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ADVISORY CIRCULAR

DEPARTMENT OF TRANSPORTATION
FEDERAL AVIATION ADMINISTRATION

SUBJECT: MAINTENANCE INSPECTION NOTES FOR FAIRCHILD HILLER F-27/FH-227 SERIES AIRCRAFT

1. PURPOSE. This advisory circular provides maintenance inspection notes which can be used for the maintenance support program for certain structural parts of Fairchild Hiller F-27/FH-227 series aircraft.

2. REFERENCES.

   a. Advisory Circular 20-9, Personal Aircraft Inspection Handbook.

   b. Advisory Circular 20-61, Nondestructive Testing Techniques For Aircraft.

   c. Advisory Circular 65-9, Airframe and Powerplant Mechanics General Handbook.

   d. Advisory Circular 43.13-1, Acceptable Methods, Techniques and Practices - Aircraft Inspection and Repairs.

3. DESCRIPTION. Maintenance inspection matters on the wing, fuselage, empennage, flight controls and landing gear are reviewed, supplementing information currently available.

4. HOW TO GET THIS PUBLICATION.

   a. Order additional copies of this publication from:

      Department of Transportation
      Federal Aviation Administration
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      Washington, D.C. 20591

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b. Identify this publication as: Advisory Circular No. 20-82 Maintenance Inspection Notes for Fairchild Hiller F-27/FH-227 Series Aircraft.

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Acting Director, Flight Standards Service

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CHAPTER 1. MAINTENANCE INSPECTION NOTES

1. PREFACE. 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 Fairchild Hiller F-27/FH-227 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, and landing gear structures. The information has been derived from service experience and maintenance publications. Also, there is a listing of selected maintenance difficulties reported during 1970 and 1971.

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 inspection 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 and service letters concerning the inspection, repair, and modification of Fairchild Hiller F-27/FH-227 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. Service letters may provide maintenance information and will

reference a service bulletin if the information published is serious enough to warrant additional action requiring engineering approval. 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 requirement of airworthiness directives issued under Part 39 of the Federal Aviation Regulations.

5. 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.

6. 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.

7. 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 which is often evidenced by oxide build-up on the surface.

8. ABBREVIATIONS USED IN THIS DOCUMENT.

AD	Airworthiness Directive
F/S	Fuselage Station
MLG	Main Landing Gear
NLG	Nose Landing Gear
P/N	Part Number
S/B	Service Bulletin
W/S	Wing Station
I/B	Inboard
O/B	Outboard
N/S	Nacelle Station
S/N	Serial Number

CHAPTER 2. WINGS

9. F-27/FH-227 AIRCRAFT MAINTENANCE INFORMATION. Following is a listing of significant maintenance difficulties that have been reported by air carriers. In addition, a number of check and inspection items are listed. This information may be useful in identifying structural inspection areas. Except where noted, wing structural references apply to both left and right wings.

   a. Center Wing.

      (1) Skin. Lower wing skin cracks have been detected at stringers No. 4 and No. 8 in area of stringer joggles near W/S 68.

      (2) Skin. Cracks have been found in the lower wing skin O/B of the center wing to fuselage fitting at the rear spar near W/S 24.

      (3) Rib. Cracks have occurred in lower rib flange to stringer attachments at stringers No. 1 through No. 11 near W/S 79.

      (4) Stringers. Lower stringers No. 1 through No. 11 have been found cracked on both sides of rib at W/S 20.

      (5) Stringers. Lower stringers No. 4 and No. 6 have been found cracked on both sides of rib at W/S zero.

      (6) Skin and Stringers. Lower wing skin and stringers No. 5, No. 6, and No. 7 have been found cracked near W/S 64.

      (7) Skin. Lower wing skin and external finger strip splice cracks have occurred between the front and rear spar near W/S 55.

      (8) Stringer. Cracks have been found in stringer No. 5 at the end of the angle splice near W/S 67.

      (9) Skin and Spar. Cracks have occurred in the lower wing skin and in horizontal leg of the front spar cap and splice strip, and the lower skin at the rear spar near W/S 37.

