CHAPTER

54

NACELLES/ PYLONS

MD-80
AIRCRAFT MAINTENANCE MANUAL

CHAPTER 54
NACELLES/PYLONS

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MD-80
AIRCRAFT MAINTENANCE MANUAL

CHAPTER 54
NACELLES/PYLONS

54-CONTENTS

GENERAL - DESCRIPTION AND OPERATION

1. General

A. The pylons, one on each side of the aft fuselage, provide support for the aircraft engines and houses fuel, electrical, hydraulic, heating, ice protection, and control lines to and from the aircraft engines. Each engine is housed by three cowl doors and a pylon apron (COWLING - DESCRIPTION AND OPERATION, PAGEBLOCK 71-10-00/001). Each pylon consists of a main frame (box), auxiliary structure (leading and trailing edges), plates/skin, and attach fittings. (Figure 1)

B. Each pylon is constructed to provide maximum fire protection.

A firewall within the pylon follows an irregular path and extends from the leading edge through the trailing edge. The firewall is constructed of titanium and steel, and all lines passing through it are provided with metal connectors. Additional protection is provided by the titanium fuselage skin adjacent to the pylon. An insulating blanket is attached to the fuselage skin between the front spar and center bulkhead on the main frame. A burn through barrier made of plasma sprayed columbium is attached to the inboard side of the engine, and is aligned with the engine burner cans.

2. Main Frame

A. The main frame or box-like structure of the pylon is between the front and rear spar, and is permanently attached to the fuselage. (For a detailed description of the main frame, refer to MAIN FRAME - DESCRIPTION AND OPERATION, PAGEBLOCK 54-10-00/001)

3. Auxiliary Structure

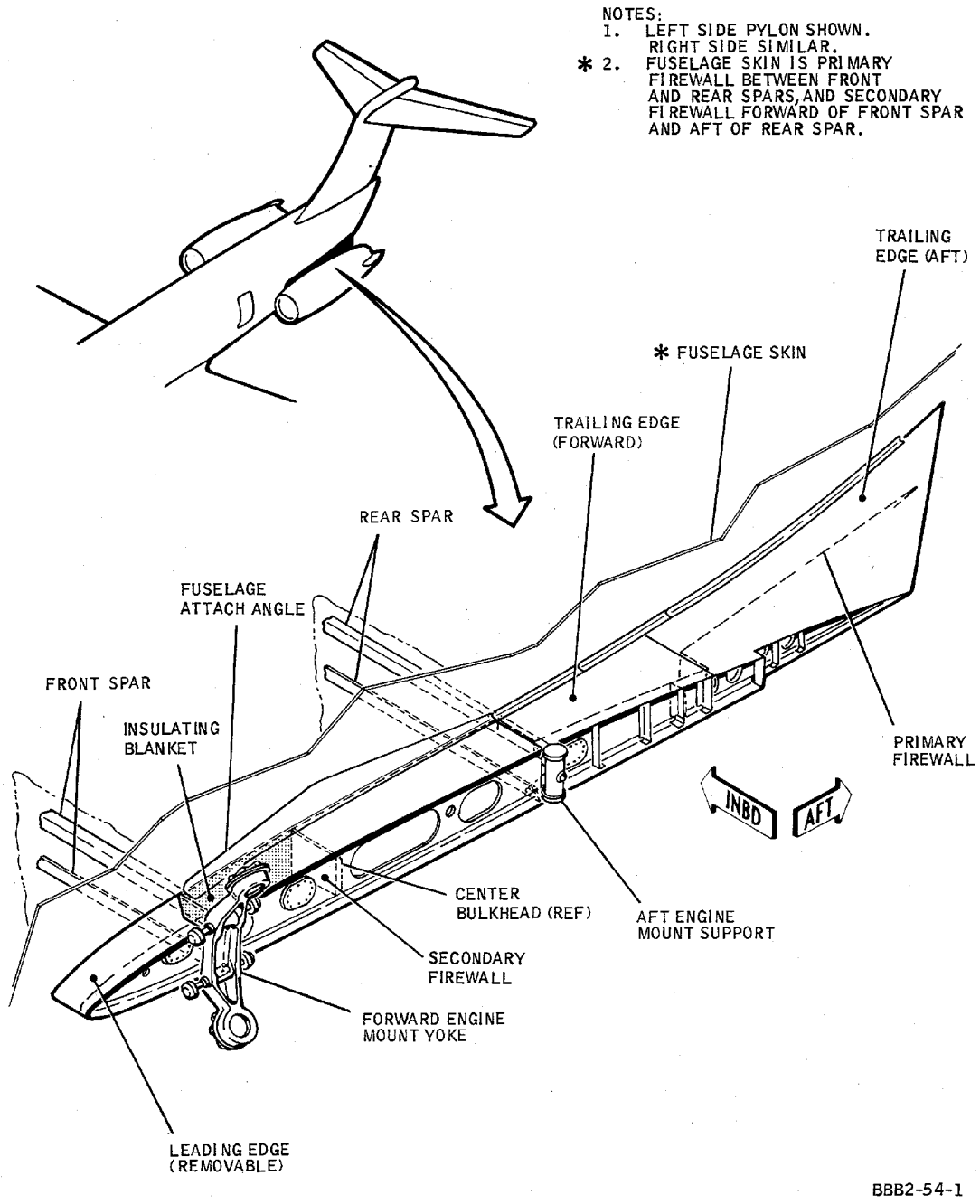
A. The pylon auxiliary structure consists of the leading and trailing edges located forward and aft of the pylon main frame. (For a detailed description of the auxiliary structure, refer to AUXILIARY STRUCTURE - DESCRIPTION AND OPERATION, PAGEBLOCK 54-20-00/001)

4. Plates/Skin

A. The pylon skin is constructed of titanium except for the aft trailing edge which is made of aluminum sheet. Drain holes are provided in the lower surfaces to prevent entrapment of fluids. (For a detailed description of the pylon skin, refer to PLATES/SKIN - DESCRIPTION AND OPERATION, PAGEBLOCK 54-30-00/001)

5. Attach Fittings

A. The pylon is permanently secured to the aft fuselage structure and skin by means of spars, attach angles, attach fittings, lockbolts and collars, and nuts and bolts. (For a detailed description of the attach fittings, refer to ATTACH FITTINGS - DESCRIPTION AND OPERATION, PAGEBLOCK 54-40-00/001)



Pylons - General
Figure 1/54-00-00-990-801

NACELLES/PYLONS - STRUCTURAL INSPECTIONS - INSPECTION/CHECK

1. General

A. This procedure contains MSG-3 task card data.

TASK 54-05-03-211-801

2. Pylon Main Frame, Front Spar, One Piece, STA 1307 (MD-87, STA 1098) - Internal Structure

A. Inspection

SUBTASK 54-05-03-010-001

(1) Gain access as required.

SUBTASK 54-05-03-160-001

(2) Clean inspection area as required.

NOTE: It is expected that the area to be inspected is clean enough to minimize the possibility that accumulated dirt, lint, fibers or grease might hide unsatisfactory conditions that would otherwise be obvious. Any cleaning that is considered necessary should be performed in accordance with accepted procedures in order to minimize the possibility of the cleaning process itself introducing anomalies.

SUBTASK 54-05-03-211-001

(3) Do the detailed inspection.

NOTE: A detailed inspection is an intensive examination of a specific item, installation or assembly, to detect damage, failure or irregularity. Available lighting is normally supplemented with a direct source of good lighting at an intensity deemed appropriate. Inspection aids such as mirrors, magnifying lenses or other means may be necessary. Surface cleaning and elaborate access procedures may also be required.

