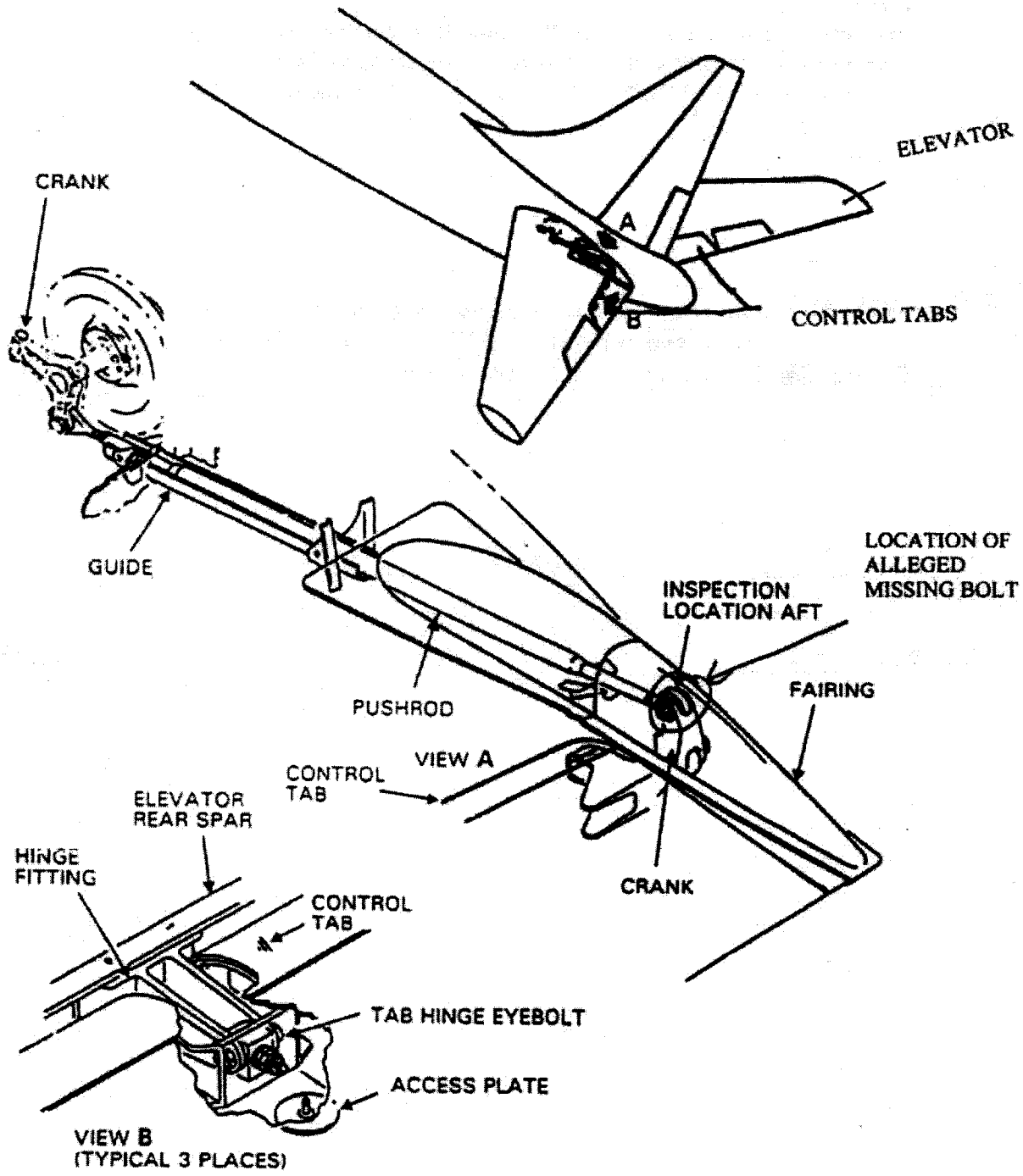
Attachment 1



Elevator Control Tab (Installation)

Attachment 2

DOCKET No.: SA-521
EXHIBIT No. 7O

NATIONAL TRANSPORTATION SAFETY BOARD

WASHINGTON, D.C.

AIRCRAFT MAINTENANCE LOG No. 8086-11
(Flight Crew Discrepancy, dated 11/25/99)

CONFIDENTIAL0031

CRAFT MAINTENANCE LOG

02202-46 (2-91) Litho U.S.A.

WORLDWIDE A CNF COMPANY

RRXA

8086-11

ACFT. NO. N 807WW

ACFT. TYPE DC-9-11 (S/F)

LEG	FLT	DATE	STATION FROM	STATION TO	GMT OUT	GMT IN	BLOCK HOURS	GMT OFF	GMT ON	FLT. HOURS	FUEL DATA UPLIFT (USG)	FUEL DATA DEPART (LBS)	FUEL DATA ARRIVAL (LBS)	DE-ICE GAL'S	CARGO DATA CARGO	CARGO DATA MAIL
1	32	11-25-99	KFLL	KDAY	0244	0508	2+24	0252	0503	2+11	5430	60.7	31.9	/	54,715	40
2																
3																
4																

LEG	DEPT. DELAY DELAY	DEPT. DELAY CODE	TRAIN. FLTS. LDGS	TRAIN. FLTS. STATION	OIL ADD 1	2	3	4	APU	A/P	CREW	EMP #	T.O.	LDG	A/P	CREW	EMP#
1	:				Q	Q	Q	Q		01	Rohrbaugh R	71604	1	1	NR	Lautrasis G	FEW4
2	:									02	Windham R	89957					
3	:									03	Urdi P	84222					
4	:																

NO.	SOURCE	DISCREPANCY	NO.	CORRECTIVE ACTION	DATE	STA	MECH
1.	P/M	At flt Level 350 Cooling doors Closed Left Pack Compressor temp 125°C, Left Pack temp Ind. 95°F, Left mix Valve Sel to 65° (first mark from Full cold.) only way to get comp temp to drop and Cabin temp to drop is open cooling doors 1/2 way.	1.	Found L/H Pack Flow Control Circuit Board INOP - Removed and Replaced L/H Pack Flow Control Circuit Board - Temp OPS Checks Good - No Defects Noted - OPS.	11/25/99	KDAY	5416
2.	P/M	ON Taxi out and T.O. Left Pack OPS Normal at flt level 350 Left Pack Flow Control has No effect and ON-OFF Switch will not Control Pack always on at max Flow See Previous 3 write ups. NOTE: Regained Control of Pack @ 180° on descent.	2.	Reference Corrective Action #1 This Log Logs Page - Removed and Replaced L/H Pack Flow Control Circuit Board - Flow Control OPS Checks Good - OPS.	11/25/99	KDAY	5416
3.	P/M	Left Nose Taxi Light INOP.	3.	Removed and Replaced L/H Taxi Lights Taxi OPS Chk Good.	11-25-99	KDAY	25479
6.	P/M	ELEVATOR REQUIRES MORE BACK PRESSURE THAN NORMAL TO FLARE THE AIRCRAFT. ALSO DURING ELEVATOR CHECK ELEVATOR CG. TO 25.4% OF 23.3%	6.	Found L/H & R/H Elevator Dampners Reversed, Moved L/H to R/H Side, R/H to L/H Side, OPS Ck'd Good, No Defects Noted	11-25-99	KDAY	40417

NO.	PART NOMENCLATURE	PART NO. OFF	SER. NO. OFF	PART NO. ON	SER. NO. ON	POS.
6	ELEVATOR DAMPNER	5652880-505	1B-1	5652380-503	9817654NRC	R/H
6	ELEVATOR DAMPNER	5652380-503	9817654NRC	5652380-505	1B-1	L/H

AIRWORTHINESS RELEASE

CHECK C/W: TERM CK | STATION: KDAY

DATE: 11-25-99 | CERT. NO.: [redacted]

GMT TIME: 1415Z | AUTH SIG: [redacted]

AIRCRAFT TIME / CYCLES

PREVIOUS LANDINGS	33198	LANDINGS THIS PAGE	1	TOTAL LANDINGS TP	33199
PREV. A/C FLT. HRS.	8407807	FLT. HRS. THIS PAGE	2:11	TOTAL A/C FLT. HRS. TP	8408018

INS READOUT

1-DIST.	2-DIST.	3-DIST.