      (10) Access Doors. Lower skin access doors have been found cracked. These doors are located between W/S 80 and 100.

      (11) Spar Web. Verticle cracks have occurred in the front spar web at the lower spar cap just O/B of the stiffener near W/S 89.

      (12) Skin. Check for cracks in skin emanating from under the fuselage-to-wing attach fittings and extending forward and aft at W/S 20.

(13) Spars. Check for cracks in the radius of the lower connecting strip at the front and rear spar near W/S 24. Cracks in these areas will probably extend I/B then turn forward.

(14) Spar Webs. Check for vertical cracks in front and rear spar webs at the lower spar caps at W/S 22.

(15) Spar. Check for cracks in the rear spar and doubler near W/S Zero.

(16) Engine Mount Support. Cracks have occurred in engine mount upper tube P/N 27-503105-11, -31, -41 and 01-503105-11 or -31; lower tube P/N 27-503101-11, -41, -51, -61, -71, -81, -91, -101 or -111; and upper bracket P/N 27-110105-11, -12, -31, -32, -41, -42, -51, -52, -61, -71, -72, -81, or -82. (Ref. Fairchild Hiller S/B F-27 54-14 revision No. 2 dated February 1969, and FH-227 54-4 revision No. 1 dated February 1969)

* b. Outer Wing Panels. (See Appendix 1.) *

(1) Doors. Cracks have been found at the attach screw holes of No. 1 inspection door opening near W/S 195 and 205.

(2) Doors. Check for cracks at the attach screw holes of the No. 2 inspection door opening near W/S 240 and 250.

(3) Doors. Check for cracks at the attach screw holes of the No. 3 inspection door opening near W/S 292 and 302.

(4) Doors. Check for cracks at the attach screw holes of the No. 4 inspection door opening near W/S 335 and 345.

(5) Door and Stringers. Check for cracks in lower skin, access door land, and stringers, at W/S 194, 197, and 204.

CHAPTER 3. FUSELAGE

10. FH-227 AIRCRAFT MAINTENANCE INFORMATION. Following is a listing of significant maintenance difficulties that have been reported by air carriers. In addition, a number of check and inspection items are listed. This information may be useful in identifying structural inspection areas. Except where noted, fuselage structural references apply to both left and right sides of the fuselage.

    a. Windshield Post Fitting. Check windshield post attach fitting and aft side of bulkhead web at F/S 55 for cracks.

    b. Forward Bulkhead. Check front bulkhead web through nose wheel well in areas of fittings for evidence of cracks.

    c. Fuselage Tail Section. Cracks have been reported in the skin around the louvers of the aft fuselage tail section. (Ref. Fairchild Hiller S/B FS-227 53-9 dated 8 June 1967.)

    d. Top Fuselage - Cables. Operators have reported a chafing condition between control cables and fuel crossfeed-water methanol lines at F/S 298. (Ref. Fairchild Hiller S/B FH-227 53-8 revision No. 2 dated 23 October 1969.) Applies to aircraft serial numbers 501 through 549.

    e. Lower Fuselage Skin. Cracks have been found in the lower fuselage skin between stringers No. 7 and No. 8 left, and stringers No. 44 and No. 45 right, from F/S 198 to 510. (Ref. Fairchild Hiller S/B F-27 53-48 dated 21 March 1967.) Aircraft with serial numbers 20 and above were modified by the manufacturer prior to delivery.

CHAPTER 4. FLIGHT CONTROLS

11. F-27/FH-227 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 otherwise indicated, flight control structural references apply to left and right sides. For details and inspection requirements, each item references pertinent service bulletins, and/or service letters.

a. Rudder and Elevator Tension Regulator. Loose rivets have been found in the rudder and elevator tension regulator. P/N 0501101-0 or 051101-1. (Ref. Fairchild Hiller S/B F-27 27-16 revision No. 2 dated 20 April 1960). Applies to aircraft with serial numbers 1 through 64.

b. Wing Flap Jackscrew Gimbal Nuts. Failure of the gimbal nuts, P/N 27-165012-3, -4, -5, -6, and 27-175023-3, -4, have occurred which render the gimbal nuts unsafe for further use. (Ref. Fairchild Hiller S/B F-27 27-18A dated 27 October 1959 and 27-28 revision No. 3 dated 22 August 1961).

