CHAPTER 5. INSPECTION REQUIREMENTS

500. GENERAL. Except for special requirements in trouble areas, inspection for corrosion should be a part of routine maintenance inspections; i.e., daily or preflight. Overemphasizing a particular corrosion problem when it is discovered and forgetting about corrosion until the next crisis is an unsafe, costly, and troublesome practice. Inspection for corrosion is a continuing requirement and should be accomplished on a daily basis. If corrosion control is assigned to a special crew or group, maintenance checks should be scheduled in such a way that these crews may accomplish their inspections and necessary rework while access plates are removed and components are disconnected or out of the way.

a. Most manufacturers' handbooks of inspection requirements are complete enough to cover all parts of the aircraft or engine, and no part or area of the aircraft should go unchecked. Use these handbooks as a general guide when an area is to be inspected for corrosion.

b. Trouble areas, however, are a different matter, and experience shows that certain combinations of conditions result in corrosion in spite of routine inspection requirements. These trouble areas may be peculiar to particular aircraft models, but similar conditions are usually found on most aircraft.

c. The flight routes and bases of operation will expose some airplanes to more corrosive conditions than others. The operational environment of an aircraft may be categorized as mild, moderate, or severe, with respect to the corrosion severity of the operational environment. The corrosion severity of the operational environments around the world are identified in Figure 4-15 through Figure 4-20. The corrosion severity of any particular area may be increased by many factors including: airborne industrial pollutants, chemicals used on runways and taxiways to prevent ice formation, humidity, temperatures, prevailing winds from corrosive environment, etc.

501. FREQUENCY OF INSPECTIONS. In addition to the routine maintenance inspections, the following special requirements should be observed:

a. Aircraft operating in a severe environment should be inspected every 15 days.

b. Aircraft operating in a moderate environment should be inspected every 45 days.

c. Aircraft operating in a mild environment should be inspected every 90 days.

d. The aircraft should be washed prior to any inspection for corrosion.

e. Checks should be performed by a crew familiar with corrosion problems and the nature of their treatment.

f. Operators of low utilization aircraft should develop a corrosion inspection and repair program based on calendar time rather than flight hours. Due to the uncertainties that may be encountered in various operating environments, adjustments to the calendar time inspection interval should be made after analysis of corrosion inspection findings.

502. RECOMMENDED DEPTH OF INSPECTION. Generally speaking, the applicability of inspection requirements provides a ready means to insure adequate inspection of all compartments and interior aircraft cavities. When such general requirements are observed, along with a periodic check of the list of common trouble areas, adequate maintenance should be assured for most operating conditions. To assist in assuring complete coverage, the following summary is included:

a. Daily and preflight inspection. Check engine compartment gaps, seams, and faying surfaces in the exterior skin. Check all areas which do not require removal of fasteners, panels, etc., such as bilge areas, wheel and wheel well areas, battery compartments, fuel cell and cavity drains, engine frontal areas, including all intake vents, and engine exhaust areas.

b. Indepth inspections. In addition to the more common trouble spots that are readily available for inspection, remove screw-attached panels, access plates, and removable skin sections as necessary to thoroughly inspect the internal cavities. Inspection should also include removal of questionable heavy internal preservative coatings, at least on a spot-check basis. Inspect the interior of the aircraft in corrosion prone areas such as around lavatories, galleys, under floors, baggage compartments, etc. (see Figure 5-1).

c. Corrosion inspections should be accomplished at each annual inspection or other scheduled indepth inspections in which areas of the aircraft not normally accessible will be available for corrosion inspection.

d. Corrosion preventive compounds such as LPS3, Dinol AV5, or equivalent products and later advanced developments of such compounds may be used to effectively reduce the occurrence of corrosion. Results of corrosion inspections should be reviewed to help establish the effectiveness of corrosion preventive compounds and determine the reapplication interval of them.

