DHC–6 (Twin Otter)

SERVICE BULLETIN 6/523

Flight Controls – Special Inspection of Control Cables for Wear and Corrosion (and Rectification)

This page transmits Revision 'A' of Service Bulletin 6/523, pages 1 thru 12 dated 10 May 96.

Service bulletin re–issued in its entirety to convey the following changes:

1. **SUBJECT**: to delete "Carbon Steel" in title.
2. **Effectivity**: to delete "without stainless steel cables (SOO 6082 or EO 69053)".
2. **Reason**: to delete references to "carbon steel".
3. **Description**: to delete references to "carbon steel".
4. **Compliance**: to delete references to "carbon steel".
5. **References**: to include All Operators Message 038, to replace Temporary Revision 76 with Temporary Revision 79 and to add Temporary Revisions 106 and 20–3.
6. **ACCOMPLISHMENT INSTRUCTIONS**: to delete references to "carbon steel". Instruction has been added to "Do not lubricate stainless steel cables". Part number (Table) is added for all corresponding E.O. 69053 stainless steel cables. Elevator lever stop cable added to table. Reference to passenger seats is deleted. Illustrations have been altered to include new E.O. 69053 stainless steel cable replacements. Cable replacement criteria added.

The compliance time on the initial issue of this service bulletin is unaffected by this revision. Additional workload is introduced by this revision in aircraft with stainless steel cables.

Remove Service Bulletin 6/523 initial issue dated 04 Aug 95 and replace with attached.

Previous issue of Service Bulletin 6/523:

Initial issue – Pages 1 thru 12 dated 04 Aug 95

TWIN OTTER

SERVICE BULLETIN

Customer Services

ATA SYSTEM: 2700 NUMBER: 6/523

BOMBARDIER REGIONAL AIRCRAFT DIVISION CONSIDER THIS SERVICE BULLETIN TO BE PARTICULARLY SIGNIFICANT AND URGES OPERATORS TO PROMPTLY EVALUATE THE CONTENTS

SUBJECT: Flight Controls – Special Inspection of Control Cables for Wear and Corrosion (and Rectification)

I. PLANNING INFORMATION

A. Effectivity

Aircraft Affected:

All DHC–6 Twin Otter Aircraft.

(Inspection procedure verified on an in–service aircraft).

Spares Affected:

None

B. Reason

Operators have found corrosion forming on control cables located in some areas of the aircraft (in particular, elevator/rudder cables under the rear baggage compartment floor at station 376). Excessive corrosion on the cables could result in breakage of the cables and a loss of flight control. This service bulletin contains a cable inspection procedure which includes application of a lubricant to non–stainless steel primary flight control cables.

C. Description

Access is gained to all primary flight control cable assemblies to check for corrosion or frayed condition. A lint–free rag is drawn along the cable to detect broken wires and a visual inspection for corrosion is carried out. Cables in the cabin area and in wings which are not readily accessible along their entire run, are released, pulled back, cleaned and inspected. Particular attention is paid at access points where they pass over pulleys or through fairleads (corrosion and wear are most likely to occur at these points).

If damage is not found, a lubricant is applied to the cables (non stainless steel cables only). The cables are re–installed and rigged, access panels/doors are closed and floor panels are cleaned and installed.

If corrosion is found, the damaged cables are removed and replaced with cables of the same part number. A lubricant is applied (non stainless steel cables only) and the cables are rigged. Access panels are closed and the results of the inspection are reported to Bombardier Regional Aircraft Division.

D. Compliance

de Havilland Inc. has recommended that this special inspection of control cables be accomplished as soon as possible but no later than 31 Dec 95.

Replace cables that do not conform to inspection criteria before next flight.

Serviceable cables should be re–inspected at intervals indicated in Inspection Requirements Manual PSM 1–6–7. (All Series). Cable lives start after this service bulletin has been carried out.

