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TASK 05-00-00-912-001

1. Airworthiness Limitation Precautions
   A. General
      (1) Critical Design Configuration Control Limitations (CDCCLs)
         (a) All occurrences of CDCCLs found in this chapter of the AMM are identified by this note after each applicable CDCCL design feature:
            1) NOTE: CDCCL - Refer to the task: Airworthiness Precautions (AMM 05-00-00/201), for important information on Critical Design Configuration Control Limitations (CDCCLs).
         (b) Design features that are CDCCLs are defined and controlled by Special Federal Aviation Regulation (SFAR) 88, and can be found in Airworthiness Limitations (AWL) and Certification Maintenance Requirements (CMR) document, D6-38278-CMR.
         (c) CDCCLs are a means of identifying certain design configuration features intended to preclude a fuel tank ignition source for the operational life of the airplane.
         (d) CDCCLs are mandatory and cannot be changed or deleted without the approval of the FAA office that is responsible for the airplane model Type Certificate, or applicable regulatory agency.
         (e) A critical fuel tank ignition source prevention feature may exist in the fuel system and its related installation or in systems that, if a failure condition were to develop, could interact with the fuel system in such a way that an unsafe condition would develop without this limitation. Strict adherence to configuration, methods, techniques, and practices as prescribed is required to ensure the CDCCL is complied with.
         (f) Any use of parts, methods, techniques or practices not contained in the applicable CDCCL must be approved by the FAA office that is responsible for the airplane model Type Certificate, or applicable regulatory agency.
      (2) Airworthiness Limitation Instructions (ALIs)
         (a) All occurrences of fuel tank system ALIs found in this chapter of the AMM are identified by this step after the General section in the applicable ALI inspection task:
            1) ALI - Refer to the task: Airworthiness Limitation Precautions (AMM 05-00-00/201), for important information on airworthiness limitation instructions (ALIs).

(b) Inspection tasks that are ALIs are defined and controlled by Special Federal Aviation Regulation (SFAR) 88, and can be found in Airworthiness Limitations (AWL) and Certification Maintenance Requirements (CMR) document, D6-38278-CMR.

(c) These ALIs identify inspection tasks related to fuel tank ignition source prevention which must be done to maintain the design level of safety for the operational life of the airplane.

(d) These ALIs are mandatory and cannot be changed or deleted without the approval of the FAA officethat is responsible for the airplane model Type Certificate, or applicable regulatory agency. Strict adherence to methods, techniques and practices as prescribed is required to ensure the ALI is complied with.

(e) Any use of methods, techniques or practices not contained in these ALIs must be approved by the FAA office that is responsible for the airplane model Type Certificate, or applicable regulatory agency.

B. Access

(1) Location Zones

100 Lower Half of Fuselage
200 Upper Half of of Fuselage
500 Left Wing
600 Right Wing

C. Critical Design Configuration Control Limitations (CDCCLs)

(1) Make sure you follow the procedures for items that are identified as CDCCLs.

WARNING: OBEY THE MANUFACTURER'S PROCEDURES WHEN YOU DO MAINTENANCE THAT HAS AN EFFECT ON A CDCCL. IF YOU DO NOT OBEY THE PROCEDURES, IT CAN INCREASE THE RISK OF A SOURCE OF FUEL TANK IGNITION. INJURIES TO PERSONNEL, AND DAMAGE TO EQUIPMENT CAN OCCUR IF THERE IS A FIRE OR EXPLOSION.

D. Airworthiness Limitation Instructions (ALIs)

(1) Make sure you follow the procedures for tasks that are identified as ALIs.

WARNING: OBEY THE MANUFACTURER'S PROCEDURES WHEN YOU DO MAINTENANCE THAT HAS AN EFFECT ON AN ALI. IF YOU DO NOT OBEY THE PROCEDURES, IT CAN INCREASE THE RISK OF A SOURCE OF FUEL TANK IGNITION. INJURIES TO PERSONNEL, AND DAMAGE TO EQUIPMENT CAN OCCUR IF THERE IS A FIRE OR EXPLOSION.

CONDITIONAL INSPECTIONS - GENERAL

1. General
   A. This section contains the recommended checks and inspections which are dictated by special or unusual conditions. The following subjects identify the conditions and list the recommended checks and inspections. Procedures required for accomplishing specific checks or inspections are covered in the individual system or component subjects in the appropriate chapters of the manual.

OVERWEIGHT TAXI CONDITION - MAINTENANCE PRACTICES (CONDITIONAL INSPECTION)

1. General
   A. Overweight Taxi:
      (1) Taxiing at a weight that is more than the maximum-design-taxi-weight (MTW). Before flight, you must decrease airplane weight to that specified by the Airplane Flight Manual for takeoff.
   B. Inspection Criteria: An immediate structural inspection is necessary if you:
      (1) Taxi the airplane overweight by more than 1/2% of the maximum-taxi-weight (MTW).
      (2) Taxi the airplane overweight any weight over the Maximum Design Taxi Weight (MTW) and have any of these conditions:
         (a) High speed ground turn
         (b) Sharp radius turn
         (c) Heavy braking
         (d) Taxi over rough pavement
         (e) Pivoting (sharp radius turning with brakes on)
   C. The Inspections
      (1) The inspection is divided into Phase 1 and 2.
      (2) If the inspection for Phase 1 shows no signs of damage, the inspection is complete. If the Phase 1 inspection shows any sign of damage, the Phase 2 inspection must be done.
      (3) If the criteria for the above paragraphs have not been met, no inspection is required, but you must decrease airplane weight to that specified by the Airplane Flight Manual before takeoff.
   D. Inspections, Repairs, and Replacements
      (1) When this procedure tells you to "examine" a part, look for these conditions:
         (a) Cracks
         (b) Structure that pulled apart
         (c) Loose paint (paint flakes)
         (d) Twisted parts (distortion)
         (e) Bent parts
         (f) Wrinkles or buckles in structure
         (g) Fastener holes that became larger or longer
         (h) Loose fasteners
         (i) Missing fasteners (fasteners that have pulled out or are gone)
         (j) Delaminations (a component with one or more layers pulled apart)
         (k) Parts that are not aligned correctly
         (l) Interference (clearance that is not sufficient between two parts)
         (m) Discoloration (heat damage)
         (n) Nicks or gouges

(o) Other signs of damage

(2) Replace or repair the components that have one or more of the conditions given above.

2. Phase 1 Inspection

A. Airplane Inspection

(1) Main and Nose Landing Gear Inspection

(a) Examine all tires and wheels.

(b) Examine the support structure.

(c) Look for signs of fluid leakage at the top and bottom of the outer cylinder of the shock strut.

NOTE: A small quantity of hydraulic fluid on the surface of the inner cylinder of the shock strut is satisfactory.

(2) Landing Gear, Fuselage, and Wing Inspection

(a) Look for fuel leaks, and other fluid leaks, in the areas that follow:

1) All wheel well areas of the main and nose landing gear.

2) The lower external surface of the fuselage in the area of the wing-to-body fairing.

3) The wing.

3. Phase 2 Inspection

A. References

(1) AMM 7-11-11, Jacking Airplane

(2) AMM 12-15-31, Main Gear Shock Strut - Servicing

(3) AMM 12-15-41, Nose Gear Shock Strut - Servicing

(4) AMM 32-11-0, Main Landing Gear

(5) AMM 32-11-21, Main Gear Shock Strut

(6) AMM 32-21-0, Nose Landing Gear

(7) AMM 32-21-11, Nose Gear Shock Strut

(8) AMM 32-32-0, Main Landing Gear Extension and Retraction

(9) AMM 32-33-0, Nose Landing Gear Extension and Retraction

(10) AMM 32-51-0, Nose Wheel Steering System

B. Airplane Inspection

(1) Main Landing Gear and Support Structure Inspection

(a) Make sure the shock strut pressures are normal and the hydraulic fluids are at the correct levels (AMM 12-15-31).

(b) Lift the airplane with jacks (AMM 7-11-11).

(c) Examine the inner and outer cylinder lugs.

(d) Examine all structural components of the main landing gear and carefully examine the components that follow:

1) Shock strut

2) Trunnion link

3) Drag strut

4) Torsion links

5) Side strut

6) Walking beam fitting of the shock strut
7) Walking beam for the main gear actuator
8) Linkage fittings of the walking beam and actuator
9) The attach nut of the orifice support tube (signs of fluid leakage).
10) Strut doors and the mechanism that retracts and extends the doors.

(e) Examine the support structure of the main landing gear and carefully examine the components that follow:
1) Landing gear beam
2) Support fittings for the landing gear beam
a) Inboard
b) Outboard
3) Trunnion support fittings and attachments
a) Forward
b) Aft
4) Stabilizer link and fittings between the rear spar and landing gear beam.
5) Body fitting for side strut and uplock attachment.

(f) Examine all of the pin joints and fuse pin connections.

(g) If you found tire damage in Phase 1, do the steps that follow:
1) Remove and examine the wheel structure.
2) Remove and examine the brake assembly.
3) Examine the axles.

(h) If one or more of the conditions that follow occurred, remove, disassemble, and examine all parts of the shock strut (AMM 32-11-21).
1) The shock strut pressures were sufficiently low to cause damage.
2) The hydraulic fluid levels were sufficiently low to cause damage.
3) You found damage to one or more of the parts during your inspection of the landing gear.

NOTE: Do not remove the orifice support tube to examine it.

(i) Make sure the main landing gear retracts and extends correctly (AMM 32-32-0).

(j) Lower the airplane from the jacks (AMM 7-11-1).

(2) Nose Landing Gear and Support Structure Inspection
(a) Make sure the shock strut pressures are normal and the hydraulic fluids are at the correct levels (AMM 12-15-41).
(b) Lift the nose of the airplane with jacks (AMM 7-11-1).
(c) If you found tire damage in Phase 1, do the steps that follow.
1) Remove and examine the wheel structure.

2) Examine the axle.

(d) Examine all structural components of the nose landing gear and carefully examine the components that follow:
1) Shock strut
2) Torsion links
3) Drag strut
4) Lock links
5) Drag brace link
6) The attach nut of the orifice support tube (signs of fluid leakage).

(e) Examine the wheel well area and carefully examine the parts that follow:
1) Web (the left and right side walls)
2) Aft bulkhead
3) Trunnion attachments
4) Drag strut attachments

(f) Examine the wheel well bulkheads and fuselage outboard of nose wheel well at (Body Stations 294.5 and 360).

NOTE: You can do this inspection on the forward side through the access holes in the sidewalls of the nose wheel well. Examine the aft side of the bulkhead at Body Station 294.5 from the electronics compartment.

(g) If one or more of the conditions that follow occurred; remove, disassemble, and examine all parts of the shock strut (AMM 32-21-11).
1) The shock strut pressures were sufficiently low to cause damage.
2) The hydraulic fluid levels were sufficiently low to cause damage.
3) You found damage to one or more of the parts during your inspection of the landing gear.

NOTE: Do not remove the orifice support tube to examine it.

(h) Make sure that steering system is adjusted and operates correctly (AMM 32-51-0).

(i) Make sure the nose landing gear retracts and extends correctly (AMM 32-33-0).

(j) Lower the nose of the airplane from the jacks (AMM 7-11-11).

(3) Fuselage Inspection

NOTE: If you find external damage to the fuselage, always examine the adjacent internal structure.

(a) Examine the lower fuselage structure.

NOTE: Examine carefully in the area below the body crease from Body Station 727 to 100 inches aft.

(b) Examine carefully these components (Body Stations 540 through 727A):
1) Keel beam chords
2) Stiffeners
3) Webs and splices

(c) Also examine carefully the top of the fuselage between S-6 left and S-6 right (Body Stations 540, 664, and 727).

(d) Examine the upper and lower fuselage skin panels forward and aft of the wing.

NOTE: Permanent wrinkles frequently occur on the lower side of the fuselage skins aft of Body Station 727. An internal inspection is necessary if you found wrinkles that were not there before the landing. Examine the wrinkles carefully for cracks.

(e) Examine the wing-to-fuselage joints (Body Stations 540 and 664).

(f) Examine the fuselage skin joints above the landing gear beam.

ICE OR SNOW CONDITION - CONDITIONAL INSPECTION

1. Ice or Snow Condition
   A. Procedure
      (1) Whenever Icing or Snow Conditions Exist, Prior to Flight:
      (2) Examine for the following:
         (a) Fuselage, wings, control surfaces, balance panel areas and hinge points for ice and snow. If snow or ice exists, refer to 12-50-0/201, Cold Weather Maintenance.
         (b) Engine inlet cowl for ice and snow, secondary inlet doors for freedom of movement, and the first stage compressor for freedom of rotation (Ref 71-09-111, Maintenance Practices).
         (c) Light coatings of frost up to 1/8-inch thick on lower wing surfaces only are permissible; however, all control surfaces, tab surfaces and balance panel cavities, wing leading edge slats, and wing upper surface must be completely free of snow or ice before takeoff (Ref 12-50-0, Cold Weather Operation).
         (d) If thrust reversers have been operated, check actuator locks for ice entrapment.

TOILET OVER-SERVICING - MAINTENANCE PRACTICES (CONDITIONAL INSPECTION)

1. General
   A. This procedure supplies the tasks that follow:
      (1) Toilet over-servicing conditional inspection (forward toilet).
      (2) Toilet over-servicing conditional cleaning (forward toilet).
      (3) Toilet over-servicing conditional inspection (aft toilet).
      (4) Toilet over-servicing conditional cleaning (aft toilet).
   B. This section supplies the inspection and cleanup procedures, when too much toilet flushing liquid (blue water) has been used during the toilet servicing procedure (AMM 12-17-00/201).
   C. When toilet flushing liquid spills inside the airplane, you must remove all signs of liquid, clean and fully dry the areas of contamination immediately.

      NOTE: The surfaces where the toilet flushing liquid (blue water) dries, will show as a blue stain.

   D. Blue water contamination is possible in the areas that follow:
      (1) Forward Lavatory
      (2) Electronic Equipment Compartment
      (3) Aft Lavatories
      (4) Aft Cargo Compartment Equipment Bay
2. Toilet Over-Servicing Conditional Inspection (Forward Toilet)
   A. General
      (1) This inspection procedure is to be done when an over-service of the forward toilet system has occurred or you think it has occurred.

          NOTE: The term "over-service" is used to show that too much blue water has been used during the servicing of the toilet system, and has spilled inside the airplane.

      (2) It is possible for blue water contamination to occur in a single isolated area or more than one area, dependent upon the amount of liquid spilled.
      (3) A full visual inspection is necessary to confirm the extent of possible blue water contamination.

          NOTE: Spilled liquid can use different flowpaths to disperse.

(4) It is recommended to do a check of the airplane records to see if there has been a spill of blue water before and if blue stains remain.

NOTE: Unnecessary work can be avoided if knowledge of another over-servicing is available for comparison.

B. References
(1) AMM 12-17-00/201, Toilet Servicing
(2) AMM 20-30-51/201, Miscellaneous Materials
(3) AMM 38-32-00/501, Toilet System
(4) AMM 38-32-51/401, Toilet Waste Tank
(5) AMM 51-31-0/201, Seals and Sealing
(6) AMM 52-48-41/001, Electronic Equipment Compartment Door
(7) AMM 52-61-0/001, Forward Airstair

C. Equipment
(1) Workstand

D. Consumable Materials
(1) Gown - Disposable
(2) Gloves - Disposable
(3) Shop Coat - Disposable
(4) Mask, face - Disposable
(5) Glasses - Safety
(6) Cloth, lint-free
(7) Cheesecloth

E. Access
(1) Location Zones
103 Forward Lavatory (A)
205 Electronic Equipment Compartment
206 Forward Airstair Compartment
207 Forward Airstair

(2) Access Panels
1104 Forward Toilet Service Panel
1201 Electronic Equipment Compartment Door
1601 Forward Airstair Door

F. Procedure
(1) Drain the forward toilet waste tank (AMM 12-17-00/201).

NOTE: Drain the system only, do not complete a full service of the toilet system.

(2) Open and tag the applicable lavatory flush motor circuit breaker.
(3) Open the electronic equipment compartment door for access (AMM 52-48-41/001).

(4) Position the maintenance stand under the electronic equipment compartment and put a strong light source inside the compartment.
(5) Extend the forward airstair for access (AMM 52-61-0/001).
(6) Remove the toilet shroud assembly, as given in the removal procedure for the toilet waste tank (AMM 38-32-51/401).
(7) In the forward lavatory, do an inspection as follows:
  (a) Look for signs of blue water on the lavatory floor.
  (b) Look for signs of the blue water on the areas which surround the toilet tank.
(8) In the electronic equipment compartment, do a visual inspection as follows:
  (a) Look for signs of blue water in the area below the toilet tank.
  (b) Examine the toilet tank drain tube, the drain valve control cable, and ground flush hose for signs of blue water.
  (c) Examine the toilet drain floor adapter and the adjacent area for signs of blue water.
  (d) Examine the airstair drain pan and moisture shroud for signs of blue water.

    WARNING: BLUE WATER CONTAMINATION CAN CAUSE SERIOUS DAMAGE TO ELECTRICAL OR ELECTRONIC EQUIPMENT. THIS CAN RESULT IN AN UNWANTED EFFECT ON THE FLIGHT SAFETY OF THE AIRPLANE.

  (e) If you find blue water has flowed into the electronic equipment compartment, put a warning placard in the flight compartment to tell all personal, "DO NOT OPERATE ELECTRONIC EQUIPMENT", before you continue.

    NOTE: The blue water can use the outer surface of tubes and cables as flowpaths to contaminate different areas of the electronic equipment compartment.

  (f) If you find signs of blue water contamination in the electronic equipment compartment, do a full visual inspection of the compartment.

    NOTE: If a serious over-servicing occurs, it is possible for blue water to find flowpaths to many possible locations.

  (g) You must do full inspections of all electrical cable looms for signs of blue water.
  (h) You must do an inspection of all tubes, such as the pitot-static tubes, for signs of blue water.
(9) If you have found signs of blue water, you must do the cleaning procedure for the toilet over-servicing task.

(10) If you have not found signs of blue water, continue with this task.
(11) Install the toilet shroud assembly, as given in the installation procedure for the toilet waste tank (AMM 38-32-51/401).
(12) Remove the tag and close the applicable lavatory flush motor circuit breaker.
(13) Do the servicing procedure for the forward toilet system (AMM 12-17-00/201).
(14) Close the electronic equipment compartment door (AMM 52-48-41/001).
(15) Remove all tools and equipment from the work area.

3. Toilet Over-Servicing Conditional Cleaning (Forward Toilet)

A. General

(1) If blue water contamination is found in the airplane, after an over-servicing event has occurred, an immediate cleanup action is necessary to prevent possible contamination of electrical or electronic components.
(2) It is possible for blue water contamination to occur in a single isolated area or more than one area, dependent upon the amount of liquid spilled. All contaminated areas are to be completely cleaned.
(3) It is most important that all moisture is removed from the contaminated area. Clean cloths and dry air are to be used.
(4) In all areas where blue water contamination has to be removed and cleaned, you must use an approved disinfectant to kill all harmful micro-organisms.
(5) The flight safety of the airplane, together with the safety of health and the prevention of bad smells, must be your first consideration when you complete this task.

B. References

(1) AMM 12-17-00/201, Toilet Servicing
(2) AMM 20-30-31/201, Cleaners and Polishes
(3) AMM 20-30-51/201, Miscellaneous Materials
(4) AMM 25-51-0/001, Electronic Compartment
(5) AMM 38-32-00/501, Toilet System
(6) AMM 38-32-51/401, Toilet Waste Tank
(7) AMM 51-31-0/201, Seals and Sealing
(8) AMM 52-48-41/001, Electronic Equipment Compartment Door
(9) AMM 52-61-0/001, Forward Airstair

C. Equipment

(1) Workstand
(2) Dry air supply

D. Consumable Materials

(1) Gown - Disposable
(2) Gloves - Disposable
(3) Shop Coat - Disposable
(4) Mask, face - Disposable
(5) Glasses - Safety

(6) Polyethylene sheet (AMM 20-30-51/201)
(7) Wipers (AMM 20-30-51/201)
(8) Cloth, lint-free
(9) Cheesecloth

E. Access

(1) Location Zones

103 Forward Lavatory (A)
205 Electronic Equipment Compartment
206 Forward Airstair Compartment
207 Forward Airstair

(2) Access Panels

1104 Forward Toilet Service Panel
1201 Electronic Equipment Compartment Door
1601 Forward Airstair Door

F. Procedure

(1) Put on protective clothing before you begin to clean up the blue water.
(2) Use a clean absorbent cloth or a sponge to remove the blue water from the contamination area.

NOTE: If a large quantity of liquid is to be removed, a suction pump should be used to drain the contaminated area.

(3) Use approved cleaning agents and disinfectants when you clean areas where blue water contamination has occurred (AMM 20-30-31/201).
(4) When blue water is found in the lavatory area, do the steps that follow:
(a) Remove laying blue water from all surfaces.

WARNING: DO NOT USE TOO MUCH FRESH WATER TO REMOVE THE BLUE STAIN BECAUSE ADDITIONAL WATER COULD CAUSE POSSIBLE DAMAGE TO ELECTRICAL EQUIPMENT. THIS CAN RESULT IN AN UNWANTED EFFECT ON THE FLIGHT SAFETY OF THE AIRPLANE.

NOTE: Most of the blue water should drain out of the airplane through the floor drains and the waste water system.

1) Use clean fresh water to dilute contaminated areas of the blue stain.

(b) If there are signs of blue water on the toilet tank, make sure you remove all blue water stains from the toilet tank and all related components and connections.

NOTE: It is important that all blue stains are removed from the area. This will allow accurate visual inspections to be done in the future.

(c) If blue water was found on the toilet floor, make sure all signs of blue water stains are removed from the toilet floor, and all floor installed connections.
(d) If blue water was found on the modular toilet, make sure all signs of blue water stains are removed and the weep holes in the floor pan are free from blockage.
(e) Use a clean, moisture-free cloth or sponge to fully dry all surfaces and components.
(f) Use a dry air supply to fully remove additional moisture from the contaminated areas which are difficult to touch.
(g) If there are surface areas which remain with a blue stain, make a record of the precise location.

NOTE: A record of a blue stain area can help to find the cause of a possible new leak of blue water, should a leak occur in the future.

(5) If blue water is found in the electronic equipment compartment, do the steps that follow:

WARNING: DO NOT USE TOO MUCH FRESH WATER TO REMOVE THE BLUE STAIN BECAUSE ADDITIONAL WATER COULD CAUSE POSSIBLE DAMAGE TO ELECTRICAL EQUIPMENT. THIS CAN RESULT IN AN UNWANTED EFFECT ON THE FLIGHT SAFETY OF THE AIRPLANE.

(a) Protect adjacent areas to the contaminated area, from the cleaning procedure, by the use of polyethylene sheeting as a waterproof cover.
(b) Use clean fresh water to dilute contaminated areas of the blue stain.
(c) Use a clean absorbent cloth or a sponge to remove laying blue water from all areas shown during the toilet over-servicing inspection of the electronic equipment compartment.

NOTE: It is important that all blue stains are removed from the area. This will allow accurate visual inspections to be done in the future.

(d) If the airstair drip pan is contaminated by blue water, do the steps that follow:
1) Make sure the airstair drip pan is drained of liquid.
2) Remove the access panel on the airstair drip pan (AMM 25-51-0/001).
3) Fully clean the airstair drip pan and access panel with fresh water.
4) Make sure the drain in the access panel is free from blockage.

(e) If the moisture shroud is contaminated by blue water, remove the moisture shroud from the airplane (AMM 25-51-0/001) and clean with fresh water.

NOTE: It is not recommended to clean the shroud in the installed configuration; damage can occur to the shroud.

(f) Make sure all moisture-shroud drain channels are clean and free from blockage.

(g) Use a clean cloth to fully dry all surfaces and use a dry air supply to dry the areas which are difficult to touch.

(h) If the area below the toilet tank shows signs of blue water contamination, fully clean the drain tube, the ground flush hose or the drain valve control cable with fresh water.

NOTE: You must be most careful with the use of water in the electronic equipment compartment; additional contamination must not occur.

(i) If the blue water contamination shows on the electronic racks and equipment, do the steps that follow:
1) Remove blue water from all surfaces, cables and connectors.
2) Use a dry air supply to remove all moisture from the contaminated areas.

NOTE: Electrical cable looms can hold moisture between the separate wires. If possible, open the wires in a contaminated cable when you dry the cable.

3) Do a check of contaminated connectors for blue water ingress and dry as necessary.

NOTE: If you think a connector is contaminated with blue water, you must disconnect and fully examine the connector and the related equipment connector.

(j) Remove all signs of blue water from tubes which could conduct moisture, such as the pitot-static tubes, as necessary.
(k) Do an operational test of equipment which possibly could have been contaminated with blue water.
(l) Remove warning placard from flight compartment.

(6) Do a check of all hose connections and tighten connector clamps as necessary.
(7) Do an inspection of the forward toilet waste system (AMM 38-32-00/501).
(8) Install the moisture shroud (AMM 25-51-0/001).
(9) Install the access panel on the airstair drip pan (AMM 25-51-0/001).
(10) Install the toilet tank shroud (AMM 38-32-51/401).
(11) Remove the tag and close the applicable lavatory flush motor circuit breaker.
(12) Do the servicing procedure for the forward toilet system (AMM 12-17-00/201).
(13) Close the electronic equipment compartment door (AMM 52-48-41/001).
(14) Remove all tools and equipment from the work area.

4. Toilet Over-Servicing Conditional Inspection (Aft Toilet)

A. General

(1) This inspection procedure is to be done when an over-service of the aft toilet system has occurred or you think it has occurred.

NOTE: The term "over-service" is used to show that too much blue water has been used during the servicing of the toilet system, and has spilled inside the airplane.

(2) It is possible for blue water contamination to occur in a single isolated area or more than one area, dependent upon the amount of liquid spilled.
(3) A full visual inspection is necessary to confirm the extent of possible blue water contamination.

NOTE: Spilled liquids can use different flowpaths to disperse.

(4) It is recommended to do a check of the airplane records to see if there has been a spill of blue water before and if blue stains remain.

NOTE: Unnecessary work can be avoided if knowledge of another over-servicing is available for comparison.

B. References

(1) AMM 12-17-00/201, Toilet Servicing
(2) AMM 20-30-51/201, Miscellaneous Materials
(3) AMM 25-40-06/401, Toilet Back Shroud

(4) AMM 38-32-00/501, Toilet System
(5) AMM 38-32-31/401, Toilet Drain Valve
(6) AMM 38-32-51/401, Toilet Waste Tank
(7) AMM 51-31-0/201, Seals and Sealing

C. Consumable Materials
(1) Gown - Disposable
(2) Gloves - Disposable
(3) Shop Coat - Disposable
(4) Mask, face - Disposable
(5) Glasses - Safety
(6) Cloth, lint-free
(7) Cheesecloth

D. Access
(1) Location Zones
109 Aft Lavatory or Galley (E)
113 Aft Lavatory (B)
114 Aft Lavatory or Galley (C)
118 Aft Lavatory or Galley (D)
218 Aft Cargo Compartment
219 Aft Cargo Compartment Door
220 Aft Cargo Compartment Equipment Bay

(2) Access Panels
1502 Aft Toilet Service Panel
4504 Aft Cargo Compartment Door

E. Procedure
(1) Drain the aft toilet waste tank (AMM 12-17-00/201).

NOTE: Drain the system only, do not complete a full service of the toilet system.

(2) Open and tag the applicable lavatory flush motor circuit breaker.
(3) Open the aft cargo compartment door for access (AMM 52-31-0/001).
(4) Remove the access panel from the rear bulkhead in the aft cargo compartment.
(5) Remove the toilet tank shroud(s), as given in the removal procedure for the toilet waste tank (AMM 38-32-51/401).
(6) In the aft lavatory, do the steps that follow:
(a) Look for signs of blue water on the lavatory floor.
(b) Look for signs of the blue water on the areas which surround the toilet tank.

(7) In the aft cargo compartment equipment bay, do the steps that follow:
(a) Position a strong light source in the aft cargo compartment equipment bay.

WARNING: BLUE WATER CONTAMINATION CAN CAUSE SERIOUS DAMAGE TO ELECTRICAL OR ELECTRONIC EQUIPMENT. THIS CAN RESULT IN AN UNWANTED EFFECT ON THE FLIGHT SAFETY OF THE AIRPLANE.

(b) Look for signs of blue water in the area below the toilet tank.
(c) Examine the toilet tank drain tube, the drain valve control cable, and ground flush hose for signs of blue water.
(d) Examine the toilet drain floor adapter and the adjacent area for signs of blue water.
(e) You must do full inspections of all electrical cable looms for signs of blue water.
(f) You must do an inspection of all tubes and hoses for signs of blue water.
(g) If you find blue water has flowed into the aft cargo compartment equipment bay, put a warning placard in the flight compartment to tell all personnel, "DO NOT OPERATE ELECTRONIC EQUIPMENT", before you continue.
(8) If you have found signs of blue water, you must do the cleaning procedure for the toilet over-servicing task.
(9) If you have not found signs of blue water, continue with this task.
(10) Remove the tag and close the applicable lavatory flush motor circuit breaker.
(11) Do the servicing procedure for the aft toilet system (AMM 12-17-00/201).
(12) Install the access panel in the rear bulkhead of the aft cargo compartment.
(13) Close the aft cargo compartment door (AMM 52-48-41/001).
(14) Remove all tools and equipment from the work area.

5. Toilet Over-Servicing Conditional Cleaning (AftToilet)
A. General
(1) If blue water contamination is found in the airplane, after an over-servicing event has occurred, an immediate cleanup action is necessary to prevent possible contamination of electrical or electronic components.
(2) It is possible for blue water contamination to occur in a single isolated area or more than one area, dependent upon the amount of liquid spilled. All contaminated areas are to be completely cleaned.
(3) It is most important that all moisture is removed from the contaminated area. Clean cloths and dry air are to be used.

(4) In all areas where blue water contamination has to be removed and cleaned, you must use an approved disinfectant to kill all harmful micro-organisms.
(5) The flight safety of the airplane, together with the safety of health and the prevention of bad smells, must be your first consideration when you complete this task.

B. References
(1) AMM 12-17-00/201, Toilet Servicing
(2) AMM 20-30-31/201, Cleaners and Polishes
(3) AMM 20-30-51/201, Miscellaneous Materials
(4) AMM 38-32-00/501, Toilet System
(5) AMM 38-32-31/401, Toilet Drain Valve
(6) AMM 38-32-51/401, Toilet Waste Tank
(7) AMM 51-31-0/201, Seals and Sealing

C. Consumable Materials
(1) Gown - Disposable
(2) Gloves - Disposable
(3) Shop Coat - Disposable
(4) Mask, face - Disposable
(5) Glasses - Safety
(6) Cloth, lint-free
(7) Cheesecloth

D. Access
(1) Location Zones

109	Aft Lavatory or Galley (E)
113	Aft Lavatory (B)
114	Aft Lavatory or Galley (C)
118	Aft Lavatory or Galley (D)
218	Aft Cargo Compartment
219	Aft Cargo Compartment Door
220	Aft Cargo Compartment Equipment Bay

(2) Access Panels

1502	Aft Toilet Service Panel
4504	Aft Cargo Compartment Door

E. Procedure
(1) Put on protective clothing before you begin to clean up the blue water.
(2) Use a clean absorbent cloth or a sponge to remove the blue water from the contamination area.

NOTE: If a large quantity of liquid is to be removed, a suction pump should be used to drain the contaminated area.

(3) Use approved cleaning agents and disinfectants when you clean areas where blue water contamination has occurred (AMM 20-30-31/201).
(4) If blue water is found in the aft lavatory area, do the steps that follow:
   (a) Remove laying blue water from all surfaces.

      WARNING: DO NOT USE TOO MUCH FRESH WATER TO REMOVE THE BLUE STAIN BECAUSE ADDITIONAL WATER COULD CAUSE POSSIBLE DAMAGE TO ELECTRICAL EQUIPMENT. THIS CAN RESULT IN AN UNWANTED EFFECT ON THE FLIGHT SAFETY OF THE AIRPLANE.

