**DOCKET No.: SA-521** 

EXHIBIT No. 7E

# NATIONAL TRANSPORTATION SAFETY BOARD WASHINGTON, D.C.

# AIRWORTHINESS GROUP CHAIRMAN'S FACTUAL REPORT ATTACHMENT IV: Douglas SB No. 27-262

### MCDONNELL DOUGL

DC-8



#### SERVICE BULLETINE

#### REVISION TRANSMITTAL SHEET

Bulletin 27-262

FLIGHT CONTROLS - Elevator And Tab - Modify Elevator Geared Tab Mechanism.

This page transmits Revision 2 for DC-8 Service Bulletin 27-262 to incorporate the following changes:

NOTE: Discard only those pages of previously issued bulletin which are affected by this revision and replace with attached pages.

Reason for Revision: To expand weight and balance procedure of elevators when installing new crank assemblies for Option I to aid operators

when performing this modification. No additional work is

required by this revision.

Page 3: Changed availability of parts to approximately 60 days, was 300.

Page 4: Revised Weight and Balance information for Options I and II.

Page 6: Revised step 20 to provide weight and balance instructions when new 3802767-1 and/or 3802768-1 crank assemblies are installed.

#### Revision Sequence

Original Date July 15/77
Revision 1 February 28/78
Revision 2 June 12/78

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Bulletin 27-262

Revision 2 June 12/78

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BULLETIN 27-262

# SERVICE BULLETIN

FLIGHT CONTROLS - Elevator And Tab - Modify Elevator Geared Tab Mechanism.

#### NOTE

This Service Bulletin provides additional information relative to DC-8 Alert Service Bulletin A27-262.

Option II provides modification instructions to accomplish the majority of the work outlined in Option I without removal of left or right elevator.

#### 1. Planning Information:

#### A. <u>Effectivity</u>:

(1) Aircraft Affected:

All Model DC-8 Series aircraft.

(2) Spares Affected:

Spare Part No.	Key Word
2710493-501 or -503	Link
4710541	Crank Assembly
4710542	Arm Assembly
5644420-(Any Configuration)	Elevator Assembly
5655694-73	Cover
5655694-75	Cover

#### B. Reason:

One operator reported one instance that during takeoff, at approximately 80 knots, the aircraft became uncontrollable in a nose-up direction resulting in an aborted takeoff. Investigation revealed that the left elevator inboard and outboard geared tab drive crank assemblies had failed. Further, it was noted that the elevator gust lock crank assembly had failed. It is suspected that failure of the geared tab crank assemblies occurred when the aircraft was parked in high gusty winds with the gust lock not engaged.

July 15/77

Revision 2 June 12/78:



Bulletin 27-262

Page 1 of 20

Replacing the existing aluminum geared tab crank assemblies with forged stainless steel crank assemblies and improving the crank assembly clearance will minimize the possibility of crank failure when the aircraft is parked in high gusty wind.

#### C. Description:

This modification accomplishes the following:

#### Option I

- (1) Improves crank assembly clearance by modifying the elevator leading edge cutouts and covers.
- (2) Modifies and reidentifies elevator geared tab link.
- (3) At operator's convenience, replaces the left and right elevator inboard and outboard geared tab drive crank and arm assemblies.

#### Option II

- (1) Improves crank assembly clearance by modifying the elevator leading edge cutouts and covers.
- (2) Modifies and reidentifies elevator geared tab link.

#### D. Compliance:

#### Option I

It is recommended the modification to provide clearance be accomplished within 12 months from issue date of this Service Bulletin.

It is recommended elevator geared tab crank and arm assembly replacement be accomplished at the operator's convenience.

#### Option II

It is recommended the modification to provide clearance be accomplished within 12 months from issue date of this Service Bulletin.

#### E. Approval:

This Service Bulletin is FAA approved.

#### F. Manpower:

This modification may be accomplished in the following approximate man-hours or elapsed hours per elevator.

3

Bulletin 27-262

July 15/77

Page 2

Revision 1 February 28/78

	- • ••••	Man-H	lours
		Opt	ion
Work Phases		<u>I</u>	II
Gain Access Removal		.7 1.5	.7
Modify (Aircraft)	•	9.8 1.8	7.6
Install Close Up		<u>.7</u>	7
Total Man-Hours		14.5	9.0
Total Elapsed Hours		6.8	4.5

NOTE: This Service Bulletin assumes that the aircraft/unit has been placed in a maintenance status. The man-hour/elapsed time estimates do not include:

- 1. Preparation for the modification: Examples; defueling, purging, placing work stands, opening standard access doors, obtaining tools, and jacking when jacking is not essential to the modification.
- Nonproductive elapsed time: Examples; sealant or adhesive cure time, cleaning, paint drying time, lunch and/or rest periods, and quality assurance inspections.
- 3. Administrative functions: Examples; planning, engineering liaison, parts requisition, shift change coordination, and report writing.

Operators should take the above into consideration when scheduling this modification.

#### G. <u>Material - Cost and Availability:</u>

#### (1) Aircraft:

Parts required to accomplish this modification are listed in paragraph 3.A and are to be procured as indicated. Parts with unit net prices are proprietary parts and must be purchased as end item spares from the Douglas Aircraft Company under the spare parts article of the purchase agreement. Unit net prices are subject to change by current pricing policies. Parts will be available in approximately 60 days after receipt of purchase order.



