

Scandinavian Airlines System

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CHAPTER 09 - TOWING & TAXIING

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TOWING AND TAXIING - GENERAL

1. General

A. This procedure has these tasks:

- (1) Towing
- (2) Taxiing.

TASK 09-00-00-542-001

2. Towing

A. Procedure

S 542-002

- (1) Refer to 09-11-00 (Towing) when you tow the airplane.

TASK 09-00-00-542-003

3. Taxiing

A. General

- (1) When you taxi the airplane on the ground, the movement is equivalent to other conventional tricycle geared airplanes. The nose wheel steering and engine thrust are used to turn the airplane.

B. Procedure

S 542-004

- (1) Refer to 09-21-00 (Taxiing) for the procedures to taxi the airplane.

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TOWING – MAINTENANCE PRACTICES

1. General

- A. The design of the airplane will permit you to tow or push the airplane from the nose or main landing gear. A forward tow fitting on the nose gear can be used to tow the airplane with a tow bar. An aft tow fitting can be installed on the nose gear to pull the airplane with a tow bar.
- B. This procedure contains the following tasks:
 - (1) Tow the Airplane
 - (2) Tow the Airplane in High Wind

TASK 09-11-00-212-032

2. Towing – Maintenance Practices

A. Towing guidelines

S 212-024

- (1) You must be careful when you tow the airplane in a turn. Do not cause more than the Maximum Towing Loads as shown in Figure 203.

S 212-025

- (2) Make sure you have the necessary clearance when you go near a parked airplane or other structures. When the APU in the towed airplane or a parked airplane is on, you must have a minimum clearance of 32.8 feet (10 meters). The clearance must be between the APU exhaust port and the adjacent airplane's wingtip (fuel vent).

S 212-042

- (3) Be careful when you move the throttle in the flight deck. Throttle movement can activate the PWS radar. Do not operate the weather radar in the hangar. Make sure no personnel, fuel leaks, or open fuel cells are in the 50 foot (15 meter) radius from the radar.

S 212-026

- (4) To tow the airplane with the entry or the cargo doors open is optional.

S 212-033

- (5) Towing stability of a Towbarless Tow Vehicle (TLTV)/Airplane combination is dependent on many variables, two of these key variables being the characteristics of the tow vehicle tractive forces and the runway conditions. Maximum towing speeds shall be the responsibility of the airplane operator in conjunction with the airport authorities with consideration of recommendations from the TLTV manufacturer.

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S 212-027

WARNING: MOST TOWBARLESS TOW VEHICLES DO NOT HAVE A SHEAR PIN TO LIMIT THE LOADS IF THE AIRPLANE BRAKES ARE USED DURING TOWING. DO NOT APPLY THE AIRPLANE BRAKES WHEN YOU TOW THE AIRPLANE WITH TOWBARLESS TOW VEHICLES. IF YOU APPLY THE BRAKES, YOU CAN APPLY LOADS TO THE NOSE LANDING GEAR THAT ARE MORE THAN THE DESIGN LOAD LIMITS. IF YOU DO NOT OBEY THIS CAUTION, DAMAGE WILL OCCUR TO THE NOSE LANDING GEAR, THE TOW VEHICLE, AND MAINTENANCE PERSONS CAN BE INJURED.

- (6) You can use towbarless equipment to push or pull the airplane. Make sure the maximum permitted loads on the landing gear are not more than the Maximum Towing Loads as shown in Figure 203.

NOTE: This procedure is for towing or pushing the airplane with a tow bar. However, most of the steps in this procedure will apply if you use towbarless equipment. Refer to the equipment manufacturers data for procedures that are specific to their equipment.

S 562-037

- (7) Boeing recommends towbarless tow vehicles be designed, tested, operated, and maintained per the following Society of Automotive Engineers (SAE) Aerospace Recommended Practices (ARP), and applicable Boeing documentation:

NOTE: Airlines must make sure the latest revisions of the standards and documents are applied.

- (a) SAE ARP 4852: Specification for Towbarless Push-Back Tow Vehicles.
- (b) SAE ARP 4853: Specification for Towbarless Tow Vehicles (TLTV).
- (c) SAE ARP 5283: Towbarless Tow Vehicles - Aircraft Nose Landing Gear Steering and Tractive Force Protection Systems or Alerting Devices - Inspection, Maintenance, and Calibration Requirements.

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- (d) SAE ARP 5285: Towbarless Towing Vehicle Operating Procedure.
- (e) Boeing Document D6-56872: Towbarless Towing Evaluation.
- (f) Boeing Service Letter 767-SL-09-001: Towbarless Towing Evaluation.

NOTE: The service letter provides additional guidance and information regarding towbarless towing recommendations and regulatory requirements.

S 212-028

- (8) If you tow the airplane at an angle and weight more than is specified, do the Exceeding Maximum Nose Gear Towing Angle Conditional Inspection (AMM 05-51-29/201).

TASK 09-11-00-582-001

3. Tow the Airplane

A. Equipment

- (1) Towing Lever Lockpin - A09003-2 preferred
- (2) Towing Lever Lockpin - A09003-1
- (3) Tow Bar (if it is necessary) - Fabricate per A09002, Data Sheet - 767 Tow Bar Design
- (4) Tow Vehicle

B. References

- (1) AMM 05-51-01/201, Hard Landing or High Drag/Side Load Landing Condition
- (2) AMM 12-15-02/301, Shock Strut Servicing
- (3) AMM 24-22-00/201, Electrical Power - Control
- (4) AMM 29-11-00/201, Pressurize/Depressurize Main Hydraulic System
- (5) AMM 32-00-20/201, Landing Gear Downlocks
- (6) AMM 32-21-11/201, Nose Gear Torsion Links
- (7) AMM 32-41-00/501, Hydraulic Brake System
- (8) AMM 32-51-00/501, Nose Wheel Steering System - Adjustment/Test.
- (9) AMM 71-11-04/201, Fan Cowl Panels

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- (10) AMM 71-11-06/201, Core Cowl Panels
- (11) AMM 78-31-00/201, Thrust Reverser System

C. Prepare to Tow the Airplane

S 862-015

CAUTION: MAKE SURE ALL ENGINE COWLS ARE CLOSED AND LATCHED BEFORE YOU TOW THE AIRPLANE. DAMAGE TO THE AIRPLANE AND EQUIPMENT CAN OCCUR.

CAUTION: MAKE SURE THE FAN REVERSER HALVES ARE CLOSED AND LATCHED BEFORE YOU TOW THE AIRPLANE. DAMAGE TO THE AIRPLANE AND EQUIPMENT CAN OCCUR.

- (1) To prepare to tow the airplane, do the steps that follow:
 - (a) Make sure you have an approved brake operator in the flight compartment.
 - (b) Close the fan cowl panels (AMM 71-11-04/201).
 - (c) Close the thrust reverser (AMM 78-31-00/201).
 - (d) Close the core cowl panels (AMM 71-11-06/201).

S 862-040

WARNING: DO NOT CONNECT A HEADSET AND DO NOT TOUCH CONNECTIONS TO THE AIRPLANE DURING ATMOSPHERIC ELECTRICAL ACTIVITY OR IN STRONG ELECTROMAGNETIC FIELDS. LIGHTNING STRIKE AND HIGH DISCHARGE CURRENTS CAN CAUSE SEVERE INJURY.

WARNING: ALL WORK AROUND THE AIRPLANE MUST STOP WHEN LIGHTNING OCCURS AT A DISTANCE OF 6 MILES OR LESS. ALL PERSONNEL MUST GO IN A BUILDING OR THE AIRPLANE. LIGHTNING CAN KILL PERSONNEL OR CAUSE INJURY.

- (2) Make sure there is clear intercom communication between the control cabin crew, the towing ground crew and the tow tractor operator.

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WARNING: WHEN YOU USE A TOW BAR TO MOVE THE AIRPLANE IN HIGH WINDS, CONNECT THE TOW BAR BEFORE YOU INSERT THE STEERING LOCKOUT PIN (TOW PIN). THE AIRPLANE COULD MOVE WHEN THE PARKING BRAKES OR WHEEL CHOCKS HAVE BEEN RELEASED FOR TOWING. INJURY TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR.

CAUTION: THE TOWING LEVER MUST BE IN THE TOWING POSITION BEFORE YOU TOW THE AIRPLANE. FAILURE TO PUT THE TOWING LEVER IN THE TOWING POSITION CAN CAUSE DAMAGE TO LANDING GEAR COMPONENTS OR TOWING EQUIPMENT.

- (a) Move the towing lever (Shown on Figure 201) on the metering valve module to the towing position.

NOTE: When you hold the tow lever in the TOWING position with the lockpin, the nose gear steering will not operate. This is when the hydraulic system is pressurized.

NOTE: You can make the airplane turn 65 degrees and not disconnect the torsion links (the steering actuator bottoms at 65 degrees). To turn more than 65 degrees, you must disconnect the torsion links.

- (b) Install the towing lever lock pin.
(c) Make sure the downlocks are installed on the nose and main landing gear (AMM 32-00-20/201).

NOTE: It is optional to install landing gear downlocks when you tow or push the airplane for the flight. This is when the airplane is in position for the flight crew to taxi the airplane prior to or after a flight.

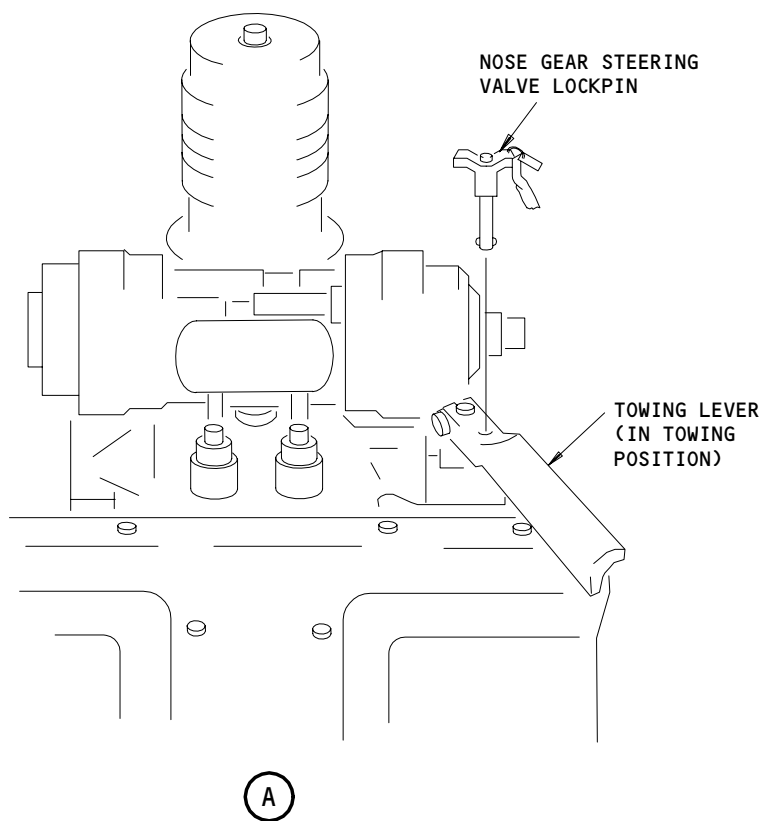
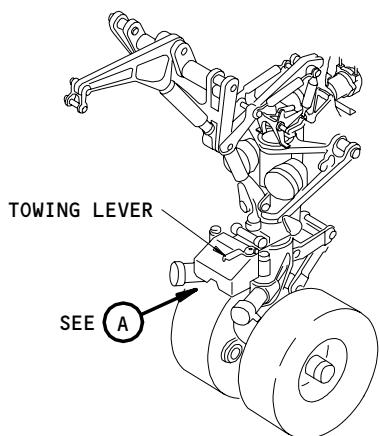
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Nose Gear Steering Valve Lockpin Installation
Figure 201

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CAUTION: DO NOT TOW THE AIRPLANE WHEN THE LANDING GEAR SHOCK STRUT IS COMPRESSED FULLY. IF YOU MUST TOW THE AIRPLANE IN AN EMERGENCY, FOLLOW THE INSTRUCTIONS BELOW. IF YOU DO NOT FOLLOW THESE INSTRUCTIONS, DAMAGE TO THE SHOCK STRUT CAN OCCUR.

IT IS PERMITTED TO TOW THE AIRPLANE WITH ONE OR MORE DEFLATED SHOCK STRUTS. THIS IS IF THE TOW SPEEDS ARE LESS THAN 5 MPH. WHEN THE AIRPLANE HAS A DEFLATED NOSE STRUT, IT IS RECOMMENDED TO TOW THE AIRPLANE FORWARD IN A STRAIGHT LINE ONLY. THE TOWING ANGLE MUST ALSO BE KEPT TO A MINIMUM.

- (d) Make sure that the shock struts have a minimum extension of 6.30 inches at DIM "A" and 6.10 inches at DIM "B" on all of the landing gear (See Figure 201A for the procedure to measure the shock strut extension).

NOTE: You can tow the airplane with deflated shock struts (4.30 inches at DIM "A" and 4.10 inches at DIM "B") in an emergency, if you obey the limits in the caution notes.

The check for a minimum shock strut extension is a "quick check" for towing the airplane during maintenance. The landing gear must be filled as shown on the servicing chart for flight dispatch.

CAUTION: THE MAXIMUM PERMITTED SHOCK STRUT EXTENSION FOR THE NOSE LANDING GEAR IS 10 INCHES. THIS IS TO MAKE SURE THE CENTERING CAM DOES NOT ENGAGE. THIS IS ALSO TO KEEP A FORWARD CENTER OF GRAVITY TO MAKE SURE THE AIRPLANE WILL NOT FALL ON ITS TAIL. IF YOU DO NOT FOLLOW THESE INSTRUCTIONS, DAMAGE TO THE AIRPLANE OR TOWING EQUIPMENT CAN OCCUR.

- (e) Make sure the open surface of the inner cylinder chrome, of the nose landing gear, is not more than 10 inches. If the shock extension is more than 10 inches see servicing of the shock strut (AMM 12-15-02/301).

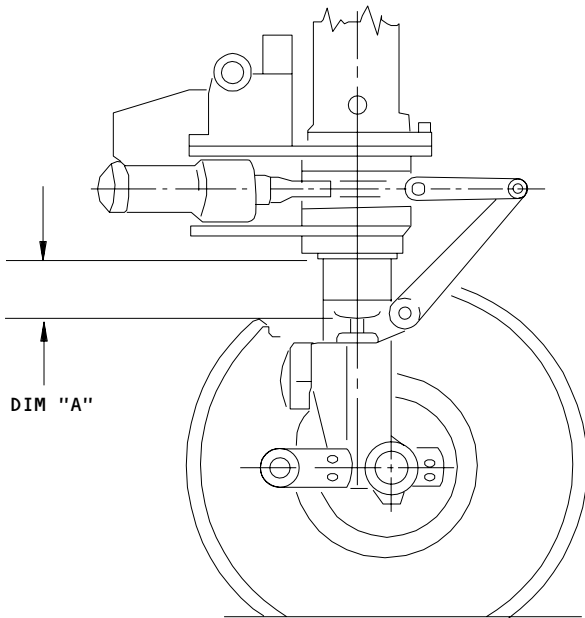
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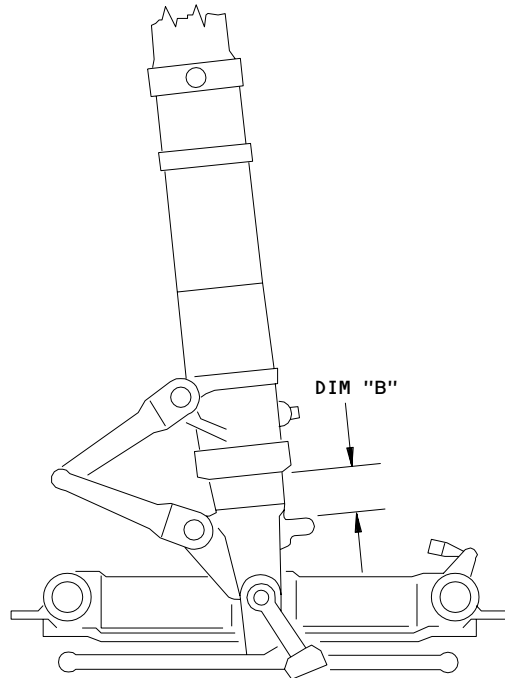
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NOSE GEAR



MAIN GEAR

MINIMUM SHOCK STRUT EXTENSION

DIM "A" = 6.30 INCHES

NOTE: FULLY COMPRESSED STRUT: DIM "A" = 4.30 INCHES

DIM "B" = 6.10 INCHES

NOTE: FULLY COMPRESSED STRUT: DIM "B" = 4.10 INCHES

Landing Gear Shock Strut Extension Specifications
Figure 201A

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- (f) Make sure the airplane center of gravity is below the GROUND STABILITY MARGIN line in Figure 202.