DISC. OPEN MAINT. ACTION CARRIED FWD TO:

BOOK CHANGED NEW LOG PAGE NO:

CAPTAIN'S SIGNATURE [redacted]

1. ORIGINAL WHITE - MAINTENANCE 2. WHITE COPY - OPS (SEND WITH TRIP ENVELOPE) 3. PINK COPY - RETAIN IN PINS

Attachment 3

DOCKET No.: SA-521
EXHIBIT No. 7R

NATIONAL TRANSPORTATION SAFETY BOARD

WASHINGTON, D.C.

DC-8 MAINTENANCE MANUAL
[Chapter 27 - Trouble Shooting Procedures]
(Emery, Douglas Aircraft Co.)

UNITED

MECHANICAL CONTROLS, PORPOISING ON AUTOPILOT - TROUBLE SHOOTING

APPLICABILITY: DC8-71 N8070U-99U AND N8177U

1. General
   A. This procedure is in three parts.
      (1) Part 1 contains checks for the most probable causes.
      (2) Part 2 is a more extensive check covering everything short of disturbing flight control rigging.
      (3) Part 3 is a complete check involving rigging.

2. Special Tools and Materials
   A. Special Tools
      (1) Cable tensionometer, 0 to 150 pounds capacity.
   B. Materials - None required

3. Trouble Shooting
   A. Part 1
      (1) Clean and lubricate elevator cable cabin pressure seals per MM/OV-23-27-00-23.
      (2) With airplane out of the wind (in hangar), gust lock on, check elevator controls for bidning and roughness. Cause of any roughness or binding is to be located. Experience has shown that tab torque tube bearings inside the elevator inboard hinge fitting are very susceptible to binding and rough operation.
      (3) Check elevator control cable tensions, per MM/OV-23-27-30-03, and record them.
      (4) Check cable on elevator autopilot servo drum for binding or damage.
      (5) Check top and bottom surface contours of elevators outboard of tabs. Top and bottom surfaces to be flat and trailing edge should not bow up or down. Any deviations from flat surfaces create "fixed tab" effects. If deviations found do not tend to cancel themselves out, an elevator change should be considered.
      (6) Repeat check "5", but on all four elevator tabs.
   B. Part 2
      (1) Check that elevator trailing edge forward of tabs fairs with tab leading edges. Correct any discrepancies.
      (2) Check control tab pushrods in elevators for clearance per MM/OV-23-27-33-17. Correct conditions not within limits.

CONTINUED

(3) Check that elevator servo support rig holes R and Q are aligned per MM/OV-23-27-30-03. Record any discrepancies.

(4) Check elevator controls rigging per MM/OV-23-27-30-03. Record any out-of-tolerance conditions.

(5) Remove the RH pilot seat and floorboards and check the MPT (Mach Pitch Trim) controls for evidence of binding. Operate the MPT to the extend position and check elevator controls for binding. Correct any binding.

(6) Check end play (looseness) of the elevator load feel/centering mechanism shaft relative to the mechanism housing. If end play exceeds .010 inch the mechanism should be r placed. The mechanism can be removed, checked and reinstalled without disturbing its adjustment.

(7) Check that elevator control system friction is within the limits of 27-30-04.

C. Part 3

(1) Disconnect elevator control cables and control tab pushrods from tab torque tubes at the elevator inboard end. Check the torque tube bearings for binding or roughness. If bearings do not operate smoothly, replace the elevator hinge fitting. Rerig elevator controls.

NOTE: Rework removed fitting to within limits of 6F-8297.

(2) Correct all discrepancies recorded during accomplishment of parts 1 and 2, preceding.

END

3

ELEVATOR AND TAB - TROUBLE SHOOTING

1. General

A. If trouble shooting the elevator and tab system indicates that adjustment or replacement of components is required or that cable tensions require adjustment, the portion of the system that contains the component or cable must be completely adjusted (see Adjustment/Test).

B. During the following trouble shooting procedures, the horizontal stabilizer must be in neutral position. Stabilizer is in neutral position when the dimension between the left jackscrew upper stop and drive nut upper stop mounting flanges is 11 15/32 (±1/16) inches.

C. Elevator is in neutral position when elevator trailing edge is 10 (±3/16) inches below marked rivet on side of tail cone.

2. Trouble Shooting Elevators and Tabs

WARNING: BEFORE OPERATING TABS, MAKE CERTAIN THAT AREAS AROUND LEFT AND RIGHT ELEVATORS AND TABS ARE CLEAR OF PERSONNEL AND EQUIPMENT.

Possible Causes	Isolation Procedure	Correction
A. FRICTION IN SYSTEM; BINDING OF CONTROL SURFACES; NEUTRAL POSITION OUT OF RIG; EXCESSIVE LOOSENESS OF SURFACES		
NOTE: Under tail wind conditions with the gust lock off, it is possible to encounter an elevator locked condition. This is possible when the elevators are at the limit of travel and held in this position by wind force on the elevator and tab surfaces. Operating the gust lock control lever to the on position should relieve this condition. If condition remains, check freedom of movement (see Inspection/Check), then trouble shoot per the following instructions.		
(1) Excessive friction in mechanical control system or excessive play or lost motion in control column	Check elevator control system for excessive friction (see Inspection/Check).	Adjust or replace parts as necessary.

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Possible Causes	Isolation Procedure	Correction
A. FRICTION IN SYSTEM; BINDING OF CONTROL SURFACES; NEUTRAL POSITION OUT OF RIG; EXCESSIVE LOOSENESS OF SURFACES (Continued)		
2) Binding control surfaces	Manually rotate elevator slowly from stop to stop and check for binding or interference of torque shafts in stabilizer stubs. Check tabs for structural binding or interference. Check tab pushrods and linkage for binding or interference.	Correct and replace parts as necessary.
3) Elevator neutral position out of rig	Check elevator neutral position (see Inspection/Check).	Rig elevator system (see Ajustment/Test).
4) Excessive looseness of surfaces	Check all surfaces for looseness (see Inspection/Check).	Replace worn bearings, bolts, or parts, as necessary.
	Check system cables for proper tension.	Adjust cable tension, (see Adjustment/Test).
	Check rigging position of elevator autopilot servo.	Position autopilot servo correctly.
B. CONTROL COLUMN CHATTER		
1) Load-feel mechanism needs grease	Disconnect load-feel mechanism from control column and determine if chatter stops.	If chatter stops, replace load-feel mechanism, (see 27-30-4 Maintenance Practices). Adjust elevator control system (see Adjustment/Test). If chatter does not stop, check for binding in control column assembly.

Possible Causes	Isolation Procedure	Correction
C. LOW COLUMN FORCES AROUND NEUTRAL POSITION; INADEQUATE PITCH TRIM COMPENSATOR		
(1) Elevator or tab neutral positions out of rig	Determine whether surfaces are within neutral tolerances (see Inspection/Check).	Adjust as required (see Adjustment/Test).
(2) Load-feel mechanism improperly adjusted	With gust lock on and elevator in neutral position, move first officer's control column to neutral position (13 1/2 degrees forward of vertical. Check that control tabs are faired with elevator. Release control column and check that column moves forward to position control tabs up 1/2 (±1/4) inch from faired position.	Adjust load-feel mechanism (see 27-30-4, Maintenance Practices).
(3) Pitch trim system improperly adjusted	With actuator in operational extend position and control column at neutral, measure horizontal forward force at centerline of control wheel. Force should be 30 1/2 (±2) pounds.	Adjust pitch trim linkage (see Adjustment/Test).
	Remove and check elevator load-feel mechanism for axial looseness. Maximum allowable end play is 0.010 inch.	Remove lockwire and back off checknuts. Rotate adjustment nuts until no end play exists between load-feel spring rod. Tighten checknuts and replace lockwire. Install load-feel mechanism, (see 27-30-4, Maintenance Practices).

ELEVATOR AND TAB - INSPECTION/CHECK

1. General

A. The linear dimensions for checking elevator travel are measured from the center of the elevator inboard trailing edge to the center of a marked rivet on the side of the tail cone. Angular dimensions for checking tab travel are measured by holding a rigging protractor on the rigging reference lines on the tab surface.

B. The elevator is in neutral position when the elevator trailing edge is 10 (±3/16) inches below the marked rivet on the tail cone. The control tab is in faired position when the tab trailing edge is aligned with the elevator trailing edge within 1/4 degree. The geared tab is in faired position when the tab trailing edge is aligned with the elevator trailing edge within 1/2 degree.

C. The horizontal stabilizer is in the neutral position when the dimension between the stabilizer jackscrew upper stop mounting flanges is 11 15/32 (±1/16) inches.