July 15/77

Bulletin 27-262

### MCDONNELL DOUGLAS

#### SERVICE BULLETIN

The purchase order must specify this Service Bulletin number and only parts listed herein. Direct purchase order to:

Douglas Aircraft Company
P.O. Box 1771
Long Beach, California 90801
Attn: Parts Sales - Commercial 7-21
(Service Bulletin 27-262)

(2) Spares:

Parts required for modification and/or replacement of spares is the same as indicated in paragraph 1.G.(1).

H. Tooling - Price and Availability:

None.

I. Weight and Balance:

#### Option I

Installation of new 3802767-1 and/or 3802768-1 crank assemblies will change weight of each elevator approximately 1 pound. Elevators may be rebalanced and balance weights removed to compensate for added weight of new crank assemblies.

#### Option II

None.

#### J. References:

- (1) DC-8 Service Bulletin A27-262.
- (2) Airworthiness Directive No. 78-01-15: Amendment 39-3118, dated February 13, 1978.
- (3) Data used in preparation of this Service Bulletin:

Data Identification	Change	Type of Data
MM Chapter 27 SRM Chapter 51 5802769	A	Maintenance Manual Structural Repair Manual Service Rework Drawing

#### K. <u>Publications Affected</u>:

The modification outlined in this Service Bulletin affects the following DAC DC-8 aircraft publications.

Publication	Chapter and/or Section
Illustrated Parts Catalog Overhaul Manual	27-30 27-16
Weight and Balance Charts	

Bulletin 27-262

July 15/77

Revision 2 June 12/78

#### 2. Accomplishment Instructions:

WARNING: TO AVOID INJURY TO PERSONNEL OR DAMAGE TO

EQUIPMENT, MAKE CERTAIN ADEQUATE PRECAUTIONS

ARE TAKEN WHILE PERFORMING ANY WORK IF

ELECTRICAL POWER IS APPLIED TO THE AIRCRAFT.

CAUTION: ELECTRICALLY GROUND THE AIRCRAFT.

GENERAL NOTE: Instructions are typical for left and right elevators.

Apply alodine solution and FR primer to bare metal after modification.

Install new 3802767-1 and 3802768-1 crank assemblies or reinstall existing 4710541 crank assembly and 4710542 arm assembly. Operator should verify existing crank and arm assemblies are serviceable before reinstallation.

Chapters within parentheses · refer to sections of the Maintenance Manual (MM) and Structural Repair Manual (SRM).

#### Option I

Modify elevator geared tab mechanism as shown on Figure 1.

NOTE: In lieu of modifying existing YS156A rod end, as shown on Figure 1, the operator may purchase

SMD5-5E1-502 rod end from:

Rexnord Incorporated Bearing Division 2400 Curtiss Street Downers Grove, Illinois 60515

#### Option II

Modify elevator geared tab mechanism as shown on Figure 2.

NOTE: In lieu of modifying existing YS156A rod end, as shown on Figure 2, the operator may purchase SMD5-5E1-502 rod end from:

Rexnord Incorporated Bearing Division 2400 Curtiss Street Downers Grove, Illinois 60515



: 1

#### OPTION I

NOTE: OPERATORS WHO HAVE ACCOMPLISHED OPTION II MAY COMPLY
WITH THE REQUIREMENTS OF OPTION I BY PERFORMING WORK
STEPS 1, 4, 5, 10, 16, 17, AND 20 THROUGH 23.

