SPECIAL AIRWORTHINESS INFORMATION BULLETIN

Aircraft Certification Service
Washington, DC

U.S. Department of Transportation

Federal Aviation Administration

NM-05-53
May 18, 2005

http://www.faa.gov/aircraft/safety/alerts/

This is information only. Recommendations aren't mandatory.

Introduction

This Special Airworthiness Information Bulletin advises you, owners and operators of **Bombardier, Inc. model CL-600-2B19 (Regional Jet Series 100 & 440) aircraft**, that operators have reported higher-than-expected levels of dual-channel disconnects of the horizontal stabilizer trim system, resulting in the STAB TRIM and MACH TRIM caution messages being posted on EICAS. Bombardier is undertaking an engineering investigation to address the root causes of this issue.

Background

While Bombardier is investigating the root cause of the disconnects, they have issued Service Letter (SL) RJ-SL-27-085 dated May 16, 2005 (attached), in order to mitigate the risk of an in-flight event and to obtain additional data for the investigation.

We have determined that an AD isn't warranted at this time.

SL RJ-SL-27-085 doesn't supersede previously issued Bombardier SL RJ-SL 27-083 dated November 29, 2004 or Bombardier All Operator Message (AOM) 832 dated October 1, 2004. You should continue compliance with those documents so that Bombardier can successfully obtain the data necessary to permanently resolve this issue.

Recommendations

We strongly recommend that you review the attached service letter and implement its content.

For Further Information Contact

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SERVICE LETTER

In-Service Engineering

RJ-SL-27-085

ATA: 2740

DATE: 16 May 05

SUBJECT: Horizontal Stabilizer Trim Control System. Disconnect Switch Sensitivity Test

MODEL: CL-600-2B19

APPLICABILITY: ALL

PURPOSE:

Bombardier's on-going investigation of the Horizontal Stabilizer Trim Control System (HSTCS) Dual Channel Inop events has made significant progress recently. Bombardier therefore wants to inform Operators of new recommendations, stemming from the preliminary findings from the investigation, which are intended to help reduce the number of Dual Channel Inop events.

DISCUSSION:

Bombardier (BA) All Operator Message (AOM) #832 issued on October 1st, 2004, requesting that Operators send Bombardier removed HSTCS disconnect switches (P/N 996-0013), has had a good response from Operators. However, an additional set of 15 switches is still required to complete all the testing and analysis identified in support of the investigation.

The switches that were received have been tested and analyzed by the switch manufacturer with the participation of BA, last March. Testing demonstrated that some switches, from a sample set of 15 collected from in-service, were susceptible to state changes with light touches. The duration of the state changes witnessed varied from a short electrical glitch to a permanent open state electrical contact. The sample set included a mix of suspect and non-suspect switches of which 8 out of 15 switches were found faulty. Also, 3 new production switches were found by test not to be susceptible to the same fault mode. The root cause of this observed behavior is currently under investigation.

Depending on the aircraft configuration, the CRJ 100-200 HSTCS can be more or less sensitive to the condition experienced by the faulty HSTCS disconnect switches. The time condition to disconnect both HSTCS channels is the following depending on the Horizontal Stabilizer Trim Control Unit configuration (by vendor P/N);

- -8HSTCU → the disconnect switch signal has to be open circuit (OC) for at least 1ms
- -9HSTCU → the disconnect switch signal has to be OC for at least 0.1s

Even with the 0.1s delay offered by the -9HSTCU, it has been observed that a faulty disconnect switch may provide an erroneous disconnect pulse adequate to disconnect both HSTCS channels. If the switch remains latched in an OC state, the HSTCS channels will not be resetable until the switch is physically cycled, at which point it should revert to its normally closed state.

As light touches are known to affect some HSTCS disconnect switches, BA is proposing a sensitivity test that can be used by maintenance crews to isolate faulty switches. At the present time, no AMM procedure is adequate to identify faulty HSTCS disconnect switches. Additionally, the HSTCS BITE test is not intended to identify intermittent electrical contact at the disconnect switch. Therefore, in order to prevent in-flight Dual Channel Inop events, Operators should consider performing the HSTCS Disconnect Switch Sensitivity Test as describe in the OPERATOR ACTION section of this Service Letter.

BOMBARDIER ACTION:

1. Bombardier is still requesting HSTCS disconnect switches be returned as per AOM #832;
2. Bombardier is still requesting Service Letter 27-083 revB questionnaire be returned upon Dual Channel Inop event and;
3. As part of the on-going investigation, Bombardier will continue monitoring the HSTCS Dual Channel Inop event rate;

OPERATOR ACTION:

Bombardier recommends Operators to proceed with the HSTCS Disconnect Switch Sensitivity Test:

1. On A/C that have accumulated more than 10000FH, at next aircraft 2A check;
2. On A/C that have accumulated less than 10000FH, at next aircraft C check;
3. Thereafter, at every following aircraft C check and;
4. As a troubleshooting method in case of Dual Channel Inop event occurrence;

HSTCS Disconnect Switch Sensitivity Test

Manpower: It will take an estimated 0.25 to 2.0 man-hours to complete this task depending on the test result

Reason for testing: This Service Letter task is used as a guidance to isolate faulty HSTCS disconnect switches that may result in unintended HSTCS Dual Channel Inop during operation

