Feedback

Canadian Aviation Service Difficulty Reports

The following content was published between January 1st, 2019 and August 13th, 2019

Table of Contents

Heads up

Aerospatiale ATR 42 320

Small Bulb, Big Problem

SDR #: 20150224028

Subject:

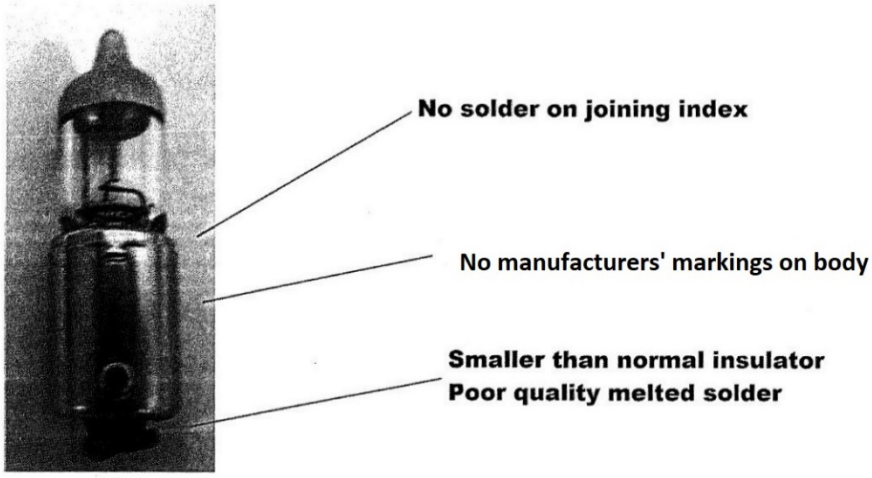
Minor edits have been made to the text below taken from the Service Difficulty Report's Problem Description. Transport Canada Civil Aviation reserves the right to edit for spelling, grammar and punctuation to increase comprehension.

A small amount of smoke was noted in-flight, emitting from the reading light in seats 5A/B. The aircraft returned to base and the bulb was replaced rectifying the defect. The company's safety management system investigation lead to the suspicion that the bulb was an unapproved or counterfeit part. Indications of the part being counterfeit are low quality and overabundance of solder on positive (NON BODY) electrical contact. A complete lack of manufacturing markings or part number (P/N) stamped or etched on the bulb, a lack of solder to secure the bulb housing halves joint, and a smaller than normal insulator separating the bulb housing and center contact.

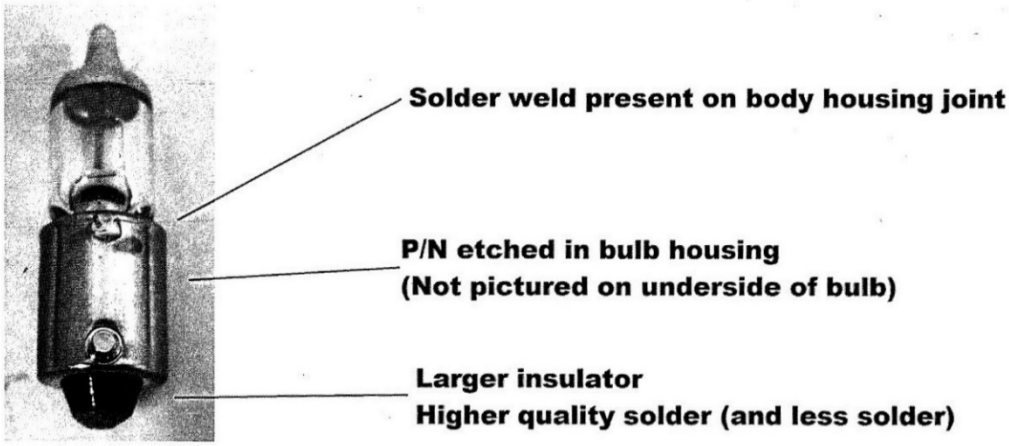
An inspection of a second company's aircraft found approximately 1/3 of the bulbs installed in the reading lights were of the unmarked, suspected counterfeit variety and several had significantly melted contacts. Upon this discovery, the reading light system on all 5 company aircraft were deferred and disabled until all the bulbs could be inspected and replaced as required.