SUBTASK 54-05-03-916-001

(4) Apply surface treatments and/or corrosion inhibiting compound as required.

NOTE: Protective materials (e.g. corrosion inhibiting compounds, paints, etc.) shall be re-applied if removed to perform the inspection/maintenance task.

SUBTASK 54-05-03-410-001

(5) Install removed panels.

(6) Record corrosion findings.

(a) Corrosion finding: Yes _____ No _____

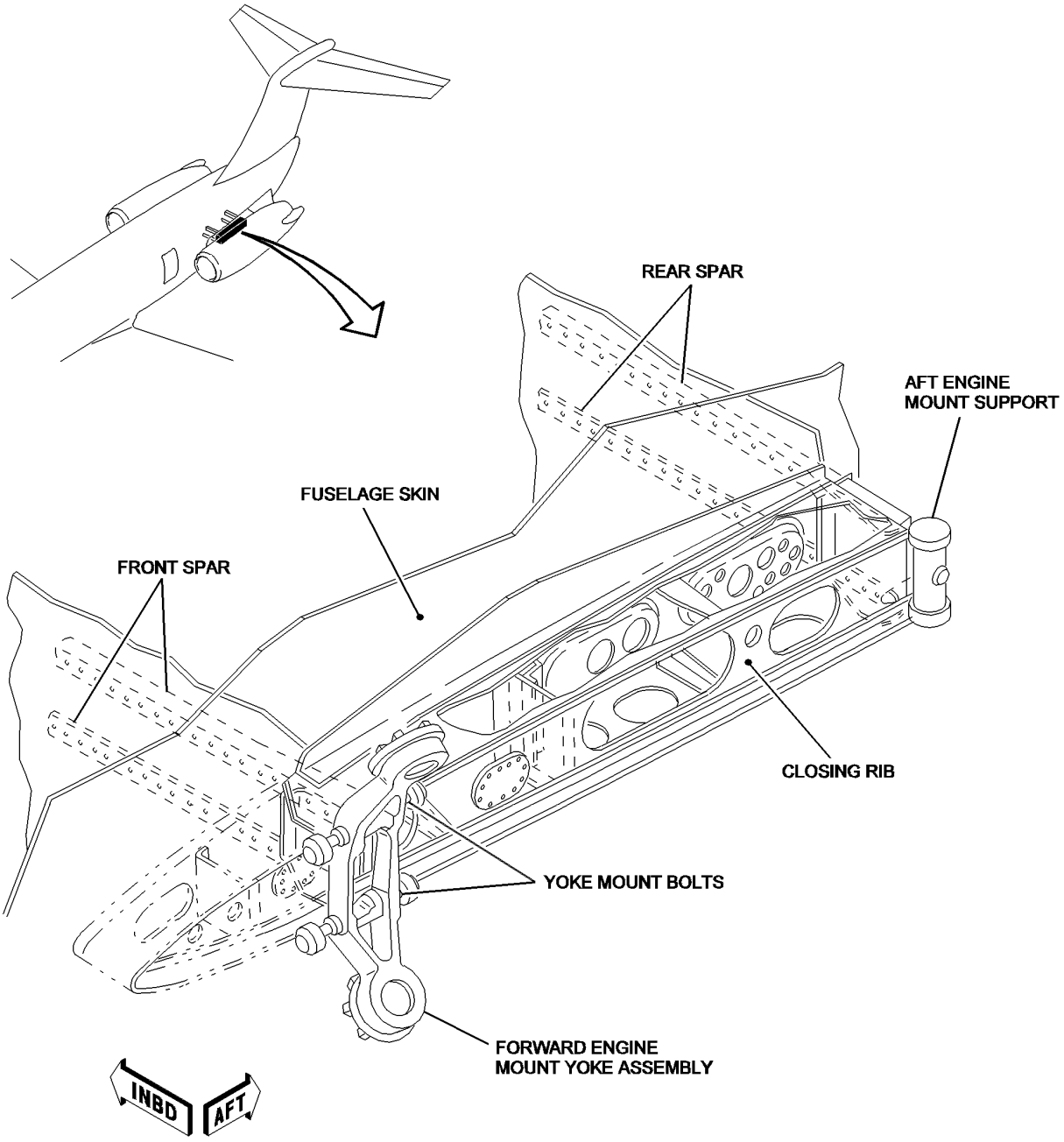
(b) If yes in Step (6)(a), record specific area of corrosion on a non-routine form and list the non-routine(s) identification number(s) here _____.

(7) Record structural findings.

(a) Structural finding: Yes _____ No _____

(b) If yes in Step (7)(a), record specific area of structural cracking on a non-routine form and list the non-routine(s) identification number(s) here _____.

END OF TASK



NOTE:
LEFT SIDE MAIN FRAME SHOWN.
RIGHT SIDE SIMILAR.

BBB2-54-8
S0000274073V1

Pylon Main Frame Structure
Figure 601/54-05-03-990-801

TASK 54-05-03-211-804

3. Pylon Main Frame, Front Spar Tangs, STA 1307 (MD-87, STA 1098) - Internal Structure

A. Inspection

SUBTASK 54-05-03-010-004

(1) Gain access as required.

SUBTASK 54-05-03-160-004

(2) Clean inspection area as required.

NOTE: It is expected that the area to be inspected is clean enough to minimize the possibility that accumulated dirt, lint, fibers or grease might hide unsatisfactory conditions that would otherwise be obvious. Any cleaning that is considered necessary should be performed in accordance with accepted procedures in order to minimize the possibility of the cleaning process itself introducing anomalies.

SUBTASK 54-05-03-211-004

(3) Do the detailed inspection.

NOTE: A detailed inspection is an intensive examination of a specific item, installation or assembly, to detect damage, failure or irregularity. Available lighting is normally supplemented with a direct source of good lighting at an intensity deemed appropriate. Inspection aids such as mirrors, magnifying lenses or other means may be necessary. Surface cleaning and elaborate access procedures may also be required.

SUBTASK 54-05-03-916-004

(4) Apply surface treatments and/or corrosion inhibiting compound as required.

NOTE: Protective materials (e.g. corrosion inhibiting compounds, paints, etc.) shall be re-applied if removed to perform the inspection/maintenance task.

SUBTASK 54-05-03-410-004

(5) Install removed panels.

(6) Record corrosion findings.