c. Aileron Control Sectors. Corrosion has been found on magnesium aileron control sectors, P/N 27-727207-21, 27-727208-21, 27-727209-21, 27-727300-21, and 27-727381-21, with two or more years' time since installation . (Ref. Fairchild Hiller Service Letters F-27 306 dated 22 August 1963, 307 dated 17 September 1963, and 311 dated 12 April 1965).

d. Horizontal Stabilizer - Upper and Lower Surfaces. Cracks have been found in the skin, stringers, and rib caps. (Ref. Fairchild Hiller S/B F-27 55-6 revision No. 7 dated 1 May 1970, 55-7 dated 20 July and FH-227 55-9 dated 7 July 1969).

e. Horizontal Stabilizer Front Spar. Operators have reported cracks in the front spar web and the upper and lower spar caps between stabilizer stations 95.45 and 125.98. (Ref. Fairchild Hiller S/B F-27 55-7 dated 20 July 1965.

f. Rudder Horn. Cracks have been detected in the rudder horn, P/N 27-243018-11.

g. Horizontal Stabilizer Upper I/B Surface. Cracks have been found in the upper skin between stabilizer stations 0 to 30 from the front spar aft to stringer No. 10. (Ref. Fairchild Hiller S/B FH-227 55-1 revision No. 1 dated 17 November 1966, and F-27 55-11 revision No. 1 dated 17 November 1966).

h. Horizontal Stabilizer Rear Spar Fittings. Operators reported cracks in the rear spar fittings, P/N 27-210501-3, -4, -5, -6. (Ref. Fairchild Hiller S/B FH-227 55-17 dated 10 February 1969).

i. Rudder Skin, Stiffeners, and Rear Spar. Cracks have been found in the rudder skin and stiffeners and cracks may occur in the rear spar flange. Skin should be inspected from rudder stations 10 to 71 between the center and rear spars. The stiffeners at rudder stations 16, 28, 40, 52, and 64 between the center and rear spars should also be checked for cracks. (Ref. Fairchild Hiller S/B's FH-227 27-4 revision No. 1 and F-27 27-42 revision No. 1, both dated 28 February 1967).

j. Elevator Trim Tab. Failures of elevator trim tab, P/N 01-223008-1, have been reported on at least two occasions. (Ref. Fairchild Hiller Alert S/B FH-227 27-17A dated 8 January 1968).

CHAPTER 5. LANDING GEAR

12. F-27/FH-227 AIRCRAFT MAINTENANCE INFORMATION. The following is a listing of significant maintenance difficulties reported by air carriers. This information may be useful in identifying structural and other inspection areas. Except where noted, the items listed refer to left and right sides. For details and inspection requirements, each item references pertinent service bulletins, and/or service letters.

a. Main Landing Gear Drag Strut Bolts. Several failures of drag strut attach bolts, P/N 9017Y11 and 9027X7, have occurred on aircraft that have accumulated 300 or more landings. (Ref. Fairchild Hiller S/B F-27 32-44 revision No. 2 dated 19 January 1962).

b. Main Landing Gear Outer Cylinder Torque Link Attach Lugs. Failures of attach lugs, to which upper torque link, P/N C9027Y3, is attached, have occurred on aircraft that have accumulated 8000 or more landings. (Ref. Fairchild Hiller S/B F-27 32-41A dated 5 April 1961, Dowty Service Bulletins 32-11 dated August 1961, revised December 1962; and 32-15 dated October 1961).

c. Main Landing Gear Drag Strut. Cracks have been detected in main landing gear drag strut assemblies, P/N 2-00259-002, with 500 hours or more time in service.

d. Nose Steering Actuator Mount Bolts. Failures of mounting bolts, P/N 244241 and 245804, in the NLG pivot bracket have been reported. (Ref. Walter Kidde Service Bulletin No. 143 dated October 1962)

e. Nose Gear Door Rods. Operators have reported binding of the nose gear door actuating swivel rods. Aircraft with serial numbers 251 and later have been modified by the manufacturer to improve lubrication. (Ref. Fairchild Hiller S/B FH-227 32-3 dated 20 December 1966).

f. Unselected Gear Retraction. Reports of unselected landing gear retraction on the ground resulted in a change of wiring in the landing gear system. The change was incorporated during the manufacture of aircraft with serial numbers 541 and later. (Ref. Fairchild Hiller S/B FH-227 32-5 dated 13 March 1967).