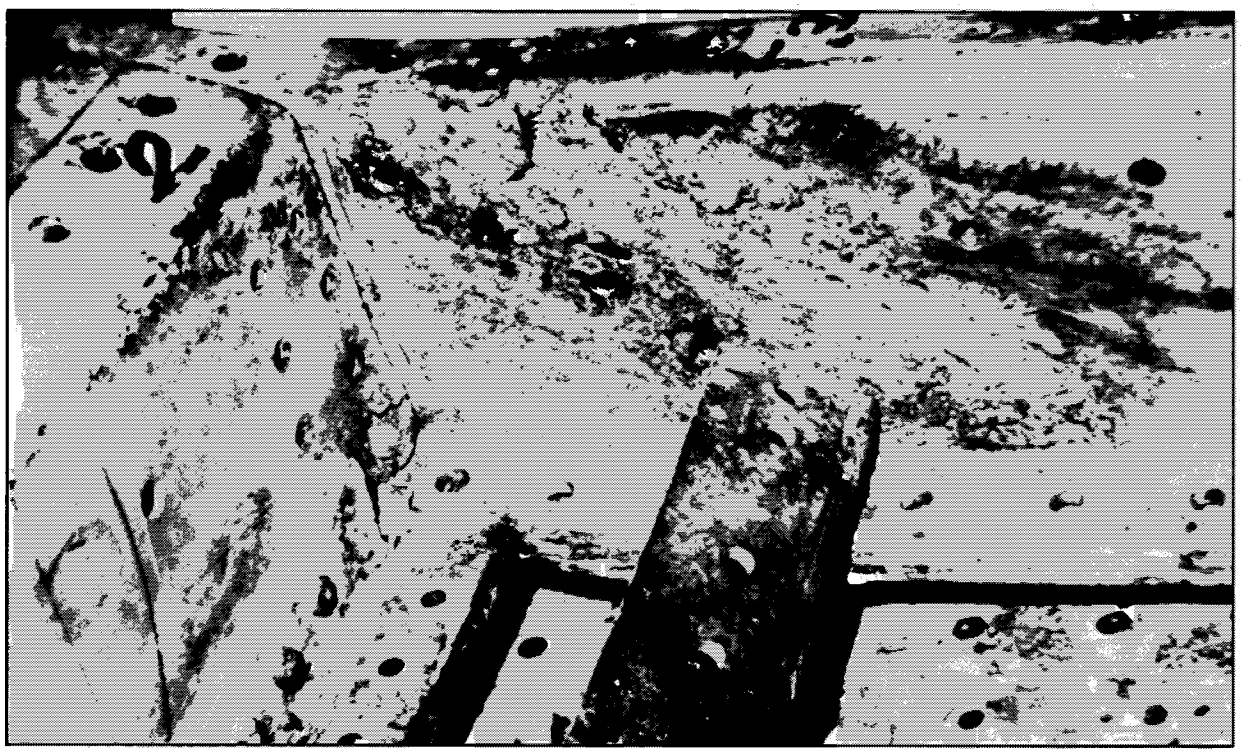

FIGURE 5-1. CORROSION FOUND AFTER REMOVING CARGO DOOR THRESHOLD COVERS

503. PRIMARY APPROACH. The primary approach to corrosion detection is corrosion inspections on a regularly scheduled basis. Early detection and treatment reduce costs, out of service time, and the possibility of flight or flight related incidents. All corrosion inspections should start with a thorough cleaning of the area to be inspected. A general visual inspection of the area follows using a flashlight, inspection mirror, and a 5-10x magnifying glass. The general inspection should look for obvious defects and suspected areas. A detailed inspection of damage or suspected areas found during the general inspection follows. The detailed inspection can be one or more of the following.