E. Approval

The special inspection and rectification conveyed by this service bulletin has been approved by the Design Approval Representative for Transport Canada at de Havilland Inc.

F. Manpower

Approximately 36 man–hours will be required to accomplish this special inspection.

This estimate is for direct labour performed by an experienced crew and it does not include set–up, planning, familiarization, cure time, part fabrication, tool acquisition or lost time.

G. Material – Price and Availability

None

H. Tooling – Price and Availability

None

I. Weight and Balance

None

J. Electrical Load Data

Not affected

K. Publications Affected

Maintenance Manual ..... PSM 1–6–2 and PSM 1–63–2

Maintenance Program (Inspection Requirements Manual) PSM 1–6–7 (All Series)

L. References

de Havilland Inc. Service Letter DH6–SL–27–01.

All Operators Message 034 and 038.

Maintenance Program (Inspection Requirements Manual) PSM 1–6–7 (All Series) Temporary Revisions 73, 74, 75, 79, 20–3 and 106.

BRAD CSCR 2267.

II. MATERIAL INFORMATION

A. Parts Required Per Aircraft

1. The following material is required for the completion of this service bulletin and may be procured as single items from Bombardier Regional Aircraft Division or purchased directly from industry sources.

Part Number	Quantity Per Aircraft	Description	Remarks
Aeroshell 22	20 Ounces	Lubricant	MIL–G–81322
	10 Rags	Lint–free cloth	1 foot x 1 foot
	10 Rags	Coarse weave cloth	1 foot x 1 foot
	1	Fibre Brush	

NOTE: This service bulletin is self–contained (illustrated). No drawings will be supplied.

B. Parts Required to Modify Spares

None

C. Special Tools and Equipment Required

None

D. Existing Parts Accountability

None

III. ACCOMPLISHMENT INSTRUCTIONS

1. Either pull and clip circuit breakers required to isolate affected circuits or placard and select aircraft electrical power to OFF. Obey all relevant WARNINGS and CAUTIONS detailed in Maintenance Manual PSM 1–6–2 or PSM 1–63–2 Chapters 12 and 24.
2. Placard flight controls in flight compartment.

Flight Compartment

1. Open hinged access doors under flight compartment to gain access to rudder, aileron and elevator cables per **Table I** and Figures 1, 2 and 3.
2. Do a visual inspection of control cables (non–jacketed) visible at this section of fuselage per **Table 1**, Figures 1, 2 and 3 and **Cable Inspection Procedure.**

Observe carefully areas where cables pass over pulleys, quadrants, drums, or through fairleads.

3. Replace cables not acceptable to criteria in **Cable Inspection Procedure**. Make sure the new cable part numbers are identical to the discarded cable part numbers per **Table 1**.

4. Lubricate new or existing non-jacketed cables as detailed in **Cable Inspection Procedure**. Do not lubricate stainless steel cables.

5. Install and rig replaced cable assemblies per Maintenance Manual PSM 1-6-2 or 1-63-2 Chapter 27.

6. Close flight compartment access doors.

Table I – Flight Compartment – Rudder/Elevator/Aileron Cable Assembly

LOCATION	100/200/300 SERIES	100/200/300 SERIES
Rudder Cable Assembly	**Carbon Steel**	**Stainless Steel**
Rudder quadrant inboard sheave to station 455.0	NAS305-34-4201	NAS305R34-4201
Rudder quadrant outboard sheave to station 455.0	NAS305-35-4266	NAS305R35-4266
Elevator Cable Assembly		
Front of elevator lever to station 426.75	C6CF1146-1	E.O. 69053-1
Rear of elevator lever to station 426.75	C6CF1147-1	E.O. 69053-2
Elevator lever stop cable	C6CF1100-11	E.O. 69053-5
Aileron Cable Assembly		
Control column to station 150.0, left-hand side	NAS304-37-1470	NAS304R37-1470
Control column to station 150.0, right-hand side	C6CF1152-1	E.O. 69053-10

Passenger Cabin

1. Remove small exterior skin panel ahead of cabin right hand door to gain access to rudder and elevator cables and pulleys per **Table 2** and Figures 1 and 2.