- (NOT SHOWN) REMOYE AND RETAIN ELEVATOR AND ATTACHING PARTS. (SEE MM CHAPTER 27-30-1, PARAGRAPH ENTITLED "REMOVAL/ INSTALLATION ELEVATOR.")
- (2) REMOVE AMO RETAIN 5655694-75 COVER AND ATTACHING PARTS AT STATION X=192.250. (SEE VIEW A-A.)
- (3) REMOYE AND RETAIN 5655694-73 COYER AND ATTACHING PARTS AT STATION Xe=112.188. (SEE VIEW 8-8.)
- (4) REMOYE AND RETAIN 4710542 ARM ASSEMBLY AND ATTACHING PARTS. (SEE YIEM A-A.)
- (5) REMOVE AND RETAIN 4710541 CRANK ASSEMBLY AND ATTACHING PARTS. (SEE VIEW 8-8.)
- (6) REMOVE AND RETAIN 2710493-501 OR -5C3 LINK AND ALL ATTACHING PARTS, EXCEPT MS24665-151 COTTER PIN.
- (7) modify link by removing material as shown. Reidentify as 2710493-505 per operator's shop practice.
- (8) INSTALL MODIFIED AND REIDENTIFIED 2710493-505 LINK USING RETAINED ATTACHING PARTS AND NEW MS24665-151 COTTER PIN.
- (9) CHAMPER FITTING AT STATION X=112.188 AS SHOWN. (SEE VIEW C-C.)
- (10) ENLARGE CUTOUT IN ELEVATOR FORMARD SPAR AT STATION X==221.000 TO DIMENSIONS SHOWN. (SEE VIEW D-0.)
- (1) ENLARGE CUTOUT IN RETAINED \$655694-75 COVER TO DIMENSIONS SHOWN. REIDENTIFY MODIFIED COVER AS 5802769-7 PER OPERATOR'S SHOP PRACTICE. (SEE VIEW E-E.)
- (12) ENLARGE CUTOUT IN SKIN AT STATION Xullet192.250 TO DIMENSIONS SHOWN,
- FABRICATE 5802769-3 AND -5 COVERS FROM RETAINED 5655694-73 COVER AS SHOWN. IDENTIFY COVERS AS 5802769-3 AND -5 PER OPERATOR'S SHOP PRACTICE. (SEE VIEW F-F.)
- (14) REMOVE AND RETAIN TWO M521059LJ PLATE MUTS AND ENLARGE CUTCUT IN SKIN AT STATION Xe=112.198 TO DIMENSIGNS SHOWN.
- (15) INSTALL TWO RETAINED MS21059L3 PLATE MUTS AS FOLLOWS:
  - 4. DRILL A NO. 10 HOLE AT DIMENSIONS SHOWN.
  - b. POSITION PLATE NUT OVER NO. 10 HOLE AND DRILL THO NO. 40 HOLES USING EXISTING HOLES IN PLATE NUT AS GUIDES.
  - c. COUNTERSINK NO. 40 HOLES 100° X .165-INCH DIAMETER (4.191) NEAR SIDE.
  - d. INSTALL PLATE MUT USING TWO MS20426A03-4 RIVETS.
- (6) REINSTALL 4710541 CRANK ASSEMBLY OR INSTALL NEW 3802767-1 CRANK ASSEMBLY, USING RETAINED ATTACHING PARTS. (SEE YIEW 8-8.)
- (17) REINSTALL 4710542 ARM ASSEMBLY OR INSTALL NEW 3802768-1 CRANK ASSEMBLY, USING RETAINED ATTACHING PARTS. (SEE VIEW A-A.)
- (18) INSTALL MODIFIED AND REIDENTIFIED 5802769-7 COVER USING RETAINED ATTACHING PARTS. (SEE VIEW E-E.)
- (19) INSTALL 5802759-3 AND -5 COVERS USING RETAINED ATTACHING PARTS. (SEE VIEW F-F.)
- (NOT SHOWN) INSTALLATION OF NEW 3802767-1 AND/OR 3802768-1 CRANK ASSEMBLIES WILL CHANGE WEIGHT OF EACH ELEVATOR APPROXIMATELY 1 POUND. ELEVATORS MAY BE REBALANCED AND BALANCE WEIGHTS REMOVED TO COMPENSATE FOR ADDED WEIGHT OF NEW CRANK ASSEMBLIES.
  - (21) (NOT SHOWN) INSTALL MODIFIED ELEVATOR USING RETAINED ATTACHING PARTS. (SEE MM CHAPTER 27-30-1, PARAGRAPH ENTITLED "REMOVAL/INSTALLATION ELEVATOR.") REIDENTIFICATION OF MODIFIED ELEVATOR IS AT OPERATOR'S OPTION.
  - PERFORM CLEARANCE CHECK, AT APPROXIMATE POSITIONS MOTED, AS SHOWN. SLOWLY MOVE ELEVATOR THROUGH FULL RANGE OF TRAYEL AND YERIFY SPECIFIED MINIMUM CLEARANCE EXISTS. (SEE VIEWS AND 3-8, AFTER MODIFICATION.)
  - (23) MODIFY ROD END AS SHOWN TO OBTAIN MINIMUM CLEARANCE AS REQUIRED.

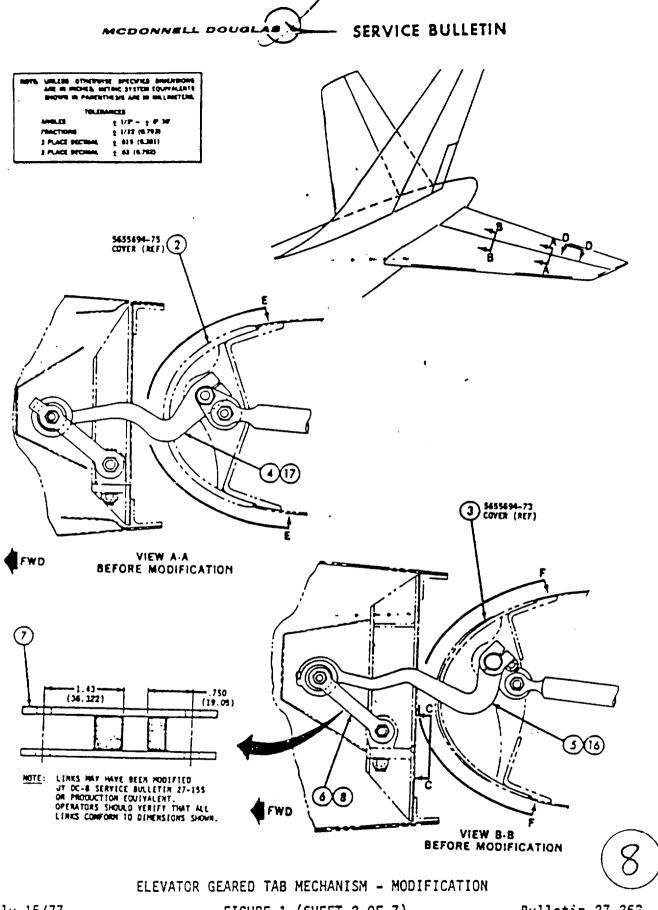
ELEVATOR GEARED TAB MECHANISM - MODIFICATION .