504. NONDESTRUCTIVE INSPECTION (NDI).

a. Visual Inspection. Visual inspection is the most widely used technique and is an effective method for the detection and evaluation of corrosion. Visual inspection employs the eyes to look directly at an aircraft surface, or at a low angle of incidence to detect corrosion. Using the sense of touch of the hand is also an effective inspection method for the detection of hidden well developed corrosion. Other tools used during the visual inspection are mirrors, borescopes, optical micrometers, and depth gauges. The following shows the type of corrosion damage detectable using the visual inspection method: Figures 5-2 and 5-3 show chipped, missing, and lifted paint;

Figure 5-4 shows dished and popped rivets; Figure 5-5 shows skin bulges or lifted surfaces; Figures 5-6 and 5-7 show cracks; and Figures 5-8 and 5-9 show corrosion products.

(1) The indications of corrosive attack can take several forms depending on the type of metal and the length of time the corrosion has had to develop. Corrosion deposits on aluminum and magnesium are generally a white powder, while ferrous metals vary from red to dark reddish brown stains.

(2) Sometimes the inspection areas are obscured by structural members, equipment installations, or for some other reason are awkward to check visually. Adequate access for inspection must be obtained by removing access panels and adjacent equipment, cleaning the area as necessary, and removing loose or cracked sealants and paints. Mirrors, borescopes, and fiber optics are useful in providing the means of observing obscure areas. Figures 5-10 through 5-18 depict some of these conditions.

