

0014073

AC NO: AC 20-64

DATE: 8/1/69




ADVISORY CIRCULAR

DEPARTMENT OF TRANSPORTATION FEDERAL AVIATION ADMINISTRATION

SUBJECT: MAINTENANCE INSPECTION NOTES FOR LOCKHEED L-188
SERIES AIRCRAFT

1. PURPOSE. This handbook describes maintenance inspection notes which can be used for the maintenance support of certain structural parts of Lockheed L-188 series aircraft. This is one of a series of Advisory Circulars to be published on existing aircraft to assist maintenance personnel in directing their attention to those areas which, in addition to normal maintenance practices, have been shown to require special attention.
2. DESCRIPTION. Maintenance on the wing, fuselage, empennage, flight controls, and landing gear structure is reviewed with a view toward supplementing information currently available.
3. HOW TO GET THIS PUBLICATION.
 - a. Order additional copies of this publication from:

Department of Transportation
Federal Aviation Administration
Distribution Unit, TAD-484.3
Washington, D. C. 20590
 - b. Identify this publication as: Advisory Circular 20-64
Maintenance Inspection Notes for Lockheed L-188 Series Aircraft.


acting Director,
Flight Standards Service

Initiated by: AC-230/FS-320

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CHAPTER 1. MAINTENANCE INSPECTION NOTES

1. INTRODUCTION. This advisory circular provides maintenance information which can be used by mechanics, repair agencies, owners, and operators in developing maintenance programs, making improvements in existing programs, and conducting inspections and repairs on certain structural parts of the Lockheed L-188 series of airplanes. The material is based, in part, upon information made available through discussions with personnel who have maintained these types of airplanes for thousands of hours of time in service. The intent of the circular is to impart some of this knowledge to other interested persons so that it is not lost.
2. DESCRIPTION. The circular contains guidance material for performing inspection and maintenance on wing, fuselage, empennage, flight controls, and landing gear structures. The information has been derived from service experience. It does not comprise a full and complete maintenance program for the subject aircraft but should be considered as supplemental maintenance data. Included in the circular are diagrammatic sketches and station identifications of the wing, fuselage, and flight controls. In addition, there is a listing of selected maintenance difficulties which have been reported during 1967 and 1968.
3. BACKGROUND.
 - a. Aircraft Use. The agency has realized that several different types of transport aircraft are being phased out of service by some airlines because of the availability of newer equipment. Such older aircraft are being purchased by other operators who may not be familiar with the scope of required maintenance and the means which have been used to keep the aircraft in a safe and airworthy condition.
 - b. Maintenance "Know How." Since maintenance "know how" is not transferred with the aircraft, the new operator generally goes through a learning cycle before he is able to rapidly pinpoint the critical problem areas of the aircraft. In this respect, identification of known areas where structural problems have been experienced will help in the preparation of an initial maintenance program by a new operator. It can also serve as a guide to other operators who have not accumulated sufficient experience to have knowledge of all the problem areas of the aircraft.
4. GENERAL INFORMATION.
 - a. Manufacturer's Bulletins. It must be emphasized that the manufacturer has published several service bulletins concerning the inspection, repair, and modification of Lockheed L-188 series aircraft. Service bulletins highlight the importance of maintaining structural integrity on aircraft with particular reference to areas known to have experienced crack and corrosion damage. Operators are urged to become conversant with the manufacturer's recommendations and make certain that responsible maintenance personnel are knowledgeable on this subject.

- b. Airworthiness Directive. It is emphasized that the material in this circular does not supersede any of the requirements of airworthiness directives issued under Part 39 of the Federal Aviation Regulations.
5. TYPE OF CONSTRUCTION. The major structural components of the aircraft are the wing group, the fuselage group, and tail group. The primary structure, shown in detail in this manual, consists of the fuselage, nacelles and the box beam sections of the wing and the vertical and horizontal stabilizers. These components have been designed in accordance with the "fail safe" policy. This policy provides multiple load paths and reduced stress levels, such that a single failure of any structural element will not result in the loss of the complete structural component.
- a. The wing is an all-metal, full cantilever-type structure and consists of a center section, an outer section, flaps, fillets and ailerons. The primary structure of the wing incorporates two main beams, upper and lower extruded surface panels, and ribs to stabilize the structure and maintain surface contour. Wing flaps are actuated by ball-bearing screw jacks and travel on steel tracks. The internal structure and skins are fabricated of aluminum alloy. Ailerons and trim tabs are of conventional design and constructed of aluminum alloy. Leading edges are attached to the front beam by hinges and incorporate provisions for ice elimination. Trailing edges are fabricated by the use of the metal-bond process, an outside skin bonded to an inner beaded skin. A major portion of the lower trailing edge is sectioned into hinged doors for inspection and maintenance.
- b. The fuselage is of conventional semimonocoque construction, using skin, stringer, and circumferential-frame combinations. The skin panels, for the most part, are made of 2024-T3 or -T4 material. Large doublers, made of the same materials and usually chem-milled, are used around doors, windows, and, generally, around all cutouts in the skin. The frames from station 200 to 1110 are mainly 19 inches apart with reinforced structure in the propeller and door areas. Stringers are made, for the most part, of formed sheet-metal sections, except near openings where heavier extruded sections are used. The floor support structure consists mainly of extruded vertical and transverse members attached to the fuselage frames. In the center section (over the wings) and in the nose section, longitudinal beams support the floor. Floor panels are of plywood in the aisles and vestibules, and metal-honeycomb-sandwich elsewhere. The latter contains electric-heating elements in passenger seating areas.

The entire fuselage is pressurized between the forward pressure bulkhead (forward of and below the flight station) and the rear pressure bulkhead (rear of the lounge or aft lavatory). The main manufacturing joints are at stations 200 and 1117. Along the main passenger compartment from station 219 to approximately 968, the fuselage is a constant section.

- c. The stabilizers consist of the horizontal stabilizer and tips, elevator and tabs, vertical stabilizer and tip, rudder and tab, fillets, and dorsal. Each member has an all-metal aluminum frame covered with aluminum skin. The horizontal stabilizer is attached to the fuselage tail section by four continuous beam caps and four continuous stringers. The vertical stabilizer is attached to the fuselage tail section by the extension of four beam caps and four stringers. The dorsal is connected to the fuselage by means of an attaching angle. There is a shear pin that connects the top of the dorsal to the vertical stabilizer at fuselage station 1117.
6. GENERAL VISUAL INSPECTION TIPS. The primary structure of the aircraft is designed to provide resistance to variable forces imposed while in operation by dispensing the forces through a structural pattern of "force flow" to the primary structural members of the wing and fuselage. External indications of failure, such as distorted skin, tilted or sheared rivets, and torn, dented, cracked, or corroded skin are usually obvious. Wrinkled skin, "oil cans," and tilted rivets, adjacent to the obviously failed area often indicate secondary damage caused by transmission of stress from the failed area. Misalignment of doors and panels may indicate distortion of internal structure. Internal structural damage, although not always apparent, may be found by closely examining the exterior surface. For example:
- a. Buckled skin between rivets at the end of a stiffener or stringer could mean that the last attaching rivet has failed, or that the stiffener or stringer is buckled in the area of the skin buckle. When a detailed inspection of the failed area is to be performed, functional parts should be actuated to determine if the failure has caused binding.
 - b. Deep diagonal skin buckles, located over a frame, former, or rib, could mean the member is distorted. When doubt exists concerning internal condition, the area in question should be opened and carefully inspected.
7. NONDESTRUCTIVE TESTING (NDT). Simply stated, nondestructive testing is preventive maintenance. This includes utilization of such maintenance tools as X-ray, ultrasonic, magnetic particles, eddy current, dye penetrant, and others.
- a. Maintenance Inspection. NDT permits maintenance inspections without removing components from aircraft or tearing down complex assemblies. Defects in various aircraft systems which would escape detection through normal visual inspection can be identified by NDT.
 - b. Training Required. Special NDT training is desirable to make sure that the operator is capable of operating the equipment and interpreting the results. Also, many states require that an X-ray operator

have an approved certificate for use of X-ray in industrial applications. This is to minimize improper use with attendant health hazard of X-ray equipment.

8. AIRCRAFT STATION DIAGRAMS. The wing, fuselage, and empennage station diagrams included in this document were developed for the L-188 aircraft and are used as a general reference only. Several models of these aircraft were manufactured and have different station locator numbers based on the particular configuration. Since the defective areas generally apply to all models of aircraft, the referenced area can be compared with a similar area and locator on the appropriate station diagram for the particular model of aircraft. (See Appendices 1 through 5.)
9. DEFINITIONS.
- a. Fatigue. The progressive fracture of a metal by means of a fault which develops and spreads under repeated cycles of stress.
 - b. Stress. The force per unit area of a body that tends to produce a deformation.
 - c. Stress raiser. A scratch, groove, rivet hole, forging defect, or other structural discontinuity giving rise to a focal point for a local concentration of stress.
 - d. Corrosion. Gradual destruction of a material by chemical action. Often evidenced by oxide buildup on the surface.
10. ABBREVIATIONS USED IN THIS DOCUMENT.
- | | |
|-----|-------------------------------|
| AD | Airworthiness Directive |
| FBC | Fixed base check |
| FCD | Fleet campaign directive |
| FS | Fuselage station |
| HSS | Horizontal stabilizer station |
| LAC | Lockheed aircraft |
| MBC | Main base check |
| MLG | Main landing gear |
| NLG | Nose landing gear |
| P/N | Part number |
| SB | Service Bulletin |
| SIL | Service Information Letter |
| TT | Total time |
| TAT | Total aircraft time |
| TSN | Time since new |
| TSO | Time since overhaul |
| TST | Total ship time |
| VSS | Vertical stabilizer station |
| WS | Wing station |

CHAPTER 2. WING

11. L-188 AIRCRAFT MAINTENANCE INFORMATION. The following is a listing of significant maintenance difficulties that have been reported by air carriers. This information may be useful in identifying structural inspection areas. Except where noted, wing structural references apply to both left and right wings.

a. <u>Lower Wing Skin Planks.</u>	<u>Lockheed Reference For Details</u>
(1) Lower wing skin plank damage was caused by integral engine start system compressor line rubbing in #2 and #3 nacelles.	SIL-61 10/17/62
(2) Cracks occurred in the lower #3 wing skin plank forward of the MLG fulcrum fitting. (Over 900 hours TSN.)	SB 601 6/24/63
(3) SB 587 alert wire was issued to inspect #4 lower wing plank drain hole for cracks at station 159.	SB 587A 4/10/64 Plus AD 65-15-4
(4) Cracks have been found at the fastener holes around the fuel sight gage and fuel overflow openings on the left- and right-hand lower wing planks. The cracks occur at wing station 128.0 and in the wing reinforcing doubler at station 266.0.	SB 631 9/6/65
(5) Cracks have been found in lower wing plank #1 between WS 205 and WS 275.	SB 653 7/3/68
b. <u>Upper Wing Skin Planks.</u>	
(1) Cracks have been found which appear to be static fractures originating on the #1 upper wing plank inner surface.	SB 565 4/27/62
(2) Cracks have been found in the upper surface in the area of the main landing gear rib forgings. These areas were previously reinforced by doublers in accordance with SB 306 and 337 except aircraft, IAC serial #1145 thru 1148 and 2020-2022, which were delivered with internal reinforcements.	SB 619A 5/21/65 Plus AD 65-9-4

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- (3) Cracks have been found at screw holes in the wing upper plank #2, at the plank #1 and #2 splice between WS 212.0 and 230.0. SB 632
6/29/65
- (4) Cracks have been found in the trailing edge of wing planks #6, #7, and #8 at wing station 143 LEFT and RIGHT upper surface. In two cases, the backup fitting, P/N 803900, for the flap track attachment was also cracked. SB 634A
10/8/65
- (5) This reference applies to the inspection of wing plank splices aft of the main landing gear fulcrum fitting and provides additional repair instructions for the WS 209 area (see d(2) page 7). SB 625C
5/16/66
Plus AD
66-11-2
- (6) This revision provides instructions to reduce the possibility of cracks developing in the upper wing planks under the nacelle skate angles. The original bulletin pertained only to the inboard nacelle skate angles, but this revision supplies reinforcement for ALL nacelle skate angles. SB 600A
2/21/68
Plus AD
64-11-3
- (7) A considerable number of cracks have been found in the #1 upper wing plank at the nacelle fillet attachments. Cracks have been found at the inboard side of all four nacelles at the attachment of the nacelle fillet with the upper #1 plank. SB 649
2/29/68
SB 665
Plus AD's
68-11-2
68-23-5
- (8) Cracks have been found in the #3 upper wing plank along the first row of fasteners adjacent to the skate angle of the outboard nacelle at WS 346.0. SB 652
4/30/68
- c. Outer Wing to Center Wing Attach Fittings.
This SB revision was issued to identify requirements for the outer wing front cap fittings, P/N 807352 and P/N 807354; specifically, corrosion of fittings, attachment bolts, and boltholes. SB 633A/633B
9/3/65 &
9/24/65
Plus AD
66-5-3
- d. Wing - MLG Ribs. These service bulletins instruct operators as follows:
- (1) To inspect the MLG ribs in each wing for fatigue cracks in the web fillets at the junctures of the rib truss members with the rib upper chord member. Similar cracks SB 630
7/20/65

have also been found in the web fillet between the forward truss member and the upper chord member beneath the #3 wing plank.

- (2) To inspect the vertical legs of the upper and lower caps of the wing ribs for cracks at wing stations 167 and 209. SB 639
11/7/66
- e. Wing-to-Nacelle Attachment Plate. Cracks have been found in the wings-to-nacelle attachment plate, P/N 810054-1, which is located inside the inboard nacelle on the lower front beam of the LEFT WS 209. (Propeller torque loads on the #2 nacelle augment the normal stresses on this plate.) SB 638
10/17/66
- f. Wing Rear Beam Clips. Cracks have been found in P/N 805483-1 (WS 179), and P/N 805491-1 (WS 197) rib attach clips location (dry bay area), at the rear beam forward face upper attachment. Cracks occur in the 0.16 radius of the flange relief cutout and extend toward the nearest fastener hole. SB 654
4/8/68
- g. Wing Upper and Lower Access Door Lands. Corrosion found on the lower wing plank access door lands appears to be caused by condensation. (Door lands are the area surrounding the access opening in the wing plank.) SB 606
11/18/63

CHAPTER 3. FUSELAGE

12. L-188 AIRCRAFT MAINTENANCE INFORMATION. The following is a listing of significant maintenance difficulties that have been reported by air carriers. This information may be useful in identifying structural inspection areas. Except where noted, fuselage structural references apply to both left and right sides.

	Lockheed Reference For Details
a. <u>Fuselage Stringers Station #1117</u> . This service bulletin provides for inspection of the underfloor stringers at the aft pressure bulkhead for cracks. The bulletin was later revised to cover all underfloor stringers, 1 thru 72.	SB 574 10/3/62 Revised 12/26/62
b. <u>Flight Station Pressure Deck</u> . Cracks have been found in the flight station pressure deck structure, butt line 40 right beam, lower beam cap flange. Cracks in this location could result in a loss of cabin pressure. Reported cracks have occurred on aircraft with over 13,000 total flight hours.	SB 609A 11/2/63 Revised 3/30/65
c. <u>Forward and Aft Cargo Door Frame Corners</u> . Cracks have been found in the lower forward and aft cargo door frames.	SB 608A 2/5/65 Revised SB 608B 2/18/65
d. <u>Fuselage Main Frame Fittings</u> . A considerable number of cracked main frame fittings have been found at FS 570 and FS 695	SB 644 2/10/67 Revised SB 644A 12/5/67 Plus AD 67-11-4
e. <u>Fuselage Bulkhead Ring Intersection with Center Wing</u> . Cracks have been found at the intersection between the wing center section lower surface and the fuselage rings at fuselage stations 571 and 694.	SB 646 4/12/68
f. <u>Cabin Window Support Structure</u> . Cracks have been found in fuselage station 853.5, (cabin window support structure.)	SB 647 5/6/68

- g. Canted Fuselage Frame Upper Web. Cracks have been
Found in the canted frame upper web, station 1167.7.
(See figure D-4 in appendix 4, page 4.)

SB 579
1/31/63
Revised SB 579A
6/17/68
Plus AD
63-17-3

CHAPTER 4. FLIGHT CONTROLS

13. L-188 AIRCRAFT MAINTENANCE INFORMATION. The following is a listing of significant maintenance difficulties that have been reported by air carriers. This information may be useful in identifying structural inspection areas. Except where noted, flight control structural references apply to both left and right sides.

Lockheed Reference
For Details

a. Empennage.

- | | |
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| (1) <u>Elevator Counterweight Installation.</u> | SB 457 |
| Excessive cumulative free play has been found in the joints of the elevator counterweight balance arm linkages. | 7/15/60 |
| (2) <u>Empennage Drain Hole.</u> This service bulletin was issued to prevent moisture accumulation in the empennage by providing improved drainage. | SB 573
9/26/62 |
| (3) <u>Canted Fuselage Station 1167.7 Frame Upper Web.</u> Cracks have been found on both sides of horizontal stabilizer station 29 at the lower cap in the 0.62-inch radius. | SIL-62
11/17/62 |
| (4) <u>Rudder Trailing Edge.</u> Cracks have been found in the outer skin and beaded inner skin of the rudder trailing edge. Cracks starting from holes at the aft end of the beads weaken the structure and cause additional cracks to develop in the outer skin at the spotwelds. Spotwelds that may crack are located 1½ to 2 inches forward of the rudder trailing edge. | SB 602
7/3/63 |
| (5) <u>Vertical Stabilizer to Fuselage Attach Channel.</u> Cracks have been found in the vertical stabilizer to fuselage attach channel, P/N 803179-5, located at fuselage station 1117.6. | SB 616
7/24/64
Revised SB 616A
4/5/65
Plus AD
65-21-5 |
| (6) <u>Elevator Balance Weight Arms and Ribs.</u> This modification will eliminate repeated inspection of the elevator balance weight arms (for cracks), required by the original SB 567, revision 1, dated 12/3/62. | SB 567
Revised 5/9/62
SB 567C
7/30/65 |

b. Ailerons.

- | | |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------|
| (1) <u>Aileron Skin Doublers.</u> Cracks have been found in the lower aileron skin between the trim tab actuating rod access door and the rear beam, notably in the area where the forward and aft flanges of the internal beaded doublers mate with the skin. | SB 444
5/27/60 |
| (2) <u>Aileron Counterbalance Attaching Angles.</u> Cracks have been found in the aileron counterweight attaching angles. | SB 451
5/10/60
Revised 7/25/60
Plus AD
60-25-2 |
| (3) <u>Aileron Push-Pull Tubes.</u> Cracks have been found in the aileron push-pull tubes, also wear, and misalignment of the support assemblies and rollers. | SB 607
10/17/63
Plus AD
64-16-4 |

c. Flaps.

- | | |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------|
| (1) <u>Wing Flap Torque Tubes.</u> Operators have reported flap torque tube support bearings binding and/or rubber sleeves deteriorated or missing. This results in torque tube wear caused by this tube turning in the inner race of the P/N KP16BS bearing. | SB 570
6/20/62 |
| (2) <u>Wing Flap Track Attaching Bolts.</u> Operators have reported extensive damage to a flap due to the failure of the outboard lower flap track attach bolts. | SB 591
4/3/63
Revised SB 591A
1/7/64 |

CHAPTER 5. LANDING GEAR

14. L-188 AIRCRAFT MAINTENANCE INFORMATION. The following is a listing of significant maintenance difficulties that have been reported by air carriers. This information may be useful in identifying structural inspection areas. Except where noted, structural references on the main landing gear (MLG) refer to both left and right gears.

	<u>Lockheed Reference For Details</u>
a. <u>Main Landing Gear Actuator Support Fittings.</u> Cracks have been found in the MLG actuator support fittings, P/N 800618.	SB 599A 10/22/63
b. <u>Main Landing Gear Actuating Cylinder Attach Fitting Intercostal.</u> During accomplishment of SB 538, a crack was found in the wing plank surface of one aircraft and a crack in the wing plank riser of another aircraft. Both cracks were located under the MLG actuator cylinder attach fitting.	SB 593A 7/12/63 SB 593B 1/24/64 Plus AD 64-14-5
c. <u>Nose Landing Gear Steering Housing.</u> Cracks have been found in the nose landing gear steering housing. These housing cracks originate at the inboard end of the 4-1/8" - 12 UNS-3A screw thread that receives the retaining nut of the steering cylinder. The cause is attributed to fatigue failure of the thread root.	SB 576 10/29/62 Revised 4/8/63 SB 576B 3/17/64 Plus AD 66-28-4
d. <u>Nose Landing Gear Assembly Trunnion Locking Slots.</u> Cracks have been found in the fulcrum bearing spacer locking slots in the NLG LEFT trunnion arm.	SB 604 10/18/63 Revised SB 604B 6/29/65
e. <u>MLG High Heat Treat Steel Plating and Stripping Practices.</u> Landing gear shock strut components have failed in service after passing through major overhaul and replating procedures.	SIL-88 7/25/66
f. <u>Main Landing Gear Lubrication.</u> This SIL outlines revised maintenance procedures and improved lubricants for landing gear static and dynamic joint corrosion protection.	SIL-32 5/23/62

CHAPTER 6. CORROSION PRONE AREAS

15. GENERAL. Corrosion is most likely to strike at the joints or attachment points in metallic structure because they provide entrapment areas for corrosive agents and moisture to accumulate. However, the problem can be compounded if metallic surfaces are exposed to an extremely corrosive environment, or if the surfaces are difficult to inspect and clean. The most important corrosion preventive measure is to keep them clean and dry.
16. EXHAUST TRAIL AREAS. Both jet and reciprocating engine exhaust deposits contain compounds that are very corrosive, and the structure in the path of exhaust gas is more likely to suffer from corrosion than is any other structure. It is customary to coat structure exposed to exhaust gases with protective finishes to prevent these gases from coming in direct contact with the metal. However, the deposits which collect on top of the protective finishes must be removed before they permeate the film and attack the metal. Most troublesome are those areas where exhaust gas deposits may become entrapped and cannot be reached by normal cleaning methods. Typical of these areas are seams, gaps, hinges, or fairings located in the exhaust gas path.
17. ENGINE FRONTAL AREAS AND COOLING AIR VENTS. These areas are subject to erosion by airborne contaminants, rain, and from foreign objects on the runways. Erosion will remove the protective finishes or oxide film from the metal surfaces, leaving them vulnerable to corrosive attack. In addition, much of the equipment installed within these recesses is also vulnerable to corrosion. When an aircraft is operated in a marine environment, salt deposits may accumulate in these areas and the ensuing corrosive attack can be rapid and destructive. It is imperative that these areas be frequently inspected and cleaned, and protective finishes be maintained.
18. BATTERY AREAS AND VENTS. Due to the highly corrosive nature of battery acid (sulfuric acid) and its fumes, battery areas and their vents are protected by special acid-resistant paints. Generally this is enough to stem the tide of corrosion if scrupulous attention is devoted to keeping these areas clean.
19. LAVATORIES, GALLEYS, AND CABIN FLOORS. The usual spillage, condensation, and other contamination of these areas are extremely corrosive to aircraft metals. The most common corrosive agents are acidic foods and beverages, and human excreta. Also, most chlorinated disinfectants are acidic and corrosive, and cannot be recommended for use in aircraft. It is impractical to assume that these areas can be kept clean and dry at all times, but it is important to inspect the structure carefully at suitable intervals, cleaning and renewing the finish as necessary. Areas behind lavatories, sinks, or ranges where waste may collect are potential trouble spots, as are personnel relief and waste disposal vents or openings on the exterior of the aircraft.

20. WHEEL WELLS AND LANDING GEARS. Equipment installations in the wheel well areas probably absorb more punishment than any other portion of an aircraft because they are exposed to moisture of flying debris during take-offs and landings, and when the aircraft is parked they are exposed to atmospheric moisture. After an airplane has entered service, it is difficult to maintain protective paint film on landing gears, equipment installations, and wheel well surfaces because the many complicated shapes, assemblies, and fittings in these areas obscure other surfaces. Items that should receive special attention during wheel well inspections are:

- a. Magnesium wheels (especially the areas around the bolt heads, lugs, and wheel webs).
- b. Portions or rigid tubing obscured by clamps and identification tapes.
- c. Exposed electrical equipment.
- d. Crevices between ribs, stiffeners, and lower skin surfaces which can serve as water or debris entrapment areas.

Corrosion control in wheel well areas may best be attained by frequent cleaning, lubrication, paint touch-up and judicious use of wheel covers.

21. CONTROL SURFACE RECESSES. Control surface recesses are potential problem areas because normally they are difficult to inspect. If corrosive agents gain entry and accumulate in these areas, they may go unnoticed for some time. Frequent inspection and cleaning of the surfaces and installations located in these recesses will prevent corrosion from gaining a foothold.
22. SPOT-WELDED SKINS. Corrosive agents may become entrapped between the layers of metal adjacent to the spot-weld beads. If moisture enters the area, an electrolytic cell can be set up between the dissimilar metal phases in the spot-weld area, and one or more of these phases will be subject to preferential corrosive attack. Whenever practical, structural areas with spot-welded assemblies should be sealed to prevent the ingress of contaminants and moisture.
23. HINGES. Hinges are natural traps for corrosive agents. Often they are susceptible to galvanic corrosion when the hinges and pins are made of dissimilar metals. The most practical means of corrosion control is to inspect and lubricate hinges frequently. After lubrication, actuation of the door through several cycles is necessary to ensure complete penetration of the lubricant.
24. LAP JOINTS BETWEEN ALUMINUM ALLOY EXTRUDED SECTIONS. Extruded sections of high-strength materials such as 7075 or 7178 aluminum alloys are more susceptible to intergranular corrosion than are other aluminum alloys. Application and maintenance of chemical processes, sealants, paints, or

combinations of these protective measures have proven most effective in controlling corrosive attack on these materials.

If intergranular corrosion occurs, it is usually found around fasteners or in lap joints. It is evidenced by raised areas or lumps under the paint film, and there have been instances where the attack has progressed to such an extent that there were actually bulges in the faying surfaces. These raised areas, lumps, and bulges are due to the accumulation of corrosion products, which take up more volume than did the affected material before it corroded.

25. FLUID ENTRAPMENT AREAS. Design specifications require that aircraft have drains installed in areas where water may collect. However, if drains are rendered ineffective because they are clogged by debris, sealant, etc., or because the level of the aircraft is changed from that of a normal ground attitude, corrosive agents can collect in a localized area. Low-point areas and drains should be inspected frequently to prevent the inception of corrosive attack.

Low points of integral fuel tanks are areas where water condensate can collect. This water and condensate is of doubtful purity, and if permitted to stand it can permeate the protective coating of the tank and bring many corrosive agents held in suspension in contact with the vulnerable metallic surfaces. Water condensate should be drained regularly from fuel tanks and the integrity of the tank sealant maintained to prevent corrosion of integral tank surfaces.

When considering fluid entrapment areas, one inevitably thinks of aircraft drinking water and wash water systems. Corrosion in these systems is rare because they are fabricated from nonmetallic materials and/or stainless steel. Water stagnation should pose no problems so long as sanitation regulations are heeded.

26. ELECTRONIC PACKAGE COMPARTMENTS. Often the safety of those on board an aircraft rests on the proper function of a little black box. The environment of electronic package compartments is carefully controlled to provide the most ideal conditions that can be achieved. The degree to which such sensitive equipment is exposed to corrosive agents is very small, but even small quantities of moisture and contaminants can adversely affect equipment reliability. Components in these areas should be inspected for corrosive attack as thoroughly as possible during routine checks, and advantage should also be taken of non-scheduled component removals for further inspection.
27. CONTROL CABLES. Control cables have preservative coatings which, when intact, prevent corrosive attack. Due to their vital function it is necessary to inspect these cables frequently to ensure that they are adequately protected. During these inspections incipient failures due to other causes also may be detected. It is recommended that control cables be inspected periodically, then cleaned and treated as necessary before reapplication of the preservatives.

8/1/69

28. MICROBIOLOGICAL FUEL CONTAMINATION AND CORROSION. Microbiological contamination in turbine fuel is caused by bacteria and fungi which feed on the constituents of the turbine fuel. The result is a sludge, or mat deposit, which has been found in some aircraft fuel tanks and is often loosely referred to as green slime. However, some deposits have been found in various shades of grey, brown, red, and white. If allowed to develop and grow in the aircraft fuel tanks, microbiological contamination can cause a myriad of problems not the least of which is severe aluminum alloy corrosion in the aircraft integral fuel tanks. Since the subject is large and complex, we recommend Lockheed's "Field Service Digest" issue of March-April 1961, Volume 7, Number 5, which is devoted to a full explanation of microbiological contamination, corrosion, treatment and prevention. Likewise, we recommend Lockheed's "Field Service Digest" issue Number 49, dated December 1965, which is devoted to general corrosion detection, removal, and control.

CHAPTER 7. MAINTENANCE INFORMATION

29. L-188 AIRCRAFT MAINTENANCE INFORMATION. The following is a listing of significant maintenance difficulties that have been reported by air carriers as mechanical reliability reports from 1967 and 1968 ADP records. This information may be useful in identifying additional structural inspection problem areas. In all cases, check the corresponding trouble area, left right, top bottom, forward aft, etc.

a. Wing.

- (1) During a routine visual inspection, two cracks were found in the lower right forward front beam cap wing stub fitting, P/N 819229. Each crack was 1 inch long at butt line 65. Another crack 1 inch long was found at the top vertical support T-angle at station 49 below No. 6 wing plank. The aircraft total time was 19,451 flight hours.
- (2) During a visual inspection, the lower left inboard forward wing-to-box-beam fitting, P/N 819229-1, was found cracked.
- (3) An 18-inch spanwise crack progressing outboard from WS 155 at the splice between #3 and #4 upper right wing planks was found during a visual inspection.
- (4) During a fleet campaign using visual, magnifying glass, dye penetrant, and boroscope inspection methods, the forward top beam cap inboard of No. 2 nacelle at station 165 was found cracked. The cracks were one-eighth inch long and emanated from a screw hole towards the aft end of the beam cap. The aircraft total time was 21,953 flight hours.
- (5) During maintenance, the left wing truss rib was found cracked at station 167. The total airframe time was 20,378 flight hours.
- (6) During a visual inspection a 4-inch crack was found in the left rear beam wing stiffener at station 204.7. The aircraft total time was 20,254 flight hours.
- (7) A routine maintenance inspection revealed a 3/4-inch crack in the left wing forward lower spar cap tang at station 331. The airframe total time was 22,311 flight hours.
- (8) During a scheduled ultrasonic inspection, the following cracks were found:

- (a) A 36-inch crack was detected at the forward end of No. 2 fuel tank access plate at the forward end of No. 4 wing plank. The crack extended from a point midway in the access plate to a point 36 inches inboard of the access plate. The crack depth varied from six thousandths of an inch to complete fracture over a 2-inch span.
 - (b) The same type crack (as (a) above) was found at No. 3 fuel tank access plate. The crack extended from a point midway in the access plate to a point outboard of the access plate.
 - (c) During a fleet campaign inspection, 1/4-inch cracks were found emanating from the inboard No. 3 nacelle fillet fairing first and third attaching screw holes in No. 1 wing plank. The aircraft total time was 21,563 flight hours.
- (9) On a routine inspection, the No. 4 sight gage aft mounting screw hole was found with a 1-inch crack in the leap doubler. The airframe total time was 20,708 flight hours.
 - (10) During inspection wing skin cracks were found at two screw holes around fuel gages between No. 3 and No. 4 nacelles. The aircraft total time was 22,287 flight hours.
 - (11) Inspection disclosed a 3-inch crack in the inboard side of the No. 4 fuel tank surge box. The total airframe time was 21,528 flight hours.
 - (12) Maintenance inspection revealed a crack 5 inches aft of the hinge on the access panel at the trailing edge of the wing, 5 feet outboard of No. 4 engine. The aircraft total time was 24,074 flight hours.
 - (13) A 1/2-inch crack was found in the left wing tip upper aft former. Total airframe time was 21,520 flight hours.
 - (14) During a scheduled inspection a 3 1/2-inch crack was found in the left outboard wing-to-nacelle attach plate, P/N 818854-1. The crack occurred 1 5/8 inches from the bottom edge of the plate. Total aircraft time was 21,686 flight hours.
 - (15) Overhaul inspection revealed random cracking of the wing and nacelle skin former webs and stiffeners at the following locations:
 - (a) No. 1 nacelle former flange outboard side station 0.0.

- (b) No. 2 nacelle former attach angle at lower outboard longeron at aft hinge for No. 1 main landing gear door.
- (c) No. 3 nacelle attach angle at lower aft edge of No. 3 forward main landing gear door. Total airframe time was 17,700 flight hours.

b. Fuselage.

- (1) Inspection revealed fuselage skin crack on the left side above the aft power receptacle. The airframe total time was 22,603 flight hours.
- (2) During a fleet campaign, three 1/2-inch skin cracks were found at the lower aft baggage door frame. Cracks occurred at the lower forward frame radius. Total aircraft time was 18,752 flight hours.
- (3) Inspection disclosed cracked corners above and below the No. 9 left and right emergency exit windows. Crack lengths were 1/8 to 1 1/4 inches. The total airframe time was 17,797 flight hours.
- (4) During a routine visual inspection, a 2-inch crack was detected in the lower rear corner of the passenger door frame. Total time on the aircraft was 19,733 flight hours.
- (5) During a visual inspection, a complete fracture of a fuselage web former was found at fuselage station 107.4. The crack was on the right side below the rudder pedals. Total time on the aircraft was 20,045 flight hours.
- (6) During a walkaround visual inspection, confirmed by dye penetrant inspection, a 2-inch crack was found in a fuselage cap strip at station 118.8. The affected cap strip is on the right side of the nose gear wheel well, below the cockpit flooring. Total time on the aircraft was 22,547 flight hours.
- (7) An overhaul inspection revealed two fuselage skin cracks. One was found on the left side of the fuselage at the nose wheel well cutout at fuselage station 186. The other crack was found below and to the right of the No. 2 hydraulic pump, between stringers 28 and 29 at fuselage station 738. Time on the aircraft was 17,700 flight hours.
- (8) During a dye penetrant inspection, a 3/8-inch crack was found in the right rear fuselage-to-wing attaching ring, P/N 801031-102, located just above the floor line. Total time on the aircraft was 20,310 flight hours.