Transport Canada Comments:

Within the quality assurance program for your company, the final quality control rests with the installer, and constant vigilance is required at all times. It is a good practice that maintainers installing parts ensure that they are using correct parts by visually comparing the new and the replacement. A correct P/N does not always guarantee that you have the right part.



The above picture shows one of the suspect counterfeit / unapproved bulbs.



The above picture illustrates the differences compared to Wamco Parts manufacturer Approval (PMA) P/N WL8GH003912-06

Diagram showing the differences between the unapproved part and a Parts Manufacturer Approval (PMA) unit.

Boeing 767 328

Bleed Air Pre-Cooler Air Leak

SDR #: 20180424017

Subject:

Minor edits have been made to the text below taken from the Service Difficulty Report's Problem Description. Transport Canada Civil Aviation reserves the right to edit for spelling, grammar and punctuation to increase comprehension.

During a regular maintenance visit, metal debris was found protruding from the right hand pre-cooler exhaust outlet of the core cowl. Further inspection revealed separation of the pre-cooler shroud and core cooling fins. Engine bleed inlet and exhaust ducts were inspected for debris, with no debris noted. The engine bleed outlet fins were intact.

The pre-cooler was replaced, along with the right hand engine strut blanket and outboard core cowl. No further damage was sustained due to the separation. There was no evidence noted as to the cause of this defect. No indications were noted by the flight crew prior to the discovery of this defect.

Transport Canada Comments:

Further investigation by this operator revealed the probable cause of the failure to be sulfidation. Sulphur compounds in the air are chemically reacting with the nickel causing the fins to become brittle and flake off. If enough fin material is lost, leading to the pre-cooler not being able to adequately cool the bleed air, eventually the core could collapse.

In this case, the piece of the core that let go internally caused the side wall of the cooler to become compromised. The resulting large hole allowed material to escape and cause secondary damage to the engine strut blanket and outboard core cowl.

This is a good example of how alert maintenance personnel exercising awareness during maintenance activities and looking beyond the immediate task can find problems before they manifest into more serious events.

Pre-Cooler Assembly with pieces from housing

Close up view of the hole in the housing and missing fins on the internal structure.

Piper – PA31 350

Anti-retraction Solenoid for the Piper PA31-350 Landing Gear Selector

SDR #: 20171108018

Subject:

Minor edits have been made to the text below taken from the Service Difficulty Report's Problem Description. Transport Canada Civil Aviation (TCCA) reserves the right to edit for spelling, grammar and punctuation to increase comprehension.

The pilot inadvertently selected gear-up upon landing, resulting in the aircraft, engines and propellers being badly damaged. The landing gear selector mechanism should prevent selecting gear-up with weight on wheels. At the time, it was thought that the gear was selected up just at the moment of touchdown while the wings still had lift and the gear struts were still fully extended. The aircraft was repaired and returned to service.

However, during subsequent maintenance to repair defects noted by the pilot, the Aircraft Maintenance Engineer (AME) checked the landing gear selector mechanism without power-on and he could select "gear-up" without the anti-retraction locking pin stopping the handle. The AME investigated further and removed the anti-retraction portion of the landing gear selector mechanism. The AME found that the solenoid assembly shaft was bent and was stuck in the stop lever hole.

When the shaft was rotated 90 degrees, the solenoid could then move freely through the stop lever hole. Inspections conducted since the gear-up incident had found that the solenoid assembly worked properly, preventing the landing gear selector handle from being selected up. At every 100 hours air time, the PA31-350 event # 2 and # 4 inspections call for inspecting the landing gear selector mechanism and the anti-retraction solenoid.

With the solenoid installed, a bent shaft is not obvious and it would be difficult to detect unless the shaft was stuck in the stop lever hole. If the AME were to rotate the shaft during the inspection, a bent shaft would likely be found. This idea was not considered during previous inspections, nor considered necessary as the solenoid operated normally. Piper may want to add to their inspection requirements, to rotate the solenoid shaft in-situ by finger at the spring flange.