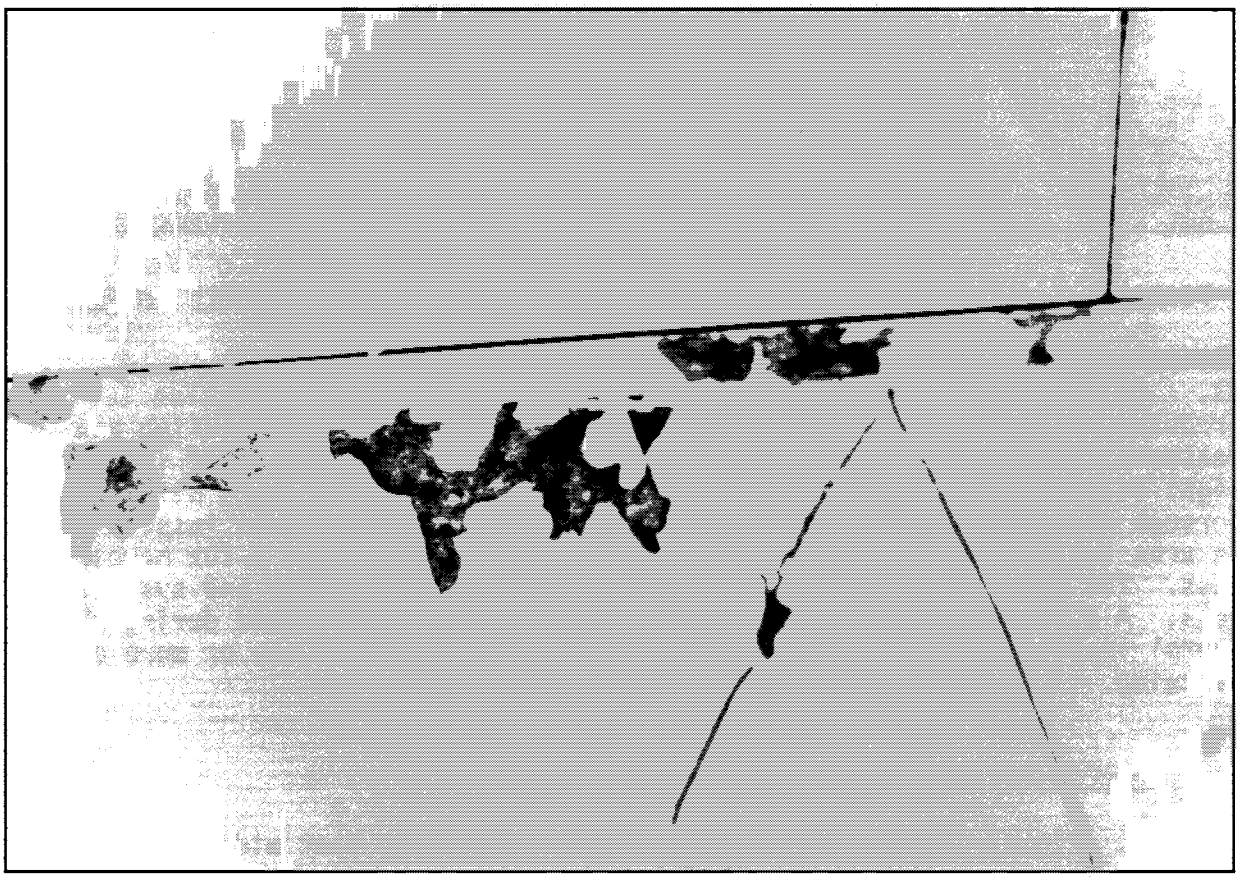

FIGURE 5-2. CORROSION UNDER CHIPPED AND LOOSE PAINT ON WING SKIN

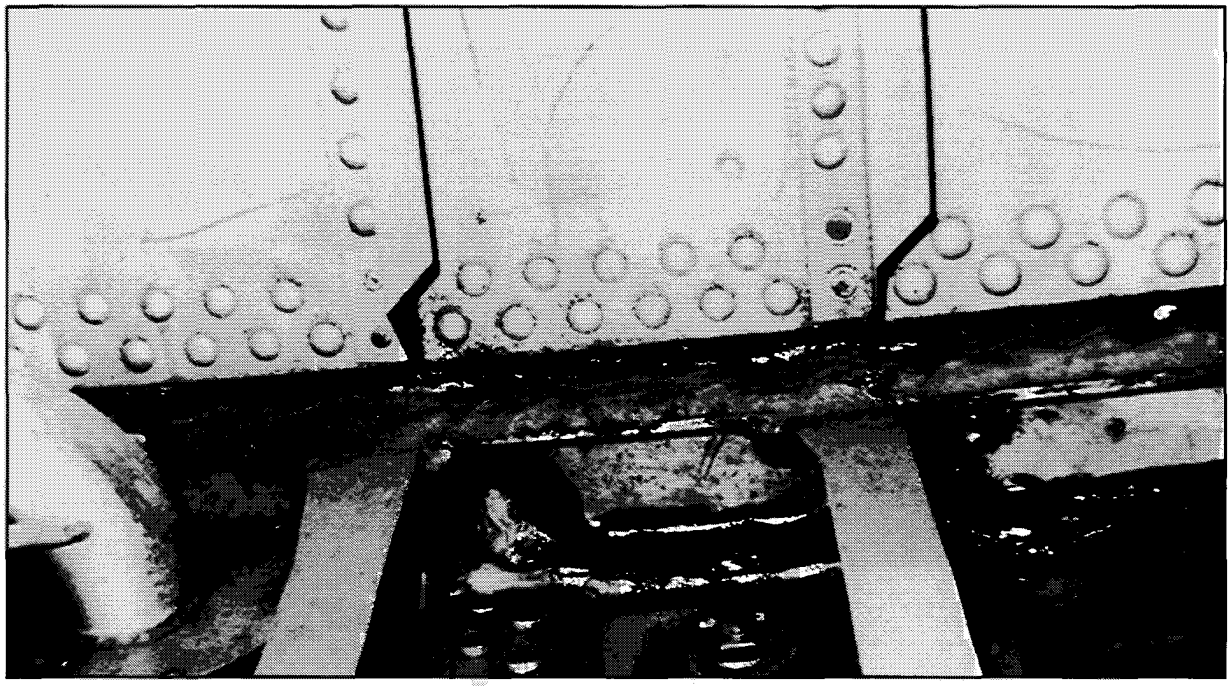

FIGURE 5-3. CORROSION INDICATED BY