D. Inspection/check procedures are identical for left and right elevator and tabs.

2. Tools and Equipment Required

NOTE: Equivalent substitutes may be used instead of the following listed items:

Item	Name	Number	Manufacturer	Use
A	Rigpin		Local	Hold control column in neutral position
B	Rigging protractor	5765013	Aircraft Mechanics, Incorporated	Measure angles of control surfaces

3. Inspection/Check Elevator and Tab

A. Check Elevator and Tab Travel

(1) Make certain that horizontal stabilizer is in neutral position.

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(2) Move gust lock control lever, located on pilot's control pedestal, to unlocked position.

(3) Insert rig pin through 13 1/2 degree rig pin hole in link and rig pin hole in control column. Check for following:

(a) Elevator is in neutral position.

(b) Control tab is in faired position.

(c) Geared tab is in faired position.

NOTE: Geared tab faired position tolerance should be balanced as close as possible between left and right geared tabs (if one geared tab trailing edge is up within the tolerance, the opposite geared tab trailing edge should be down within the tolerance).

(d) Looseness at elevator trailing edge does not exceed 13/64 inch.

(e) Looseness at control tab trailing edge does not exceed 3/64 inch.

(f) Looseness at geared tab trailing edge does not exceed 1/32 inch.

(4) Remove rig pin from control column and rig pin link. Check that column moves forward to new neutral position and that elevator control tabs move up 1/2 (±1/4) inch and remain in this position.

(4a) Move gust lock control lever, located on pilots control pedestal, to unlocked position.

(5) Manually move elevator trailing edge down until stops contact and move right control column full forward. Check for following:

(a) Aft stops at lower end of control column contact.

(b) Control tab stops contact.

(c) Elevator trailing edge is 23 7/32 (±13/32) inches below marked rivet on tail cone.

(d) Control tab is 8 1/2 (±1/2) degrees above faired position.

(e) Geared tab is 4 3/4 (±1/2) degrees above faired position.

6) Manually move elevator trailing edge up until stops contact and move right control column full aft. Check for following:

(a) Forward stops at lower end of control column contact.

(b) Control tab stops contact.

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(c) Elevator trailing edge is 12 1/4 (±13/32) inches above marked rivet on tail cone.

(d) Control tab is 26 1/2 (±1/2) degrees below faired position.

(e) Geared tab is 26 3/4 (±1) degrees below faired position.

(7) Release control column.

B. Check Elevator and Tab System for Excessive Friction

NOTE: To eliminate effect of wind on control surfaces, elevator and tab friction check should be performed in hangar or in still air conditions.

(1) Move gust lock control lever, located on pilot's control pedestal, to unlocked position.

(2) Manually move elevator trailing edge up and then down. Check for following:

NOTE: Elevator trailing edge must be moved slowly to minimize effect of elevator dampers.

(a) No binding or interference in elevator bus linkage.

(b) Elevator torque shafts have sufficient clearance where shafts pass through stabilizer stubs.

(3) Move gust lock control lever to locked position.

(4) Attach a measuring tape to convenient point on instrument panel with extended end of tape resting over top of right control column so that column travel can be measured within 1/32 inch accuracy.

(5) Pull control column aft, then allow column to return slowly forward until centering force is zero and column stops moving. Measure and record position of column.

(6) Push control column forward, then allow column to return slowly aft until centering force is zero and column stops moving. Measure and record position of column.

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(7) If difference between positions recorded in steps (5) and (6) is greater than 1/2 inch, elevator system friction is excessive; proceed with following checks:

(a) Check pressure seal tubes on elevator cables through pressure dome in aft fuselage section.

NOTE: Seal tubes must be clean and free of oil or grease. Seal grommets must have free-running fit on seal tubes throughout cable travel.

(b) Check entire elevator cable system for fairlead misalignment, seized pulley bearings, excessive pulloff at pulleys, binding guard pins, or cables rubbing at cutouts.

(c) Check that elevator servo drum is free to rotate when disengaged.

(d) Check elevator load-feel and centering spring mechanism, located at lower end of right control column, for binding or interference.