- (9) A crack was found in a pressure web at butt line 40, fuselage station 195. The pressure web affected is located on the right side. Total time on the aircraft was 22,781 flight hours.
- (10) A 1 1/2-inch crack was found in a former rib on the right side at station 550. The crack was located 6 inches below the floor level. Total time on the aircraft was 20,568 flight hours.
- (11) During overhaul inspection, several fuselage structure cracks were detected as follows:
 - (a) Former flange cracked on left and right sides of fuselage at stringers 30 and 31, station 570.97.
 - (b) Former flange cracked at fuselage station 1150 at stringers 7, 10, and 12 in the tail compartment.
 - (c) Former flange cracked at station 1133 at stringers 70 and 71 in the tail compartment.
 - (d) Former flange cracked at station 768 at stringer 23 located above floor level in the hydraulic compartment.
 - (e) Former flange cracked at upper aft end of forward cargo pit door.
 - (f) Right side cabin floor beam flange cracked at station 652.
 - (g) Right and left side cabin floor beam flange cracked at fuselage station 580 above the forward spar.
- (12) During structural modification to a cargo configuration, the contractor found the left aft main fuselage frame fitting cracked at station 695. Total time on the aircraft was 19,276 flight hours.
- (13) During routine visual inspection, a 3-inch crack was detected across the belt frame at fuselage station 715.50. The crack was on the left side at the floor line. Total time on aircraft was 14,945 flight hours.
- (14) During inspection, the belt frame on the right side of the fuselage at stringer 19, station 730, was found cracked through.
- (15) During a scheduled inspection, stringer No. 37 was found cracked at fuselage station 1113. The crack occurred at the forward clip fastener hole. Total time on aircraft was 19,778 flight hours.

- (16) Fuselage stringer No. 49 was found cracked at fuselage station 1117. The crack occurred at the No. 5 fastener on the forward side at the rear pressure bulkhead. Total time on the aircraft was 20,842 flight hours.
- (17) Fuselage formers were found cracked at the 12 o'clock position at fuselage station 1133, and at the 9 and 2 o'clock positions at fuselage station 1158. Total time on the aircraft was 21,898 flight hours.
- (18) Fuselage formers were found cracked at 9, 10, 11, 11:30 and 2 o'clock positions at fuselage station 1150, and at the 9 o'clock position at fuselage station 1167. Total time on the aircraft was 21,932 flight hours.
- (19) Right and left reinforcing angles, P/N 803185-47 and -48, were found cracked at station 1185. One crack was found in the former-to-skin attachment at fuselage station 1167, and another crack was found at station 1133. Total time on the aircraft was 21,151 flight hours.
- (20) Fuselage former attach tab was found cracked at the 10 o'clock position at fuselage station 1193. Total time on the aircraft was 22,207 flight hours.

c. Flight Controls.

- (1) A 1 1/2-foot fatigue crack was found at the trailing edge of the wing flap. The crack was located aft of the Mylar strip at the rear of the No. 2 engine.
- (2) A 9 1/2-inch crack was found on the right horizontal stabilizer front beam web near stabilizer station 29. Total time on the aircraft was 19,853 flight hours.
- (3) During inspection, the No. 8 balance weight open type arm, P/N 816900-4, on the left elevator was found cracked. Total time on the aircraft was 19,452 flight hours.
- (4) During main base check, a 1 1/2-inch crack was found in the vertical stabilizer right attach angle at station 1117. The crack had progressed three-fourths inch forward and aft through the Hi-Lok fastener hole. Total time on the aircraft was 19,437 flight hours.

- (5) Pilot reported No. 3 engine vibration indication at and above 220 knots. The vibration was also noticeable by slight buzzing of the power lever on the ground. During cruise, a definite vibration was experienced in the ailerons, elevators, and rudder. The engine vibration was pronounced above 800 degrees engine tailpipe temperature. Inspection of the control surfaces revealed rudder rib damage requiring reinforcement. The rudder was replaced. Total time on the airframe was 15,949 flight hours.

d. Main Landing Gears.

- (1) During overhaul inspection two 3/4-inch cracks were found at the top of the left main landing gear inboard truss rib tabs at wing station 167. The cracks originated from the tab cutouts extending downward and aft toward the truss cap between risers Nos. 16, 17, 18, and 19 of the No. 3 upper wing plank. Total time on the aircraft was 21,734 flight hours.
- (2) During inspection, the left main landing gear door actuator fitting, P/N 802058-1, was found broken. The mounting bolt was holding the fitting in place. There were 857 landings since the last removal of the door actuator. Total time on the aircraft was 20,268 flight hours.
- (3) During a dye penetrant inspection, a 1/2-inch crack was detected on the left main landing gear actuator support fitting, P/N 841275-101. The crack was located aft of the outboard hole. Total time on the aircraft was 14,356 flight hours.

e. Corrosion.

- (1) During inspection, exfoliation corrosion was found on the left fuselage longeron, P/N 897596-1, between fuselage stations 474.5 and 484.5. Total time on the aircraft was 20,740 flight hours.
- (2) During a main base check inspection, corrosion was found in several spots on the aft cargo door fuselage doubler. The bottom edge of the aft cargo door sill is covered by a stainless steel striker plate. Total time on the aircraft was 17,721 flight hours.
- (3) Heavy corrosion was found on the floor beams at fuselage stations 333 and 371. Total time on the aircraft was 21,520 flight hours.

- (4) Three separately corroded areas were found on the left upper wing at station 65. The corroded areas were .030 inch deep and 1/2 inch in diameter around the fuselage-fillet-to-wing attach fasteners at wing planks Nos. 1, 6, and 7. Total time on the aircraft was 23,315 flight hours.
- (5) During scheduled inspection, corrosion was found on the lower wing surface. The corrosion occurred under the fuselage-to-wing fillet chafe strip at numbers 4, 5, and 6 wing planks. Four spots of corrosion were found measuring .011 inch, .024 inch, .024 inch, and .013 inch. The areas were treated and filled with epoxy filler before installing repaired doublers. Total time on the aircraft was 21,715 flight hours.
- (6) Corrosion was found on the lower section of the captain's sliding window frame. Total time on the aircraft was 21,620 flight hours.
- (7) During inspection, an area of approximately 12 inches by 6 inches on the outside skin at stringer No. 30 and fuselage stations 500 to 549 was found to be corroded beyond limits. Also, two small areas approximately 1 inch square were found corroded at stringer 22, fuselage stations 685 and 690. Total time on the aircraft was 24,649 flight hours.

f. Miscellaneous.

- (1) An unscheduled landing was made as a precautionary measure due to in-flight cracking of the first officer's windshield. The windshield heat was in the low position. The aircraft was ferried to Buffalo, where the windshield was replaced. Flight time since the last inspection was 17 hours. Total time on the aircraft was 19,644 flight hours.
- (2) The No. 4 oil cooler flap door was found cracked at the door actuator attach bracket. The crack was approximately one-half inch in length and progressed out of a screw hole toward the door hinge. The oil cooler flap door, P/N 836505-9, was replaced. Total time on the aircraft was 14,286 flight hours.
- (3) During ground inspection, the No. 4 propeller oil access door, P/N 811567-11, was found excessively worn. The wear allowed the upper hinge end of the door to protrude sufficiently to be caught by the propeller blade cuff and be torn free. The aircraft was ferried to its main base, where the propeller cowl panel, P/N 813395-27, was replaced and the propeller cuff repaired.

FIGURE A-1. BASIC DIMENSIONS

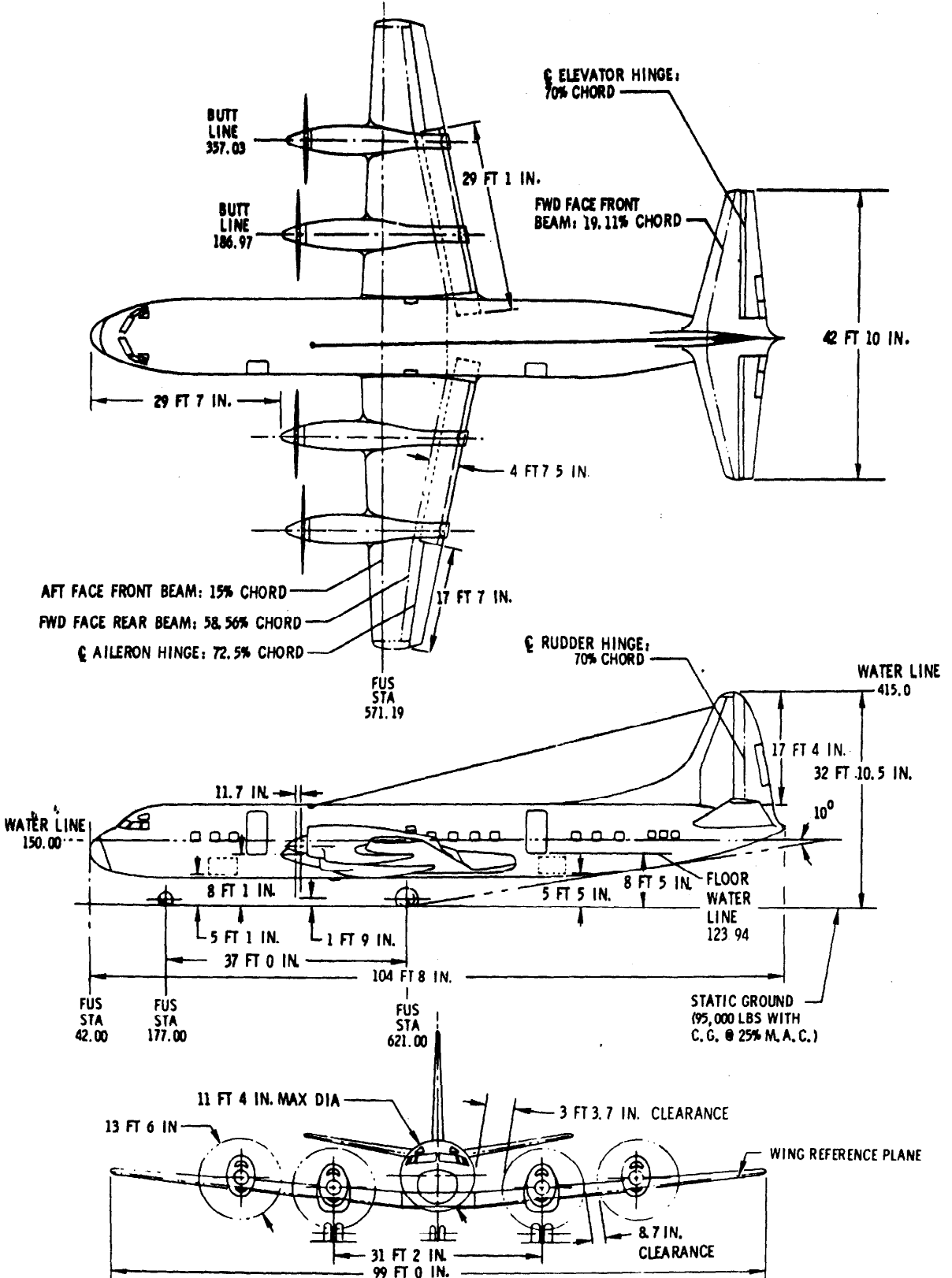
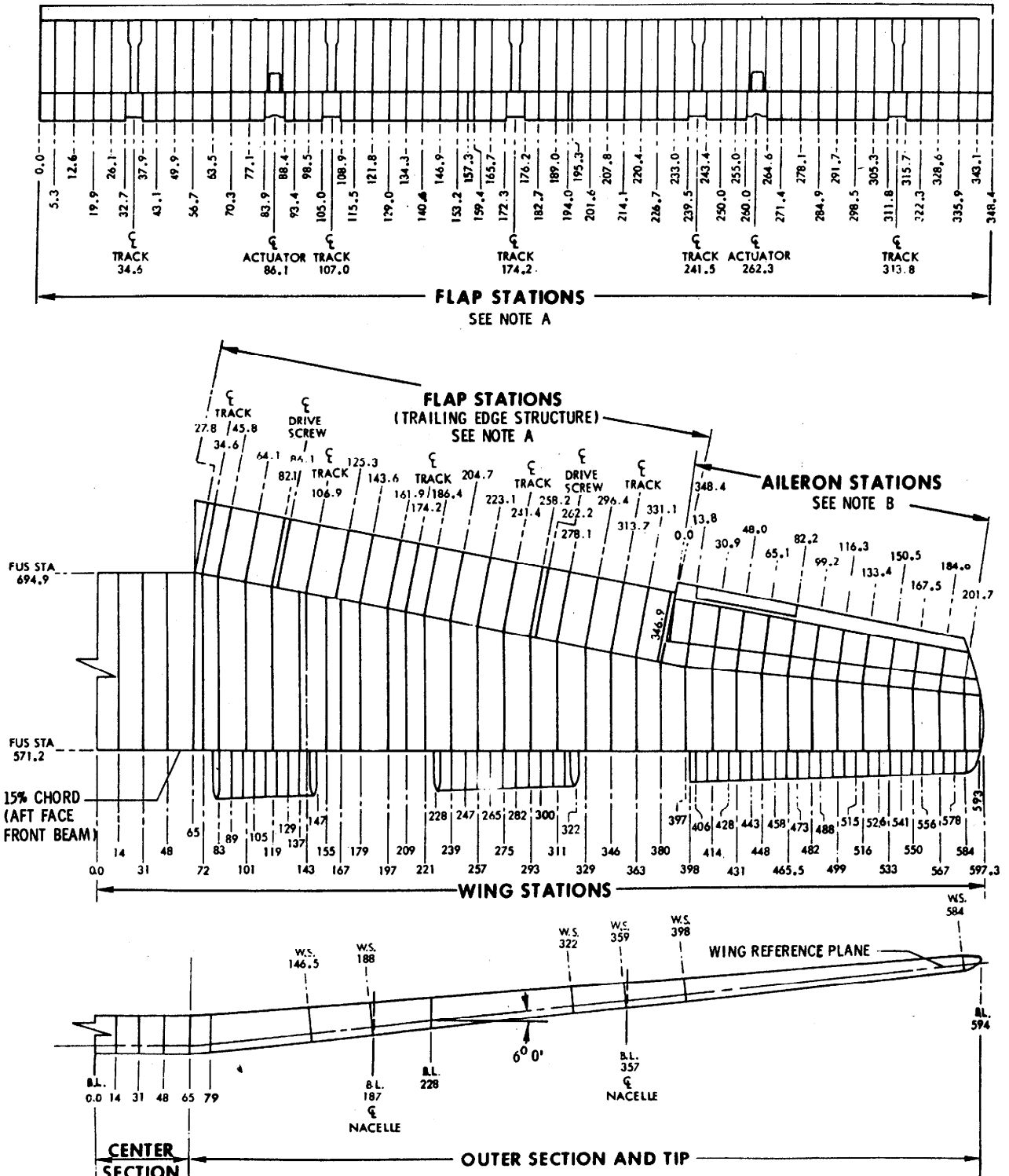


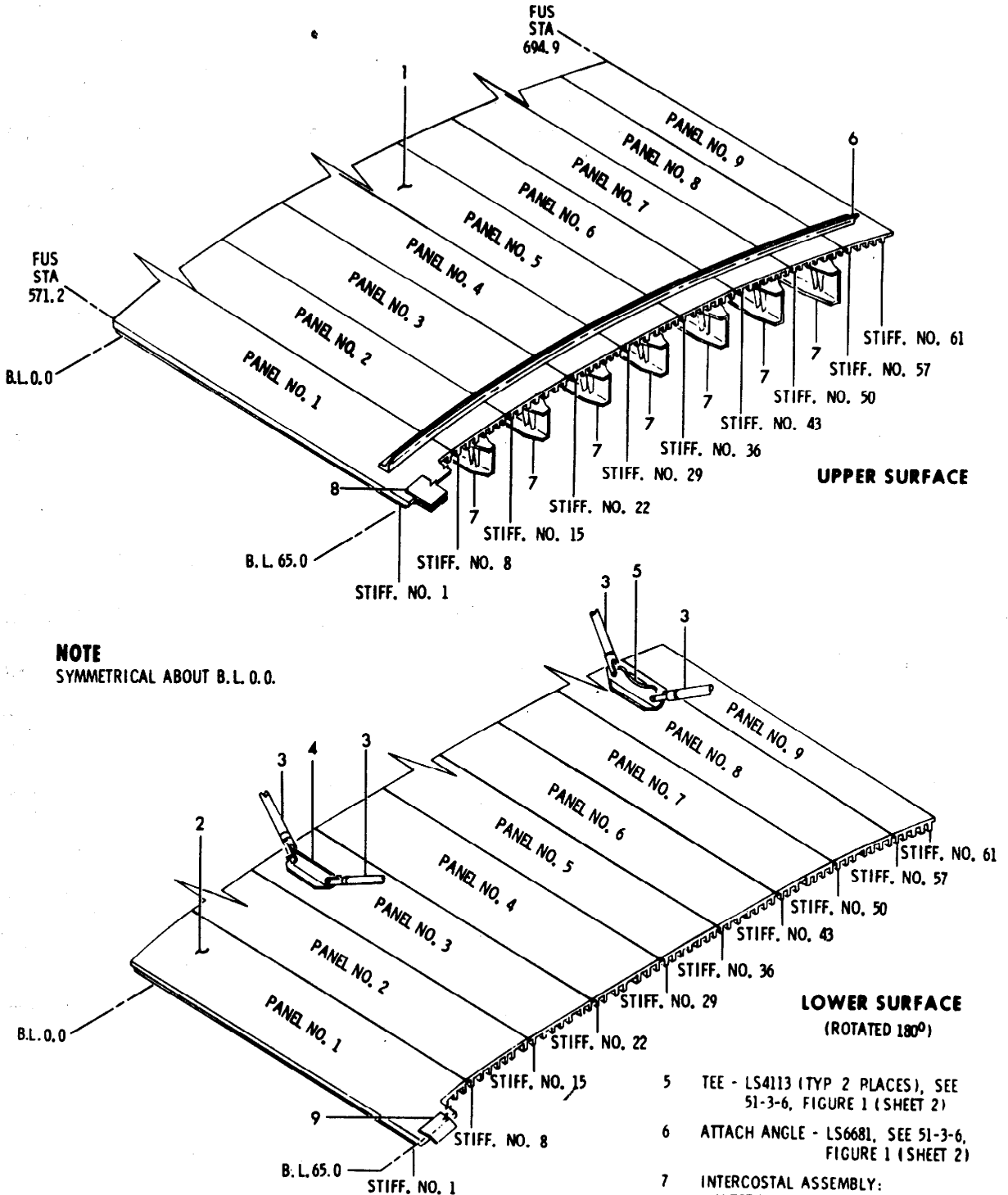
FIGURE B-1. WING STATION DIAGRAM



NOTE

- A. FLAP STATION AND TRAILING EDGE STATION PLANES ARE PERPENDICULAR TO THE WING REAR BEAM.
- B.AILERON STATION PLANES ARE PERPENDICULAR TO HINGE CENTERLINE AND WING REFERENCE PLANE.

FIGURE B-2. WING SKIN PLANKS AND MATERIAL INDEX

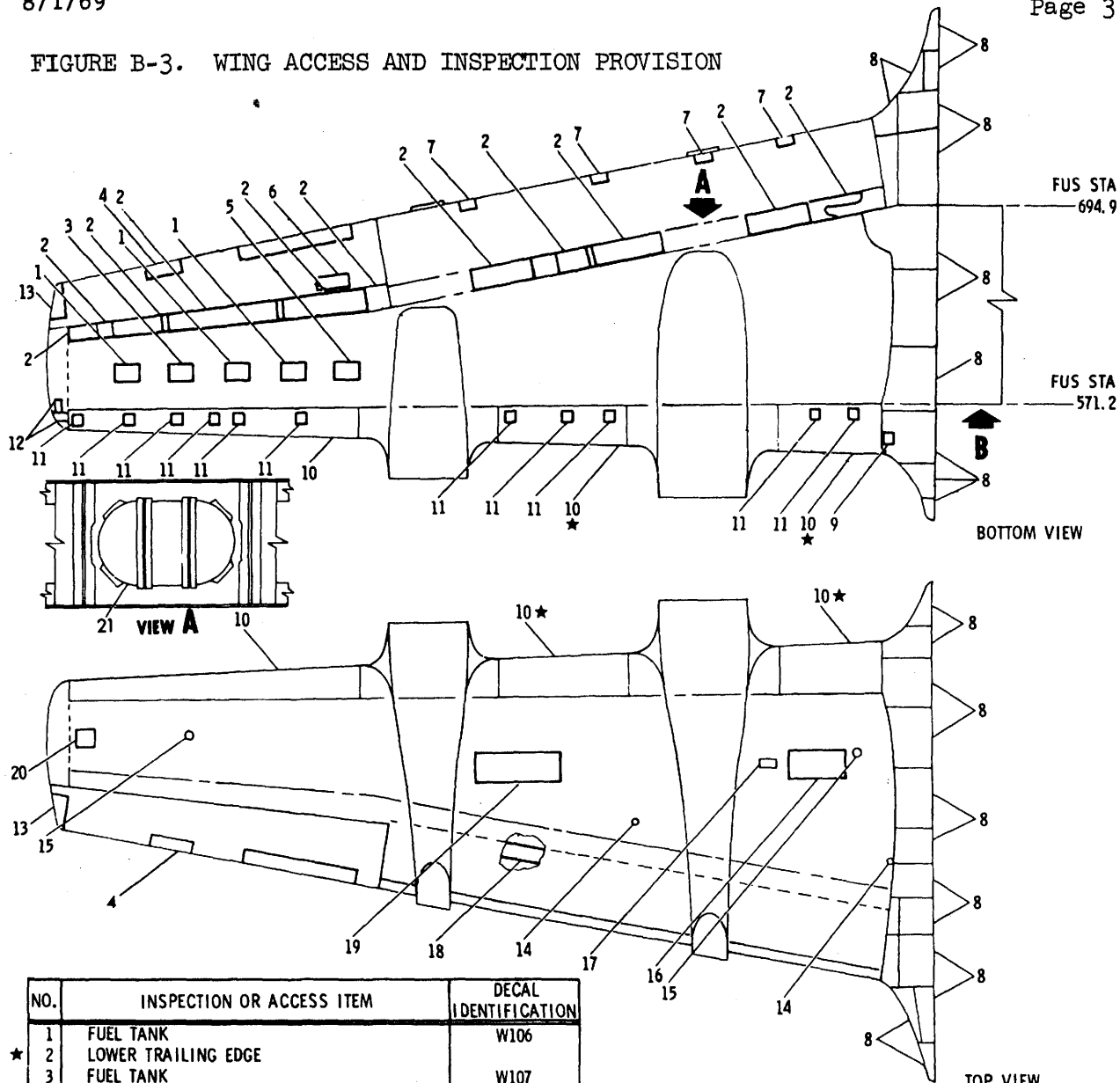


NOTE
SYMMETRICAL ABOUT B.L. 0.0.

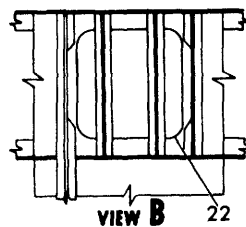
- 1 PANEL (TYP) - LS7255, SEE 57-2-1, FIGURE 3
- 2 PANEL (TYP) - LS7256, SEE 57-2-1, FIGURE 3
- 3 TUBE - 2024-T3 AL ALLOY
- 4 TEE - LS4929 (TYP 4 PLACES), SEE 51-3-6, FIGURE 1 (SHEET 2)

- 5 TEE - LS4113 (TYP 2 PLACES), SEE 51-3-6, FIGURE 1 (SHEET 2)
- 6 ATTACH ANGLE - LS6681, SEE 51-3-6, FIGURE 1 (SHEET 2)
- 7 INTERCOSTAL ASSEMBLY:
INTERCOSTAL - LS6258, SEE 51-3-6, FIGURE 1 (SHEET 2)
FITTING - LS6300-2-36-557
- 8 SPLICE PLATES - .150 7075-T6 AL ALLOY
- 9 SPLICE PLATE - .190 7075-T6 CLAD

FIGURE B-3. WING ACCESS AND INSPECTION PROVISION



NO.	INSPECTION OR ACCESS ITEM	DECAL IDENTIFICATION
1	FUEL TANK	W106
* 2	LOWER TRAILING EDGE	
3	FUEL TANK	W107
4	AILERON TRAILING EDGE	
5	FUEL TANK	W108
6	AILERON	
7	FLAP TRAILING EDGE	
8	FILLETS	
9	ENGINE START LINE (RIGHT SIDE ONLY)	
10	LEADING EDGE	
* 11	LEADING EDGE	
12	LIGHTS	
13	AILERON TIP	
14	FUEL PUMP	
15	OVERWING FUEL FILLERS	
16	FUEL TANK	W105
17	FUEL SYSTEM	W103
18	FLAP LEADING EDGE	
19	FUEL TANK	W102
20	FUEL TANK	W101
21	DRY BAY	
22	CENTER SECTION	



NOTE (ROTATED FOR CLARITY)

A. LEFT SIDE SHOWN. ALL ACCESS OPENINGS ARE FOR RIGHT AND LEFT SIDES EXCEPT WHERE NOTED.

B. REFER TO 54-0, FIGURE 3 FOR ACCESS TO WING IN VICINITY OF NACELLES.

C. REFER TO 53-0, FIGURES 3 AND 4 FOR ACCESS TO WING IN THE CENTER SECTION.

* INDICATES A HINGED ACCESS DOOR. ALL OTHERS ARE REMOVABLE.

FIGURE C-1. NACELLE STATION DIAGRAM

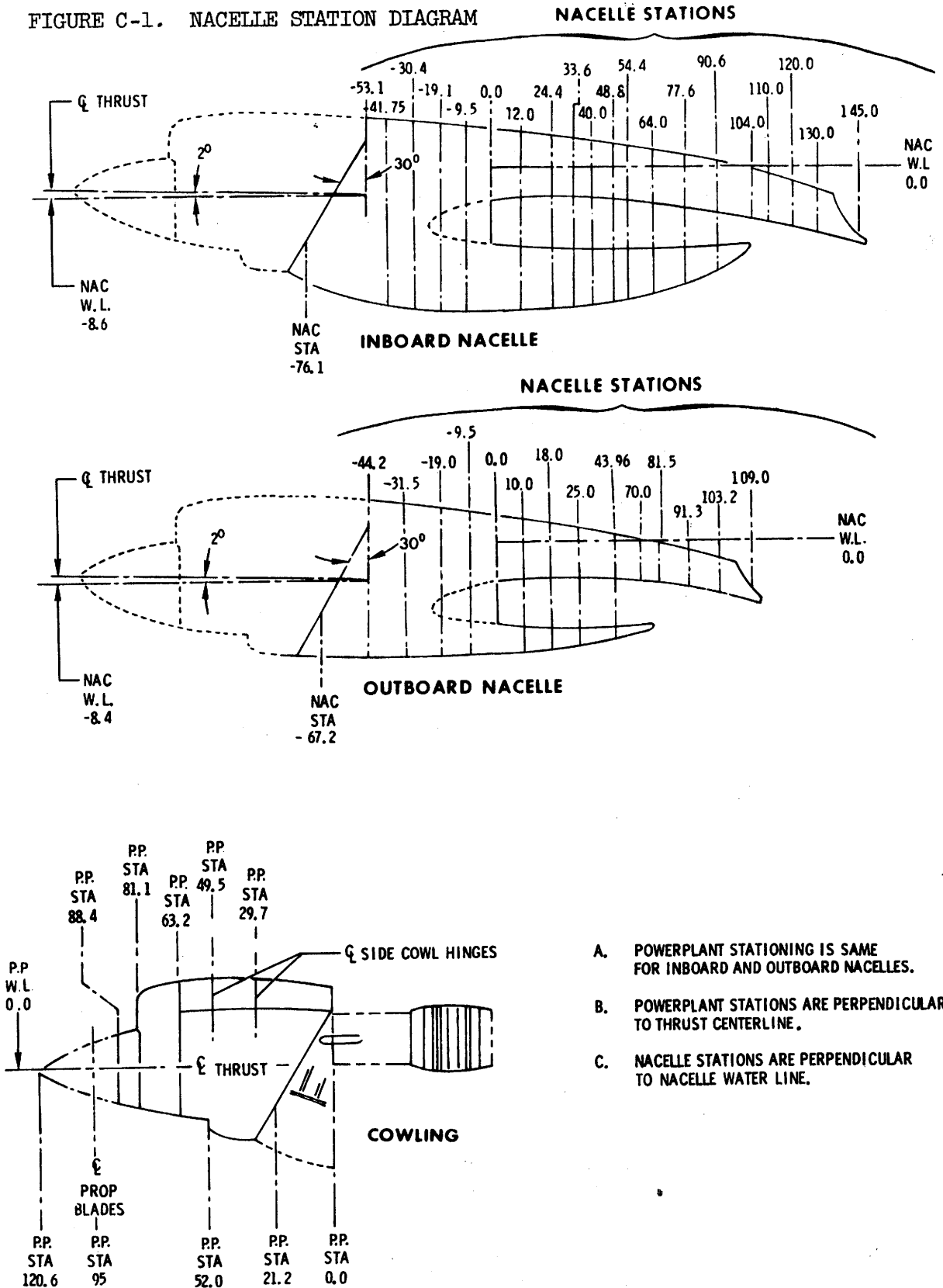
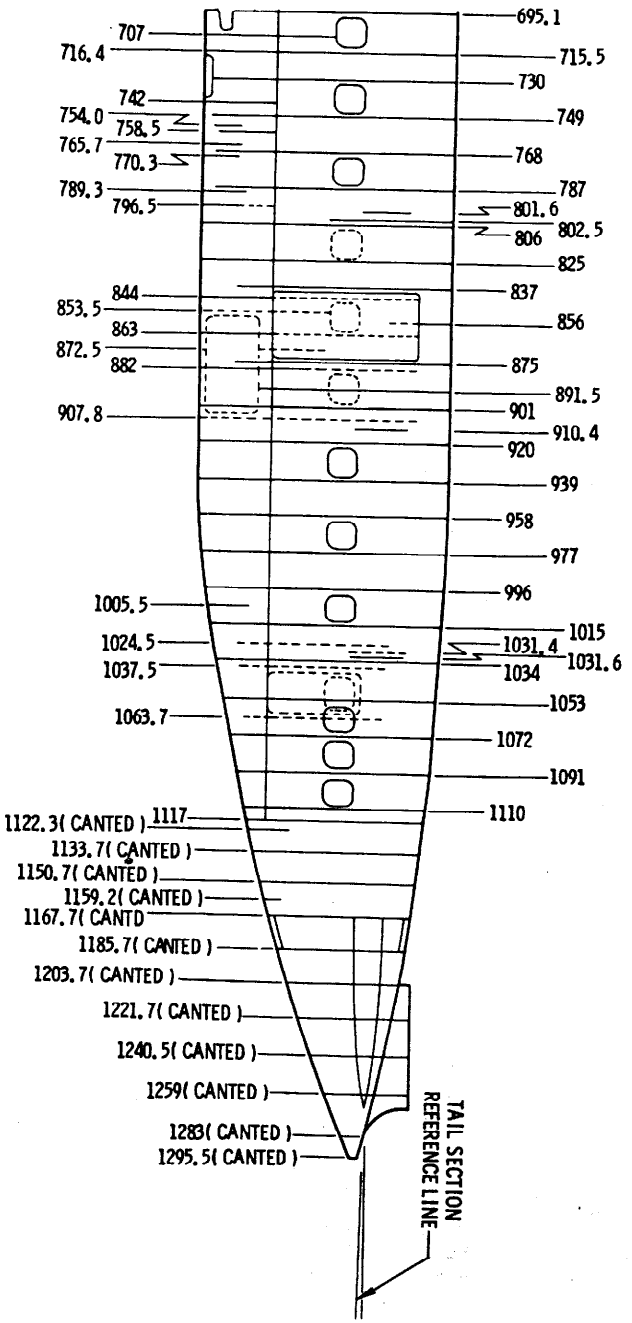


FIGURE D-1. FUSELAGE STATIONS DIAGRAM (SERIAL NOS. 1001 AND UP)



(SEE SHEET 2 FOR LAC SERIALS 2001 AND UP)