BLISTERING OF PAINT IN FUEL CELL

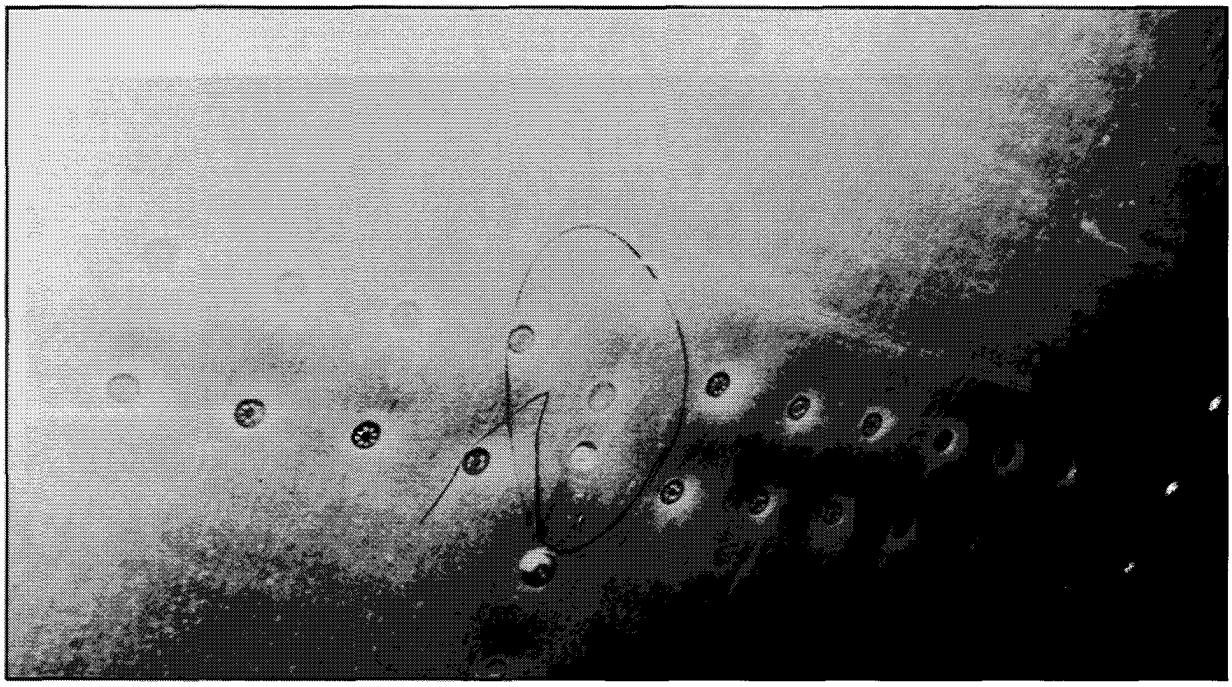

FIGURE 5-4. POPPED RIVET HEADS RESULTING FROM CORROSION PRODUCTS

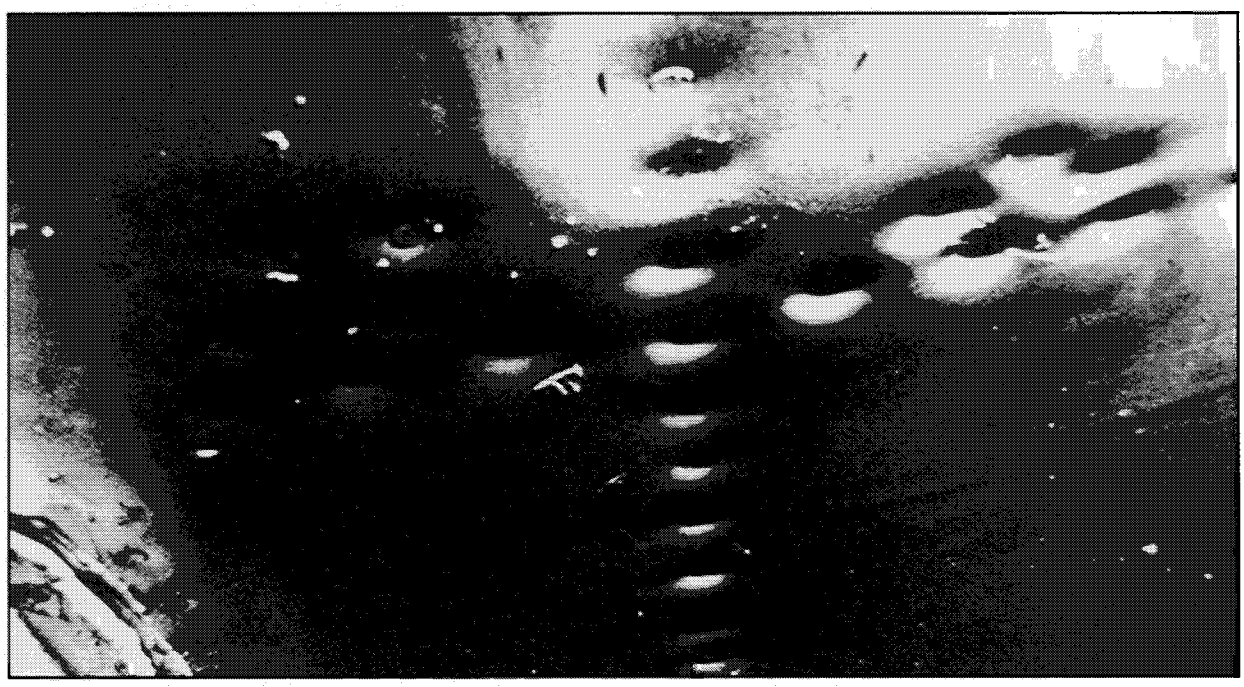