      NOTE: Most of the blue water should drain out of the airplane through the floor drains and the waste water system.

   (b) Use clean fresh water to dilute contaminated areas of the blue stain.
   (c) Use a clean, moisture-free cloth or sponge to fully dry all surfaces and components.
   (d) Use a dry air supply to fully remove additional moisture from the contaminated areas which are difficult to touch.
   (e) If there are surface areas which remain with a blue stain, make a record of the precise location.

      NOTE: A record of a blue stain area can help to find the cause of a possible new leak of blue water, should a leak occur in the future.

   (f) If there are signs of blue water on the toilet tank, make sure you remove all blue water from the toilet tank and all related components and connections.

      NOTE: It is important that all blue stains are removed from the area. This will help when you do accurate visual inspections in the future.

   (g) If blue water was found in the modular toilet, make sure all signs of blue water and related stains are removed and the weep holes in the floor pan are free from blockage.

(5) When blue water is found in the aft cargo compartment equipment bay, do the steps that follow:

WARNING: DO NOT USE TOO MUCH FRESH WATER TO REMOVE THE BLUE STAIN BECAUSE ADDITIONAL WATER COULD CAUSE POSSIBLE DAMAGE TO ELECTRICAL EQUIPMENT. THIS CAN RESULT IN AN UNWANTED EFFECT ON THE FLIGHT SAFETY OF THE AIRPLANE.

(a) Protect adjacent areas to the contaminated area, from the cleaning procedure, by the use of polyethylene sheeting as a waterproof cover.
(b) Use clean fresh water to dilute contaminated areas of the blue stain.
(c) If the area below the toilet tank shows signs of blue water contamination, fully clean the drain tube, the ground flush hose or the drain valve control cable with fresh water.

NOTE: You must be most careful with the use of water in the aft cargo compartment equipment bay; additional contamination must not occur.

(d) Use a clean absorbent cloth or a sponge to remove laying blue water from all areas shown during the toilet over-servicing inspection of the aft cargo compartment equipment bay.

NOTE: It is important that all blue stains are removed from the area. This will allow accurate visual inspections to be done in the future.

(e) Use a clean cloth to fully dry all surfaces and use a dry air supply to dry the areas which are difficult to touch.
(f) If the blue water contamination shows on the electrical or electronic equipment, do the steps that follow:
    1) Remove blue water from all surfaces, cables and connectors.
    2) Use a dry air supply to remove all moisture from the contaminated areas.

NOTE: Electrical cable looms can hold moisture between the separate wires. If possible, open the wires in a contaminated cable when you dry the cable.

3) Do a check of contaminated connectors for blue water ingress and dry as necessary.

NOTE: If you think a connector is contaminated with blue water, you must disconnect and fully examine the connector and the related equipment connector.

(g) Remove all signs of blue water from tubes which could conduct moisture, as necessary.
1) Do an operational test of equipment which possibly have been contaminated with blue water.
2) Remove warning placard from flight compartment.

(6) Install the toilet tank shroud (AMM 38-32-51/401).
(7) Remove the tag and close the applicable lavatory flush motor circuit breaker.
(8) Do the servicing procedure for the aft toilet system (AMM 12-17-00/201).
(9) Replace the access panel in the rear bulkhead of the aft cargo compartment.
(10) Close the aft cargo compartment door.
(11) Remove all tools and equipment from the work area.

GALLEY SPILL - MAINTENANCE PRACTICES (CONDITIONAL INSPECTION)

1. General
   A. This procedure supplies one task. This task is to do an inspection and the cleanup of the areas of contamination after a liquid is spilled in the galley.
   B. If liquids are spilled inside the galley, you must remove all signs of liquid and fully dry the areas of contamination immediately.
   C. If the floor area of the galley area is not sealed correctly, liquid contamination can result in corrosion of the floor structure.

      NOTE: Moisture above the galley floor can go through small holes in the floor surface area and stay out of view. This could possibly cause unwanted damaged to the airplane structure or to equipment in the area below the galley floor.

2. Galley Spill Conditional Inspection
   A. General
      (1) This inspection procedure is to be done when liquid has been spilled in the galley area.

          NOTE: When a small amount of liquid is spilled, an inspection is not usually necessary.

      (2) In the galley areas, a water (liquid) barrier is installed to contain liquid when it is spilled. To protect the water barrier, vinyl mats cover the galley floor.
      (3) In the adjacent entry and service door thresholds, waste water drains are installed to remove liquids (gray water) from the floor. These drain holes must be kept free from blockages.
      (4) The integrity of the water barrier seal, in the forward galley areas, is most important because the location of the electronic equipment compartment is directly below the forward galley.
      (5) A leak from the forward galley which has a damaged water barrier, into the compartment below, could possibly cause serious damage to the electronic equipment. The result could be a possible hazard to the flight safety of the airplane.
   B. References
      (1) AMM 20-30-51/201, Miscellaneous Materials
      (2) AMM 25-01-12/701, Equipment/Furnishings
      (3) AMM 25-27-211/401, Entry and Service Area Floor Covering
      (4) AMM 25-31-0/001, Galleys
      (5) AMM 25-31-51/401, Galley No. 1
      (6) AMM 25-31-61/401, Galley No. 4
      (7) AMM 38-31-0/001, Waste Water System
      (8) AMM 51-31-0/001, Seals and Sealing

(9) AMM 53-21-0/401, Passenger Cabin Floors
(10) AMM 53-21-11/801, Water Barrier

C. Equipment
(1) Workstand

D. Consumable Materials
(1) Gown - Disposable
(2) Gloves - Disposable
(3) Shop Coat - Disposable
(4) Mask, face - Disposable
(5) Glasses - Safety
(6) Cloth, lint-free
(7) Cheesecloth

E. Access
(1) Location Zones

104	Forward Galley (1)
106	Forward Galley (2)
109	Aft Galley (3)
114	Aft Galley (4)
118	Aft Galley (6)
205	Electronic Compartment
218	Aft Cargo Compartment
219	Aft Cargo Compartment Door
220	Aft Cargo Compartment Equipment Bay

(2) Access Panels

1201	Electronic Equipment Compartment Door
4504	Aft Cargo Compartment Door

F. Procedure
(1) In the galley where the liquid was spilled, use a clean cloth or a sponge to remove all liquid from the floor of the galley area.
(2) In the galley area where the liquid was spilled, remove the floor area covering (AMM 25-27-211/401), to do an inspection of the waterseal.

NOTE: The waterseal of the galley area can be damaged if care is not taken when you remove the vinyl floor mats.

(3) Make sure the door threshold drain, adjacent to the galley area, is clear and free from blockages (AMM 38-31-0/001).
(4) Inspect the fillet seal at the base of the galley for signs of damage.
(5) Inspect the floor waterseal for signs of damage to materials and sealants.
(6) If you find signs of damage to seals and/or sealing, refer to the approved repairs (AMM 53-21-0/801 and AMM 53-21-11/801).
(7) If the inspection is applicable to the forward galley, open the electronic equipment compartment door for access.
(8) If the inspection is applicable to the aft galley, open the aft cargo compartment door for access, and remove the access panel on the rear bulkhead of the aft cargo compartment.

(9) Use a strong light and do a close visual examination of the area below the floor of the galley.
(10) If you find signs of moisture below the galley area, in electronic equipment compartment or the aft cargo compartment equipment bay, do the steps that follow:
  (a) Use a clean cloth or a sponge to absorb and remove all moisture from the area.
  (b) Do an examination of all the waste-water drain tubes and related clamps for signs of a leak.
  (c) Tighten all clamps and/or replace damaged drain tubes as necessary.
  (d) Examine the floor beams, intercostals and structure for signs of moisture and/or corrosion.
  (e) Do an inspection of installed equipment, in the applicable equipment compartment (AMM 5-51-12/201), for signs of contamination.
    1) If you find signs of moisture on equipment electrical cables, use a dry air supply to remove all moisture from the contaminated areas.

      NOTE: Electrical cable looms can hold moisture between the separate wires. If possible, open the wires in a contaminated cable when you dry the cable.

    2) Do a check of contaminated connectors for moisture ingress and dry as necessary.

      NOTE: If you think a connector is contaminated with moisture, you must disconnect and fully examine the connector and the related equipment connector.

  (f) If you find signs of moisture, use a clean cloth or a dry air supply to remove all moisture and fully dry the contaminated components.
(11) If you do not find signs of moisture and the water barrier is in a serviceable condition, do the close out procedure.

  NOTE: The removal of the galley and repairs to the floor water barrier are only necessary when signs of damage and leaks in the galley floor are found.

(12) If your inspection shows damage to the water barrier of the galley floor area and/or shows the moisture travel to go below the galley floor, remove the applicable galley.
  (a) Remove forward galleys (AMM 25-31-51/401).
  (b) Remove aft galleys (AMM 25-31-61/401).
(13) If necessary, remove the galley floor (AMM 53-21-0/401 and AMM 25-27-211/401).

(14) Fully clean the area and the floor panels and make sure you remove all the remaining sealant.
(15) If corrosion is found on the airframe, refer to the Structural Repair Manual (SRM).
(16) Install the galley floor (AMM 53-21-0/401).
(17) Install the water barrier in the galley (AMM 53-21-11/801).
(18) Install the galley (as applicable).
(19) If an equipment is found to have been contaminated with moisture, you must do an operational test of the equipment after all the moisture has been removed.
(20) Do the close out procedure as follows:
(21) Install the galley floor covering (AMM 25-27-211/401).
(22) If applicable, close the electronic equipment compartment door.
(23) If applicable, install the access panel on the rear bulkhead of the aft cargo compartment and close the aft cargo compartment door.

BATTERY ELECTROLYTE CONTAMINATION CONDITION - MAINTENANCE PRACTICES (CONDITIONAL INSPECTION)

1. General
   A. This procedure has these two tasks:
      (1) Lead Acid Battery Contamination
      (2) Alkaline Battery Contamination
   B. The primary source of acid contamination is in the battery compartments.
   C. Battery electrolytes can overflow during battery charging, or leak when the battery is serviced.
   D. Contamination occurs at times and the acid must be made neutral before corrosion damage can occur.
   E. Electrolyte contamination, unless you make it neutral, can quickly corrode a metallic structure.
   F. Electrolyte can cause damage to materials such as fabrics, wood, leather, and other nonmetallic materials.
      (1) Electrolyte contamination can cause discoloration on the surface it touches.
2. Lead Acid Battery Contamination
   A. Standard Tools and Equipment
      (1) Rubber or plastic gloves (commercial)
      (2) Goggles - Safety (commercial)
      (3) Face shield (commercial)
      (4) Aprons (commercial)
      (5) Boots (commercial)
      (6) Head gear (commercial)
   B. Consumable Materials
      (1) Bicarbonate of soda (commercial)
      (2) Chemical - Sodium Bicarbonate (O-S-576) (commercial)
   C. Procedure

      CAUTION: DO NOT GET BATTERY ELECTROLYTE (ACID) IN YOUR MOUTH, YOUR EYES, OR ON YOUR SKIN. DO NOT BREATHE THE FUMES FROM THE BATTERY ELECTROLYTE. PUT ON PROTECTIVE SPLASH GOGGLES AND GLOVES WHEN YOU CLEAN UP THE BATTERY ELECTROLYTE CONTAMINATION. KEEP THE FUMES FROM SPARKS, FLAMES, AND TEMPERATURES ABOVE THE FLASHPOINT. BATTERY ELECTROLYTE IS A POISONOUS AND FLAMMABLE MATERIAL WHICH CAN CAUSE INJURY TO PERSONS AND DAMAGE TO EQUIPMENT.

      (1) You must do the safety steps that follow when lead acid contamination or leakage is found.
         (a) Do not let the acid leakage move to adjacent areas which will not be cleaned.
         (b) In the battery areas, protect the equipment below the batteries with plastic sheets.

(c) Make sure the area is vented.
(d) Use protective covers to prevent contamination of adjacent areas with acids or the solution to make the acid neutral.
(e) You must always wear protective clothing when you clean up acid contamination.

(2) Do the steps that follow to clean up the battery electrolyte contamination:
(a) Soak up the excess fluids with a cloth.
(b) Neutralize the contaminated area with a 20 percent sodium bicarbonate solution.

NOTE: One pound of sodium bicarbonate mixed into one gallon of water will make the necessary solution.

(c) Apply the solution with a cloth, mop, brush, or sponge.

NOTE: Do not put the sodium bicarbonate solution into the battery.

1) Make sure the solution goes into the contaminated faying surface joints.

NOTE: A pressure application of the solution can be necessary to flush the faying surface joints and some access areas fully.

2) Apply the solution until the bubbling of the acid/solution stops.

NOTE: When the bubbling stops, the acid has become neutral.

a) Let the solution stay on the surface for 5 minutes more after the bubbles stop.

(d) Remove the solution with a mop or sponge.
1) Discard the contaminated cleanup materials into a plastic container.

EXTREME DUST CONDITION - CONDITIONAL INSPECTION

1. Extreme Dust Condition
   A. When Extreme Dust Conditions Exist Prior to Flight:
      (1) Examine for the following:
         (a) Stabilizer trim and flap screw and mechanism for cleanliness.
         (b) Static vents and pitot tube for cleanliness.
         (c) Engine inlets for dust accumulation.
         (d) PT2 probe for cleanliness.

EXCEEDING DESIGN SPEED, SEVERE TURBULENCE OR BUFFETING CONDITION - MAINTENANCE PRACTICES (CONDITIONAL INSPECTION)

1. General
   A. The structural examination in this subject is applicable after a severe turbulence or buffeting condition or stalls (beyond initial buffet or stick shaker) or exceeding design speed.
2. Exceeding Design Speed, Severe Turbulence or Buffeting Conditional Inspection
   A. Severe Turbulence
      (1) The following general information applies to a severe turbulence condition.
      (2) The following flight vertical load acceleration limits are specified in the FAA Flight Manual, Section I:
         (a) Flaps up 2.5g to -1.0g
         (b) Flaps down 2.0g to 0.0g
      (3) The judgment of the pilot shall determine the requirement for structural inspection.

      NOTE: Severe turbulence is identified as turbulence which causes large, abrupt changes in altitude and/or attitude. The airplane could be out of control for a while. It usually causes large variations in airspeed. Passengers and crew are moved violently against their seat belts and loose objects will move around the airplane.

      NOTE: If an inspection is necessary, perform the tasks entitled "Examine Airplane Structure" and "Cabin Inspection" in this procedure. If the pilot determines a structural inspection is not required, then this task does not need to be performed.

   B. Buffeting
      (1) If an unusual maneuver or abnormal or excessive buffeting or vibration is experienced in flight, a structural examination is required.
      (2) After stalls (beyond initial buffet or stick shaker) examine the following:
         (a) Accessible interior structure in fuselage, aft of rear pressure bulkhead, for distortion, cracks, flaking paint and pulled or missing fasteners. Check the following: Fuselage bulkheads and stabilizer attachment fittings at body stations 1088, and 1156, horizontal stabilizer center section hinge fittings, horizontal stabilizer front and rear spar terminal fittings, and stabilizer jackscrew mechanism mount fittings and support structure. Check jackscrew and hinges for evidence of binding.

(b) Horizontal stabilizer exterior surfaces for evidence of buckling, checking particularly at skin splices for cracking, yielding and pulled or missing fasteners.

NOTE: If any exterior damage is observed, the spars and all accessible internal primary structure in the affected area must be examined for distortion or buckling, cracks, flaking paint and pulled or missing fasteners.

(c) Elevator and tab external surfaces for cracks, pulled or missing fasteners, and hinge bearings and actuator bearings for evidence of binding.

NOTE: If any external damage is observed, the elevator spar web should be examined for distortion, flaking paint, cracks and pulled or missing fasteners.

NOTE: If any unusual handling conditions are observed, check all flight controls for force requirements and cable tensions (Ref Chapter 27, Flight Controls).

C. Exceeding Design Speed

(1) The maximum design speed of the airplane for normal flight operation is the Maximum Operating Speed as defined in Section 1, "LIMITATIONS" of the airplane Flight Manual. An aural warning horn activates at this speed condition. If the airplane exceeds the Maximum Operating Speed by 20 knots or more, a structural examination is required.

3. Examine Airplane Structure

A. General

(1) If severe buffeting or excessive flight load factors occur as a result of turbulence, excessive speeds or unusual maneuvers, the inspections must be performed.

B. Fuselage exterior surface for distortion, flaking paint, cracks and pulled or missing rivets. Particular attention should be paid to the keel beam lower chords and webs between body stations 540 and 727, the area above the wing aft of station 639, the lower body between stations 727 and 927, and the whole area between stations 927 and 1088.

NOTE: If any exterior damage is observed, examine all accessible internal primary structure in affected area for distortion or buckling, cracks, flaking paint and pulled or missing fasteners. Wrinkles in keel beam vertical web are considered normal. Permanent wrinkles often occur in the lower side fuselage skins aft of Sta. 727. Interior inspection is required if such wrinkles are found and not known to be pre-existing. If wrinkles were pre-existing, they must be closely inspected for cracks.

C. Accessible interior structure in fuselage, aft of rear pressure bulkhead, for distortion, cracks, flaking paint and pulled or missing fasteners. Check the following: Fuselage bulkheads and fin and stabilizer attachment fittings at body stations 1016, 1088, and 1156; horizontal stabilizer center section hinge fittings; horizontal stabilizer front and rear spar terminal fittings; and stabilizer jackscrew mechanism mount fittings and support structure. Check jackscrew and hinges for evidence of binding.

D. Exterior surfaces around top and bottom of wing root area, including wing to body fairing, for distortion, cracks and pulled or missing fasteners.

NOTE: If any exterior damage is observed, the body to wing joints at body stations 540 and 664 and the upper wing skin splice at BL 70.85 must be examined for distortion, flaking paint, cracks and pulled or missing fasteners.

E. Wing exterior surfaces, checking particularly at skin splices for misalignment and pulled or missing rivets, and along trailing edge upper surface for skin buckles.

NOTE: If any exterior damage is observed, all accessible internal primary structure in the affected area must be examined for distortion, buckling, cracks, flaking paint and pulled or missing fasteners.

F. Wing control surfaces for cracks, pulled or missing rivets and for evidence of binding.

G. Horizontal stabilizer exterior surface for evidence of buckling, checking particularly at skin splices for cracking, yielding and pulled or missing fasteners.

NOTE: If any exterior damage is observed, the spars and all accessible internal primary structure in the affected area must be examined for distortion or buckling, cracks, flaking paint and pulled or missing fasteners.

H. Elevator and tab external surfaces for cracks, pulled or missing fasteners, and hinge bearings and actuator bearings for evidence of binding.

NOTE: If any external damage is observed, the elevator spar web should be examined for distortion, flaking paint, cracks and pulled or missing fasteners.

I. Fin and rudder in same manner as horizontal stabilizer and elevator.

J. Flight controls for freedom of movement.

NOTE: If any unusual handling conditions are observed, check all flight controls for force requirements and cable tensions (Ref applicable sections of Chapter 27, FLIGHT CONTROLS).

K. Engine-to-wing fairing panels and lower surface of engine cowlings for buckling, cracks, pulled or missing fasteners, or any unusual external condition.

NOTE: If any such conditions are observed, proceed with further examination of nacelle and fairing, as described in 5-51-61, Dragged Engine Nacelle Condition.

L. Wing, nacelles, fuselage external surfaces, and all landing gear wheel wells, for evidence of fuel or any other fluid leakage.

M. Whenever the flight load accelerations are believed to have been exceeded, and the foregoing examinations reveal evidence of extensive damage, the aircraft must be checked for alignment (Structural Repair Manual, Chapter 51, Alignment Check Procedure).

N. Check landing gear doors for damage and excessive looseness. If gear unsafe warning lights were present at time of turbulence, buffeting or design speed exceedance, check operation of landing gear doors and landing gear uplocks (Chapter 32).

NOTE: Normal aircraft operation in flight with gear selected "off" subsequent to turbulence can be taken as proof of satisfactory uplock operation. Similarly, normal gear extension can be taken as proof of satisfactory door operation provided that the door index marks are aligned.

O. Check all inspection access panels and blowout panels for distortion, displacement, broken latches, skin cracks or delaminations, and pulled or missing fasteners.

P. Examine wing root and tip fairings for delamination, distortion, flaking paint, cracks, and pulled or missing fasteners.

EXCEEDING FLAP DOWN SPEEDS CONDITION - CONDITIONAL INSPECTION

1. General
   A. This procedure contains the following tasks:
      (1) Flaps Inspection
      (2) Slats Inspection
   B. The flaps must be examined for damage or unusual conditions if lowered at more than placard speeds.
   C. When the leading edge slats are lowered at speeds more than the flaps 1 placard for flap detents 1, 2, and 5, or more than the alternate flap extend speed placard for flap detents 10 and above, the slat components must be examined for damage and conditions defined in this procedure.
   D. The conditional inspection should be accomplished as follows:
      (1) If overspeed was less than 15 knots, do this inspection within 100 flight hours of overspeed indication.
      (2) If overspeed was more than 15 knots, do this inspection before next flight.
2. Flaps Inspection
   A. Flap Area
      (1) Examine for the following:
         (a) All wing flaps external skin for distortion and pulled or missing fasteners.
         (b) Flap tracks for cracks or distortion, track attachment points for cracks, distortion, and hole elongation.
         (c) Flap track support fittings, and wing in-spar surfaces in close proximity to flap support fittings for cracks, distortion, hole elongation, and pulled or missing fasteners.
         (d) Flap carriages for cracks; bearings and mounting bolts for binding, cracks, distortion, and hole elongation.
3. Slats Inspection
   A. Leading Edge Slat Area
      (1) Examine for the following:

      WARNING: DO THE DEACTIVATION PROCEDURE FOR THE SLAT ACTUATION SYSTEM. INJURY TO A PERSON OR DAMAGE TO EQUIPMENT CAN OCCUR IF THE SLATS MOVE. THE SLAT ACTUATION SYSTEM MUST NOT BE OPERATED DURING THIS INSPECTION. FAILURE TO OBEY CAN CAUSE INJURY TO PERSONS.

(a) Deactivate the leading edge slat system (AMM 27-81-0/201).
(b) Examine the leading edge slat components and support structure.
    1) Examine the external skin of all slats for distortion. Also look for fasteners that have pulled out or are not there.
    2) Examine all slat main tracks, auxiliary arms, rack and pinion drive and the related attachment structure. Look for cracks, distortion, or hole elongation.
    3) Examine all slat track support rollers. Also examine their attachment bolts and wing inspar surfaces that are near the slat support roller fixed ribs. Look for cracks, distortion, hole elongation, and for fasteners that have pulled out or are not there.

HARD LANDING OR HIGH DRAG/SIDE LOAD LANDING CONDITION, OR OFF RUNWAY EXCURSION - MAINTENANCE PRACTICES (CONDITIONAL INSPECTION)

1. General
   A. The Inspection
      (1) The inspection is divided into two phases (Phase I and Phase II).
      (2) If the inspection during Phase I does not show that damage has occurred, no more inspections are necessary.
      (3) If the Phase I inspection shows that damage has occurred, the Phase II Inspection is necessary.
      (4) If you find damage in the Phase II inspection, inform Boeing about the total damage found. Additional inspections may be required.
   B. Hard Landing
      (1) The hard landing conditional inspection is for hard landings at or below the maximum design landing weight limits.
      (2) The pilot must make a decision if a structural inspection is necessary and enter in aircraft logbook.

          NOTE: An indication of a hard landing on the main landing gear is a peak recorded vertical acceleration that exceeds 2.1G (incremental 1.1G). This vertical accelerometer data must be measured by the flight data recorder accelerometer at a data sampling rate of at least eight samples per second. The acceleration threshold for a hard landing inspection may be significantly lower than 2.1G if there is more than two degrees of roll at the time of main gear touchdown, or in the event the nose gear contacts the runway before the main gear.

          (a) If the landing is also overweight, the Overweight Landing inspection, not the Hard Landing Inspection, must be done.
   C. High Drag/Side Load Landing/Off Runway Excursion
      (1) The Phase I inspection is applicable when a hard landing or high drag/side load landing occurs.
      (2) A hard landing or high drag/side load landing conditional inspection should be initiated whenever one or more of the following occurs:
          (a) The airplane skids or overruns from the prepared surface onto an unprepared surface.
          (b) The airplane lands short of the prepared surface.
          (c) The airplane makes a landing that involves the blowing of two or more tires.
          (d) The airplane skids on the runway to make you think that damage of the airplane is suspected.
   D. When the conditional inspection tells you to examine a component or area, look for the following conditions (replace or repair components, if necessary):
      (1) Cracks

(2) Creases or cracks in the skin or web
(3) Skin wrinkling that crosses a line of fasteners
(4) Pulled apart structure
(5) Loose paint (paint flakes)
(6) Twisted parts (distortion)
(7) Bent components
(8) Fastener holes that have become larger or longer
(9) Loose fasteners
(10) Fasteners pulled out or missing
(11) Delaminations
(12) Misalignment
(13) Interference
(14) Other signs of damage

E. Examinations are visual with minimum disassembly (without component removal) unless stated otherwise.

2. Phase I Inspection

A. Main Landing Gear Areas

(1) After an off-runway excursion, do the following steps:
(a) Do a through washing of the gear with wheels and brakes removed.
(b) All wheel/tire assemblies should be replaced when evidence of possible contamination from water, dirt, or mud in the wheel bearings exists.
(c) All gear wheel speed transducers should be removed and inspected.
(d) The gear must be cleaned of debris, especially under the axle sleeves and in bearings, then thoroughly lubricate before returning to service.
(e) Ensure brakes operate (AMM 32-41-41/601).

(2) Examine the main landing gear areas as follows:
(a) Examine the main landing gear wheels and tires for damage or cracks.
1) If any of the main landing gear wheels are removed because of a blown tire, do the steps that follow (AMM 05-51-251):
a) Examine the wheel structure for cracks
b) Examine the brake assembly for damage
c) Examine the wheel bearings for smooth operation (no roughness)
d) Examine airplane structure including control surfaces for damage from tire/wheel fragments
(b) Check for wheel misalignment.

(c) Examine the main landing gear shock-strut at the top and bottom ends for signs of hydraulic fluid leakage.

NOTE: A small quantity of hydraulic fluid on the inner cylinder is satisfactory.

(d) Examine the main landing gear doors and linkage for distortion, cracks, or other types of damage.

(e) Examine the main gear trunnion, trunnion link, and shock strut top end for cracks, distortion, or other signs of damage.

(f) Examine the main gear drag brace, side brace, attach fittings, and joints for distortion or cracks.
   1) Inspect the downlock link assembly and downlock, the uplock support structure and body frame structure at the intersection of the inboard end of the reaction link, and the upper end of the sidebrace assembly.

(g) Examine the inside diameter of the drag brace fuse pins (Fig. 202) and outboard end of the main landing gear beam for distortion (Fig. 201). Disassembly of structure is limited to gain access to inner diameter of pins for this inspection. Inspection of the outboard end of the main landing gear beam will be limited to external visual, unless Phase II inspections are required.

(h) Examine the landing gear beam-to-rear-spar:
   1) Attachment fittings (Fig. 203)
   2) Upper and lower wing skin panels around the spar attachment fittings, for the main gear support beam and forward trunnion.

(i) Examine the landing gear forward trunnion-to-rear-spar attach structure

(j) Examine the landing gear aft trunnion-to-landing-gear-beam attachment. Do not remove grease seals that are present (Fig. 205).

(k) Examine the main landing gear beam to rear spar-stabilizing link for damage of the link, or crank shafting of the forward and aft attach bolts (Fig. 203). Damage at this location indicates the trunnion link should be removed for inspection of the forward trunnion fuse bolt (Fig. 204).
   1) Forward and aft attach bolt inspections - loosen nuts and turn or tap the bolts inboard or outboard to ensure bolts are free to move, and are not deformed or crank shafted.

(l) Examine the main landing gear beam-to-body attachment (side-of-body support link).
1) Examine body bulkheads common to the support link, including the fuselage skin adjacent to the body bulkheads that support the inboard end of the main landing gear beam and side brace.
a) Visually inspect for fitting distortion or damage (Fig. 203).
(m) Examine main gear torsion links including the upper and lower joints for damage or distortion. Ensure the apex joint is secure and tight and there is no shimmy damper leakage or damage to the shimmy damper shaft.

B. Nose Landing Gear Areas
(1) After an off-runway excursion, do the following steps:
(a) Do a through washing of gear with wheels removed.
(b) The gear must be cleaned of debris, especially under axle sleeves and in bearings, and thoroughly lubricated before returning to service.
(c) All wheel/tire assemblies should be replaced when evidence of possible contamination from water, dirt, or mud in the wheel bearings exists.
(2) Examine the nose landing gear areas as follows:
(a) Examine the nose wheel well for buckled skin, paint that has flaked, and for cracks.
1) Look for fasteners that have pulled out, or are not in the web of the nose wheel well.
2) Look carefully in the area near the outer cylinder trunnion attach points, and the drag-strut support fittings.
3) Do an exterior examination of the fuselage skin and frame just aft of wheel well at body station 294.5.
(b) Examine the nose landing gear outer-cylinder at the trunnion-fitting area and the drag brace and linkage.
1) Look for cracks, paint that has flaked, and bent parts.
2) Look for fasteners that have pulled out, or are missing.
(c) Examine the landing gear wheels and tires for damage or cracks.
1) If any landing gear wheels are removed because of a blown tire, do the following steps (AMM 05-51-54):
a) Examine the nose wheel structure for cracks.
b) Examine the nose wheel bearings for smooth operation (no roughness).
(d) Check for wheel misalignment.

(e) Examine the nose landing gear shock strut at the top and bottom ends for signs of hydraulic fluid leakage.

NOTE: A small quantity of hydraulic fluid on the inner cylinder is satisfactory.

(f) Examine the nose landing gear outer cylinder for distortion, cracks, paint that has flaked, or other types of damage.

(g) Examine bolted connections, specifically trunnions (attaching upper end of outer cylinder and upper end of upper drag brace), and both upper and lower drag brace segments, attach lugs, and pins.

(h) Examine lock links, torsion links, and torsion link joints including the apex joint. Ensure all joints including nuts, retaining pins, and cotter pins are secure.

C. Fuselage

(1) Examine the upper and lower fuselage skin panels forward and aft of the wing for buckles, wrinkles, or damage.

NOTE: Permanent wrinkles frequently occur on the lower side of the fuselage skins aft of STA 727.

(2) If you found wrinkles on the skin panels and you did not know they were there before, make an internal inspection.

NOTE: If the wrinkles were there before, make a careful inspection of the wrinkles for cracks.

(3) Examine the keel beam chords, stiffeners, webs and splices at station 663 thru 727A for distortion, buckled, or damaged panels and loose fasteners.

(a) Make sure the fasteners are installed in the correct positions.

D. Wing

(1) Examine the strut-to-wing fairing panels on the upper and lower nacelle for buckling, cracks, and loose fasteners.

(2) Make sure the fasteners are installed in the correct positions.

(3) Examine the wing leading edge fairing for displacement, fastener hole elongation, or tear-out, skin cracks, and loose fasteners.

(a) Make sure the fasteners are installed in the correct positions.

3. Phase II Examination

A. Examine the Airplane Structure

(1) Lift the airplane on jacks at the wing and fuselage jack points (AMM 07-11-11).

(2) Retract and then extend the main and nose landing gear with the normal system (AMM 32-32-00 and AMM 32-33-00) to make sure there is no interference, misalignment, or distortion.

(3) Retract and then extend the main and nose landing gear with the alternate manual system (AMM 32-34-00 and AMM 32-35-00) to make sure there is no interference, misalignment, or distortion.

B. Main Landing Gear Areas

(1) Examine the main landing gear areas as follows:

(a) Examine the outer and inner cylinder lugs for distortion, cracks and other types of damage.

(b) Examine the side brace, drag brace, trunnion link, forward and aft trunnion attachments, and torsion links for cracked paint, distortion, or other damage.

(c) Examine the gear side brace downlock linkage for cracks or other types of damage.

(d) Look at the hydraulic fluid levels in the shock struts.

1) Do a two-point servicing check or service the shock struts (AMM 12-15-31).