(a) Corrosion finding: Yes _____ No _____

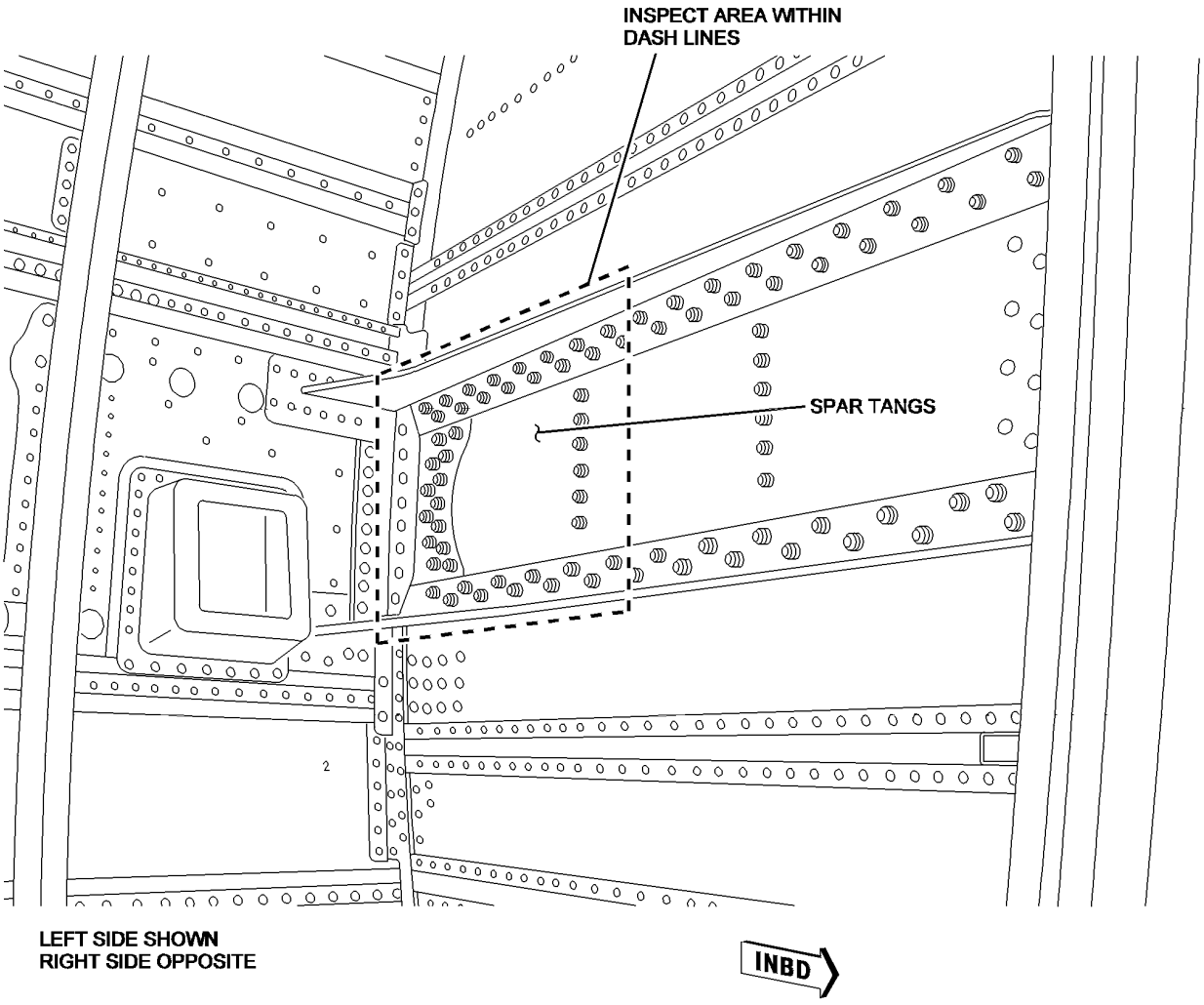
(b) If yes in Step (6)(a), record specific area of corrosion on a non-routine form and list the non-routine(s) identification number(s) here _____.

(7) Record structural findings.

(a) Structural finding: Yes _____ No _____

(b) If yes in Step (7)(a), record specific area of structural cracking on a non-routine form and list the non-routine(s) identification number(s) here _____.

——— END OF TASK ———



BBB2-54-8
S0000274073V1

Front Spar Tangs
Figure 602/54-05-03-990-805

TASK 54-05-03-211-802

4. Pylon Main Frame, Rear Spar, Upper and Lower Two Piece Caps (Pylon), STA 1380, (MD-87, STA 1171) - Internal Structure

A. Inspection

SUBTASK 54-05-03-010-002

(1) Gain access as required.

SUBTASK 54-05-03-160-002

(2) Clean inspection area as required.

NOTE: It is expected that the area to be inspected is clean enough to minimize the possibility that accumulated dirt, lint, fibers or grease might hide unsatisfactory conditions that would otherwise be obvious. Any cleaning that is considered necessary should be performed in accordance with accepted procedures in order to minimize the possibility of the cleaning process itself introducing anomalies.

SUBTASK 54-05-03-211-002

(3) Do the detailed inspection.

NOTE: A detailed inspection is an intensive examination of a specific item, installation or assembly, to detect damage, failure or irregularity. Available lighting is normally supplemented with a direct source of good lighting at an intensity deemed appropriate. Inspection aids such as mirrors, magnifying lenses or other means may be necessary. Surface cleaning and elaborate access procedures may also be required.

SUBTASK 54-05-03-916-002

(4) Apply surface treatments and/or corrosion inhibiting compound as required.

NOTE: Protective materials (e.g. corrosion inhibiting compounds, paints, etc.) shall be re-applied if removed to perform the inspection/maintenance task.

SUBTASK 54-05-03-410-002

(5) Install removed panels.

(6) Record corrosion findings.

(a) Corrosion finding: Yes _____ No _____

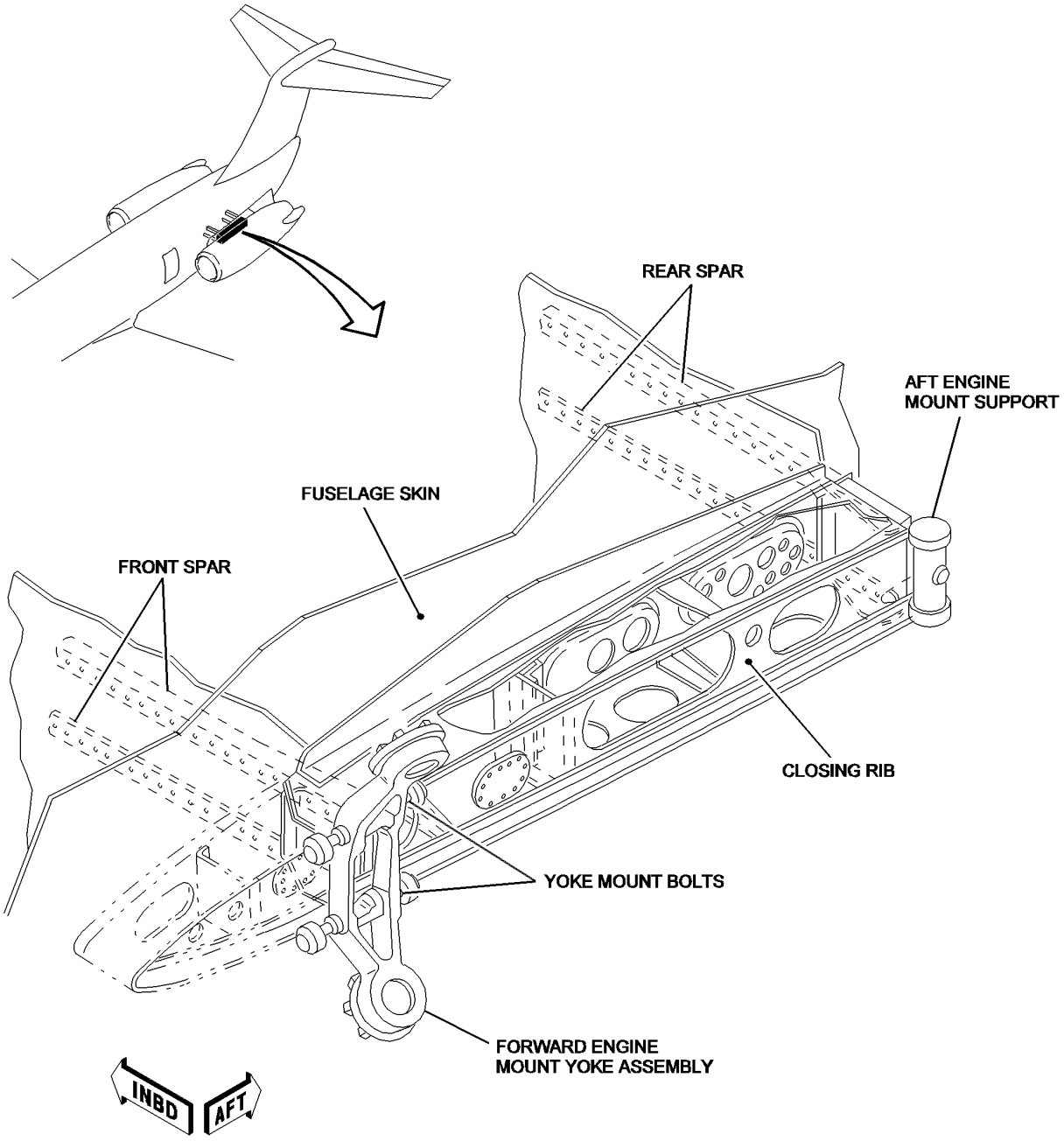
(b) If yes in Step (6)(a), record specific area of corrosion on a non-routine form and list the non-routine(s) identification number(s) here _____.