WARNING: PERFORM THE FOLLOWING STEPS BEFORE APPLYING EXTERNAL POWER. THE PITOT PROBE CAN BECOME VERY HOT AND CAUSE INJURY TO PERSONNEL.

- (g) Push the BAT switch on the P5 panel to the ON position.
(h) Turn the STBY power switch on the P5 panel to the AUTO position.

S 862-003

- (3) Supply electrical power to the airplane (AMM 24-22-00/201).

S 862-041

- (4) Do a check for a lateral fuel imbalance and adjust the current fuel loading as appropriate.
(a) The maximum allowable fuel imbalance between the left and right main tanks is 2,500 pounds (1134 kilograms) when total main tank fuel is 48,000 pounds (21,772 kilograms) or less, with a linear reduction to 1,500 pounds (680 kilograms) when total main tank fuel is 79,800 pounds (36,197 kilograms), and is 1,500 pounds (680 kilograms) when total main tank fuel exceeds 79,800 pounds (36,197 kilograms).

S 862-004

- (5) Supply right system hydraulic power (or center system hydraulic power if the right system does not operate) (AMM 29-11-00/201).

S 212-005

- (6) Do a check of the brake system (AMM 32-41-00/501).
(a) Make sure that the hydraulic brake pressure is 3000 ±100 psi.

NOTE: The BRAKE PRESSURE indicator gage is found on the pilot's center instrument panel, P3.

- (b) If electrical power is not available, make sure the pressure gage for the brake accumulator (found in wheel well adjacent to accumulator) reads 2600 to 3000 psi.

NOTE: To tow the airplane with brakes that operate, you must have 2600 to 3000 psi in the accumulator. You can apply the brakes two or three times when the accumulator pressure is 2600.

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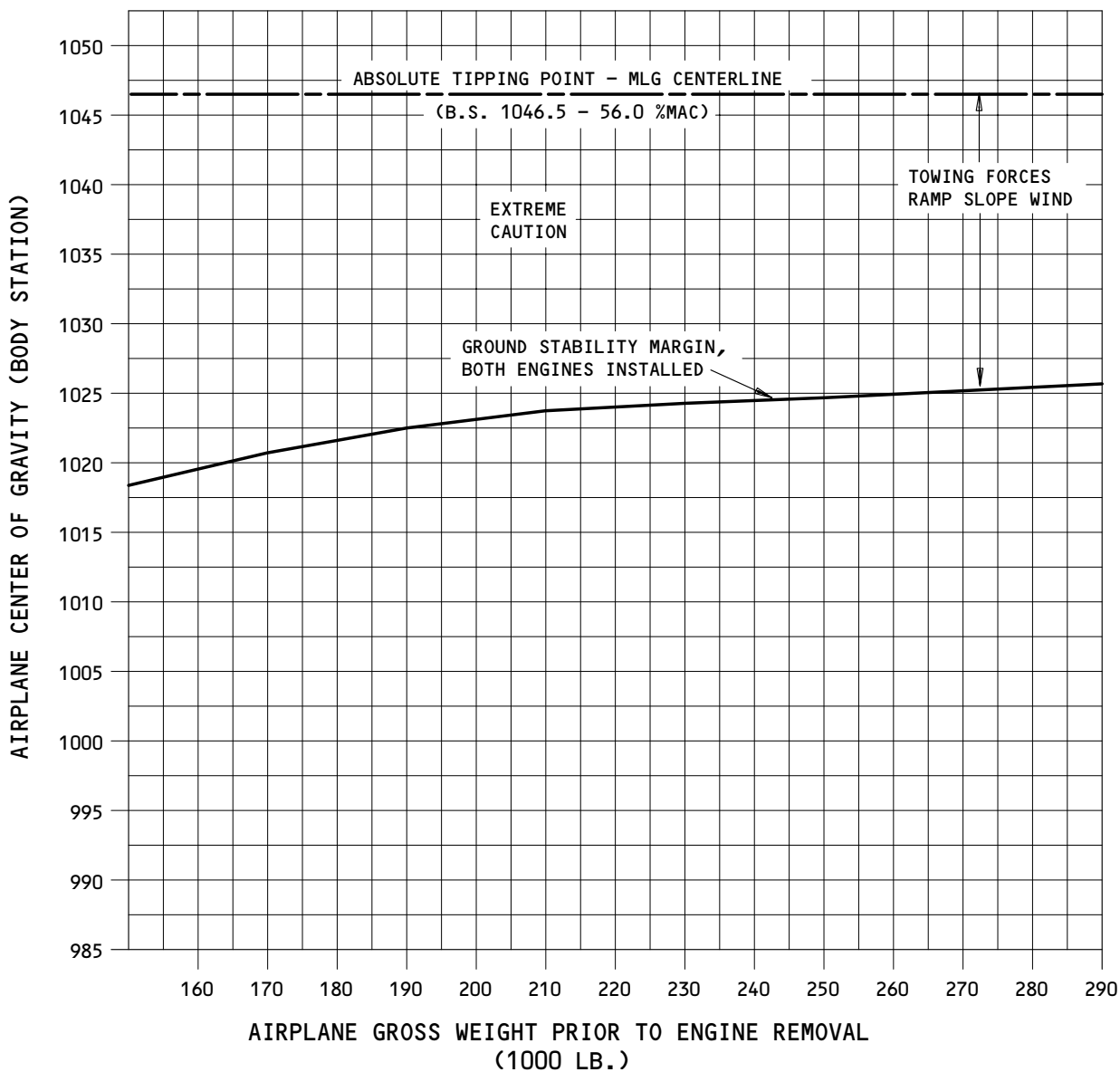
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TIPPING OF 767 AIRPLANE

THE CHART BELOW SHOWS THE 767-200 TIPPING LIMITS. THE ABSOLUTE TIPPING LIMIT IS THE MLG CENTERLINE AT B.S. 1046.5. THE GROUND STABILITY MARGIN LINE REPRESENTS THE ABSOLUTE TIPPING LIMIT TO ACCOUNT FOR FACTORS SUCH AS TOWING FORCES, RAMP SLOPE AND WIND. WHEN YOU MAKE SURE THAT THE AIRPLANE WEIGHT AND C.G. DURING MAINTENANCE OPERATIONS IS BELOW THIS LINE, A TIPPING SITUATION WILL BE AVOIDED

767-200
GROUND STABILITY MARGIN
TOWING/SHORT TERM MAINTENANCE AND ENGINE REMOVAL CONDITIONS



Towing Center of Gravity Limits (767-200)
Figure 202 (Sheet 1)

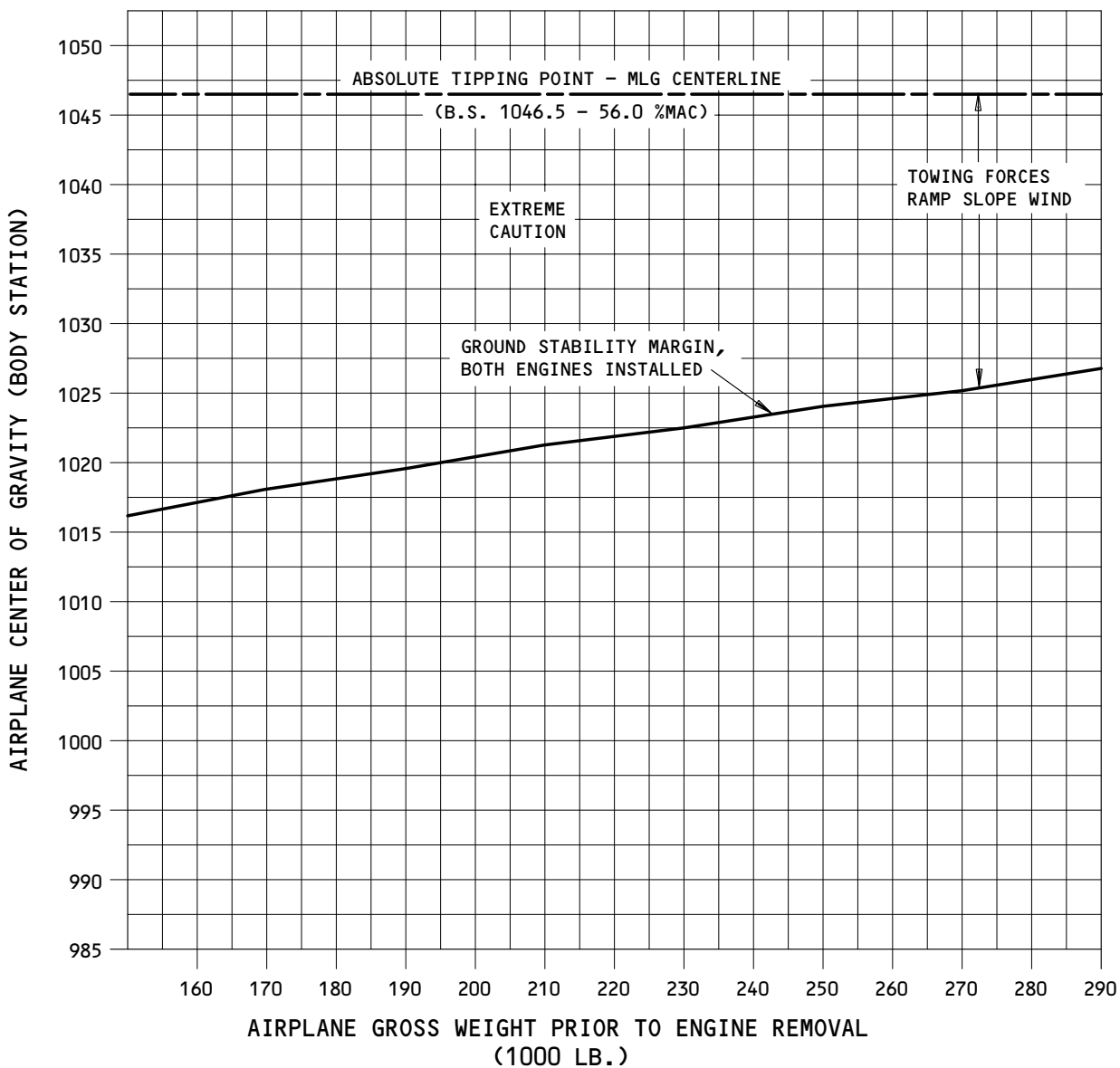
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TIPPING OF 767 AIRPLANE

THE CHART BELOW SHOWS THE 767-300 TIPPING LIMITS. THE ABSOLUTE TIPPING LIMIT IS THE MLG CENTERLINE AT B.S. 1046.5. THE GROUND STABILITY MARGIN LINE REPRESENTS THE ABSOLUTE TIPPING LIMIT TO ACCOUNT FOR FACTORS SUCH AS TOWING FORCES, RAMP SLOPE AND WIND. WHEN YOU MAKE SURE THAT THE AIRPLANE WEIGHT AND C.G. DURING MAINTENANCE OPERATIONS IS BELOW THIS LINE, A TIPPING SITUATION WILL BE AVOIDED

**767-300
GROUND STABILITY MARGIN
TOWING/SHORT TERM MAINTENANCE AND ENGINE REMOVAL CONDITIONS**



Towing Center of Gravity Limits (767-300)
Figure 202 (Sheet 2)

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CAUTION: DO NOT PERMIT THE LOADS ON THE NOSE LANDING GEAR (WHILE THE AIRPLANE IS IN A TURN) TO BE MORE THAN THE SPECIFIED LOADS. IF YOU APPLY MORE LOADS THAN ARE SPECIFIED, STRUCTURAL DAMAGE TO THE LANDING GEAR CAN OCCUR.

- (7) Make sure the maximum permitted tow loads for the nose landing gear are not more than those shown in Figure 203 and Figure 206.

CAUTION: DO NOT TOW THE AIRPLANE AT ANGLES THAT ARE MORE THAN 65 DEGREES. THIS IS WHEN THE TORSION LINKS FOR THE NOSE GEAR ARE NOT DISCONNECTED. IF YOU TOW DURING THESE CONDITIONS, DAMAGE TO THE AIRPLANE HYDRAULIC SYSTEM CAN OCCUR.

DO NOT LET THE LOWER TORSION LINK DROP OR CAUSE DAMAGE TO THE ADJACENT EQUIPMENT. ATTACH THE UPPER AND LOWER TORSION LINKS AS NECESSARY TO PREVENT DAMAGE DURING THE TOW.

- (a) When the nose gear angle will be more than 65 degrees, disconnect the torsion links before you tow the airplane (AMM 32-21-11/201).

NOTE: A red indicator stripe is painted on the doors for the nose landing gear. This stripe will tell you when you are near a 65 degree nose gear turn.

- (b) If you tow the airplane at an angle more than is specified, do the Nose Wheel Steering System - Adjustment/Test (AMM 32-51-00/501).

CAUTION: IF YOU USE A TOW BAR, MAKE SURE THAT THE TOW BAR HAS SHEAR PINS THAT ARE SPECIFIED. THESE SPECIFICATIONS ARE SHOWN IN THE DESIGN DATA SHEET A09002 FOR THE 767 TOW BAR. IF YOU DO NOT FOLLOW THESE SPECIFICATIONS, DAMAGE TO THE TOW LUGS ON THE NOSE LANDING GEAR CAN OCCUR.

- (c) Put the tow vehicle in position and, if it is necessary, attach the tow bar to the fitting on the nose landing gear.

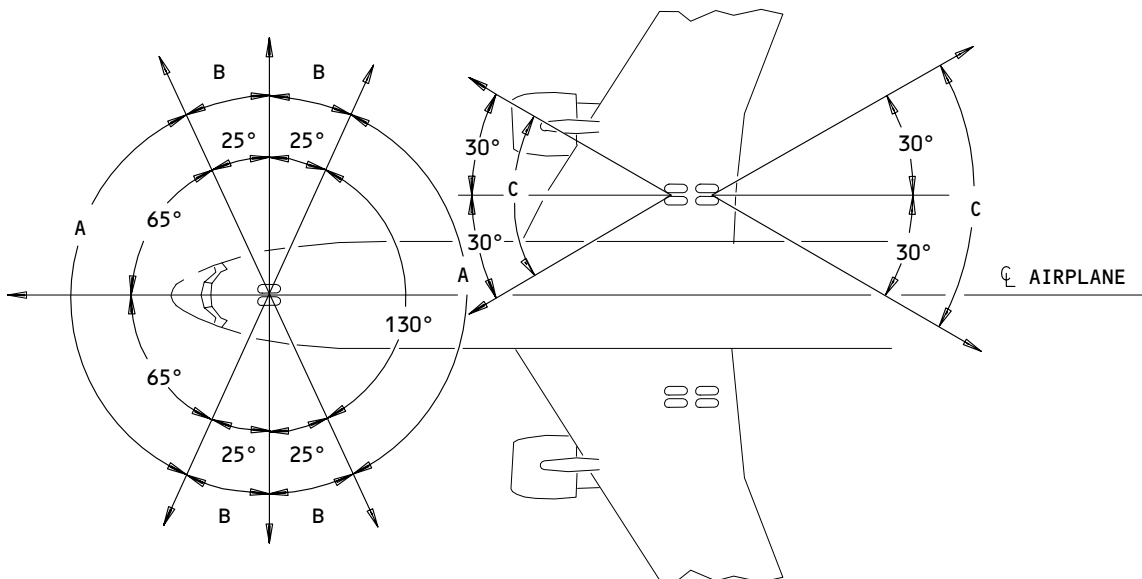
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MAXIMUM TOWING LOADS

- A = 62,000 LBS (28,122 KG)
- B = 31,000 LBS (14,060 KG)
- C = 47,000 (21,318 KG) PER GEAR

NOTE: DISCONNECT THE NOSE GEAR TORSION LINK WHEN TOWING AT ANGLES MORE THAN 65° TO PREVENT DAMAGE TO THE HYDRAULIC STEERING SYSTEM.