2. Remove upholstery and panels to gain access to overhead aileron cables per **Table 2** and Figure 3.

3. Release, attach string and pull back elevator and rudder cables to allow visual inspection per **Table 2**, Figures 1, 2, 3, and **Cable Inspection Procedure.**

4. Observe carefully areas where cables pass over pulleys, quadrants, drums, or through fairleads.

5. Replace cables not acceptable to criteria in **Cable Inspection Procedure.** Make sure the new cable part numbers are identical to the discarded cable part numbers per **Table 2.**

6. Lubricate replaced or existing non–jacketed cables as detailed in **Cable Inspection Procedure**. Do not lubricate stainless steel cables.

7. Install and rig cable assemblies per Maintenance Manual PSM 1–6–2 or 1–63–2 Chapter 27.

8. Adjust cable guide tubes under cabin floor as required to maintain original positioning.

9. Install floor panels and carpet.

Table 2 – Passenger Cabin – Rudder/Elevator/Aileron Cable Assembly

LOCATION	100/200/300 SERIES	100/200/300 SERIES
Rudder Cable Assembly	**Carbon Steel**	**Stainless Steel**
Rudder quadrant inboard sheave to station 455.0	NAS305–34–4201	NAS305R34–4201
Rudder quadrant outboard sheave to station 455.0	NAS305–35–4266	NAS305R35–4266
Elevator Cable Assembly		
Front of elevator lever to station 426.75	C6CF1146–1	E.O. 69053–1
Rear of elevator lever to station 426.75	C6CF1147–1	E.O. 69053–2
Elevator lever stop cable	C6CF1100–1	E.O. 69053–5
Aileron Cable Assembly		
Station 150.0 to aileron quadrant, right–hand side	C6CF1153–3	E.O. 69053–11
Station 150.0 to aileron quadrants, left–hand side	C6CF1155–3	E.O. 69053–12

Rear Fuselage

1. Gain access to rudder and elevator cable assemblies in baggage compartment and rear fuselage.
2. Do a visual inspection of control cables (non–jacketed) visible at this section of fuselage per **Table 3**, Figures 1 and 2, and **Cable Inspection Procedure**. Observe carefully areas where cables pass over pulleys, quadrants, drums, or through fairleads. Place special emphasis on elevator and rudder cable inspection near cable cluster at Station 376 (refer to Figures 1 or 2).
3. Replace cables not acceptable to criteria in **Cable Inspection Procedure**. Make sure the new cable part numbers are identical to the discarded cable part numbers per **Table 3**.
4. Lubricate new or existing non–jacketed cables only as detailed in **Cable Inspection Procedure**. Do not lubricate stainless steel cables.
5. Install and rig replaced cable assemblies per Maintenance Manual PSM 1–6–2 or 1–63–2 Chapter 27.
6. Install access panels.

Table 3 – Rear Fuselage – Rudder/Elevator Cable Assembly

LOCATION	100/200/300 SERIES	100/200/300 SERIES
Rudder Cable Assembly	**Carbon Steel**	**Stainless Steel**
Station 455.0 to right–hand side rudder control attachment	C6CF1150–1	E.O.69053–6
Station 455.0 to left–hand side rudder control attachment	C6CF1151–1	E.O.69053–7
Elevator Cable Assembly		
Upper cable, station 426.75 to elevator quadrant	C6CF1148–1	E.O.69053–3
Lower cable, station 426.75 to elevator quadrant	C6CF1149–1	E.O.69053–4

Wing

1. Release, attach string and pull aileron cables out of wing box.
2. Do a visual inspection of control cables per **Table 4**, Figure 3, and **Cable Inspection Procedure.** Observe carefully areas where cables pass over pulleys, quadrants, drums, or through fairleads.
3. Lubricate new or existing non–jacketed cables as detailed in **Cable Inspection Procedure**. Do not lubricate stainless steel cables.
4. Replace cables not acceptable to criteria in **Cable Inspection Procedure**. Make sure the new cable part numbers are identical to the discarded cable part numbers per **Table 4**.
5. Install and rig cable assemblies per Maintenance Manual PSM 1–6–2 or 1–63–2 Chapter 27.
6. Install access panels.