2) If a high drag or side load landing, and a hard landing occur at the same time, remove the main gear inner cylinders. Do this also if the shock strut servicing was not correct.

a) Then dimensionally check the barrel of the inner cylinder and axles for distortion or bending, and examine for cracking.

b) Inspect the interior components of the shock strut for damage.

(e) Examine bolts and pin connections in the main gear (not inspected in Phase I for distortion.

1) Remove trunnion link per AMM 32-11-11/401, and NDT inspect the forward trunnion fuse bolt (Fig. 204, Detail A).

(f) Remove grease reservoir and inspect the aft trunnion fuse nut to make sure that nut is secure and not cracked or distorted (Fig. 205).

NOTE: This inspection should be done only after the trunnion link has been reinstalled.

(g) Remove the retention pin for the main landing gear outboard fuse pin, and rotate the pin to ensure no crank shafting or deformation of the pin (Fig. 201).

C. Nose Landing Gear Areas

(1) Examine the nose landing gear areas as follows:

(a) Look at the hydraulic fluid levels in the shock struts.

1) Do a two-point servicing check or service the shock struts (AMM 12-15-31).

2) If a high drag or side load landing, and a hard landing occur at the same time, or if the nose gear hits hard, remove the nose gear inner cylinders. Do this also if the shock strut servicing was not correct.
   a) Then dimensionally check the barrel of the inner cylinder and axles for distortion or bending, and examine for cracking.
   b) Inspect the interior components of the shock strut for damage.

(b) Make sure the nose wheel steering system operates correctly and the steering mechanism is rigged correctly (AMM 32-51-00/201).

(c) If any landing gear wheels are removed because of a blown tire, do the steps that follow (AMM 05-51-251):
   1) Examine the nose wheel structure for cracks.
   2) Examine the nose wheel bearings for smooth operation (no roughness)

D. Fuselage

(1) Examine the lower fuselage structure for skin buckling, flaking paint, cracks, and loose fasteners.

NOTE: Examine the area below the body crease and from station 727 to 100 inches aft.

(a) Make sure the fasteners are installed in the correct positions.

(2) Examine the wing to fuselage joints at stations 540 and 664 for distortion, flaking paint, cracks, and loose fasteners.
(a) Make sure the fasteners are installed in the correct positions.

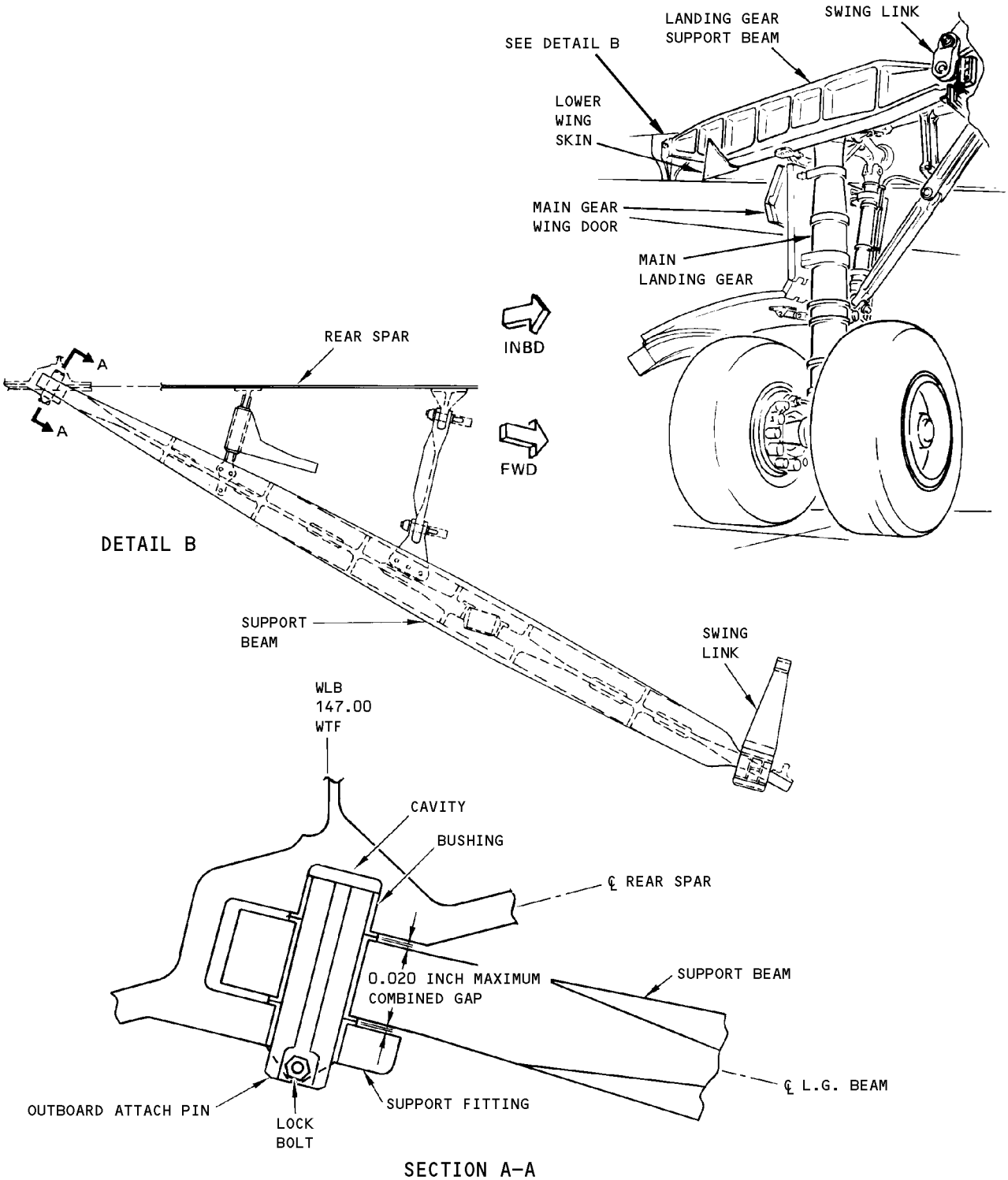
(3) Examine the upper fuselage structure between S-6 LH and S-6 RH at station 540, 664, and 727 for buckling, distortion, flaking paint, cracks, and loose fasteners.
(a) Make sure the fasteners are installed in the correct positions.

(4) Examine the bulkheads at body stations 294.5 and 360 and the fuselage structure immediately outboard of the nose wheel well for buckling, flaking paint, cracks, and loose fasteners.

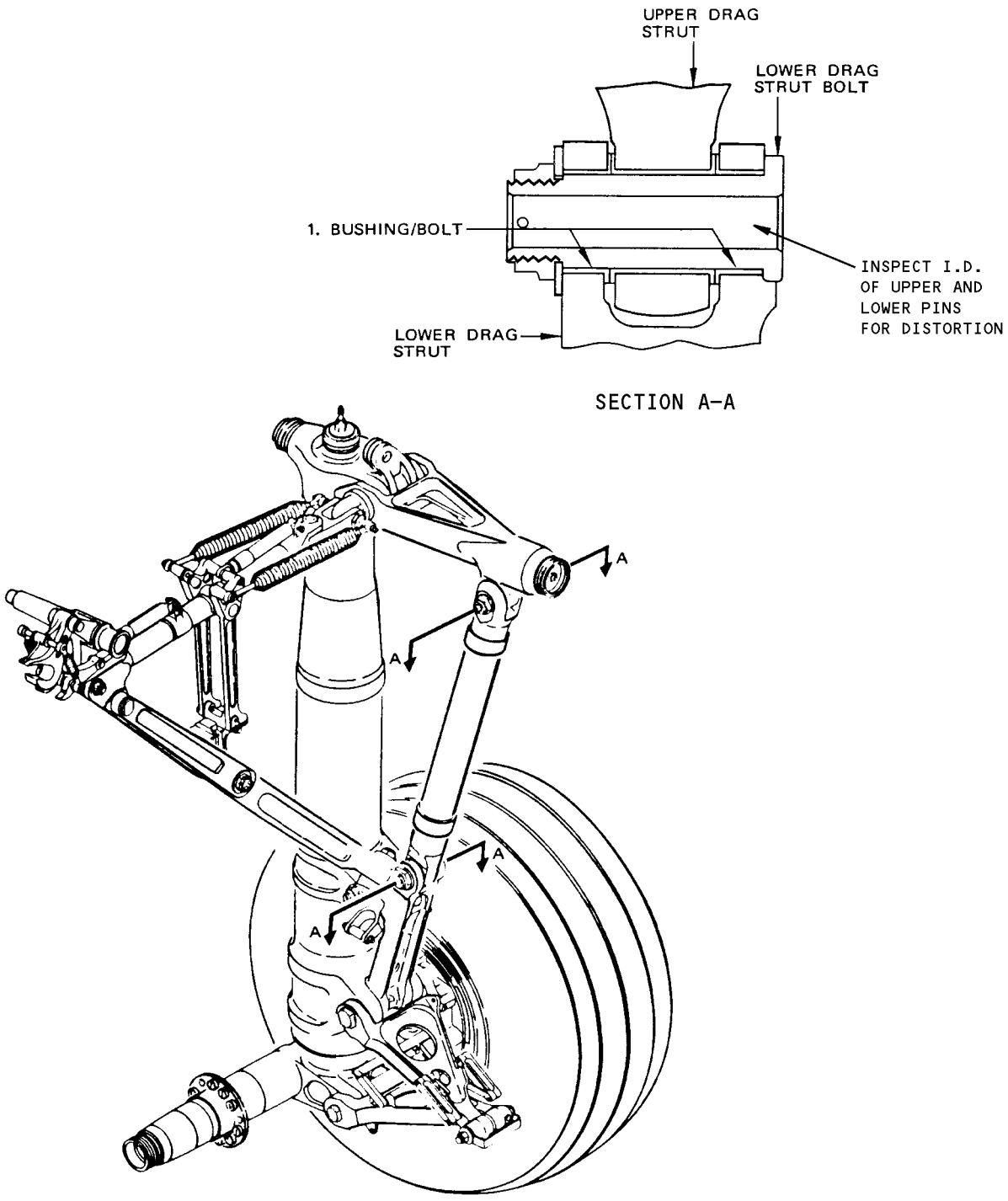
NOTE: You can examine the forward side if you use the access holes in the sidewalls of the nose wheel well. You can examine the aft side of the bulkhead at station 294.5 from the electronics compartment.

(a) Make sure the fasteners are installed in the correct positions.

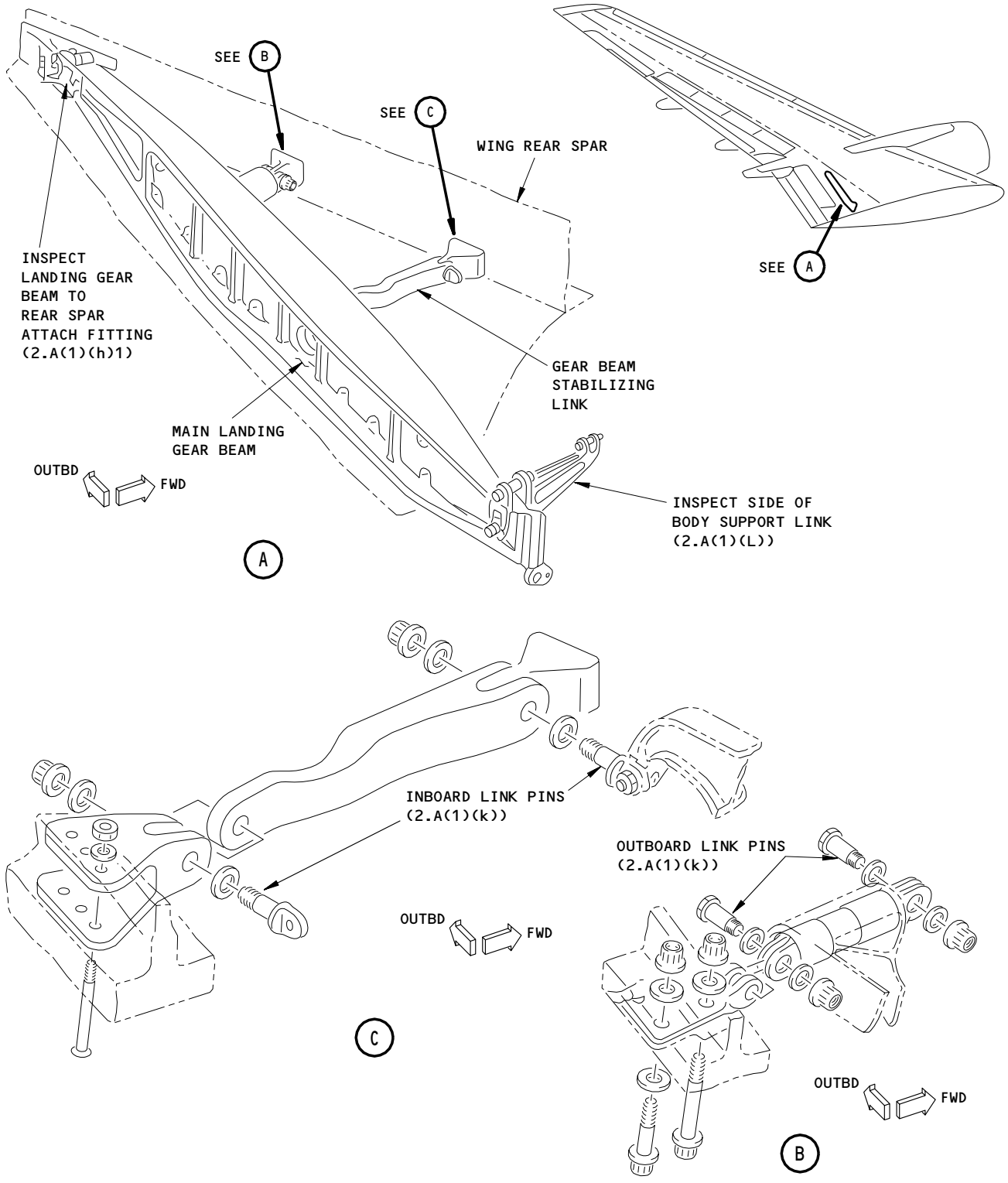
(5) Examine the wheel well of the nose landing gear for buckling, flaking paint, cracks, and loose paint.
(a) Make sure the fasteners are installed in the correct positions.



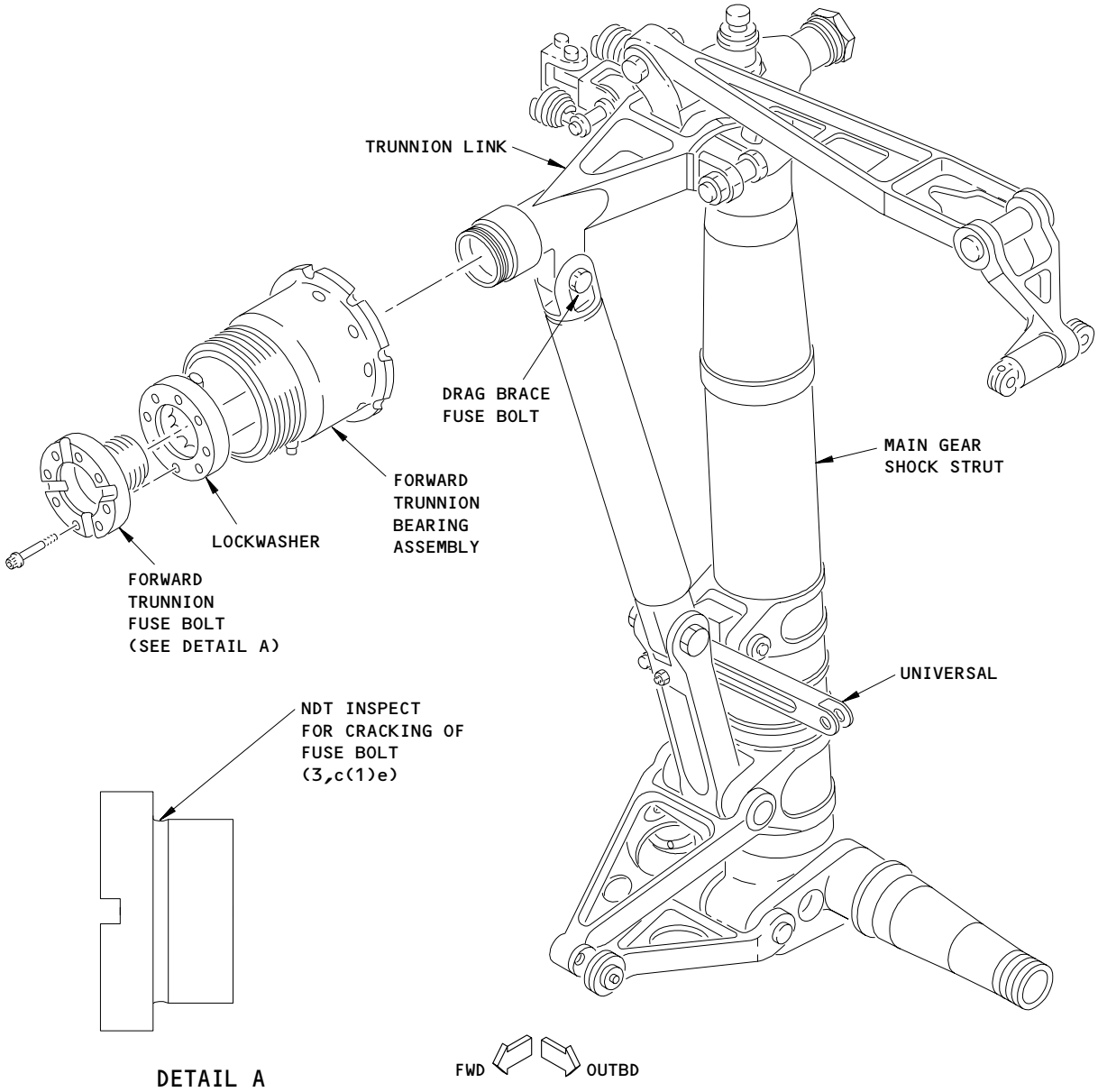
Landing Gear Support Beam Attachments
Figure 201



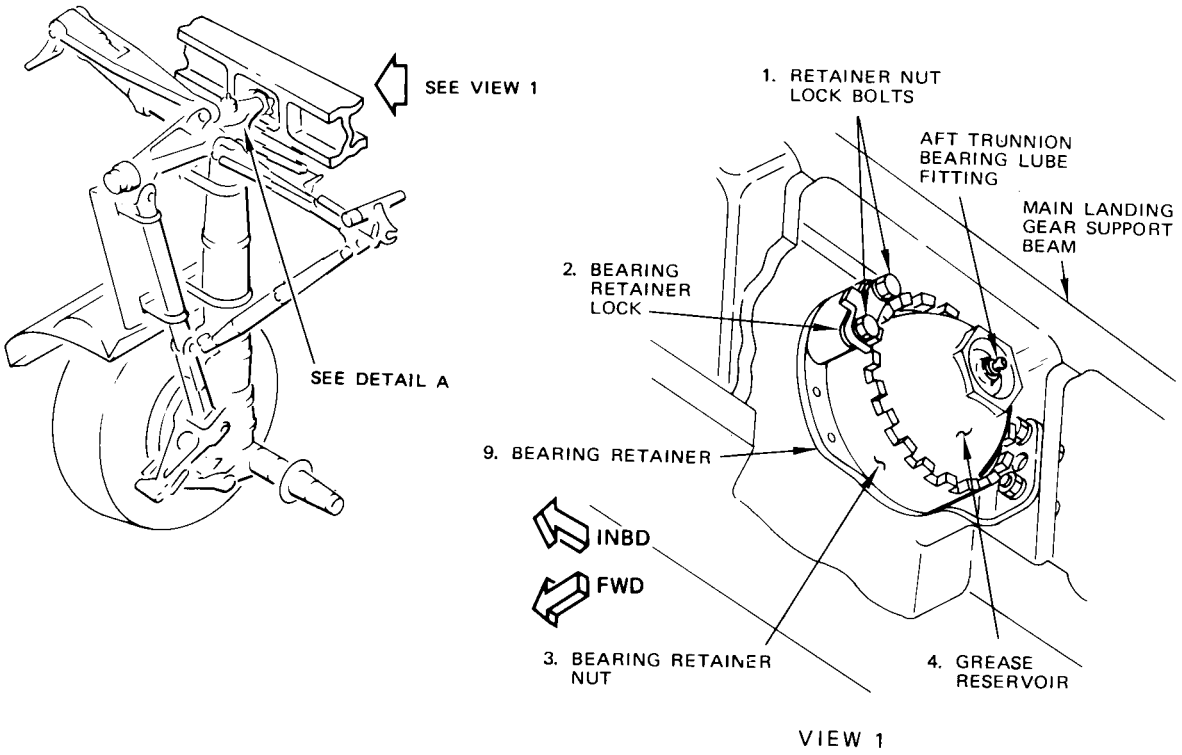
Main Gear Lower Drag Strut Wear Limits
Figure 202



Main Landing Gear Beam Link Attachments to Wing Rear Spar
Figure 203



Forward Trunnion Fuse Bolt
Figure 204



Aft Trunnion to Landing Gear Beam Attachment
Figure 205

(6) Make sure there are no loose fasteners in the web of the nose wheel well near the trunnion support fittings.
(a) Make sure the fasteners are installed in the correct positions.
(7) Examine the keel beam chords, stiffeners, webs, and splices at station 540 thru 727A for distortion, buckled or damaged panels and loose fasteners.
(a) Make sure the fasteners are installed in the correct positions.
(8) Examine the trunnion support fitting at body station 706 for the main landing gear for cracks and bolt distortion.
(a) Make sure the fasteners are installed in the correct positions.
(9) If you find wrinkles frequently occur on the lower side of the fuselage skin aft of STA 727. If the wrinkles were there before, you must make a careful inspection for cracks.

E. Wings
(1) Examine the wings, nacelles, and upper and lower nacelle strut-to-wing fairing for fuel or other fluid leaks.
(2) Examine the wing ribs along the aft side of the rear spar, WBL 92.5 and 114.0 for cracks.
(3) Examine the upper and lower trailing edge panels and the airplane structure for damage.

NOTE: Make sure you examine the area near the main landing gear beam carefully.

(4) Examine the inboard and outboard trailing edge flaps, flap tracks, drive screws, linkages and fairings for sheared rivets and structure damage.
(5) Examine the flap track bolts on the outboard trailing edge flap for crankshafting when the flaps touch the ground.
(6) Examine the flap track bolts on the inboard trailing edge flap for crankshafting when the flaps touch the ground.
(7) Do the task to make and inspection of the engine after a hard landing (AMM 71-00-00/601).
(8) Do an inspection of the forward and aft engine mounts on the engine (AMM 71-20-00).
(9) Do an inspection of the aft flange on the turbine frame.
(10) Do the task to inspect the engine nacelle when it touched the ground (AMM 05-51-62).
(11) Examine the flight controls to make sure the movement of travel is free and the cable tension is satisfactory.
(12) Do a check of the rigging for the steering mechanism of the nose landing gear (AMM 32-51-00).

ENGINE SEIZURE/ENGINE SURGE/UNCONTAINED FAILURES - MAINTENANCE PRACTICES (CONDITIONAL INSPECTION)

1. General
   A. Engine Malfunction Conditions
      (1) When an engine malfunctions, a structural inspection is necessary if:
         (a) Unusually high engine loads (high torque) occurred.
         (b) The engine must be removed for repairs.
      (2) Malfunctions which require structural inspections are:
         (a) Engine blade fractures that caused high vibrations or compressor surges.
         (b) Rotors, disks, airseals that turn, spacers, or shafts that fractured.
         (c) A malfunction that will not allow the fan or compressor to turn easily.
   B. Inspection
      (1) The inspection is divided into two phases (Phase 1 and Phase 2).
      (2) Do the Phase 1 inspection before the next flight.
      (3) Do the Phase 2 inspection if:
         (a) Unusually high engine loads (high torque) were possible, and;
         (b) The engine must be removed for repairs.

            NOTE: If you do not find damage during the Phase 1 inspection, the Phase 2 inspection is not necessary.

   C. Repairs and Replacements
      (1) When this procedure tells you to "examine" a part, remove (if necessary) and look for these conditions:
         (a) Structure that pulled apart
         (b) Loose paint (paint flakes)
         (c) Twisted parts (distortion)
         (d) Bent parts
         (e) Fastener holes that became larger or longer
         (f) Loose fasteners
         (g) Missing fasteners (fasteners that have pulled out or are gone)
         (h) Delaminations (a lamination with one or more layers pulled apart)
         (i) Parts that are not aligned correctly
         (j) Interference (clearance that is not sufficient between two parts)
         (k) Other signs of damage
      (2) Replace or repair the components that have one or more of the conditions given above.
      (3) If fasteners are removed, replace with new fasteners.

2. Phase 1 Inspection
   A. Engine Inspection
      (1) Engine Compressor Section
         (a) Examine the:
            1) Inlet case
            2) Inlet guide vanes
            3) Front bearing support
            4) Compressor blades that you can see

               NOTE: If you find damage, refer to Chapter 72, Engine, for approved limits and maintenance procedures.

      (2) Engine Exhaust Section
         (a) Examine the:
            1) Exhaust cone
            2) Exhaust nozzle
            3) Exhaust struts
            4) Turbine blades in the fourth stage
         (b) Look for burn marks:
            1) In the turbine exhaust area
            2) On the rear fan case (from blades that rubbed on the case)
         (c) Look in the exhaust area for:
            1) Small pieces of metal
            2) Quantities of oil

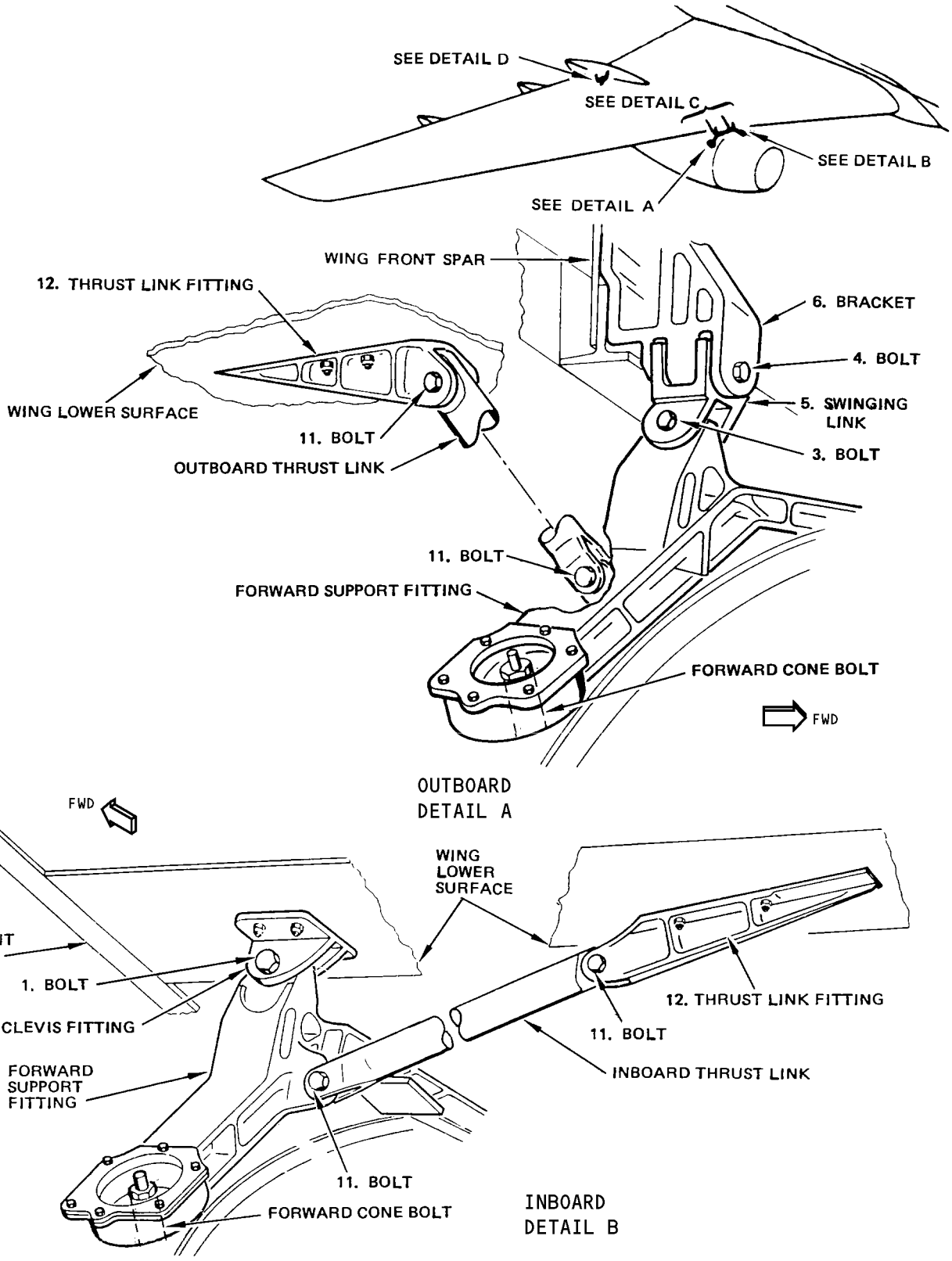
               NOTE: If you do not find damage during the Phase 1 inspection, the Phase 2 inspection is not necessary.

3. Phase 2 Inspection
   A. Engine
      (1) Remove the engine (Ref 71-00-00/401)
   B. Inspection of the inboard side of the Engine Forward Mount (Fig. 201)
      (1) Remove and examine the bolt (1) that attaches the support fitting of the engine forward mount to the clevis fitting (installed on the wing lower surface).
      (2) Examine the clevis fitting (2).

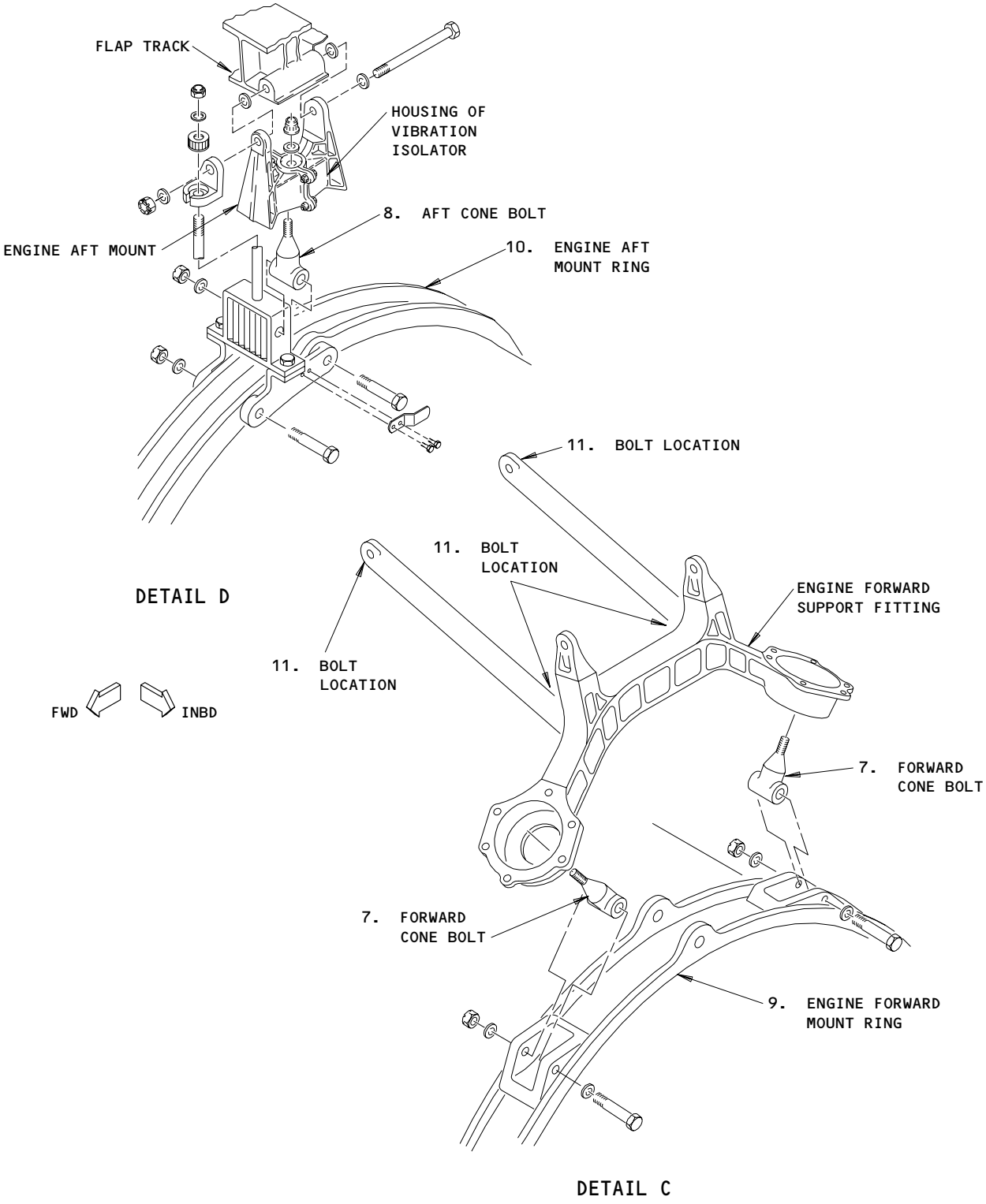
         NOTE: If no damage is found, no further inspections are necessary.