LAC SERIALS 1001 AND UP

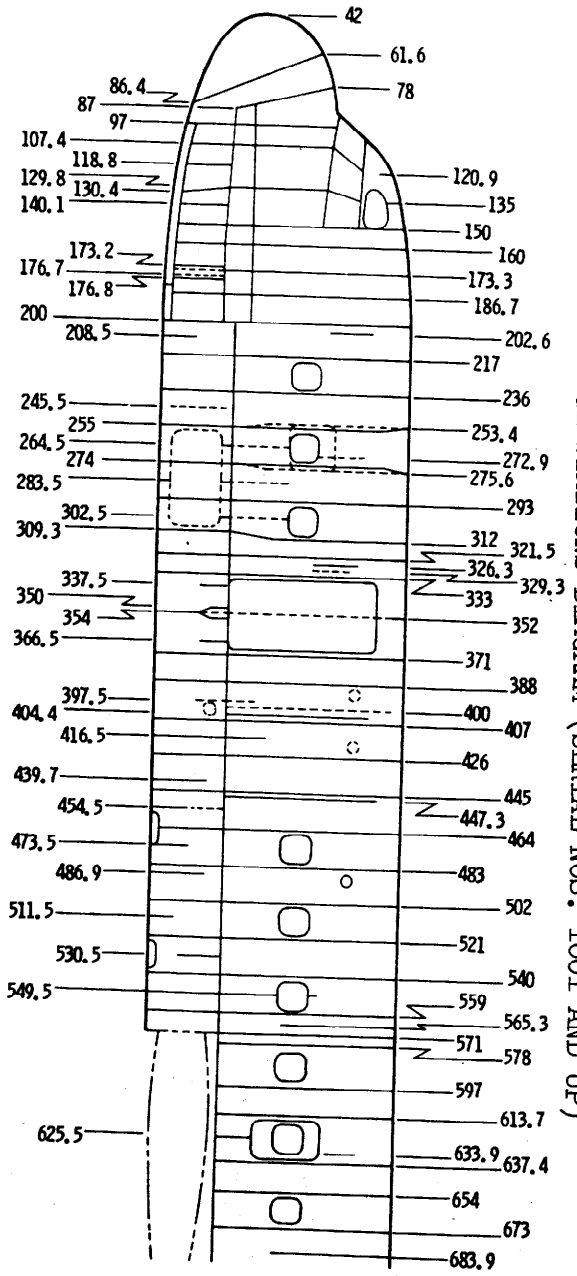


FIGURE D-2. FUSELAGE STATIONS DIAGRAM (SERIAL NOS. 2001 AND UP)

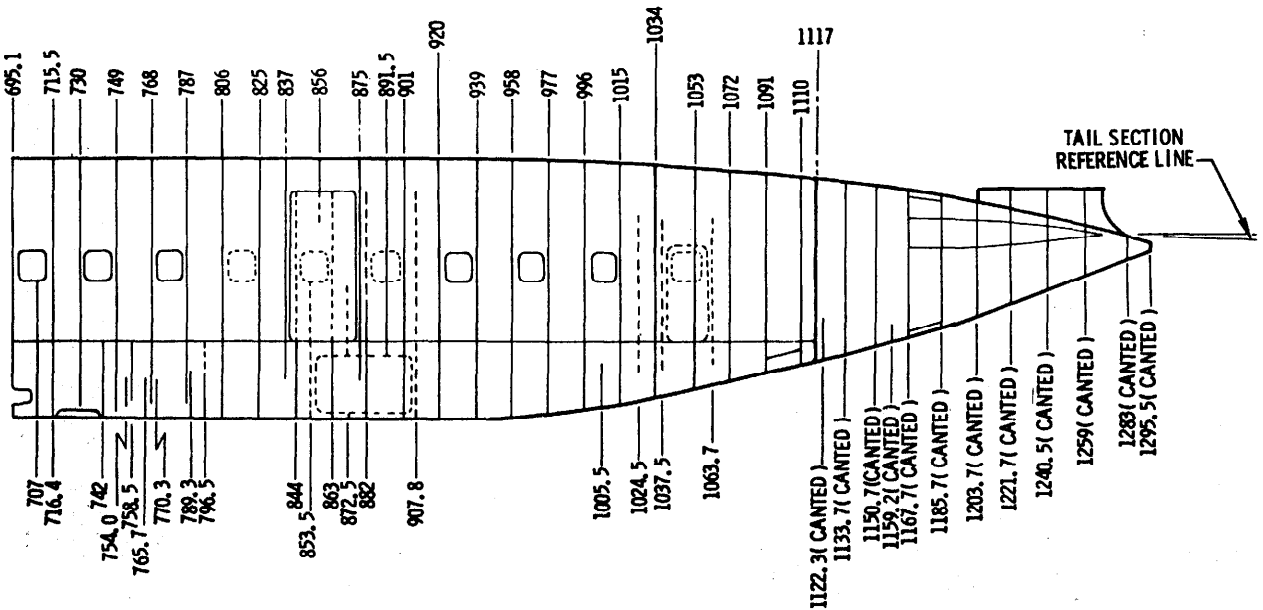
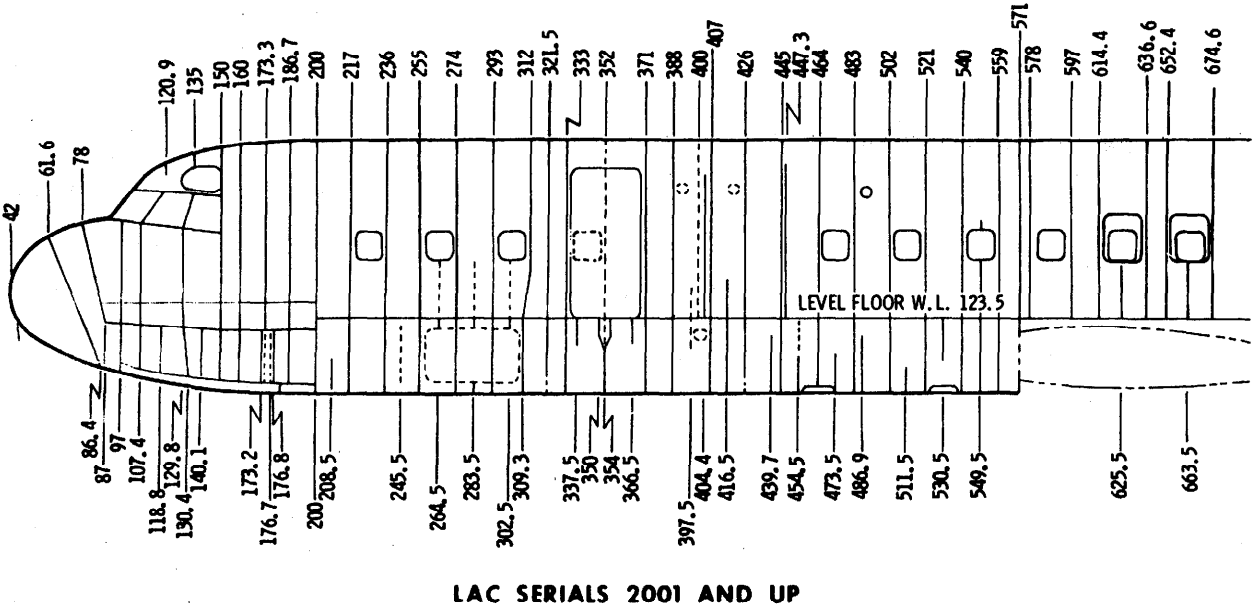
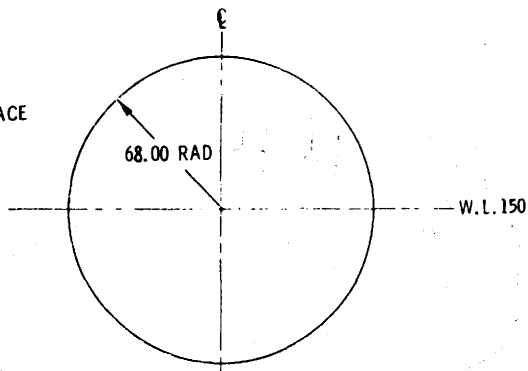


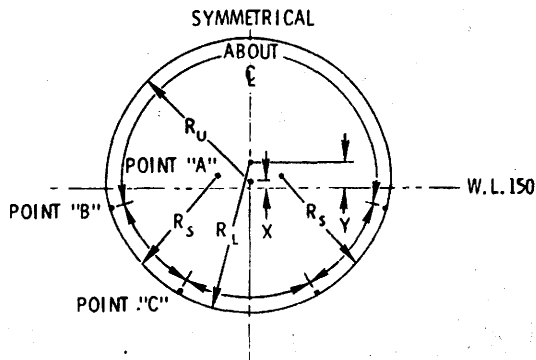
FIGURE D-3. FUSELAGE CONTOUR COORDINATES

FUS STA 42 TO FUS STA 217 - BETWEEN THESE STATIONS THE FUSELAGE IS A FAIRED SECTION. THE CONTOUR SHOULD CONFORM TO THE SURROUNDING STRUCTURE.

FUS STA 217 TO FUS STA 901 - CONSTANT SECTION AS SHOWN. OUTER-SURFACE CONTOUR IS GIVEN; SUBTRACT SKIN THICKNESS (SEE 53-2-1, FIGURE 1) TO OBTAIN FRAME, FORMER OR BULKHEAD CONTOUR.



FUS STA 901 TO FUS STA 1117 - SEE TABLE FOR VALUES OF DIMENSIONS AT APPROPRIATE FUSELAGE STATION.



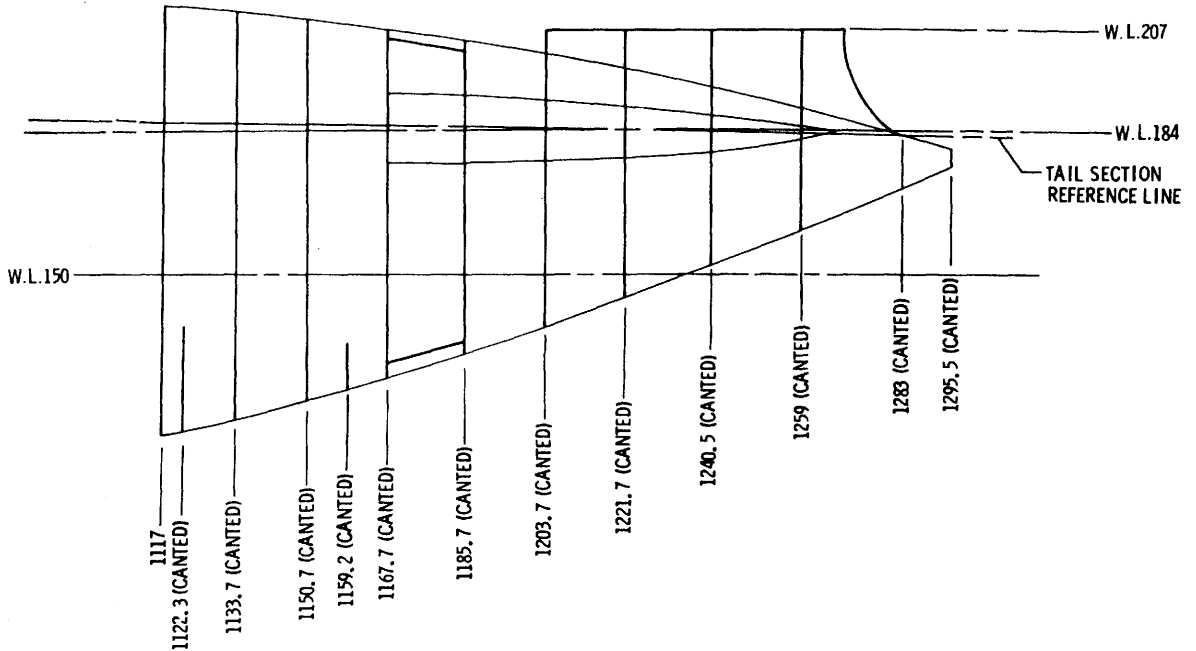
FUS STA	X	Y	POINT "A"		POINT "B"		POINT "C"		R _U	R _S	R _L
			B.L.	W.L.	B.L.	W.L.	B.L.	W.L.			
907.8	0	.25	.13	149.96	64.94	129.83	28.23	88.19	68.00	67.86	68.18
920	0	1.34	.96	149.78	66.32	134.96	36.11	92.73	68.00	67.01	68.85
939	0	3.75	3.15	149.73	67.76	144.24	43.14	98.69	68.00	64.84	69.94
958	.04	6.57	5.61	150.20	67.93	152.01	46.86	103.45	67.96	62.35	70.83
977	.82	9.62	-7.04	150.75	67.18	150.17	44.42	103.63	67.19	60.14	71.47
996	2.26	12.84	7.21	151.58	65.45	146.08	38.75	102.30	65.74	58.50	71.88
1005.5	3.15	14.50	6.92	152.17	64.21	144.06	35.23	101.71	64.85	57.86	72.00
1015	4.06	15.99	6.43	152.94	62.91	143.09	31.76	101.51	63.86	57.33	71.89
1024.5	4.97	17.16	5.87	153.82	61.62	142.96	28.75	101.83	62.78	56.80	71.37
1034	5.88	17.99	5.25	154.81	60.40	143.60	26.07	102.53	61.63	56.28	70.46
1037.5	6.22	18.20	5.00	155.19	59.92	143.86	25.10	102.84	61.18	56.08	70.02
1053	7.70	18.55	3.92	156.97	58.11	146.83	21.58	104.74	59.12	55.14	67.36
1063.7	8.73	18.18	3.19	158.19	56.79	149.15	19.71	106.41	57.59	54.36	64.84
1072	9.52	17.53	2.73	159.08	55.64	150.47	19.21	108.07	56.37	53.60	62.48
1117	13.83	13.83	0	163.83	—	—	—	—	48.96	48.96	48.96

NOTE

1. DATA GIVEN FOR OUTER-SURFACE CONTOUR. SUBTRACT SKIN THICKNESS (SEE 53-2-1, FIGURE 1) TO OBTAIN FRAME, FORMER OR BULKHEAD CONTOUR.
2. BETWEEN FUS STA 1072 AND 1117 THE FUSELAGE IS A FAIRED SECTION. THE CONTOUR SHOULD CONFORM TO THE SURROUNDING STRUCTURE.

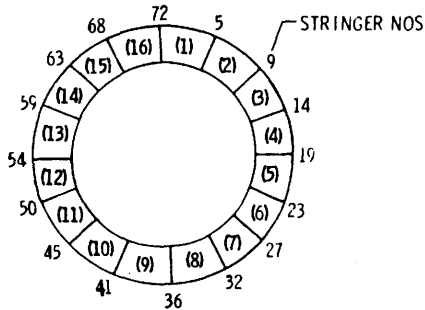
FUS STA 1117 TO FUS STA 1295 - BETWEEN THESE STATIONS THE FUSELAGE IS A FAIRED SECTION. THE CONTOUR SHOULD CONFORM TO THE SURROUNDING STRUCTURE.

FIGURE D-4. FUSELAGE CANTED SECTION



NOTE

A. FRAME OR FORMER SEGMENTS ARE LOCATED APPROXIMATELY AS SHOWN:-



VIEW LOOKING FORWARD AT A TYPICAL FRAME

FUS STA (CANTED)	FRAME OR FORMER	REINFORCEMENT
1117	SEE 53-2-3, FIGURE 1 (SHEET 5)	
1122.3	(6) THRU (11) - .040 7075-T6 CLAD	(8) (9) - LS3255 * (7) THRU (10) - .040 7075-T6 CLAD •
1133.7	(1) THRU (16) - .032 7075-T6 CLAD LS3572-4 *	FWD FACE - (3) THRU (5), (12) THRU (14) - LS3572-4 ♦ AFT FACE - (1) THRU (16) - LS6844 ♦
1150.7	S E E S H E E T 2	
1159.2	(7) THRU (10) - .040 2024-T4 CLAD	
1167.7	S E E S H E E T 2	
1185.7	S E E S H E E T 2	
1203.7	S E E S H E E T 3	
1221.7	S E E S H E E T 3	
1240.5 1259	.032 2024-T4 CLAD	
1283	.032 6061-T4 AL ALLOY	
1295.5	SEE 53-3-1, FIGURE 1 (SHEET 2)	

B. PORTION OF FRAME OR FORMER SEGMENT IS INDICATED WHERE NECESSARY AS FOLLOWS:

- * INNER FLANGE
- ♦ OUTER FLANGE
- WEB

C. REFER TO 53-2-3, FIGURE 2 FOR REPAIRS AND NEGLIGIBLE DAMAGE. IF NOT APPLICABLE, REFER TO 51-3-6, FIGURE 1 (SHEETS 1 AND 2).

FIGURE E-1. STABILIZERS STATIONS DIAGRAM

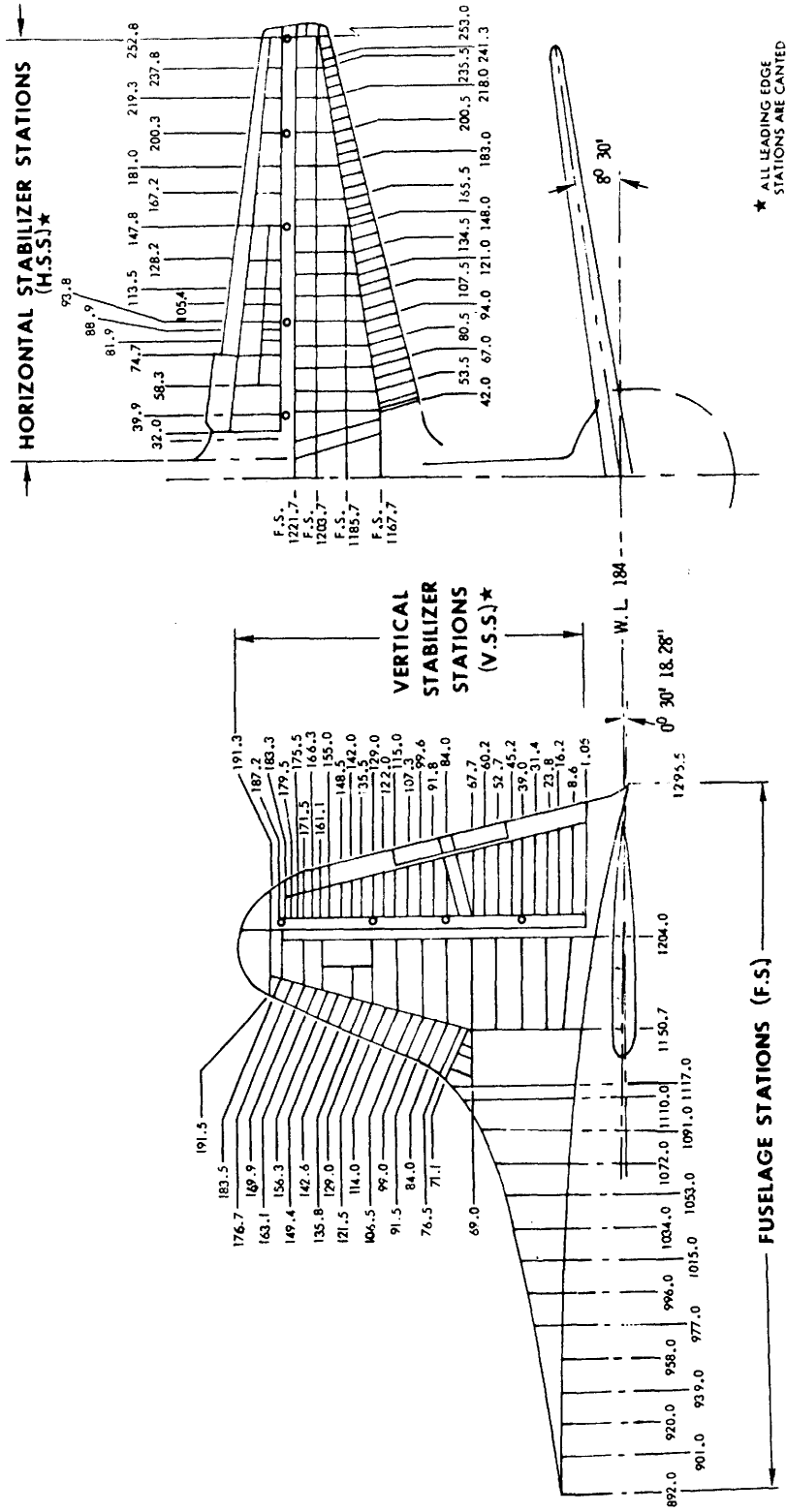
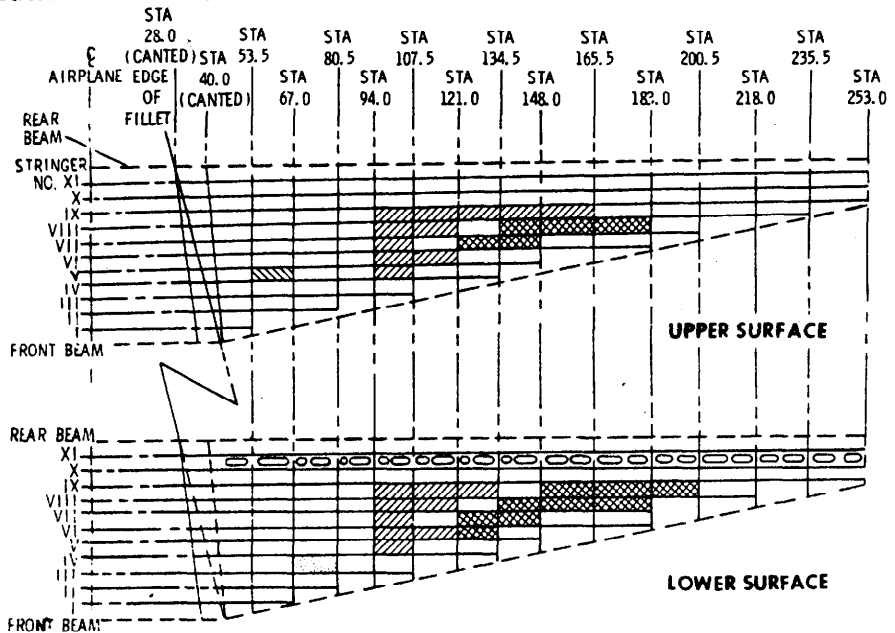


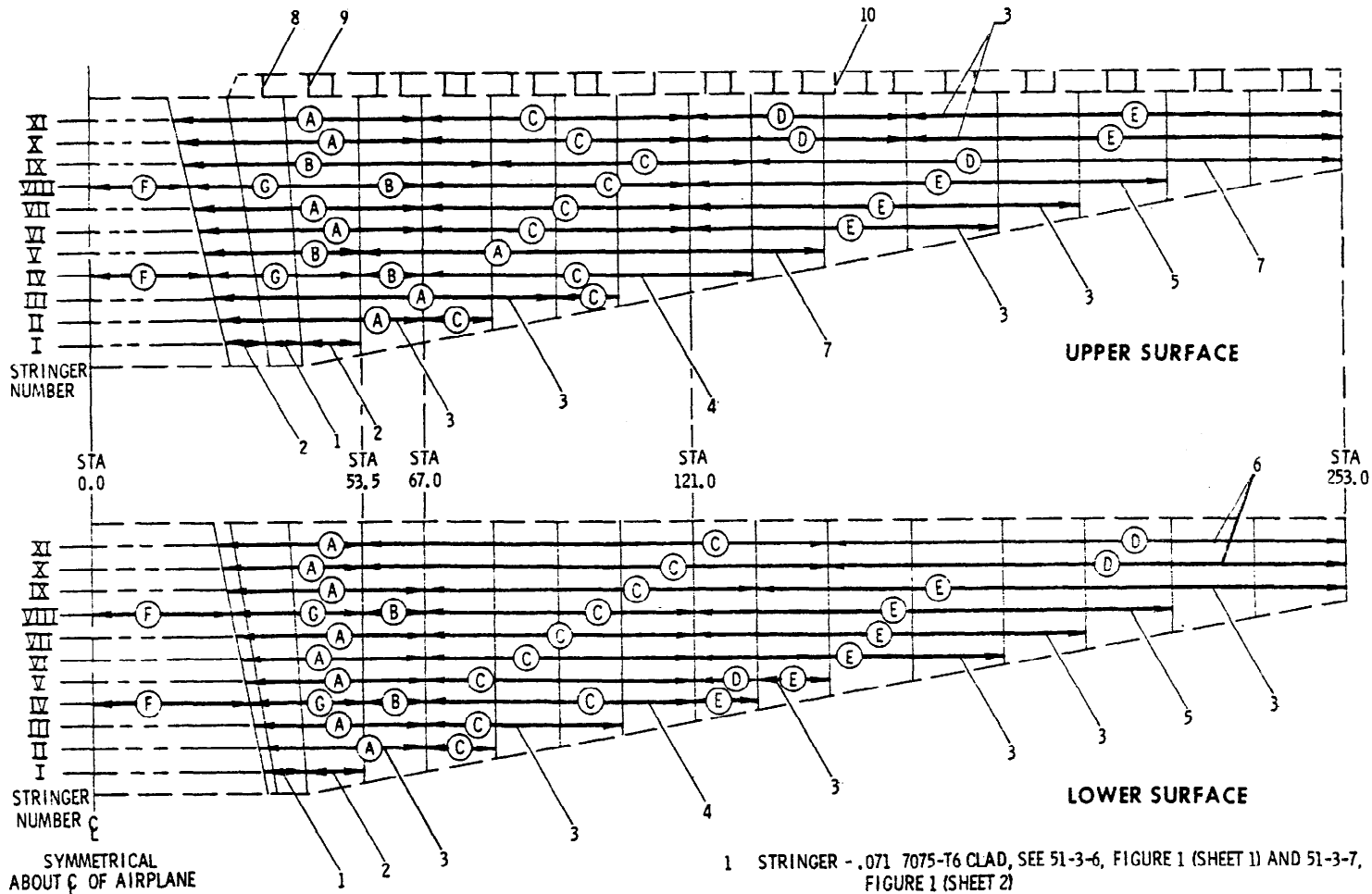
FIGURE E-2. HORIZONTAL STABILIZER STRINGER IDENTIFICATION



FOR REPAIRS:
 IN AREA MARKED THIS [diagonal lines] . NOTE ITEMS INDICATED THIS + IN CALLOUTS BELOW.
 IN AREA MARKED THIS [horizontal lines] . NOTE ITEMS INDICATED THIS * IN CALLOUTS BELOW.
 IN AREAS MARKED THIS [cross-hatch] . NOTE ITEMS INDICATED THIS ♦ IN CALLOUTS BELOW.
 IN AREAS MARKED THIS [stippled] . SEE SHEET 2.
 THIS TYPE REPAIR MAY BE MADE ONLY IN THE LOCATIONS INDICATED ABOVE, ON LEFT AND RIGHT STABILIZERS.
 NOTE: NO REPAIR SHOULD BE ADJACENT TO, NOR DIRECTLY OPPOSITE (IN THE OTHER SURFACE) ANOTHER REPAIR OF THIS TYPE.

- 1 ACCESS DOOR - MAKE FROM .050 7075-T6 CLAD. SHAPE TO SUIT CUT-OUT IN SKIN WITH MINIMUM GAP. ATTACH WITH NAS517-3 SCREWS.
- 2 DOUBLER - MAKE FROM .050 7075-T6 CLAD. DIMENSIONS NOT SHOWN ARE TO BE TAKEN FROM AIRPLANE. MAKE ACCESS HOLE ENDS SEMI-CIRCULAR. TRIM FLANGE AS SHOWN FOR ANGLE. JOGGLE SIDES ON TO STRINGER FLANGES.
- 3 ANGLE - MAKE FROM .040 7075-T6 CLAD, SAME LENGTH AS DOUBLER. TRIM ENDS AS SHOWN IN MAIN VIEW, OR WHERE APPLICABLE, AS IN VIEW "A".
- 4 FILLER - MAKE FROM .032 7075-T6 CLAD. TRIM ENDS AS SHOWN.
- 5 SKIN ATTACHMENTS:
 - ROW (1) ♦♦ FOR LENGTH OF DOUBLER, ADD MS20426AD5 RIVETS MIDWAY BETWEEN EXISTING RIVETS.
 - * FOR LENGTH OF DOUBLER, REPLACE EXISTING MS20426AD5 RIVETS WITH MS20426DD6 RIVETS.
 - ROWS (7) AND (7) - IN AREA OF CUT-OUT IN SKIN ADD ANCHOR NUTS (SAME TYPE AS ITEM 7) MIDWAY BETWEEN MS20426AD5 RIVETS REPLACED IN EXISTING HOLES (COUNTERSUNK IN STRINGER FLANGES).
 - OUTSIDE AREA OF CUT-OUT IN SKIN, REPLACE 3 EXISTING RIVETS WITH MS20426DD6 RIVETS.
 - ROWS (3) AND (8) - MS20426DD6. USE 3 IN EACH ROW, SPACED 1.00 APART EACH SIDE OF DAMAGE.
 - ROWS (4) AND (5) - MS20426DD6. USE 3 IN EACH ROW, SPACED 1.10 APART EACH SIDE OF DAMAGE.
 - ROW (8) *♦♦ RETAIN ORIGINAL RIVETS.
 - ♦ FOR LENGTH OF DOUBLER ADD MS20426AD5 RIVETS MIDWAY BETWEEN EXISTING RIVETS.
- 6 STEM ATTACHMENTS - AN470AD5. SPACE 1.00 APART.
- 7 ANCHOR NUTS (NUMBER AS REQ) - NAS680A3. POSITION AROUND PERIPHERY OF CUT-
- 8 CUT-OUT IN S¹ MAKE ENDS SEMI-CIRCULAR.
- 9 ADJACENT RIB
- 10 ORIGINAL SKIN
- 11 ADJACENT STRINGERS
- 12 EXISTING STRAP ON ADJACENT STRINGER (WHERE APPLICABLE).

FIGURE E-3. HORIZONTAL STABILIZER STRINGER IDENTIFICATION



- 1 STRINGER - .071 7075-T6 CLAD, SEE 51-3-6, FIGURE 1 (SHEET 1) AND 51-3-7, FIGURE 1 (SHEET 2)
- 2 STRINGER - .050 7075-T6 CLAD, SEE 51-3-6, FIGURE 1 (SHEET 1) AND 51-3-7, FIGURE 1 (SHEET 2)
- 3 STRINGER - LS6658, SEE FIGURE 2
- 4 STRINGER - LS6778, SEE FIGURE 2
- 5 STRINGER - LS6777, SEE FIGURE 2
- 6 STRINGER - LS6659, SEE FIGURE 2
- 7 STRINGER - LS6796, SEE FIGURE 2
- 8 STIFFENER - .040 2024-T4 CLAD, SEE 51-3-6, FIGURE 1 (SHEET 1)
- 9 STIFFENER - LS6881 (TYPICAL EXCEPT AS SHOWN), SEE 51-3-6, FIGURE 1 (SHEET 2)
- 10 STIFFENER - LS3505, SEE 51-3-6, FIGURE 1 (SHEET 2)

NOTE

- A. FOR LOCATION OF ALL RIBS, SEE 55-0, FIGURE L.
- B. LETTERS INDICATE APPLICABLE REPAIR TYPE AS SHOWN ON FIGURE 2.

APPENDIX 6. MAINTENANCE NOTES FOR WING STRUCTURAL AREAS

1. INTRODUCTION. These maintenance notes have been compiled to assist L-188 series aircraft owners/operators in maintaining the wing of their airplanes for a long and useful service life. Summarized herein are structural areas of the wing which have shown need for special inspections and/or maintenance during the service history of the L-188 fleet. Types of discrepancies which may be found, the locations, and corrective action measures are listed. The purpose of this information is to acquaint maintenance planning personnel with specific areas of the wing which should be included in an overall wing inspection/maintenance program.

This documentation has been assembled for reference usage and is not intended to replace nor be used in lieu of any maintenance/inspection material or manual. Detail methods for inspections, maintenance and repairs/reinforcements are contained in these existing documents and in the service bulletins referenced herein.

Direct assistance for your maintenance/inspection activities can be obtained by contacting the aircraft manufacturer.

2. SERIAL NUMBER (S/N) CODING FOR AIRCRAFT.

- a. 1001, 1002, 1004, thru 1148, 2001 thru 2022.
- b. 1002, 1004 thru 1043, 1045 thru 1120, 2001 thru 2012.
- c. 1001, 1002, 1004 thru 1056, 1058, (Right Wing Only), and 1059 thru 1069.

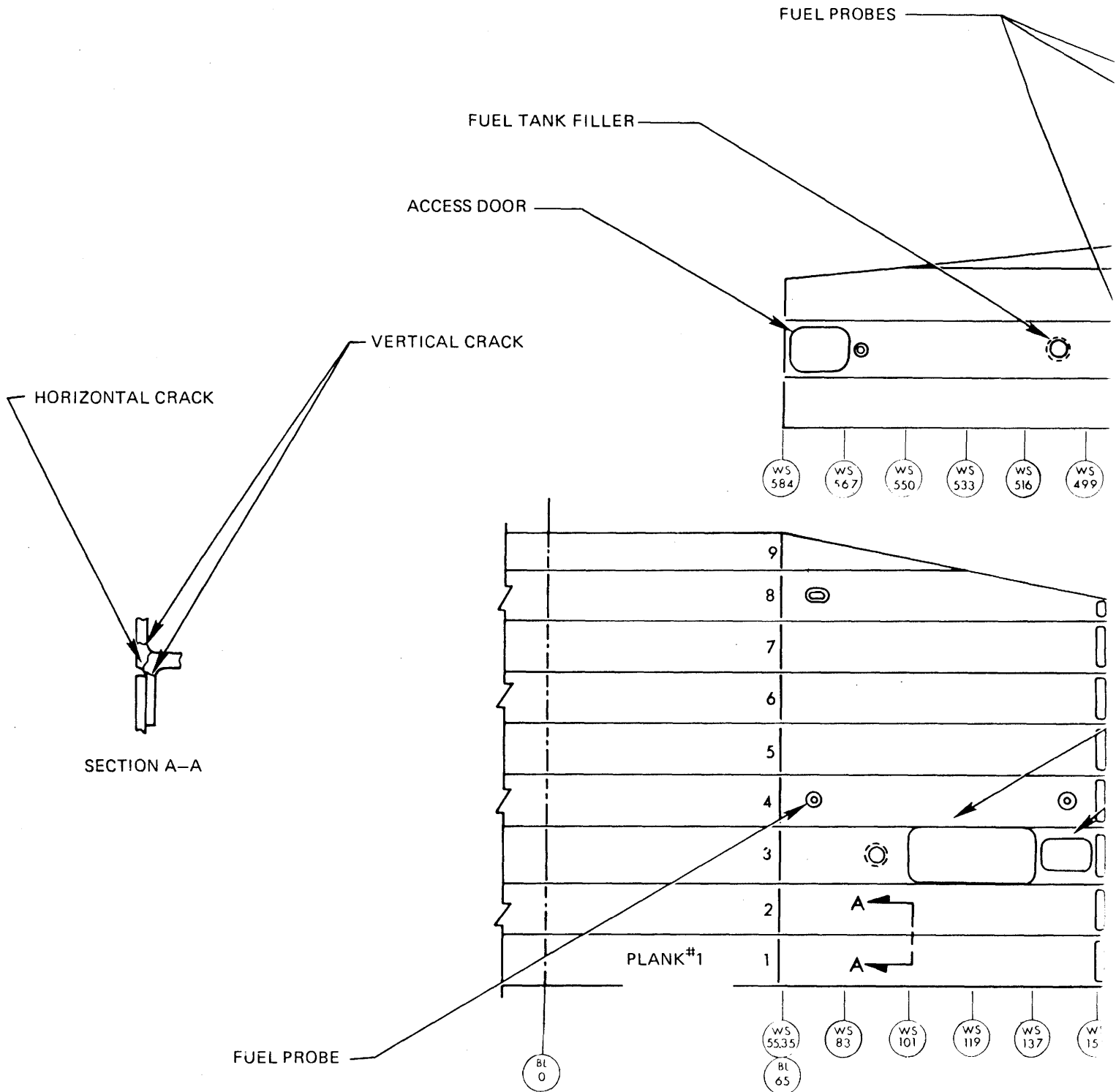
3. LOCKHEED STRUCTURAL SERVICE BULLETIN INDEX.