CHAPTER 6. NACELLES

13. F-27/FH-227 AIRCRAFT MAINTENANCE INFORMATION. Following is a listing of significant maintenance difficulties that have been reported by air carriers. In addition, a number of check and inspection items are listed. This information may be useful in identifying structural inspection areas. Except where noted, nacelle structural references apply to both left and right nacelles.

    a. Lower Connection Strips. Cracks have been detected in the lower connecting strips at cutout areas of N/S 124, 141, and 157.

    b. Nacelle General. Check entire area of center section interior O/B ends for cracks and skin stringers, front and rear spar, and any other evidence of structural irregularity between N/S 120 and 160.

    c. Stringers. Check upper center section stringers No. 2 through No. 10 for cracks or other evidence of structural irregularities.

    d. Access Doors. Check for cracks in all access doors and door areas.

    e. Premature Cable Wear. Operators have reported premature wear of engine, fuel shutoff, and crossfeed control cables caused by rubbing in fairleads. Applies to aircraft with serial numbers prior to 521. (Ref. Fairchild Hiller S/B FH-227 54-3 dated 25 April 1967.)

    f. Nacelle Aft Bulkhead. On aircraft with serial numbers prior to 522, inspecto for cracks in the rear bulkhead of the left nacelle adjacent to the AC voltage regulator shelf. (Ref. Fairchild Hiller S/B FH-227 54-7 dated 7 June 1967.)

CHAPTER 7. CORROSION-PRONE AREAS

14. 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.

15. EXHAUST TRAIL AREAS. Both jet and reciprocating engine exhaust deposits contain compounds that are very corrosive, and the structure in the path of exhaust gases 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.

16. 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.

17. BATTERY AREAS AND VENTS. Due to the highly corrosive nature of battery 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.

18. 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 can collect are potential trouble spots, as are personnel relief and waste disposal vents or openings on the exterior of the aircraft.

19. 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 and flying debris during takeoffs 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 of 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 touchup and judicious use of wheel covers.

20. 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.

21. 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 elecrolytic 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.

22. 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.

23. 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.

24. 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 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.

25. 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 nonscheduled component removals for further inspection.

26. 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.

27. 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 or the deterioration of the inner liner in fuel bladder cells. Fairchild Hiller Service Letters FH-227 28-2 dated 15 May 1966 and F-27 222 dated 24 June 1960 are related to this problem.

CHAPTER 8. MAINTENANCE INFORMATION

28. F-27/FH-227 AIRCRAFT MAINTENANCE INFORMATION. The following is a listing of significant maintenance difficulties that have been reported by air carriers as mechanical reliability reports from January 1970 through June 1971 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 routine inspection, found 1/4-inch crack, left wing at No. 1 tank plate. Crack started from nut plate rivet hole under rivet head, W/S 196 aft of No. 7 stringer. This area had been inspected by X-ray approximately 104 hours prior to discovery of crack but was not visible on X-ray.

(2) During X-ray inspection, found 1/4-inch to 1/2-inch cracks in stringers No. 2, No. 3, No. 4, No. 7 and No. 8, wing center section at W/S zero.

b. Fuselage.

(1) Routine inspection disclosed intergranular corrosion on cockpit floor between F/S 77 and 97. The damaged area was left and right of the center line.

(2) During routine inspection, found intergranular corrosion on the floor panel between F/S 576 and 588 at approximately the center line of the fuselage. The aircraft total time was 12,180 hours.

(3) Routine inspection revealed a 1/2-inch crack in skin and a 3/8-inch crack on the fuselage former flange at F/S 803, right-hand side at stringer No. 168. Total airframe time was 25,238 hours.