   C. Inspection of the Outboard Side of the Engine Forward Mount (Fig. 201)
      (1) Remove and examine the bolt (3) that attaches the support fitting of the engine forward mount to the swinging link.
      (2) Remove and examine the bolt (4) that attaches the swinging link to the bracket installed on the wing front spar.
      (3) Examine the swinging link (5).
      (4) Examine the bracket (6) installed on the wing front spar.

D. Other Inspection Items (Fig. 201)
   (1) Remove and examine the two forward (7) and one aft (8) cone bolts.
   (2) Examine the two engine mount rings [forward (9) and aft (10)] adjacent to the cone bolts.
   (3) Remove and examine the four thrust link bolts (11).
   (4) Examine the thrust link fittings (12) that connect the thrust links to the wing lower surface.



Engine Mount and Cone Bolt Installation
Figure 201 (Sheet 1)



Engine Mount and Cone Bolt Installation
Figure 201 (Sheet 2)

ENGINE NACELLE AND THRUST REVERSER DAMAGE - MAINTENANCE PRACTICES (CONDITIONAL INSPECTION)

1. General
   A. Engine Nacelle and Thrust Reverser Damage If damage to the engine nacelle or thrust reverser occurs, a structural inspection is necessary. The conditions for these inspections are:
      (1) an engine nacelle or thrust reverser that hit the ground (dragged nacelle).
      (2) an engine nacelle or thrust reverser that was hit by an object sufficiently heavy (for example: ground support equipment) to cause structural damage.
      (3) an engine that broke away (engine separation/breakaway).
      (4) wrinkles on the nacelle.
   B. Inspection
      (1) The inspection is divided into two phases (Phase 1 and Phase 2).
      (2) Do the Phase 1 inspection before the next flight.
      (3) Do the Phase 2 inspection if you find damage during the Phase 1 inspection or the engine broke away.

          NOTE: The Phase 2 inspection is not necessary if: No damage is found in the Phase 1 inspection. The engine did not break away.

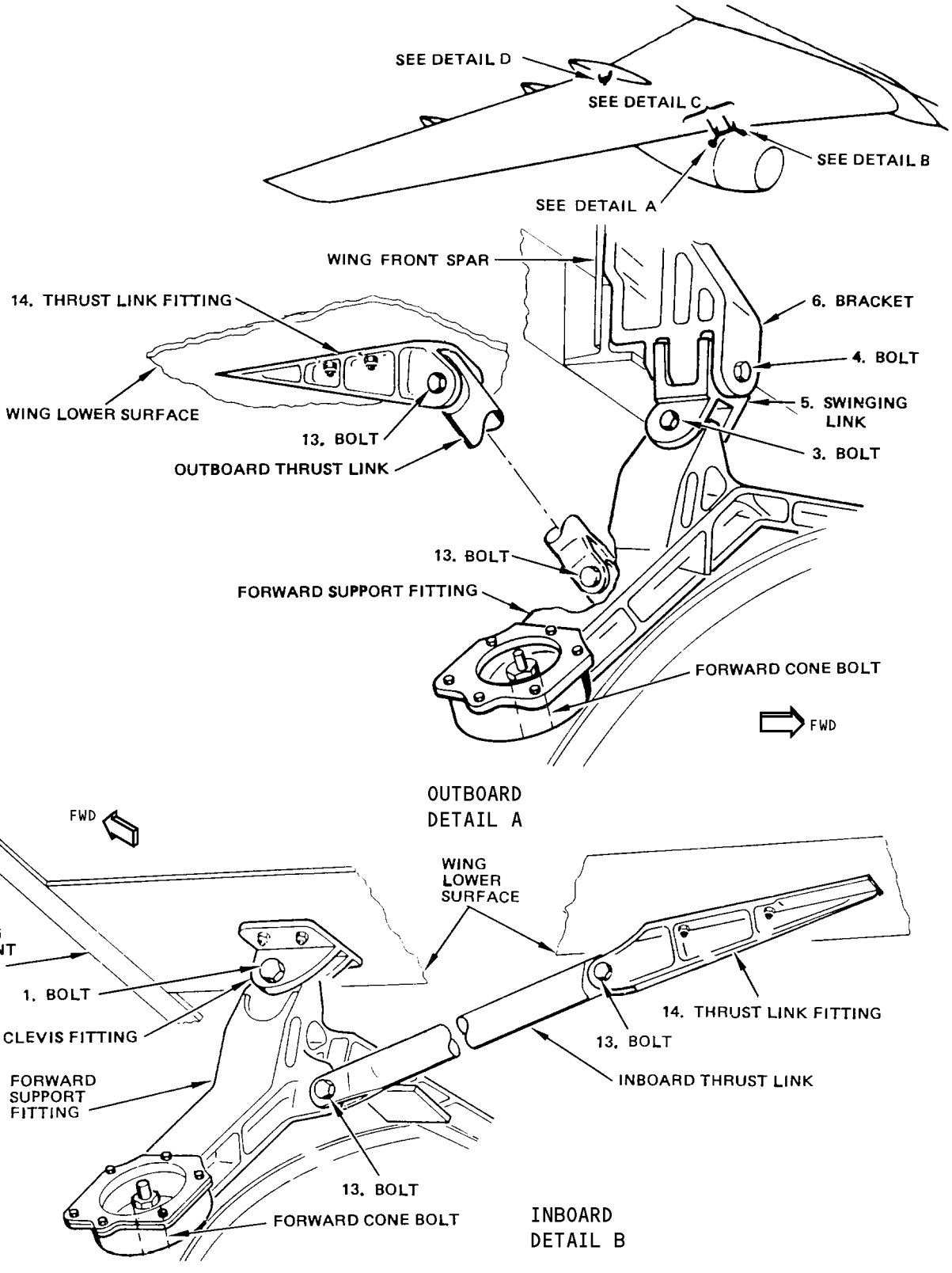
   C. Repairs and Replacements
      (1) When this procedure tells you to "examine" a part, remove (if necessary) and look for these conditions:
          (a) structure that pulled apart
          (b) loose paint (paint flakes)
          (c) twisted parts (distortion)
          (d) bent parts
          (e) fastener holes that became larger or longer
          (f) loose fasteners
          (g) missing fasteners (fasteners that have pulled out or are gone)
          (h) delaminations (a lamination with one or more layers pulled apart)
          (i) parts that are not aligned correctly
          (j) interference (clearance that is not sufficient between two parts)
          (k) other signs of damage
      (2) Replace or repair the components that have one or more of the conditions given above.
      (3) If fasteners are removed, replace with new fasteners.
2. Phase 1 Inspection
   A. Engine and Nacelle Inspection
      (1) Examine the fairings.

(2) Examine the nacelle cowlings.
(3) If internal engine damage is possible, refer to Chapter 72, for Engine approved limits and maintenance procedures.

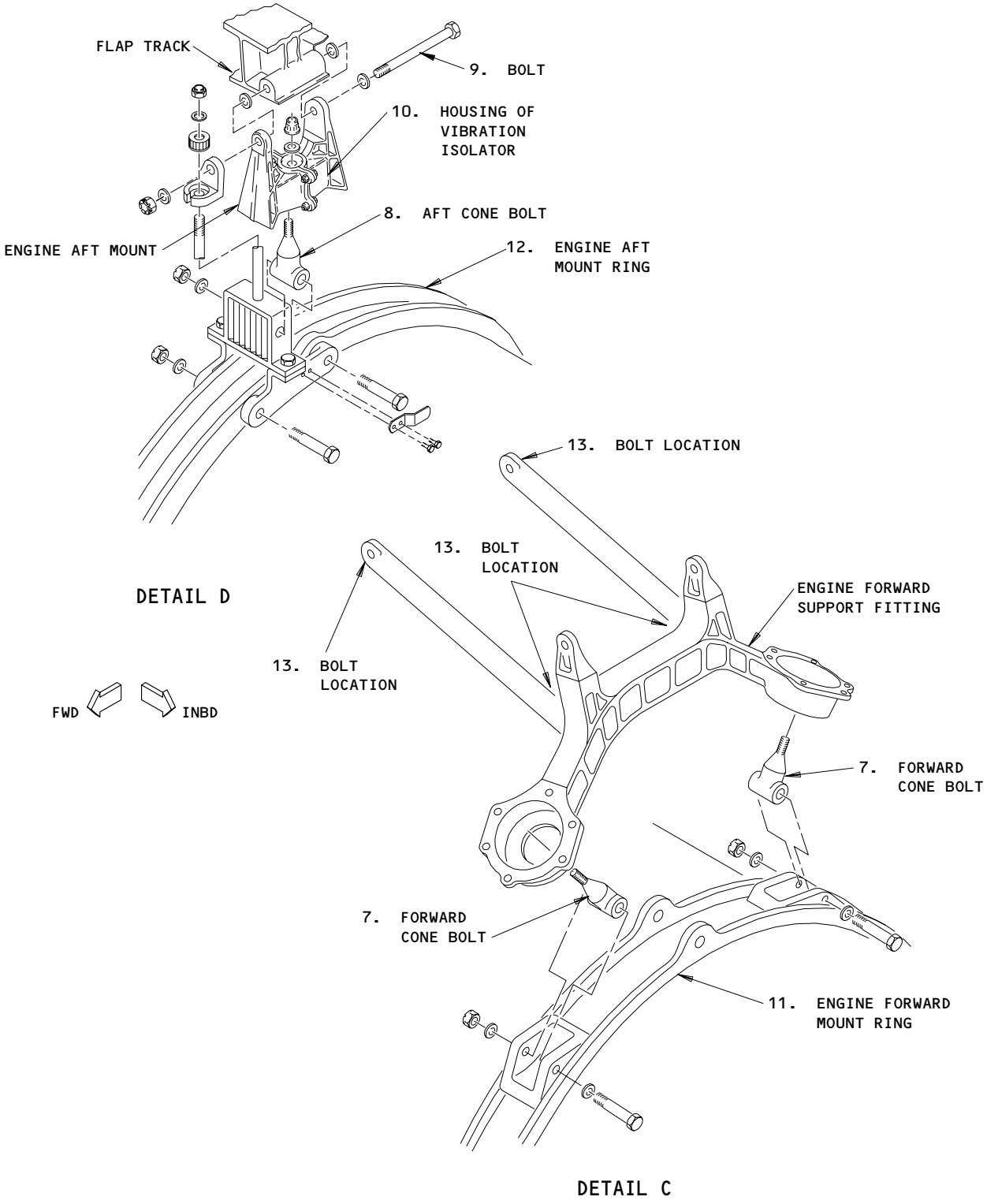
B. Thrust Reverser Inspection
(1) Remove the fairings for the thrust reverser actuators.
(2) Examine the fairings and deflector doors.
(3) Examine all parts that connect to the deflector doors.
(4) Examine the tailpipe and the attachments on the tailpipe extension.

NOTE: The Phase 2 inspection is not necessary if:
- No damage is found in the above Phase 1 inspection.
- The engine did not break away.

3. Phase 2 Inspection
A. Engine
(1) Remove the engine (Ref 71-00-00/401).
B. Engine Mount Inspection (Fig. 201)
(1) Remove and examine the bolt (1) that attaches the support fitting of the engine forward mount to the clevis fitting (installed on the wing lower surface of the inboard side of the engine).
(2) Examine the clevis fitting (2).
(3) Remove and examine the bolt (3) that attaches the support fitting of the engine forward mount to the swinging link (outboard side of the engine).
(4) Remove and examine the bolt (4) that attaches the swinging link to the bracket installed on the wing front spar.
(5) Examine the swinging link (5).
(6) Examine the bracket (6) installed on the wing front spar.
(7) Remove and examine the two forward (7) and one aft (8) cone bolts.
(8) Remove and examine the bolt (9) that attaches the engine aft mount to the flap track.
(9) Examine the housing of the vibration isolator (10) for the aft cone bolt.
(10) Examine the two engine mount rings (forward (11) and aft (12)) adjacent to the cone bolts.
(11) Remove and examine the four thrust link bolts (13).
C. Wing Inspection
(1) Examine the front spar and wing surface near the forward engine mount connections.
(2) Examine the thrust link fittings (14) that connect the two thrust links to the wing lower surface.
(3) Examine the wing surface near the thrust link connections.
(4) Look for signs of fuel leaks adjacent to all connections to the wing.



Engine Mount and Cone Bolt Installation
Figure 201 (Sheet 1)

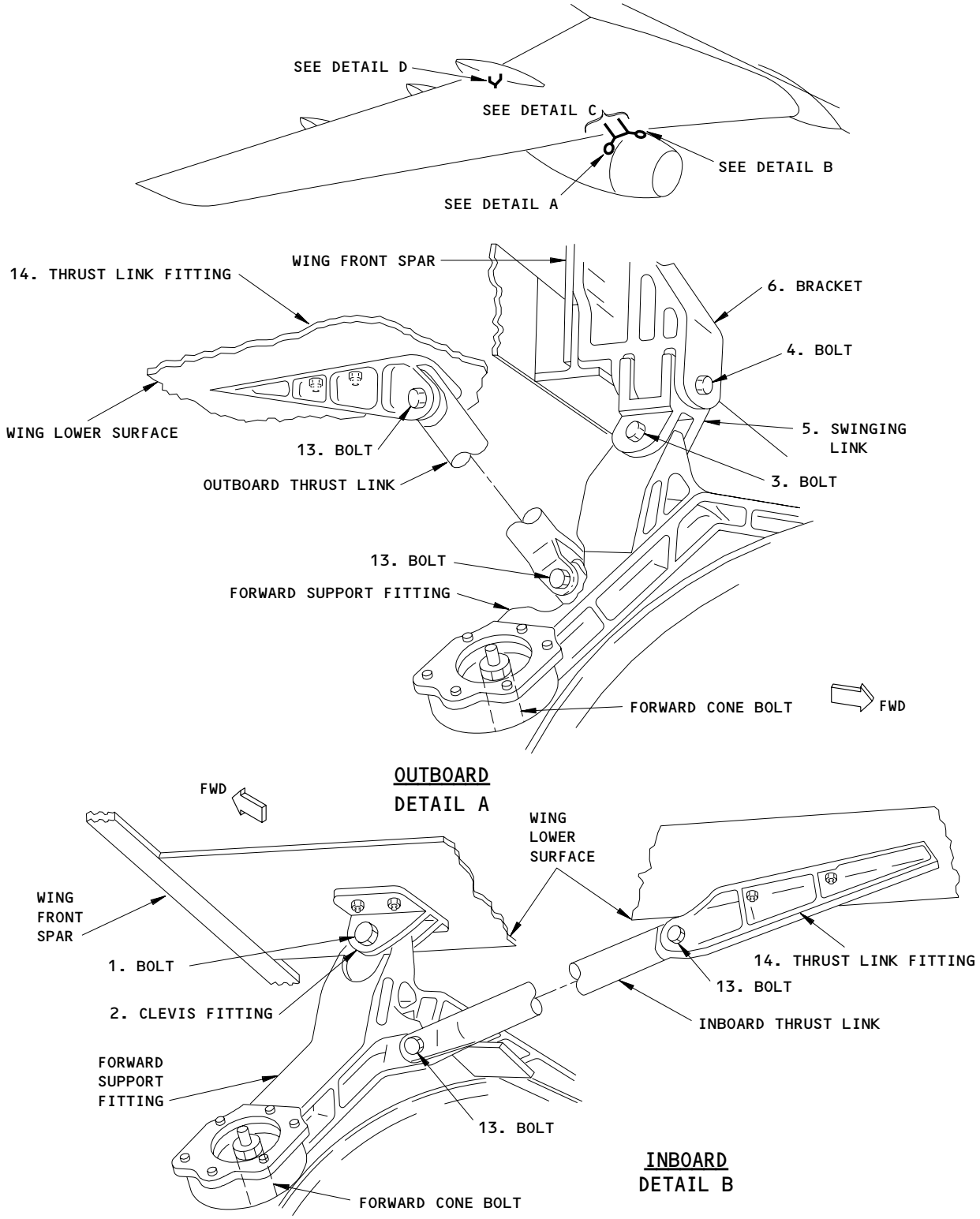


Engine Mount and Cone Bolt Installation
Figure 201 (Sheet 2)

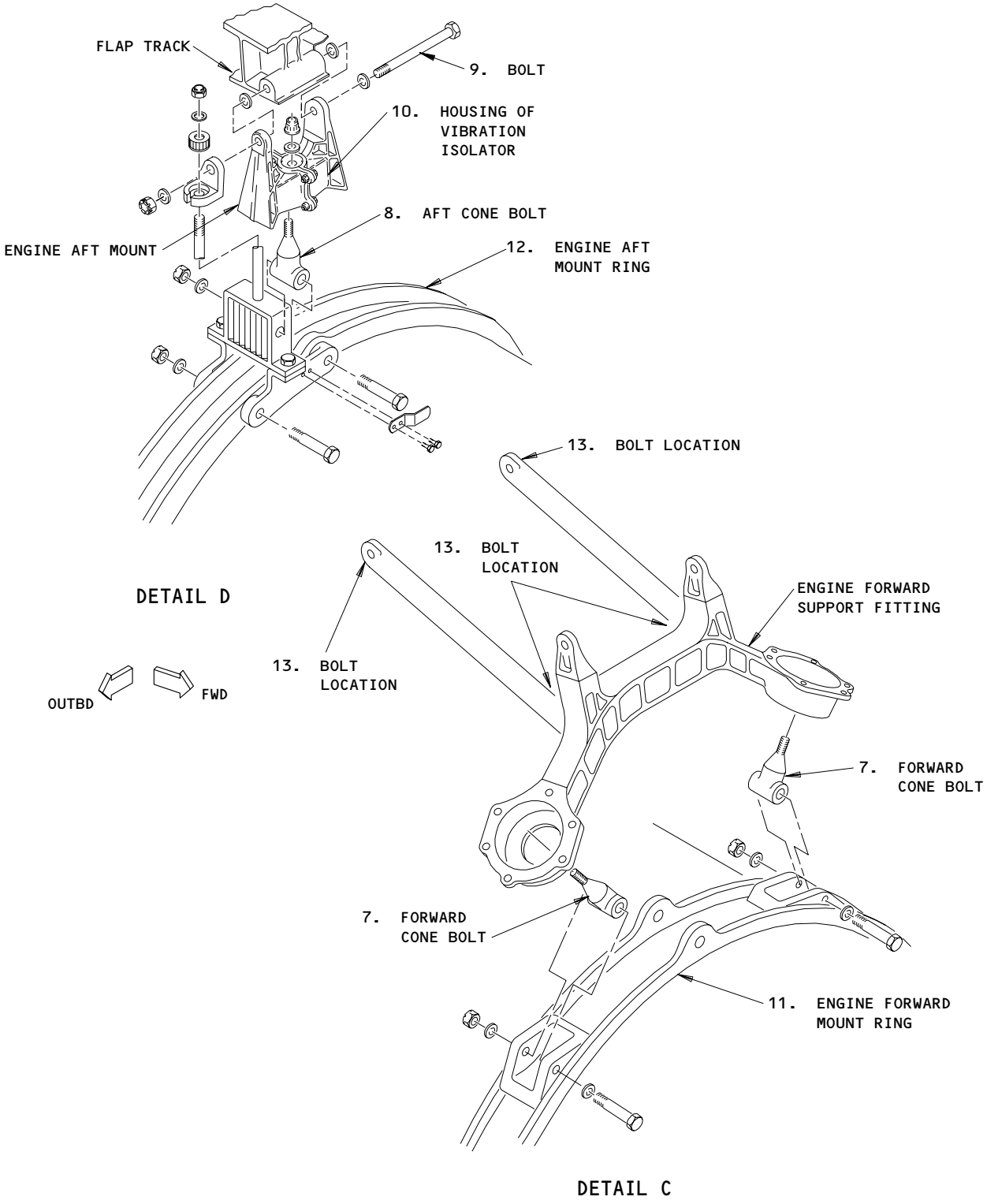
FORWARD ENGINE MOUNT SUPPORT UPPER INBOARD BOLT FRACTURE - MAINTENANCE PRACTICES (CONDITIONAL INSPECTION)

1. General
   A. Bolt Fracture Condition
      (1) When this bolt is found fractured for any reason, a structural inspection of the engine mount support structure is necessary.
      (2) The conditions for a bolt fracture are:
         (a) the bolt fractured because of fatigue.
         (b) the bolt may have fractured because of the conditions found in MM 5-51-61 or MM 5-51-62, but the fracture may have gone undetected if only the Phase I inspections of these conditions were done.
         (c) the fracture of the bolt may have gone undetected during a normal scheduled inspection.
   B. Inspection
      (1) This inspection has one phase which is the Engine Mount Inspection.
      (2) This inspection must be done before the next flight.
   C. Repairs and Replacements
      (1) When this procedure tells you to "examine" a part, remove (if necessary) and look for these conditions:
         (a) structure that pulled apart
         (b) loose paint (paint flakes)
         (c) twisted parts (distortion)
         (d) bent parts
         (e) fastener holes that became larger or longer
         (f) loose fasteners
         (g) missing fasteners (fasteners that have pulled out or are gone)
         (h) delaminations (a lamination with one or more layers pulled apart)
         (i) parts that are not aligned correctly
         (j) interference (clearance that is not sufficient between two parts)
         (k) other signs of damage
      (2) Replace or repair the components that have one or more of the conditions given above.
      (3) If fasteners are removed, replace with new fasteners.
2. Engine Mount Inspection
   A. Do the Engine Mount Inspection (Fig. 201).
      (1) Remove the engine (Ref 71-00-00/401).
      (2) Examine the clevis fitting (2).
      (3) Remove and examine the bolt (3) that attaches the support fitting of the engine forward mount to the swinging link (outboard side of the engine).
      (4) Remove and examine the bolt (4) that attaches the swinging link to the bracket installed on the wing front spar.

(5) Examine the swinging link (5).
(6) Examine the bracket (6) installed on the wing front spar.
(7) Remove and examine the two forward (7) and one aft (8) cone bolts.
(8) Remove and examine the bolt (9) that attaches the engine aft mount to the flap track.
(9) Examine the housing of the vibration isolator (10) for the aft cone bolt.
(10) Examine the two engine mount rings (forward (11) and aft (12)) adjacent to the cone bolts.
(11) Remove and examine the four thrust link bolts (13).
(12) Examine the front spar and wing surface near the forward engine mount connections.
(13) Examine the thrust link fittings (14) that connect the two thrust links to the wing lower surface.
(14) Examine the wing surface near the thrust link connections.
(15) Look for signs of fuel leaks adjacent to all connections to the wing.



Engine Mount and Cone Bolt Installation
Figure 201 (Sheet 1)



Engine Mount and Cone Bolt Installation
Figure 201 (Sheet 2)

CABIN DEPRESSURIZATION CONDITION - MAINTENANCE PRACTICES (CONDITIONAL INSPECTION)

1. General
   A. The examination in this subject is applicable after a cabin depressurization caused by unscheduled opening of pressurization outflow valves.
2. Cabin Depressurization Conditional Inspection
   A. Check for displaced blowout panels and visible lining and insulation damage (Ref Chap 21).
   B. Check area around pressurization outflow and relief valves for damage and examine valves (Ref Chap 21).

EXCESSIVE CABIN PRESSURE LEAKAGE - CONDITIONAL INSPECTION

1. General
   A. Pressure leakage testing is performed to determine the tightness of the pressurized areas of the fuselage and the rate of leakage from the structure.
   B. If personnel are in the airplane during a test, they must be in good physical condition. If any person experiences pain during pressure change, the pressure should be immediately stabilized and lowered until the person can either make the pressure equal in the ears, or be removed from airplane.

      WARNING: OBEY ALL SAFETY STANDARDS FOR COMPRESSION AND DECOMPRESSION. WHEN PERSONS ARE IN A PRESURIZED AREA. SUDDEN PRESSURE CHANGES WILL CAUSE PAIN AND INJURY AND MUST NOT BE DONE. WHEN YOU DO NOT OBEY THE SAFETY PRECAUTIONS, INJURY TO PERSONS WILL OCCUR.

   C. Miscellaneous Information

      NOTE: A method to calculate absolute pressure is as follows: Determine the field atmospheric pressure (in inches of mercury). Divide field atmospheric pressure by 2.036 and add the result to the gauge pressure or differential pressure inside the cabin to give the absolute pressure (PSIA). For example: If the field atmospheric pressure is 29.86 inHG and the cabin differential pressure is 4.0 psid, divide 29.86 by 2.036 which equals 14.67 psi. Add the cabin differential pressure (in psi) to the field pressure (4.0 psid + 14.67 psi = 18.67 psia) to obtain an absolute pressure of 18.67 psi.

      (1) The APU will be used as the pressurization source for the test. Optionally, engine bleed air or external air source may be used for the pressurization.
      (2) The cabin pressure differential indicator is used for this test.
      (3) Refer to Prepare for Cabin Pressure Leakage Test for removal of certain system units.
      (4) Figure 201 shows how to obtain a correction factor used in connection with some test data. Figure 202 shows the straight line curves for acceptable airplane leakage rates.

2. Equipment and Materials
   A. Stop Watch
   B. Bar (suitable to lock the equipment cooling flow control valve)
   C. Box end wrench/or common screwdriver

3. Prepare for Cabin Pressure Leakage Test

A. Physically lock equipment cooling flow control valve in fully closed position for entire test.

NOTE: Locking equipment cooling flow control valve may be done by using a box wrench to close valve and lockwiring box wrench to available airplane structure or a screwdriver for valves with a screwdriver slot.

B. Remove oxygen system continuous flow control units forward of forward cargo compartment bulkhead and oxygen diluter demand regulators in crew cabin (AMM 35-21-21/401).

NOTE: A method to calculate absolute pressure is as follows: Determine the field atmospheric pressure (in inches of mercury). Divide field atmospheric pressure by 2.036 and add the result to the gauge pressure or differential pressure inside the cabin to give the absolute pressure (PSIA). For example: If the field atmospheric pressure is 29.86 inHG and the cabin differential pressure is 4.0 psid, divide 29.86 by 2.036 which equals 14.67 psi. Add the cabin differential pressure (in psi) to the field pressure (4.0 psid + 14.67 psi = 18.67 psia) to obtain an absolute pressure of 18.67 psi.

NOTE: Removal of oxygen equipment is not necessary if the absolute pressure is not more than 20 psi.

(1) Remove the oxygen masks from the stowage boxes (AMM 35-21-51/401).

C. Check pitot static systems for integrity and test pitot static systems (AMM 34-11-0/501).

NOTE: No pressure leakage test should be conducted on an airplane which has not been tested for pitot static systems leaks or blocks unless all air data equipment is removed.

(1) Remove all spare air data units and air data units with disconnected pitot static lines from the airplane.

(2) The pitot static lines must be capped.

D. Start APU (AMM 49-11-0/201).

E. Make sure the pressurization mode selector on forward overhead panel is in AUTO position.

F. Turn on air conditioning pack (AMM 21-00-00/201). Operate pack in auto at approximately 70°F (21°C).

NOTE: Either the left or the right air conditioning pack may be used.

G. Verify that outflow valve position indicator shows valve to be wide open. FLIGHT/GROUND switch in ground position.

H. Make sure all of the airplane doors are properly closed and sealed.

I. Put the pressurization mode selector on forward overhead panel to MAN DC position.

4. Test Cabin Leakage

A. With air conditioning system stabilized, toggle main outflow valve closed.

(1) Monitor the valve position indicator to make sure that valve closes.

(2) Allow outflow valve to close completely.

NOTE: With forwarding outflow valve closed, blue light should be on.

B. Record rate of climb indicator reading.

WARNING: THE INDICATION ON THE CABIN DIFFERENTIAL INDICATOR MUST NOT BE MORE THAN 4.0 PSI DURING A NORMAL TEST. WHEN YOU INCREASE THE PRESSURE MORE THAN 4.0 PSI, DAMAGE TO THE AIRPLANE STRUCTURE OR INJURY TO PERSONS CAN OCCUR.

C. Continue pressurizing at maximum or lower rate as desired until cabin pressure differential reaches 4.0 psi on differential indicator.

NOTE: Differential indicator reading should not exceed 4.0 psi during normal test.

D. Turn off the air conditioning pack (AMM 21-00-00/201).

E. Switch off APU if it is necessary (AMM 49-11-0/201).

F. Make a record of the pressure differential and the time during the cabin bleed down. Start the test at 4.0 psi differential (time zero). Stop the test at 2.5 psi differential.

G. Record a minimum of four sets of measurements for each of the following:

(1) The time on the stopwatch.

(2) The cabin differential pressure.

H. If the test is to be run again, do a 20-minute cool-down time.
   (1) Do this with the equipment cooling fans operating at zero differential pressure.

       NOTE: This will make sure the fans will not overheat.

I. If the 737 airplane exhibits excessive cabin to ambient leakage per AMM 05-51-91, then it is recommended that the following tests or checks be performed.

   NOTE: Several small leakage areas may contribute to create an excessive fuselage leakage rate. Therefore, it is recommended that all sources of leakage be repaired.

   (1) Perform forward outflow valve test (AMM 21-43-11/501).
   (2) Check the following areas for excessive leakage while the airplane is pressurized between 3 and 4 psid.
       (a) Verify that the EE cooling automatic flow control valve is closed properly.
           1) Some EE valves close at approximately 2.5 ±0.5 psid.
           2) Some EE valves close at approximately 0.9 ±0.5 psid.
       (b) Verify that the bilge drains located along the bottom centerline of the airplane are closed properly.
           The bilge drain valves close at approximately 2.0 psid.
       (c) Check all door and hatch seals for leakage.
       (d) Check the flight deck windows for leakage.
       (e) Check the forward outflow valve for leakage.
       (f) Check the cabin pressure outflow valve seal for leakage.
       (g) Check the cabin pressure safety relief valves for leakage.
       (h) Check the cabin pressure negative relief valve seal for leakage.
       (i) Check the water service panel seals for leakage.
       (j) Check all air conditioning and APU duct seals at pressure bulkhead penetrations (located in the A/C bay, aft pressure dome, right rear wheel well, and forward pack bays) for leakage.

(k) Check the structure in the forward and aft wheel wells for leakage.

(l) Check the control cable seals in pressure bulkhead penetrations for excessive leakage.

J. Areas which are difficult to access may also exhibit leaks.

(1) Structure hidden by the wing-to-body fairing and the APU bulkhead should be checked for potential structure and seal leaks.

5. Do the Leakage Rate analysis

A. Get the correction factor from Fig. 201 and correct the time data for each data point.

NOTE: You want to use the correction factors with the bleed down time data when the ambient pressure does not equal 14.7 psi and/or the cabin temperature does not equal 70°F.