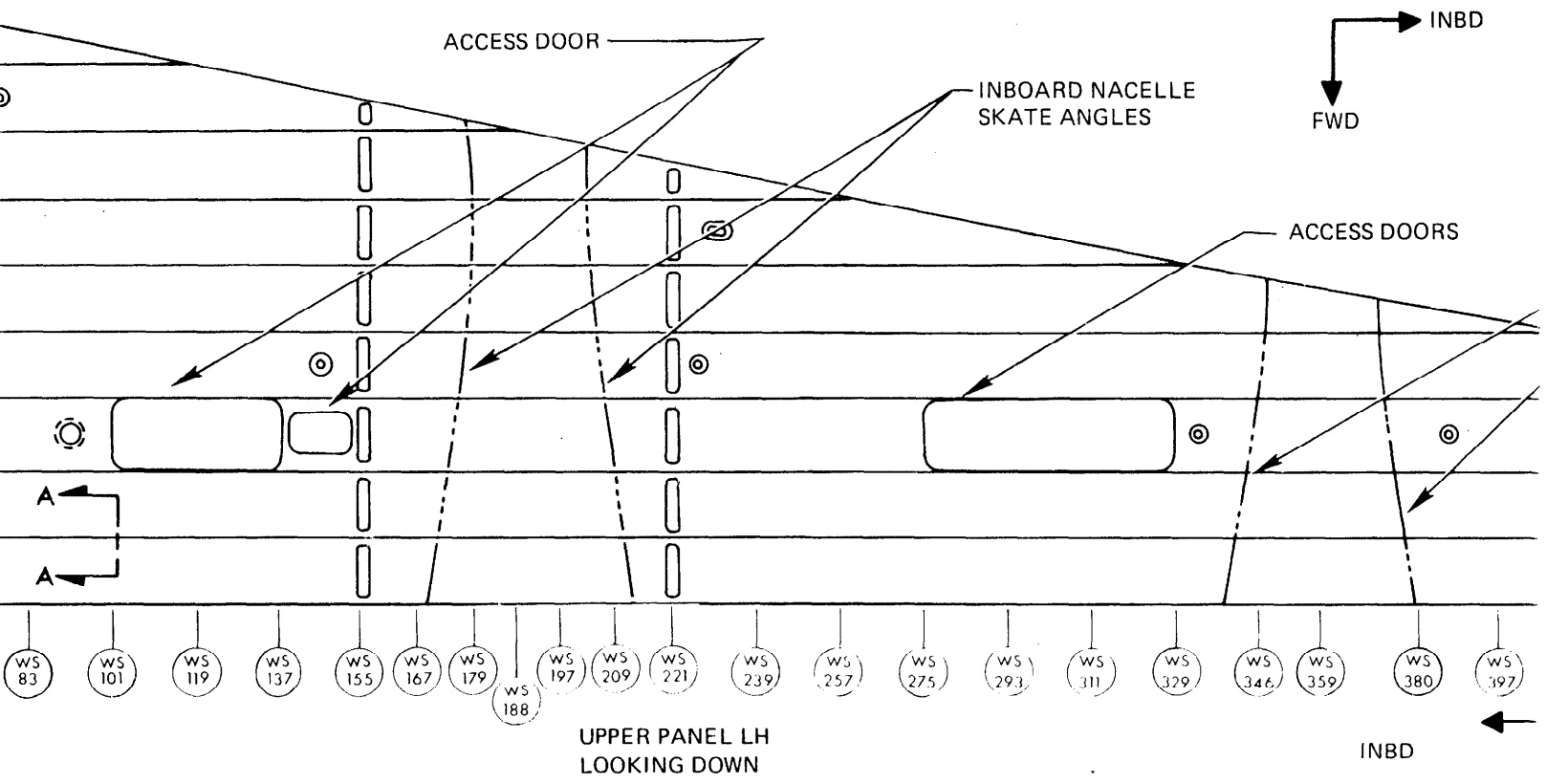
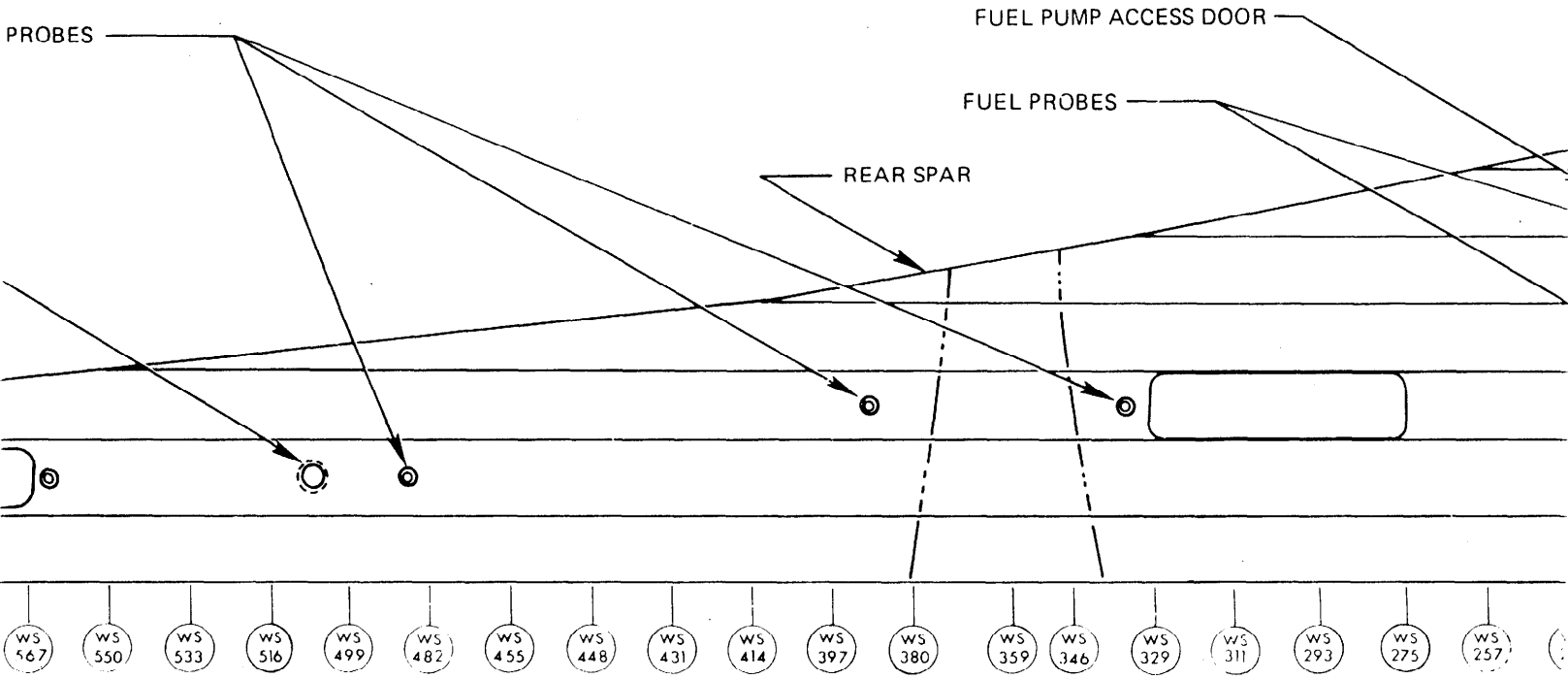
- 88/SB-334 - Wing - Wing Leading Edge Attaching Screws - Replacement Of
- 88/SB-564 - Wing - Inspection of Wing Plank Depressions
- 88/SB-587 - Wing - No. 4 Wing Plank - Inspection Of
- 88/SB-591 - Wing - Flap Track Attaching Bolts - Inspection Of
- 88/SB-593 - Wing - Main Landing Gear Actuating Cylinder Attach Fitting Intercostal - Inspection Of
- 88/SB-599 - Wing - Main Landing Gear Actuator Support Fittings - Inspection Of
- 88/SB-600 - Wing - Upper Skin Planks - Inspection and Repair Of
- 88/SB-616 - Wing - Upper & Lower Access Door Lands - Inspection Of
- 88/SB-619 - Wing - Upper Surface at W.S. 167 and W.S. 209 - Reinforcement
- 88/SB-620 - Wing - Wing Plank Splices Corrosion and Stress Corrosion Cracks - Inspection and Repair Of
- 88/SB-625 - Wing - Wing Plank Splices Aft of Main Landing Gear Fulcrum Fittings - Inspection Of
- 88/SB-628 - Wing - Corrosion of Wing Panels at Centroid Risers - Prevention Of
- 88/SB-631 - Wing - MLG Ribs - Inspection and Rework Of

- 88/SB-632 - Wing - Upper Surface Cracks at Fastener Holes - Inspection and Repair Of
- 88/SB-633 - Wing - Outer Wing to Center Wing Attach Fittings - Inspection Of
- 88/SB-634 - Wing - Upper Surface Cracks at Trailing Edge - Inspection and Repair - W.S. 143
- 88/SB-638 - Wing - Wing to Nacelle Attachment Plates - Inspection and Repair Of
- 88/SB-639 - Wing - Main Landing Gear Rib Caps - Inspection and Rework Of
- 88/SB-649 - Wing - No. 1 and No. 2 Upper Plank Surface Cracks at Nacelle Fillet Attachment - Inspection and Repair Of
- 88/SB-652 - Wing - Cracks in No. 3 Upper Wing Panel at W.S. 346 - Preventive and Repair Of
- 88/SB-653 - Wing - Plank No. 1, Lower Attachment to Spar Cap, W.S. 205-275 - Repair or Reinforcement Of
- 88/SB-654 - Wing - Rear Beam Clip Inspection - W.S. 179/197
- 88/SB-655 - Wing - Trailing Edge Rib Panels - Repair and Preventive Reinforcement
- 88/SB-665 - Wing - Upper Plank No.1, W.S. 168 to W.S. 174, and Upper Forward Spar Cap, W.S. 156 to 178 - Preventive Reinforcement and Repair Of
- 88/SB-669 - Wing - Repair for Cracks in Wing Lower Surface, **Planks** Nos. 1 thru 8, W.S. 157 to 219
- 88/SB-670 - Wing - Crack in Upper Forward Spar Cap Vertical Leg at W.S. 168 - Repair and Preventive Reinforcement
- 88/SB-675 - Wing - Upper Surface - Repair of Wing Plank Nos. 2 to 4 on Each Side of Inboard Nacelles
- 88/SB-676 - Wing - Preventive Reinforcement of Upper Planks 1 thru 5 at Inboard Side of Outboard Nacelle
- 88/SB-678 - Wing - Center Section - Corrosion Repair at B.L. 65 L/R
- 88/SB-682 - Wing - Upper Surface - Repair for crack in Upper Forward Spar Cap and Web at W.S. 209
- 88/SB-685 - Wing - Corrosion Around Splice Fasteners, Rework and Repair

4. SERVICE INFORMATION LETTERS (SILs).

- a. 88/SIL-58 Inspection of Wing Planks Under Wing to Fuselage Fillets and Lavatory Drain Valve
- b. 88/SIL-61 Inspection and Repair of Wing Lower Skin Planks
- c. 88/SIL-87 General Structures - Sealants for Fuel Sealing, Pressurization Sealing, and Corrosion Protection





1

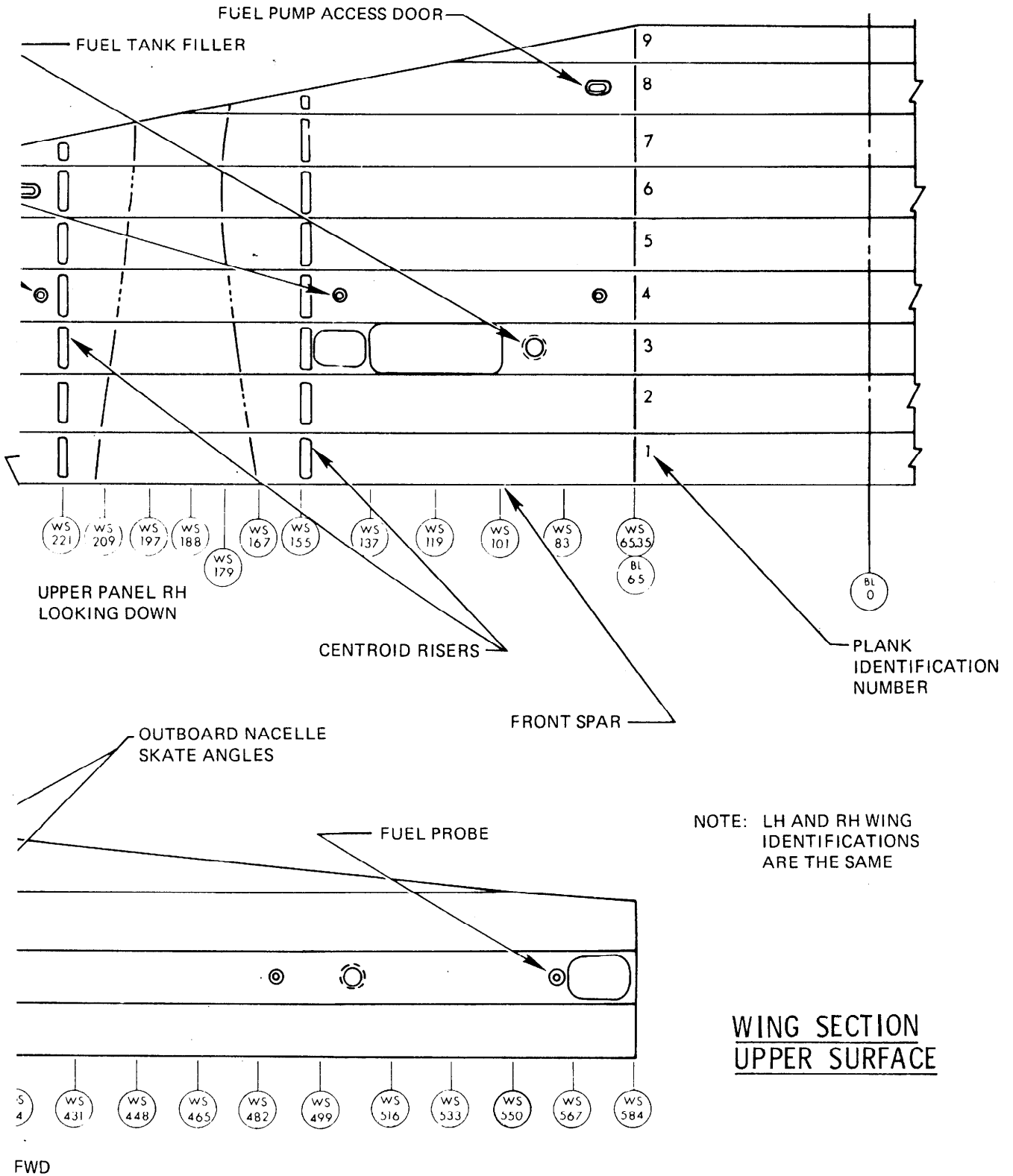
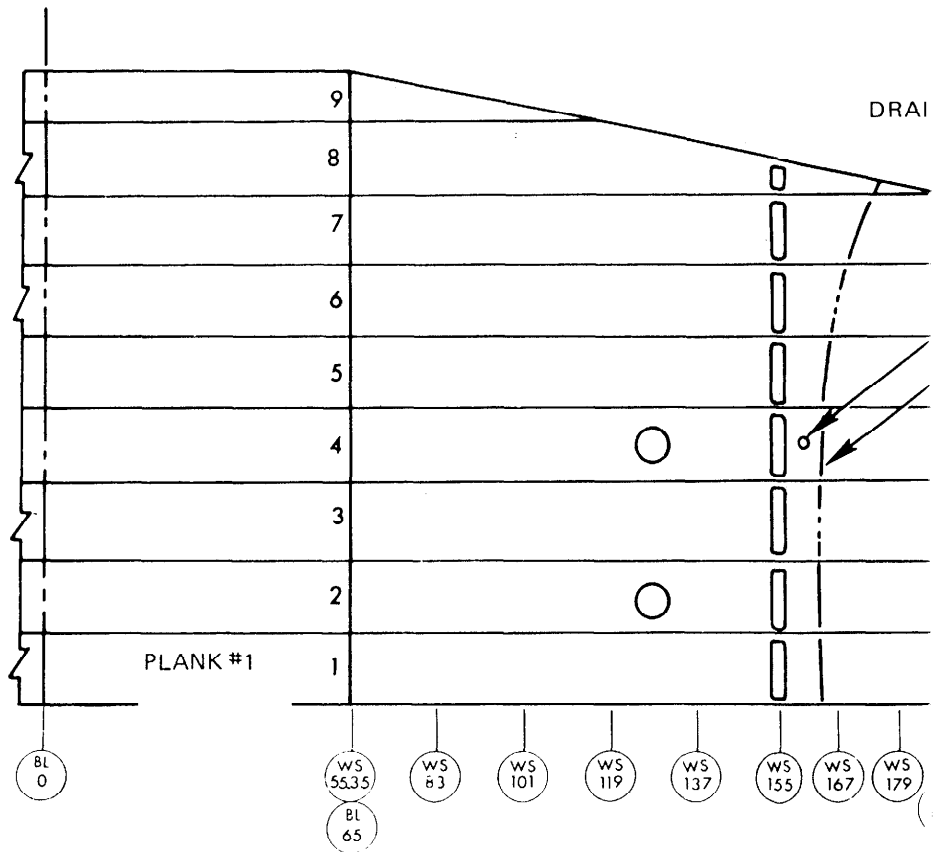
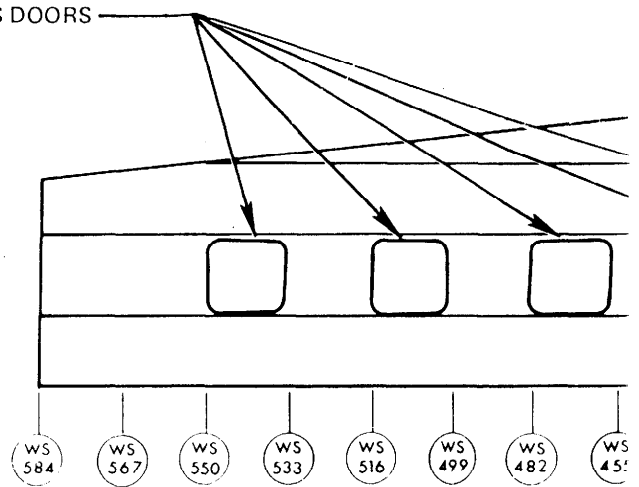
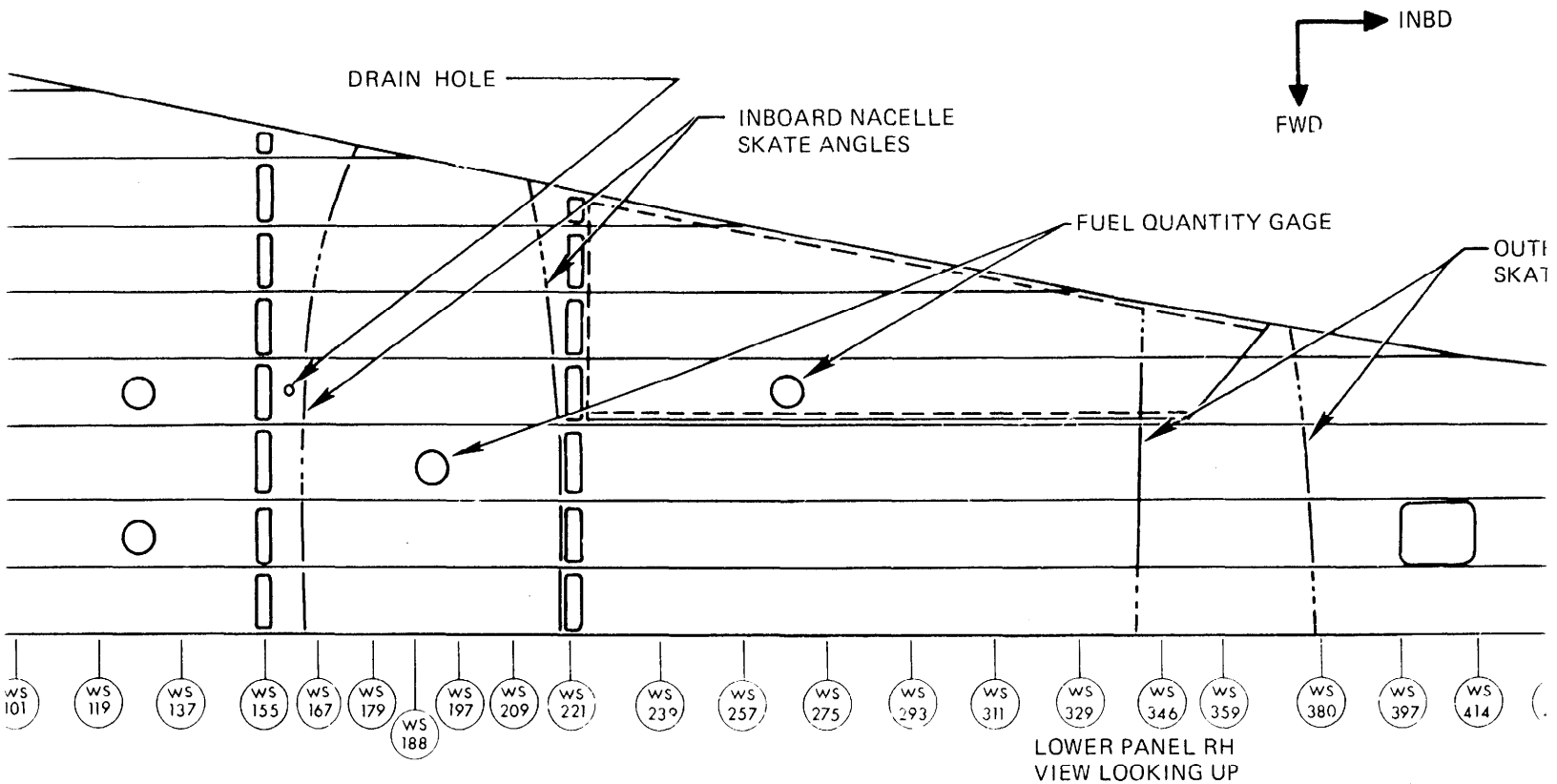
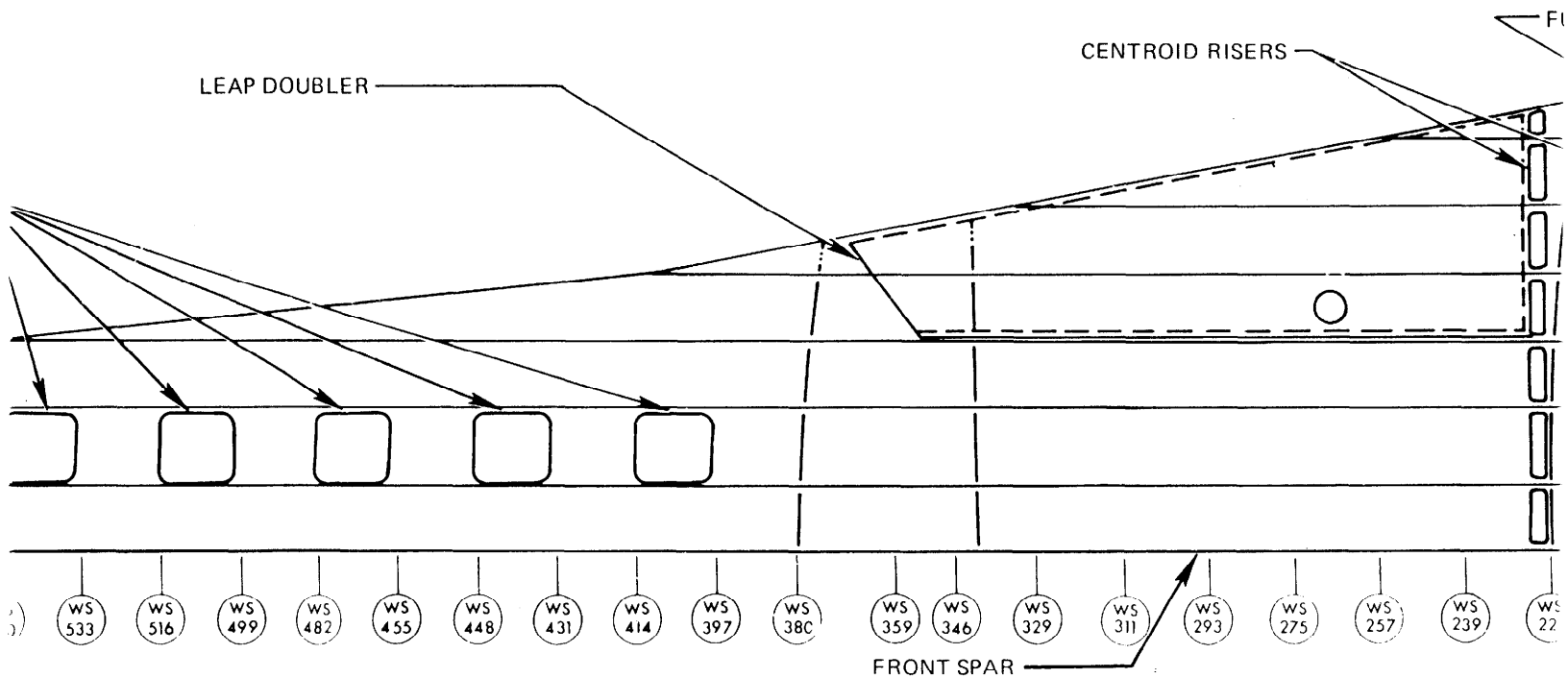


FIGURE F-1. Wing Section Upper Surface

LEAP DOUBLER —

ACCESS DOORS





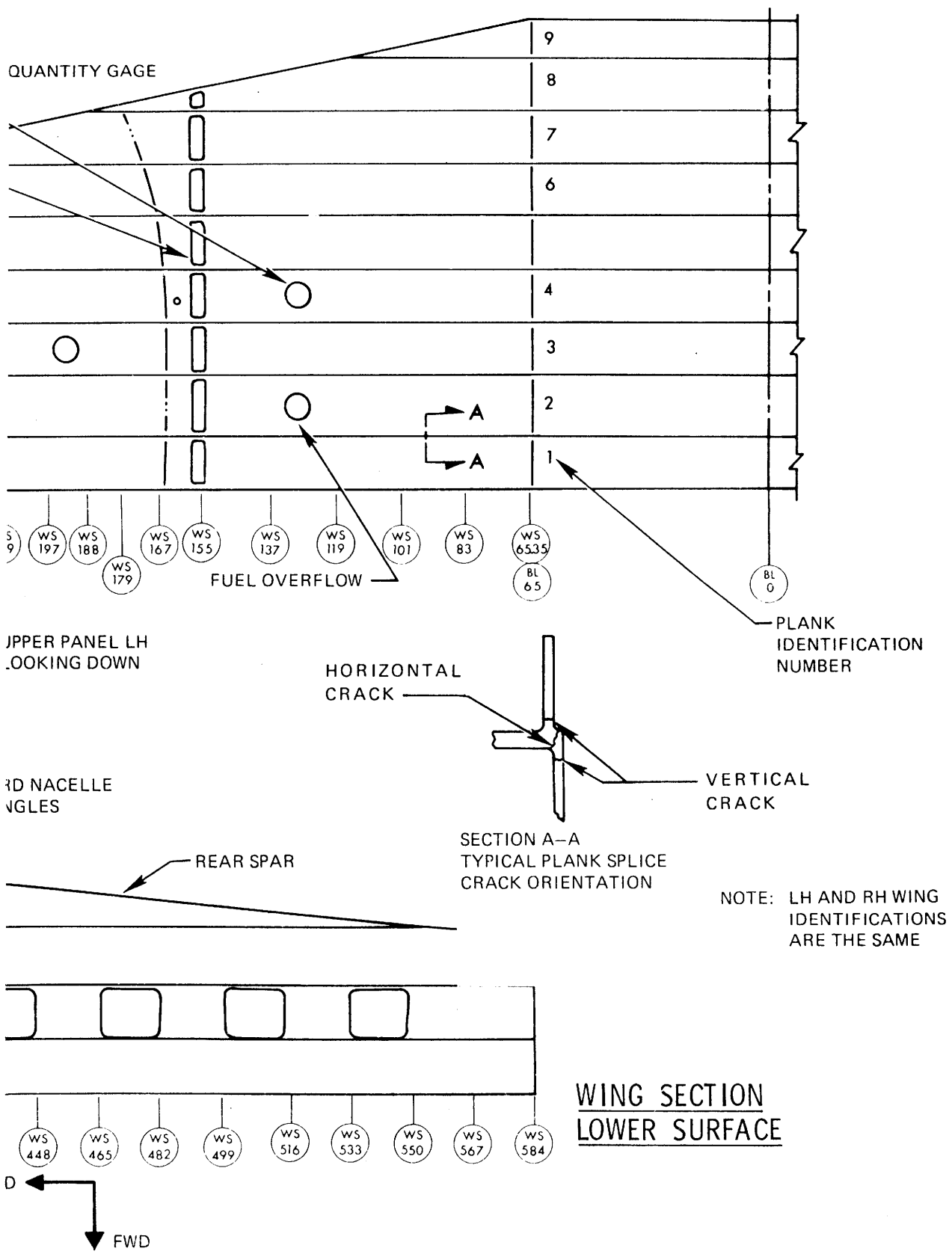


FIGURE F-2. Wing Section Lower Surface.

FIGURE F-3. SERVICE PROBLEM AREAS

Pages 8 through 27 (and 28) refer to various service problem areas and are cross-referenced to the photographs in figures Figures F-4 through F-32.

1	2	3	4	5	6
NO.	MAJOR ASSEMBLY	ITEM	SERVICE HISTORY	PAGE REF. FOR ILLUSTR.	S/N CODE
W-1	Outer Wing Leading Edge Inboard, Middle, & Outboard Sections	A t t a c h S c r e w s Upper and Lower	Loosening has occurred of the screws attaching the leading edge skins to the front spar caps.	29 30	⚠
W-2	Outer Wing Lower Surface	No. 1 and 3 Planks	Surface depressions have been reported in planks between Wing Stations 478 and 528.	31	⚠
W-3	Outer Wing Lower Surface, W.S. 159.6	No. 4 Plank	Cracks have occurred at the lower No. 4 wing plank drain hole adjacent to Wing Station 159.6.	32	⚠
W-4	Outer Wing Lower Surface	Rear Spar	Loose and failed flap track attachment bolts have been found.	33	⚠

7	8		9	10
RECOMMENDATIONS				
METHOD OF INSP.	FREQUENCY OF INSPECTION	TYPE OR METHOD OF REPAIR		PREVENTIVE ACTION
Visual	Inspect at 50 flight hours intervals and retighten all screws each 300 hours until LAC 88/SB-334 is incorporated.	Remove existing screws and replace with new type fasteners per 88/SB-334.		Accomplish 88/SB-334.
Visual	Inspect within next 300 hour interval. If depressions exceed limits reinspect each 100 hours until corrective action is taken.	Replace H-clips per instructions of LAC Service Bulletin 88/SB-564.		Same as Column 9.
External Visual	Repeat inspections at 1000 hour intervals until permanent repair is incorporated. Interim repairs have special inspection requirements.	<p>(1) Preventive/temporary repair may be effected by installing 5/16 Hi-Lok fasteners in drain holes per 88/SB-587C with continued 1000 hr. repeat inspections.</p> <p>(2) Permanent repair/reinforcement can be made by incorporating either SED/63-9015-101 or SED/63-9015-135 shown on Dwg. SED/63-9015B.</p>		Same as Column 9, Item (2).
Visual	Inspect within 850 hours and reinspect at 5000 hour intervals.	Replace and/or tighten bolts and rework bolt holes per LAC 88/SB-591A.		Same as Column 9.

