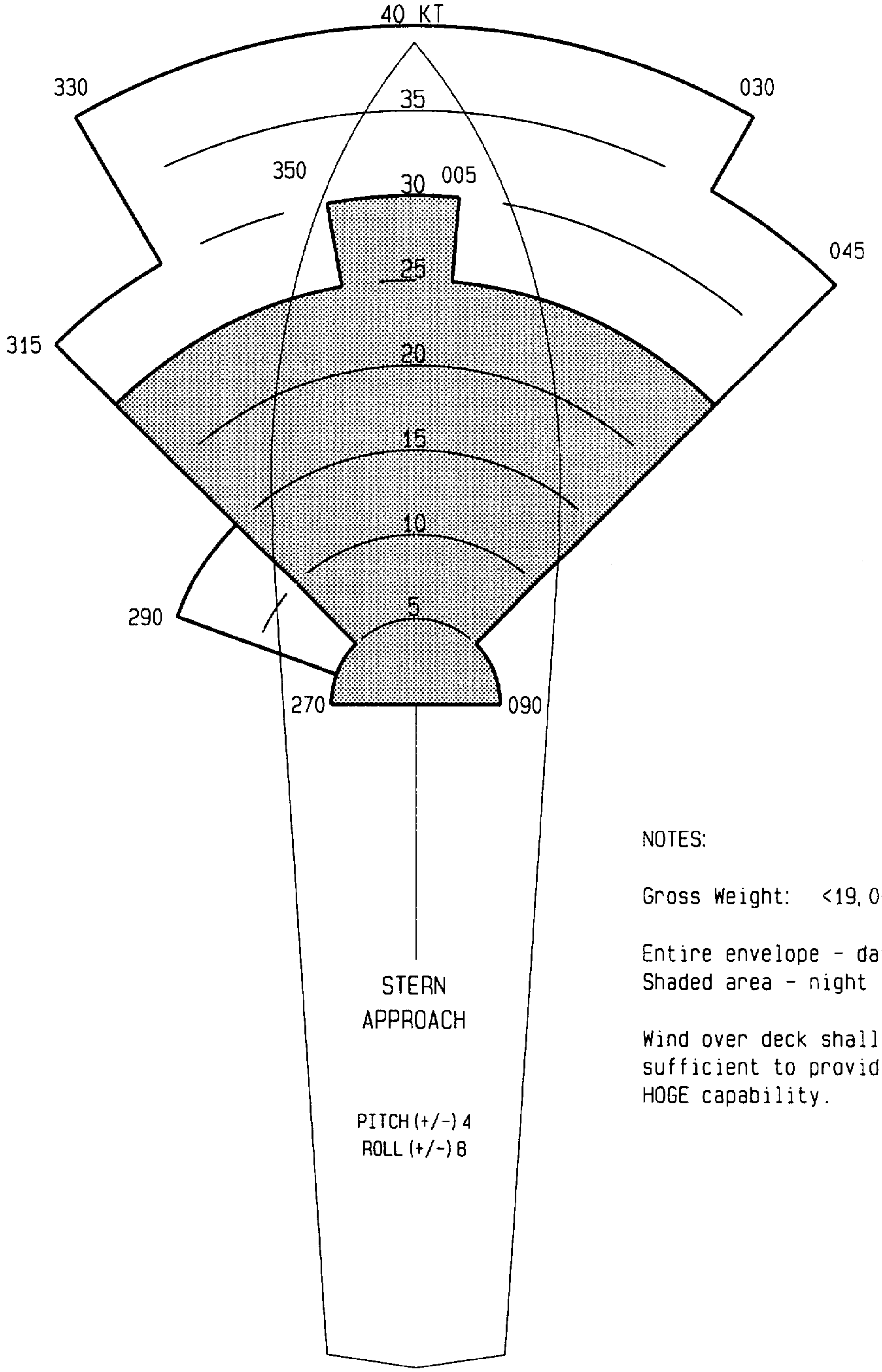
Lift into 5- to 10-foot hover.

Move aft 5 to 10 feet.

Turn-on-spot for positioning into wind.

Transition to forward flight. (Use caution when clearing king posts and cables.)

Figure B-32. H-3 Launch and Recovery Envelopes for AE 26 Class Ships (Sheet 4 of 4)
Sheet 4: Degraded Recovery Envelope



NOTES:

Gross Weight: <19,000 LB

Entire envelope - day
Shaded area - night

Wind over deck shall be sufficient to provide HOGE capability.

Figure B-33. H-3 Launch and Recovery Envelopes for CG 47 Class Ships (Sheet 1 of 2)
Sheet 1: Gross Weight of 19,000 lb Maximum

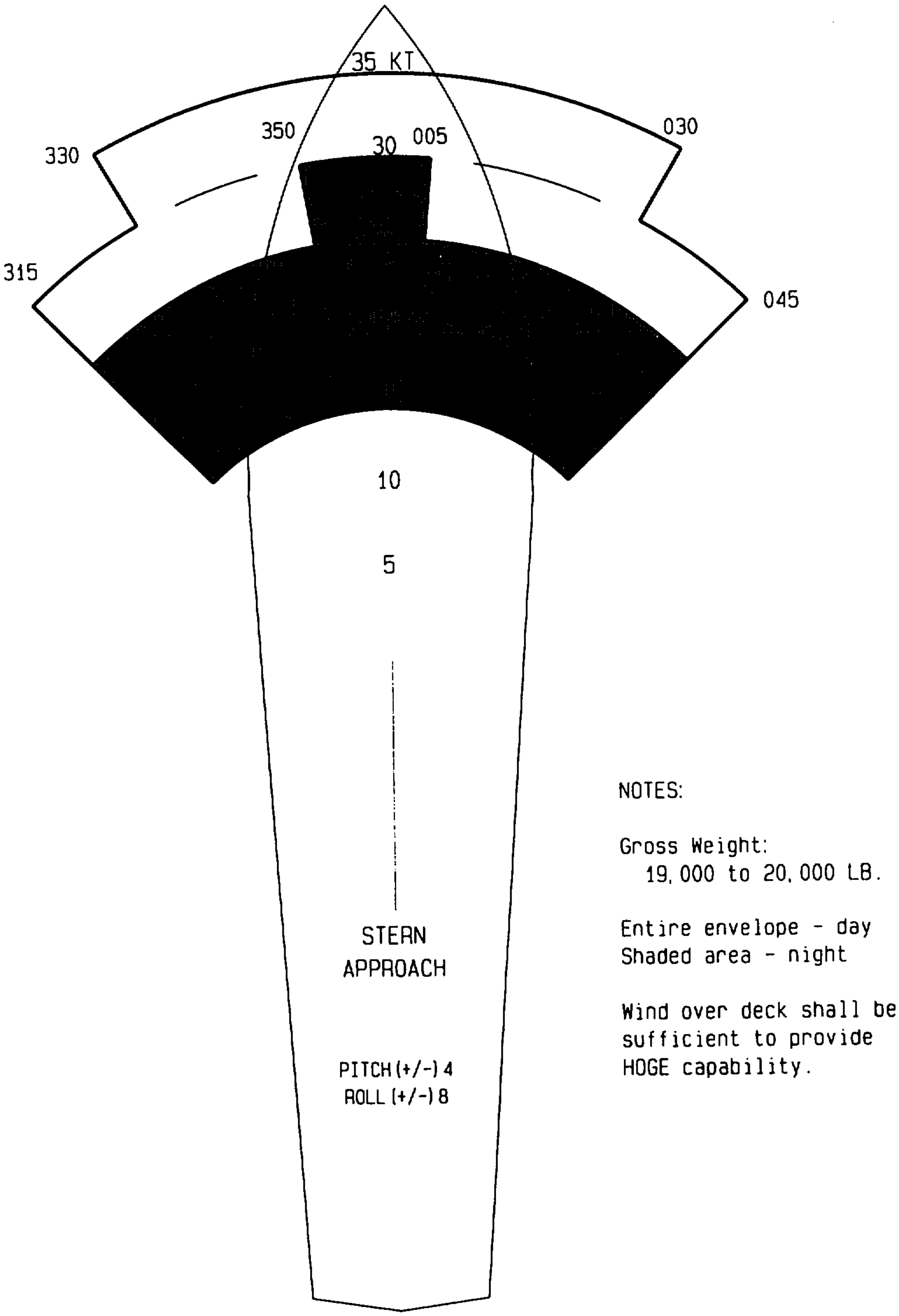
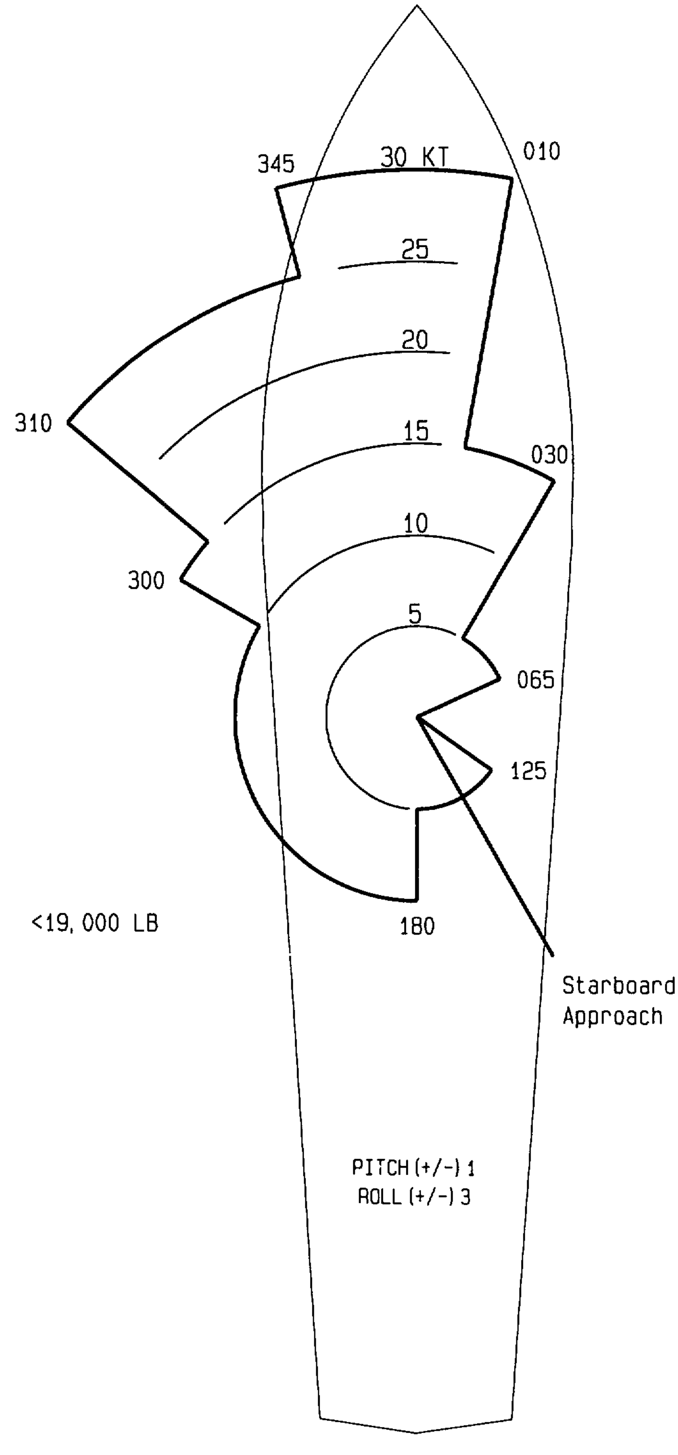


Figure B-33. H-3 Launch and Recovery Envelopes for CG 47 Class Ships (Sheet 2 of 2)
Sheet 2: Gross Weight of 20,000 lb Maximum

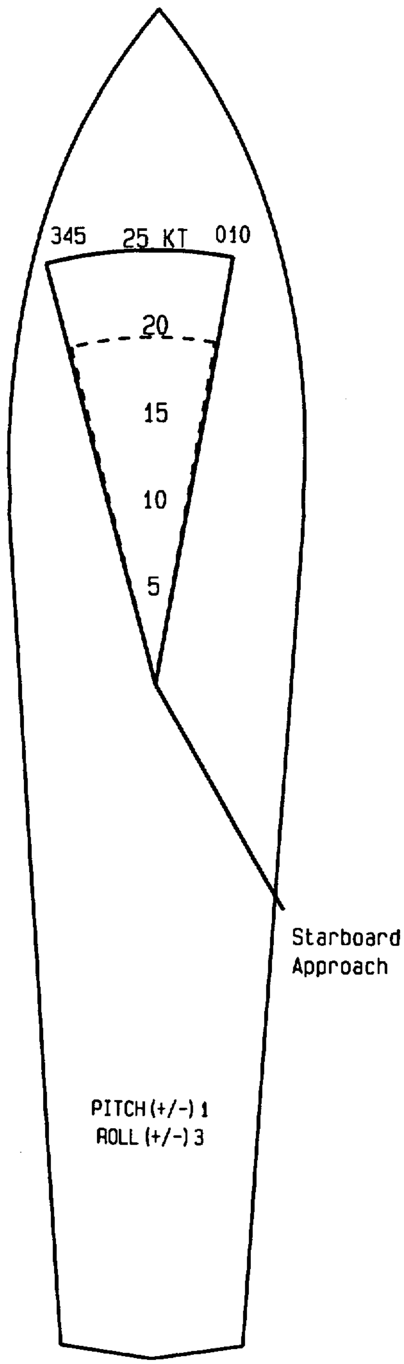


NOTES:

Gross Weight: <19,000 LB

Day envelope

Figure B-34. H-3 Launch and Recovery Envelopes for CGN 36 Class Ships (Sheet 1 of 3)
Sheet 1: Gross Weight of 19,000 lb Maximum



NOTES:

Entire envelope - ASE OFF.

Dashed Boundary - AUX OFF.

Day Operations.

Figure B-34. H-3 Launch and Recovery Envelopes for CGN 36 Class Ships (Sheet 2 of 3)
Sheet 2: Degraded Recovery Envelope, Daytime

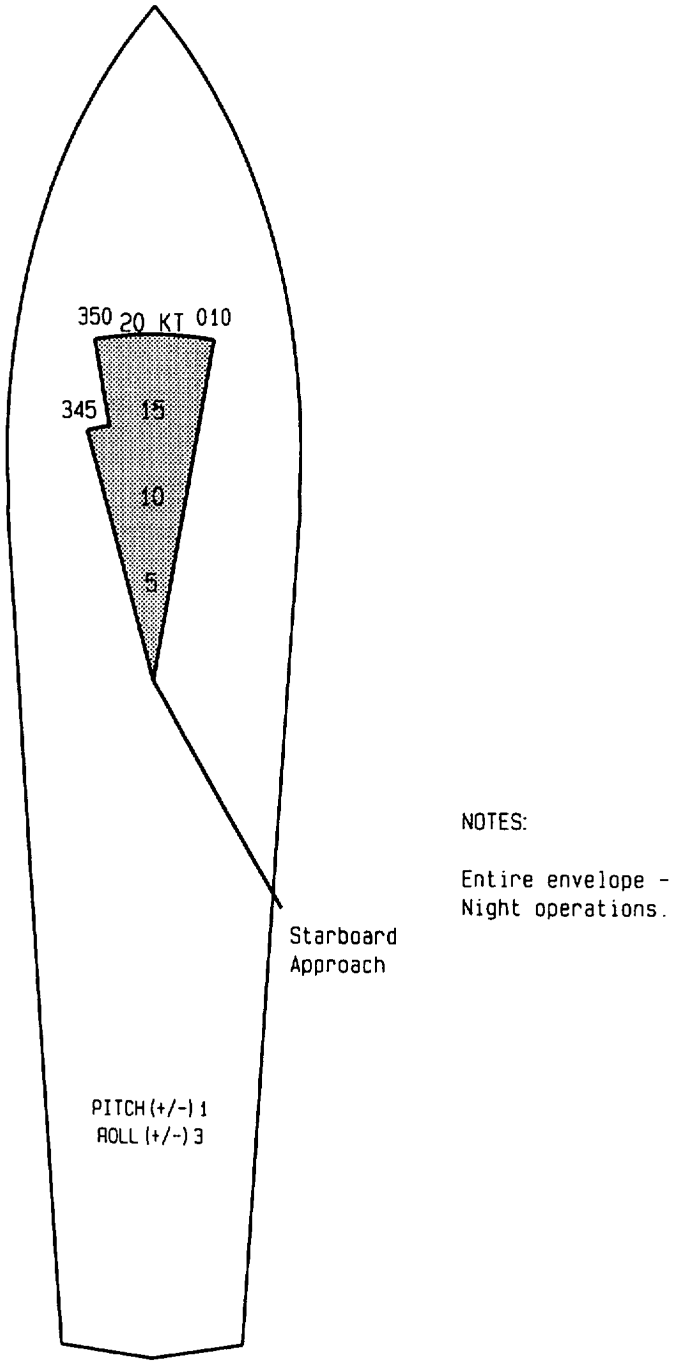


Figure B-34. H-3 Launch and Recovery Envelopes for CGN 36 Class Ships (Sheet 3 of 3)
Sheet 3: Degraded Recovery Envelope, Nighttime

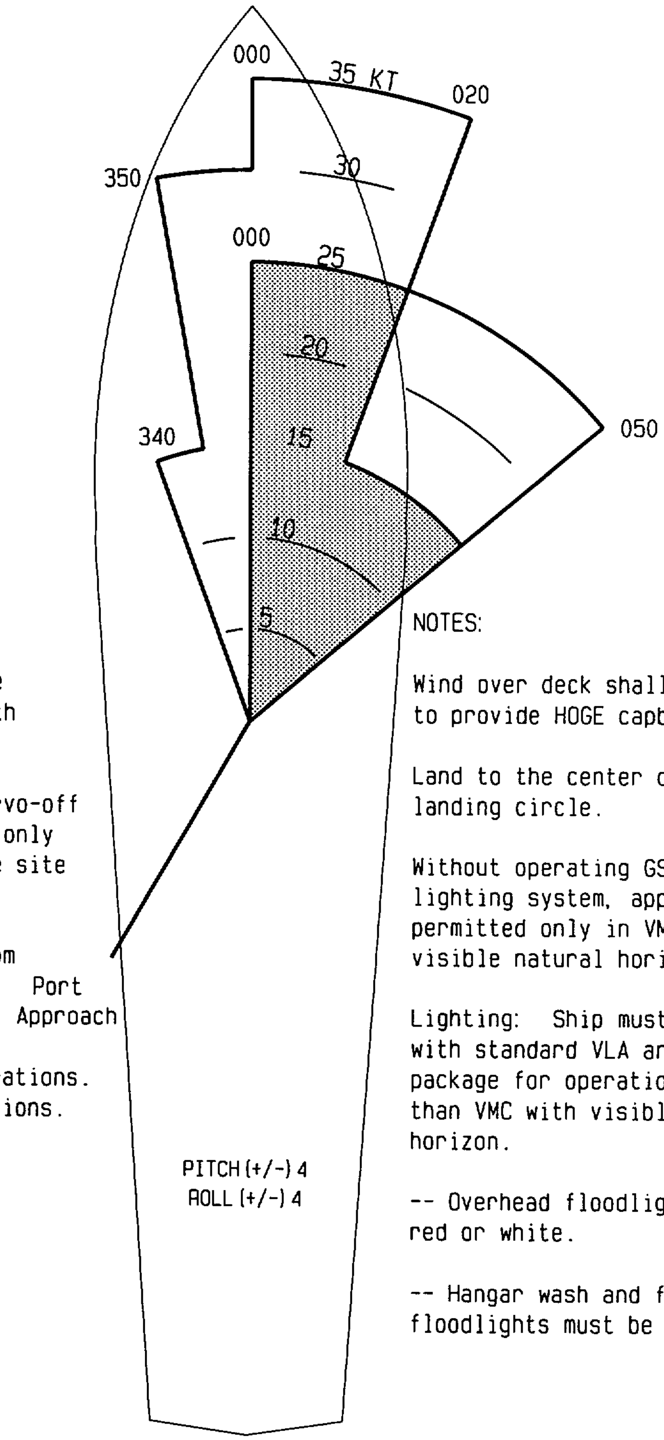
NOTE:

Tail rotor buss limits are waived for SH-3A/D/G/H with AFC 314.

Night ASE or auxiliary servo-off recoveries are authorized only when a large ship or shore site is not available.

HIFR winds recommended from 340-360.

Entire envelope - day operations.
Shaded area - night operations.



NOTES:

Wind over deck shall be sufficient to provide HOGE capbility.

Land to the center of the landing circle.

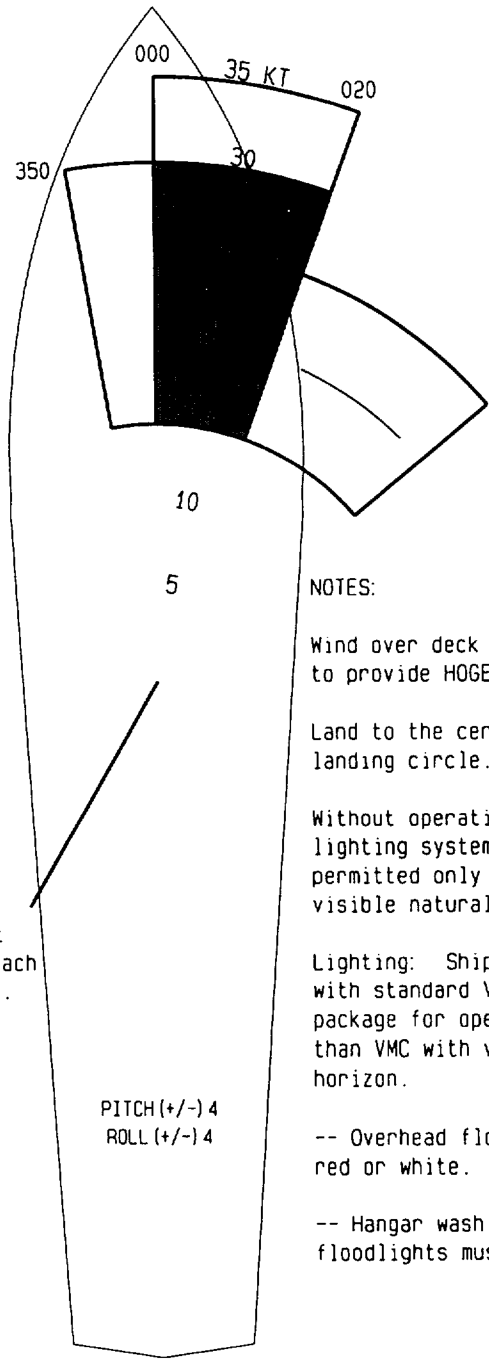
Without operating GSI or centerline lighting system, approaches permitted only in VMC with visible natural horizon.

Lighting: Ship must be equipped with standard VLA and LAMPS add-on package for operations in other than VMC with visible natural horizon.

-- Overhead floodlights may be red or white.

-- Hangar wash and flight deck floodlights must be white or yellow.

Figure B-35. H-3 Launch and Recovery Envelopes for DD 963 Class Ships (Sheet 1 of 6)
Sheet 1: Gross Weight of 19,000 lb Maximum, Port Approach



NOTE:

Tail rotor buss limits are waived for SH-3A/D/G/H with AFC 314.

Night ASE or auxiliary servo-off recoveries are authorized only when a large ship or shore site is not available.

HIFR winds recommended from 340-360.

Entire envelope - day operations.
Shaded area - night operations.

NOTES:

Wind over deck shall be sufficient to provide HOGE capbility.

Land to the center of the landing circle.

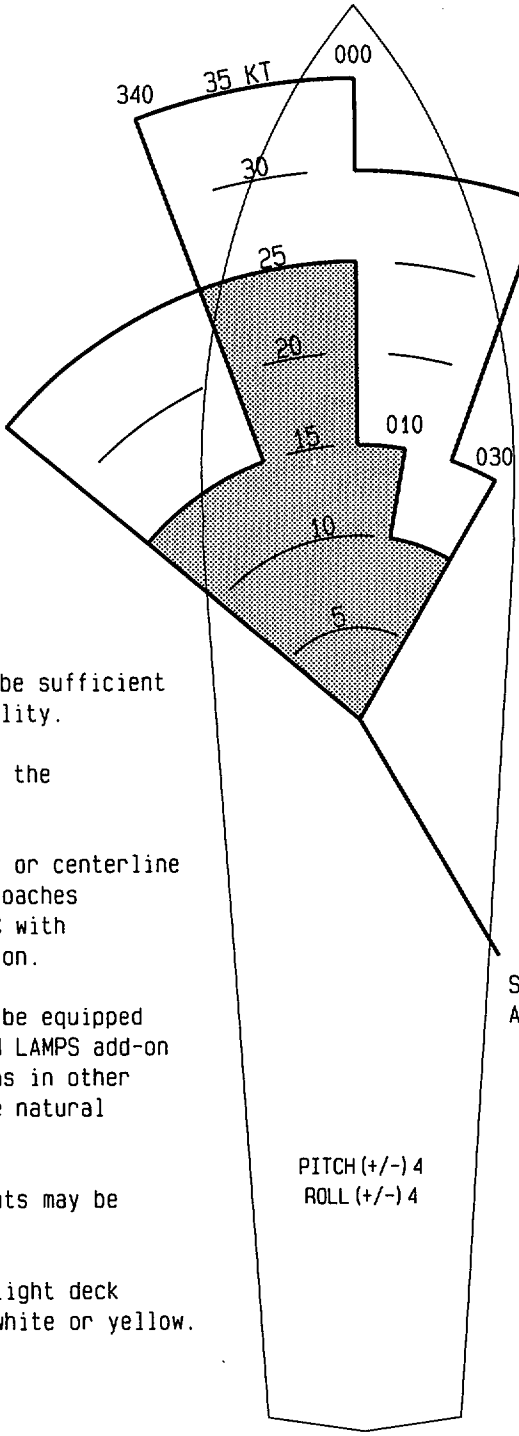
Without operating GSI or centerline lighting system, approaches permitted only in VMC with visible natural horizon.

Lighting: Ship must be equipped with standard VLA and LAMPS add-on package for operations in other than VMC with visible natural horizon.

-- Overhead floodlights may be red or white.

-- Hangar wash and flight deck floodlights must be white or yellow.

Figure B-35. H-3 Launch and Recovery Envelopes for DD 963 Class Ships (Sheet 2 of 6)
Sheet 2: Gross Weight of 20,000 lb Maximum, Port Approach



NOTES:

Wind over deck shall be sufficient to provide HOGE capbility.

Land to the center of the landing circle.

Without operating GSI or centerline lighting system, approaches permitted only in VMC with visible natural horizon.

Lighting: Ship must be equipped with standard VLA and LAMPS add-on package for operations in other than VMC with visible natural horizon.

-- Overhead floodlights may be red or white.

-- Hangar wash and flight deck floodlights must be white or yellow.

NOTE:

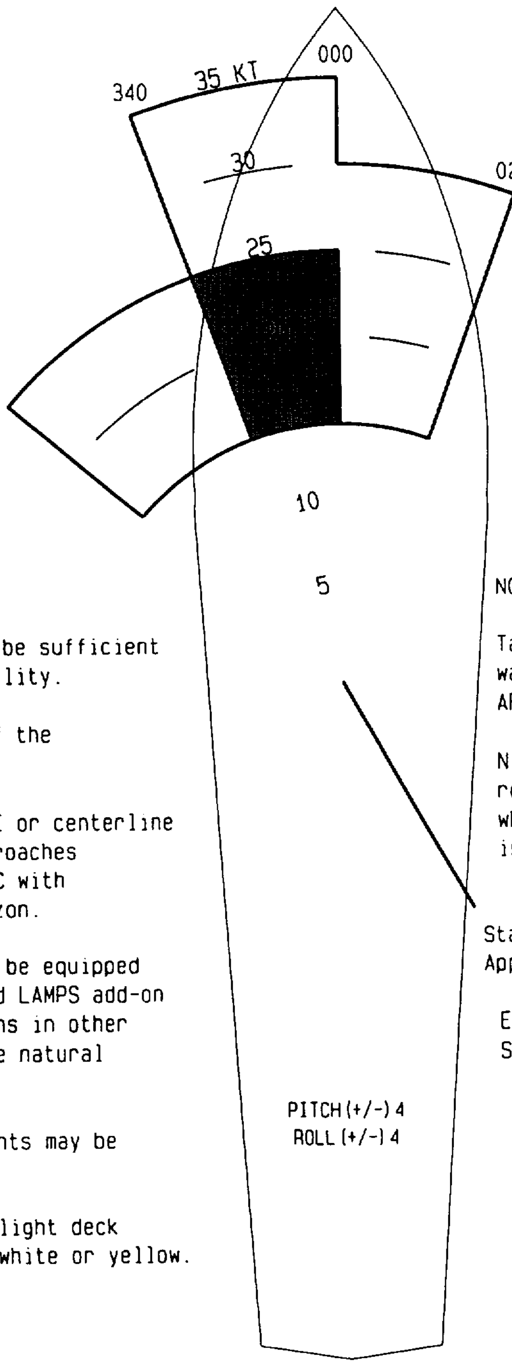
Tail rotor buss limits are waived for SH-3A/D/G/H with AFC 314.

Night ASE or auxiliary servo-off recoveries are authorized only when a large ship or shore site is not available.

HIFR winds recommended from 340-360.

Entire envelope - day operations.
Shaded area - night operations.

Figure B-35. H-3 Launch and Recovery Envelopes for DD 963 Class Ships (Sheet 3 of 6)
Sheet 3: Gross Weight of 19,000 lb Maximum, Starboard Approach



NOTES:

Wind over deck shall be sufficient to provide HOGE capbility.

Land to the center of the landing circle.

Without operating GSI or centerline lighting system, approaches permitted only in VMC with visible natural horizon.

Lighting: Ship must be equipped with standard VLA and LAMPS add-on package for operations in other than VMC with visible natural horizon.

-- Overhead floodlights may be red or white.

-- Hangar wash and flight deck floodlights must be white or yellow.

NOTE:

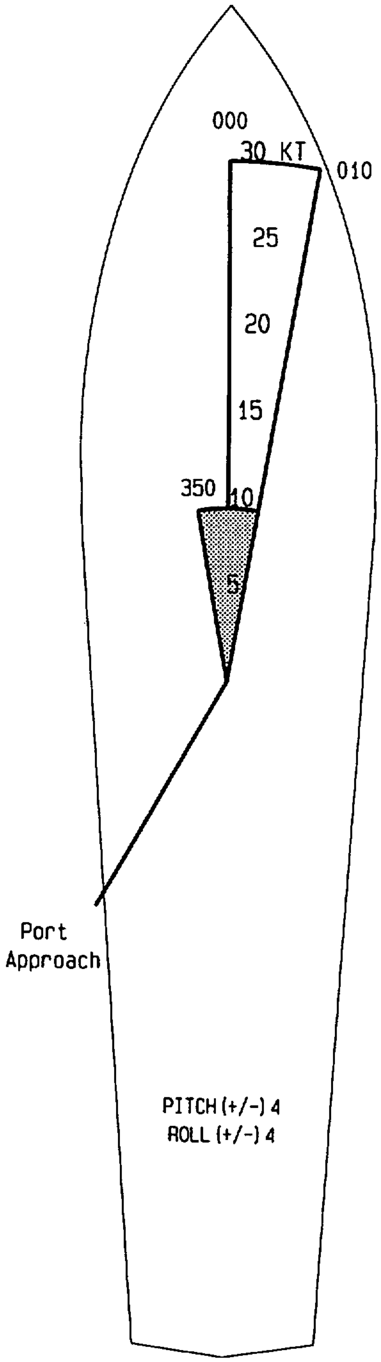
Tail rotor buss limits are waived for SH-3A/D/G/H with AFC 314.

Night ASE or auxiliary servo-off recoveries are authorized only when a large ship or shore site is not available.

HIFR winds recommended from 340-360.

Entire envelope - day operations.
Shaded area - night operations.

Figure B-35. H-3 Launch and Recovery Envelopes for DD 963 Class Ships (Sheet 4 of 6)
Sheet 4: Gross Weight of 20,000 lb Maximum, Starboard Approach



NOTES:

ASE/AUX OFF

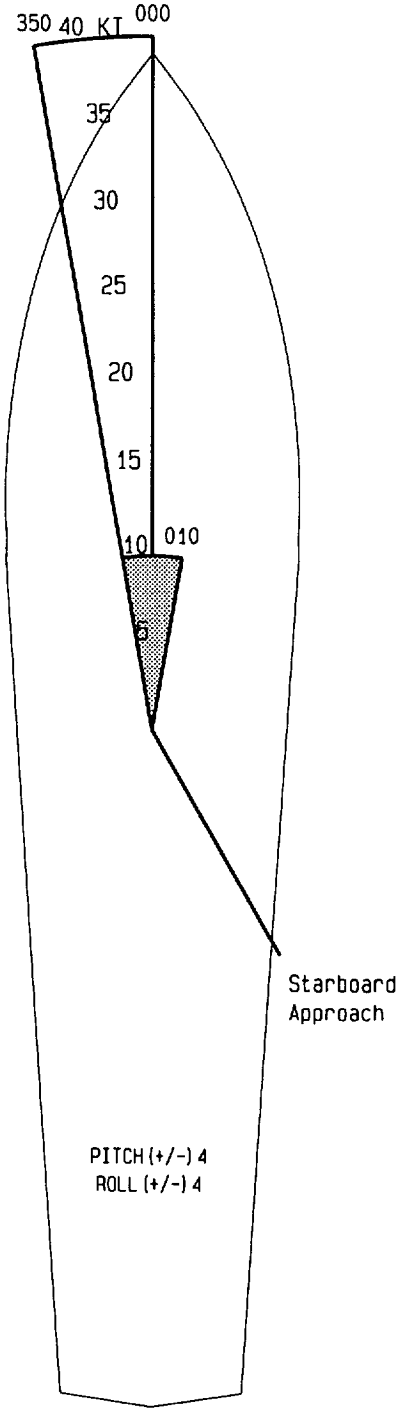
Maximum wind-over deck
for aux off.

Entire envelope - day.
Shaded area - night.

Gross Weight < 19,000 LB.

Figure B-35. H-3 Launch and Recovery Envelopes for DD 963 Class Ships (Sheet 5 of 6)
Sheet 5: Degraded Recovery Envelope, Port Approach

MAR/96



NOTES:

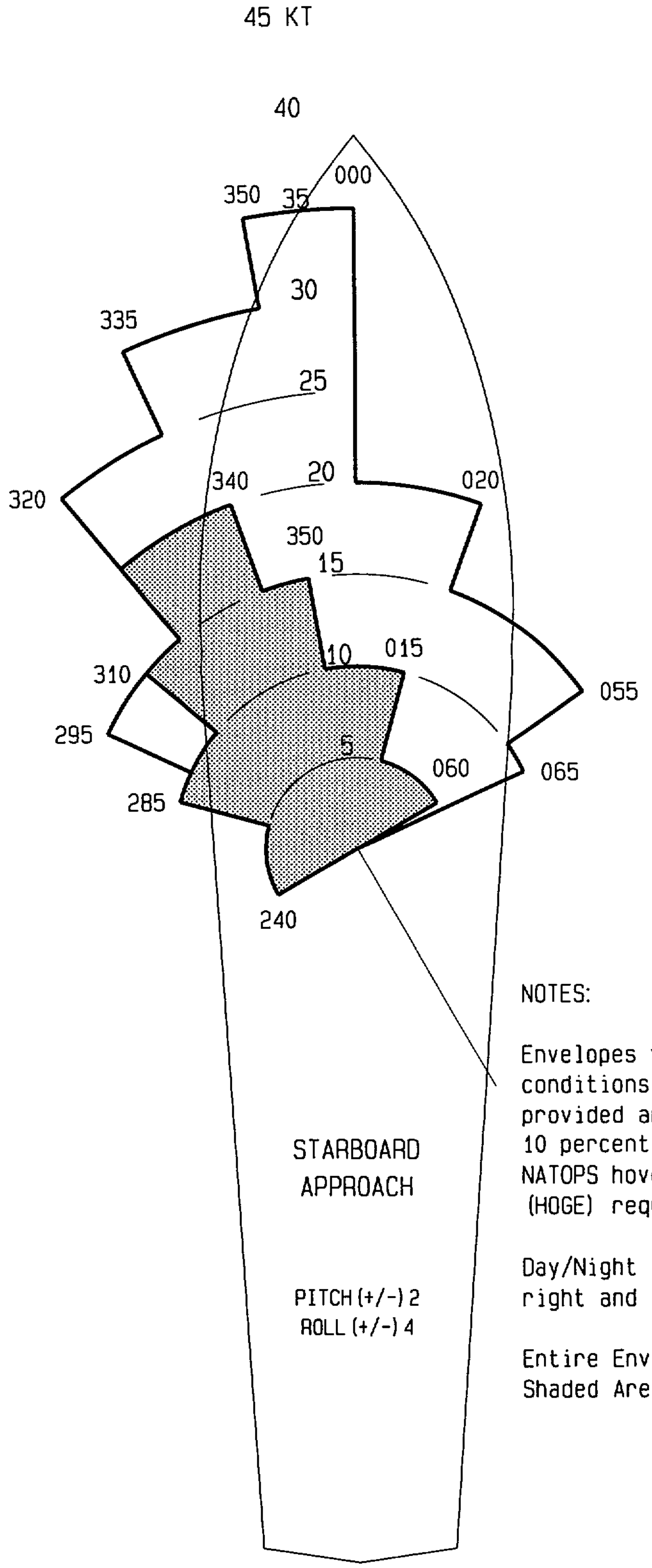
ASE/AUX OFF

Maximum wind-over deck for aux off.

Entire envelope - day
Shaded area - night

Gross Weight < 19,000 LB.

Figure B-35. H-3 Launch and Recovery Envelopes for DD 963 Class Ships (Sheet 6 of 6)
Sheet 6: Degraded Recovery Envelope, Starboard Approach



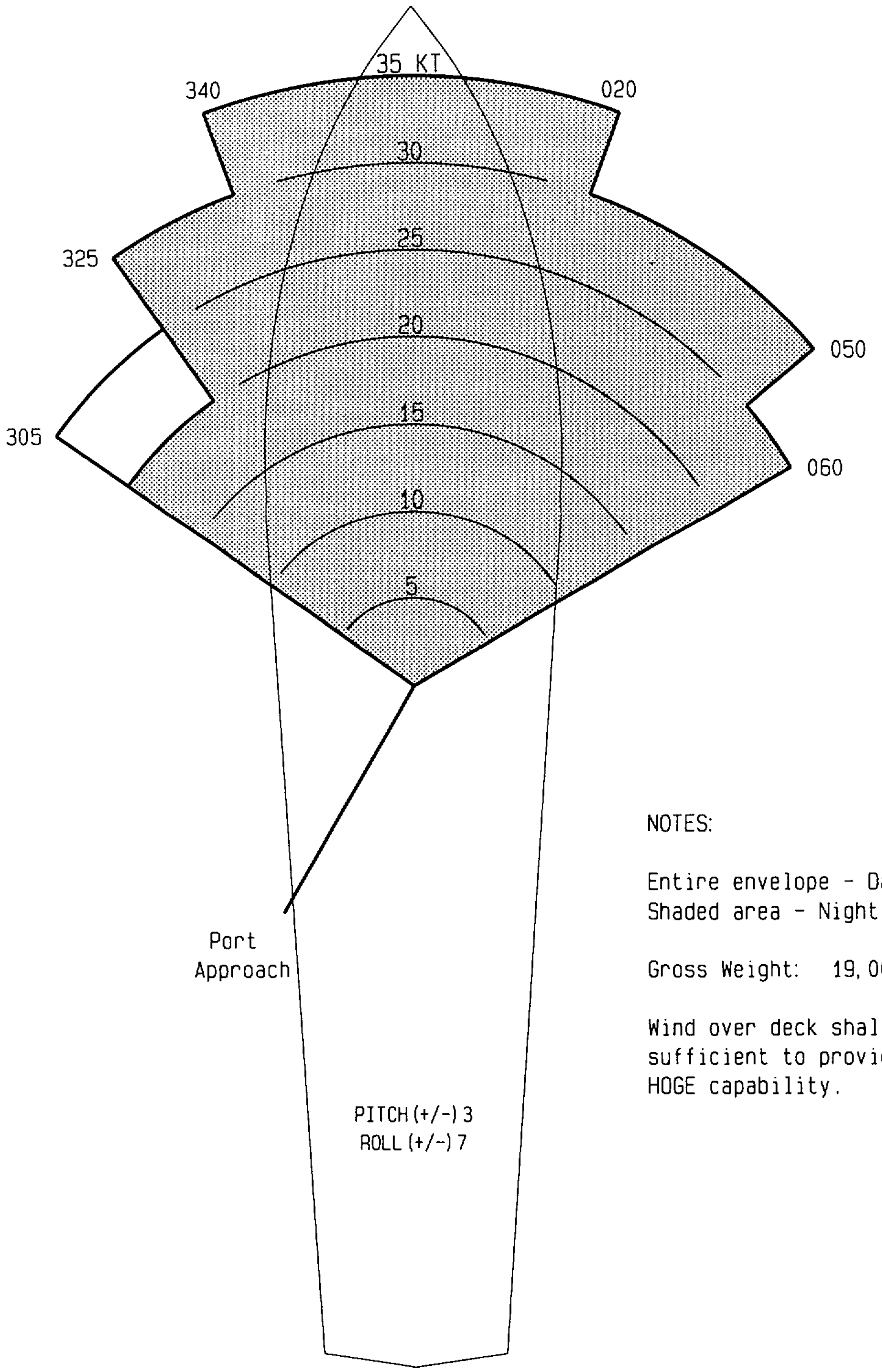
NOTES:

Envelopes valid for all acft GW/CG conditions allowed by NATOPS provided ambient conditions allow a 10 percent torque margin above NATOPS hover out of ground effect (HOGE) required torque predictions.

Day/Night envelopes valid for right and left seat landings.

Entire Envelope - Day
Shaded Area - Night

Figure B-36. SH/UH-3H Launch and Recovery Envelope for DDG 51 Class Ships



NOTES:

Entire envelope - Day.
Shaded area - Night.

Gross Weight: 19,000 LB MAX.

Wind over deck shall be sufficient to provide HOGE capability.

Figure B-37. H-3 Launch and Recovery Envelopes for DDG 993 Class Ships (Sheet 1 of 6)
Sheet 1: Gross Weight of 19,000 lb Maximum, Port Approach

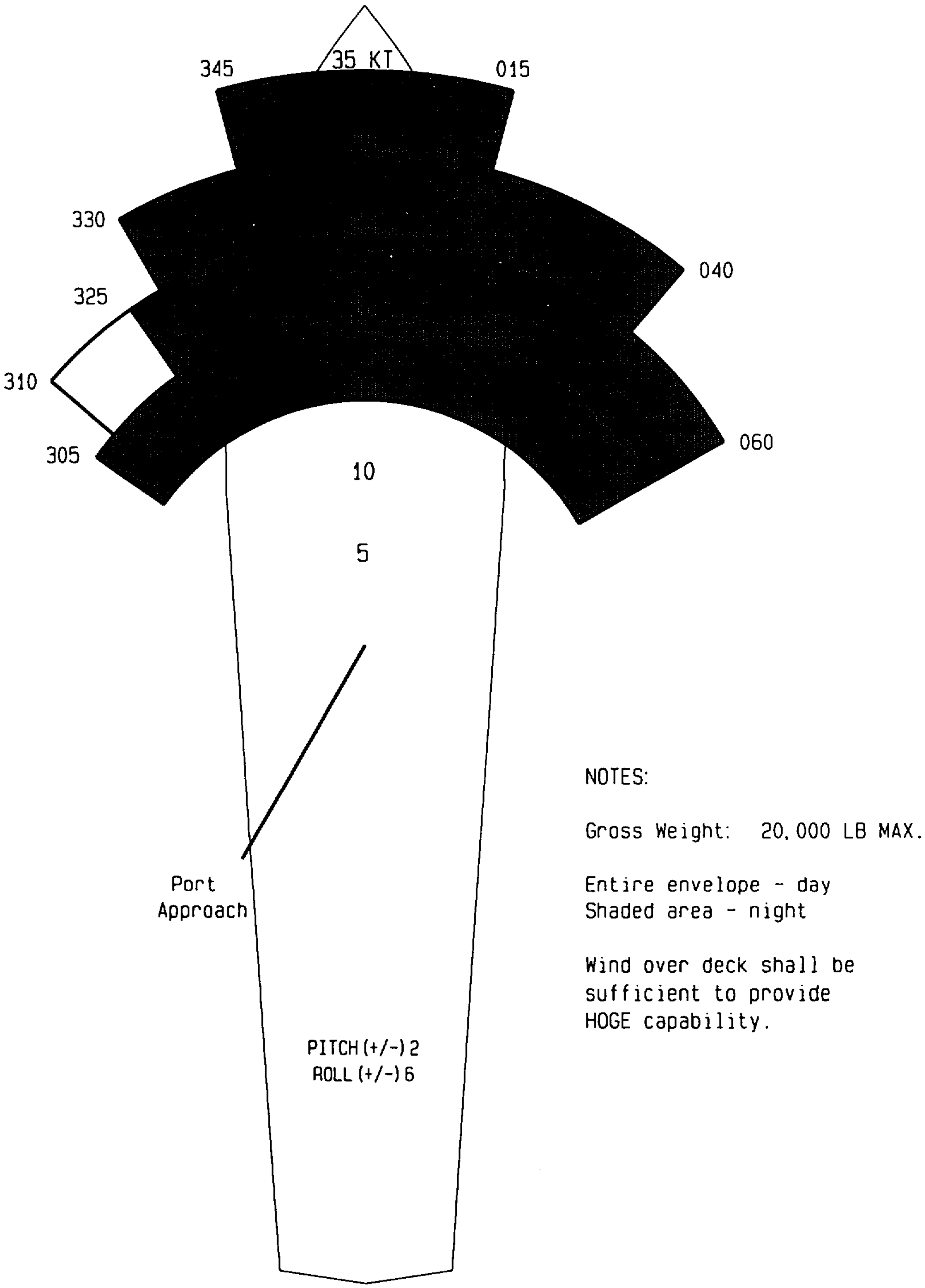
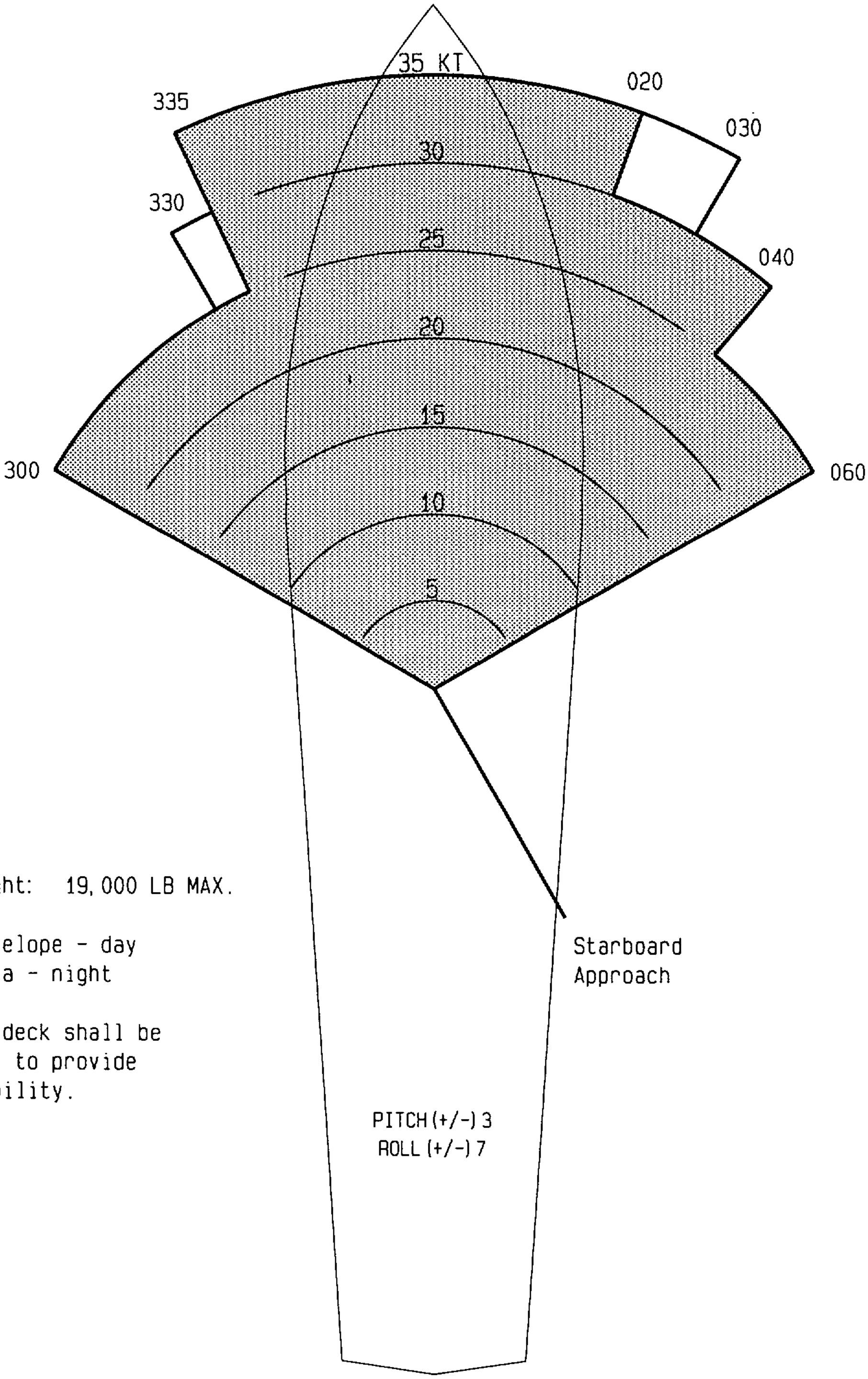


Figure B-37. H-3 Launch and Recovery Envelopes for DDG 993 Class Ships (Sheet 2 of 6)
Sheet 2: Gross Weight of 20,000 lb Maximum, Port Approach



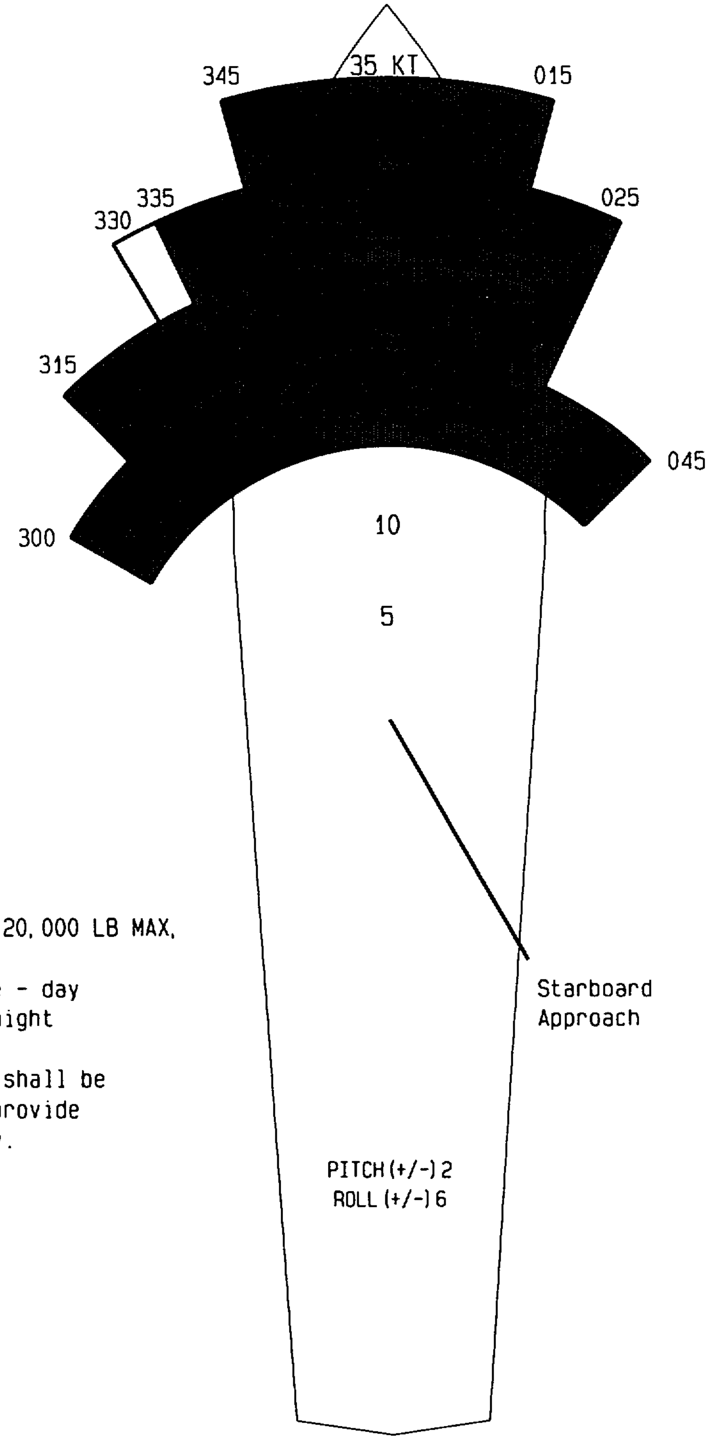
NOTES:

Gross Weight: 19,000 LB MAX.

Entire envelope - day
Shaded area - night

Wind over deck shall be
sufficient to provide
HOGE capability.

Figure B-37. H-3 Launch and Recovery Envelopes for DDG 993 Class Ships (Sheet 3 of 6)
Sheet 3: Gross Weight of 19,000 lb Maximum, Starboard Approach



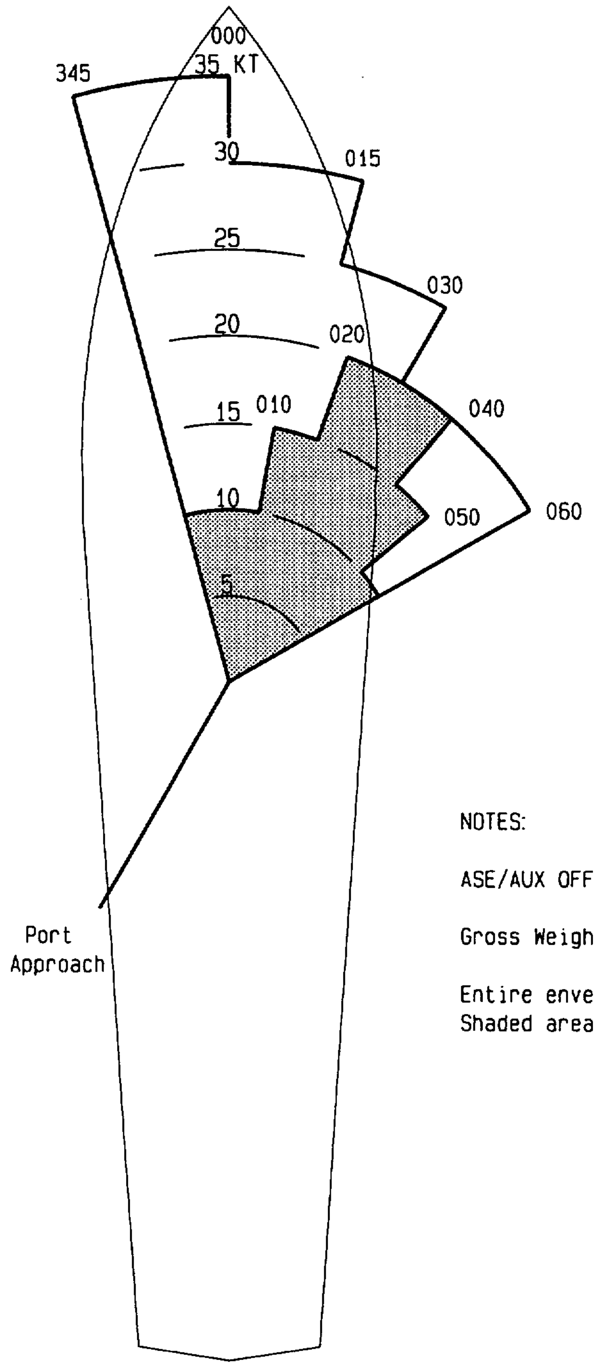
NOTES:

Gross Weight: 20,000 LB MAX.

Entire envelope - day
Shaded area - night

Wind over deck shall be sufficient to provide HOGE capability.

Figure B-37. H-3 Launch and Recovery Envelopes for DDG 993 Class Ships (Sheet 4 of 6)
Sheet 4: Gross Weight of 20,000 lb Maximum, Starboard Approach



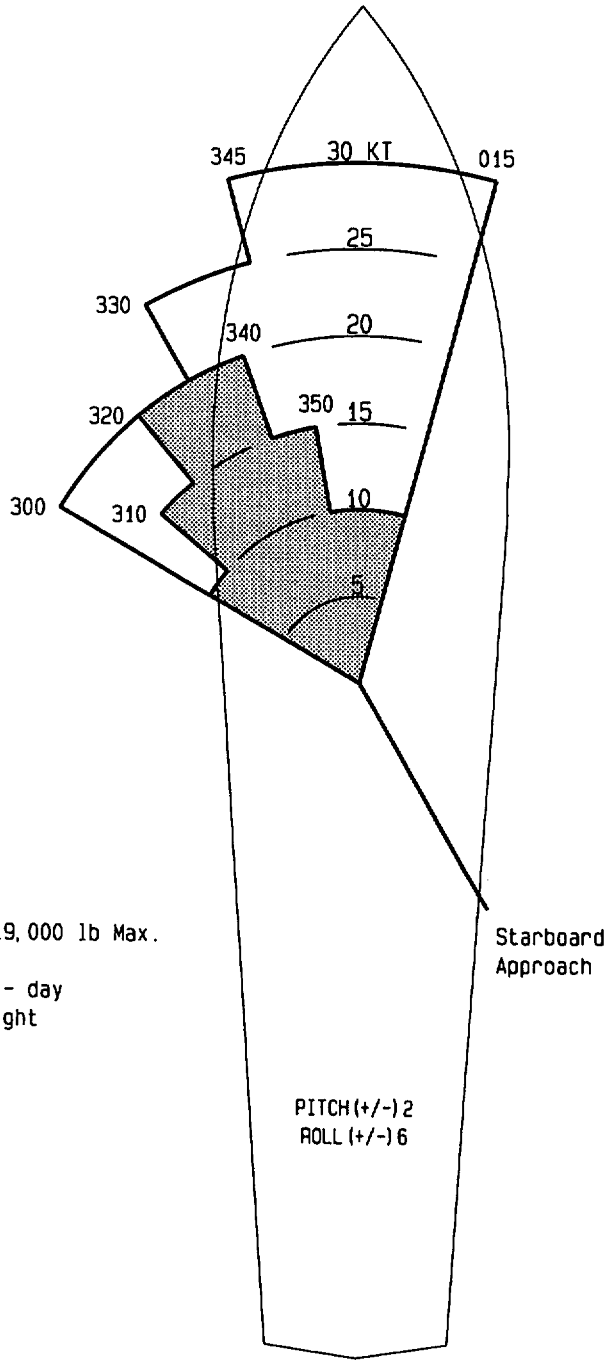
NOTES:

ASE/AUX OFF

Gross Weight < 19,000 lb Max.

Entire envelope - day
Shaded area - night

Figure B-37. H-3 Launch and Recovery Envelopes for DDG 993 Class Ships (Sheet 5 of 6)
'Sheet 5: Degraded Recovery Envelope, Port Approach



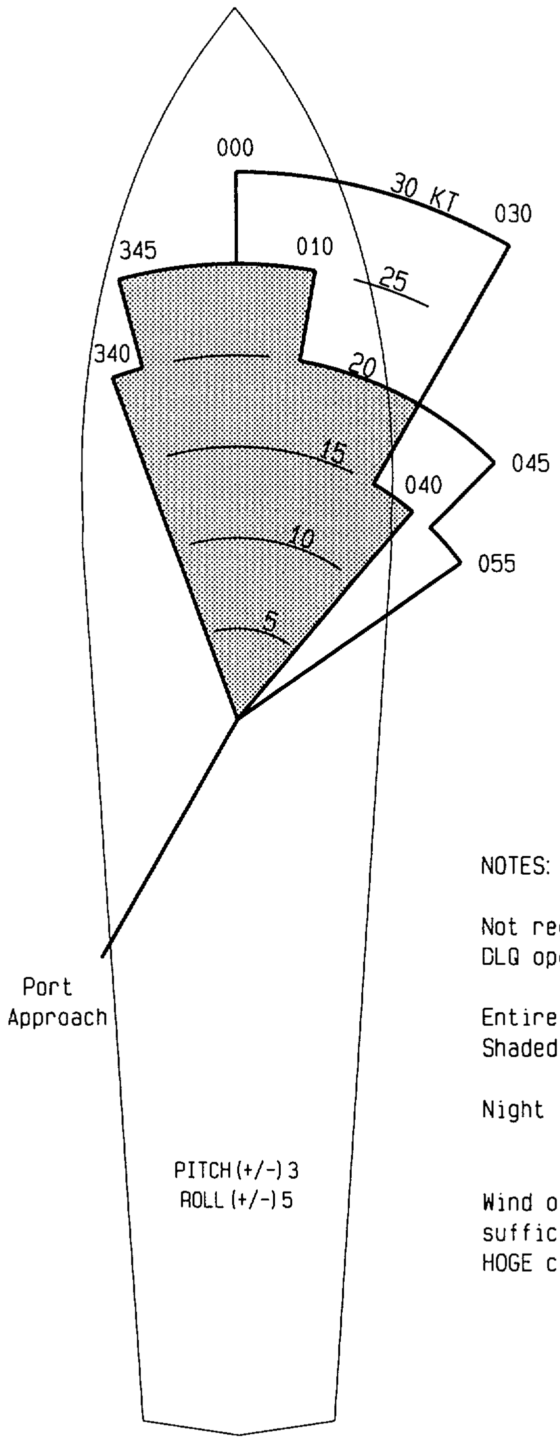
NOTES:

ASE/AUX OFF

Gross Weight < 19,000 lb Max.

Entire envelope - day
Shaded area - night

Figure B-37. H-3 Launch and Recovery Envelopes for DDG 993 Class Ships (Sheet 6 of 6)
Sheet 6: Degraded Recovery Envelope, Starboard Approach



NOTES:

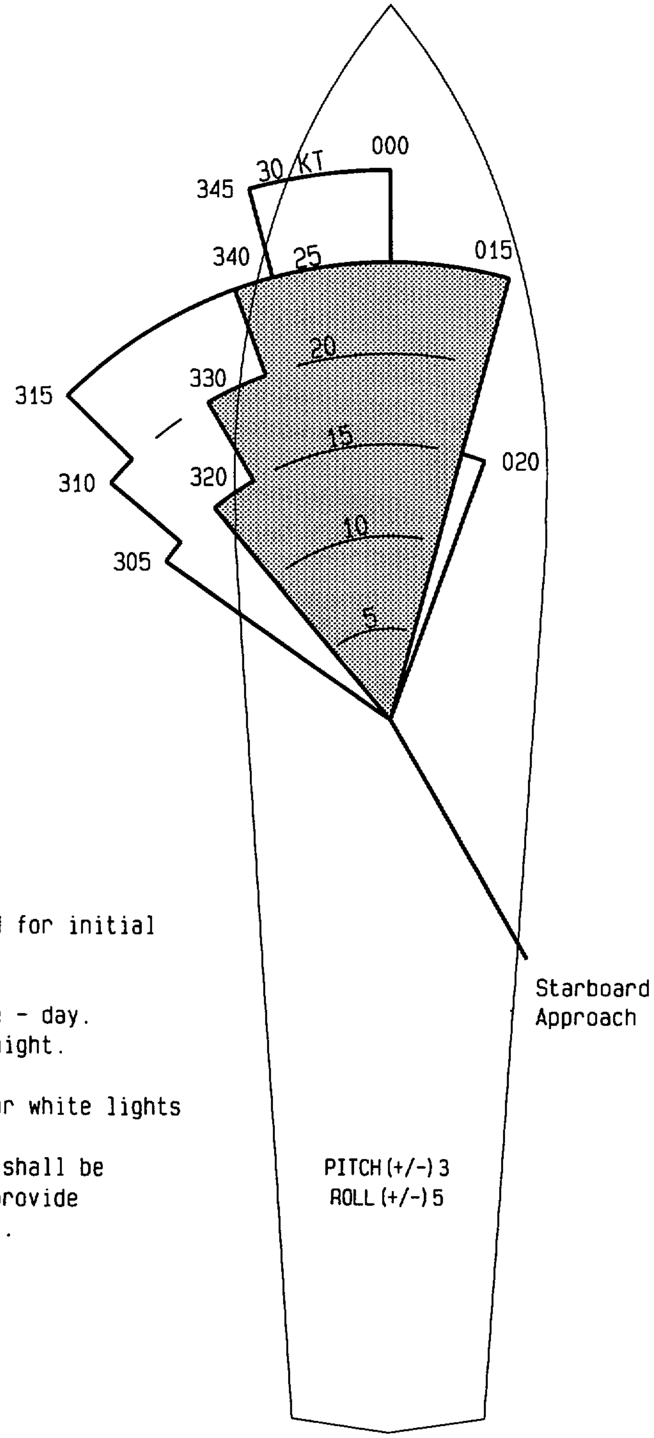
Not recommended for initial DLQ operations.

Entire envelope - day
Shaded area - night

Night - amber or white lights.

Wind over deck shall be sufficient to provide HOGE capability.

Figure B-38. H-3 Launch and Recovery Envelopes for Non-RAST FFG 7 Class Ships (Sheet 1 of 4)
Sheet 1: Port Approach



NOTES:

Not recommended for initial
DLQ operations.

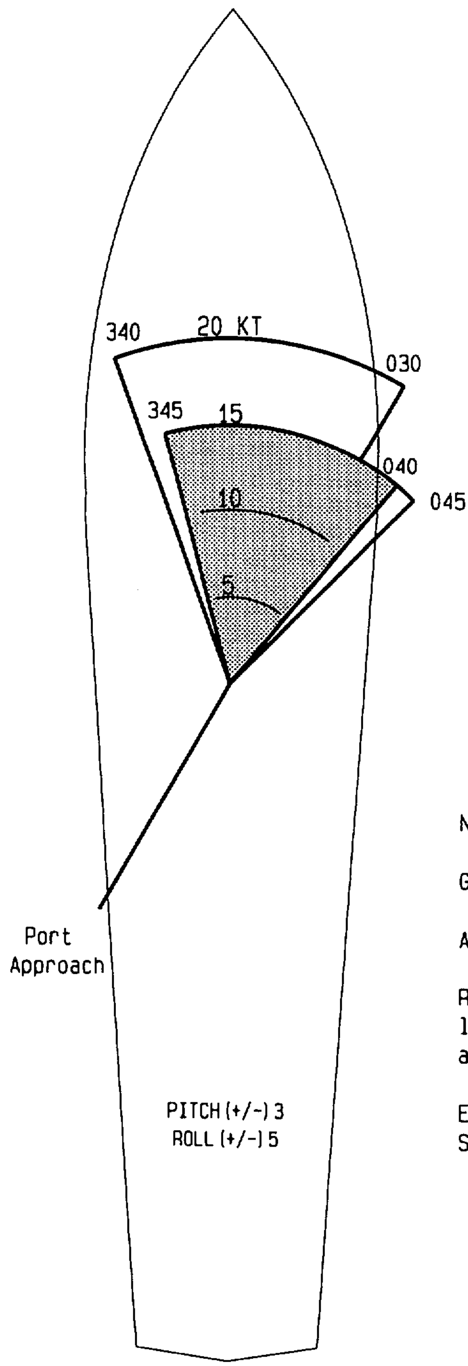
Entire envelope - day.
Shaded area - night.

Night - amber or white lights

Wind over deck shall be
sufficient to provide
HOGE capability.

Figure B-38. H-3 Launch and Recovery Envelopes for Non-RAST FFG 7 Class Ships (Sheet 2 of 4)
Sheet 2: Starboard Approach

DEC/83



NOTES:

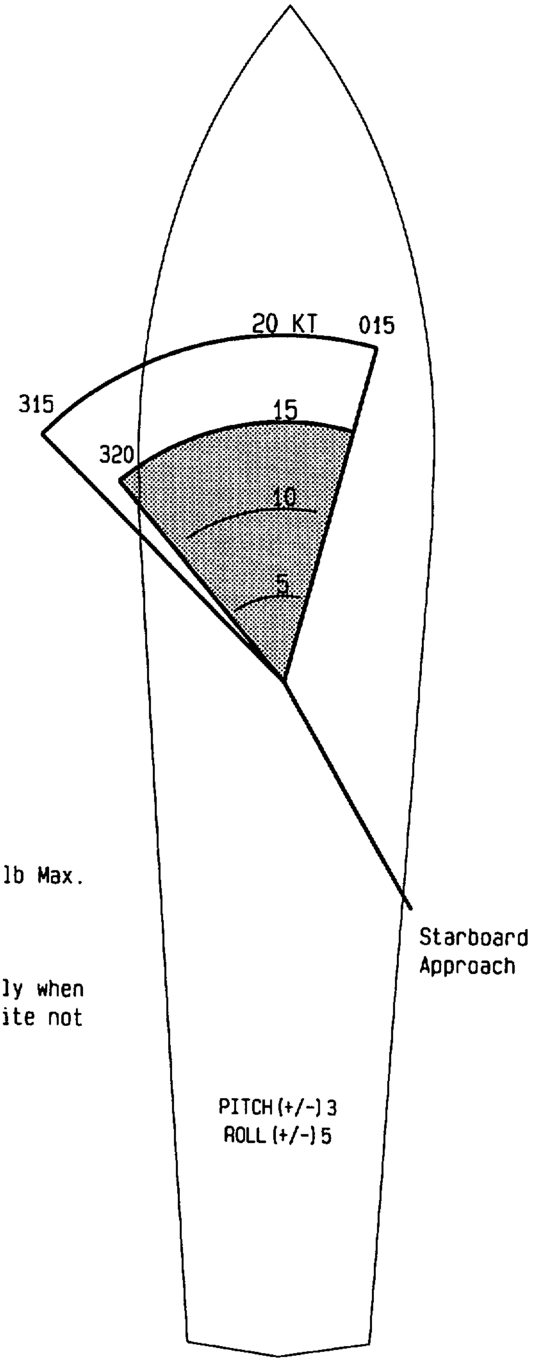
Gross Weight < 19,000 lb Max.

ASE/AUX OFF

Recovery authorized only when large ships or shore site not available.

Entire envelope - day
Shaded area - night

Figure B-38. H-3 Launch and Recovery Envelopes for Non-RAST FFG 7 Class Ships (Sheet 3 of 4)
Sheet 3: Degraded Recovery Envelope, Port Approach



NOTES:

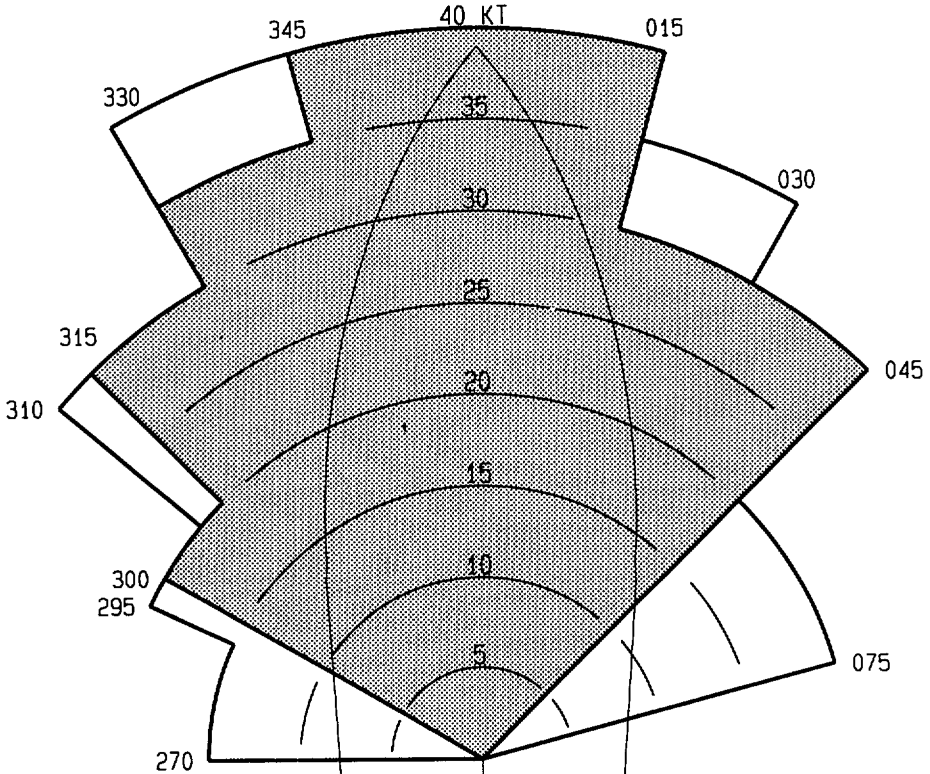
Gross Weight > 19,000 lb Max.

ASE/AUX OFF

Recovery authorized only when large ships or shore site not available.

Entire envelope - day
Shaded area - night

Figure B-38. H-3 Launch and Recovery Envelopes for Non-RAST FFG 7 Class Ships (Sheet 4 of 4)
Sheet 4: Degraded Recovery Envelope, Starboard Approach



WARNING:

Envelope developed during standard day sea level conditions and based on flying qualities only.

Check power available, HOGE required, and minimum headwind prior to commencing approach and takeoff.

NOTES:

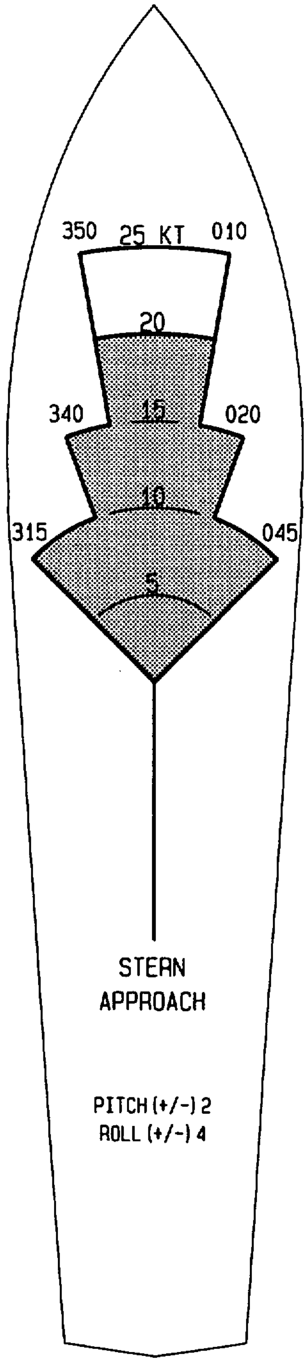
Takeoffs should be performed toward the relative wind.

Initial DLQ operations authorized.

Entire envelope - day
Pitch: (+/-) 2 degrees
Roll: (+/-) 7 degrees

Shaded area - night
Pitch: (+/-) 2 degrees
Roll: (+/-) 4 degrees

Figure B-39. H-3 Launch and Recovery Envelopes for RAST-Capable FFG 7 Class Ships (Sheet 1 of 2)
Sheet 1: Stern Approach



WARNING

Envelope developed during standard day sea level conditions and based on flying qualities only.

Check power available, HOGE required, and minimum headwind prior to commencing approach or takeoff.

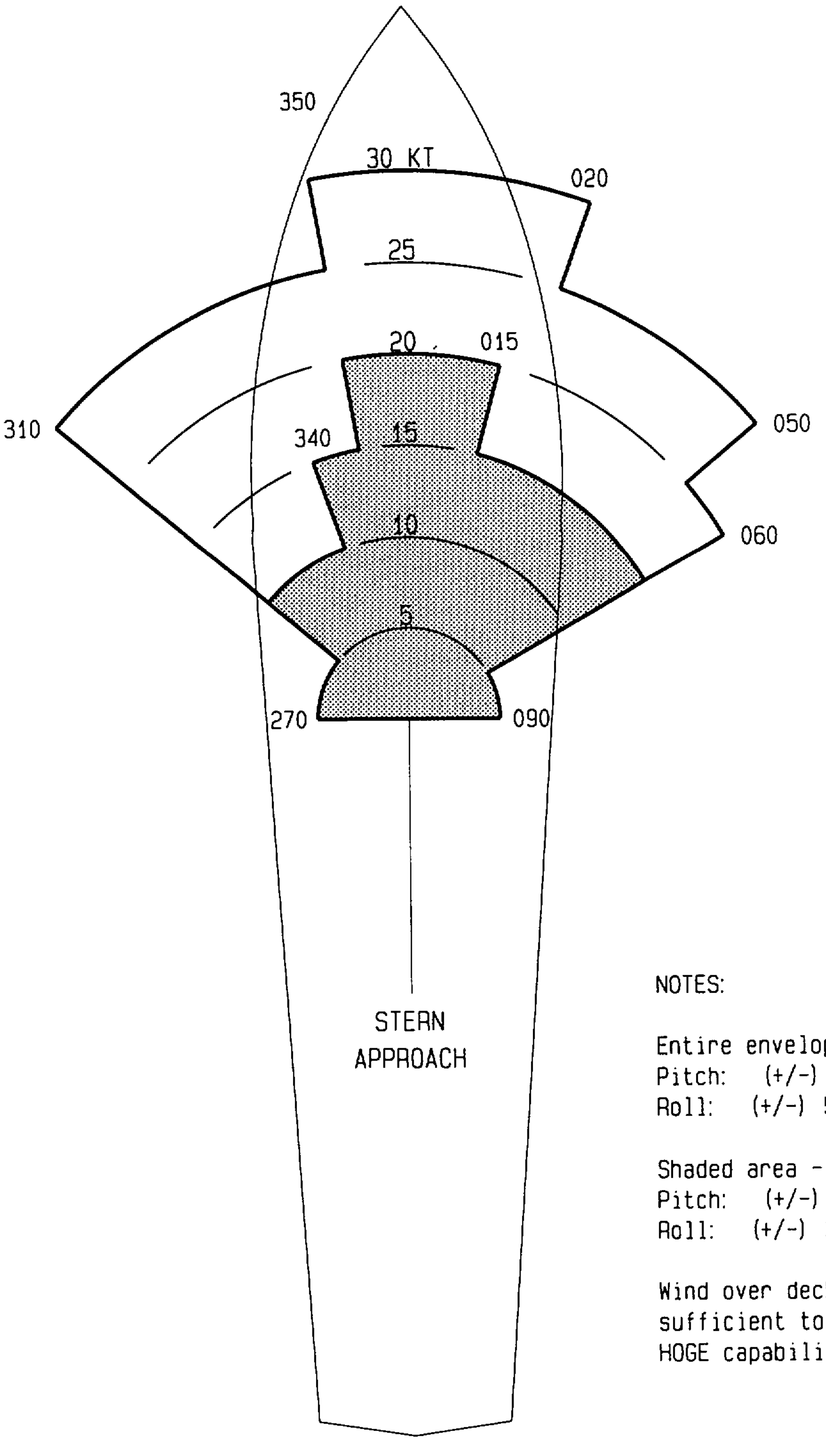
NOTES:

ASE/AUX OFF

Entire envelope - day
Shaded area - night

Night operations authorized only during emergency.