(4) Inspection disclosed a 3/8-inch skin crack and 3/4-inch fuselage former crack at F/S 834, right side at stringer No. 168. Total airframe time was 25,238 hours.

(5) Routine inspection disclosed fuselage former at F/S 404 had a 2-inch crack on the right side and two 1/2-inch cracks on the left side. Total airframe time was 29,125 hours.

(6) One report was received concerning loss in flight of a 15-inch by 30-inch section of the right wing-to-fuselage fiberglass fillet.

c. Flight Controls - Empennage.

(1) Operator reported finding cracks in stringers, ribs, and brackets in the vertical stabilizer VOR antenna mounting area at vertical stabilizer station 201.56. Total time on the aircraft concerned ranged from 7,798 hours to 9,888 hours.

(2) During routine overhaul inspection, a 5/8-inch crack from the bolt hole to the edge of the casting, P/N 27-233000-31, was found in the forward leg of the left rear vertical stabilizer attach casting. Total aircraft time was 14,704 hours.

(3) One operator conducted a fleet campaign and increased inspection frequency as a result of finding a 2-inch crack in the right elevator spar web at the O/B hinge bracket attachment at elevator station 156. (Ref. Fairchild S/B F-27 27-21 revision No. 3 dated 26 May 1962).

(4) During approach for landing, the crew reported a sharp jerk of the elevator controls. After landing, inspection revealed a hinge bracket broken out from the elevator spar. The bracket was P/N 27-220001-141. Elevator time since overhaul was 1,855 hours.

d. Landing Gear.

(1) Several operators reported finding cracked MLG drag strut end fittings; lower fitting, P/N 200259-302, and upper fitting, P/N 200259-611. Cracks originated at the retaining pin holes. Total time in service of end fittings ranged from 8,278 hours to 9,764 hours.

(2) The crew reported a loud bang from the nose wheel well after takeoff when gear retracted and nose gear position indicator showed nose gear down. Subsequent inspection disclosed link rod to NLG door lock was broken.

(3) During routine inspection, six loose rivets were found at MLG support angles for retract cylinder attach fittings, P/N 01-502033-41.

(4) The crew reported vibration in the nose section. Ground personnel verified the nose gear was up but one nose gear door was open. Inspection, after landing, revealed the left door attach arm, P/N 27-422013-5, was broken.

e. Miscellaneous.

(1) One operator experienced a shattering of the left outer windshield panel during cruise. The total time since new was 7,317 hours.

(2) One report of R/H cockpit sliding window shattering during flight was received. Total time in service was 20,782 hours.

(3) An engine gearbox failure resulted in an in-flight shutdown and an unscheduled landing. Subsequent investigation disclosed that the input bevel pinion splines, P/N 601013-329, and blower spur wheel, P/N 601013-284, had failed. Gearbox time since overhaul was 3,363 hours.

CHAPTER 9. FH-227 AIRCRAFT WINDSHIELD FRAME

29. MAGNETIZATION CHARACTERISTICS. The windshield frame on the FH-227 is made of ferrous metal; thus the windshield frame becomes magnetized if the aircraft has an electrical discharge during an electrical storm. This, in turn, causes erroneous readings on the standby magnetic compass. The windshield, particularly the center post, should be checked periodically for being magnetized. The windshield can be degaussed.

