ATTACHMENT 2

TO

SYSTEMS GROUP CHAIRMAN'S FACTUAL REPORT

DCA17FA076

DC-9-83 (MD-83), N786TW, On Aircraft Elevator Test Plan (N787TW)

MD-80 ELEVATOR BOOST SYSTEM CHECKS

THE FOLLOWING ARE EXPERIMENTAL TEST PROCEDURES AND ARE NOT TO BE USED FOR AIRCRAFT MAINTENANCE OR FOR DETERMINING AIRCRAFT SERVICEABILITY.

1. Checks with Hydraulic Power Off

A. Depressurize left hydraulic system (AMM 29-00-00/201, paragraph 8.A.).

B. Place horizontal stabilizer in neutral position by aligning protruding head rivets on left side horizontal stabilizer leading edge with protruding head rivet on side of vertical stabilizer.

C. Measure and record limits of elevator surface travel.

(1) Place elevator surface in neutral position by aligning trailing edge of elevator with protruding head rivet on side of vertical stabilizer.

(2) Place inclinometer on elevator surface and set to reading zero.

(3) Using hand force to move elevator, measure and record elevator surface positions at limits of travel.

(a) Full elevator TEU: Left _____ Right _____

(b) Full elevator TED: Left _____ Right _____

(Ref. rig tolerances: 27.0 +/- 0.5 degrees TEU, 16.5 +/- 0.5 degrees TED)

D. Measure and record elevator control tab travel.

(1) Move right control column slightly fore and aft and allow column to stabilize in neutral position.

(2) Place elevator surface in neutral position by aligning trailing edge of elevator with protruding head rivet on side of vertical stabilizer.

NOTE: All control tab angles are measured relative to elevator surface using 5916715 protractor.

(3) Measure and record TEU or TED distance of control tab from elevator surface:
Left _____ Right _____

(Ref. rig tolerance: 0.00 +/- 0.25 degree)

(4) Hold elevator surface in neutral position and move right control column forward until upper stop on elevator control tab crank contacts stop on elevator control tab inboard hinge fitting.

(a) Record control tab TEU position: Left _____ Right _____

(Ref. rig tolerance: 20 +/- 2 degrees)

(5) Hold elevator surface in neutral position and move right control column aft until lower stop on elevator control tab crank contacts stop on elevator control tab inboard hinge fitting.

(a) Record control tab TED position: Left _____ Right _____

(Ref. rig tolerance: 26 +/- 2 degrees)

(6) Move right control column full forward and elevator surface full TED.

(a) Record control tab TEU position: Left _____ Right _____

(Ref. rig tolerance: 18.5 +/- 3.5 degrees)

(7) Move right control column full aft and elevator surface full TEU.

(a) Record control tab TED position: Left _____ Right _____

(Ref. rig tolerance: 26.5 +/- 2.5 degrees)

2. Checks with Hydraulic Power On

A. Pressurize left hydraulic system (AMM 29-00-00/201, paragraph 8.B. external pressure source or 8.E. power transfer unit pressure).

B. Make sure aircraft is powered electrically.

C. Make sure horizontal stabilizer is in neutral position (i.e., protruding head rivets on left side horizontal stabilizer leading edge aligned with protruding head rivet on side of vertical stabilizer).

D. Activate flight recorder by placing FLT RCDR switch on overhead panel to GND TEST position.

NOTE: Flight recorder can also be activated by releasing parking brake and either placing a fuel shutoff lever in on position or de-energizing ground control relays (left ground control relay C/B open, aircraft in flight mode).

NOTE: Recording clock time when check events occur will help identify events in recorder data.

E. Flight control rollout check.

(1) Slowly move right control column full forward, full aft, and back to neutral.

(2) Slowly move either control wheel full left, full right, and back to neutral.

(3) Slowly move either set of rudder pedals full left, full right, and back to neutral.

F. Check elevator boost actuation point.

(1) Slowly move right control column forward and stop when blue ELEVATOR POWER ON light in EOAP illuminates.

(2) Return control column to neutral.

G. Observe elevator surface motion and travel during boost system actuation.

(1) Position personnel and/or video camera(s) and observe and record elevator surface behavior during boost system actuation.

(a) Make visual note during next step of apparent speed of surface when movement occurs and force of contact with limit stops for comparison with test done in paragraph 3.D.

(2) Move right control column full forward and hold to actuate boost system.

(3) Record elevator surface TED position while boost system is actuated:
Left _____ Right _____

(4) Return control column to neutral.

H. Check elevator boost system operation with control columns in neutral position.

(1) Determine elevator control tab position when boost system actuates.

(a) Make sure control columns are in neutral position.

(b) Place elevator surfaces at approximately neutral position.

(c) Move right elevator surface TEU until travel limit stop contacts.

(d) Place 5916715 protractor on left elevator surface to measure control tab angle.

NOTE: Boost system will move both elevators. Be prepared to read control tab position measurement at point where movement begins.

(e) Slowly move left elevator surface TEU and stop when boost system just begins to move right elevator surface TED.