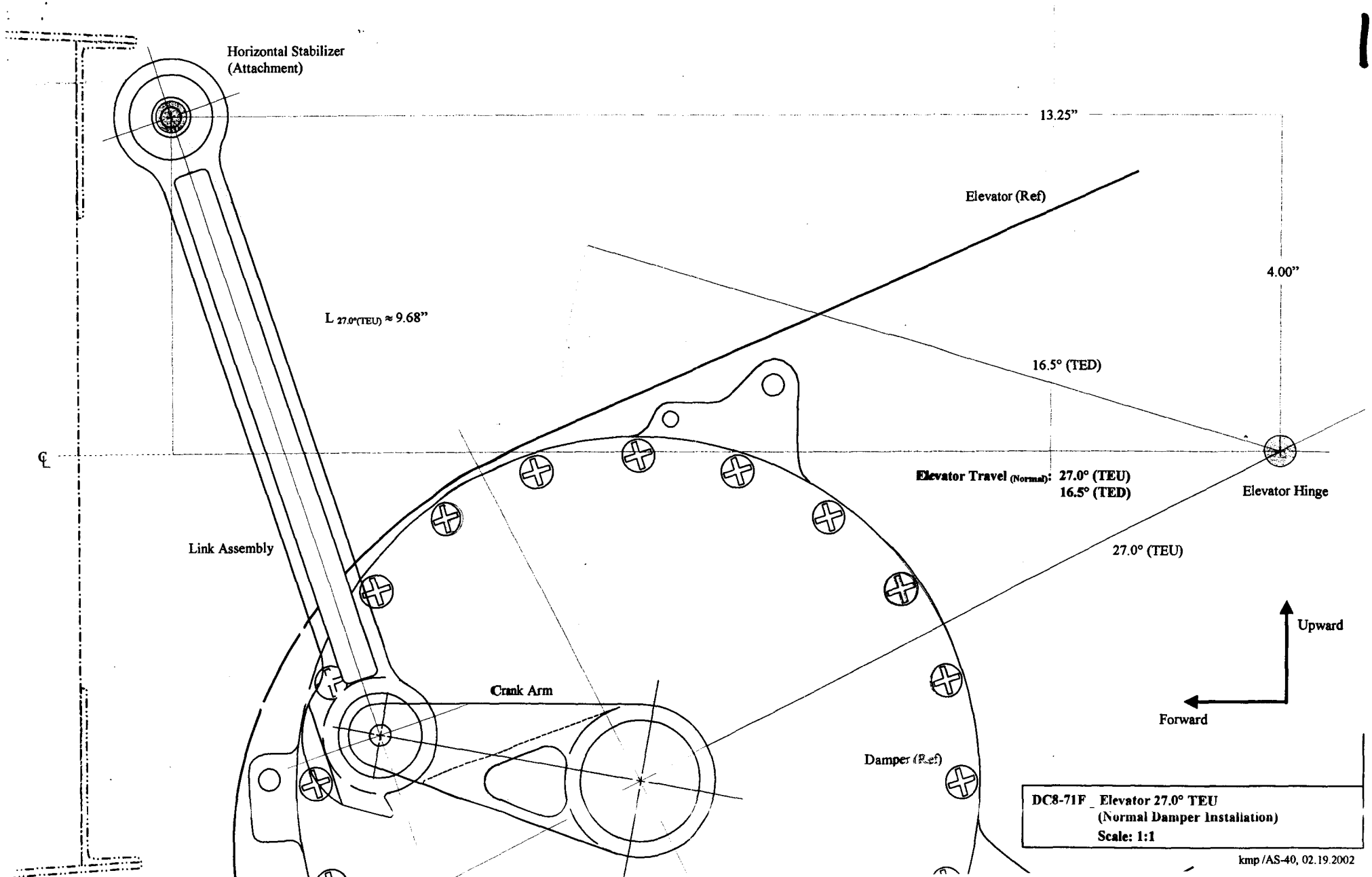
Attachment 4

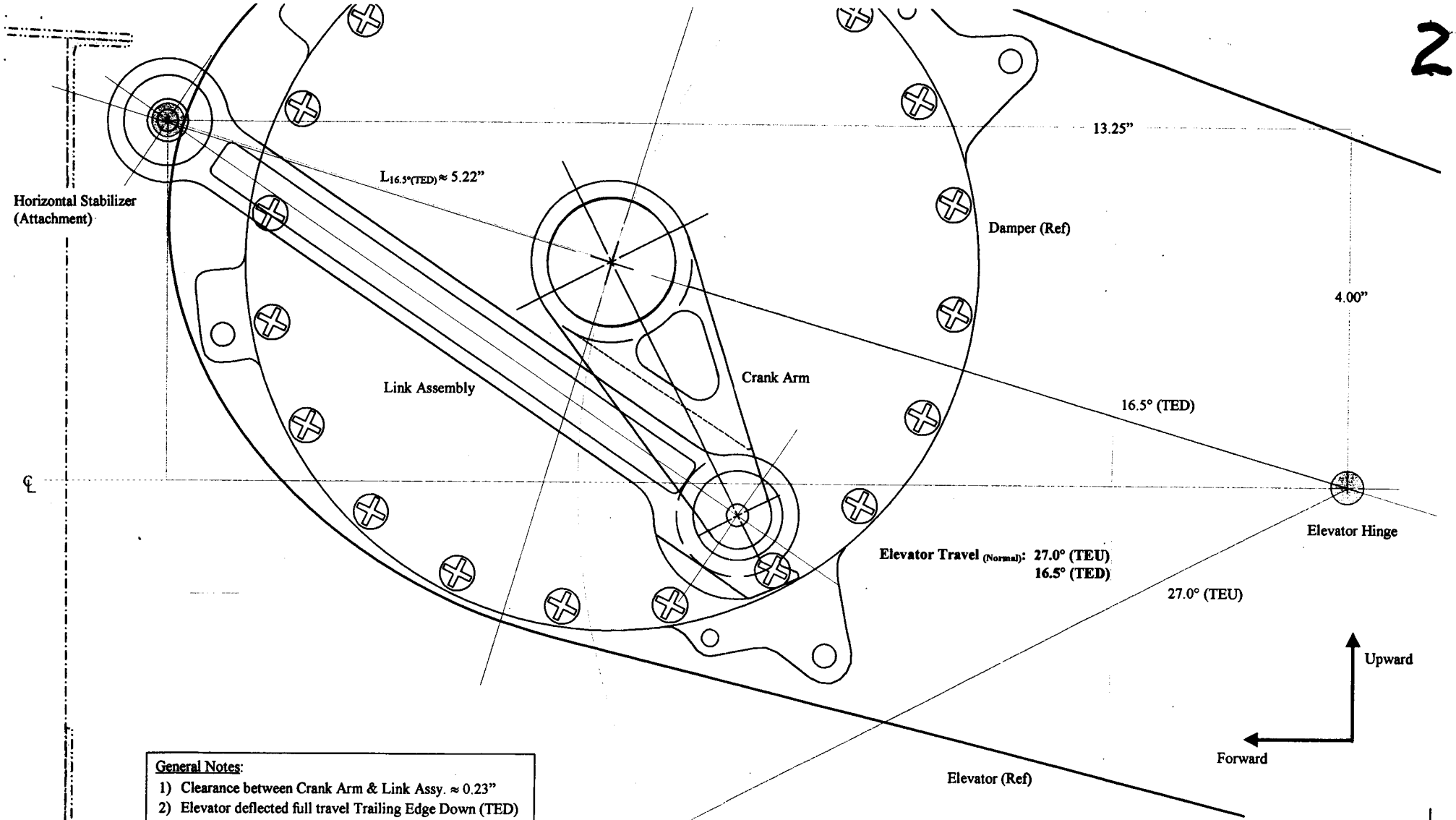
DOCKET No.: SA-521
EXHIBIT No. 7Q

NATIONAL TRANSPORTATION SAFETY BOARD

WASHINGTON, D.C.

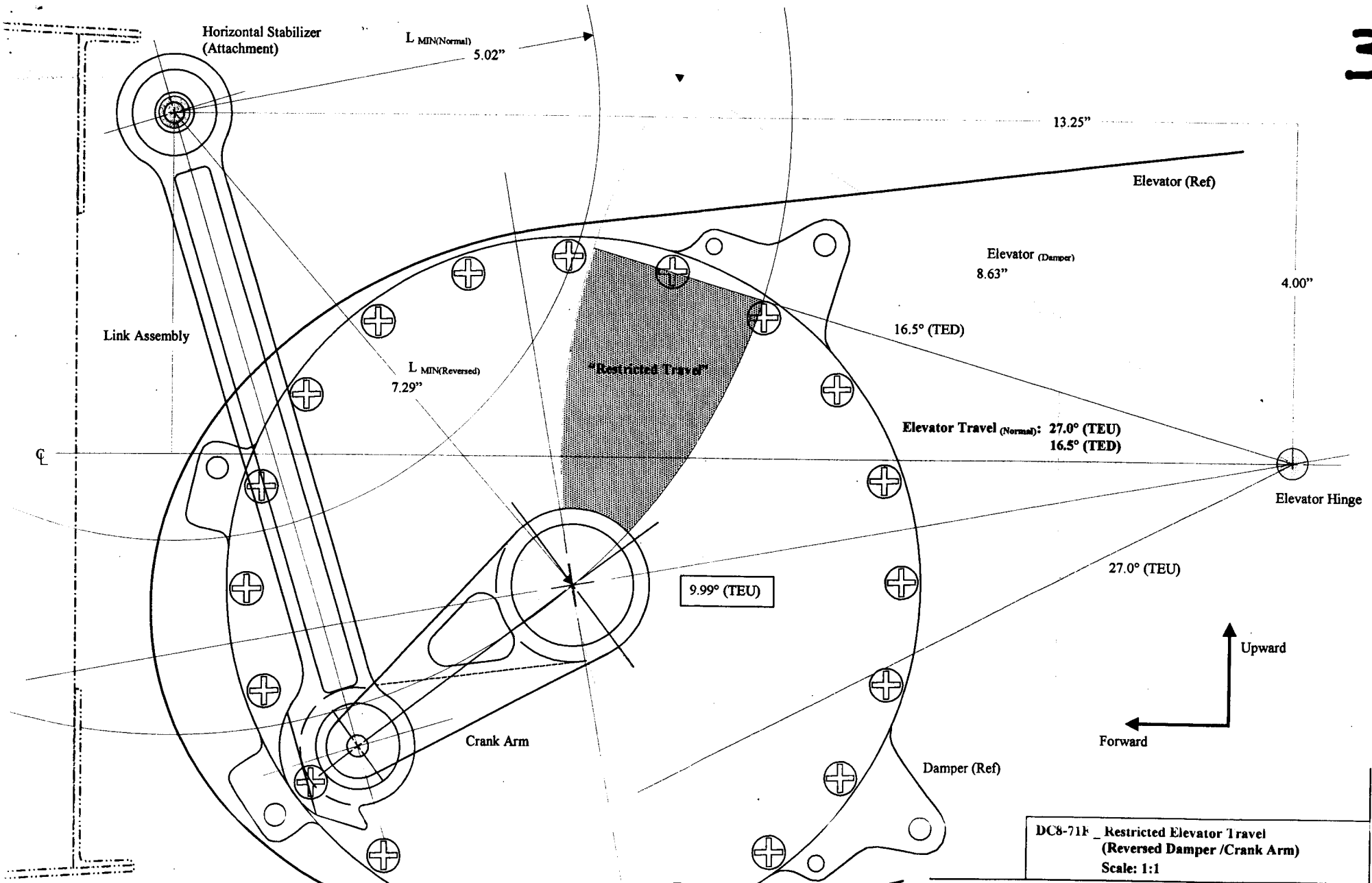
DC-8 ELEVATOR /DAMPER
(Installation Drawings)


Horizontal Stabilizer
(Attachment)
13.25"
Elevator (Ref)
4.00"
L 27.0°(TEU) ≈ 9.68"
16.5° (TED)
℄
Elevator Travel (Normal): 27.0° (TEU)
16.5° (TED)
Elevator Hinge
Link Assembly
27.0° (TEU)
Upward
Forward
Crank Arm
Damper (Ref)
DC8-71F _ Elevator 27.0° TEU
(Normal Damper Installation)
Scale: 1:1
kmp /AS-40, 02.19.2002