Figure B-39. H-3 Launch and Recovery Envelopes for RAST-Capable FFG 7 Class Ships (Sheet 2 of 2)
Sheet 2: Degraded Recovery Envelope, Stern Approach



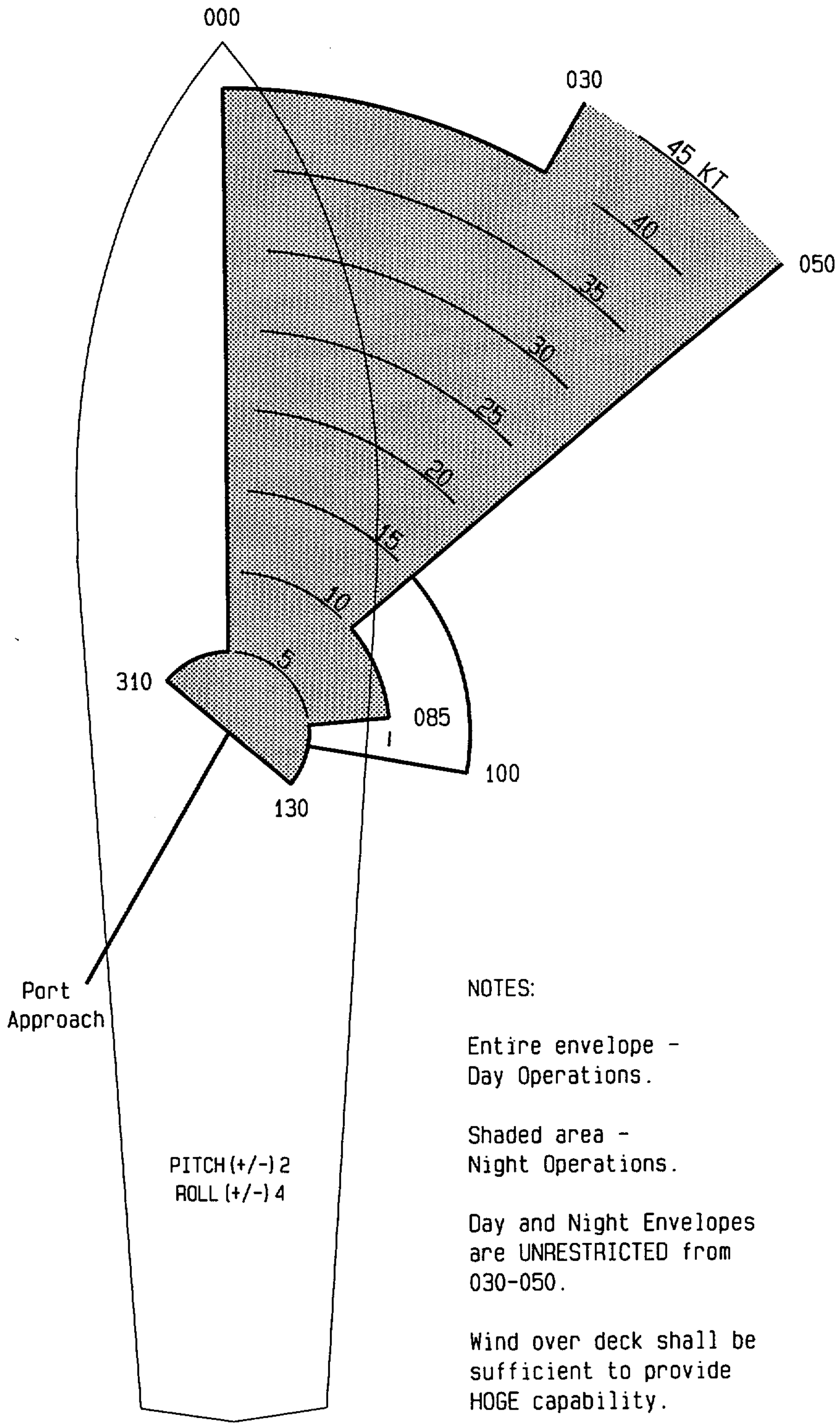
NOTES:

Entire envelope - day
Pitch: (+/-) 2 degrees
Roll: (+/-) 5 degrees

Shaded area - night
Pitch: (+/-) 2 degrees
Roll: (+/-) 3 degrees

Wind over deck shall be sufficient to provide HOGE capability.

Figure B-40. H-3 Launch and Recovery Envelopes for IX 514 Class Ships



NOTES:

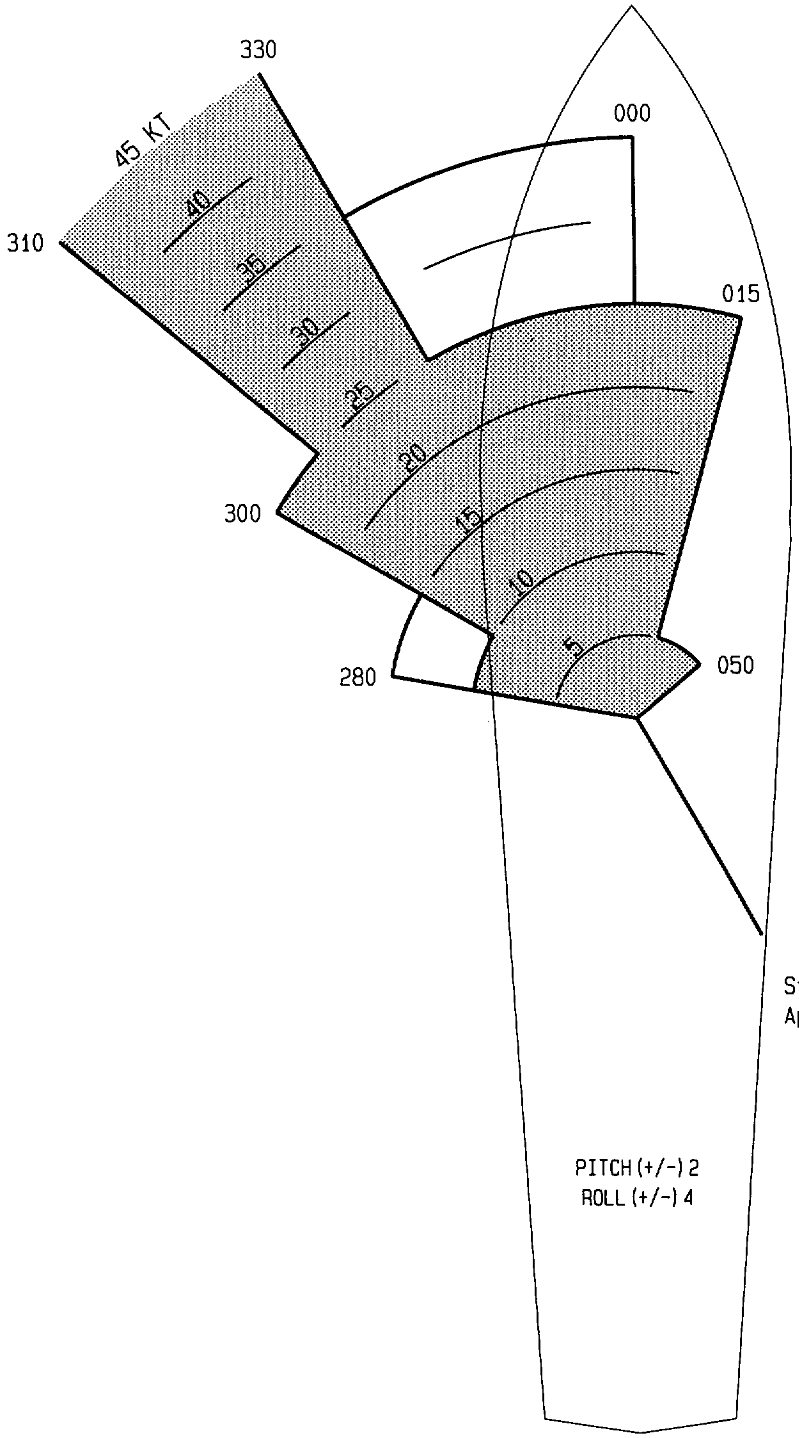
Entire envelope - Day Operations.

Shaded area - Night Operations.

Day and Night Envelopes are UNRESTRICTED from 030-050.

Wind over deck shall be sufficient to provide HOGE capability.

Figure B-41. H-3 Launch and Recovery Envelopes for LCC 19 Class Ships (Sheet 1 of 2)
Sheet 1: Gross Weight of 18,000 to 19,000 lb, Port Approach



NOTES:

Entire envelope - Day operations.

Shaded area - Night operations.

Day and Night envelopes are UNRESTRICTED from 310-330.

Wind over deck shall be sufficient to provide HOGE capability.

Figure B-41. H-3 Launch and Recovery Envelopes for LCC 19 Class Ships (Sheet 2 of 2)
Sheet 2: Gross Weight of 18,000 to 19,000 lb, Starboard Approach

NOTES:

Gross weight < 19,000 LB

Entire envelope - day
Shaded area - night

Superstructure may cause considerable burble extending 500 ft downwind, large "null" area to lee of superstructure, and moderate flight deck turbulence for all WOD above 15kt.

CAUTION:

Winds above 20kt from 010 to 060 may produce significant turbulence and right lateral drift in the low hover.

Winds above 20kt from 300 to 060 produce significant downwash in flight deck vicinity. Up to 20% increase in HOGE torque may be required to overcome downwash. Effect increases with WOD velocity, becoming severe above 30 kt.

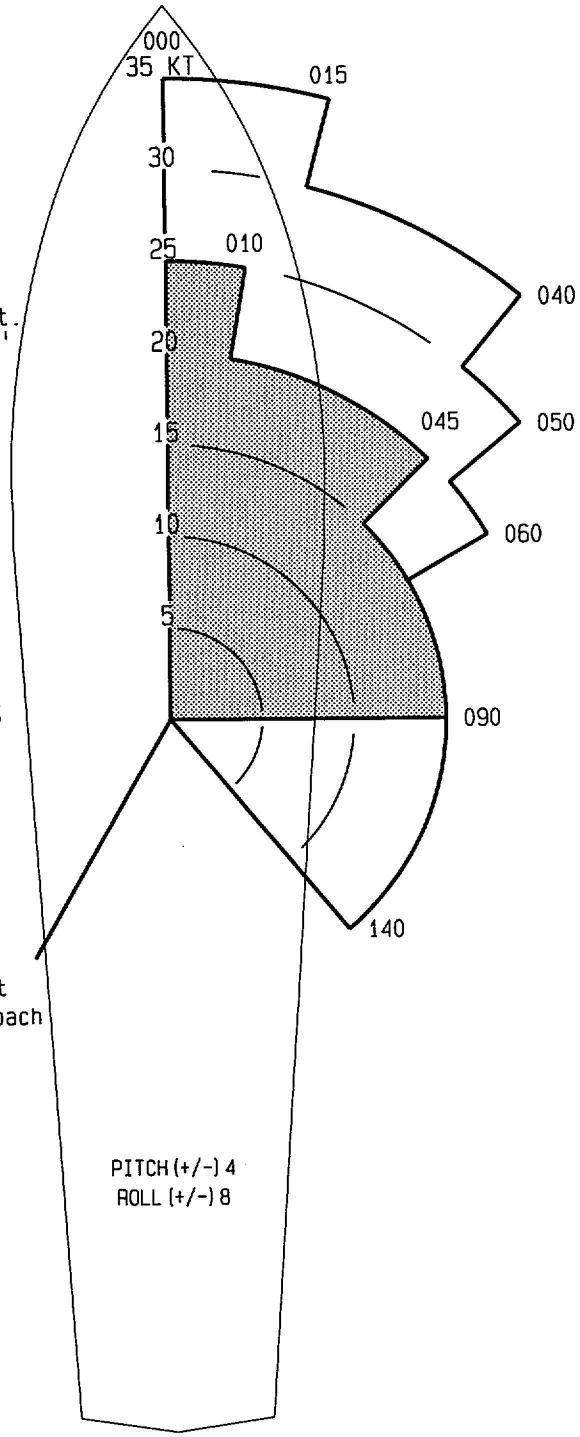


Figure B-42. H-3 Launch and Recovery Envelopes for TAO 187 Class Ships (Sheet 1 of 4)
Sheet 1: Gross Weight of 19,000 lb Maximum, Port Approach

NOTES:

Gross Weight 19,000 - 20,000 LB

Entire envelope - day
Shaded area - night

Superstructure may cause considerable burble extending 500 ft downwind, large "null" area to lee of superstructure, and moderate flight deck turbulence for all WOD above 15kt.

CAUTION:

Winds above 20kt from 010 to 060 may produce significant turbulence and right lateral drift in the low hover.

Winds above 20kt from 300 to 060 produce significant downwash in flight deck vicinity. Up to 20% increase in HOGE torque may be required to overcome downwash. Effect increases with WOD velocity, becoming severe above 30 kt.

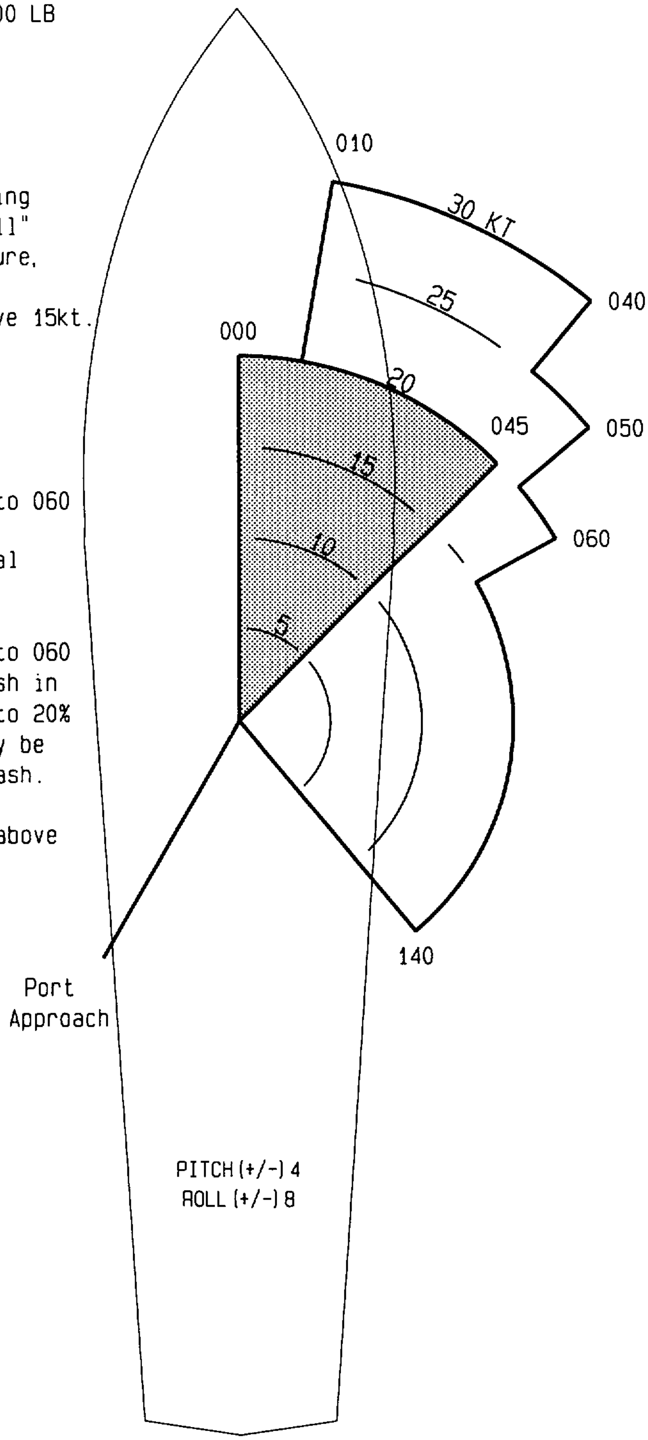
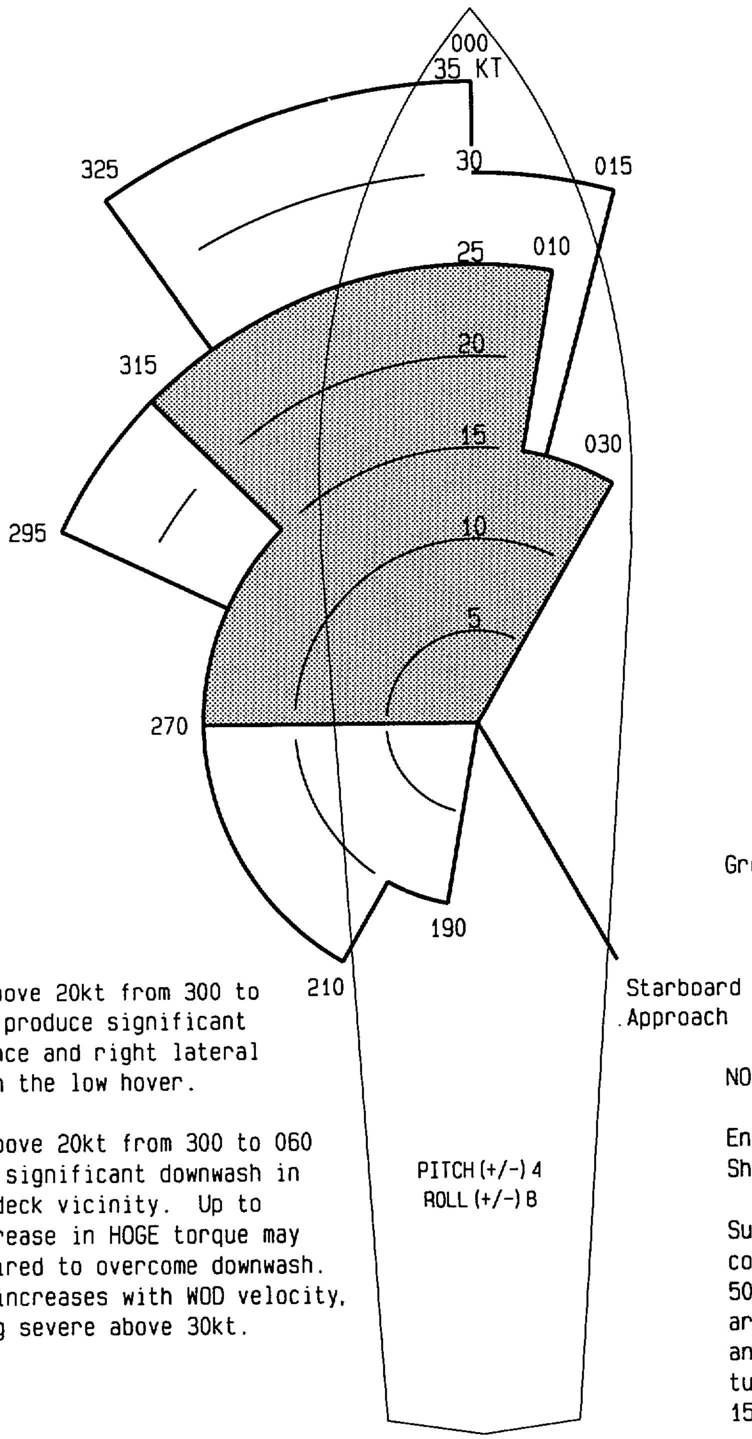


Figure B-42. H-3 Launch and Recovery Envelopes for TAO 187 Class Ships (Sheet 2 of 4)
Sheet 2: Gross Weight of 19,000 to 20,000 lb, Port Approach



CAUTION:

Winds above 20kt from 300 to 340 may produce significant turbulence and right lateral drift in the low hover.

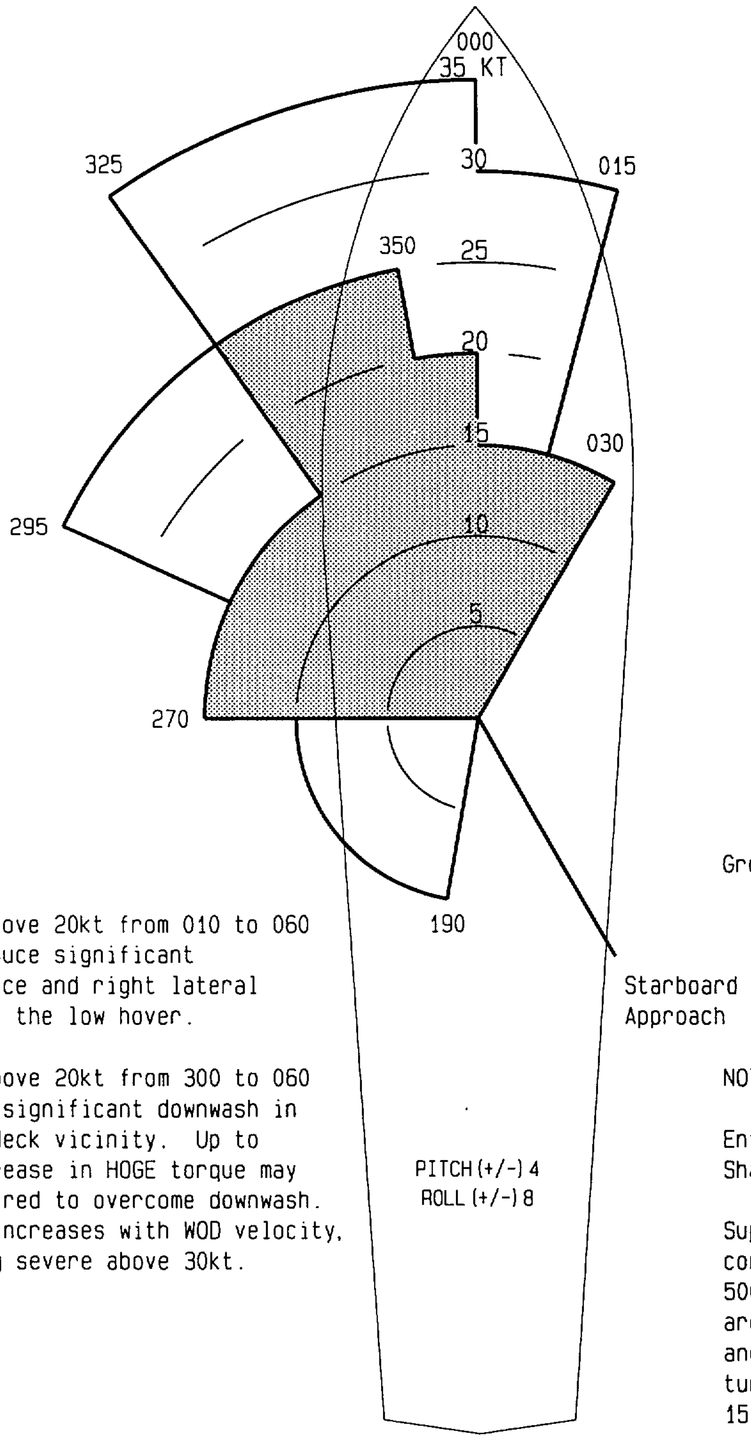
Winds above 20kt from 300 to 060 produce significant downwash in flight deck vicinity. Up to 20% increase in HOGE torque may be required to overcome downwash. Effect increases with WOD velocity, becoming severe above 30kt.

NOTES:

Entire envelope - day
Shaded area - night

Superstructure may cause considerable burble extending 500ft downwind, large "null" area to lee of superstructure, and moderate flight deck turbulence for all WOD above 15 kt.

Figure B-42. H-3 Launch and Recovery Envelopes for TAO 187 Class Ships (Sheet 3 of 4)
Sheet 3: Gross Weight of 19,000 lb Maximum, Starboard Approach



CAUTION:

Winds above 20kt from 010 to 060 may produce significant turbulence and right lateral drift in the low hover.

Winds above 20kt from 300 to 060 produce significant downwash in flight deck vicinity. Up to 20% increase in HOGE torque may be required to overcome downwash. Effect increases with WOD velocity, becoming severe above 30kt.

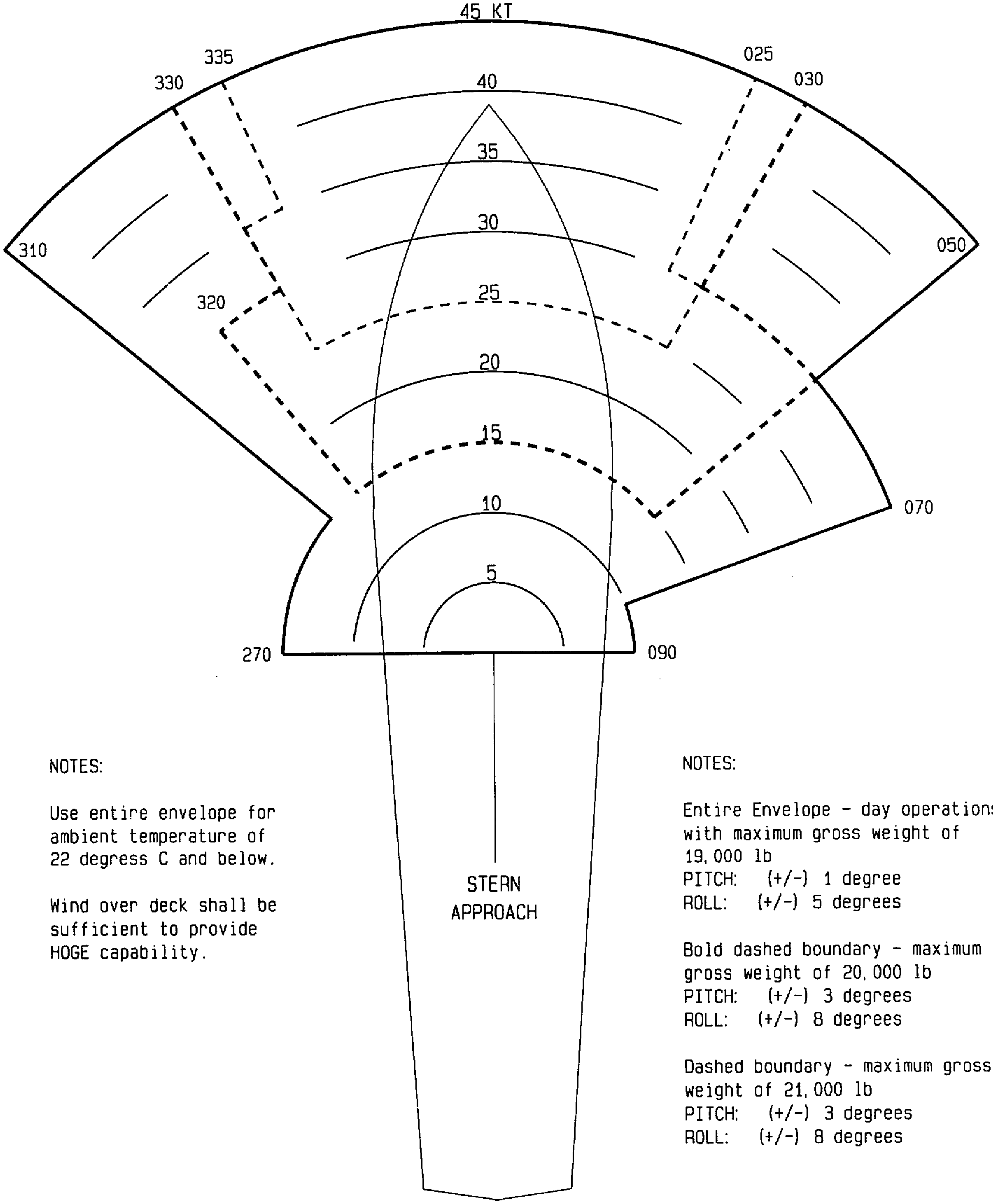
Gross weight 19,000 - 20,000 LB

NOTES:

Entire envelope - day
Shaded area - night

Superstructure may cause considerable burble extending 500ft downwind, large "null" area to lee of superstructure, and moderate flight deck turbulence for all WOD above 15 kt.

Figure B-42. H-3 Launch and Recovery Envelopes for TAO 187 Class Ships (Sheet 4 of 4)
Sheet 4: Gross Weight of 19,000 to 20,000 lb, Starboard Approach



NOTES:

Use entire envelope for ambient temperature of 22 degress C and below.

Wind over deck shall be sufficient to provide HOGE capability.

NOTES:

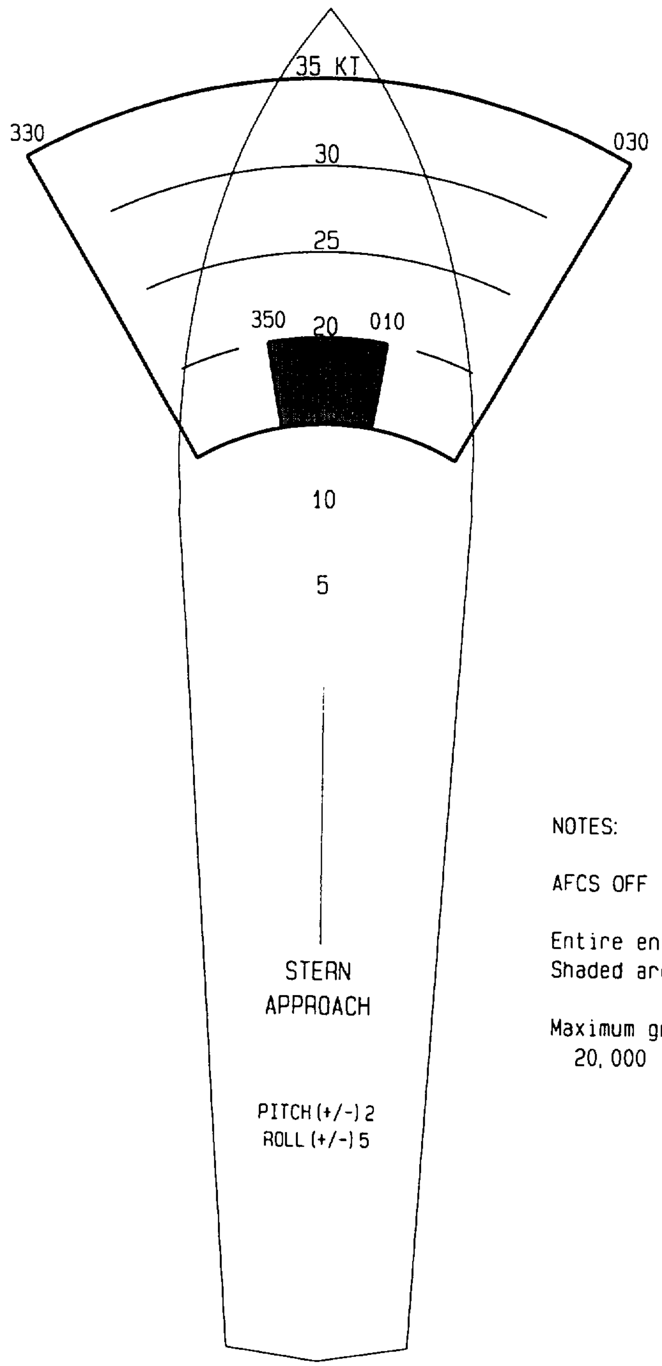
Entire Envelope - day operations with maximum gross weight of 19,000 lb
PITCH: (+/-) 1 degree
ROLL: (+/-) 5 degrees

Bold dashed boundary - maximum gross weight of 20,000 lb
PITCH: (+/-) 3 degrees
ROLL: (+/-) 8 degrees

Dashed boundary - maximum gross weight of 21,000 lb
PITCH: (+/-) 3 degrees
ROLL: (+/-) 8 degrees

Figure B-43. H-3 Launch and Recovery Envelopes for WHEC 715 Class Ships (Sheet 1 of 2)
Sheet 1: Stern Approach

MAR/96



NOTES:

AFCS OFF

Entire envelope - day
Shaded area - night

Maximum gross weight -
20,000 lb.

Figure B-43. H-3 Launch and Recovery Envelopes for WHEC 715 Class Ships (Sheet 2 of 2)
Sheet 2: Degraded Recovery Envelope, Stern Approach

WARNING

TO PREVENT INJURY TO PERSONNEL AND DAMAGE TO THE HELICOPTER DUE TO GROUND RESONANCE, USE ONLY THE AXLE TIEDOWN FITTINGS DURING ROTOR OPERATION. DO NOT USE THE HEAVY WEATHER TIEDOWN CONFIGURATION.

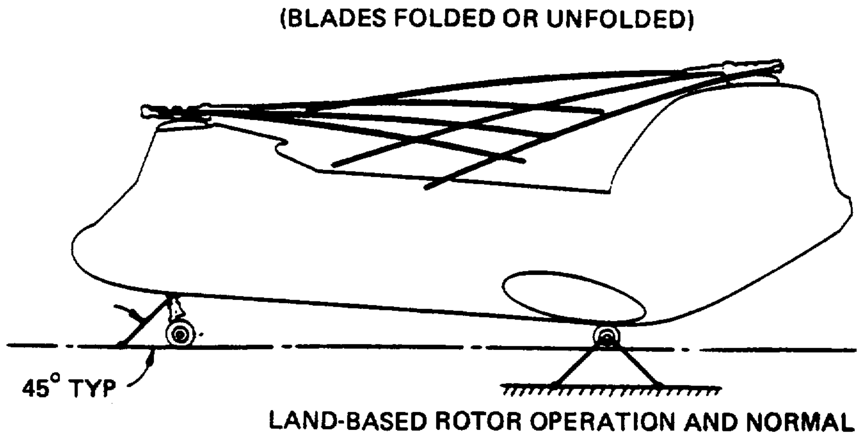
CAUTION

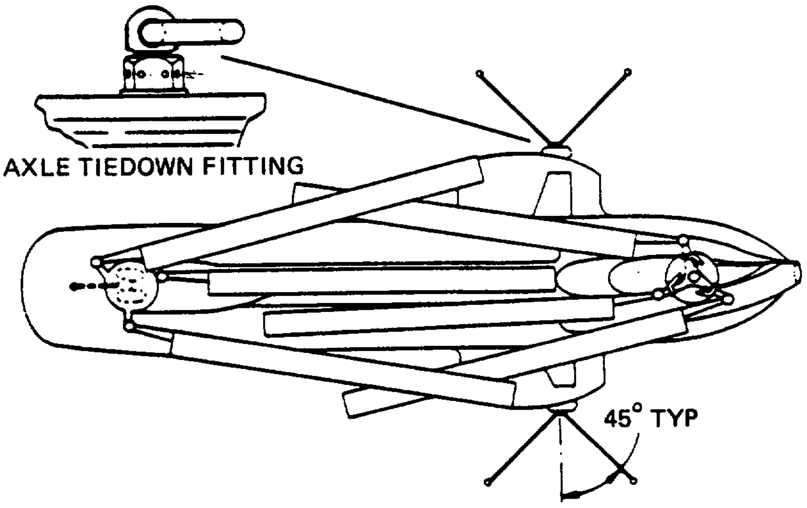
WHEN SECURING THE ROTOR BLADES WITH BLADE ANCHORS, DO NOT EXCEED A 12-INCH BLADE TIP DOWNWARD DEFLECTION FROM THE NORMAL DROOP POSITION OF EACH BLADE. THE BLADE COULD BE DAMAGED IF THIS LIMIT IS EXCEEDED.

WHEN WINDS IN EXCESS OF 60 KNOTS ARE ANTICIPATED THE ROTOR BLADES MUST BE REMOVED OR THE HELICOPTER MUST BE HANGARED. IF THE ROTOR BLADES WERE NOT REMOVED FROM THE HELICOPTER AND THE WINDS EXCEEDED 60 KNOTS, INSPECT THE ROTOR BLADES IN ACCORDANCE WITH THE ROTOR SYSTEM MANUAL, NAVAIR 01-250-HDA 2.4.3.

NOTE

DURING HEAVY WEATHER THE USE OF AXLE TIEDOWNS IS OPTIONAL.





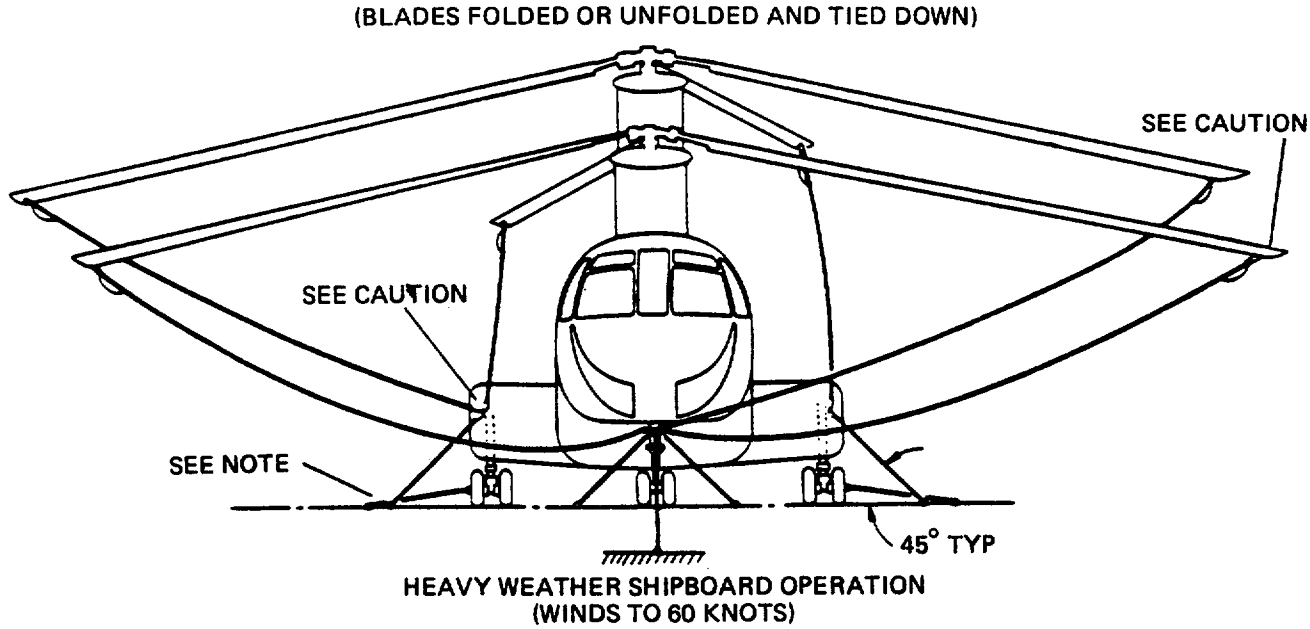
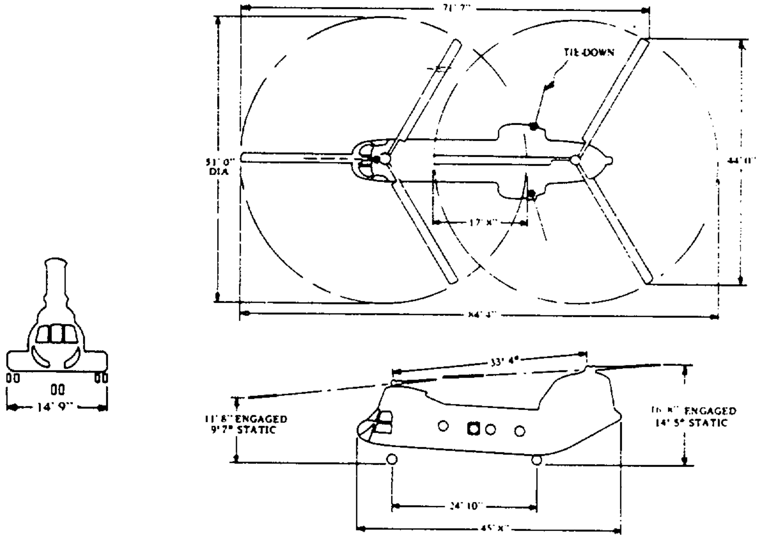


Figure B-44. H-46 Tiedown

MODEL	H-46A/D	CH-46E
POWER	2 – T58-GE-10	2-T58-GE-16
CREW	3 or 4	3 or 4
MAXIMUM RANGE	206 nm at 130 knots	192 nm at 140 knots
MAXIMUM SPEED*	130.5 knots (A)/145 knots (D)	145 knots
ENDURANCE	2.0 hr at 70 knots	1.8 hr at 70 knots
WEIGHT: Basic	13,000 lb (approx)	18,000 lb (approx)
Maximum	23,000 lb	23,300 lb
FUEL: Type	JP-5/JP-4	JP-5/JP-4
Capacity	380 gal	356 gal

CARGO/PASSENGER CAPABILITY: External hook; 600 lb personnel hoist; seats for 25 passenger; 15 litters; 854 ft^3 internal cargo space



WARNING

Use of the stubwing tiedowns shall be limited to static tiedowns only. Incorrect tiedown configuration can lead to ground resonance. For heavy weather with rotors stopped, use normal mooring procedures.

NOTES:

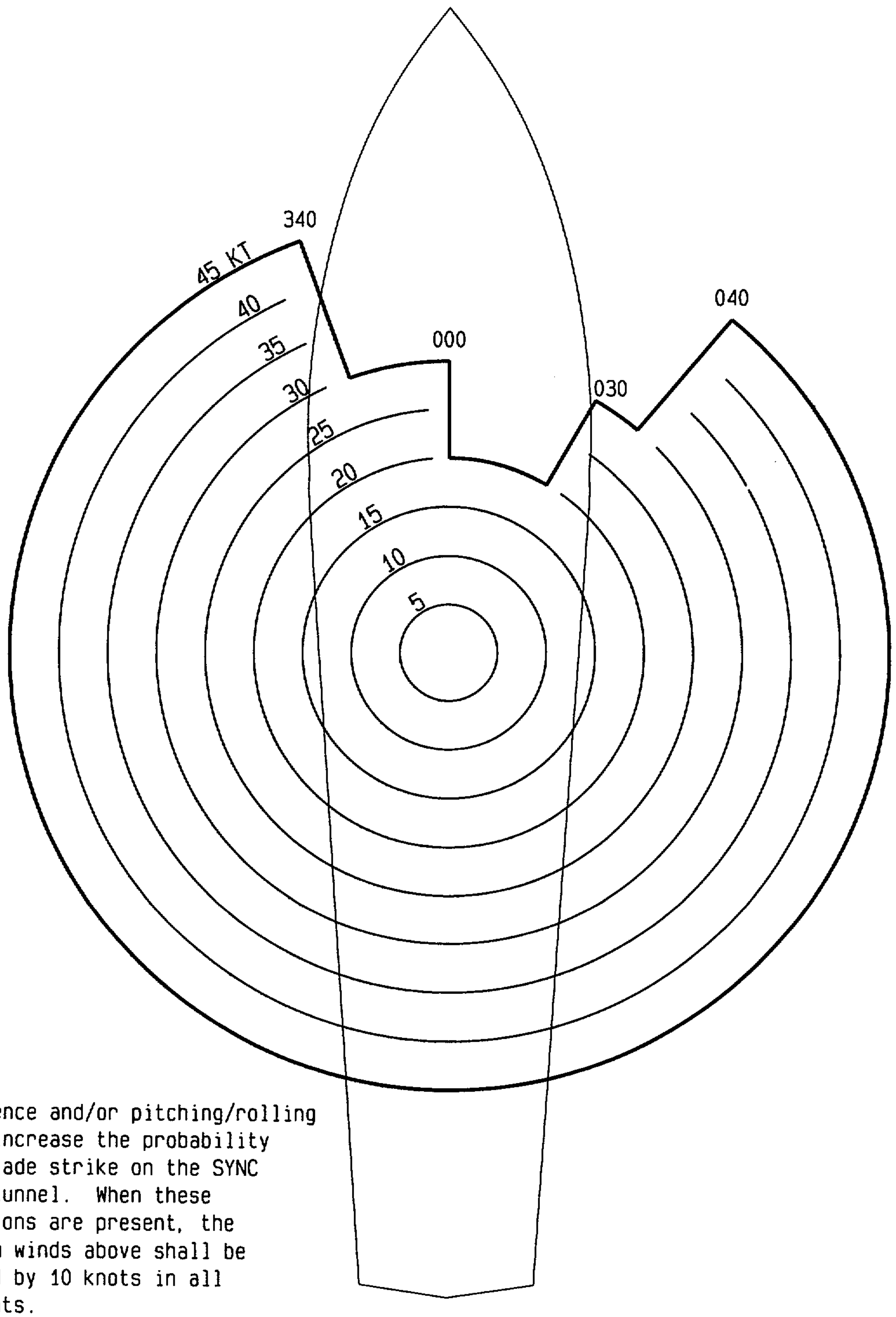
Maximum wind for rotor engagement/disengagement, use wind diagram. Limits apply to both steady state and gusty winds. Maximum wind velocities including peak gusts must not exceed the wind limits shown in the diagram.

Launch and recovery should be made into the relative wind, but never exceed a 35-knot crosswind component.

Operations in the island wash areas should be held to a minimum.

Rotor operations with tiedowns installed are permitted in winds up to 45 knots. Under these conditions, two TD-1A tiedown chains, 4 feet minimum length, are attached to each main gear axle tiedown fitting. The angle between the chains on each main gear axle must be 90° or greater. The chains shall be installed with no slack on the main gear axles. Only one TD-1A chain may be used on the auxiliary gear tiedown fitting. It must be installed in the forward direction within 45° of the helicopter centerline and with sufficient slack to allow full extension of the auxiliary gear oleo strut. Never, under any circumstances, use the axle tiedown and stubwing tiedown concurrently.

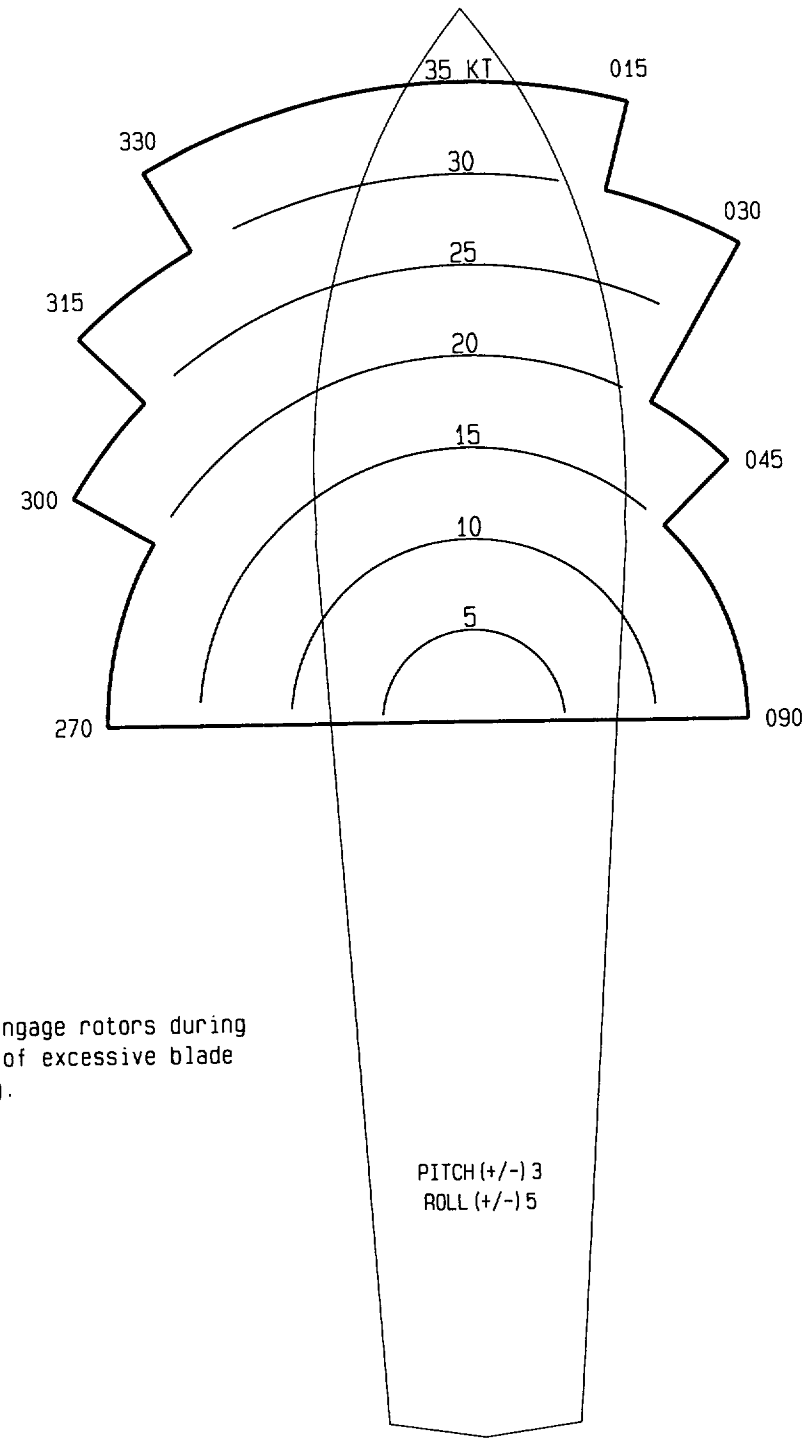
Figure B-45. H-46 Sea Knight



NOTE:

Turbulence and/or pitching/rolling decks increase the probability of a blade strike on the SYNC shaft tunnel. When these conditions are present, the maximum winds above shall be reduced by 10 knots in all quadrants.

Figure B-46. H-46 Engage/Disengage Envelope



NOTE:

Do not engage rotors during periods of excessive blade flapping.

Figure B-47. H-46 Engage/Disengage Envelope for AO 177 Class Ships

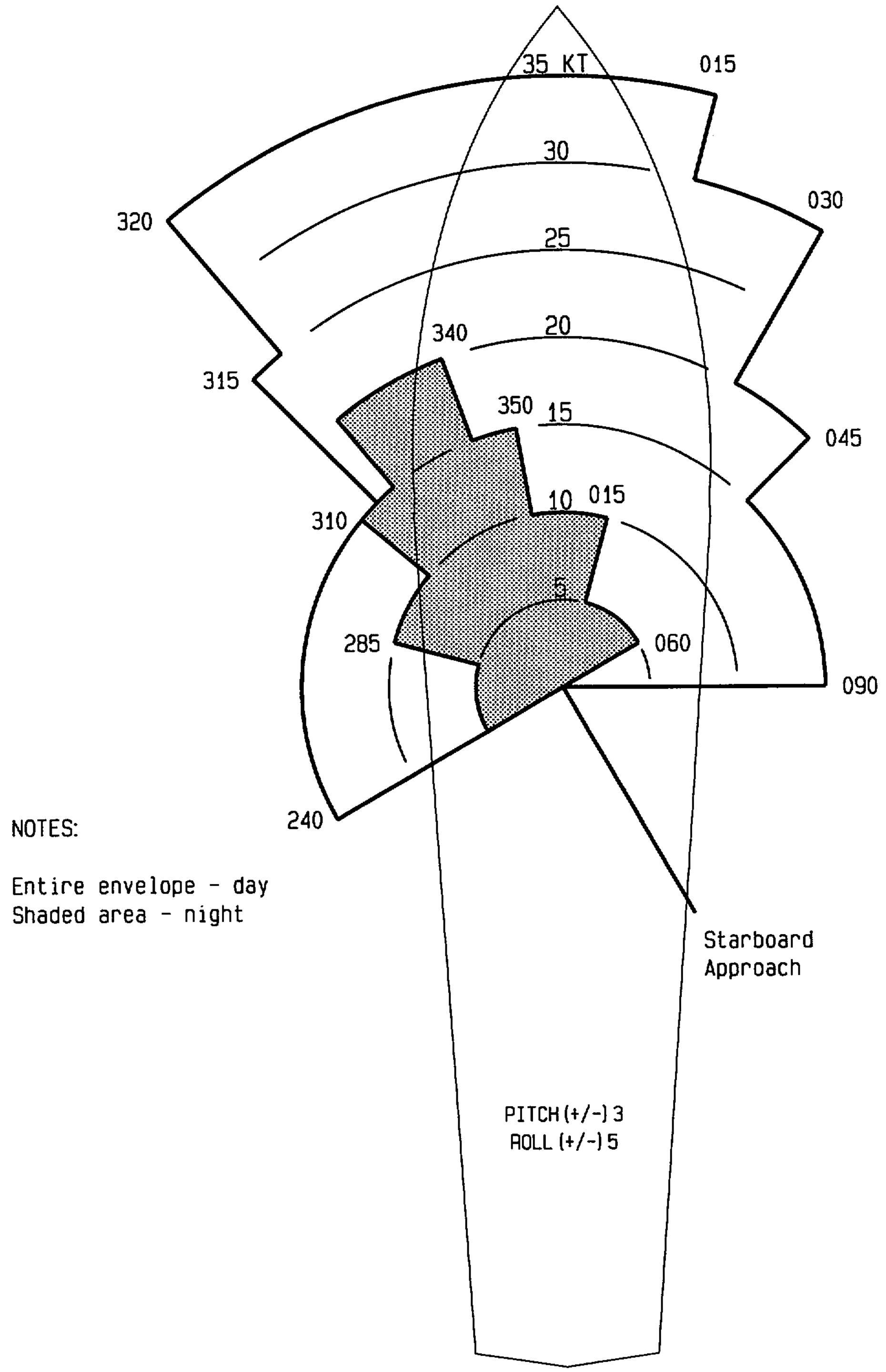
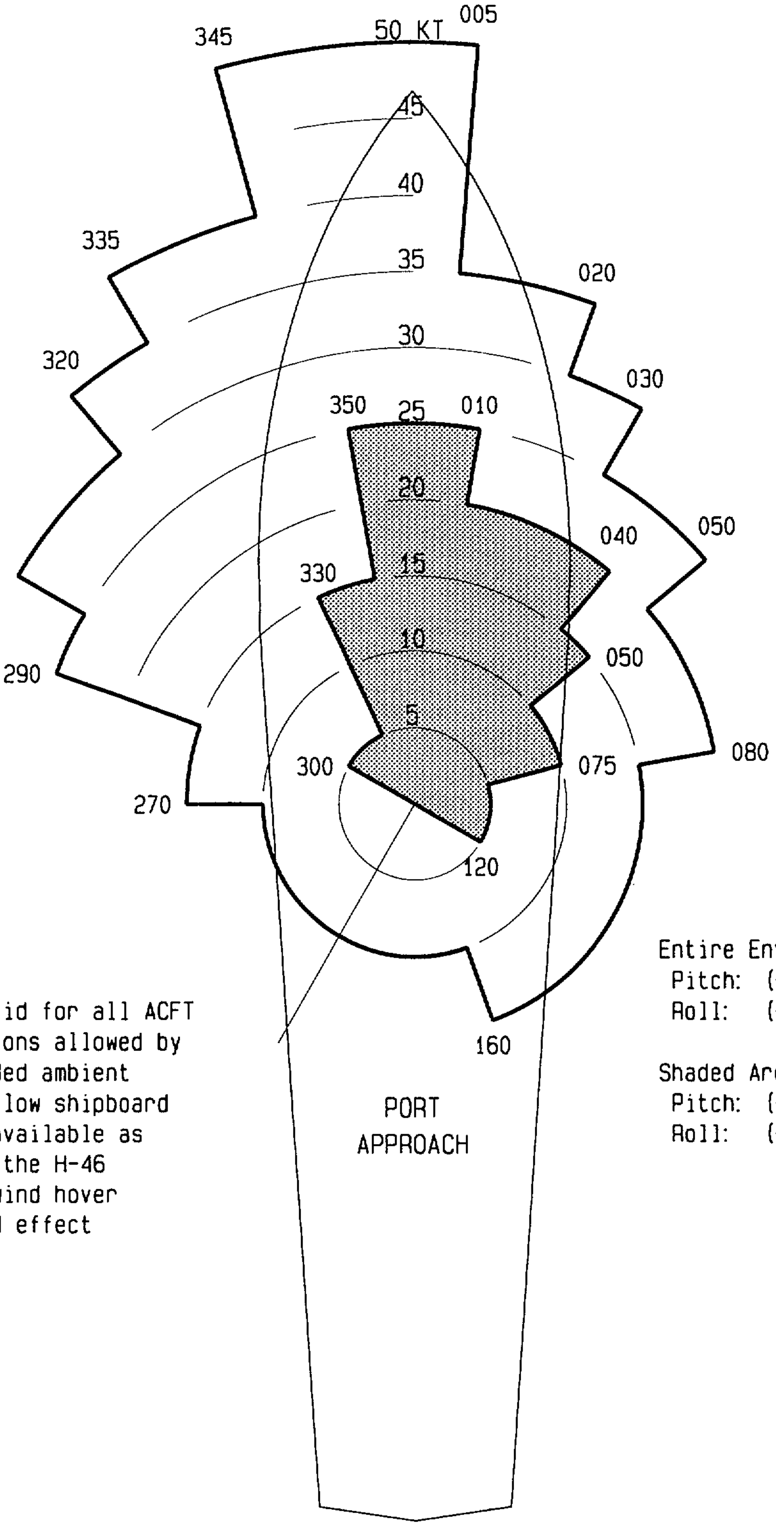


Figure B-48. H-46 Launch and Recovery Envelope for AO 177 Class Ships



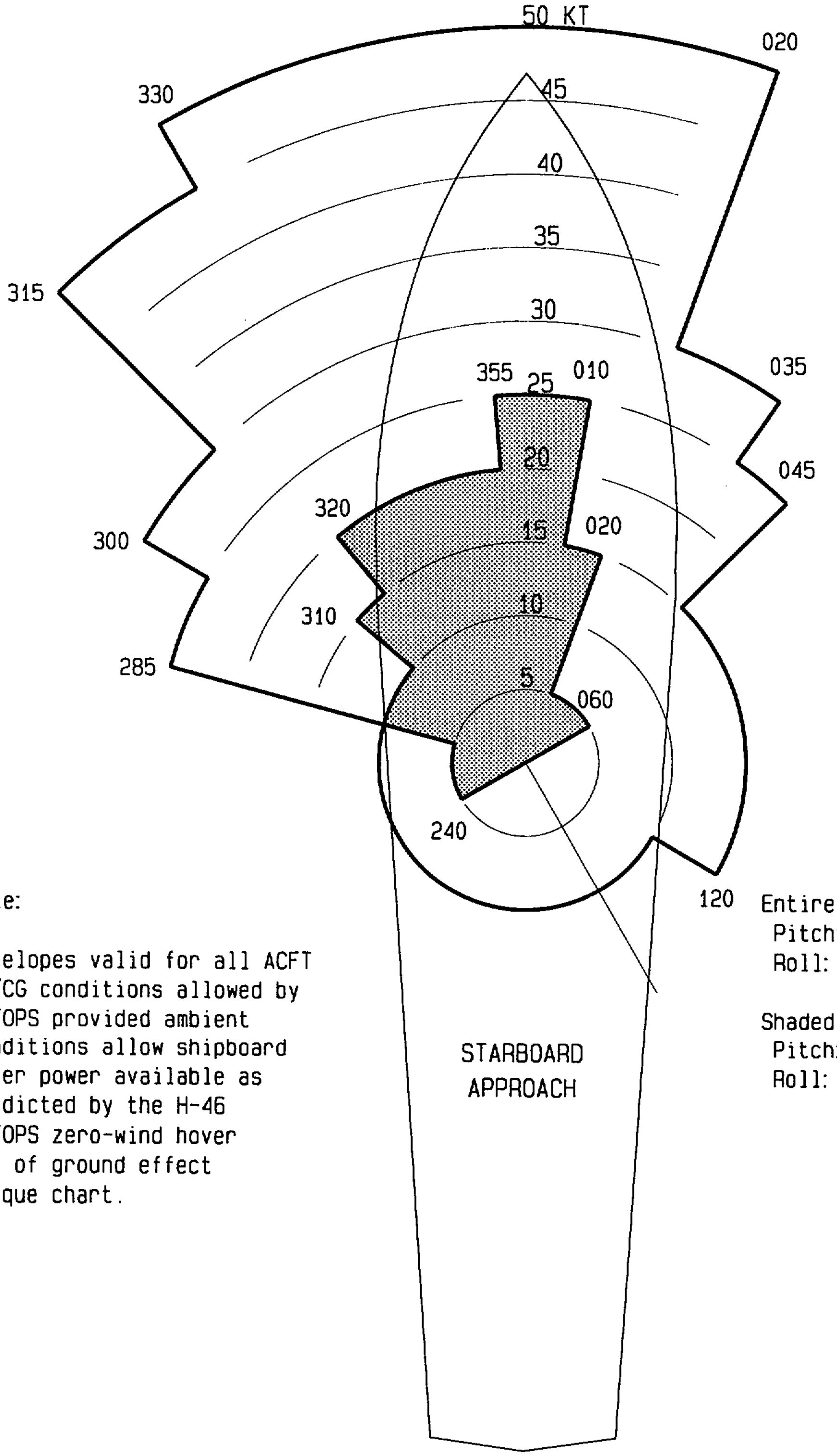
Note:

Envelopes valid for all ACFT GW/CG conditions allowed by NATOPS provided ambient conditions allow shipboard hover power available as predicted by the H-46 NATOPS zero-wind hover out of ground effect torque chart.

Entire Envelope - Day
Pitch: (+/-) 4 degrees
Roll: (+/-) 4 degrees

Shaded Area - Night
Pitch: (+/-) 2 degrees
Roll: (+/-) 4 degrees

Figure B-49. CH-46D/E Launch and Recovery Envelopes for AOE 6 Class Ships (Sheet 1 of 2)
Sheet 1: Port Approach



Note:

Envelopes valid for all ACFT GW/CG conditions allowed by NATOPS provided ambient conditions allow shipboard hover power available as predicted by the H-46 NATOPS zero-wind hover out of ground effect torque chart.

Entire Envelope - Day
Pitch: (+/-) 4 degrees
Roll: (+/-) 4 degrees

Shaded Area - Night
Pitch: (+/-) 2 degrees
Roll: (+/-) 4 degrees

Figure B-49. CH-46D/E Launch and Recovery Envelopes for AOE 6 Class Ships (Sheet 2 of 2)
Sheet 2: Starboard Approach

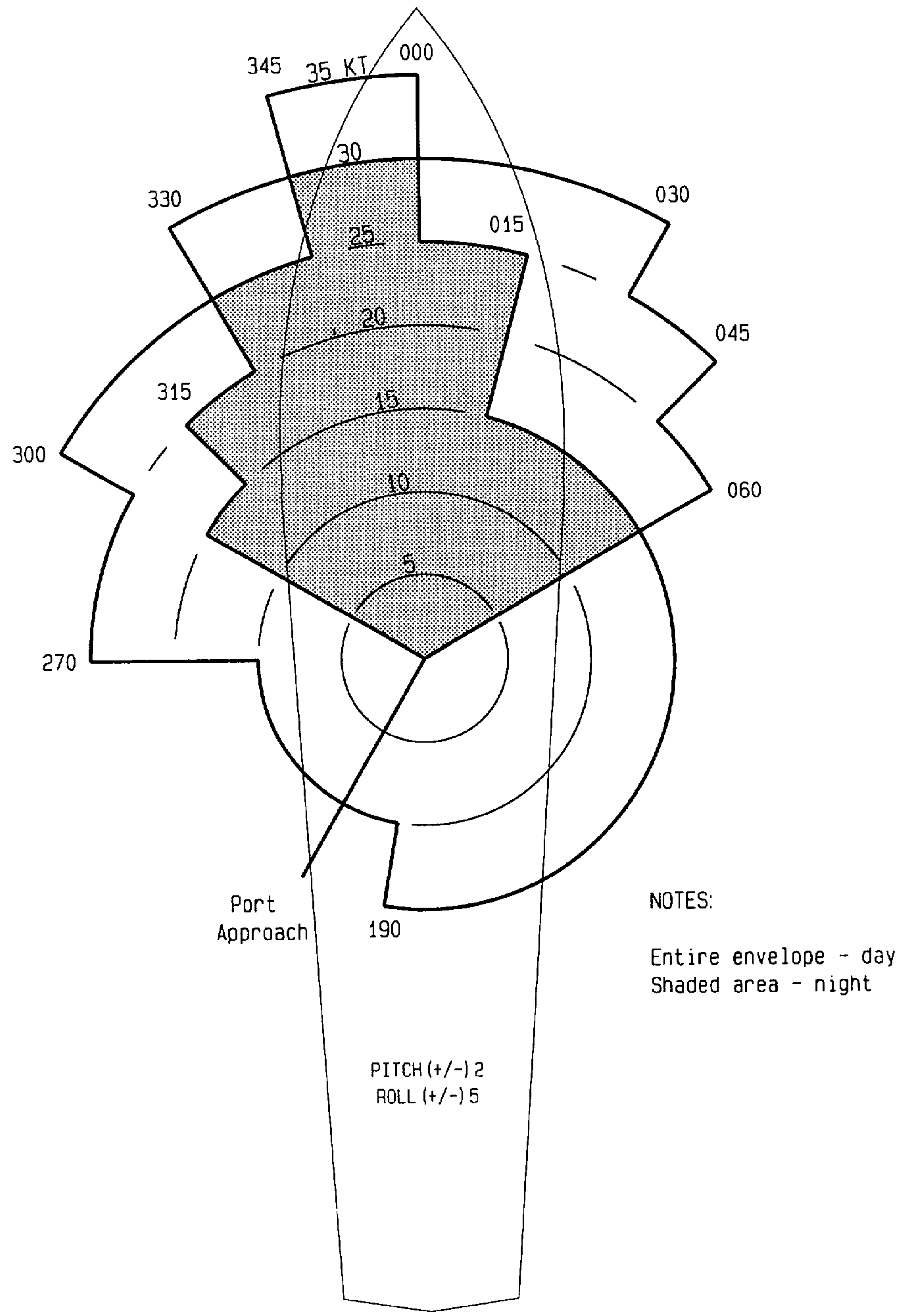


Figure B-50. H-46 Launch and Recovery Envelope for AOR Class Ships (Sheet 1 of 2)
Sheet 1: Port Approach

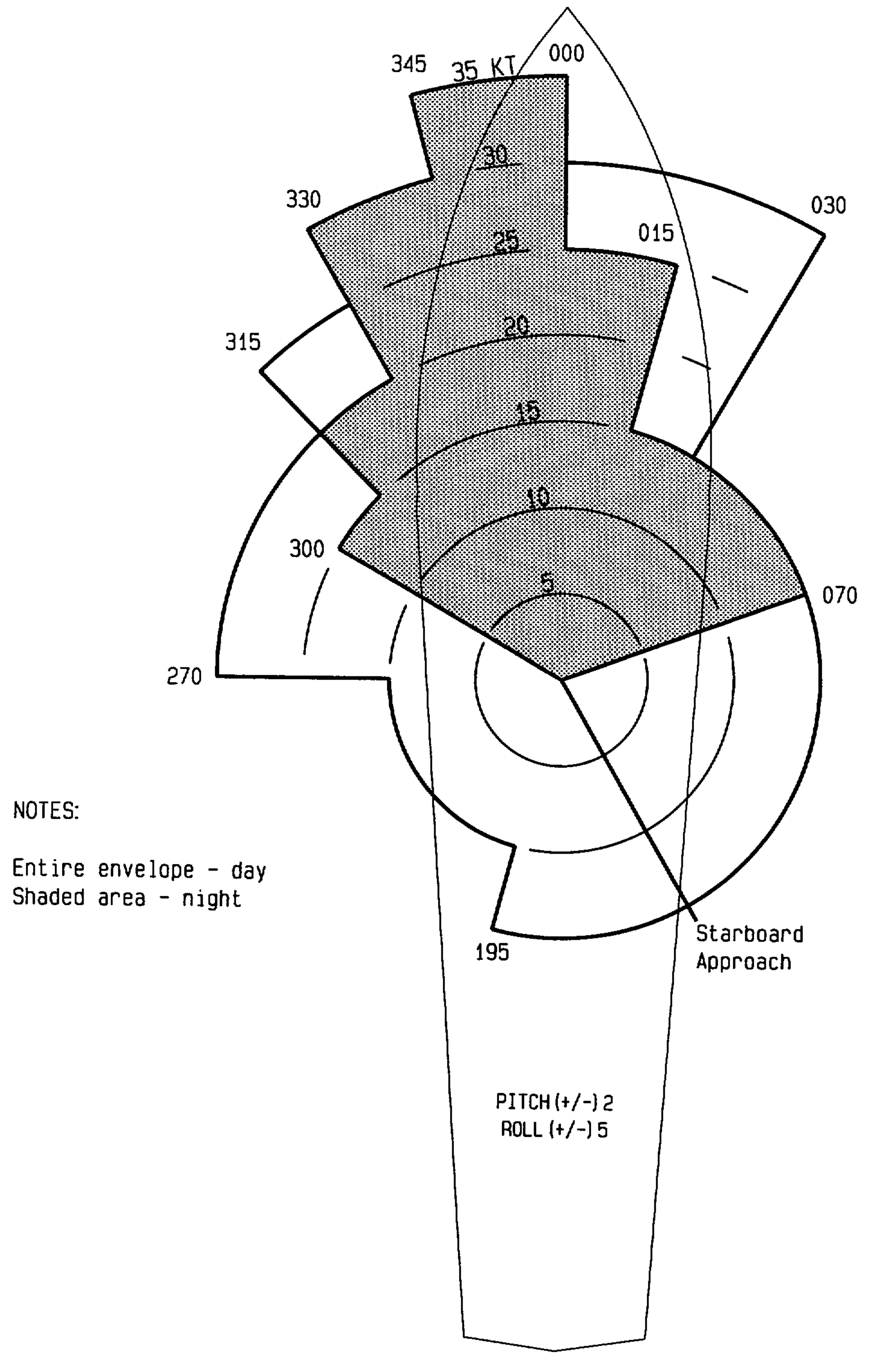


Figure B-50. H-46 Launch and Recovery Envelope for AOR Class Ships (Sheet 2 of 2)
Sheet 2: Starboard Approach

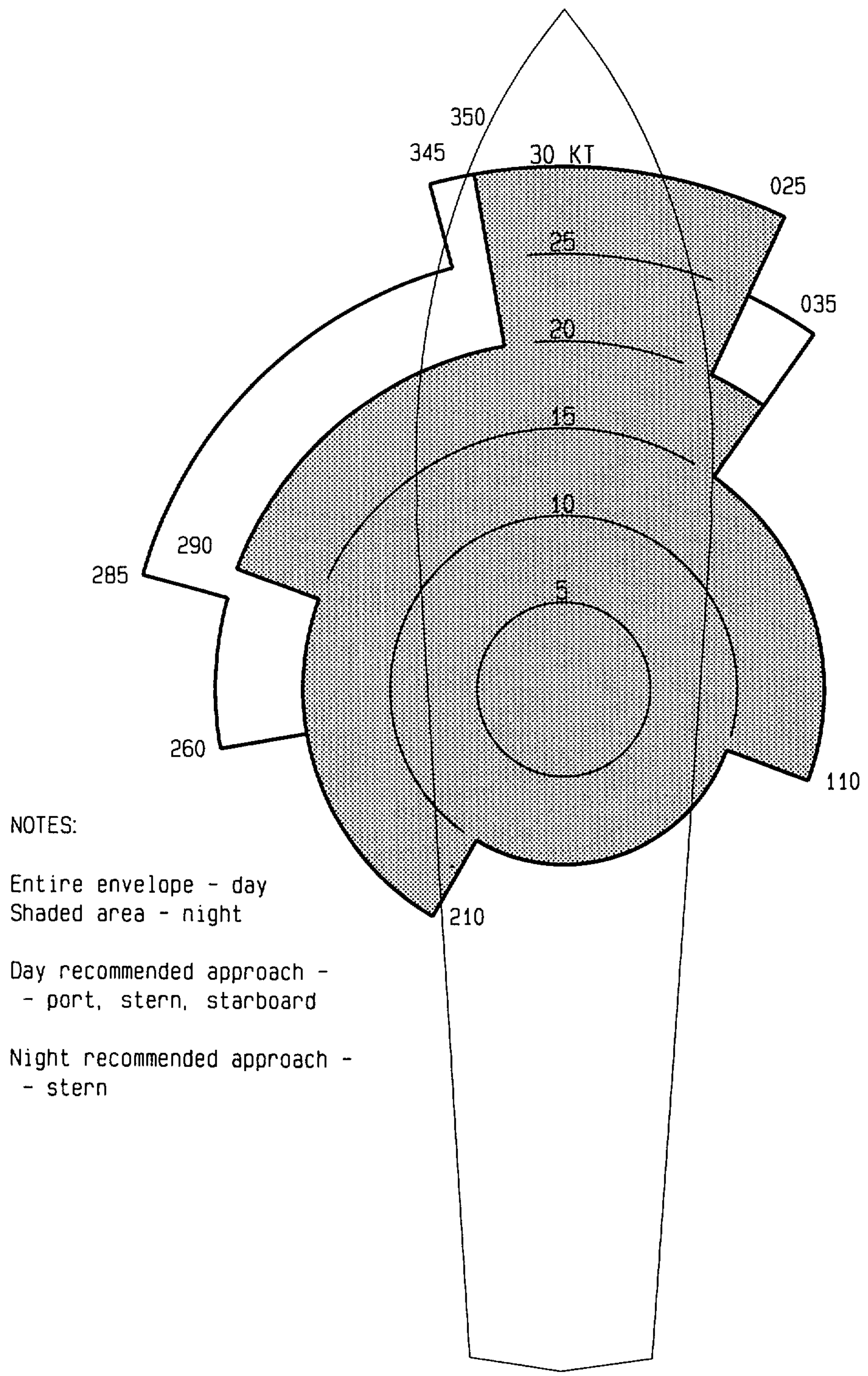
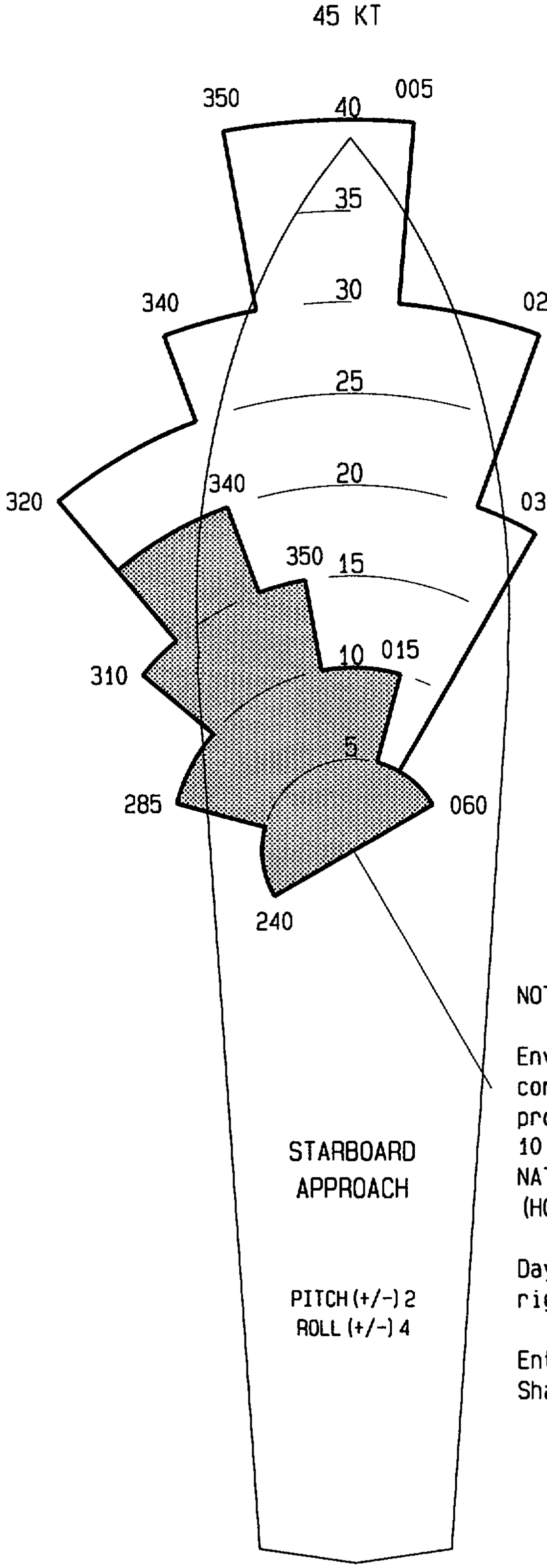


Figure B-51. H-46 Launch and Recovery Envelope for CG 47 Class Ships



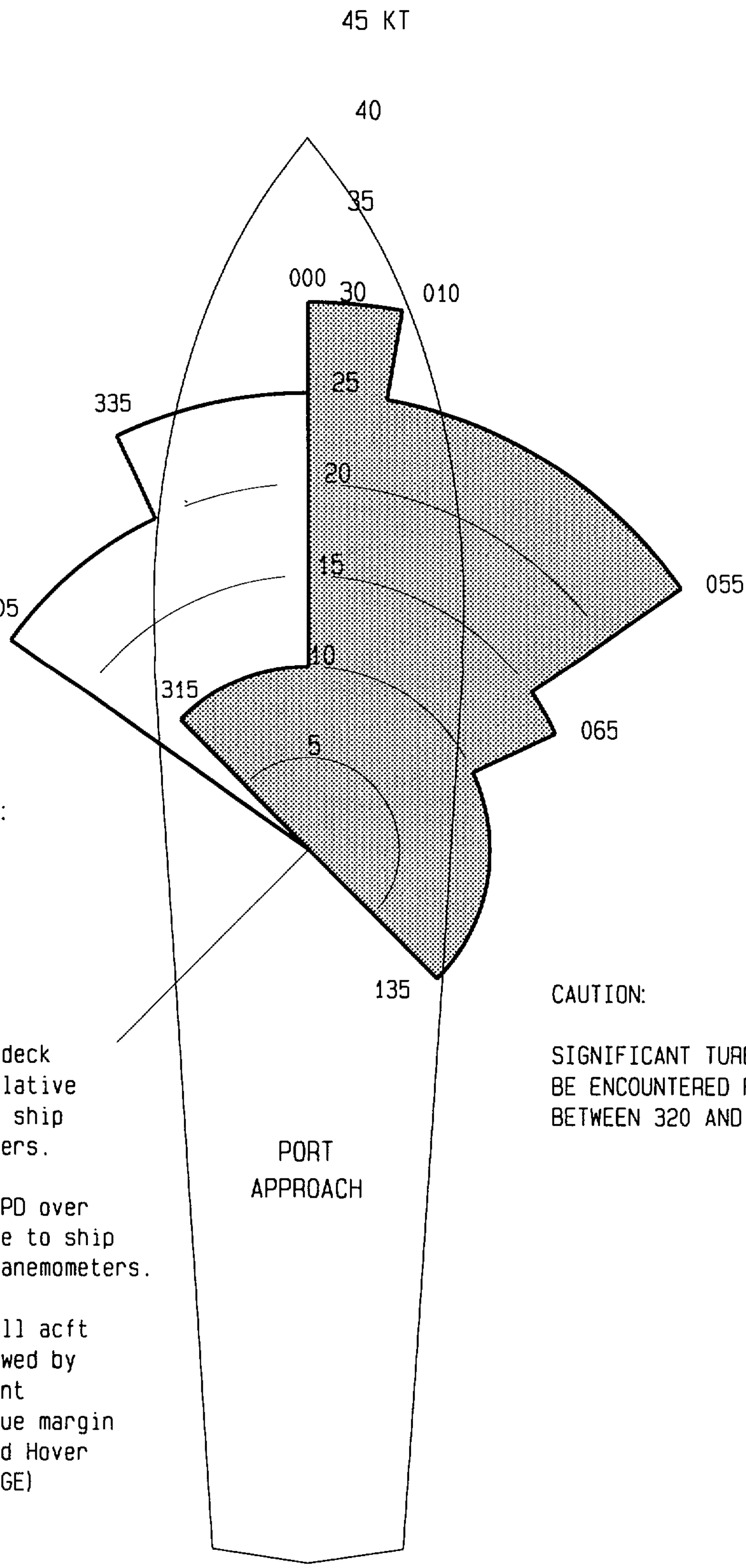
NOTES:

Envelopes valid for all acft GW/CG conditions allowed by NATOPS provided ambient conditions allow a 10 percent torque margin above NATOPS hover out of ground effect (HOGE) required torque predictions.

Day/Night envelopes valid for right and left seat landings.

Entire Envelope - Day
Shaded Area - Night

Figure B-52. H-46 Launch and Recovery Envelope for DDG 51 Class Ships



NOTES:

Entire envelope - day:
Pitch: 2 degrees
Roll: 8 degrees

Shaded area - night
Pitch: 2 degrees
Roll: 4 degrees

WOD DIR is wind over deck direction measured relative to ship centerline by ship mast-mounted anemometers.

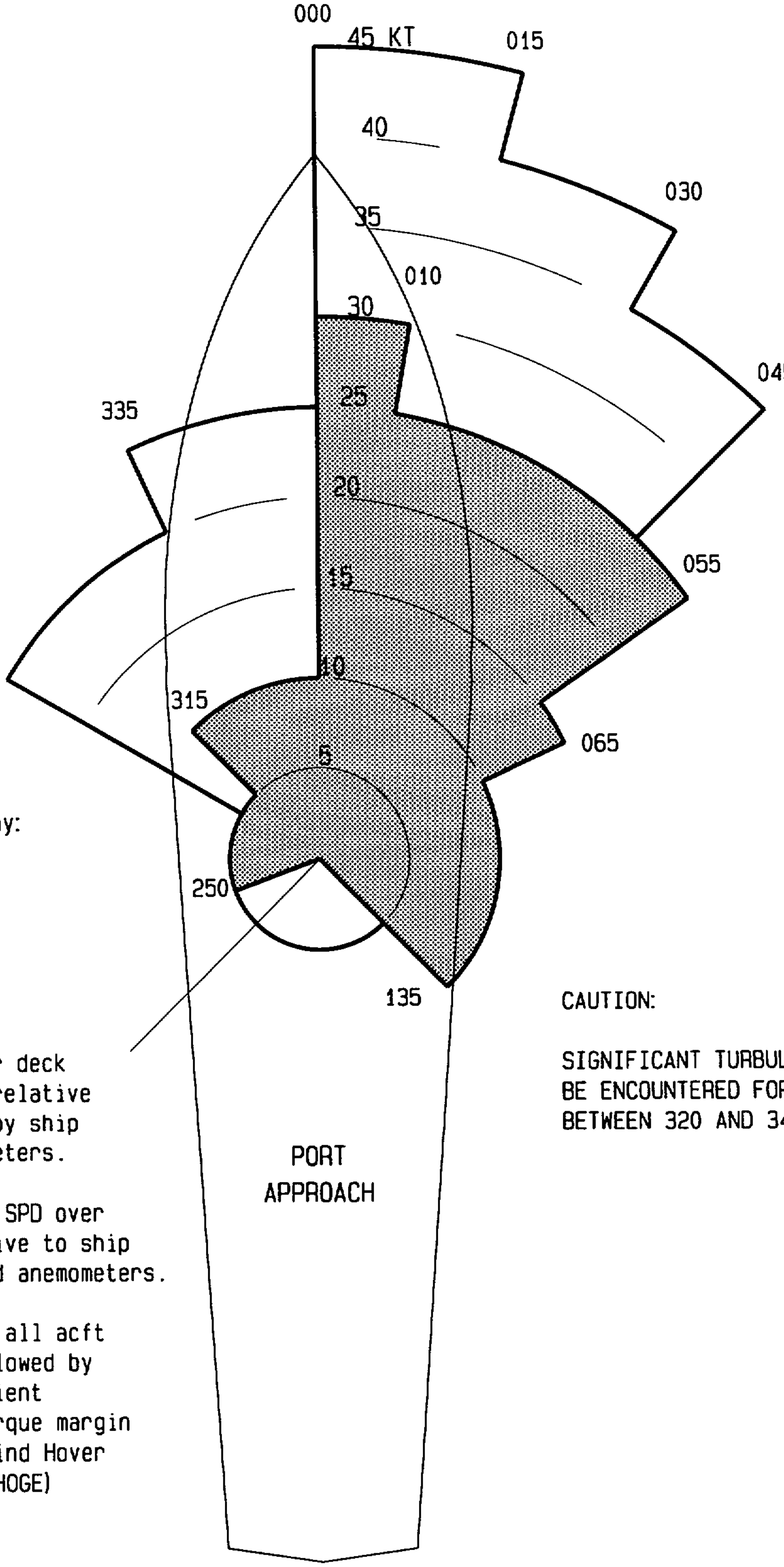
WOD SPD is max wind SPD over deck measured relative to ship by ship mast-mounted anemometers.