Table 4 – Wing – Aileron Cable Assembly

LOCATION	100/200/300 SERIES	100/200/300 SERIES
Left Wing	**Carbon Steel**	**Stainless Steel**
Aileron quadrant, lower sheave, left–hand forward (Pre–Modification 6/1435)	C6CF1124–1 (Large end fitting)	
Aileron quadrant, lower sheave, left–hand forward (Post–Modification 6/1435)	C6CF1452–1 (Largest end fitting)	E.O. 69053–16
Aileron quadrant, upper sheave, left–hand rear	C6CF1125–1 (Small end fitting)	E.O. 69053–14
Left–hand wing forward	C6CW1031–1	E.O. 69053–17
Left–hand wing rear	C6CW1032–1	E.O. 69053–18
Right Wing		
Aileron quadrant, upper sheave, right–hand forward	C6CF1124–3 (Large end fitting)	E.O. 69053–13
Aileron quadrant, upper sheave, right–hand rear	C6CF1125–3 (Small end fitting)	E.O. 69053–15
Right–hand wing forward	C6CW1032–1	E.O. 69053–18
Right–hand wing rear	C6CW1031–1	E.O. 69053–17

Cable Inspection Procedure

CAUTION: WEAR GLOVES OR USE CLOTH OF SUFFICIENT THICKNESS FOR PROTECTION OF HANDS WHEN INSPECTING CONTROL CABLES FOR CORROSION OR BROKEN WIRE STRANDS.

CAUTION: REFER TO THE APPLICABLE MANUFACTURER'S MATERIAL SAFETY DATA SHEET (MSDS) FOR SPECIFIC DATA SAFETY ON ANY OF THE MATERIALS SPECIFIED HEREIN.

NOTE: Corrosion is identified as a dark red powder or stain found on the cable surface. Red dust on the cable surface resulting from phenolic pulley wear is not corrosion. White powder found on the cable surface is zinc dust caused by cable wear.

1. Make sure that all portions of the cable run are clean from dust or metal particles. Remove dust or metal particles on the cable with a coarse weave cloth.
2. Slacken turnbuckles to allow careful twisting of cables to open strands.
3. Replace cables if cable exceeds wear limits in Maintenance Manual PSM 1–6–2, Part 1–19 (TR106) or PSM 1–63–2, Chapter 20–60–01, (TR20–3).
4. If zinc powder (white powder) is found without any broken wires, clean and lubricate the cable assembly as follows:

CAUTION: DO NOT USE STEEL WOOL, WIRE BRUSHES, OR ABRASIVE MATERIAL TO REMOVE SURFACE CORROSION FROM CABLES. THESE MATERIALS WILL CAUSE CONTAMINATION THAT WILL RESULT IN CONSEQUENTIAL WEAR AND CORROSION.