(7) Record structural findings.

(a) Structural finding: Yes _____ No _____

(b) If yes in Step (7)(a), record specific area of structural cracking on a non-routine form and list the non-routine(s) identification number(s) here _____.

——— END OF TASK ———



NOTE:
LEFT SIDE MAIN FRAME SHOWN.
RIGHT SIDE SIMILAR.

BBB2-54-8
S0000274073V1

Pylon Main Frame Structure
Figure 603/54-05-03-990-804

TASK 54-05-03-211-803

5. Pylon Attach Fittings, Yoke - Forward Engine Mount, STA 1307 (MD-87, STA 1098) - Structure

A. Inspection

SUBTASK 54-05-03-010-003

(1) Gain access as required.

SUBTASK 54-05-03-160-003

(2) Clean inspection area as required.

NOTE: It is expected that the area to be inspected is clean enough to minimize the possibility that accumulated dirt, lint, fibers or grease might hide unsatisfactory conditions that would otherwise be obvious. Any cleaning that is considered necessary should be performed in accordance with accepted procedures in order to minimize the possibility of the cleaning process itself introducing anomalies.

SUBTASK 54-05-03-211-003

(3) Do the detailed inspection.

NOTE: A detailed inspection is an intensive examination of a specific item, installation or assembly, to detect damage, failure or irregularity. Available lighting is normally supplemented with a direct source of good lighting at an intensity deemed appropriate. Inspection aids such as mirrors, magnifying lenses or other means may be necessary. Surface cleaning and elaborate access procedures may also be required.

SUBTASK 54-05-03-916-003

(4) Apply surface treatments and/or corrosion inhibiting compound as required.

NOTE: Protective materials (e.g. corrosion inhibiting compounds, paints, etc.) shall be re-applied if removed to perform the inspection/maintenance task.

SUBTASK 54-05-03-410-003

(5) Install removed panels.

(6) Record corrosion findings.

(a) Corrosion finding: Yes _____ No _____

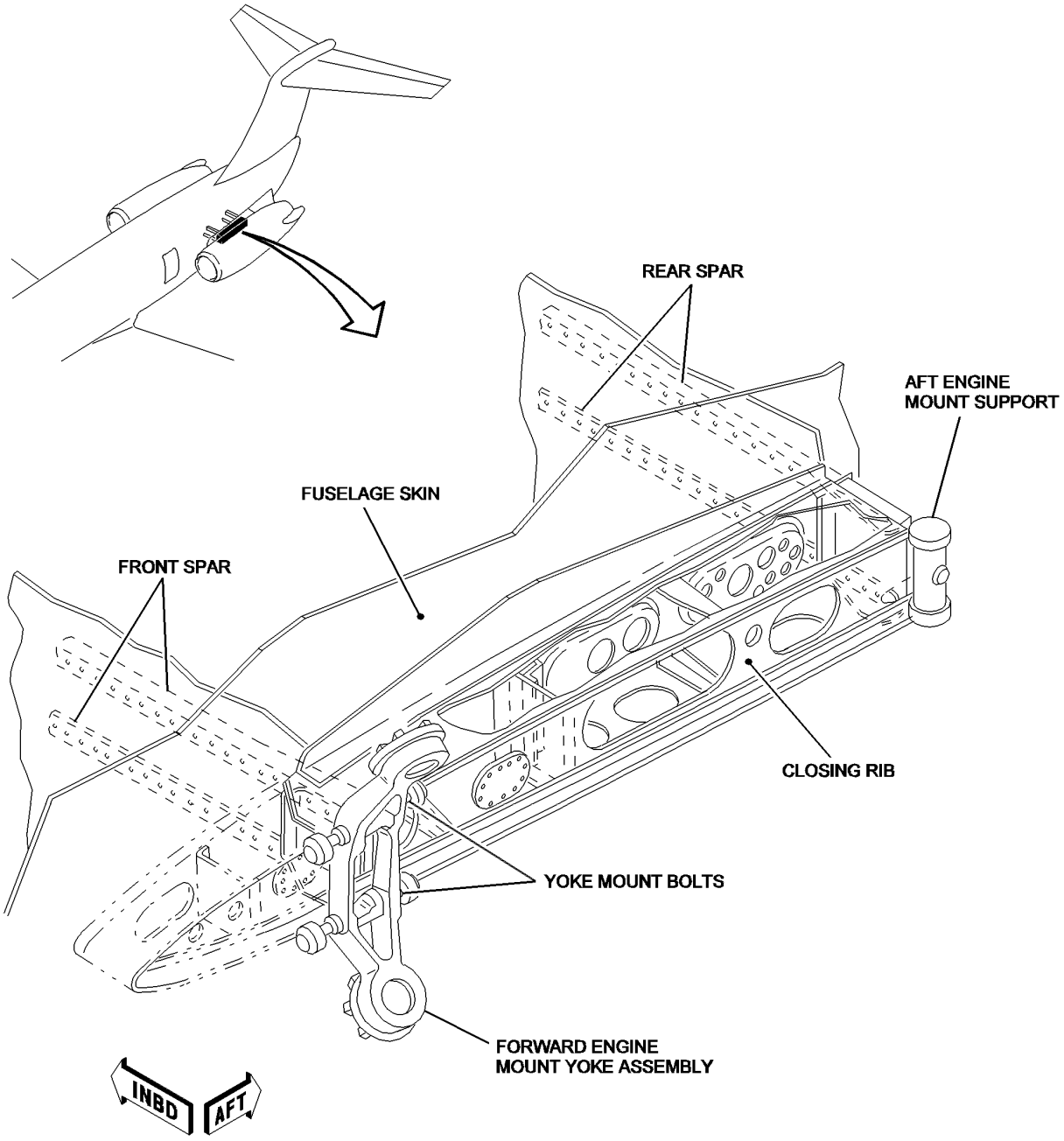
(b) If yes in Step (6)(a), record specific area of corrosion on a non-routine form and list the non-routine(s) identification number(s) here _____.

(7) Record structural findings.

(a) Structural finding: Yes _____ No _____

(b) If yes in Step (7)(a), record specific area of structural cracking on a non-routine form and list the non-routine(s) identification number(s) here _____.

——— END OF TASK ———



NOTE:
LEFT SIDE MAIN FRAME SHOWN.
RIGHT SIDE SIMILAR.