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Bulletin 27-262

FIGURE 1 (SHEET 1 OF 7)

July 15/77

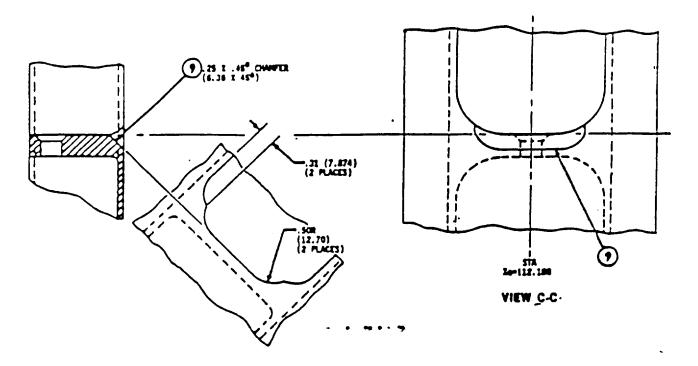


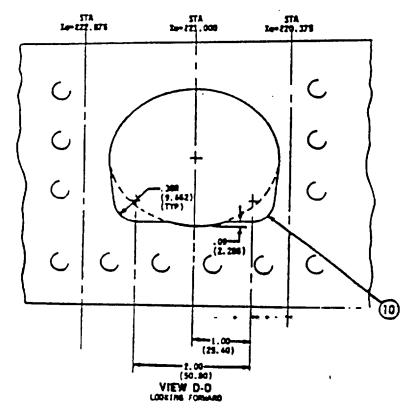
July 15/77

FIGURE 1 (SHEET 2 OF 7)

Bulletin 27-252

Revision 1 February 28/78





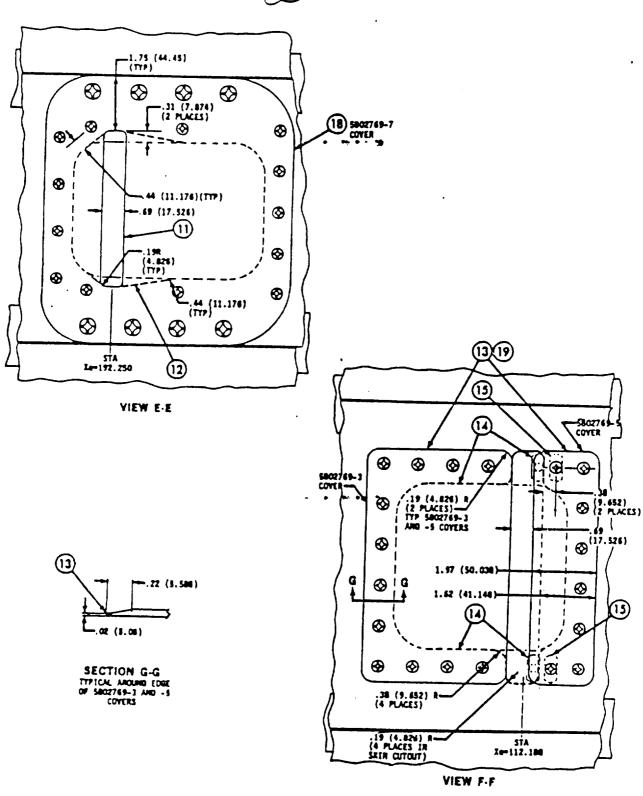
ELEVATOR GEARED TAB MECHANISM - MODIFICATION

Bulletin 27-262

FIGURE 1 (SHEET 3 OF 7)

July 15/77

Revision 1 February 28/78

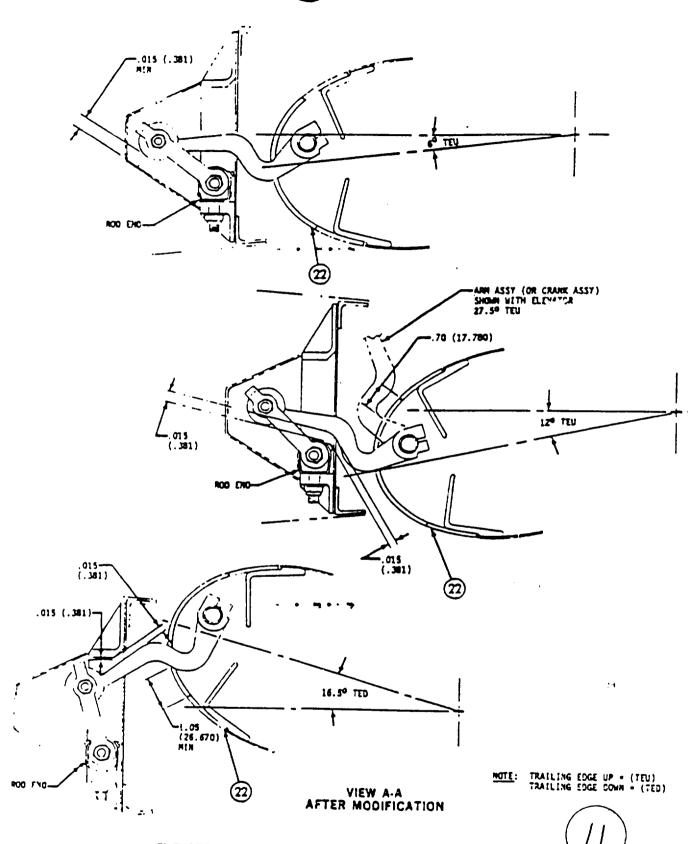


ELEVATOR GEARED TAB MECHANISM - MODIFICATION

July 15/77

FIGURE 1 (SHEET 4 OF 7)