Envelopes valid for all acft GW/CG conditions allowed by NATOPS provided ambient conditions allow torque margin above NATOPS zero-wind Hover Out Ground Effect (HOGE) predictions.

CAUTION:

SIGNIFICANT TURBULENCE MAY BE ENCOUNTERED FOR WINDS BETWEEN 320 AND 340 DEGREES.

Figure B-53. H-46E Launch and Recovery Envelopes for LPD 4 Class Ships (Sheet 1 of 7)
Sheet 1: Spot 1, Port Approach



NOTES:

Entire envelope - day:
Pitch: 2 degrees
Roll: 8 degrees

Shaded area - night
Pitch: 2 degrees
Roll: 4 degrees

WOD DIR is wind over deck direction measured relative to ship centerline by ship mast-mounted anemometers.

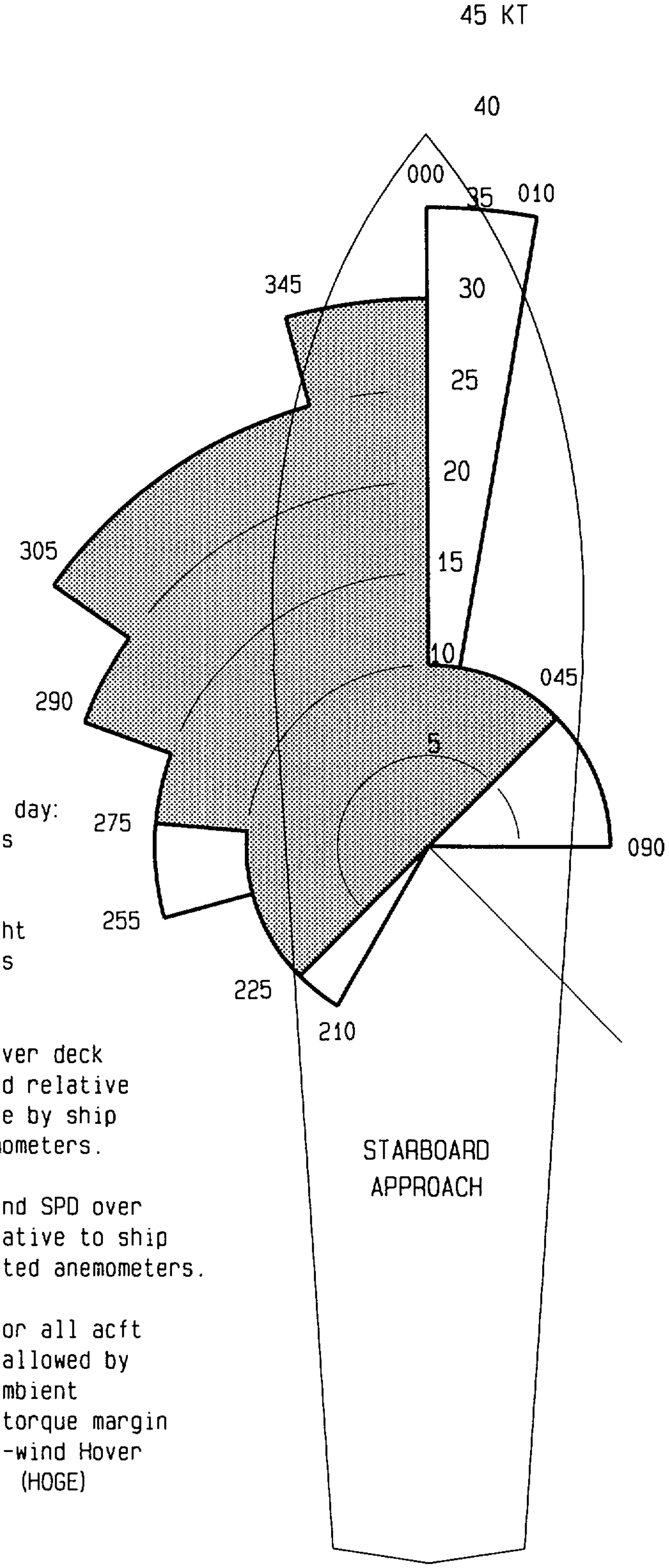
WOD SPD is max wind SPD over deck measured relative to ship by ship mast-mounted anemometers.

Envelopes valid for all acft GW/CG conditions allowed by NATOPS provided ambient conditions allow torque margin above NATOPS zero-wind Hover Out Ground Effect (HOGE) predictions.

CAUTION:

SIGNIFICANT TURBULENCE MAY BE ENCOUNTERED FOR WINDS BETWEEN 320 AND 340 DEGREES.

Figure B-53. H-46E Launch and Recovery Envelopes for LPD 4 Class Ships (Sheet 2 of 7)
Sheet 2: Spot 2, Port Approach



NOTES:

Entire envelope - day:
Pitch: 2 degrees
Roll: 8 degrees

Shaded area - night
Pitch: 2 degrees
Roll: 4 degrees

WOD DIR is wind over deck direction measured relative to ship centerline by ship mast-mounted anemometers.

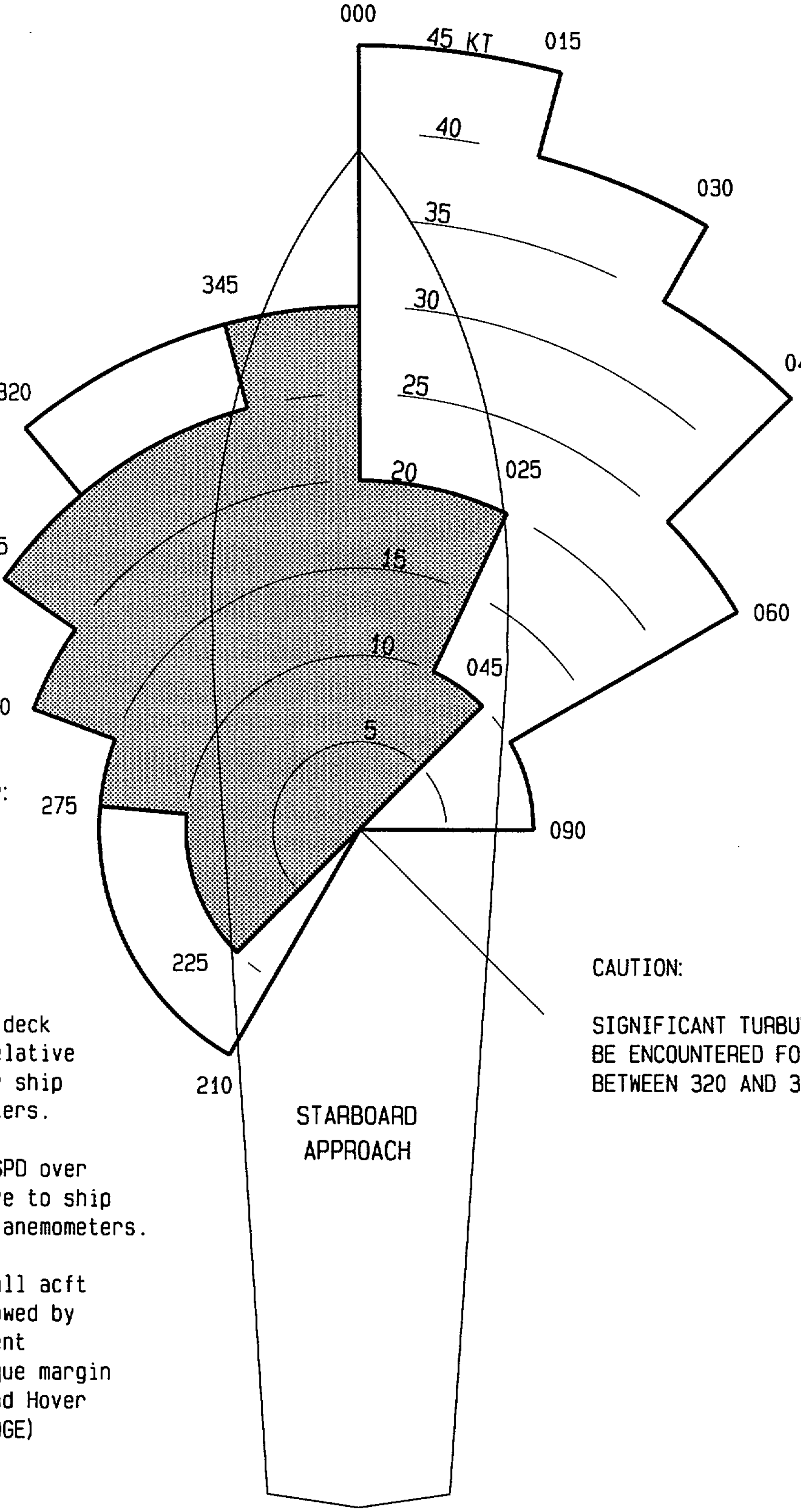
WOD SPD is max wind SPD over deck measured relative to ship by ship mast-mounted anemometers.

Envelopes valid for all acft GW/CG conditions allowed by NATOPS provided ambient conditions allow torque margin above NATOPS zero-wind Hover Out Ground Effect (HOGE) predictions.

CAUTION:

SIGNIFICANT TURBULENCE MAY BE ENCOUNTERED FOR WINDS BETWEEN 320 AND 340 DEGREES.

Figure B-53. H-46E Launch and Recovery Envelopes for LPD 4 Class Ships (Sheet 3 of 7)
Sheet 3: Spot 1, Starboard Approach



NOTES:

Entire envelope - day:
 Pitch: 2 degrees
 Roll: 8 degrees

Shaded area - night
 Pitch: 2 degrees
 Roll: 4 degrees

WOD DIR is wind over deck direction measured relative to ship centerline by ship mast-mounted anemometers.

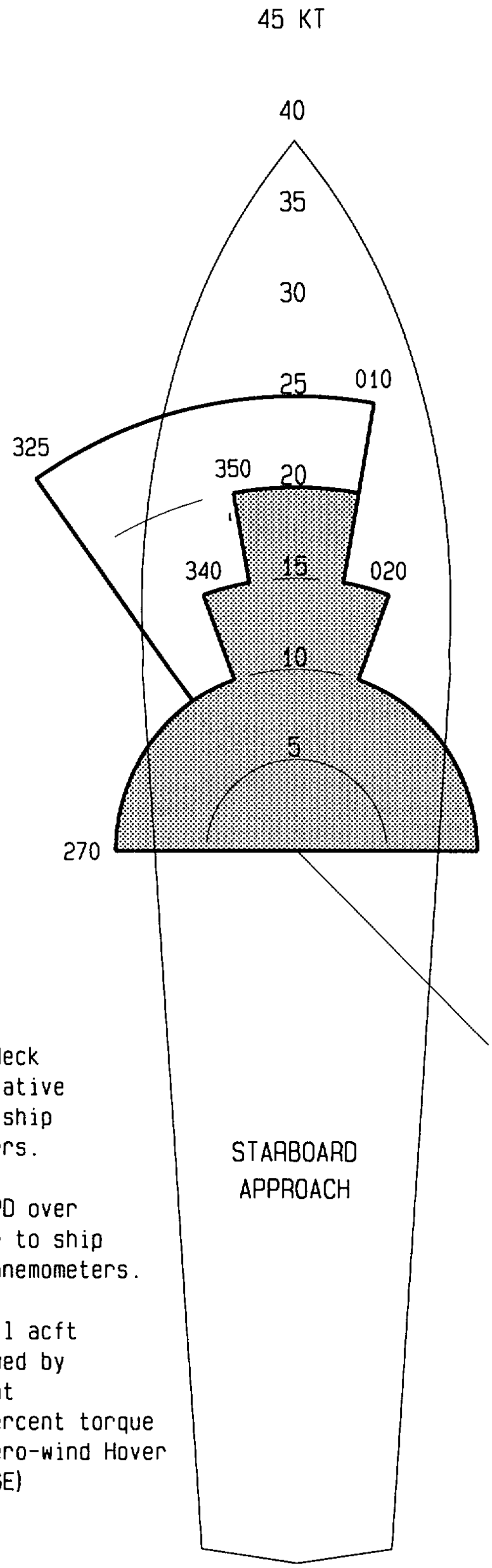
WOD SPD is max wind SPD over deck measured relative to ship by ship mast-mounted anemometers.

Envelopes valid for all acft GW/CG conditions allowed by NATOPS provided ambient conditions allow torque margin above NATOPS zero-wind Hover Out Ground Effect (HOGE) predictions.

CAUTION:

SIGNIFICANT TURBULENCE MAY BE ENCOUNTERED FOR WINDS BETWEEN 320 AND 340 DEGREES.

Figure B-53. H-46E Launch and Recovery Envelopes for LPD 4 Class Ships (Sheet 4 of 7)
Sheet 4: Spot 2, Starboard Approach



NOTES:

Entire envelope - day:
Pitch: 2 degrees
Roll: 8 degrees

Shaded area - night
Pitch: 2 degrees
Roll: 4 degrees

WOD DIR is wind over deck direction measured relative to ship centerline by ship mast-mounted anemometers.

WOD SPD is max wind SPD over deck measured relative to ship by ship mast-mounted anemometers.

Envelopes valid for all acft GW/CG conditions allowed by NATOPS provided ambient conditions allow 10 percent torque margin above NATOPS zero-wind Hover Out Ground Effect (HOGE) predictions.

CAUTION:

SIGNIFICANT TURBULENCE MAY BE ENCOUNTERED FOR WINDS BETWEEN 320 AND 340 DEGREES.

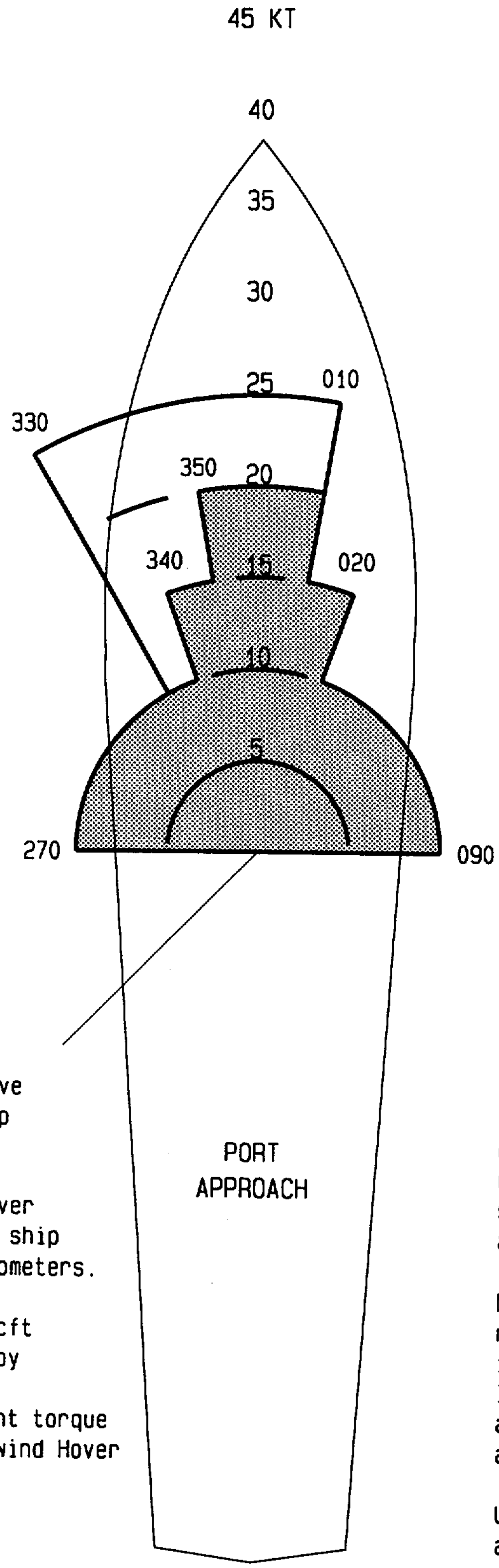
NOTES:
Envelopes valid for approaches

conducted directly to, departures directly from these spots using LHA/LPH/LHD style approach/departure profiles.

Night unaided approaches are not authorized due to inadequate lighting. Unaided low hover taxi from spots 1 and 2 and recovery to spots 3 and 5 are authorized.

Unaided launch ops are authorized.

Figure B-53. H-46E Launch and Recovery Envelopes for LPD 4 Class Ships (Sheet 5 of 7)
Sheet 5: Spots 3 and 5, Starboard Approach



NOTES:

Entire envelope - day:
Pitch: 2 degrees
Roll: 8 degrees

Shaded area - night
Pitch: 2 degrees
Roll: 4 degrees

WOD DIR is wind over deck direction measured relative to ship centerline by ship mast-mounted anemometers.

WOD SPD is max wind SPD over deck measured relative to ship by ship mast-mounted anemometers.

Envelopes valid for all acft GW/CG conditions allowed by NATOPS provided ambient conditions allow 10 percent torque margin above NATOPS zero-wind Hover Out Ground Effect (HOGE) predictions.

CAUTION:

SIGNIFICANT TURBULENCE MAY BE ENCOUNTERED FOR WINDS BETWEEN 320 AND 340 DEGREES.

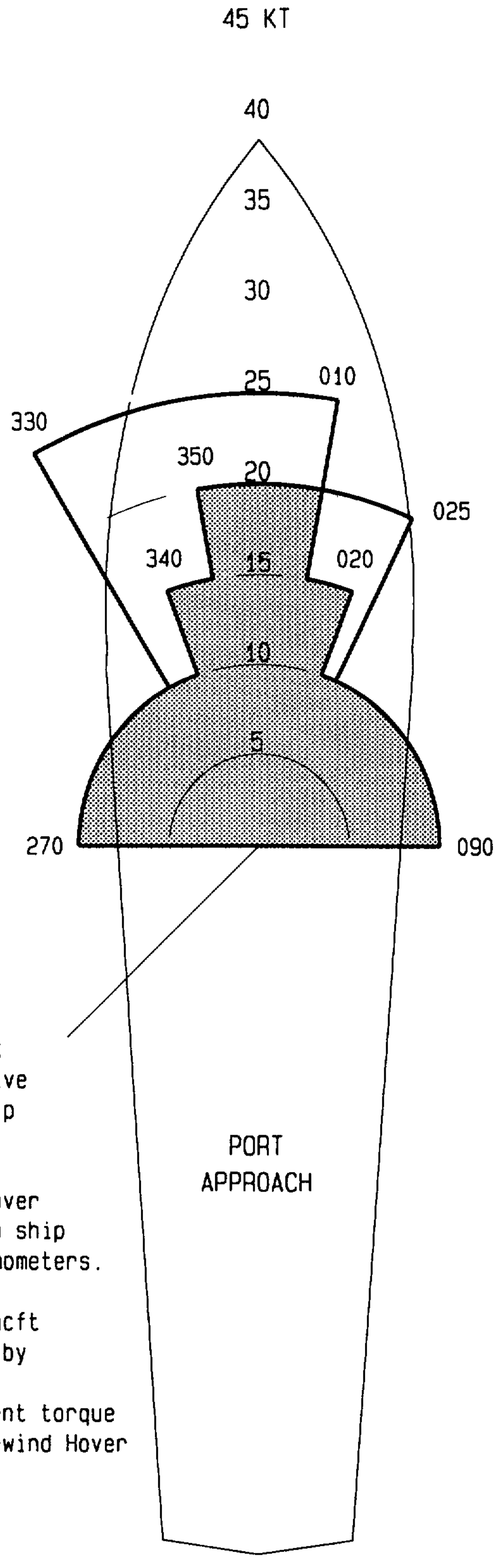
NOTES:
Envelopes valid for approaches

conducted directly to, departures directly from these spots using LHA/LPH/LHD style approach/departure profiles.

Night unaided approaches are not authorized due to inadequate lighting. Unaided low hover taxi from spot 1 and recovery to spot 4 are authorized.

Unaided launch ops are authorized.

Figure B-53. H-46E Launch and Recovery Envelopes for LPD 4 Class Ships (Sheet 6 of 7)
Sheet 6: Spot 4, Port Approach



NOTES:

Entire envelope - day:
Pitch: 2 degrees
Roll: 8 degrees

Shaded area - night
Pitch: 2 degrees
Roll: 4 degrees

WOD DIR is wind over deck direction measured relative to ship centerline by ship mast-mounted anemometers.

WOD SPD is max wind SPD over deck measured relative to ship by ship mast-mounted anemometers.

Envelopes valid for all acft GW/CG conditions allowed by NATOPS provided ambient conditions allow 10 percent torque margin above NATOPS zero-wind Hover Out Ground Effect (HOGE) predictions.

CAUTION:

SIGNIFICANT TURBULENCE MAY BE ENCOUNTERED FOR WINDS BETWEEN 320 AND 340 DEGREES.

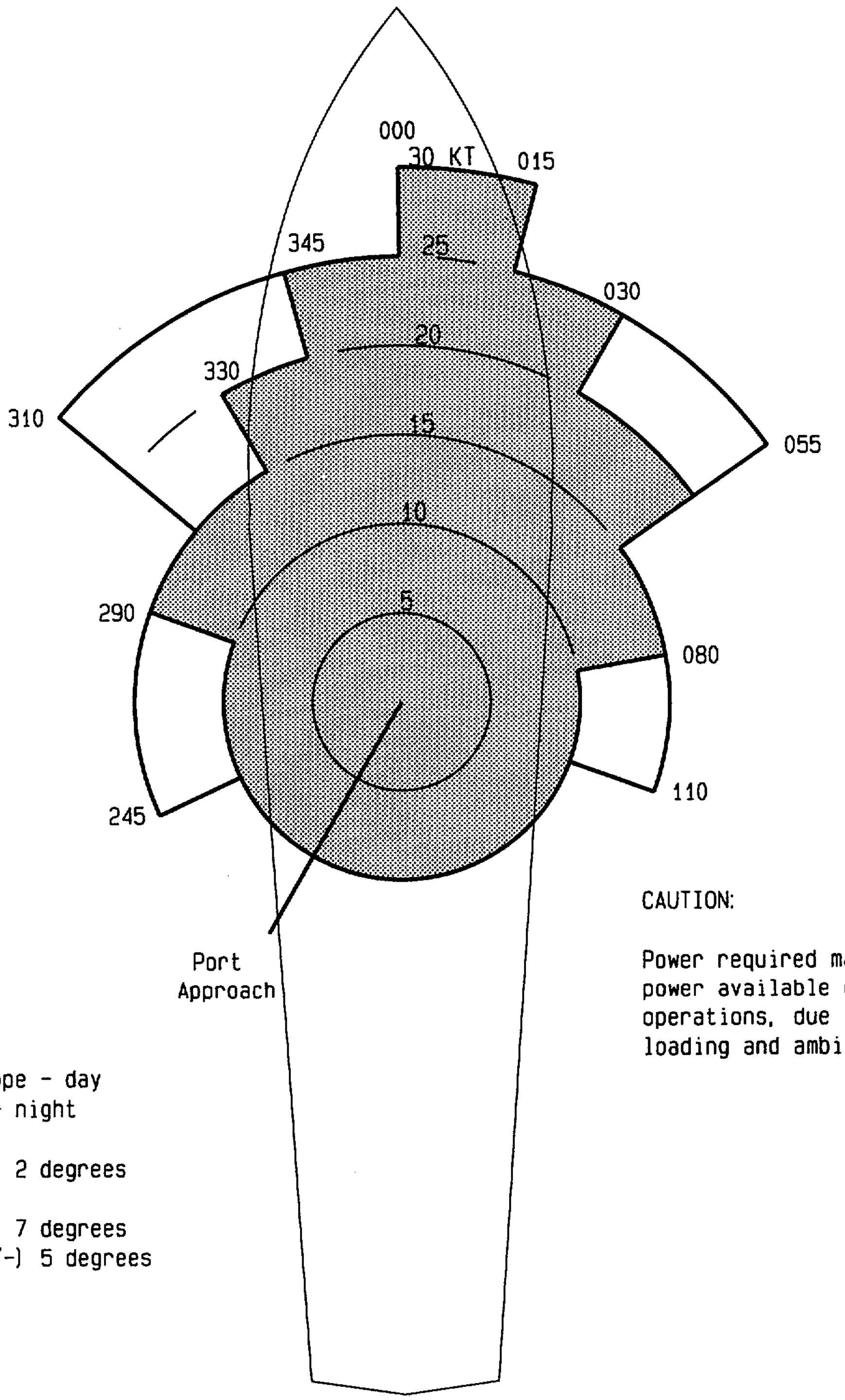
NOTES:
Envelopes valid for approaches

conducted directly to, departures directly from these spots using LHA/LPH/LHD style approach/departure profiles.

Night unaided approaches are not authorized due to inadequate lighting. Unaided low hover taxi from spot 2 and recovery to spot 6 are authorized.

Unaided launch ops are authorized.

Figure B-53. H-46E Launch and Recovery Envelopes for LPD 4 Class Ships (Sheet 7 of 7)
Sheet 7: Spot 6, Port Approach



CAUTION:

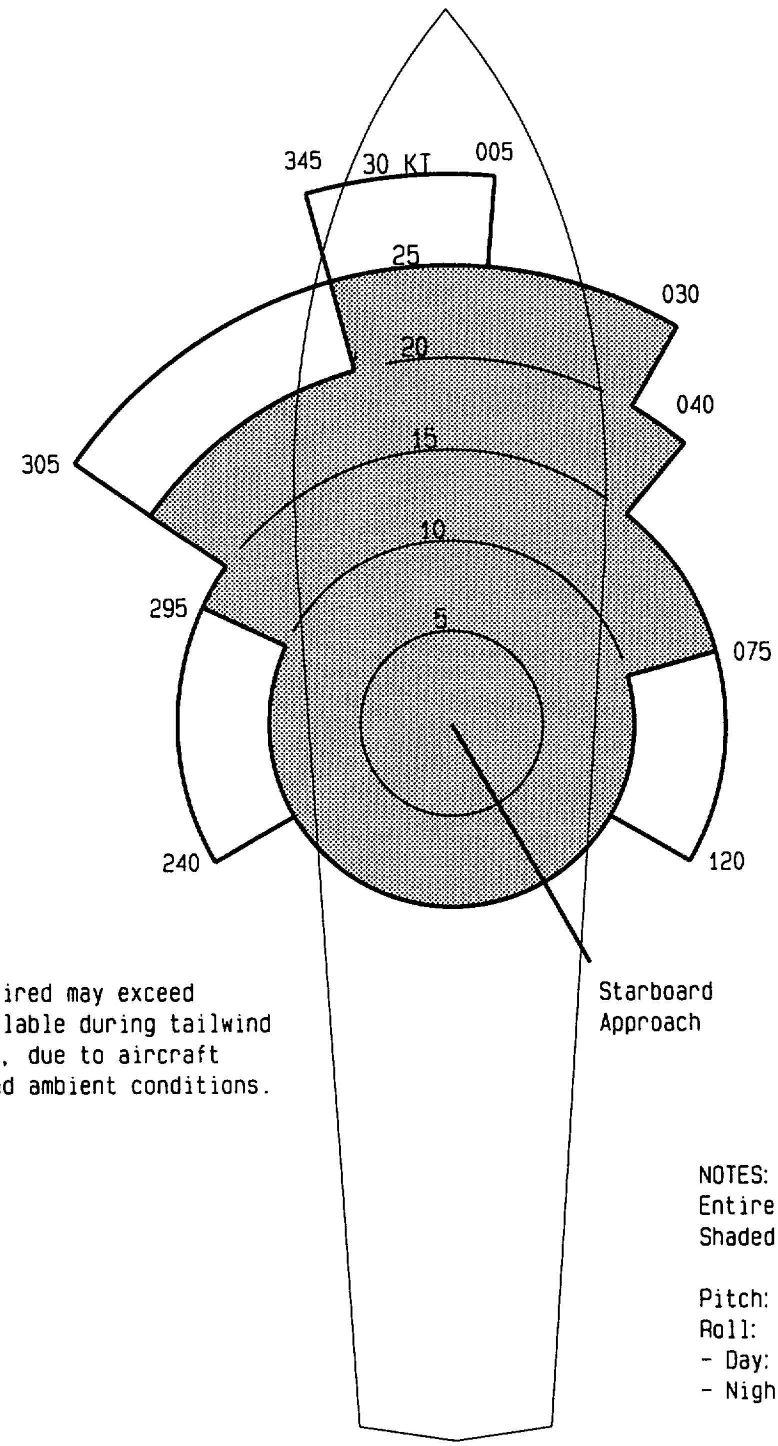
Power required may exceed power available during tailwind operations, due to aircraft loading and ambient conditions.

NOTES:

Entire envelope - day
Shaded area - night

Pitch: (+/-) 2 degrees
Roll:
- Day: (+/-) 7 degrees
- Night: (+/-) 5 degrees

Figure B-54. H-46 Launch and Recovery Envelopes for LSD 36 Class Ships (Sheet 1 of 2)
Sheet 1: Port Approach



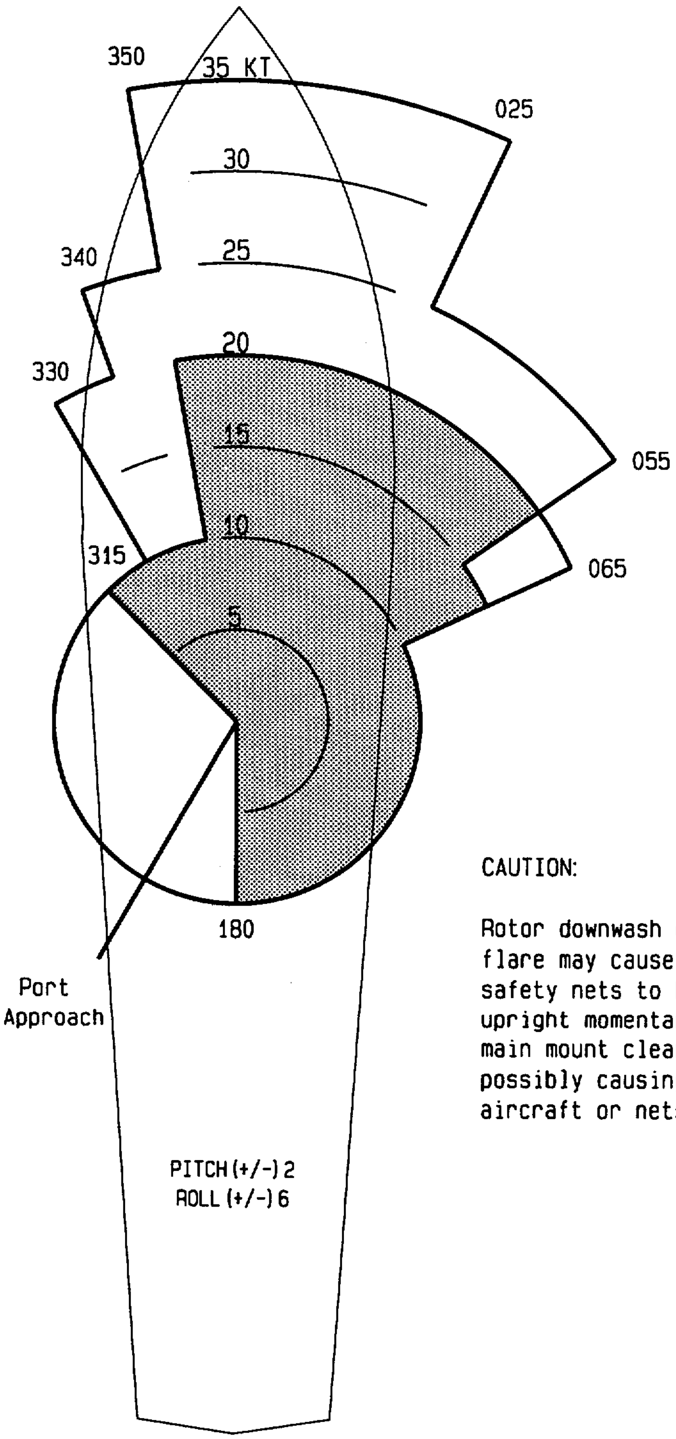
CAUTION:

Power required may exceed power available during tailwind operations, due to aircraft loading and ambient conditions.

NOTES:
Entire envelope - day
Shaded area - night

Pitch: (+/-) 2 degrees
Roll:
- Day: (+/-) 7 degrees
- Night: (+/-) 5 degrees

Figure B-54. H-46 Launch and Recovery Envelopes for LSD 36 Class Ships (Sheet 2 of 2)
Sheet 2: Starboard Approach



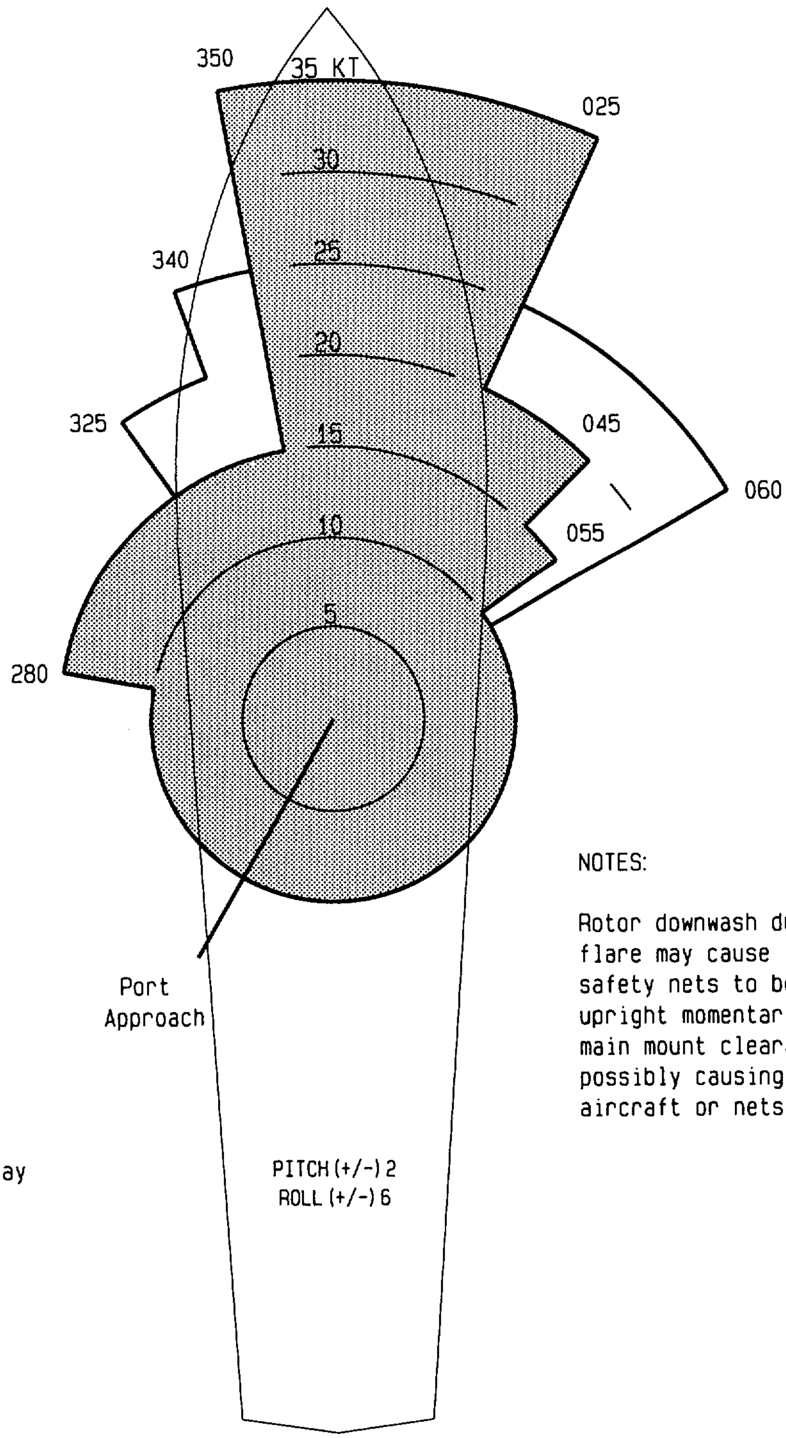
CAUTION:

Rotor downwash during landing flare may cause flight deck safety nets to bounce upright momentarily, reducing main mount clearance, and possibly causing damage to aircraft or nets.

Notes:

Entire envelope - day
Shaded area - night

Figure B-55. H-46 Launch and Recovery Envelopes for LSD 41 Class Ships (Sheet 1 of 4)
Sheet 1: Spot 1, Port Approach



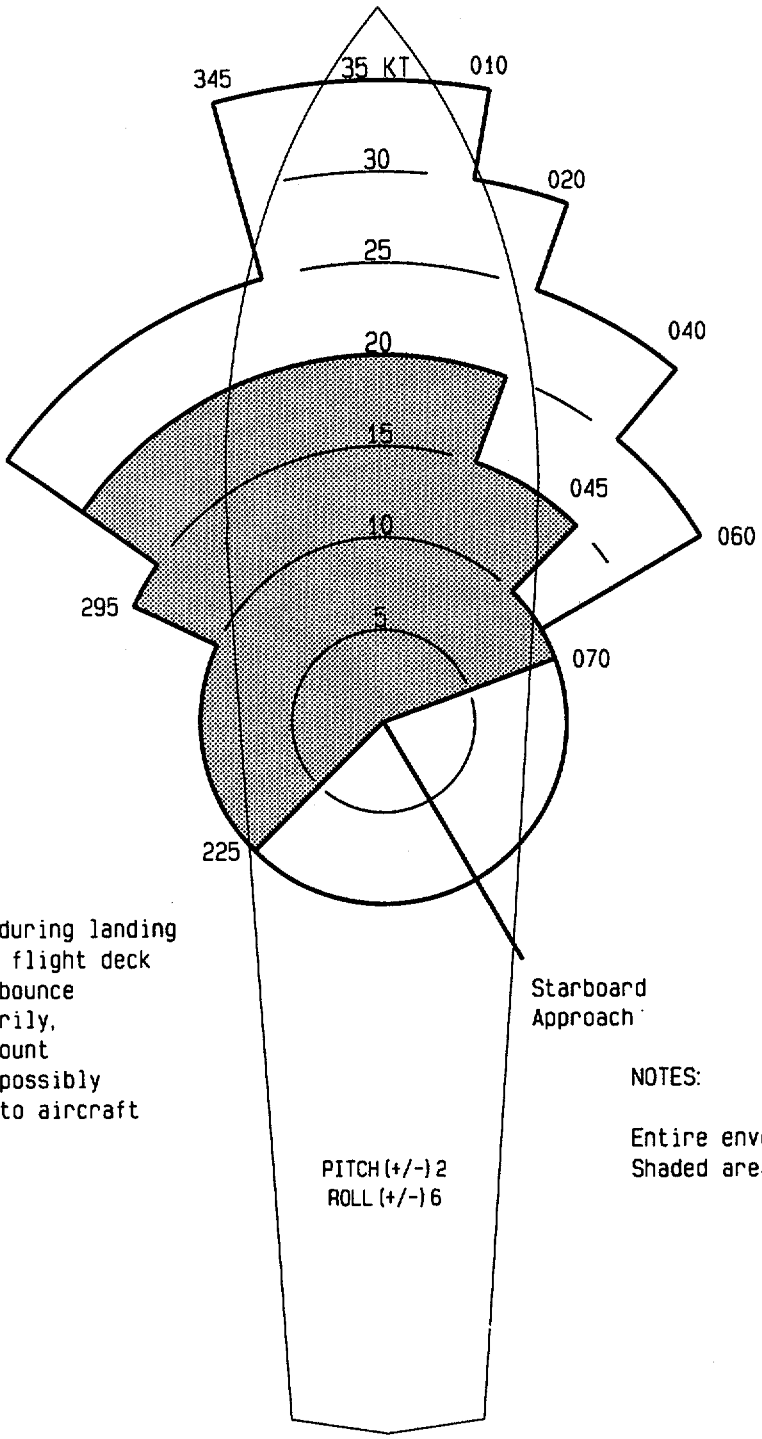
NOTES:

Rotor downwash during landing flare may cause flight deck safety nets to bounce upright momentarily, reducing main mount clearance, and possibly causing damage to aircraft or nets.

NOTES:

Entire envelope - day
Shaded area - night

Figure B-55. H-46 Launch and Recovery Envelopes for LSD 41 Class Ships (Sheet 2 of 4)
Sheet 2: Spot 2, Port Approach



CAUTION:

Rotor downwash during landing flare may cause flight deck safety nets to bounce upright momentarily, reducing main mount clearance, and possibly causing damage to aircraft or net.

NOTES:

Entire envelope - day
Shaded area - night

Figure B-55. H-46 Launch and Recovery Envelopes for LSD 41 Class Ships (Sheet 3 of 4)
Sheet 3: Spot 1, Starboard Approach

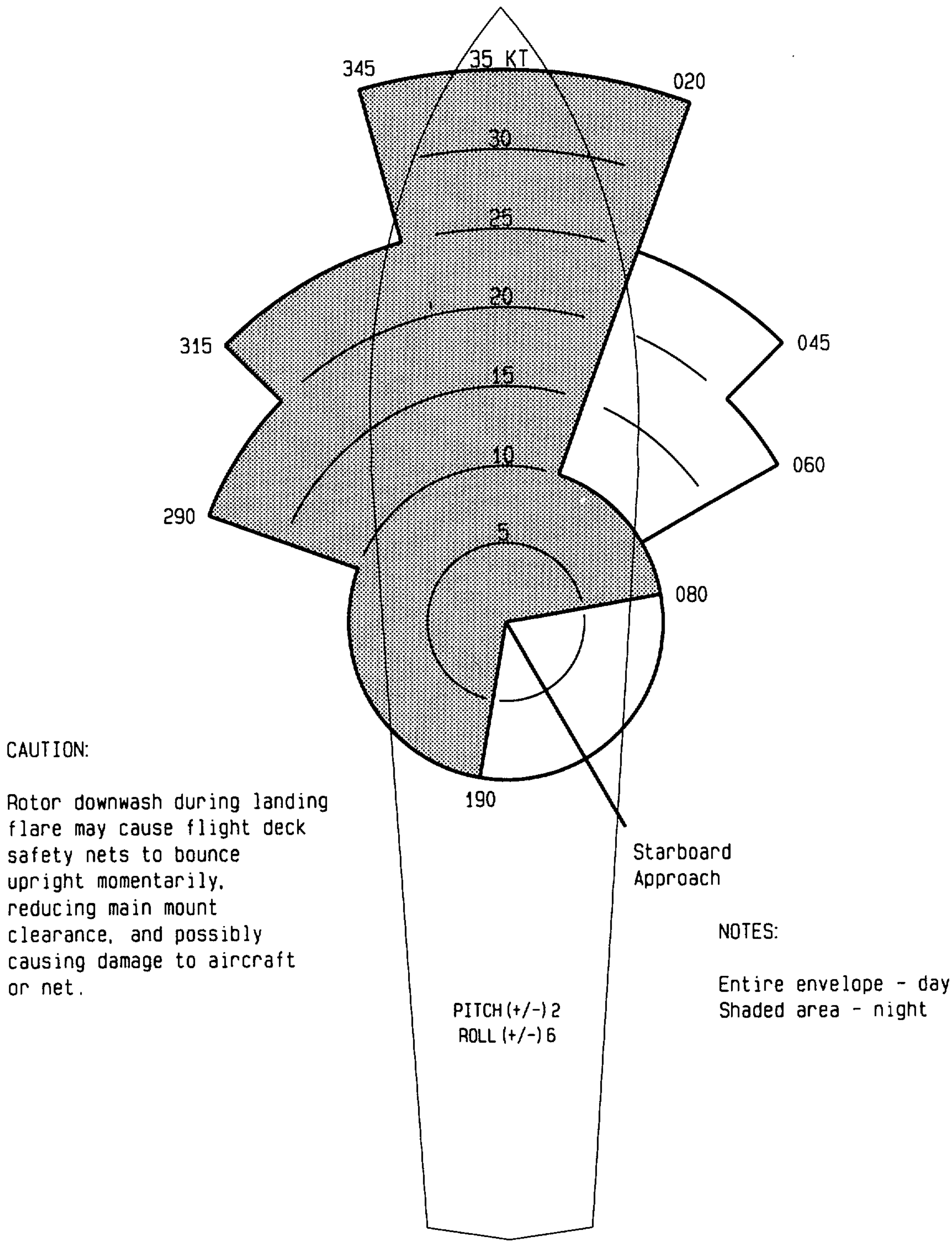


Figure B-55. H-46 Launch and Recovery Envelopes for LSD 41 Class Ships (Sheet 4 of 4)
Sheet 4: Spot 2, Starboard Approach

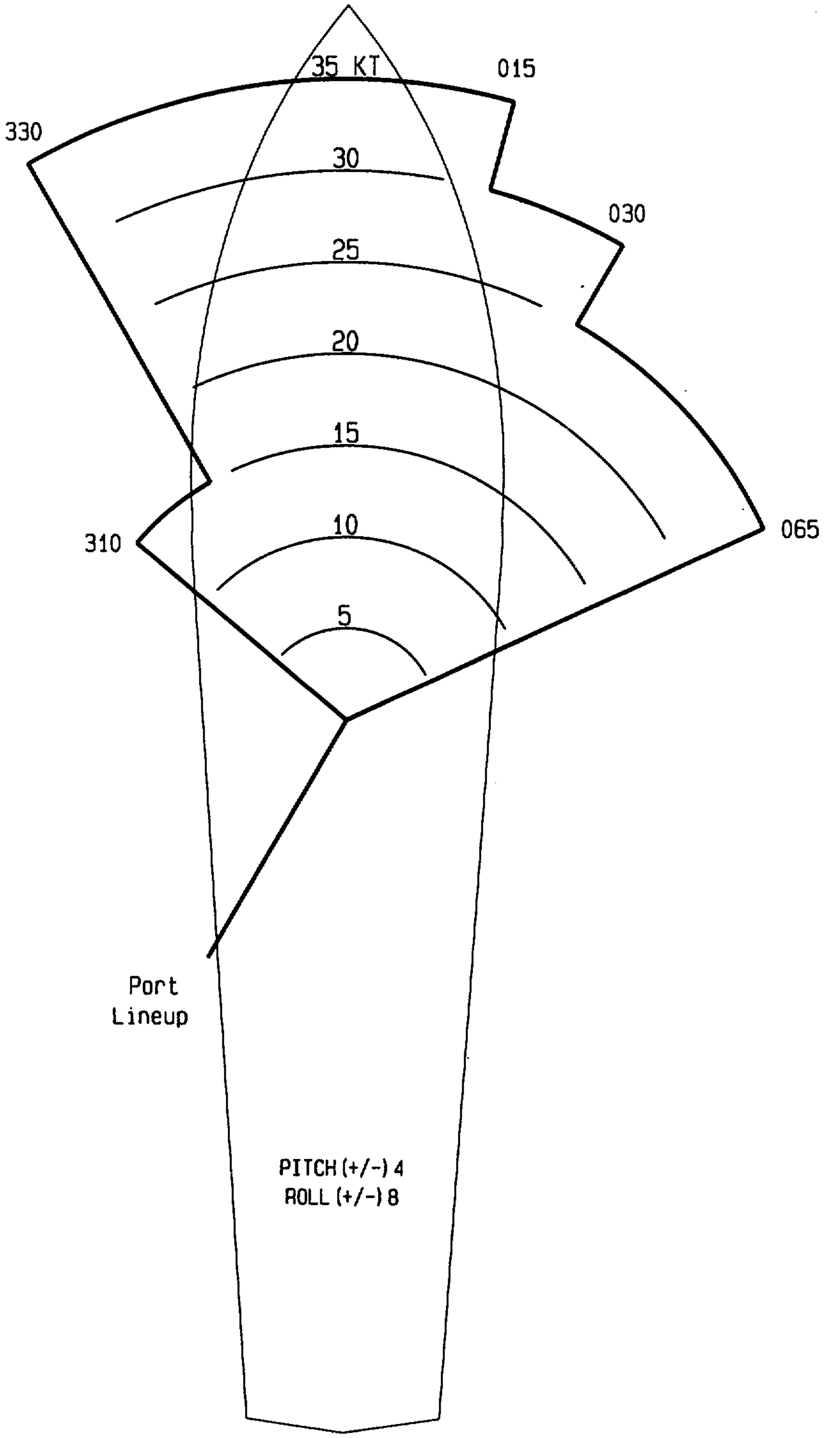


Figure B-56. H-46 Engage/Disengage Envelopes for TAO 187 Class Ships (Sheet 1 of 2)
Sheet 1: Port Approach

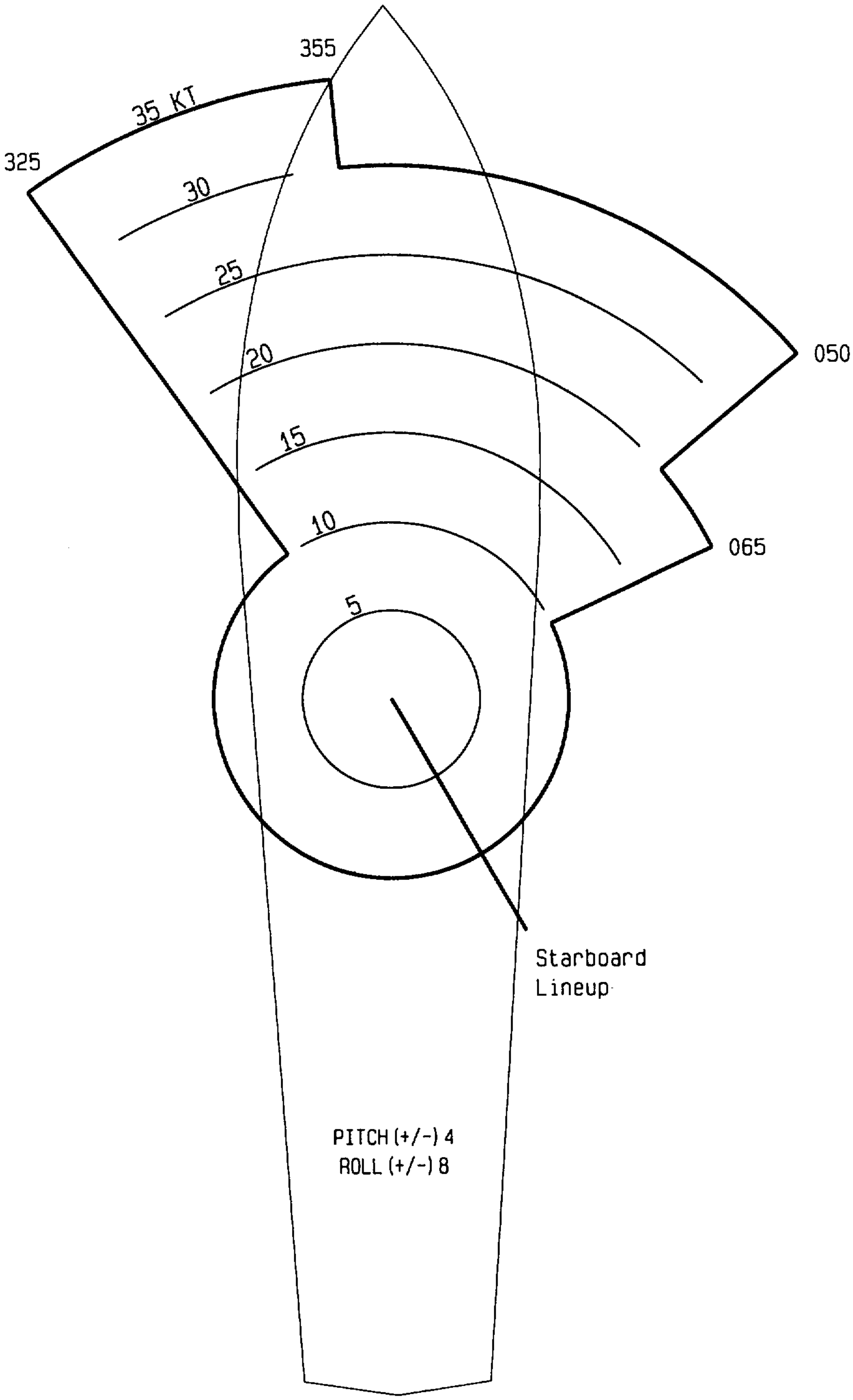


Figure B-56. H-46 Engage/Disengage Envelopes for TAO 187 Class Ships (Sheet 2 of 2)
Sheet 2: Starboard Approach

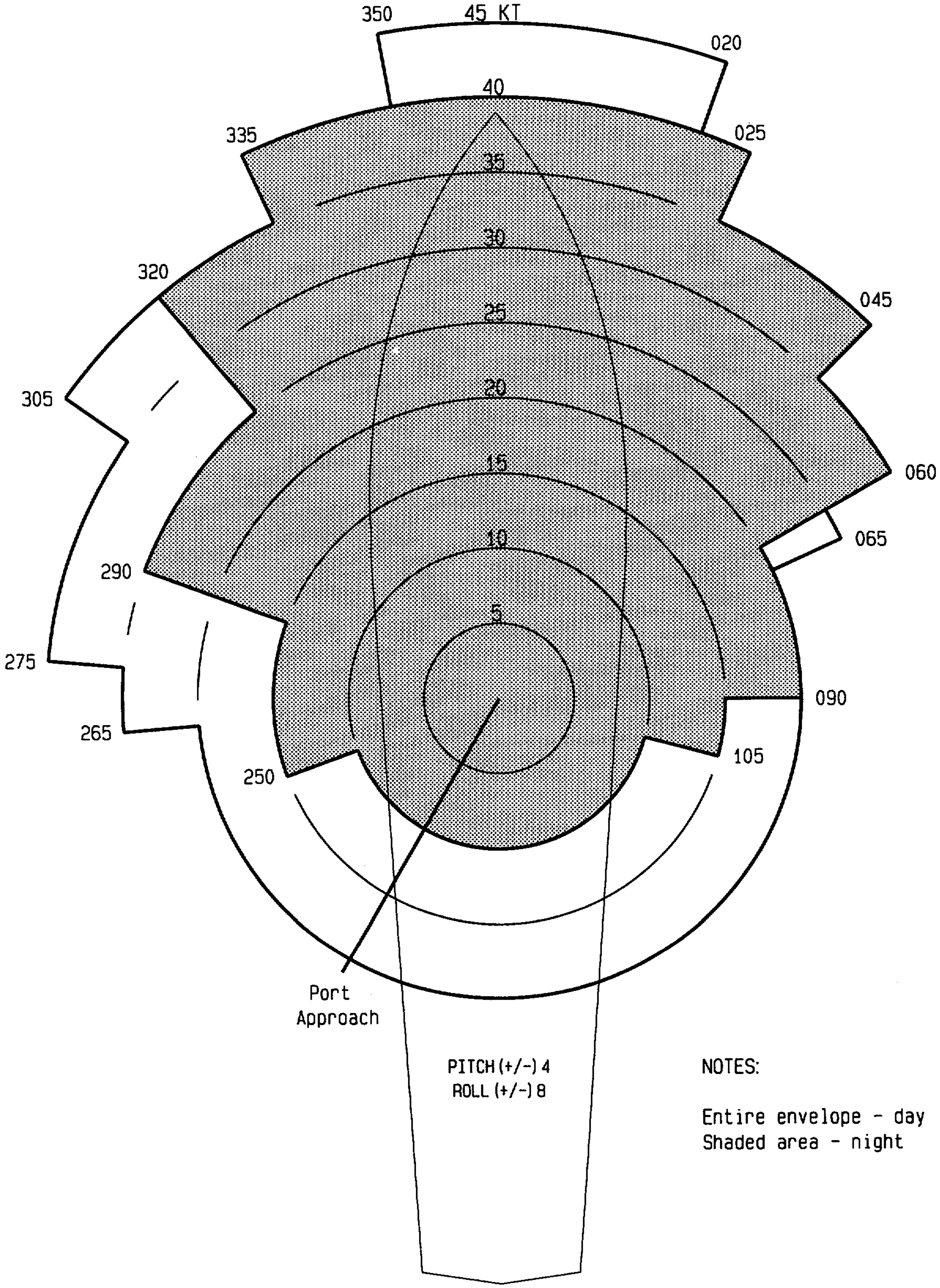
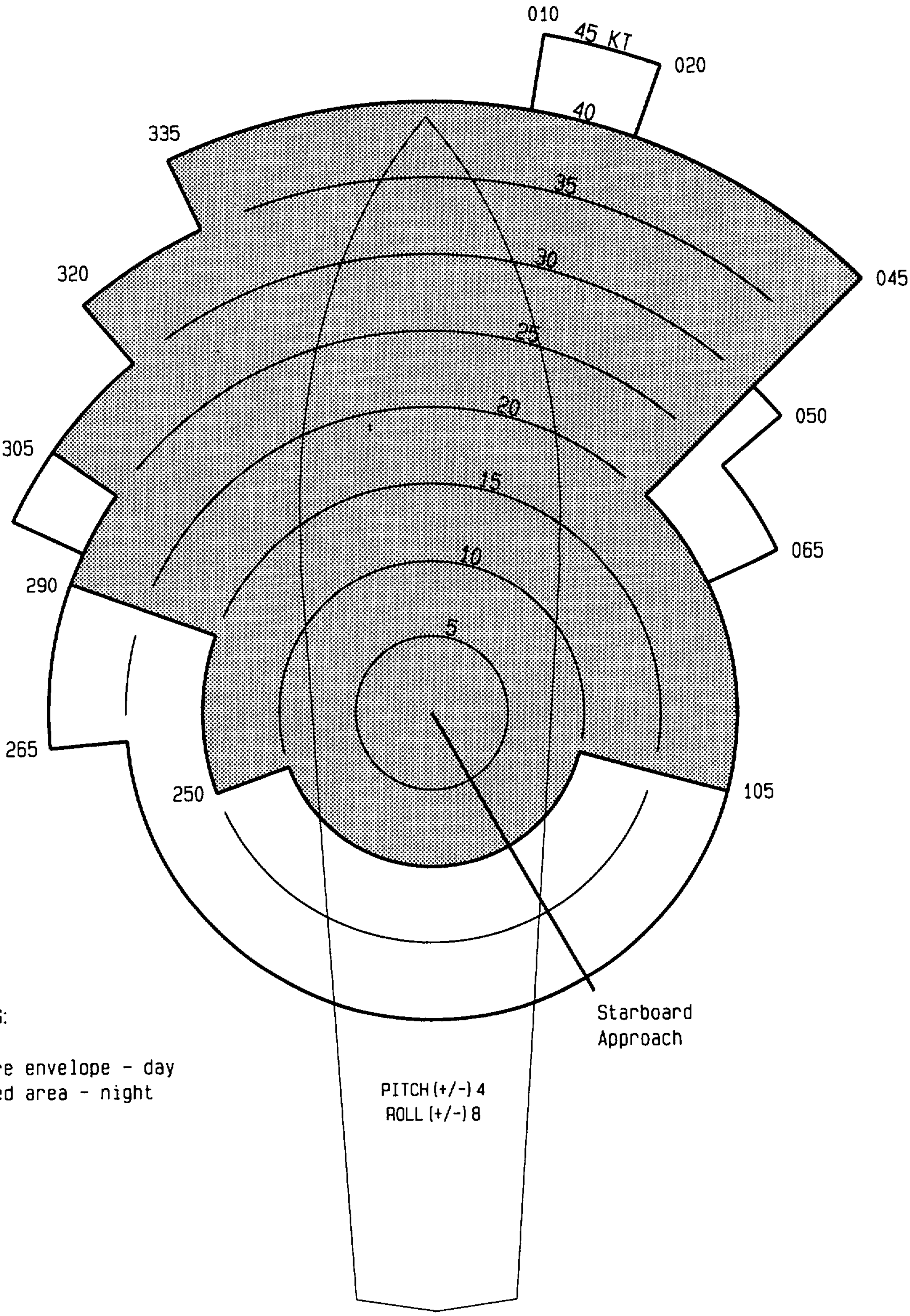


Figure B-57. H-46 Launch and Recovery Envelopes for TAO 187 Class Ships (Sheet 1 of 2)
Sheet 1: Port Approach



NOTES:

Entire envelope - day
Shaded area - night

Figure B-57. H-46 Launch and Recovery Envelopes for TAO 187 Class Ships (Sheet 2 of 2)
Sheet 2: Starboard Approach

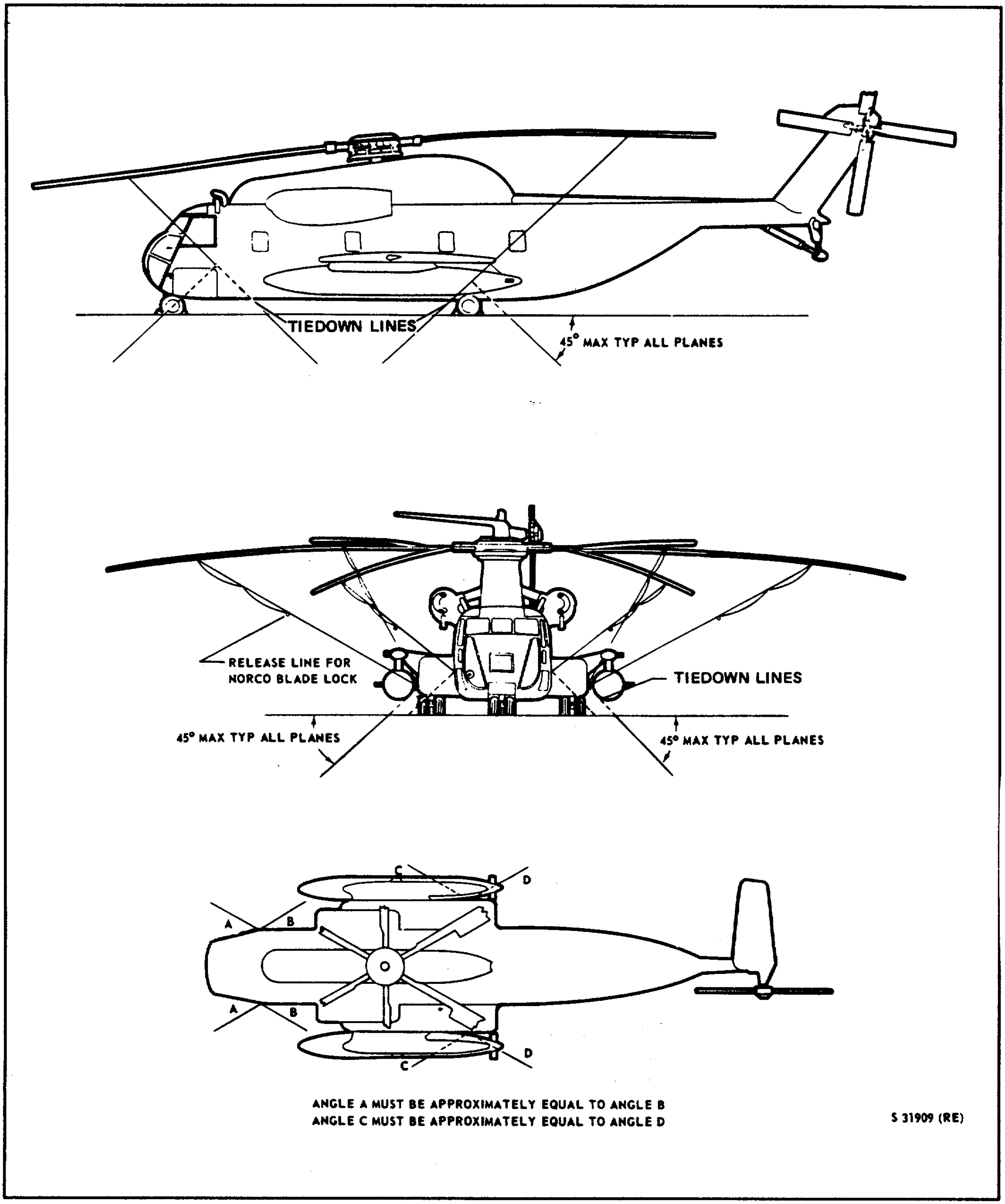
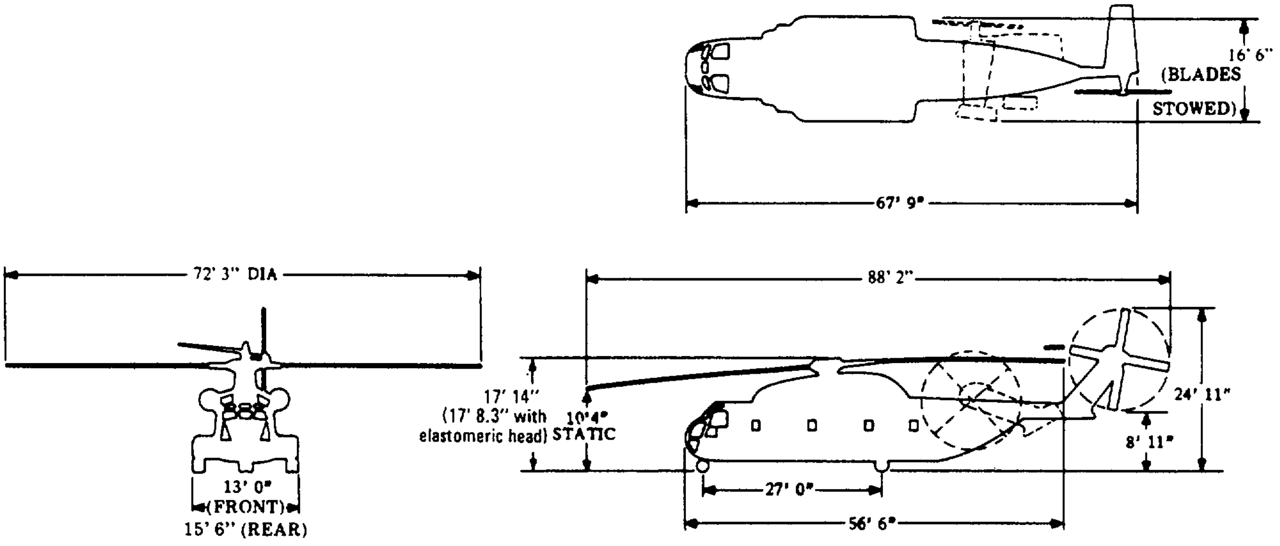


Figure B-58. H-53 Tiedown

MODEL	CH-53A	CH-53D
POWER	2 – T64-GE-6A	2 – T64-GE-413
CREW	3	3
MAXIMUM RANGE	335 nm at 137 knots	299 nm at 130 knots
MAXIMUM SPEED	130 knots	130 knots
ENDURANCE	2.25 hr at 80 knots	2.75 hr at 73 knots
WEIGHT: Basic	22,900 lb (approx)	22,900 lb (approx)
Maximum	40,750 lb	42,000 lb
FUEL: Type	JP-5/JP-4	JP-5/JP-4
Capacity	638 gal	638 gal 1,938 gal (with external tanks)

CARGO/PASSENGER CAPABILITY: External hook; no hoist installed; seats for 37 passengers; 24 litters; 1,460 ft^3 internal cargo space



MINIMUM HEIGHT WITH PYLON FOLDED: 17' 2"

WARNING

After landing H-53 aircraft with external auxiliary fuel tanks, the aircrewman shall install the auxiliary fuel tank safety pins prior to lineman attaching tiedown chains and positioning chocks. Prior to takeoff, the chocks and tiedown chains are to be removed before the aircrewman removes the auxiliary fuel tank safety pins.

NOTES:

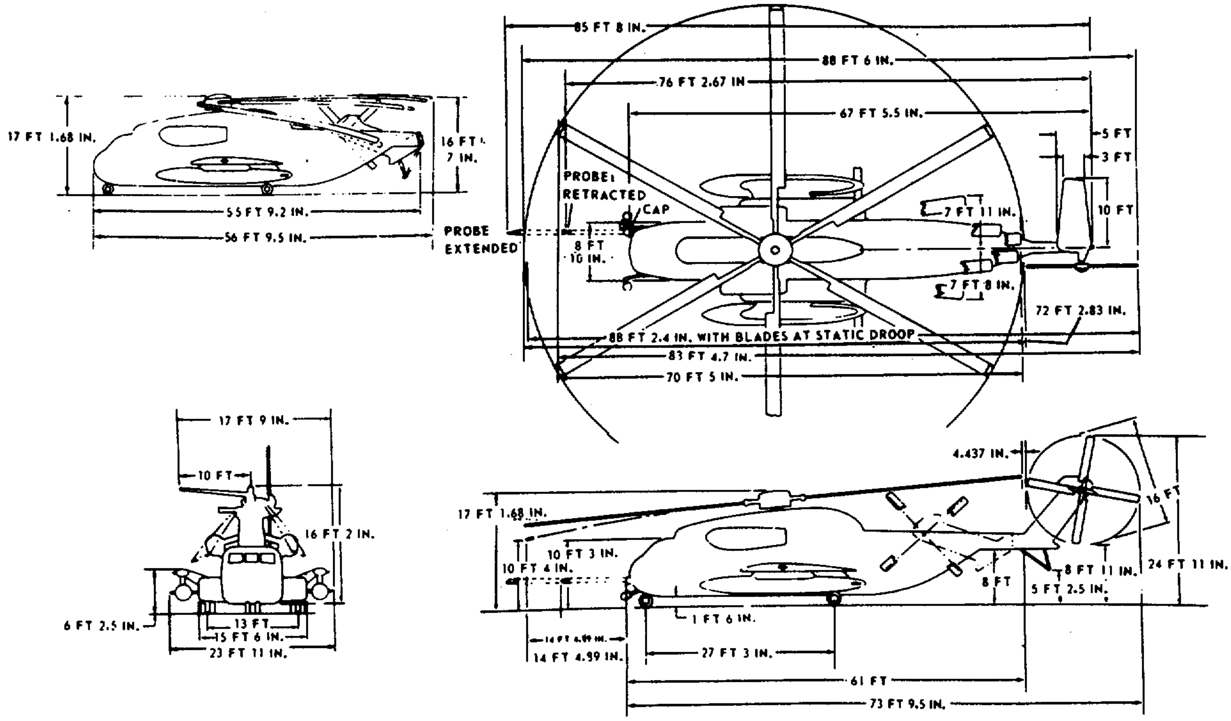
Maximum wind for rotor engagement/disengagement is 45 knots in any quadrant.

Operations in the island wash areas should be held to a minimum.

Figure B-59. CH-53A/D Sea Stallion

MODEL	RH-53D
POWER	2 – T64-GE-415
CREW	4-8
MAXIMUM RANGE	666 nm at 130 knots
MAXIMUM SPEED	160 knots
ENDURANCE	6.5 hr at 78 knots (full fuel)
WEIGHT: Basic	25,583 lb
Maximum	42,000 lb
FUEL: Type	JP-5/JP-4
Capacity	1,638 gal

CARGO/PASSENGER CAPABILITY: External hook; 600 lb personnel hoist; seats for 37 passengers; 24 litters; 1,460 ft^3 internal cargo space



WARNING

After landing H-53 aircraft with external auxiliary fuel tanks, the aircrewman shall install the auxiliary fuel tank safety pins prior to lineman attaching tiedown chains and positioning chocks. Prior to takeoff, the chocks and tiedown chains are to be removed before the aircrewman removes the auxiliary fuel tank safety pins.

NOTES:

Maximum wind for rotor engagement/disengagement is 45 knots in any quadrant.

Operations in the island wash areas should be held to a minimum.

Figure B-60. RH-53D Sea Stallion

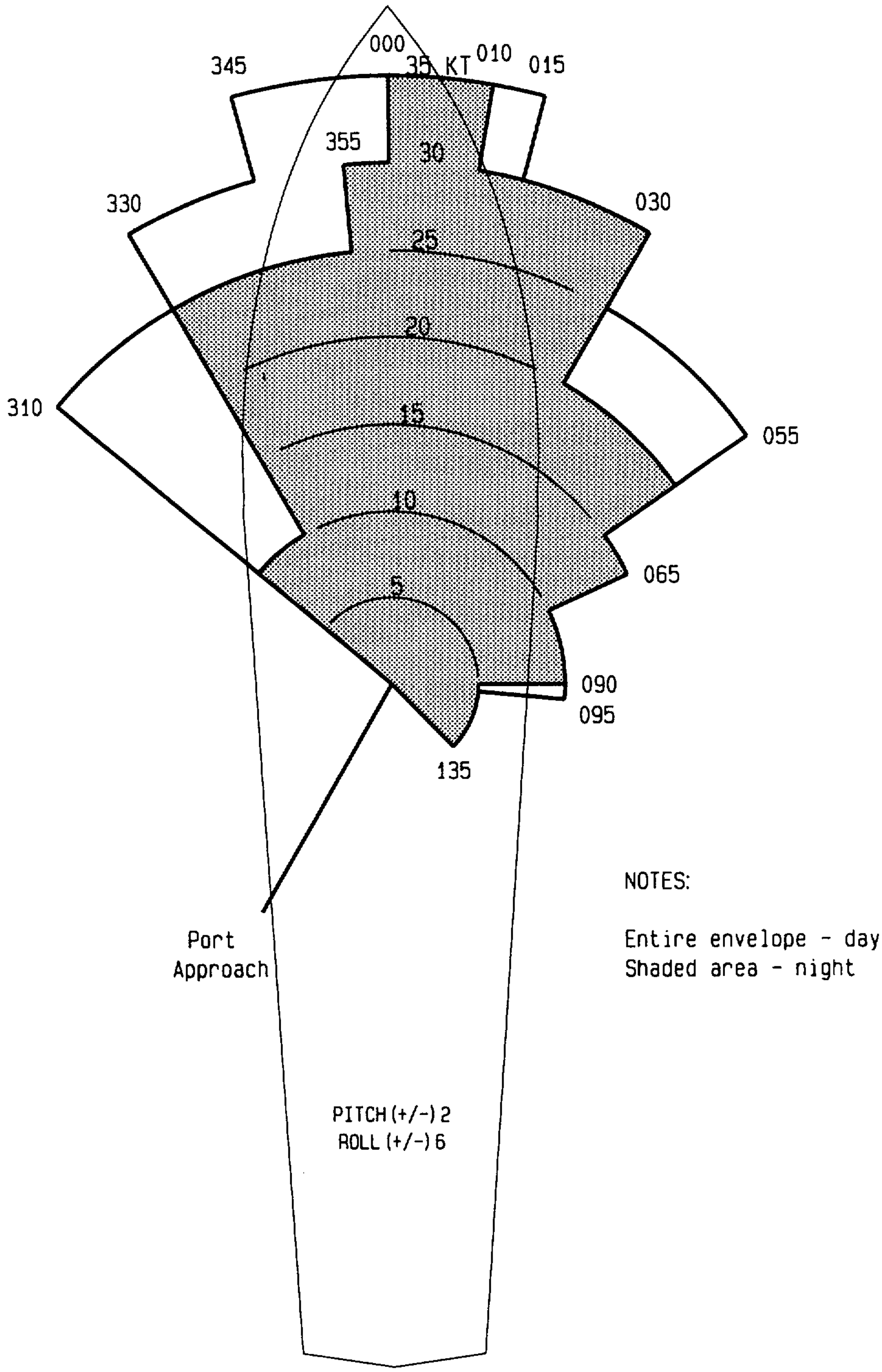


Figure B-61. H-53A/D Launch and Recovery Envelopes for LPD 4 Class Ships (Sheet 1 of 2)
Sheet 1: Spots 1 and 2, Port Approach

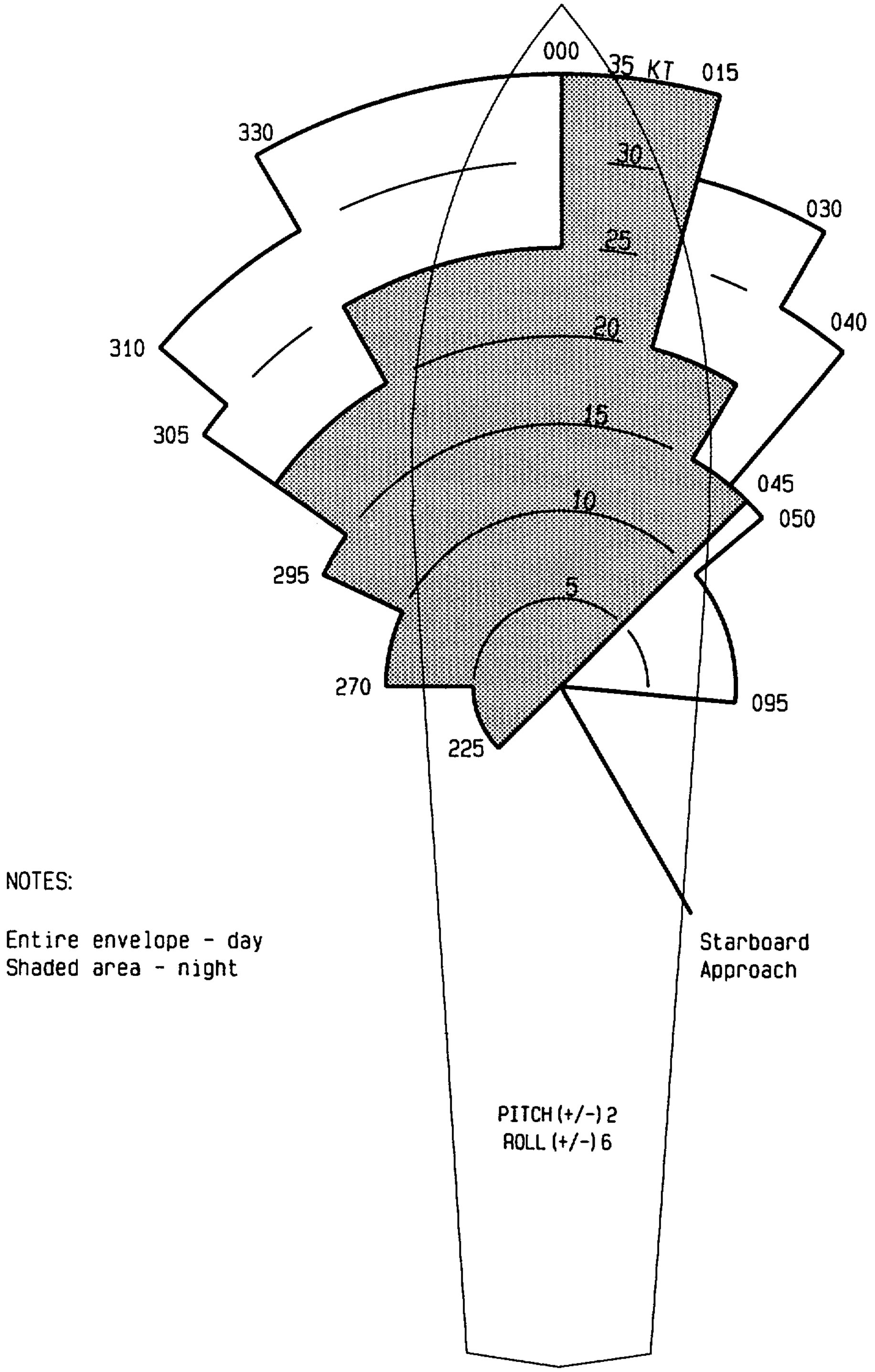
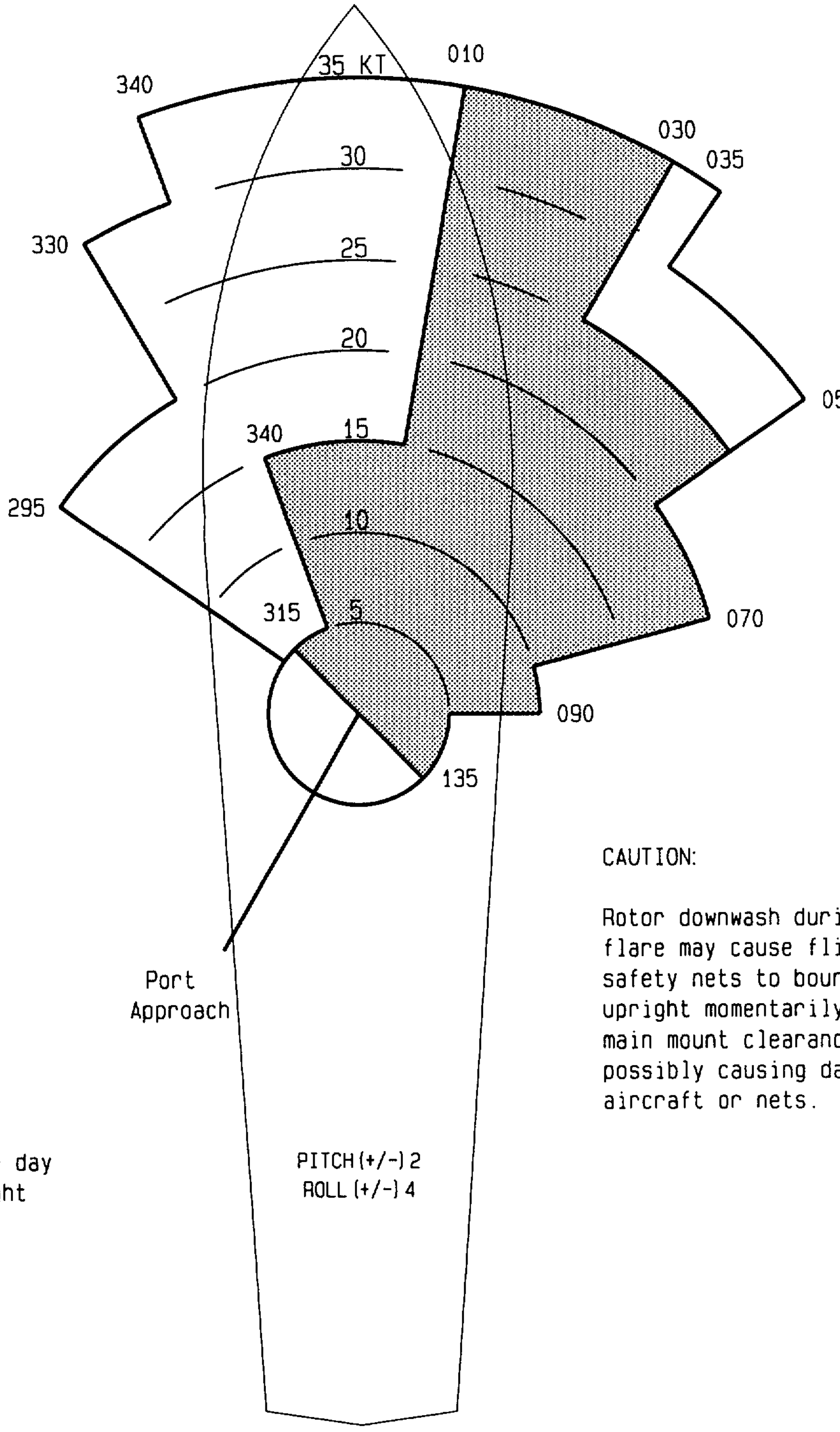


Figure B-61. H-53A/D Launch and Recovery Envelopes for LPD 4 Class Ships (Sheet 2 of 2)
Sheet 2: Spots 1 and 2, Starboard Approach



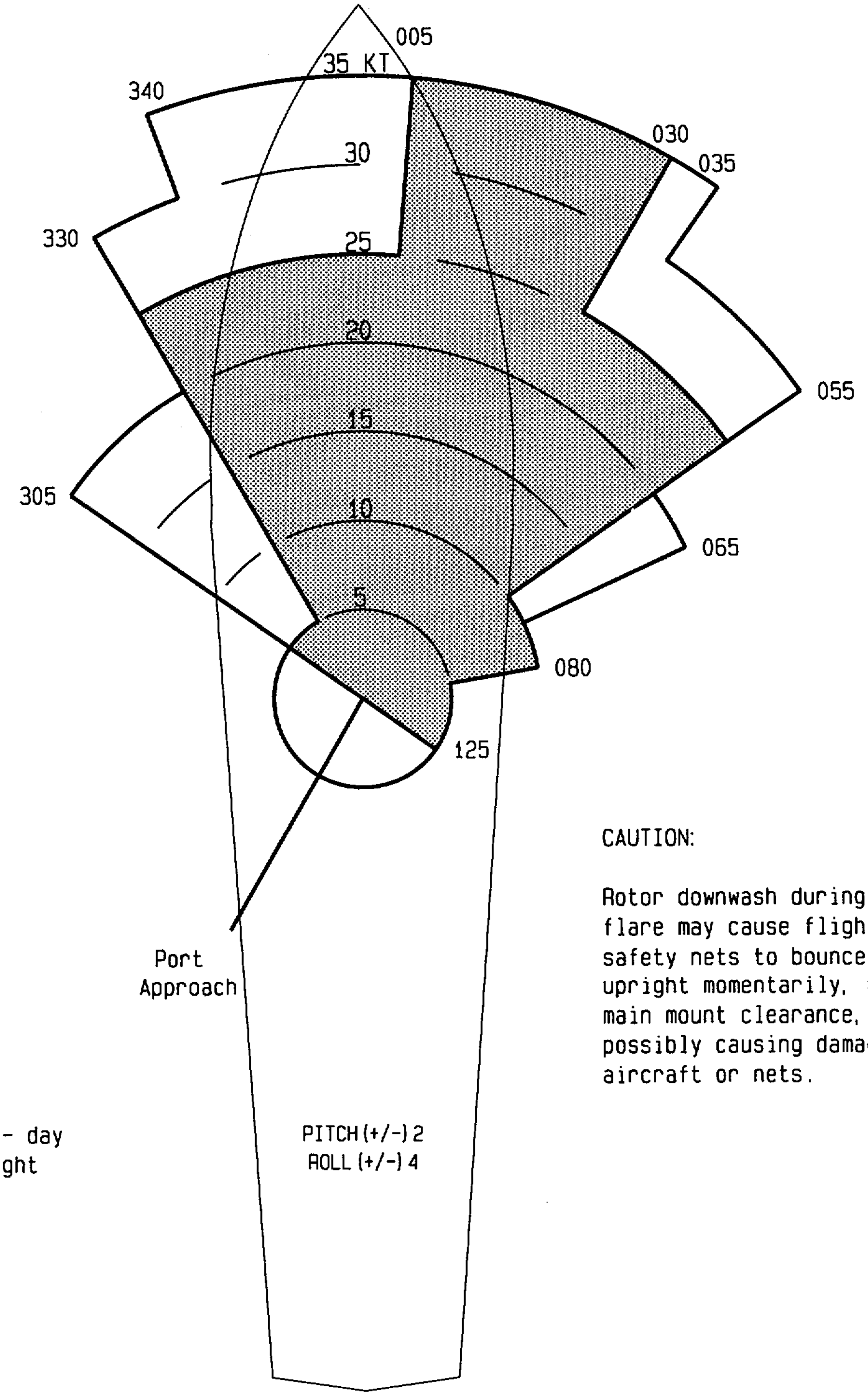
CAUTION:

Rotor downwash during landing flare may cause flight deck safety nets to bounce upright momentarily, reducing main mount clearance, and possibly causing damage to aircraft or nets.