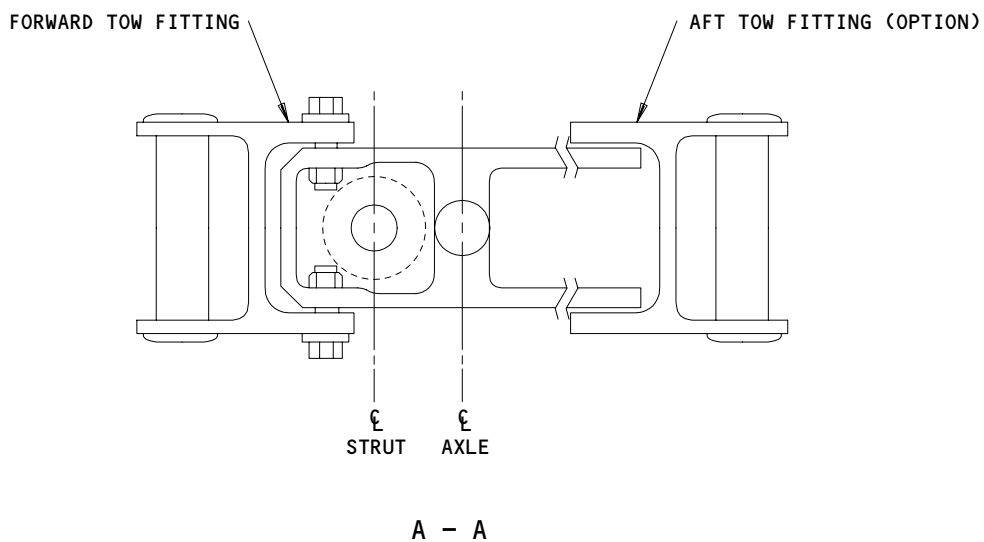
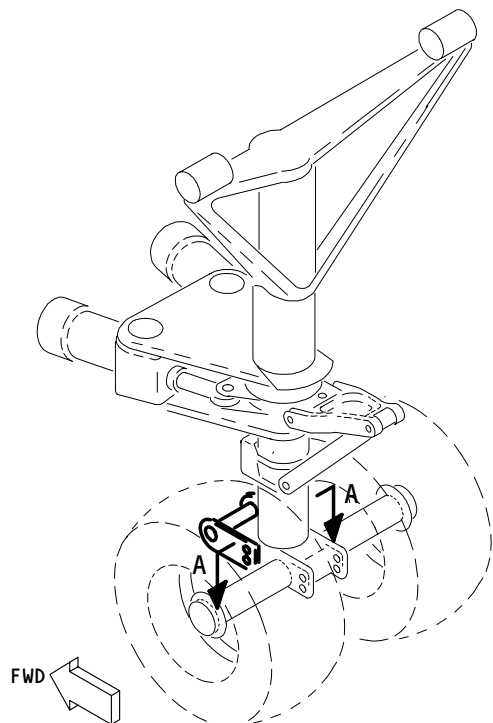
Nose and Main Gear Maximum Towing Loads vs. Towing Directions
Figure 203

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Nose Gear Tow Bar Attachment Fitting
Figure 204

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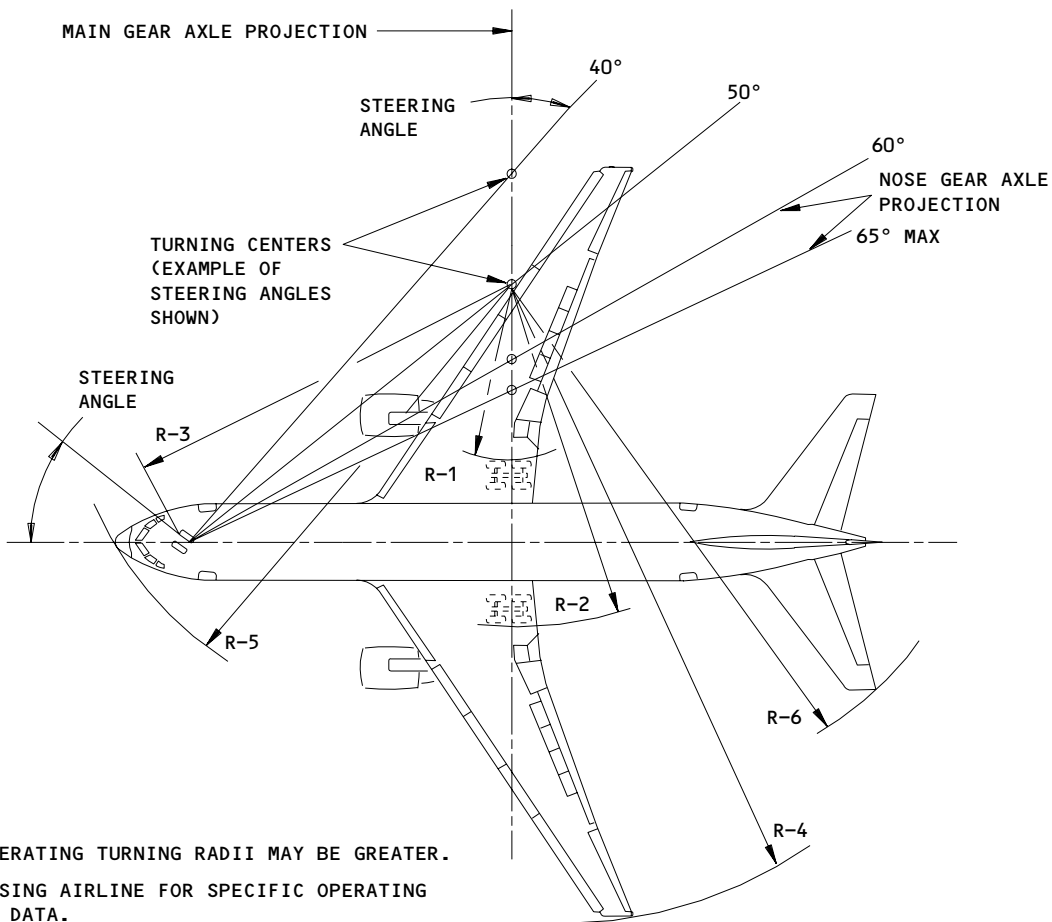
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BOEING

767 MAINTENANCE MANUAL



NOTES: ACTUAL OPERATING TURNING RADII MAY BE GREATER.
CONSULT USING AIRLINE FOR SPECIFIC OPERATING
PROCEDURE DATA.

DIMENSIONS ROUNDED TO NEAREST FOOT AND 0.1 METER

| STEERING ANGLE (DEG) | R1 INNER GEAR | | R2 OUTER GEAR | | R3 NOSE GEAR | | R4 WINGTIP | | R5 NOSE | | R6 TAIL | |
|----------------------------|------------------|------|------------------|------|-----------------|------|---------------|------|------------|------|------------|------|
| | FT | M | FT | M | FT | M | FT | M | FT | M | FT | M |
| 30 | 94 | 28.7 | 130 | 39.6 | 129 | 39.4 | 191 | 58.2 | 137 | 41.8 | 162 | 49.4 |
| 35 | 74 | 22.6 | 110 | 33.5 | 113 | 34.3 | 172 | 52.4 | 122 | 37.2 | 145 | 44.2 |
| 40 | 59 | 18.0 | 95 | 29.0 | 100 | 30.6 | 157 | 47.9 | 111 | 33.8 | 132 | 40.2 |
| 45 | 47 | 14.3 | 82 | 25.0 | 91 | 27.8 | 145 | 44.2 | 102 | 31.1 | 123 | 37.5 |
| 50 | 36 | 11.0 | 72 | 21.9 | 84 | 25.7 | 135 | 41.1 | 96 | 29.3 | 115 | 35.1 |
| 55 | 27 | 8.2 | 63 | 19.2 | 79 | 24.0 | 126 | 38.4 | 91 | 27.7 | 108 | 32.9 |
| 60 | 20 | 6.1 | 55 | 16.8 | 75 | 22.7 | 118 | 36.0 | 88 | 26.8 | 103 | 31.4 |
| 65 | 12 | 3.7 | 48 | 14.6 | 71 | 21.7 | 111 | 33.8 | 85 | 25.9 | 98 | 29.9 |

767-200

Turning Radii - No Slip Angle
Figure 205 (Sheet 1)

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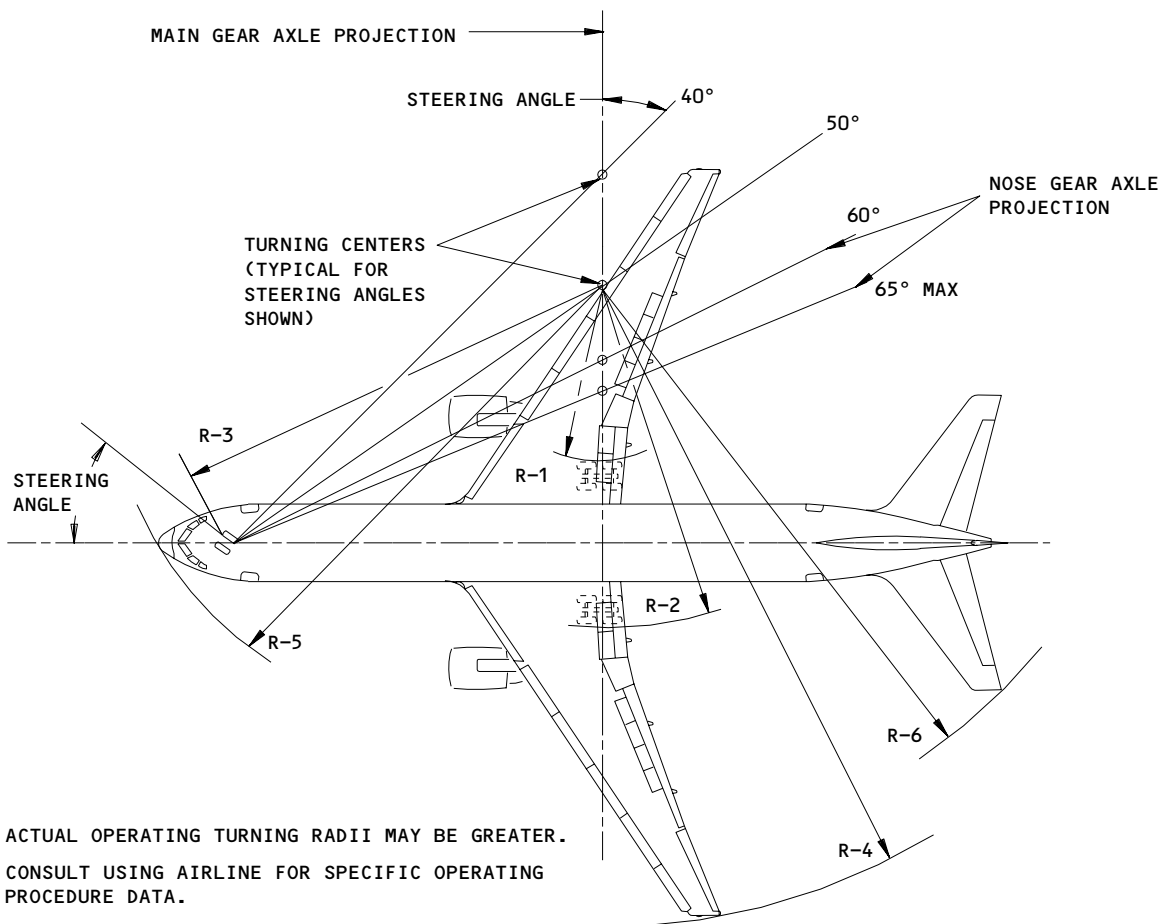
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767 MAINTENANCE MANUAL



NOTES: ACTUAL OPERATING TURNING RADII MAY BE GREATER.
CONSULT USING AIRLINE FOR SPECIFIC OPERATING
PROCEDURE DATA.

DIMENSIONS ROUNDED TO NEAREST FOOT AND 0.1 METER

| STEERING ANGLE (DEG) | R1 INNER GEAR | | R2 OUTER GEAR | | R3 NOSE GEAR | | R4 WINGTIP | | R5 NOSE | | R6 TAIL | |
|----------------------------|------------------|------|------------------|------|-----------------|------|---------------|------|------------|------|------------|------|
| | FT | M | FT | M | FT | M | FT | M | FT | M | FT | M |
| 30 | 111.5 | 34.0 | 147.3 | 44.9 | 151.0 | 46.0 | 209.3 | 63.8 | 157.4 | 48.0 | 182.7 | 55.7 |
| 35 | 88.8 | 27.1 | 124.6 | 38.0 | 131.8 | 40.2 | 186.8 | 56.9 | 139.3 | 42.5 | 163.3 | 49.8 |
| 40 | 71.1 | 21.7 | 106.9 | 32.6 | 117.8 | 35.9 | 169.3 | 51.6 | 126.3 | 38.5 | 148.7 | 45.3 |
| 45 | 56.8 | 17.3 | 92.6 | 28.2 | 107.2 | 32.7 | 155.2 | 47.3 | 116.6 | 35.5 | 137.3 | 41.8 |
| 50 | 44.8 | 13.7 | 80.6 | 24.6 | 99.1 | 30.2 | 147.4 | 44.9 | 109.3 | 33.3 | 128.5 | 39.2 |
| 55 | 34.4 | 10.5 | 70.2 | 21.4 | 92.8 | 28.3 | 133.3 | 40.6 | 103.7 | 31.6 | 121.2 | 36.9 |
| 60 | 25.2 | 7.7 | 61.0 | 18.6 | 87.8 | 26.8 | 124.3 | 37.9 | 99.4 | 30.3 | 115.1 | 35.1 |
| 65 | 16.9 | 5.2 | 52.7 | 16.1 | 84.0 | 25.6 | 116.2 | 35.4 | 96.1 | 29.3 | 109.9 | 33.5 |