Bulletin 27-262

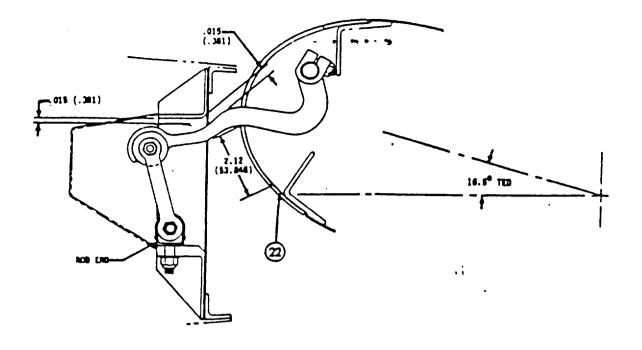


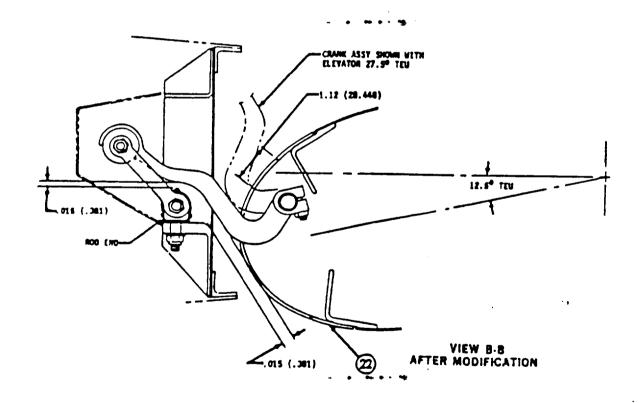
ELEVATOR GEARED TAB MECHANISM - MODIFICATION

Bulletin 27-252 FIGURE 1 (SHEET 5 OF 7)

July 15/77

Revision 1 February 28/78



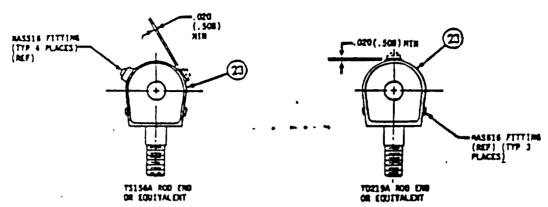


ELEVATOR GEARED TAB MECHANISM - MODIFICATION

July 15/77

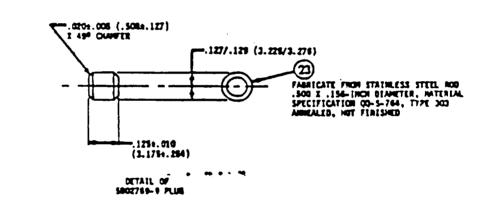
FIGURE 1 (SHEET 6 OF 7) Bulletin 27-252

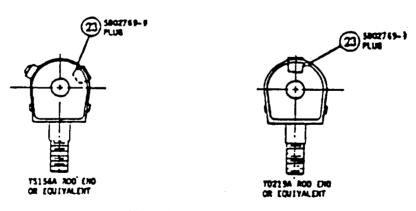
Revision 1 February 28/78



- 1. ROOTE MASS 4 FITTIME.
- 2. [MITALL SHORTSS-9 PLUS FLUSH TO ROD DIG.
- 3. GRING AS REQUIRES (NOT TO EXCEED .020 MERIMAN SHOWS).
- 4. TOUGH UP REDIONE AREA PER OPERATOR'S SHOP PRACTICE.

#### DETAIL OF NOD END BEFORE MODIFICATION





OCTAIL OF NOD END AFTER MGDIFICATION

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ELEVATOR GEARED TAB MECHANISM - MODIFICATION

FIGURE 1 (SHEET 7 OF 7)

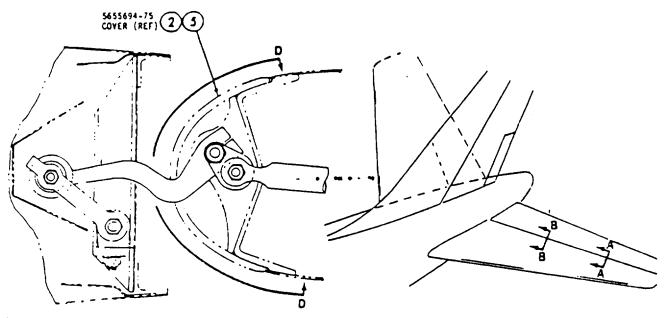
July 15/77



#### OPTION II

- (1) (NOT SHOWN) POSITION ELEVATOR TRAILING EDGE UP (TEU) AND HOLD IN THIS POSITION.
- 2 EXTEND LOWER PORTION OF EXISTING CUTOUT IN 5655694-7 SKIN AND 5655694-75 COVER. (SEE VIEW 0-0.)
  CAUTION: USE EXTREME CARE NOT TO DAMAGE 5655694-83 FITTING ADJACENT TO CUTOUT.
- EXTEND LOWER PORTION OF EXISTING CUTOUT IN 5655694-5 SKIN AND 5655694-73 COVER. (SEE VIEW E-E.)