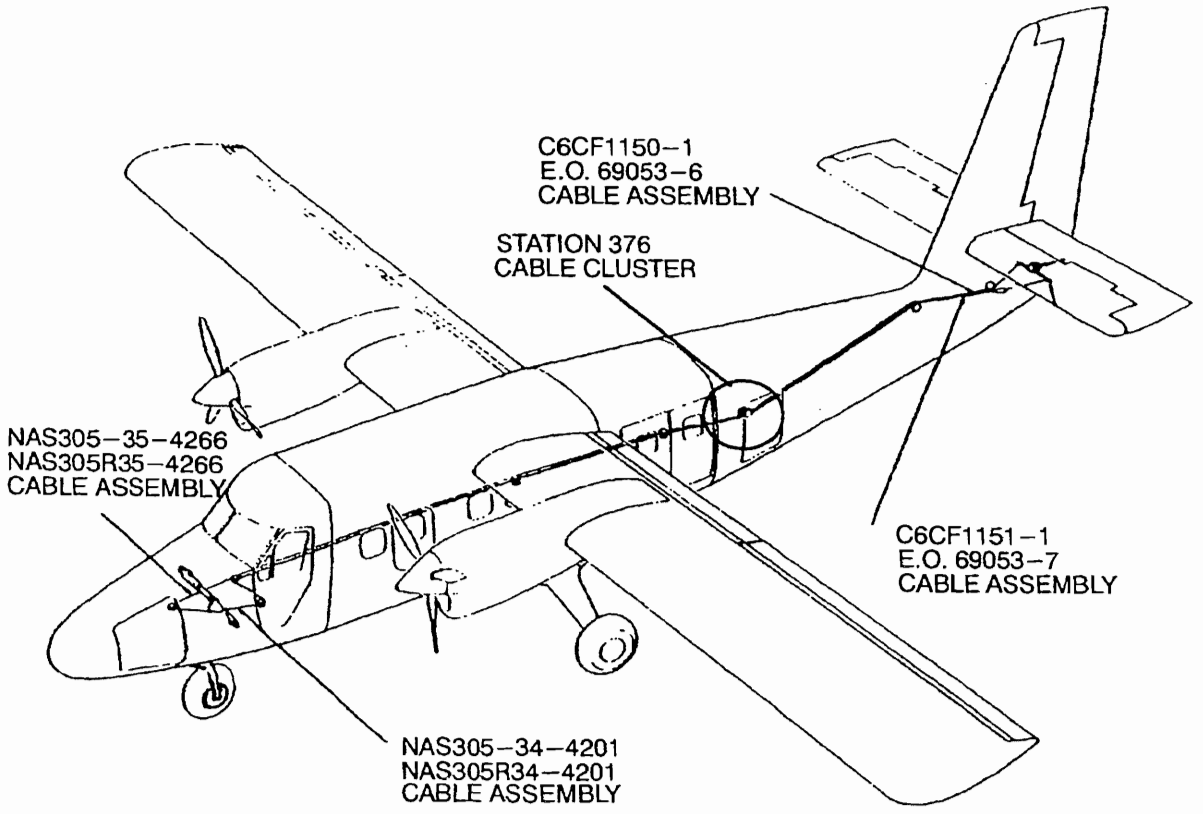
(a) Remove corrosion and or zinc dust from the external surfaces with a coarse weave cloth or fibre brush.

(b) Apply a thin layer of lubricant MIL–G–81322 (Aeroshell 22) to accessible length of non–jacketed non stainless steel cables. Place special emphasis where cables pass over pulleys, quadrants, drums or through fairleads.

