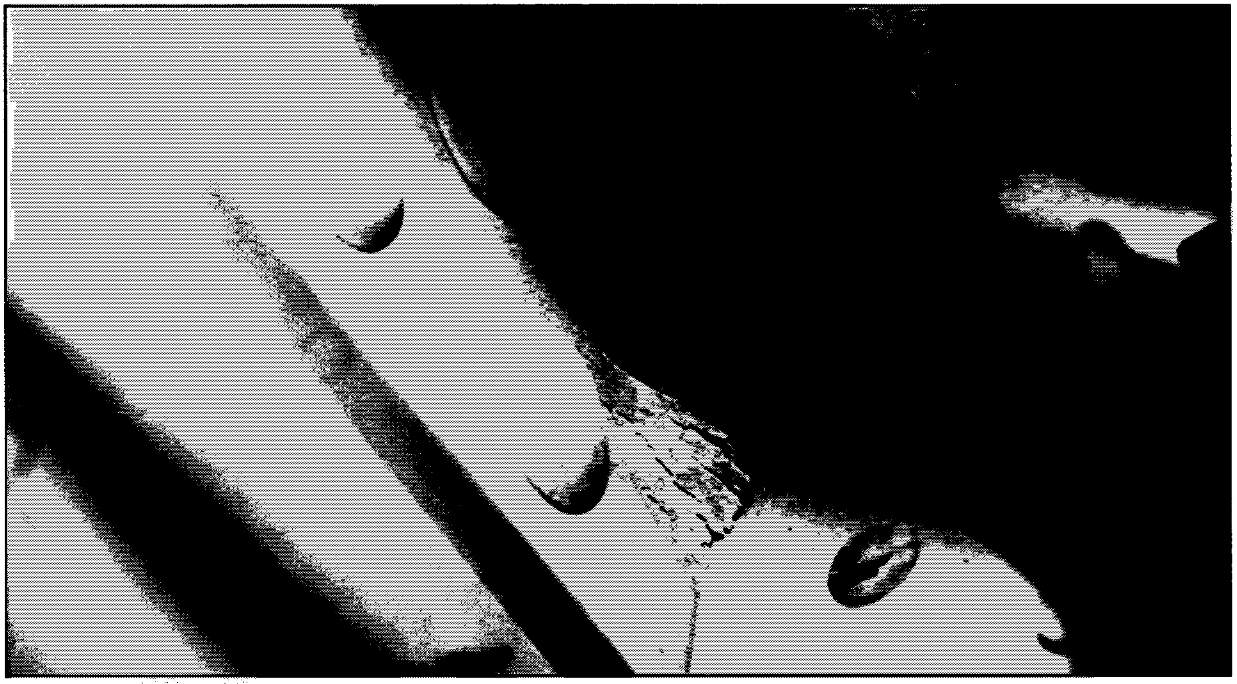

FIGURE 5-9. SPAR CHORD CORROSION

FIGURE 5-10. REMOVAL OF FILLET SEAL FROM INTERNAL EDGE OF LAP JOINT EXPOSED FULL EXTENT OF CORROSION

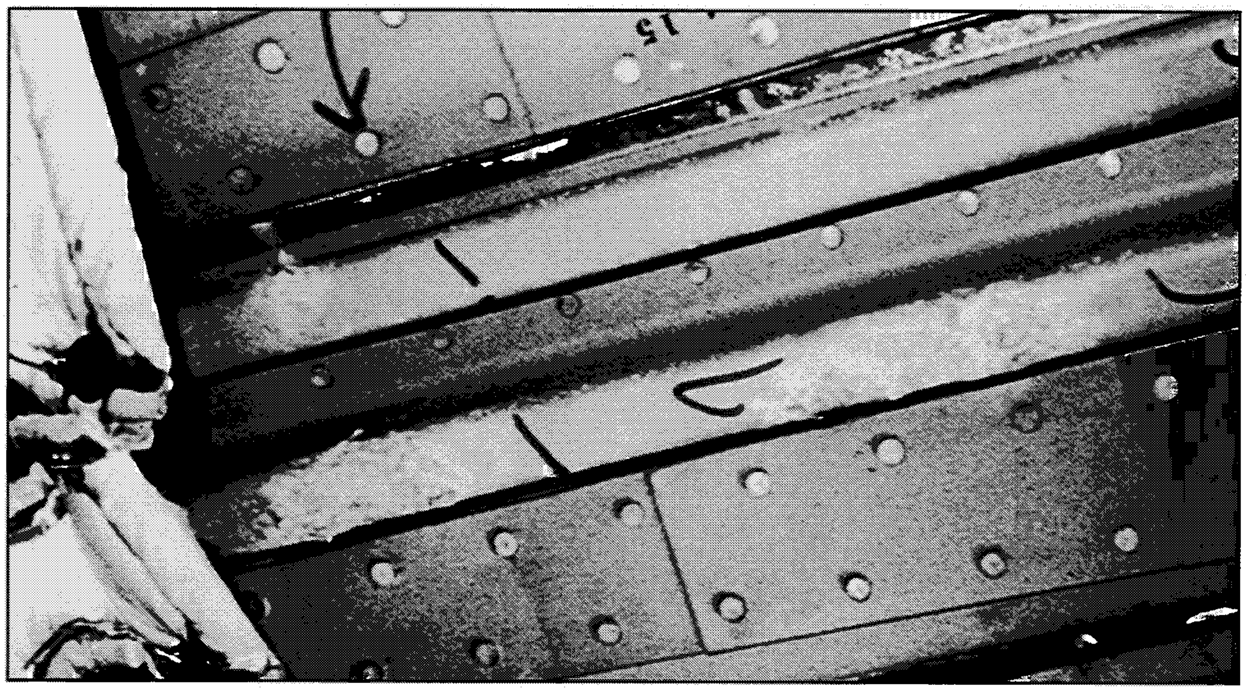

FIGURE 5-11. REMOVAL OF INSULATION BLANKETS EXPOSED CORROSION

FIGURE 5-12. CORROSION DEVELOPED UNDER LEVELING COMPOUND INSTALLED DURING PREVIOUS REPAIR OF OVERWING EXIT

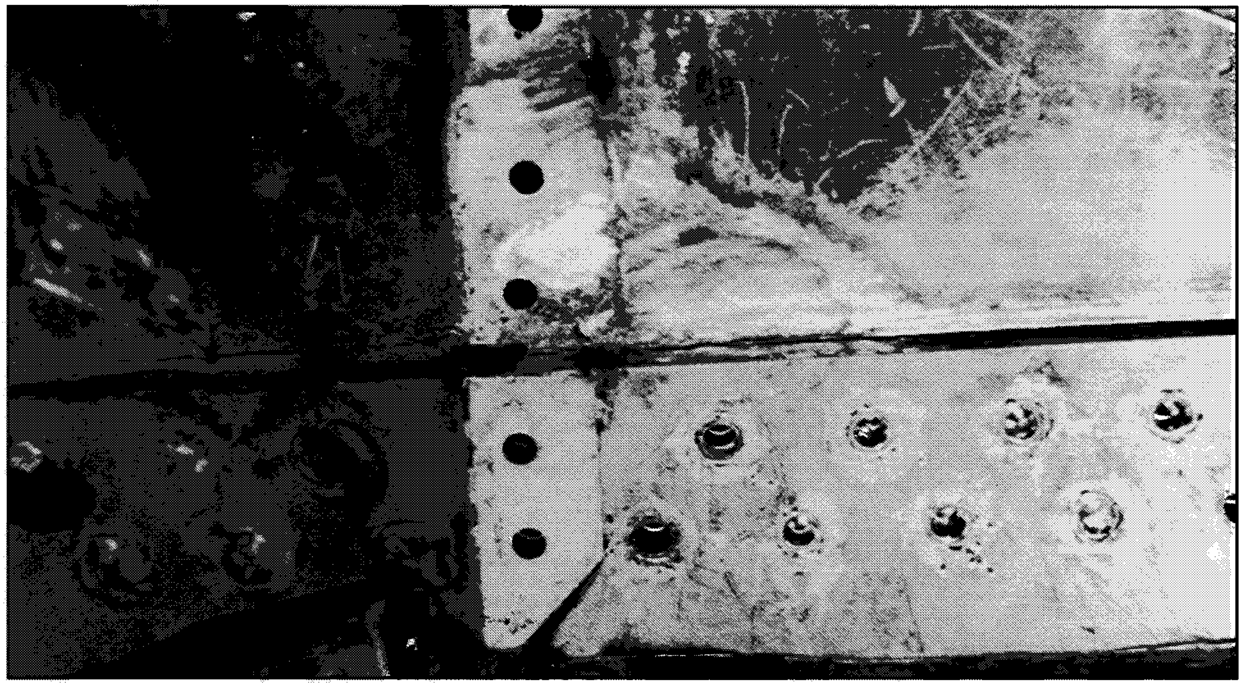

FIGURE 5-13. CORROSION BEHIND A STRUCTURAL COMPONENT ON A WING SPAR

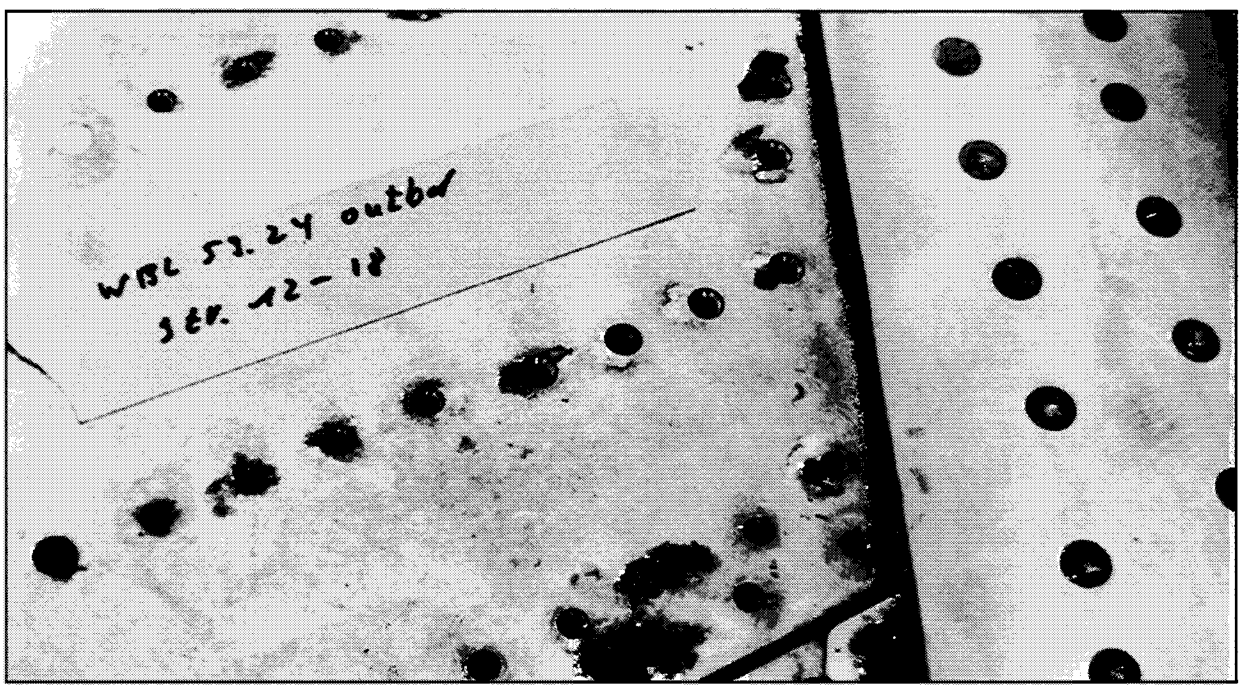

FIGURE 5-14. CORROSION DAMAGE AROUND FASTENER HOLES AND IN FASTENER HOLES

FIGURE 5-15. SEVERELY CORRODED LAP JOINT

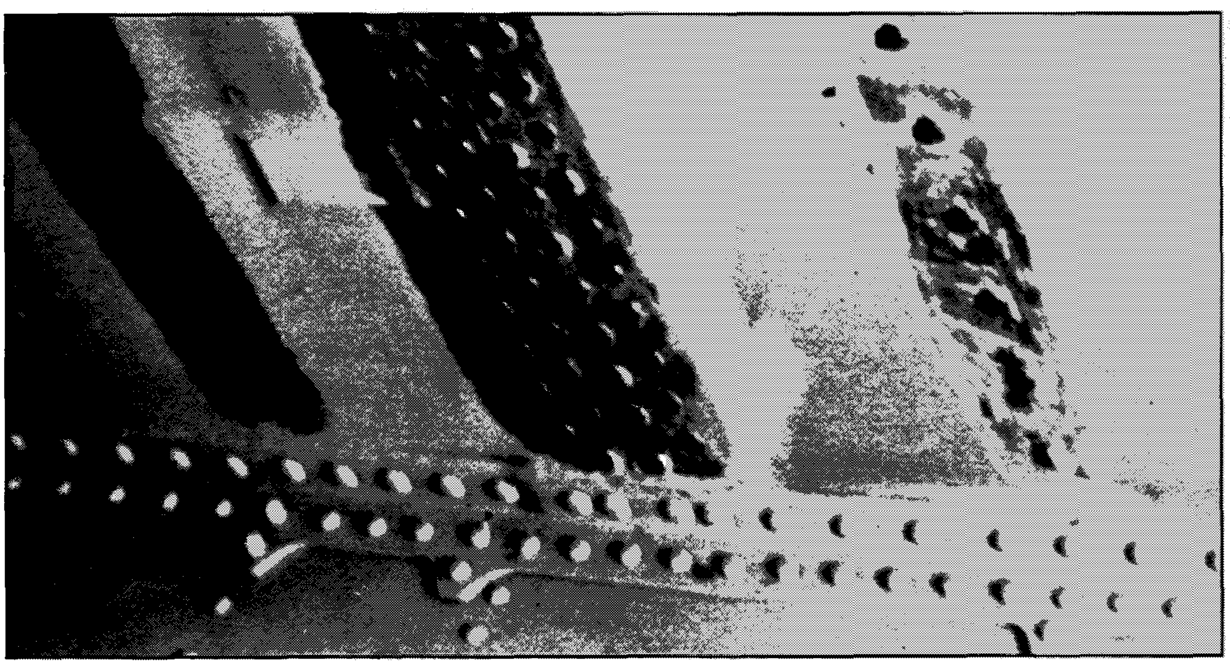

FIGURE 5-16. LOCAL PAINT REMOVAL REQUIRED TO EXPOSE FULL EXTENT OF CORROSION

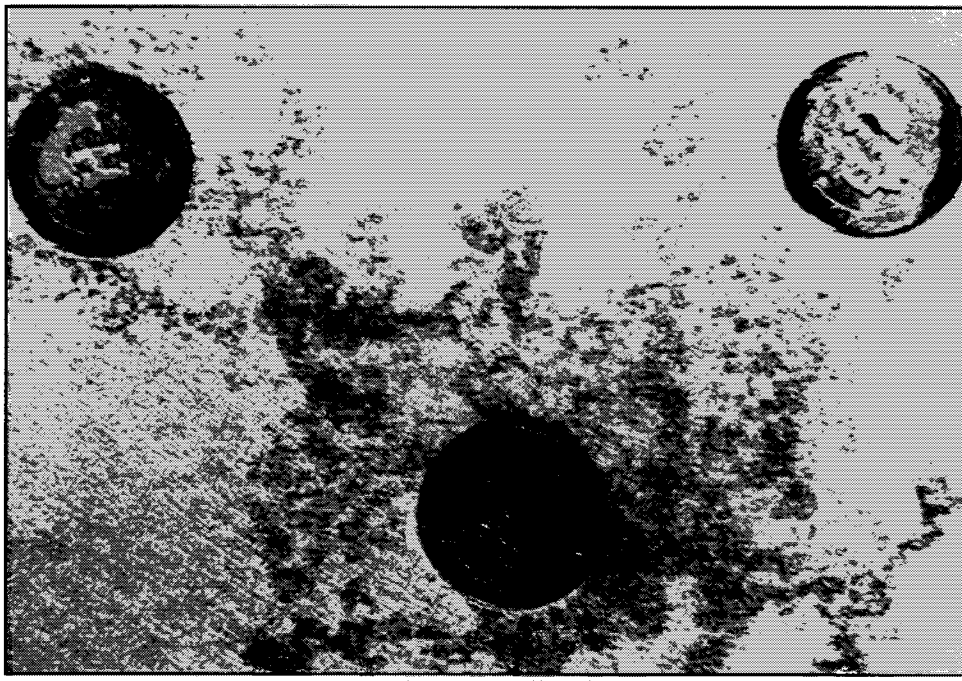

FIGURE 5-17. CORRODED AREA AFTER PAINT REMOVAL FROM WING SKIN