  CAUTION: USE EXTREME CARE NOT TO DAMAGE 5655694-81 FITTING ADJACENT TO CUTOUT.
- (4) (NOT SHOWN) POSITION ELEVATOR TRAILING EDGE DOWN (TED) AND HOLD.
- 5 EXTEND UPPER PORTION OF EXISTING CUTOUT IN S655694-7 SKIH AND S655694-75 COVER. (SEE VIEW D-D.)
  CAUTION: USE EXTREME CARE NOT TO DAMAGE S655694-83 FITTING ADJACENT TO CUTOUT.
- 6 EXTEND UPPER PORTION OF EXISTING CUTOUT IN 5655694-5 SKIN AND 5655694-73 COVER. (SEE VIEW E-E.)
  CAUTION: USE EXTREME CARE NOT TO DAMAGE 5655694-81 FITTING ADJACENT TO CUTOUT.
- (7) REIDENTIFY 5655694-75 COVER AS S802769-11 PER OPERATOR'S SHOP PRACTICE.
- (8) REIDENTIFY 5655694-73 COVER AS 5802769-13 PER OPERATOR'S SHOP PRACTICE.
- 9) REMOVE AND RETAIN 2710493-501 OR -503 LINK AND ALL ATTACHING PARTS, EXCEPT MS24665-151 COTTER PIN.
- (10) MODIFY LINK BY REMOVING MATERIAL AS SHOWN. REIDENTIFY AS 2710493-505 PER OPERATOR'S SHOP PRACTICE.
- (11) INSTALL MODIFIED AND REIDENTIFIED 2710493-505 LINK USING RETAINED ATTACHING PARTS AND NEW MS24665-151 COTTER PIN.
- (12) (NOT SHOWN) POSITION ELEVATOR TRAILING EDGE DOWN (TED) AND HOLD.
- (13) CHAMFER FITTING AT STATION Xe=112.188 AS SHOWN. (SEE VIEW C-C.)
- PERFORM CLEARANCE CHECK, AT APPROXIMATE POSITIONS MOTED, AS SHOWN. SLOWLY MOVE ELEVATOR THROUGH FULL RANGE OF TRAVEL AND VERIFY SPECIFIED MINIMUM CLEARANCE EXISTS. (SEE VIEWS A-A AND 8-8, AFTER MODIFICATION.)
- (15) MODIFY ROO END AS SHOWN TO OBTAIN MINIMUM CLEARANCE AS REQUIRED.



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VIEW A-A BEFORE MODIFICATION

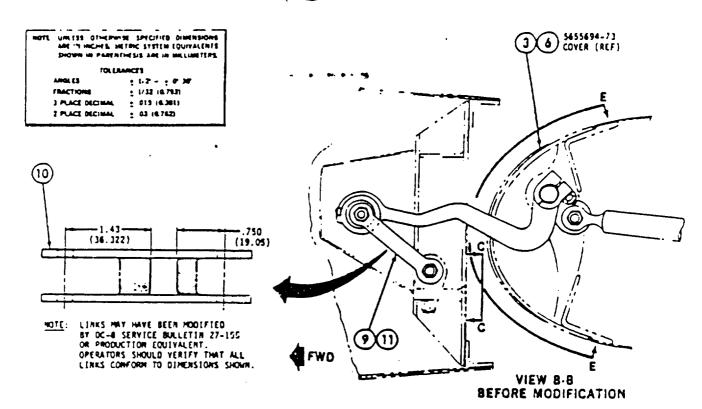
ELEVATOR GEARED TAB MECHANISM - MODIFICATION

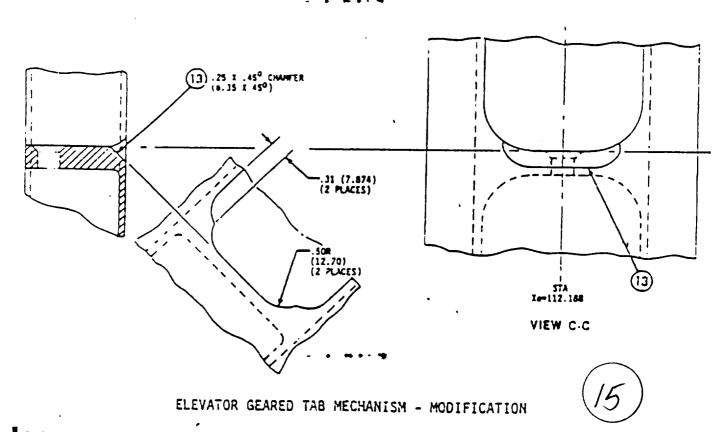
July 15/77

FIGURE 2 (SHEET 1 OF 6)