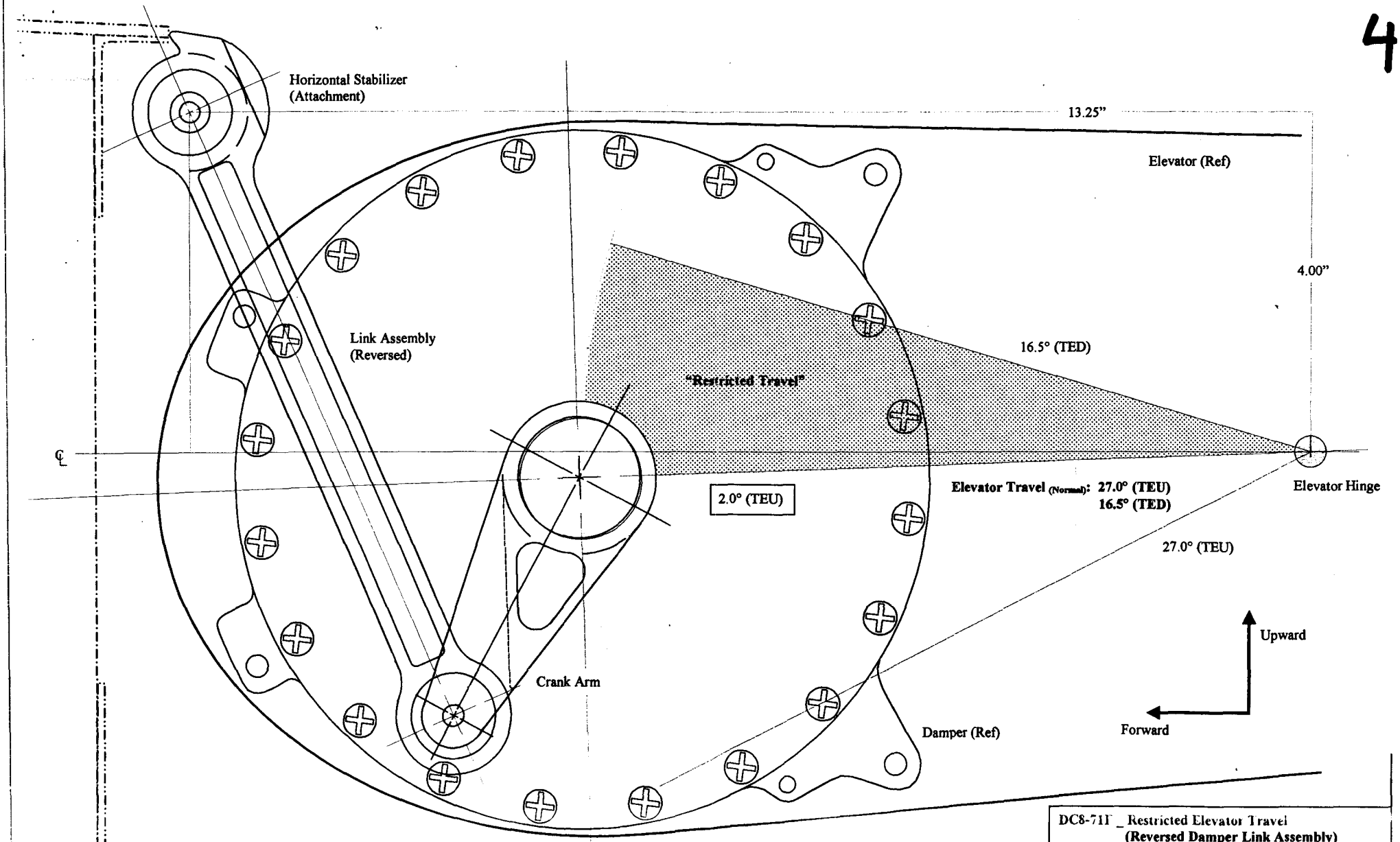


General Notes:
1) Clearance between Crank Arm & Link Assy. ≈ 0.23"
2) Elevator deflected full travel Trailing Edge Down (TED)

DC8-71F _ Elevator 16.5° TED
(Normal Damper Installation)
Scale: 1:1

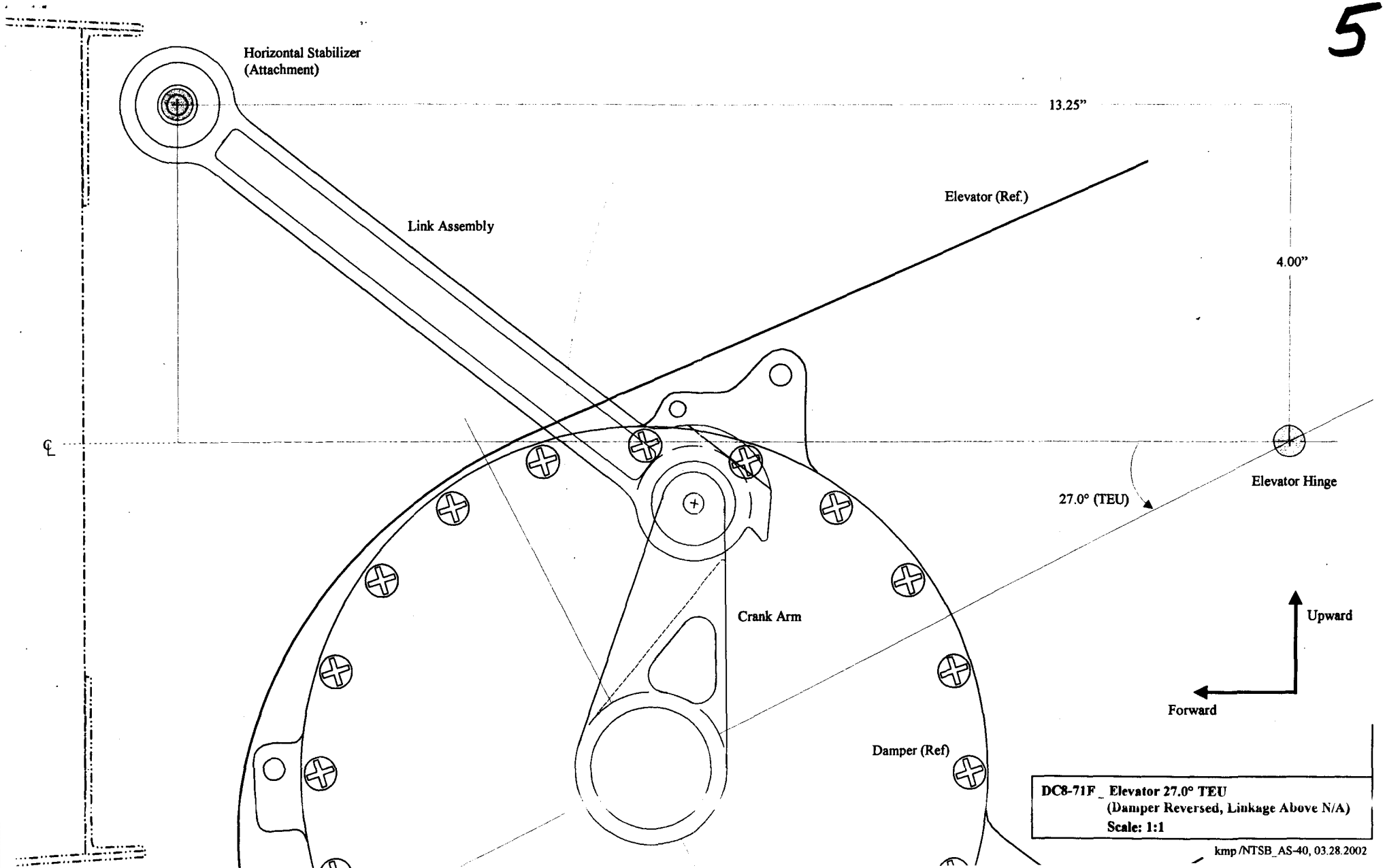


DC8-71F _ Restricted Elevator Travel
(Reversed Damper /Crank Arm)
Scale: 1:1



DC8-71T _ Restricted Elevator Travel
(Reversed Damper Link Assembly)
Scale: 1:1

5



DC8-71F _ Elevator 27.0° TEU
(Damper Reversed, Linkage Above N/A)
Scale: 1:1

kmp /NTSB_AS-40, 03.28.2002

Attachment 5

DOCKET No.: SA-521
EXHIBIT No. 17Y

NATIONAL TRANSPORTATION SAFETY BOARD

WASHINGTON, D.C.

Transcript of Bruce Robbins (Emery) interview, September 11, 2001

(99 pages)

NATIONAL TRANSPORTATION SAFETY BOARD

In the Matter of:)
)
EMERY WORLDWIDE AIRLINES) Docket No.: SA-521
)

WITNESS: BRUCE ROBBINS

PAGES: 3 through 99

PLACE: Emery Worldwide Airlines
One Emery Plaza
Dayton, Ohio

DATE: Wednesday, September 12, 2001

The interview, conducted pursuant to notice, at 8:30 a.m.

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C O N T E N T S

PROCEEDINGS

BY MR. McGILL:

Q Bruce, can you start off by giving us a little background of your aviation experience, please?

A Sure, I started aviation in 1978 in the US Navy. Spent four years there. After I got out of navy, I went to work for Airborne Express. Spent some time there. Went to the manufacturing sector working at Calverton, Long Island working for Grumman.