B. Plot each time-pressure data point onto the chart shown in Fig. 202.

C. Draw a best fit straight line through the data points plotted in Fig. 202.

D. If the plotted line is in the upper zone in Fig. 202, the pressure leakage rate is satisfactory.

6. Put the Airplane Back to its Usual Condition

A. Check the restored Airspeed Indicator system for leaks and correct operation if necessary (AMM 34-11-00/501).

B. Upon completion of testing, systems and components subject to damage during pressure testing require reactivation or reinstallation and functional testing in compliance with applicable maintenance manual sections.

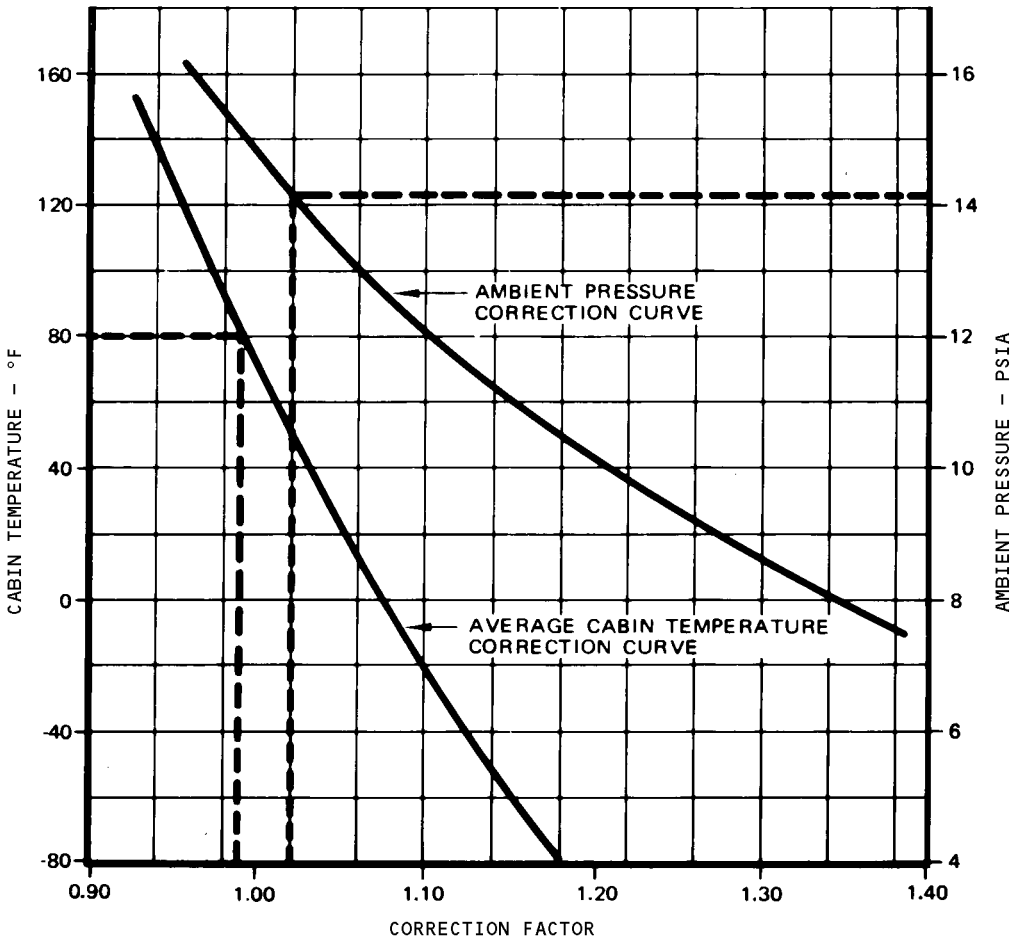
C. Remove equipment cooling flow control valve locking device.

(1) Open the equipment cooling flow control valve.

D. Put the pressurization mode selector on the forward overhead panel to AUTO position.

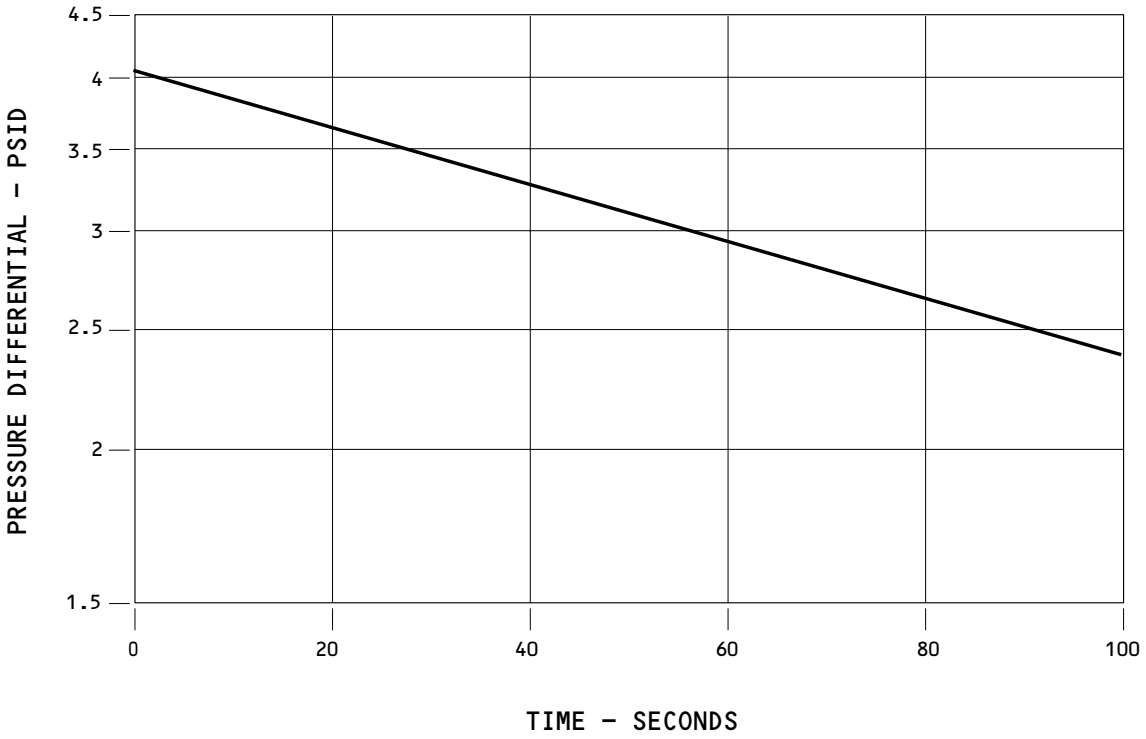
E. If the oxygen system continuous flow control units were removed, then install and test the oxygen equipment (AMM 35-21-21/401).

(1) Install the oxygen masks to the stowage boxes (AMM 35-21-51/401).



CORRECTION FACTOR TO BE APPLIED TO BLEED DOWN TIME WHEN AMBIENT PRESSURE DOES NOT EQUAL 14.7 PSIA AND/OR CABIN TEMPERATURE DOES NOT EQUAL 70°F.

Pressure Leakage Test Correction Factor
Figure 201



NOTE: 2.5 PSIG IS THE RECOMMENDED MINIMUM TEST POINT.

Pressure Leakage Rate Check Chart
Figure 202

BRAKE SEIZURE CONDITION - CONDITIONAL INSPECTION

1. Brake Seizure Condition
   A. Examine main landing gear per the following:
      (1) Check axles and brake attachment flanges for cracks.
      (2) Check the shock strut for leaks and the drag strut bearings for damage.
      (3) Check cadmium plate on mounting flanges and lower torsion links for evidence of blistering and melting.

          NOTE: On the brake mounting flanges, on the axles in the areas of the brake mounting flanges and on the sleeves, later airplanes have a heat-resistant coating instead of cadmium plate. If cadmium plating has apparently disappeared, it may have vaporized or melted away. Melted cadmium that has fallen off tends to ball up as does mercury. Cadmium that has melted and remained in place after cooling may be blistered, mottled, or wrinkled in appearance. The hydraulic fluid-resistant paint finish will have burned away in most cases. Undamaged cadmium plate has a silver gray color. The heat-resistant coating is recognizable by a greenish gray color. For application of the heat-resistant coating, refer to Chapter 51, Heat, Weather and Oil Resistant Inorganic Protective Coating - Cleaning/Painting.

      (4) Check hydraulic fluid-resistant paint on axles and lower end of inner cylinder for a brown shade due to overheating.

          CAUTION: DO NOT SUBJECT THE VERTICAL FACES OF THE BRAKE MOUNTING FLANGES OR ANY OTHER PART TO THE FIELD HARDNESS TEST.

      (5) If check (3) shows that cadmium has blistered and check (4) shows that parts have been overheated, remove parts for hardness test. On airplanes with heat-resistant coating, a field hardness test may be conducted with a portable hardness tester on the outside rim of the steel brake mounting flanges which are heat-treated to 270-300 ksi.
      (6) If check (3) shows that cadmium has melted, inspect for evidence of cadmium embrittlement or cracking, using fluorescent magnetic particle inspection technique. Additional hand polishing and visual inspection techniques may be used as required.
      (7) Shot peen brake mounting flanges and adjacent axle areas following fuse plug melting. Shot peening to be accomplished as soon as convenient, but not later than landing gear overhaul.
   B. Check tires and wheels for damage (AMM 32-45-0/601).
   C. Check main gear brakes (AMM 32-41-41/601).

HIGH ENERGY STOP/HEAT DAMAGE CONDITION - MAINTENANCE PRACTICES (CONDITIONAL INSPECTION)

1. General
   A. This section gives an examination procedure for landing gear cylinders, wheels, and brakes after a high energy stop condition. The extent of the examination depends on the level of absorbed kinetic energy.
   B. The approximate energy absorbed by a brake unit can be found by the use of the brake energy chart (Fig. 201). Use of the chart will provide only an approximation of the energy absorbed during the stop. The factors that follow will also affect the energy absorbed:
      (1) Residual energy from the previous stop
      (2) The runway slope
      (3) The wind conditions
      (4) Thrust reverser use.
   C. Approximate energy absorbed by a brake example, with the use of Fig. 201, is as follows:
      (1) Landing Gross weight - 91,000 pounds (41,278 kg)
      (2) Brakes on Speed - 120 knots (no wind)
      (3) Pressure Altitude - 5000 ft
      (4) Outside Air Temperature - 86°F (30°C)
      (5) Normal Landing Stop Using Auto Brake Setting 2
      (6) Normal Reverse, Number 2 Detent
      (7) No Taxi Distance
      (8) Resultant Brake Energy - 8.2 million foot-pounds
      (9) Resultant is in the COOLING RECOMMENDED range
2. High Energy Stop

   WARNING: DO NOT GO NEAR THE MAIN LANDING GEAR FOR 1 HOUR AFTER THE AIRPLANE HAS MADE A HIGH ENERGY STOP. INJURY TO PERSONS CAN OCCUR.

   WARNING: THE POWER CABLE OF THE BORESCOPE MUST BE IN GOOD CONDITION. IF THERE ARE ANY CIRCUMFERENTIAL CUTS, FRAYED AREAS, OR RUPTURES TO THE EXTERNAL RUBBER COVER OF THE CABLE, INJURY TO PERSONS CAN OCCUR.

   A. Equipment
      (1) Borescope - Fiber Optic Light Supply - Model BLS-97, American Cystoscope Makers Inc., Industrial Division, Pelham, New York
      (2) Borescope - Fiber Optic Light Supply - Model BLS-98, American Cystoscope Makers Inc., Industrial Division, Pelham, New York
      (3) Rigid Borescope - Model BF0-3920A, American Cystoscope Makers Inc., Industrial Division, Pelham, New York
      (4) Flexible Borescope - Model BF1F-3127DD, Cystoscope Makers Inc., Industrial Division, Pelham, New York

(5) Fiber Light Carrier - Model FO-400 5A, Cystoscope Makers Inc., Industrial Division, Pelham, New York
(6) Rigid Borescope - Model FIB 730, Richard Wolf Medical Instruments Corp., Rosemont, Illinois
(7) Rigid Borescope - Model FIB 740, Richard Wolf Medical Instruments Corp., Rosemont, Illinois
(8) Rigid Borescope - Model FIB 760, Richard Wolf Medical Instruments Corp., Rosemont, Illinois

B. References
(1) AMM 32-11-111/801, Axle - Approved Repairs
(2) AMM 32-41-41/401, Main Gear Wheel Brake
(3) AMM 32-41-41/601, Main Gear Wheel Brake
(4) AMM 32-42-11/401, Antiskid Transducer
(5) AMM 32-45-00/601, Tires
(6) AMM 32-45-11/401, Main Gear Tire and Wheel
(7) AMM 51-21-161/701, Heat, Weather & Oil Resistant Protective Coating

C. High Energy Stop Conditional Inspection - In CAUTION Range

WARNING: DO NOT GO NEAR THE MAIN LANDING GEAR FOR 1 HOUR AFTER THE AIRPLANE HAS MADE A HIGH ENERGY STOP. INJURY TO PERSONS CAN OCCUR.

(1) Move the airplane away from the runway in use.
(a) Do not use the brakes very much when the airplane is moved.
(b) Do not set the parking brake.
(2) Let the brakes, tires, and wheels cool so you can touch them.
(3) Examine the wheels and tires on axles where the wheel fuse plug did not melt per AMM 32-45-00/601.
(4) Examine the brakes on the axles where the wheel fuse plugs did not melt per AMM 32-41-41/601.
(5) Examine the brakes (Ref 32-41-41/601).
(a) Apply the brakes fully five or six times. Monitor the brake operation and look for hydraulic leaks during brake application.

NOTE: Make sure the brakes work properly. Look at the movement of the brake indicator wear pins.

D. High Energy Stop Conditional Inspection - In FUSE PLUG MELT Range.

WARNING: DO NOT GO NEAR THE MAIN LANDING GEAR FOR 1 HOUR AFTER THE AIRPLANE HAS MADE A HIGH ENERGY STOP. INJURY TO PERSONS CAN OCCUR.

WARNING: DO NOT SPRAY EXTINGUISHER OR COOLANT DIRECTLY ON THE INFLATED TIRE OR WHEEL. AN EXPLOSION CAN BE CAUSED AND INJURY TO PERSONS CAN OCCUR.

(1) Move the airplane away from the runway in use immediately because the tires will possibly deflate.
   (a) Do not use the brakes very much when the airplane is moved.
   (b) Do not set the parking brake.
   (c) Do not let the airplane move. Do one of these steps:
      1) Keep the tow tug connected to the airplane.
      2) Put the chocks on the nose landing gear tires.
   (d) Tell the fire department persons that the types of fires that follow could occur:
      1) Hydraulic fluid
      2) Grease
      3) Tires
   (e) After 1 hour, use water mist or fog on the wheel or tire to decrease the temperature. Or, wait 2 to 3 hours for the brakes, wheels and tires to cool so that they can be touched. If a chemical agent is used to extinguish a brake-area fire, thoroughly rinse extinguishing agent from the brakes and surrounding components once they have cooled. Use large amount of low-pressure, clean water to rinse.

      NOTE: A different source of cooling can be an air conditioning cart or truck.

(2) Examine the tires on the axles where all tires and wheel assemblies are inflated (Ref 32-45-00/601).
(3) Examine the wheels on the axles where all tires and wheel assemblies are inflated (Ref 32-45-00/601).
(4) Examine the brakes on the axles where all tires and wheel assemblies are inflated (Ref 32-41-41/601).
(5) Remove the wheels and tires on the axles where the tire(s) are deflated. Do this after the landing gear wheels and tires are cool and safe to go near. Have wheels and tires inspected per the supplier's recommended procedures.
(6) Remove the brakes on axles where the tire(s) are deflated. Have the brakes inspected per the supplier's recommended procedure.

(7) Examine the Main Landing Gear

NOTE: If heat damage is apparent in the steps that follow, do the Heat Damage Inspection procedure.

(a) Examine the heat-resistant coating on the brake mounting flanges, and on the lower torsion links for signs of blistering and melting.

NOTE: A heat-resistant coating is used on the brake mounting flanges, on the axles in the areas of brake mounting flanges and on the sleeves. The hydraulic fluid-resistant paint finish will have burned away in most cases. The heat-resistant coating is a greenish gray color. For application of the heat-resistant coating, refer to AMM 51-21-161/701.

(b) Examine the hydraulic fluid-resistant paint on the axles and the lower end of the inner shock strut cylinder. Look for a brown shade that was caused by an overheat condition.

CAUTION: DO NOT PERFORM THE FIELD HARDNESS TEST ON THE VERTICAL FACES OF THE BRAKE MOUNTING FLANGES OR OTHER PARTS. IF YOU DO NOT OBEY THESE INSTRUCTIONS, DAMAGE TO THE AIRPLANE CAN OCCUR.

(c) If the examination in step (a) shows that coating has blistered and step (b) shows that parts have been overheated, remove the parts for a hardness test.

NOTE: A field hardness test may be done with a portable hardness tester on the outside rim of steel brake mounting flanges. Do this only if the mounting flanges are heat-treated to 270-300 ksi.

(d) If the examination in step (a) shows that coating has melted, inspect for evidence of embrittlement or cracking. Use the fluorescent magnetic particle inspection technique. Additional hand polishing and visual inspection techniques can be used as necessary. For approved repairs, refer to AMM 32-11-111/801.

(e) Shot-peen the brake mounting flanges and the adjacent axle areas after a fuse plug has melted. Do the shot-peen when schedules permit, but not later than the landing gear overhaul.

(8) Remove the antiskid transducers (AMM 32-42-11/401).

(9) Examine the paint (green primer or light gray enamel) on the inner surfaces (bore) of the axle with a borescope. Use the borescope to a minimum depth of 16 inches (406.4 mm). Look for discoloration or blistering.

(a) Green paint will change to a light brown or black color.

(b) Light gray paint will change to a yellow color.

(c) If the plating shows signs of heat damage, do the heat damage inspection procedure.

(d) If the paint shows only a small discoloration, more heat damage inspections can wait. Do the last part of the inspection when the airplane gets back to the primary base. Do not land more than three times before you do this inspection.

3. Heat Damage Inspection

A. General

(1) This inspection is used to find if the high strength steel that showed signs of heat damage, had changed. It will look for a change in the temper or heat treat properties.

WARNING: DO NOT BREATHE THE VAPORS OF THE SOLVENTS OR ETCH SOLUTIONS. DO NOT GET THEM IN YOUR EYES, ON YOUR SKIN OR ON YOUR CLOTHES. INJURY TO PERSONS MAY OCCUR.

(2) This inspection will usually occur on the components of the landing gear axles. The signs of discolored or blistered paint or plating shows that a general intense heat has changed the temper of the axle. When this happens, the ammonium persulphate procedure should be applied to the damaged part of the axle. Do this procedure after the axles have been reworked. Axle rework procedures can be found in Chapter 32, Landing Gear.

B. Consumable Materials

(1) Air - Clean, dry, compressed

(2) Ammonium persulphate etch solution

(a) 100 grams of ammonium persulphate per 0.27 gallon of tap water

(3) 0231 Methyl or Isopropyl Alcohol - TT-1-735 (Ref 20-30-31)

(4) G00034 Cheesecloth

(5) Brushes

(6) B00183 Trichloroethylene Solvent - BMS 11-6, types I and II

(7) G00270 Masking tape

(8) B00168 Wet and Dry Abrasive Paper - Number 400 or finer

C. References

(1) AMM 32-45-11/401, Main Gear Wheel Well and Tire - Removal/Installation

D. Ammonium Persulphate Solution Procedure

WARNING: DO NOT BREATHE THE VAPORS OF THE SOLVENTS OR ETCH SOLUTIONS. DO NOT GET THEM IN YOUR EYES, ON YOUR SKIN OR ON YOUR CLOTHES. INJURY TO PERSONS MAY OCCUR.

(1) Strip the cadmium surface with sandpaper applied by hand. Strip a minimum area of 0.5 inch through the area that is not to be tested.

(a) Strip a minimum area of 0.5 inch larger than the area that is to be tested.

(2) Clean the area to etched, with solvent.

WARNING: DO NOT LET THE ETCHANT SOLUTION TOUCH THE CADMIUM PLATED SURFACES. POISONOUS FUMES CAN OCCUR AND CAUSE INJURY TO PERSONS.

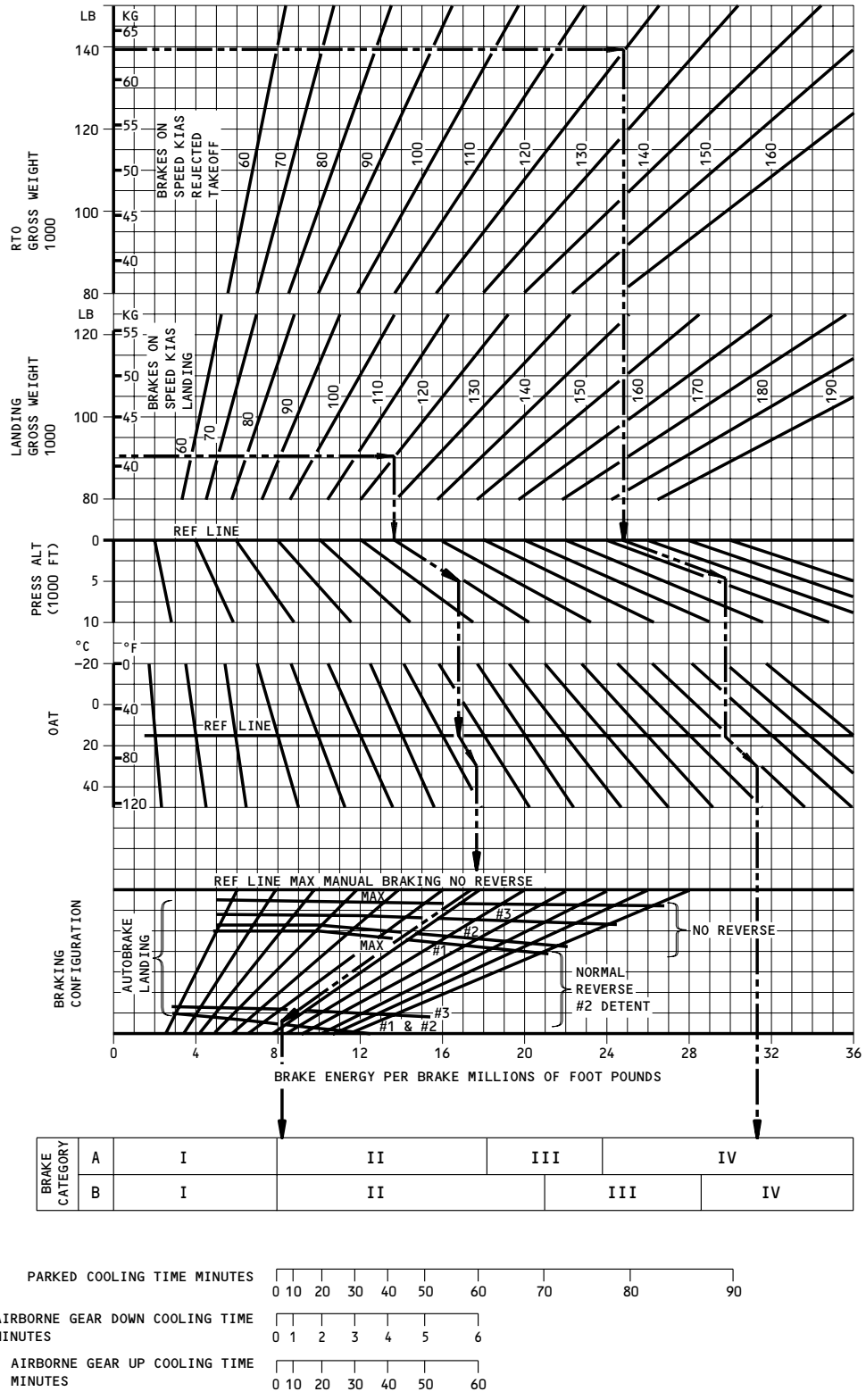
(3) Apply the ammonium persulphate solution, with a cheesecloth, on the surface to be tested for 30 to 60 seconds.
(4) Rinse the surface with hot or cold water immediately. Alcohol can also be used.
(5) Dry the surface with clean, dry compressed air immediately.

E. Examine etched area.
(1) Examine the parts with a bright light and without magnification. Look for signs of burning.
(a) If all of the etched area is the same shade of gray, there will be no change to the temper of the steel.
(b) The area that has been too hot will be light in color. Look for the light color in the center of a darder area.
(c) If the etched area is mottled, the condition of the heat treat is not sure. Replace the axle or do a high quality metallurgical test.

F. Put the airplane back to its usual condition.
(1) Remove the etch with abrasive paper.

NOTE: Do this step if the part is serviceable. If it is not serviceable, install replacement parts.

(2) Refinish the surface with the correct primer and paint.
(3) Install replacement tires and wheels (Ref 32-45-11/401).
(a) If the paint shows only a small discoloration, more heat damage inspections can wait. Do the last part of the inspection when the airplane gets back to the primary base. Do not land more than three times before you do this inspection.



BRAKE COOLING SCHEDULE

GUIDANCE INFORMATION ONLY

OBSERVE MAXIMUM QUICK TURNAROUND LIMIT.

NOTE:

TO CORRECT FOR WIND ENTER CHART WITH BRAKES ON SPEED MINUS ONE-HALF THE HEADWIND OR PLUS 1.5 TIMES THE TAILWIND.

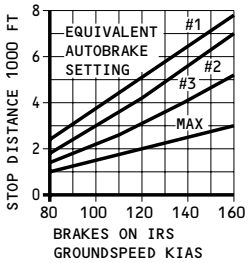
CHART SHOWS ENERGY PER BRAKE ADDED BY A SINGLE STOP WITH ALL BRAKES OPERATING. ENERGY IS ASSUMED TO BE EQUALLY DISTRIBUTED AMONG THE OPERATING BRAKES. TOTAL ENERGY IS SUM OF RESIDUAL ENERGY PLUS ENERGY ADDED.

ADD ONE MILLION FOOT-POUNDS PER BRAKE FOR EACH TAXI MILE.

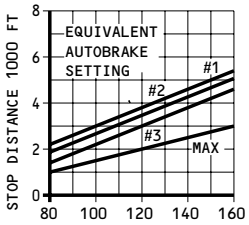
USE MAX MANUAL BRAKING NO REVERSE REF LINE FOR RTO ENERGY.

IF GROUNDSPEED IS USED FOR BRAKES ON SPEED, IGNORE WIND, ALTITUDE, AND OAT EFFECTS.

MANUAL BRAKE LANDING
NO REVERSE



MANUAL BRAKE LANDING
NORMAL REVERSE
#2 DETENT



Brake Cooling Schedule
Figure 201 (Sheet 1)

BRAKE CATEGORY DEFINITIONS:

CATEGORY	BRAND NAME	BRAKES	WHEELS
A	BENDIX	10-61819-17,-21,-28	10-61819-18,-23 10-62174-3
	GOODRICH	10-61819-22,-26,-27,-31,-35	10-61819-16,-24,-25,-30, -36,-37,-38 10-62174-1
B	GOODRICH	10-62174-2,-5	10-62174-1

COOLING SCHEDULE

I. NORMAL: NO SPECIAL PROCEDURE REQUIRED.

II. COOLING RECOMMENDED: COOL AS SCHEDULED. GROUND COOLING SCHEDULE RECOMMENDED PRIOR TO TAKEOFF.

III. CAUTION: WHEEL FUSE PLUGS MAY MELT. DELAY TAKEOFF AND INSPECT AFTER 30 MINUTES. AFTER TAKEOFF, EXTEND THE GEAR SOON FOR AT LEAST 7 MINUTES.

IV. FUSE PLUG MELT: NO REVERSE THRUST OR BRAKING CONFIG CREDIT ALLOWED IN THIS AREA. CLEAR RUNWAY IMMEDIATELY. DO NOT SET PARKING BRAKE. DO NOT APPROACH GEAR OR ATTEMPT TAXI OR SUBSEQUENT TAKEOFF BEFORE WAITING MANDATORY TIME SHOWN ON QUICK TURNAROUND LIMIT CHART. ALERT FIRE EQUIPMENT.

Brake Cooling Schedule
Figure 201 (Sheet 2)

MERCURY SPILLAGE CONDITION - MAINTENANCE PRACTICES (CONDITIONAL INSPECTION)

1. General
   A. It is assumed that any significant quantity of mercury on board an airplane is properly contained, packaged and labeled for loading in a cargo compartment.
   B. The spillage of mercury or a mercury compound, within an airplane, requires immediate action for its isolation and recovery to prevent possible corrosion damage to and possible embrittlement of aluminum alloy structural components.
   C. All metallic aircraft structure which is wetted by elemental mercury suffers severe degradation in strength. The rate of diffusion of mercury into a metal is dependent on the specific metal contacted and the protective finish applied; however, once diffusion has started it cannot be stopped. Structural degradation may not be visually apparent until the structure is subject to load (Ref Structural Repair Manual, Chapter 51, Mercury Spillage Corrective Action).
   D. When using X-ray equipment to detect mercury, droplets of mercury will show on a negative as small white spots. Corrosion and embrittlement will show as tree-like forms completely penetrating a structural component.
   E. Personnel precautions
      (1) Mercury spreads very easily from one surface to another. It adheres to hands, shoes, clothes, tools, hoses, etc., therefore, the following precautions must be observed:
         (a) Allow no through traffic from the contaminated section to any "clean" section.
         (b) Avoid contact with surfaces suspected of being contaminated. If necessary, use wood or fiber sheets to support body while working in the area. Do not attempt to pick up free mercury or amalgamated mercury by hand.
         (c) Clean tools with soap and hot water or by a steam bath. Discard drill bits after use on mercury contaminated structure.
         (d) Wear wing socks in the contaminated area to prevent scratching the exposed surfaces. Throw away socks after use. Clean shoes with vacuum cleaner and wash them with hot water and soap. Thoroughly wash clothes worn during cleanup as soon as possible.
         (e) Always wash thoroughly after contacting mercury. Keep hands away from mouth. Do not eat, smoke or even blow nose without first washing your hands carefully.

(f) Appreciable amounts of mercury will vaporize at normal temperatures to the extent that a stagnant air mass will become dangerous to personal health.

WARNING: ALWAYS PROVIDE AMPLE VENTILATION WHILE CLEANING MERCURY CONTAMINATED AREAS.

F. Precautions for cleaning up mercury spilled on floor.
(1) When mercury is found on the floor, do not remove access plates/inspection plates, screws, rivets, etc., from floor. Any hole which is left open in the contaminated area of the floor may allow mercury to spread to the structure underneath the floor.
(2) Do not use cleaning materials such as solvents, solids or polishes on the contaminated areas. These materials may promote the corrosion.
(3) If hands become contaminated while working with clean-up equipment, do not touch any exposed metal in the surrounding area as you may contaminate it.
(4) If corrosion is evident and clean-up cannot be completed immediately, coat contaminated area with corrosion preventative oil (CP oil) or with engine oil. This helps to slow down the rate of corrosion and also helps to prevent spreading of the contamination.

2. Equipment and Materials
A. Corrosion preventative oil, or engine oil
B. Cardboard
C. Paper troughs
D. Scotch tape
E. Zinc oxide tape
F. Medicine dropper
G. High capacity vacuum cleaner
H. Trap-type glass container
I. Mercury vacuum pump, Lab Safety Supply Co., P.O. Box 1368, Jonesville, Wisconsin 53545
J. 10X hand lens
K. Sensing device (mercury sniffer)
(1) Beckman Instruments, Inc., Fullerton, California
(2) Sunshine Scientific Instrument Company, 1810-12 Grant Street, Philadelphia, Pennsylvania
L. Portable X-ray equipment

3. Mercury Spillage Corrective Measures
A. Passenger Compartment or Main Cargo Deck
(1) Log the incident with respect to the following:
(a) Amount of spillage
1) Small - Broken thermometers, etc.
2) Larger - Such as might be expected by damage to a technical instrument using mercury, etc.