Builetin 27-262

Revision 1 February 28/78

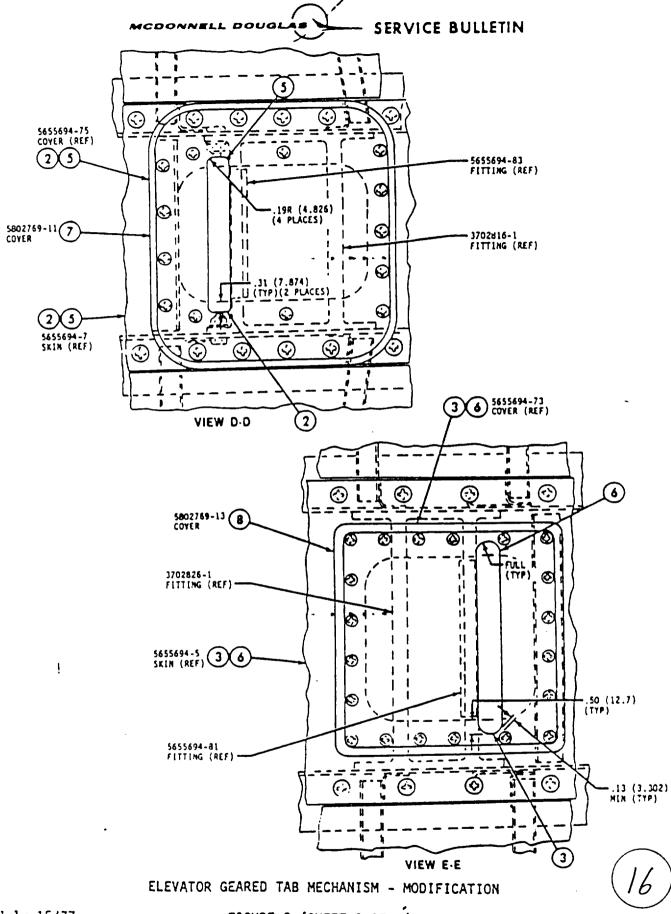




Bulletin 27-252

FIGURE 2 (SHEET 2 OF 6)

July 15/77

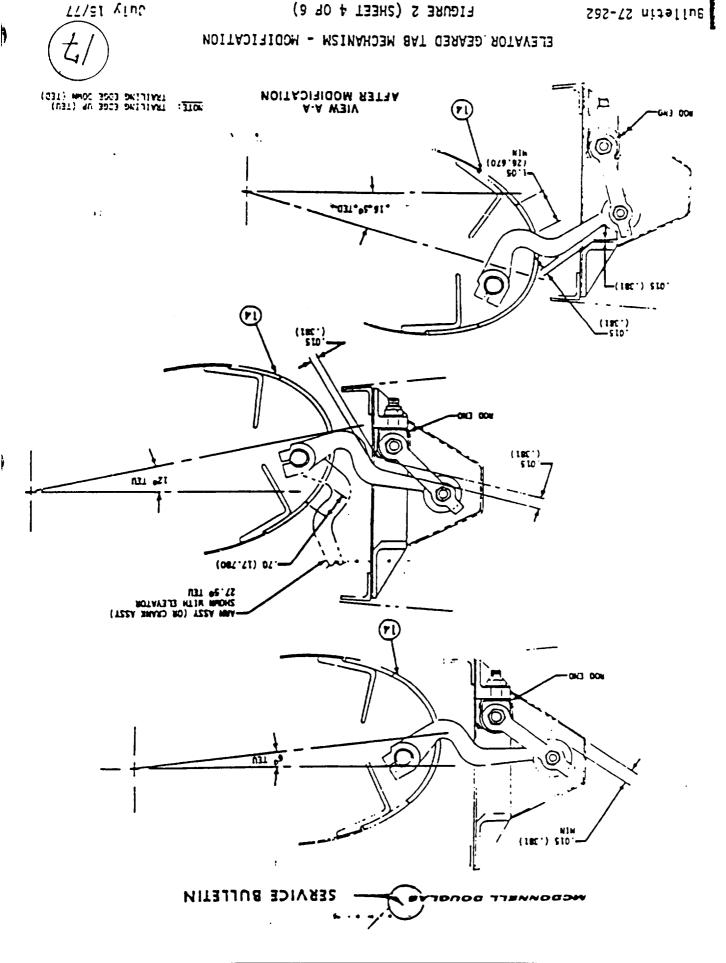


July 15/77

FIGURE 2 (SHEET 3 OF 6)