767-300

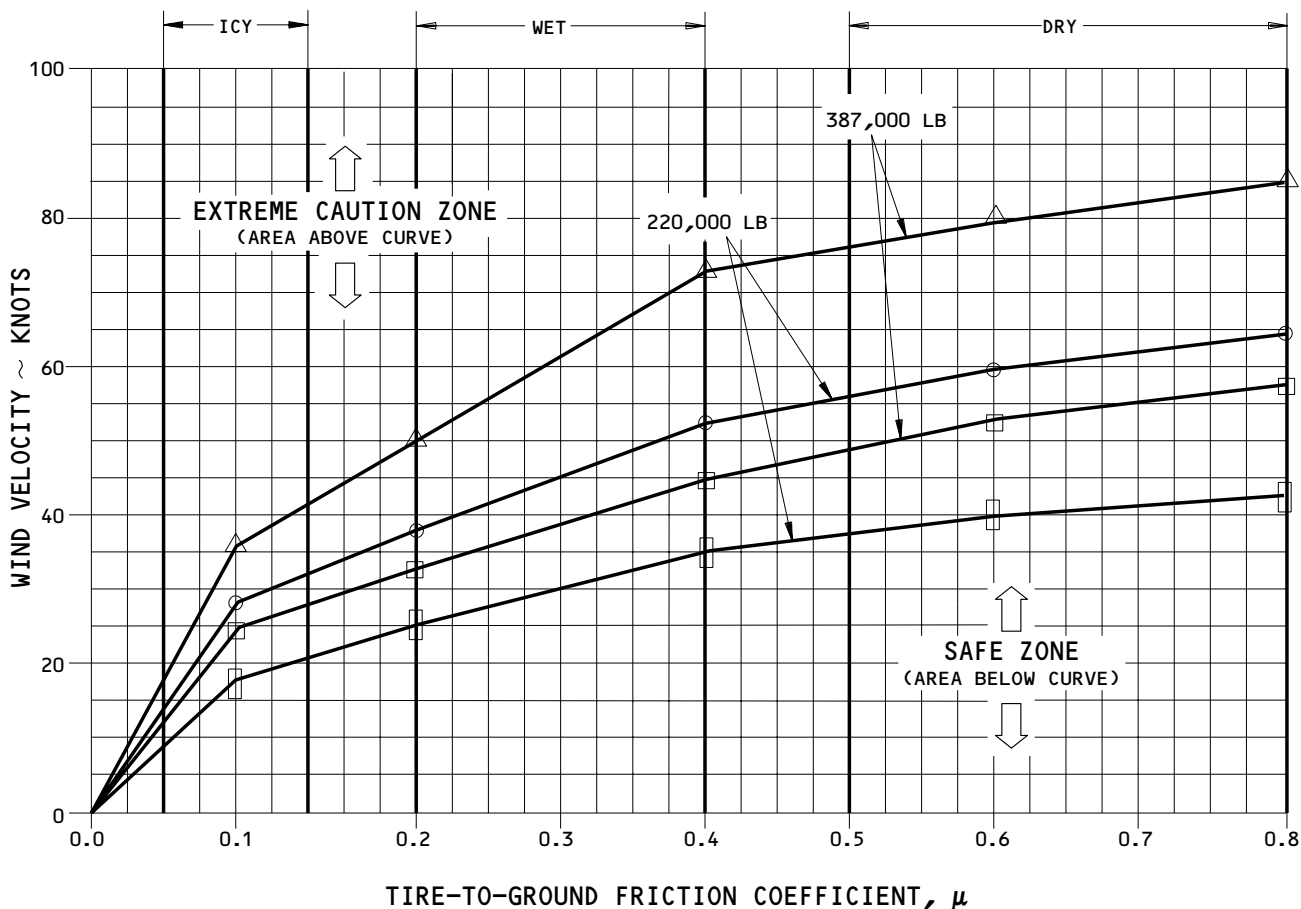
Turning Radii - No Slip Angle
Figure 205 (Sheet 2)

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| WEIGHT(LB) | CG (%MAC) |
|------------|-----------|
| ○ 220,000 | 0.11 |
| □ 220,000 | 0.36 |
| △ 387,000 | 0.11 |
| ◇ 387,000 | 0.36 |

- NOTE:**
- FLAPS UP, STABILIZER SET AT TWO PILOT UNITS (PARALLEL TO THE FUSELAGE REFERENCE LINE)
 - WIND FROM ANY DIRECTION
 - WIND GUST SHALL BE ADDED TO STEADY WIND VELOCITY FOR MAXIMUM WIND SPEED.
 - USE ACTUAL AIRPLANE WEIGHT, CG POSITION AND TIRE-TO-GROUND FRICTION COEFFICIENT FOR INTERPOLATION.
 - IF NO MEASURED VALUE FOR TIRE-TO-GROUND FRICTION COEFFICIENT IS AVAILABLE, USE THE LOWER LIMIT OF THE APPROPRIATE BOUNDED FRICTION.
 - FOR TOWING AND MANEUVERING IN CLOSE PROXIMITY TO BUILDINGS OR OTHER AIRCRAFT, REDUCE THE ALLOWABLE WIND BY ONE-THIRD
 - FOR STATIC OPERATIONS AND PARKING, SET THE PARKING BRAKE. ADHERE TO THE BOEING RECOMMENDATION FOR THE MAXIMUM TIME LIMIT THAT THE PARKING BRAKE IS EFFECTIVE.
 - ZERO GROUND SLOPE ASSUMED
 - REDUCE THE WIND LIMITS TO ACCOUNT FOR OPERATIONAL CONSIDERATIONS, SUCH AS HIGH SPEED TOWING OR CONTAMINATED RUNWAYS.

767-200 MAXIMUM WINDS FOR TOWING OPERATIONS

Airplane Stability - Maximum Winds for Towing and Taxiing
Figure 206

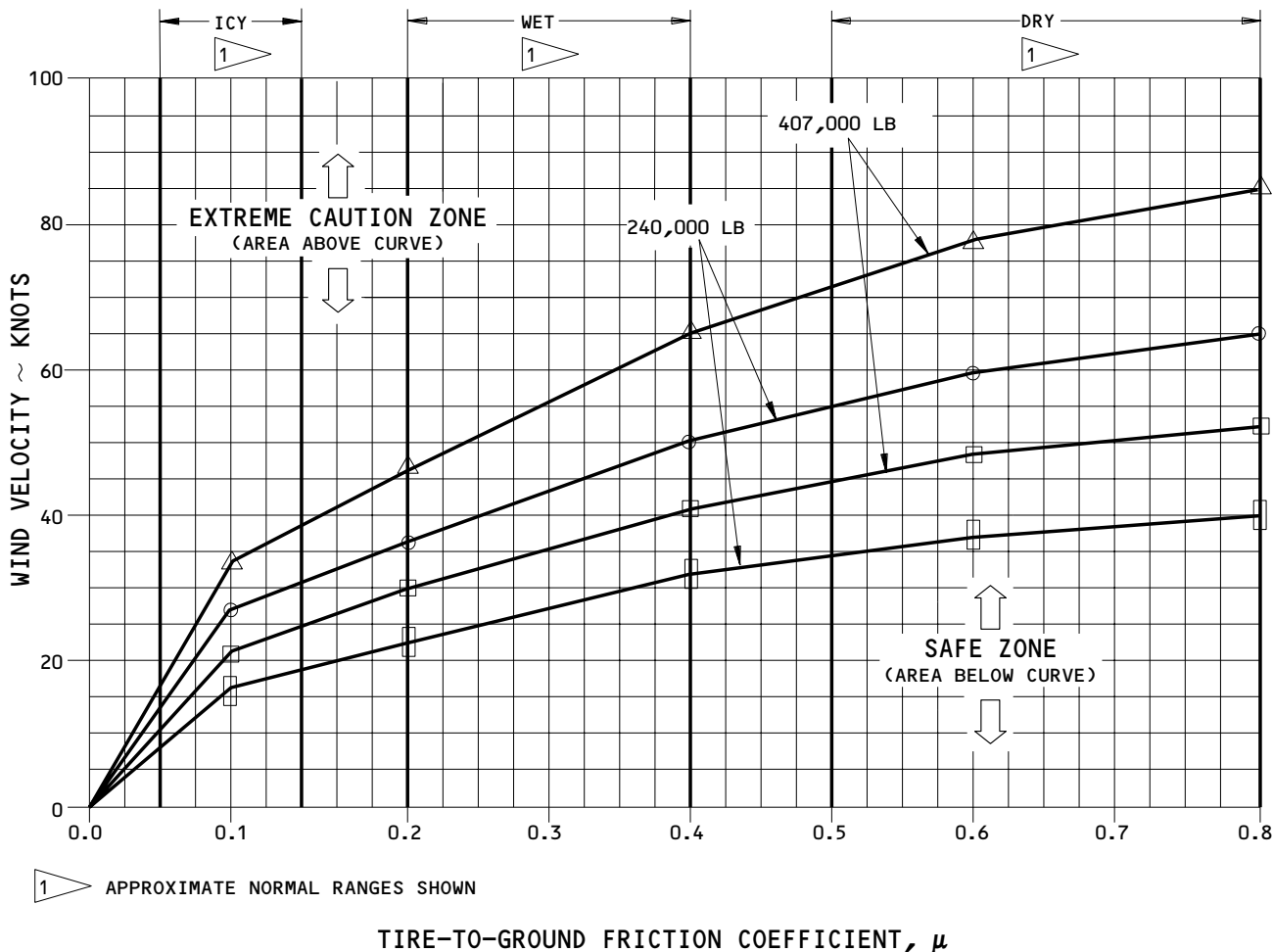
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| WEIGHT(LB) | CG (%MAC) |
|------------|-----------|
| ○ 240,000 | 0.07 |
| □ 240,000 | 0.37 |
| △ 407,000 | 0.07 |
| □ 407,000 | 0.37 |

- NOTE:**
- FLAPS UP, STABILIZER SET AT TWO PILOT UNITS (PARALLEL TO THE FUSELAGE REFERENCE LINE)
 - WIND FROM ANY DIRECTION
 - WIND GUST SHALL BE ADDED TO STEADY WIND VELOCITY FOR MAXIMUM WIND SPEED.
 - USE ACTUAL AIRPLANE WEIGHT, CG POSITION AND TIRE-TO-GROUND FRICTION COEFFICIENT FOR INTERPOLATION.
 - IF NO MEASURED VALUE FOR TIRE-TO-GROUND FRICTION COEFFICIENT IS AVAILABLE, USE THE LOWER LIMIT OF THE APPROPRIATE BOUNDED FRICTION.
 - FOR TOWING AND MANEUVERING IN CLOSE PROXIMITY TO BUILDINGS OR OTHER AIRCRAFT, REDUCE THE ALLOWABLE WIND BY ONE-THIRD
 - FOR STATIC OPERATIONS AND PARING, SET THE PARKING BRAKE. ADHERE TO THE BOEING RECOMMENDATION FOR THE MAXIMUM TIME LIMIT THAT THE PARKING BRAKE IS EFFECTIVE.
 - ZERO GROUND SLOPE ASSUMED
 - REDUCE THE WIND LIMITS TO ACCOUNT FOR OPERATIONAL CONSIDERATIONS, SUCH AS HIGH SPEED TOWING OR CONTAMINATED RUNWAYS.

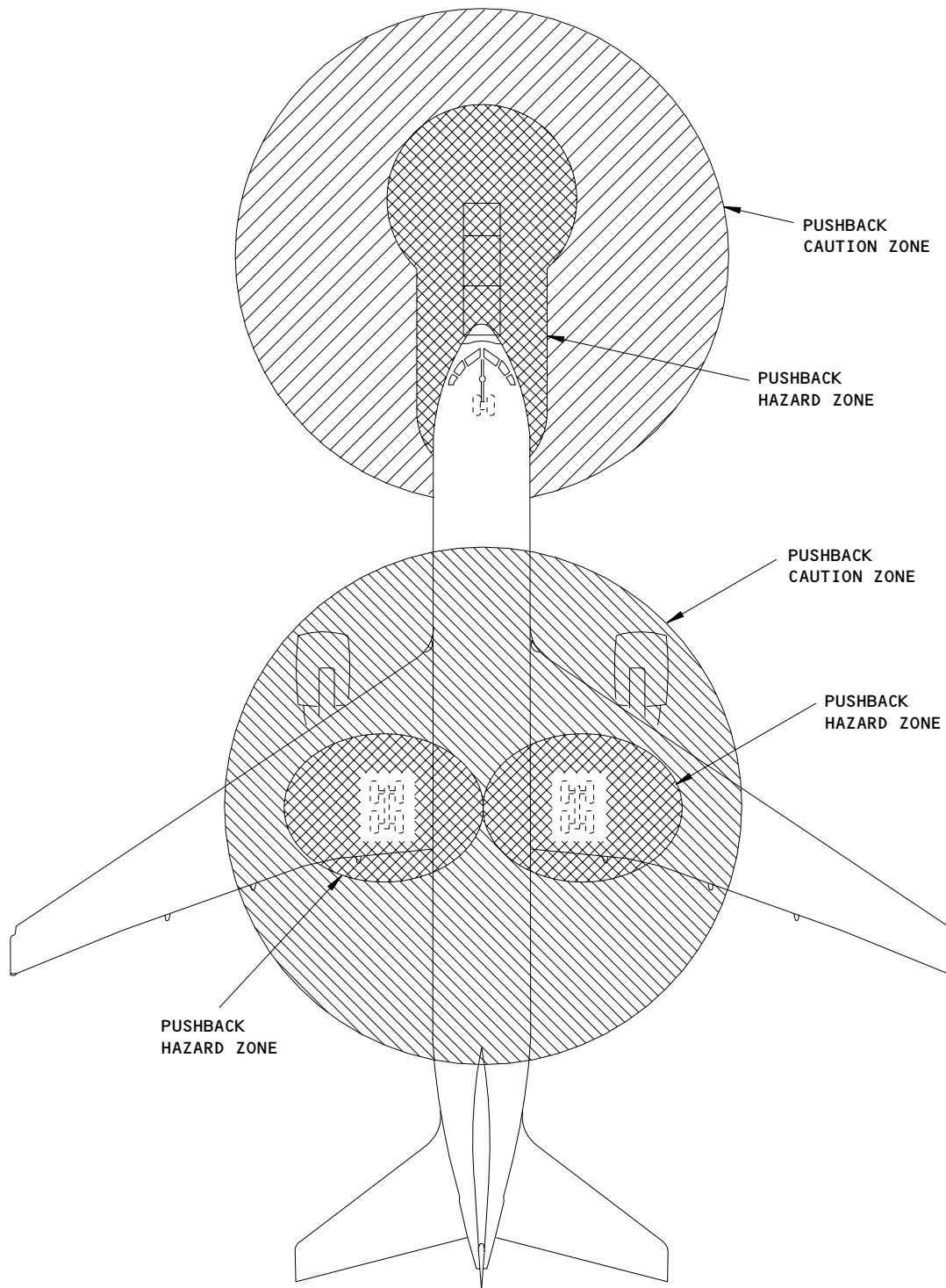
767-300 MAXIMUM WINDS FOR TOWING OPERATIONS

Airplane Stability - Maximum Winds for Towing and Taxiing
Figure 206A

EFFECTIVITY

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WARNING: MAINTAIN A MINIMUM OF TEN FEET (3 METERS) SEPARATION BETWEEN PERSONS ON THE GROUND, AND THE NOSE WHEELS, THE TOW BAR AND TOW VEHICLE, AND THE MAIN WHEELS WHILE THE AIRPLANE IS MOVING.

Towing Hazard Zones
Figure 207

| | |
|-------------|-----|
| EFFECTIVITY | ALL |
|-------------|-----|

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A04528

- (d) Make sure the parking brakes are released.
- D. Tow the Airplane

S 582-007

CAUTION: DO NOT HOLD OR TURN THE TILLER FOR THE NOSE WHEEL STEERING WHILE THE AIRPLANE IS TOWED. IF YOU HOLD OR TURN THE TILLER, DAMAGE TO THE NOSE WHEEL STEERING SYSTEM CAN OCCUR.

- (1) To tow the airplane, do the steps that follow:

WARNING: WHEN YOU TOW THE AIRPLANE, ALL PERSONS MUST STAY OUT OF THE DANGEROUS AREAS AROUND THE TOW VEHICLE, TOW BAR, NOSE WHEELS, AND THE MAIN WHEELS. PERSONS ON THE GROUND MUST KNOW IT IS POSSIBLE TO BE RUN OVER BY THE NOSE WHEELS, MAIN WHEELS, AND THE TOW VEHICLE. THIS IS BECAUSE THE AIRPLANE WILL CHANGE POSITION DURING PUSHBACK AND TOWING. MAKE SURE YOU KEEP A MINIMUM OF 10 FEET SEPARATION BETWEEN PERSONS ON THE GROUND AND THE EQUIPMENT THAT MOVES. IF YOU DO NOT KEEP THE MINIMUM DISTANCE, A FATAL INJURY CAN OCCUR.

- (a) Make sure the persons that work near the tow vehicle, tow bar, nose wheels, and the main wheels know the pushback hazard zones as shown in Fig. 207.
- (b) It is optional to tow the airplane with the entry or cargo doors open.

CAUTION: IF YOU USE A TOW BAR, YOU CAN CAUSE THE SHEAR PINS TO SHEAR IF YOU USE THE AIRPLANE BRAKES WHILE YOU TOW THE AIRPLANE.