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Pylon Main Frame Structure
Figure 604/54-05-03-990-803

MAIN FRAME - DESCRIPTION AND OPERATION

1. General

A. The main frame of the pylon consists of two spars, a center bulkhead, fore-and-aft closing rib, upper and lower panels (skins), and fuselage attach angles and fittings. The box-like structure is permanently attached to the aft fuselage by means of lockbolts and collars, and nuts and bolts.

Materials used in construction of the pylon are fire resistant. (Figure 1)

2. Main Frame

A. Description

(1) Front Spar

- The front spar on the pylon main frame is a one-piece steel fitting. The inboard end of the spar is attached to the fuselage. The outboard end of the spar is provided with two lugs for attachment of the forward engine mount yoke.

(2) Rear Spar

- The rear spar on the pylon main frame consists of upper and lower, two-piece, titanium caps joined by a titanium web. The caps at the inboard end of the spar are attached to the fuselage. The caps at the outboard end of the spar provides for attachment of the aft engine mount.

(3) Center Bulkhead

- The main frame center bulkhead is made of titanium and is attached to the fuselage by means of a flexible diaphragm.

(4) Closing Rib

- The main frame fore-and-aft closing rib consists of upper and lower steel caps joined by a steel web.

(5) Panels

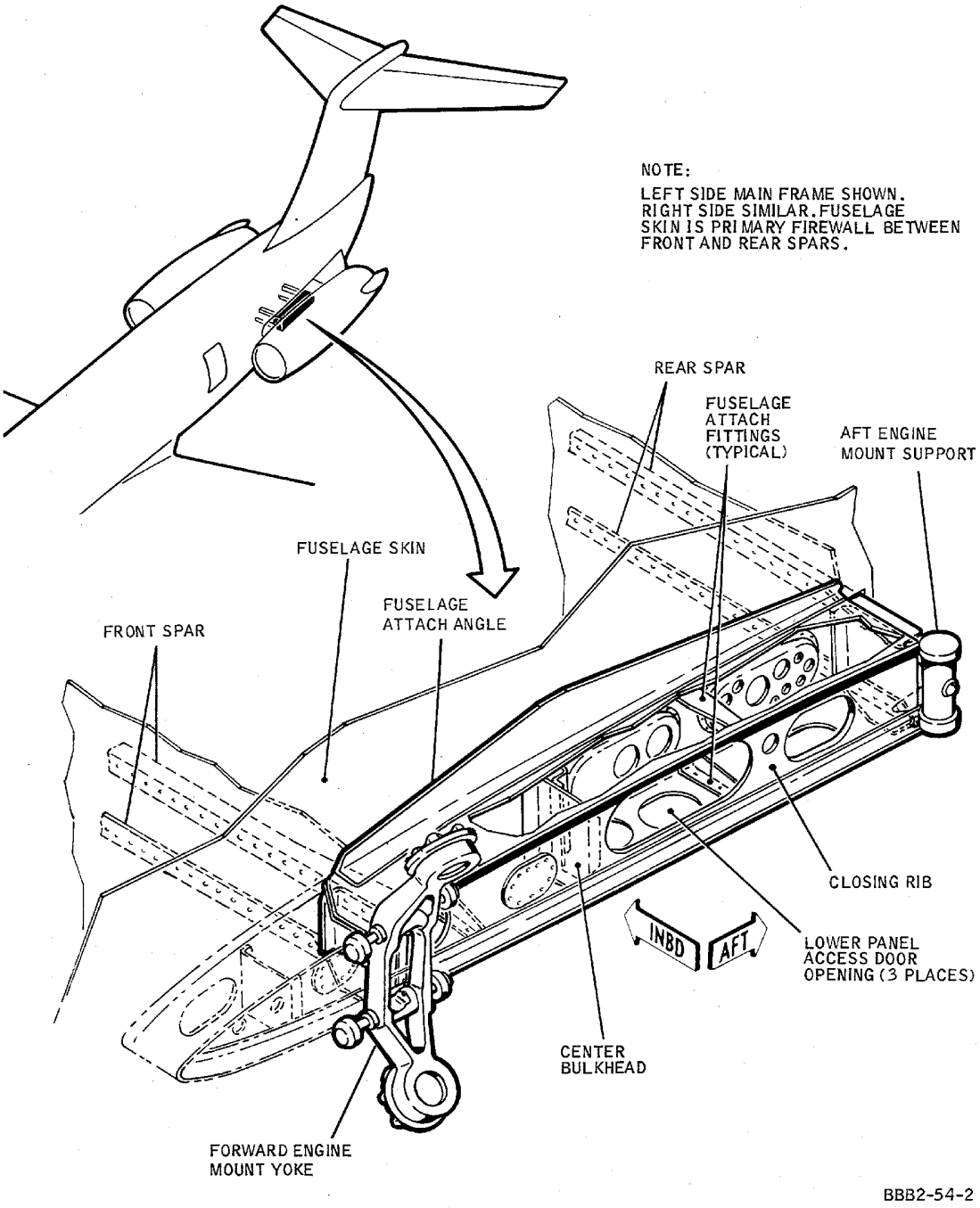
- The upper and lower panels (skins) on the main frame are made of titanium.

(6) Attach Angles and Fittings

- The main frame attach angles and fittings are made of titanium and are permanently attached to the fuselage.

(7) Access Doors

- Three non load carrying doors in the lower panel of the main frame provide access to pneumatic, hydraulic, electrical, fire extinguisher, and engine pres-sure ratio components. Each door is hinged and held closed by means of two quick action latches.



Pylon Main Frame
Figure 1/54-10-00-990-801

AUXILIARY STRUCTURE - DESCRIPTION AND OPERATION

1. General

A. The pylon auxiliary structure consists of the pylon leading and trailing edges to complete the airfoil profile that supports the engine.

2. Auxiliary Structure

A. Description

(1) Leading Edge - The pylon leading edge closing rib, panel or skin, and stiffeners are constructed of titanium. The rib adjacent to the fuselage is made of aluminum. The closing rib is the primary firewall in the leading edge. With the engine removed, the leading edge panel is removable for inspection and maintenance. The panel attaches to the pylon front spar and ribs with flush screws. (AUXILIARY STRUCTURE - MAINTENANCE PRACTICES, PAGEBLOCK 54-20-00/201)

(2) Trailing Edge - The pylon trailing edge is in two sections. The forward section panels or skins, closing rib, and aft bulkhead are constructed of titanium. Two additional ribs in the forward section are made of aluminum. The lower panel is attached with screws and is removable. A detachable panel at the forward inboard side of the lower panel provides access to the thrust reverser hydraulic lines and the cone bolt nut for the aft engine mount. The aft section panels or skins, four ribs, and trailing edge vee are constructed of aluminum. A rib used as the primary firewall is made of titanium. A small access door in the lower panel is provided to facilitate pylon assembly. The forward and aft sections of the trailing edge are joined to the fuselage by means of upper and lower attach angles and two bolts at the forward section aft bulkhead.

AUXILIARY STRUCTURE - MAINTENANCE PRACTICES

1. General

A. The maintenance practices in this section provide removal/ installation instructions for the pylon auxiliary structure, consisting of the pylon leading and trailing edges. The procedures for the left and right pylon leading and trailing edges are identical. (Figure 201)

B. With the engine removed, the pylon leading edge panel may be removed for inspection or repair by removing surface attaching screws.

C. Drain holes located in lower surface of auxiliary structure leading and trailing edges should be checked and kept open for water drainage.