Transport Canada Comments:

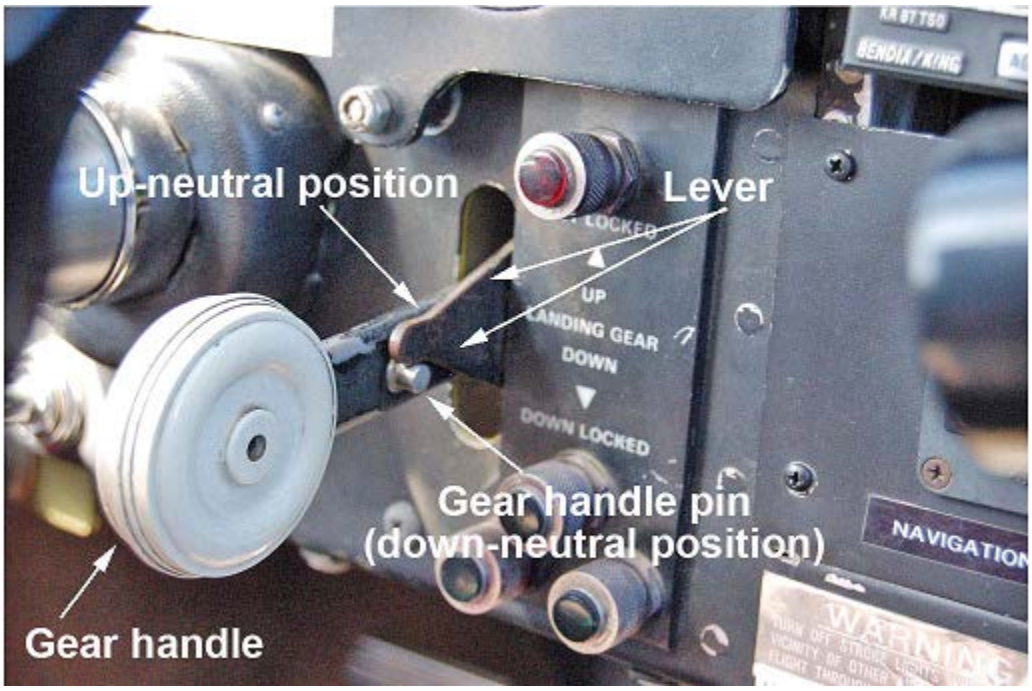
The Piper PA31-350 (Chieftain) is one of several models of Piper aircraft equipped with a very similar landing gear selector handle with an anti-retraction solenoid as described in this service difficulty report (SDR). A quick search of the web service difficulty reporting system (WSRDS) database reveals that there have been over 40 SDRs filed since 1975 with respect to issues pertaining to the landing gear selector handle and anti-retraction solenoid. Some of these incidents resulted in unplanned retractions on

the ground with consequential damage to the aircraft. In April 2007, the Transportation Safety Board (TSB) investigated an accident under TSB file A07O0095 where the aircraft suffered a retraction of the landing gear just after landing. The cause was attributed to a broken spring in the landing gear handle which weakened the handle's ability to return to its most forward spring-loaded position and allowed the handle to move past the neutral stop when it was most likely inadvertently bumped.