MOST TOWBARLESS TOW VEHICLES DO NOT HAVE A SHEAR PIN TO LIMIT THE LOADS IF AIRPLANE BRAKES ARE USED DURING TOWING. IF AIRPLANE BRAKES ARE USED WHILE TOWING WITH A TOWBARLESS TOW VEHICLE ATTACHED TO THE NOSE LANDING GEAR, PERFORM THE "HARD LANDING OR HIGH DRAG/SIDE LOAD LANDING CONDITION" INSPECTION FOR THE NOSE LANDING GEAR AREAS (AMM 05-51-01/201).

- (c) While the airplane is towed, do not use the airplane brakes to stop the airplane, unless it is an emergency.
- (d) Refer to Figure 205 to find the specified airplane clearance during the tow.
- (e) Before the airplane is parked, make sure you move the airplane not less than 12 feet in a straight line.

NOTE: This procedure will make sure that the torsional loads (side load pressures) are released before it is parked.

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CAUTION: MAKE SURE THE TORSION LINK DOES NOT FALL BEFORE IT IS CONNECTED. IF THE TORSION LINK FALLS, IT CAN CAUSE DAMAGE TO ADJACENT EQUIPMENT.

(f) If the torsion links were disconnected, align the links during the last 12 feet of the tow. This will permit the torsion links to be installed smoothly.

NOTE: Small adjustments for the torsion link connection can be made with the side movement of the tow bar or tow vehicle.

(g) Connect the torsion links (AMM 32-21-11/201).

CAUTION: DO NOT APPLY THE PARKING BRAKES WHEN THEY ARE HOT. IT IS POSSIBLE THAT THE BRAKES WILL NOT BE RELEASED WHEN THEY ARE APPLIED WHILE THEY ARE HOT.

(h) At the end of towing, put the wheel chocks fore and aft of a main gear wheel on each of the main gear.

(i) Make sure parking brake is released.

E. Put the Airplane Back to Its Initial Condition

S 862-008

(1) Remove the electrical power if it is not necessary (AMM 24-22-00/201).

S 092-009

(2) Disconnect the tow bar from the tow fitting and remove the tow bar, if it is necessary.

S 862-010

WARNING: MOVE AWAY FROM THE NOSE WHEELS. THE NOSE WHEELS CAN TURN QUICKLY TO THEIR CENTERED POSITION WHEN THE LOCKPIN IS REMOVED AND INJURY TO PERSONS CAN OCCUR.

(3) Make sure the wheels of the nose landing gear are in the centered position, and remove the towing lever lockpin.

TASK 09-11-00-582-013

4. Tow the Airplane in High Wind

A. General

(1) You can tow the airplane in high wind. You must obey the conditions described in Fig. 206.

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TOW AIRPLANE WITH ENGINES REMOVED – MAINTENANCE PRACTICES

1. General

- A. This procedure has this task:
(1) Towing at the center of gravity.

TASK 09-11-01-582-001

2. Towing at the Center of Gravity

A. Procedure

S 862-004

CAUTION: KEEP THE CENTER OF GRAVITY (CG) AT THE SPECIFIED LIMITS SHOWN IN FIGURE 201. THIS MUST BE DONE DURING ALL GROUND MOVEMENTS AND MAINTENANCE. LOOK AT ALL UNUSUAL CONDITIONS TO MAKE SURE THAT THE CENTER OF GRAVITY DOES NOT MOVE TOO FAR AFT.

(1) 767-200 AIRPLANES;

Do not tow the airplane with one or two engines removed and the center of gravity is not in the SAFE ZONE (see Figure 201). Use accepted weight and balance procedures and keep the airplane center of gravity below the GROUND STABILITY MARGIN line.

S 862-005

CAUTION: KEEP THE CENTER OF GRAVITY (CG) AT THE SPECIFIED LIMITS SHOWN IN FIGURE 201A. THIS MUST BE DONE DURING ALL GROUND MOVEMENT AND MAINTENANCE. LOOK AT ALL UNUSUAL CONDITIONS TO MAKE SURE THAT THE CENTER OF GRAVITY DOES NOT MOVE TOO FAR AFT.

(2) 767-300 AIRPLANES;

Do not tow the airplane with one or two engines removed and the center of gravity is not in the SAFE ZONE (see Figure 201A). Use accepted weight and balance procedures and keep the airplane center of gravity below the GROUND STABILITY MARGIN line.

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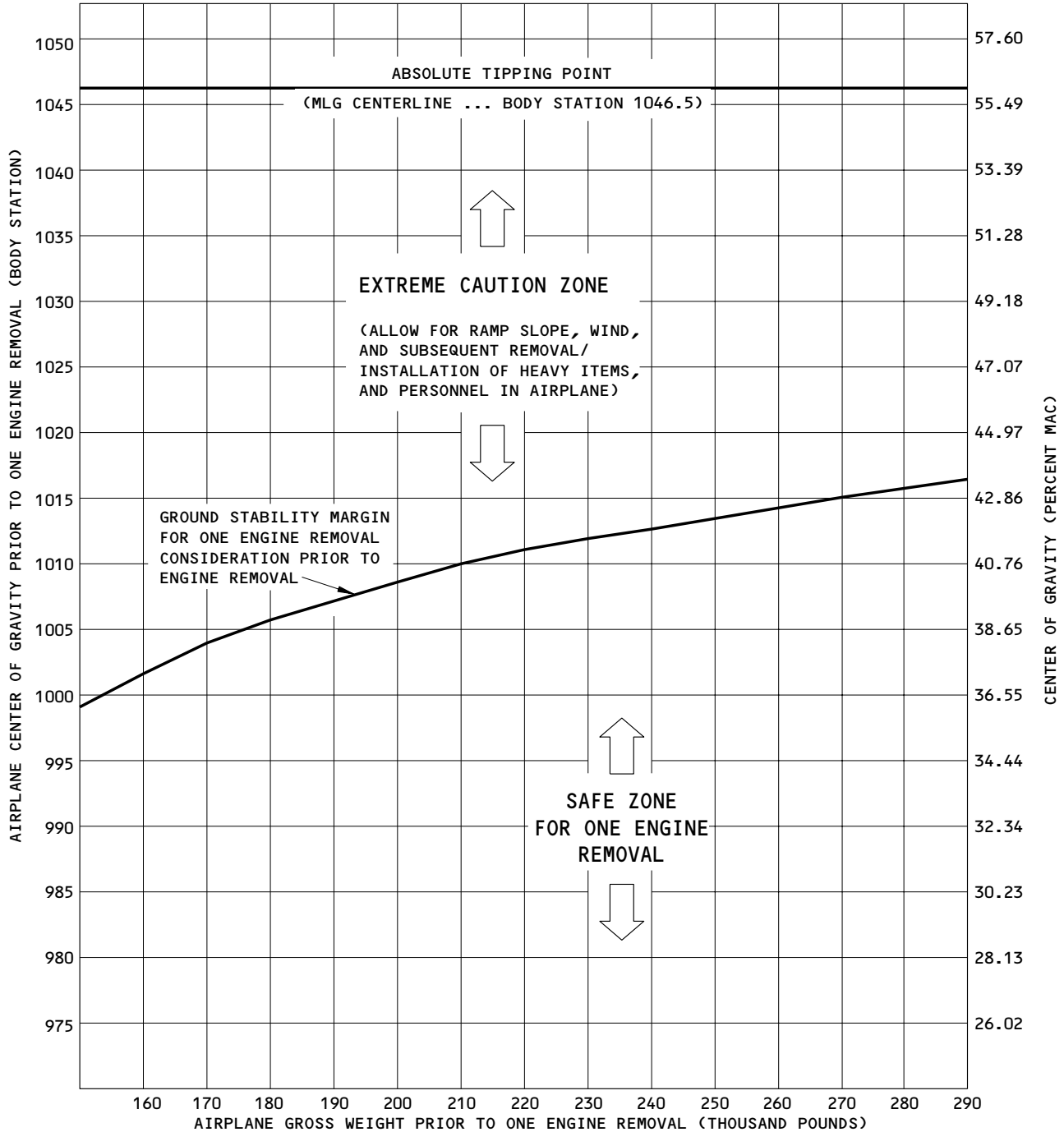


767 MAINTENANCE MANUAL

TIPPING OF 767 AIRPLANE

THE CHART BELOW SHOWS THE 767-200 TIPPING LIMITS. THE ABSOLUTE TIPPING LIMIT IS THE MLG CENTERLINE AT B.S. 1046.5. THE GROUND STABILITY MARGIN LINE REPRESENTS THE ABSOLUTE TIPPING LIMIT TO ACCOUNT FOR FACTORS SUCH AS TOWING FORCES, RAMP SLOPE AND WIND. BY ENSURING THAT THE AIRPLANE WEIGHT AND C.G. DURING MAINTENANCE OPERATIONS IS BELOW THIS LINE, A TIPPING SITUATION WILL BE AVOIDED

767-200
GROUND STABILITY MARGIN
TOWING/SHORT TERM MAINTENANCE AND ENGINE REMOVAL CONDITIONS



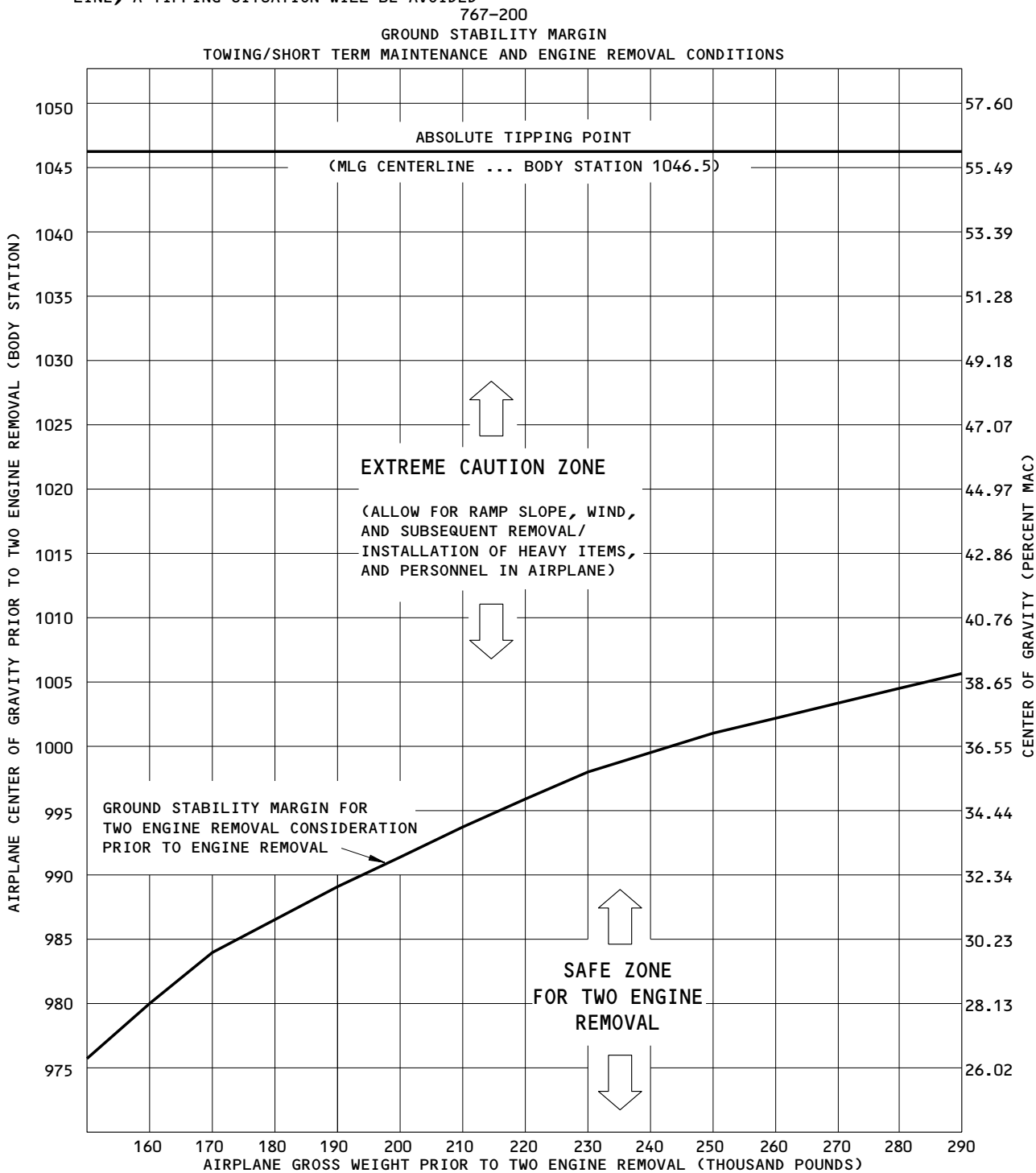
Towing Center of Gravity Limitations with Engine(s) Removed
Figure 201 (Sheet 1)

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09-11-01

TIPPING OF 767 AIRPLANE

THE CHART BELOW SHOWS THE 767-200 TIPPING LIMITS. THE ABSOLUTE TIPPING LIMIT IS THE MLG CENTERLINE AT B.S. 1046.5. THE GROUND STABILITY MARGIN LINE REPRESENTS THE ABSOLUTE TIPPING LIMIT TO ACCOUNT FOR FACTORS SUCH AS TOWING FORCES, RAMP SLOPE AND WIND. BY ENSURING THAT THE AIRPLANE WEIGHT AND C.G. DURING MAINTENANCE OPERATIONS IS BELOW THIS LINE, A TIPPING SITUATION WILL BE AVOIDED



**Towing Center of Gravity Limitations with Engine(s) Removed
Figure 201 (Sheet 2)**

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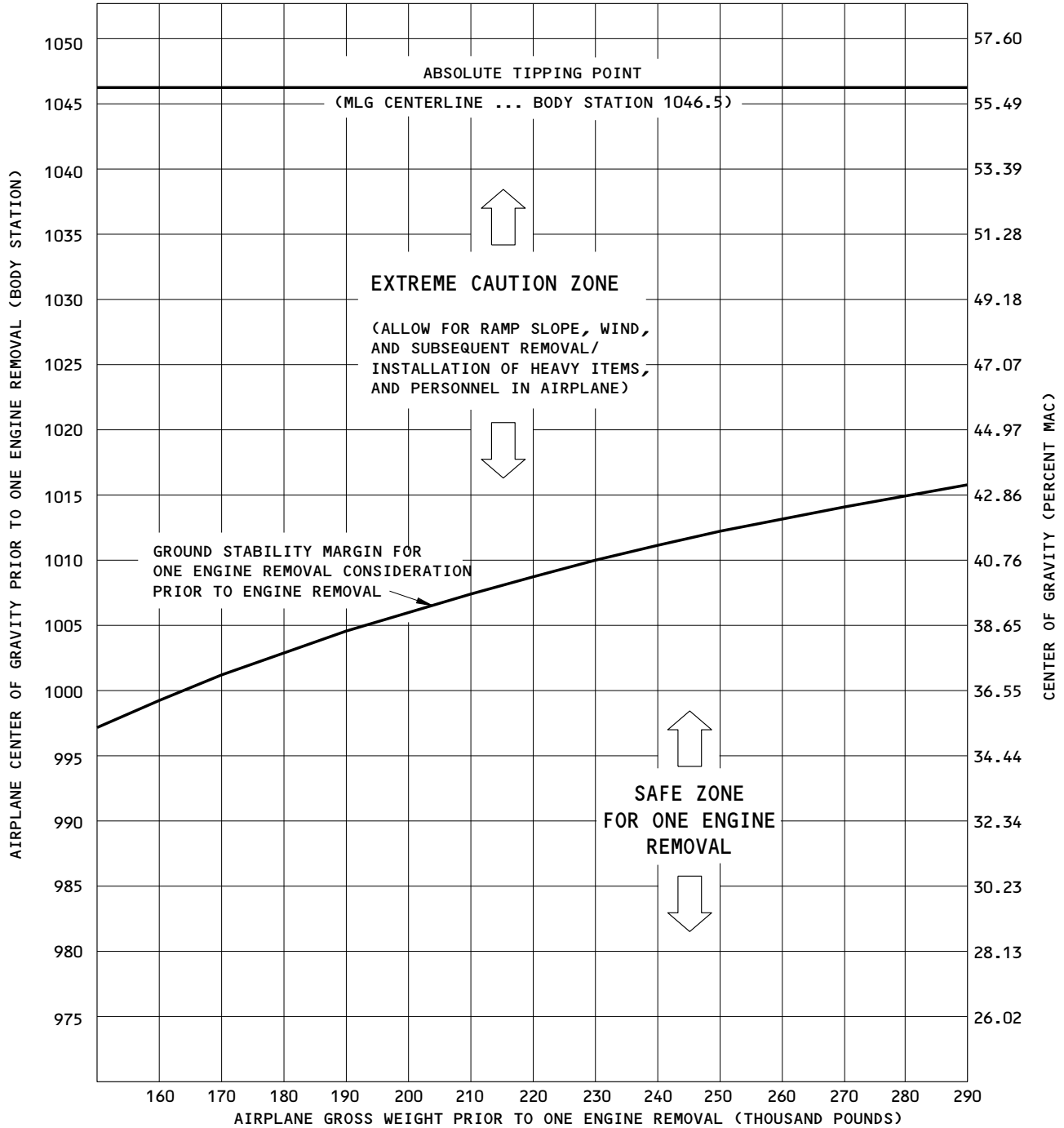