1	2	3	4	5	6
NO.	MAJOR ASSEMBLY	ITEM	SERVICE HISTORY	PAGE REF. FOR ILLUSTR.	S/N CODE
W-5	Outer Wing Lower Surface, W.S. 179-197	Wing Plank No. 7	Cracks have occurred in the wing plank surface and plank riser located under the main landing gear actuating cylinder attach fitting angles, P/N 802699.	34 35	⚠
W-6	Outer Wing Lower Surface, W.S. 187	Support Fitting, MLG Actuator P/N 800618-1 P/N 800618-2 P/N 800618-3 P/N 800618-4	Fatigue cracks have occurred at the aft end of the MLG actuator support fittings in the radius of the vertical legs.	35 36	⚠

7	8		9	10
RECOMMENDATIONS				
METHOD OF INSP.	FREQUENCY OF INSPECTION	TYPE OR METHOD OF REPAIR	PREVENTIVE ACTION	
<p>Visual Requires removal of 801266-1 door (Dry Bay A/C) & 800917 Door (Wet Bay A/C)</p>	<p>Within next 2500 flight hours on A/C which have 88/SB-538 incorporated. Otherwise, inspect at 88/SB-538 incorporation, or within next 2500 ft. hours, whichever occurs first.</p> <p>Repeat inspections at 2500 ft. hour intervals are recommended.</p>	<p>Repair wing plank skin and riser cracks per Electra Structural Repair Manual, Section 57-2-1, Fig. 3, Sheets 41 thru 44, LAC Dwg. 841880, and LAC 88/SB-593C. Repair out-of-round holes per LAC Service Bulletin 88/SB-593C.</p>	<p>Same as Column 9.</p>	
<p>Visual, Dye Penetrant</p>	<p>Dye penetrant inspect original 800618-3 & -4 fittings within 215 flight hours. Repeat at 425 ft. hrs. Visual dye penetrant inspect aft 4 in. of fittings at each 850 ft. hrs.</p> <p>Visual inspect reworked fittings (radius on aft edge) at each 850 ft. hrs. and dye penetrant inspect at each 1700 ft. hrs.</p> <p>No repeat inspections for new 841275-101, -102 fittings.</p>	<p>Install new 800618-3 or 841275-101 (LH) and 800618-4 or 841275-102 (RH) support fittings to replace damaged parts per LAC 88/SB-599A.</p>	<p>Install new fittings, P/N 841275.</p>	

1	2	3	4	5	6
NO.	MAJOR ASSEMBLY	ITEM	SERVICE HISTORY	PAGE REF. FOR ILLUSTR.	S/N CODE
W-7	Outer Wing Upper Surface	Wing Planks under nacelle skate angles	Cracks up to three inches in length have occurred under the inboard and outboard skate angles of the inboard nacelle.	37	⚠
W-8	Outer Wing Upper and Lower Surfaces	Fuel Tank Access Door Lands	Corrosion has been reported on lower wing plank access door lands due to condensation.	38	⚠

7	8		9	10
RECOMMENDATIONS				
METHOD OF INSP.	FREQUENCY OF INSPECTION	TYPE OR METHOD OF REPAIR	PREVENTIVE ACTION	
<p>Visual (External, Internal) X-Ray</p>	<p>Initial external inspection at 450 ft. hrs. with repeat at next 450. Initial internal inspection at 900 ft. hrs. with repeat at 3000 hr. intervals. Discontinue inspections after 6000 hrs. if no cracks found.</p>	<p>(1) Repair cracks in planks per Electra Structural Repair Manual, Section 57-2-1. (2) Install skate angle attachment reinforcement at inbd. and outbd. nacelles per LAC Alert Service Bulletin 88/SB-600A (Ref: LAC Dwg. 841481).</p>	<p>Same as Column 9, Item (2).</p>	
<p>Visual</p>	<p>Within next 850 ft. hrs. Reinspect at each overhaul period.</p>	<p>Remove corrosion per Electra Structural Repair Manual Section 51-2-14 and add protective coating per LAC Service Bulletin 88/SB-606. Repair per LAC Drawing 841295 when damage exceeds .010 inch depth. NOTE: Contact LAC for repair of damage which exceeds allowable limits of Dwg. 841295. (Refer to 88/SB-620G for access door gap sealing instructions.)</p>	<p>Add protection per 88/SB-606. Refer to 88/SB-620G for access door gap sealing instructions.</p>	

1 NO.	2 MAJOR ASSEMBLY	3 ITEM	4 SERVICE HISTORY	5 PAGE REF. FOR ILLUSTR.	6 S/N CODE
W-9	Outer Wing Upper Surface, W.S. 167 & W.S. 209	Wing Planks at MLG Rib Forgings	Cracks have occurred in the wing upper surface in the area of the MLG rib forgings.	39 40	△
W-10	Center Section Wing, Outer Wing	Wing Planks Upper and Lower Surfaces	Corrosion and cracks have occurred at various locations in the upper and lower wing plank splices.	30 37 38 41 42 43	△
W-11	Outer Wing Lower Surface, W.S. 167 & W.S. 209	Wing Plank Nos. 3, 4, 5, & 6.	Cracks have occurred in the lower wing No. 5 plank of the LH inboard MLG fulcrum fitting at the No. 4 and No. 5 splice; also, at a fastener hole in plank No. 6 at approx. W.S. 211.	44	△

7	8		9	10
RECOMMENDATIONS				
METHOD OF INSP.	FREQUENCY OF INSPECTION	TYPE OR METHOD OF REPAIR	PREVENTIVE ACTION	
<p>Visual and dye penetrant. Ultrasonic and X-Ray may be used in local areas.</p>	<p>Initial inspection within 700 landings with repeat inspections at 1400 landing intervals. No repeat inspections required after incorporation of reinforcements described in LAC Service Bulletin 88/SB-619.</p>	<p>Install 0.063 inch thick doublers under existing external doublers and install angle stiffeners on the wing internal surface at the Plank No. 3 & No. 4 splice on A/C S/N 1001, 1002, 1004 thru 1144, and 2001 thru 2019.</p> <p>Install new external doublers only on A/C S/N 1145 thru 1148 and 2020 thru 2022.</p> <p>Accomplish rework per LAC Service Bulletin 88/SB-619A.</p> <p>Ref. LAC Drawings 841314C, 841315C, 841345, 841346, SED/64-9010, SED/64-9011.</p>	<p>Same as Column 9.</p>	
<p>Visual, Ultrasonic</p>	<p>Repeat inspection intervals based on action taken.</p>	<p>As specified in LAC Service Bulletin 88/SB-620G.</p>	<p>Accomplish Service Bulletin 88/SB-620G.</p>	
<p>Dye Penetrant, Ultrasonic</p>	<p>Initial inspection within 700 landings with repeat inspections at 1400 landing intervals. Repetitive inspections may be discontinued after incorporation of LAC Service Bulletin 88/SB-625 reinforcements.</p>	<p>As specified in LAC Service Bulletin 88/SB-625D.</p> <p>Seal plank splices under repairs per 88/SB-620G.</p>	<p>Same as Column 9.</p>	

1 NO.	2 MAJOR ASSEMBLY	3 ITEM	4 SERVICE HISTORY	5 PAGE REF. FOR ILLUSTR.	6 S/N CODE
W-12	Outer Wing Upper & Lower Surfaces W.S. 155 W.S. 221	Centroid Riser Cavities	Corrosion has occurred in the centroid riser cavities under the plastic fillers.	32 45	△
W-13	Outer Wing Upper Surface, W.S. 167 & W.S. 209	MLG Rib Web Fillets	Cracks have occurred in web fillets at rib truss and upper chord member junctures.	34 46	△
W-14	Outer Wing Lower Surface W.S. 128 W.S. 193 W.S. 266	Wing Plank Nos. 2, 3, 4.	Cracks have occurred at the fastener holes around the fuel sight gage and fuel overflow openings on LH and RH lower wing planks.	47 48	△
W-15	Outer Wing Upper Surface W.S. 212-230	Wing Plank No. 2	Cracks have occurred at screw holes in the No. 2 plank at the plank No. 1 and No. 2 splice between W.S. 212 and 230.	39	△

7	8		9	10
RECOMMENDATIONS				
METHOD OF INSP.	FREQUENCY OF INSPECTION	TYPE OR METHOD OF REPAIR	PREVENTIVE ACTION	
V i s u a l	At normal maintenance inspection interval.	<p>Remove plastic fillers and metallic washers, and remove any corrosion present in accordance with instructions contained in LAC Drawing 841444. Repair per Dwg. 841443, if required.</p> <p>Install new aluminum fillers as shown on Dwg. 841332, and washers, P/N 841326-101, per LAC Service Bulletin 88/SB-628B.</p>	Install aluminum fillers per 88/SB-628B.	
D y e P e n e t r a n t	Accomplish within next 1000 landings.	Inspect, rework and repair per LAC Service Bulletin 88/SB-630 and Dwg. 841374.	Per LAC Dwg. 841374 Ref: 88/SB-630.	
Visual, Dye Penetrant	Initially at 500 hrs. Repeat at 1000 hours. No repeat after incorporation of preventive repair.	Type A repair where cracks have not entered risers. Type B repairs where cracks extend thru risers. Ref: LAC Dwg. 841336C and 88/SB-631B.	Per LAC Dwg. 841371B Ref: 88/SB-631B.	
Visual, Dye Penetrant	Initially at 500 hrs. Repeat at 1000 hours. No repeat after incorporation of preventive repair.	Install appropriate doubler per LAC Dwg. 841364A. Ref: LAC 88/SB-632A.	Install 841364-109 spacer and Hi-Lok fasteners per LAC 88/SB-632A.	

1 NO.	2 MAJOR ASSEMBLY	3 ITEM	4 SERVICE HISTORY	5 PAGE REF. FOR ILLUSTR.	6 S/N CODE
W-16	Wing Joint-Center Sec. to Outer Wing	Attachment Fittings P/N 807352 and P/N 807354	Fatigue cracks have occurred, emanating from the barrel-nut access holes of the outer wing front cap fittings at B.L. 65.	49	⚠
W-17	Outer Wing-Trailing Edge Upper Surface W.S. 143	U p p e r Plank Nos. 6, 7, & 8.	Cracks have occurred in the trailing edge of Wing Planks Nos. 6, 7, & 8 at W.S. 143, left and right upper surfaces, and in backup fitting, P/N 803900, for the flap track attachment.	34	⚠
W-18	Outer Wing Lower Surface W.S. 167 & W.S. 209	Wing-to-Nacelle Attachment Plate, P/N810053-1 P/N810053-3 P/N810054-1 P/N810054-3	Cracks have occurred in the attachment plate which is located in the inboard nacelle on the lower front beam of the left wing assembly.	50 51	⚠
W-19	Outer Wing Upper and Lower Surface W.S. 167 & W.S. 209	M a i n Landing Gear Rib Caps	Cracks have occurred in the vertical legs of the MLG rib caps.	52	⚠

7	8		9	10
RECOMMENDATIONS				
METHOD OF INSP.	FREQUENCY OF INSPECTION	TYPE OR METHOD OF REPAIR		PREVENTIVE ACTION
Visual, Dye Penetrant	Initial inspection within 1100 flight hours for cracks in lower fittings. Within next 3000 ft. hours inspect for cracks and burrs in both upper and lower fittings. Deburr all fittings within the 4100 ft. hours limit.	(1) Replace any cracked fittings before further flight, with new fittings deburred per LAC 88/SB-633B. (2) Deburr all uncracked fittings having burrs, per LAC 88/SB-633B.		Same as Column 9, Item (2).
Visual	Initial inspection within 500 landings. No special repeat inspection required after incorporation of repair or preventive reinforcement.	Repair cracks per LAC Dwg. 841390, or the Electra Structural Repair Manual, in accordance with LAC Service Bulletin 88/SB-634B.		Incorporate preventive reinforcement per LAC Dwg. 841505. Ref: 88/SB-634B.
Visual	Inspect within next 700 landings. Repeat inspections every 2000 landings until plate is replaced.	Replace attachment plate in accordance with LAC 88/SB-638B.		Install new attachment plates, P/N 841656-101 or 841438-101.
Internal Visual	Inspection recommended within 700 landings and repeat inspections at overhaul periods. Interim action requires inspection at each 120 landings for maximum of 500 landings.	Interim action consists of stop drilling crack in accordance with LAC Service Bulletin 88/SB-639 and Electra Structural Repair Manual. Accomplish repair in accordance with 88/SB-639. Ref: Dwgs. SED/66-9101 and SED/66-9107.		Accomplish intent of repair per 88/SB-639, drawings SED/66-9101 and SED/66-9107.

1 NO.	2 MAJOR ASSEMBLY	3 ITEM	4 SERVICE HISTORY	5 PAGE REF. FOR ILLUSTR.	6 S/N CODE
W-20	Outer Wing Upper Surface	Wing Planks Nos. 1 & 2	Cracks have occurred in the No. 1 Plank at the nacelle fillet attachments at the inboard side of all four nacelles.	29 30 53	△
W-21	Outer Wing Upper Surface W.S. 101-137, 257-275, 275-329, and 346	Wing Plank No. 3.	Cracks have occurred in No. 3 upper wing panel along the first row of fasteners adjacent to the skate angle of the outboard nacelle.	53	△ ₃
W-22	Outer Wing Lower Surface W.S. 75-153, 223-329, and 385 Outbd.	Wing Plank No. 1	Cracks have occurred in Plank No. 1 from forward edge attachment holes.	54	△
W-23	Outer Wing Upper and Lower Surfaces W.S. 179 W.S. 197	Rib Attach Clips P/Nos: 805483-1/-2 805491-1/-2 805482-3/-4 805492-1/-2	Cracks have occurred in the rib clips located at the rear beam forward face upper attachment.	46	△

7	8		9	10
RECOMMENDATIONS				
METHOD OF INSP.	FREQUENCY OF INSPECTION	TYPE OR METHOD OF REPAIR		PREVENTIVE ACTION
Visual, Eddy Current, Dye Penetrant	Initial inspection within 400 flight hours. Repeat inspections at intervals not to exceed 1400 ft. hours until preventive reinforcements are incorporated.	Type A, Type B, Type C and Type D repair, as appropriate, in accordance with LAC Service Bulletin 88/SB-649B.		Type A, Type B, or Type C repairs and reinforcements or 88/SB-675 reinforcement.
Visual inspection for cracks. Eddy current or X-ray optional.	Initial inspection within 700 ft. hrs. unless previously inspected within 350 hrs. Repeat at normal structural maint. inspection intervals until preventive reinforcement is incorporated.	(1) Repair cracks in wing panel per Dwg. 841507B. (2) Repair cracks around access doors per Dwg. 841655A.		Service Bulletin 88/SB-652C, paragraph 2E. Ref: Dwg. 841507B.
Visual and Dye Penetrant	Initial inspection within 1000 flight hours of Service Bulletin issue unless previously inspected within 500 hours. Repeat inspections at 4000 hour intervals until preventive reinforcement is installed.	Repair in accordance with LAC Service Bulletin 88/SB-653A and Dwg. No. 841441B Repair Installation Nos. 841441-175, -176, -177, -178, -179, -180, -193, -195, and -196.		Service Bulletin 88/SB-653A, paragraph 2C. (1). Installation No. 841516-137.
Visual Dye Penetrant	On aircraft having 10,000 flight hours or more, inspect in next 700 hours. Repeat inspection at standard structural inspection interval.	(1) Rework existing clips in accordance with Dwg. 841509. (2) Install replacement clips per Dwg. 841509 in accordance with LAC Service Bulletin 88/SB-654.		Same as Column 9, Item (2).

1	2	3	4	5	6
NO.	MAJOR ASSEMBLY	ITEM	SERVICE HISTORY	PAGE REF. FOR ILLUSTR.	S/N CODE
W-24	Outer Wing Trailing Edge, Flap Stations 125 to 331	Trailing Edge Skin Panels, Trailing Edge Ribs.	Loose fasteners and cracks have occurred in the wing trailing edge skin panels and trailing edge rib webs and flanges.	36	△
W-25	Outer Wing Upper Surface W.S. 156-178	Upper Plank No. 1 W.S. 168-174 Upper Forward Spar Cap W.S. 156-178	Cracks emanating from the leading edge have occurred in the No. 1 upper planks inboard of the No. 2 and No. 3 nacelles. Cracks have occurred in the aft tang of the upper front spar cap emanating from the first attachment hole in area of the inboard skate angle of the inboard nacelles.	37 40	△

7	8		9	10
RECOMMENDATIONS				
METHOD OF INSP.	FREQUENCY OF INSPECTION	TYPE OR METHOD OF REPAIR	PREVENTIVE ACTION	
<p>Visual (from access holes to Inter-costal) and X-ray (from Intercostal to T.E.). Verify cracks using Dye Penetrant (Requires skin removal).</p>	<p>Conveniently scheduled inspection period. Repeat at normal inspection intervals.</p>	<p>Electra Structural Repair Manual, Sections 57-4-1, 51-2-14, and 51-3-9.</p>	<p>Service Bulletin 88/SB-655, paragraph 2.C. Ref: Dwg. 841512</p>	
<p>Visual, X-Ray</p>	<p>As specified in LAC 88/SB-665D. No. 1 plank: initial inspection within next 50 ft. hours with repeat inspections at intervals not to exceed 625 hours. Spar Cap: 1250 ft. hour repeat inspection intervals increasing to 2500 ft. hour intervals after No. 1 plank is reinforced or repaired. Special repeat inspections may be discontinued for No. 1 plank and spar cap when their respective repairs or reinforcements are incorporated.</p>	<p>Per Repair Index Dwg. 841628 in accordance with Service Bulletin 88/SB-665D: Wing Upper Surface Dwg. 841580D 841581B 841582B Wing Upper Front Spar Cap Dwg. 841623B 841624B</p>	<p>Per Drawing 841628 in accordance with 88/SB-665D Ref: Dwg. 841576A 841577B 841578A 841579A</p>	

1	2	3	4	5	6
NO.	MAJOR ASSEMBLY	ITEM	SERVICE HISTORY	PAGE REF. FOR ILLUSTR.	S/N CODE
W-26	Outer Wing Lower Surface W.S. 157 to W.S. 219	Wing Planks Nos. 1 thru 8	Cracks have occurred in the lower wing planks in the vicinity of the Main Landing Gear ribs at W.S. 167 and 209.	35 44 54 55	⚠
W-27	Outer Wing Front Spar W.S. 168	Upper Cap and Spar Web	Cracks have occurred in upper spar cap vertical leg and in web at rib attach bolts at W.S. 168.	50 51	⚠
W-28	Outer Wing Upper Surface	Wing Planks Nos. 2 to 4 on each side of inboard nacelles	Cracks have occurred in upper wing planks 2, 3, and 4 in skate angle area.	56	⚠
W-29	Outer Wing Upper Surface W.S. 346	Wing Planks No. 1 thru 5 at inboard side of outboard nacelles	Cracks have occurred in upper wing planks No. 1 thru 5 at W.S. 346.	30	⚠

7	8		9	10
RECOMMENDATIONS				
METHOD OF INSP.	FREQUENCY OF INSPECTION	TYPE OR METHOD OF REPAIR		PREVENTIVE ACTION
Visual and Dye Penetrant	<p>Initial inspection within the next 400 hours time in service unless previously accomplished.</p> <p>LAC Service Bulletin 88/SB-669A for detailed instructions.</p> <p>Repeat inspections within 2500 ft. hours or 2500 landings whichever comes first.</p>	<p>Per listed repair installations in accordance with LAC Service Bulletin 88/SB-669A.</p> <p><u>INSTALLATION</u> <u>PLANK</u></p> <p>No. 841634 No. 1 & 2 841635 No. 1 841636 No. 3, 4, 5 841642 No. 5 & 6 841865 MLG Drag Strut Area</p>		Same as Column 9.
Visual, Eddy current	<p>On aircraft having 20,000 ft. hours or more inspect within 625 ft. hours. Repeat inspection at 1250 ft. hour intervals until preventive reinforcement or repair which eliminates repeat inspections is installed.</p>	<p>Repair in accordance with LAC Service Bulletin 88/SB-670D, paragraph 2.E.</p> <p><u>DRAWINGS</u> 841624B 841738A 841743B 841806B</p>		<p>Service Bulletin 88/SB-670D, paragraph 2.D. Ref: Dwg. 841717E</p>
Visual and Dye Penetrant	<p>Inspect within 700 ft. hours with follow-up inspections at normal structural maintenance inspection intervals.</p>	<p>Repair in accordance with LAC Service Bulletin 88/SB-675 and Dwg. Nos. 841758 and 841770A.</p>		Same as Column 9
Visual (accomplish in conjunction with 88/SB-649 inspection)	<p>Normal structural maintenance inspection interval, but in no case shall interval exceed that required by LAC Service Bulletin 88/SB-649.</p>	<p>Preventive reinforcement - See column 10 for installation instructions</p>		<p>Install reinforcements per LAC Service Bulletin 88/SB-676. Ref: Dwg. 841760</p>

1 NO.	2 MAJOR ASSEMBLY	3 ITEM	4 SERVICE HISTORY	5 PAGE REF. FOR ILLUSTR.	6 S/N CODE
W-30	Wing Center Section B.L. 65 L/R	Upper and Lower Wing Surfaces at B.L. 65 Splice Area	Corrosion damage has been reported in upper and lower wing surfaces at B.L. 65 where center section joins outer sections.	42 57	⚠
W-31	Outer Wing Front Spar W.S. 209	Upper cap and spar web	Cracks have occurred in the spar web at the MLG rib attach bolts thru the rib tee, spar web, upper spar cap and nacelle attach fitting.	51	⚠
W-32	Outer Wing and Center Section B.L. 0 to W.S. 584	Upper and Lower Wing Surfaces, B.L. 0 to W.S. 584	Corrosion damage around plank splice fasteners has occurred on both the upper and lower wing surfaces.	43	⚠

7	8		9	10
RECOMMENDATIONS				
METHOD OF INSP.	FREQUENCY OF INSPECTION	TYPE OR METHOD OF REPAIR	PREVENTIVE ACTION	
V i s u a l	Inspect at next periodic with repeat inspections at every major structural inspection interval.	Repair in accordance with LAC Service Bulletin 88/SB-678A.	P e r i o d i c inspections and application of corrosion protection coatings.	
Visual, Eddy current	On aircraft having 20,000 hours or more inspect within 625 ft. hours. Repeat inspection at 1250 ft. hour intervals until preventive reinforcement or repair which eliminates repeat inspections is installed.	Repair in accordance with LAC Service Bulletin 88/SB-682B, paragraph 2.F. DRAWINGS 841802 841804C	Service Bulletin 88/SB-682B, paragraph 2.E. Ref: Drawing 841800C	
V i s u a l	Normal wing structural maintenance inspection interval, but in no case shall interval exceed that required by LAC Service Bulletin 88/SB-620.	Repair in accordance with LAC Service Bulletin 88/SB-685, paragraphs 2.C and 2.D. DRAWINGS 841867 841872	P e r i o d i c inspections and application of corrosion protection coatings.	

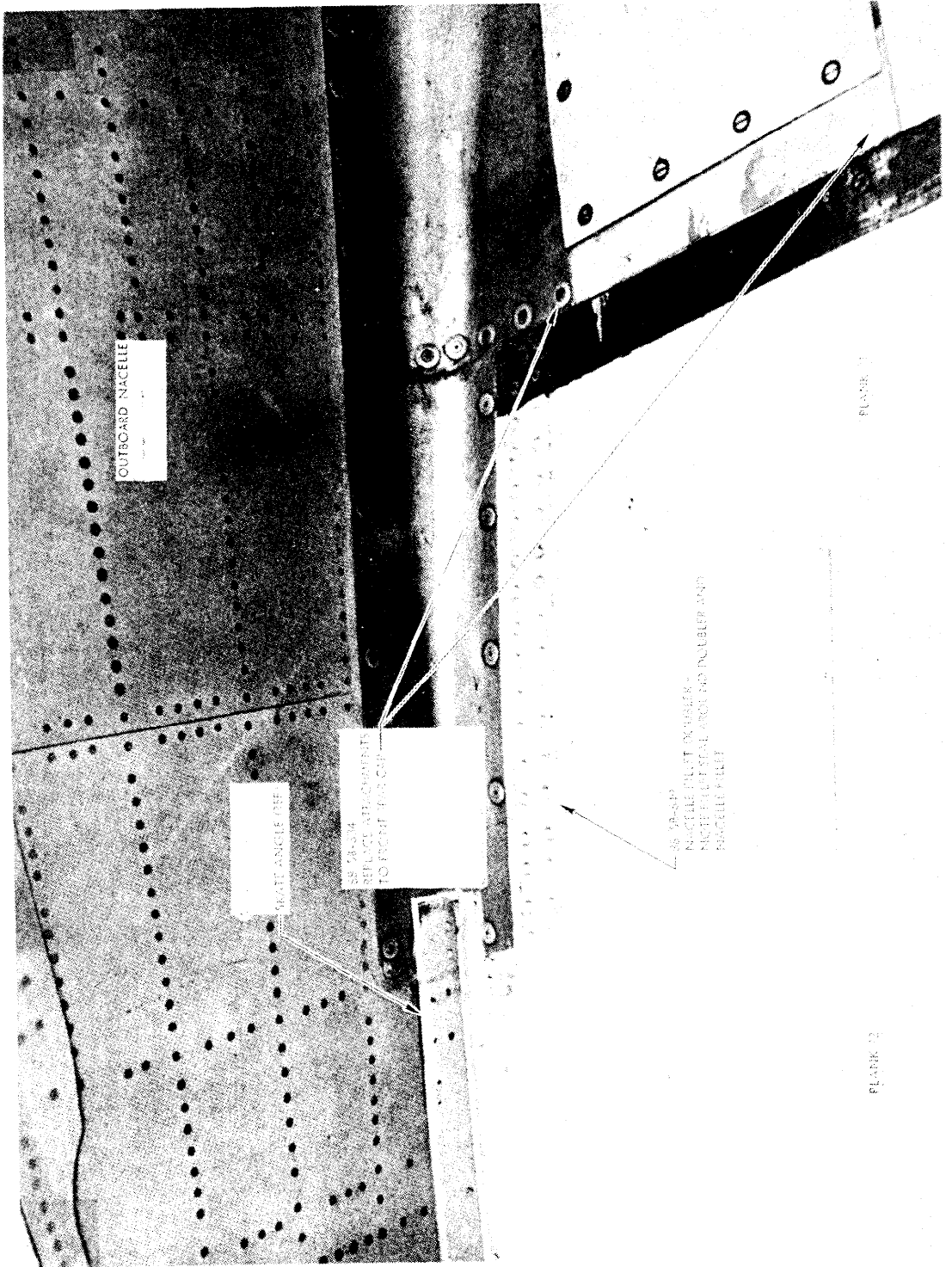


FIGURE F-4. WING UPPER SURFACE
Reference W-1, page 8
W-20, page 20

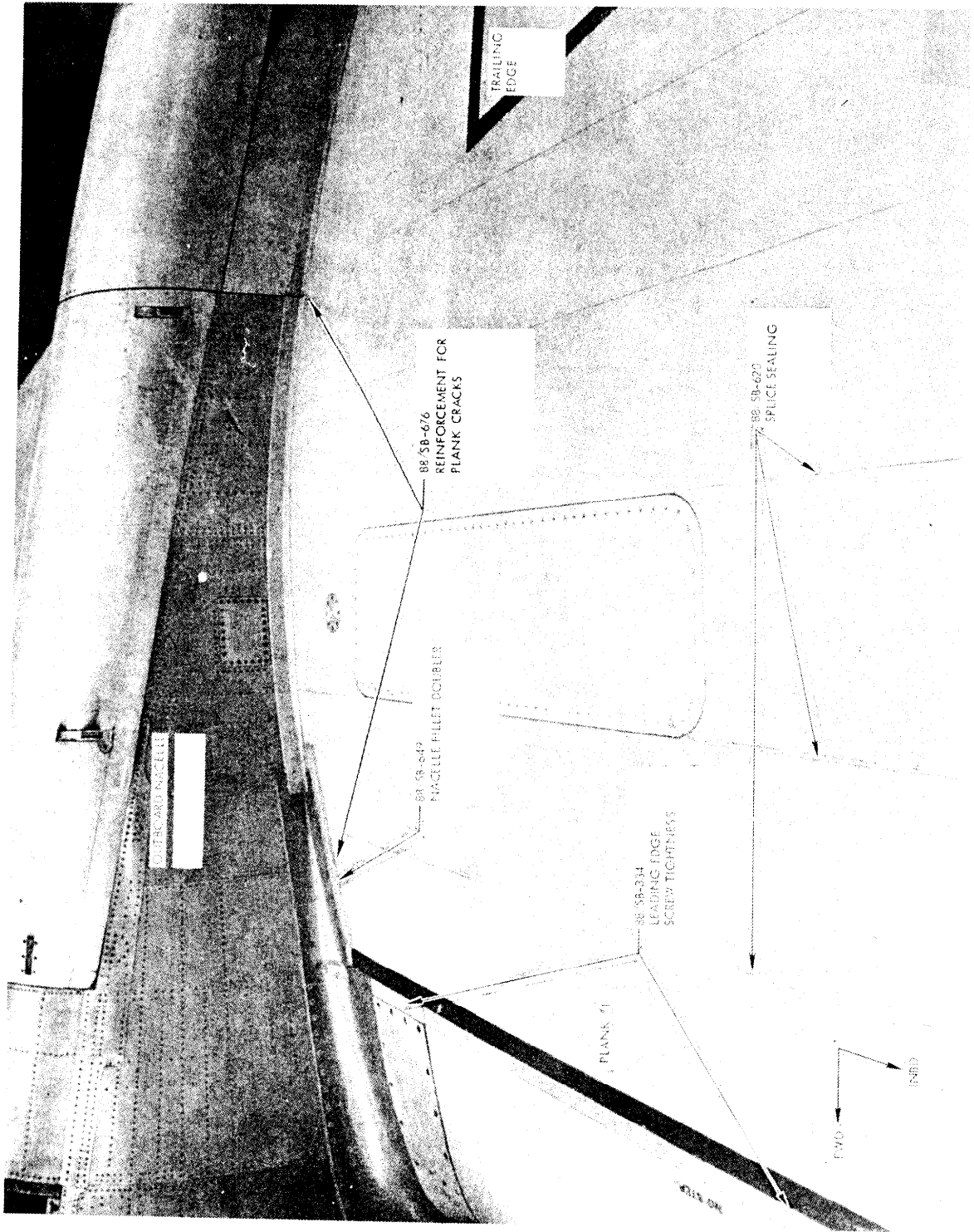


FIGURE F-5. WING UPPER SURFACE
Reference W-1, page 8
W-10, page 14
W-20, page 20
W-29, page 24