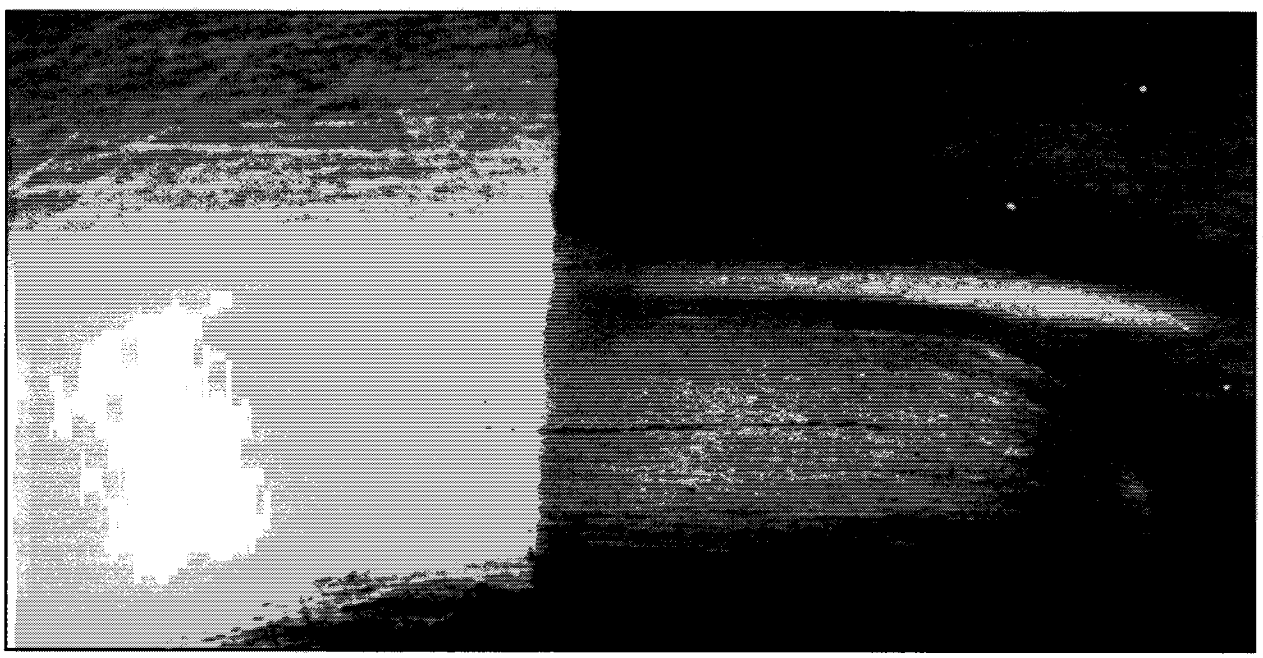

FIGURE 5-18. ALODINE 1200 TREATMENT PRIOR TO PAINTING MAY HIGHLIGHT PRESENCE OF REMAINING CORROSION OR CRACKS

b. Other Methods. In addition to visual inspection there are several NDI methods such as: liquid penetrant, magnetic particle, eddy current, x-ray, ultrasonic, and acoustical emission which may be of value in the detection of corrosion. These methods have limitations and should be performed only by qualified and certified NDI personnel. Eddy current, x-ray, and ultrasonic inspection methods require properly calibrated (each time used) equipment and a controlling reference standard to obtain reliable results.

(1) Liquid Dye Penetrant. Inspection for large stress-corrosion or corrosion fatigue cracks on nonporous ferrous or nonferrous metals may be accomplished by the use of liquid dye penetrant processes. The dye applied to a clean metallic surface