FIGURE 5-5. SKIN BULGING AROUND FASTENERS CAUSED BY PRESSURE FROM CORROSION PRODUCTS

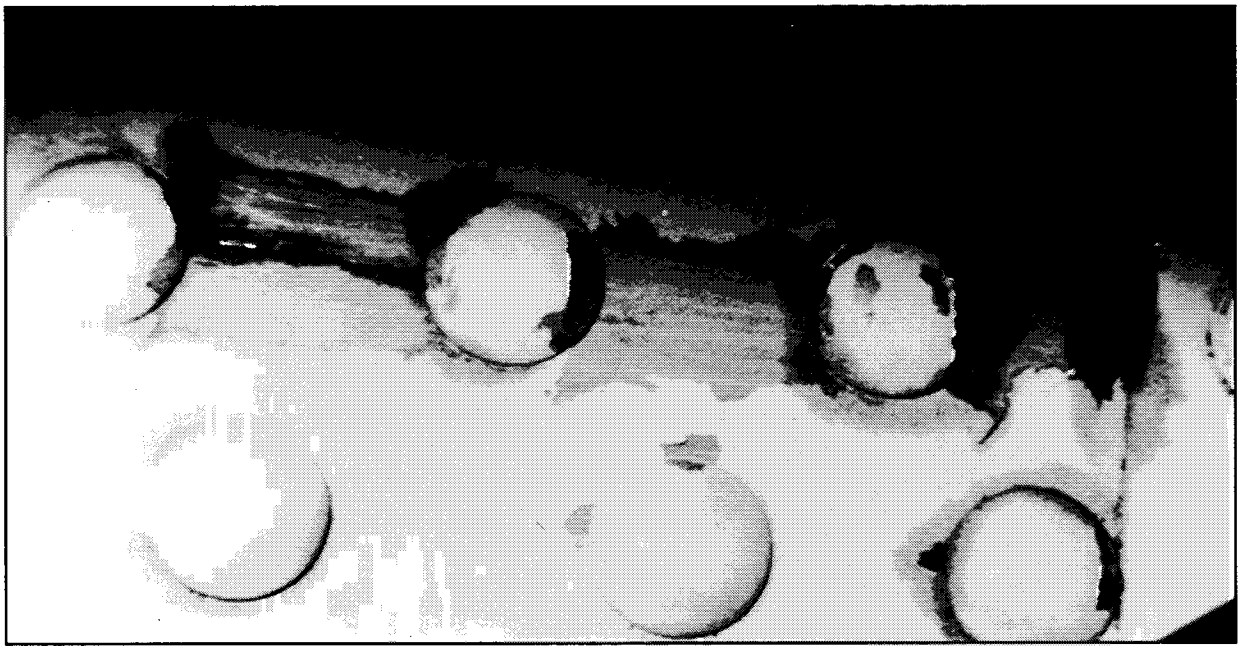

FIGURE 5-6. CORROSION CRACKING BETWEEN FASTENERS ON A WING SPAR