Notes:

Entire envelope - day
Shaded area - night

Figure B-62. H-53A/D Launch and Recovery Envelopes for LSD 41 Class Ships (Sheet 1 of 4)
Sheet 1: Spot 1, Port Approach



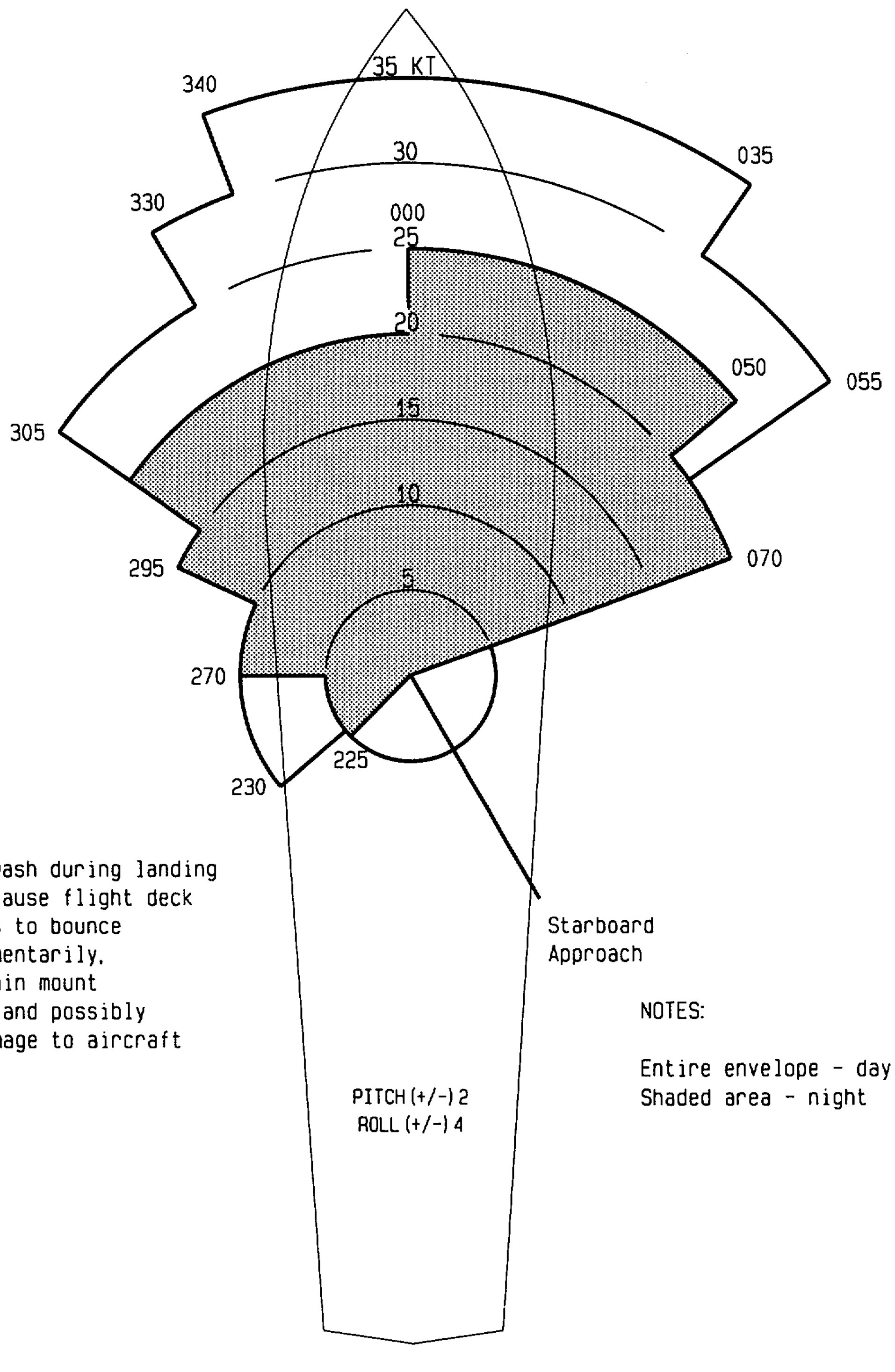
CAUTION:

Rotor downwash during landing flare may cause flight deck safety nets to bounce upright momentarily, reducing main mount clearance, and possibly causing damage to aircraft or nets.

Notes:

Entire envelope - day
Shaded area - night

Figure B-62. H-53A/D Launch and Recovery Envelopes for LSD 41 Class Ships (Sheet 2 of 4)
Sheet 2: Spot 2, Port Approach



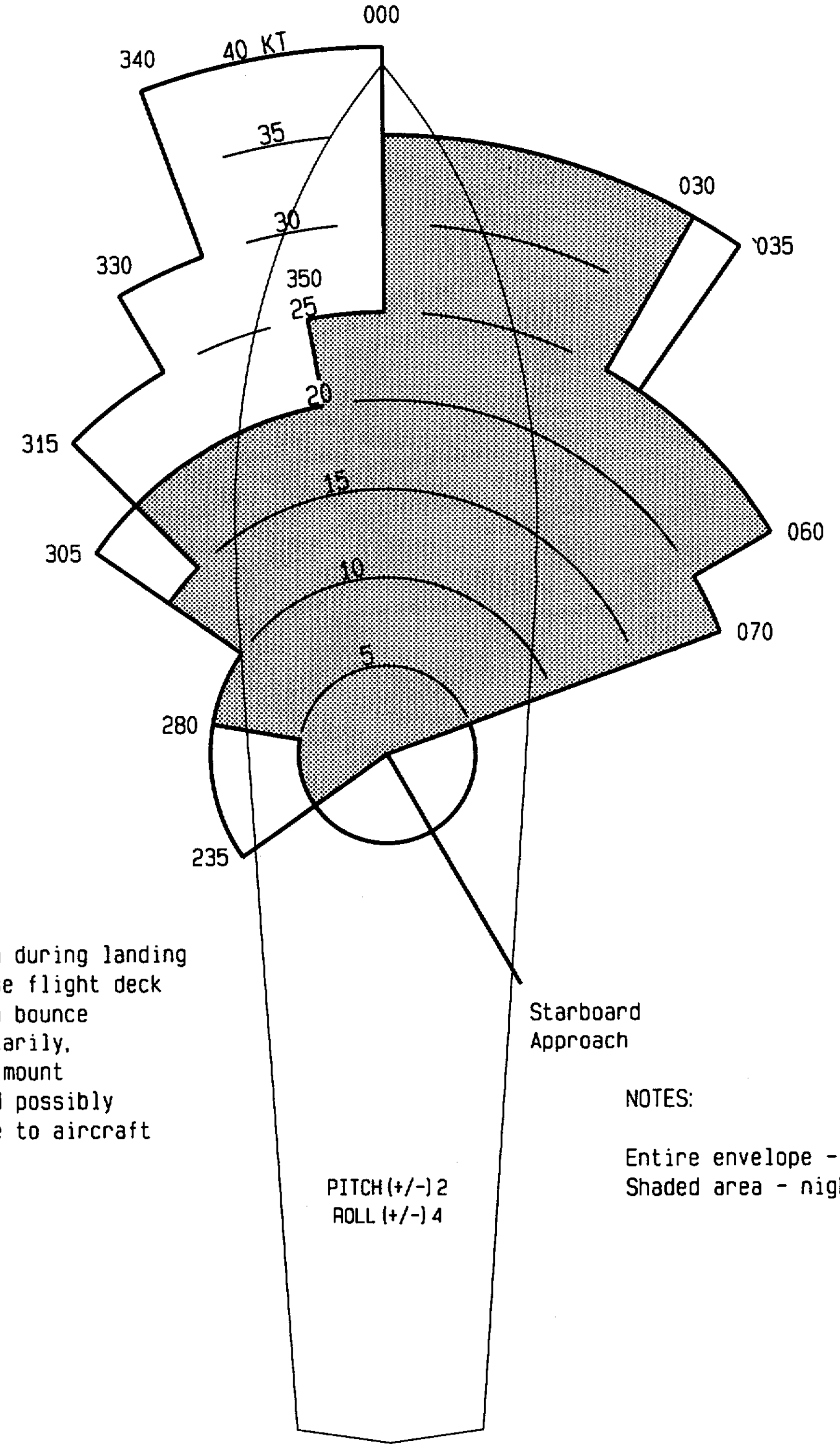
CAUTION:

Rotor downwash during landing flare may cause flight deck safety nets to bounce upright momentarily, reducing main mount clearance, and possibly causing damage to aircraft or net.

NOTES:

Entire envelope - day
Shaded area - night

Figure B-62. H-53A/D Launch and Recovery Envelopes for LSD 41 Class Ships (Sheet 3 of 4)
Sheet 3: Spot 1, Starboard Approach



CAUTION:

Rotor downwash during landing flare may cause flight deck safety nets to bounce upright momentarily, reducing main mount clearance, and possibly causing damage to aircraft or net.

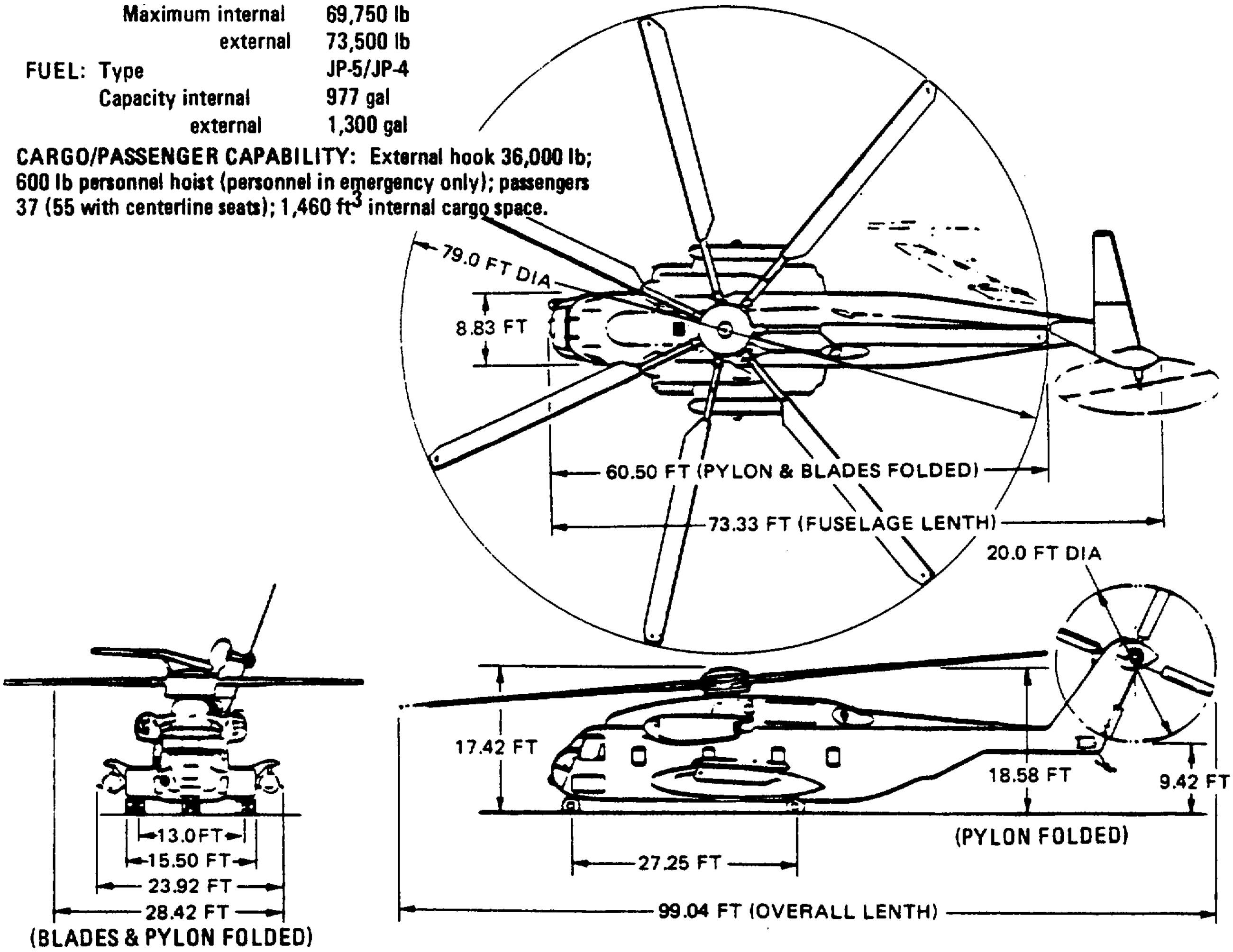
NOTES:

Entire envelope - day
Shaded area - night

Figure B-62. H-53A/D Launch and Recovery Envelopes for LSD 41 Class Ships (Sheet 4 of 4)
Sheet 4: Spot 2, Starboard Approach

MODEL	CH-53E
POWER	3–T64-GE-416
CREW	3
MAXIMUM RANGE	490 nm (full fuel, sea level)
MAXIMUM SPEED	150 knots
ENDURANCE	5.5 hr (full fuel, sea level)
WEIGHT: Basic	36,000 lb
Full Fuel	51,000 lb
Maximum internal	69,750 lb
external	73,500 lb
FUEL: Type	JP-5/JP-4
Capacity internal	977 gal
external	1,300 gal

CARGO/PASSENGER CAPABILITY: External hook 36,000 lb; 600 lb personnel hoist (personnel in emergency only); passengers 37 (55 with centerline seats); 1,460 ft^3 internal cargo space.



WARNING

After landing H-53 aircraft with external auxiliary fuel tanks, the aircrewman shall install the auxiliary fuel tank safety pins prior to lineman attaching tiedown chains and positioning chocks. Prior to takeoff, the chocks and tiedown chains are to be removed before the aircrewman removes the auxiliary fuel tank safety pins.

NOTES:

Maximum wind for rotor engagement/disengagement is 45 knots in any quadrant.

Operations in the island wash areas should be held to a minimum.

Figure B-63. CH-53E Super Stallion

MODEL		MH-53E
POWER		3-T64-GE-416
CREW		3
MAXIMUM RANGE		720 nm (full fuel, sea level)
MAXIMUM SPEED		150 knots
ENDURANCE		6.8 hr (full fuel, sea level)
WEIGHT:	Basic	36,000 lb
	Full Fuel	57,844 lb
	Maximum internal	69,750 lb
	external	73,500 lb
FUEL:	Type	JP-5/JP-4
	Capacity internal	3212.4 GAL

CARGO/PASSENGER CAPABILITY: External hook 36,000 lb; 600 lb personnel hoist (personnel in emergency only); passengers 37 (55 with centerline seats); 1,460 ft^3 internal cargo space.

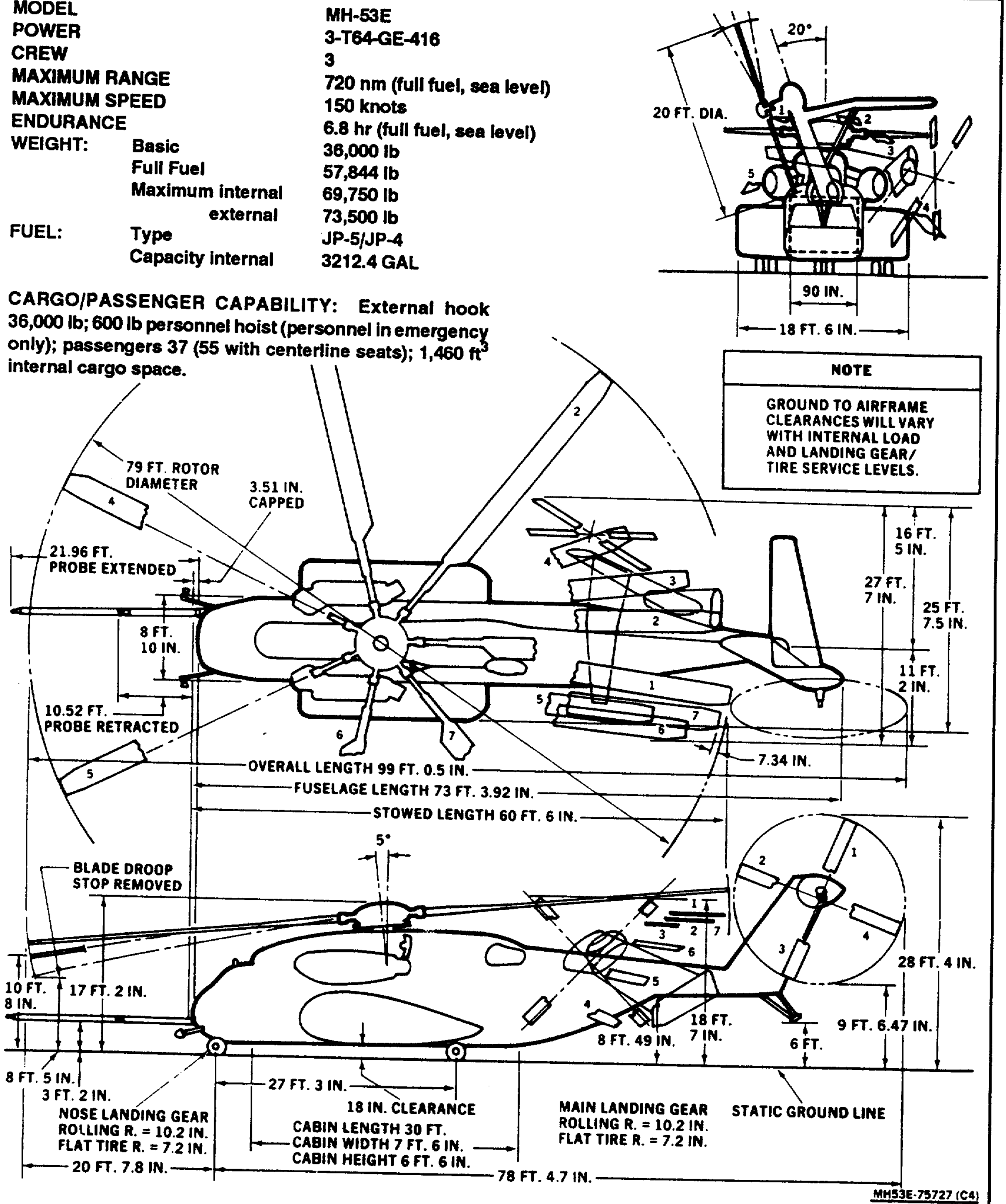
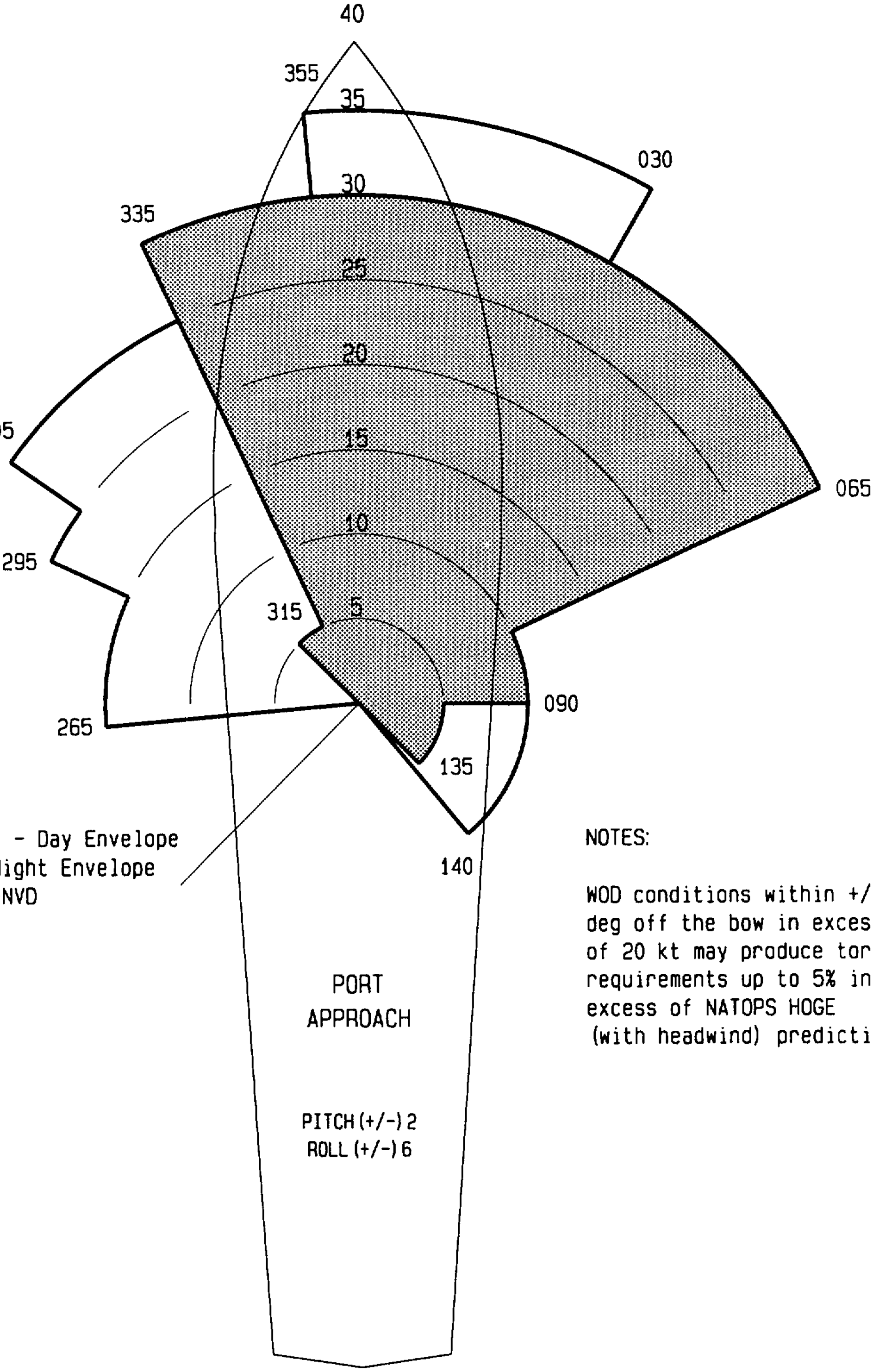


Figure B-64. MH-53E Sea Dragon

45 KT

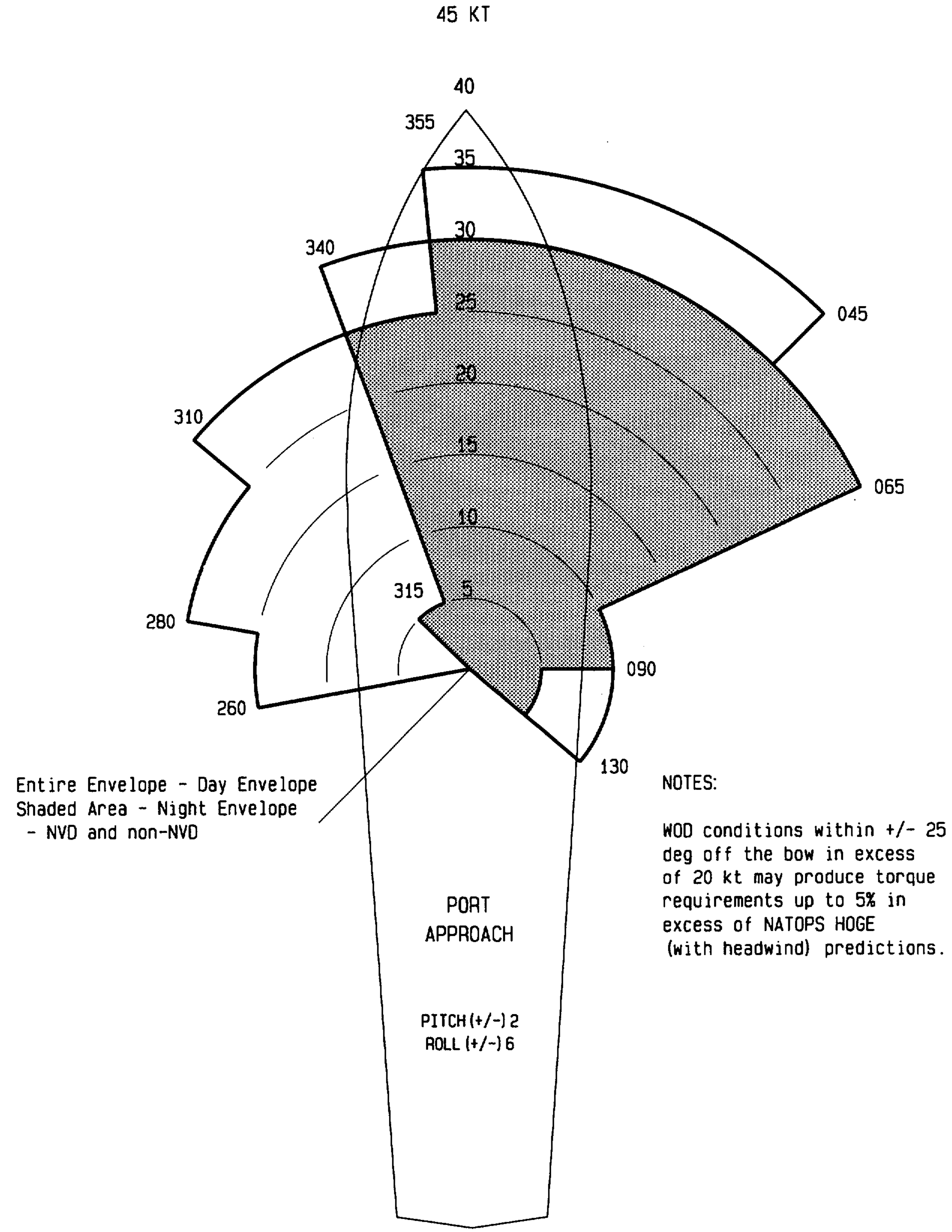


Entire Envelope - Day Envelope
Shaded Area - Night Envelope
 - NVD and non-NVD

NOTES:

WOD conditions within +/- 25 deg off the bow in excess of 20 kt may produce torque requirements up to 5% in excess of NATOPS HOGE (with headwind) predictions.

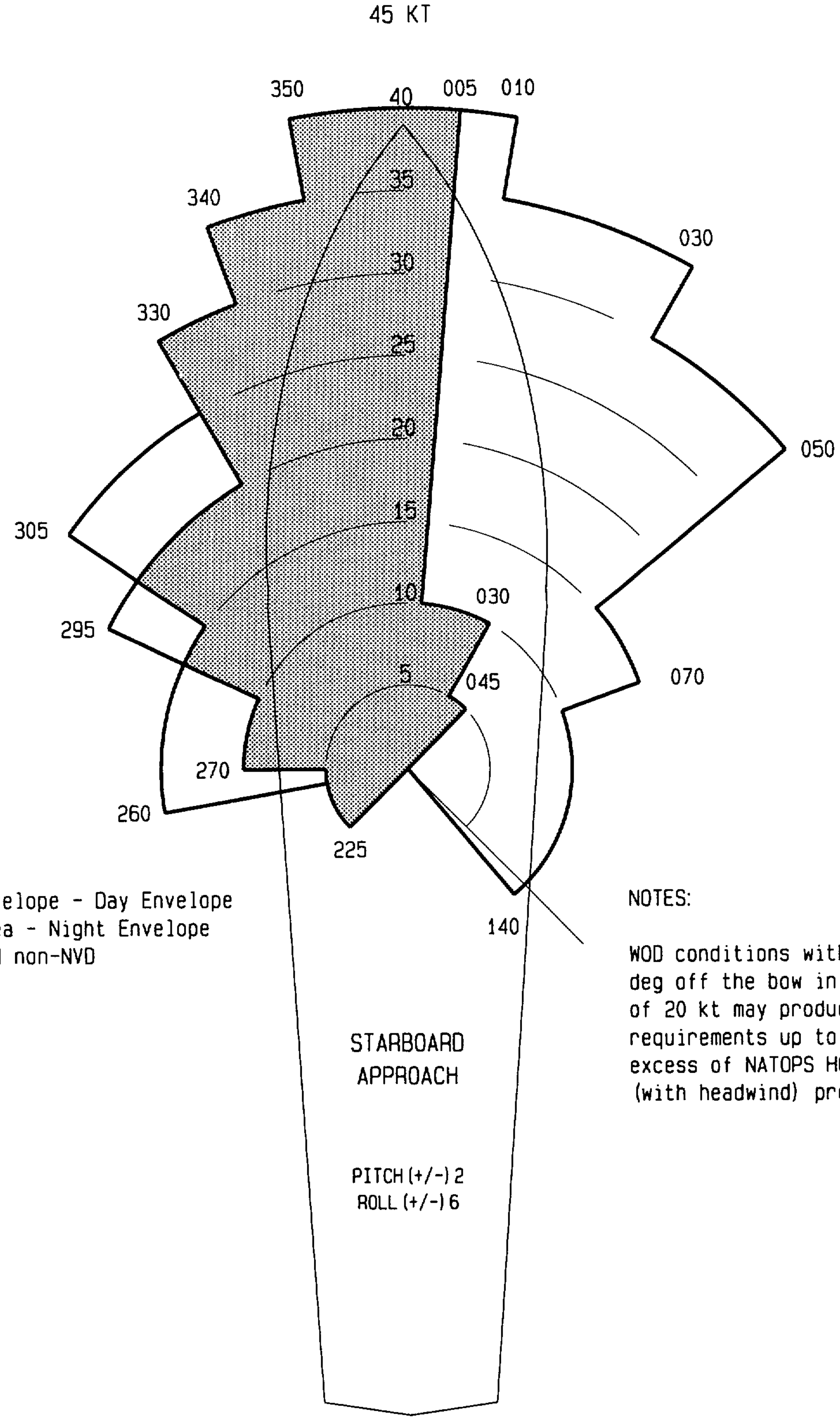
Figure B-65. H-53E Launch and Recovery Envelopes for LPD 4 Class Ships (Sheet 1 of 8)
Sheet 1: Spot 1, Port Approach



NOTES:

WOD conditions within +/- 25 deg off the bow in excess of 20 kt may produce torque requirements up to 5% in excess of NATOPS HOGE (with headwind) predictions.

Figure B-65. H-53E Launch and Recovery Envelopes for LPD 4 Class Ships (Sheet 2 of 8)
Sheet 2: Spot 2, Port Approach

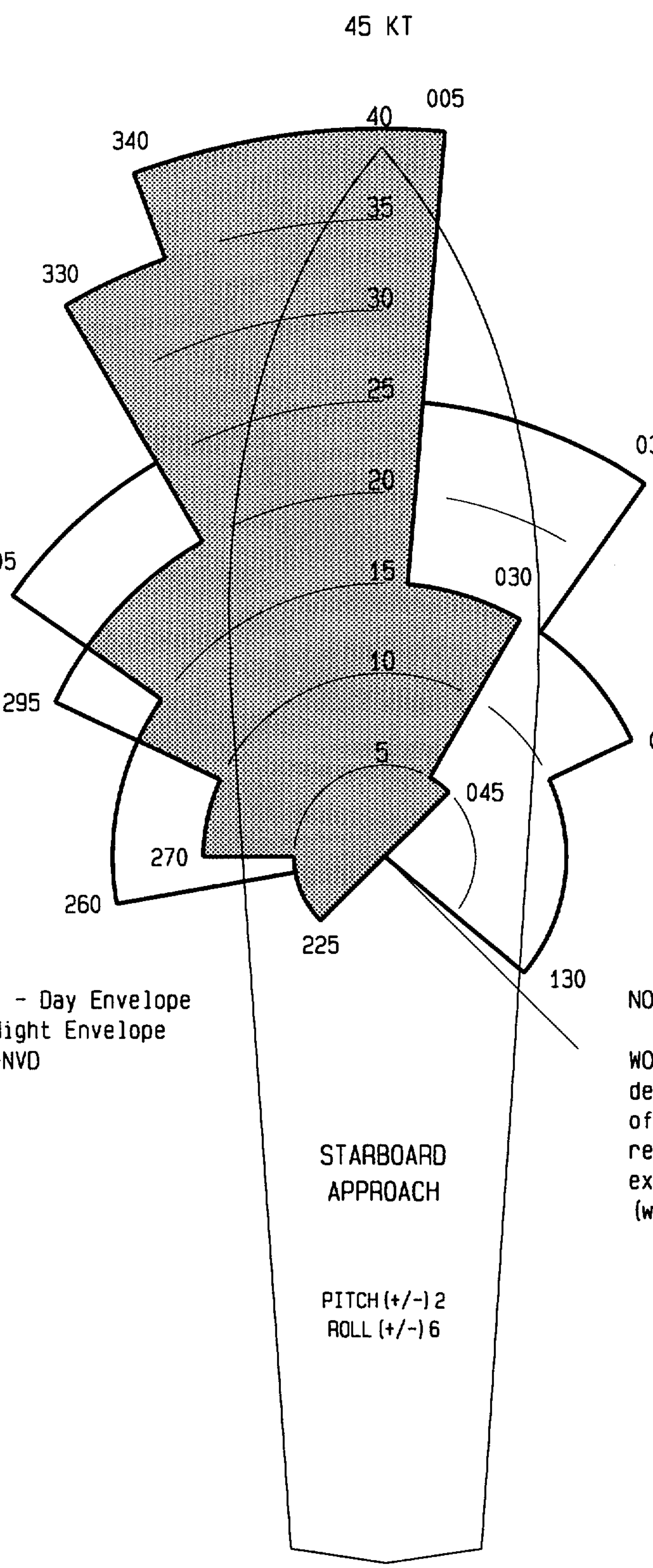


Entire Envelope - Day Envelope
Shaded Area - Night Envelope
- NVD and non-NVD

NOTES:

WOD conditions within +/- 25 deg off the bow in excess of 20 kt may produce torque requirements up to 5% in excess of NATOPS HOGE (with headwind) predictions.

Figure B-65. H-53E Launch and Recovery Envelopes for LPD 4 Class Ships (Sheet 3 of 8)
Sheet 3: Spot 1, Starboard Approach



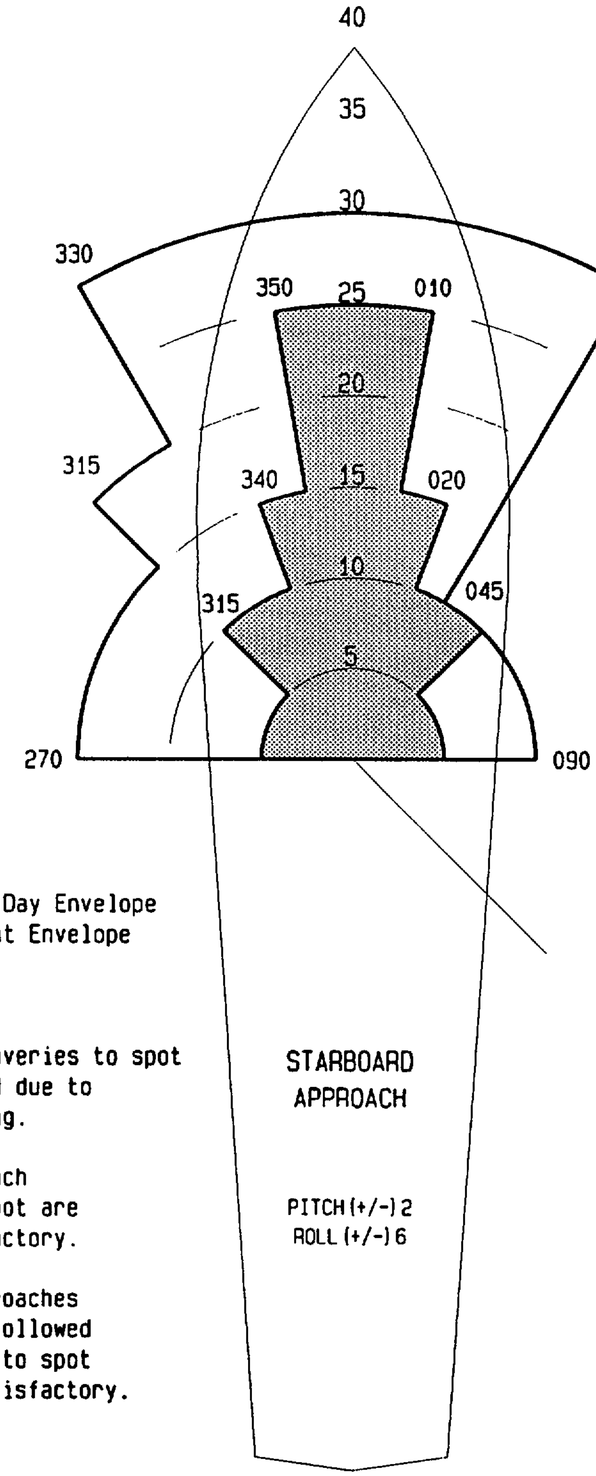
Entire Envelope - Day Envelope
Shaded Area - Night Envelope
 - NVD and non-NVD

NOTES:

WOD conditions within +/- 25 deg off the bow in excess of 20 kt may produce torque requirements up to 5% in excess of NATOPS HOGE (with headwind) predictions.

Figure B-65. H-53E Launch and Recovery Envelopes for LPD 4 Class Ships (Sheet 4 of 8)
Sheet 4: Spot 2, Starboard Approach

45 KT



Entire Envelope - Day Envelope
Shaded Area - Night Envelope

NOTES:

Night NON-NVD recoveries to spot are not authorized due to inadequate lighting.

Night NON-NVD launch operations from spot are considered satisfactory.

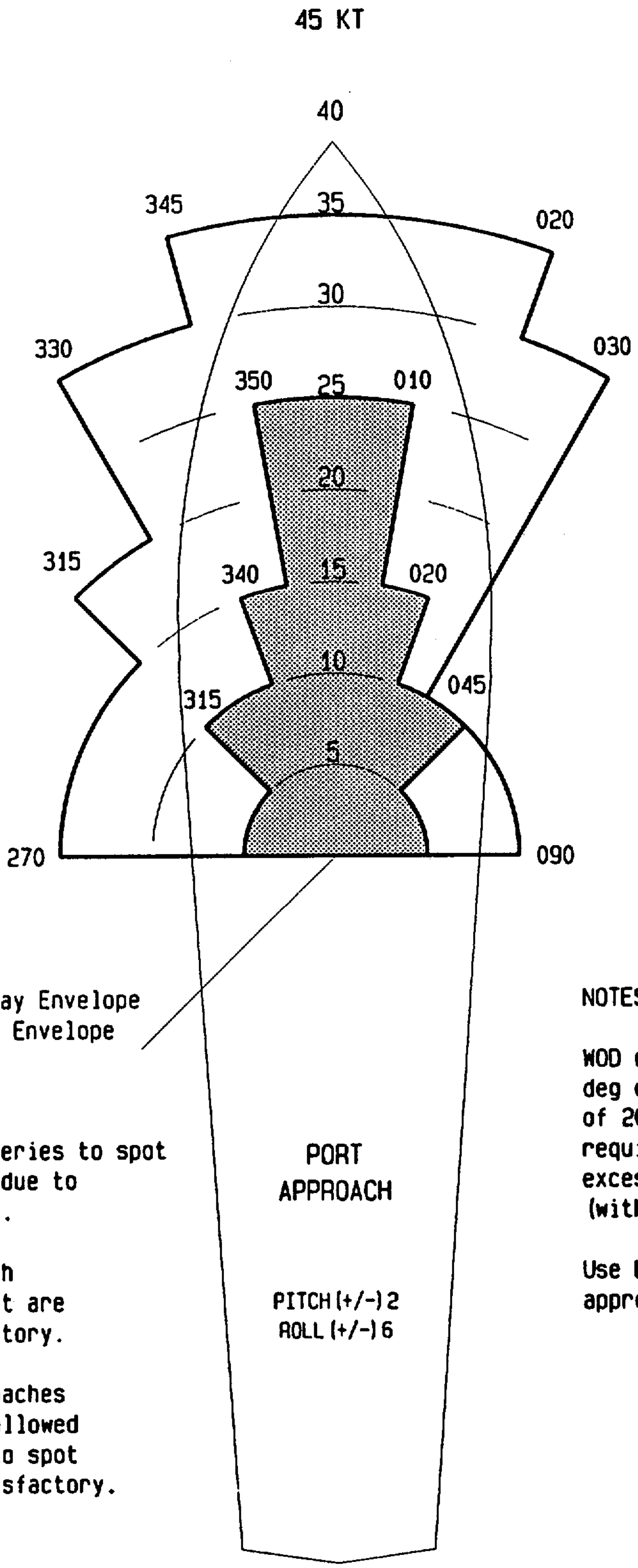
Night NON-NVD approaches flown to spot 1, followed by low hover taxi to spot are considered satisfactory.

NOTES:

WOD conditions within +/- 25 deg off the bow in excess of 20 kt may produce torque requirements up to 5% in excess of NATOPS HOGE (with headwind) predictions.

Use LHA/LPH/LHD style approach/departure profile.

Figure B-65. H-53E Launch and Recovery Envelopes for LPD 4 Class Ships (Sheet 5 of 8)
Sheet 5: Spot 3, Starboard Approach



Entire Envelope - Day Envelope
Shaded Area - Night Envelope

NOTES:

Night NON-NVD recoveries to spot are not authorized due to inadequate lighting.

Night NON-NVD launch operations from spot are considered satisfactory.

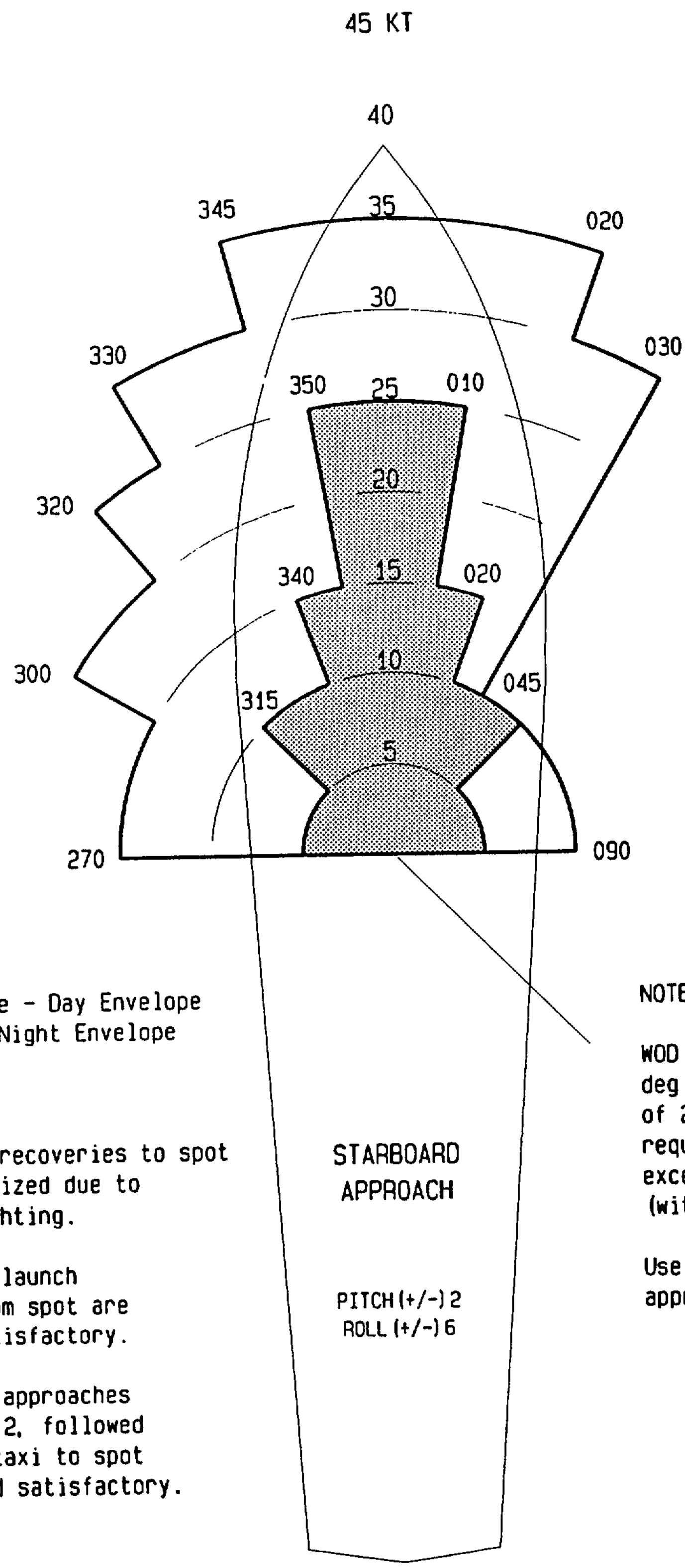
Night NON-NVD approaches flown to spot 1, followed by low hover taxi to spot are considered satisfactory.

NOTES:

WOD conditions within +/- 25 deg off the bow in excess of 20 kt may produce torque requirements up to 5% in excess of NATOPS HOGE (with headwind) predictions.

Use LHA/LPH/LHD style approach/departure profile.

Figure B-65. H-53E Launch and Recovery Envelopes for LPD 4 Class Ships (Sheet 6 of 8)
Sheet 6: Spot 4, Port Approach



Entire Envelope - Day Envelope
Shaded Area - Night Envelope

NOTES:

Night NON-NVD recoveries to spot are not authorized due to inadequate lighting.

Night NON-NVD launch operations from spot are considered satisfactory.

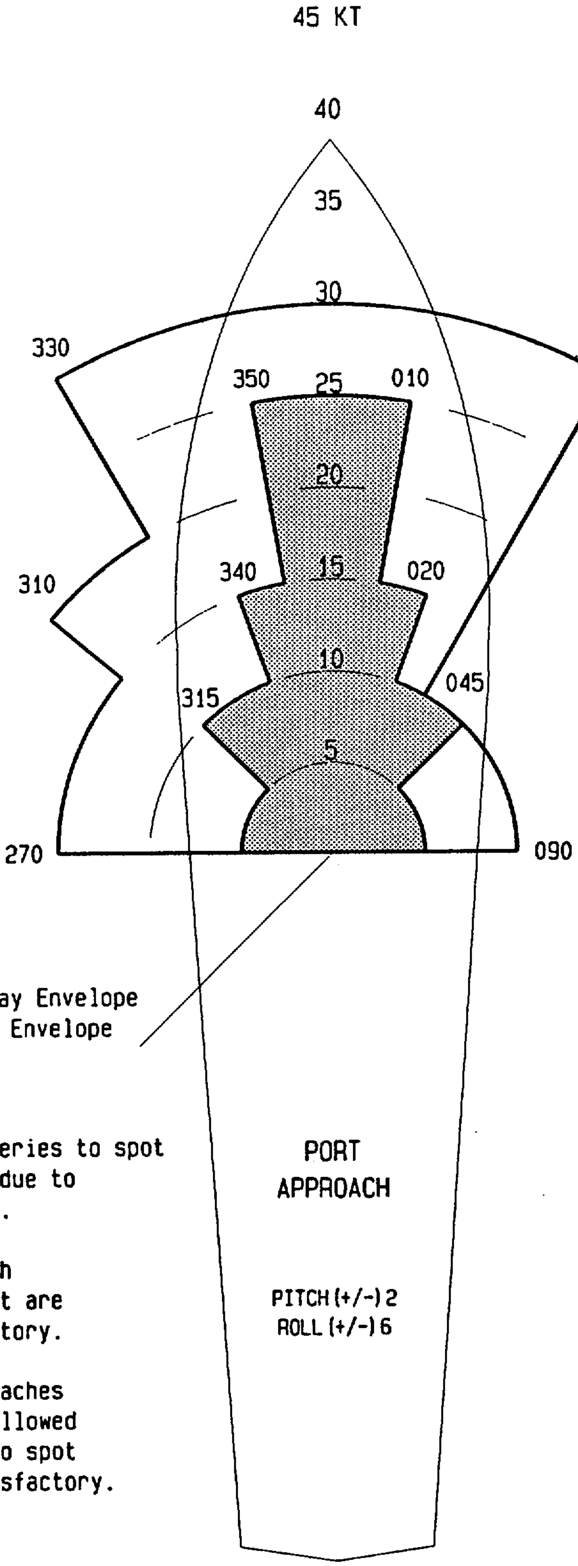
Night NON-NVD approaches flown to spot 2, followed by low hover taxi to spot are considered satisfactory.

NOTES:

WOD conditions within +/- 25 deg off the bow in excess of 20 kt may produce torque requirements up to 5% in excess of NATOPS HOGE (with headwind) predictions.

Use LHA/LPH/LHD style approach/departure profile.

Figure B-65. H-53E Launch and Recovery Envelopes for LPD 4 Class Ships (Sheet 7 of 8)
Sheet 7: Spot 5, Starboard Approach



Entire Envelope - Day Envelope
Shaded Area - Night Envelope

NOTES:

Night NON-NVD recoveries to spot are not authorized due to inadequate lighting.

Night NON-NVD launch operations from spot are considered satisfactory.

Night NON-NVD approaches flown to spot 2, followed by low hover taxi to spot are considered satisfactory.

NOTES:

WOD conditions within +/- 25 deg off the bow in excess of 20 kt may produce torque requirements up to 5% in excess of NATOPS HOGE (with headwind) predictions.

Use LHA/LPH/LHD style approach/departure profile.

Figure B-65. H-53E Launch and Recovery Envelopes for LPD 4 Class Ships (Sheet 8 of 8)
Sheet 8: Spot 6, Port Approach

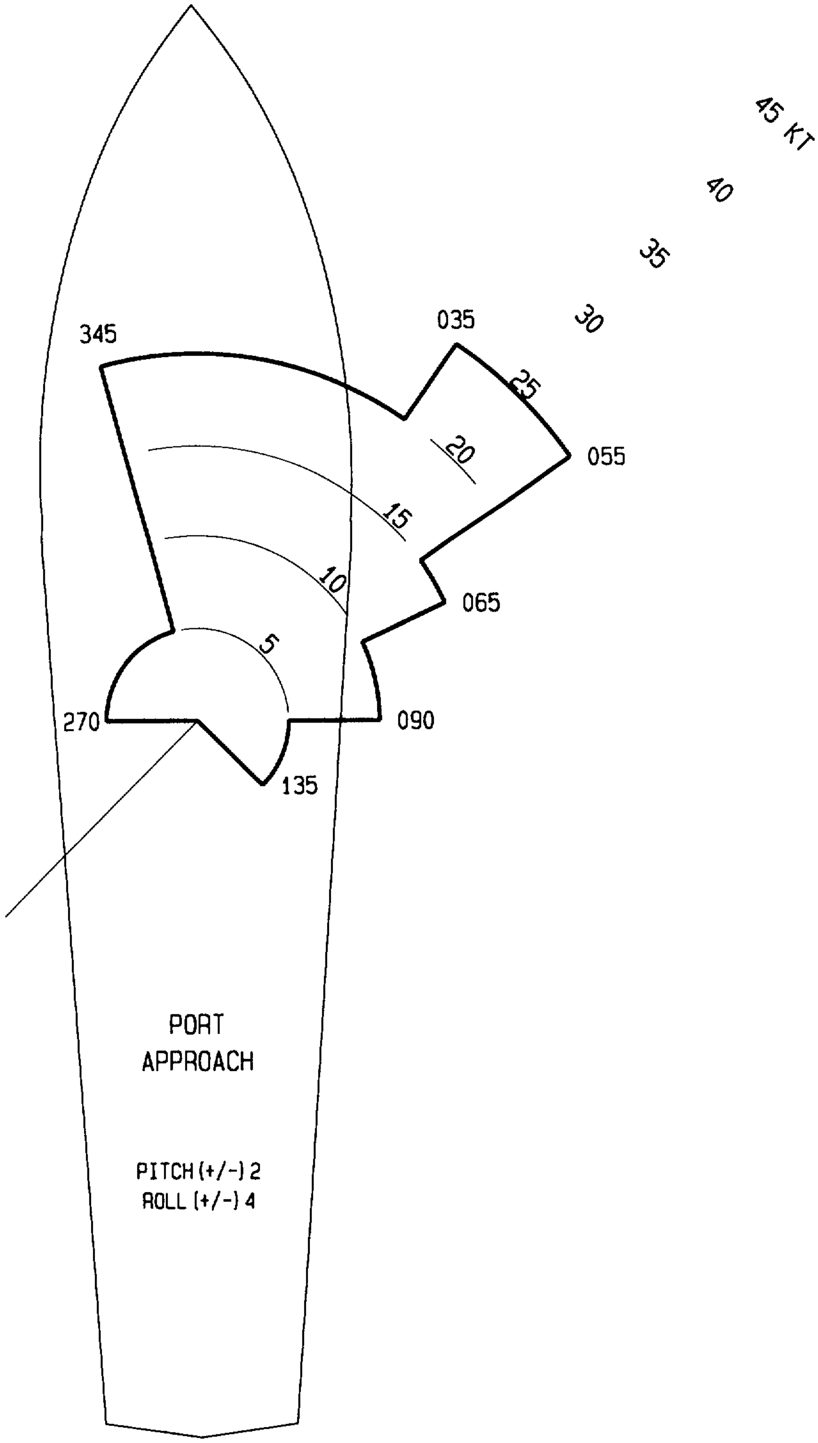


Figure B-66. H-53E Launch and Recovery Envelopes for LSD 36 Class Ships (Sheet 1 of 2)
Sheet 1: Day Envelope, Port Approach

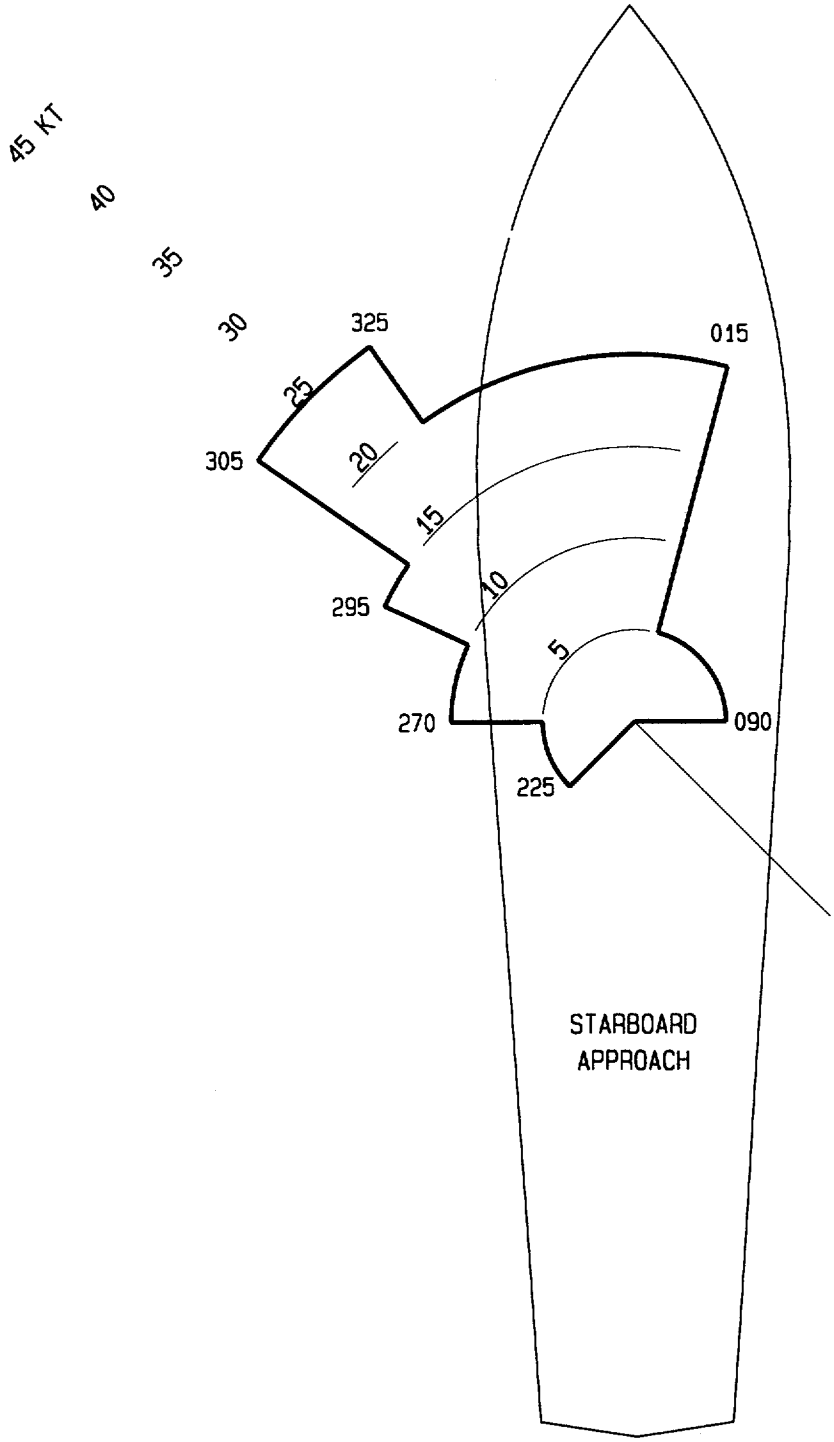
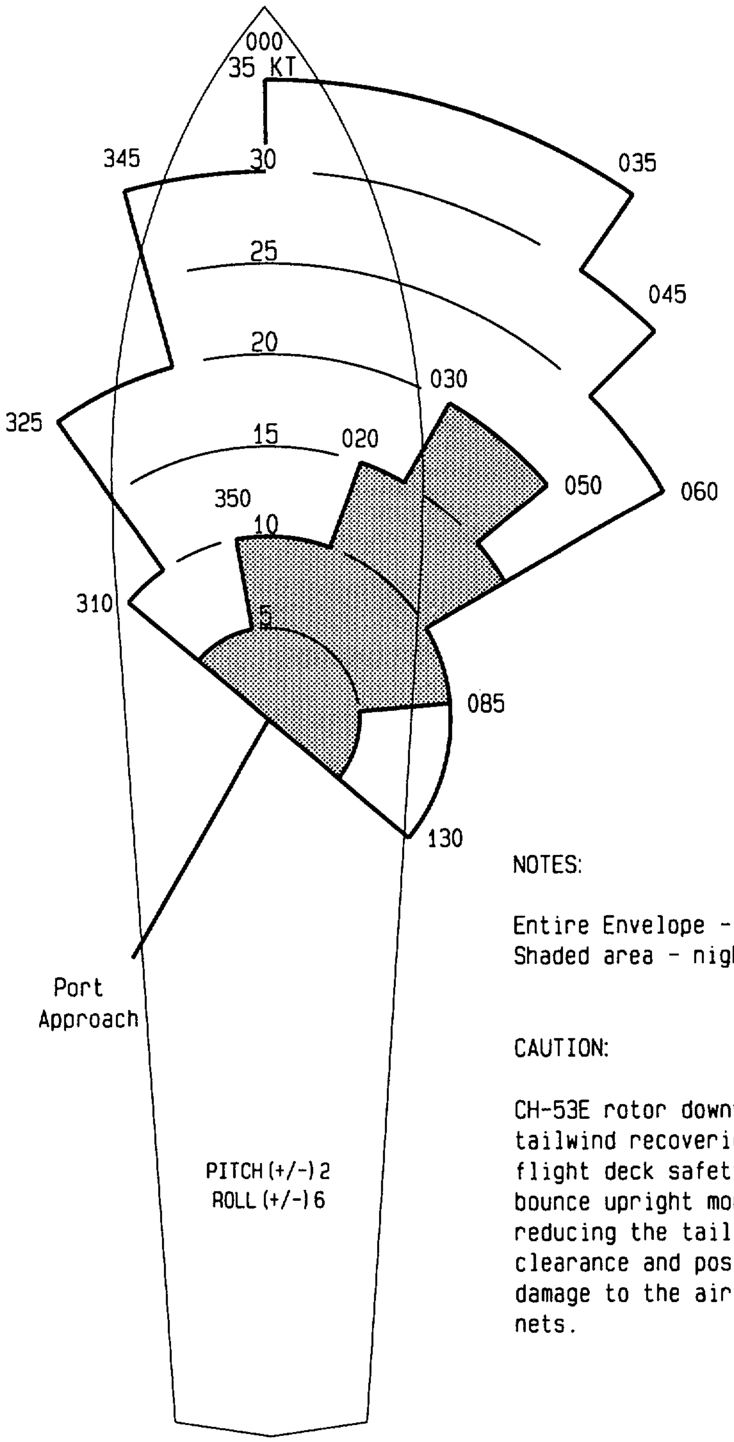


Figure B-66. H-53E Launch and Recovery Envelopes for LSD 36 Class Ships (Sheet 2 of 2)
Sheet 2: Day Envelope, Starboard Approach



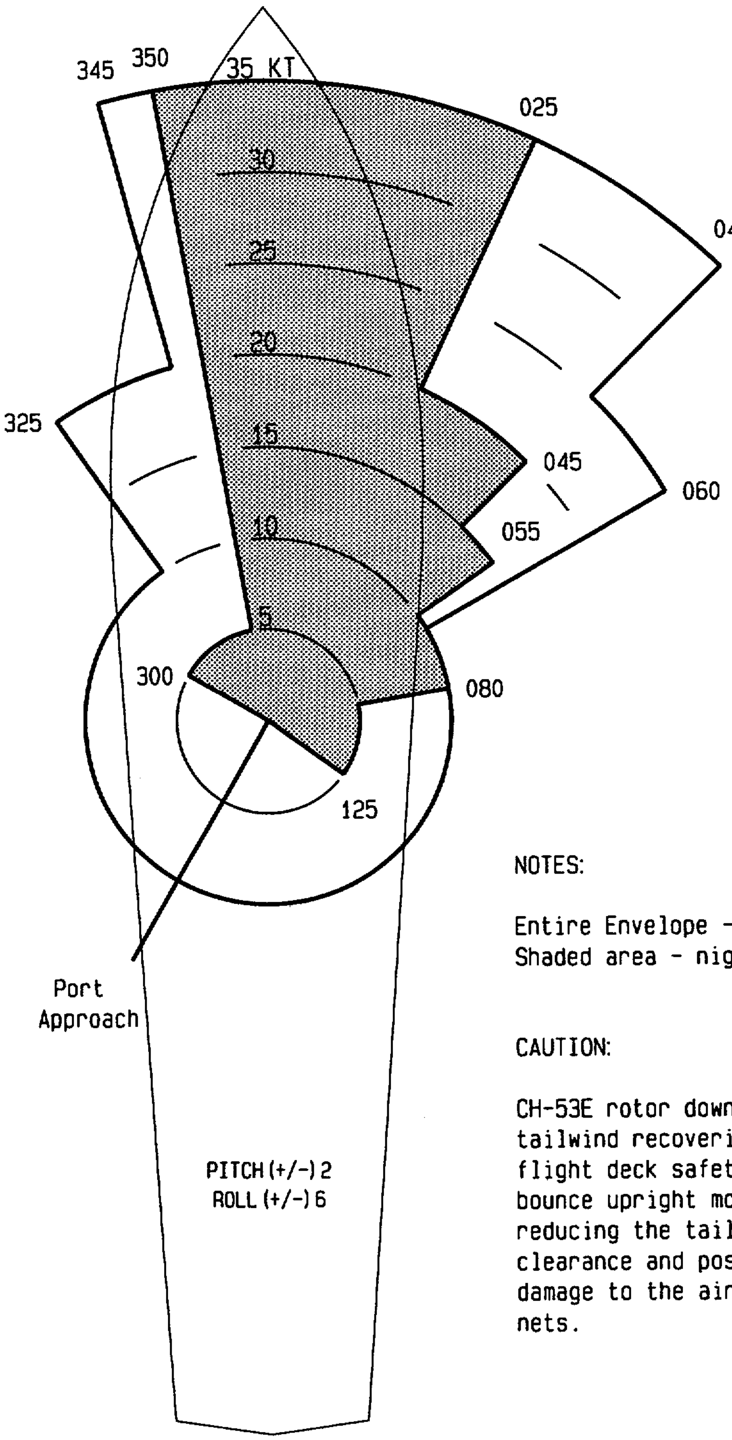
NOTES:

Entire Envelope - day
Shaded area - night

CAUTION:

CH-53E rotor downwash during tailwind recoveries may cause flight deck safety nets to bounce upright momentarily, reducing the tail skid clearance and possibly causing damage to the aircraft or nets.

Figure B-67. H-53E Launch and Recovery Envelopes for LSD 41 Class Ships (Sheet 1 of 4)
Sheet 1: Spot 1, Port Approach



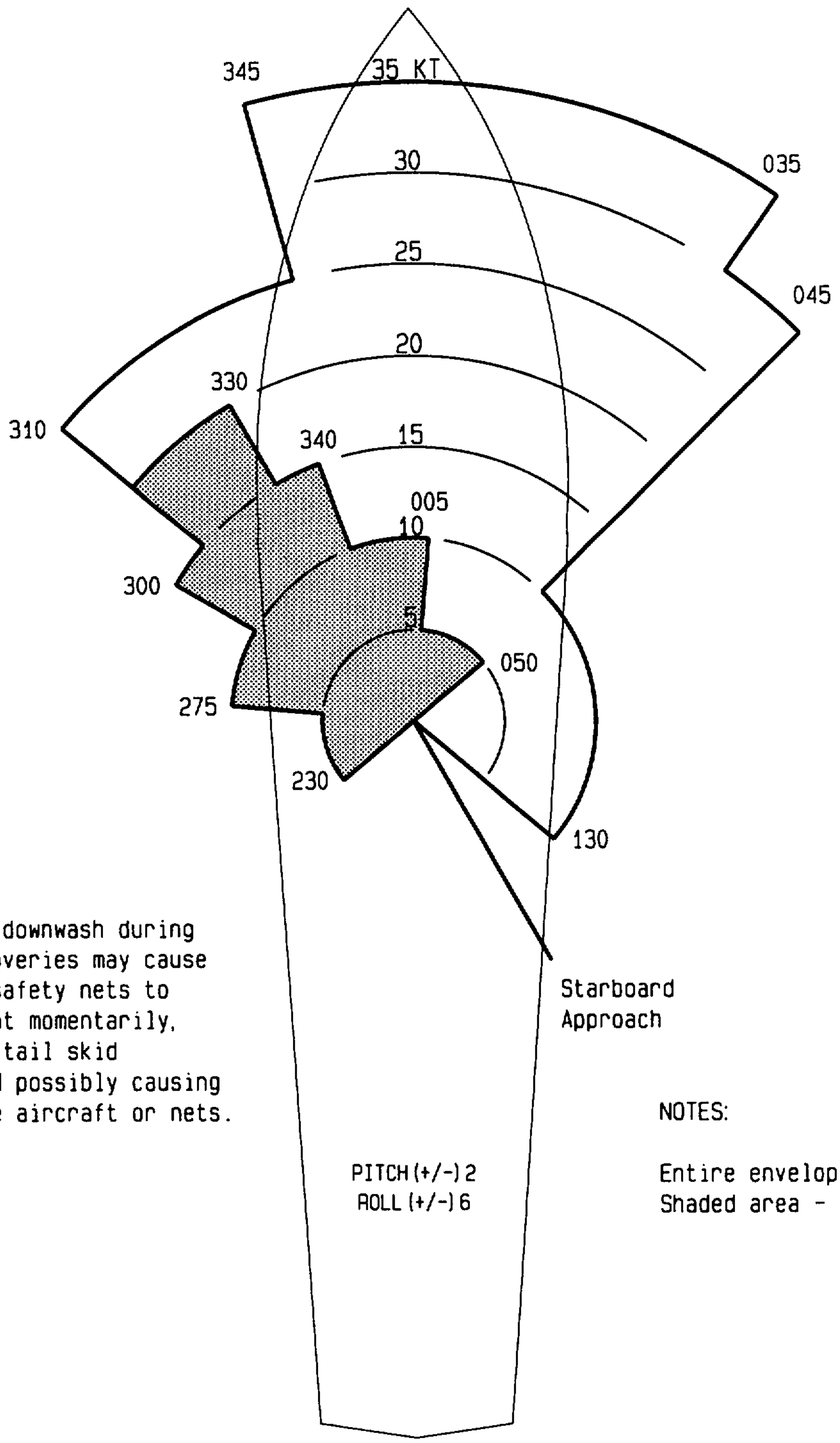
NOTES:

Entire Envelope - day
Shaded area - night

CAUTION:

CH-53E rotor downwash during tailwind recoveries may cause flight deck safety nets to bounce upright momentarily, reducing the tail skid clearance and possibly causing damage to the aircraft or nets.

Figure B-67. H-53E Launch and Recovery Envelopes for LSD 41 Class Ships (Sheet 2 of 4)
Sheet 2: Spot 2, Port Approach



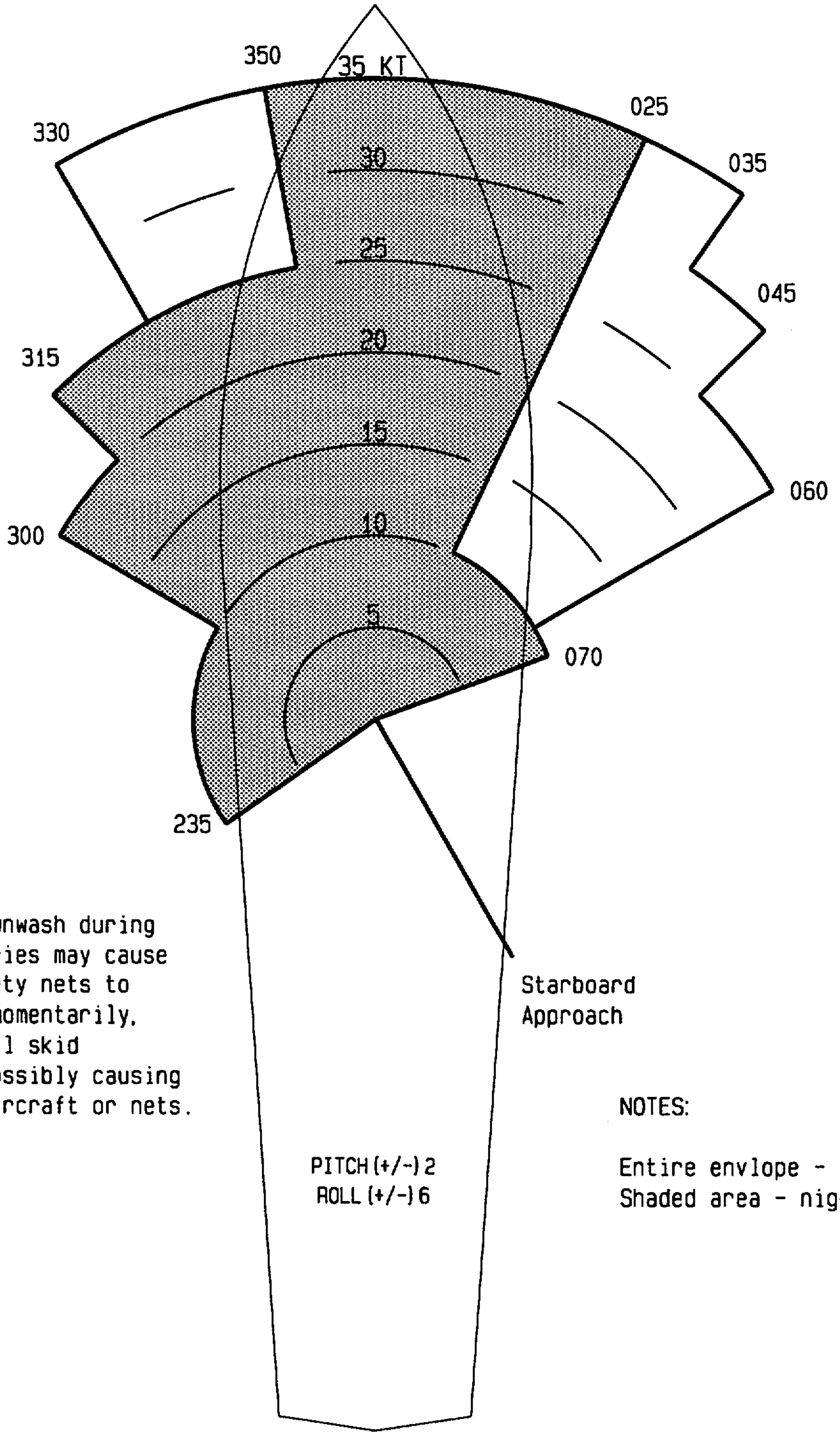
CAUTION:

CH-53E rotor downwash during tailwind recoveries may cause flight deck safety nets to bounce upright momentarily, reducing the tail skid clearance and possibly causing damage to the aircraft or nets.

NOTES:

Entire envelope - day
Shaded area - night

Figure B-67. H-53E Launch and Recovery Envelopes for LSD 41 Class Ships (Sheet 3 of 4)
Sheet 3: Spot 1, Starboard Approach



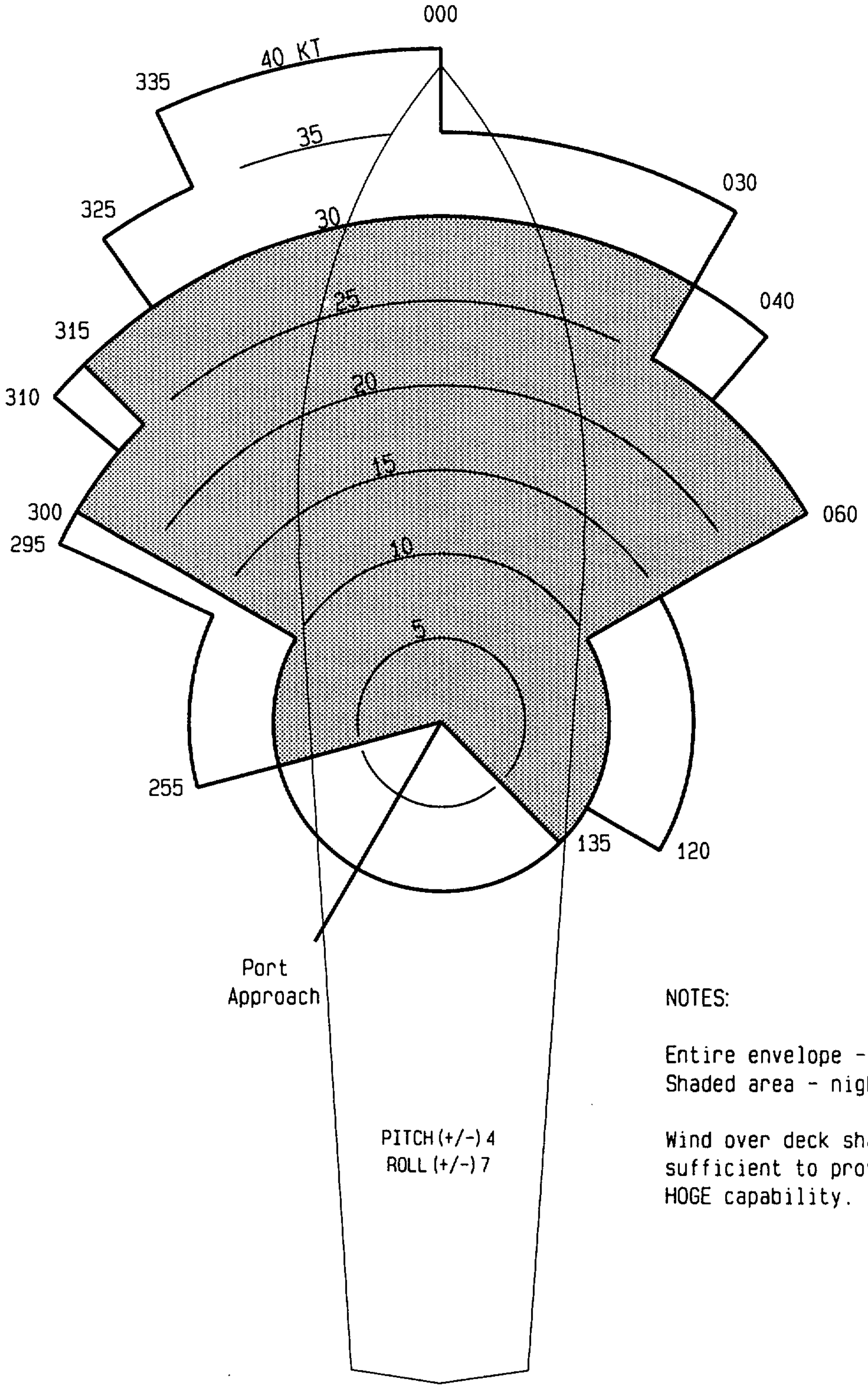
CAUTION:

CH-53E rotor downwash during tailwind recoveries may cause flight deck safety nets to bounce upright momentarily, reducing the tail skid clearance and possibly causing damage to the aircraft or nets.