will enter small openings, such as cracks or fissures by capillary action. After the dye has had an opportunity to be absorbed by any surface discontinuities, the excess dye is removed and a developer is applied to the surface. The developer acts like a blotter and draws the dye from the cracks or fissures back to the surface of the part, giving visible indication of the location of any fault that is present on the surface. The magnitude of the fault is indicated by the quantity and rate of dye brought back to the surface by the developer.

(2) Magnetic Particle Inspection. This method may be used for the detection of cracks or flaws on or near the surface of ferromagnetic metals (metals which are attracted by magnetism). A portion of the metal is magnetized, and finely divided magnetic particles (either in liquid suspension or dry) are applied to the object. Any surface faults will create discontinuities in the magnetic field and cause the particles to congregate on or above these imperfections, thus locating them.

(3) Eddy Current Inspection. Eddy current testing (primarily low-frequency) can be used to detect thinning due to corrosion and cracks in multi-layered structures. Low frequency eddy current testing can also be used to some degree for detecting or estimating corrosion on the hidden side of aircraft skins because, when used with a reference standard, the thickness of material which has not corroded can be measured. Low frequency eddy current testing can be used for estimating corrosion in underlying structure because the eddy currents will penetrate through into the second layer of material with sufficient sensitivity for approximate results. High-frequency eddy current testing is most appropriate for detection of cracks which penetrate the surface of the structure on which the eddy current probe can be applied (including flat surfaces and holes).

