DEPARTMENT OF AEROSPACE ENGINEERING

19ASB303 AIRCRAFT MAINTENANCE ENGINEERING

UNIT – 3 - INSPECTION

Checklist - Special inspection

1. Introduction to Special Inspection

Special inspections in aircraft maintenance are conducted outside routine scheduled inspections to assess specific components or conditions that may impact the aircraft's airworthiness. These inspections may be required due to operational incidents, environmental exposure, or manufacturer recommendations.

---

2. Purpose of Special Inspections

- **Safety Assurance:** Detects abnormalities or damage caused by extraordinary events such as lightning strikes or hard landings.
- **Regulatory Compliance:** Ensures aircraft meet the additional inspection requirements set by aviation authorities.
- **Operational Readiness:** Confirms that the aircraft remains fit for flight after unexpected occurrences.
- **Preventive Maintenance:** Identifies wear and tear before it leads to significant failures.

---

3. Types of Special Inspections

a. Hard Landing Inspection

- **Reason:** Performed after an aircraft experiences a landing with excessive vertical speed.
- **Checklist:**
  - Inspect landing gear for structural damage.
  - Examine fuselage for cracks or deformation.
  - Assess wing root and attachment points.
  - Check for excessive fluid leaks or system malfunctions.

b. Lightning Strike Inspection

- **Reason:** Conducted after the aircraft is struck by lightning.
- **Checklist:**
  - Inspect fuselage and composite surfaces for burn marks or delamination.
  - Check antennas and external wiring for damage.
  - Examine electronic systems for anomalies.
  - Perform functional tests on avionics and flight controls.

c. Bird Strike Inspection

- **Reason:** Required when an aircraft collides with a bird during flight or landing.
- **Checklist:**
  - Inspect leading edges of wings and stabilizers for impact damage.
  - Examine engine fan blades for deformation or cracks.
  - Assess cockpit windshield for cracks.
  - Check pitot tubes and static ports for obstruction.

d. Heavy Turbulence Inspection

- **Reason:** Conducted if an aircraft encounters severe turbulence during flight.
- **Checklist:**
  - Inspect wing spars and control surfaces for structural damage.
  - Check cabin interior for signs of dislodged panels or loose components.
  - Examine hydraulic and electrical systems for leaks or malfunctions.
  - Verify calibration of flight control systems.

e. Overweight Landing Inspection

- **Reason:** Required when an aircraft lands with a fuel load exceeding normal landing weight.
- **Checklist:**
  - Inspect landing gear for stress fractures.
  - Examine tire pressure and braking system efficiency.
  - Assess wing structure and fuselage for damage.
  - Perform load monitoring system checks.

---

4. Checklist Implementation and Documentation

- **Inspection Log:** Record all special inspections in aircraft maintenance logs.
- **Airworthiness Release:** Ensure inspection completion before the aircraft is cleared for flight.
- **Regulatory Approval:** Some special inspections may require approval from aviation authorities before resuming operations.

5. Conclusion

Special inspections are crucial in maintaining aircraft integrity and operational safety after specific events. Following a structured checklist ensures that no critical components are overlooked, minimizing the risk of in-flight failures.