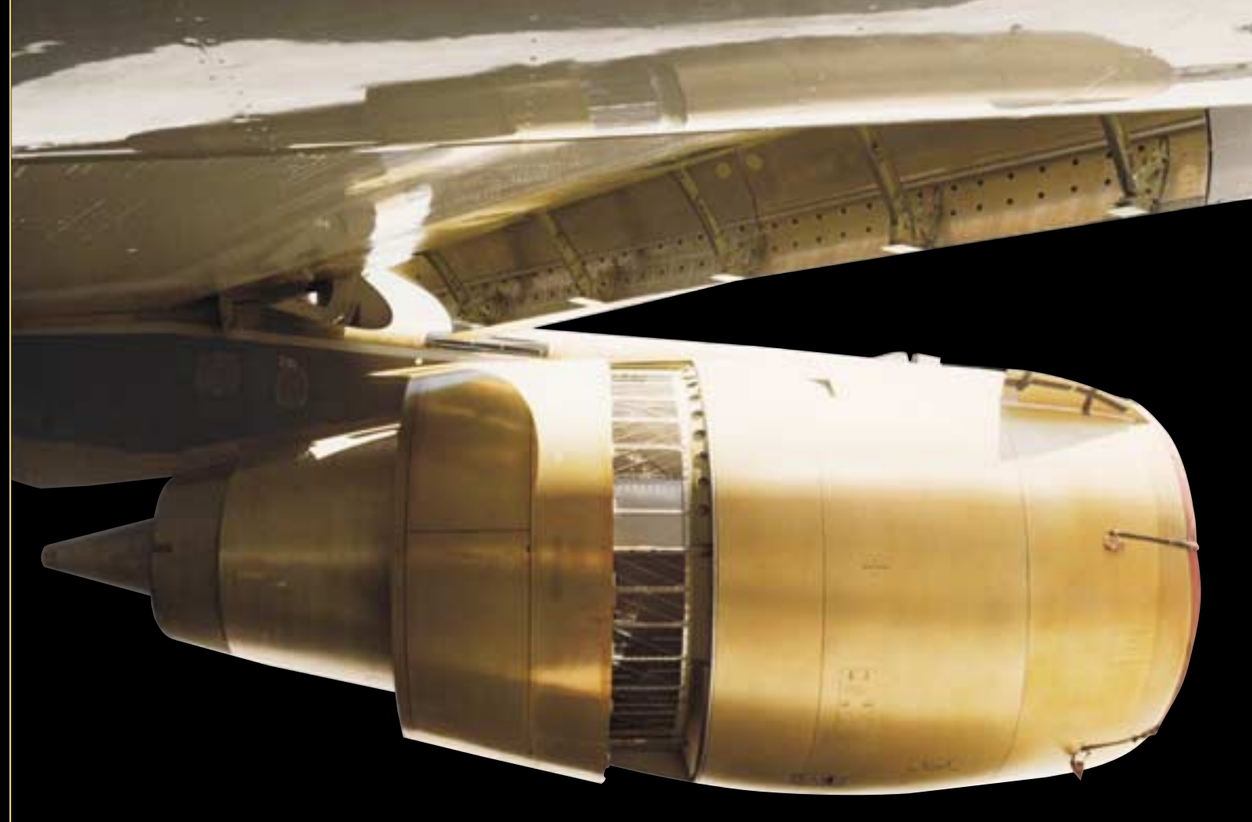
DC-10 THRUST REVERSER SAFETY ENHANCEMENT



Following an airplane accident in which inadvertent thrust reverser deployment was considered a major contributor, the aviation industry and the U.S. Federal Aviation Administration (FAA) adopted new criteria for evaluating the safety of thrust reverser systems on commercial airplanes. Several airplane models were determined to be uncontrollable in some portions of the flight envelope after inadvertent deployment of the thrust reverser. In response, Boeing and the FAA issued service bulletins and airworthiness directives, respectively, for mandatory inspections and installation of thrust reverser actuation system locks on affected Boeing-designed airplanes. Boeing and the FAA are issuing similar documents for all models of the DC-10.

SAFETY

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Boeing has initiated a four-phased safety enhancement program for thrust reverser systems on all DC-10 airplanes. The program is designed to ensure compliance with new criteria, established by the U.S. Federal Aviation Administration (FAA), for evaluating the safety of all thrust reversers on commercial airplanes. According to the new criteria, a thrust reverser system is acceptable if an inadvertent deployment is extremely improbable, if the airplane is controllable at any point in the flight envelope in the event of an inadvertent deployment, or both.

The safety enhancement program for the DC-10 is designed to improve the reliability of the thrust reverser system throughout the course of four phases. Each phase increases reliability approximately tenfold.

1. Repetitive inspections of selected thrust reverser subsystems and hardware.
2. Modification of the thrust reverser indication system.
3. Installation of thrust reverser actuation system locks for the wing engines.
4. Modification of command wires for the tail engine thrust reverser.