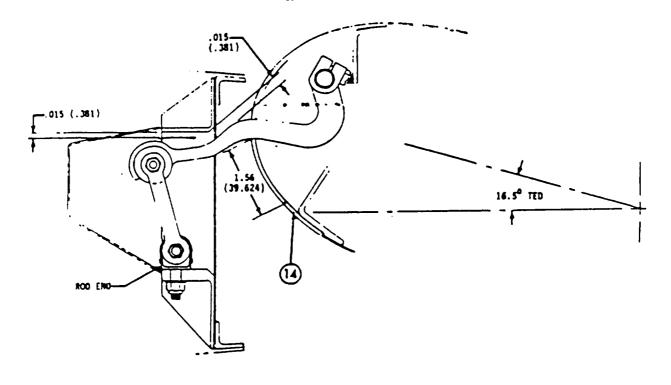
Bulletin 27-262

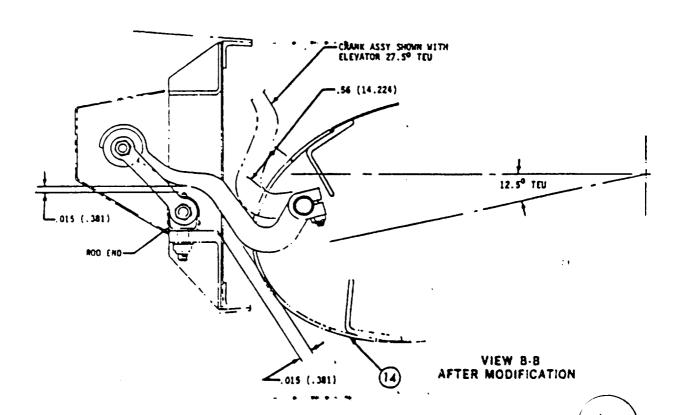
Revision 1 February 28/78



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Revision I February 28/78





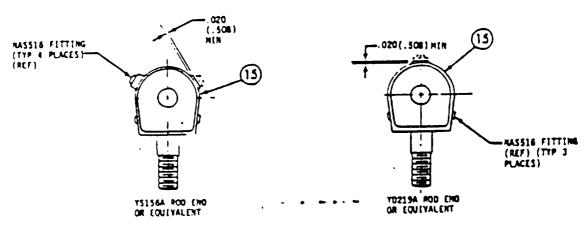
ELEVATOR GEARED TAB MECHANISM - MODIFICATION

FIGURE 2 (SHEET 5 OF 6)

Bulletin 27-262

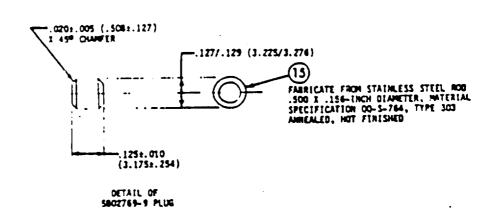
July 15/77

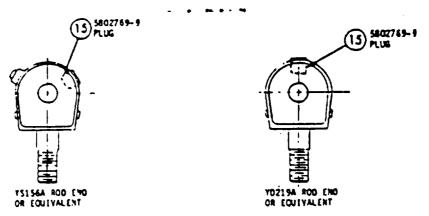
Revision 1 February 28/78



- 1. REMOYE MASSIG FITTING.
- 2. INSTALL SECTION-9 PLUE FLUSH TO ROO END.
- 3. GRING AS REQUIRED (NOT TO EXCEED .020 MINIMUM SHOWN).
- 4. TOUCH UP REMORK AREA PER OPERATOR'S SHOP PRACTICE.

#### DETAIL OF ROD END BEFORE MODIFICATION





#### DETAIL OF ROD END AFTER MODIFICATION

ELEVATOR GEARED TAB MECHANISM - MODIFICATION

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FIGURE 2 (SHEET 6 OF 6)

July 15/77

Page 18

Bulletin 27-262

Revision 1 February 28/78

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#### 3. Material Information:

- A. The basis for the following material data is per aircraft.
  - (1) Parts to be purchased as end item spares. Discard old parts.

NOTE: No parts required for Option II.

New Part No.	Qty	Unit Net <u>Price</u>	Key Word	Old Part No.	
3802767-1	2 2	\$386.00	Crank Assy	4710541	
3802768-1		359.00	Crank Assy	4710542 (Arm Assy)	

(2) Parts and material to be procured from operator's stock.

Part/Material	Qty Per Option <u>I II</u>	Key Word	Instructions- Disposition
MS20426AD3-4 MS24665-151 5802769-9	2 2 2 2	Rivet Cotter Pin Plug	1/

- 1/ Fabricate from stainless steel rod .500 x .156-inch diameter, Material Specification QQ-S-764, Type 303 Annealed, Hot Finished.
  - (3) Parts to be modified and reidentified by the operator.

	Qty Opt	Per ion			Instructions-	
New Part No.	<u>I</u>	II	Key Word	Old Part No.	Disposition	
2710493-505	2	2	Link	2710493-501 or -503		
5802769-11		2	Cover	5655694-75		
5802769-13		2	Cover	5655694-73		
5802769-3	2		Cover	5655694-73	3/	
5802769-5	2		Cover		2	
5802769-7	2		Cover	5655694-75		
None	2	2	Elevator Assy	5644420-(**)	<u>2</u> /	

- \*\* Indicates any configuration.
- 2/ Reidentification is at operator's option.
- $\underline{3}$ / One 5655694-73 cover makes one 5802769-3 and -5 cover.

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Bulletin 27-252



B. The basis for the following material data is per spares.

#### Option I

- (1) Modify and reidentify spare covers per this Service Bulletin. No parts are required.
- (2) Modify and reidentify spare 2710493-501 or -503 links per this Service Bulletin. No parts are required.
- (3) Modify spare elevator assemblies per this Service Bulletin. Four MS20426AD3-4 rivets are required. Reidentification is at operator's option.
- (4) Order 3802767-1 crank assembly as a replacement for spare 4710541 crank assembly.
- (5) Order 3802768-1 crank assembly as a replacement for spare 4710542 arm assembly.

#### Option II

- (1) Modify and reidentify spare covers per this Service Bulletin. No parts are required.
- (2) Modify and reidentify spare 2710493-501 or -503 links per this Service Bulletin. No parts are required.
- (3) Modify spare elevator assemblies per this Service Bulletin. No parts are required. Reidentification is at operator's option.

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Bulletin 27-262

July 15/77