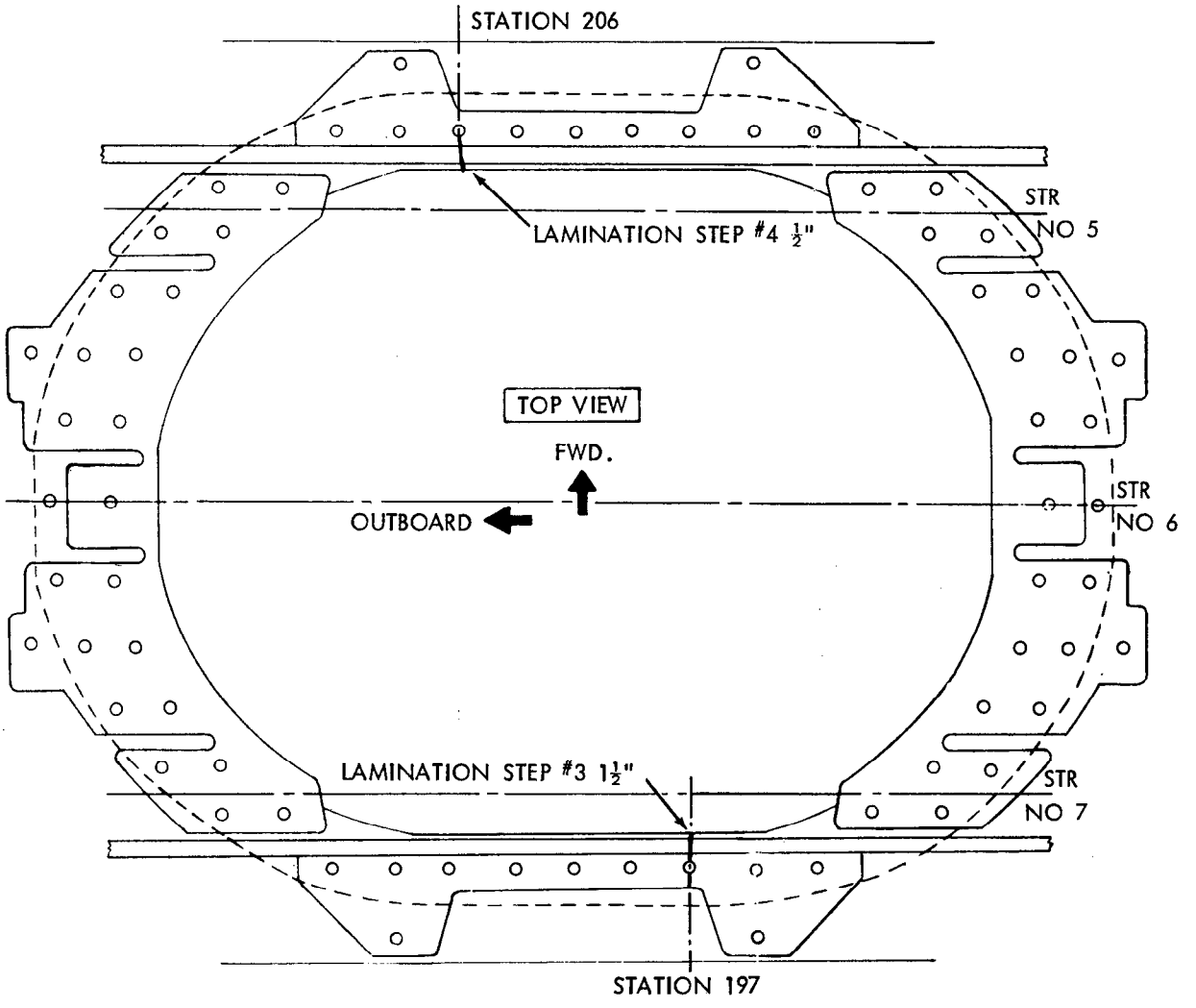

FIGURE 1. CRACKS IN WING FUEL ACCESS DOOR LAND AT WS 197 AND WS 206.

On a routine inspection of an FH-227 series aircraft, two cracks, ½-inch long each, were found in the No. 1 fuel access door land screw-holes (Ref. Fairchild Hiller Service Bulletin FH 227-51-1). Total aircraft time 12,830 hours. Time since inspection 150 hours. Time since last X-ray 465 hours.