2. Removal/Installation Auxiliary Structure

A. Remove Pylon Trailing Edge

NOTE: On aircraft without APU inhibit switch installed, check that APU MASTER switch, located on cockpit overhead switch panel, is in OFF position; tag APU MASTER switch, maintenance being performed on engine pylon, do not operate APU until maintenance on pylon is completed.

WARNING: DO NOT OPERATE APU WHILE MAINTENANCE IS BEING PERFORMED ON ENGINE PYLON, SERIOUS INJURY OR DEATH MAY OCCUR TO PERSONNEL.

(1) Remove aft section of pylon trailing edge as follows:

(a) Remove access door from lower panel.

(b) Remove attachments securing firewall rib to forward section aft bulkhead.

(c) Remove screws securing upper and lower panels to fuselage attach angles and forward section aft bulkhead.

(d) Remove aft section from pylon.

(2) Remove forward section of pylon trailing edge as follows:

NOTE: Removal of pylon forward section requires l of 28 lockbolt attachments from rear spar and 6 rivets from aft bulkhead in forward section.

(a) Remove screws securing lower panel to adjacent structure. Remove panel.

(b) Remove attachments securing closing rib to main frame (box) rear spar.

(c) Remove bolts (2 places) and rivets (6 places) securing aft bulkhead of forward section to fuselage.

(d) Remove screws and attachments securing upper panel to fuselage attach angles and rear spar.

(e) Remove forward section from pylon.

(3) Remove auxiliary structure aft section of trailing edge.

B. Install Pylon Trailing Edge

NOTE: On aircraft without APU inhibit switch installed, check that APU MASTER switch, located on cockpit overhead switch panel, is in OFF position; tag APU MASTER switch, maintenance being performed on engine pylon, do not operate APU until maintenance on pylon is completed.

WARNING: DO NOT OPERATE APU WHILE MAINTENANCE IS BEING PERFORMED ON ENGINE PYLON, SERIOUS INJURY OR DEATH MAY OCCUR TO PERSONNEL.

(1) Install forward section of pylon trailing edge as follows:

(a) Position forward section against fuselage and main frame (box) rear spar, as required.

(b) Secure upper panel of forward section to fuselage attach angles and rear spar with screws and attachments.

(c) Secure aft bulkhead of forward section to fuselage with bolts (2 places) and rivets (6 places).

(d) Secure closing rib of forward section to rear spar with attachments.

(e) Secure lower panel to forward section and adjacent structure with screws.

(2) Install aft section of pylon trailing edge as follows:

(a) Position aft section against fuselage and forward section, as required.

(b) Secure upper and lower panels to fuselage attach angles and forward section aft bulkhead with screws.

(c) Secure firewall rib to forward section aft bulkhead.

(d) Install access door in lower panel.

(3) Make certain that all drain holes in lower surface of pylon trailing edge are open.

C. Remove Pylon Leading Edge

NOTE: On aircraft without APU inhibit switch installed, check that APU MASTER switch, located on cockpit overhead switch panel, is in OFF position; tag APU MASTER switch, maintenance being performed on engine pylon, do not operate APU until maintenance on pylon is completed.

WARNING: DO NOT OPERATE APU WHILE MAINTENANCE IS BEING PERFORMED ON ENGINE PYLON, SERIOUS INJURY OR DEATH MAY OCCUR TO PERSONNEL.

(1) Remove pylon leading edge attach screws and remove leading edge. (Figure 201)

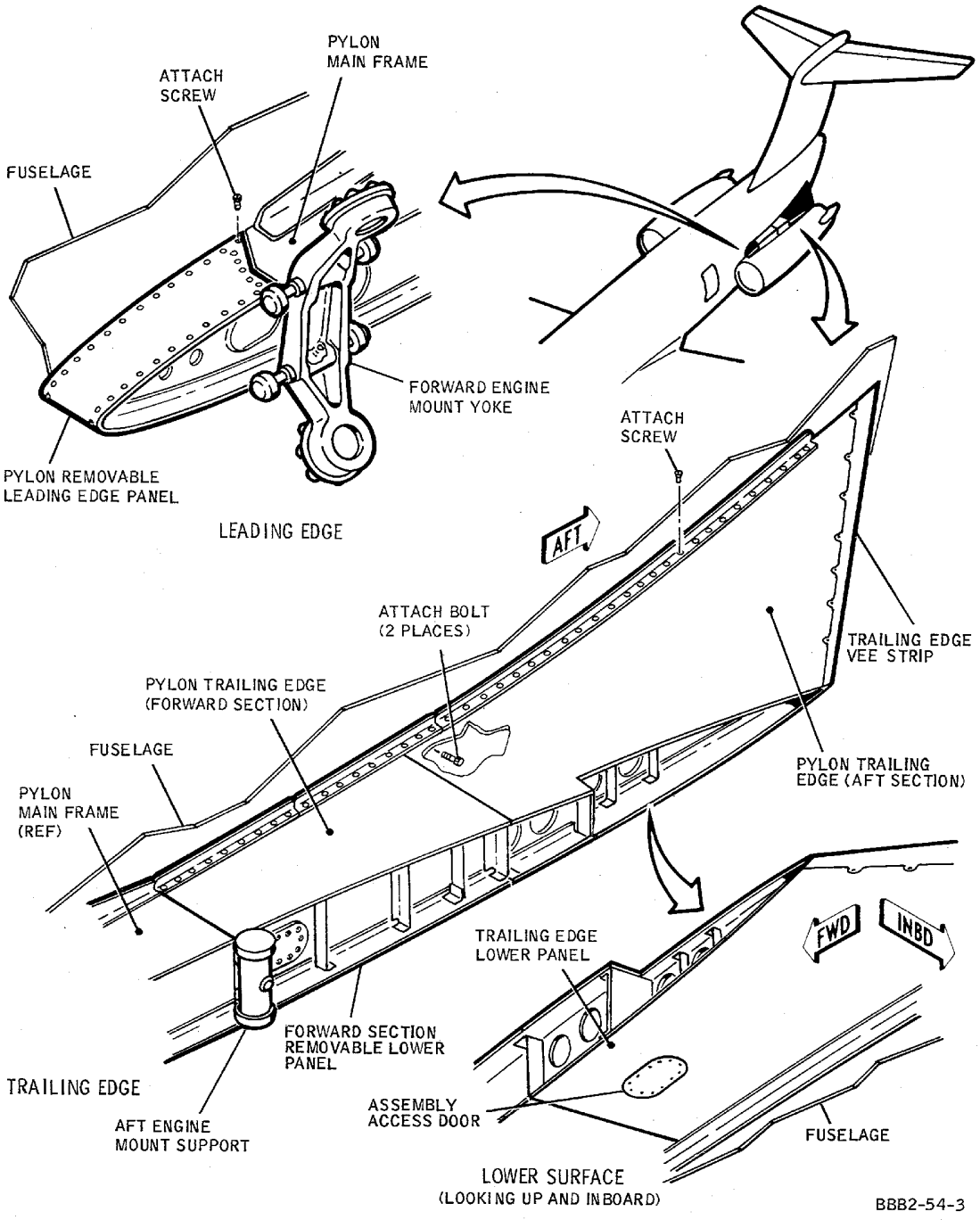
D. Install Pylon Leading Edge

NOTE: On aircraft without APU inhibit switch installed, make certain that APU MASTER switch, located on cockpit overhead switch panel, is in OFF position; tag APU MASTER switch, maintenance being performed on engine pylon, do not operate APU until maintenance on pylon is completed.

