AOL ALL OPERATOR LETTER	PRODUCT SUPPORT

BOEING

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AOL 9-2549

To: All DC-9 and MD-80 Operators

Subject: ENGINE STARTING SYSTEM

Applicable To: All DC-9 AND MD-80 Airplanes

Reference: (a) Minimum Equipment List (MEL) Procedures Manual, Item 80-1, Revision 12, dated August 1996
(b) DC-9/MD-80 Maintenance Manual (MM) Chapter 80-10-0/80-10-00

REASON

ENGINE STARTER FAILURE RESULTS IN PROCEDURAL CLARIFICATION AND REVISION.

In December 1996, an operator experienced an engine start valve indication problem (START VALVE OPEN) prior to take off. Maintenance on the start valve annunciator system was deferred per reference (a). During departure climb-out, an engine starter failure occurred which caused an engine fire warning alert, an air turn back, and an in-flight shutdown of the engine. Although a nacelle fire had not occurred, some engine-mounted components were damaged.

A start valve teardown inspection found that the manual override button pin tip, Part Number (P/N) 3168376-1, was bent and that the button was stuck in the depressed (override) position. This condition can hold the solenoid switcher ball off its seat and allows the start valve to open uncommanded whenever air pressure is available to the valve, even when the valve has been wrenched closed. Since the valve position annunciator was indicating START VALVE OPEN before and during this event, it is possible that the valve annunciator was indicating properly and that the engine starter had been motoring the entire time.

It is possible to damage the manual override button pin during its actuation by using something other than hand pressure. Since a stroke of approximately 1/16 inch is all the motion needed for the override button to push the solenoid switcher ball off its seat, there is only a small amount of tactile feedback to indicate that the button has been pressed. A mechanic should not use force in an attempt to obtain more stroke on the override button. Using a tool as a pry bar to depress the manual override button could very easily apply sufficient force to deform the slender steel pin.

Verification that the start valve is closed after the engine start is not an easy task. Although the valve has been wrenched closed, there is no guarantee that the valve will stay closed if a bent pin condition exists; therefore, a START VALVE OPEN annunciation should be assumed to be true in all cases.

To clarify proper maintenance dispatching action when the annunciator system malfunctions, the recommended maintenance procedure per the Master Minimum Equipment List (MMEL), Item 80-1, will be revised to specify for conditions when the annunciator light is inoperative OFF and inoperative ON. These changes will provide assurance that the valve is not open and will not open.

The maintenance procedures included in DC-9 MEL Procedures Manual, Item 80-1, START VALVE OPEN Annunciator Systems, will be amended at the next revision to read as follows:

1. Start valve open light inoperative OFF:
   a. Start affected engine.
   b. Check that start valve closes after engine start.
   c. If start valve remains open, wrench the valve closed using the manual start hex head feature.

2. Start valve open light inoperative ON (annunciator illuminated):
   a. Open the appropriate engine lower cowl door.
   b. Deactivate the start valve as follows:
      (1) Disconnect the control air line at the valve port.
      (2) Install a plug in the control air line and secure the control air line.
      (3) Install a cap on the start valve control air port.
   c. For engine start, open the start valve using the manual start hex head feature.
   d. Coordinate with the flight crew to close the valve after engine start.
   e. Verify that the start valve external position indicator indicates the valve is CLOSED and that no air discharges from the starter exhaust outlet after starting.

In addition, temporary revisions will be issued to DC-9 MM, Chapters 80-10-0 and 80-10-2, and MD-80 MM, Chapters 80-10-00 and 80-10-02, with the following caution and note.

CAUTION:

Use only hand pressure to depress the override button. Use of a screwdriver or other tool as a pry bar to depress the override button can deform the slender pin mechanism inside the valve. A deformed override button pin can hold the solenoid switcher ball off its seat which allows the valve to open uncommanded when air pressure is available to the engine start valve. If undetected and uncorrected, this condition will result in significant damage to the engine starter.

NOTE:

The normal stroke of the override button is approximately 1/16 inch. If the button stroke appears greater than 1/16 inch or if the return action appears sticky, then a deformed override button pin should be suspected.

Should additional information be required, please submit your inquiries through your local Field Service Representative or to Boeing Commerical Airplane Group - Douglas Products Division, ATTN: Technical and Fleet Support - Propulsion/Environmental and Interior Systems, P. O. Box 1771, Long Beach, California 90801; SITA: TOAMD7X, ARINC: LAXMDCR, Telex 674357, FAX: (562) 593-7710, or call (562) 593-7268.

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