1 REPETITIVE INSPECTIONS OF SELECTED THRUST REVERSER SUBSYSTEMS AND HARDWARE

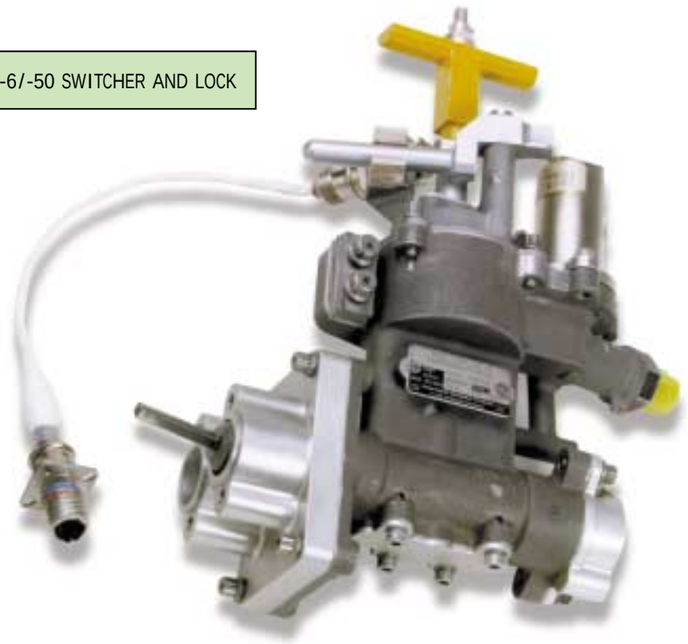
Repetitive "health check" inspections involve checking and testing the thrust reverser systems on all three engines of the DC-10. Boeing recommends that an initial inspection be accomplished within 1,500 flight-hours or 6 months and the repetitive inspections be done at intervals not to exceed 6,000 flight-hours or 18 months. The requirements apply to all models of the DC-10.

Checks for GE-powered DC-10s include a holding torque check of the pneumatic drive motor's internal disc brake; an inspection of the translating cowl air seal, fairing, and the aft frame; and checks of the feedback rod-to-yoke alignment, translating cowl auto-restow function, position indication for the overpressure shutoff valve, in-flight lockout system function, and fan reverser operation.

Inspections of P&W-powered DC-10s involve checking the stow latch, P-seal/bullnose seal, pneumatic drive unit latch, indication circuitry, running torque, in-flight lockout, and thrust reverser operation.

These inspections are further defined in Boeing Service Bulletin DC10-78A056 and Middle River Aircraft Systems Service Bulletins 78-2004 and 78-3001 for GE-powered DC-10s and Boeing Service Bulletin DC10-78A057 for P&W-powered DC-10-40s. These bulletins will be revised to include additional checks of modified indication systems and new locking systems. The FAA issued a Notice of Proposed Rulemaking (NPRM) in November 1999. An airworthiness directive (AD) mandating the repetitive inspections is imminent.

CF6-6/-50 SWITCHER AND LOCK



2 MODIFICATION OF THE THRUST REVERSER INDICATION SYSTEM

The second phase of the DC-10 safety enhancement program involves modifying the thrust reverser indication light system in the flight deck. All the indicators are placed on the center instrument panel, so they can be monitored when the thrust reversers are in use. The flight crew immediately will notice any indicator that does not light in the proper sequence and should flag it for maintenance before the next flight. This increases the reliability of the thrust reverser system by reducing the exposure time to possible latent failures of the indication system.

Boeing Service Bulletin DC10-78-060, released Dec. 17, 1999, recommends installation of these indication light systems on both GE- and P&W-powered DC-10s within 18 months of the service bulletin's publication date.

In April 2000, the FAA issued an NPRM, requesting comments on a proposed AD for the indication system on all models of the DC-10. An AD mandating the incorporation of Boeing Service Bulletin DC10-78-060 is expected by the end of 2000.