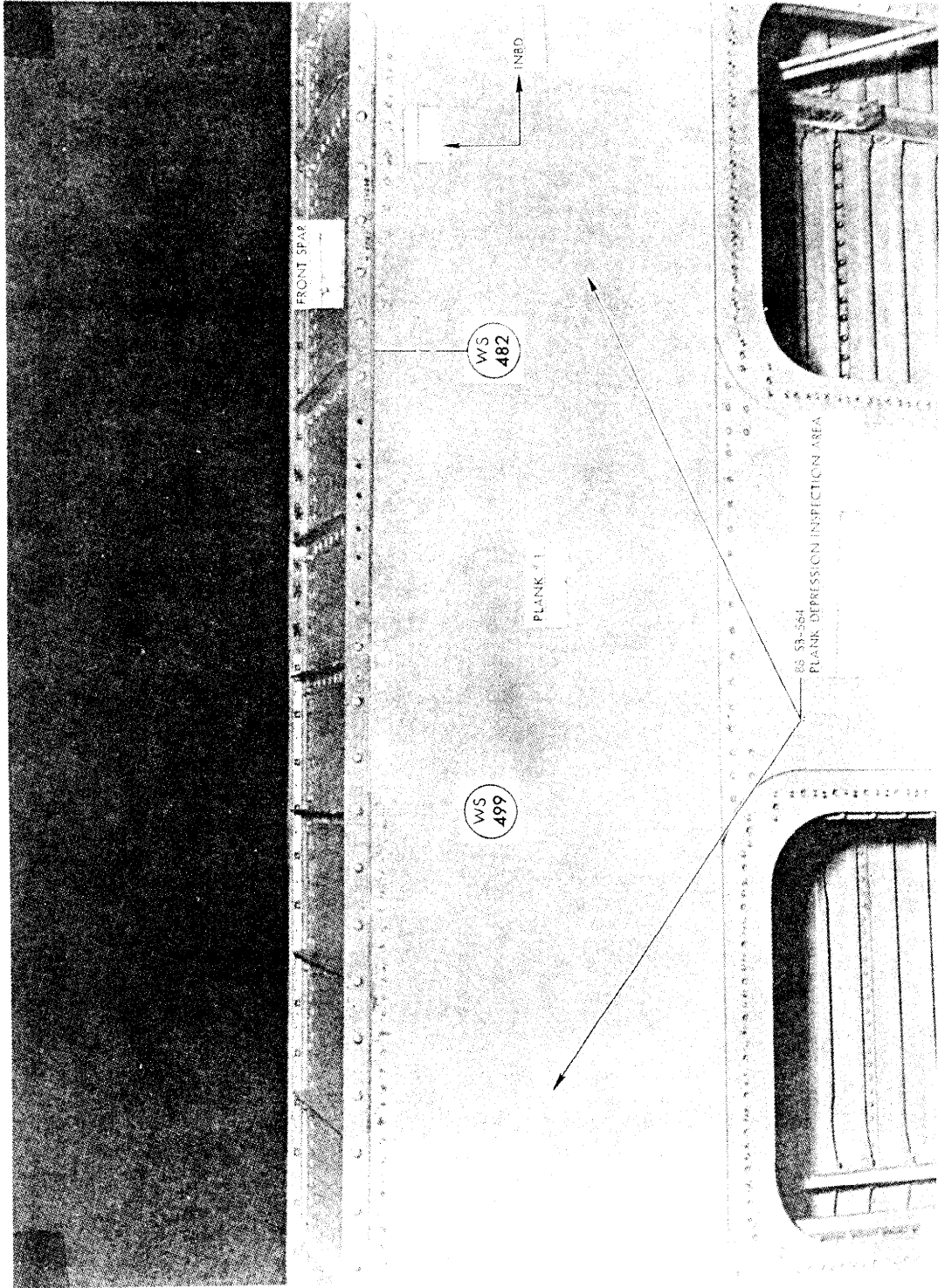


Figure F-6. WING LOWER SURFACE
Reference W-2, page 8

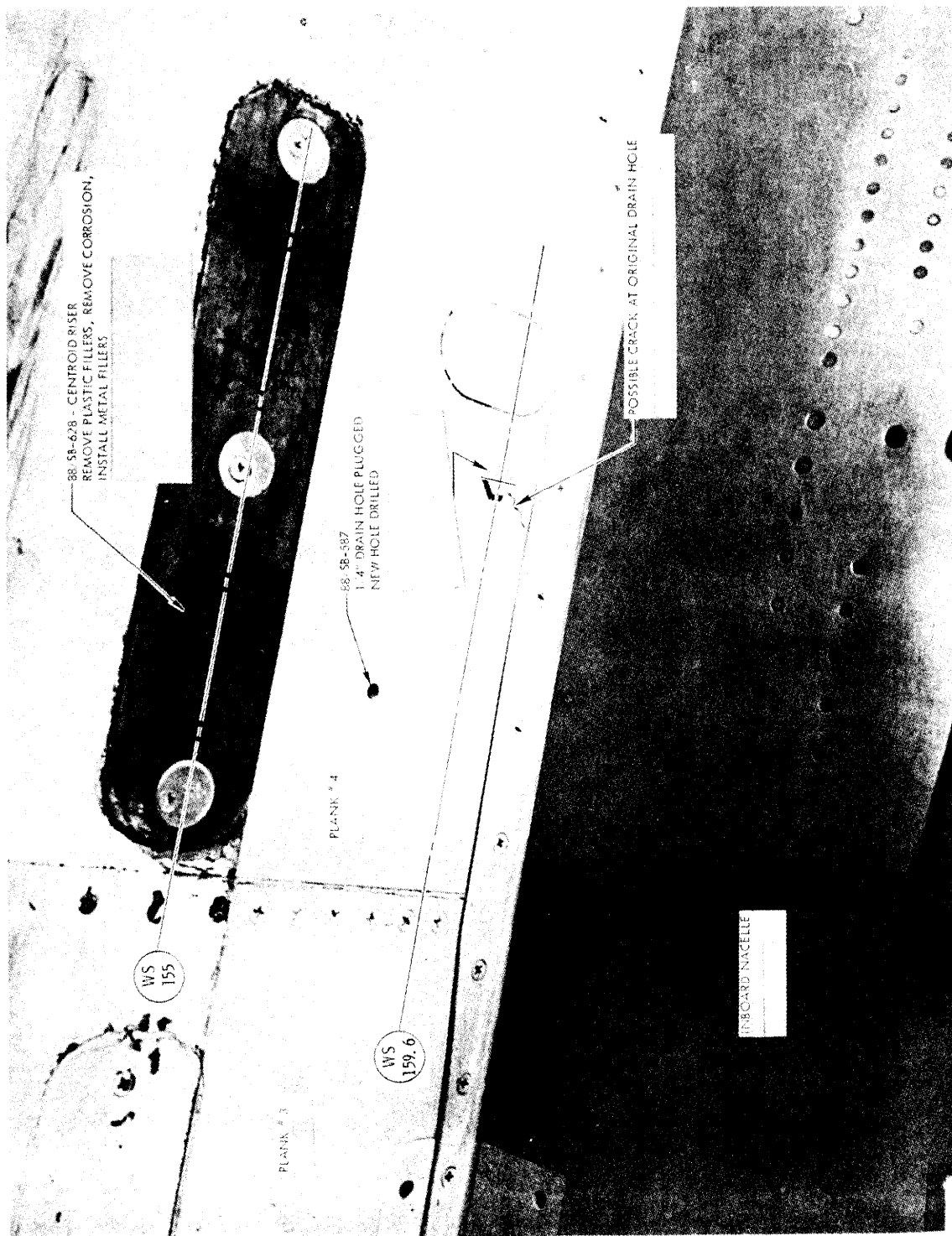


Figure F-7. WING LOWER SURFACE
Reference W-3, page 8
W-12, page 16

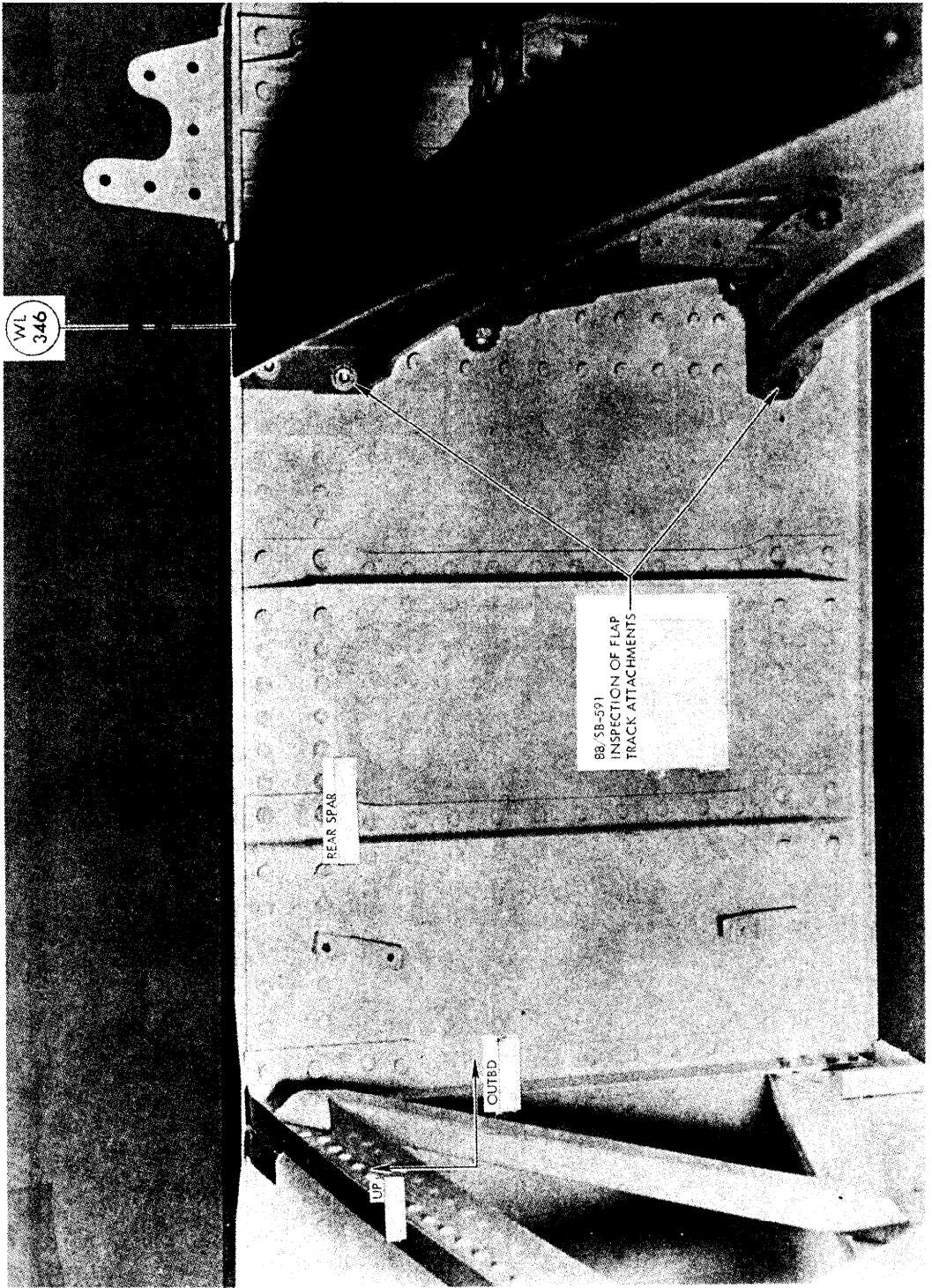
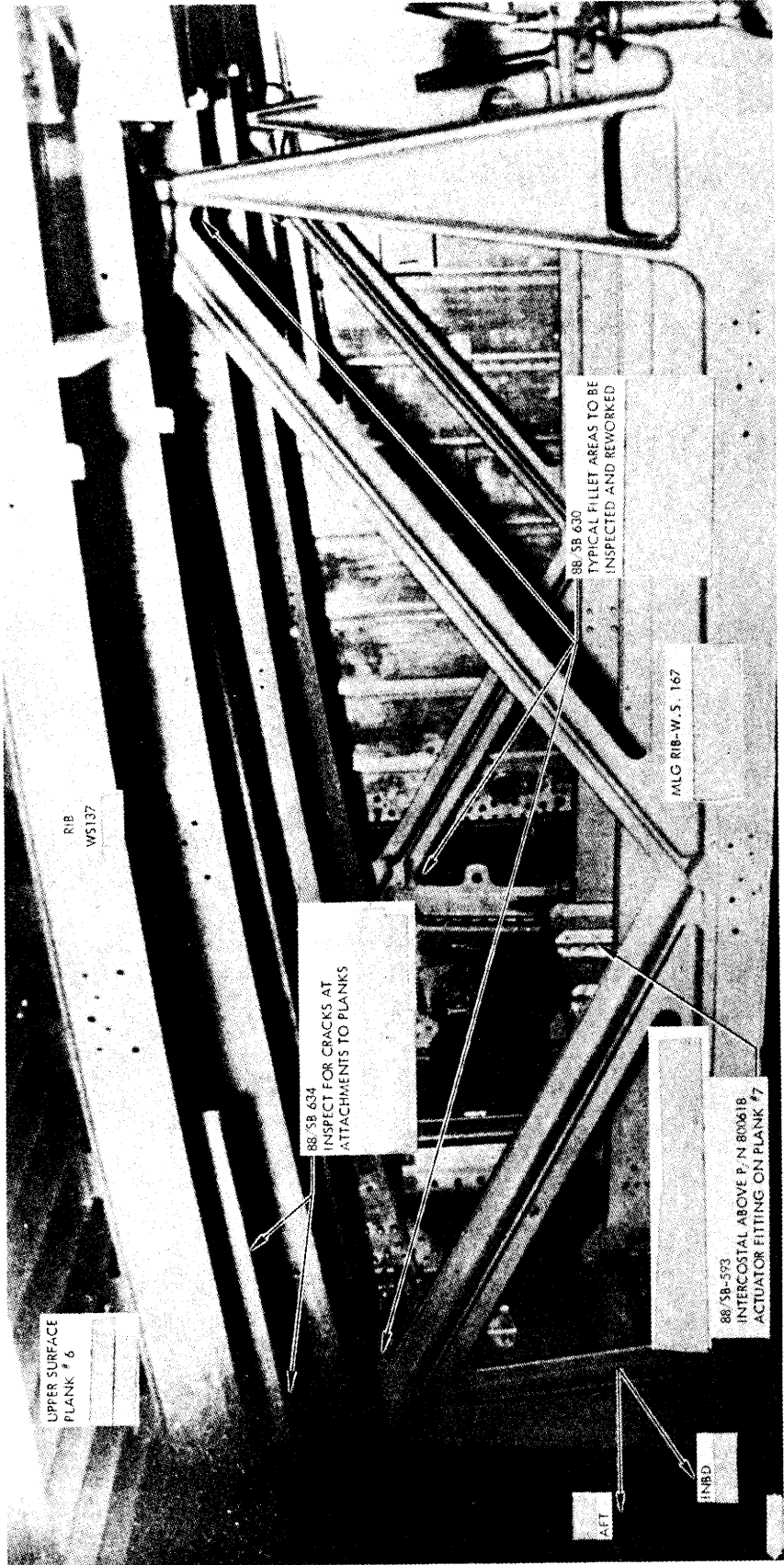


Figure F-8. WING EXTERNAL STRUCTURE
Reference W-4, page 8

FIGURE F-9. WING INTERNAL STRUCTURE
Reference W-5, page 10
W-13, page 16
W-17, page 18



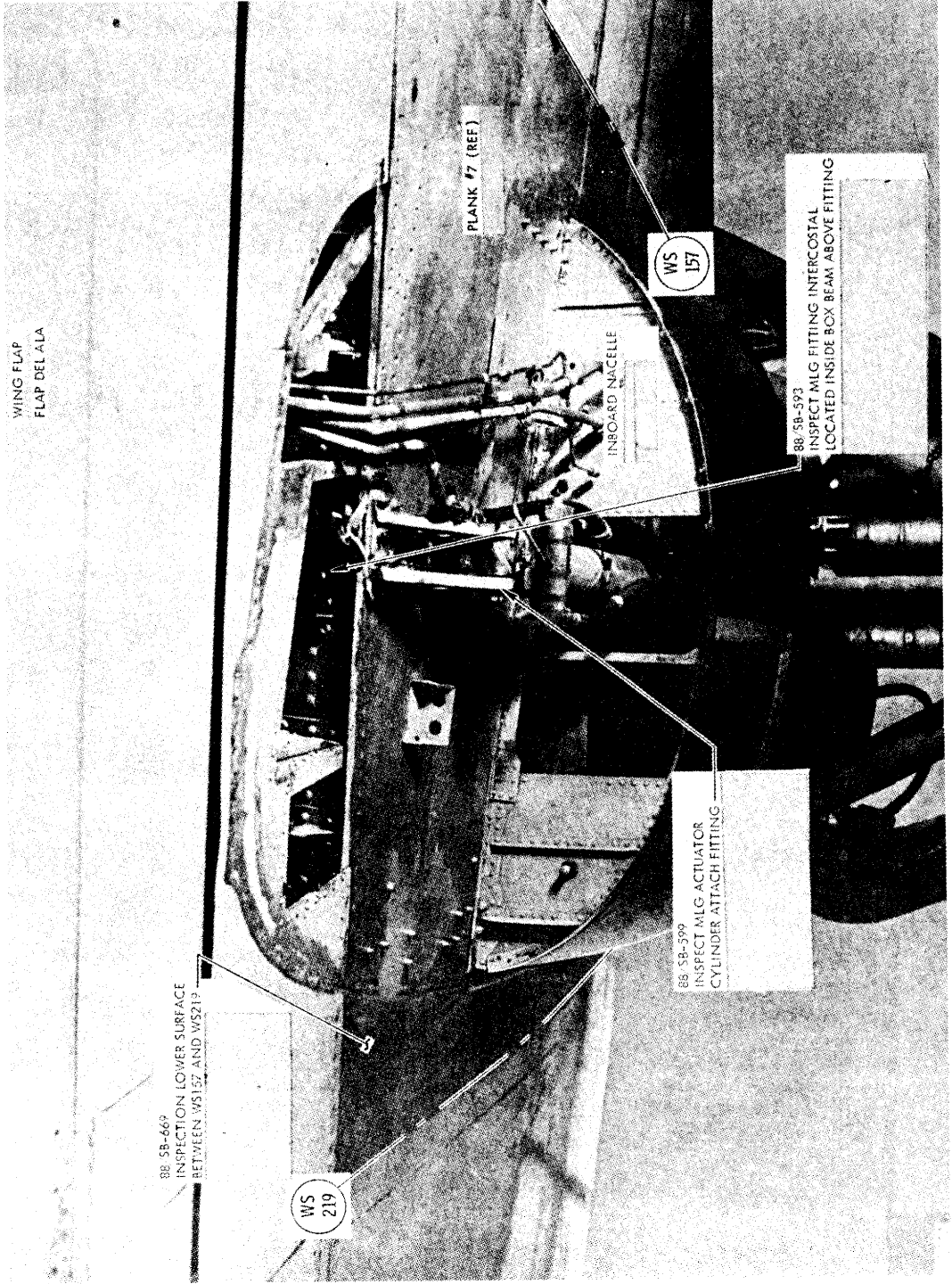


FIGURE F-10. WING LOWER SURFACE
Reference W-5, page 10
W-6, page 10
W-26, page 24

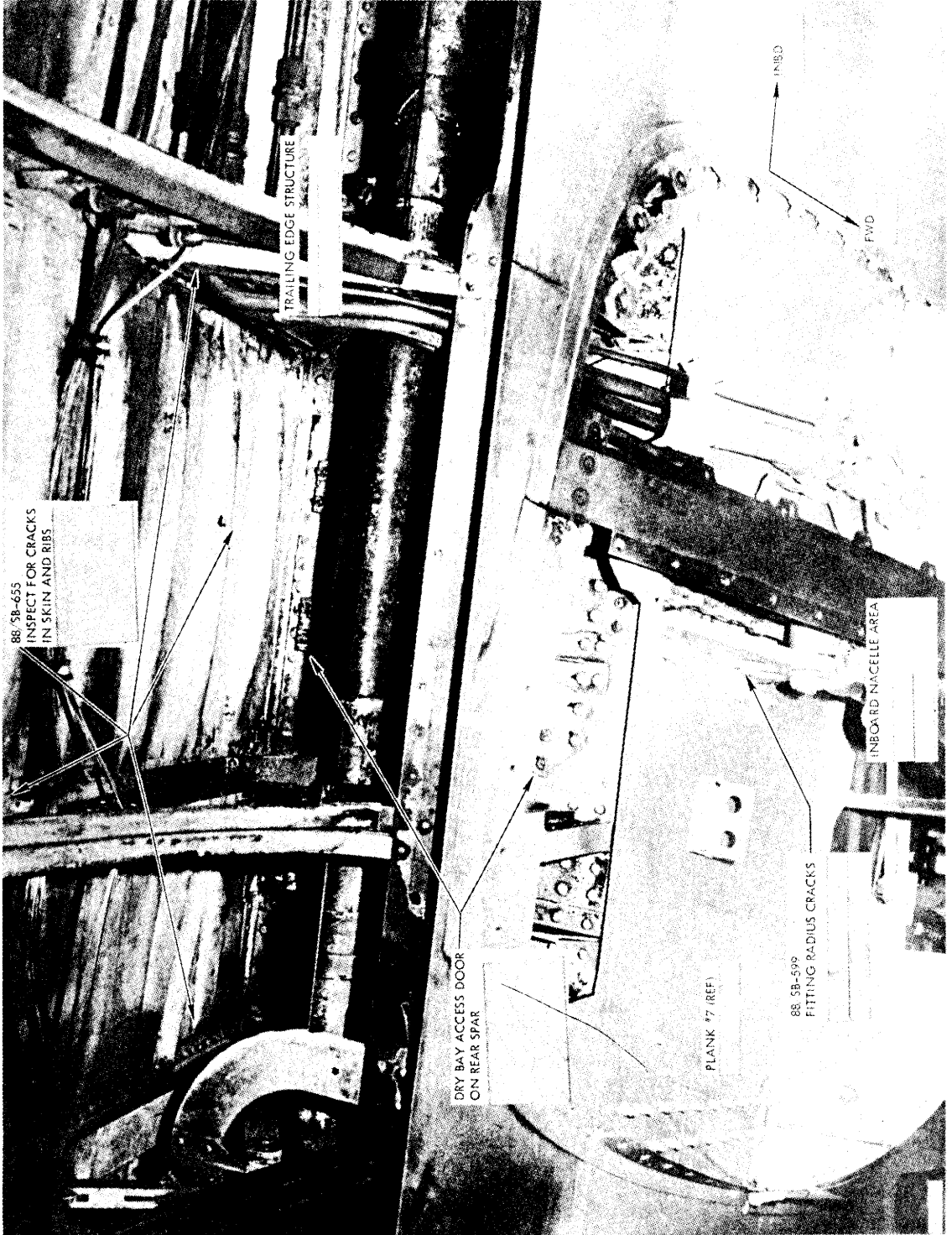


FIGURE F-11. WING UPPER SURFACE
Reference W-6, page 10
W-24, page 22

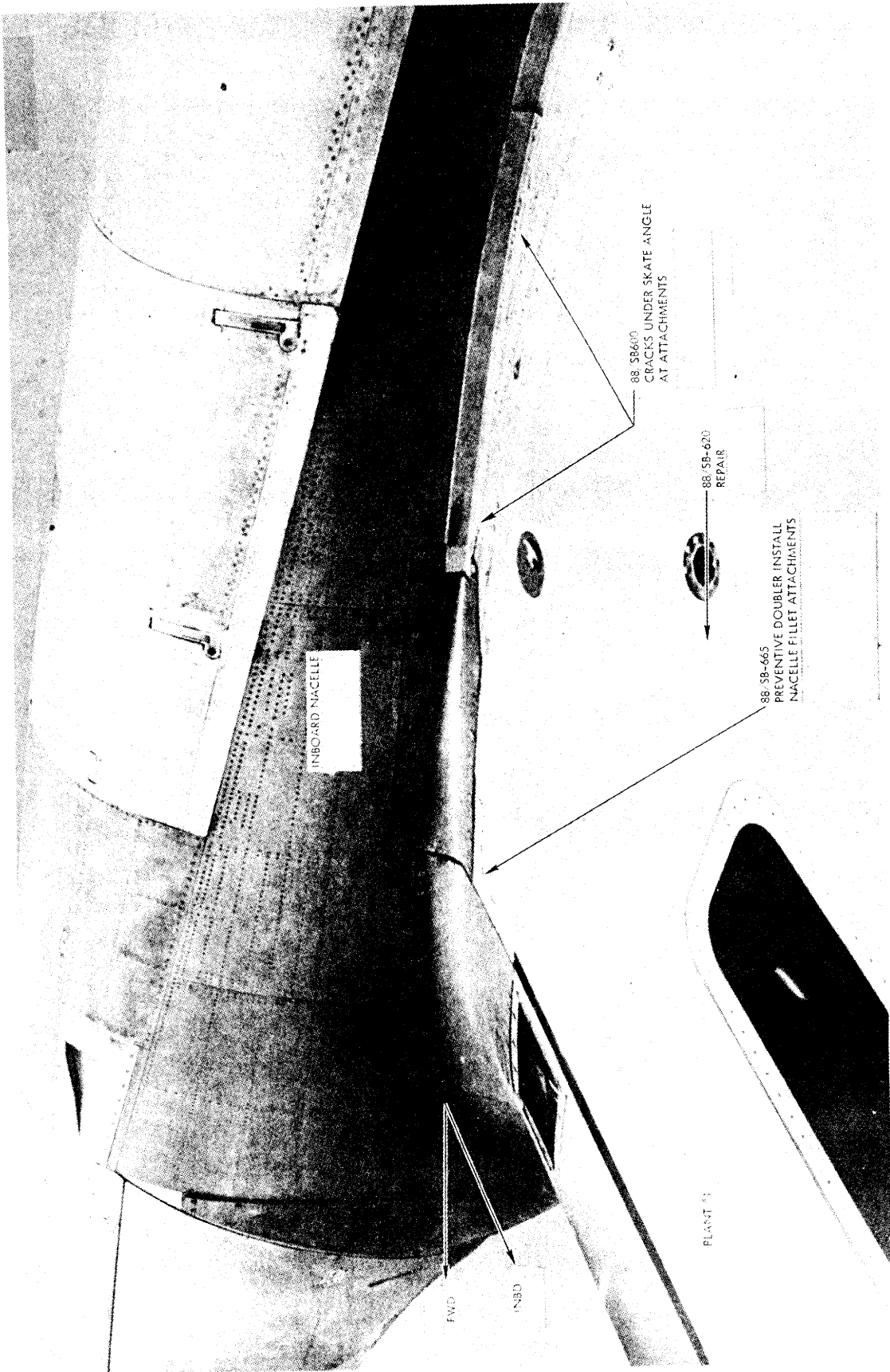


FIGURE F-12. WING UPPER SURFACE
Reference W-7, page 12
W-10, page 14
W-25, page 22