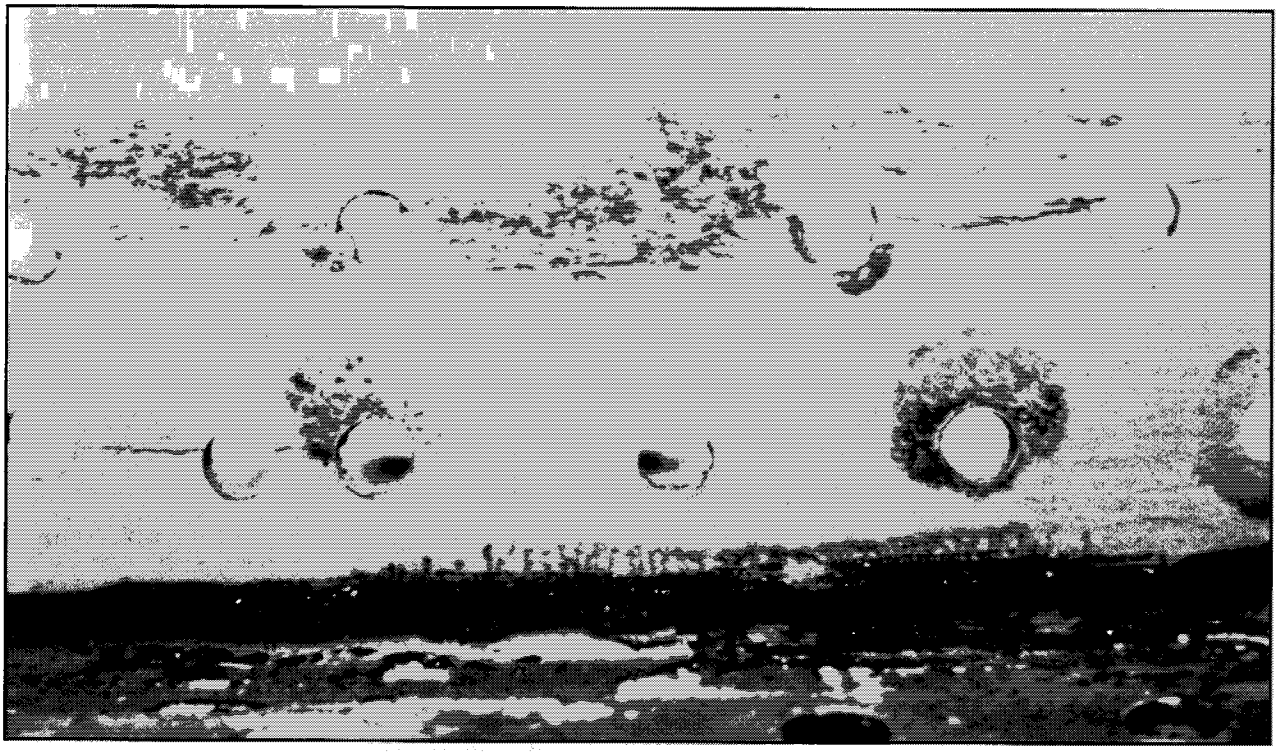

FIGURE 5-7. FAYING SURFACE CORROSION ON WING SPAR CHORD WITH CORROSION CRACKING ALSO VISIBLE

FIGURE 5-8. SEVERE CROWN STRINGER CORROSION