Step	**Description**		
1.0	Switch Time Since New & Cycle Since New, if known	**TSN:** **CSN:**	
2.0	Aircraft Serial Number, Flight Hours & Flight Cycles	**S/N:** **FH:** **FC:**	
3.0	HSTCU part number installed on subject aircraft (-7, -8 or -9)	**P/N:**	
4.0	Turn on A/C power		
5.0	Ensure that both channels of the HSTCS are ON		
		Pass	
		Yes	**No**
5.1	Ensure that no STAB TRIM, MACH TRIM, STAB CHAN 1 INOP or STAB CHAN 2 INOP messages are posted on the EICAS display		
6.0	Conduct the operational test of the HSTCS trim disconnect switches as follows: (The pilot and co-pilot switches must be tested independently)		

		Pass	
		Yes	**No**
6.1	Without depressing the disconnect switch (no click, no movement in the *z* axis), apply lateral pressure on the side of the switch in different directions (*x* and *y* axis) as per Figure 1-2, monitoring for STAB TRIM, STAB CHAN 1 INOP or STAB CHAN 2 INOP messages on the EICAS displays.		
6.2	Without depressing the disconnect switch (no click, no movement in the *z* axis), rotate the disconnect switch with a pivotal action on its axis several times in each direction as per Figure 1-2, monitor for STAB TRIM, STAB CHAN 1 INOP or STAB CHAN 2 INOP messages on the EICAS displays.		
7.0	If any of the EICAS messages (STAB TRIM, STAB CHAN 1 INOP or STAB CHAN 2 INOP) are posted during the test, replace the applicable disconnect switch with a new one as per AMM TASK 27-41-30-000-802, “Removal of the Pitch Disconnect Switch”, and AMM TASK 27-41-30-400-802, “Installation of the Pitch Disconnect Switch”		

Table 1: Test Procedure

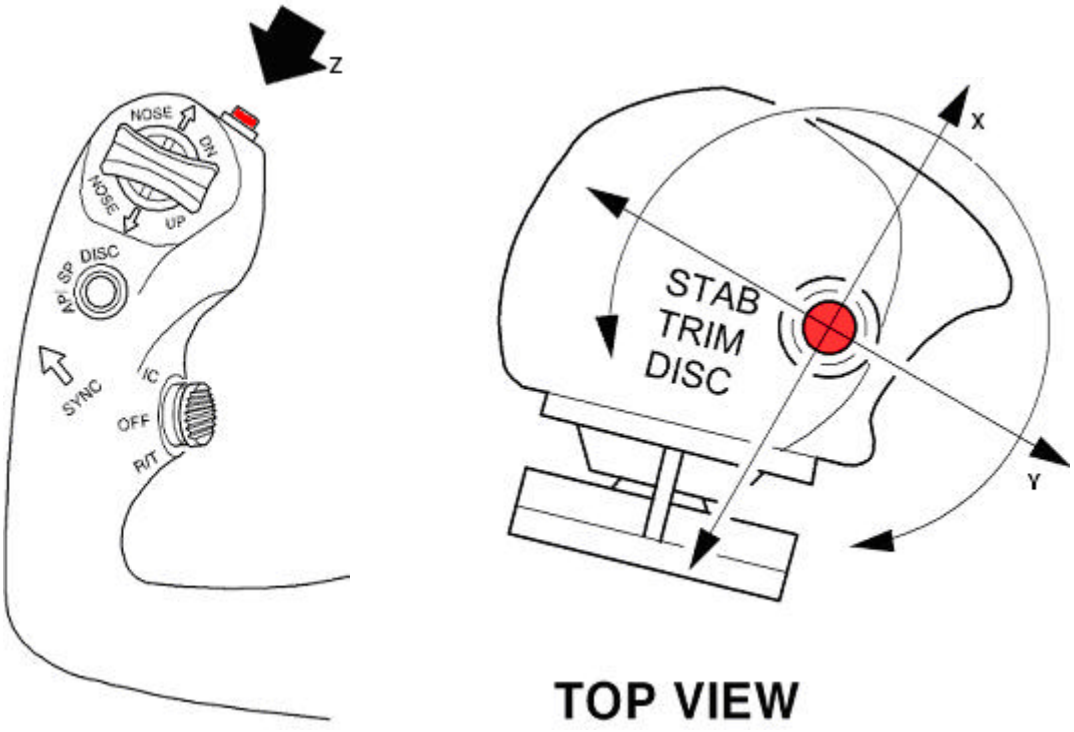

Figure 1-2: HSTCS Disconnect Switch Sensitivity Test

In order to aid in the root cause investigation, it is requested that any switch that does not pass the HSTCS Disconnect Switch Sensitivity Test and Table 1 be shipped to:

Martin Crevier, S677 1413 02
13100 Henri-Fabre Boulevard
Mirabel, Québec
Canada
J7N 3C6

All returned switches shall be identified with the following information:

- Switch TSN & CSN, if known
- Aircraft Serial Number, Flight Hours & Flight Cycles

Operators may purchase trim disconnect switches (P/N 996-0013) though normal process via BA spares.

Finally Operators are reminded to support the investigation of this issue by continuing to supply:

- Either functional disconnect switches or faulty ones, as identified in AOM #832
- Filled out questionnaires as identified in SL 27-083 revB, whenever a Dual Channel Inop Event is encountered.

Please direct responses and inquiries to your Bombardier Aerospace Regional Aircraft Field Service Representative or the Technical Help Desk in Montreal at telephone number (514) 855-8500 or facsimile (514) 855-8501 or thd.crj@aero.bombardier.com

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