TOPIC 8 DISASSEMBLY, INSPECTION, REPAIR AND ASSEMBLY TECHNIQUES

DISASSEMBLY, INSPECTION, REPAIR AND ASSEMBLY TECHNIQUES

Inspections are visual examinations and manual checks to determine the condition of an aircraft or component. An aircraft inspection can range from a casual walk-around to a detailed inspection involving complete disassembly and the use of complex inspection aids. An inspection system consists of several processes, including reports made by mechanics or the pilot or crew flying an aircraft and regularly scheduled inspections of an aircraft.

An inspection system is designed to maintain an aircraft in the best possible condition. Thorough and repeated inspections must be considered the backbone of a good maintenance program. Irregular and haphazard inspection will invariably result in gradual and certain deterioration of an aircraft. The time spent in repairing an abused aircraft often totals far more than any time saved
in hurrying through routine inspections and maintenance.

It has been proven that regularly scheduled inspections and preventive maintenance assure airworthiness. Operating failures and malfunctions of equipment are appreciably reduced if excessive wear or minor defects are detected and corrected early. The importance of inspections and the proper use of records concerning these inspections cannot be overemphasized.

Airframe and engine inspections may range from
preflight inspections to detailed inspections. The time intervals for the inspection periods vary with the models of aircraft involved and the types of operations being conducted. The airframe and engine manufacturer's instructions should be consulted when establishing
inspection intervals.

Aircraft may be inspected using flight hours as a basis for scheduling, or on a calendar inspection system. Under the calendar inspection system, the appropriate inspection is performed on the expiration of a specified number of calendar weeks. The calendar inspection system is an efficient system from a maintenance management standpoint. Scheduled replacement of components with stated hourly operating limitations is normally accomplished during the calendar inspection falling nearest the hourly limitation.

In some instances, a flight hour limitation is established to limit the number of hours that may be flown during the calendar interval. Aircraft operating under the flight hour system are inspected when a specified number of flight hours are accumulated. Components with stated hourly operating limitations are normally replaced during the inspection that falls nearest the hourly limitation.

• The reliability of protective devices fitted to equipment.

Cable shielding, aircraft structure shielding and circuit protection devices are designed to protect vital avionics from HIRF. Visual inspection and measurement of shielding and bonding effectiveness are maintenance actions used to check these. HIRF protective devices such as resistors, zener diodes and filters could short or open when exposed to HIRF. Check and repair any circuit protection devices as needed.

The manufacturer will normally protect the aircraft against HIRF. Bonding, shielding and separation of critical components usually achieve this. It is difficult to know when the aircraft has been subjected to HIRF; consequently protection is best achieved by regular checks of:

- Bonding of the aircraft including all bonding terminals correctly torque loaded.
- Correct crimping.
- Screens correctly terminated and grounded.

HARD OR OVERWEIGHT LANDING INSPECTION

The structural stress induced by a landing depends not only upon the gross weight at the time but also upon the severity of impact. However, because of the difficulty in estimating vertical velocity at the time of contact, it is hard to judge whether or not a landing has been sufficiently severe to cause structural damage. For this reason, a special inspection should be performed after a landing is made at a weight known to exceed the design landing weight or after a rough landing, even though

the latter may have occurred when the aircraft did not exceed the design landing weight.
Wrinkled wing skin is the most easily detected sign of an excessive load having been imposed during a landing. Another indication which can be detected easily is fuel leakage along riveted seams. Other possible locations of damage are spar webs, bulkheads, nacelle skin and attachments, firewall skin, and wing and fuselage stringers. If none of these areas show adverse effects, it is reasonable to assume that no serious damage has occurred.

If damage is detected, a more extensive inspection and alignment check may be necessary.

SEVERE TURBULENCE INSPECTION/OVER "G"

When an aircraft encounters a gust condition, the air load on the wings exceeds the normal wing load supporting the aircraft weight. The gust tends to accelerate the aircraft while its inertia acts to resist this change. If the combination of gust velocity and airspeed is too severe, the induced stress can cause structural damage.

A special inspection should be performed after a flight through severe turbulence. Emphasis should be placed upon inspecting the upper and lower wing surfaces for excessive buckles or wrinkles with permanent set. Where wrinkles have occurred, remove a few rivets and examine the rivet shanks to determine if the rivets have sheared or were highly loaded in shear.

Through the inspection doors and other accessible openings, inspect all spar webs from the fuselage to the tip. Check for buckling, wrinkles, and sheared attachments. Inspect for buckling in the area around the nacelles and in the nacelle skin, particularly at the wing leading edge. Check for fuel leaks. Any sizable fuel leak is an indication that an area may have received overloads which have broken the sealant and opened the seams.

If the landing gear was lowered during a period of severe turbulence, inspect the surrounding surfaces carefully for loose rivets, cracks, or buckling. The interior of the wheel well may give further indications of excessive gust conditions. Inspect the top and bottom fuselage skin. An excessive bending moment may have left wrinkles of a diagonal nature in these areas.