NOTES:

Entire envlope - day
Shaded area - night

Figure B-67. H-53E Launch and Recovery Envelopes for LSD 41 Class Ships (Sheet 4 of 4)
Sheet 4: Spot 2, Starboard Approach

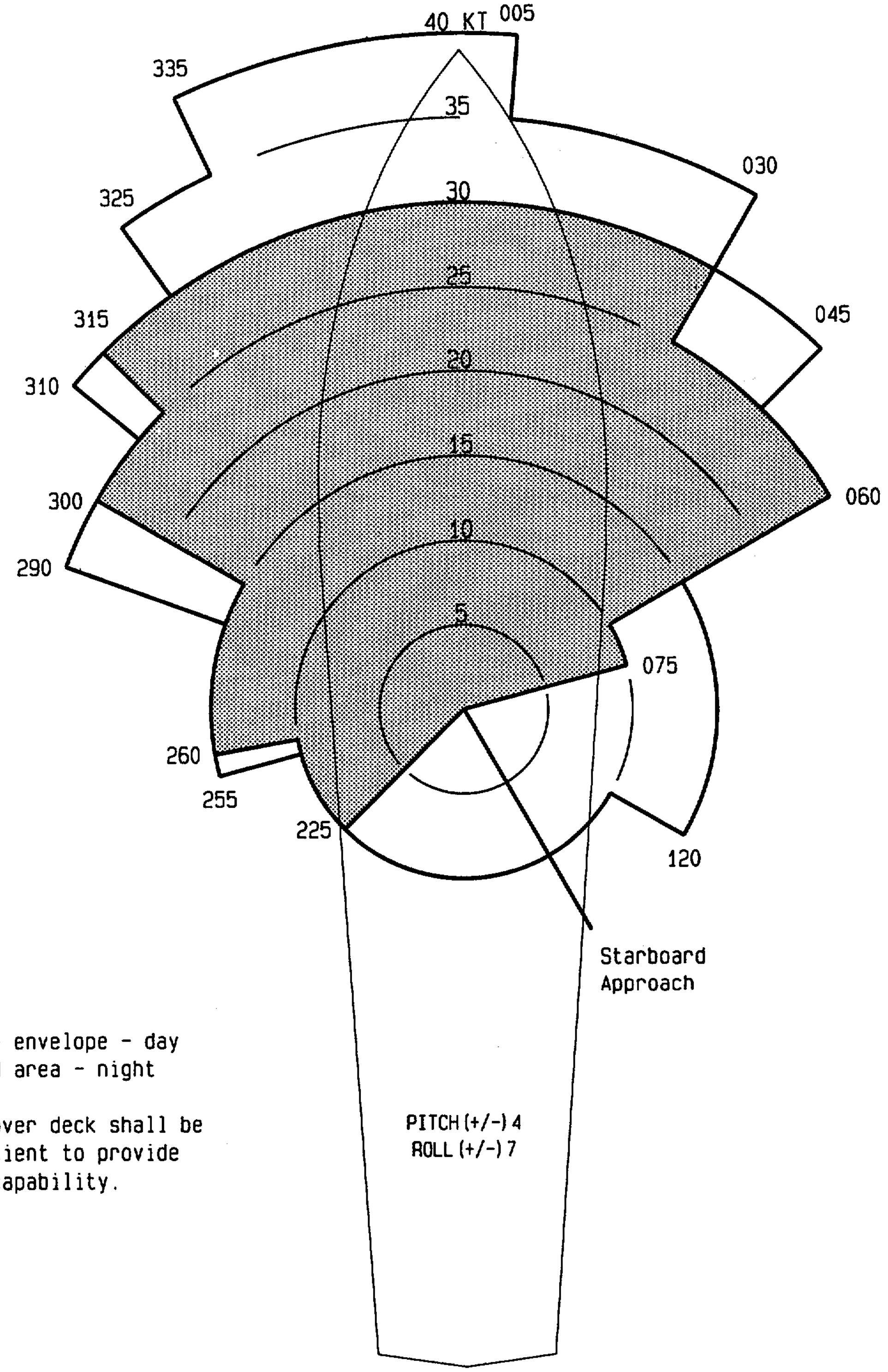


NOTES:

Entire envelope - day
Shaded area - night

Wind over deck shall be sufficient to provide HOGE capability.

Figure B-68. H-53E Launch and Recovery Envelopes for TAO 187 Class Ships (Sheet 1 of 2)
Sheet 1: Port Approach



NOTES:

Entire envelope - day
Shaded area - night

Wind over deck shall be sufficient to provide HOGE capability.

Figure B-68. H-53E Launch and Recovery Envelopes for TAO 187 Class Ships (Sheet 2 of 2)
Sheet 2: Starboard Approach

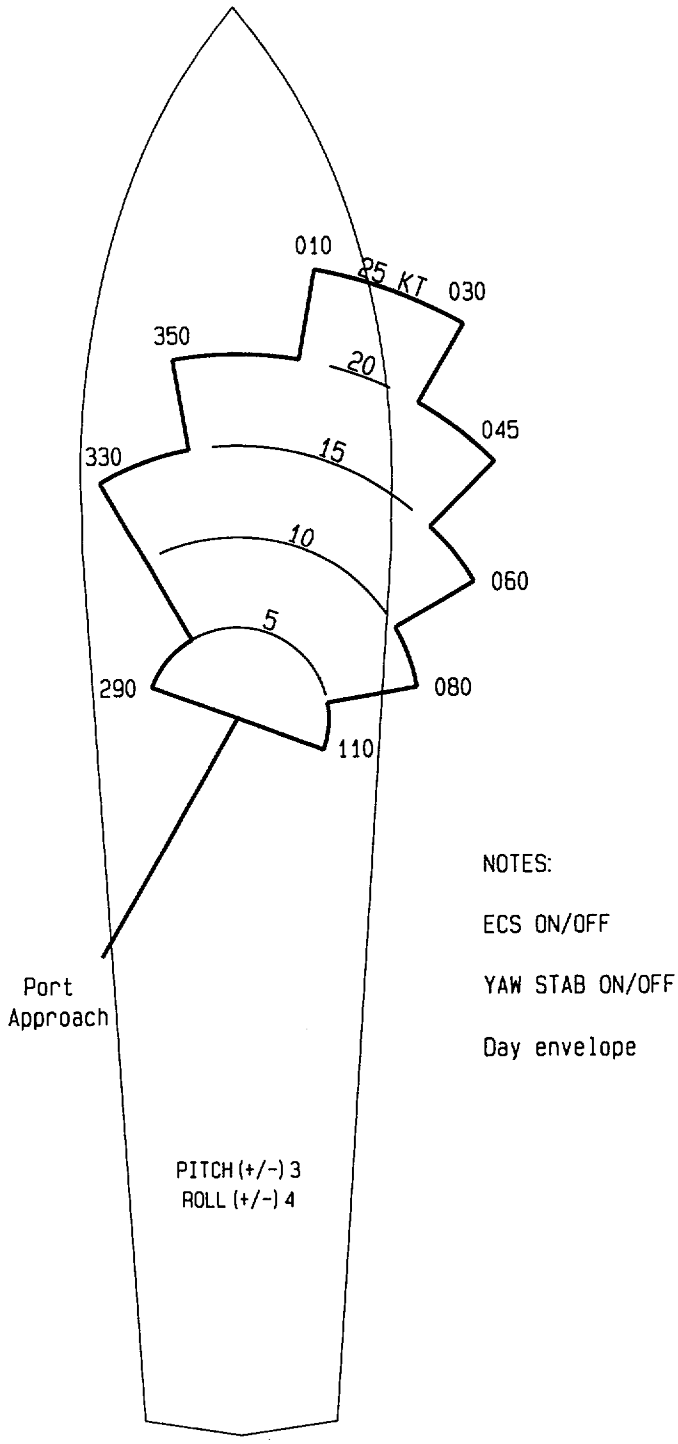
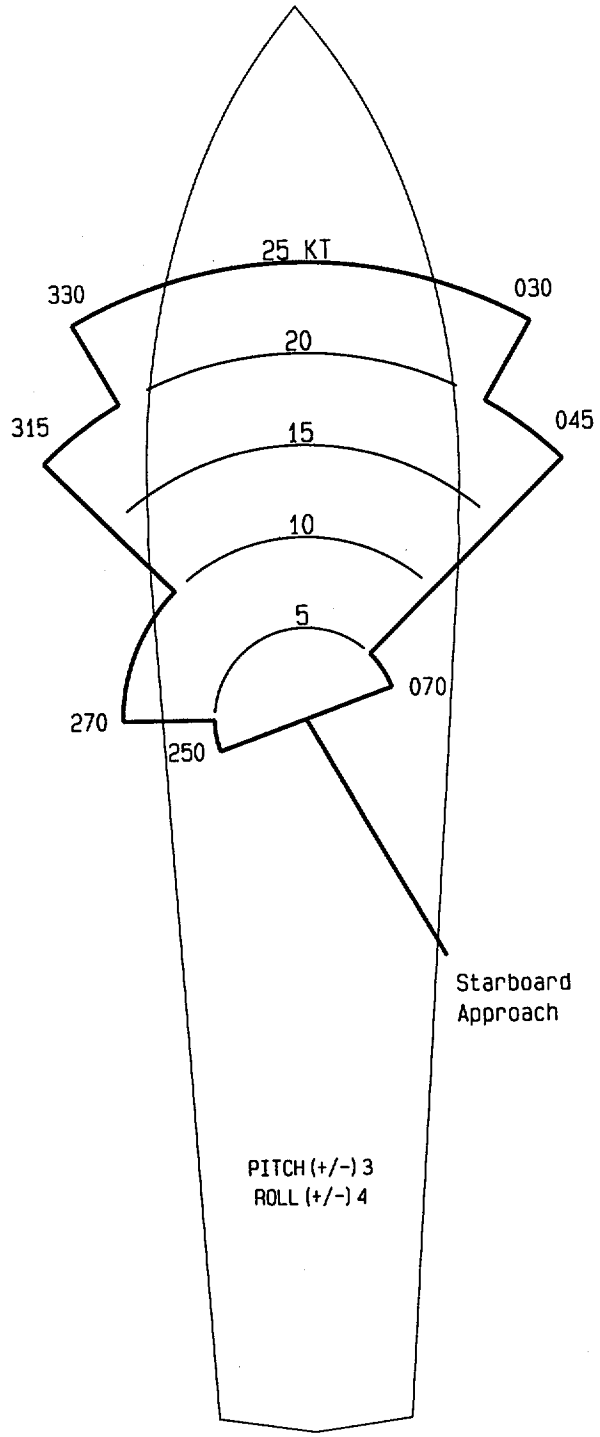


Figure B-71. TH-57C Launch and Recovery Envelopes for IX 514 Class Ships (Sheet 1 of 3)
Sheet 1: Port Approach



NOTES:

ECS ON/OFF

YAW STAB ON/OFF

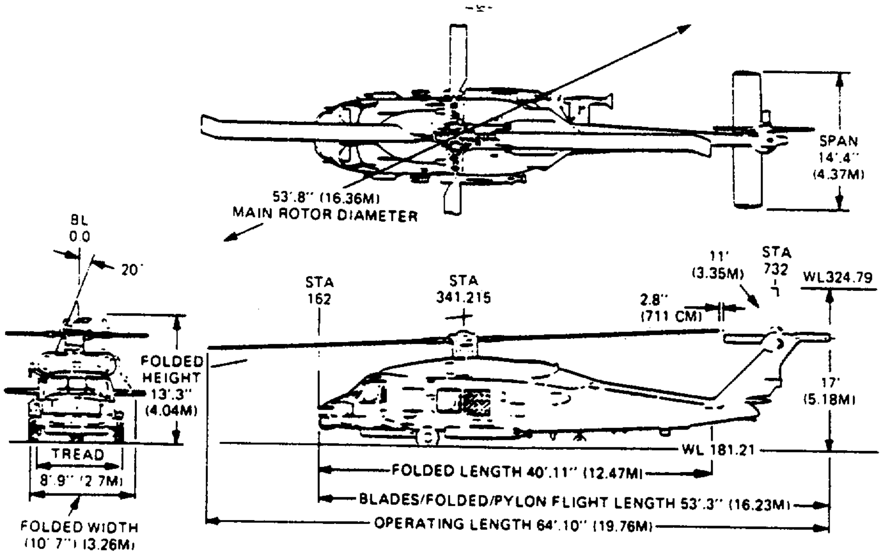
Day envelope

Figure B-71. TH-57C Launch and Recovery Envelopes for IX 514 Class Ships (Sheet 2 of 3)
Sheet 2: Starboard Approach

MODEL	SH-60B
POWER	2-T700-GE-401 or 401C
CREW	3
MAXIMUM RANGE	450 nm at 120 knots
MAXIMUM SPEED	180 knots
ENDURANCE	4.7 hr at 65 knots (19,000 lb)
WEIGHT: Empty	13,854 lb (approx.)
Maximum	21,700 lb.
FUEL: Type	JP-4/JP-5
Capacity	590 gal

CARGO/PASSENGER CAPACITY: External hook 6,000 lb maximum; 600 lb personnel hoist; 2 passengers only if seats installed; 1 litter patient; limited small cargo space

NOTE: All passengers and crew shall have a seat.



NOTES:

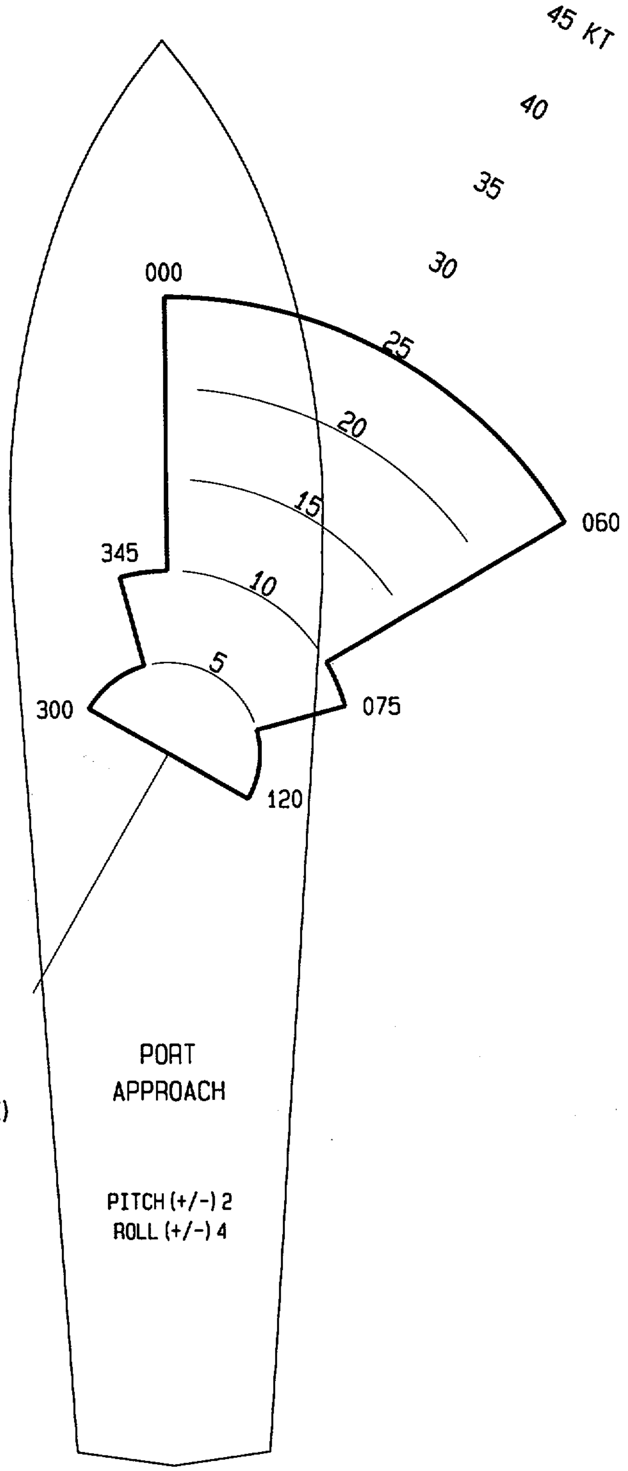
During launch, recovery, and deck handling operations, the pitch and roll indicators at the LSO station shall be utilized. The bridge inclinometers display greater values and should be used only in the event of a gyro failure.

The SH-60B shipboard operating envelopes are based on launch and recovery during an optimum quiescent period. The pilot shall endeavor to take off or land during this quiescent period.

Rotor and pylon fold and spread, maneuvering and traversing should be conducted during ship roll motion of 10° or less. When the deck motion cannot be reduced below 10° roll, deck operations should be conducted during the quiescent periods.

Rotor engage/disengage limits — 45 knots any azimuth.
Tail pylon spread — 45 knots any azimuth. Rotor spread/fold — 45 knots any azimuth.
HIFR relative winds envelope — 10 to 30 knots/300° to 360° azimuth.

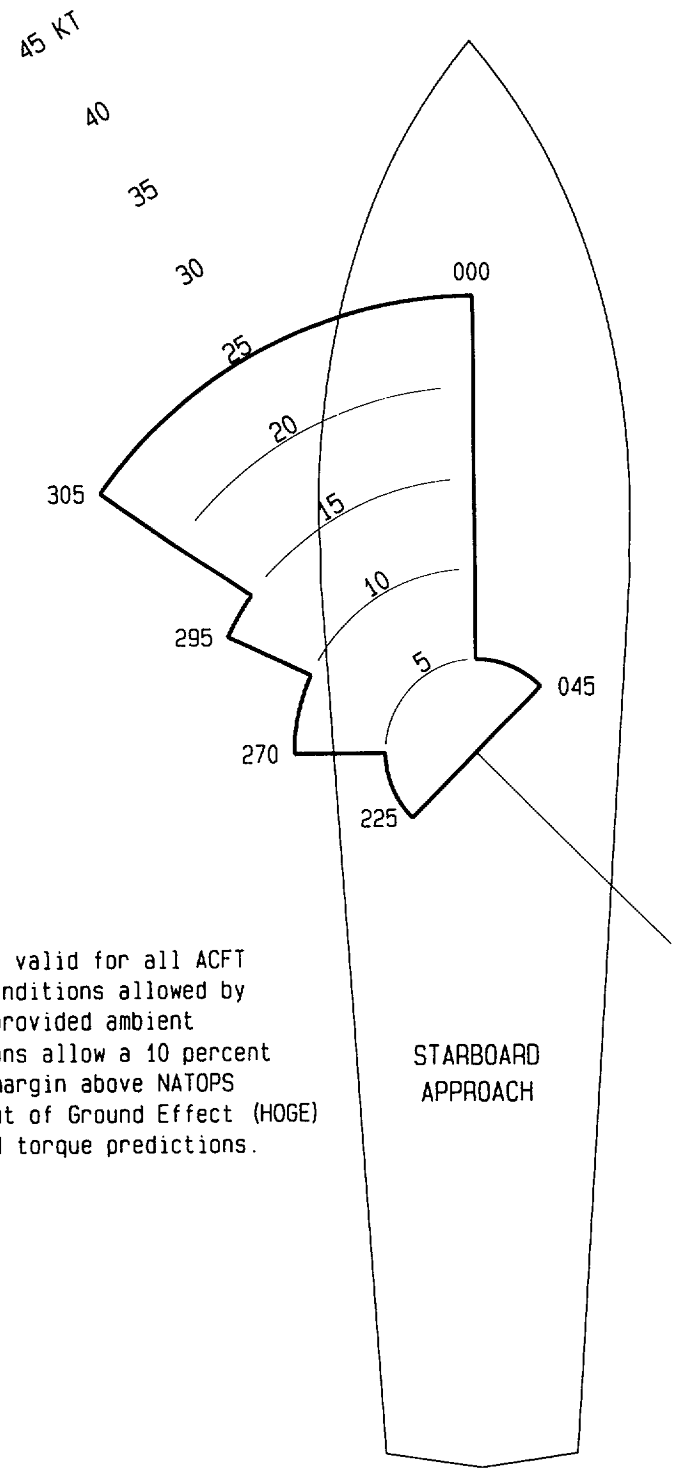
Figure B-73. SH-60B/F Sea Hawk



Note:

Envelope valid for all ACFT GW/CG conditions allowed by NATOPS provided ambient conditions allow a 10 percent torque margin above NATOPS Hover Out of Ground Effect (HOGE) required torque predictions.

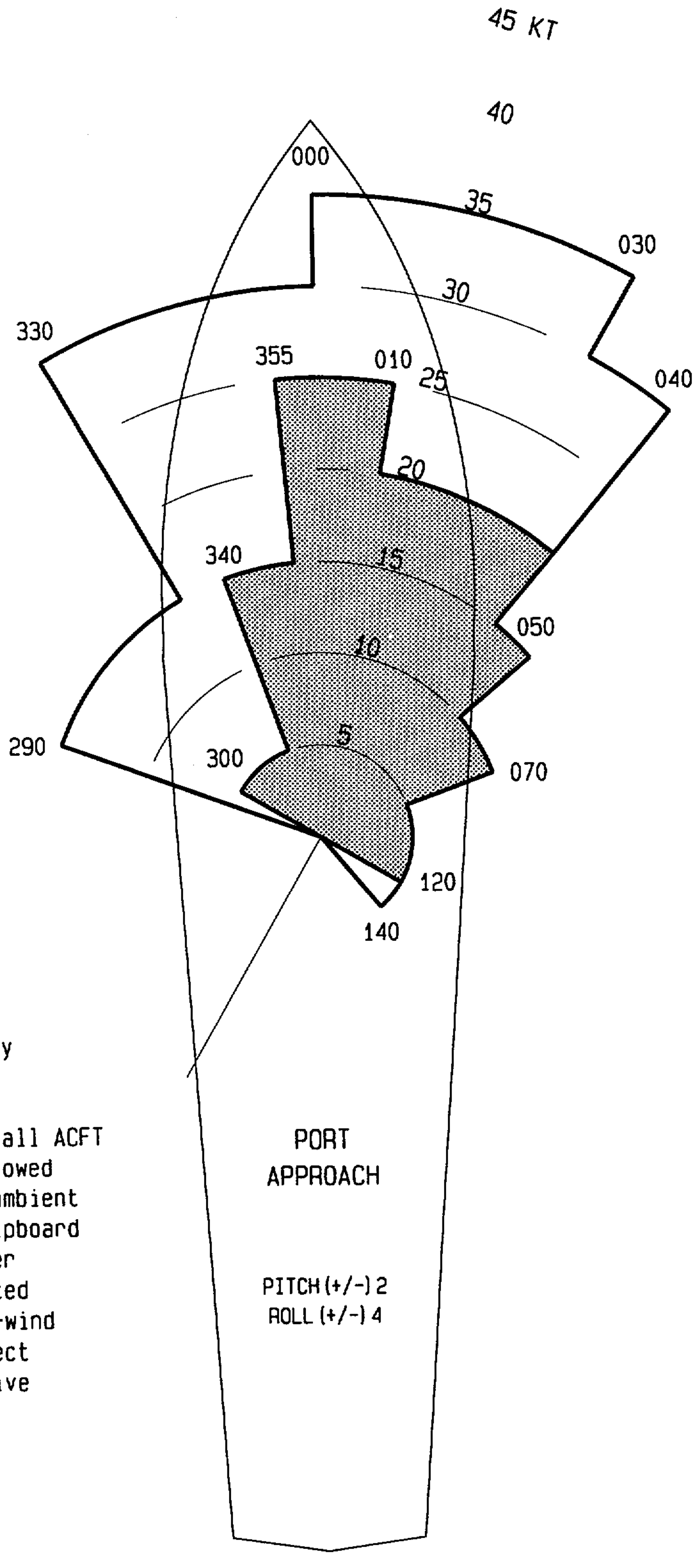
Figure B-74. SH-60B/F Launch and Recovery Envelopes for AE 26 Class Ships (Sheet 1 of 2)
Sheet 1: Day Only, Port Approach



Note:

Envelope valid for all ACFT GW/CG conditions allowed by NATOPS provided ambient conditions allow a 10 percent torque margin above NATOPS Hover Out of Ground Effect (HOGE) required torque predictions.

Figure B-75. SH-60B/F Launch and Recovery Envelopes for AOE 1 Class Ships (Sheet 2 of 2)
Sheet 2: Day Only, Starboard Approach

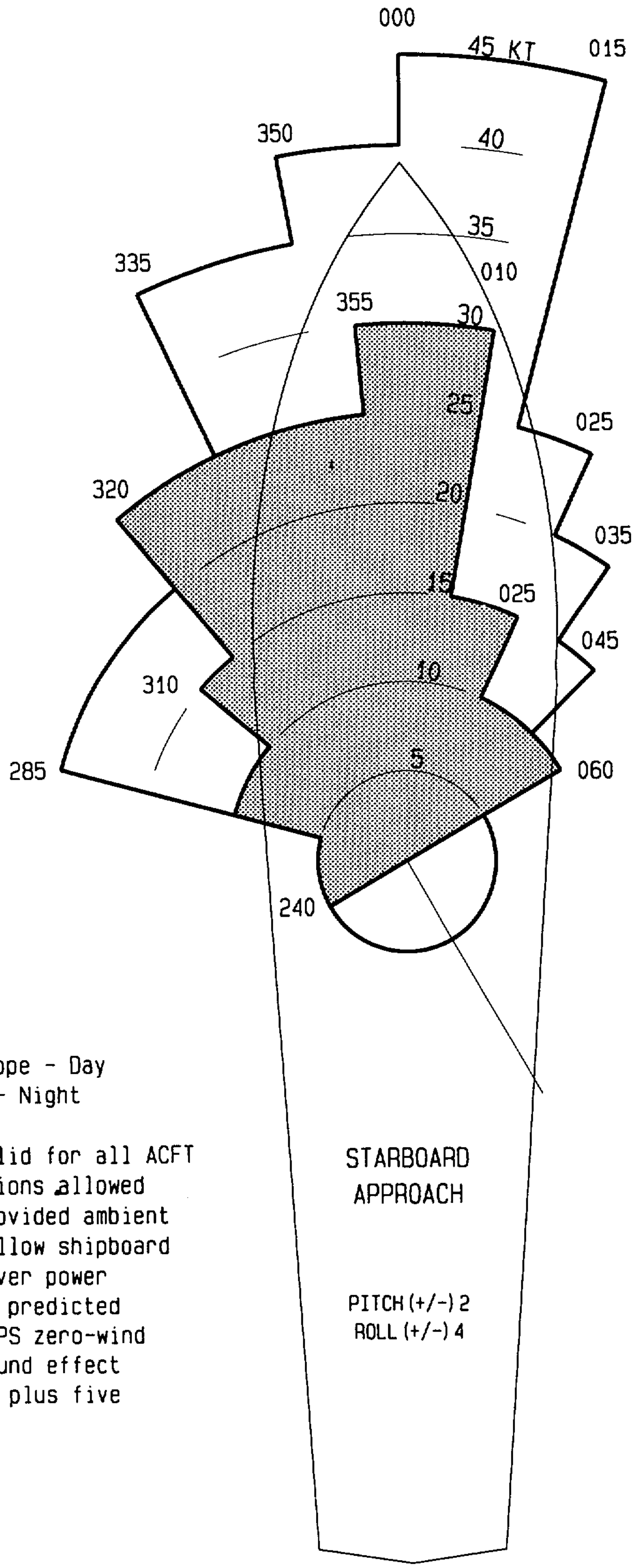


NOTES:

Entire Envelope - Day
Shaded Area - Night

Envelopes valid for all ACFT GW/CG conditions allowed by NATOPS provided ambient conditions allow shipboard shipboard hover power available as predicted by H-60 NATOPS zero-wind hover in ground effect torque chart plus five percent.

Figure B-76. SH-60B/F Launch and Recovery Envelopes for AOE 6 Class Ships (Sheet 1 of 2)
Sheet 1: Port Approach

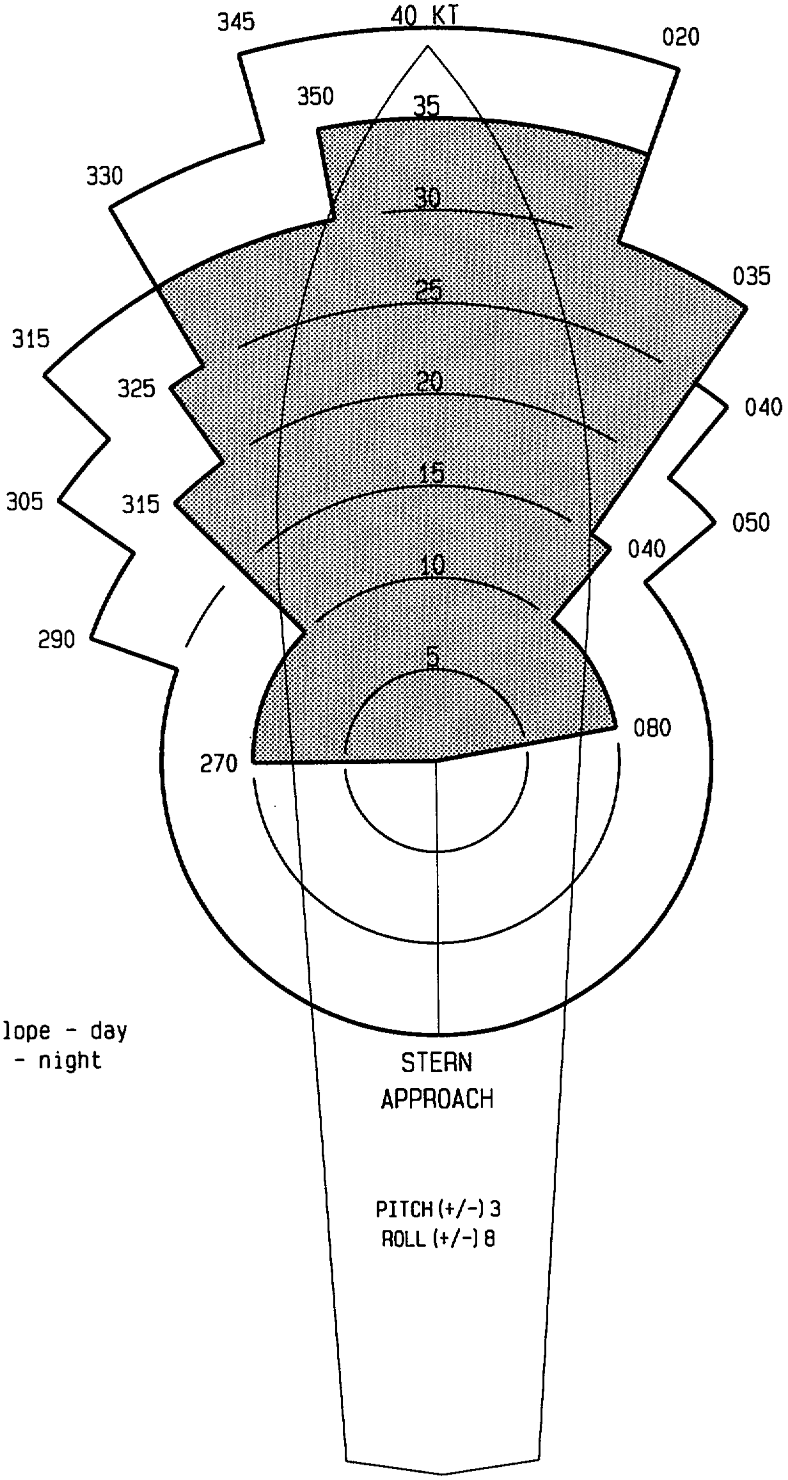


NOTES:

Entire Envelope - Day
Shaded Area - Night

Envelopes valid for all ACFT GW/CG conditions allowed by NATOPS provided ambient conditions allow shipboard shipboard hover power available as predicted by H-60 NATOPS zero-wind hover in ground effect torque chart plus five percent.

Figure B-76. SH-60B/F Launch and Recovery Envelopes for AOE 6 Class Ships (Sheet 2 of 2)
Sheet 2: Starboard Approach



NOTES:

Entire envelope - day
Shaded area - night

Figure B-77. SH-60B/F Launch and Recovery Envelopes for CG 47 Class Ships (Sheet 1 of 2)
Sheet 1: Recovery Assist Envelope

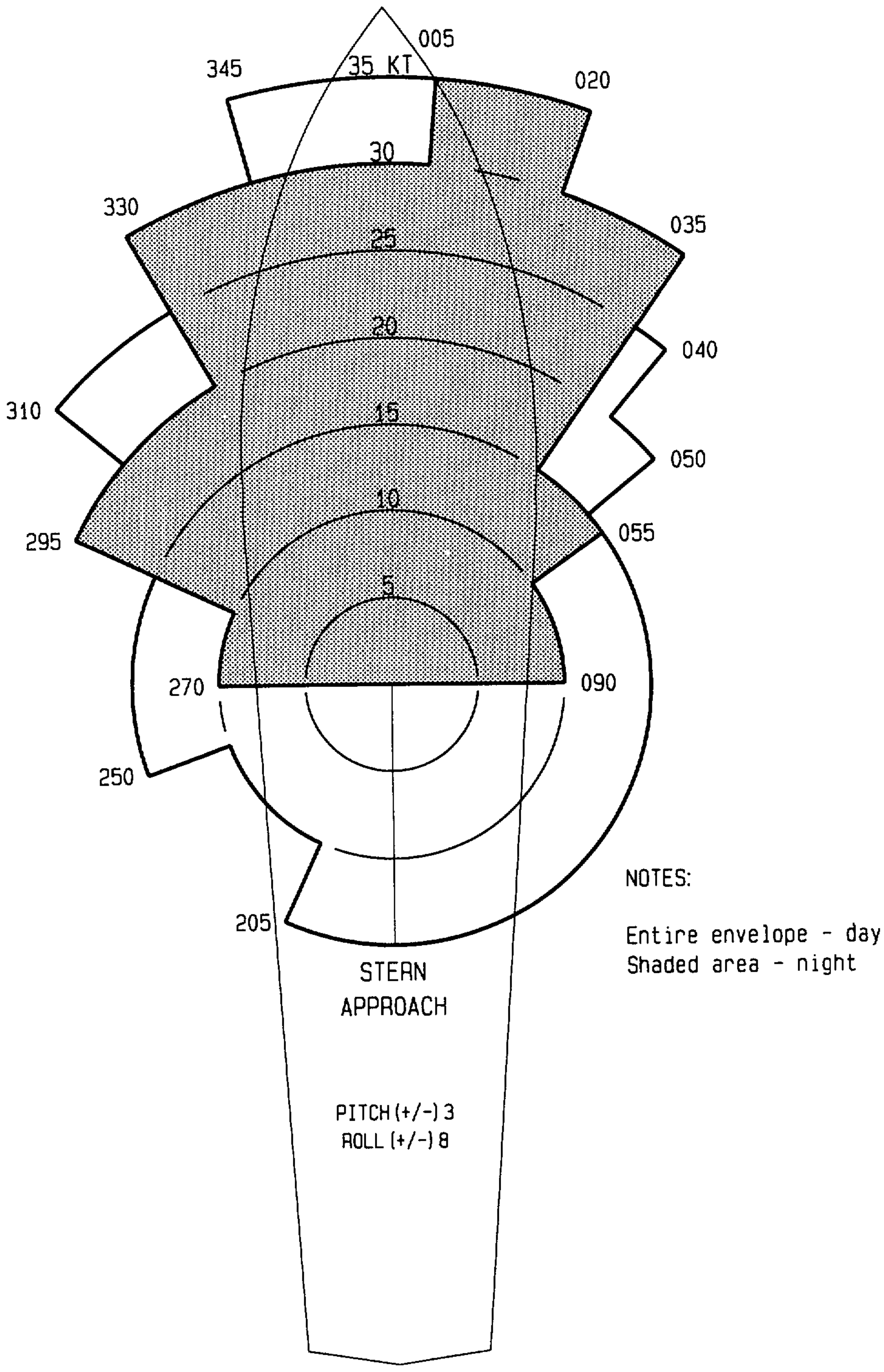


Figure B-77. SH-60B/F Launch and Recovery Envelopes for CG 47 Class Ships (Sheet 2 of 2)
Sheet 2: Free Deck and Clear Deck Envelope

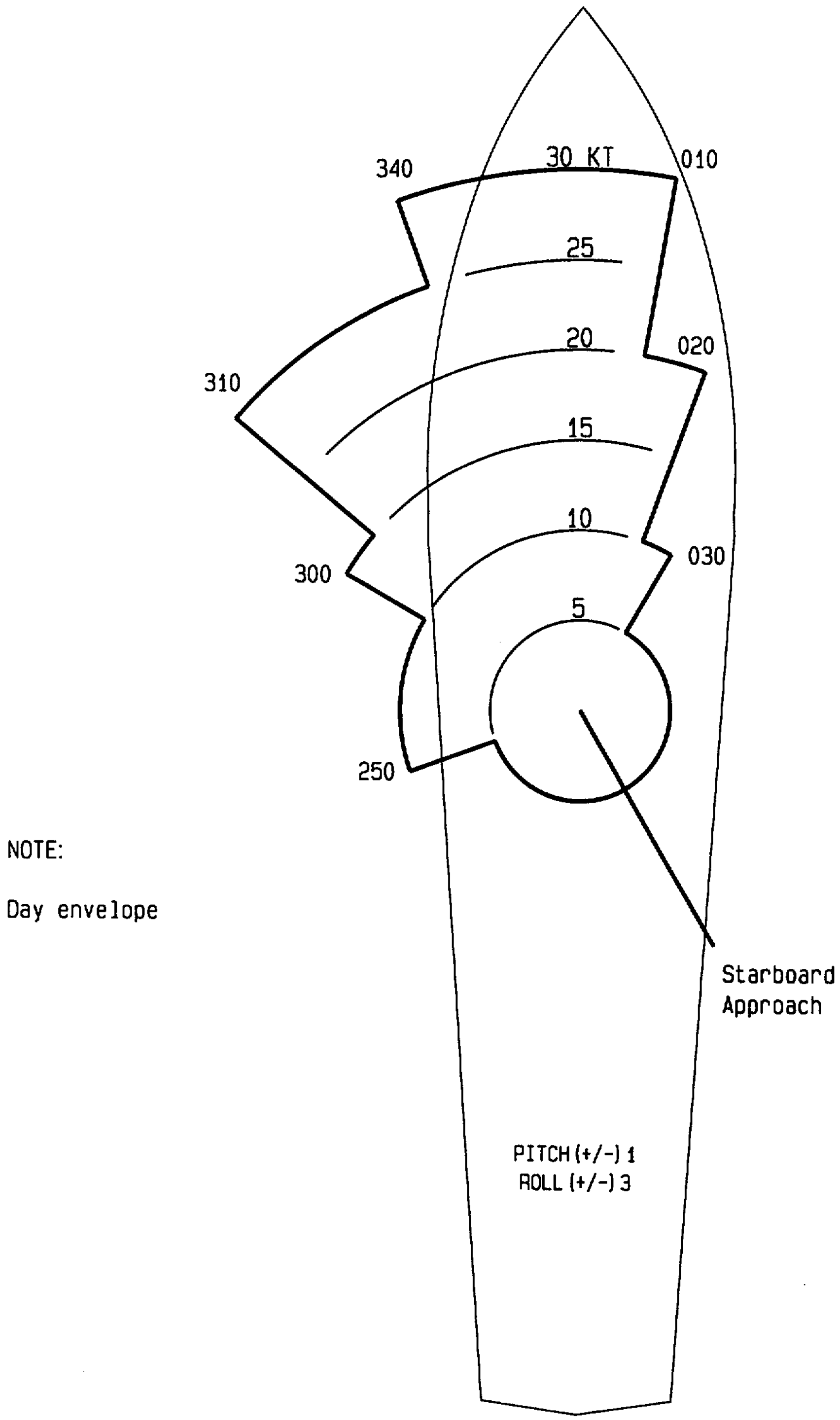
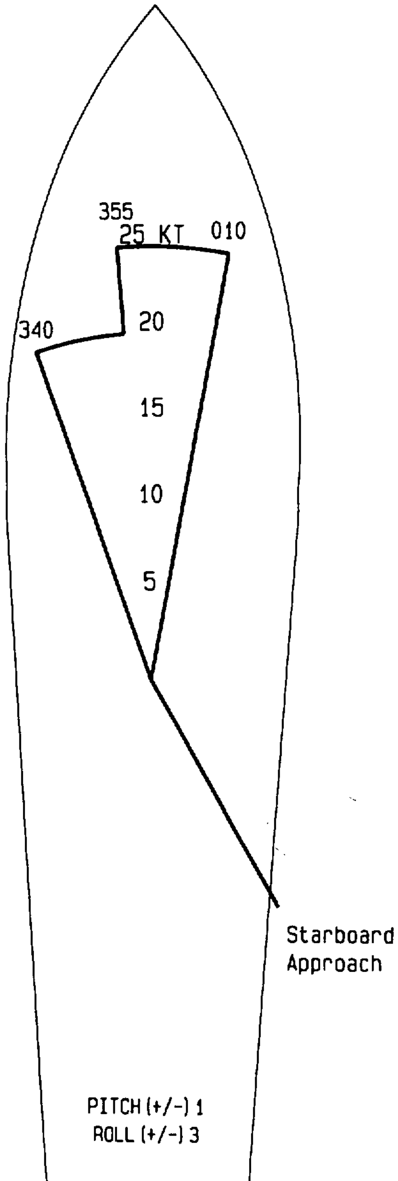


Figure B-78. SH-60B/F Launch and Recovery Envelopes for CGN 36 Class Ships (Sheet 1 of 2)
Sheet 1: Starboard Approach



NOTES:

Entire envelope -
Day SAS/BOOST off.

Night operations authorized only if alternate ship or shore site is not available.

Figure B-78. SH-60B/F Launch and Recovery Envelopes for CGN 36 Class Ships (Sheet 2 of 2)
Sheet 2: Degraded Recovery Envelope, Starboard Approach

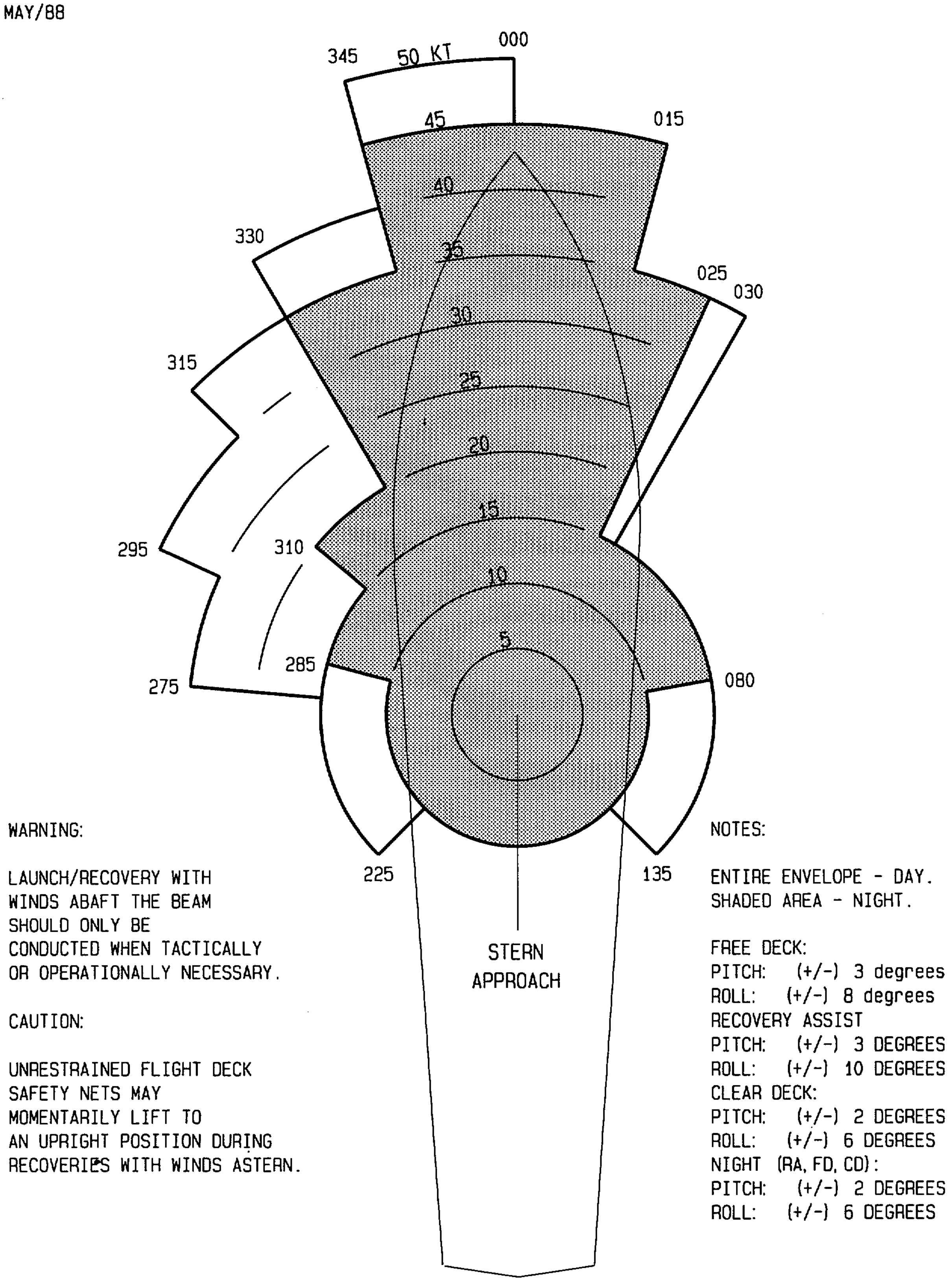
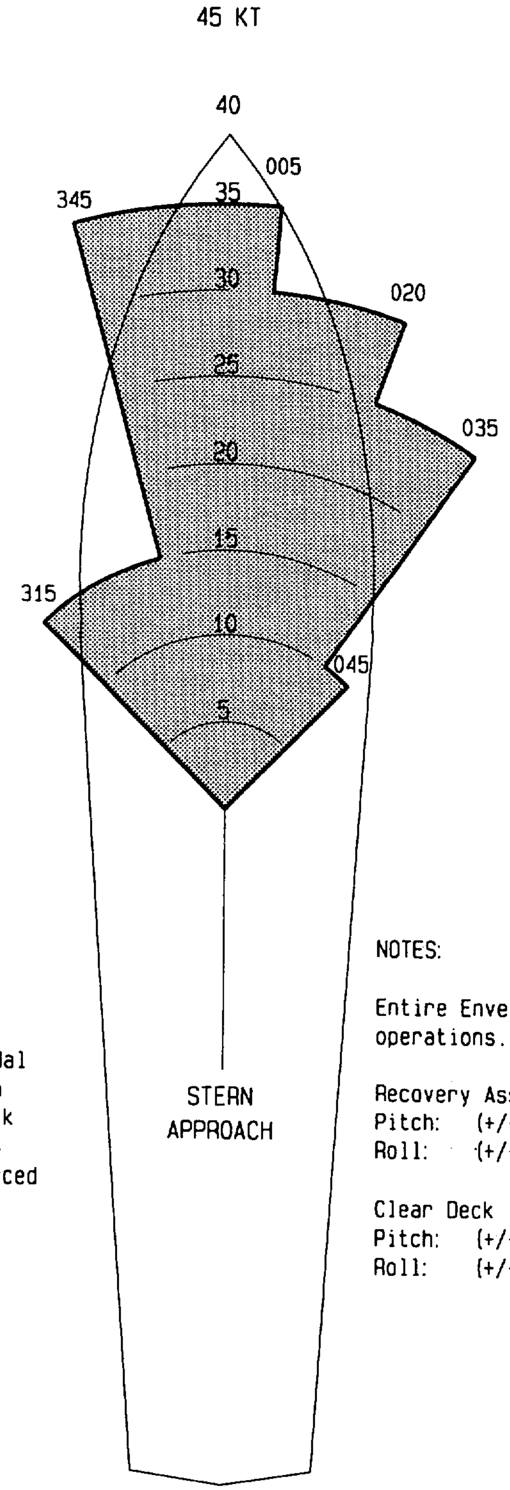


Figure B-79. SH-60B/F Launch and Recovery Envelopes for DD 963 Class Ships (Sheet 1 of 2)
Sheet 1: Recovery Assist, Free Deck, and Clear Deck

MAR/96



NOTES:

SAS/BOOST OFF

Up to 75 pounds of left pedal force will be required when hovering boost off over deck with starboard winds. This value is significantly reduced with port winds.

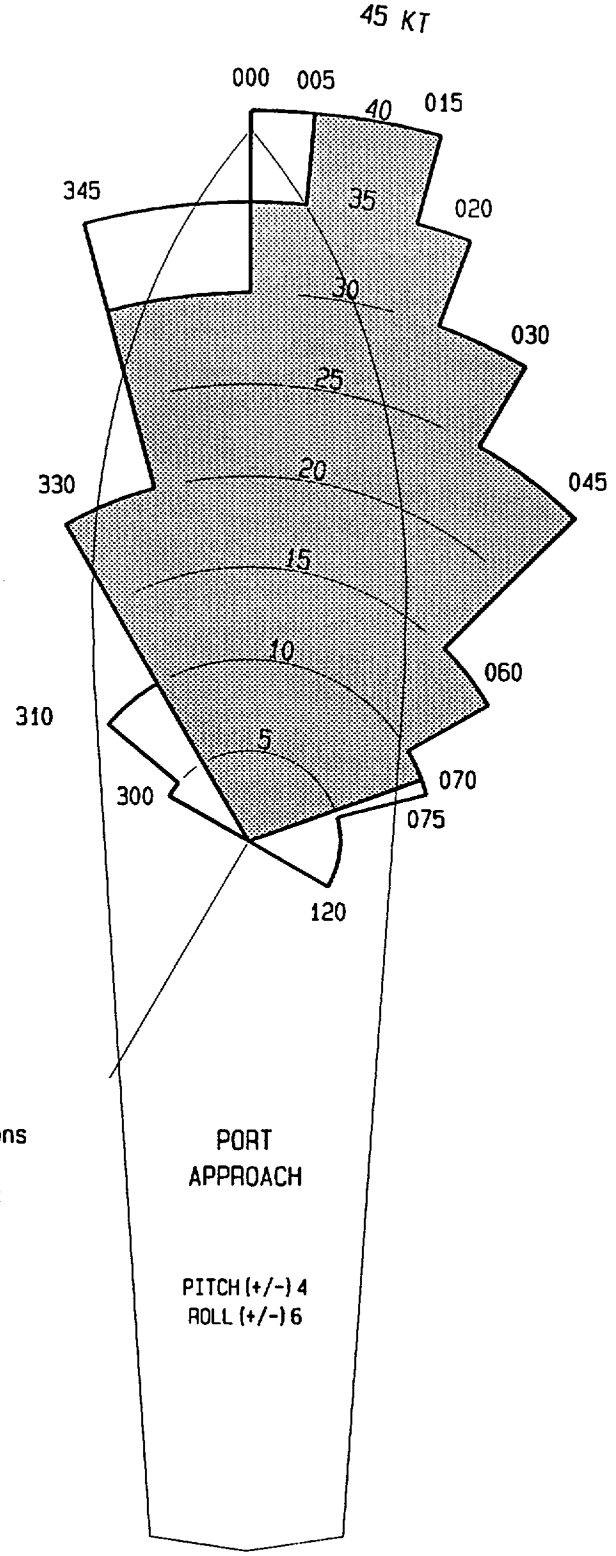
NOTES:

Entire Envelope - day or night operations.

Recovery Assist/Free Deck
Pitch: (+/-) 2 degress
Roll: (+/-) 5 degrees

Clear Deck
Pitch: (+/-) 1 degree
Roll: (+/-) 4 degrees

Figure B-79. SH-60B/F Launch and Recovery Envelopes for DD 963 Class Ships (Sheet 2 of 2) Sheet 2: Recovery Assist, Free Deck, and Clear Deck Degraded Launch/Recovery Envelope

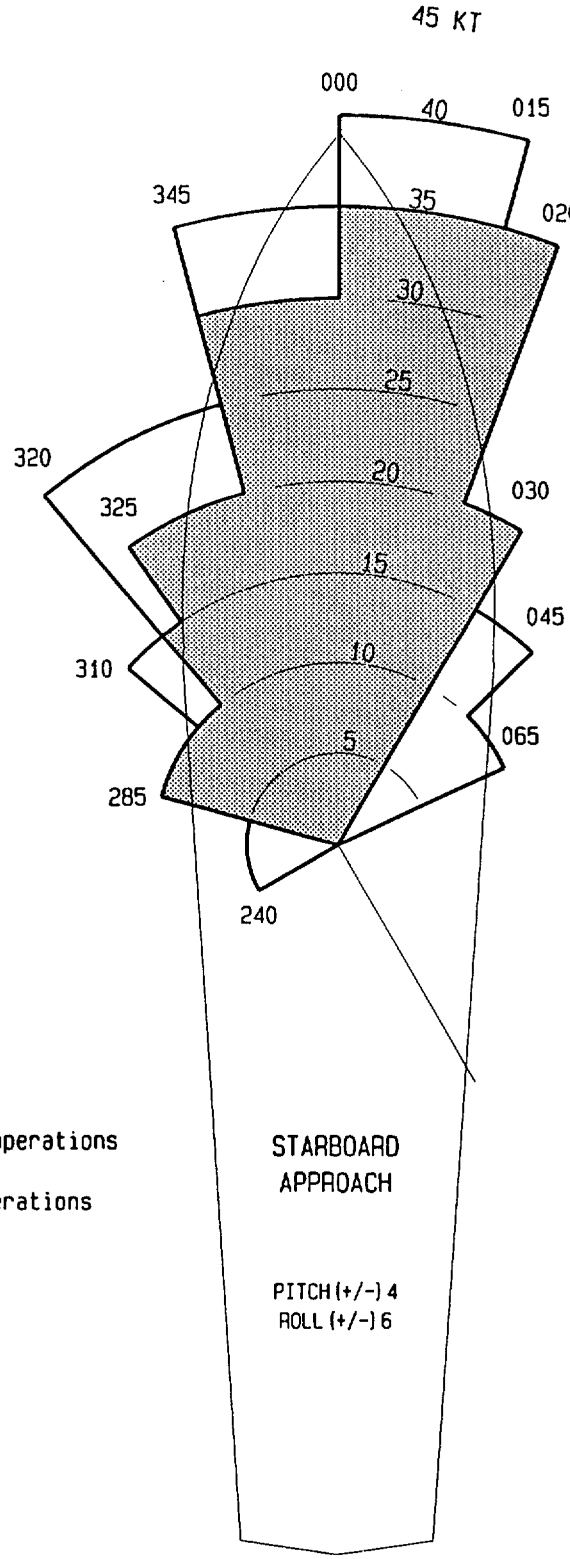


Notes:

Entire Envelope - Day operations

Shaded Area - Night operations

Figure B-80. SH-60B/F Launch and Recovery Envelopes for DD 963 (Non-RAST) and DDG 993 Class Ships (Sheet 1 of 2) Sheet 1: Port Approach



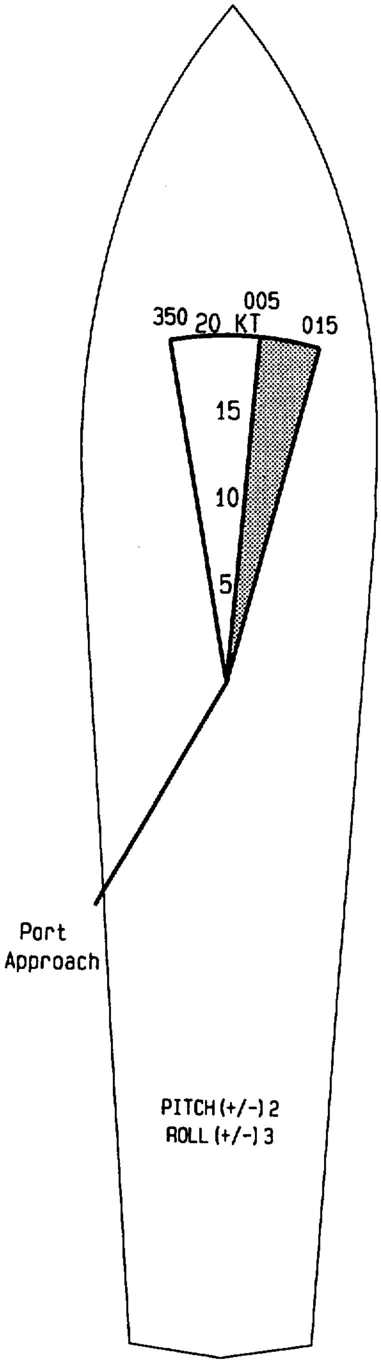
Notes:

Entire Envelope - Day operations

Shaded Area - Night operations

Figure B-80. SH-60B/F Launch and Recovery Envelopes for DD 963 (Non-RAST) and DDG 993 Class Ships (Sheet 2 of 2) Sheet 2: Starboard Approach

SEP/84



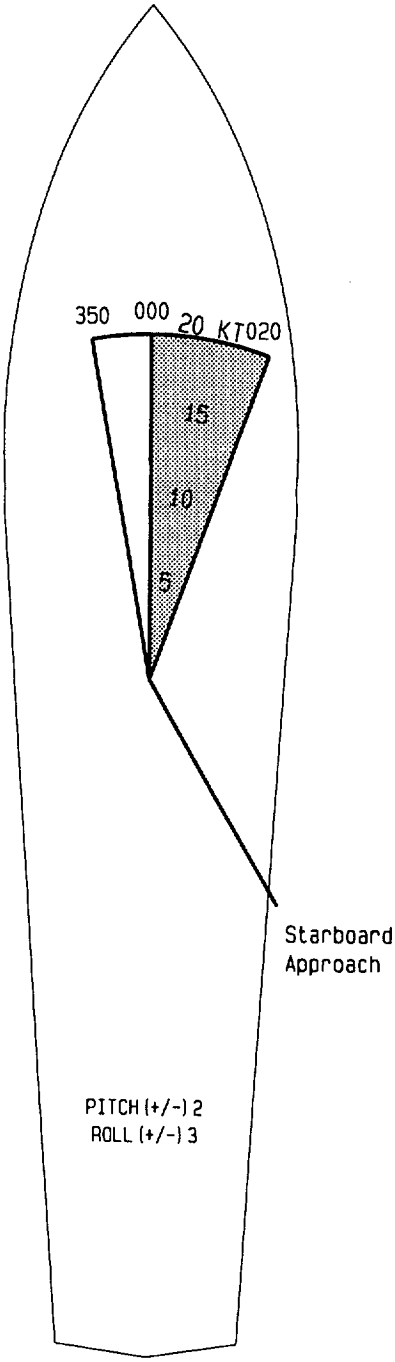
NOTES:

SAS/BOOST OFF

Entire envelope - day
Shaded area - night

Figure B-81. SH-60B/F Launch and Recovery Envelopes for DDG 993 Class Ships (Sheet 1 of 2) Sheet 1: Degraded Recovery Envelope, Port Approach

SEP/84

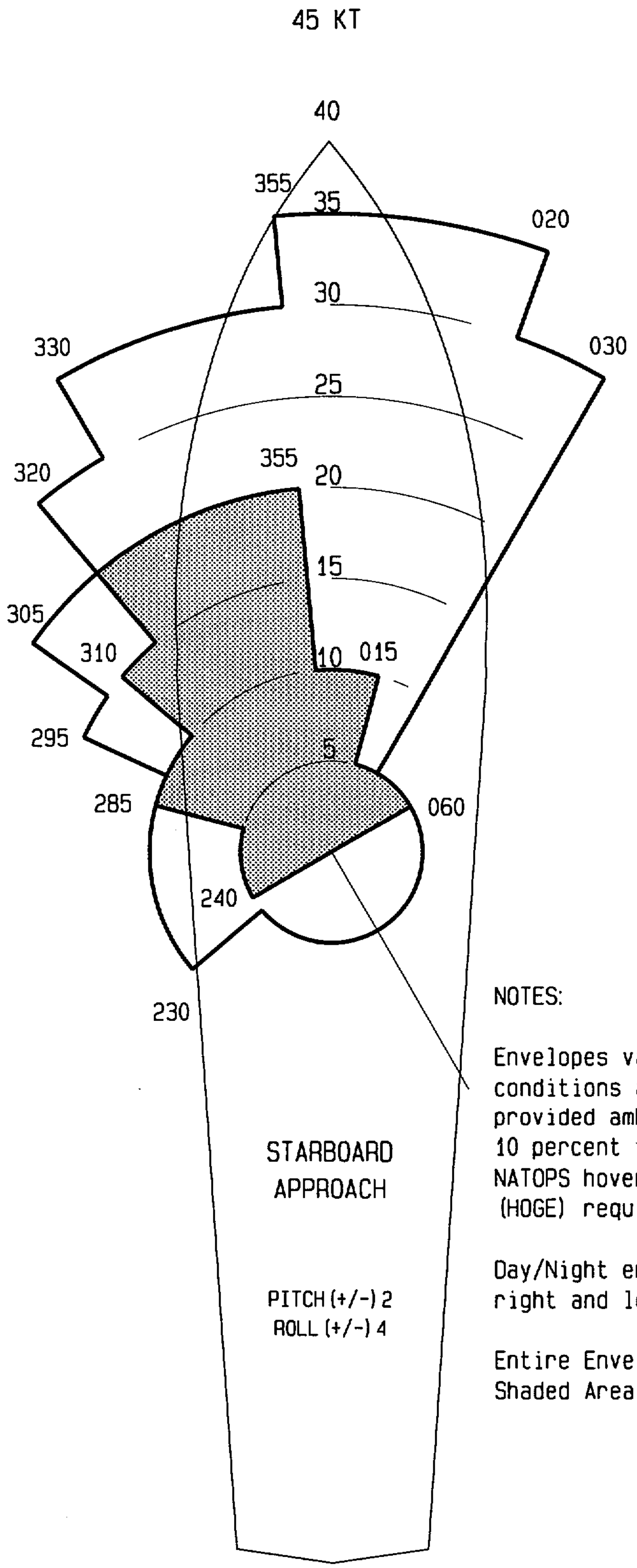


NOTES:

SAS/BOOST OFF

Entire envelope - day
Shaded area - night

Figure B-81. SH-60B/F Launch and Recovery Envelopes for DDG 993 Class Ships (Sheet 2 of 2) Sheet 2: Degraded Recovery Envelope, Starboard Approach



NOTES:

Envelopes valid for all acft GW/CG conditions allowed by NATOPS provided ambient conditions allow a 10 percent torque margin above NATOPS hover out of ground effect (HOGE) required torque predictions.

Day/Night envelopes valid for right and left seat landings.

Entire Envelope - Day
Shaded Area - Night

Figure B-82. SH-60B/F Launch and Recovery Envelopes for DDG 51 Class Ships

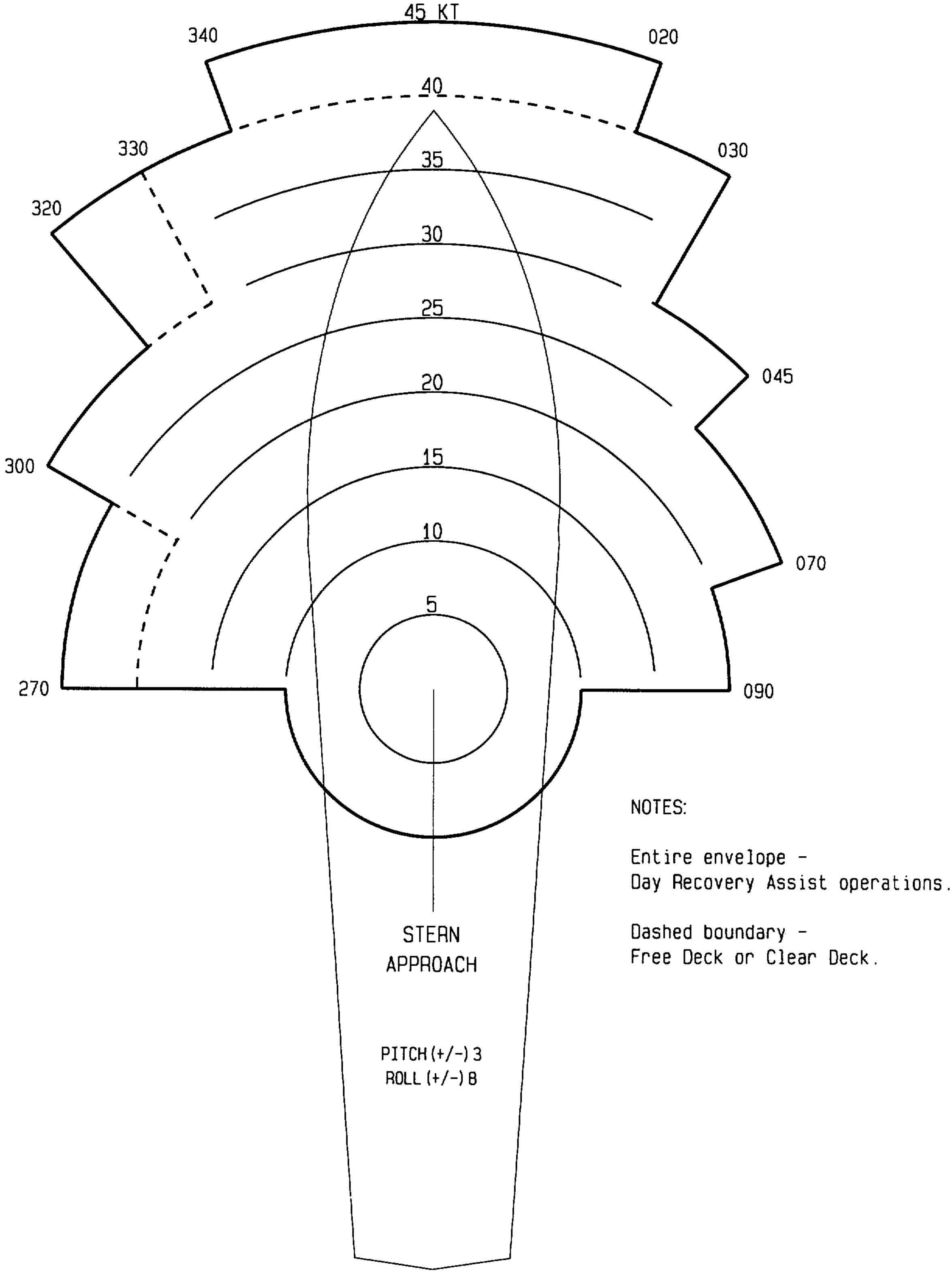
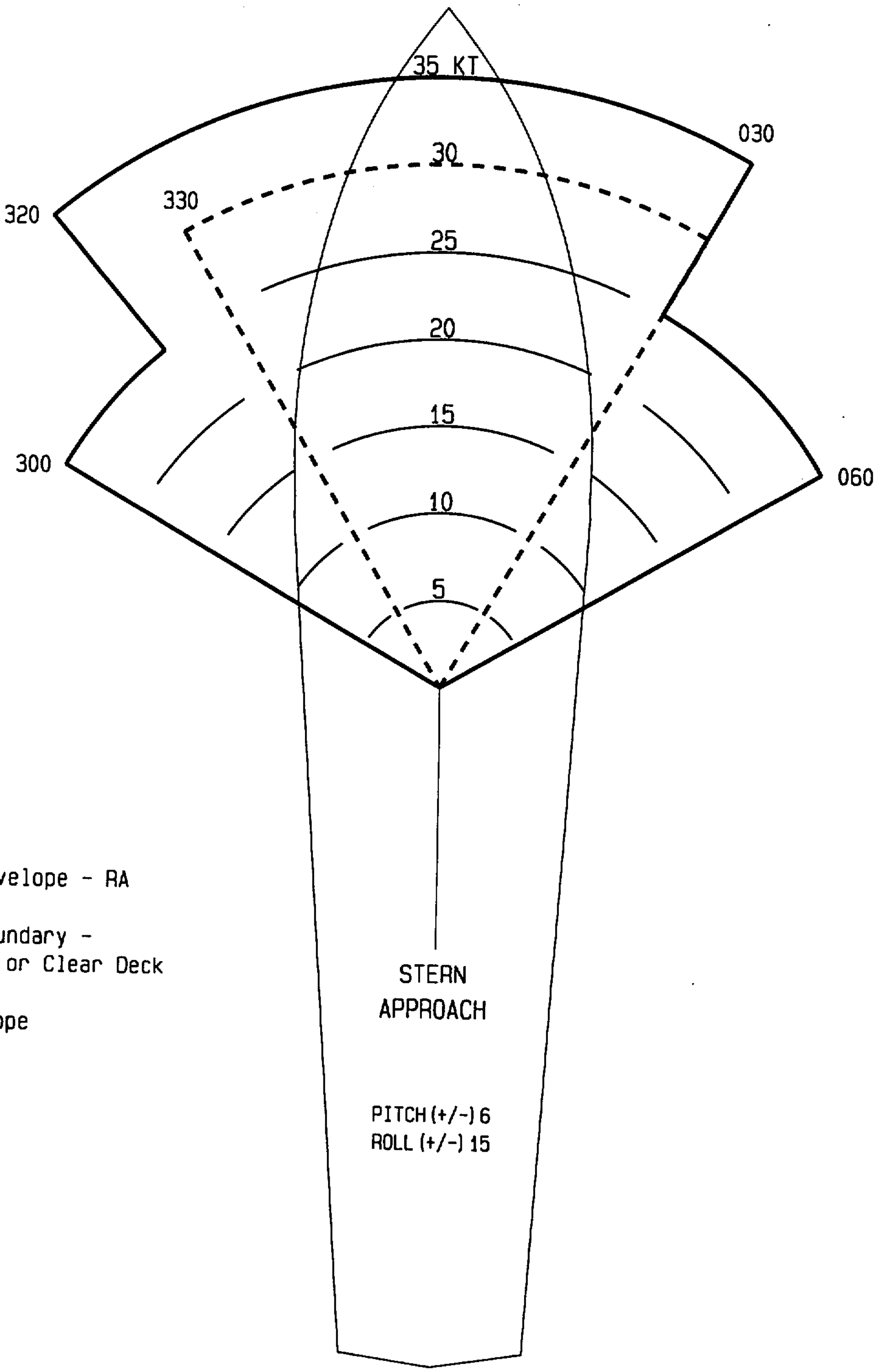


Figure B-83. SH-60B/F Launch and Recovery Envelopes for RAST-Capable FFG 7 Class Ships (Sheet 1 of 4) Sheet 1: Recovery Assist, Free Deck, and Clear Deck Envelopes, Day Envelope (Moderate Pitch and Roll)



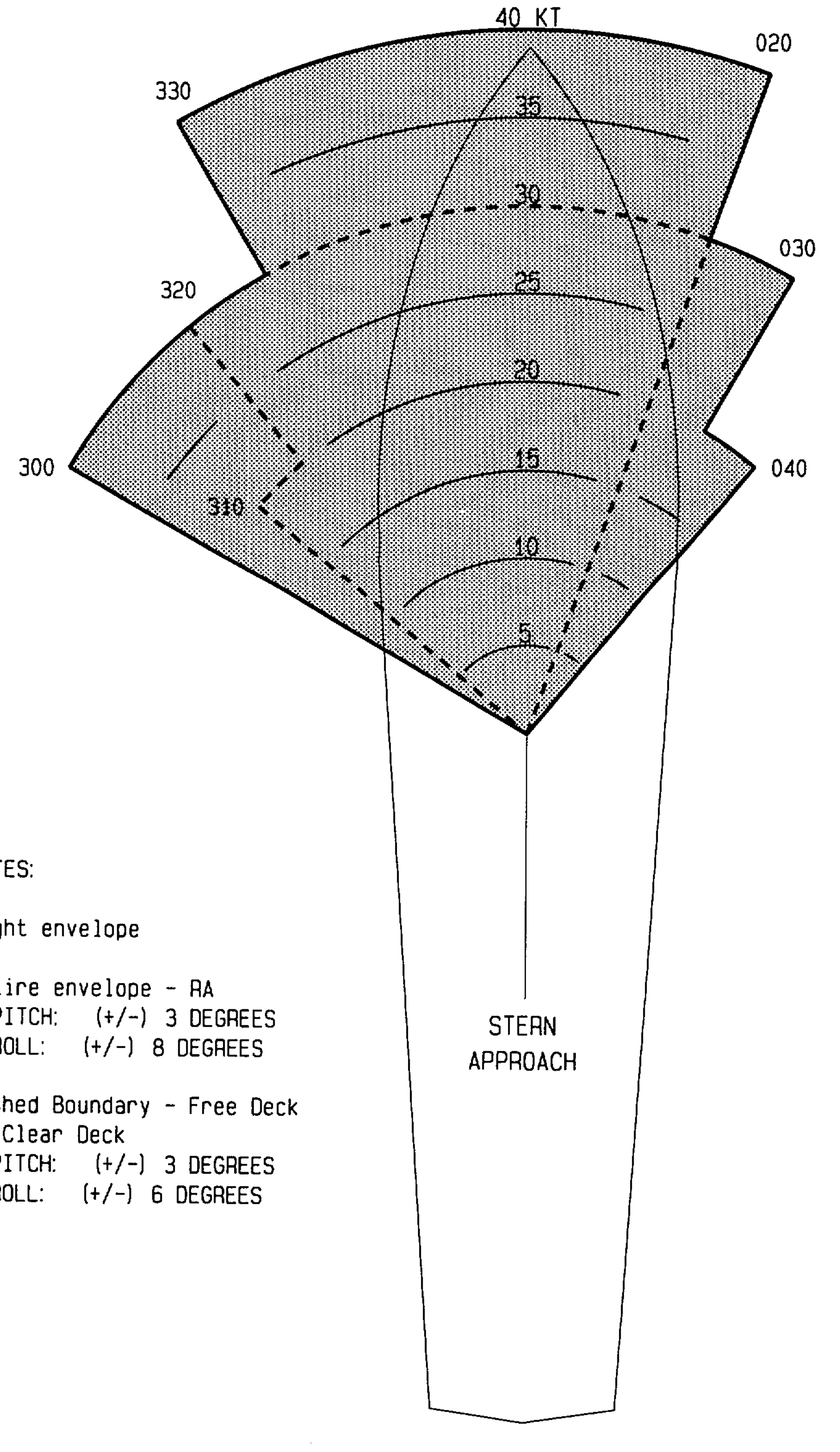
NOTES:

Entire envelope - RA

Dashed boundary -
Free Deck or Clear Deck

Day envelope

Figure B-83. SH-60B/F Launch and Recovery Envelopes for RAST-Capable FFG 7 Class Ships (Sheet 2 of 4) Sheet 2: Recovery Assist, Free Deck, and Clear Deck Envelopes, Day Envelope (High Pitch and Roll)



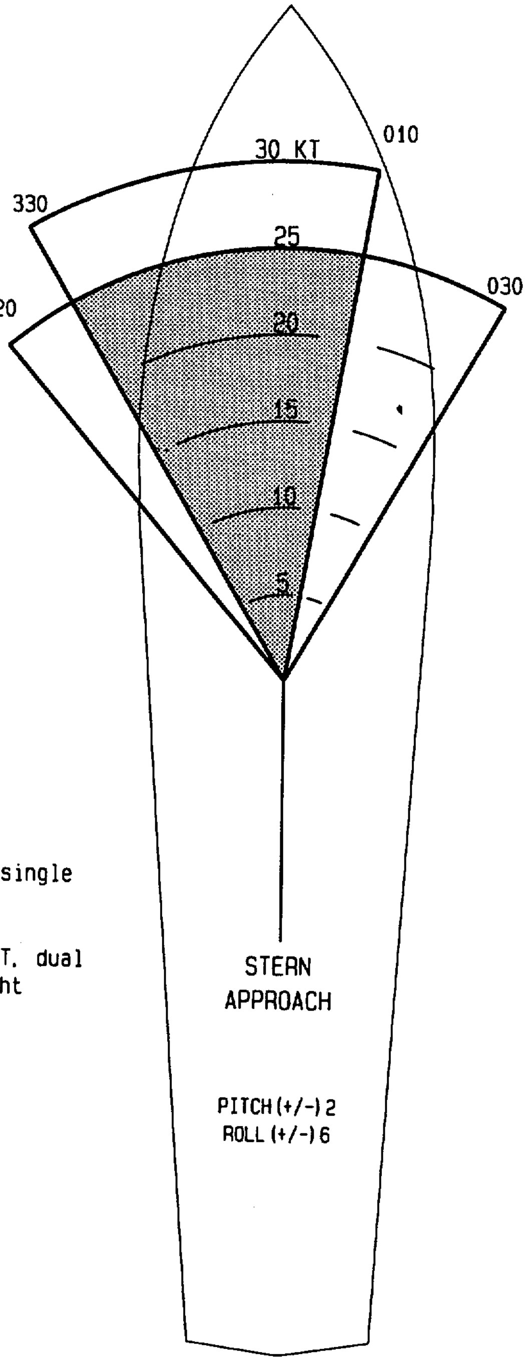
NOTES:

Night envelope

Entire envelope - RA
- PITCH: (+/-) 3 DEGREES
- ROLL: (+/-) 8 DEGREES

Dashed Boundary - Free Deck
or Clear Deck
- PITCH: (+/-) 3 DEGREES
- ROLL: (+/-) 6 DEGREES

Figure B-83. SH-60B/F Launch and Recovery Envelopes for RAST-Capable FFG 7 Class Ships (Sheet 3 of 4) Sheet 3: Recovery Assist, Free Deck, and Clear Deck Envelopes, Night Envelope

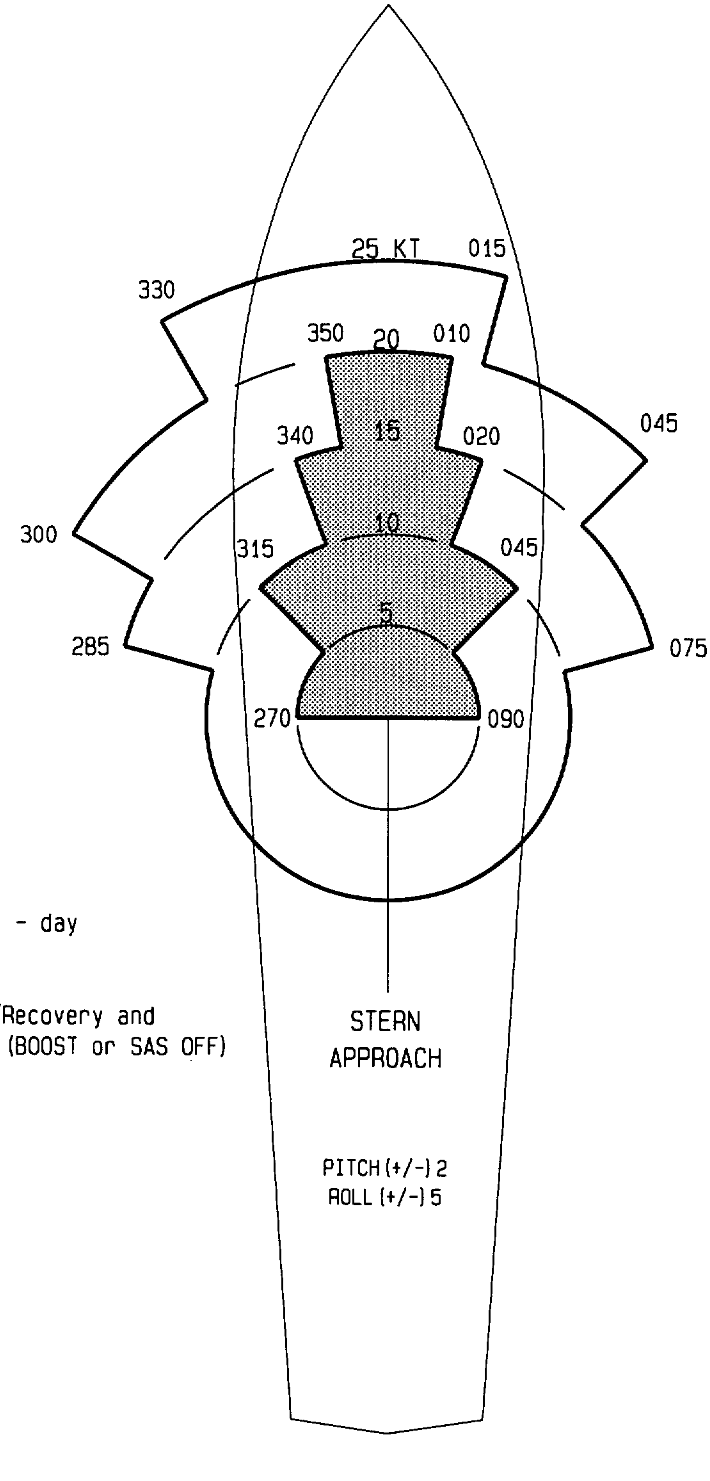


NOTES:

Entire envelope - day single SAS failure

Shaded area - day BOOST, dual SAS failure; all night degraded modes

Figure B-83. SH-60B/F Launch and Recovery Envelopes for RAST-Capable FFG 7 Class Ships (Sheet 4 of 4) Sheet 4: Degraded RAST Recovery Envelope

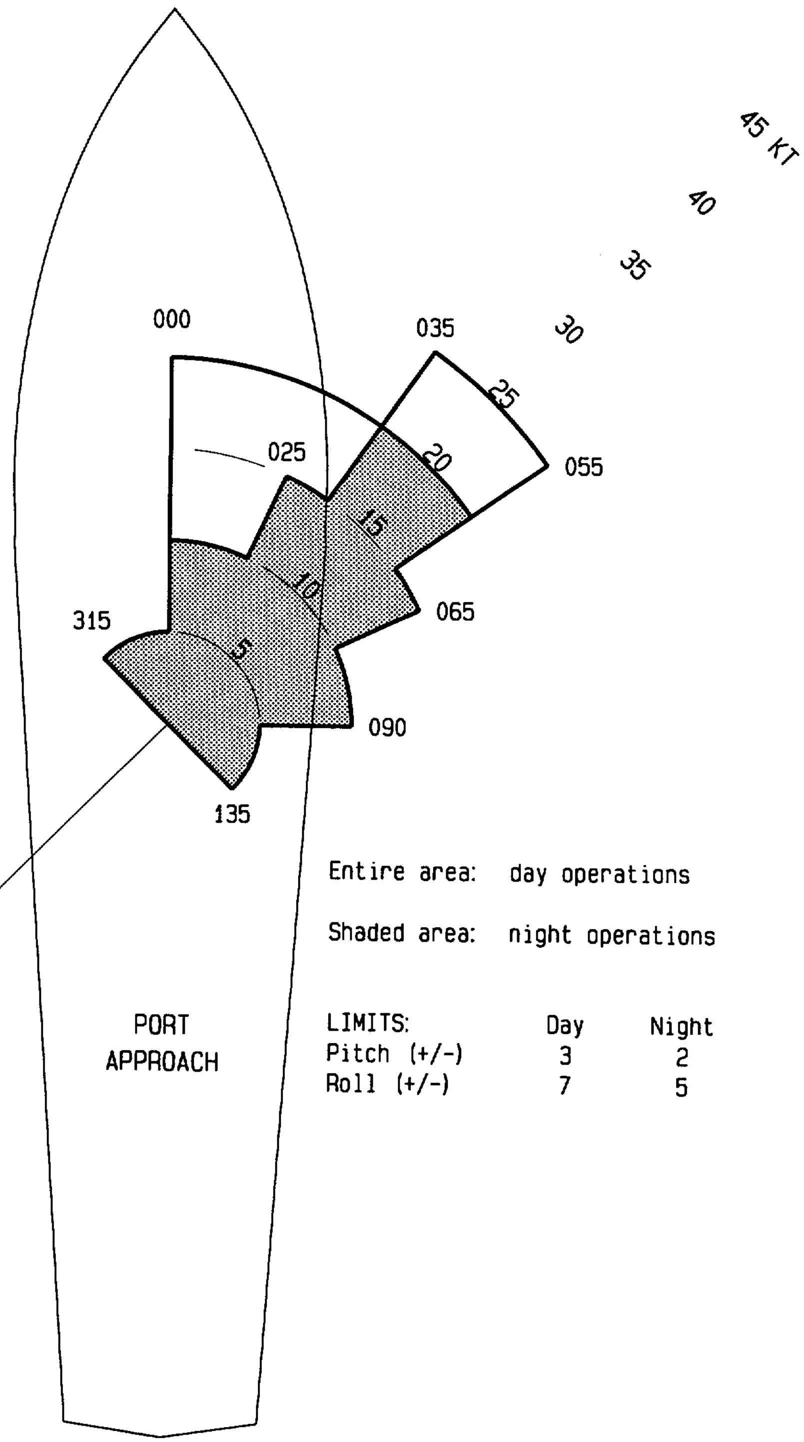


NOTES:

Entire envelope - day

Shaded area -
night Launch/Recovery and
day degraded (BOOST or SAS OFF)
recovery.