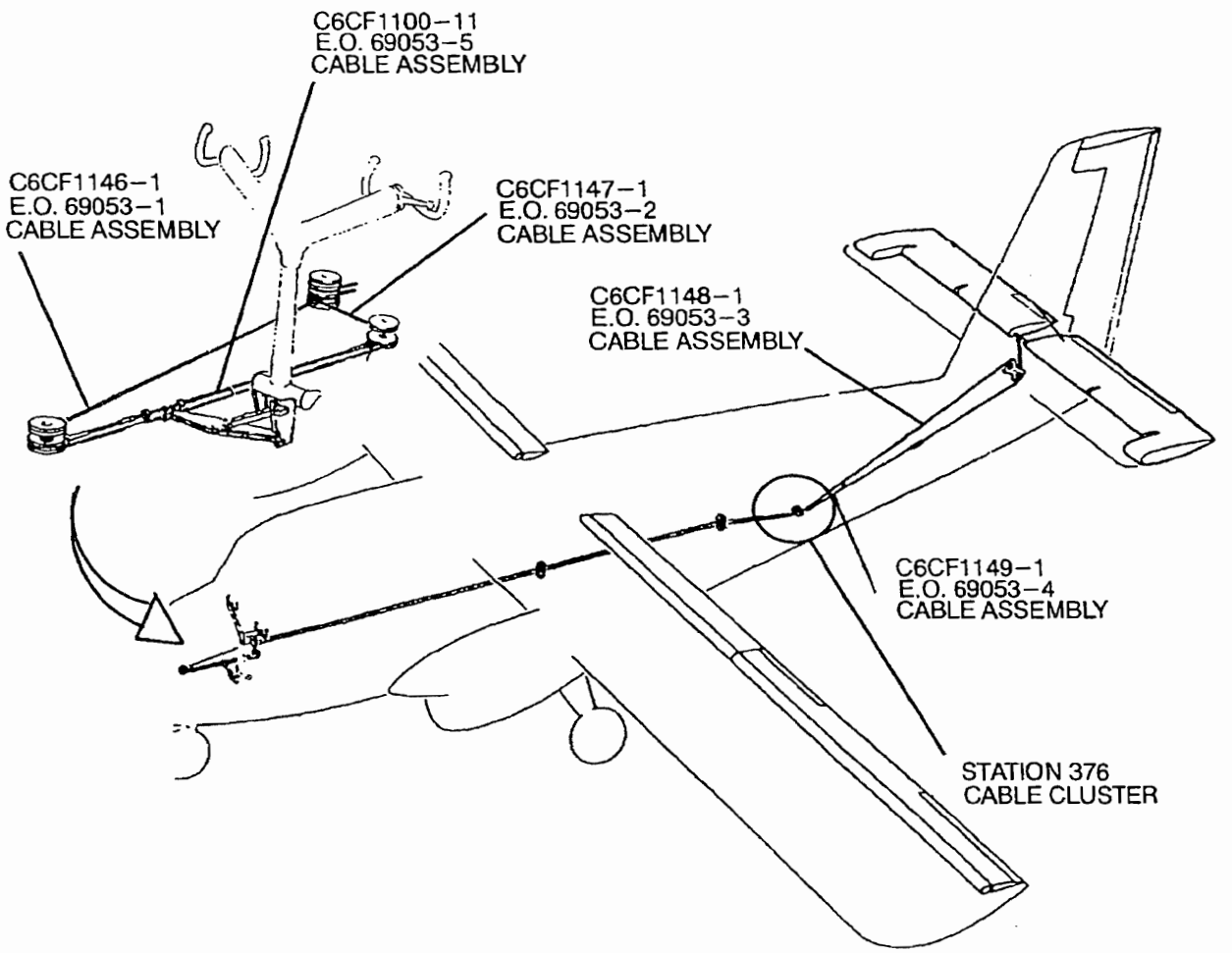
5. Install and rig cable assemblies per Maintenance Manual PSM 1–6–2 or 1–63–2 Chapter 27.