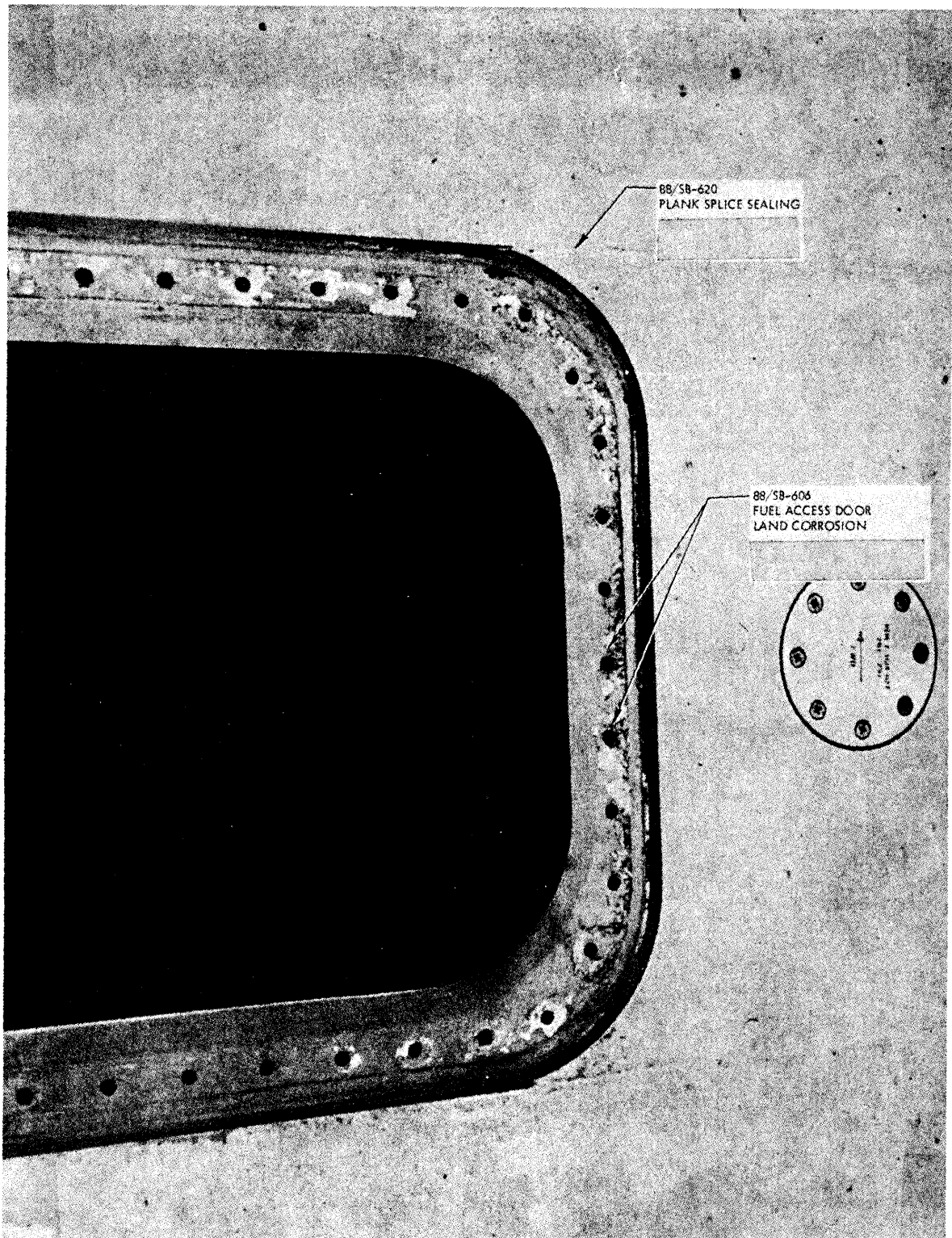


FIGURE F-13. WING UPPER SURFACE
Reference W-8, page 12
W-10, page 14

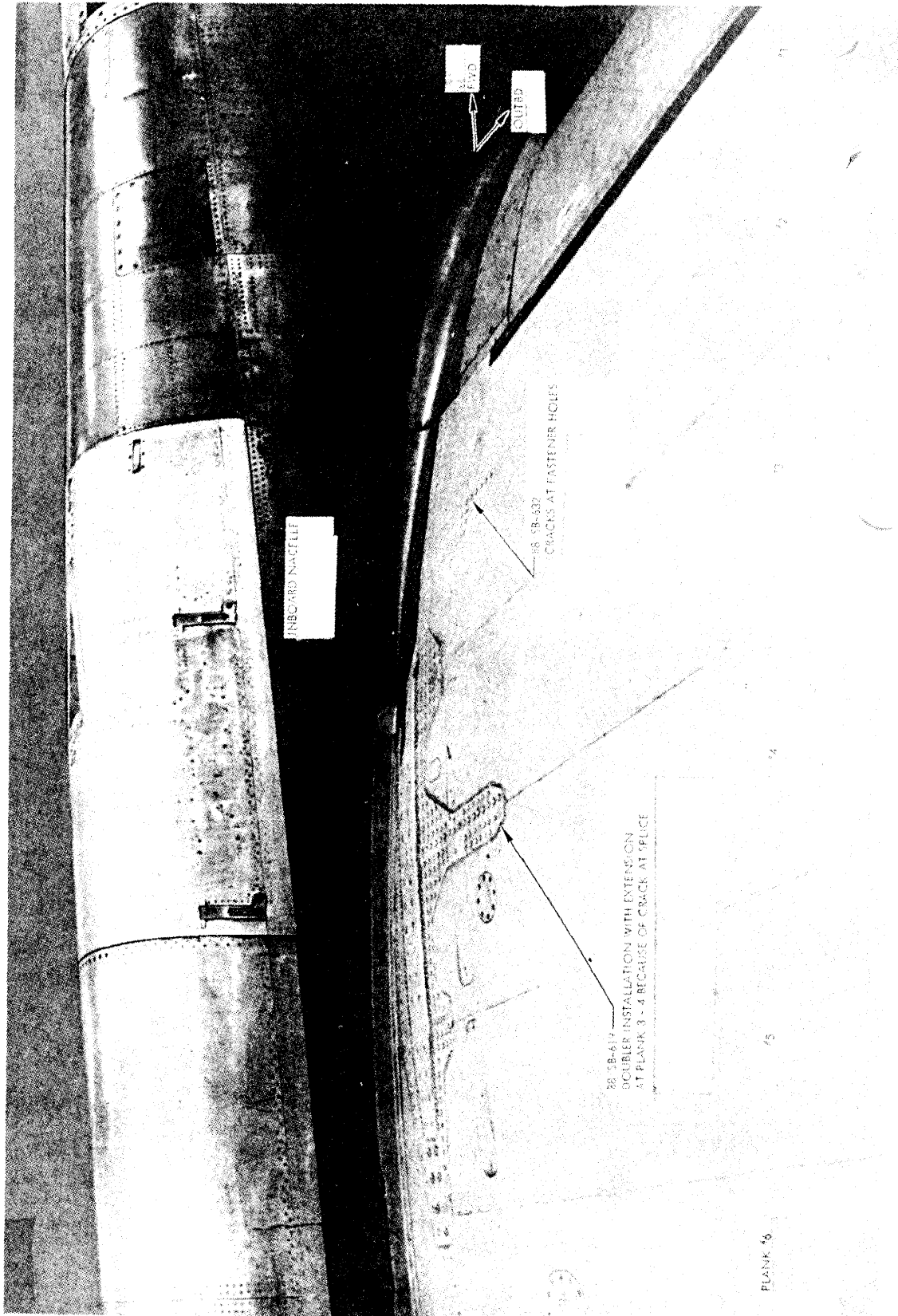


FIGURE F-14. WING UPPER SURFACE
Reference W-9, page 14
W-15, page 16

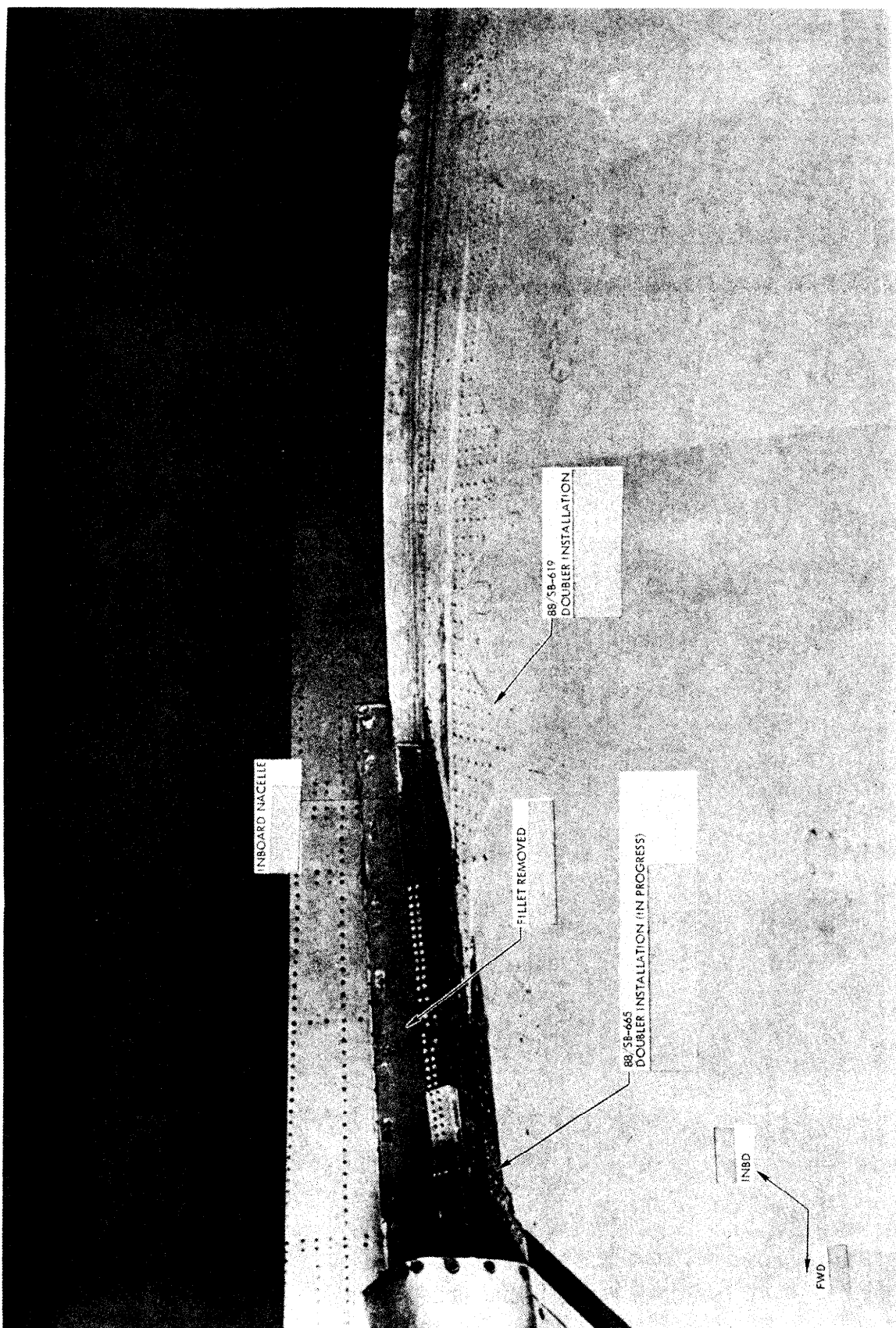


FIGURE F-15. WING UPPER SURFACE
Reference W-9, page 14
W-25, page 22

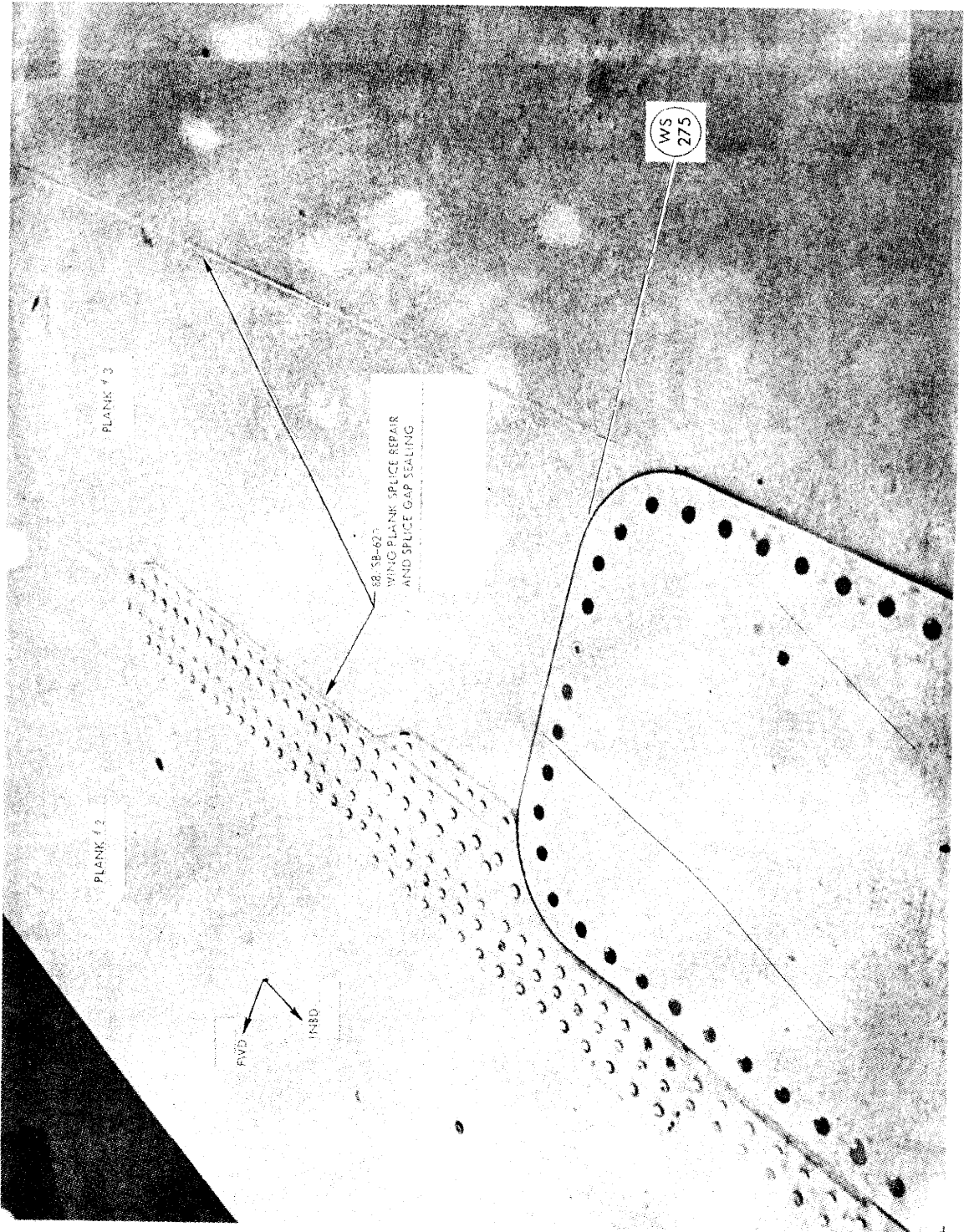


FIGURE F-16. WING UPPER SURFACE
Reference W-10, page 14

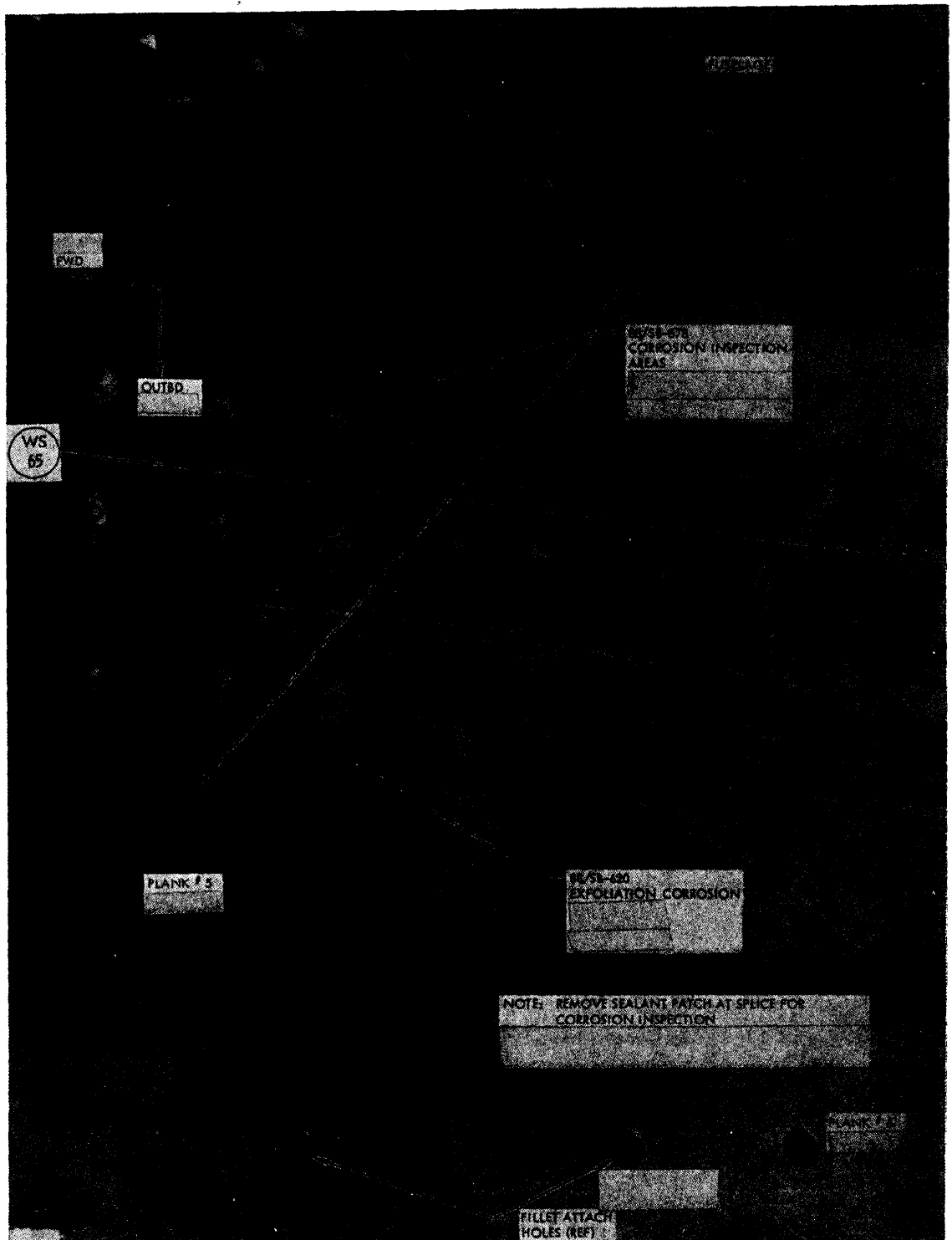


FIGURE F-17. WING UPPER & LOWER SURFACE
Reference W-10, page 14
W-30, page 26

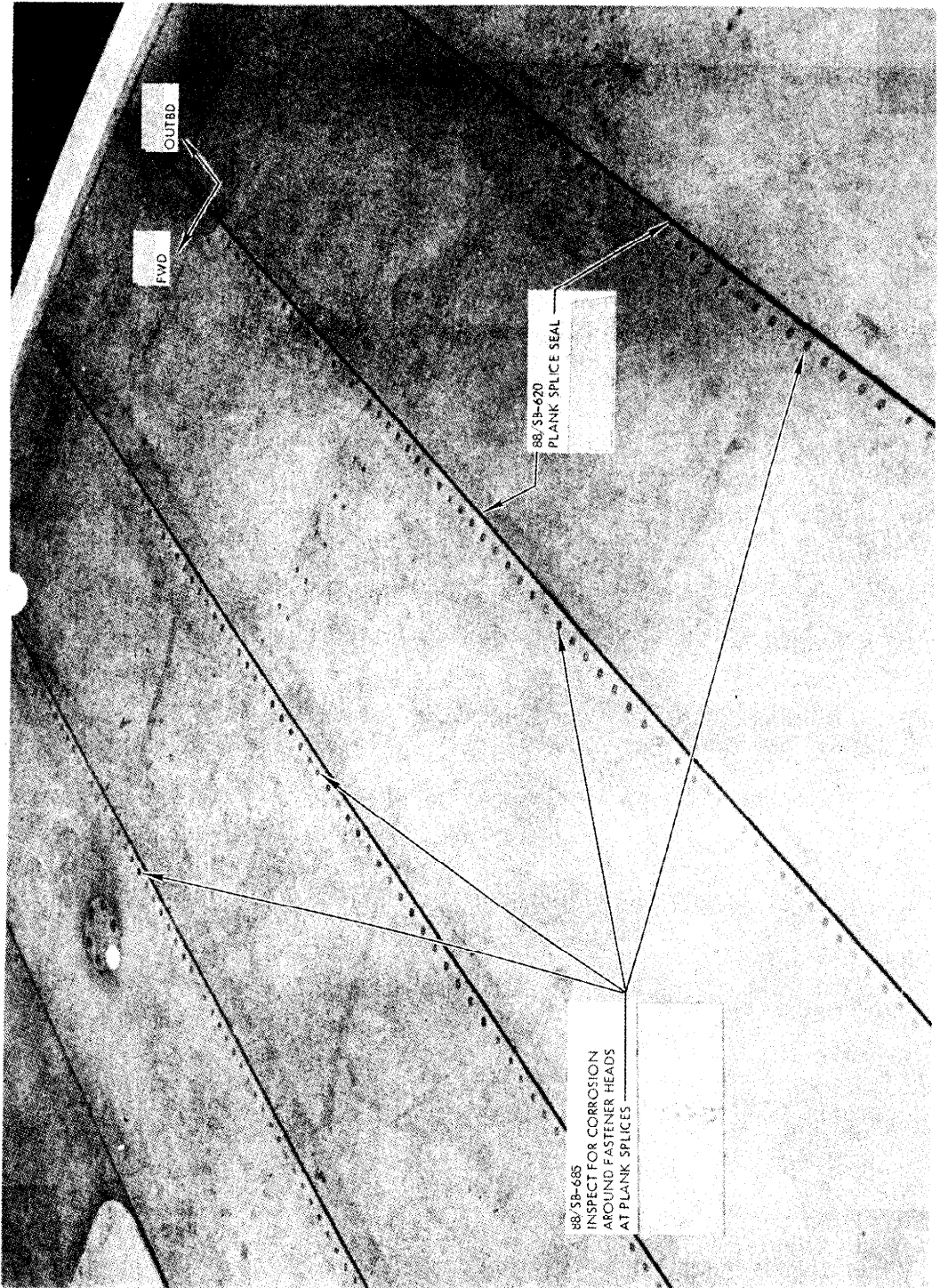


FIGURE F-18. WING UPPER & LOWER SURFACE
Reference W-10, page 14
W-32, page 26

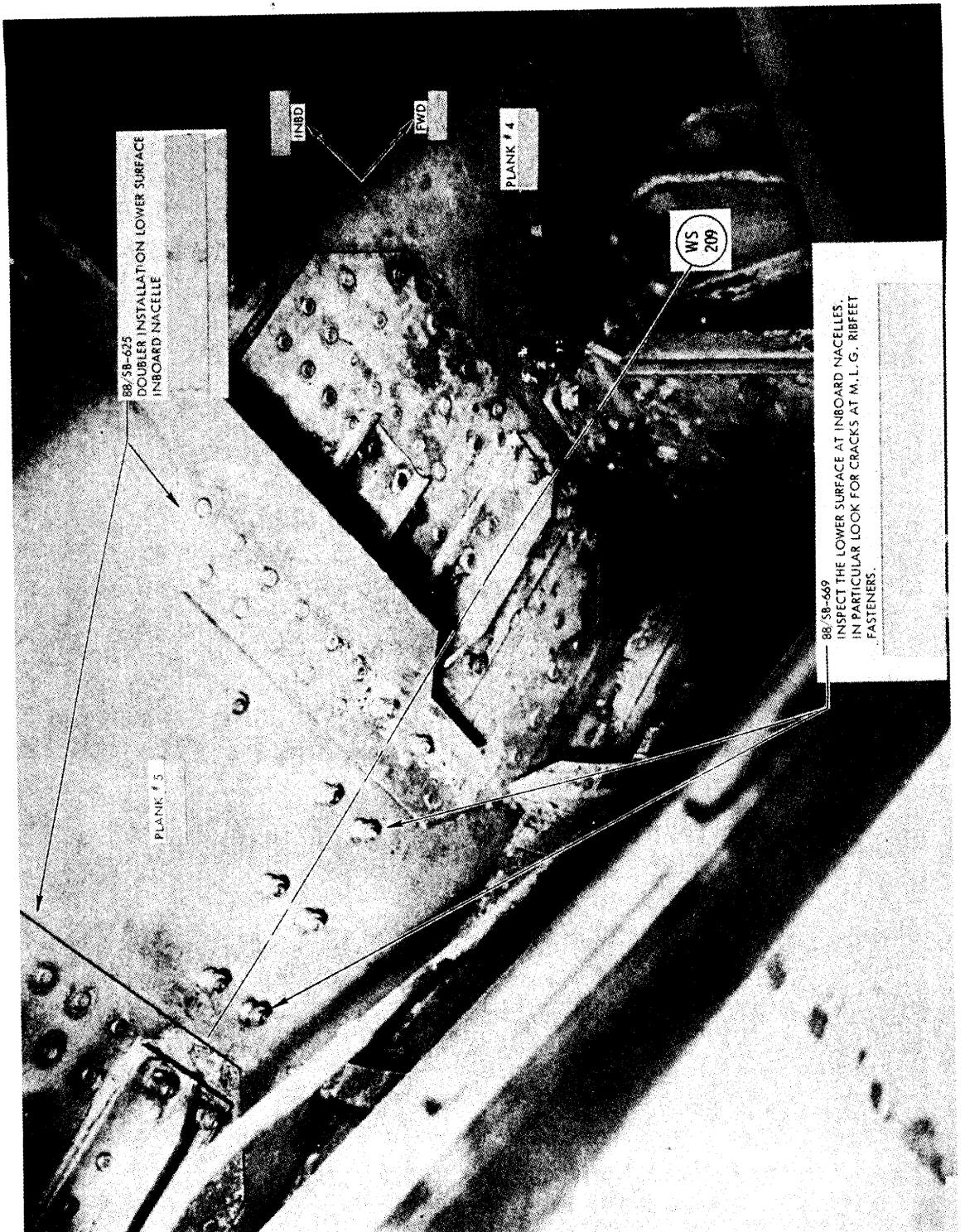


FIGURE F-19. WING LOWER SURFACE

Reference W-11, page 14

W-26, page 24

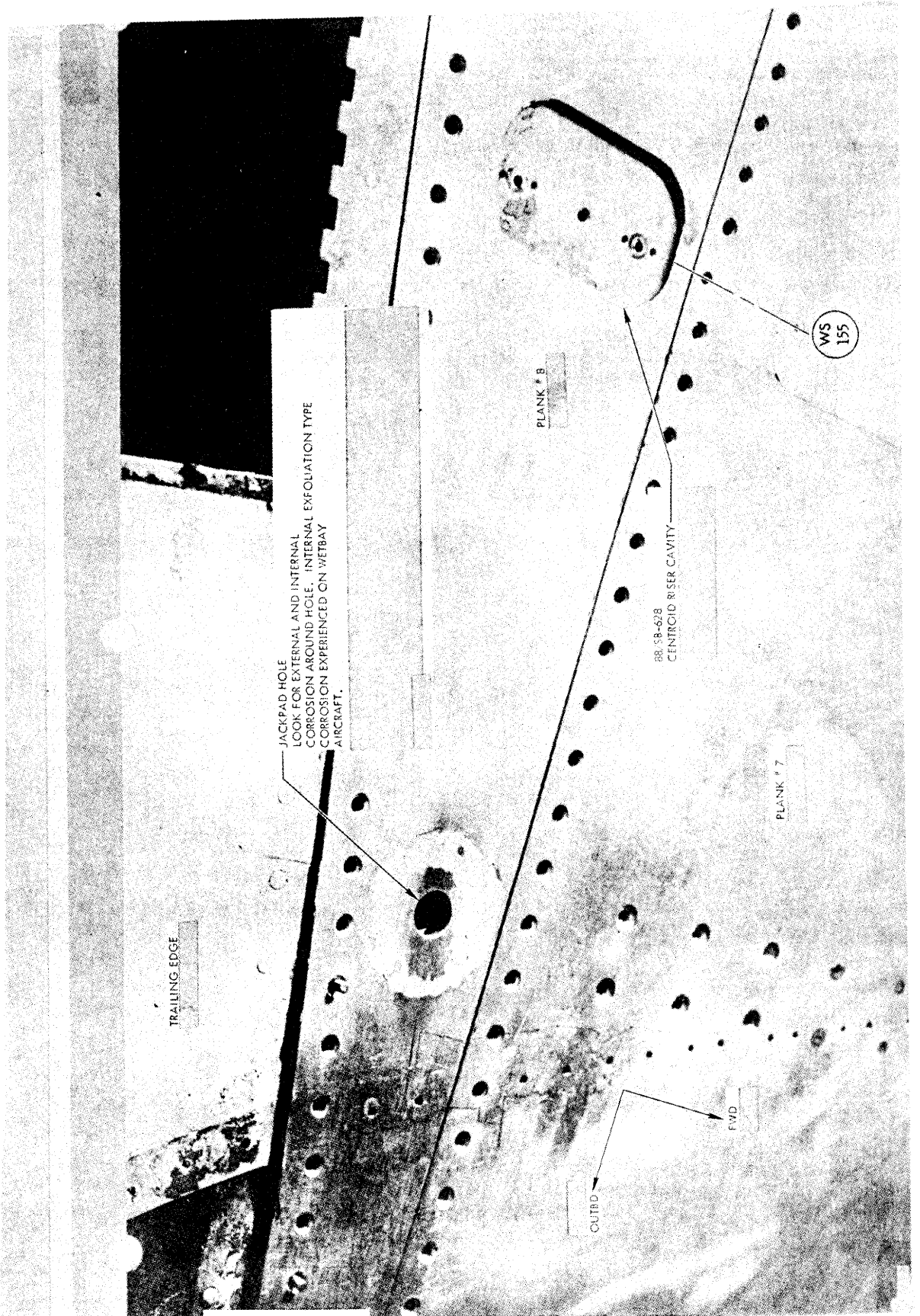


FIGURE F-20. WING LOWER SURFACE
Reference W-12, page 16

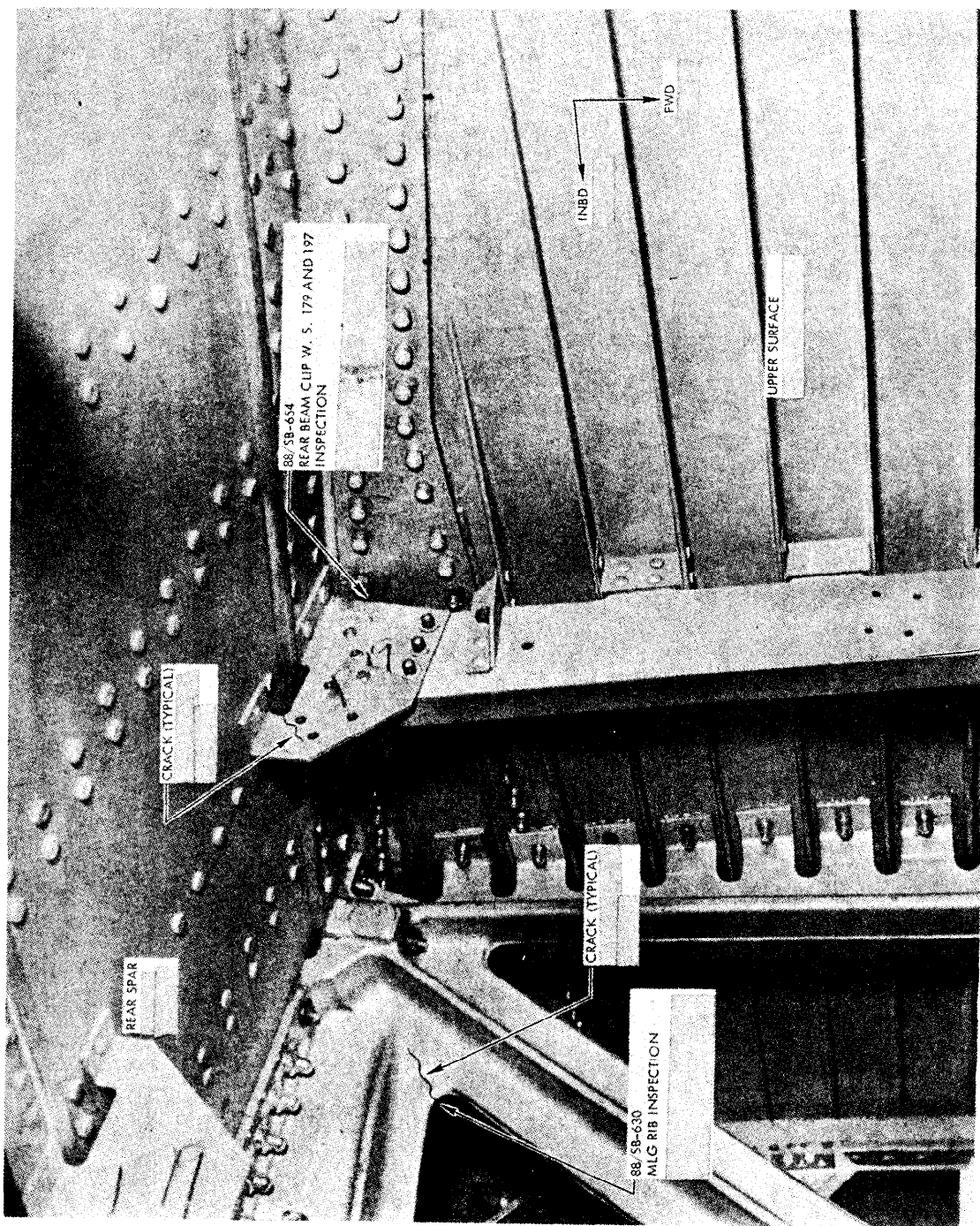


FIGURE F-21. WING INTERNAL STRUCTURE
Reference W-13, page 16
W-23, page 20

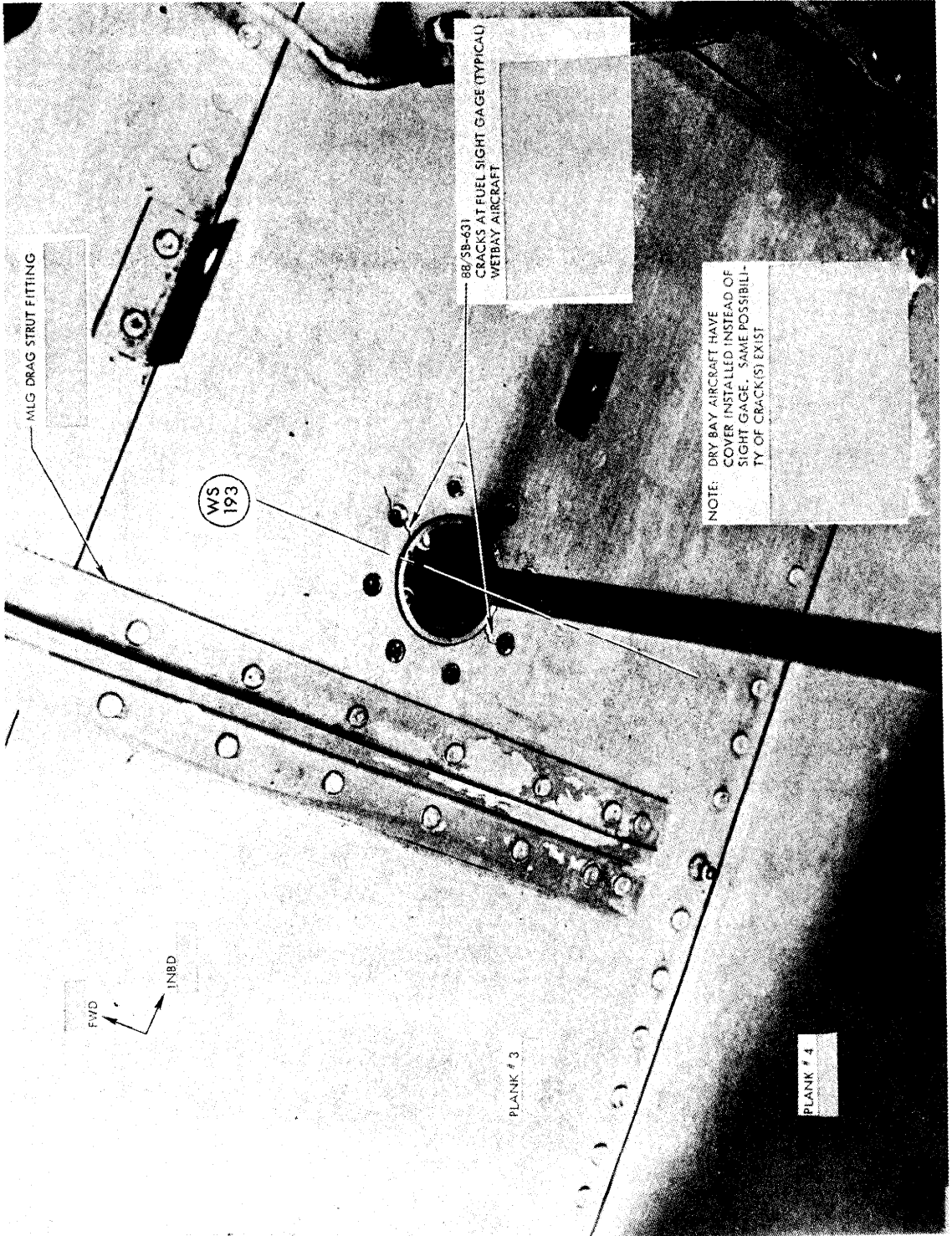


FIGURE F-22. WING LOWER SURFACE
Reference W-14, page 16