Figure B-84. SH-60B/F Launch and Recovery Envelopes for IX 514 Class Ships



NOTE:

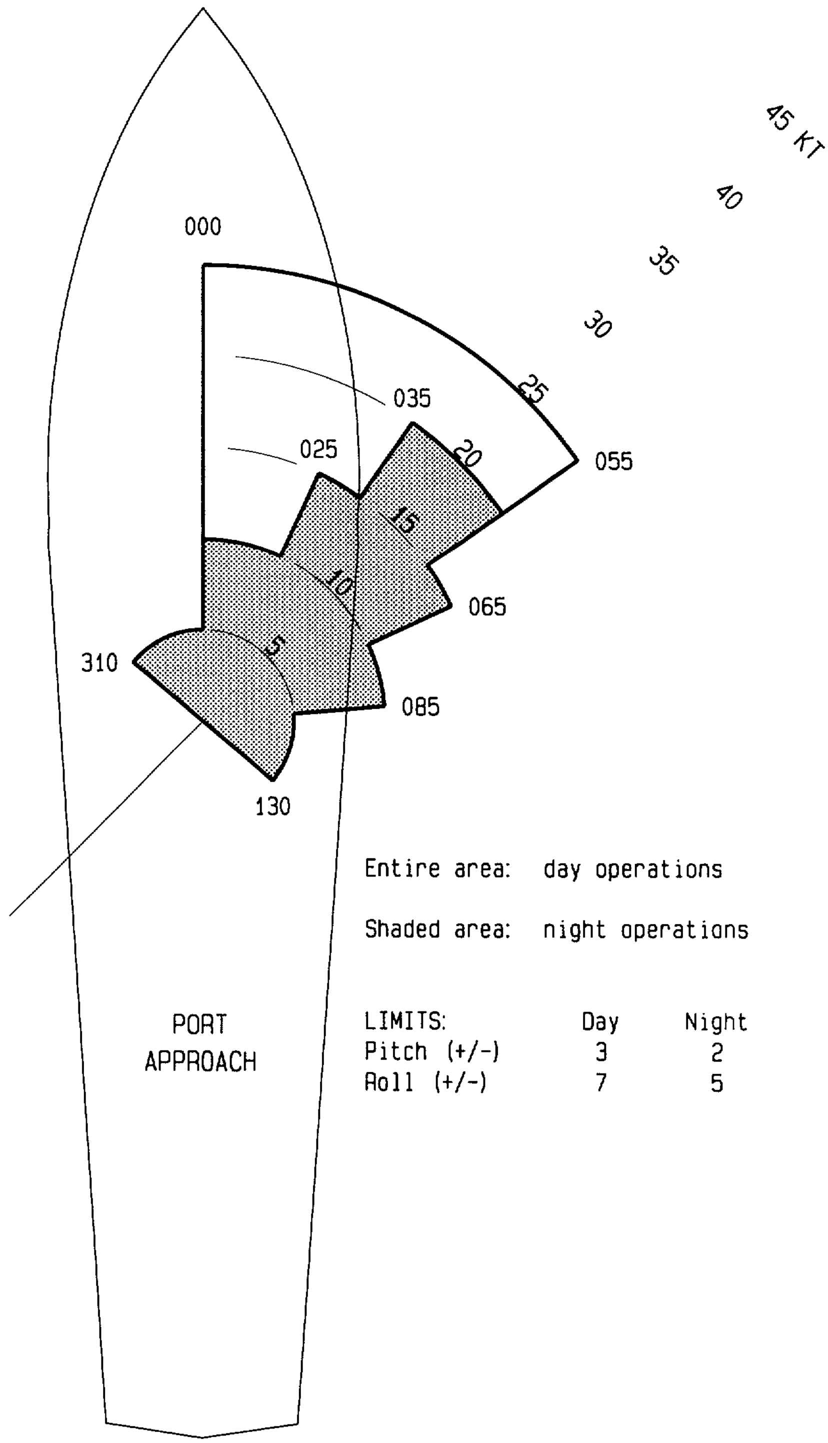
Envelopes valid for all SH-60B/F gross weights allowed by NATOPS provided ambient conditions allow HOGE capability plus a 10 percent torque margin.

Entire area: day operations

Shaded area: night operations

LIMITS:	Day	Night
Pitch (+/-)	3	2
Roll (+/-)	7	5

Figure B-85. SH-60B/F Launch and Recovery Envelopes for LPD 4 Class Ships (Sheet 1 of 5)
Sheet 1: Spot 1, Port Approach



NOTE:

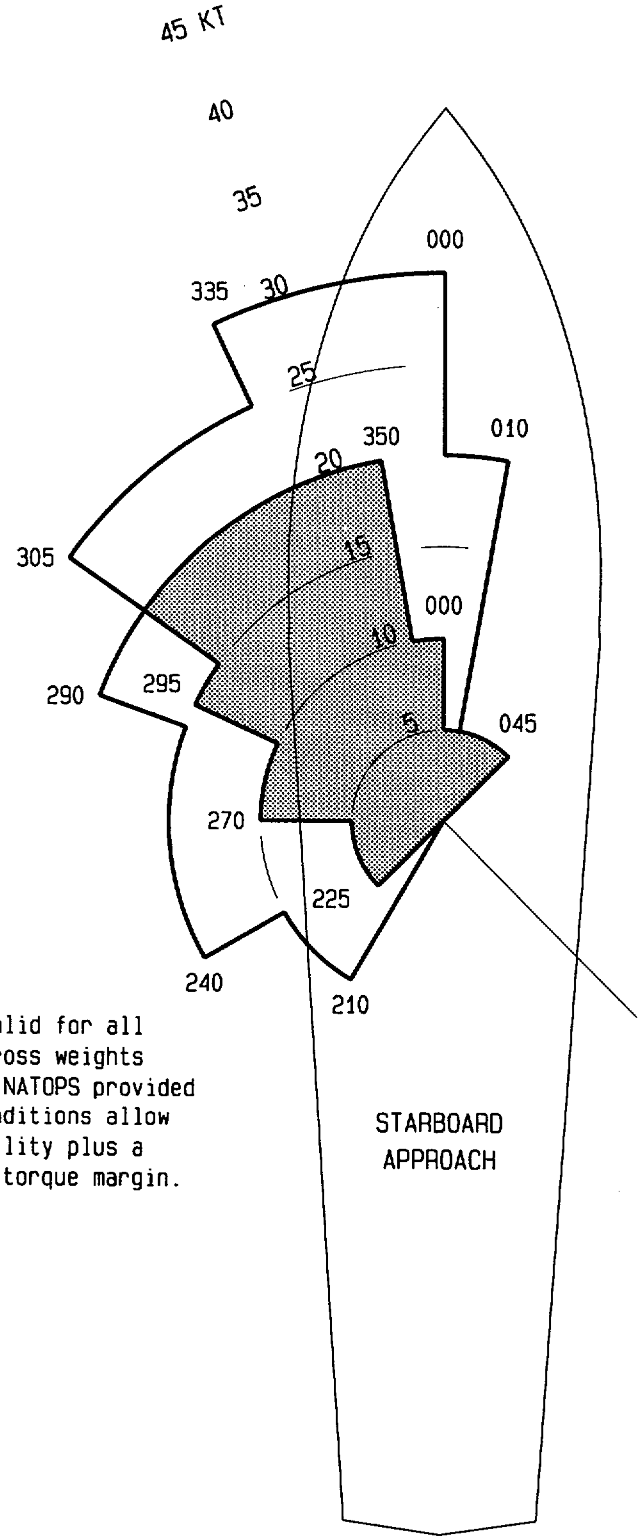
Envelope valid for all SH-60B/F gross weights allowed by NATOPS provided ambient conditions allow HOGE capability plus a 10 percent torque margin.

Entire area: day operations

Shaded area: night operations

LIMITS:	Day	Night
Pitch (+/-)	3	2
Roll (+/-)	7	5

Figure B-85. SH-60B/F Launch and Recovery Envelopes for LPD 4 Class Ships (Sheet 2 of 5)
Sheet 2: Spot 2, Port Approach



NOTE:

Envelope valid for all SH-60B/F gross weights allowed by NATOPS provided ambient conditions allow HOGE capability plus a 10 percent torque margin.

Entire area: day operations

Shaded area: night operations

LIMITS:	Day	Night
Pitch (+/-)	3	2
Roll (+/-)	7	5

Figure B-85. SH-60B/F Launch and Recovery Envelopes for LPD 4 Class Ships (Sheet 3 of 5)
Sheet 3: Spot 1, Starboard Approach

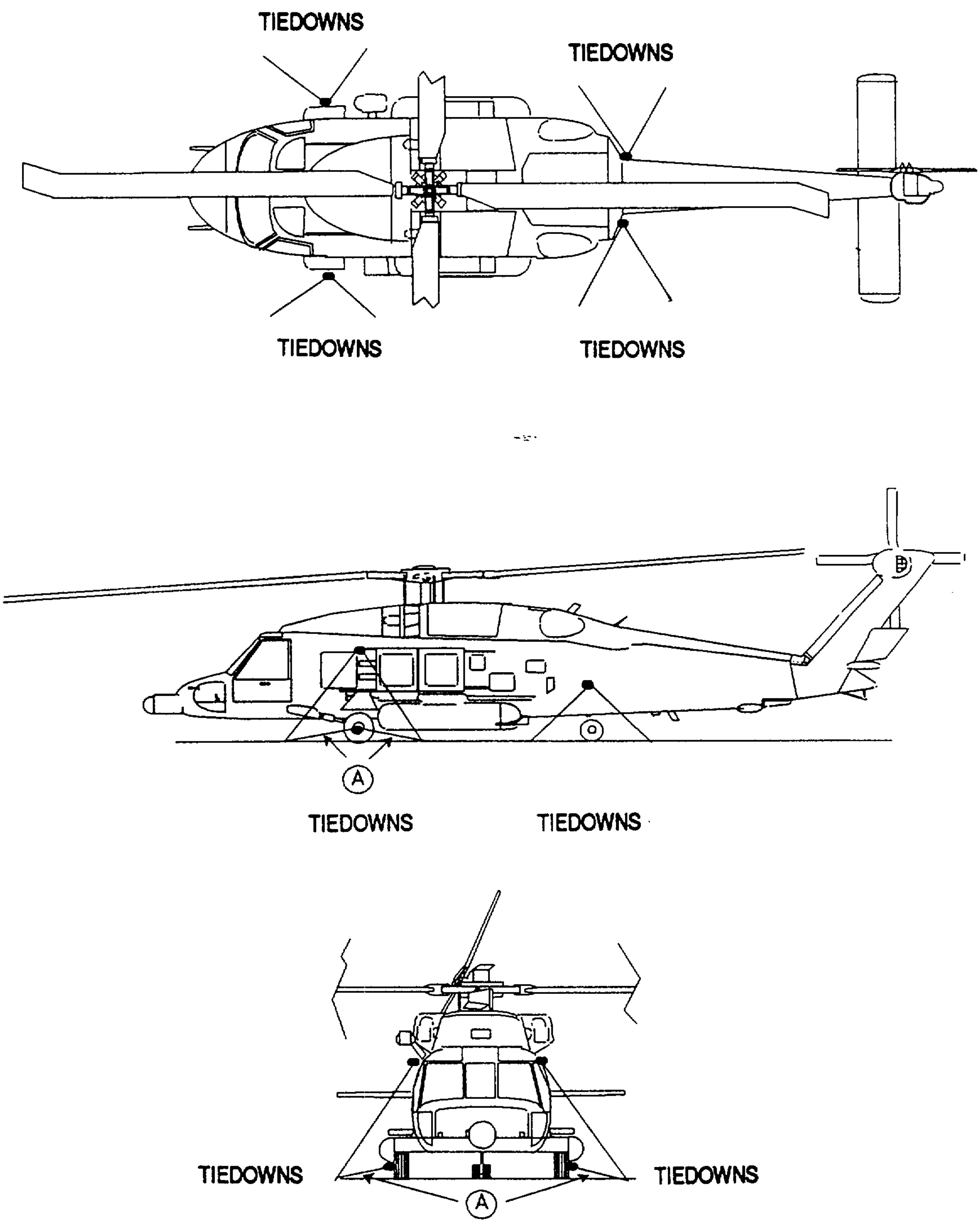
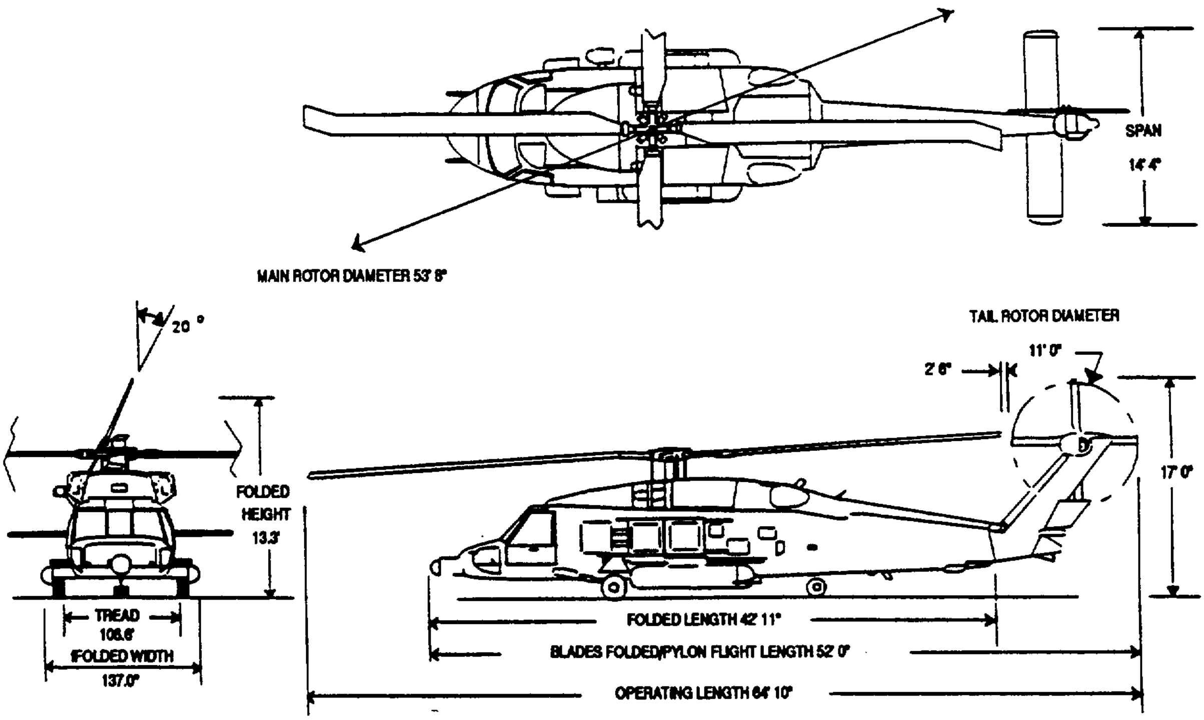


Figure B-86. HH-60J Tiedown (Coast Guard)

MODEL	HH60J (U.S. Coast Guard)
POWER	2-T700-GE-401C
CREW	4
MAXIMUM RANGE	600 NM at 146 knots
MAXIMUM SPEED	180 knots
ENDURANCE	6 hrs. at 70 knots
WEIGHT: Empty	13,395 lb
Maximum	21,884 lb.
FUEL: Type	JP-4/JP-5
Capacity	590 gal. main/310 gal. external

CARGO/PASSENGER CAPACITY: External hook; 600 lb rescue hoist; 6 passengers; 1 litter patient.



NOTE: Maximum wind for rotor engagement is 45 knots in any quadrant.

Figure B-87. HH-60J Jay Hawk (Coast Guard)

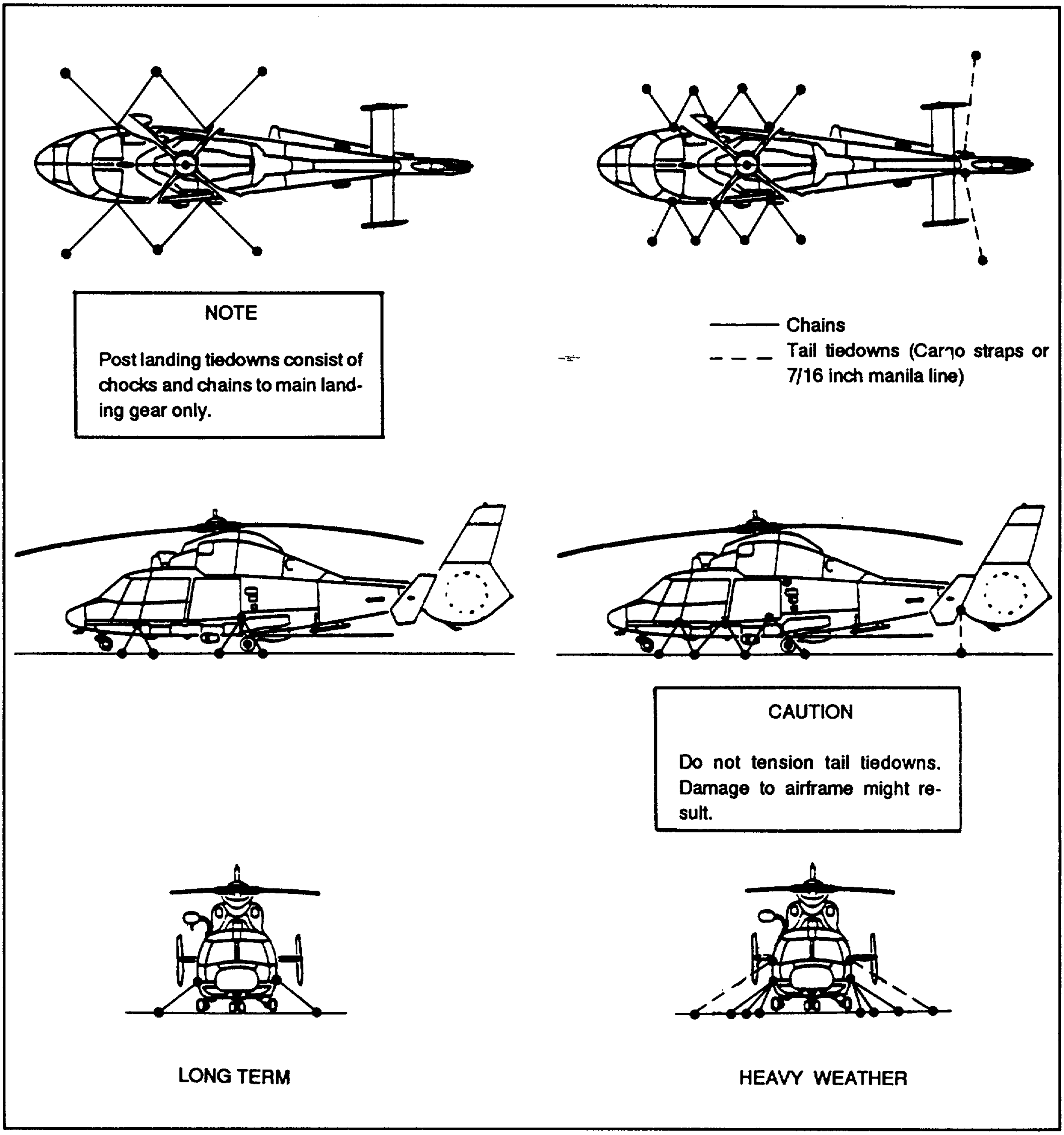
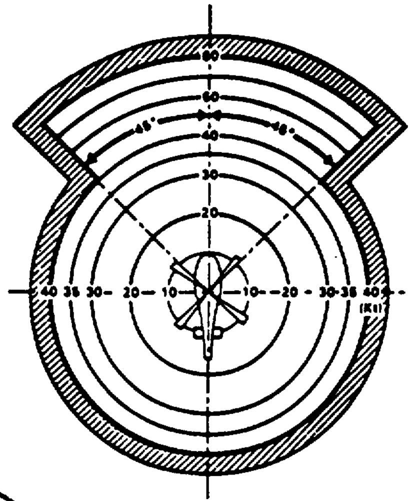


Figure B-88. HH-65A Secondary and Heavy Weather Tiedowns (Coast Guard)

MODEL	HH-65A (U.S. Coast Guard)
POWER	**Two LTS-101-750B-2 engines**
CREW	1 or 2 pilots, 1 crewmember
MAXIMUM RANGE	450 nm (no reserve)
MAXIMUM SPEED	150 knots
ENDURANCE	4.0 hrs @ 70 kts
WEIGHT: BASIC	6,000
MAXIMUM	8,900
FUEL: TYPE	JP-5/JP-4
CAPACITY	291 gal.

CARGO/PASSENGER CAPABILITY: External hook; 600 lb personnel hoist; seats for 7 passengers; 1 rescue basket; 1 litter.



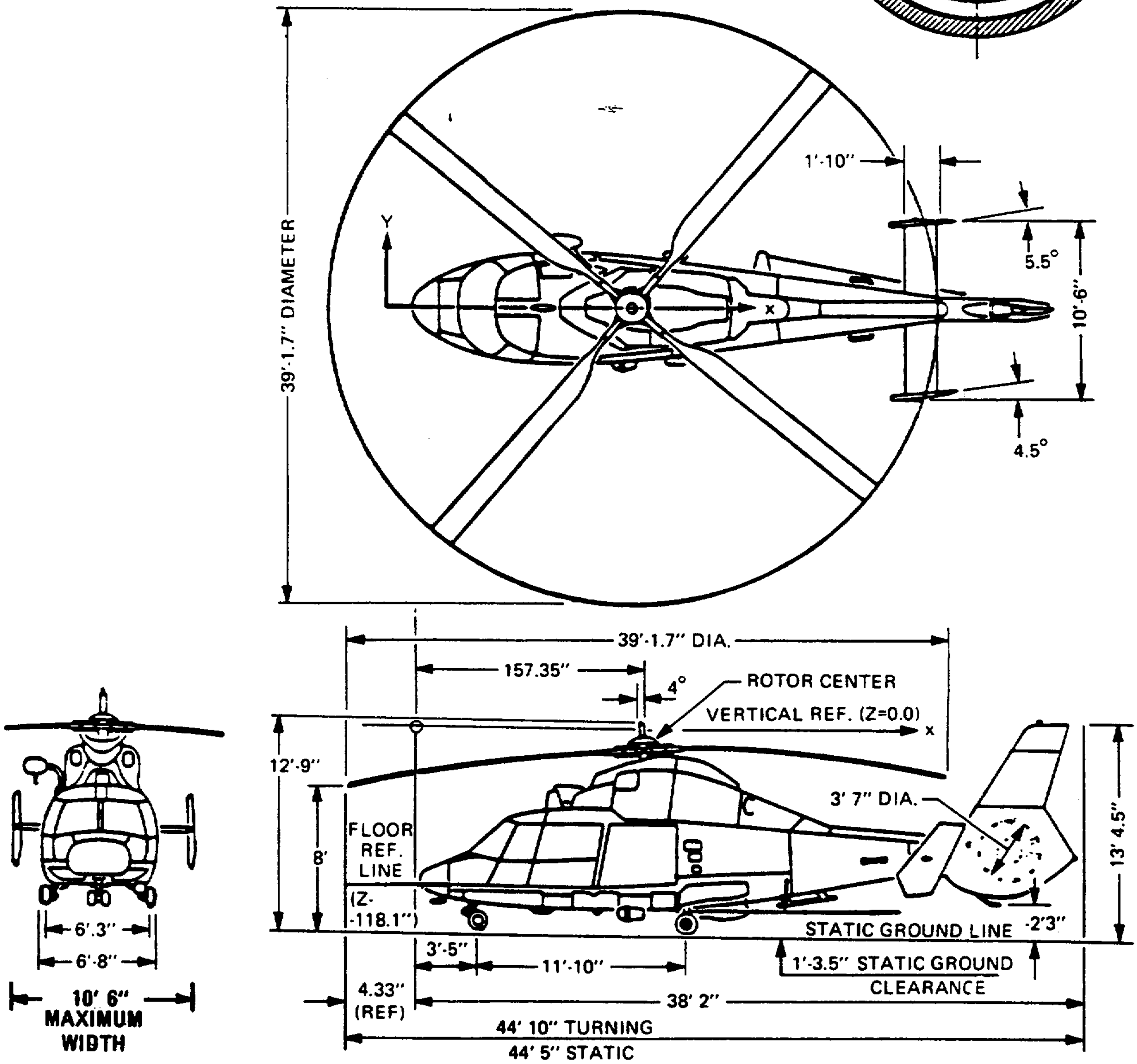
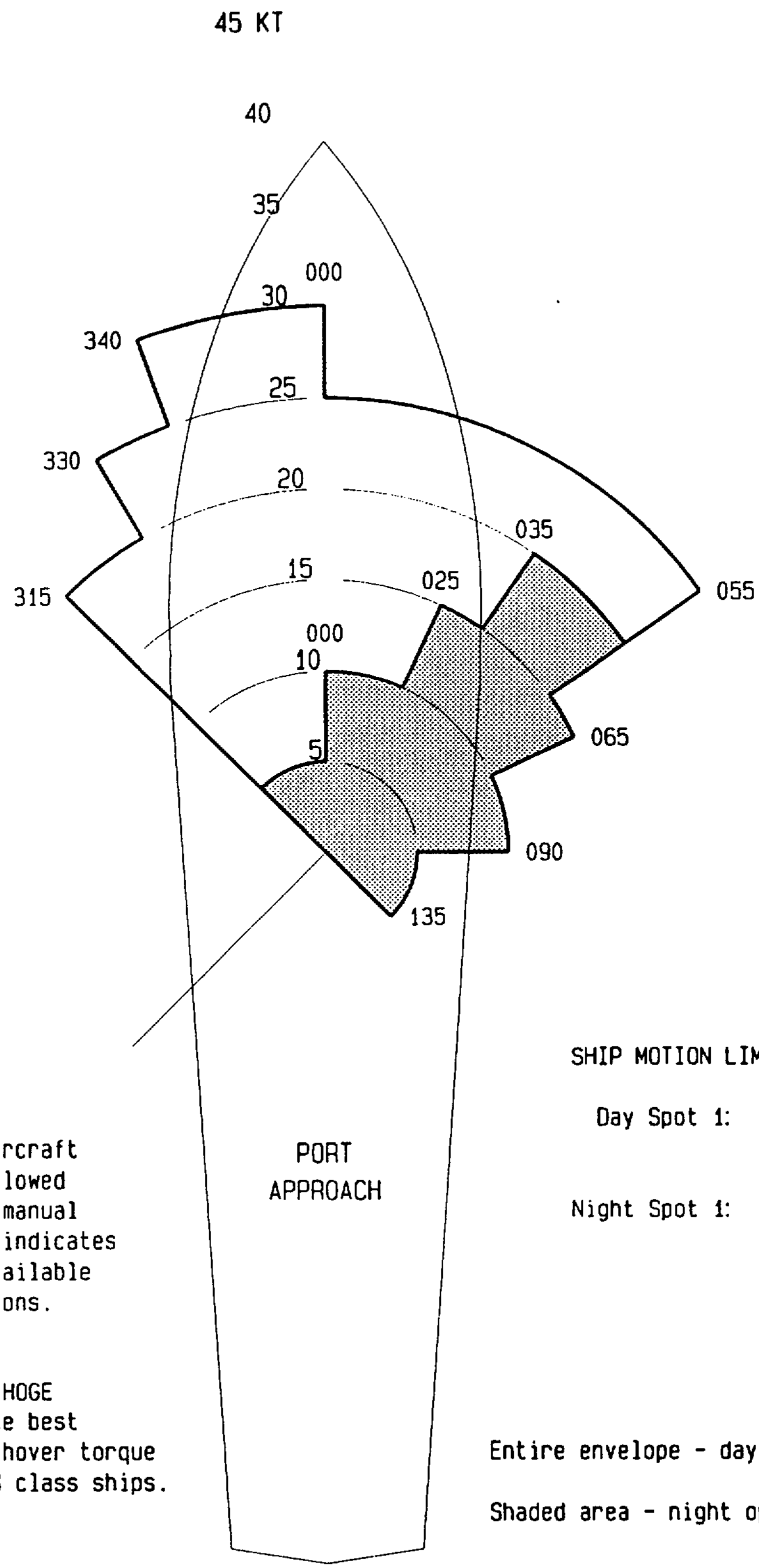


Figure B-89. HH-65A Dolphin (Coast Guard)



NOTES:

Envelope valid for all aircraft gross weights and CG's allowed by the MH-47E operator's manual provided that the manual indicates sufficient HOGE torque available for given ambient conditions.

MH-47E operator's manual HOGE torque predictions are the best prediction for shipboard hover torque requirements aboard LPD 4 class ships.

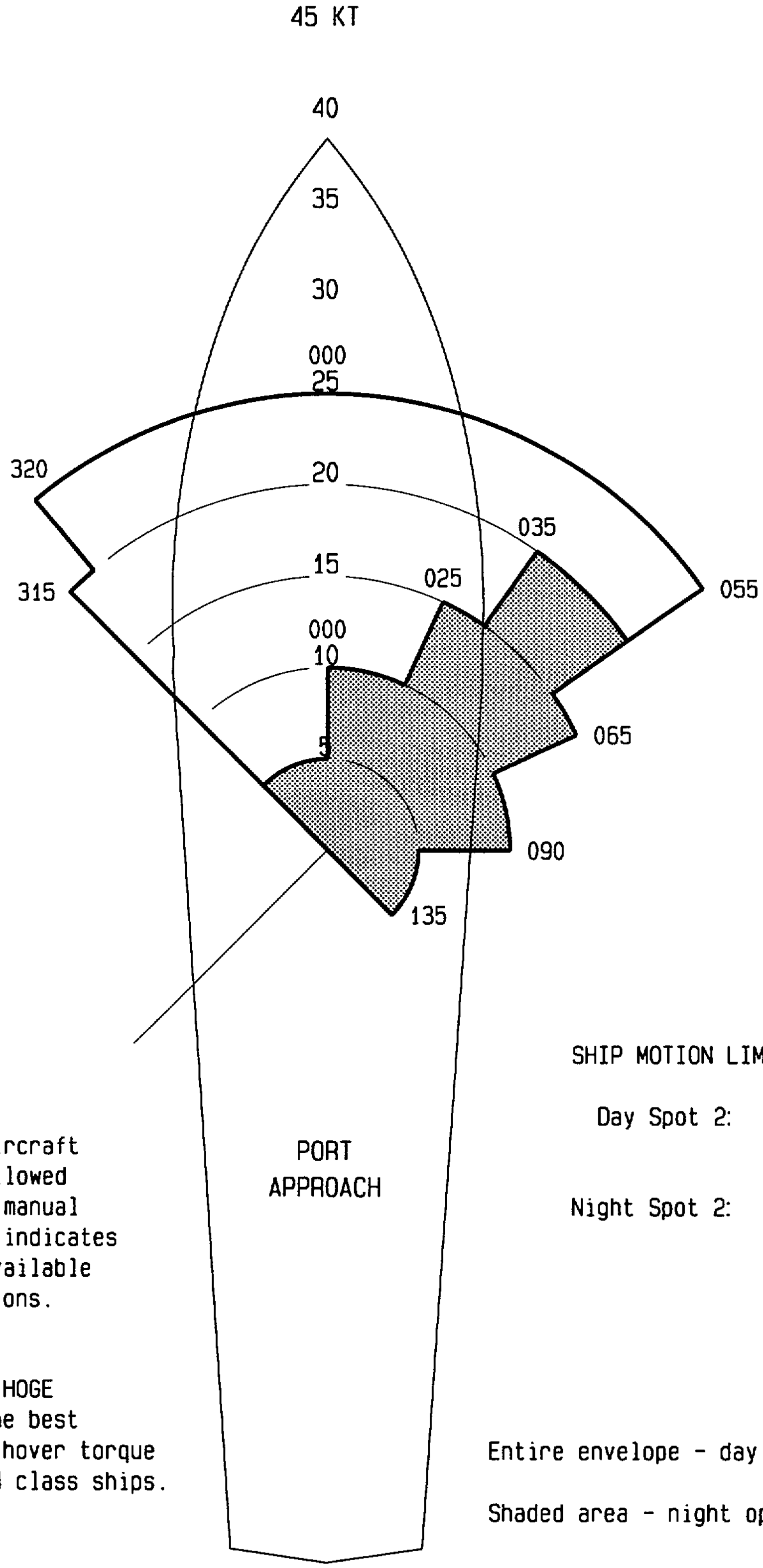
SHIP MOTION LIMITS

Day Spot 1:	Pitch	(+/-) 4
	Roll	(+/-) 6
Night Spot 1:	Pitch	(+/-) 2
	Roll	(+/-) 4

Entire envelope - day operations

Shaded area - night operations

Figure B-90. MH-47E Launch and Recovery Envelopes for LPD 4 Class Ships (Sheet 1 of 4)
Sheet 1: Spot 1, Port Approach



NOTES:

Envelope valid for all aircraft gross weights and CG's allowed by the MH-47E operator's manual provided that the manual indicates sufficient HOGE torque available for given ambient conditions.

MH-47E operator's manual HOGE torque predictions are the best prediction for shipboard hover torque requirements aboard LPD 4 class ships.

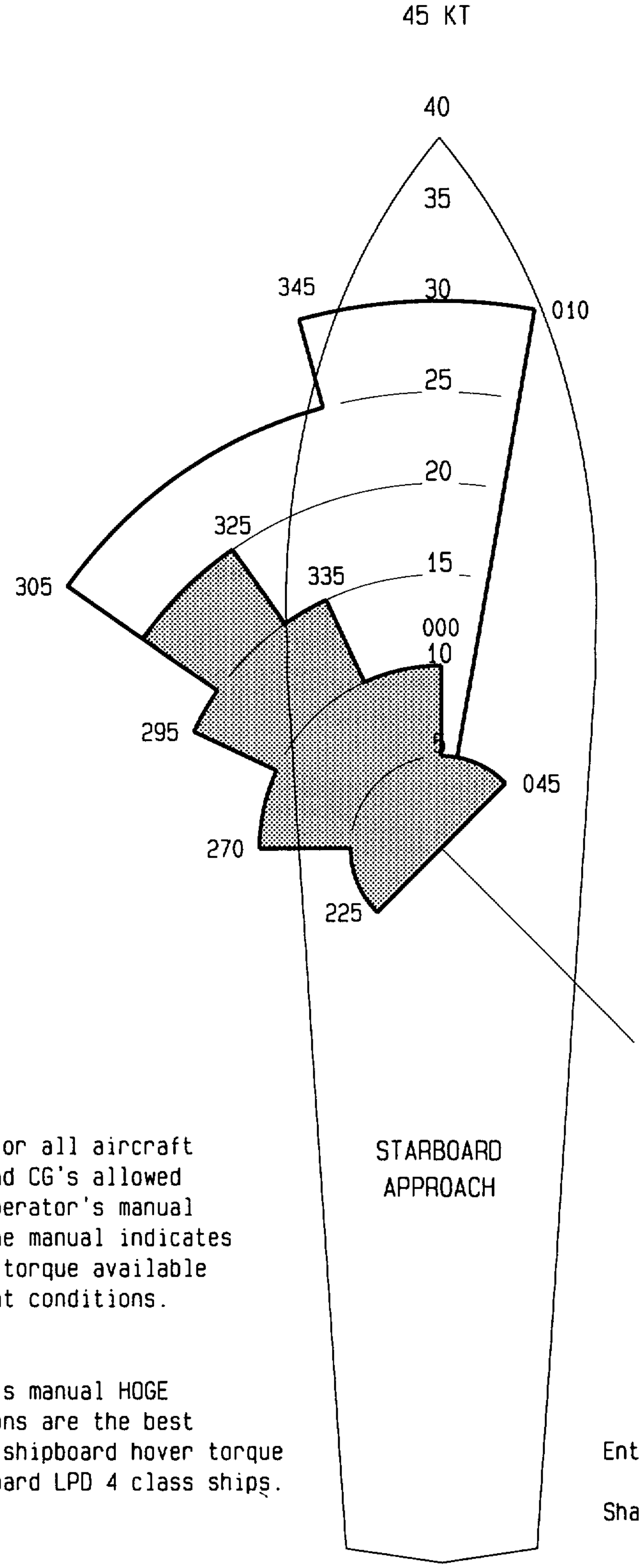
SHIP MOTION LIMITS

Day Spot 2:	Pitch	(+/-) 4
	Roll	(+/-) 7
Night Spot 2:	Pitch	(+/-) 2
	Roll	(+/-) 4

Entire envelope - day operations

Shaded area - night operations

Figure B-90. MH-47E Launch and Recovery Envelopes for LPD 4 Class Ships (Sheet 2 of 4)
Sheet 2: Spot 2, Port Approach



NOTES:

Envelope valid for all aircraft gross weights and CG's allowed by the MH-47E operator's manual provided that the manual indicates sufficient HOGE torque available for given ambient conditions.

MH-47E operator's manual HOGE torque predictions are the best predictions for shipboard hover torque requirements aboard LPD 4 class ships.

SHIP MOTION LIMITS

Day Spot 1: Pitch (+/-) 4
Roll (+/-) 6

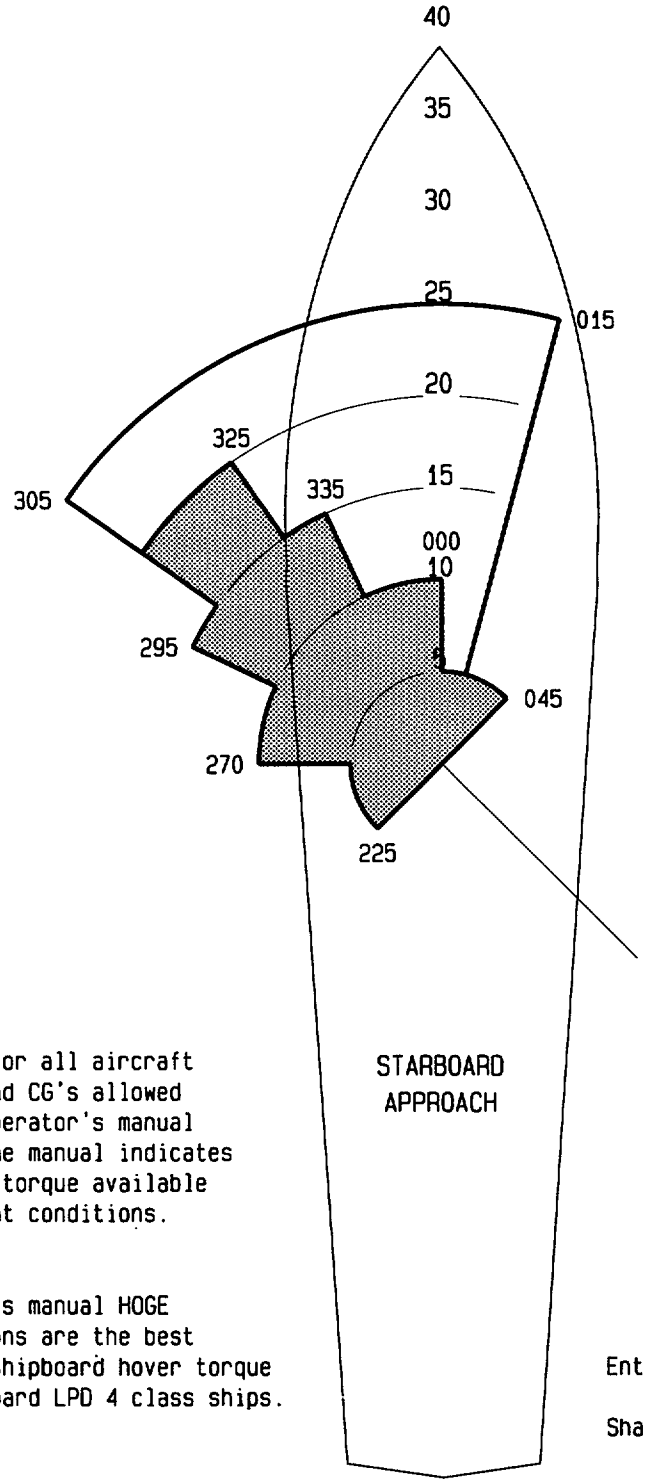
Night Spot 1: Pitch (+/-) 2
Roll (+/-) 4

Entire envelope - day operations

Shaded area - night operations

Figure B-90. MH-47E Launch and Recovery Envelopes for LPD 4 Class Ships (Sheet 3 of 4)
Sheet 3: Spot 1, Starboard Approach

45 KT



NOTES:

Envelope valid for all aircraft gross weights and CG's allowed by the MH-47E operator's manual provided that the manual indicates sufficient HOGE torque available for given ambient conditions.

MH-47E operator's manual HOGE torque predictions are the best prediction for shipboard hover torque requirements aboard LPD 4 class ships.

SHIP MOTION LIMITS

Day Spot 2: Pitch (+/-) 4
Roll (+/-) 7

Night Spot 2: Pitch (+/-) 2
Roll (+/-) 4

Entire envelope - day operations

Shaded area - night operations

Figure B-90. MH-47E Launch and Recovery Envelopes for LPD 4 Class Ships (Sheet 4 of 4)
Sheet 4: Spot 2, Starboard Approach

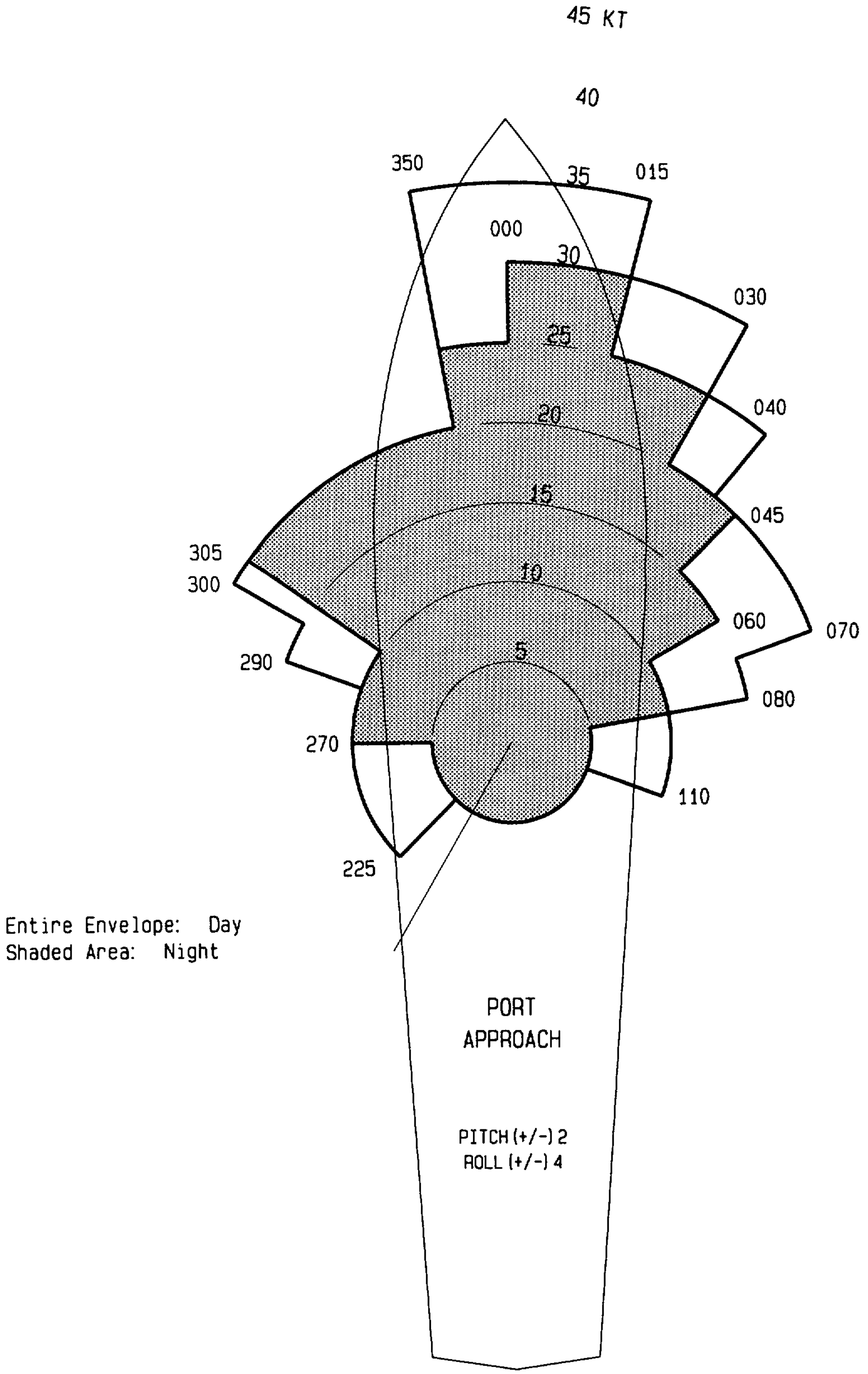


Figure B-91. OH-58D Launch and Recovery Envelopes for Non-RAST FFG 7 Class Ships (Sheet 1 of 2)
Sheet 1: Port Approach

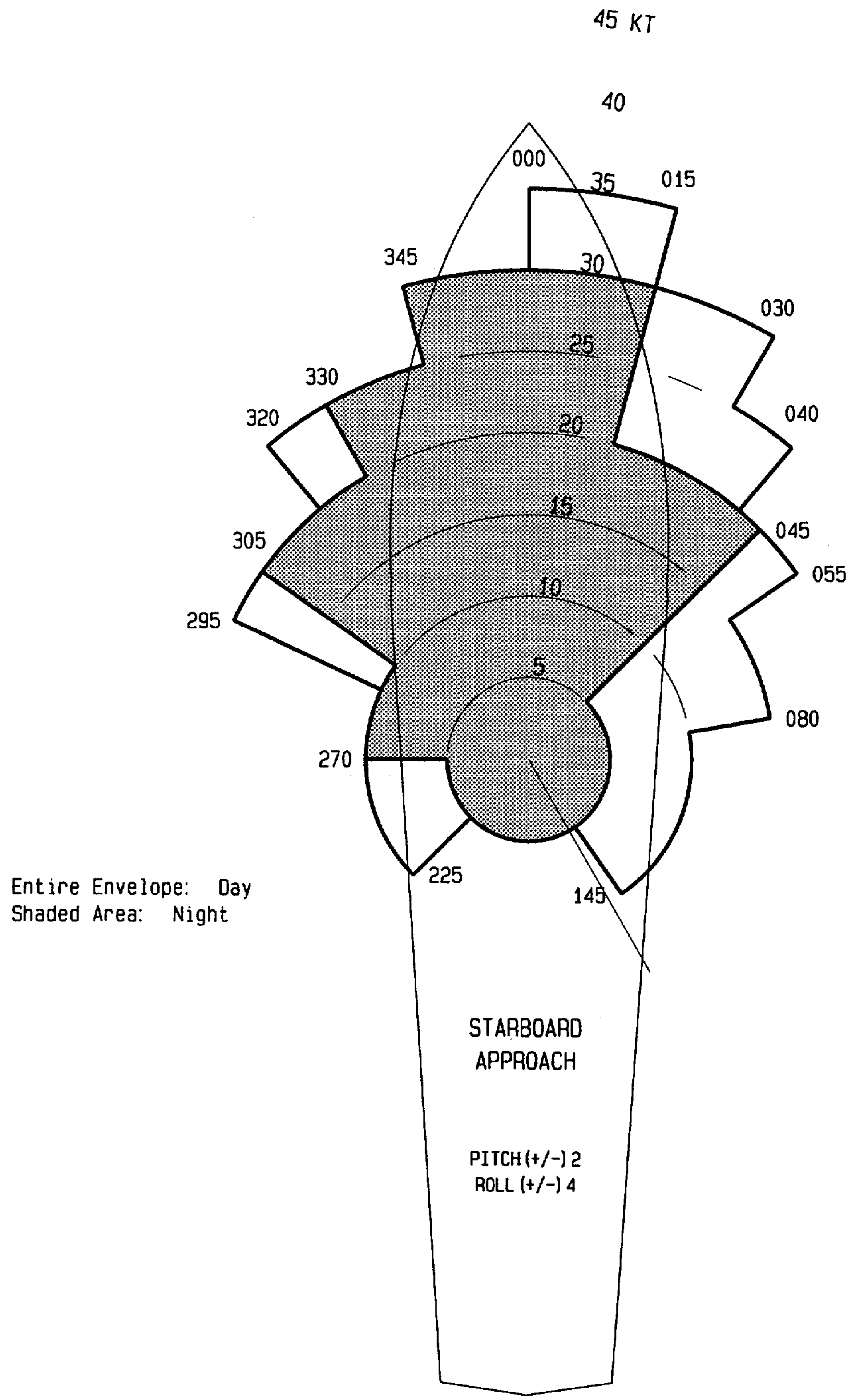
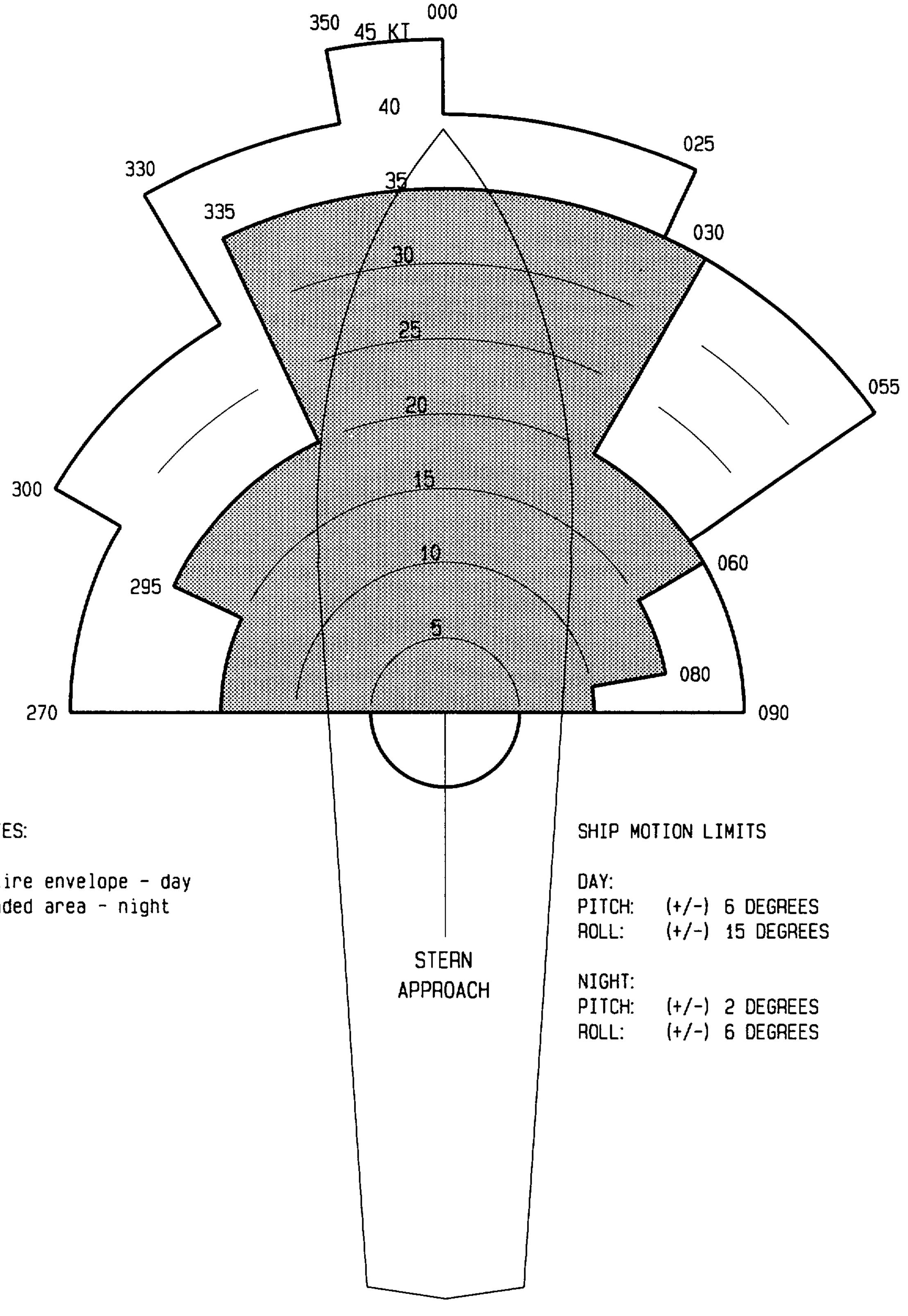


Figure B-91. OH-58D Launch and Recovery Envelopes for Non-RAST FFG 7 Class Ships (Sheet 2 of 2)
Sheet 2: Starboard Approach



NOTES:

Entire envelope - day
Shaded area - night

SHIP MOTION LIMITS

DAY:
PITCH: (+/-) 6 DEGREES
ROLL: (+/-) 15 DEGREES

NIGHT:
PITCH: (+/-) 2 DEGREES
ROLL: (+/-) 6 DEGREES

Figure B-92. MH-60K Launch and Recovery Envelope for RAST-Capable FFG 7 Class Ships

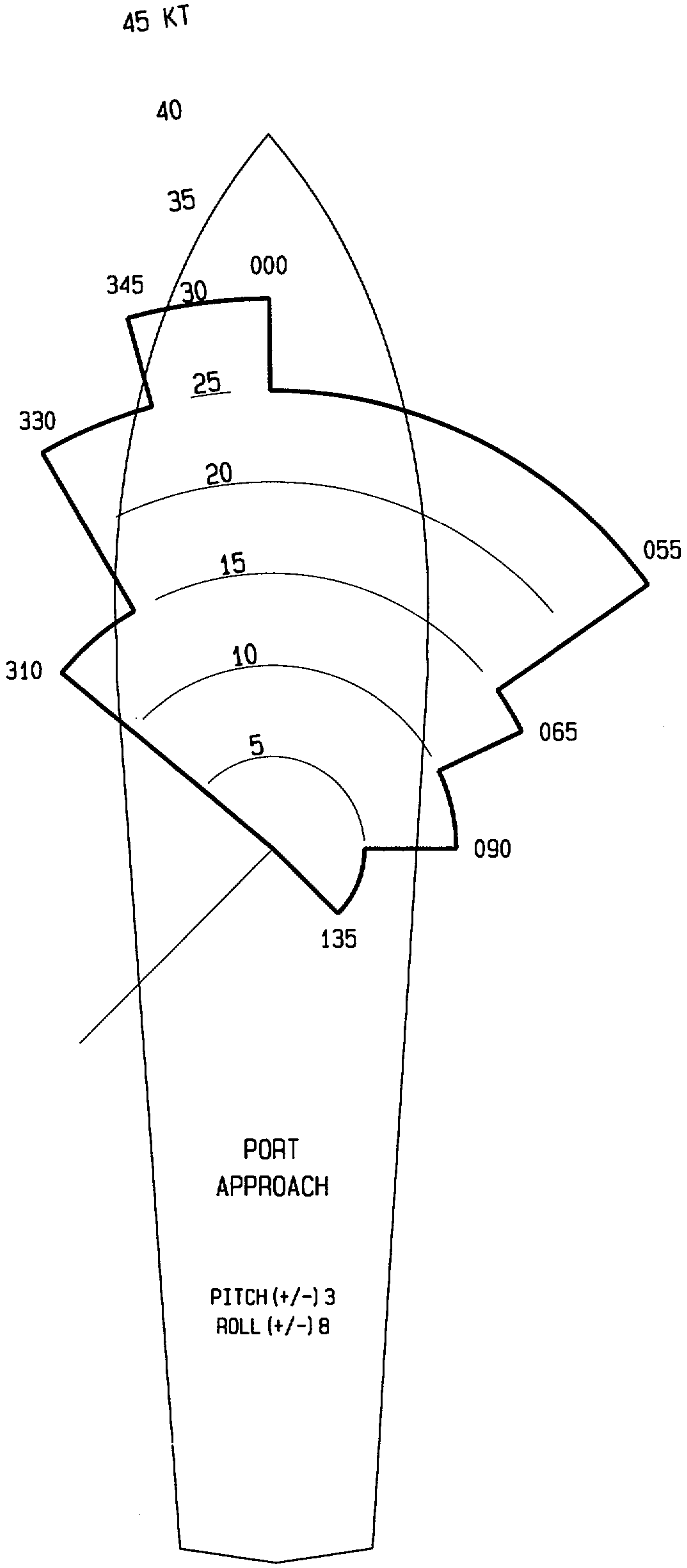


Figure B-93. MH-60K Launch and Recovery Envelopes for LPD 4 Class Ships (Sheet 1 of 4)
Sheet 1: Spot 1 Day, Port Approach

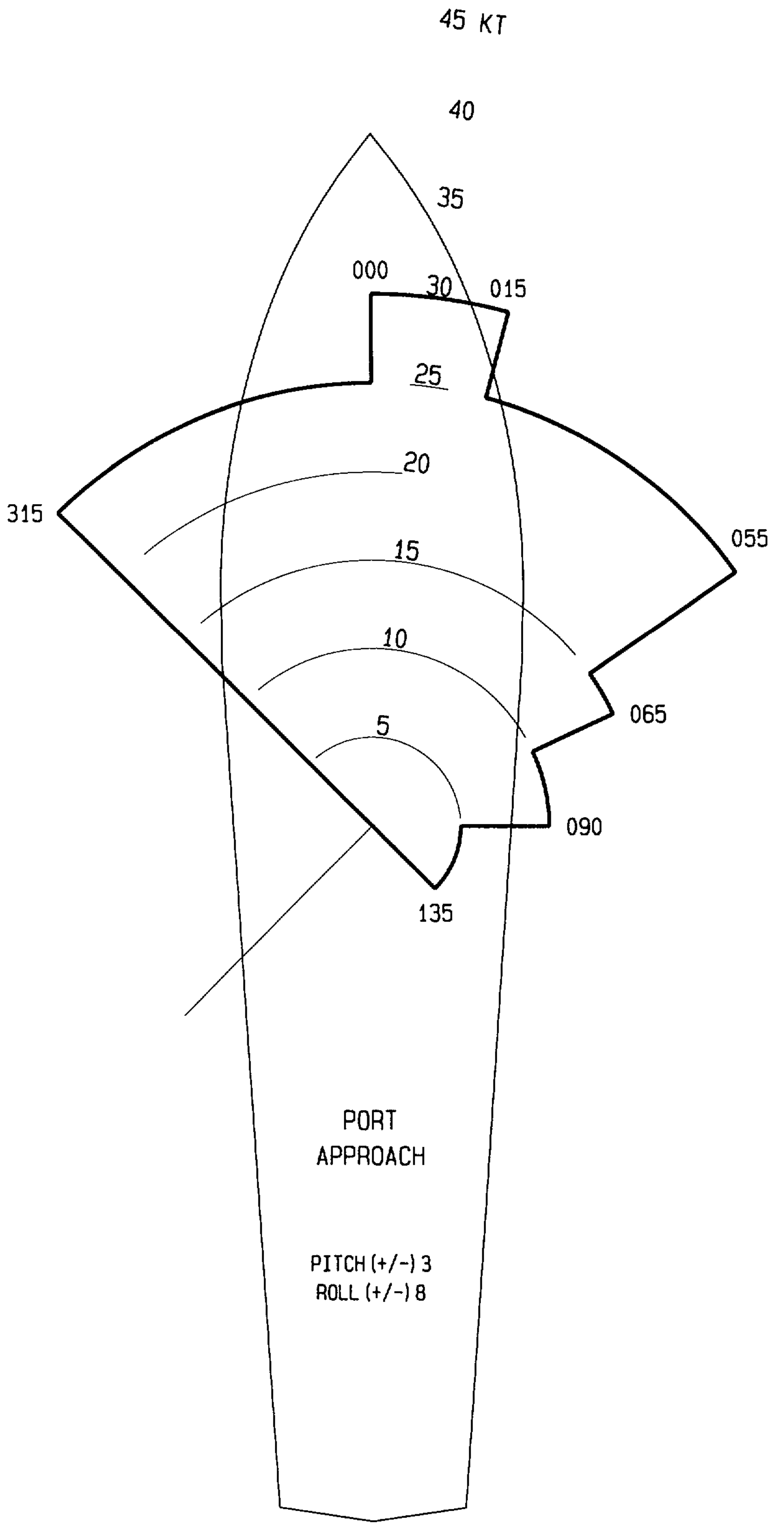


Figure B-93. MH-60K Launch and Recovery Envelopes for LPD 4 Class Ships (Sheet 2 of 4)
Sheet 2: Spot 2 Day, Port Approach

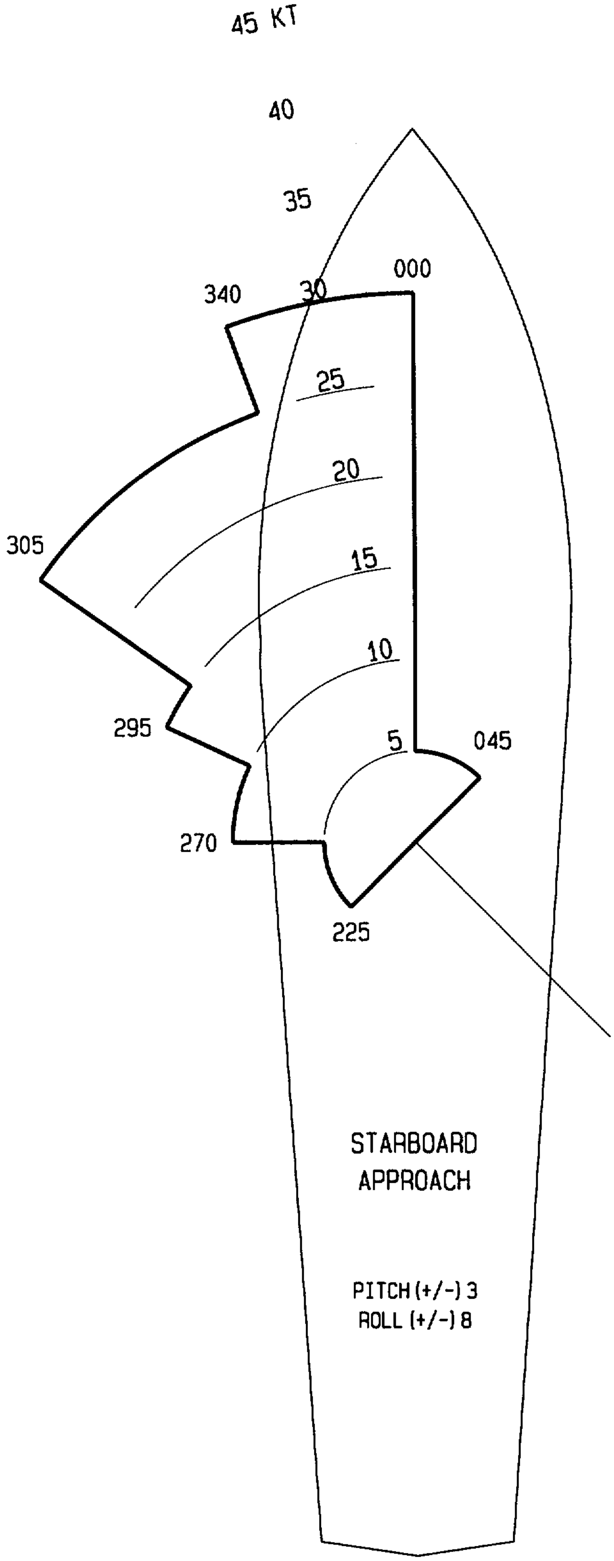


Figure B-93. MH-60K Launch and Recovery Envelopes for LPD 4 Class Ships (Sheet 3 of 4)
Sheet 3: Spot 1 Day, Starboard Approach

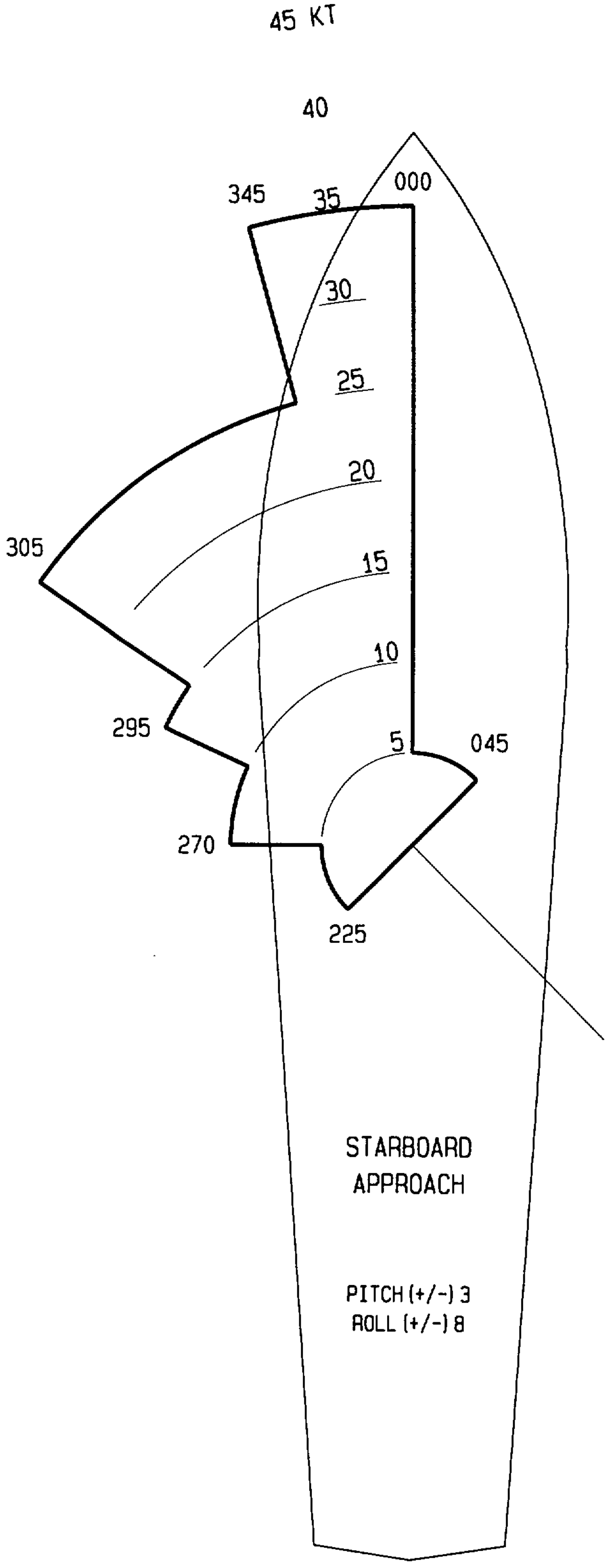


Figure B-93. MH-60K Launch and Recovery Envelopes for LPD 4 Class Ships (Sheet 4 of 4)
Sheet 4: Spot 2 Day, Starboard Approach

APPENDIX C

Army/Air Force/National Guard Helicopter Specifications

CONTENTS

C.1 OTHER DOD HELICOPTERS

Figures C-1 through C-22 provide tiedown, operational, and dimensional information on helicopters used by the Army, Air Force, and National Guard. For some helicopters, the notes provide limitations for rotor engagement and disengagement.

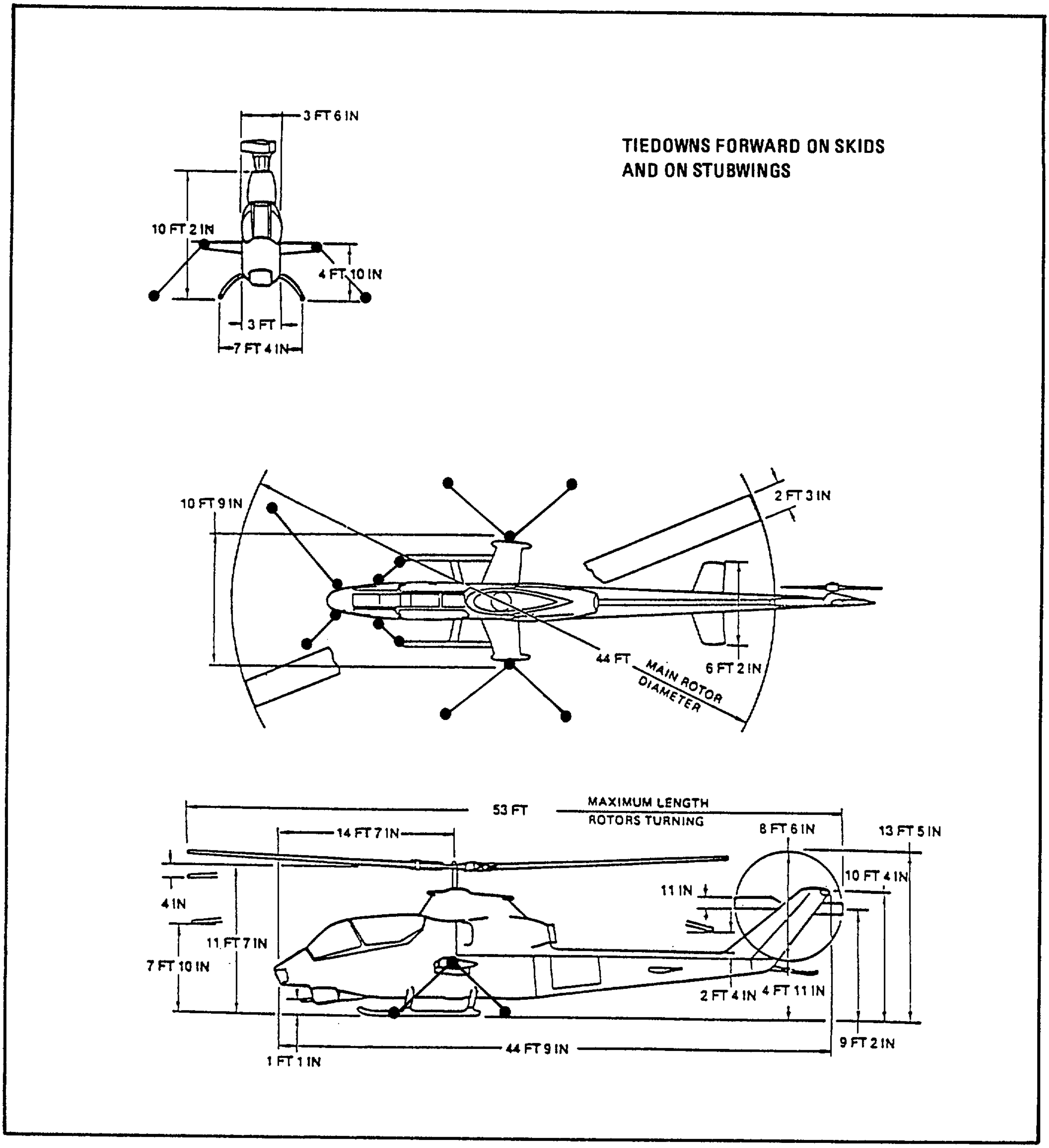
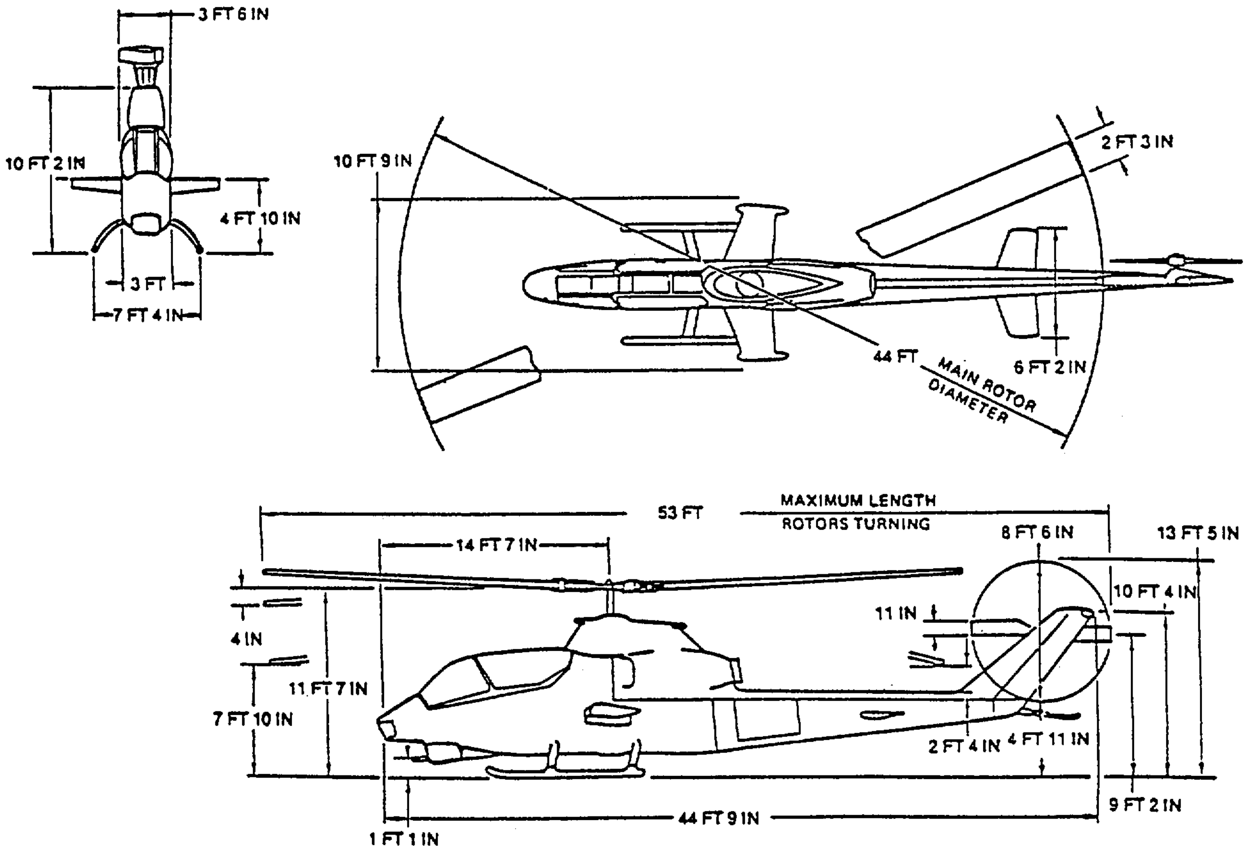


Figure C-1. AH-1S Tiedown

MODEL	**AH-1S**
POWER	**1 – T53-L-703**
CREW	**2**
MAXIMUM RANGE	**320 nm at 130 knots**
MAXIMUM SPEED	**140 knots**
ENDURANCE	**2.6 hr**
WEIGHT: Basic	**6,500 lb**
Maximum	**10,000 lb**
FUEL: Type	**JP-4/JP-5**
Capacity	**262 gal**

CARGO/PASSENGER CAPABILITY: None.



NOTES:

Rotors may be engaged/disengaged in winds up to 30 knots from any direction.

Maximum gust spread 15 knots.