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TIPPING OF 767 AIRPLANE

THE CHART BELOW SHOWS THE 767-300 TIPPING LIMITS. THE ABSOLUTE TIPPING LIMIT IS THE MLG CENTERLINE AT B.S. 1046.5. THE GROUND STABILITY MARGIN LINE REPRESENTS THE ABSOLUTE TIPPING LIMIT TO ACCOUNT FOR FACTORS SUCH AS TOWING FORCES, RAMP SLOPE AND WIND. BY ENSURING THAT THE AIRPLANE WEIGHT AND C.G. DURING MAINTENANCE OPERATIONS IS BELOW THIS LINE, A TIPPING SITUATION WILL BE AVOIDED

767-300
GROUND STABILITY MARGIN
TOWING/SHORT TERM MAINTENANCE AND ENGINE REMOVAL CONDITIONS



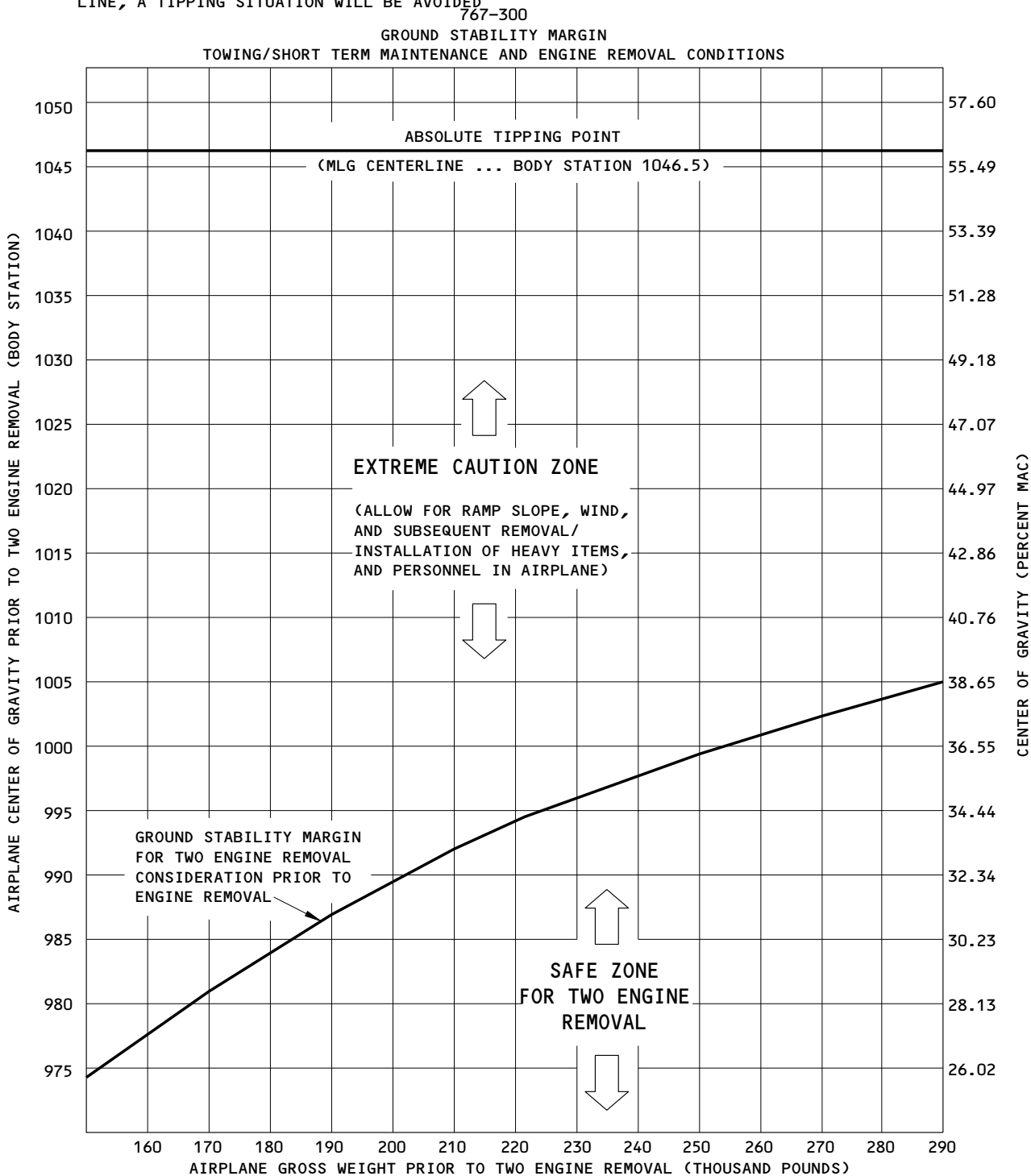
Towing Center of Gravity Limitations with Engine(s) Removed
Figure 201A (Sheet 1)

EFFECTIVITY
767-300 AIRPLANES

09-11-01

TIPPING OF 767 AIRPLANE

THE CHART BELOW SHOWS THE 767-300 TIPPING LIMITS. THE ABSOLUTE TIPPING LIMIT IS THE MLG CENTERLINE AT B.S. 1046.5. THE GROUND STABILITY MARGIN LINE REPRESENTS THE ABSOLUTE TIPPING LIMIT TO ACCOUNT FOR FACTORS SUCH AS TOWING FORCES, RAMP SLOPE AND WIND. BY ENSURING THAT THE AIRPLANE WEIGHT AND C.G. DURING MAINTENANCE OPERATIONS IS BELOW THIS LINE, A TIPPING SITUATION WILL BE AVOIDED.



Towing Center of Gravity Limitations with Engine(s) Removed
Figure 201A (Sheet 2)

EFFECTIVITY
767-300 AIRPLANES

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TOW AIRPLANE WITH LIMITED HYDRAULIC BRAKE PRESSURE - MAINTENANCE PRACTICES

TASK 09-11-03-582-001

1. Tow the Airplane

A. General

- (1) When you tow the airplane, do not touch the rudder pedals with your feet. Do not apply the brakes unless there is an emergency, or until the airplane is stopped. A light pressure on the top of the rudder pedals will cause a decrease of hydraulic pressure through the bleed hole in each antiskid valve. This flow will not stop when you turn off the antiskid system.

NOTE: Full pressure (3000 psig) will only supply six full applications of the brakes.

WARNING: WHEN ELECTRICAL POWER IS NOT AVAILABLE TO OPERATE THE BRAKE HYDRAULIC SYSTEM, TELL THE TOW VEHICLE DRIVER. TOW SPEEDS MUST BE DECREASED OR YOU MUST NOT TOW THE AIRPLANE. WITHOUT ELECTRICAL POWER, THERE IS ONLY ACCUMULATOR PRESSURE AVAILABLE TO OPERATE THE BRAKES.

- (2) Obey this WARNING during all of this task.
- (3) The brakes are usually supplied with power by the airplane right hydraulic system. The center system is used when the right system has a failure. The center system operates automatically when the right system does not operate.

B. References

- (1) AMM 09-11-00/201, Towing
- (2) AMM 32-00-15/201, Landing Gear Door Locks

C. Procedure

S 862-004

- (1) Tow the Airplane (AMM 09-11-00/201).
- D. Prepare to set the parking brake when the airplane is parked.

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S 492-002

WARNING: USE THE PROCEDURE IN AMM 32-00-15/201 TO INSTALL THE DOOR LOCKS. THE DOORS OPEN AND CLOSE QUICKLY AND CAN CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

CAUTION: ELECTRICAL POWER FROM THE 28V DC HOT BATTERY BUS IS NECESSARY TO SET THE PARKING BRAKES ELECTRICALLY (NORMAL). WHEN ELECTRICAL POWER IS NOT AVAILABLE, THE MANUAL OVERRIDE LEVER ON THE PARKING BRAKE VALVE MUST BE MOVED MANUALLY TO POSITION 2. THE VALVE IS FOUND IN THE RIGHT MAIN GEAR WHEEL WELL AND IS USED TO SET THE PARKING BRAKES. FAILURE TO CLOSE THE PARKING BRAKE VALVE BEFORE YOU APPLY THE BRAKES WILL CAUSE THE HYDRAULIC PRESSURE TO DECREASE.

- (1) Open the door for the right landing gear and install the door lock (AMM 32-00-15/201).

S 982-003

- (2) Do the steps that follow to apply the parking brake:
 - (a) Put the manual override lever of the parking brake valve (found in the right main gear wheel well) to POS 2 (closed).
 - (b) Push the top of the rudder pedals to apply the brakes.
 - (c) Pull the parking brake lever to keep pressure on the brake linkage.
 - (d) Release the brake pedal pressure.
 - (e) Release the parking brake handle.

NOTE: The foot pressure on the brake pedal must be released before the parking brake handle is released. When you do not release the foot pressure, the parking brakes will not be applied.

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TOW AIRPLANE WITH FLAT TIRE(S) – MAINTENANCE PRACTICES

1. General

- A. The airplane can be towed when it has flat tires (see Figure 201). Such operations must be kept to a minimum because flat tires put too much load on the inflated tires, during these conditions. These loads cause the good tires to be damaged and replacement will be necessary (Refer to AMM 32-45-01). Also during some conditions, damage can occur to the wheels, landing gear, and/or the airplane structure.

TASK 09-11-04-582-001

2. Tow the Airplane With Flat Tire(s)

A. References

- (1) AMM 09-11-00/201, Towing
- (2) AMM 32-45-01/401, Main Gear Wheel and Tire
- (3) AMM 32-45-03/601, Wheels

B. Prepare to Tow the Airplane with Flat Tires

S 582-002

- (1) To tow the airplane with flat tires, do the steps that follow (AMM 09-11-00):
 - (a) The airplane can be towed by the nose gear with one flat nose tire and five flat main tires. This is permitted only to remove the airplane from the runway. If there is a total of more than six flat tires, tow the airplane at both main gear.
 - (b) Keep the tow speeds to a minimum.
 - (c) Prevent sharp turns when you tow the airplane.

S 212-003

- (2) After the airplane is towed with two flat tires on one axle (as in conditions (2), (6), (7), (8), of Figure 201), do a wheel inspection (AMM 32-45-03).

NOTE: It is not recommended to tow the airplane if the wheel rims are ground flat. Wheel rims with flat spots could cause high drag loads and landing gear damage. Tow only to get the airplane off of the runway if the runway must be cleared.

NOTE: It is recommended to replace the flat spotted wheels and the flat tires with serviceable equipment before you tow the airplane (AMM 32-45-01).

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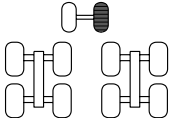
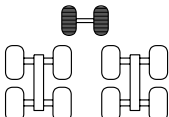
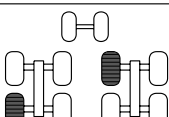
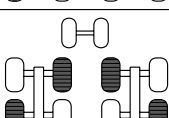
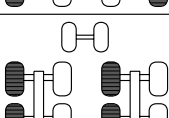
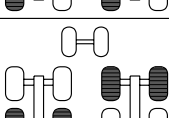
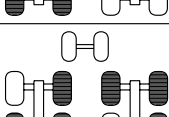
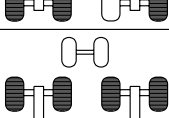
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BOEING

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○ GIVES LOCATION OF INFLATED TIRE

● GIVES LOCATION OF FLAT TIRE

| CONDITIONS | POSITION OF FLAT TIRE(S) | LIMITS |
|---|---|--|
| (1) ONE FLAT TIRE ON NOSE GEAR |  | DO NOT USE TOWBARLESS TOWING. |
| (2) TWO FLAT TIRES ON NOSE GEAR |  | 1. DO NOT USE TOWBARLESS TOWING. 2. TOW TO CLEAR RUNWAY, THEN INSTALL AT LEAST ONE SERVICEABLE TIRE. |
| (3) ONE FLAT TIRE POSITIONED ON ONE OR BOTH MAIN GEAR |  | NONE |
| (4) TWO FLAT TIRES ON DIAGONAL WHEELS, POSITIONED ON ONE OR BOTH MAIN GEAR |  | NONE |
| (5) TWO FLAT TIRES IN TANDEM, POSITIONED ON ONE OR BOTH MAIN GEAR |  | NONE |
| (6) TWO FLAT TIRES ON FRONT OR REAR WHEELS, POSITIONED ON ONE OR BOTH MAIN GEAR |  | TOW ONLY TO GET OFF RUNWAY IF RUNWAY MUST BE CLEARED, THEN REPLACE TIRES OR MOVE TIRES AROUND TO MEET CONDITION (4). |
| (7) THREE FLAT TIRES POSITIONED ON ONE OR BOTH MAIN GEAR |  | TOW ONLY TO GET OFF RUNWAY IF RUNWAY MUST BE CLEARED, THEN INSTALL SERVICEABLE TIRES TO MEET CONDITION (4). |
| (8) FOUR FLAT TIRES ON ONE OR BOTH MAIN GEAR |  | TOW AT BOTH MAIN GEARS IF RUNWAY MUST BE CLEARED, THEN INSTALL SERVICEABLE TIRES TO MEET CONDITION (4). |

Tow Airplane with Flat Tire(s)
Figure 201

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TAXIING - MAINTENANCE PRACTICES

1. General

A. Taxi Safety

- (1) When you taxi an airplane, caution and precision are necessary. The taxi procedure must be done only by persons that are approved.
- (2) The taxi path must be clear of all persons and vehicles.
- (3) You must get approval from the airport ground control to taxi the airplane. This will prevent interference with other airport operations.
- (4) You must keep clearance from the buildings and the other airplanes, at all times.
- (5) You must have electrical power to operate the taxi lights, the navigation lights, the radio and intercom equipment, and other systems. This is necessary to taxi the airplane safely.
- (6) The applicable airplane hydraulic systems must be pressurized to supply hydraulic pressure. This is for the airplane brakes and the nose wheel steering systems.
- (7) When the taxi operations are done at night or in bad weather conditions, the crew must know the area around the airplane. They must know the location of parked vehicles, maintenance stands, and the condition of the pavement surface.
- (8) A taxi checklist for the airline maintenance persons is necessary to help the crew have a safe taxi operation.

B. Maintenance Persons Necessary to Taxi the Airplane

- (1) The persons necessary for a safe taxi operations must include a flight compartment crew and a ground crew.
- (2) There must be a minimum of two flight compartment persons.
 - (a) The flight compartment persons must be approved on all of the procedures that follow, for the taxi operations:
 - 1) To prepare the flight compartment
 - 2) The engine start, operation, and shutdown procedures
 - 3) The engine fire and emergency procedures
 - 4) The radio and intercom operation and procedures
 - 5) The taxi procedures (turning, wing tip clearances, taxi speeds, etc.).
- (3) One or two ground crew persons are necessary to do the tasks that follow:

NOTE: In areas of congestion or a limit of space (hangers, ramp areas next to the terminal, airplane parking areas, etc.) more ground persons are necessary. This is to help monitor the wing clearances and to be general observers.