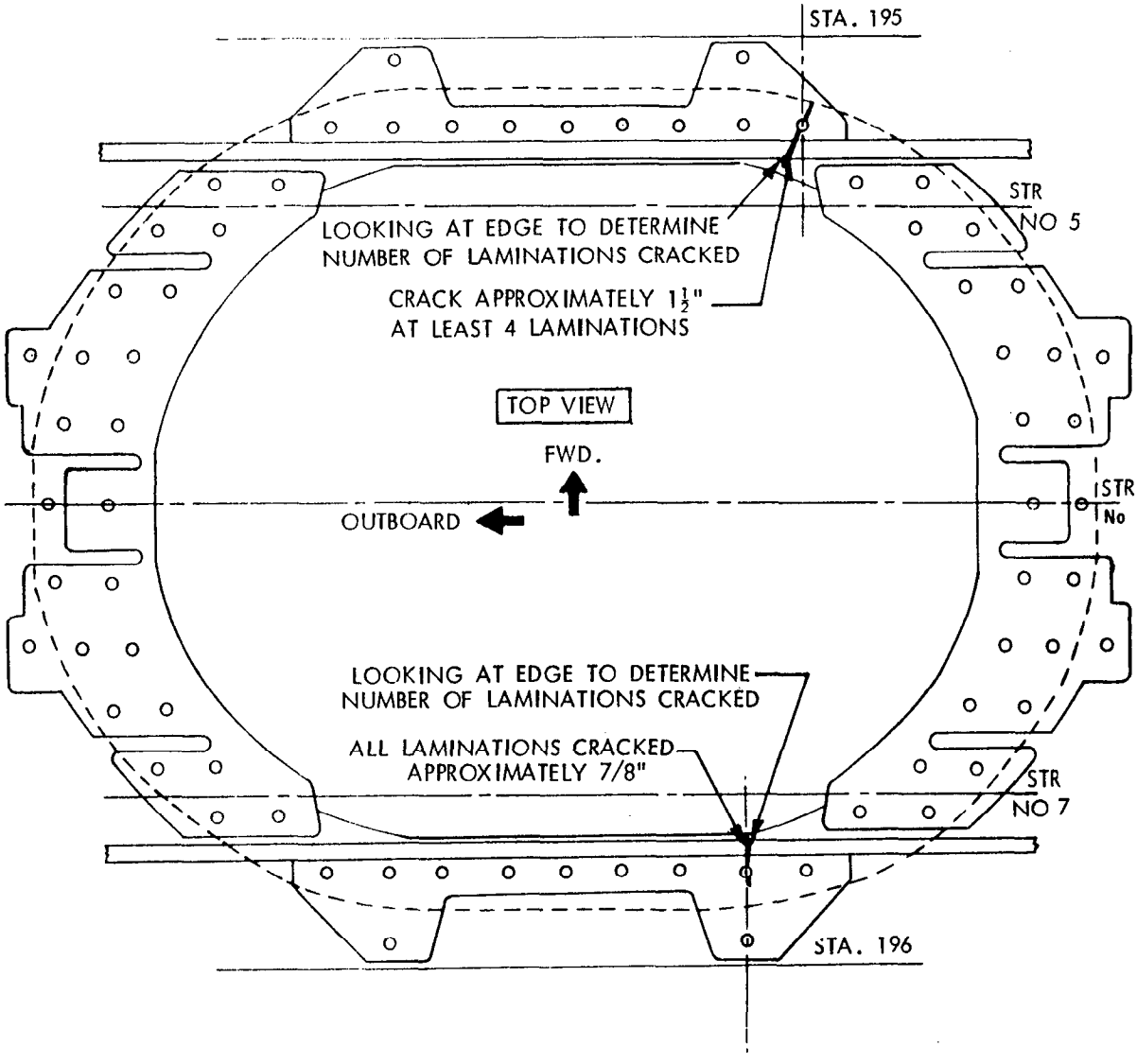

FIGURE 2. CRACKS IN WING FUEL ACCESS DOOR LAND AT WS 195 AND WS 196.

On a routine inspection of an FH-227 series aircraft, two cracks, 1/2-inch and 7/8-inch long, were found in the left outer wing panel at the screw-holes in the No. 1 fuel access door land. (Ref. Fairchild Hiller Service Bulletin FH-227-51-1). Total aircraft time 12,257 hours. Time since inspection 132 hours. Time since last X-ray 1,143 hours.

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MAINTENANCE INSPECTION NOTES FOR FAIRCHILD HILLER F-27/FH-227 SERIES AIRCRAFT

DEPARTMENT OF TRANSPORTATION
FEDERAL AVIATION ADMINISTRATION

Initiated by: AFS-230