Figure C-2. AH-1S Cobra

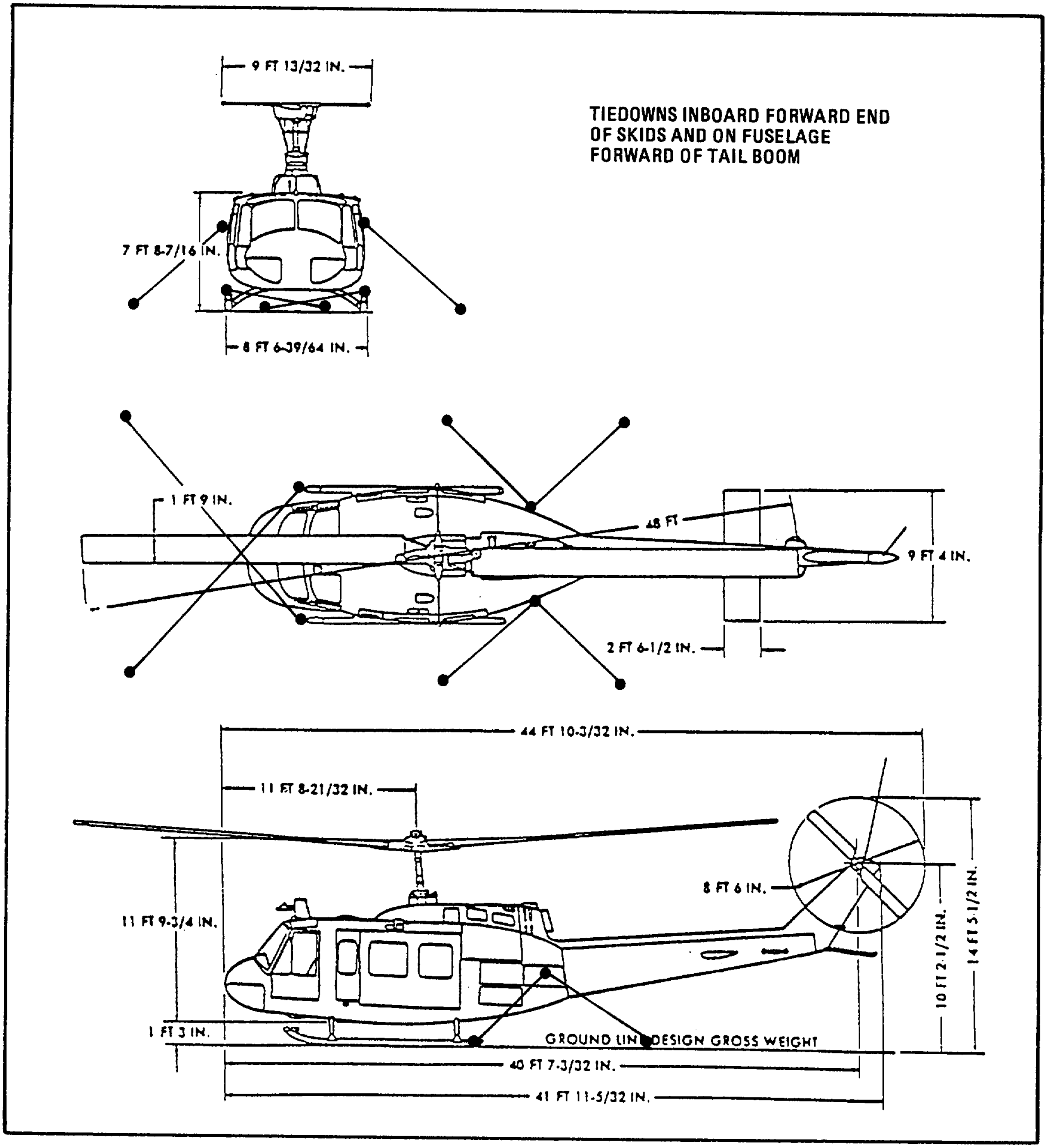
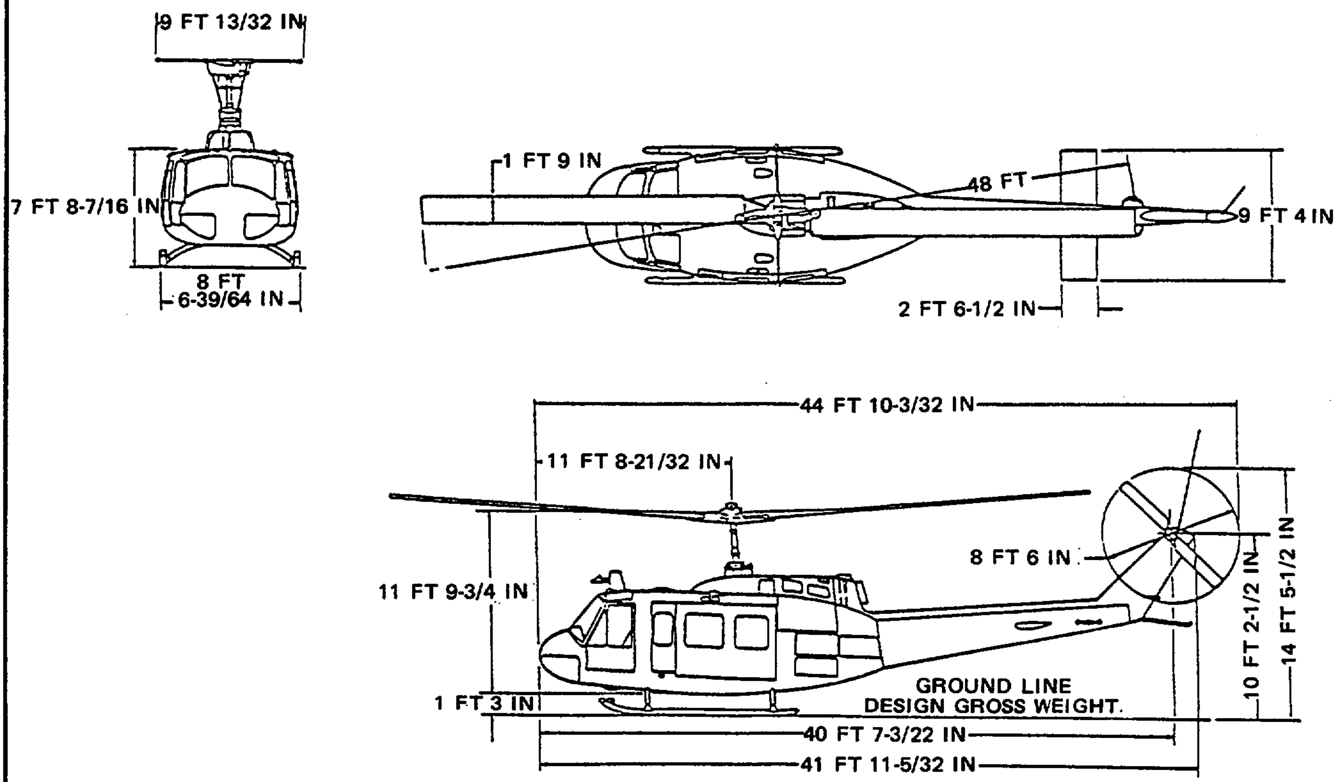


Figure C-3. UH-1H/V Tiedown

MODEL	UH-1H/V
POWER	1 – T53-L-13B
CREW	1
MAXIMUM RANGE	270 nm
MAXIMUM SPEED	120 knots
ENDURANCE	2.7 hr
WEIGHT: Basic	6,600 lb
Maximum	9,500 lb
FUEL: Type	JP-4/JP-5
Capacity	209 gal

CARGO/PASSENGER CAPABILITY: Some have cargo hooks; seats for 12 passengers



NOTES:

Some have rescue hoists.

Rotors may be engaged/disengaged in winds up to 30 knots from any direction.

Maximum gust spread 15 knots.

Figure C-4. UH-1H/V Iroquois

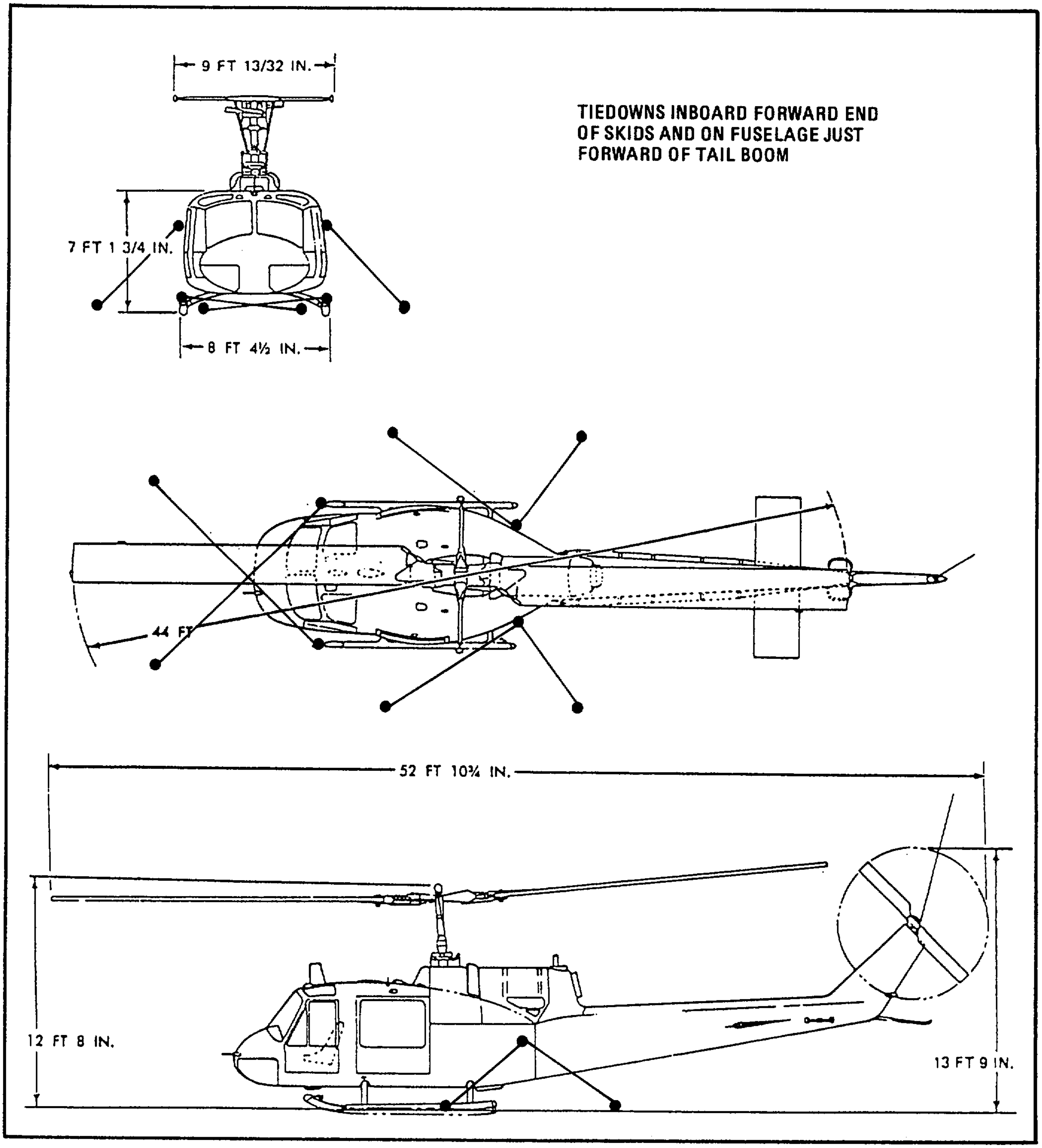
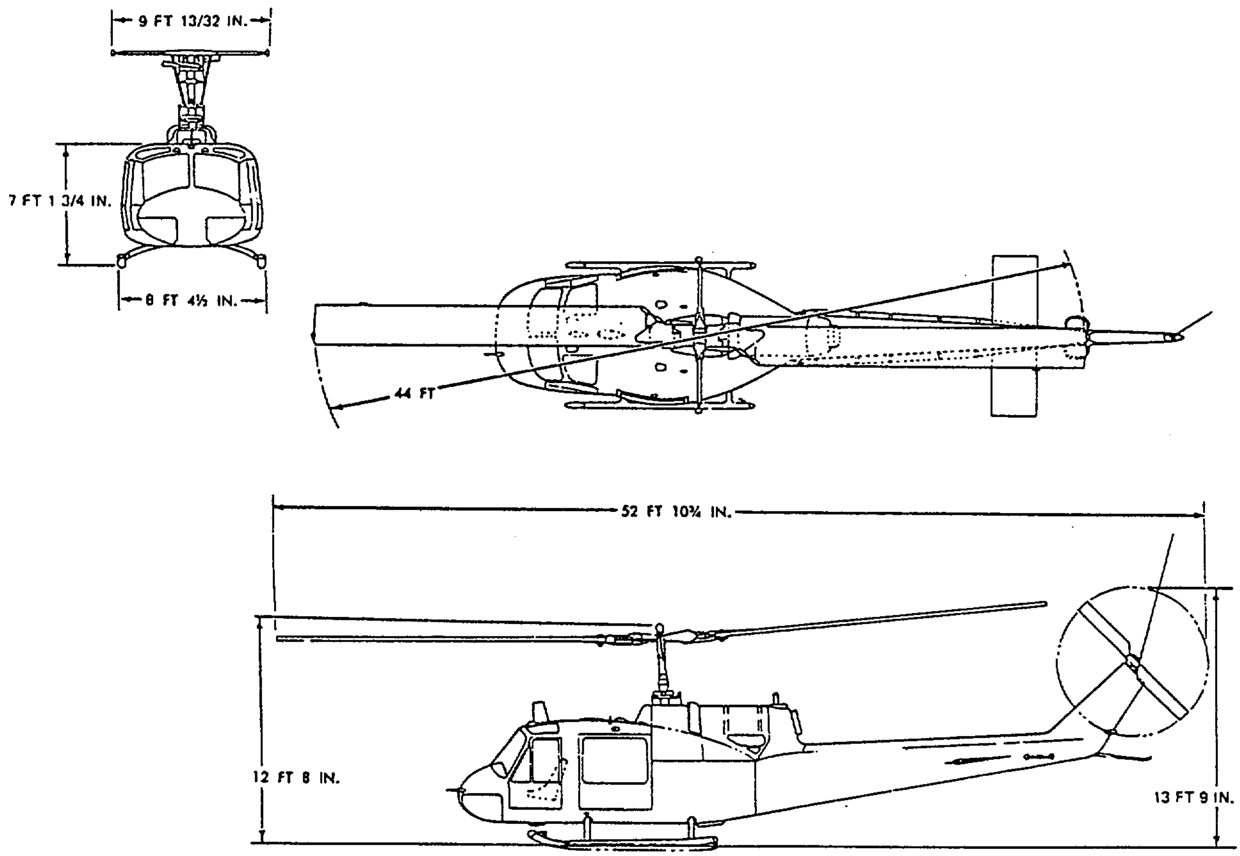


Figure C-5. UH-1M Tiedown

MODEL	**UH-1M**
POWER	**1 – T53-L-13B**
CREW	**2**
MAXIMUM RANGE	**300 nm**
MAXIMUM SPEED	**140 knots**
ENDURANCE	**2.0 hr at 55 knots**
WEIGHT: Basic	**4,830 lb**
Maximum	**9,500 lb**
FUEL: Type	**JP-4/JP-5**
Capacity	**242 gal**

CARGO/PASSENGER CAPABILITY: Some have 600 lb rescue hoist; seats for 7 passengers; 140 ft^3 cargo space.



NOTES:

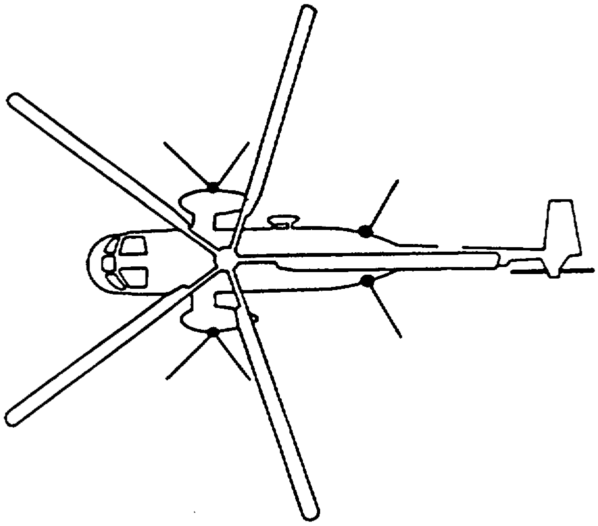
Rotors may be engaged/disengaged in winds up to 30 knots from any direction.

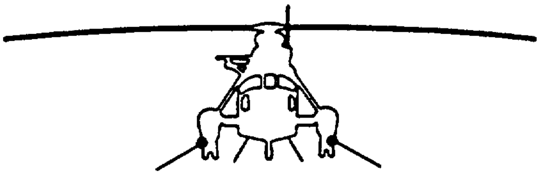
Maximum gust spread 15 knots.

Figure C-6. UH-1M Iroquois

WARNING

TO AVOID ENTRY INTO GROUND RESONANCE, ALL TIEDOWNS SHALL BE ATTACHED WITH 2 TO 3 INCHES OF SLACK WHEN THE ROTOR SYSTEM IS ENGAGED.





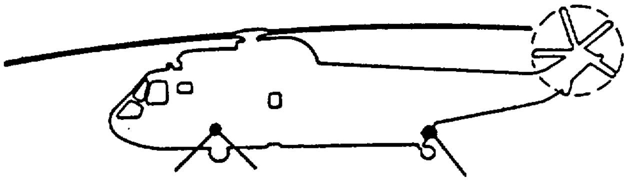


Figure C-7. HH-3E/H Tiedown

MODEL	HH-3E/H
POWER	2 – T58-GE-5
CREW	3
MAXIMUM RANGE	465 nm at 130 knots
MAXIMUM SPEED	140 knots
ENDURANCE	2.9 hr at maximum weight; 4.5 hr at minimum weight
WEIGHT: Basic	14,500 lb
Maximum	22,050 lb
FUEL: Type	JP-4/JP-5/JP-8
Capacity	1,032 gal

CARGO/PASSENGER CAPABILITY: Rescue hook; seats for 23 to 25 passengers

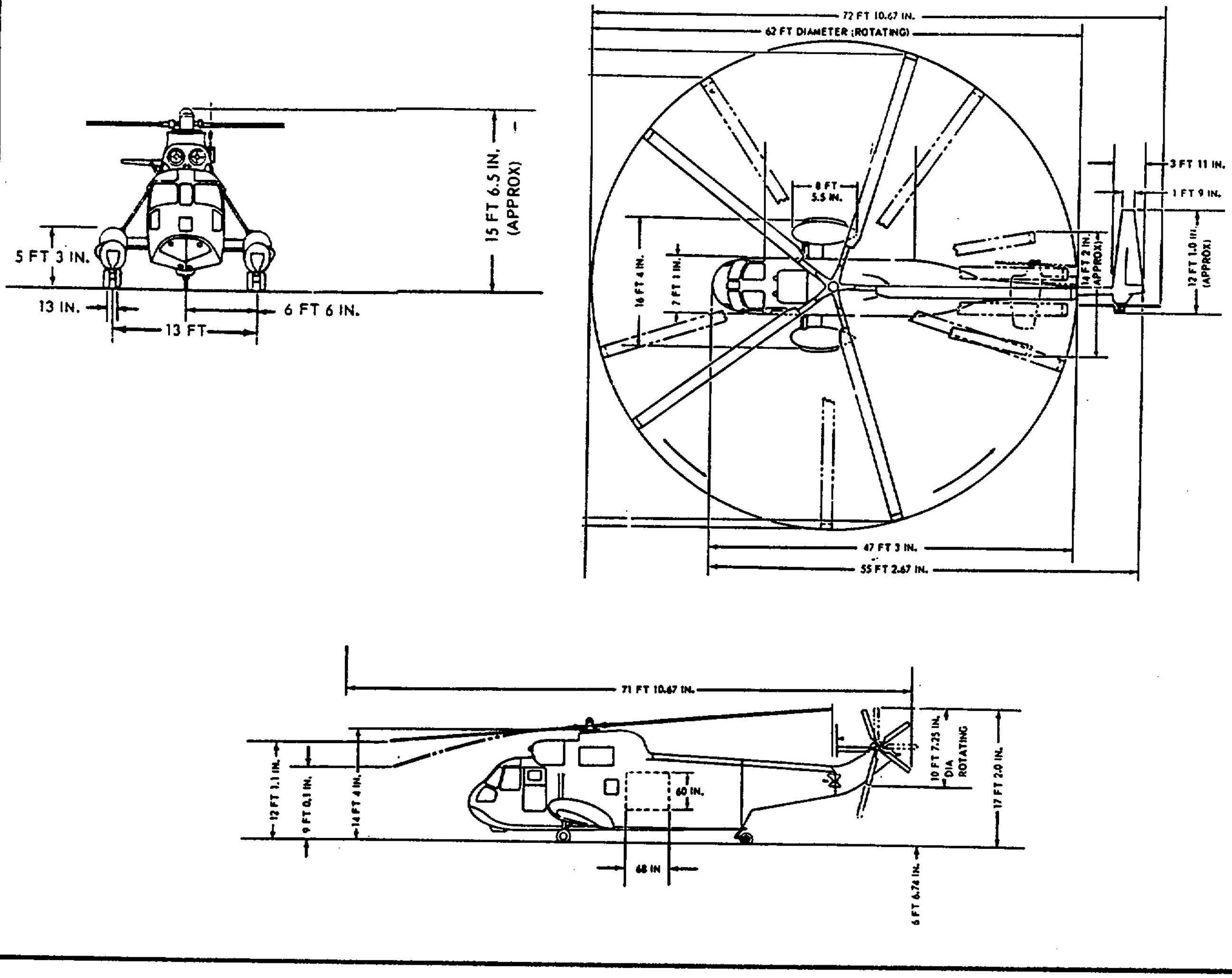


Figure C-8. HH-3E/H Jolly Green Giant

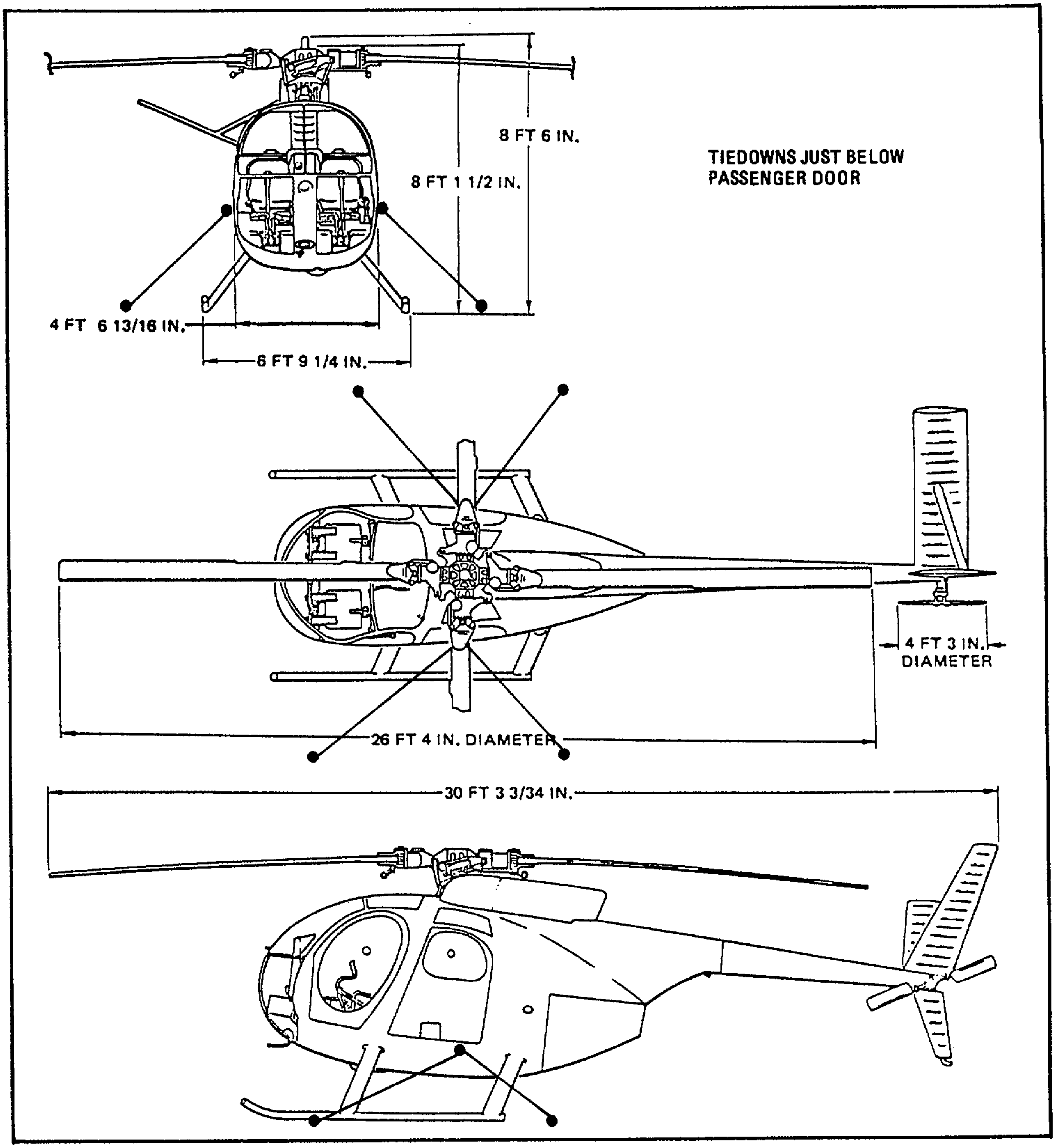
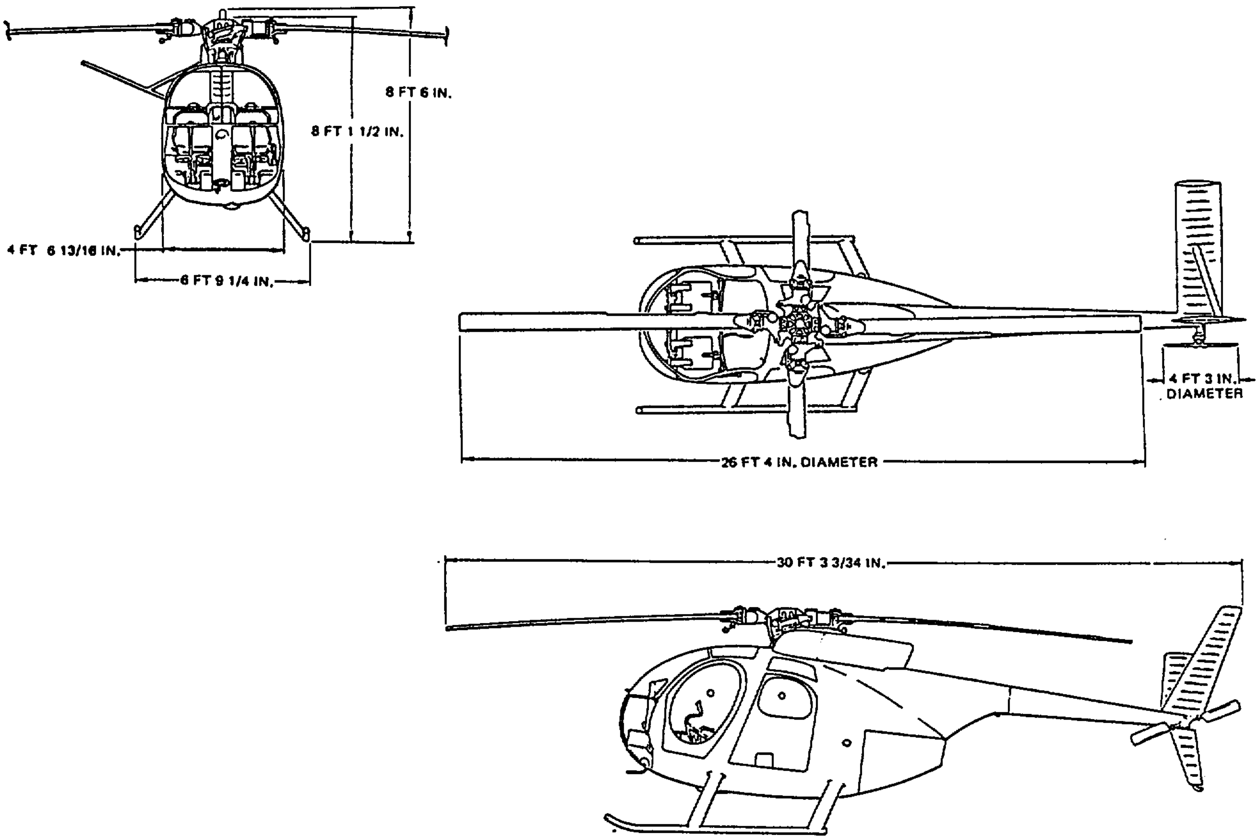


Figure C-9. OH-6A Tiedown

MODEL	OH-6A
POWER	1 – T63-A-5A/700
CREW	2
MAXIMUM RANGE	370 nm at 104 knots
MAXIMUM SPEED	130 knots
ENDURANCE	3.6 hr at 104 knots
WEIGHT: Basic	1,160 lb
Maximum	2,400 lb
FUEL: Type	JP-4
Capacity	61 gal

CARGO/PASSENGER CAPABILITY: Seats for 2 passengers



NOTES:

Limited to day and night marginal visual conditions.

Rotors may be engaged/disengaged in winds up to 40 knots from any direction.

Maximum gust spread 20 knots.

Figure C-10. OH-6A Cayuse

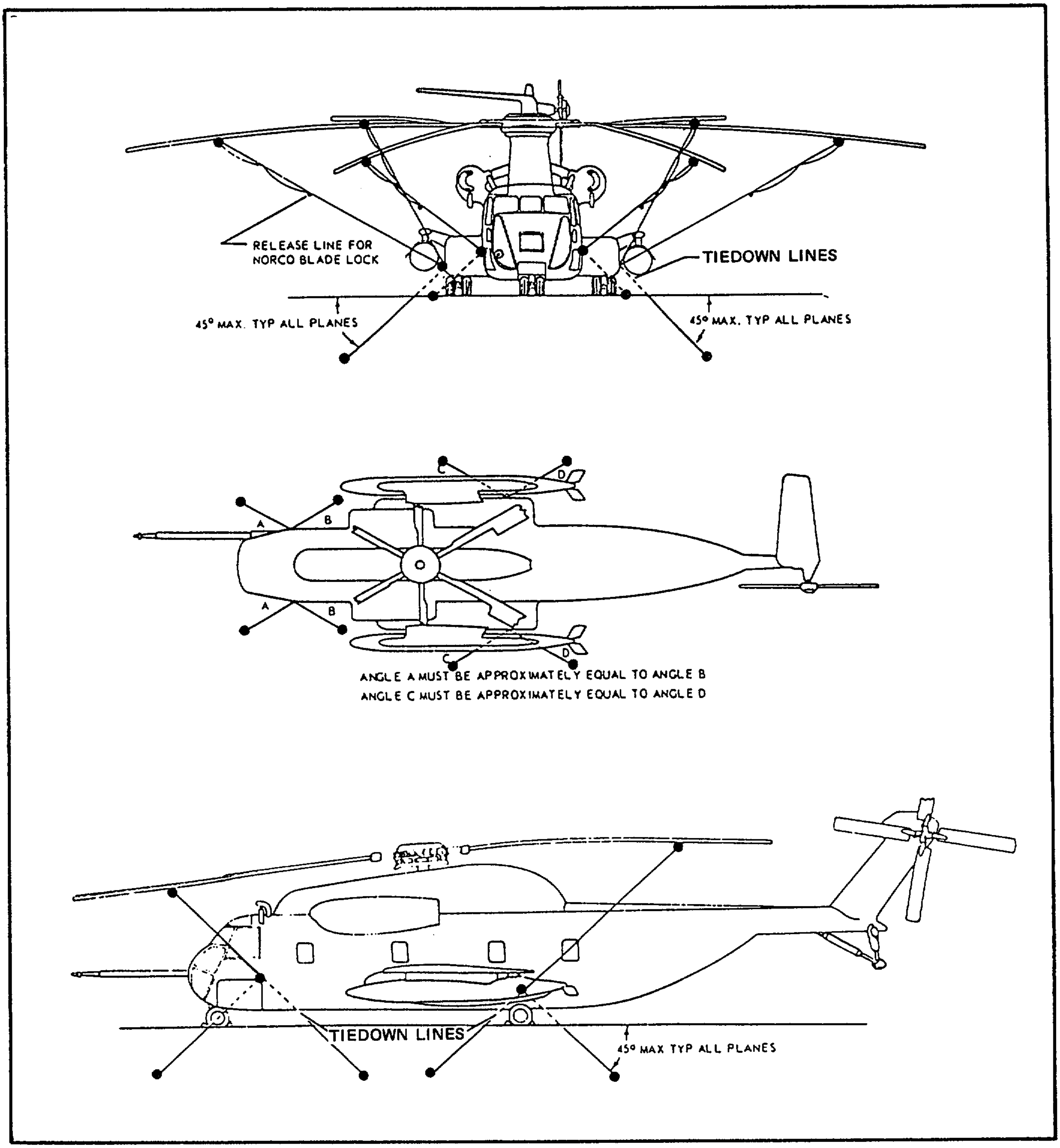
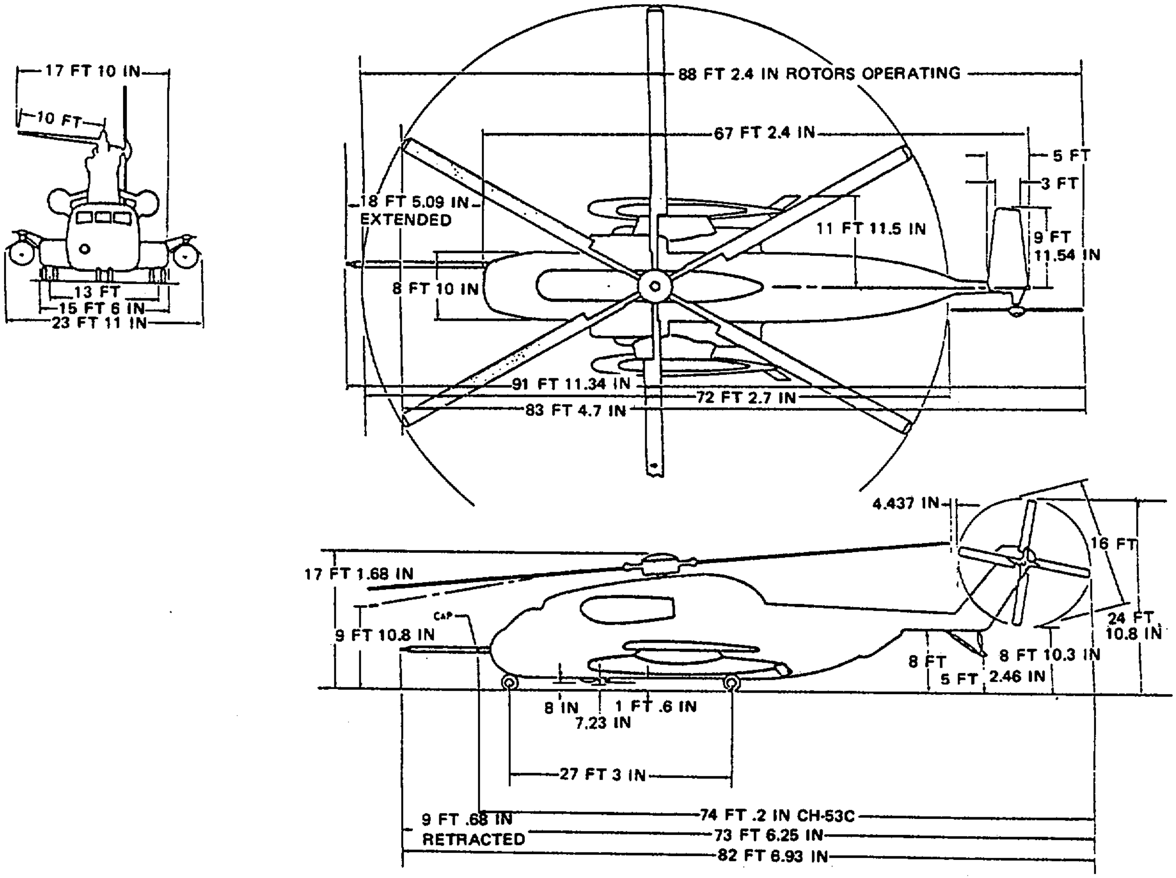


Figure C-13. HH-53B/C Tiedown

MODEL	HH-53B/C/H
POWER	2 – T64-GE-7
CREW	3
MAXIMUM RANGE	540 nm at 150 knots (JP-4); 570 nm (JP-5) with 450 gal drop tanks; 675 nm (JP-4) or 720 nm (JP-5) with 650 gal drop tanks
MAXIMUM SPEED	150 knots
ENDURANCE	4.5 hr at 100 knots (JP-4), 4.7 hr (JP-5) with 450 gal drop tanks; 5.7 hr (JP-4) or 6.0 (JP-5 with 650 gal drop tanks
WEIGHT: Basic	B/C 26,500 lb; H 29,000 lb
Maximum	42,000 lb
FUEL: Type	JP-4/JP-5/JP-8
Capacity	1,465 gal with 450 gal drop tanks; 1,865 gal with 650 gal drop tanks

CARGO/PASSENGER CAPABILITY: Cargo and rescue hooks; seats for 19 passengers



NOTE:

Rotors may be engaged/disengaged in winds up to 45 knots from any direction.

Figure C-14. HH-53B/C/H Super Jolly Green Giant

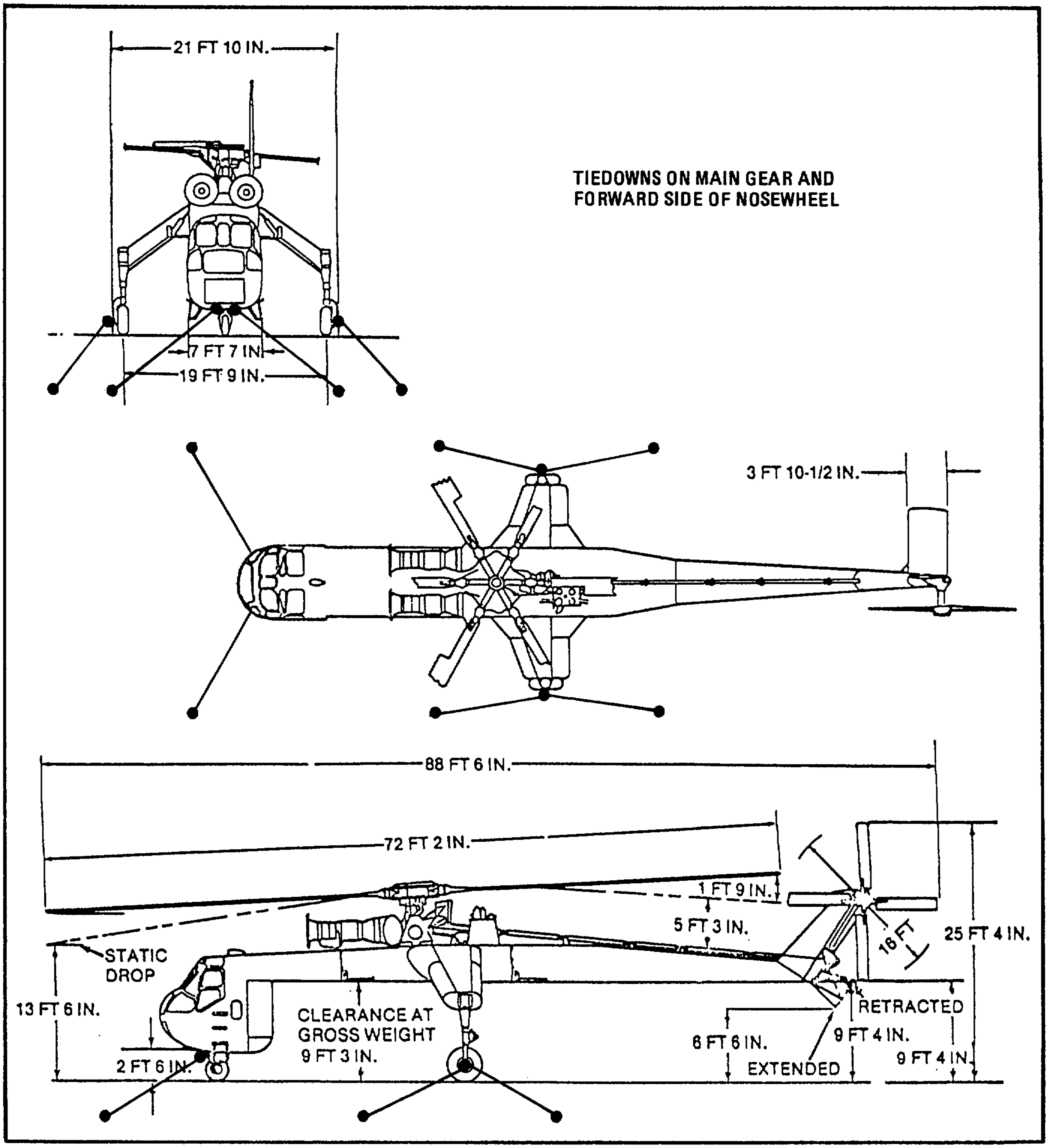
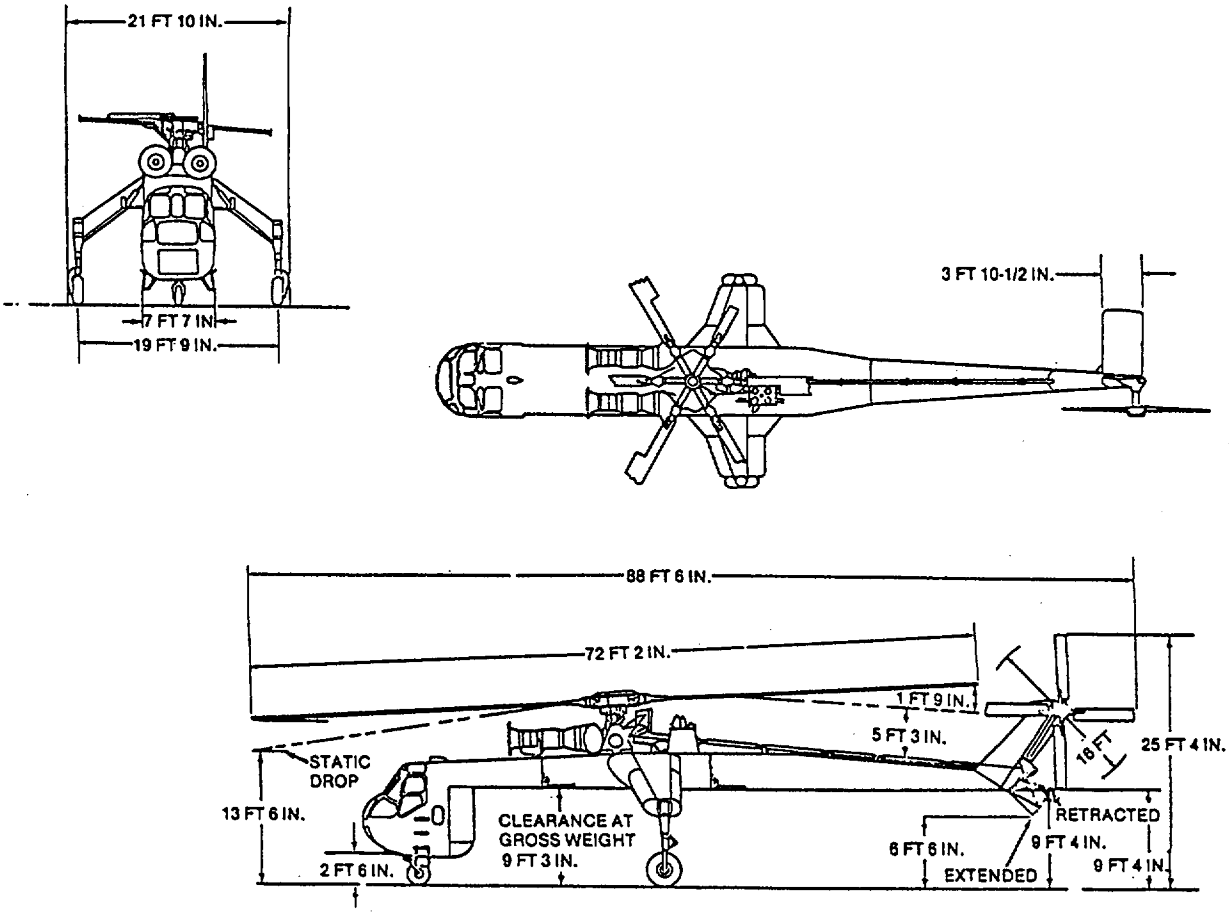


Figure C-15. CH-54A/B Tiedown

MODEL	CH-54A/B
POWER	2 – T73-P-700
CREW	3
MAXIMUM RANGE	226 nm at 100 knots
MAXIMUM SPEED	103 knots
ENDURANCE	2.3 hr at 100 knots
WEIGHT: Basic	22,386 lb
Maximum	47,000 lb
FUEL: Type	JP-4/JP-5
Capacity	1,342 gal

CARGO/PASSENGER CAPABILITY: 25,000 lb load suspension system; seats for 45 passengers in pod.



NOTE:

Rotors may be engaged/disengaged in winds up to 50 knots from any direction.

Figure C-16. CH-54A/B Skycrane

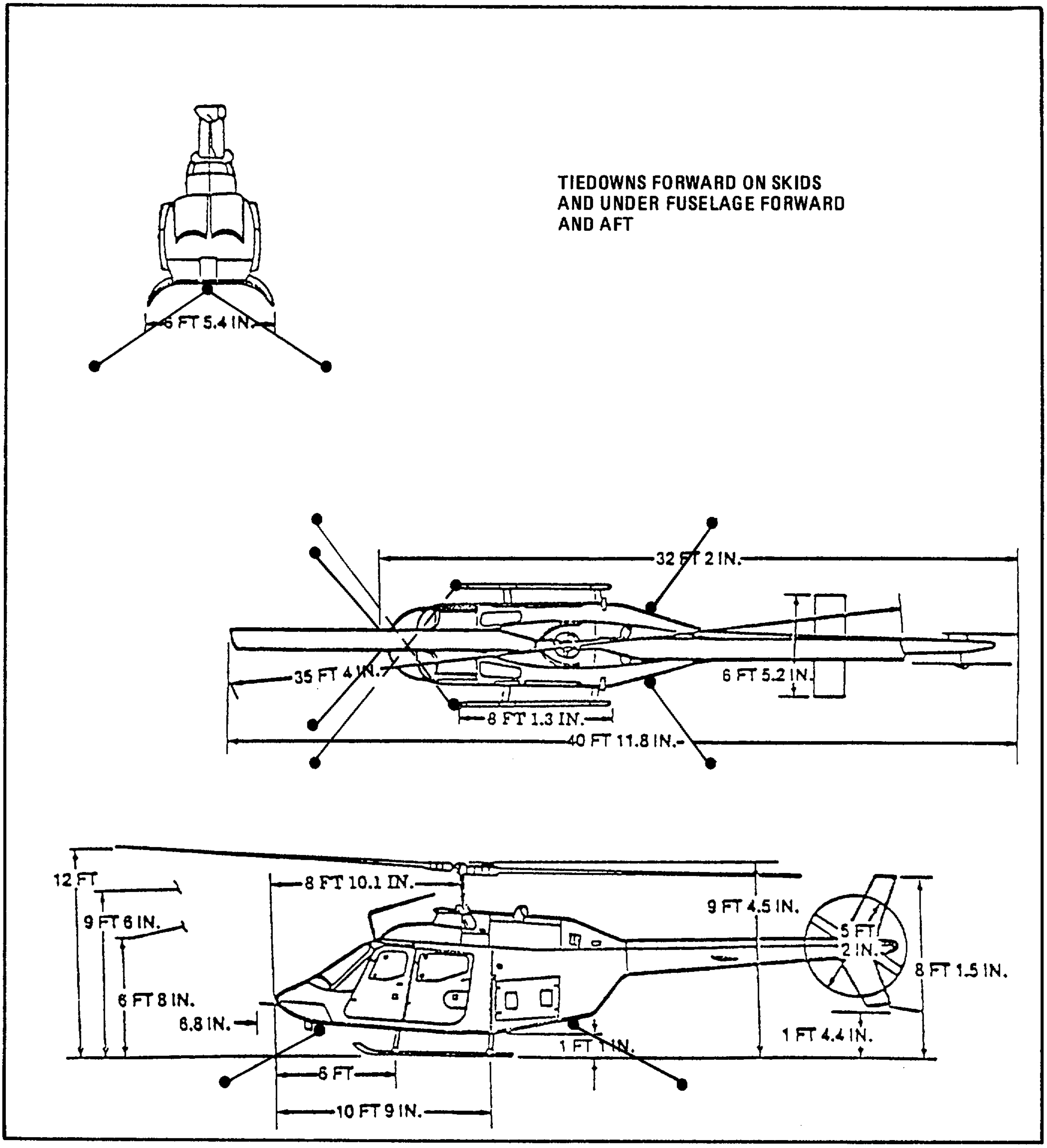
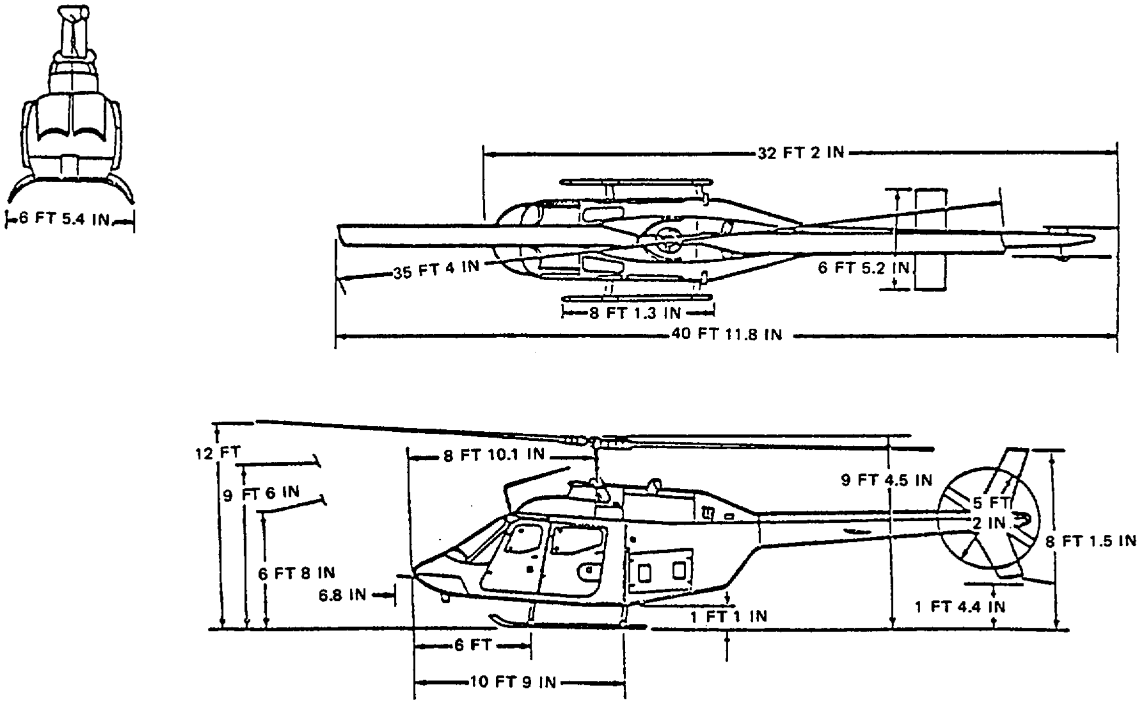


Figure C-17. OH-58A/C Tiedown

MODEL	**OH-58A/C**
POWER	**1 – T-63-A-700 or 720**
CREW	**2**
MAXIMUM RANGE	**260 nm**
MAXIMUM SPEED	**120 knots**
ENDURANCE	**3.0 hr**
WEIGHT: Basic	**1,766 lb**
Maximum	**3,200 lb**
FUEL: Type	**JP-4/JP-5**
Capacity	**71 gal**

CARGO/PASSENGER CAPABILITY: Seats for 2 passengers



NOTES:

Day/night VMC.

Rotors may be engaged/disengaged in winds up to 45 knots from any direction.

Maximum gust spread 15 knots.

Figure C-18. CH-58A/C Kiowa

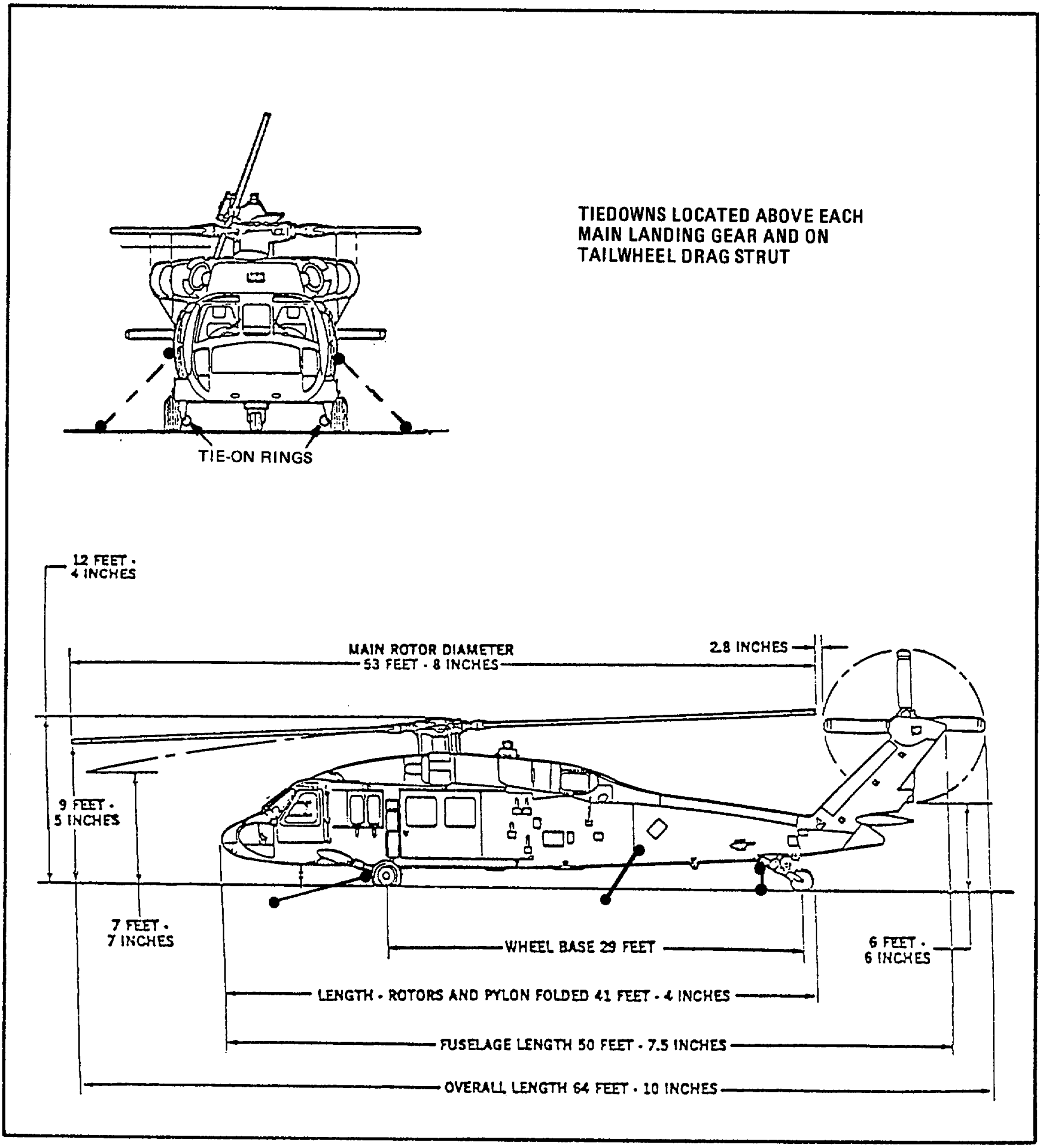
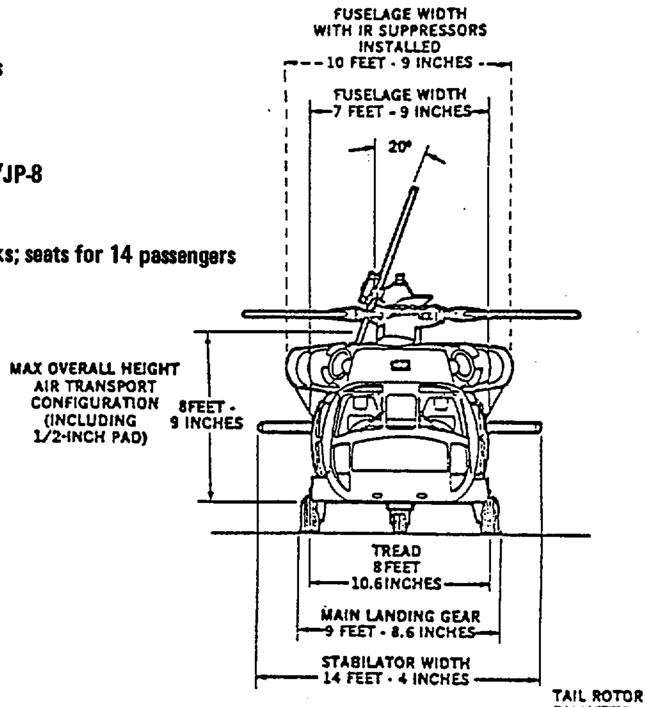
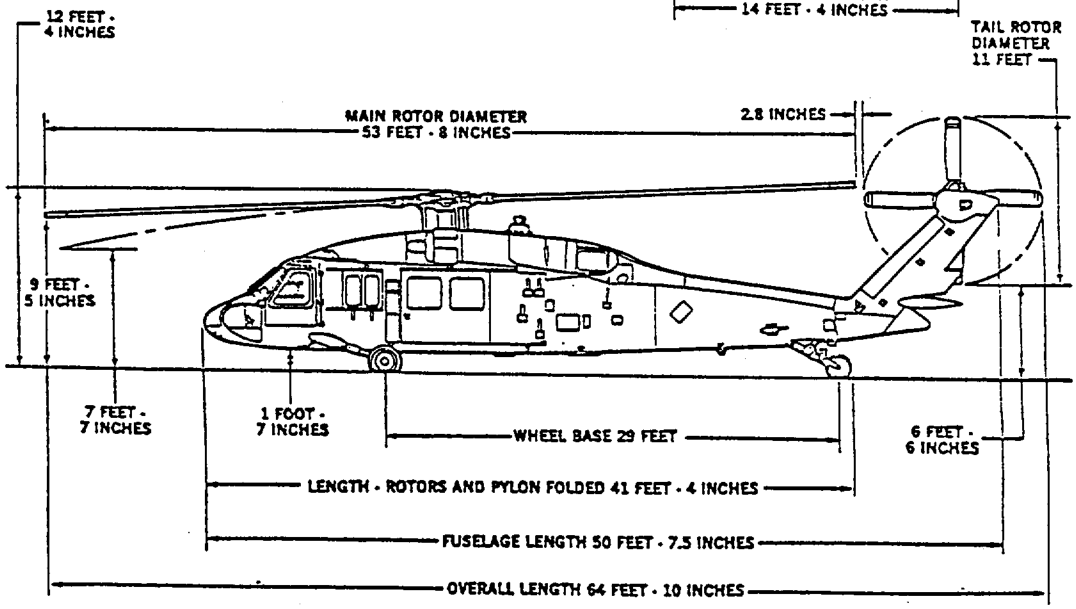


Figure C-19. UH-60A Tiedown

MODEL	**UH-60A**
POWER	**2 – T700-GE-700**
CREW	**3**
MAXIMUM RANGE	**266 nm**
MAXIMUM SPEED	**155 knots**
ENDURANCE	**2.2 hr**
WEIGHT: Basic	**13,000 lb**
Maximum	**20,250 lb**
FUEL: Type	**JP-4/JP-5/JP-8**
Capacity	**362 gal**

CARGO/PASSENGER CAPABILITY: Cargo and rescue hooks; seats for 14 passengers





NOTES:

Rotors may be engaged/disengaged in winds up to 45 knots from any direction.

Figure C-20. UH-60A Black Hawk

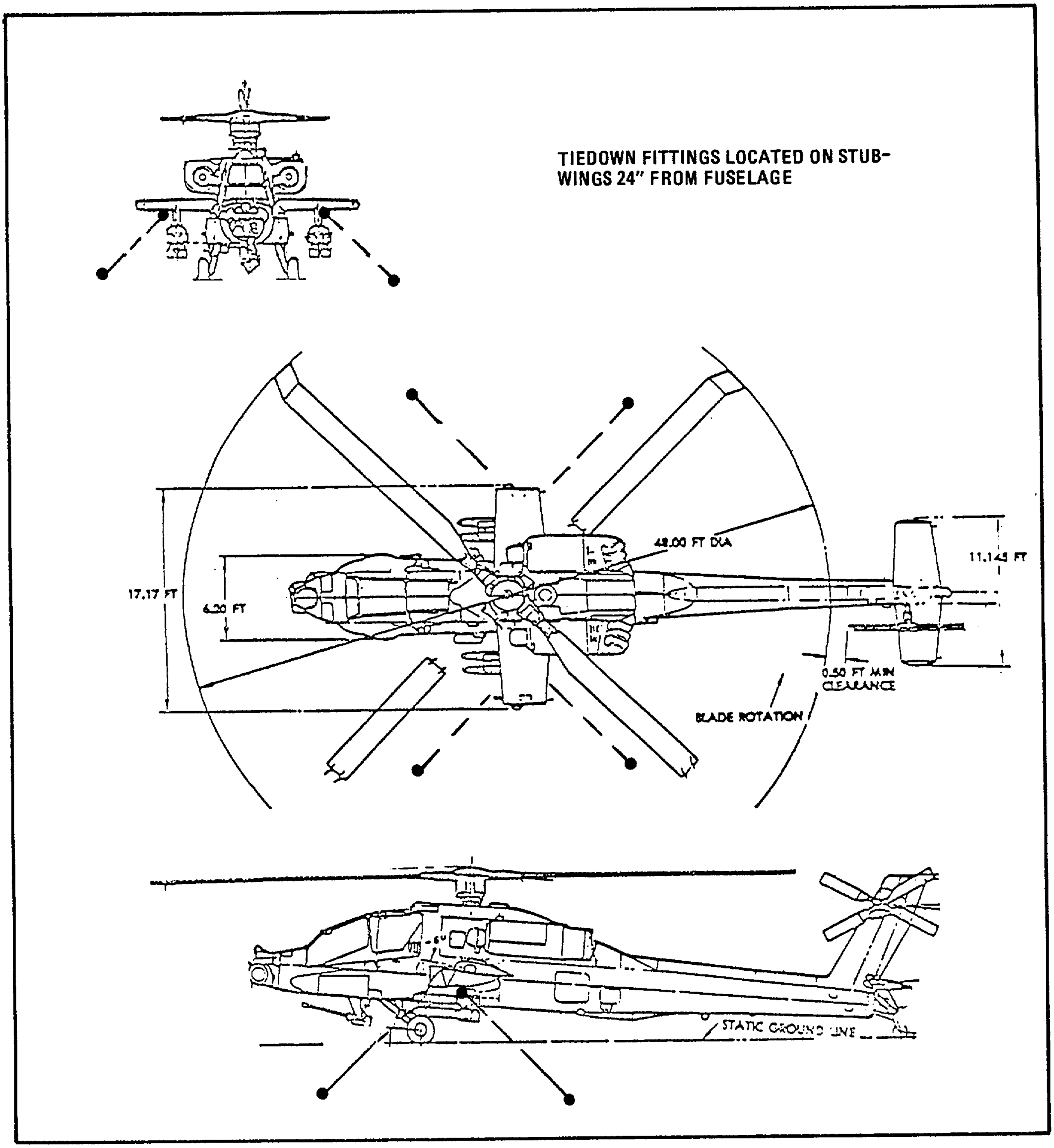
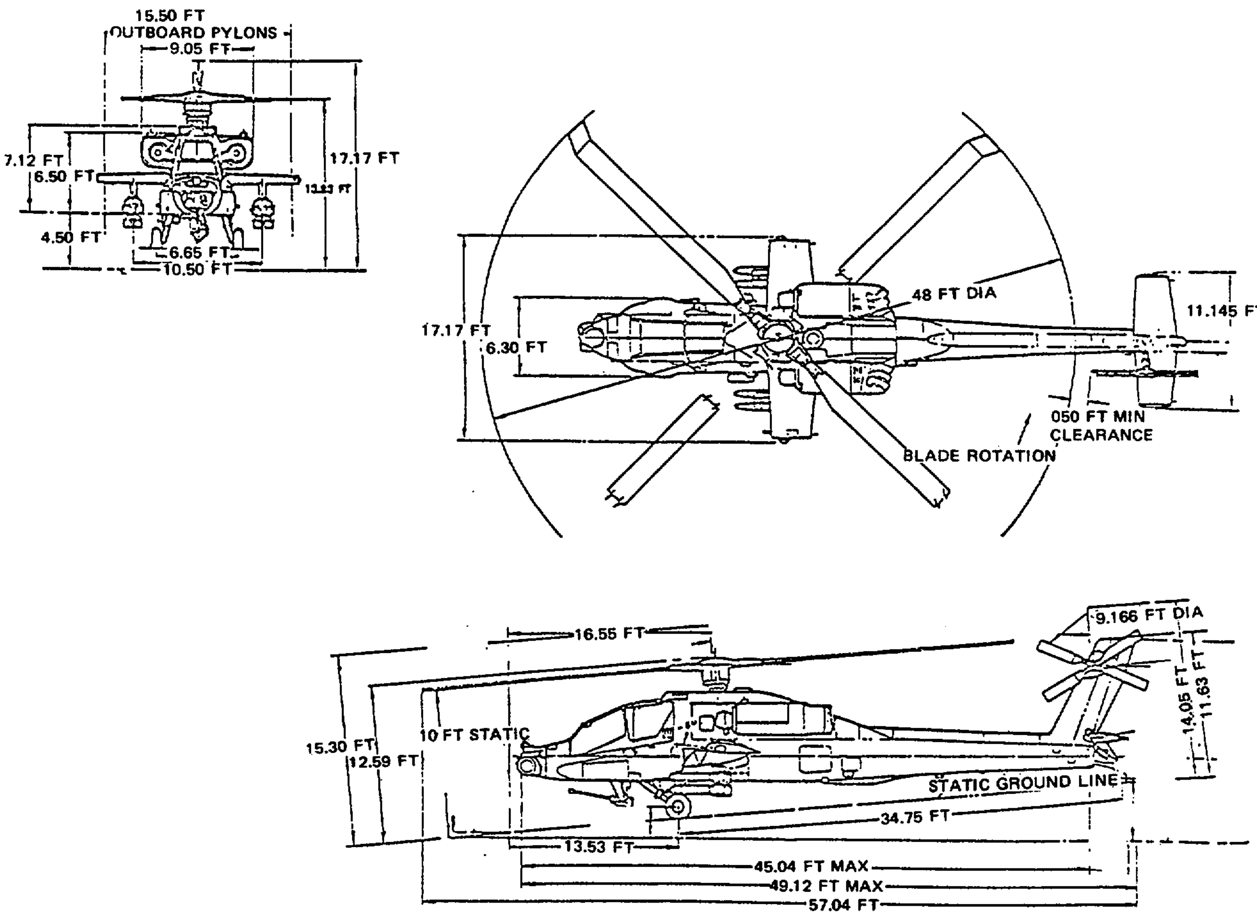


Figure C-21. AH-64A Tiedown

MODEL	AH-64A
POWER	2 – T-700-GE-701
CREW	2
MAXIMUM RANGE	330 nm at 145 knots
MAXIMUM SPEED	197 knots
ENDURANCE	2.5 hr
WEIGHT: Basic	14,660 lb
Maximum	17,650 lb
FUEL: Type	JP-4/JP-5/JP-8
Capacity	812 gal

CARGO/PASSENGER CAPABILITY: None



NOTE:

Rotors may be engaged/disengaged in winds up to 45 knots from any direction.

Figure C-22. AH-64A Apache

APPENDIX D

Flight Deck Clothing

PERSONNEL	HELMET *	JERSEY	SYMBOLS
Aircraft Handling Crew and Chockmen	Blue	Blue	Crew Number
Aircraft Handling Officers, CPO, LPO	Yellow	Yellow	Billet Title
Elevator Operators	White	Blue	E
HCL/FLO/LSO	White	White	Billet Title
LSE (Crew Directors)	Yellow	Yellow	Crew Number
LSE (CV)	Red	Green	H
Maintenance Crews	Green	Green	Black Stripe and Squadron Designator
Medical	White	White	Red Cross
Messengers and Telephone Talkers	White	Blue	T
Ordnance	Red	Red	Black Stripe and Squadron Designator
Ordnance Officer	White	Red	Black Stripe/Safety
Photographers	Green	Green	P
Plane Captains	Brown	Brown	Squadron Designator
Crash anad Salvage Crews	Red	Red	Crash/Salvage
Tractor Driver	Blue	Blue	Tractor
Troubleshooters	Green	Green	Black Stripe broken by abbreviation of specialty (that is, P/P (Power Plants))
Aviation Fuel Crew	Purple	Purple	F

*** Combination cranial.**

PERSONNEL	HELMET	JERSEY	SYMBOLS
Aviation Fuel Officer	Purple	Purple	Fuel Officer
Combat Cargo	White	White	Combat Cargo

Notes:

1. The life preserver, vest type, U.S. Navy, Mk 1, is designed for prolonged wear while engaged in flight deck activity and is available in colors identical to those listed above.

2. Combination cranial helmets for the following personnel shall be marked with three reflective international orange stripes, 1 inch wide, evenly spaced, running fore and aft placed on top of white reflective tape.

   (a) All officers

   (b) Flight and hangar deck chief petty officer and leading petty officer

   (c) Crash and salvage chief petty officer and leading petty officer

   (d) EOD team members

   (e) Squadron gunner

   (f) Ship's air gunner.

3. Helmets for all flight deck personnel shall be marked with a 6-inch square (or equivalent) of white reflective tape on the back shell and a 3-inch by 6-inch piece (or equivalent) on the front shell.

4. Cranial helmets shall have a 2 inch by 2 inch square of velcro pile tape on the left front impact shell assembly for attaching the SDU-5/E distress marker light (strobe light). Hook velcro tape will be attached to the strobe light. See NSTM CH-77 for installation procedures.

APPENDIX E

Weapons Loading/Strikedown/ Downloading and Recovery Guide

WEAPON	HANGAR DECK		RECOVERY (3)	
	LOAD	STRIKEDOWN/ DOWNLOAD	UNEXPENDED	HUNG
General Purpose Bomb/LGB	YES (1) (5)	YES (6)	YES (2)	YES (2)
DST Mk 36/Mk 40	YES (5)	YES (6)	YES (2)	YES (2)
Mk 77 Firebomb	NO	NO	NO	NO
2.75/5.0 Roccket Launcher	NO	NO	YES	YES
Aircraft Parachute Flare	NO	NO	NO	NO
Tube-Loaded Flare Dispenser	NO	NO	YES	YES
7.62 mm Gun	YES	YES	YES	YES
.50 cal. Gun	YES	YES	YES	YES
20 mm Gun/Mk 4 Gun Pod (7)	YES	YES (7)	YES	YES
Mk 20 Rockeye II/APAM	YES (5)	YES (6)	YES	YES
AIM-9 Sidewinder (all)	NO (4)	YES	YES	YES
A/A Stinger	NO (4)	YES	YES	YES
Walleye	YES (5)	YES (6)	YES	YES
AGM-65 Maverick	NO (4)	YES	YES	YES
AGM-114B/K Hellfire	NO (4)	NO (6)	YES	YES
AGM-119B Penguin	NO (4)	NO (4)	YES	YES
AGM-122 Sidearm	NO (4)	YES	YES	YES
Decoy Flare	NO	NO	YES	YES
Mine (all)	YES (5)	YES (6)	YES	YES
Torpedo (all)	YES	YES (6)	YES	YES
Signal Underwater Sound Charge	YES	YES	YES	YES
Marine Locator Marker	YES	YES	YES	YES
Practice Bomb	YES (5)	YES (6)	YES	YES
JAU-22B Cartridge	YES	YES	YES	YES
TOW	NO	YES	YES (8)	YES (9)
AN/ALE-XX Chaff Dispenser	YES	YES	YES	YES
Air Chaff Cartridge	NO (10)	NO (10)	YES	YES
Gen-Ex Transponder	YES	YES	YES	YES

See page E-2 for notes to this table.

Notes:

1. No mechanical nose fuzes will be installed on the hangar deck.

2. Arming wires intact.

3. Guidance provided is subject to limitations in tactical manuals for specific aircraft.

4. Air-launched missiles shall not normally be loaded on the hangar deck except when operational commitments so dictate. Commanding officers may authorize loading of missiles on the hangar deck only up to the point of mechanical attachment of the weapon to the launcher/rack in accordance with the procedures prescribed in the appropriate NAVAIR weapons/stores loading checklists/SRCs.

5. Ejector cartridges shall not be installed on the hangar deck. Installation of ejector/jettison cartridges in the BRU-9/10/11 ejector bomb rack is authorized provided the rack is electrically disconnected and either the mechanical safety pin is installed or the in-flight operable bomb rack lock (IFOBRL) mechanism is locked.

6. In the event of strikedown of a loaded aircraft to the hangar deck, the nose fuzes (as applicable) and ejector/jettison cartridges shall be removed immediately after the aircraft is in spot and tied down. Ejector/jettison cartridges may remain in the BRU-9/10/11 ejector bomb rack provided the rack is electrically disconnected, and either the mechanical safety pin is installed or the IFOBRL mechanism is locked.

7. The M61A1 gun ammunition is exempt from downloading requirements for up aircraft temporarily spotted in the hangar decks and aircraft undergoing limited maintenance; that is, turn-around maintenance, providing compliance with all gun dearm procedures of the airborne weapons/stores loading manual, associated checklists, and stores reliability card have been accomplished.

8. Helicopters with unexpended or hung TOW ordnance should fly shipboard recovery patterns with weapons pointed away from the ship to the maximum extent practicable. Aircraft should be downloaded in HERO-safe conditions with weapons pointed away from the ship. After downloading, the missile launch container front-end membrane should be examined. If the launch container front-end membrane seal is broken, EOD personnel should be notified for missile disposal. If the membrane is not broken, the missile should be returned to an ammunition point for inspection.

9. An activated missile batttery is completely dead in 30 minutes. If a TOW missile with AWC-238 incorporated does not launch because of no fire voltage or fire voltage but no motor ignition, the missile is still in HERO-safe condition and the aircraft can return to ship after 30 minutes.

10. Chaff modules must be loaded/downloaded in a HERO/RADHAZ safe environment and inserted in a chaff dispenser when fully loaded.

APPENDIX F

Testing Laboratories — JP-5 Fuel

U.S. NAVY (CONUS)

FULL SCALE LABORATORIES (SPECIAL SAMPLES ONLY)

Location	Laboratory Shipping Address	Laboratory Mailing Address
Norfolk, VA	Commanding Officer Petroleum Testing Laboratory Fuel Department Code 702 Building W-388 Naval Supply Center Norfolk, VA 23512-5000	Commanding Officer Petroleum Testing Laboratory Fuel Department Code 702 Building W-388 Naval Supply Center Norfolk, VA 23512-5000
San Diego, CA	Petroleum Laboratory U.S. Navy Point Loma Annex Building 70A San Diego, CA 92106-5044	Commanding Officer (Code 703) Naval Supply Center 937 North Harbor Drive San Diego, CA 92132-5044

LIMITED LABORATORIES (ROUTINE SAMPLES ONLY)

Location	Laboratory Shipping Address	Laboratory Mailing Address
EAST COAST — NORTH		
Philadelphia, PA	Quality Assurance Office Philadelphia Naval Shipyard Philadelphia, PA 19112	Commander Philadelphia Naval Shipyard Philadelphia, PA 19112 Attn: Quality Assurance Office
EAST COAST — SOUTH		
Norfolk, VA	Naval Air Station Material Engineering Division Laboratory Naval Aviation Depot Norfolk, VA 23511	Commanding Officer Material Engineering Division Laboratory Naval Aviation Depot Naval Air Station Norfolk, VA 23511-5899

Location	Laboratory Shipping Address	Laboratory Mailing Address
Portsmouth, VA	Chemical Laboratory Norfolk Naval Shipyard Portsmouth, VA 23709	Commander Norfolk Naval Shipyard Portsmouth, VA 23709 Attn: Chemical Laboratory
Cherry Point, NC	Marine Corps Air Station Naval Aviation Depot Material Engineering Division (Code 340) Cherry Point, NC 28533	Commanding Officer Naval Aviation Depot Marine Corps Air Station Cherry Point, NC 28533-5030 Attn: Material Engineering Division Laboratory
Charleston, SC	Charleston Naval Shipyard Quality Assurance Office (Code 134) Charleston, SC 29408	Commander Charleston Naval Shipyard Charleston, SC 29408 Attn: Quality Assurance (Code 134.12)
Jacksonville, FL	Naval Air Station Naval Aviation Depot Material Engineering Division Laboratory Jacksonville, FL 32212	Commanding Officer Naval Aviation Depot Naval Air Station Jacksonville, FL 32212 Attn: Material Engineering Division Laboratory
Jacksonville, FL	Officer in Charge Navy Fuel Depot Jacksonville, FL 32208 Attn: Petroleum Testing Laboratory	Officer in Charge Navy Fuel Depot Jacksonville, FL 32208 Attn: Petroleum Testing Laboratory
GULF COAST		
Pensacola, FL	Naval Air Station Naval Aviation Depot Material Engineering Division Laboratory Pensacola, FL 32508-5300	Commanding Officer Naval Aviation Depot Naval Air Station Pensacola, FL 32508-5300 Attn: Material Engineering Division Laboratory
WEST COAST — NORTH		
Seattle, WA	Commanding Officer Naval Supply Center Puget Sound Manchester Division Bremerton, WA 98314-5100 Attn: Petroleum Testing Laboratory	Commanding Officer Naval Supply Center Puget Sound Bremerton, WA 98314-5100 Attn: Petroleum Testing Laboratory
Bremerton, WA	Commanding Officer Puget Sound Naval Shipyard (Code 134.12) Chemist Bremerton, WA 98314-5000	Commanding Officer Puget Sound Naval Shipyard (Code 134.12) Chemist Bremerton, WA 98314-5000

Location	Laboratory Shipping Address	Laboratory Mailing Address
WEST COAST — SOUTH		
Alameda, CA	Naval Air Station Naval Aviation Depot Material Engineering Division Laboratory Alameda, CA 94501	Commanding Officer Naval Aviation Depot Naval Air Station Alameda, CA 94501-5201 Attn: Material Engineering Division Laboratory
Long Beach, CA	Commander Long Beach Naval Shipyard Long Beach, CA 90802-5099 Attn: Industrial Laboratory	Commander Long Beach Naval Shipyard Long Beach, CA 90802-5099 Attn: Industrial Laboratory
San Diego, CA	Naval Air Station Naval Aviation Depot Material Engineering Division Laboratory North Island San Diego, CA 92135	Commanding Officer Naval Aviation Depot Naval Air Station North Island San Diego, CA 92135-5112 Attn: Material Engineering Division Laboratory

U.S. NAVY (OVERSEAS)

FULL SCALE LABORATORIES CAPABLE OF CONDUCTING MOST PETROLEUM TESTS (ROUTINE AND SPECIAL SAMPLES)

Location	Laboratory Shipping Address	Laboratory Mailing Address
Pearl Harbor, HI	Commanding Officer Naval Supply Center (Code 704) Pearl Harbor, HI 96860	Commanding Officer Naval Supply Center (Code 704) Box 300 Pearl Harbor, HI 96860-5300

Note: NSC Pearl Harbor facilities should be used by units in the Central Pacific.

Location	Laboratory Shipping Address	Laboratory Mailing Address
Pearl Harbor, HI	Commander Pearl Harbor Naval Shipyard Pearl Harbor, HI 96860 Attn: Industrial Test Laboratory	Commander Pearl Harbor Naval Shipyard Industrial Test Laboratory Box 400 Pearl Harbor, HI 96860
Yokosuka, Japan	Officer in Charge U.S. Navy Fuel Detachment FPO Seattle 98760-2000 Attn: Hakozaki Petroleum Laboratory	Officer in Charge U.S. Navy Fuel Detachment FPO Seattle 98760-2000 Attn: Petroleum Laboratory
Sasebo, Japan	Officer in Charge U.S. Navy Fuel Detachment FPO Seattle 98762-1500 Attn: Petroleum Laboratory	Officer in Charge U.S. Navy Fuel Detachment FPO Seattle 98762-1500 Attn: Petroleum Laboratory

Location	Laboratory Shipping Address	Laboratory Mailing Address
Guam, Marianas Island	Commanding Officer U.S. Naval Supply Depot Guam, Marianas Island Attn: Petroleum Testing Laboratory	Commanding Officer U.S. Naval Supply Depot FPO San Francisco 96630-1500 Attn: Petroleum Testing Laboratory
INDIAN OCEAN		
Diego Garcia (Routine samples only)	Commanding Officer Naval Support Facility Box 4 Diego Garcia FPO San Francisco 96885 Attn: Petroleum Testing Laboratory	Commanding Officer Naval Support Facility Box 4 Diego Garcia FPO San Francisco 96885-2000 Attn: Petroleum Testing Laboratory
CARIBBEAN		
Roosevelt Roads, Puerto Rico	Commanding Officer U.S. Naval Station Roosevelt Roads, PR Attn: Petroleum Testing Laboratory	Commanding Officer U.S. Naval Station FPO Miami 09551-8000 Attn: Petroleum Testing Laboratory
NORTH ATLANTIC		
Keflavik, Iceland	Commanding Officer U.S. Naval Station Keflavik, Iceland Attn: Petroleum Testing Laboratory	Commanding Officer (Code 544) U.S. Naval Station FPO New York 09571 Attn: Petroleum Testing Laboratory

MEDITERRANEAN CONTRACT TESTING FACILITIES (ROUTINE AND SPECIAL SAMPLES)

Location	Coordinating Activity
Naples, Italy Piraeus, Greece Istanbul, Turkey Mersin, Turkey	Commander Fleet Air Mediterranean U.S. Navy Support Activity Box 38 FPO New York 09521

MIDEAST CONTRACT TESTING FACILITIES (ROUTINE AND SPECIAL SAMPLES)

Location	Coordinating Activity
Bahrain	Chief Petroleum Quality Assurance Office Middle East FPO New York 09526

U.S. AIR FORCE PETROLEUM TESTING LABORATORIES ROUTINE AND SPECIAL SAMPLES

Location	Coordinating Activity
Searsport, ME	Det #20, Hq SAMMA Air Force Aerospace Fuels Laboratory (SFQLF) P.O. Box 408 Searsport, ME 04974
Tampa, FL	Chief Air Force Aerospace Fuels Laboratory (SFQLC) P.O. Box 6051 MacDill Air Force Base, FL 33608
Dayton, OH	Chief Air Force Aerospace Fuels Laboratory (SFQLA) Wright-Patterson Air Force Base, OH 45433
Mukilteo, WA	Chief Air Force Aerospace Fuels Laboratory (SFQLA) P.O. Box 118 Mukilteo, WA 98275
Suffolk, England, UK	Chief Energy Management Laboratory (SFTLF) RAF Mildenhall Suffolk, UK

U.S. ARMY PETROLEUM TESTING LABORATORIES (ROUTINE AND SPECIAL SAMPLES)

Location	Laboratory Address
New Cumberland Army Depot New Cumberland, PA	Chief, Petroleum Field Officer (East) U.S. Army General Material and Petroleum Activity Attn: STSGP-PE, Building 83-3 New Cumberland Army Depot New Cumberland, PA 17070
Defense Depot Tracy, CA	Chief, Petroleum Field Office (West) U.S. Army General Material and Petroleum Activity Attn: STSGP-PW, Building 247 Defense Depot Tracy Tracy, CA 95376
Yokohama, Japan	6th QM Petroleum Products Laboratory U.S. Army Japan Depot Yokohama, Japan
Kaohsuing, Taiwan	U.S. Army Petroleum Testing Facility Military Support Center Building Pier 17 Kaohsuing,Taiwan

Reference: NAVAIRINST 10340.3 Series

APPENDIX G

U.S. Navy/Marine Corps/Coast Guard Helicopters Passenger Egress Diagrams

G.1 UH-1

The UH-1 normally carries a pilot, a copilot, and a crew chief and is capable of carrying up to eight passengers. Four passengers sit side by side on an athwartship-oriented, bench-type seat and two each can be positioned on each side of the transmission facing out. There is a jettisonable escape window in the cargo doors on either side of the aircraft adjacent to the ends of the four-passenger seat. These escape windows are the pull-in type. A jettisonable door is located immediately adjacent to both the pilot and the copilot. (See Figure G-1.)

