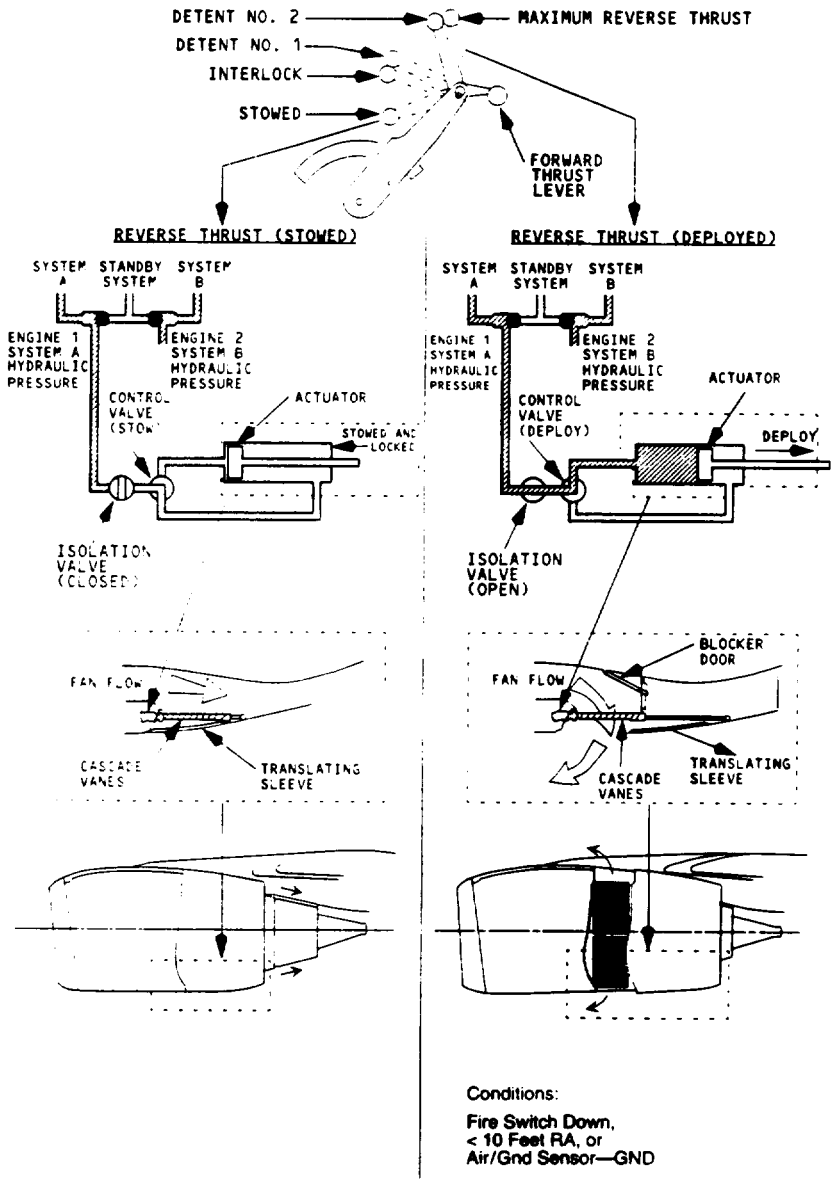
Attachment 29

Operational Factors Group Chairman's Factual Report

DCA00MA030

Thrust Reverser System

Thrust Reverser Synoptic



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The REVERSER light, located on the aft overhead panel illuminates whenever a comparator senses a disagreement between the position of the reverser isolation valve and the selector valve, or a disagreement between the reverser sleeve position sensors.

The REVERSER light, also illuminates when the thrust reverser is commanded to stow and extinguishes 10 seconds later when the isolation valve closes. Any time the REVERSER light illuminates for more than approximately 12 seconds, a malfunction has occurred, and the MASTER CAUTION and ENG system annunciator lights illuminate.

When the reverser sleeves are in the stowed position, a hydraulically operated locking actuator inhibits motion to each reverser sleeve until reverser extension is selected. Additionally, an auto-restow circuit compares the actual reverser sleeve position and the commanded reverser position. In the event of incomplete stowage or uncommanded movement of the reverser sleeves toward the deployed position, the auto-restow circuit opens the isolation valve and commands the control valve to the stow position, directing hydraulic pressure to stow the reverser sleeves. Once the auto-restow circuit is activated, the isolation valve remains open and the control valve is held in the stowed position until the thrust reverser is commanded to deploy or until corrective maintenance action is taken.

Warning: Actuation of the thrust reversers on the ground without suitable precautions is dangerous to ground personnel.

Thrust Reverser

Each engine is equipped with a hydraulically operated thrust reverser, consisting of left and right translating sleeves. Aft movement of the reverser sleeves causes blocker doors to deflect fan discharge air forward, through fixed cascade vanes, producing reverse thrust. The thrust reverser is for ground operations only and is used for rejected takeoffs and after touchdown to slow the aircraft, reducing stopping distance and brake wear.

Hydraulic pressure for the operation of engine number 1 and engine number 2 thrust reversers comes from hydraulic systems A and B, respectively. If hydraulic system A or B fails, alternate operation for the affected thrust reverser is available through the standby hydraulic system. When the standby system is used, the affected thrust reverser deploys and retracts at a slower rate, and some thrust asymmetry can be anticipated.

The thrust reverser can be deployed if the fire switch is down and either radio altimeter senses less than 10 feet altitude, or when the air/ground safety sensor is in the ground mode. Movement of the reverse thrust levers is mechanically restricted until the forward thrust levers are in the idle position.

When reverse thrust is selected, the isolation valve opens, and the thrust reverser control valve moves to the deploy position, allowing hydraulic pressure to unlock and deploy the reverser system. An interlock mechanism restricts movement of the reverse thrust lever until the reverser sleeves have approached the deployed position. When either reverser sleeve moves from the stowed position, the amber REVERSER UNLOCKED light on the center instrument panel illuminates. As the thrust reverser reaches the deployed position, the reverse thrust lever can be raised to detent number 1. A reverse thrust lever position between detent number 1 and detent number 2 provides adequate reverse thrust for normal operations. When necessary, the reverse thrust lever can be pulled beyond detent number 2, providing maximum reverse thrust.

Downward motion of the reverse thrust lever past detent number 1 commands the reverser to stow. Once the thrust reverser is commanded to stow, the control valve moves to the stow position allowing hydraulic pressure to stow and lock the reverser sleeves. After the thrust reverser is stowed, the isolation valve closes. If the reverser remains deployed when the reverse thrust lever is moved to the forward thrust position an interlock limits forward thrust lever movement. The interlock is withdrawn during reverser translation to the stowed position. Freedom of movement of the forward thrust levers is not an absolute indication that the reverser sleeves are completely stowed, as interlock withdrawal is commanded during reverser sleeve transition.