(b) Date and time of spillage
(c) Exact location of spillage

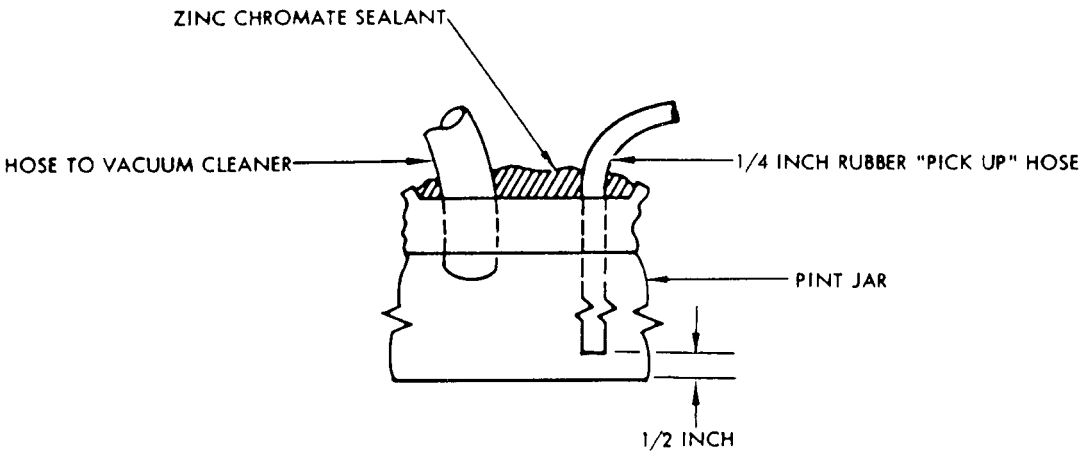
(2) General clean-up and inspection (using equipment available) must be made immediately after spillage occurs or immediately after spillage is detected.
(a) Pick up all visible spillage (broken thermometer, etc.) by use of cardboard or paper troughs, scotch tape, zinc oxide tape. A medicine dropper is useful for larger globules of visible mercury. If none of these methods are practical, isolate the spillage by covering it with fastened-down cloth (towels, plastic sheets, etc.) until vacuum methods, etc., become available.
(b) Vacuum thoroughly the carpet area (or the cargo deck) where the spillage occurred.
1) For a small spillage, use a trap-type glass container, with a high flow vacuum cleaner (Fig. 201).

NOTE: Vaporized mercury may contaminate commercial vacuum cleaner. A contaminated vacuum cleaner should be cleaned after use.

2) For a larger spillage, use a mercury vacuum pump to collect mercury without the emission of mercury from the exhaust.
(c) Make a visual inspection of seat track rails (and crease beam components) if spillage occurs near them. Use the equivalent of a 10X hand lens for determination of corrosion damage. Any evidence of mercury corrosion or embrittlement requires repair.

NOTE: A sensing device (mercury sniffer) is recommended to detect hidden deposits of mercury when a spillage is classified as "larger." If available, use X-ray equipment to assist in detecting mercury.

(d) Make a close inspection of all exposed brass metal, such as turnbuckles, or cables. A silver color on non-plated brass is indication of mercury reactions.



Trap-Type Glass Container
Figure 201

(3) Strict clean-up and inspection (using mercury vacuum pump, mercury sniffers, X-ray equipment, etc.), and possible repairs, must be made during first airplane service at a main base.
(4) Reinspect area of spillage and areas below spillage at first overhaul.

B. Lower Cargo Compartments
(1) Log the incident with respect to the following:
(a) Amount of spillage
1) Small - Broken thermometers, etc.
2) Larger - Such as might be expected by damage to a technical instrument using mercury, etc.
(b) Date and time of spillage
(c) Exact location of spillage
(2) General clean-up and inspection (using equipment available) must be made immediately after spillage occurs or immediately after spillage is detected.
(a) Pick up all visible spillage by use of cardboard or paper troughs, scotch tape, zinc oxide tape. A medicine dropper is useful for larger globules of visible mercury. If none of these methods are practical, isolate the spillage by covering it with fastened-down cloth (towels, plastic sheets, etc.) until vacuum methods, etc., become available.
(b) Vacuum visible regions of a cargo compartment immediately. Vacuum thoroughly the aluminum alloy deck floor where the spillage has occurred. Vacuum also any portion of a bulkhead as required. The use of a mercury vacuum pump is recommended.
(c) Make a visual inspection immediately of visible structural components affected (cargo track rails, deck floor, bulkheads, etc.). Use the equivalent of a 10X power hand lens for determination of corrosion damage to readily accessible metal structural components. Any evidence of mercury corrosion or embrittlement requires repair.
(d) Make a close inspection of all exposed brass metal, such as turnbuckles, or cables. A silver color on nonplated brass is an indication of mercury reactions.
(e) If available, use a portable X-ray machine inside the cargo compartments and along the outside lower surface of the fuselage to check suspected corrosion areas of the skin, stringers and frames which are hidden below the floor.
(3) Strict clean-up and inspection (using mercury vacuum pump, mercury sniffers, X-ray equipment, etc.), and possible repair, must be made during first airplane service at a main base.
(4) Reinspect area of spillage and areas below spillage at first overhaul.

HYDRAULIC FLUID REACTION WITH TITANIUM – CONDITIONAL INSPECTION

1. Hydraulic Fluid Reaction with Titanium
   A. General
      (1) At normal ambient temperatures, hydraulic fluid is compatible with titanium. Above 270°F, however, hydraulic fluid becomes acidic and attacks titanium causing corrosion and embrittlement.
      (2) Consumable Materials
         (a) Solvent – Acetone.
         (b) Solvent – SkyKleen 1000.
         (c) Scraper, wood or plastic – commercially available.
      (3) Hydraulic fluid contamination is evidenced by a light glossy brown film, a dull black residue, or a bare surface on painted ducts.
      (4) Metal deterioration is evidenced by a bright etched (rough) surface.
   B. Examination of Titanium Parts in Hydraulic Fluid Contamination Areas
      (1) Examine all titanium parts in hydraulic fluid contamination high temperature areas for hydraulic fluid contamination or metal deterioration.

         NOTE: Titanium parts include ducts in the wheel well areas, engine fan case, and the firewalls. Also included are the ducts in the aft fuselage between the pressure bulkhead and the APU firewall. Other titanium parts are some strut attach fittings and spar webs, landing gear beam, APU support structure, and stabilizer links.

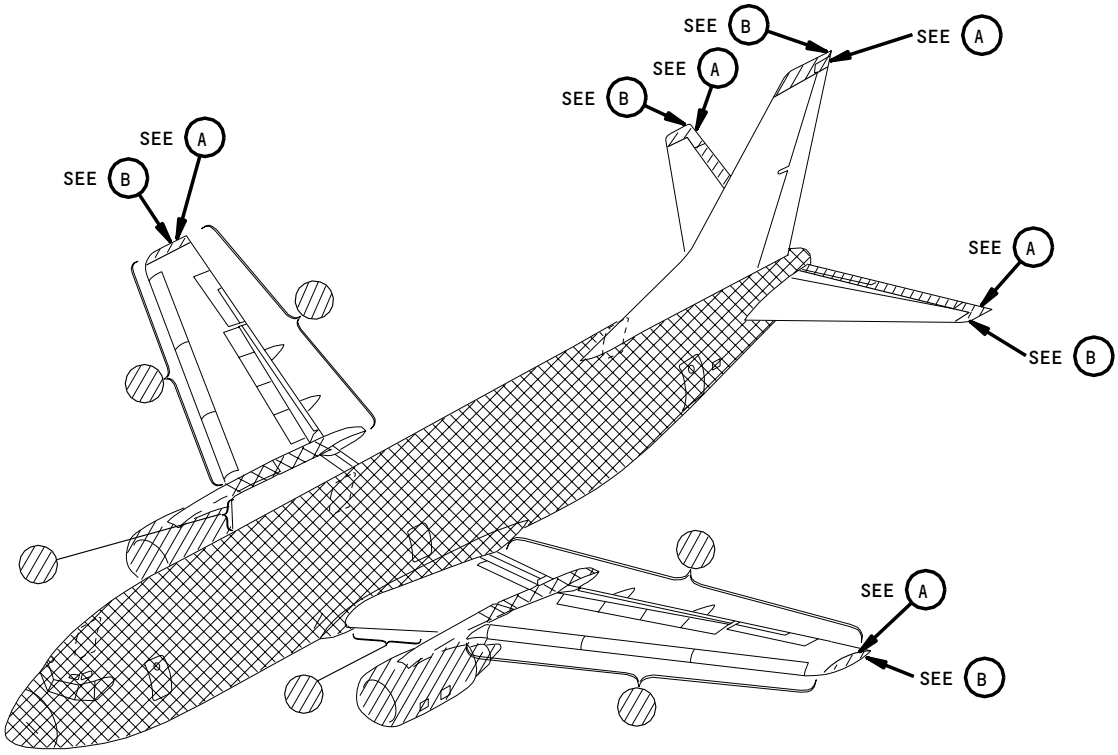
      (2) Remove the hydraulic fluid residue. Use acetone or skykleen 1000 and wooden or plastic scrapers.
      (3) Parts showing metal deterioration should be replaced.

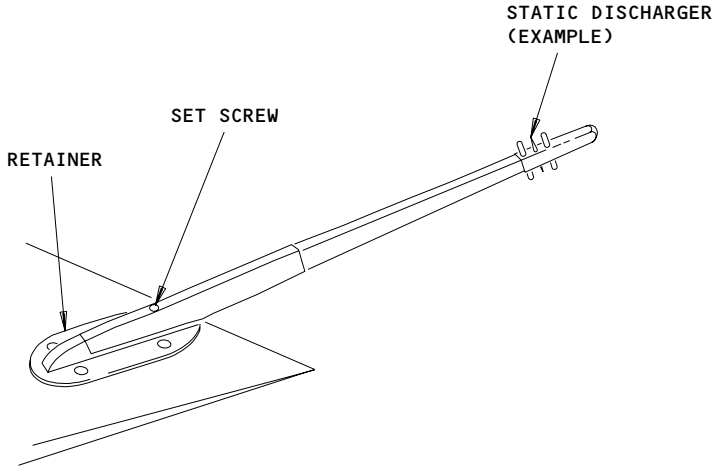
CABIN OVERPRESSURIZATION – CONDITIONAL INSPECTION

1. General
   A. If cabin overpressurization occurs (20 psia for oxygen system components and 18 psia for air data units), the following must be accomplished:
      (1) Replace oxygen system continuous flow control units and oxygen diluter demand regulators.
      (2) Check all spare air data units in airplane and air data units with disconnected pitot static lines for damage.
   B. Upon completion of replacement and check, systems and components subject to damage due to overpressurization require reactivation or reinstallation and functional testing in compliance with applicable maintenance manual sections.

LIGHTNING STRIKE CONDITION - MAINTENANCE PRACTICES (CONDITIONAL INSPECTION)

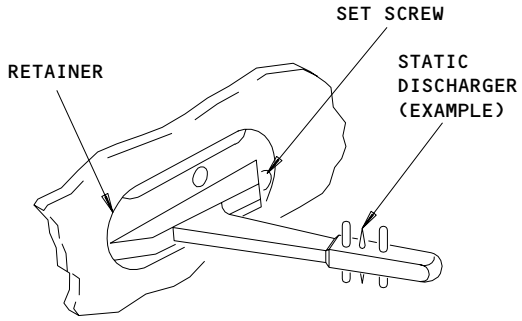
1. General
   A. The airplane has all the necessary and known lightning strike protection measures. Most of the external parts of the airplane are metal structure with sufficient thickness to be resistant to lightning strikes. This metal assembly is its basic protection. The thickness of the metal surface is sufficient to protect the internal spaces from a lightning strike. The metal skin also gives protection from the entrance of electromagnetic energy into the electrical wires of the aircraft. The metal skin does not prevent all electromagnetic energy from going into the electrical wiring; however, it does keep the energy to a satisfactory level. If lightning strikes the airplane, you must fully examine all of the airplane to find the areas of the lightning strike entrance and exit points. When you look at the areas of entrance and exit, examine these areas carefully to find all of the damage that has occurred.
   B. Lightning strike entrance and exit points are usually found in Zone 1 (Fig. 201), but also can occur in zones 2 and 3.
   C. You can usually find signs of a lightning strike in Zone 1 (Fig. 201). However, lightning strikes can occur to any part of the airplane which includes the fuselage, wing-body fairing, antennas, vertical stabilizer, horizontal stabilizer, and along the wing trailing edge (Zone 2, Fig. 201).
   D. In metal structures, lightning damage usually shows as pits, burn marks or small circular holes. These holes can be grouped in one location or divided around a large area. Burned or discolored skin also shows lightning strike damage.
   E. In composite (non-metallic) structures, solid laminate or honeycomb damage shows as discolored paint. It also shows as burned, punctured, or delaminated skin plies. Damage you can not see can also be there. This damage can extend around the area you can see. Signs of arcing and burning can also occur around the attachments to the supporting structure.
   F. Airplane components made of ferromagnetic material may become strongly magnetized when subjected to lightning currents. Large time varying current flowing in the metal airplane structure due to a lightning strike can cause this magnetization.





TRAILING EDGE SURFACE
INSTALLATION (EXAMPLE)

A



STABILIZER AND FIN CAP
INSTALLATION (EXAMPLE)

B

External Lightning Strike Areas
Figure 201

G. A lightning strike usually attaches to the airplane in a Zone 1 (Fig. 201) area and goes out a different Zone 1 area. Frequently a lightning strike can enter the nose radome and go out of the airplane at one of the horizontal stabilizer trailing edges. The usual areas for lightning to make an entrance or exit point are the nose radome, the wing tips, the engine nacelle lip, the horizontal stabilizer tips, and the vertical stabilizer tips. Less regularly, lightning entrance and exit points are found on trailing edge flap track fairings, external lights, landing gear, landing gear doors, waste water masts, and pitot probes. But it is important to know that lightning can make an entrance or exit from any area of the aircraft, even from Zone 3 areas where lightning strikes do not usually occur.

H. Zone 2 areas (Fig. 201) are areas where an initial entry or exit point is not usual, but where a lightning channel may be pushed back from an initial entry or exit point. As an example, the nose radome may be the area of an initial entry point, but the lightning channel may be pushed back along the fuselage aft of the radome by the forward motion of the airplane.

I. Lightning strikes can cause problems to the electrical power systems and the external light wiring. The electrical system is designed to be resistant to lightning strikes and can get a lightning strike without damage. But, a strike of unusually high intensity can possibly cause damage to the electrical system components.

J. Frequently, a lightning strike is referred to as a static discharge. This is incorrect and may cause you to think that the static dischargers found on the external surfaces of the airplane prevent lightning strikes. These static dischargers are for bleeding off static charge only; they have no lightning protection function. As the airplane flies through the air, it can pick up a static charge from the air (or dust/water particles in the air). This static charge can become large enough to bleed off the airplane on its own. If the charge does not bleed off on its own, it will usually result in interference to the VHF or HF radios. The static dischargers help to bleed the static charge off in a way that prevents radio noise.

K. The static dischargers are frequently hit by lightning. Because of this, some personnel think static dischargers are for lightning protection. This is incorrect; the static dischargers have no lightning protection function. The dischargers have the capacity to carry only a few micro-Amps of current from the collected static energy. The 200,000 Amps from a lightning strike will cause damage to the discharger or make it fully unserviceable.

2. Examine External Surfaces for Lightning Strike Damage

A. References

(1) AMM 23-11-0, HF Communications System

(2) AMM 23-21-0, VHF Communications System

(3) AMM 23-61-0, Static Dischargers

(4) AMM 28-11-0, Fuel Tanks
(5) AMM 28-11-11, Door - Access, Wing Surge Tanks
(6) AMM 27-11-0, Ailerons
(7) AMM 27-21-0, Rudder
(8) AMM 27-31-0, Elevators
(9) AMM 28-41-0, Fuel Quantity Indicating System
(10) AMM 34-24-0, Standby Magnetic Compass
(11) AMM 34-31-01, ILS Navigation System
(12) AMM 34-35-0, Marker Beacon System
(13) AMM 34-48-0, Radio Altimeter System
(14) AMM 34-41-0, Weather Radar System
(15) AMM 34-31-01, VOR System
(16) AMM 34-53-0, ATC System
(17) AMM 34-55-01, DME System
(18) AMM 34-57-01, Automatic Direction Finder (ADF)
(19) AMM 53-52-0, Nose Radome
(20) SRM 51-40-9, Allowable Damage and Repair of Flame Sprayed Aluminum Coatings
(21) D637239, Nondestructive Test Manual

B. Examine the Airplane External Surface
(1) Examine the Zone 1 (Figure 201) surface areas for signs of lightning strike damage.
(a) Do the examinations that follow:
1) Examine the external surfaces carefully to find the entrance and exit points of lightning strike.
2) Make sure to look in the areas where one surface stops and another surface starts.
3) Examine the internal and external surfaces of the nose radome for burns, punctures, and pin holes in the composite honeycomb sandwich structure.
4) Examine the metallic structure for holes or pits, burned or discolored skin and rivets.
5) Examine the external surfaces of the composite components for discolored paint, burned, punctured, or delaminated skin plies.

6) You need to use instrumental NDI methods or tap tests to find composite structure damage you cannot see.

NOTE: Damage you can not see, such as delamination, can extend to the areas around the damaged area you can see. Delamination can be detected by instrumental NDI methods or by a tap test. For a tap test, use a solid metal disk and tap the area adjacent to the damaged area lightly. If there is delamination, you will hear a sound different from the sound of a solid bonded area. Refer to the Nondestructive Test Manual D637239.

(b) If you find lightning strike damage to aluminum coated composite panels, refer to SRM 51-40-9 for allowable damage, time limited repair, and permanent repair procedures.

CAUTION: MAKE SURE TO REPAIR THE LIGHTNING STRIKE DAMAGE TO THE ALUMINUM COATING ON COMPOSITE PANELS. IF YOU DO NOT REPAIR AN ELECTRICALLY CRITICAL PANEL, AS SPECIFIED BY SRM 51-40-9. A SUBSEQUENT LIGHTNING STRIKE COULD CAUSE THE MALFUNCTION OF A NECESSARY AIRPLANE SYSTEM.

CAUTION: MAKE SURE TO SEAL OR REPAIR ALL DAMAGE. FAILURE TO SEAL OR REPAIR DAMAGE CAN CAUSE MORE INTERNAL DAMAGE BECAUSE MOISTURE CAN GET IN.

(c) Repair or seal the damaged areas. See SRM 51-40-9.

(2) Examine the Zone 2 (Figure 201) surface areas for signs of a lightning strike.

(a) Do the examinations that follow:

1) Use special care to look for the entrance and exit points of the lightning strike.
2) Make sure you look in the areas where one surface stops and the other surface starts.

(b) If the entrance and exit points are not found in this examination of Zone 1 and 2 areas, examine Zone 3 (Fig. 201) for signs of a lightning strike.

1) Look carefully for the entrance and exit points of the lightning strike.
2) Make sure you look in the areas where one surface stops and the other surface starts.
3) Examine the metallic structure for holes or pits and for burned or discolored skin and rivets.

4) Examine external surfaces of composite honeycomb material for discolored paint, burned, punctured, or delaminated skin plies.
5) You need to use instrumental NDI methods or tap tests to find composite structure damage you cannot see.

NOTE: Damage you can not see, such as delamination, can extend to the areas around the damaged area you can see. Delamination can be detected by instrumental NDI methods or by a tap test. For a tap test, use a solid metal disk and tap the area adjacent to the damaged area lightly. If there is delamination, you will hear a sound different from the sound of a solid bonded area. Refer to the Nondestructive Test Manual D637239.

CAUTION: MAKE SURE TO SEAL OR REPAIR ALL DAMAGE. FAILURE TO SEAL OR REPAIR DAMAGE CAN CAUSE MORE INTERNAL DAMAGE BECAUSE MOISTURE CAN GET IN.

(c) Repair or seal the damaged areas. See SRM 51-40-9

(3) Make sure the navigation lamps, rotary lights, and landing lights operate and do not have a broken lens.

(4) Do the examinations of the flight controls that follow:
(a) If the rudder shows signs of a lightning strike, examine the surface hinges, bearings, and bonding jumpers for signs of damage.
(b) If the elevators show signs of a lightning strike, examine the surface hinges, bearings, and bonding jumpers for signs of damage.
(c) If the ailerons show signs of a lightning strike, examine the surface hinges, bearings, and bonding jumpers for signs of damage.
(d) If the speed brakes show signs of a lightning strike, examine the surface hinges, bearings, and bonding jumpers for signs of damage.
(e) If the nose wheel doors show signs of a lightning strike, examine the surface hinges, bearings, link mechanism, door structure, and bonding jumpers for signs of damage.
(f) If the main landing gear doors show signs of a lightning strike, examine the surface hinges, bearings, and bonding jumpers for signs of damage.
(g) If the trailing edge flaps show signs of a lightning strike, examine the surface hinges, bearings, and bonding jumpers for signs of damage.

(h) If the leading edge flaps/slats show signs of a lightning strike, examine the surface hinges, bearings, and bonding jumpers for signs of damage.
(i) If the wingtips show signs of a lightning strike, make a careful examination of the wingtips, fuel vent outlet and surge tanks for signs of damage.

(5) Do an operational test of the rudder if there are signs of lightning strike damage to the rudder or vertical stabilizer (AMM 27-21-0).
(6) Do an operational test of the elevator if there are signs of lightning strike damage to the elevator or horizontal stabilizer (AMM 27-31-0).
(7) Do an operational test of the ailerons if there are signs of lightning strike damage to the ailerons (AMM 27-11-0).
(8) Do an operational test of the speed brakes if there are signs of lightning strike damage to the speed brake system (AMM 27-62-0).
(9) If there are signs of lightning strike damage to the nose gear doors, do the steps that follow:
(a) Disengage the nose gear door locks (AMM 32-00-1).
(b) Manually move the forward nose gear doors to make sure the mechanism operates smoothly (32-22-0).
(c) Visually examine the nose gear door link mechanism for lightning strike damage.
(d) Examine the nose door hinges for lightning strike damage.
(e) Examine the nose gear door structure for lightning strike damage.
(f) Make sure that the proximity switch electrical module gives the correct gear door position indication (AMM 32-09-100).
(g) Make sure to engage the nose gear door lock when the examination is complete.
(10) If there are signs of lightning strike damage to main landing gear doors, do the steps that follow:
(a) Disengage the main gear door locks before manually moving the main gear doors (AMM 32-00-1).
(b) Manually close the main gear doors to make sure the link mechanism operates smoothly (AMM 32-00-15).
(c) Visually examine the main gear doors for lightning strike damage.
(d) Visually examine the main gear door linkage mechanism for lightning strike damage.
(e) Visually examine the main gear door hinges for lightning strike damage.
(f) Make sure the proximity switch electrical module gives the correct indication for the door position.
(g) Make sure to engage the main gear door lock when the landing gear door examination is completed.

(11) Do an operational test of the trailing edge flaps if there are signs of lightning strike damage to the trailing edge flaps (AMM 27-51-0).
(12) Do an operational test of the leading edge flap/slats if there are signs of lightning strike damage to the trailing edge flap/slats (AMM 27-81-0).

C. Examine the Static Dischargers
(1) Do the examinations that follow:
(a) Visually examine all dischargers to make sure they are in place, not broken and installed correctly on their mounting retainers.
(b) Examine the dischargers for damage as shown by a burned or rougher coating and pits in the metal discharger retainers.
(c) Examine the dischargers for broken, bent, or blunt tungsten pins.
1) If bent pins are found, replace the discharger assembly.
2) If broken pins are found, replace the discharger assembly.
(d) Look for deterioration of the discharger coating or damage to the tip cup.
1) Deterioration to the leading edge of the discharger must not extend back more than 1/3 of the width of the discharger.
(2) Do a resistance test if you find a damaged static discharger (AMM 23-61-0).

D. Airplane Internal Examination
(1) If a lightning strike has caused a system malfunction, do a full examination of the defective system with the use of the applicable maintenance manual section for that system.
(2) Do a check of the standby compass system only if the flight crew reported a very large compass deviation (AMM 34-24-0).
(3) Make sure the fuel quantity system is accurate (AMM 28-41-0).
(a) Repair any identified problems.

E. Examine the Air Data Sensors
(1) Examine the air data sensors for signs of lightning strike damage.
(a) Pitot Probes: Do an operational test of the pitot probes if there are signs of lightning strike damage to the pitot probes (AMM 34-11-11).
(b) Static Ports: Do an operational test of the pitot static system if there are signs of lightning strike damage near the static port (AMM 34-11-0).
(c) AOA Vanes: Do an operational test if there are signs of lightning strike damage to the AOA vanes (AMM 27-32-11).
(d) TAT Probe: Do an operational test of the TAT probes if there are signs of lightning strike damage to the probe (AMM 34-16-21).

F. Examine the Airplane Antennas
(1) Examine the antennas for these systems for damage:
(a) HF (If installed)(AMM 23-11-0)
(b) VHF (AMM 23-21-0)
(c) ILS (AMM 34-31-01)
(d) Marker Beacon (AMM 34-35-0)
(e) RA (AMM 34-48-0)
(f) VOR (AMM 34-31-01)
(g) ATC (AMM 34-53-0)
(h) DME (AMM 34-55-01)
(i) ADF (AMM 34-57-01)
(j) ACARS (If installed)
(k) CPS (If installed)
(l) SATCOM (If installed)
(m) TCAS (If installed)
(n) Airborne Telephone (If installed)
(2) Examine the nose radome and the WXR antenna as follows (AMM 53-52-0 and 34-41-0):
(a) Examine the radome for pin holes, punctures, and paint that has chipped.
(b) Make sure the radome bonding straps are attached correctly to the airframe.
(c) Examine the lightning diverter strips, and repair them if there is damage.
(d) If there is damage to the radome, examine the WXR waveguide for damage.

3. Operational Checks of Radio and Navigation Systems
A. General
(1) The level of the checks after a lightning strike to the airplane is determined by flight crew information and the airplane condition after the incident. For example, if all the NAV/COM systems are exercised by the flight crew in flight after the lightning strike and no anomalies are found, then checks to the exercised systems would not normally be required. For systems not exercised by the flight crew in flight or systems where anomalies were found, additional checks to that system may be required. In addition, even if a system were exercised in flight after the lightning strike and no anomalies were found, but subsequent inspections showed lightning damage near that system antenna, addition checks of that system may be required.
B. References
(1) AMM 23-11-0, HF Communications System
(2) AMM 23-21-0, VHF Communications System
(3) AMM 34-31-01, ILS Navigation System
(4) AMM 34-35-0, Marker Beacon System
(5) AMM 34-48-0, Radio Altimeter System

(6) AMM 34-41-01, Weather Radar System
(7) AMM 34-31-01, VOR System
(8) AMM 34-53-0, ATC System
(9) AMM 34-55-01, DME System
(10) AMM 34-57-01, Automatic Direction Finder (ADF) System

C. Radio and Navigation System Operational Checks
(1) Do an operational test for each of these systems that you did not operate after the lightning strike, or the flight crew reported a problem after the lightning strike, or if there was damage found near the system antenna.
(a) HF Communications System (AMM 23-11-0)
(b) VHF Communications System (AMM 23-21-0)
(c) ILS Navigation System (AMM 34-31-01)
(d) Marker Beacon System (AMM 34-35-0)
(e) Radio Altimeter System (AMM 34-48-0)
(f) Weather Radar System (AMM 34-41-01)
(g) VOR System (AMM 34-31-01)
(h) ATC System (AMM 34-53-0)
(i) DME System (AMM 34-55-01)
(j) Automatic Direction Finder (ADF) System (AMM 34-57-01)
(k) ACARS System (If installed)
(l) CPS System (If installed)
(m) SATCOM System (If installed)
(n) TCAS System (If installed)
(o) Airborne Telephone (If installed)
(p) Emergency Locator Transmitter, ELT (If installed)

D. Coaxial Cable Check
(1) If one or more of the previous systems have problems with their operational checks, examine and do a test of the coaxial cables and connectors.

E. Return the Airplane to Service
(1) After all lightning damage has been repaired, components replaced if necessary, and tests completed if necessary, the airplane can be put back into service.

HOT AIR DUCT RUPTURE CONDITION - MAINTENANCE PRACTICES (CONDITIONAL INSPECTION)

1. Hot Air Duct Rupture Conditional Inspection
   A. Examine any airplane structure which has been exposed to excessive heat to determine whether such overheating has weakened structure (Ref Nondestructive Test Manual).

EXCESSIVE AILERON OR RUDDER TRIM CORRECTION WITH FLAPS EXTENDED - MAINTENANCE PRACTICES (CONDITIONAL INSPECTION)

1. General
   A. This procedure contains one task:
      (1) Outboard Midflap Carriage Spindle Fracture Inspection
   B. Operators have reported that due to the fracture of the inboard spindle of the outboard midflap, pilots have had to hold more than 2.5 units of wheel or an unspecified amount of rudder to keep the airplane level. If one carriage spindle fractures at the forward end of the spindle (the critical section), the pilot can compensate for it with inputs to the ailron and/or the rudder. However, if both the inboard and the outboard spindles fracture in the critical section on an outboard flap, continued safe flight and landing for the airplane may be precluded.
   C. You must inspect the outboard flap carriage spindles for fractures if the flight crew reports either of the conditions below were necessary to maintain level flight when the flaps are in transition or the flaps are in any extended position:
      (1) 2.5 units or more of wheel
      (2) 1.0 or more units of rudder.
   D. This inspection is required prior to the next flight.

      WARNING: YOU MUST PERFORM THIS INSPECTION PRIOR TO THE NEXT FLIGHT. IF YOU DO NOT PERFORM THIS INSPECTION PRIOR TO THE NEXT FLIGHT, INJURY TO PERSONS AND/OR SEVERE DAMAGE TO THE AIRPLANE CAN OCCUR.

2. Outboard Flap Carriage Spindle Fracture Inspection
   A. General
      (1) You must do one of the two inspections below. The ultrasonic inspection is preferred and you should perform this inspection when the equipment is available. If ultrasonic inspection equipment is not available, you should perform the alternate procedure, Carriage Spindle Gap Check Measurement.
      (2) See AMM 27-51-81/401, Fig. 401 for carriage spindle removal and installation.
   B. Prepare for Inspection
      (1) Extend the flaps to detent 40.
   C. Ultrasonic Inspection (Preferred)
      (1) Perform an ultrasonic inspection on the carriages as shown in Boeing 737 NDT Manual, Part 4-57-50-02 to detect fractured carriage spindles.

          NOTE: Perform this procedure at both the inboard and outboard carriage positions.

(a) If a fracture is detected in one of the carriage spindles, do these steps:
1) Remove the outboard midflap (AMM 27-51-72/401).
2) Remove and replace the fractured carriage (AMM 27-51-81/401).
3) Install the outboard midflap (AMM 27-51-72/401).
(b) If you do not find spindle fractures, do this step:
1) Do the Flight Controls Trim Correction - Trouble Shooting (AMM 27-09-400/101) for troubleshooting of unexpected aileron and/or rudder inputs.

D. Carriage Spindle Gap Check Measurement (Alternate)
(1) Do the steps that follow for the inboard carriage:
(a) With a pen, mark a line on the leading edge of the midflap, in line with a fixed point on the carriage.
(b) Measure the distance between the line on the leading edge of the midflap and the fixed point on the carriage.
1) Write down the measurement.
(c) Apply enough upward force to the lower surface of the midflap, to lift the carriage off of the dead weight rollers.
(d) With the force appplied, measure the distance between the line on the leading edge of the midflap and the fixed point on the carriage.
1) Write down the measurement.
(e) If there is a difference between the two measurements, the carriage spindle has a fracture.
(2) Do the steps that follow for the outboard carriage:
(a) With a pen, mark a line on the leading edge of the midflap, in line with a fixed point on the carriage.
(b) Measure the distance between the line on the leading edge of the midflap and the fixed point on the carriage.
1) Write down the measurement.
(c) Apply enough upward force to the lower surface of the midflap, or to the end of the aft fairing, to lift the carriage off of the dead weight rollers.
(d) With the force applied, measure the distance between the line on the leading edge of the midflap and the fixed point on the carriage.
1) Write down the measurement.