G.2 SH-2

The SH-2 normally carries a pilot, copilot, and a sensor operator. On some occasions, a passenger may ride in a jump seat installed adjacent to the sensor operator. An alternate configuration provides for transporting three passengers in a bench-type seat located aft of the main hatch on the starboard side.

A webbing is installed across the aft fuselage to prevent movement of personnel into the tail area upon crashing or landing at sea.

The escape window on the port side is jettisoned by pulling a handle aft and pushing out the window. (See Figure G-2.)

G.3 SH-3

The SH-3 normally carries a pilot, copilot, sonar operator, and a sensor operator. In addition, there is provision for transporting three passengers on an auxiliary troop seat located aft of the sonar and sensor operator's seats. (See Figure G-3.) In the utility configuration, bench-type troop seats are located along both sides of the cabin. (See Figures G-4 and G-5.)

The window emergency release handle for each window assembly is below the window. The handle marked "EMER RELEASE" is pulled up to release the window assembly. (See Figures G-3 through G-5.)

G.4 CH-46

The CH-46 normally carries a pilot, copilot, and crew chief plus up to 25 troops may be transported. The cabin area can accommodate the installation of litters for carrying disabled personnel. Installation of the litters may obstruct some emergency escape windows. The cabin area may also be used to carry cargo or a combination of cargo and troops.

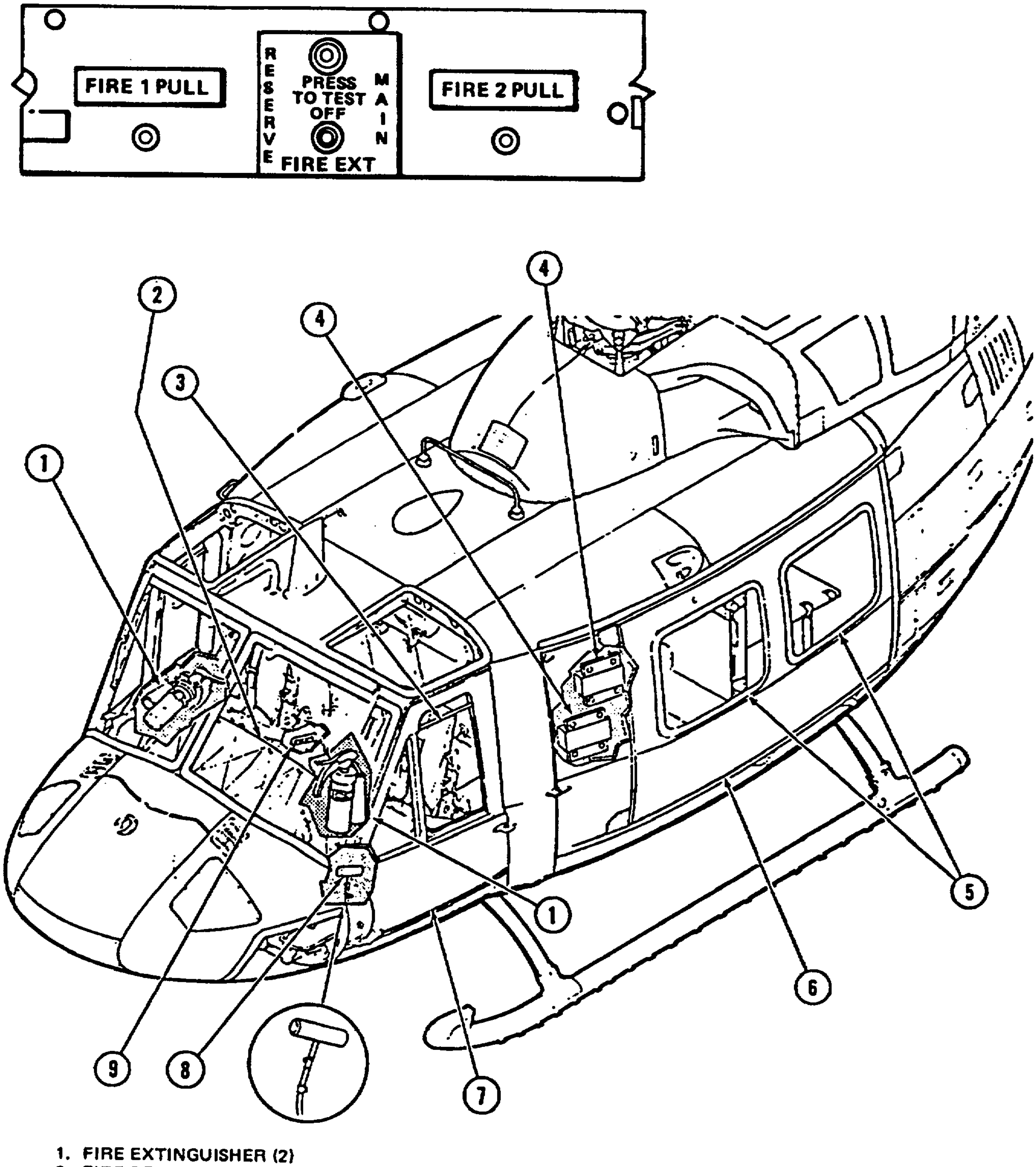
The diagram of the emergency exits (Figure G-6) shows the availability of the rear loading ramp and cargo hatch and the rescue hatch for an emergency exit.

The escape hatch (windows) are actuated by pulling out a tape stretched across the top of the window and the window opened by pushing outboard.

The main entrance door which may be used as an emergency exit is of a clamshell design with the door opening from the center upwards and downwards. Opening of either half of the door by using the separate handles provided for each half would allow for the emergency egress of personnel.

The forward emergency escape hatch located on the port side opposite the main entrance door may be opened in an emergency by pulling out on a tape that is attached across the hatch at approximately one-third of its height from the bottom and pushing outboard on the door panel.

Gun mounting lugs are provided at the escape hatch and the main hatch (Figure G-6). Installation of guns at these positions will impede, if not prevent, emergency egress from these hatches.



1. FIRE EXTINGUISHER (2)
2. FIRE DETECTION SYSTEM
3. CREW DOOR WINDOW (2)
4. FIRST AID KIT (4)
5. JETTISONABLE PASSENGER CARGO DOOR WINDOWS (4)
6. PASSENGER CARGO DOOR (2)
7. CREW DOOR (2)
8. JETTISONABLE DOOR RELEASE – CREW DOOR (2)
9. EXTERNAL STORES JETTISON HANDLE

Figure G-1. UH-1 Emergency Exits and Equipment

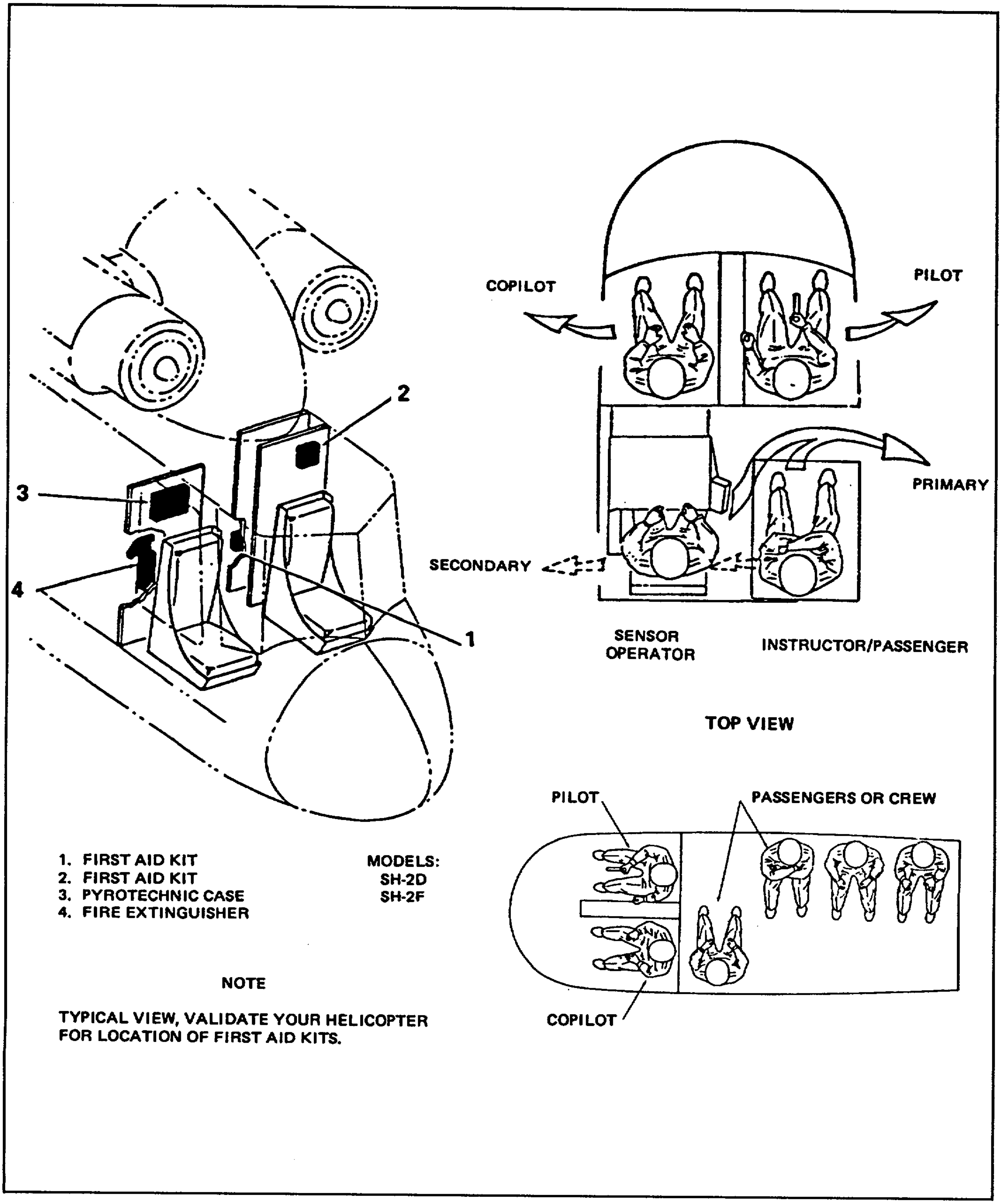


Figure G-2. SH-2 Emergency Exits and Equipment

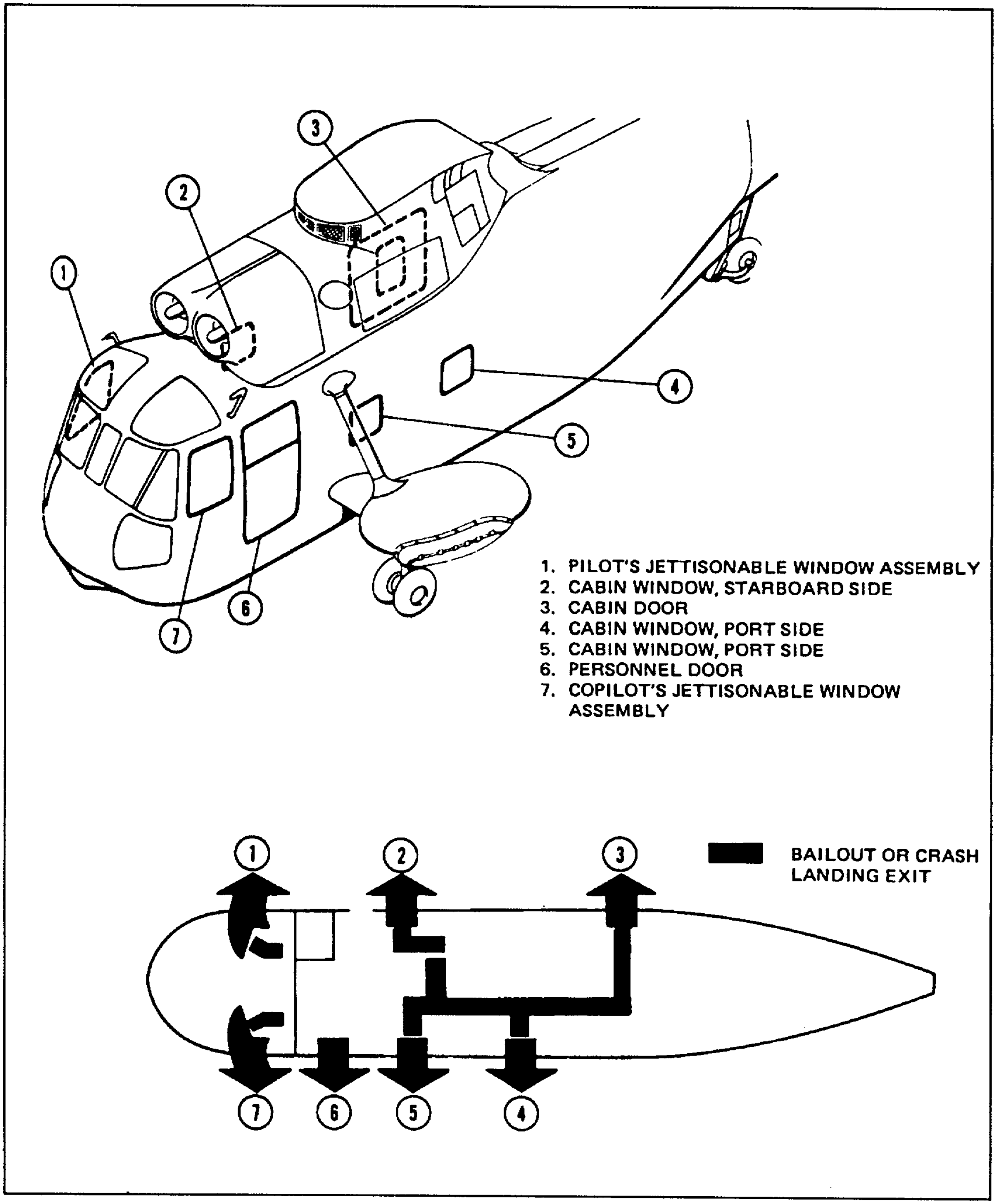


Figure G-3. SH-3A, SH-3D, SH-3D Emergency Exits and Equipment

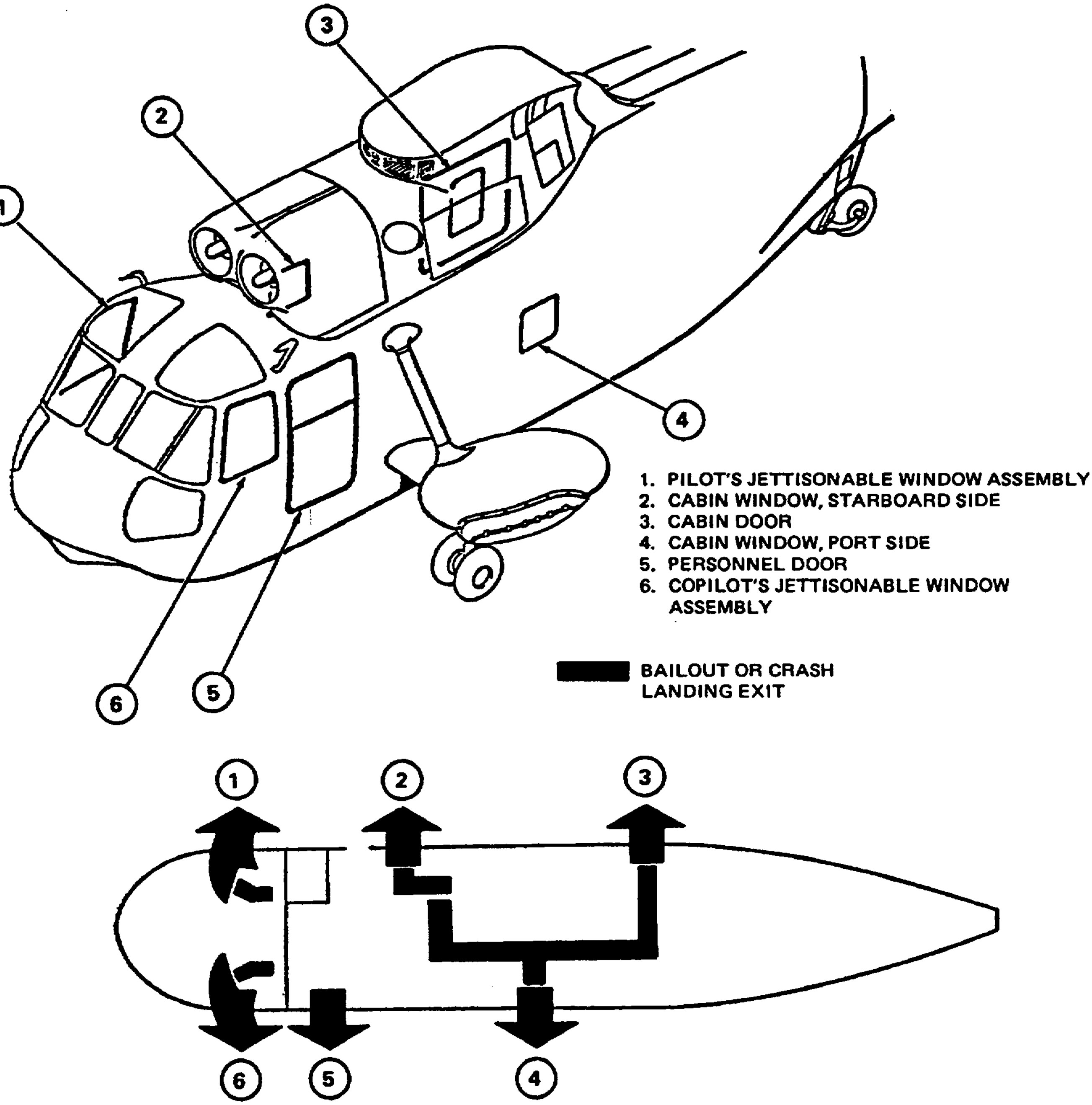


Figure G-4. SH-3G and HH-3A Emergency Exits and Equipment

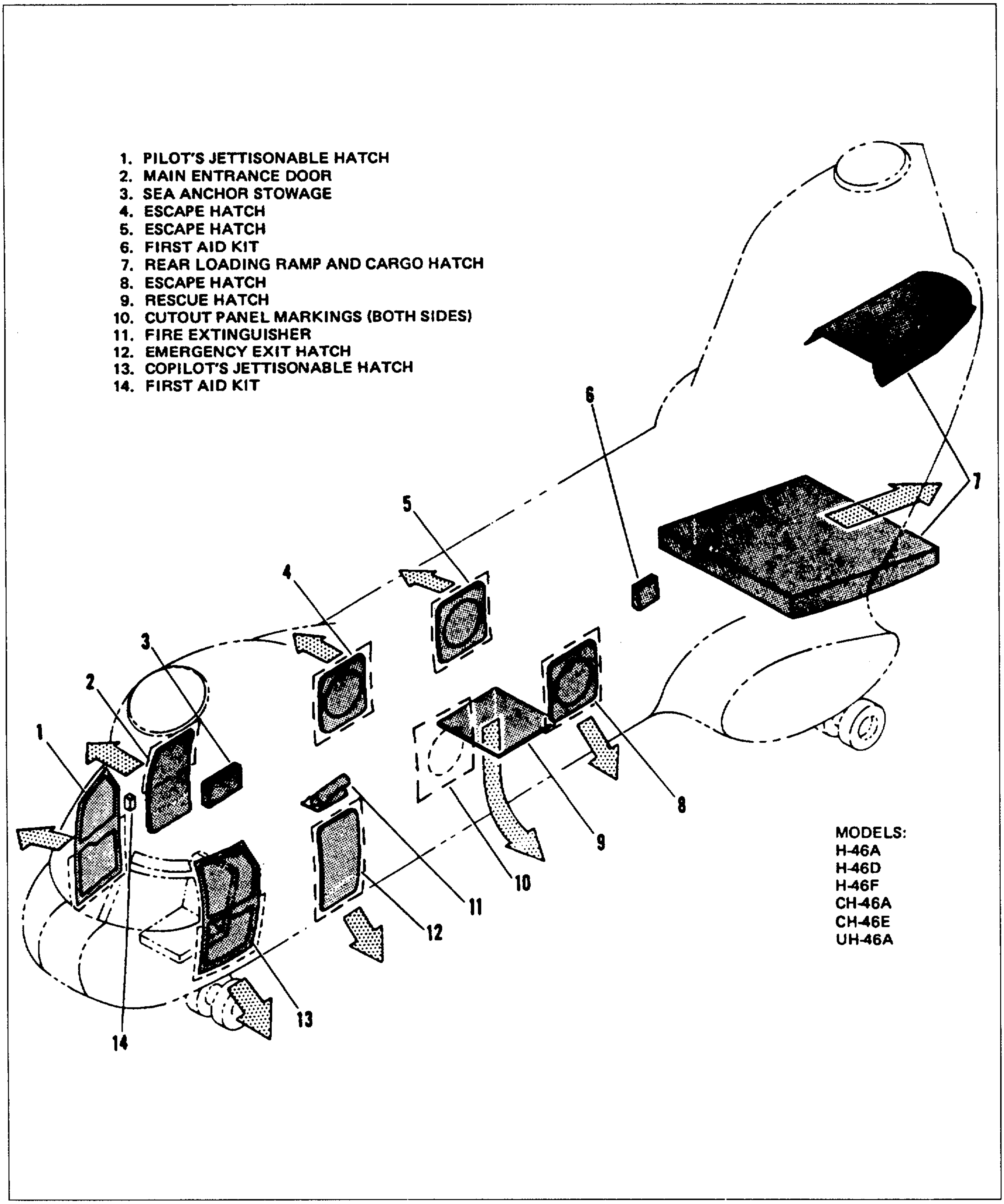
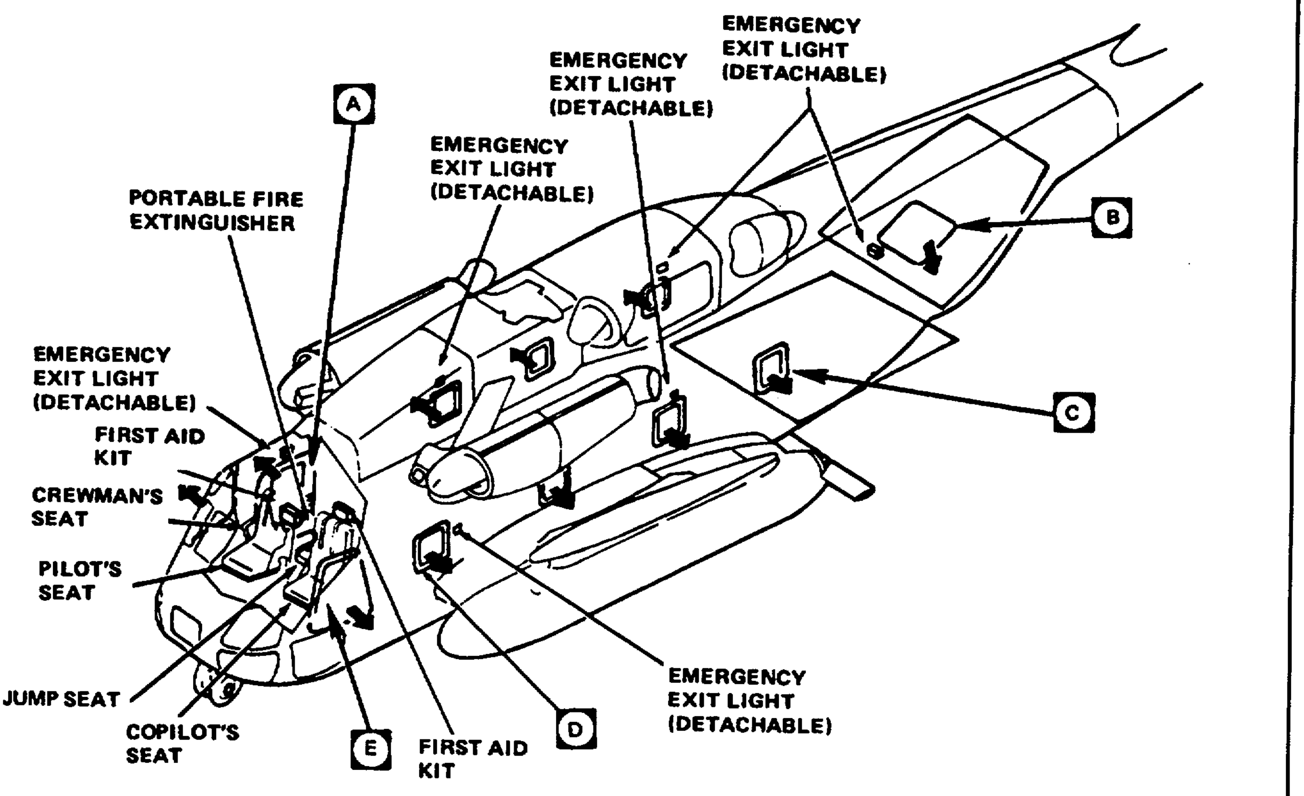
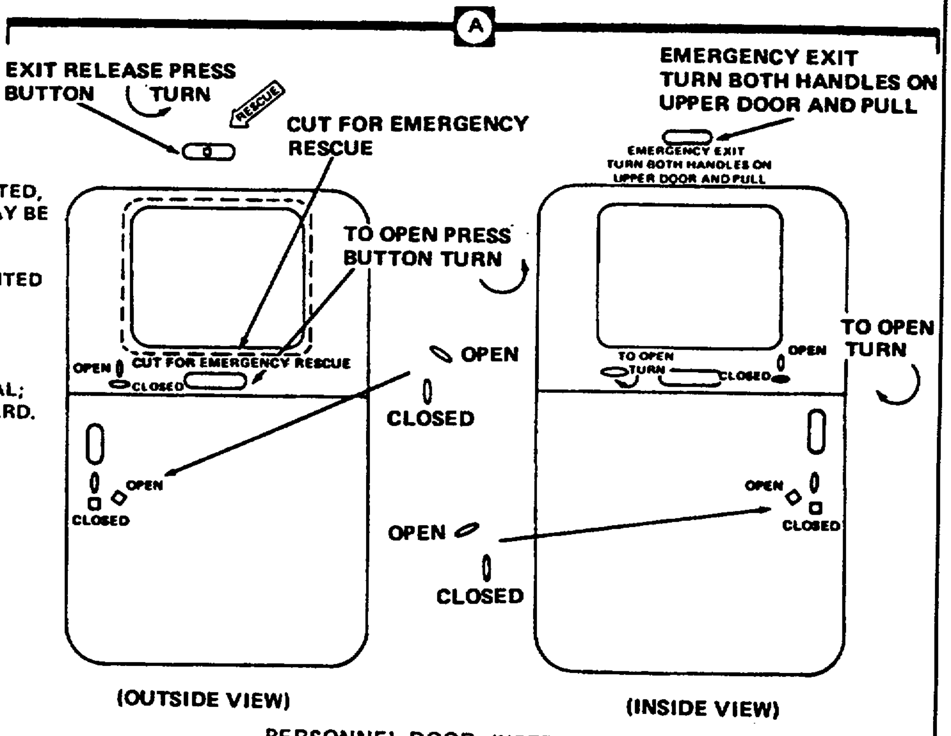


Figure G-6. CH-46 Emergency Exits and Equipment





NOTES

1. IF THE HELICOPTER BECOMES INVERTED, THE SINGLE POINT CARGO HATCH MAY BE USED AS AN EXIT.
2. ALL EMERGENCY HANDLES ARE PAINTED ORANGE-YELLOW. EMERGENCY EXIT INSTRUCTIONS ARE STENCILED IN YELLOW PAINT.
3. PULL TAB TO REMOVE KEY FROM SEAL; THEN, FORCIBLY PULL WINDOW INWARD. FOR HELICOPTERS NOT MODIFIED BY AFC 303, PULL TAB TO REMOVE KEY FROM SEAL; THEN, FORCIBLY PUSH WINDOW OUT.
4. TOP PART OF DOOR OPENS INWARD. BOTTOM PART OPENS INWARD AND FORWARD ON HINGES.
5. REMOVE WINDOWS OUTWARD ONLY.
6. CABIN EMERGENCY HATCH OPENS INWARD AND UP.

Figure G-7. CH-53 Emergency Equipment, Exits, and Entrances (Sheet 1 of 2)

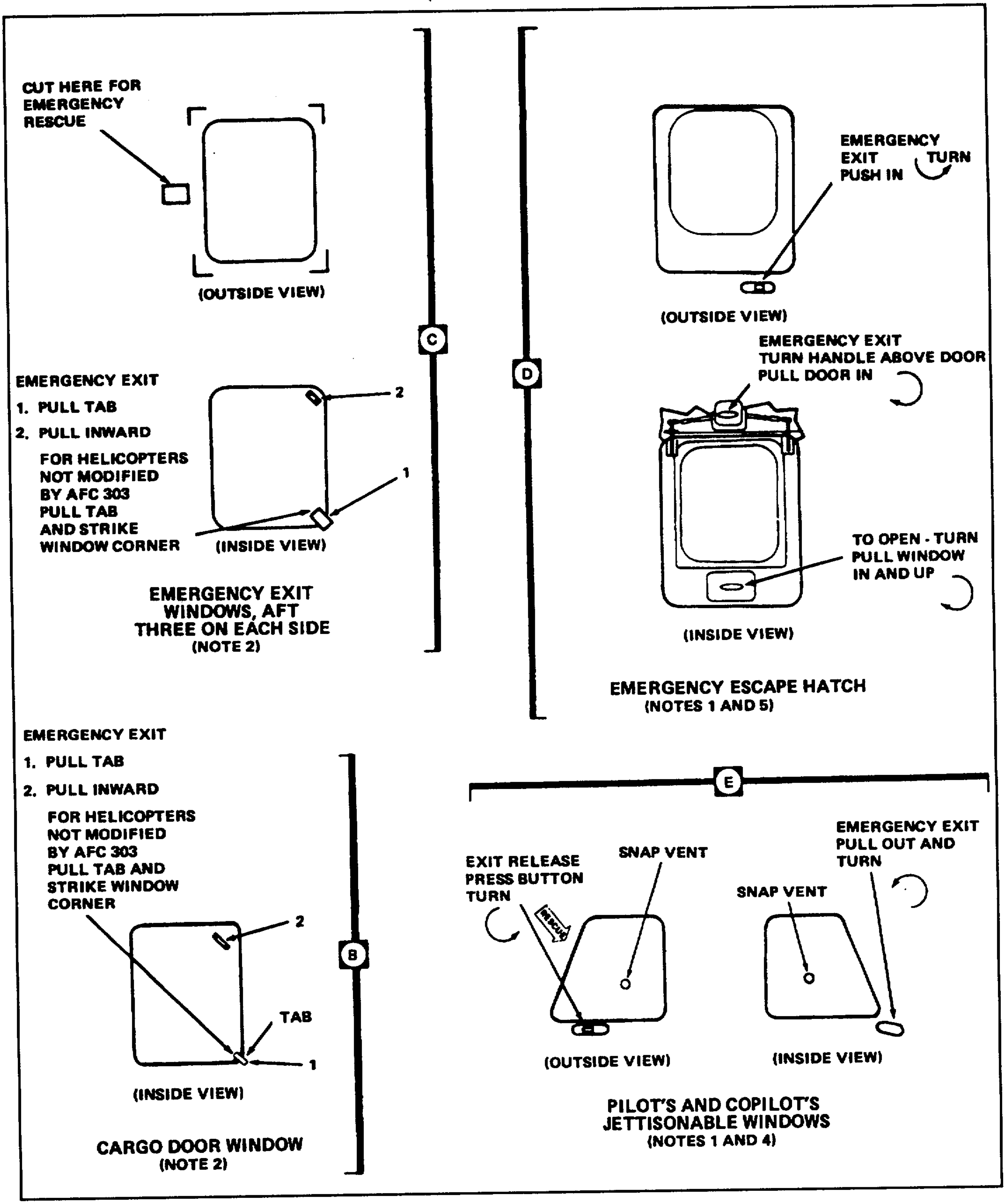


Figure G-7. CH-53 Emergency, Exits, and Entrances (Sheet 2 of 2)

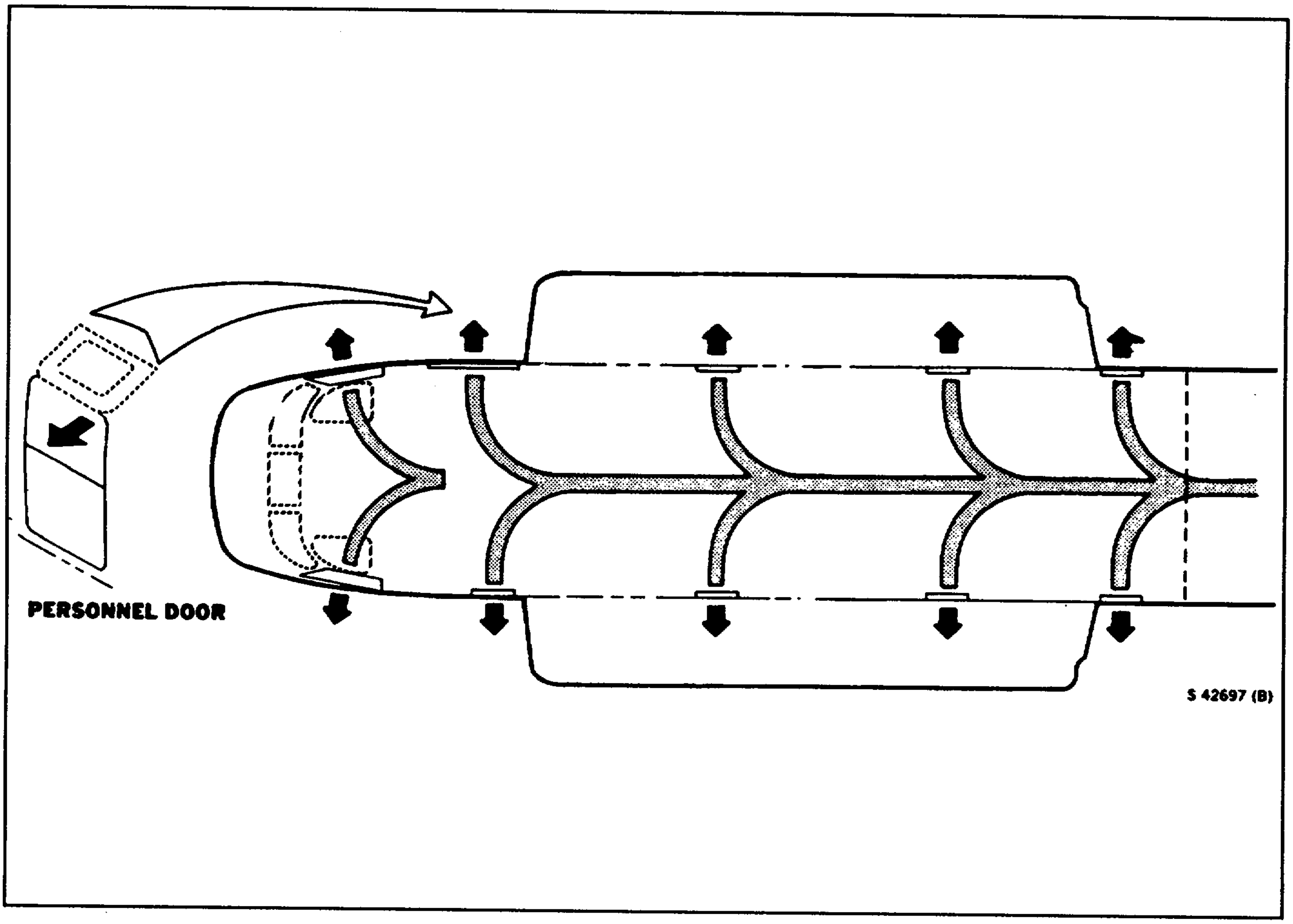


Figure G-8. CH-53 Evacuation Exits on Water

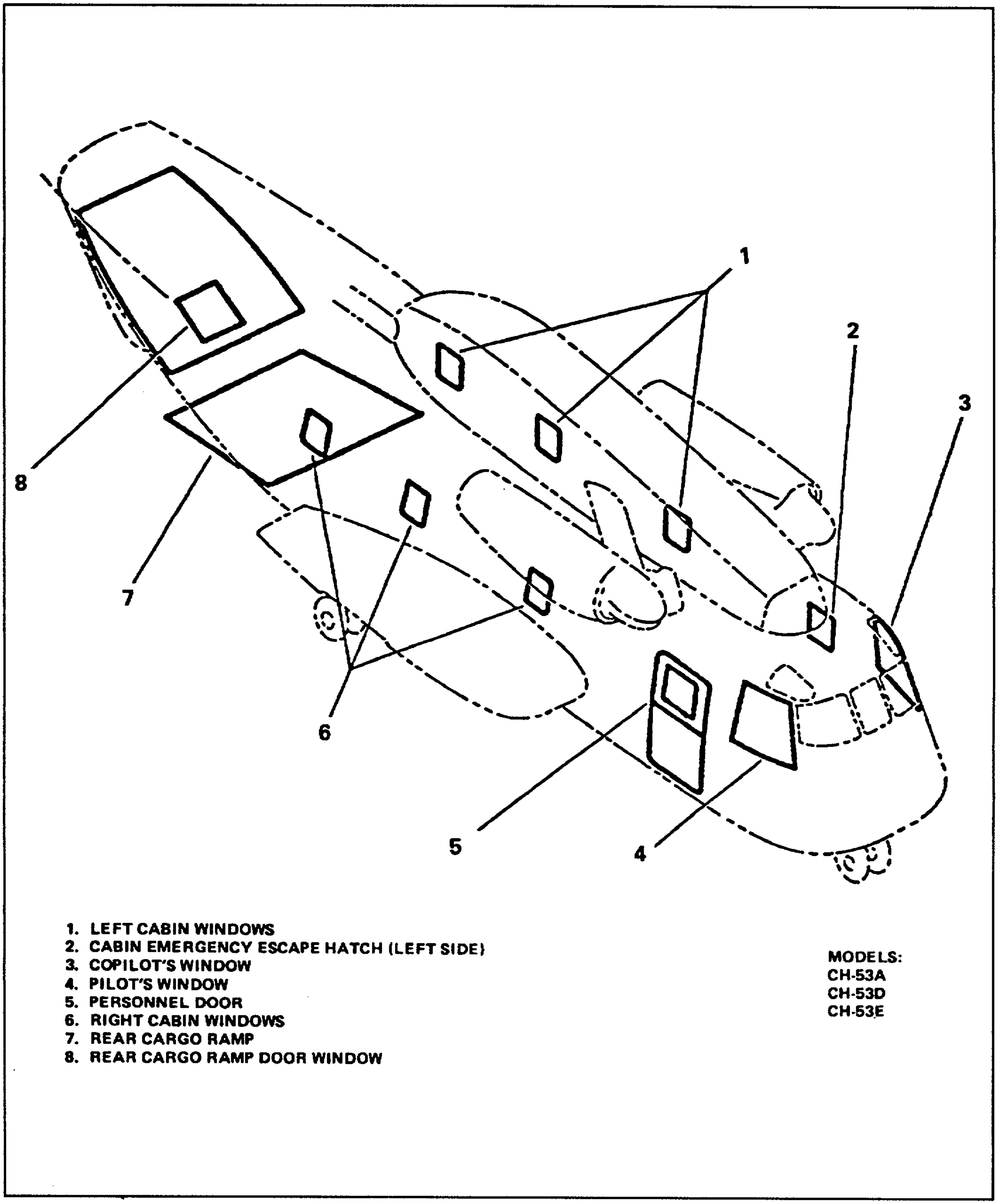
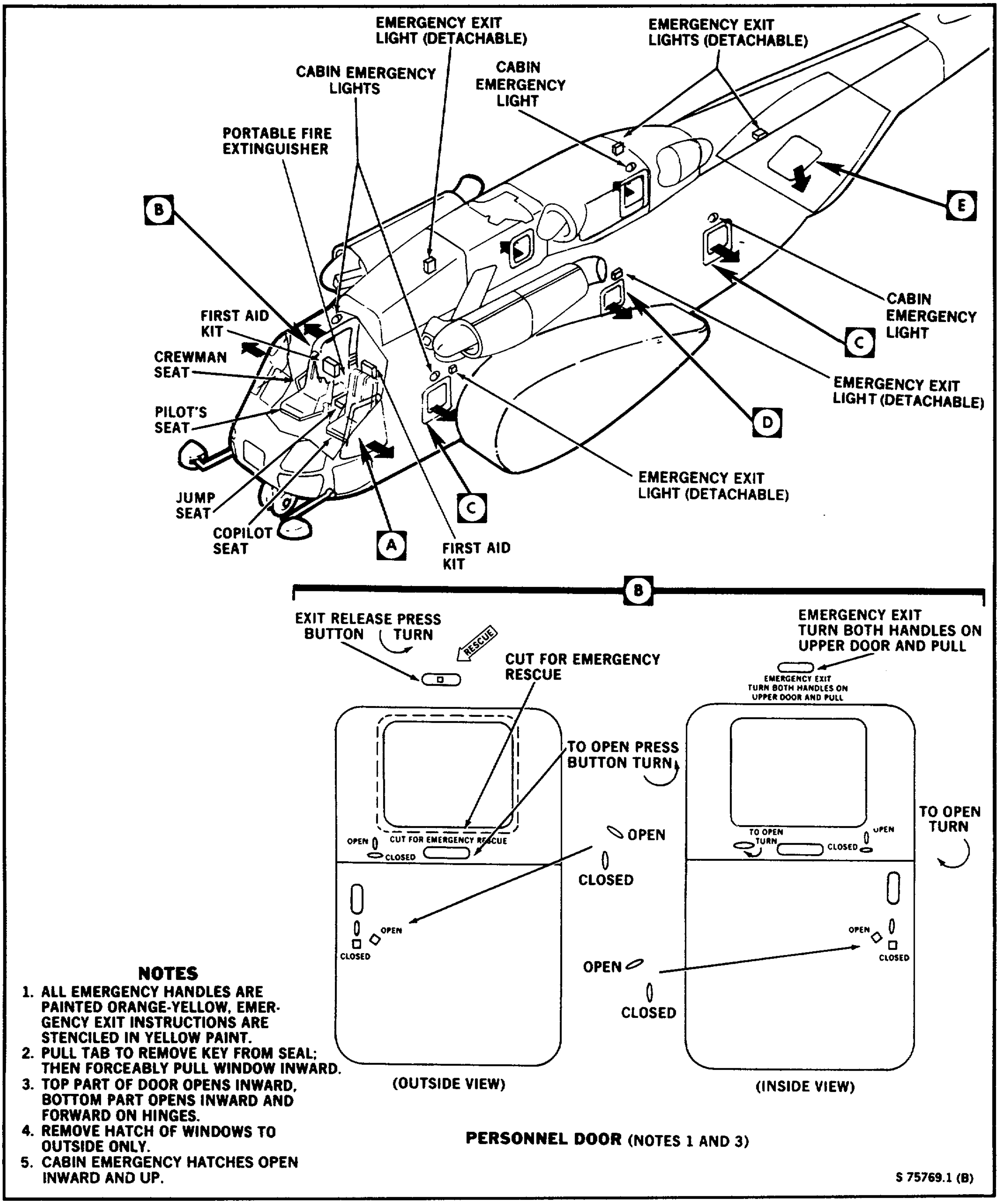


Figure G-9. CH-53 Emergency Exits and Entrance Doors



NOTES

1. ALL EMERGENCY HANDLES ARE PAINTED ORANGE-YELLOW, EMERGENCY EXIT INSTRUCTIONS ARE STENCILED IN YELLOW PAINT.
2. PULL TAB TO REMOVE KEY FROM SEAL; THEN FORCEABLY PULL WINDOW INWARD.
3. TOP PART OF DOOR OPENS INWARD, BOTTOM PART OPENS INWARD AND FORWARD ON HINGES.
4. REMOVE HATCH OF WINDOWS TO OUTSIDE ONLY.
5. CABIN EMERGENCY HATCHES OPEN INWARD AND UP.

Figure G-10. MH-53E Emergency Equipment, Exits, and Entrances (Sheet 1 of 2)

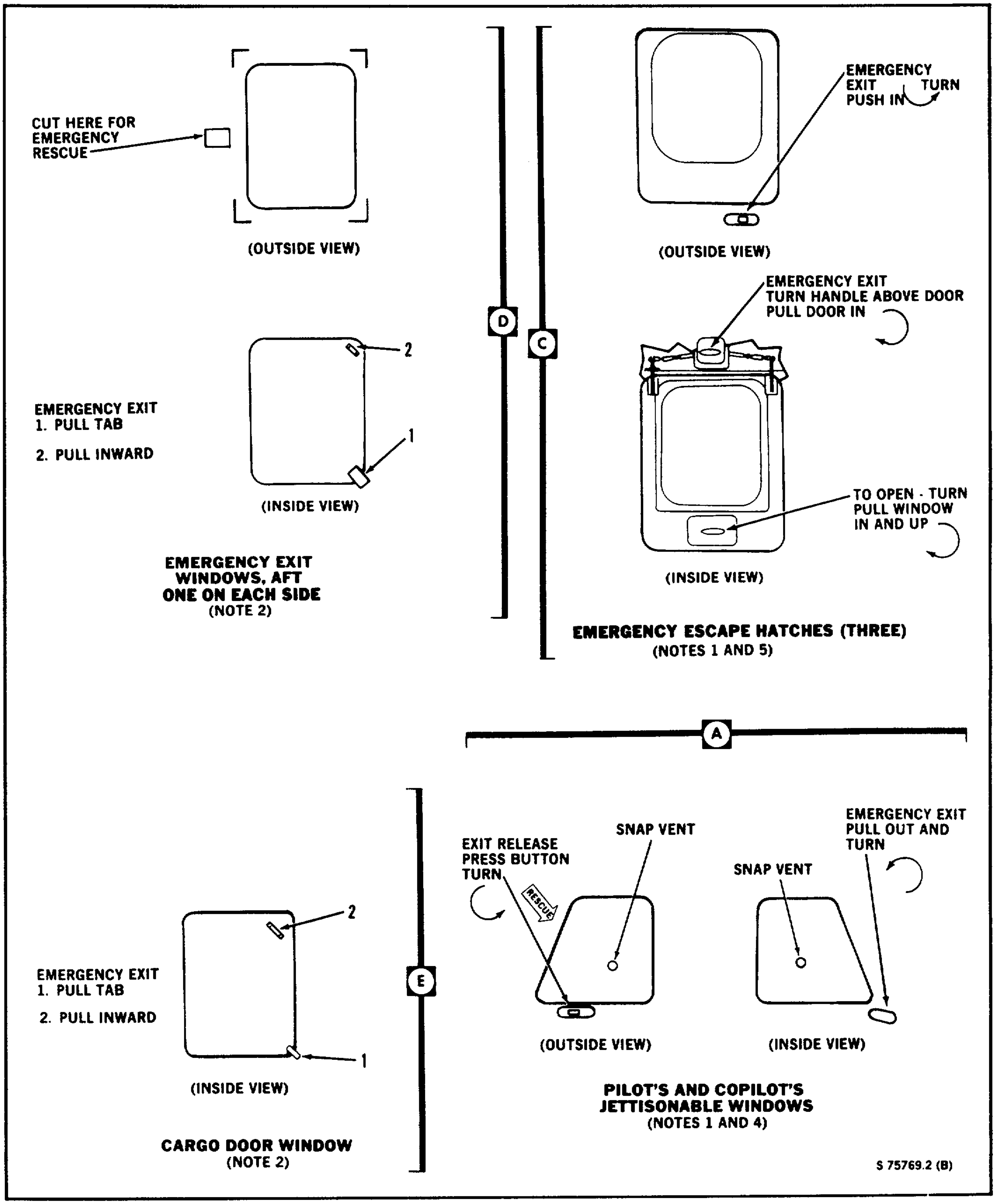


Figure G-10. MH-53E Emergency Equipment, Exits, and Entrances (Sheet 2 of 2)

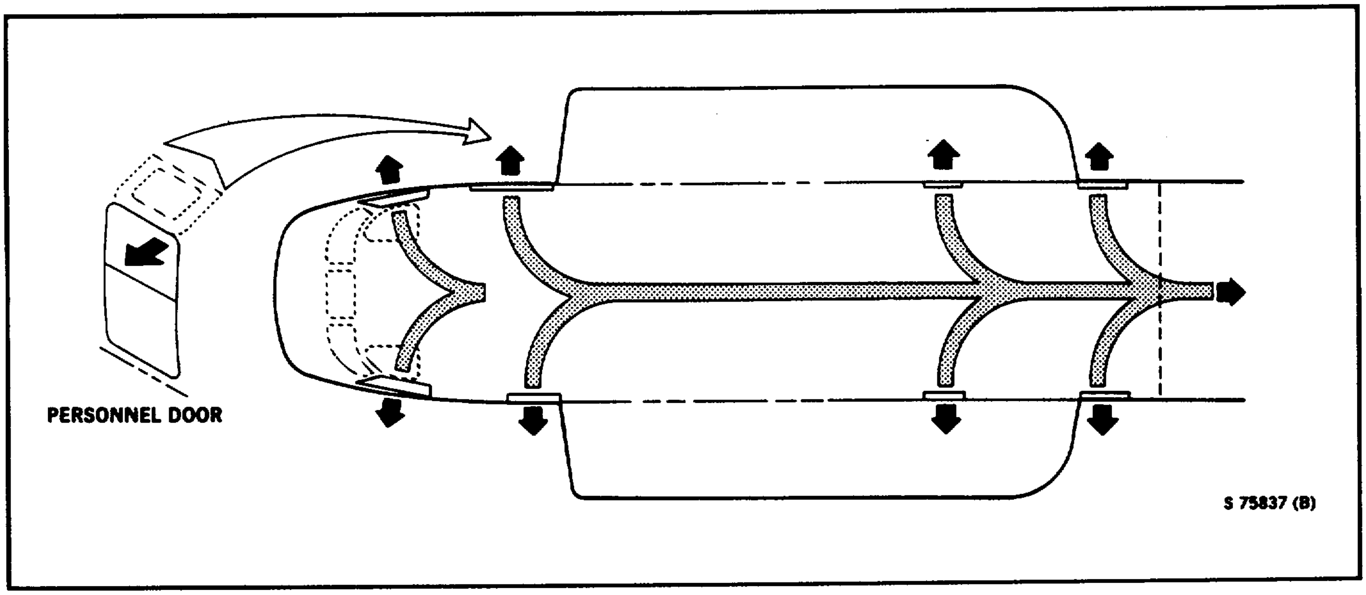


Figure G-11. MH-53E Evacuation Exits on Water

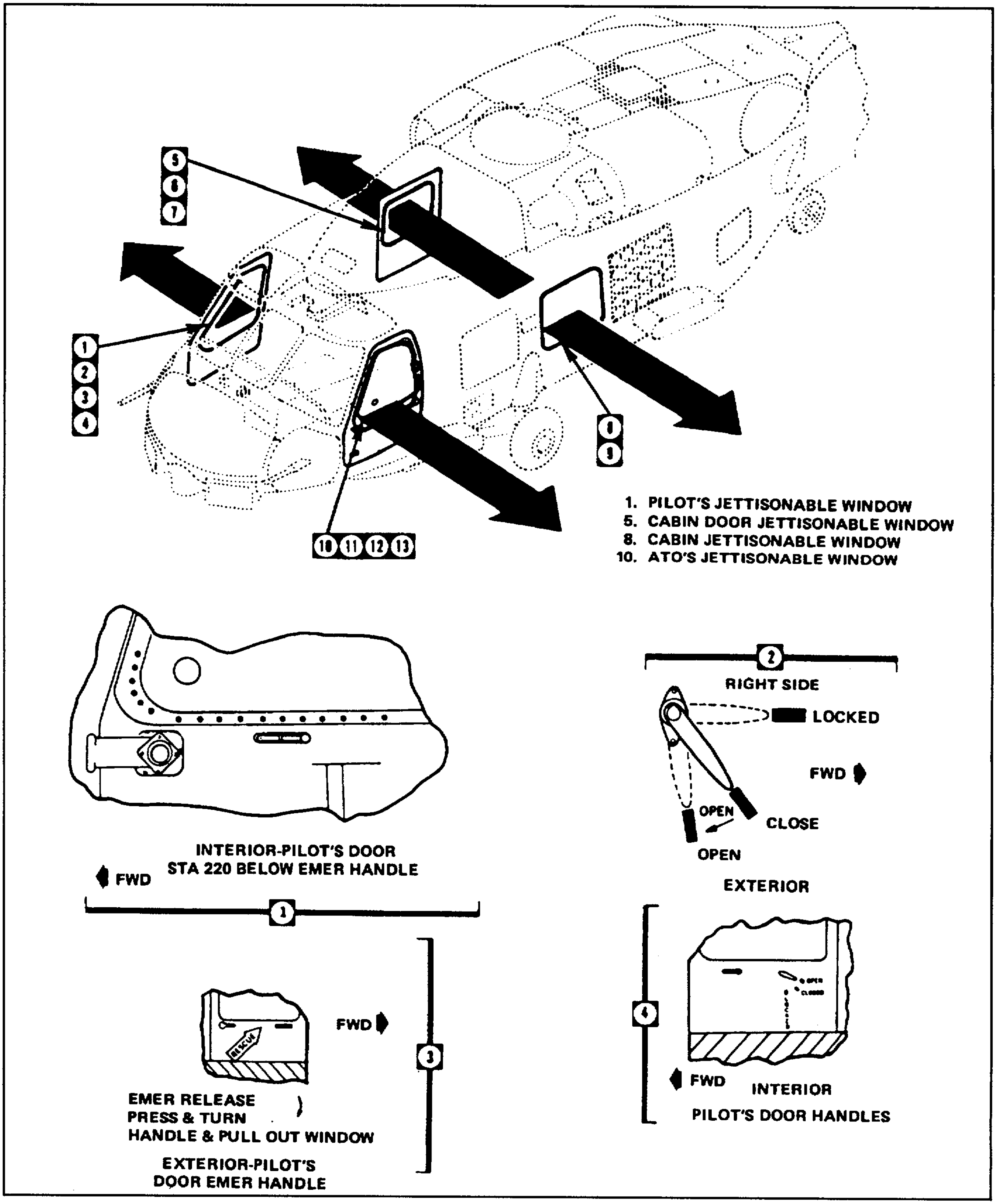


Figure G-12. SH-60B/F Emergency Entrances and Exits (Sheet 1 of 2)

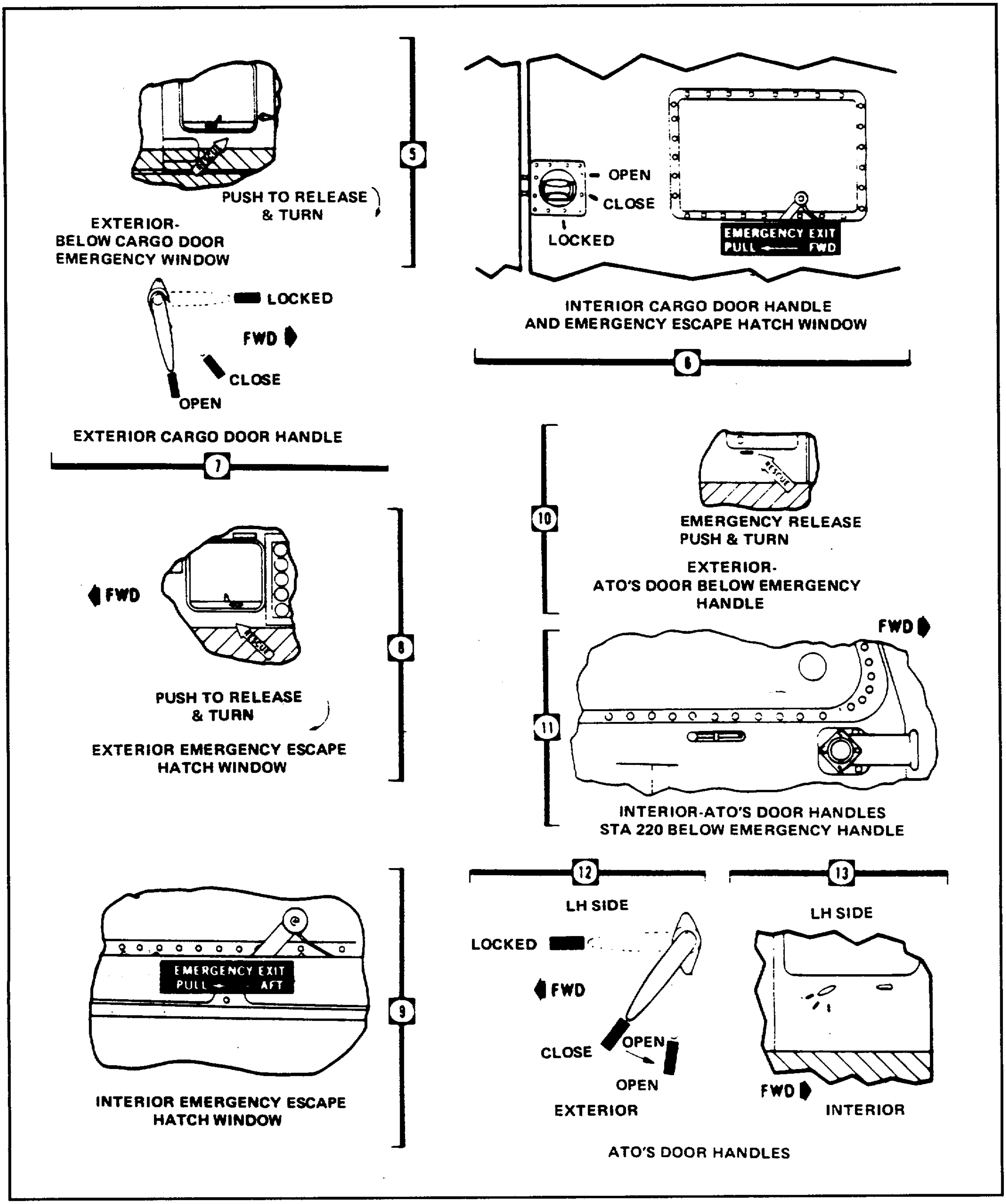


Figure G-12. SH-60B/F Emergency Entrances and Exits (Sheet 2 of 2)

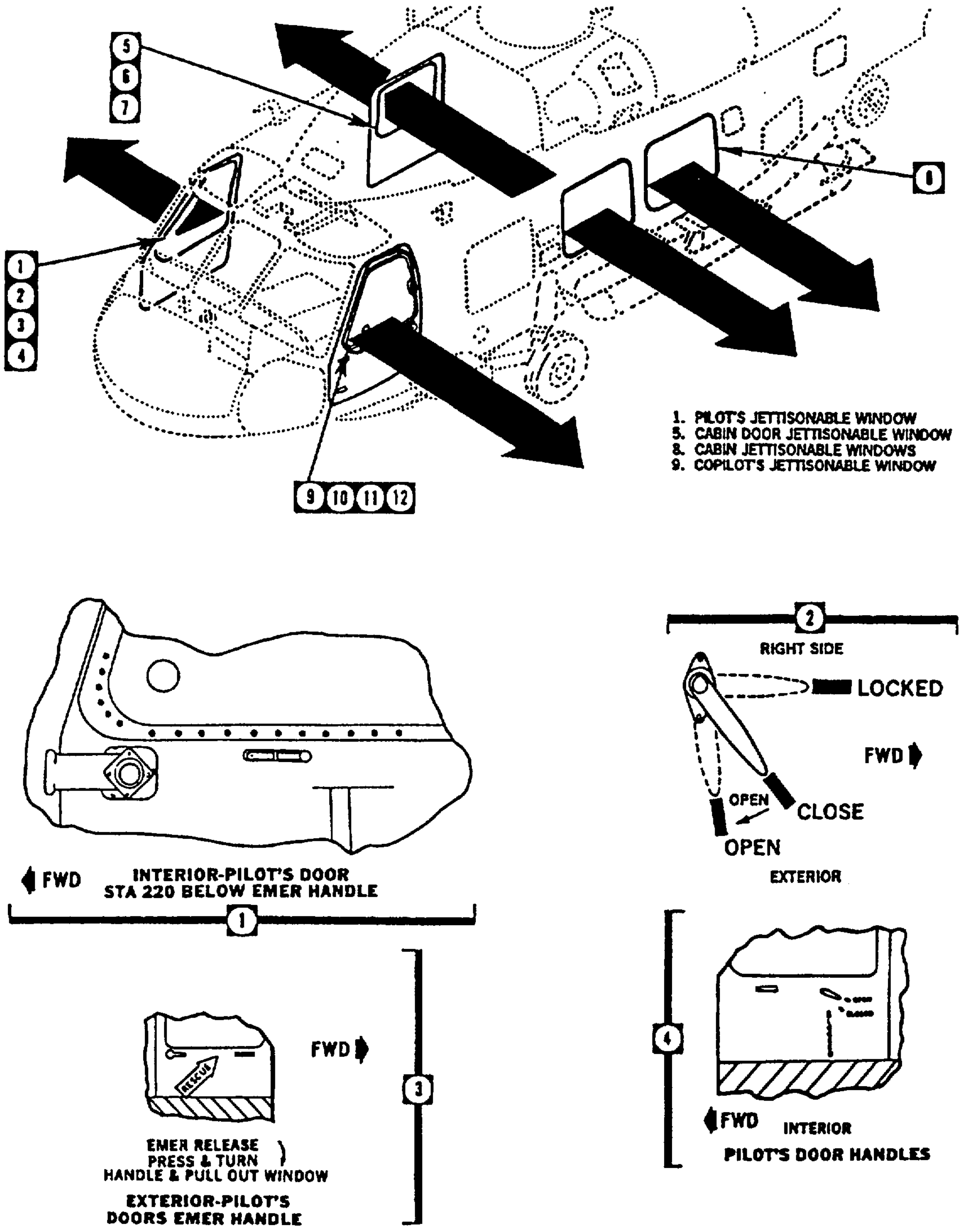


Figure G-13. HH-60J (USCG) Entrances and Exits (Sheet 1 of 2)

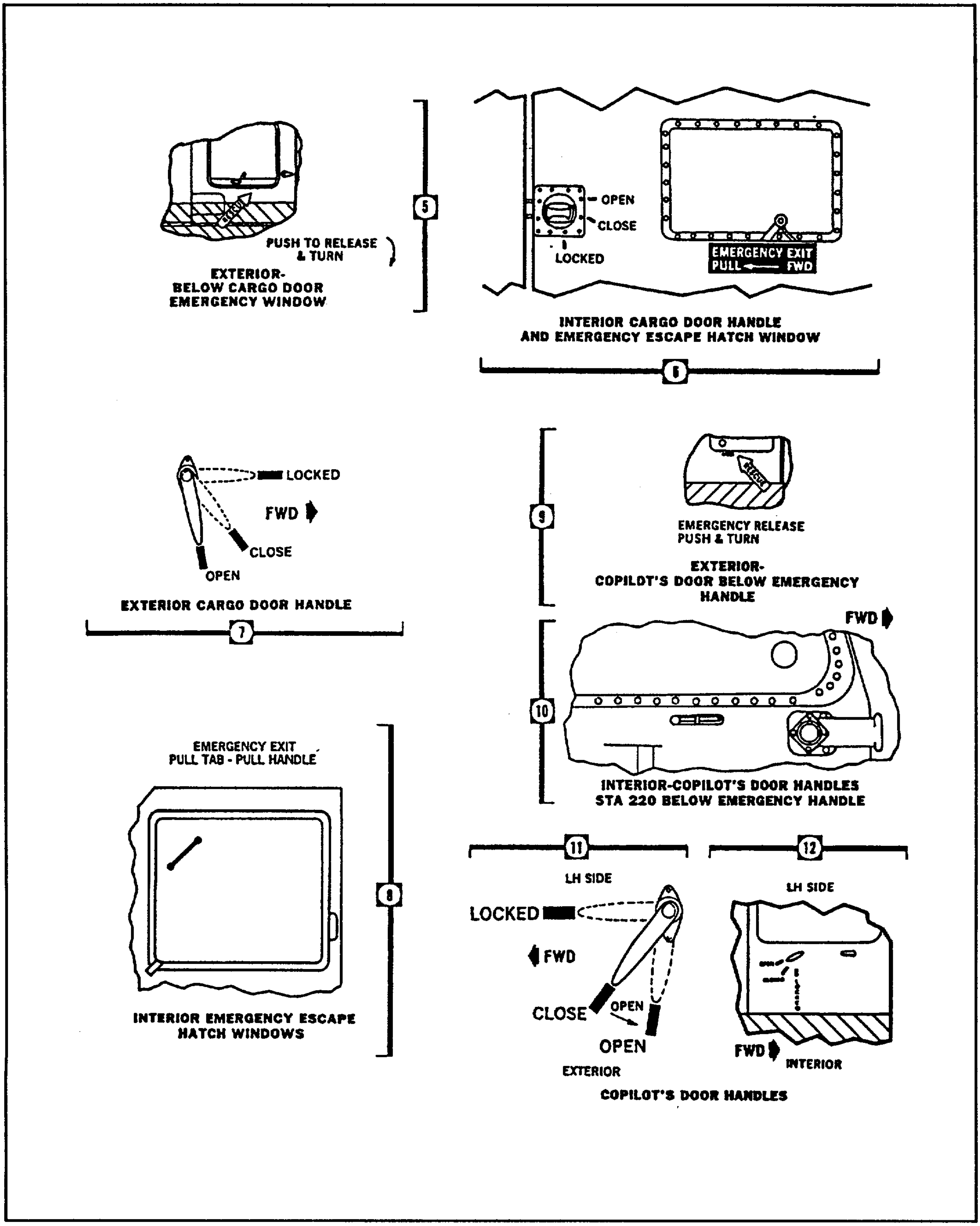


Figure G-13. HH-60J (USCG) Emergency Entrances and Exits (Sheet 2 of 2)

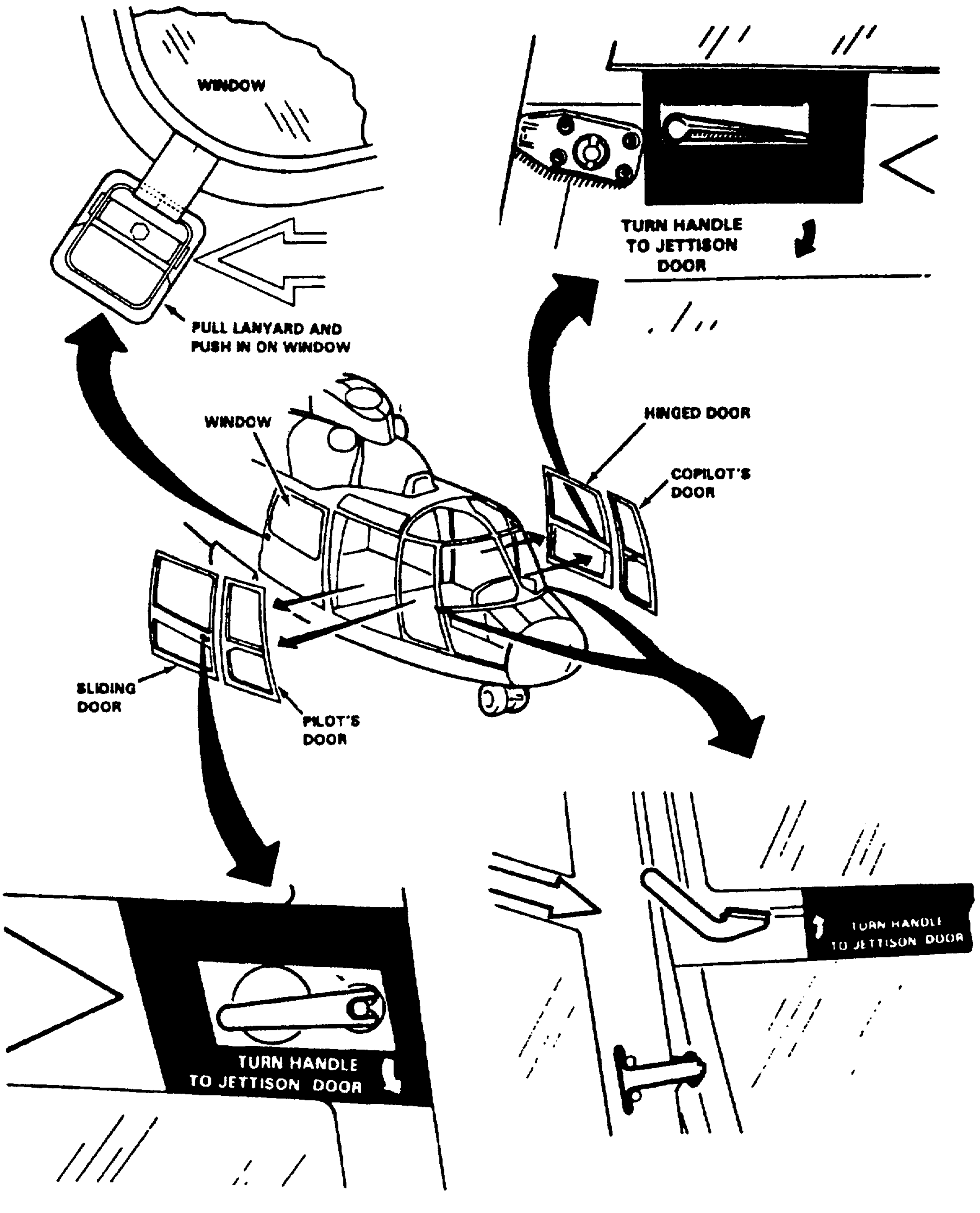


Figure G-14. HH-65A (USCG) Emergency Entrances and Exits

APPENDIX H

Shipboard Safety/Site Suitability Checklist

ACTION OFFICER ______________________________

DATE ______________________________

SHIPS NAME/COMPANY ______________________________

LOCATION ______________________________
(NAME, LAT/LONG,GRID, ETC.)

POINTS OF CONTACT

OWNING COMPANY/OPERATOR ______________________________
____

SHIPS MASTER ______________________________
____

LOG ______________________________
____

LAW ENFORCEMENT ______________________________
____

OTHER ______________________________
____

MAIL ADDRESS ______________________________
____

MESSAGE ADDRESS ______________________________
____

FAX NUMBER ______________________________
____

WEATHER (SEASONAL AT OPERATIONS LOCATION)

PREDOMINANT ______________________________

VISIBILITY ______________________________

PREVAILING WINDS ______________________________

ROUTE WX FROM BASE ______________________________

WATER TEMP ______________________________

SEA STATE ______________________________

OTHER ______________________________

TIME ZONE ______________________________

OBTAIN LOCAL METRO PACKAGE FOR AREA FOR DATES OF OPERATION

<u>LIAISON</u>

CONDUCT DETAILED SCENARIO BRIEF WITH OWNER/OPERATOR/MASTER

CONDUCT SITE WALK THROUGH WITH POC

*DETERMINE CHANGES TO CONFIGURATION PRIOR TO EVENT

*CONSOLIDATE SAFETY/OPS RESTRICTIONS

*DETERMINE PROHIBITED AREAS/SPACES

OBTAIN SKETCHES, BLUEPRINTS, ENGINEERING DIAGRAMS, MODELS (AS AVAILABLE)

DETERMINE SHIPBOARD FIREFIGHTING CAPABILITIES

*WHAT TYPE

*WHERE FIREFIGHTING GEAR IS LOCATED

*ESTABLISHED PROCEDURES

*SHIPS CREW RESPONSIBILITIES

*SOTG RESPONSIBILITIES

OPERATIONS

AIR OPERATIONS PROCEDURES AT SITE

*FAA HQ/LOCAL FAA

*FREQUENCIES

*MANDATORY RADIO CALLS

*ENTRY/EXIT POINTS

*TRAFFIC PATTERN

*HOLDING POINTS

*LOCATION FOR SOTG AIR CONTROLLER

*NOISE ABATEMENT REQUIREMENTS

*LOCAL CONCENTRATIONS OF CIVILIAN

*BIRD SANCTUARIES

*ITG CONSIDERATIONS (PREFERABLE REQUIRED)

*AREA FOR VIPS/OBSERVERS

*SAR ASSETS/SAR POSTURE

LANDING FACILITIES AVAILABLE (EMERGENCY ONLY)

*DIMENSIONS ________________________

*WEIGHT LIMITATIONS ________________________

*PROHIBITED FOR (TYPE/S OF A/C) ________________________

DESIGNATE

*INSERT POINTS

*DETERMINE HORIZONTAL, VERTICAL, AND SLANT CLEARANCES FOR ROTORS AT DESIGNATED INSERT POINTS

ESTABLISH WAVEOFF DIRECTION PROCEDURES FOR EACH INSERT POINT

DETERMINE EXISTING HAZARDS TO TROOPS IN INSERT POINTS

*GEAR ADRIFT - DISPOSAL/TIE DOWN, IF UNABLE DETERMINE RESTRICTIONS

NVG OPS RESTRICTIONS

*LIGHTS - SECURE IF ABLE

*OBSTACLES TO NVG EQUIPPED AIRCREWS - WIRES, POSTS, ANTENNAS, VEHICULAR TRAFFIC

MEDICAL

SHIPS MEDICAL CAPABILITIES

ESTABLISH CORPSMAN STATIONS

DETERMINE NEAREST MEDICAL FACILITY/LEVEL OF MEDICAL CARE (TRAUMA; BURN) *POC/#

*LOCATION

*FREQUENCIES

*PROCEDURES

*LZ/HELIPAD CAPABILITIES

DETERMINE AIR ROUTE TO SUITABLE FACILITIES

DETERMINE SURFACE ROUTE TO FACILITIES (PIERSIDE OPERATIONS)

APPENDIX I

Shipboard Procedures for Helicopter Emergencies

WHEN AN IN-FLIGHT EMERGENCY OR MAYDAY IS DECLARED, THE FOLLOWING STEPS SHOULD BE INITIATED IMMEDIATELY:

1. PLOT THE AIRCRAFT POSITION.
2. TURN TOWARD THE AIRCRAFT OR CRASH SITE AND PROCEED AT BEST SPEED.
3. ENSURE AIR DISTRESS FREQUENCY 243.0 MHZ UHF (GUARD) IS MONITORED.
4. SET EMERGENCY FLIGHT QUARTERS.
5. SUMMON HELICOPTER PILOT, IF AVAILABLE, TO PROCEED TO CIC.
6. BRIEF AND STATION ADDITIONAL LOOKOUTS.
7. IF APPLICABLE, DETERMINE BEST COURSE AND SPEED FOR AIRCRAFT RECOVERY. GENERALLY, POWER LOSS EMERGENCIES REQUIRE OPTIMUM WINDS ACROSS THE DECK, AND CONTROLLABLITY EMERGENCIES REQUIRE A STABLE DECK FOR LANDING.

WARNING

SMOKE MARKERS OR FLARES SHALL NOT BE USED TO MARK THE POSITION OF SURVIVORS OR WRECKAGE BECAUSE FUEL MAY BE PRESENT.

PLANNED/IMMEDIATE DITCH EMERGENCIES

DUE TO AN IMPENDING CATASTROPHIC FAILURE OR OUT OF CONTROL FIRE, THE AIRCRAFT WILL BE DITCHED.

A. DUAL ENGINE FAILURE

A DUAL ENGINE FAILURE WILL RESULT IN THE AIRCRAFT DITCHING.

B. LOSS OF TAIL ROTOR THRUST

A LOSS OF THRUST REQUIRES THE PILOT TO IMMEDIATELY DITCH.

C. LOSS OF TAIL ROTOR CONTROL

A LOSS OF TAIL ROTOR CONTROL SEVERELY DEGRADES THE CONTROLLABILITY OF THE HELICOPTER IN LOW SPEED AND HOVER FLIGHT. THE HELICOPTER CAN BE FLOWN IN CRUISE FLIGHT. A CV OR SIMILAR LARGE DECK SHIP OR DIVERT TO AN AIRFIELD IS NECESSARY TO MAKE A SAFE RECOVERY. IF THIS OPTION IS NOT AVAILABLE THE PILOT MAY ELECT TO ATTEMPT A SHIPBOARD LANDING OR DITCH THE AIRCRAFT IN THE VICINITY OF THE SHIP.

D. FIRE IN FLIGHT

IF THE FIRE IS OUT OF THE CONTROL THE PILOT WILL DITCH THE AIRCRAFT IMMEDIATELY. IF POSSIBLE, THE HELICOPTER WILL RETURN TO THE SHIP.

E. FUEL EMERGENCIES

THE HELICOPTER WILL RETURN TO THE SHIP IMMEDIATELY. A DUAL ENGINE FAILURE, WHICH WILL RESULT IN AN IMMEDIATE DITCH, MAY OCCUR. THE SHIP SHOULD HAVE A GREEN DECK READY FOR THE HELO UPON RETURN.

POWER FAILURE EMERGENCIES

A. SINGLE ENGINE FAILURE

WITH A SINGLE ENGINE FAILURE THE HELICOPTER MAY CONTINUE FLYING IN FORWARD FLIGHT. PERFORMANCE AT LOW AIRSPEEDS AND HOVERING IS DEGRADED. THE HELICOPTER WILL JETTISON STORES/FUEL TO REDUCE GROSS WEIGHT, AND RETURN TO THE SHIP. THE SHIP SHOULD MANEUVER TO OBTAIN WINDS FOR A SINGLE ENGINE LANDING.

B. ENGINE MALFUNCTIONS

THE HELICOPTER IS EXPERIENCING AN ENGINE PROBLEM WHICH MAY CAUSE A SINGLE ENGINE FAILURE TO OCCUR. THE SHIP SHOULD MANEUVER TO OBTAIN OPTIMUM WINDS FOR A SINGLE ENGINE LANDING.

TRANSMISSION (GEARBOX)/POWER TRAIN EMERGENCIES

THE HELICOPTER IS EXPERIENCING A DEGRADATION OF A TRANSMISSION. THE HELICOPTER WILL RETURN TO THE SHIP. IF SECONDARY INDICATIONS ARE PRESENT THE HELICOPTER WILL PROCEED INBOUND FOR IMMEDIATE LANDING. IF FAILURE OF A TRANSMISSION OCCURS OR IS IMMINENT, THE PILOT WILL DITCH THE AIRCRAFT IMMEDIATELY.

CONTROLLABILITY EMERGENCIES

A. ABNORMAL VIBRATION

THE HELICOPTER WILL RETURN TO THE SHIP FOR IMMEDIATE LANDING. IF CONTROL BECOMES DIFFICULT, THE PILOT MAY ELECT TO DITCH THE HELICOPTER.

B. HYDRAULIC/FLIGHT CONTROL MALFUNCTIONS

THE HELICOPTER IS EXPERIENCING A MALFUNCTION IN THE MECHANICAL FLIGHT CONTROLS OR THE AIRCRAFT STABILIZATION EQUIPMENT. AIRCRAFT CONTROL MAY BE DEGRADED. THE PILOT MAY DETERMINE THAT AN IMMEDIATE DITCH IS NECESSARY.

C. ELECTRICAL/GENERATOR FAILURE

IN NIGHT OR INSTRUMENT CONDITIONS THE HELICOPTER MAY LOSE CRITICAL STABILIZATION EQUIPMENT OR FLIGHT INSTRUMENTS. A DEGRADATION OF NAVIGATION EQUIPMENT AND RADIO COMMUNICATIONS CAN BE EXPECTED. IF A TOTAL ELECTRICAL FAILURE IS SUSPECTED AT NIGHT THE SHIP/DECK SHOULD BE BRIGHTLY ILLUMINATED TO SERVE AS A BEACON FOR THE HELICOPTER.

LOST COMMUNICATIONS — SEE CHAPTER SIX.

Note

INFORMATION ON EMERGENCIES THAT DO NOT REQUIRE IMMEDIATE ACTION CAN BE FOUND IN PARAGRAPH 2.7.

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