(4) X-Ray Inspection. X-ray inspection has somewhat limited use for the detection of corrosion because it is difficult to obtain the sensitivity required to detect minor or moderate corrosion. Briefly, x-ray works by passing high energy rays generated by an x-ray machine through the material being inspected. This exposes the special film placed on the opposite side of the material. Areas of high density are indicated on the film as underexposed areas, while areas of low density are indicated on the film as overexposed areas. Proper interpretation of the film will indicate whether defects are present. Moderate to servere corrosion or cracks can be detected using x-ray

inspection. However this method, like other NDI methods, requires a qualified and certified operator to obtain reliable results.

(5) Ultrasonic Inspection. Ultrasonic testing provides a sensitive detection capability for corrosion damage when access is available to a surface with a continuous bulk of material exposed to the corrosion. Ultrasonic inspection is commonly used to detect exfoliation, stress-corrosion cracks, and general material thinning. Ultrasonic digital thickness gages are not reliable for determining moderate or severe damage prior to removing the corrosion. Highly trained personnel should conduct the examination if any useful information is to be derived from the indicating devices.

(6) Acoustic Emission Testing. This method using heat-generated emissions can be used to detect corrosion and moisture in adhesive-bonded metal honeycomb structures. Acoustic emission testing can detect corrosion initiation as well as advanced corrosion.

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