- (a) To remove and replace the wheel chocks
- (b) To help during the engine start
- (c) To help the flight compartment crew during the airplane movement
- (d) To make sure the airplane taxi path is clear.

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C. Communications

- (1) Most of the area around the airplane is out of the field of view permitted by the flight compartment windows. Also, much of the ground operations work near the airplane is out of the field of view of the flight compartment crew.
- (2) There must be communication between airplane and ground crews. This is necessary during the engine start, removal and replacement of wheel chocks, and during the engine shutdown.
- (3) You must use hand signals, lights, intercom and/or radio communications. These are important to have a safe taxi operation.
- (4) The communications with the ground control authority is also necessary for taxi operations. This will make sure that the persons in the control tower know of the taxi operation, and the path that the airplane will follow.

D. Procedure to Taxi the Airplane

- (1) When you taxi the airplane on the ground, the movement is equivalent to other airplanes with conventional tricycle landing gear.
 - (a) The nose wheel steering, and the engine thrust are used as necessary, to taxi the airplane.
- (2) Airplane ground stability.
 - (a) During the airplane taxi, the center of gravity (CG) must always be below the Ground Stability Limit line (AMM 09-11-00/201, Tow the Airplane).
 - (b) Find the airplane center of gravity (CG) for the applicable airplane configuration. Use component weight and CG data, and the procedures to calculate them, in the approved weight and balance manuals.
- (3) Airplane clearance during the taxi.
 - (a) Make sure you have the necessary clearance when you go near a parked airplane or other structures. When the APU in the taxi airplane or the parked airplane is on, you must have a minimum clearance of 32.8 feet (10 meters). The clearance must be between the APU exhaust port and the adjacent airplane's wingtip (fuel vent).
- (4) Airplane taxi speed.
 - (a) The taxi speed must not be more than approximately 20 knots. Speeds more than this, added to long taxi distances will cause heat to collect in the tires.
 - (b) Before you make a turn, decrease the speed of the airplane to a speed which is applicable to the local conditions. On a dry surface, use a speed of approximately 8 to 12 knots.
- (5) Airplane turns during taxi.
 - (a) Always use the largest turn radius possible.
 - (b) Do not try to turn the airplane until it has moved.
 - (c) The wingtips and the horizontal stabilizer move in larger arcs during a turn than the nose of the airplane (Refer to Fig. 201). Thus, monitor these areas of the airplane carefully for clearance with buildings, equipment, and other airplanes.
 - (d) Make all turns at a slow taxi speed to prevent tire skids.
 - (e) When an outboard engine is used to help make a turn, use only the minimum power possible.

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- (f) Do not let the airplane stop during a turn.
- (g) Do not use the brakes to help during a turn.

NOTE: See the paragraph on Airplane taxi in bad weather conditions about differential braking.

- 1) Decrease the speed of the airplane with the brakes when it is necessary, before the turn is started.
- 2) Make a minimum radius turn with maximum nose wheel steering, and the engine thrust only.
- 3) When you use the brakes during a turn, the main and nose landing gear tires will be scrubbed.
- (h) When it is possible, complete the taxi in a straight line roll for a minimum of 12 feet. This will remove the torsional stresses in the landing gear components, and in the tires.
- (6) Airplane taxi in bad weather conditions.
 - (a) You must know the conditions of the taxi surface, and the taxi speeds when you taxi in bad weather conditions.
 - (b) If the taxi surface has snow, slush, or ice on it, the anti-ice system can be used.
 - (c) Taxi the airplane with the flaps up.
 - (d) Use the differential engine thrust when you taxi the airplane on a slick surface at decreased speeds. This will help to keep airplane movement through a turn.
 - (e) A light differential braking can have more of an effect than nose wheel steering, on very slick surfaces.
- E. Airplane Characteristics (Figs. 201, 202, 203, 204)
 - (1) The minimum turn radius that the airplane can make is shown in Figure 201. The wingtips and the horizontal stabilizer move in larger arcs during a turn than the nose of the airplane. Thus, monitor these areas of the airplane carefully for clearance with buildings, equipment, and other airplanes.
 - (2) The basic factors that can change the geometry of a turn are as follows:
 - (a) The nose wheel steering angle
 - (b) The engine power position
 - (c) The center of gravity location on the airplane
 - (d) The airplane gross weight
 - (e) The taxi surface conditions
 - (f) The airplane ground speed
 - (g) The differential braking that you use.
 - (3) When you operate jet engine airplanes, you must follow all precautions. This is necessary to prevent injury to persons, or damage to buildings, equipment, or other airplanes.
 - (a) Refer to Figure 202 and Figure 203 to find the dangerous areas at engine idle, and at the engine breakaway thrust.
 - (b) All persons must keep away from the two engine inlet and exhaust areas. Hot, high velocity gases come out of the exhaust nozzles of the engine. The velocity of the engine fan air, specially at high thrust positions, is sufficient to cause injury to persons, or it can kill you.

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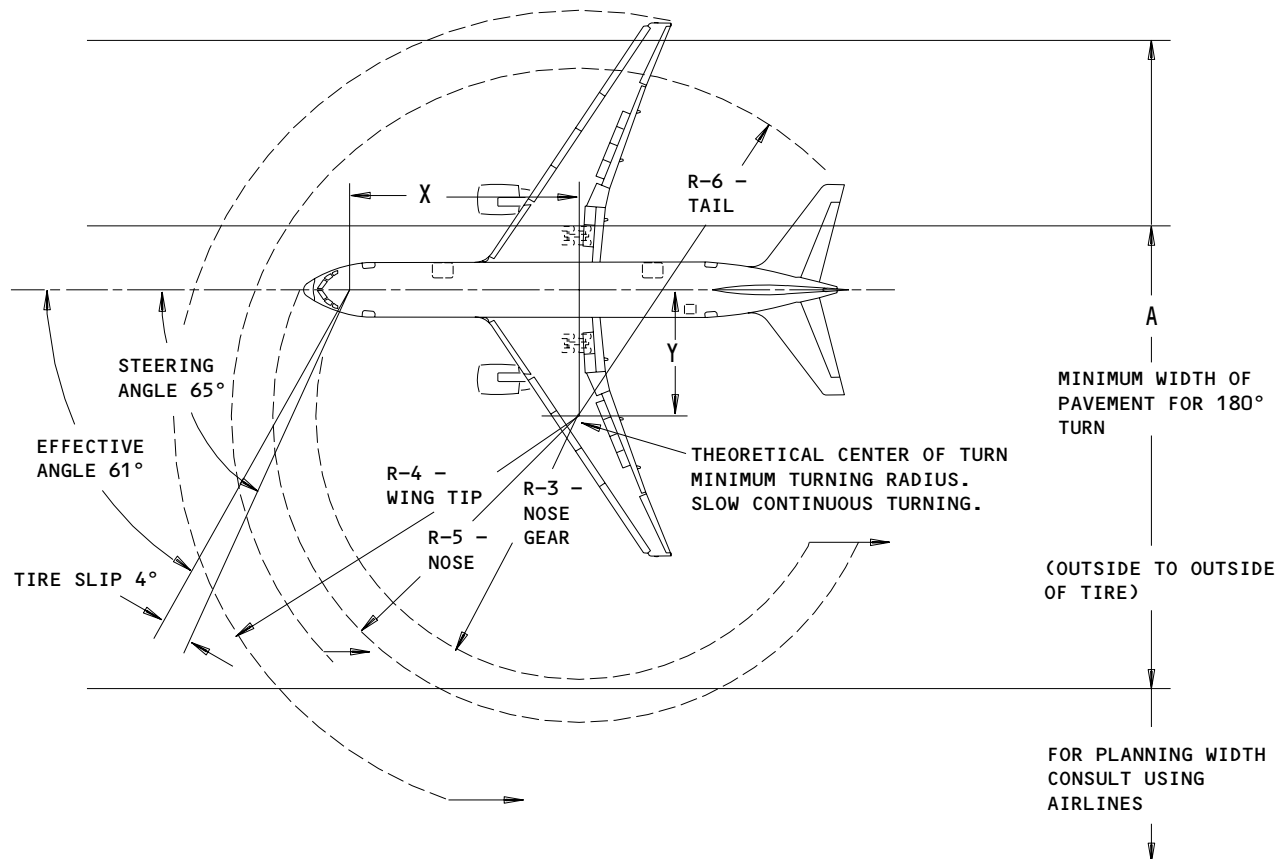
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NOTE: 4° TIRE SLIP ANGLE
APPROXIMATE FOR 65° TURN.
CONSULT USING AIRLINE FOR
SPECIFIC OPERATING PROCEDURE.

| FOR AN EFFECTIVE TURN ANGLE OF 61° | | | | | | | | |
|------------------------------------|-----------|-------|-------|-------|-------|-------|-------|--------|
| MODEL | | X | Y | A | R-3 | R-4 | R-5 | R-6 |
| 767-200 | FT. - IN. | 64-7 | 35-10 | 129-0 | 73-10 | 116-8 | 87-2 | 101-11 |
| | METERS | 19.69 | 10.92 | 39.32 | 22.51 | 35.56 | 26.57 | 31.06 |
| 767-300 | FT. | 74.7 | 41.4 | 146.3 | 87.0 | 122.6 | 98.7 | 114.0 |
| | METERS | 22.8 | 12.6 | 44.6 | 26.5 | 37.4 | 30.1 | 34.7 |
| 767-400 | FT. | 85.8 | 47.6 | 165.3 | 98.1 | 136.8 | 111.4 | 119.6 |
| | METERS | 26.2 | 14.5 | 50.4 | 29.9 | 41.7 | 34.0 | 36.5 |

**Taxi Turning Radii
Figure 201**

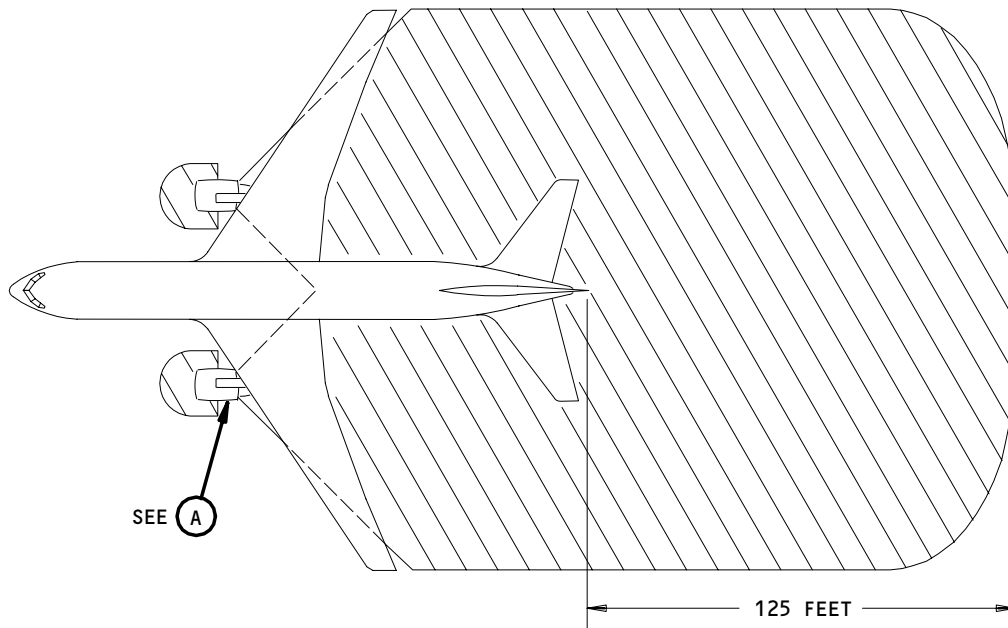
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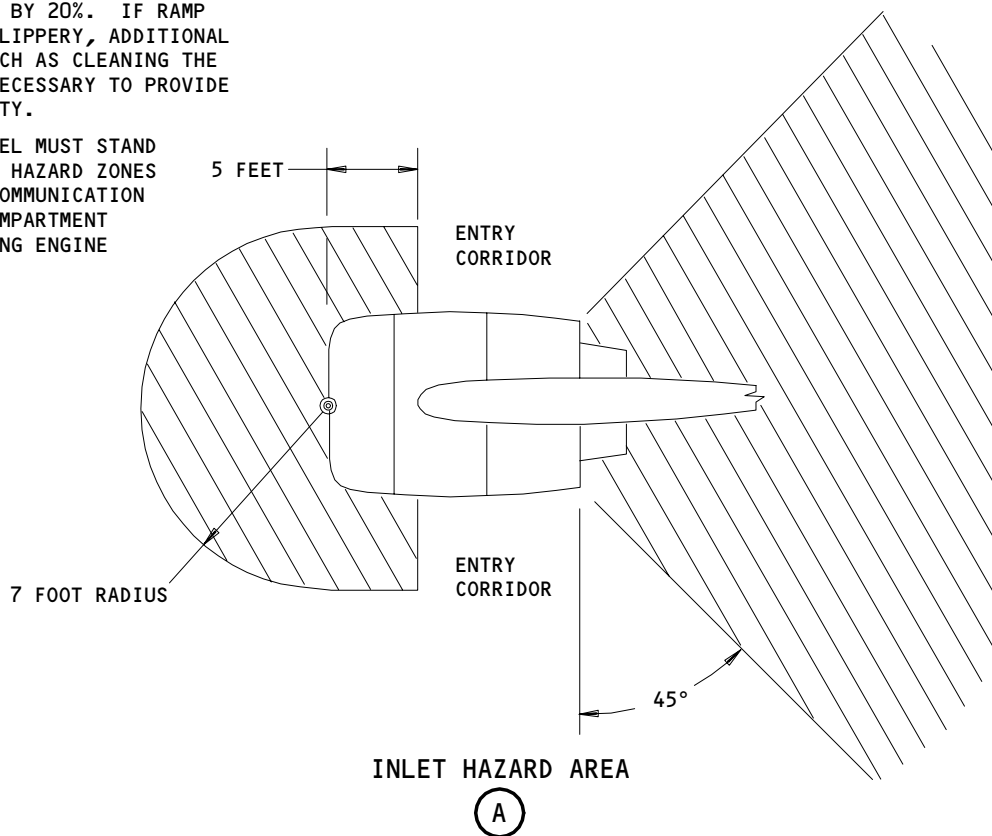
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EXHAUST HAZARD AREA

WARNING: IF SURFACE WIND IS REPORTED GREATER THAN 25 KNOTS, INCREASE DISTANCE OF INLET BOUNDARY BY 20%. IF RAMP SURFACES ARE SLIPPERY, ADDITIONAL PRECAUTIONS SUCH AS CLEANING THE RAMP WILL BE NECESSARY TO PROVIDE PERSONNEL SAFETY.

GROUND PERSONNEL MUST STAND CLEAR OF THESE HAZARD ZONES AND MAINTAIN COMMUNICATION WITH FLIGHT COMPARTMENT PERSONNEL DURING ENGINE RUNNING.