WARNING: DO NOT OPERATE APU WHILE MAINTENANCE IS BEING PERFORMED ON ENGINE PYLON, SERIOUS INJURY OR DEATH MAY OCCUR TO PERSONNEL.

(1) Place pylon leading edge in position, and install attach screws. (Figure 201)

(2) Make certain that all drain holes in lower surface of pylon leading edge are open.



Pylon Auxiliary Structure -- Removal/Installation
Figure 201/54-20-00-990-801

PLATES/SKIN - DESCRIPTION AND OPERATION

1. General

A. The titanium and aluminum plating and skin that forms the outside surface of the pylon is attached to spars, formers, and channels that make up the pylon main frame (box), leading edge, and trailing edge. (Figure 1) (Figure 2)

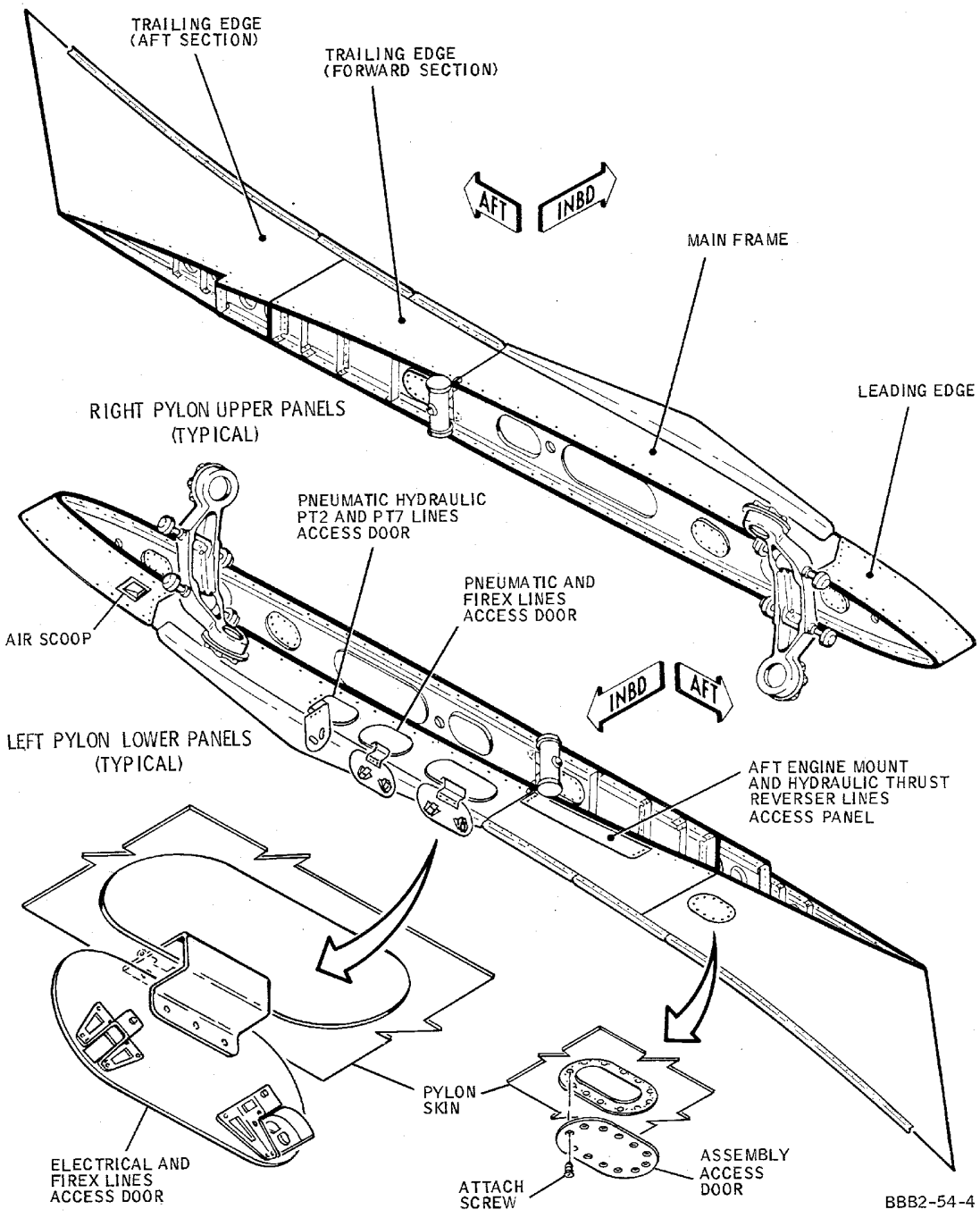
2. Plates/Skin

A. Description

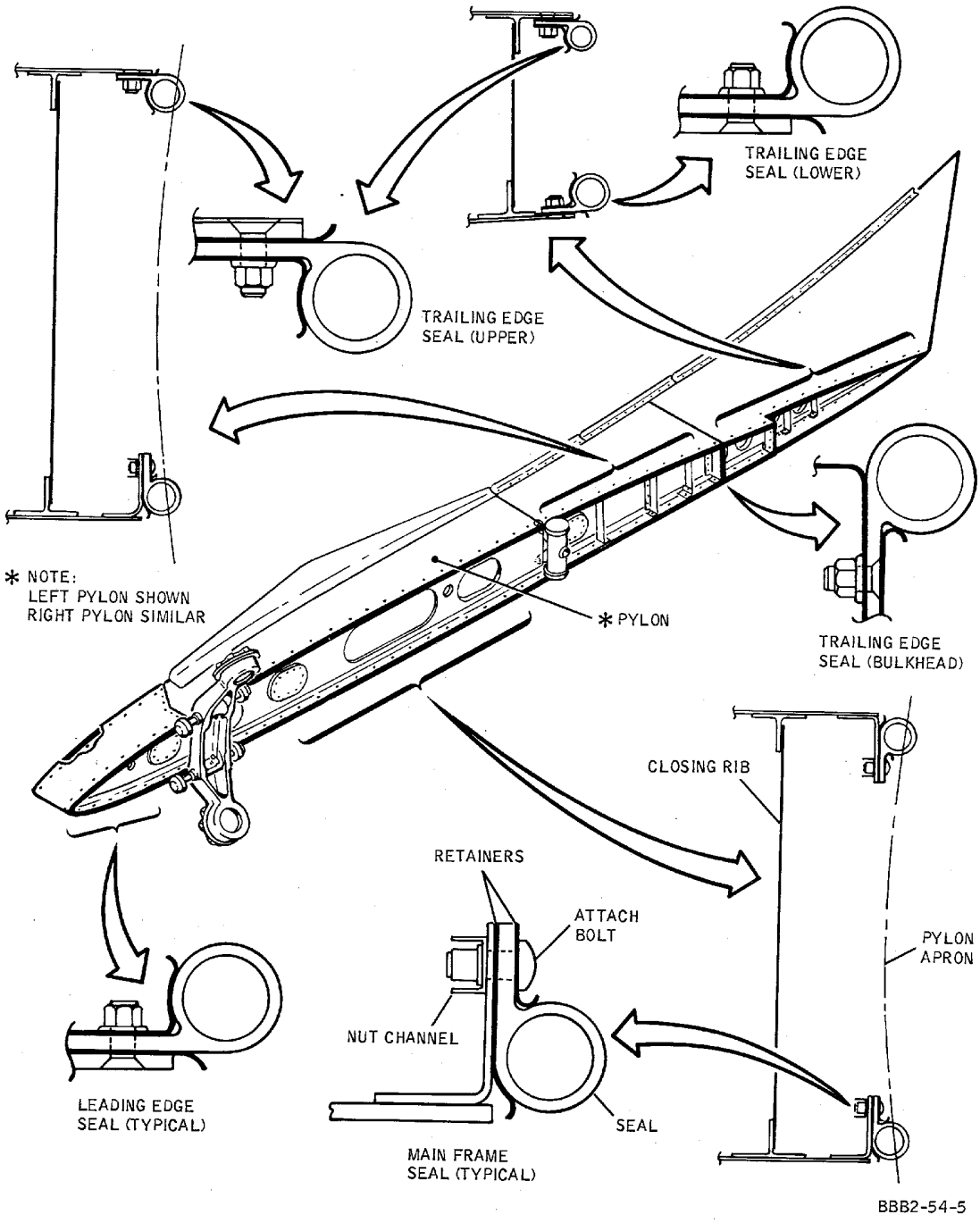
(1) Pylon Skin - The pylon skin from the leading edge to the trailing edge aft section is made of titanium. The trailing edge aft section is made of aluminum sheet with aluminum doublers.