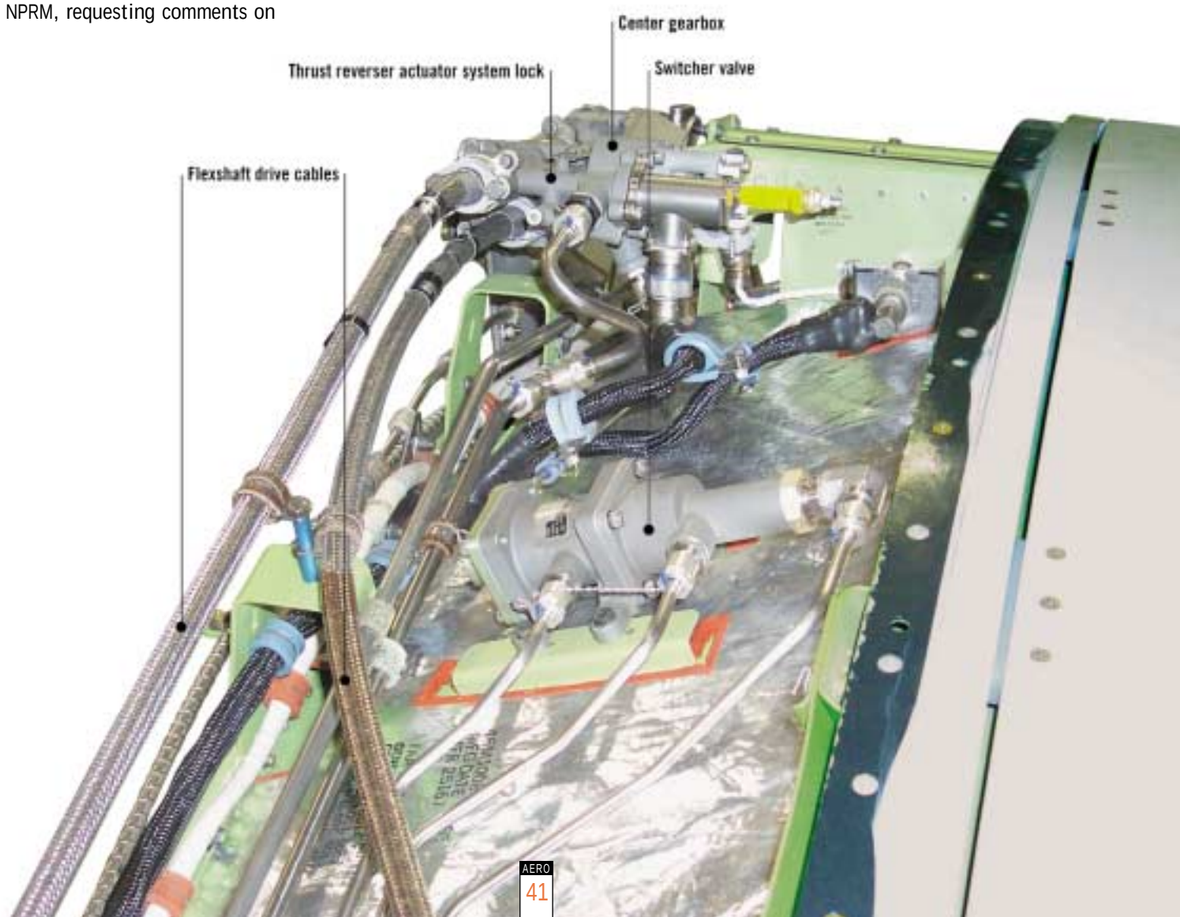
3 INSTALLATION OF THRUST REVERSER ACTUATION SYSTEM LOCKS FOR THE WING ENGINES

The third phase of the safety enhancement program requires installation of additional, independent locking systems for the thrust reversers on the wing engines (engine nos. 1 and 3). The installation of lock provisions on the tail engine (engine no. 2) thrust reverser is recommended to retain interchangeability between the wing engine reversers and the tail engine reverser. This allows operators to stock neutral spare reversers and quickly configure them for any engine position.

The basic design elements of the thrust reverser locking system require the modification of the throttle module, the addition of lock-control relay boxes, the modification of the thrust reversers to incorporate the lock hardware (plus the modification of the fan cowl doors on GE-powered DC-10s), and the addition of associated airplane wiring (see p. 43 for requirement details).

Once installed, the new thrust reverser locking system will provide a third, totally independent, level of protection against inadvertent deployment. It will be a positive lock on

LOCK INSTALLATION ON CF6 THRUST REVERSER



THRUST REVERSER LOCK INSTALLATION

The complete thrust reverser locking system for DC-10s comprises two locks for each thrust reverser and is installed for the wing engines. Lock provisions, rather than the complete locking system, are installed on the tail engine thrust reverser. These installations are accomplished as follows:

1 The throttle module in the flight deck pedestal is modified to add new switches on all three reverse-thrust levers. This keeps the feel and forces identical for all three throttle and reverse-thrust levers to the flight crew. Only the switches on the wing engine reverse-thrust levers are wired. Wire support brackets are added in the pedestal, adjacent to the throttle module.

2 The forward relay panel is modified to connect the existing in-flight lockout system to the new thrust reverser locking system.

3 The upper main circuit breaker panel is modified to provide power to the new system.

4 Relay boxes are installed in the right and left tunnel areas adjacent to the lower forward cargo compartment.

5 Terminal boards are installed on the right and left sides of the center accessory compartment. The new dedicated wire bundles in the wing leading edge terminate at this point.

6 Wiring is installed from the throttle module, forward relay panel, and the upper main circuit breaker panel to a disconnect at station 475. Wiring is installed on the left and right sides of the fuselage from the disconnect to the relay boxes, and from the relay boxes to the terminal boards in the center accessory compartment.

7 Wing pressure feedthroughs are installed on the right and left sides of the center accessory compartment. Wiring is installed from the terminal boards in the center accessory compartment, through the wing pressure feedthroughs, along the leading edge of the wing to a disconnect at the pylon.

8 Wiring is installed from the disconnect at the wing, forward through the pylon, to the pylon junction box.

9 Wiring is installed on the wing engine from the pylon junction box to the thrust reverser halves.

10 The wing engine thrust reversers are modified to add the locks and associated wiring and hardware.

11 On GE-powered DC-10s, the pylon is modified and pneumatic tubing is installed; fan cowls are modified to provide clearance for the new locks.