INLET HAZARD AREA

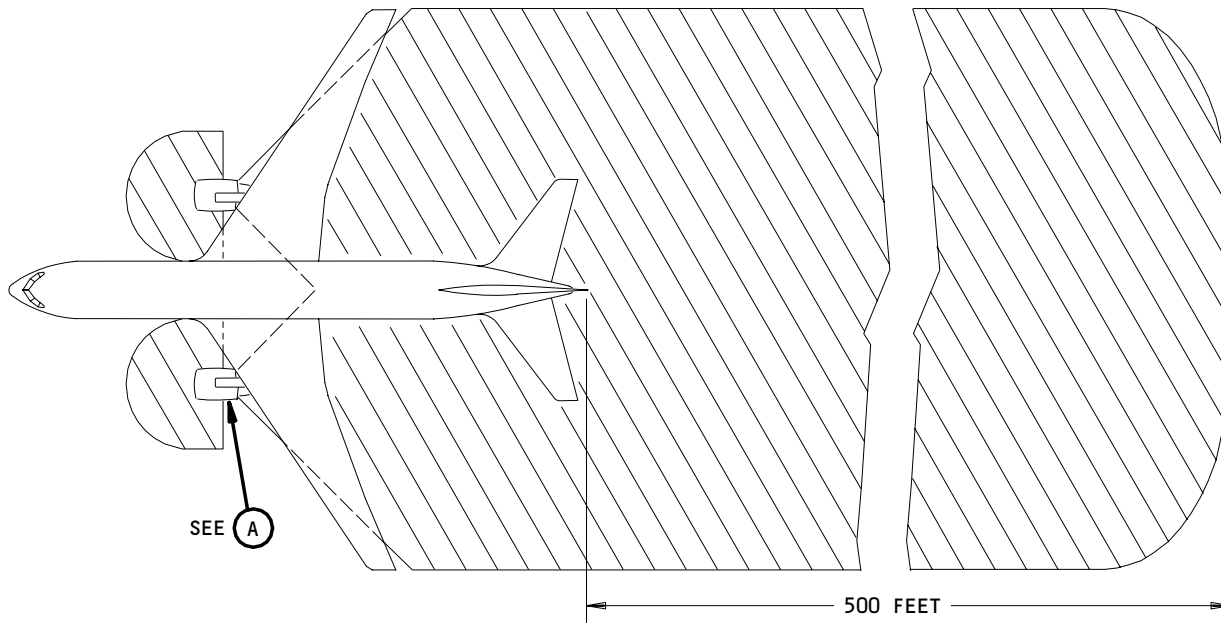
Minimum Idle Power Hazard Area
Figure 202

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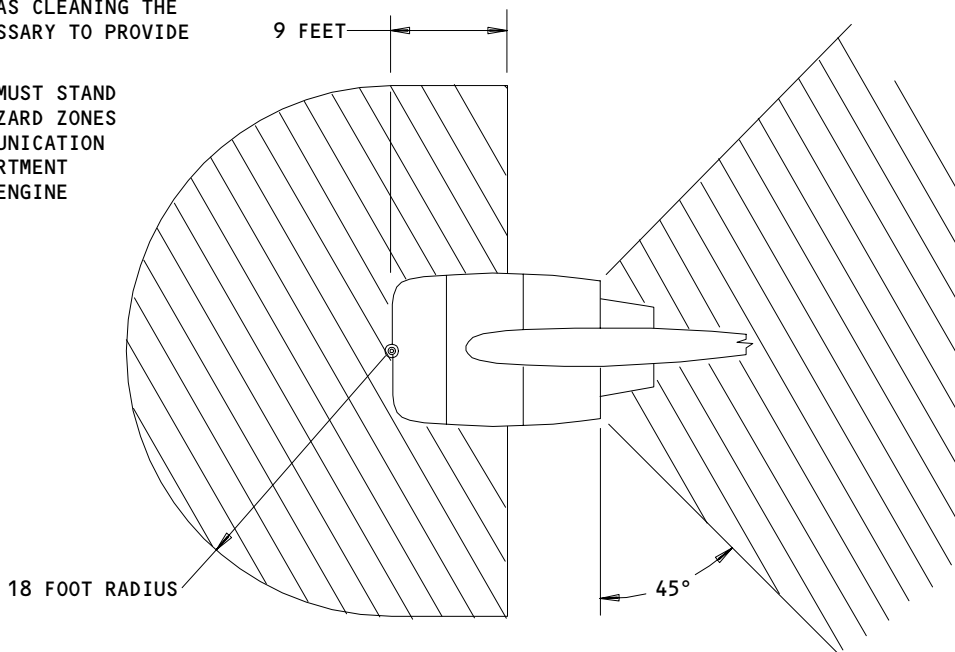
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EXHAUST HAZARD AREA

WARNING: IF SURFACE WIND IS REPORTED GREATER THAN 25 KNOTS, INCREASE DISTANCE OF INLET BOUNDARY BY 20%. IF RAMP SURFACES ARE SLIPPERY, ADDITIONAL PRECAUTIONS SUCH AS CLEANING THE RAMP WILL BE NECESSARY TO PROVIDE PERSONNEL SAFETY.

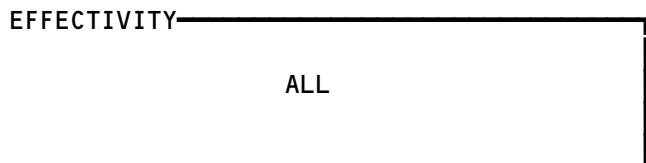
GROUND PERSONNEL MUST STAND CLEAR OF THESE HAZARD ZONES AND MAINTAIN COMMUNICATION WITH FLIGHT COMPARTMENT PERSONNEL DURING ENGINE RUNNING.



INLET HAZARD AREA

(A)

Breakaway Power Hazard Area
Figure 203

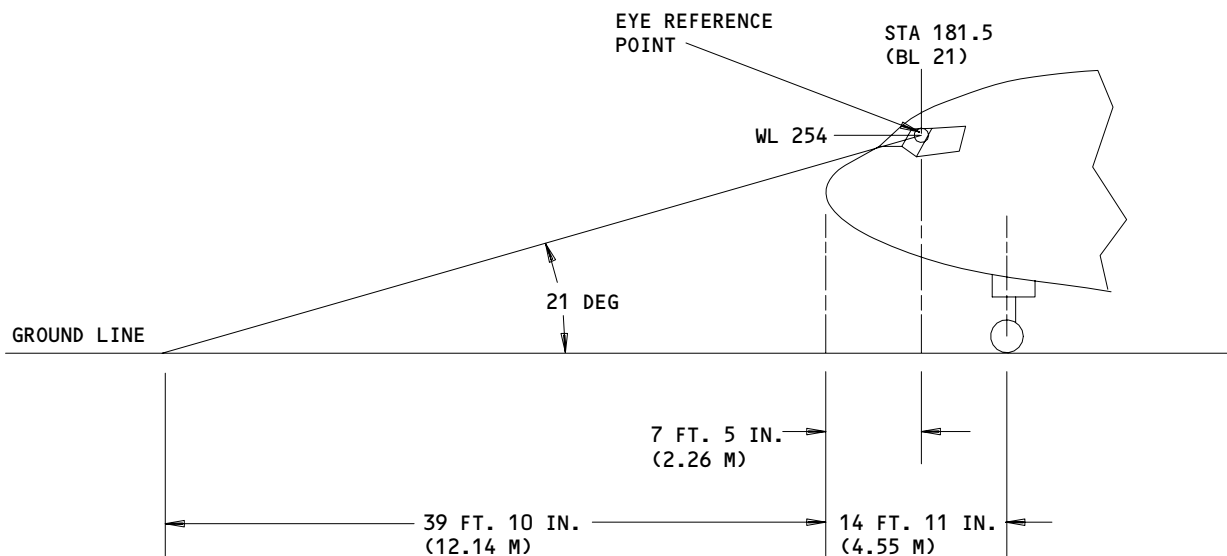


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Flight Deck Sight Line (For On-Ground Use)
Figure 204

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- (c) When the thrust reverser is in the reverse position, the high velocity fan air will come out and move forward. When this occurs, the hot, high velocity engine exhaust gases will continue to come out rearwards.
- (4) To find the angles of view from the flight compartment, for a person in the left seat, refer to Figure 204. This is when the left seat is correctly adjusted.

TASK 09-21-00-582-001

2. Taxi the Airplane

A. References

- (1) AMM 09-11-00/201, Towing
- (2) AMM 24-22-00/201, Electrical Power - Control
- (3) AMM 29-11-00/201, Main Hydraulic Systems
- (4) AMM 71-00-00/201, Power Plant

B. Prepare to Taxi the Airplane

§ 582-002

- (1) To prepare to taxi the airplane, you must do the steps that follow:

NOTE: These steps are only minimum procedures.

- (a) Use the airline taxi checklist.
- (b) Examine the external areas of the airplane.
 - 1) Make sure that the wheel chocks are in the correct position.
 - 2) Make sure that all engine cowls, doors, and hatches are in a latched/locked position or restrained from swinging by some other means.
 - 3) Make sure that the engine inlets and exhausts are clear.
 - 4) Make sure that the flight control surfaces are clear and will not touch the ground equipment.
 - 5) Make sure that the tires are in a satisfactory condition.

CAUTION: DO NOT TAXI THE AIRPLANE WITH THE SHOCK STRUTS OF THE MAIN LANDING GEAR FULLY COMPRESSED. DAMAGE TO THE SHOCK STRUTS CAN OCCUR.

- 6) Make sure that the shock struts of the main landing gear are filled correctly (AMM 12-15-01).

CAUTION: DO NOT TAXI THE AIRPLANE WITH THE SHOCK STRUT OF THE NOSE LANDING GEAR FULLY COMPRESSED. DAMAGE TO THE SHOCK STRUT CAN OCCUR.

- 7) Make sure that the shock strut of the nose landing gear is filled correctly (AMM 12-15-01).

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CAUTION: DO NOT LET THE SHOCK STRUT OF THE NOSE LANDING GEAR EXTEND MORE THAN THE MAXIMUM PERMITTED EXTENSION OF 10 INCHES. AN EXTENSION MORE THAN 10 INCHES CAN CAUSE THE CENTERING CAM TO ENGAGE AND CAUSE DAMAGE TO THE SHOCK STRUT DURING A TURN.

IT CAN ALSO MAKE THE AFT CENTER OF GRAVITY LIMITS CHANGE AND CAUSE THE AIRPLANE TO FALL ON ITS TAIL.

- 8) Make sure that not more than 10 inches of chrome surface, of the inner cylinder on the shock strut, shows.
- 9) Make sure that the towing lever on the metering valve module on the nose landing gear is in the NORMAL position (AMM 09-11-00).
- (c) Make sure the flight compartment seats are adjusted as follows:
 - 1) To give the correct view from the flight compartment windows.
 - 2) To give the correct position to operate the rudder and brake pedals.
- (d) Make sure that all airplane systems are prepared to have electrical power safely put on the airplane.
- (e) Supply electrical power (AMM 24-22-00).

CAUTION: A MINIMUM OF 600 GALLONS (4020 POUNDS/1827 KILOGRAMS) OF FUEL IS NECESSARY IN EACH FUEL TANK TO COOL THE HYDRAULIC FLUID. WHEN SUFFICIENT FUEL IS NOT IN THE FUEL TANKS, THE HYDRAULIC FLUID WILL BECOME TOO HOT.

- (f) The heat exchangers are plumbed directly to the rear spar and related fittings are welded to the units. A minimum of 600 gallons (4020 pounds/1827 kilograms) of fuel in each main tank are required to provide hydraulic fluid cooling (AMM 29-11-00).
- (g) Make sure that the fuel quantity indicator on the captain's overhead panel, P-5, shows a minimum of 4020 pounds (1827 kilograms) of fuel.

NOTE: Add the quantity of fuel that will be necessary for the engine start and taxi operations.

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- (h) Do a check for a lateral fuel imbalance and adjust the current fuel loading as appropriate.
- 1) The maximum allowable fuel imbalance between the left and right main tanks is 2,500 pounds (1134 kilograms) when total main tank fuel is 48,000 pounds (21,772 kilograms) or less, with a linear reduction to 1,500 pounds (680 kilograms) when total main tank fuel is 79,800 pounds (36,197 kilograms), and is 1,500 pounds (680 kilograms) when total main tank fuel exceeds 79,800 pounds (36,197 kilograms).
- (i) Make sure that the hydraulic systems are pressurized for the brake and nose wheel steering operations (AMM 29-11-00).

NOTE: Hydraulic power for the brakes comes from the right hydraulic system. The center hydraulic system gives automatic backup when the right system does not operate. If the right and center systems do not operate, a reserve brake system can be started through the RESERVE BRAKES AND STEERING switch (the switch is on the captain's instrument panel, P-1). If all hydraulic systems do not operate, the airplane must not be taxied. But, if all hydraulic systems stop during the taxi, the brakes will be operated through the brake accumulator. The brake accumulator is in the right hydraulic system.

When it is fully serviceable, the accumulator for the parking brake will permit the brakes to be applied approximately 5 to 6 times.

The nose wheel steering gets power from the center hydraulic system. The landing-gear-control lever must be in the DN position to use the nose wheel steering system.

- (j) Make sure that the landing-gear-control lever is in the DN position.
- (k) Make sure that the VHF radio is on and set to the correct frequency. This is for radio communications with the authority for the airport ground control.

WARNING: DO NOT CONNECT A HEADSET AND DO NOT TOUCH CONNECTIONS TO THE AIRPLANE DURING ATMOSPHERIC ELECTRICAL ACTIVITY OR IN STRONG ELECTROMAGNETIC FIELDS. LIGHTNING STRIKE AND HIGH DISCHARGE CURRENTS CAN CAUSE SEVERE INJURY.

- (l) Make sure that the service interphone and the hand radios operate, and the ground crew can hear you.

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C. Taxi the Airplane

S 582-003

- (1) To taxi the airplane, do the steps that follow:
- (a) Get the necessary approval from the airport ground control to start the engine.
 - (b) Tell the ground crew to remove the wheel chocks, and the static electrical ground wire (as necessary).
 - (c) Make sure the beacon light is turned on.
 - 1) The beacon light must be on while the engines are running.
 - (d) Make sure that the navigation lights are on. The lights must be on during movement of the airplane.
 - (e) Start the engines (AMM 71-00-00).
 - (f) When the airplane is prepared to taxi, get approval to taxi from the airport ground control.
 - (g) When the ground crew gives the signal, release the brakes and start to taxi the airplane.
 - 1) Supply engine power smoothly to start the airplane forward movement.
 - 2) Put the engines back to minimum power when the airplane starts to move.
 - (h) Make sure the airplane moves forward, in a straight line before a turn is started.
 - (i) Turn the airplane with the tiller for the nose wheel steering, or the rudder pedals.

NOTE: You will get approximately 65 degrees of nose wheel steering when the tiller for the nose wheel steering is turned to its maximum. You will get approximately 7 degrees of nose wheel steering through maximum movement of the rudder pedals.

- (j) Monitor the ground crew when you taxi in congested areas.
 - 1) This is to make sure that the airplane stays clear of all equipment, buildings, and airplanes.
- (k) When the taxi surface has taxi lines available, taxi the airplane with the nose wheel on the line.

CAUTION: DO NOT USE THE BRAKES CONTINUOUSLY TO KEEP THE NECESSARY TAXI SPEED. IF YOU USE THE BRAKES WITHOUT SUFFICIENT TIME FOR THEM TO COOL, YOU CAN CAUSE THE BRAKES TO BECOME TOO HOT. THIS CAN CAUSE BRAKE DAMAGE OR THE TIRE INFLATION PRESSURE TO DECREASE BECAUSE A WHEEL-THERMAL-FUSE PLUG MELTED.

- (l) Taxi the airplane slowly with the engines at minimum power.
 - 1) Use the Inertial Reference System (IRS) in the Ground Speed (GS) mode to monitor the taxi speed.

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- 2) If the airplane taxi speed is too fast (with the engines at idle), operate the brakes slowly and smoothly for a short time. This will decrease the taxi speed.
 - a) If the taxi speed increases again, operate the brakes as you did in the step before.
- (m) Always use the largest radius possible when you turn the airplane. This will decrease the side loads on the landing gear, and the tire scrub will be decreased.
 - 1) Make sure that the airplane continues to move while a turn is made. Do not stop during a turn.
- (n) When it is possible, complete the taxi in a straight line roll for a minimum of 12 feet. This will remove the torsional stresses in the landing gear components, and in the tires.
- (o) Operate the brakes to stop the airplane.
- (p) Set the parking brake after the airplane has stopped.
- (q) Use the airline checklist to deactivate, and to shutdown the applicable airplane systems.

WARNING: ALWAYS ATTACH THE GROUNDING CABLE TO THE GROUND CONNECTION FIRST. NEVER ATTACH THE CABLE TO THE AIRPLANE AND THEN TO THE GROUND CONNECTION. FAILURE TO COMPLY MAY RESULT IN DAMAGE TO EQUIPMENT OR INJURY TO PERSONEL.

- (r) Tell the ground crew to install the wheel chocks about 3 inches away from the tires, and to install the static electrical ground wire.
- (s) Release the parking brake after the wheel chocks are installed (optional).

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