(2) Access Doors - Access doors on the lower surface of the pylon vary in size, type, attachment, and method of opening. These doors provide access to pneumatic, electrical, and hydraulic lines. The component lines, ducts, or connectors for a specific system, are grouped for access through one of the access doors. (Figure 1)

(3) Rubber Seals - A fabric-covered, high-temperature rubber seal is attached to the outboard edge of the pylon skin where the seal contacts the nacelle apron. A rubber seal is also attached to the inboard leading edge of the pylon skin where the seal contacts the fuselage. All seals, except those located between the front and rear spars are installed with flush screws. (Figure 2)



Pylon Skin and Access Doors
Figure 1/54-30-00-990-801



Pylon Seals
Figure 2/54-30-00-990-802

ATTACH FITTINGS - DESCRIPTION AND OPERATION

1. General

A. The pylons are permanently attached to the aft fuselage structure with spars extending into the fuselage, with attach angles provided on the fuselage skin, and with attach fittings provided in the main frame or box. (MAIN FRAME - DESCRIPTION AND OPERATION, PAGEBLOCK 54-10-00/001)

Lockbolts and collars, and nuts and bolts, are used for this permanent installation (Figure 1). Engine cowling doors are attached to a removable pylon apron and are described in COWLING - DESCRIPTION AND OPERATION, PAGEBLOCK 71-10-00/001.

2. Attach Fittings

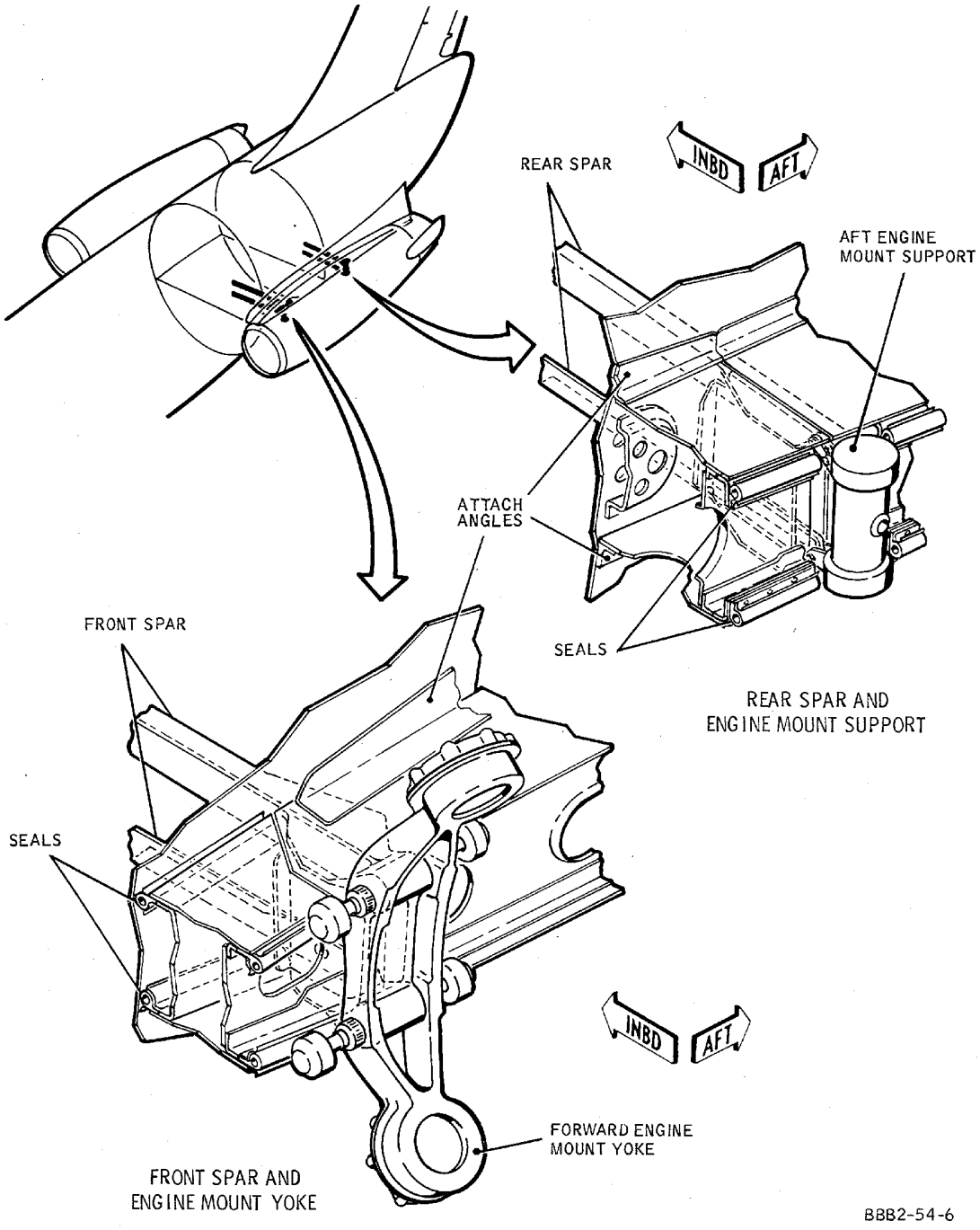
A. Description

(1) Rear Spar - The rear spar is constructed of web and angles of titanium, and has holes in the outboard end of the spar caps to provide a mounting for the aft engine mount.

(2) Front Spar - The front spar is a one-piece Hi-Tuf steel fitting with two holes for attachment of the forward engine mount yoke. Engine loads are transmitted directly through vibration isolators into the engine mount and support pylon. Maintenance practices for the vibration isolators and the vibration absorbers are provided in VIBRATION ISOLATORS - MAINTENANCE PRACTICES, PAGEBLOCK 71-20-02/201 and VIBRATION ABSORBER, SUBJECT 71-20-03 Page 201.

(3) Fuselage Attach Angles - Attach angles, made of titanium, are provided on the fuselage skin for attachment to the pylon and extend from the pylon front spar to the aft end of the pylon trailing edge.

(4) Fuselage Attach Fittings - Attach fittings, made of titanium, are provided in the main frame for attachment to the fuselage. Two of the fittings are located approximately 15 inches aft of the front spar. The remaining two fittings are located approximately 19 inches forward of the rear spar. Each fitting is attached to the fuselage frame by means of two bolts.



Pylon Attach Fittings
Figure 1/54-40-00-990-801