From Grumman, I went to Rosenbaum based out of Ypsilanti, Michigan, flying aircraft out of Dayton, Ohio. Came to work for Emery in 1989 as a supervisor, avionics supervisor. Went to maintenance supervisor to maintenance controller. Back to supervisor. Was promoted to manager of maintenance training. Developed the department there and spent several years as a manager of maintenance training and from there, went to director of engineering and developed the engineering department at Emery.

Left Emery in June of 2000 and went to work for a start up airlines, Heartland Airlines, based out of Dayton, Ohio, who have yet to get their funding. Now, I am a professional consultant.

Q Okay. First off, when did you actually become director of engineering?

A It was in the spring of 1999.

Q Can you give us a little short talk here about your responsibilities as director of engineering?

A Yes, I can do that. Director of engineering, I was over reliability, which had check analysts and specialist, maintenance programs and publications, technical publications for technical services. I had also a power plant engineer, avionics engineer, systems engineer and a structures engineer. With those engineers, we took care of interfacing with other engineering firms to develop STCs, repairs needed on the line for structures.

We assisted in troubleshooting the aircraft when it appeared that the maintenance manual didn't provide adequate troubleshooting. The publications section, we were charged with updating and maintaining the maintenance inspection programs, all the maintenance manuals, the MPPM, all the airline specific manuals and reliability according D-74 ops specs, maintained the reliability section.

Q That reliability was for DC-8s, not DC-10s?

A DC-8s initially. DC-10s, we were gathering data to put DC-10s into reliability.

Q Talk a little bit on the DC-8 reliability. We have had numerous discussions about the degree of maintenance. How did you track how maintenance is performed

and the effectiveness of your program?
A there are equations that are used that are standard for reliability in tracking what we would call or term repeat write-ups. If an aircraft had repeat write-ups with the same four-digit ATA code, that would be flagged for an action notice. And action notice is distributed to maintenance planners, who then follow along with the recommended actions from engineering and reliability to troubleshoot the aircraft or to perform whatever action was put on the action notice.
Q Talk a little about the -- we keep hearing how you have repeat write-ups. How did you track that from a reliability standpoint?
A We use the pilot reports to determine if there is a problem on the aircraft that is repeating itself. Obviously it's not being addressed properly or maintenance has been ineffective in fixing or identifying the problem. In some cases, particular with aircraft with a lot of wiring, you have a situation where there is a problem on the aircraft that only rears its head every so often and maintenance may or may not be able to find that depending on the condition of the aircraft at the time you are looking at it.

So, there are occasions where you will have repeat items write-ups that are difficult to find. There are also write-ups such as auto pilots and pressurization that only come into play in a real sense under dynamic conditions with the aircraft, so statically maintenance has a very difficult time troubleshooting. Those are hard items to duplicate and to fix on the line.

Most of the time we would take -- use various sources of information, pilot reports, from maintenance actions that have taken place, tear down reports from the equipment or components taken from the aircraft, that there were any problems with that. If engineering could identify a certain circuit or system piece that we felt was necessary or was the probably culprit, we would either have a rewire job done via an action notice or have a component changed, quarantined or sent to the shop.
Q When you get tear down reports, do you -- what components -- which components do you track on reliability on tear down?
A You can track any serialized unit. There are different levels of tracking within Emery's system. Not every serialized unit would be tracked for purposes of reliability. Obviously small components, small check valves and things of that nature may have a serial number. A switch may have a serial number on it to know what type of

switch it is that is not necessary to track. It doesn't really play into reliability, so it really varies as to what you track and what you don't track.

The whole goal is to provide the airlines with as much vital data that promotes safety, reliability and keeps your cost down. If it was a high-dollar item, and it may not even be serialized, we would track the usage of that item, so once again, it varies.

Q Do you track flight control components?

A I believe the system tracks flight controls.

Q We have had discussions of several times flight controls being repaired or overhauled at various 145 facilities and they would come in with less than a desirable status. How did you track and maintain the performance of these components?

A There is a -- if a unit was continually being found as bad from stock meaning that the vendor was not providing adequate service, we would -- obviously there would be a QC audit performed to make sure that they were complying with the maintenance manual. Reliability would get involved only if it impacts the dispatch reliability of the aircraft for the most part.

Bad from stock units, only when it become an economic issue did we get involved with that. That is really left up to an audit function. Materiel would track -- obviously they track expenses. If they saw a vendor that had poor performance, they would flag both quality control and engineering. Engineering would assist quality control in trying to find out if there was a systemic problem within as far as procedural or was it either shipping issues -- there was quite a few things that can cause components to be bad once you have received them and shipping is just one of them. Complex components, obviously just as the aircraft goes to a 145 facility when it comes out -- it's not perfect a lot of times. So, complexity of the components plays a big part in what you get.

Q So the materiel quality control area would probably track components like flight controls that go into a 145 heavy overhaul thing like TTS; is that correct, rather than through your area since it's not --

Q Can you say that again?

A You are saying the materiel -- and we don't have a person here that is representing the director of materiel management, but in that position, I see where they had kind of a QC area where supplies, components that were sent to heavy maintenance 145s, whereas you are more involved with parts that are sent directly to a line that is affecting the flying of the airplane; is that correct?

A That's fair.
Q So, what I wanted to know then, -- like TTS we have already identified as having has several problems with flight controls coming from other vendors, other 145s. What did Emery do and whose responsibility to check that out and how did they do it?
A I really can't answer that. Only if it became an economic issue would they get engineering reliability involved in a formal basis.
Q But from your position as running the reliability program itself, you wouldn't have gotten involved with that?
A Not from a heavy check standpoint.
Q The various components that are coming, that is from other 145 facilities, I was trying to better understand who is setting these things up. This one here happens to be the CCI controls that was put on the actual aircraft, but from the customer, who are these other people and how did they get involved with those?
A Willis Aeronautical.
Q Yes.
A They are a broker of parts.
Q Aerofund Financial, Willis Aeronautical -- how does the chain get down to where these parts are installed in the airplane?
A I don't know anything about Aerofund Financial. I'm not the expert on this particular subject matter, but it's my understanding that Willis Aeronautical as a broker were contacted, as were other people, for DC-8 control purposes. And through that Complete Controls was found and they were a broker for Complete Controls and Emery completed a case audit of Complete Controls and put them on a vendor list and Willis Aeronautical is really just moving parts from point A to point B. They are not a provider of 145 facility.
Q So, when you need any type of part, would you go to a broker to get that particular part?
A With the aircraft age, it's very difficult to get parts for DC-8s. When you need parts, you have to beat the bushes and if a parts broker -- in a lot of cases, parts brokers will go out and become a primary broker for 145 repair facilities so that they can have a better chance of moving their parts. Parts brokers, that's what they do.
It's a good source to find parts, although obviously it has to come from a certified 145 repair facility and that has to be audited and put on the vendor's list. With the age of the aircraft, you get them where you can find them.
Q Yes, this is a problem with the age of an

aircraft. But when you accept a component like that that is overhauled from another 145, how do you track the reliability? Obviously you have sent out a set of flight controls to someone, but you are receiving another set from someone else. How do you track that in the form of reliability?

A It if impacts the dispatch reliability, if it's focused in on flight control -- was the cause of a late departure or cancellation, we would get involved with who was the vendor, how did it get installed, the complete history of those components. Otherwise, unless it's brought specifically to the attention of engineering, these things, depending on a lot of circumstances -- how many parts did we receive, how many of them were good versus bad, when they were bad, was it cosmetic things, was it severe. There is not enough information for me to give you the answer, only that engineering would not normally be involved unless it affected dispatch reliability or if it was specifically targeted by another department asking for help.

Q Since you have good depth in avionics as being a former supervisor for Emery, the avionic components work nearly the same way, am I correct? You would go through a broker?

A It's possible. A lot of the avionics, we dealt directly with 145 repair facilities because it does tend to expedite.

Q My thrust of all of this is how does one -- the purpose of having a reliability program, being able to just statistically improve the operation of all these things by analyzing tear downs and performance data and so forth to try to always make it better, just generally when one flied the older aircraft like this and you are going through brokers rather than sending the same component out, having it torn down, understanding what was wrong with it and bringing it back into your system, putting it back on the same airplane, how do you -- how does this work trying to create reliability?

A Specifically with flight controls?

Q I am talking avionics now.

A Well, reliability is just that. The main functions, the top functions for reliability is safety and dispatch reliability, keeping the aircraft in the air safely and just dispatched on time.