(e) If there is a difference between the two measurements, the carriage spindle has a fracture.

(3) If a fracture is detected in one of the carriage spindles, do these steps:
(a) Remove the flap (AMM 27-51-72/401).
(b) Remove and replace the fractured carriage (AMM 27-51-81/401).
(c) Install the flap (AMM 27-51-72/401).

(4) If you do not find spindle fractures, do this step:
(a) Do the Flight Controls Trim Correction - Trouble Shooting (AMM 27-09-71/101) for troubleshooting of unexpected aileron and/or rudder inputs.

BIRD/HAIL STRIKE CONDITION - MAINTENANCE PRACTICES (CONDITIONAL INSPECTION)

1. General
   A. Examine the entire aircraft exterior especially wing leading edges, flaps and slats, engine inlets, and nacelles for impact damage when a bird strike is reported or suspected due to extreme possibility of multiple bird strikes. Aircraft configuration should be the same as when bird strike occurred, i.e., position of flaps, landing gear, etc. If flap position is unknown, examine trailing edge flaps and leading edge flaps and slats in fully extended position. Damage areas should be marked for thorough examination and/or action when the exterior examination of the total aircraft is complete. Refer to the Structural Repair Conditional Manual for repair of any impact damage.
2. Bird/Hail Strike Conditional Inspection
   A. Before this inspection can be done, you must clean the bird remains from the airplane, do this task: AMM 12-40-04/2 - Bird Strike Cleaning.
   B. Examine wing, nacelle strut, and horizontal and vertical stabilizer leading edge for displacement, distortion, fastener hole elongation or tear-out, flaking paint, skin cracks, and pulled or missing fasteners.
   C. Examine pylon panels, doors, and structure for buckling, cracks, and pulled or missing fasteners.
   D. Examine wing leading and trailing edge structure, panels, and doors for displacement, distortion, flaking paint, cracks, and pulled or missing fasteners. Examine both sides of honeycomb panels for cracks, delamination, soft spots, and core damage.
   E. Examine leading edge and trailing edge flap mechanism and trailing edge track fairing for distortion, cracks, misalignment, or other evidence of distress.
   F. Check control surfaces for binding, excess free play, misalignment, distortion or displacement of skins, and pulled or missing fasteners.
   G. Examine nose and main gear doors and linkage for distortion, cracks, and other evidence of distress.
   H. Check pilot's windows for delamination, spalling, or cracks and adjacent structure for distortion, cracks, and pulled or missing fasteners.
   I. Examine forward body nose section and radome for cracks, distortion, delamination, misalignment, displacement of skins, and pulled or missing fasteners.

J. Examine inside and outside of radome for honeycomb core damage and soft spots.

K. Examine nose cowl and nose dome for dents, cracks, buckling, pulled or missing fasteners, damage to acoustic panels, and damage to the Pt2 probe.

L. Examine engine for bent or broken fan and compressor blades (Ref. P&W MM 72-00/601). Also, look for dented and cracked side cowls, oil leaks, plugged ram air CSD cooler (if installed), and plugged Ps3 filter (Ref. P&W MM 75-30 IC) look in the exhaust area for F.O.D and/or metal particles. If engine appears serviceable, operate engine (Ref. AMM 71-09-100/201). To assure that takeoff power is available, record all engine parameters.

M. Determine if a takeoff power engine run is required:

(1) If there is evidence of a birdstrike or if changes in engine parameters have been recorded, you must operate the engine (Ref. 71-09-100/201). To assure takeoff power is available, record all engine parameters.

(2) If there is no evidence of bird ingestion and if no changes in engine parameters are recorded, and engine run at takeoff power is not required.

NOTE: Signs of birdstrike are not always easy to see. A small quantity of organic material in the inlet is a sign of a birdstrike. Bird parts are usually found in the locations that follow: on the inboard surface on the part span shrouds on the concave side, on the outboard ends of the exit guide vanes for the fan, and on the outboard ends of the inlet guide vanes for the low pressure compressor. The inspection of the inlet area can be helped if you follow the pattern of the bird parts to find the possibly damaged areas.

N. Examine the Stage 1 compressor for shingled blades. If you find shingled blades refer to the Pratt and Whitney JT8D maintenance manual Ref. 72-00/601.

3. Hail Strike (Airplane on Ground) Conditional Inspection

A. Examine wing, nacelle strut, and horizontal and vertical stabilizer fairing for dents, displacement, distortion, flaking paint, or skin cracks.

B. Examine pylon panels, doors, and structure for dents, cracks, and flaking paint.

C. Examine wing, structure, panels, and doors for dents, displacement, distortion, flaking paint, or cracks. Examine both sides of honeycomb panels for cracks, delamination, soft spots, and core damage.

D. Examine nose and main gear doors for dents and other evidence of damage.

E. Check pilot's windows for delamination, spalling, or cracks, and adjacent structure for distortion or cracks.

F. Examine forward body nose section and radome for dents, cracks, distortion, or delamination.

G. Examine inside and outside of radome for honeycomb core damage and soft spots.
H. For allowable hail damage, refer to the structural repair manual (SRM).

NACELLE PRESSURE RELIEF DOORS OPEN CONDITION - MAINTENANCE PRACTICES (CONDITIONAL INSPECTION)

1. General
   A. The pressure relief doors are designed to protect the nacelle/strut structure from over-pressurization due to excessive leakage from or rupture of pneumatic ducts. However, it is possible for the doors to open as a result of hard landings, severe turbulence, engine vibration, or any other condition that would create temporary or permanent distortion. If the doors are found open conduct the following inspections.
2. Examine Nacelle Structure
   A. Nacelle inner and outer surfaces for distortion, cracks and pulled or missing rivets. Particular attention should be given to discolored surfaces or flaking paint which could be evidence of high temperature air impingement.
3. Examine Pneumatic Ducting
   A. Hard ducting and flexible sensing line for cracks and tears, clamps, nuts, etc. for tightness.

EXCEEDING DESIGN SPEED CONDITION - MAINTENANCE PRACTICES
(CONDITIONAL INSPECTION)

1. Exceeding Design Speed Conditional Inspection
   A. Examine Airplane after Exceeding Design Speed Condition
      (1) Examine exterior surface of keel beam lower chords and webs for distortion, flaking paint, cracks and pulled or missing rivets; fuselage skin just aft of sta. 663 below windows for skin wrinkles.
      (2) If any damage is observed on these parts examine interior structure in affected area.
      (3) Examine accessible interior structure in fuselage, aft of rear pressure bulkhead for distortion, cracks, flaking paint and pulled or missing fasteners.
         (a) Check fuselage bulkheads and fin attach fittings, horizontal stabilizer center section hinge fittings, and stabilizer jackscrew mechanism mount fittings and support structure.
         (b) Inspect rub strips for evidence of movement of structure against rub strips. Such movement indicates distortion of structure.
      (4) Examine exterior surfaces around top and bottom of wing-to-body attachment, including wing to body fairing, for distortion, cracks, severe chafing and pulled or missing fasteners.
      (5) If any exterior damage is observed, examine the following:
         (a) Body to wing joints, longeron splice, and underwing drag splice for distortion, flaking paint, cracks and pulled or missing fasteners.
         (b) Wing exterior surfaces at skin splices for misalignment and pulled or missing fasteners, and along upper surface of wing leading edge and trailing edge skin for buckling.
      (6) Examine wing control surfaces and attachments at wing front and rear spars for cracks, pulled or missing rivets and for evidence of binding.

         WARNING: INSTALL LOCKS ON ALL EXTENDED LEADING EDGE FLAPS (REF 27-81-0, MAINTENANCE PRACTICES) TO PREVENT INJURY FROM INADVERTENT FLAP OPERATION.

      (7) Examine horizontal stabilizer exterior surfaces for evidence of buckling, checking particularly at skin splices for cracking and pulled or missing fasteners.
      (8) If any exterior damage is observed, examine spars and all accessible internal primary structure in affected area for distortion or buckling, cracks, flaking paint and pulled or missing fasteners.

(9) Examine elevator external surfaces for cracks, pulled or missing fasteners, and hinge bearings and actuator bearings for evidence of binding. Elevator tip balance weight tower for distortion, flaking paint, cracks and pulled or missing fasteners.
(10) If any external damage is observed, examine the elevator front spar web for distortion, flaking paint, cracks and pulled or missing fasteners.
(11) Examine fin and rudder in the same manner as horizontal stabilizer and elevators in paragraph 1.A.(7) thru (10).
(12) Check flight controls for freedom of movement.
(13) If any unusual handling conditions are observed, check all flight controls for force requirements and cable tensions (Ref 27-11-0, 27-21-0, 27-31-0, 27-41-0, 27-51-0, 27-61-0, and 27-81-0, Adjustment/Test).
(14) Examine engine-to-wing fairings and lower surface of nacelle cowlings for buckling, cracks, pulled or missing fasteners, or any unusual external condition.
(15) If any such conditions are observed, proceed with further examination of nacelle (AMM 5-51-211).
(16) Examine wing, nacelles, fuselage external surfaces, and all landing gear wheel wells, for evidence of fuel or any other fluid leakage.
(17) Whenever flight load accelerations reveal evidence of extensive damage, check aircraft for alignment (Refer to Structural Repair Manual, 51-60-0, Alignment Check Procedure).
(18) Check operation of landing gear doors and landing gear uplocks (Ref 32-10-0, 32-20-0, 32-32-0 and 32-33-0, Adjustment/Test).
(19) Check all inspection access panels and blowout panels for distortion, displacement, broken latches, skin cracks or delaminations, and pulled or missing fasteners.
(20) Examine wingtip fairings for delamination, distortion, flaking paint, cracks, and pulled or missing fasteners.
(21) Examine horizontal and vertical stabilizer for buckling, distortion, flaking paint, cracks, and pulled or missing fasteners.

LANDING GEAR OPERATION ABOVE DESIGN SPEED CONDITION - MAINTENANCE PRACTICES (CONDITIONAL INSPECTION)

1. Landing Gear Operation Above Design Speed Conditional Inspection
   A. Examine all nose and main gear doors including hinges, linkage and linkage support structure, and fairing panels for distortion, cracks, misalignment, displacement, fastener hole elongation or tear-out, pulled or missing fasteners, and any other evidence of distress.
   B. Examine system installations in wheel wells for any evidence of distress.

TIRE TREAD LOSS OR TIRE BURST - (CONDITIONAL INSPECTION)

1. General
   A. Following any incident involving the loss of tread from, or the bursting of, a nose or main gear tire, the areas detailed below should be inspected for impact damage and/or obstruction from tire fragments becoming lodged in the structure and components. Impact damage is usually evidenced by rubber and bitumen markings deposited on the impacted surface.
2. Tire Tread Loss - Conditional Inspection
   A. Examine lower surface of wing upper and lower inboard fixed trailing edge panels for damage, areas of delamination on local separation (detected by coin tapping method) and soft spots from core crushing (detected by pushing on surface).
   B. Examine inboard trailing edge flaps and fairings for damage, areas of delamination or local separation and soft spots from core crushing. Examine for tire fragments lodged in linkages or in flap carriages (main and foreflap sequence carriages).
   C. Examine trailing edge flap jackscrews, actuating linkages and rods for damage and obstruction from tire fragments. Examine flap jackscrew seal plate for delamination or local separation.
   D. Examine antenna and lower fuselage wing-to-body fairing panels for damage, areas for delamination or local separation and soft spots from core crushing.
   E. Examine wheel well areas for damage and obstruction from tire fragments. Pay particular attention to hydraulic plumbing and flap drive torque tubes for distortion due to impact damage from tire pieces.
   F. Examine landing gear assemblies, associated components and hydraulic plumbing for evidence of impact or flailing damage and hydraulic fluid leakage.
   G. Examine wheel well doors and actuating rods for damage and obstruction from tire fragments.
   H. Examine remaining tires on the affected gear for evidence of slashing and wire penetration of the tread and sidewalls.

VOLCANIC ASH CONDITION - MAINTENANCE PRACTICES (CONDITIONAL INSPECTION)

1. General
   A. Flight crew reports of electrostatic discharge across the windshields and a bright glow in the engine inlets along with subsequent engine shutdown in some cases and obscured visibility through the windshields and windows are indications of volcanic ash encounter.
   B. Volcanic ash is highly abrasive material generally considered to be non-corrosive over the short term. However, the abrasive nature of the ash can affect finishes resulting in a corrosive situation. Removal of volcanic ash and repair of finishes should be accomplished at the earliest opportunity.
   C. The texture of volcanic ash resembles talcum powder. The majority of the particles are under 5 microns with trace amounts over 50 microns. Because of the abrasive nature of volcanic ash, care should be taken not to rub the surface when washing the airplane (Ref 12-40-0).
   D. The ash will cling to exposed lubricated surfaces and may penetrate many conventional seals, enter the engine gas path and air conditioning system, and may enter other orifices on the airplane. It is assumed that volcanic ash will not enter sealed bearings such as wheel bearings. Monitoring of rotating or sliding parts for evidence of ash related damage not found initially should be considered as a follow-on program depending on the severity of the ash fallout.
   E. The conditional inspection should be accomplished if one or more of the following occur:
      (1) An airplane is flown through a cloud of volcanic ash.
      (2) An airplane is engulfed in volcanic ash fallout during ground operations (towing, taxiing, parking, etc.).
      (3) An airplane encounters existing volcanic ash fallout during landing or takeoff.
   F. Volcanic ash can cause personnel discomfort during the time of exposure. Precautions should be taken when working in a volcanic ash environment to prevent volcanic ash entering the eyes and respiratory system.

      WARNING: VOLCANIC ASH CAN CAUSE EYE IRRITATION AND MAY BE HAZARDOUS TO THE RESPIRATORY SYSTEM. PERSONNEL ENCOUNTERING VOLCANIC ASH CONDITIONS SHOULD WEAR PROTECTIVE CLOTHING, EYE GOGGLES, AND A RESPIRATOR MASK SUFFICIENT TO FILTER VOLCANIC ASH PARTICLES.

2. Volcanic Ash Conditional Inspection
   A. When volcanic ash is encountered, examine the following:
      (1) Examine frontal surfaces of fuselage (including weather radar radome), wing, engine nacelles, vertical stabilizer, and horizontal stabilizer for abrasion.
         (a) Examine wing leading edges for dents and allowable skin thickness per Structural Repair Manual.
         (b) Examine wing leading edge for roughness (AMM 27-81-21/601).
      (2) Examine windshields and windows for abrasion damage which obscures vision.
      (3) Examine engines for damage (Ref P&WA Chapter 72, Inspection/Check).
      (4) Examine engine control mechanisms and linkages for evidence of volcanic ash.
      (5) Examine pitot/static probes and static ports and PT2 probes for volcanic ash accumulation and plugged condition.
      (6) Examine pneumatic system as follows:
         (a) Remove bleed air precoolers (heat exchanger) (Ref 36-12-21) and examine for evidence of volcanic ash.

            NOTE: If no evidence of volcanic ash is found in bleed air and fan air outlets of bleed air precoolers, examination of pneumatic system is complete and remainder may be omitted.

         (b) Remove 13th stage bleed air valves (Ref 21-11-11) and examine for evidence of volcanic ash.
         (c) Remove bleed air valves (Ref 36-11-11) and examine for evidence of volcanic ash.
         (d) Remove 8th stage bleed air check valves (Ref 36-11-31) and examine for evidence of volcanic ash.
         (e) Remove pressure relief valves (Ref 36-11-0) and examine for evidence of volcanic ash.
         (f) Remove precooler cooling air valves (Ref 36-12-31) and examine for evidence of volcanic ash.
         (g) Remove isolation valve (Ref 36-11-21) and examine for evidence of volcanic ash.
         (h) Remove APU check valve (Ref 36-11-51) and examine for evidence of volcanic ash.
         (i) Remove APU bleed air (shutoff) valve (Ref 49-52-11) and examine for evidence of volcanic ash.
         (j) Examine ground air connector for evidence of volcanic ash.
         (k) Check operation of duct pressure transmitters (Ref 36-21-11).

(7) Examine air conditioning system as follows:
  (a) Remove water separators (Ref 21-51-31) and examine for evidence of volcanic ash.

    NOTE: If no evidence of volcanic ash is found in water separators, examination of air conditioning system is complete and remainder may be omitted.

    If APU was in operation and supplying air to an airconditioning pack, then pack inspection is required.

  (b) Remove air cycle pack heat exchangers (Ref 21-51-21) and examine for evidence of volcanic ash.
  (c) Remove air cycle machines (Ref 21-51-11) and examine for evidence of volcanic ash.
  (d) Remove pack flow control valves (Ref 21-11-21) and examine for evidence of volcanic ash.
  (e) Remove turbofans (Ref 21-52-61) and examine for evidence of volcanic ash.
  (f) Examine outflow valve for evidence of volcanic ash.
(8) Examine exterior light lenses for abrasion.
(9) Examine fuel system as follows:
  (a) Obtain fuel sample from each fuel tank sump (Ref 12-11-0) and examine samples for evidence of volcanic ash.
  (b) Obtain fuel sample from each surge tank sump (if fuel is present in surge tanks) (Ref 12-11-0) and examine sample for evidence of volcanic ash.
  (c) Examine interior of each surge tank (Ref 28-11-11) for evident of volcanic ash.
(10) Examine oxygen system (if cabin and cockpit contamination is reported) as follows:
  (a) Remove diluter demand regulators (Ref 35-11-41) and/or mask/regulator stowage boxes (Ref 35-11-45) and examine for evidence of volcanic ash.
  (b) Remove flow control units (Ref 35-21-21) and examine for evidence of volcanic ash.
  (c) Examine portable oxygen cylinder masks for evidence of volcanic ash.
  (d) Examine passenger and crew oxygen masks for evidence of volcanic ash.

(11) Examine auxiliary power unit (APU) as follows:
  (a) Examine inlet and exhaust ducts for evidence of volcanic ash ingestion.

    NOTE: If no evidence of volcanic ash is found in APU inlet and exhaust ducts, examination of APU is complete and remainder may be omitted.

  (b) Remove oil, air, and fuel filters (Ref 49-91-11, 49-52-21, 49-31-21 SRV) and examine for evidence of volcanic ash.
  (c) Disconnect compressor discharge pressure and bleed air lines (Ref 49-52-91 CP; 49-52-11 R/I) and examine for evidence of volcanic ash.
  (d) Remove electrical and pneumatic control valves (Ref 49-61-21, 49-61-31 R/I) and examine for evidence of volcanic ash.

(12) Examine potable water system as follows:
  (a) Remove bleed air, compressor intake, and compressor outlet air filters (Ref 38-41-11) and examine for evidence of volcanic ash.

    NOTE: If no evidence of volcanic ash is found in air filters, examination of potable water system is complete and remainder may be omitted.

  (b) Remove compressor (Ref 38-41-21) and examine for evidence of volcanic ash.
  (c) Obtain water sample from water tanks (Ref 38-11-0) and examine for evidence of volcanic ash.
  (d) Remove pressurization check valves (Ref 38-11-0 and 38-41-0) and examine for evidence of volcanic ash.
  (e) Remove water quantity transmitters (Ref 38-11-21 and 38-11-22) and examine for evidence of volcanic ash.

(13) On Passenger/Cargo Convertible airplanes, examine smoke detectors for evidence of volcanic ash.

(14) Examine engine and APU fire extinguisher bottle nozzles for evidence of volcanic ash.

(15) Examine constant speed drive and oil cooler for evidence of volcanic ash.

(16) Examine landing gear as follows:
  (a) Examine exposed inner cylinders of main and nose landing gear shocks struts for evidence of volcanic ash.
  (b) Examine all hydraulic actuator exposed piston rods for evidence of volcanic ash.
  (c) Examine all landing gear component attachment points for evidence of volcanic ash.

(d) Examine landing gear door hinges and lock mechanisms for evidence of volcanic ash.
(e) Examine main and nose gear manual release wheel well mechanisms for evidence of volcanic ash.
(f) Examine all cables and pulleys for evidence of volcanic ash.
(g) Examine landing gear brakes for evidence of volcanic ash.
(h) Examine landing gear selector valve and brake metering valves for evidence of volcanic ash.
(i) Examine proximity switches (sensors) for evidence of volcanic ash.

(17) Examine hydraulic system as follows:
(a) Obtain sample of hydraulic fluid (Ref 29-09-111) and examine for evidence of volcanic ash.
(b) Remove air pressure filter (Ref 29-09-321), and air pressure regulator (Ref 29-09-341), vent filter (Ref 29-09-331), check valves (Ref 29-11-101, 29-12-61, and 29-21-71), bleed valve (Ref 29-09-300), relief valves (Ref 29-09-351, 29-12-51, and 29-21-61), and charging valve (Ref 29-09-300) and examine for evidence of volcanic ash.

(18) Examine flight controls as follows:
(a) Examine aileron, elevator, rudder, leading edge flap, leading edge slat, and spoiler actuator exposed piston rods for evidence of volcanic ash.
(b) Examine control cables in unpressurized area for evidence of volcanic ash.
(c) Examine stabilizer jackscrew for evidence of volcanic ash.
(d) Examine all flight control surface hinges for evidence of volcanic ash.
(e) Examine trailing edge flap tracks and flap mechanisms for evidence of volcanic ash.
(f) Examine trailing edge flap track fairings and linkages for evidence of volcanic ash.
(g) Examine leading edge flaps, leading edge slats, and mechanisms for evidence of volcanic ash.
(h) Examine aileron and elevator balance panels for evidence of volcanic ash.

(19) Examine wing and engine nacelle thermal anti-icing system as follows:
(a) Remove wing anti-ice valves (Ref 30-11-11) and examine for evidence of volcanic ash.
(b) Remove engine and nacelle anti-ice control valves (Ref 75-11-11, 75-11-21) and examine for evidence of volcanic ash.

(20) Examine airplane interior (if cabin and cockpit contamination is reported) as follows:
   (a) Examine upper and main deck compartments, closets, seats, powered crew seats, floor coverings, lavatories, lavatory components, galleys, and galley components for evidence of volcanic ash.
   (b) Examine refrigeration/chiller units (if installed) for evidence of volcanic ash.
   (c) Examine baggage/cargo systems and electrical/electronic compartments for evidence of volcanic ash.
   (d) On executive airplanes, examine powered window blinds for evidence of volcanic ash.
   (e) Examine control cables and mechanisms for evidence of volcanic ash.

DRAGGED TAIL CONDITION - MAINTENANCE PRACTICES (CONDITIONAL INSPECTION

1. Dragged Tail Conditional Inspection
   A. Inspect lower fuselage skins from BS 747 to tail cone for scrapes, burns, holes, loose or missing fasteners and signs of cracks or buckling of the belly skin.
   B. If damage to exterior fuselage skin is detected, inspect internally in the area of the damage, for bent or cracked stringer, frames, or clips: buckled or wrinkled webs; loose or missing fasteners.
   C. If damage is detected, repair damage per Structural Repair Manual or other approved procedure.

AIRFRAME VIBRATION CONDITION (CONDITIONAL INSPECTION) - MAINTENANCE PRACTICES

1. General
   A. This procedure provides a check of items which may cause inflight airframe vibration. The vibration may be eliminated or reduced as a result of the check of these items.
   B. Vibration can be caused by many factors. Vibration similar to mach buffeting felt in the forward cabin can be induced by trailing edge flaps and usually occurs at high speed. Similar type vibration, at lower speeds on climb and in cruise, may be created by ground spoiler float, excessive slop in outboard aileron/tab, or loose doors and fairings.
2. Conditional Inspection
   A. Vibration occurs with trailing edge flaps up and is most noticeable in aft and forward fuselage. Check the following:
      (1) Check for excessive play in elevator tab pushrod, tab lockout mechanism, or tab hinges (AMM 27-31-0/101). Also perform an elevator tab free-play check and inspection of elevator tab hinge hardware per Service Bulletin 737-55A1070.
      (2) Check for loose elevator hinge fitting bolts (AMM 27-31-0/101).
      (3) Check for elevator balance panel hinge bolts (AMM 27-31-41).
      (4) Check for loose or worn elevator output torque tube bolts which attach inner or outer torque tubes (AMM 27-31-0/101, AMM 27-31-191).
      (5) Check for loose or worn elevator output torque tube crank, control, pushrod or elevator mast fitting (AMM 27-31-0/101, AMM 27-31-191).
      (6) Make sure that all doors, panels, and fairings are in fair and attached securely.
      (7) Make sure that nose and main gear doors are faired and all seals intact.
      (8) Check nose gear doors for proper adjustment (AMM 32-22-0/501).
      (9) Check for excessive play in horizontal stabilizer hinge bearing (AMM 27-41-31/601).
      (10) Check for separation or deterioration of elevator hinge seals or elevator nose seals (AMM 27-31-171).
      (11) Check for abnormal vibration in auxiliary power unit (APU) (AMM 49-00/101).
      (12) Check for loose or worn APU inlet door compartments (AMM 49-15-0/501).
      (13) Check for damaged or loose aft body vortex generators (AMM 53-31-21/401).
   B. Vibration occurs with trailing edge flaps up and is most noticeable on the wing root area. Check the following:
      (1) Check for misadjusted upper wing trailing edge panels (AMM 27-51-72/501).
      (2) Check for loose or damaged outboard trailing edge flap track fairing (AMM 27-51-121).
      (3) Check for misadjusted ram air exhaust louvers (AMM 21-51-91).
      (4) Check for separation of ram air inlet door seals (AMM 21-51-41).
      (5) Check for misadjusted main landing gear wing door (AMM 32-13-21).

(6) Check for delamination or deterioration of trailing edge aftflap (SRM 51-40-6).

C. Vibration occurs with trailing flaps. Extended between 2 and 5 units and is most noticeable in wing root area. Check the following:
(1) Check for vertical play in trailing edge flap assembly foreflap (AMM 27-51-41/601).
(2) Check for wear of foreflap sequencing carriage bearing (AMM 27-51-111/601).
(3) Check for loose attachment bolts on hinged flap carriage rollers (AMM 27-51-51/401).
(4) Check for play in trailing edge inboard flap aft segment.
(5) Check for wear or deterioration of aft segment actuating mechanism cam roller bearing.
(6) Check for misadjusted upper wing trailing edge panels (AMM 27-51-72/501).
(7) Check for foreflap/spoiler interface blade seals (AMM 27-61-11/401).
(8) Check for loose leading edge slat actuator access panel.
(9) Check for deterioration of trailing edge aftflaps or foreflap.

D. Vibration associated with noise. Check the following:
(1) Check for missing sealant at wing-to-body fairing.
(2) Check for discrepant ground service check swing valve (AMM 21-21-11/401).
(3) Check for loose or vibrating air distribution duct (AMM 21-21-0 thru AMM 21-24-0).
(4) Check for misadjusted nose landing gear door (AMM 32-33-11).
(5) High-pitched noise that can be heard at the aft two to three seat rows.
(a) Check the outflow valve diffuser screen per Service Letter 737-SL-21-30.

E. Vibration felt in control column.
(1) Check elevator control cable tension (AMM 27-09-111).

F. High frequency vibration and sound occurs when the flaps are extended. Vibration can be heard over the wing.
(1) Check the inboard midflap seal plate (AMM 27-51-341).

NOTE: A misadjusted seal plate can cause a humming noise that can be heard at the seats just aft of the wing.

3. In-flight Airframe Vibration
A. Boeing has compiled vibration information obtained from flight test, as well as individual operators. This information was used to create the troubleshooting guide. It is suggested that operators use applicable guides while troubleshooting airframe vibration.

4. Vibration Diagnosis Flight Test

A. Fly aircraft at the same speed, altitude, payload, and angle of attack associated with the vibration report. Monitor for the onset of vibration. Proceed per "vibration absent" or "vibration present".

(1) "Vibration absent" try to induce vibration per the following procedure. Restore aircraft to normal flight between each step.

(a) Vary speed (± 30 knots), altitude (± 1000 ft) and angle of attack.

(b) Apply small up-stabilizer angle and hold; then, apply small down-stabilizer angle and hold.

(c) Apply small right-rudder angle and hold; then, apply small left-rudder angle and hold.

1) If no vibration is found, terminate procedure and monitor for vibration during service. If vibration cannot be duplicated during troubleshooting, but continues to occur intermittently during service, it is suggested that flight crew use Fig. 201 to record details of the event. Alternately, flight crews can use Fig. 202, at their discretion and the discretion of their flight operations department, to gather more detailed information to assist troubleshooting.

(2) "Vibration present" - Isolate the vibration location and frequency. A "low frequency" can be felt or seen: up to about 20 hertz; a "high frequency" can be sensed and usually heard above 25 hertz. For the low frequency, try to identify the direction (vertical, lateral, etc.). Then, execute the flight procedures listed on Fig. 202 and observe/record the effect of each step on the vibration. Small changes may be meaningful. Often a visual observation can confirm movement of an engine or other surface. Allow sufficient time during each step for the vibration to change (30 seconds to 1 minute on condition).

(a) If no source of vibration can be identified or isolated to a system, terminate the procedure and monitor aircraft for vibration during service. Contact Boeing Service Engineering for further assistance.

(b) If Boeing assistance is required, the following information is useful for Boeing evaluation of the vibration.

1) All results from the aforementioned flight testing. If possible, provide completed copies of Fig. 201 and/or 202.

2) What are the locations of any unique external features such as external doublers, skin patches or dents on the fuselage or wing surfaces.

3) Did any maintenance action precede the initial report of vibration. What maintenance action was taken during the diagnosis of the vibration.

5. Airframe Vibration

A. This guide has been compiled to aid in troubleshooting airframe vibrations on 737-100/-200 airplanes. The guide is divided into two levels of inspections and tests.

B. LEVEL I: General Inspections - Performed on Ground - Initial report may not specify vibration type or location.

(1) Level I checks might be used during a sensory check of the airplane after the first flight squawk.

C. LEVEL II: Inspections and Tests - Initial report may specify vibration type and/or location, or flight condition - Inspections and tests require removal of panels, taking measurements, performing ground tests, etc.

(1) Level II check are more in-depth and require more time to perform.

6. Level I - General Inspections

Level I - General Inspections	
REPORTED VIBRATION	INSPECTION LOCATION
Reported high frequency vibration that is usually manifested as a sound but in some cases might be felt. The vibration can be constant during all phases of flight or may vary with increased airspeed.	Check for the following:
	1. Missing sealant at the wing-to-body fairing (typical IPC 53-50-0-10, Item 10).
	2. Discrepant ground service swing check valve per AMM 21-21-11.
Vibration might be heard/felt in a specified location or may be transmitted to a broad area of the airframe.	3. Ram air inlet deflector door for looseness per AMM 21-52-21.
	4. Ram air exhaust modulation louver assembly per AMM 21-52-91.
	5. Mis-adjusted nose landing gear doors per AMM 32-22-11.
	6. Mis-adjusted main landing gear strut and wing doors per AMM 32-13-11 and 32-13-21.
	7. Damaged, mis-faired or malfunctioning lower fuselage doors, access panels and hatches including landing gear and cargo doors, ground service access panels, maintenance compartment access hatches and any missing or delaminated panels. Also check all panels and components in and around the engines. Reference AMM 52-31-0 (Cargo Door), 52-48-11 (A/C Access Doors), 52-48-21 (APU Access Door), 52-48-31 (Lower Nose Compartment Access Door), 52-48-41 (EE Bay Access Door), 52-49-0 (Misc Doors).

Level I - General Inspections	
REPORTED VIBRATION	INSPECTION LOCATION
Reported high frequency vibration that is usually manifested as a sound but in some cases might be felt. The vibration can be constant during takeoff or approach when flaps are out. Vibration can be heard/felt in the wing root area.	Check for the following:
	1. Loose attachment bolts on the hinged flap carriage rollers per AMM 27-51-51.
	2. Play in the trailing edge inboard flap aft. Segment caused by wear or deterioration of the aft segment actuation mechanism cam roller bearing and drum assembly components. These components are located on the inboard end of the midflap segment (typical IPC 57-53-2-14A, Items 85, 86, 225, and 230).
	3. Separation or deterioration of the foreflap/spoiler interface blade seal per AMM 27-61-11, Fig. 401.