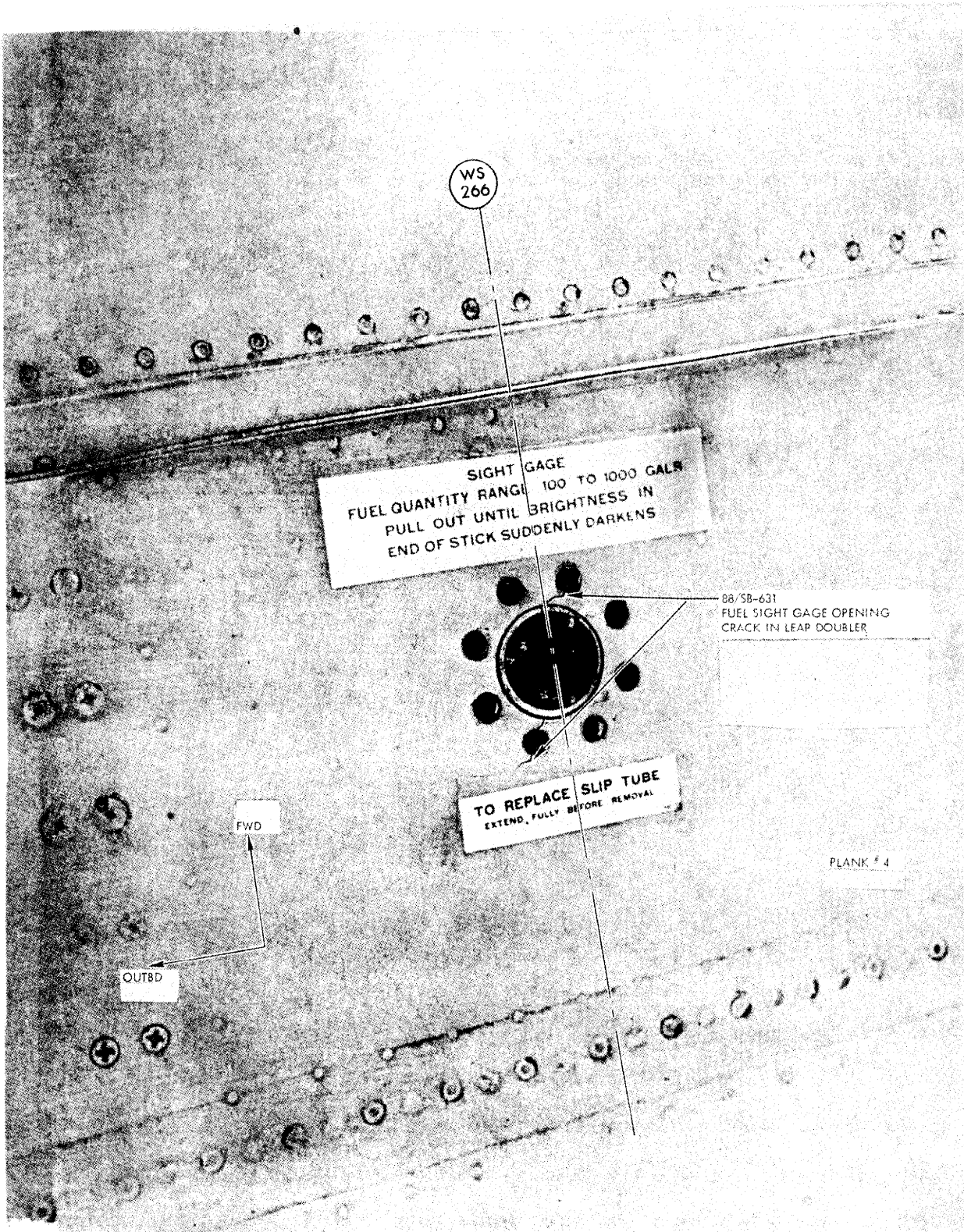


FIGURE F-23. WING LOWER SURFACE
Reference W-14, page 16

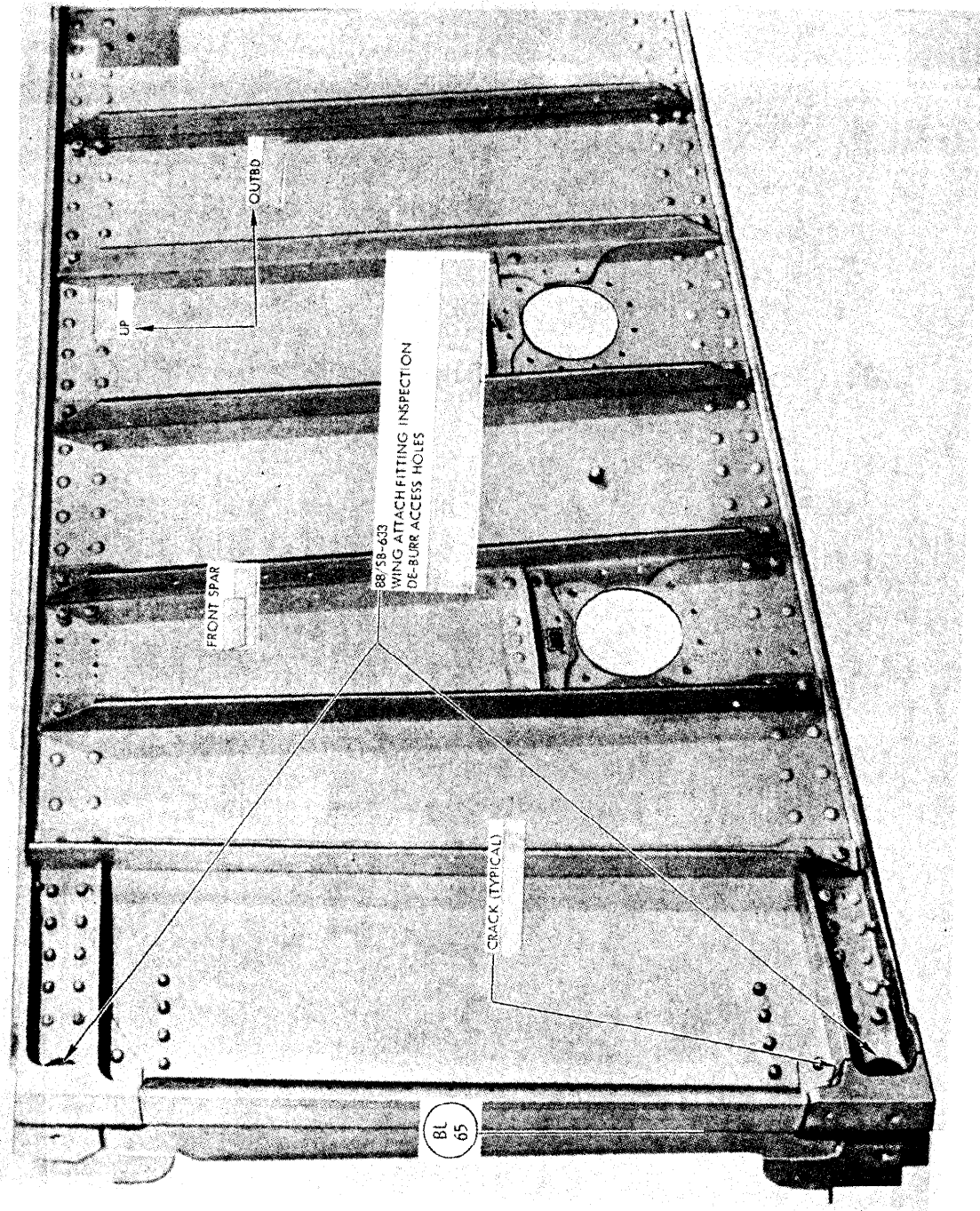


FIGURE F-24. WING INTERNAL STRUCTURE
Reference W-16, page 18

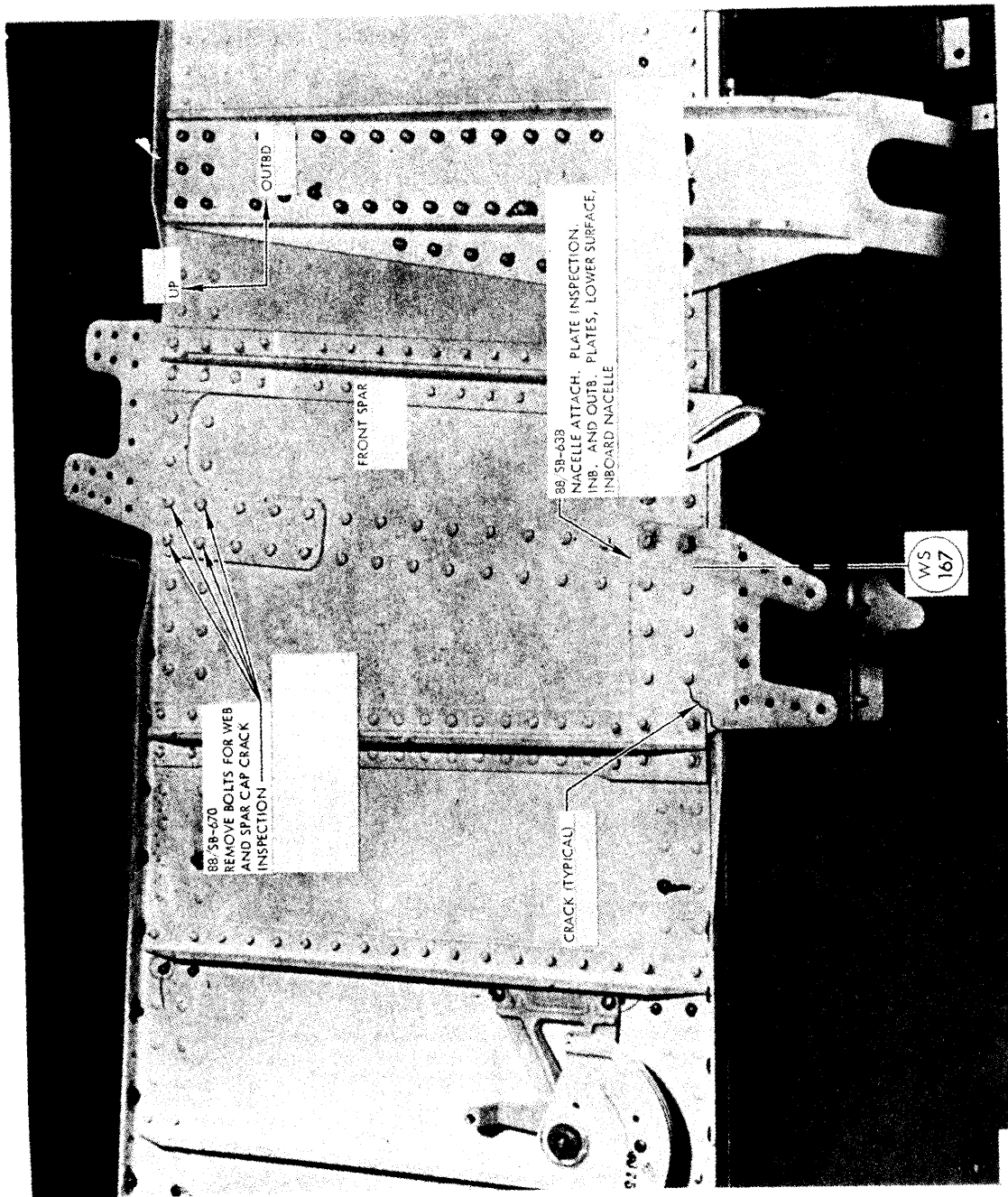


FIGURE F-25. WING EXTERNAL STRUCTURE
Reference W-18, page 18
W-27, page 24

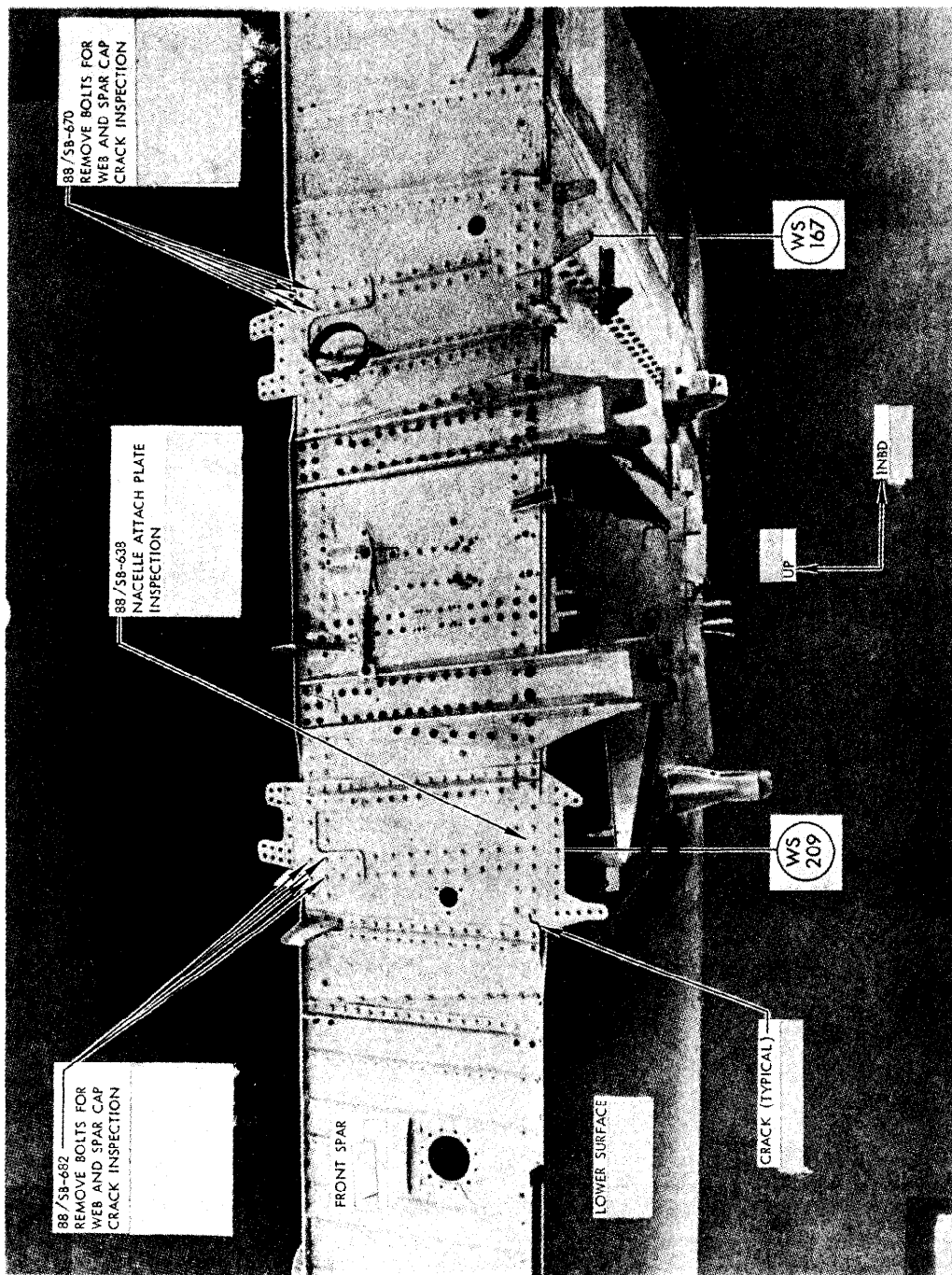


FIGURE F-26. WING EXTERNAL STRUCTURE
Reference W-18, page 18
W-27, page 24
W-31, page 26

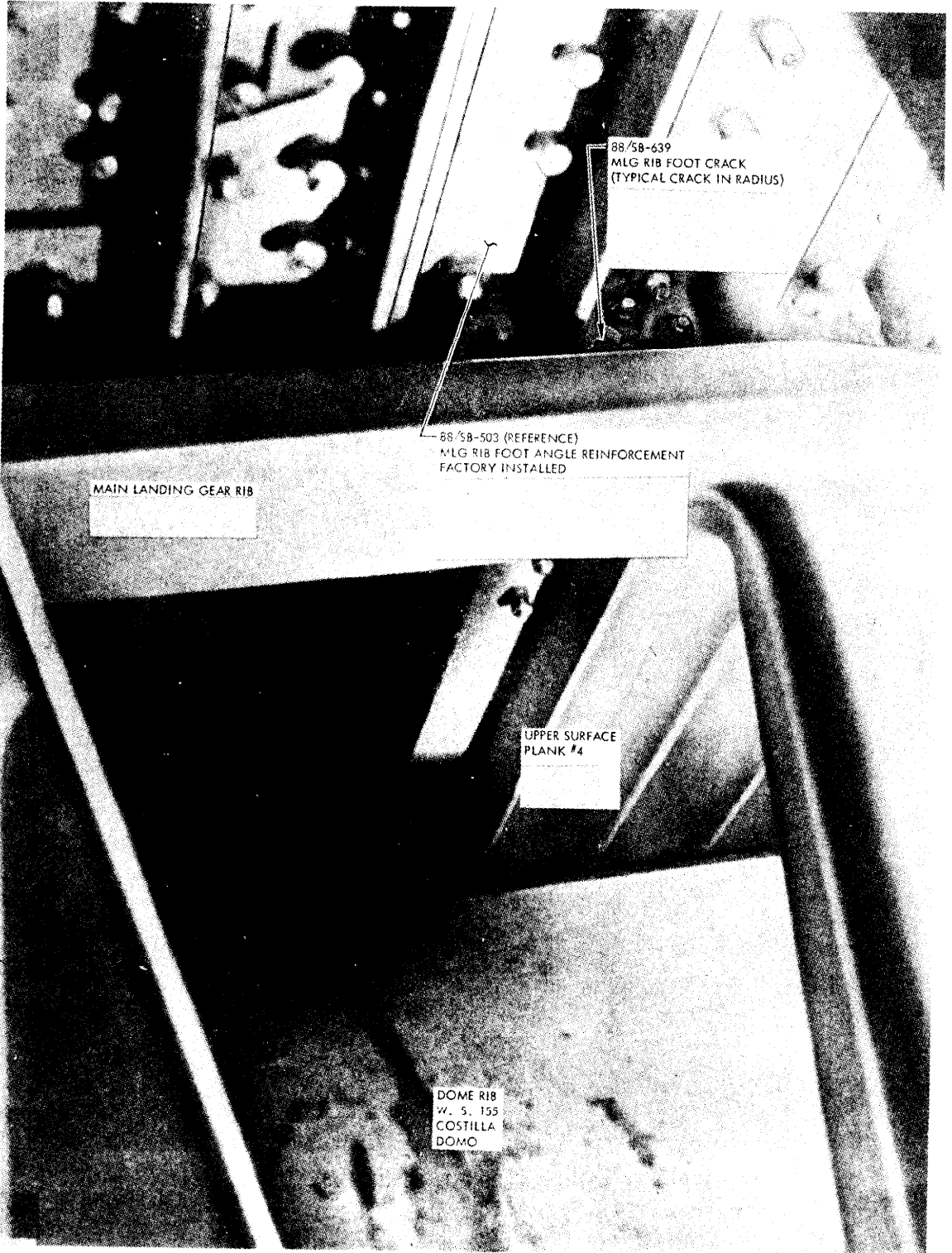


FIGURE F-27. WING INTERNAL STRUCTURE
Reference W-19, page 18

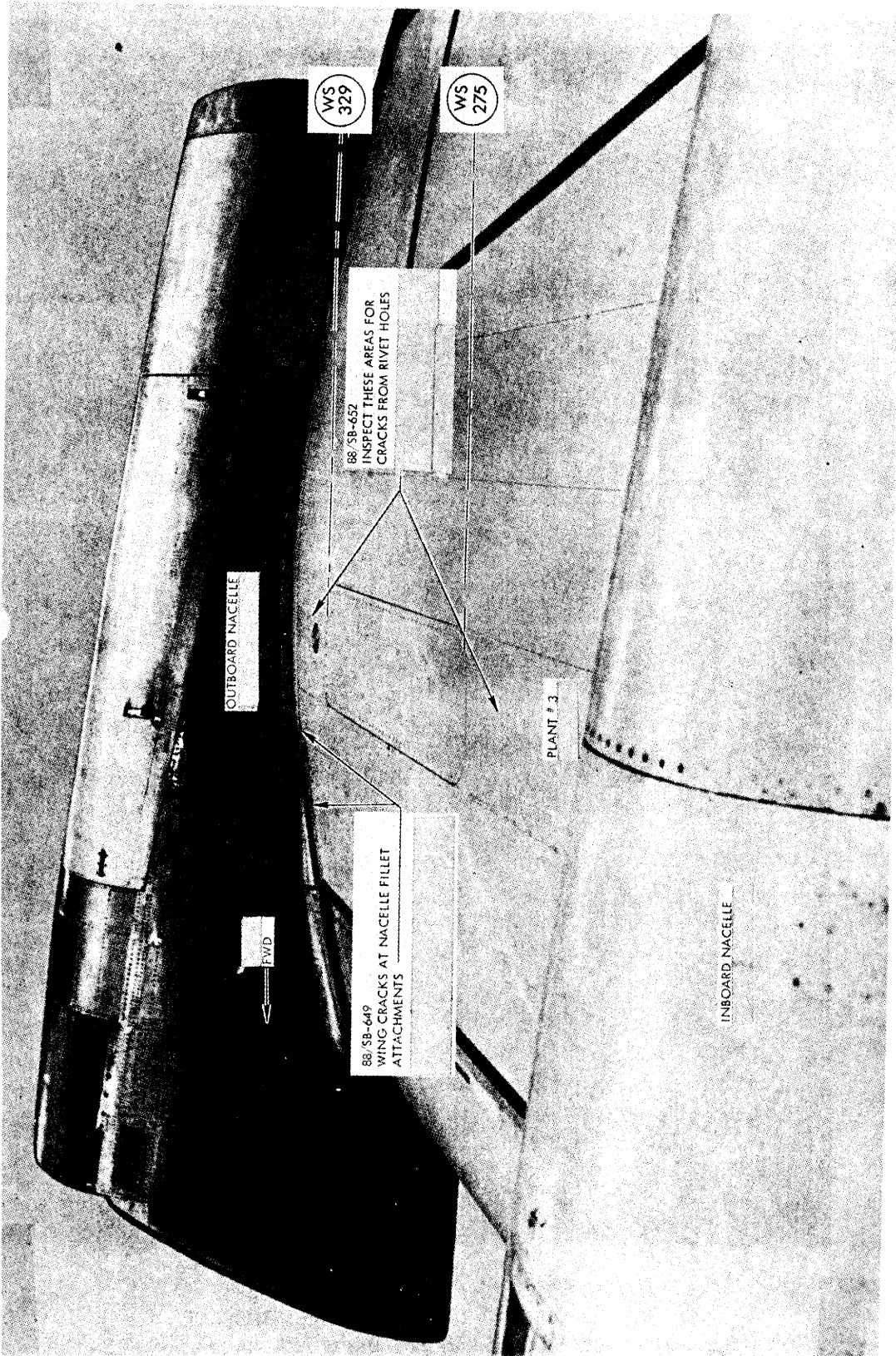


FIGURE F-28. WING UPPER SURFACE
Reference W-20, page 20
W-21, page 21

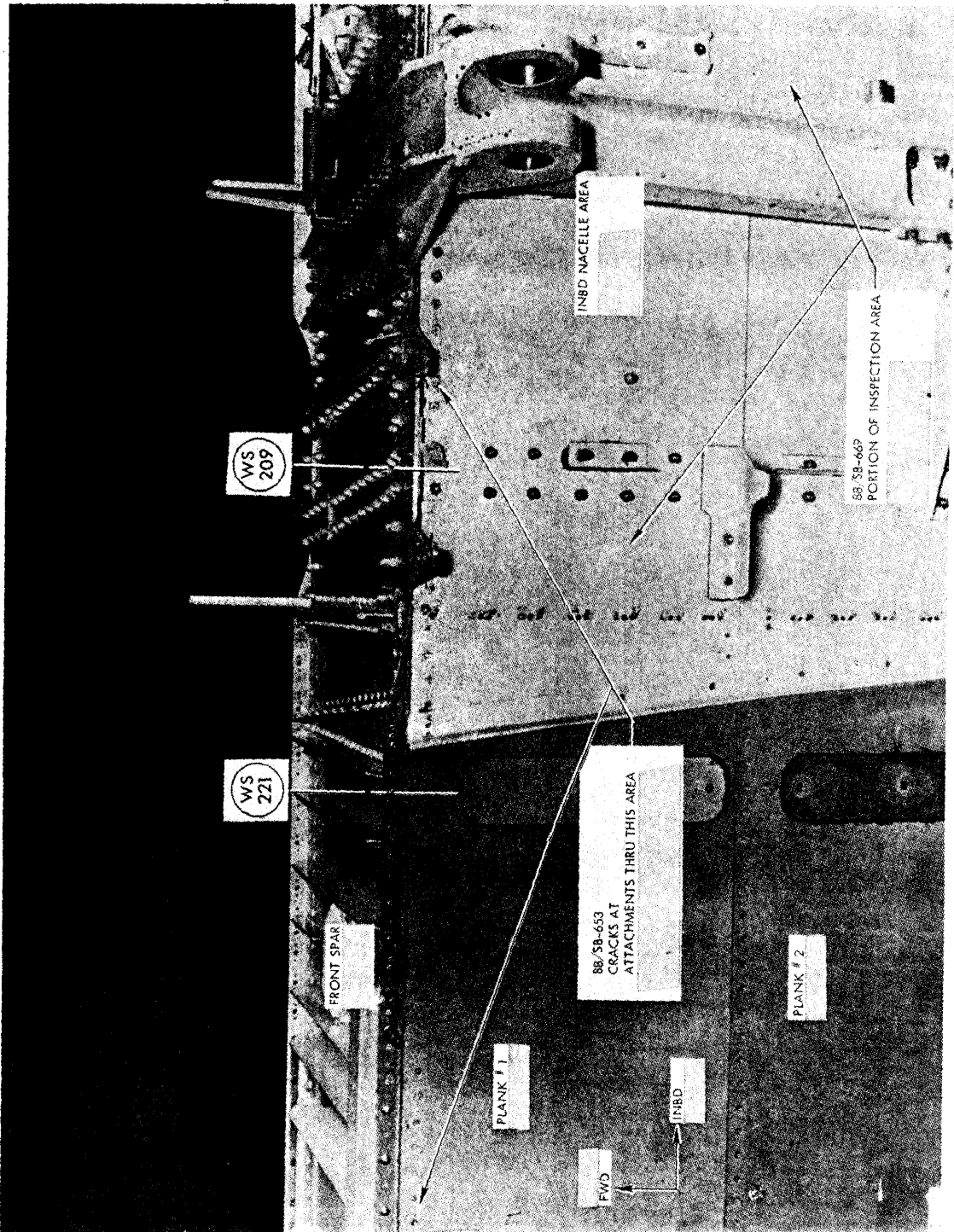


FIGURE F-29. WING LOWER SURFACE
Reference W-22, page 20
W-26, page 24

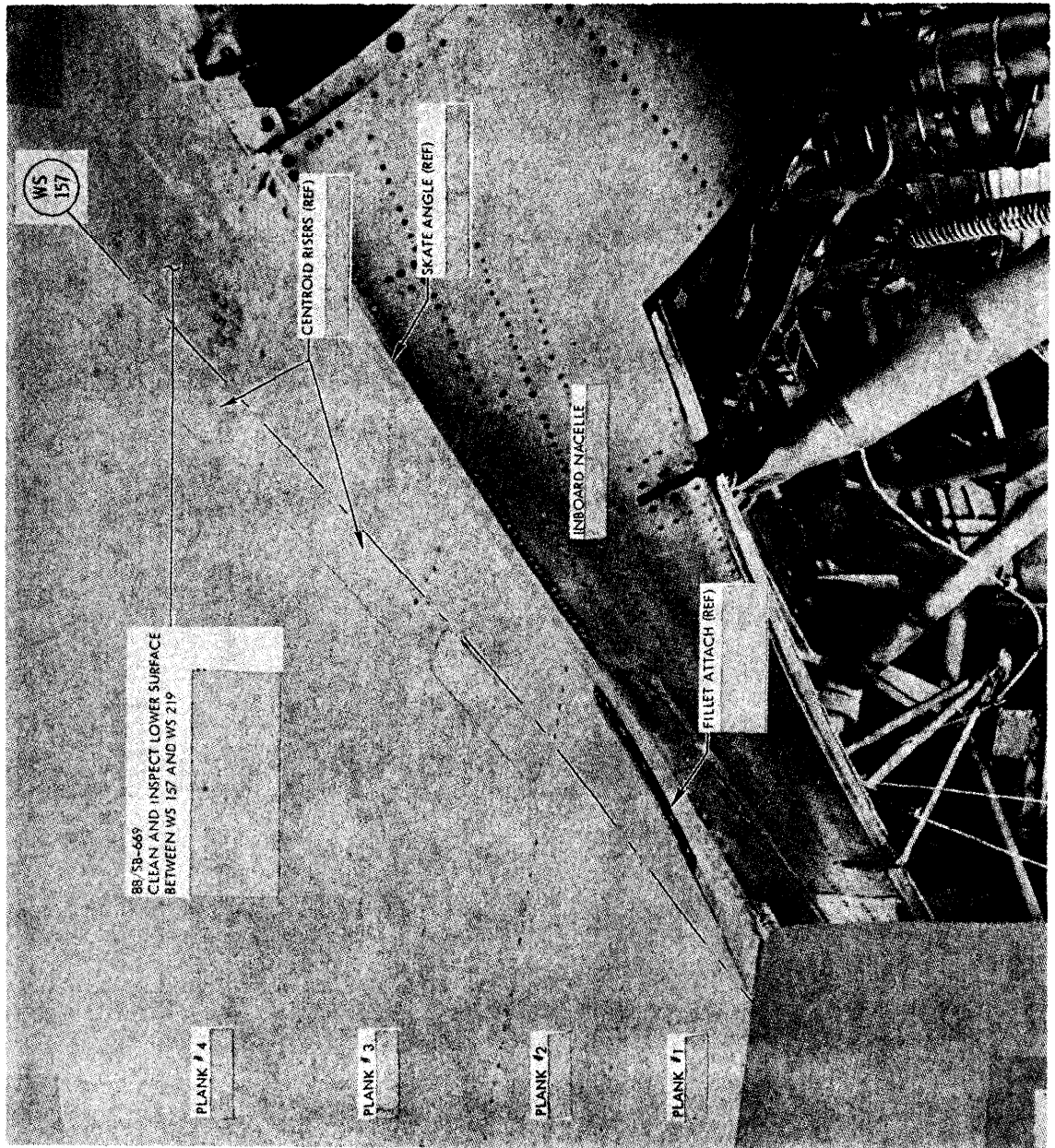


FIGURE F-30. WING LOWER SURFACE
Reference W-26, page 24

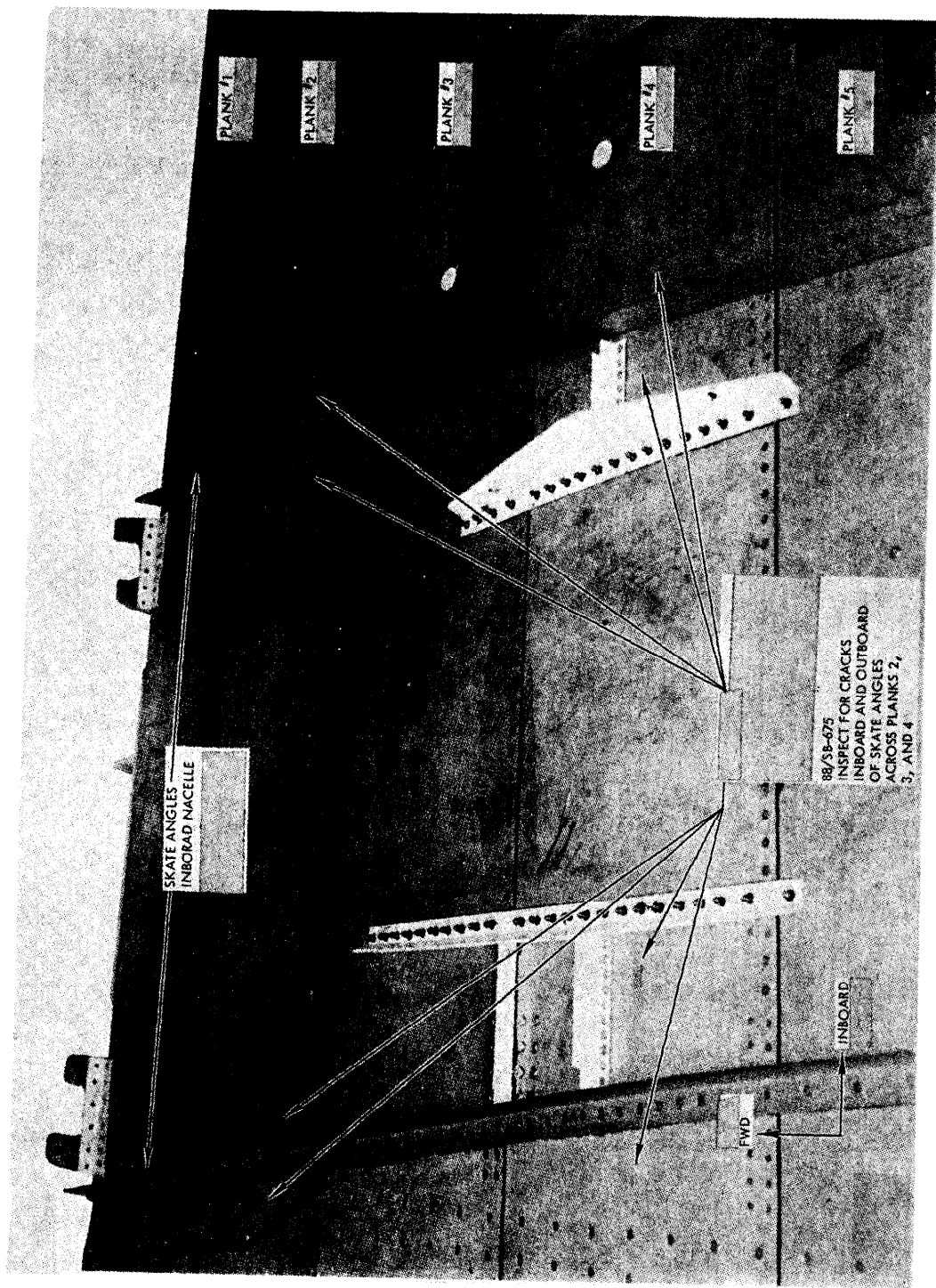


FIGURE F-31. WING UPPER SURFACE
Reference W-28, page 24

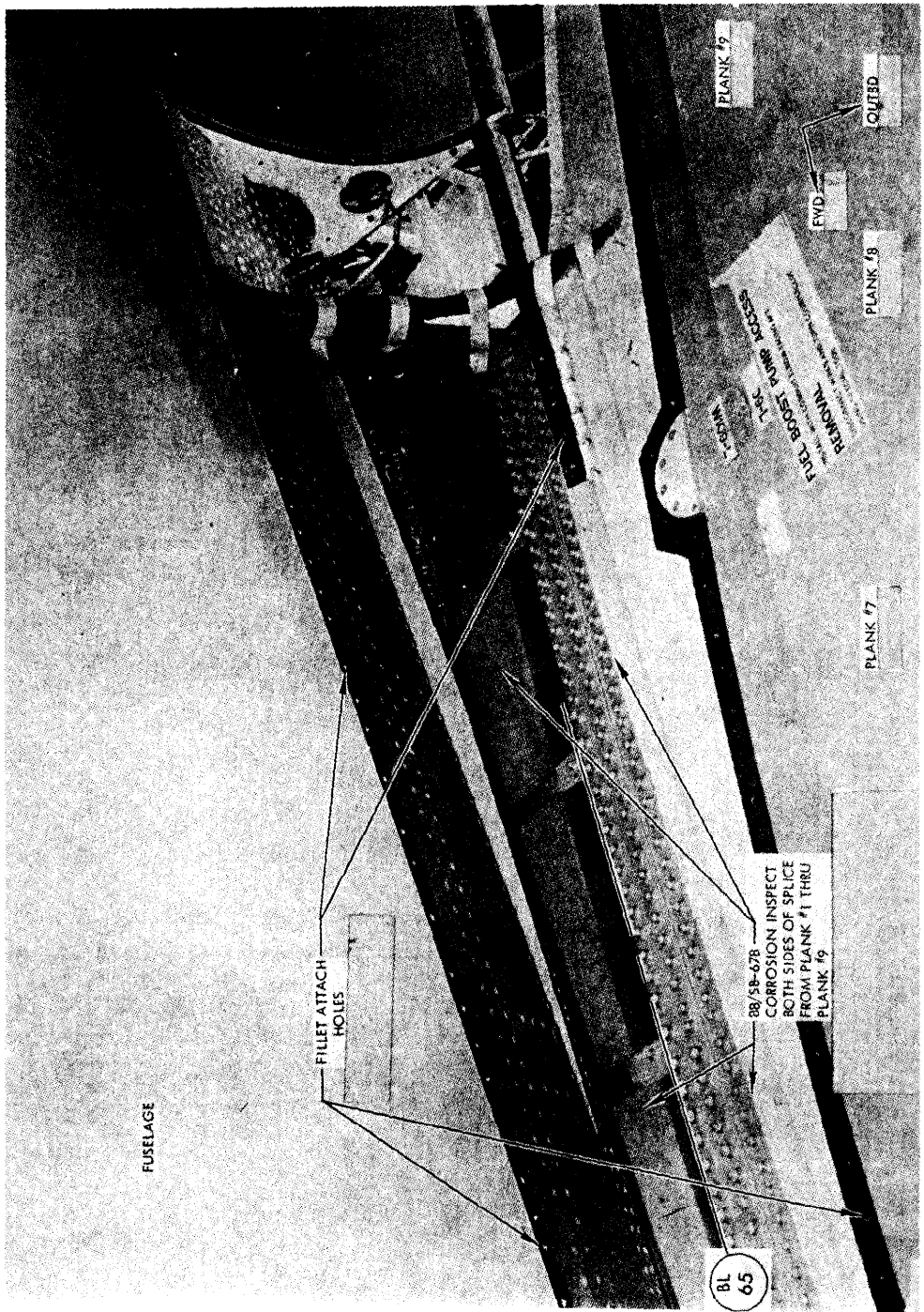


FIGURE F-32. WING UPPER & LOWER SURFACE
Reference W-30, page 26