The third thing, which from a business standpoint is important, and that is economics. Economics is the part we are talking about. The aircraft is in heavy check. As long as the aircraft comes out on its scheduled departure time and it is functioning, it's not top priority. And I

don't want to take anything away from the emphasis we place on the economics, but the main function and most of the statistical data is driven from line operations, real dispatch data.

With respect to flight controls in particular, why you wouldn't send a set out, just like you would send out a radio, have it repaired and brought back, flight controls are large services and they require a lot of time to overhaul and this is over and above what the on aircraft maintenance planning document from Douglas says to do. Emery elected to take the more stringent procedure and have these overhaul. It may take them 45 days to overhaul them. It might take them 90 days to overhaul. If the aircraft is scheduled to come out and 30 and it's 45 days, nobody wants to hold it up for this.

So, you try to provide spares so that you have a constant supply on hand.

Q Only because I haven't read but very little of it, to tell you the truth, but I have stacks of various alleged happenings and events from maintenance and pilots and so forth on the operations. I was looking at these things on the repeat repairs where different components are reinstalled and not sent out and they have got all kinds of things like that. I know, nothing specific right now, but this is where I was trying to better understand how, from your position as running the reliability, how you are tracking these different components when some guy takes one out and what happens to it, whether it's a VOR or flight instrument component and you send it out, how are you tracking what kind of results you are getting and where does it go to the next airplane and do you have that kind of capability?

A When it's brought under focus as a problem component impacting reliability, that component is analyzed in great detail. There were cases where we had the manufacturer modify power supplies because the power supplies were failing at a low rate -- low hour, I should say. So, when it becomes a problem, you are always beating down the long pole in the tent. Whichever one is the problem system for the aircraft or the problem component, that is the one you target and analyze it and you try to do whatever engineering or in some cases, it's procedural, sometimes it's troubleshooting techniques, whatever item it takes to fix that to get that off the top of the list.

Q How many technical analysts work in your department?

A At the time I was there?

Q Yes, sir.

A I believe it was four to five.
Q Is that separate from reliability analysts?
A They provide similar functions and any time I could overlap and use them for --
Q So, the total under the manager of reliability would be how much?
A I believe there were six.
Q I want to talk just a little bit, Bruce, about the use of manuals. We have kind of discussed this earlier at different times. Flying so many different models and different types and so forth, address how you kept track of all of the revisions with all of these different manuals and how mechanics would always know which one to appropriately use.
A With tracking revisions, there is not very many revisions called out for the DC-8 model itself. Boeing does not -- they do provide revisions, but it's not very frequent. Supplemental manual that are developed in house for systems that were installed, STCs that were accomplished on the aircraft, those manuals are also, once the engineering is accomplished and the system has been refined, there are a few revisions possibly at the front end of a program, but as a program matures, there is very few revisions once again.
So, the revision cycle, there is not a lot of revisions for the maintenance manuals themselves. The manuals such as the MP&P, those manuals are a constant evolution based upon the airline's growth and changes in FAA, there are lots of reasons to change that and that is a fairly frequent revision process. Those are all tracked in the computer system and maintained in the tech library.
Q How do you know or do you have a policy that you receive -- for instance, on your OEM manuals or STC manuals, do you have the latest revision? How would one know that that is the latest revision?
A Every station or every vendor that receives manuals that are on a distribution list, they get audited or they do self audits. And at that time, they register each manual that was given to them, what revision level it's at and if there is any discrepancies, that is remedied at that point.
Q I was more referring to how would you at the headquarters if you have got the right one here, not the ones that you are sending out amongst all the people, but how do you know that you have the right ones here?
A Which manuals? All of them?
Q An OEM manual from a particular vendor or manufacturer?

Attachment 6

To: Frank Hilldrup, National Transportation Safety Board

From: Ron Alverado

Subject: Observations while working on sight in Dayton Ohio

Date: August 8, 2002

Dear Sir,

Per your request, the following is my witness account of a specific flight control problem I was asked to solve while providing on sight support at the Emery Worldwide Airlines flight line in Dayton Ohio June 2001.

EWA was working on an aileron flight control system discrepancy on aircraft N796FT. An EWA employee named Clay Bass was performing this maintenance. When I approached the aircraft to see if my help was needed I identified that the maintenance manual being referenced was the incorrect effectivity for that aircraft. The response from Mr. Bass was to mind my own business, and that EWA re-rigs every aircraft leaving TTS because we do not know how to rig flight controls. I left the area and went to assist on another aircraft. The aircraft was released after the EWA mechanics finished their task.

The aircraft N796FT returned later that night and I was asked to prepare the aircraft for its flight the next morning. This included tending to any logbook discrepancies generated from the previous flight. One of the logbook items generated by the flight crew was related to the aileron system. Ailerons require 4 degrees of trim. My first step was to reference the Maintenance manual for guidance. Then I went to the cockpit to check the neutral of the aileron tab setting. When I attempted to turn the aileron trim knob it came of in my hand. We then verified all adjustments in the fuselage leading out to the wings, then checked the cables routed through the wings. When we removed the panels at the power packs we immediately noticed hardware that was installed hand tight and missing cotter pins and safety wire. I brought this to the attention of an EWA and TTS supervisor. To address the discrepancy I adjusted the aileron system per the maintenance manual, which included resetting neutral at the tabs, installed and secured the aileron trim knob, and performed travel checks associated with the inspection/check portion of the maintenance manual. After the maintenance was complete signed off the aircraft logbook and continued servicing the aircraft to prepare for the next flight. Aircraft N796FT departed for its next flight and returned again the next day with no discrepancies noted in the aileron system.

Upon returning to TTS, the on site TTS supervisor (Perry Jacobson) that was in Dayton during this time period, generated a letter in parallel to a phone conversation with Dave that took place at the time of the incident. This letter was written July 19, 2001. Dave Hoffstetter communicated by telephone at the time of the occurrence with Emery Worldwide Airlines Maintenance Control to try and help harmonize the situation, yet allow EWA to understand the mistake that was made by their mechanics.

Following the above incident Dave Hoffstetter sent the revised "C" check work card addressing the aileron trim tab settings to EWA's maintenance control. Apparently, maintenance Control or the line maintenance group did not know that their fleet had been standardized to have "0" degrees trim tab at neutral. The emery "C" check routine work card 4501 clearly calls out the neutral setting to be "0" inch + or – 1/8" inch.

Thank you for the opportunity to share this frightening account and I regret not being able to remember more names of people involved. I know I would recognize the people involved if I saw them. However, should you have any questions please do not hesitate to contact me.

Sincerely,

[redacted]

Ron Alvarado
Tennessee Technical Services
A&P mechanic/Quality Assurance Inspector

Attachment 7

DOCKET No.: SA-521
EXHIBIT No. 17BB

NATIONAL TRANSPORTATION SAFETY BOARD

WASHINGTON, D.C.

Transcript of Joseph A. Abramski (FAA) interview, January 23, 2002

(95 pages)

NATIONAL TRANSPORTATION SAFETY BOARD

In the Matter of:)
)
EMERY WORLDWIDE AIRLINES) Docket No.: SA-521
)

WITNESS: JOSEPH A. ABRAMSKI

PAGES: 3 through 95

PLACE: Emery Worldwide Airlines
One Emery Plaza
Dayton, Ohio

DATE: Wednesday, January 23rd, 2002

The interview, conducted pursuant to notice, at 8:30 a.m.

APPEARANCES:

FRANK McGILL
National Transportation Safety Board

LYLE K. STREETER
Federal Aviation Administration

STEVEN CARBONE
National Transportation Safety Board

to standardize and make it better?

A Yes, it was our position that the certificate holder's manual as it is stated in the regulations -- they had a variety of different maintenance manuals from various airlines, so many different kinds of configurations. We sought to go ahead and we proposed to Emery, told them that within the confines of the regulations as we read them, because those certificate holder's manuals must maintain the standards, the time limits, et cetera, et cetera to reflect the fleet configurations and to maintain -- in order to properly maintain those aircraft, that all these different manuals that they had all over the place needed to be consolidated so that the average mechanic could go on in there, into that manual and know exactly what he is going to deal with rather than a series of supplemental manuals.

At the time of the transfer of the certificate, Emery was in negotiations with an organization called Avitech out of Florida to consolidate those manuals, to be specific, and that was going to be a rather costly affair. Nonetheless, it didn't matter to me. I'm not looking at the cost factor itself, but I do know that those needed to be addressed.