7. Level II - Inspections and Tests
   A. Use this table after you get a vibration report that specifies the location and type of vibration. The numbers in the table relate to the "Check Numbers" column in the Inspections and Tests table.
   B. Vibration Types and Locations

Level II - Vibration Types and Locations				
REPORTED VIBRATION TYPE	CREW COMPARTMENT	PASSENGER COMPARTMENT - OVERWING	PASSENGER COMPARTMENT - GENERAL	AFT EMPENNAGE
HIGH FREQUENCY - VIBRATION	103, 106	101, 102	101, 102	106
LOW FREQUENCY VIBRATION ASSOCIATED WITH FEEL	100, 106, 107	100	100, 104	100, 106, 107
HIGH FREQUENCY VIBRATION ASSOCIATED WITH SOUND AND FEEL	103	101, 102, 105	101, 102, 105	

C. Inspections and Tests (Level II)

D. Check Number 100:

(1) Airplane reported as "buffeting". Do the following:

(a) Check body/wing and tail for excessive or large dents/patches and bulges. Pay particular attention to the leading edge devices. The leading edge devices should be undamaged and free of patches and dents. The condition of the leading edges have a significant effect on high speed buffet characteristics. Refer to Structural Repair Manual (SRM) 57-50-1 for maximum allowable damage.

(b) Check that the wing vortex generators are undamaged and are properly positioned on the airplane per Dispatch Deviations Procedure Guide, Section 3, Item No. 57-30-6.

(c) Check leading edge flaps and slats for proper fair and adjustment. Pay particular attention to fair of slat with wing leading edge when leading edge devices are retracted. Mismatch of slat upper trailing edge has significant effect on airplane high speed buffet characteristics (AMM 27-81-0/501).

(d) Check condition of spoiler panel to flap seals (AMM 27-61-11/501).

(e) Check both captain's and first officer's airspeed/mach and altimeter readings are accurate (AMM 34-12-0/501).

(f) Perform full range leakage ground tests of captain's and first officer's pitot pitot-static systems (AMM 34-11-0/501).

(g) Verify that the proper pitot static probes are installed in four places (typical IPC 34-10-0-2, Items 15 and 20).

E. Check Number 100:

(1) Reported high frequency vibration manifested by sound when flaps are extended. Vibration may be heard over the wing. Do the following:

(a) Check for vertical play in the trailing edge flap assembly foreflap caused by wear of the foreflap sequencing carriage bearings (AMM 27-51-41/601 and AMM 27-51-111/601).

(b) Check for loose attachment bolts on the hinged flap carriage rollers (AMM 27-51-51/401).

(c) Check for play in the trailing edge inboard flap aft segment caused by wear or deterioration of the aft segment actuation mechanism cam roller bearing. The bearing is located on the inboard end of the midflap segment (typical IPC 57-53-2-14A, Item 85).

(d) Check the adjustment of the upper wing trailing edge panels (typical IPC 57-30-0-15) (AMM 27-51-72/501).
(e) Check for separation or deterioration of the foreflap/spoiler interface blade seal (AMM 27-61-11, Fig. 401).
(f) Check for loose leading edge slat actuator access panel (typical IPC 57-30-0-45).
(g) Check the trailing edge aftflap for delamination per Structural Repair Manual (SRM) 51-40-6.
(h) Check the inboard aftflap drive mechanism (typical IPC 57-53-02-14A, Items 85, 86, 225 and 230).
(i) Check the inboard midflap seal plate (elephant ear) (AMM 27-51-341/401). A misadjusted seal plate may cause a humming noise that can be heard at seats just aft of wing.
(j) Remove/Replace left or right pack turbofan (typical IPC 21-50-0-14, Item 260).

F. Check Number 102:
(1) Reported high frequency vibration manifested by sound when flaps are up. The vibration may or may not be heard during all phases of flight. Vibration might be heard over the wing or in the passenger compartment. Do the following general checks and adjustments:
(a) Wing trailing edge (AMM 27-51-12/501 and AMM 27-51-72/501).
(b) Trailing edge flap track fairing (AMM 27-51-121/501).
(c) Ram air exhaust louvers (AMM 21-52-91/401).
(d) Ram air inlet door seals (AMM 21-52-41/401).
(e) Main landing gear wing door (AMM 32-13-21/501).
(f) Trailing edge aftflap for delamination per Structural Repair Manaul (SRM) 51-40-6.
(g) Missing sealant at the wing-to-body fairing (typical IPC 53-50-0-10, Item 10).
(h) Discrepant ground service swing check valve (typical IPC 21-20-0-42, Item 90, AMM 21-21-11).
(i) Air distribution duct (AMM 21-21-0 through AMM 21-24-0).
(j) Ram air deflector door adjustment (AMM 21-52-21/401 and AMM 21-52-31/401).
(k) Check for freeplay in aileron tab (AMM 27-09-600/601).
(l) Check for worn tab control rod bearings (AMM 27-11-151/601).
(m) Check aileron hinges for wear (AMM 27-11-11/601).
(n) Check aileron cable tension (AMM 27-11-0/501).
(o) Check for loose or worn balance panel hinges, hinge fittings, and/or bolts (AMM 27-11-31/601).

G. Check Number 103:
(1) Reported high frequencey vibration manifested by sound when flaps are up. The vibration may or may not be heard during all phases of flight. Vibration might be heard in the crew compartment. Do the following general check and adjustments:
(a) Nose landing gear doors (AMM 32-22-11/401).

(b) Lower fuselage doors, access panels and hatches located in the vicinity of the crew compartment.

H. Check Number 104:
(1) Vibration is reported as hydraulic system related. One beat per second knocking sound during climb.
(a) Hydraulic reservoir "A" not holding pressure, or hydraulic reservoir head pressure in reservoir "A" is more than 55 psi. Remove and replace air pressure regulator (typical IPC 29-14-00-10, Item 140).

I. Check Number 105:
(1) Vibration is reported as engine related. Do the following:
(a) Check engine mount for tightness (AMM 54-41-11/401 and AMM 71-20-0/601).
(b) Adjust the P&D valve (AMM 73-21-1/401) (Reference P&WA JT8D Maintenance Manual).
(c) Remove and replace the fuel control (AMM 73-21-1/401) (Reference P&WA JT8D Maintenance Manual).

J. Check Number 106:
(1) Reported vibration which can be constant during all phases of flight and may be felt in both the crew compartment and aft empennage.
(a) Rudder checks:
1) Check rudder freeplay (AMM 27-09-600/601).
2) Remove and replace worn components (AMM 27-21-11/601, AMM 27-21-12/601 and AMM 27-21-19/601).
(b) Elevator Tab Checks:
1) Check elevator tab freeplay (AMM 27-09-600/601).
2) Inspect elevator tab lock linkage and pushrods (AMM 27-31-121/601). Inspect for missing tab lock linkage bolts.
3) Inspect elevator tab hinge fitting bolts and bearings (AMM 27-31-31/601).
4) Inspect outboard elevator control tab hinge fittings for looseness per S/B 737-55-1040.
(c) Elevator Checks:
1) Check elevator freeplay (AMM 27-09-600/601).
2) Check for loose or worn output torque tube crank control pushrod or elevator mast fitting (AMM 27-31-191/601).

3) Check elevator hinge fittings per S/B 737-55-1054 and for worn bearings. A check of the hinges may be accomplished by placing the elevator in the neutral position and applying a "shake" force at the hinge positions.
4) Check for loose or worn elevator output torque tube bolts which attach the inner and outer torque tubes per AMM 27-31-191/601 and S/B 737-27-1057.
5) Check for worn bushings at the outboard end of torque tube (typical IPC 27-30-00-16, Items 225 and 226).
6) Check for loose or missing elevator balance panel hinge bolts (AMM 27-31-41/601).
7) Check for separation or deterioration of elevator hinge seal (AMM 27-31-171/501).
8) Check balance of elevator assembly per Structural Repair Manual (SRM) 51-80-04, -05.

K. Check Number 106:
(1) Reported vibration which is present during high airspeed conditions (Mach > 0.70). Vibration diminishes or ceases with decline in airpeed. Do the following Horizontal Stabilizer and Tail checks:
(a) Check for gaps between the mating surface of the tailcone and the fuselage. If the tailcone was previously removed, the sealant may be missing. Fill seal gap with BMS 5-79.
(b) Check for excessive play in the horizontal stabilizer hinge bearing and fack screw assembly (AMM 27-41-31/601).
(c) Check for aft body vortex generators per Dispatch Deviations Procedures Guide, Section 3, Item No. 55-30-1. If not installed, install per S/B 737-55-1005 and 737-53-1032. Repair damaged or loose vortex generators (AMM 53-31-21/401).

L. Check Number 107:
(1) The vibration is categorized as "Dutch Roll" (a phenomena of the empennage rocking from side to side during flight). While in flight, switch yaw damper to "off" for at least 30 seconds and note any change in vibration level. Do the following succession. Discontinue steps when discrepant component is found.
(a) Check and/or replace yaw damper coupler (AMM 22-11-141/401).
(b) Replace the rudder PCU Electro-Hydraulic Servo-valve (typical IPC 27-20-1-1, Item 401).
(c) Check and/or replace the rudder PCU (AMM 27-21-91/401 or AMM 27-21-92/401).

FLIGHT DECK VIBRATION EVENT LOG

To assist in the resolution of any vibration observed in the flight deck or in the cabin, please complete the following:

Date: _____ Aircraft: _____ Model: 737-_____ T/O Gross Wt: _____

Flight condition at approximate onset: (please check applicable box)
T/O Roll ☐ Climb <3,000ft) ☐ Climb ☐ Cruise ☐ Hold ☐ Decent ☐ Landing ☐

Altitude:_____ Airspeed:_____ Mach:_____ Autopilot: on / off

Eng #1:___% N1___% N2 Eng #2:___% N1___% N2 Eng Vib:___#1___#2

What event, if any, initiated the vibration?_____

What event, if any, caused the vibration to stop?_____

Was the vibration continuous or intermittent? Continuous ☐ Intermittent ☐

How does the vibration start and stop? Starts/Stops Suddenly ☐ Starts/Stops Slowly ☐

What is the magnitude of the vibration?

Barely perceptible ☐ Clearly Noticeable ☐ Annoying ☐ Uncomfortable ☐

Was the vibration noticeable in the cabin?_____ If yes, where? _____

What are the characteristics of the vibration: (please check one)

☐ Low Frequency: Motion can be felt by the whole body.
Motion of sun visors or window heater cable man may be noticeable.

Direction: Mostly Lateral ☐ Mostly Veritical ☐ Vertical and Lateral ☐

☐ High Frequency: Vibration that can be felt tactilely with hands and feet.
Discribe the locations(s) where the vibration is felt:
(i.e. rudder pedal or control column)

_____

If there was noise associated with the vibration, describe the character of the noise.
(e.g. moan, drone, buzz, whine, whistle)

_____

_____

_____

_____

_____

Additional description of vibration/noise or other observations:

_____

_____

_____

_____

Flight Deck Vibration Event Log
Figure 201

FLIGHT PROCEDURES FOR VIBRATION TROUBLESHOOTING

Please record for each flight:

Flight number _____ Take-off Weight _____

Date _____ Take-off CG _____

Take-off UMT (GMT) _____ Load distribution _____

Record for onset of vibration:

Altitude	Mach	Speed	Stab Trim	Rudder Trim	Fuel Left	Fuel Center	Fuel Right

Autopilot: Mode: _____ Airspeed: _____ Climb Speed: _____ OAT: _____ AOA: _____

Eng #1: ___ % N1 ___ % N2 Eng #2: ___ % N1 ___ % N2 Eng Vib: ___ #1 ___ #2

FOR VIBRATION TROUBLESHOOTING, PLEASE COMPLETE ALL TESTS ONLY AS OPERATIONS ALLOW. ORDER MAY VARY AS REQUIRED TO COMPLETE. WITH DISCRETION, TESTS MAY BE ACCOMPLISHED DURING REVENUE FLIGHT.

TEST (Restore the aircraft to normal flight between each step)	Effect on vibration (circle one)	
1) Disengage autoplilot and retrim (as required) without changing speed or thrust. Re-engage autopilot.	No Change Increase	Decrease Stopped
2) Turn yaw damper off.	No Change Increase	Decrease Stopped
3a) Gradually increase speed without changing thrust until vibration changes.	No Change Increase	Decrease Stopped
3b) Gradually decrease speed without changing thrust until vibration changes.	No Change Increase	Decrease Stopped
4a) Gradually increase/degrease engine 1 speed without changing airspeed until vibration changes or until thrust has been increased/decreased by 10% N1. Indicated Engine Vibration = _____ #1 _____ #2	No Change Increase	Decrease Stopped
4b) Restore engine 1 to original N1 setting. Indicated Engine Vibration = _____ #1 _____ #2	No Change Increase	Decrease Stopped
4a) Gradually increase/degrease engine 2 speed without changing airspeed until vibration changes or until thrust has been increased/decreased by 10% N1. Indicated Engine Vibration = _____ #1 _____ #2	No Change Increase	Decrease Stopped

Flight Procedures for Vibration Troubleshooting
Figure 202 (Sheet 1)

1413816

TEST (Restore the aircraft to normal flight between each step)	Effect on vibration (circle one)	
5b) Restore engine 2 to original N1 setting. Indicated Engine Vibration = _____#1 _____#2	No Change Increase	Decrease Stopped
6a) Input right rudder trim. Maintain heading with wheel. Trim Change = _____ Units	No Change Increase	Decrease Stopped
6b) Return to hands-off trim.	No Change Increase	Decrease Stopped
7a) Input left rudder trim. Maintain heading with wheel. Trim Change = _____ Units	No Change Increase	Decrease Stopped
7b) Restore engine 1 to original N1 setting.	No Change Increase	Decrease Stopped
8a) Mis-trim stabilizer airplnae nose down while pulling on column to maintain 1G flight. Continue mis-trimming until vibration changes or approximately 20 lbs column pull is required. Trim Change = _____ Units	No Change Increase	Decrease Stopped
8b) Return to hands-off trim.	No Change Increase	Decrease Stopped
9a) Mis-trim stabilizer airplnae nose down while pulling on column to maintain 1G flight. Continue mis-trimming until vibration changes or approximately 20 lbs column pull is required. Trim Change = _____ Units	No Change Increase	Decrease Stopped
9b) Return to hands-off trim.	No Change Increase	Decrease Stopped
10a) Using the control wheel, input small left aileron.	No Change Increase	Decrease Stopped
10b) Using the control wheel, input small left aileron.	No Change Increase	Decrease Stopped
11) Turn hydraulic system "A" off.	No Change Increase	Decrease Stopped
12) Turn hydraulic system "B" off.	No Change Increase	Decrease Stopped
23) Turn air conditioning pack off.	No Change Increase	Decrease Stopped

Flight Procedures for Vibration Troubleshooting
Figure 202 (Sheet 2)

TEST (Restore the aircraft to normal flight between each step)	Effect on vibration (circle one)	
24) Turn bleed air valve off.	No Change Increase	Decrease Stopped
25) Turn electrical generator 1 off. (Keep APU generator on line)	No Change Increase	Decrease Stopped
26) Turn electrical generator 2 off. (Keep APU generator on line)	No Change Increase	Decrease Stopped
27) Cycle landing gear selector handle to up, pause and return handle to off.	No Change Increase	Decrease Stopped
28) Cycle speed brakes. (Observe operational restrictions)	No Change Increase	Decrease Stopped

In addition to the above information, please comment on the following questions:

1) Is the vibration vertical or lateral? _____

2) In what section of the fuselage is the vibration most noticeable? _____

3) What is the approximate frequency and intensity of the vibration? _____

4) At what trailing edge flap setting does the vibration occur? _____

5) Is the vibration continuous after initiation or does it dampen with time? _____

Additional comments:

_____

_____

_____

_____

_____

_____

_____

_____

Flight Procedures for Vibration Troubleshooting
Figure 202 (Sheet 3)

1413845

OVERWEIGHT LANDING - MAINTENANCE PRACTICES (CONDITIONAL INSPECTION)

1. General
   A. Overweight or Hard Landing
      (1) When the airplane makes a landing at weights above the maximum design landing weight (MLW), the landing will be considered as overweight landing, and the examination described below is required.
         (a) If the landing was also a hard landing, the Hard Landing Conditional Maintenance Practices Inspection, plus the Overweight Landing Conditional Inspection must be done as defined in the respective procedures. If damage is found in the Phase I Conditional Inspection of either procedure, then both the Overweight and Hard Landing Phase II inspections must be done.

            NOTE: The pilot must make the decision if the airplane was a HARD LANDING. An OVERWEIGHT LANDING that was not accompanied by a HARD LANDING does not require a phase 2 inspection.

   B. The Examination
      (1) The examination is divided into Phase I and II. Phase I, step 2A examination is applicable when comments indicate the overweight landing sink rate was low to moderate. Phase I, step 2B examination is applicable when comments indicate the overweight landing sink rate was more than moderate.
      (2) If Phase I, step 2A reveals any evidence of damage, Phase I, step 2B must be accomplished. If Phase I, step 2B reveals any evidence of damage, Phase II must be accomplished.
      (3) If examination per Phase I reveals no damage, no further examination is necessary, except repeat inspections of BS 706 main landing gear trunnion support fitting must be accomplished per SB 737-53-1060, Rev 2.
      (4) If examination per Phase I reveals no damage, no further examination is necessary, except on airplanes with two piece bonded support fittings (Fig. 201). Airplanes with two piece bonded support fittings require repeat inspections of BS 706 main landing gear trunnion support fittings per SB 737-53-1060, Rev 2.
      (5) If examination per Phase I reveals no damage, no further examination is necessary.
2. Phase I Examination
   A. Examine airplane structure for overweight landing condition at low to moderate sink rate.
      (1) Check tires and wheels for damage.
      (2) Check main gear shock strut upper and lower ends for evidence of fluid leakage.

         NOTE: A small amount of fluid on the inner cylinder is normal.

(3) Check nose gear shock strut upper and lower ends for evidence of fluid leakage.

NOTE: A small amount of fluid on the inner cylinder is normal.

(4) Check nose gear tires and wheels for damage.

B. Examine airplane structure for overweight landing at more than moderate sink rate.

(1) Landing Gear Area:

(a) Nose wheel well area for buckling, flaking paint, cracks and pulled or missing fasteners in web of nose wheel well, particularly in vicinity of trunnion support.

(b) Nose gear wheels for cracks.

(c) Nose gear orifice support tube attach nut for evidence of fluid leakage.

(d) Nose gear outer cylinder for distortion, cracks, and flaking paint.

(e) Nose gear doors, hinges and retraction mechanism for damage, distortion, buckles, pulled or missing fasteners.

(f) Main gear wheels for cracks.

(g) Main gear orifice support tube attach nut for evidence or fluid leakage.

(h) Main gear strut doors and linkage for distortion, cracks, or other evidence of distress.

(i) Main gear trunnion link and shock strut upper end for cracks and bolt distortion. Landing gear beam and attachment for cracks and loose or missing fasteners.

(j) Remove upper wing-to-body fairing just forward of the aft fairing per operator's standard procedure.

(k) On airplanes with a two piece bonded support fitting, inspect the Body Station 706 main landing gear trunnion support fitting per Fig. 201, and SB 737-53-1060, Rev 2.

(l) On airplanes with a one-piece main landing gear trunnion support fitting as shown in Fig. 202, do the inspection that follows:

1) Look for cracks or evidence of distortion in the area below and outboard of stringer 18A (Fig. 202).

2) If a crack is found, contact Boeing for information on how to make a repair.

(2) Fuselage:

(a) Upper and lower fuselage skin panels forward and aft wing for buckles, wrinkles or tears. Permanent wrinkles often occur on the lower side fuselage skins aft of STA 727. Interior inspection is required if such wrinkles are found and not know to be pre-existing. If the wrinkles were pre-existing they must be closely inspected for cracks.

(b) Keel beam chords, stiffeners, webs and splices at station 663 thru 727A for distortion, buckled or damaged panels and pulled or missing fasteners.

(3) Wing:
(a) Engine-to-wing fairing panels for buckling, cracks and pulled or missing fasteners.
(b) Wing leading edge fairing for displacement, fastener hole elongation or tear-out, skin cracks, pulled or missing fasteners.

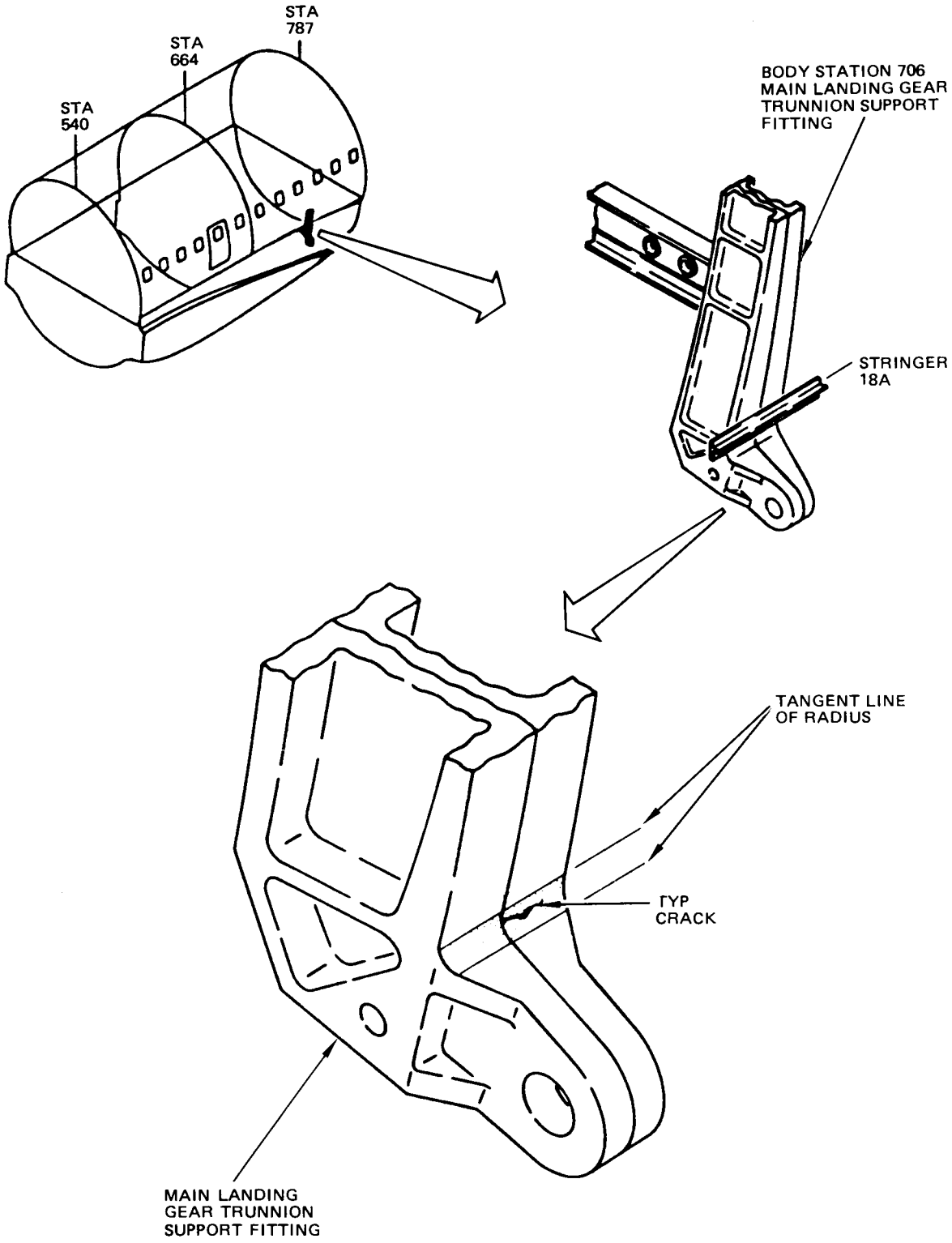
3. Phase II Examination
A. Examine airplane structure
(1) Jack the airplane at wing and fuselage jack points (Ref Chapter 7, Lifting and Shoring). Retract and then extend main and nose landing gear (Ref Chapter 32, Landing Gear). Check for evidence of interference, misalignment, or distortion.
(2) Landing Gear Area:
(a) If wheel removal is necessary, due to blown tires, examine wheel structure for cracks. Check brake assemblies for damage and wheel bearings for roughness.
(b) Nose gear outer cylinder trunnion fitting area, torsion links, and drag brace link assemblies for distortion, cracks, flaking paint, and pulled, loose, or missing fasteners.
(c) Nose landing gear for shock strut servicing abnormalities, such as loss of fluid or difficulty in maintaining normal pressure.
(d) If examination per (b) and (c) give indication of damage, or if overweight landing is combined with high impact on the nose gear, remove inner cylinder and examine for distortion and cracks. Examine orifice support tube, without removing, for distortion and cracks.
(e) If examination per (b) and (c) give no indication of damage, inner cylinder and orifice support tube examination should be made at the first convenient opportunity following report of overweight landing.
(f) Main landing gear outer and inner cylinder lugs and main gear torsion links for cracks and visible surface distortion.
(g) Main gear drag and side strut linkage for distortion or cracks.
(h) Shock strut walking beam fitting and shock strut aft trunnion support fitting for cracks.
(i) Main gear actuator walking beam and linkage fittings for distortion, cracks, nick, gauges and pulled or missing fasteners.
(j) Main gear outer cylinder to trunnion link attach bolt, trunnion link fittings for cracks. Remove bolt, examine holes and bushing for elongation.
(k) Main landing gear shock strut for fluid level. If fluid level is low; remove inner cylinder and examine for distortion or cracks. Examine orifice support tube, without removing, for obvious cracks (Refer to Chapter 32, Landing Gear for relevant steps pertaining to removal of main gear inner cylinder.
(l) Nose and main landing gear wheel well cavities for evidence of fuel or other fluid leaks in region of landing gears.

(3) Fuselage:
  (a) Lower fuselage structure for skin buckling, flaking paint, cracks, and pulled or missing fasteners. In particular examine area below body crease and from station 727 to 100 inches aft.
  (b) Wing to fuselage joints at stations 540 and 664 for distortion, flaking paint, cracks and pulled or missing fasteners.
  (c) Upper fuselage structure between S-6 LH and S-6 RH at station 540, 664 and 727 for buckling, distortion, flaking paint, cracks and pulled or missing fasteners.
  (d) Bulkheads at body stations 294.5 and 360, fuselage structure immediately outboard of nose wheel well for buckling, flaking paint, cracks and pulled or missing fasteners.

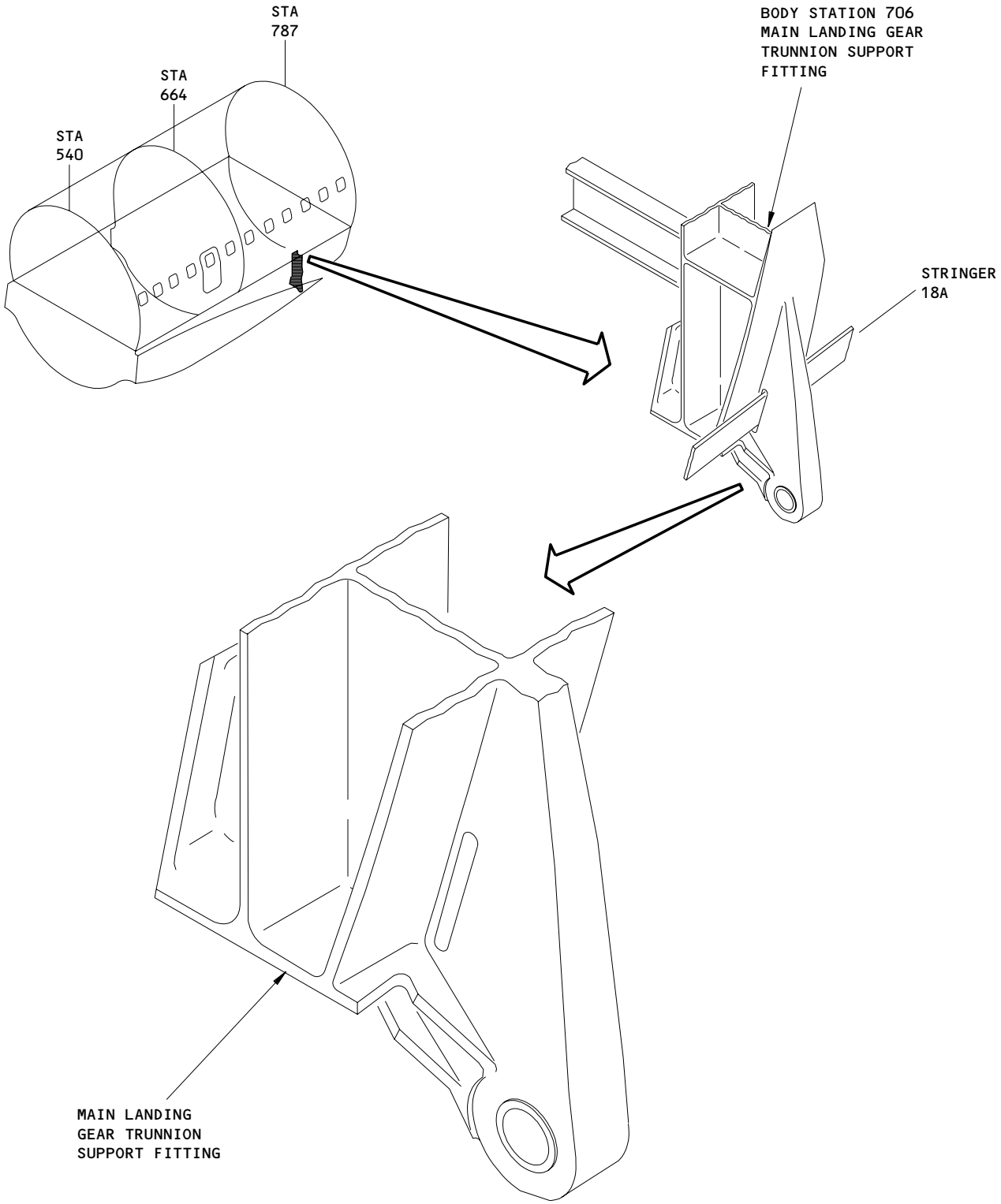
      NOTE: This examination can be performed on the forward side through access holes in nose wheel well side walls. Examine aft side of bulkhead at station 294.5 from the electronics compartment.

  (e) Nose landing gear wheel well for buckling, flaking paint, cracks, and pulled or missing fasteners in web of nose wheel well particularly in vicinity of trunnion support fittings.
  (f) Keel beam chords, stiffeners, webs and splices at station 540 thru 727A for distortion, buckled or damaged panels and pulled or missing fasteners.
  (g) Fuselage exterior surface for evidence of fuel or other fluid leaks.
  (h) Permanent wrinkles often occur on lower side fuselage skins aft of STA 727. Interior inspection is required if such wrinkles are found and not know to be pre-existing. If the wrinkles were pre-existing they must be closely inspected for cracks.
(4) Wings:
  (a) Wings, nacelles, engine-to-wing fairing for evidence of fuel or other fluid leaks.
  (b) Wing ribs along aft side of rear spar, WBL 92.5 and 114.0 for cracks.
  (c) Upper and lower trailing edge panels and structure with particular attention to main landing gear beam area.
  (d) Inboard and outboard trailing edge flaps, flap tracks, drive screws, linkages and fairings for sheared rivets and structure damage.
  (e) Inboard and outboard spoilers for sheared rivets and structure damage.
  (f) Outboard trailing edge flap track bolts for crank shafting when flaps have been in contact with ground.
  (g) Inboard trailing edge flap track bolts for crank shafting when flaps have been in contact with ground.

(5) Nacelles:
    (a) Conduct dragged engine nacelle inspection (Ref 5-51-61).
(6) Flight Controls for freedom of movement, and specified cable tension.
(7) Check rigging of nose landing gear steering mechanism (Ref Chapter 32, Landing Gear).
    (a) Wing leading edge-fairing for displacement, fastener hole elongation or tear-out, skin cracks, pulled or missing fasteners.



Main Landing Gear Trunnion Support Fittings
Figure 201



One Piece Main Landing Gear Trunnion Support Fitting
Figure 202