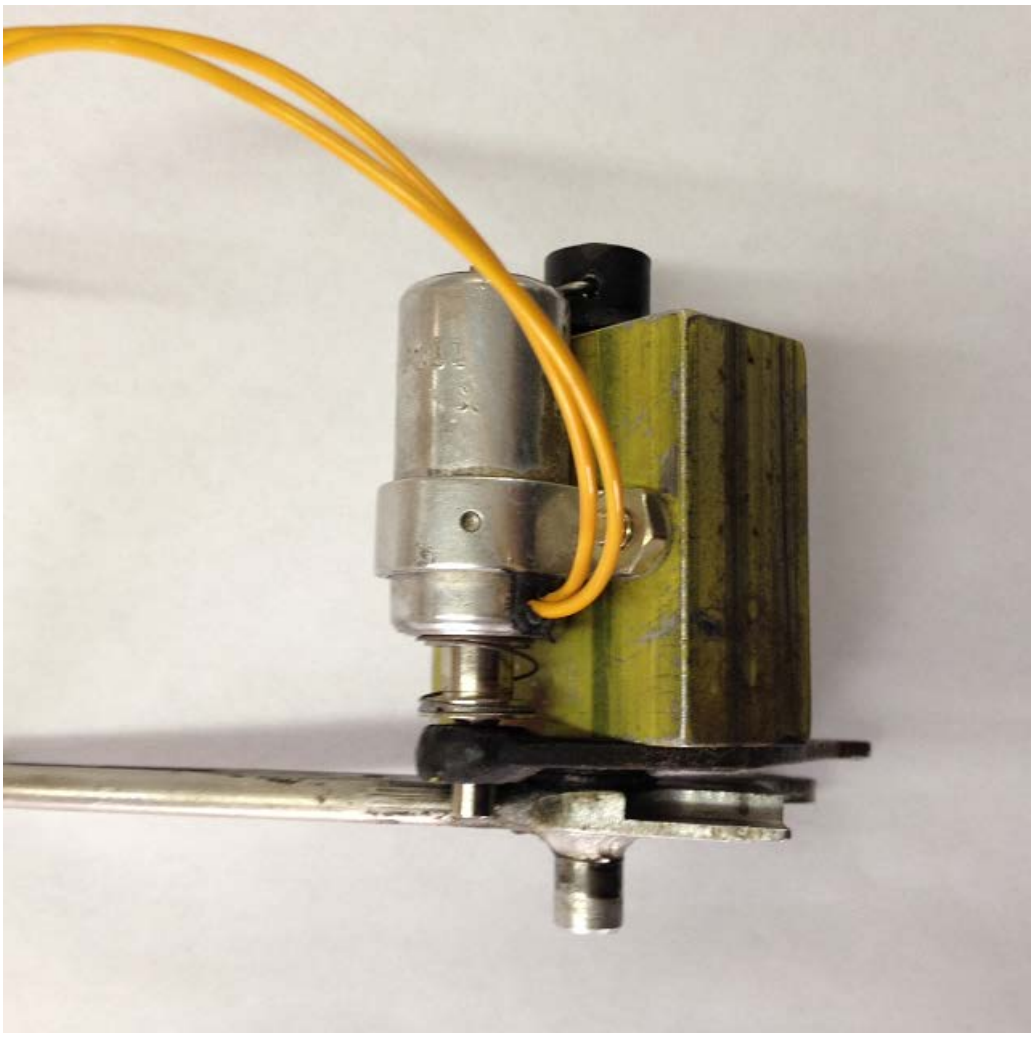
Piper released Service Letter No. 492, dated September 6 1967, which provided general instructions for inspection and operation of the landing gear handle. In addition, Piper incorporated the intent of that inspection into the Piper PA31 Service Manual and added a specific requirement to check the anti-retraction solenoid at every event # 2 and # 4 as described in the SDR.

The submitter's finding in this SDR, that the manual does not specifically require the technician to rotate the shaft to verify that it is not bent, is a valuable observation. Even though it is not specifically called out in the Instructions for Continued Airworthiness (ICAs), TCCA highly recommends that maintainers of these types of aircraft be diligent in inspecting for this condition (bent shaft) specifically, in addition to other negative conditions (e.g. weak return springs in handle, proper alignment and functioning of anti-retraction solenoid and or squat switch etc.)

TCCA also reminds maintainers and operators that if any such conditions are found, to submit an SDR to TCCA.



Piper PA31-350 Landing Selector



Piper PA31-350 Anti-retraction solenoid

Fixed Wing

Aerospatiale, ATR 42 320

Overhaul oversight leads to damaged landing gear component

SDR #: 20170711013

Subject:

Minor edits have been made to the text below taken from the Service Difficulty Report's Problem Description. Transport Canada Civil Aviation reserves the right to edit for spelling, grammar and punctuation to increase comprehension.

While completing a nightly walk-around, it was discovered that the right-hand main landing gear side brace D22710000-9 was assembled incorrectly at overhaul or last

shop visit. The lower arm upper pin Part Number (P/N) D57407 and collar (washer) P/N D57408 at the universal joint, were installed upside down causing the collar to hit the link assembly, P/N GA62048, of the secondary alignment brace. This caused the link to be bent slightly.