Originally going back in time, and this is my understanding of it, when the fleet was small and United Airlines aircraft were being added and the Scandinavian Air

Attachment 8

DOCKET No.: SA-521
EXHIBIT No. 17CC

NATIONAL TRANSPORTATION SAFETY BOARD

WASHINGTON, D.C.

Transcript of Harold Camden (FAA) interview, January 23, 2002

(45 pages)

NATIONAL TRANSPORTATION SAFETY BOARD

In the Matter of:)
)
EMERY WORLDWIDE AIRLINES) Docket No.: SA-521
)

WITNESS: HAROLD CAMDEN

PAGES: 3 through 45

PLACE: Emery Worldwide Airlines
One Emery Plaza
Dayton, Ohio

DATE: Wednesday, January 23rd, 2002

The interview, conducted pursuant to notice, at 1:00 p.m.

APPEARANCES:

FRANK McGILL
National Transportation Safety Board

LYLE K. STREETER
Federal Aviation Administration

STEVEN CARBONE
National Transportation Safety Board

policy with very few procedures, which presented a problem because the reason that was a big problem was the fact that if someone was using policy and not procedures, everybody performs the tasks they way he thinks it should be done and if this system happened to break down, you had no way of finding what broke down in the system because you had too many inputs, different inputs. That was one of the things that we addressed in that very first is the MPMP wasn't a functional document.

The next thing we found that we felt wasn't functional was that they was using all the air carriers that they had purchased the airplanes from, using their manuals. Every one had its own manual. What concerned us about that was that there was no revision, way they could revise it and you know it was up to date.

Also, even that early we found mechanics using the wrong manual with the wrong aircraft. We found that within the first couple weeks.

So, that was one of our biggest problems and we did get -- it was one of the areas we addressed. There are other areas, but I just can't --

Q Let's just take the one you just brought up. By the time of the accident, which is about a year later -- no, wait --

A Two months later.

A Yes.

Q And go through all of these issues?

A Yes, and before we closed them out, each one was discussed and given to us in writing.

Q Were you happy with that relationship? Did they do what they were told to do?

A Well, yeah, on these particular items.

Q At that time, what other items then were on the table?

A Let me put it this way. Emery -- senior management, I have never had any problems whatsoever. They saw the problems when you explained it to them. Most of the time they understood. Our main problem was that they would get these problems fixed, but again, with policy and no procedures, you would go somewhere else and you would find the same problem again.

That's where if you had had a good procedure and a good quality assurance system, if they had had a problem here, it would automatically -- should have triggered to check these other areas and make sure they had and we had a lot of problems with that for the year and three quarters that we operated. We would find a problem here. We would go to the next facility and we could find the same problem there.

The same way with a lot of the write-ups and

things like that. They would address them. They never refused to address them and they trained, too. But we even called for extra training and they trained, but the breakdown was that we didn't have -- they didn't have good manuals to go by and with that being a fault, that is your bible in a company like that and if you don't have that bible like a bible should be, well, it's going to break down. And that's what we found.

Q Did you find that the maintenance staff, the leadership was knowledgeable enough to have created the proper environment to --

A A lot of times I think they were over their heads. I'm not talking about the senior, but I am talking about the lower management level. I think in a lot of cases, they were over their heads. They couldn't see the problems themselves. Once we pointed the problem out, it got addressed, but they didn't have the ability to go and say this is a problem, let's fix before we are told about it.

Q Do you think that is experience or was that just they needed more people?

A I think they had adequate people to do the job. We never did see where they were shorthanded when we monitored the maintenance and this type of deal.

Q What about all the time that was going on,

the pilot union collected an enormous amount of data that concerned repeated discrepancies, write-ups that they were very concerned about? Did you ever get involved with any of these --

A On repeat write-ups?

Q Yes.

A Well, we was working with it every week. It got to the point that I had a weekly meeting with my staff and Emery's staff, the managers, and we would go over the problem areas of the past week where they found and places that they needed to address. I mean, normally, a PMI doesn't do this. But we saw a need that just had -- in order to keep going, we had to bring it. They was very cooperative and we had -- I think the meetings we had solved a lot of their problems.

The biggest problem was I think the training breakdown. They trained, but the tracking of it wasn't the best in the world, because a lot of the mechanics hadn't been to training for two or three years. So, finally we didn't get the training. It wasn't the supervisors that controlled who was going to class and should be in training. They sent the names out for these people to get the training and then this way, they had to have a real reason if they didn't show up for it.

A lot of this stuff -- you know, 18 months, a

lot of this stuff was in the workings and was beginning -- we was beginning to see, but they didn't last long enough for us to really see if we was making any headway.

Q In the repeat write-ups --

A We addressed that. They came up with a tracking system on the repeat write-ups and at the very end, they were getting a handle on it. But this was within the last month or two months, because they was bringing the planes in and going through a complete inspection on the weekends on certain planes that was scheduled to come in.

We did see a drop in the percentage of the repeat write-ups. A lot of times, generally you are talking about repeat write-ups because the fact is that people when they wrote something, they was referring to one thing, but they still -- it was another system break down, but they was referring to the wrong system. We caught that quite a bit. Even on the RASIP inspections, they found that.

Q The last RASIP was done in October 16th to November 2nd.

A Yes.

Q And again, this was a regional inspection, so you were not part of it.

A No, in fact, on that particular inspection was pulled, the region with the personnel here and we wasn't part of it and even those people wrote their own EIRs up

Attachment 9

Docket No. SA-521

Exhibit No. 2-C

NATIONAL TRANSPORTATION SAFETY BOARD

Washington, D. C.

Operational Factors/Human Performance Group Chairman's Factual Report
Attachment 2 Excerpt – Interview of Mark M. McConaughy

(60 pages)

BEFORE THE

NATIONAL TRANSPORTATION BOARD

FIELD INTERVIEWS)
EMERY WORLDWIDE AIRLINES FLIGHT 017)
May 2, 3, 4, 2000)
OPERATIONS/HUMAN PERFORMANCE GROUP)

Emery Worldwide Airlines
One Emery Plaza
Vandalia, Ohio

Tuesday,
May 2, 2000

The interview began at 10:15 a.m.

Interview of:

MARK M. McCONAUGHY

PRESENT:

KENNETH L. EGGE
Aviation Safety Investigator
National Transportation Safety Board
Office of Aviation Safety
Operational Factors Div. (AS-30)
490 L'Enfant Plaza East, S.W.
Washington, D.C. 20594-2000

EVAN BYRNE, Ph.D.
Human Performance Investigator
National Transportation Safety Board
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T.R. PROVEN
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Washington, D.C. 20591

CAPTAIN DIRK J. P. VISSER, IV.
FA Liaison, Chief Accident Investigator
EWA Council 110
95 West Maplemere Road
Williamsville, NY 14221-3123

(1)

know, maybe stick my neck out here a little bit, but the only thing -- you know, from coming from my law enforcement background, what I see with the FAR's and the FAA's way of handling situations is, the FAR's are basically written to deal with a person whose initial objective is to comply with the regulations. And I think when that occurs, that's wonderful. Because then the system works like it's supposed to.

But when you get in a situation where you have -- in cases there are persons, person or persons, who, for whatever reason, don't want to comply with the regulations, it starts getting real tough and real difficult to cause the changes you need to have happen. And I don't know what the answer to that is. It just seems to me sometimes when you do actually find some evidence of things that are criminal, it just seems to take an awful lot to get it to that point. And a lot more than I think it should.

Because I mean those kinds of things, I mean if they get corrected the way they should get corrected, you know, people do those kinds of things and get prosecuted and it becomes knowledge. Those people that are on the fence will I think probably get on the right side of the fence.

But that's just the one thing I have a

Attachment 10

Tennessee Technical Services

MEMORANDUM

To: All Inspection Personnel

CC: Dave Hoffstetter, Jack Ray, Dan Fry, Ray Pigozzi

From: JB Jim Bailey, Director of Quality Assurance

Date: October 24, 2001

Re: DC-8 Elevator Control Tab Inspection Requirements

- Due to recent developments involving the DC-8 elevator control tab hardware installation, TTS (inspection) will generate a non-routine to remove the L/H and R/H elevator control tab fairings and inspect for the following, prior to any DC-8 aircraft departing our facility:

1) Ensure that the correct hardware, per aircraft effectivity, is installed and properly saftied on each control tab push-rod to drive crank fitting. Use the appropriate Illustrated Parts Catalog.

2) Ensure that the bolt is installed with the head of the bolt being inboard, as illustrated in the Douglas Overhaul Manual 27-16-1, Page 13/14.

3) Any discrepancies will be documented and corrected prior to the aircraft departing our facility.