Close Out

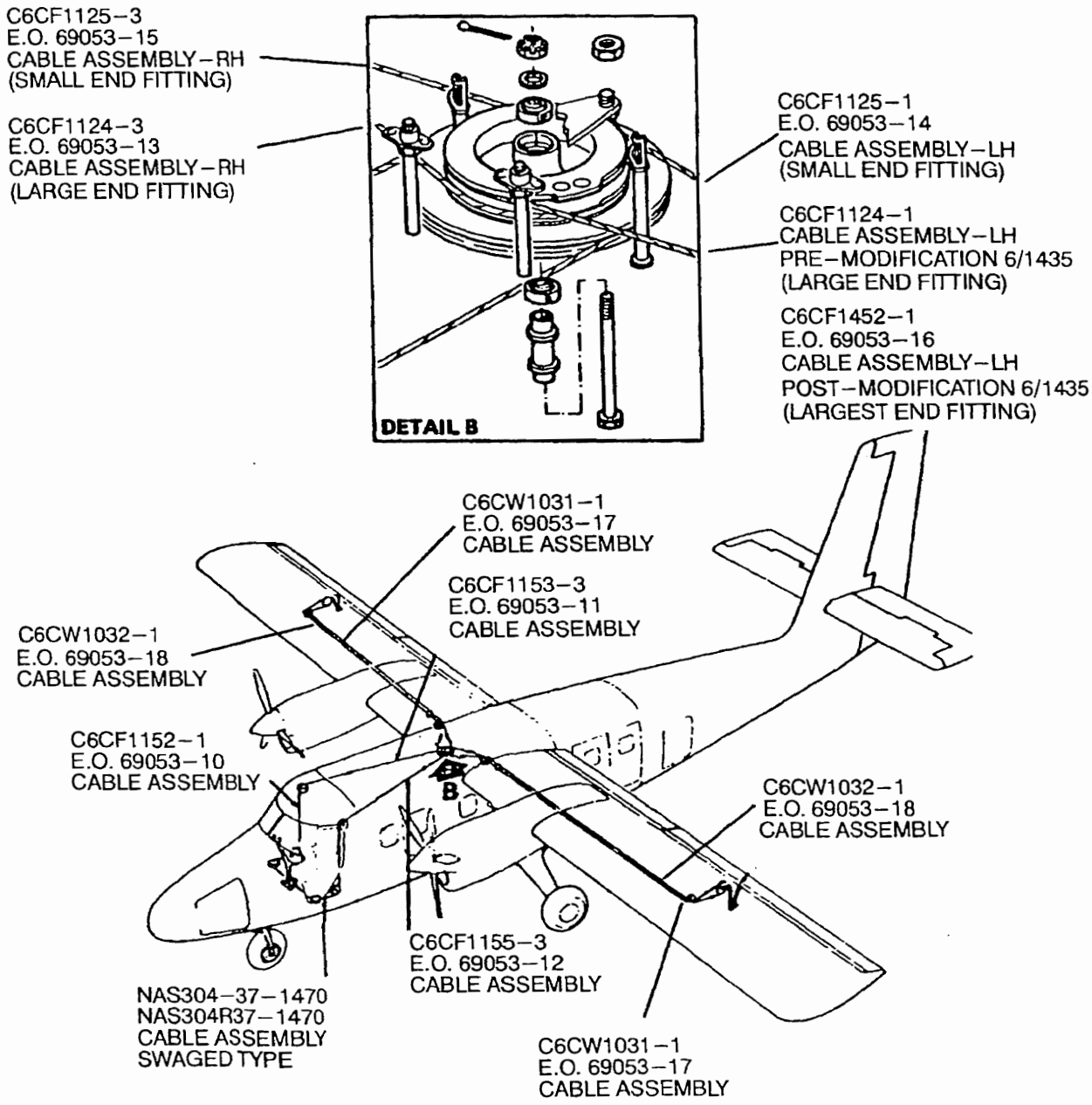
1. Install all access panels, doors, and coverings removed during the special inspection.
2. Remove placards and close all circuit breakers.
3. On completion of this special inspection (and rectification), make this entry in the appropriate logbook(s): "Service Bulletin 6/523 Rev 'A', Flight Controls – Special Inspection of Control Cables for Wear and Corrosion (and Rectification) – Inspection (and Rectification) completed."



Cable Assembly Locations – Rudder Control System (100/200/300 Series)
Figure 1



Cable Assembly Locations – Elevator Control System (100/200/300 Series)
Figure 2



Cable Assembly Locations – Aileron Control System (100/200/300 Series)
Figure 3