(f) Record TEU position of left control tab that was measured when right elevator surface just began to move: _____

(g) Place elevator surfaces at approximately neutral position.

(h) Move left elevator surface TEU until travel limit stop contacts.

(i) Place 5916715 protractor on right elevator surface to measure control tab angle.

NOTE: Boost system will move both elevators. Be prepared to read control tab position measurement at point where movement begins.

(j) Slowly move right elevator surface TEU and stop when boost system just begins to move left elevator surface TED.

(k) Record TEU position of right control tab that was measured when left elevator surface just began to move: _____

(2) Measure and record control tab position with elevator surface full TEU.

(a) Depressurize left hydraulic system (AMM 29-00-00/201, paragraph 8.A.).

(b) Make sure control columns are in neutral position.

(c) Move elevator surfaces TEU until travel limit stops contact.

(d) Record control tab TEU positions using measurements taken with 5916715 protractor: Left _____ Right _____

(3) If control tab TEU measurements recorded when boost system just began to move elevator surfaces (steps 2.H.(1)(f) and 2.H.(1)(k)) are larger than measurements recorded with elevator surfaces at full TEU position (step 2.H.(2)), do following steps:

(a) Make sure control columns are in neutral position.

(b) Move elevator surfaces TEU until travel limit stops contact.

(c) Using multiple hands to evenly distribute force on each control tab trailing edge, push trailing edges of both tabs upward at same time and attempt to move tabs to approximately positions recorded when boost system just began to move elevator surfaces (steps 2.H.(1)(f) and 2.H.(1)(k)).

(d) Record whether tab movement was possible and whether it was possible to reach attempted positions: _____

NOTE: Previous steps are intended to help assess likelihood of wind force being able to deflect control tabs against load feel spring.

(4) If control tab TEU measurements recorded when boost system just began to move elevator surfaces (steps 2.H.(1)(f) and 2.H.(1)(k)) are smaller than measurements recorded with elevator surfaces at full TEU position (step 2.H.(2)), do following steps:

(a) Make sure control columns are in neutral position.

(b) Move elevator surfaces TEU until travel limit stops contact.

(c) Using multiple hands to evenly distribute force on each control tab trailing edge, push trailing edges of both tabs upward at same time and attempt to move tabs.

(d) Record whether tab movement was possible: _____

NOTE: Previous steps are intended to help assess likelihood of wind force being able to deflect control tabs against load feel spring.

I. Deactivate data recorder by reversing activation method used in step 2.D.

3. Checks Using Elevator Accumulator Pressure

A. Make sure horizontal stabilizer is in neutral position (i.e., protruding head rivets on left side horizontal stabilizer leading edge aligned with protruding head rivet on side of vertical stabilizer).

B. Check accumulator charge and system pressure holding capability per AMM criteria (ref. AMM 27-30-11/201, par. 6.).

(1) Depressurize left hydraulic system (AMM 29-00-00/201, paragraph 8.A.).

(2) Make sure elevator hydraulic system is depressurized by opening elevator system bypass valve located aft of accumulator pressure gauge or by cycling control column several times.

(3) Make sure accumulator pressure gauge reads 2000 +/- 50 PSI.

(4) Make sure accumulator pressure does not drop more than 100 PSI in 30 minutes.

(5) Close elevator system bypass valve.

(6) Hold elevator surfaces at approximately neutral position.

(7) Pressurize left hydraulic system (AMM 29-00-00/201, paragraph 8.B. external pressure source or 8.E. power transfer unit pressure).

(8) Allow system to stabilize for 3 to 5 minutes and make sure that accumulator pressure gauge reads system pressure (3000 PSI).

(9) Shut off hydraulic pressure source.

(10) Allow system to stabilize for 10 minutes and make sure that stabilized pressure reading on accumulator pressure gauge is not less than 2200 PSI.

(11) Record stabilized pressure: _____

(12) Record pressure after 10 minutes: _____. Pressure shall not be less than 2200 PSI after 10 minutes.

C. Check accumulator system pressure holding capability after extended period without powered hydraulic pressure source.

(1) Hold elevator surfaces at approximately neutral position.

(2) Pressurize left hydraulic system (AMM 29-00-00/201, paragraph 8.B. external pressure source or 8.E. power transfer unit pressure) and allow system to stabilizer for 3 to 5 minutes.

(3) Shut off hydraulic pressure source.

(4) Allow system to stabilize for 10 minutes and record stabilized pressure reading on accumulator pressure gauge: _____

(5) Record reading on accumulator pressure gauge after _____ hours: _____

NOTE: Do paragraph 3.D. check as soon as possible after recording pressure reading.

D. Check boost system operation after extended period without powered hydraulic pressure source.

(1) Position personnel and/or video camera(s) and observe and record elevator surface behavior during boost system actuation.

(a) Make visual note during step 3.D.(2) of apparent speed of surface when movement occurs and force of contact with limit stops for comparison with test done in paragraph 2.G.

(b) Record any differences observed: _____

_____

(2) Move right control column full forward and hold to actuate boost system.

(3) Record elevator surface TED position while boost system is actuated:
Left _____ Right _____

(4) Return control column to neutral.