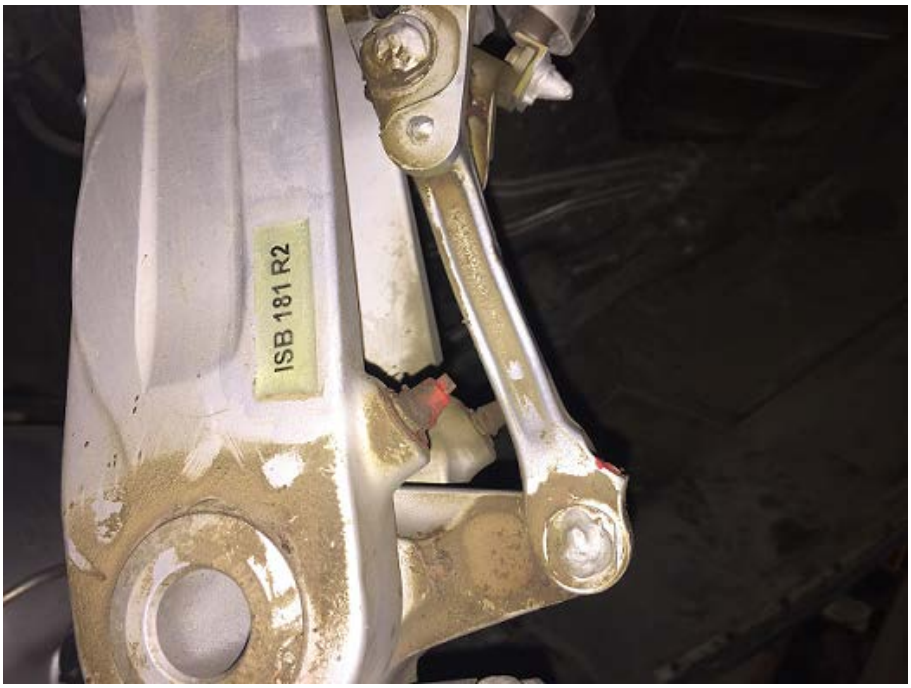
Transport Canada Comments:

Maintenance personnel are reminded that when installing components or assemblies onto an aircraft, they are responsible for inspecting that unit and the associated paperwork before installation.

Pursuant to section 571.13 of the CARs, a part is to be inspected and its accompanying documentation verified prior to installation in accordance with a procedure that the Minister finds acceptable, having regard for the safety of the aircraft, to ensure that the part conforms to its type design...

Just because a component has a green tag does not necessarily mean it is serviceable.

Damage to link caused by contact with collar



Noticeable bend in link P/N GA62048

Incorrectly installed collar which shows evidence of contact with link unit

Aerospatiale, ATR 42 300

Chafed wires result in smoky flight compartment

SDR #: 20180723019

Subject:

Minor edits have been made to the text below taken from the Service Difficulty Report's Problem Description. Transport Canada Civil Aviation reserves the right to edit for spelling, grammar and punctuation to increase comprehension.

Electrical smoke on take-off by the captain's left knee. Maintenance found 2 chafed Flight Management System (FMS) wires, W09008-815 and W09008-816, both wires were then isolated & secured.

All other local wiring inspected, no further damage found. Number 2 FMS inoperative, Differed Maintenance Item (DMI) two circuit breakers collared. Engine runs carried out as per 72-00-00 serviceable.

Transport Canada Comments:

When installing components or performing visual inspections, maintainers are reminded to be diligent for potential chafing between structure and lines, conduits, hoses, electrical harnesses, etc.

Location of fastener and evidence of arcing

Arcing evidence on wires

Aerospatiale, ATR 42 300

The importance of a thorough and attentive walk-around.

SDR #: 20180817016

Subject:

Minor edits have been made to the text below taken from the Service Difficulty Report's Problem Description. Transport Canada Civil Aviation reserves the right to edit for spelling, grammar and punctuation to increase comprehension.

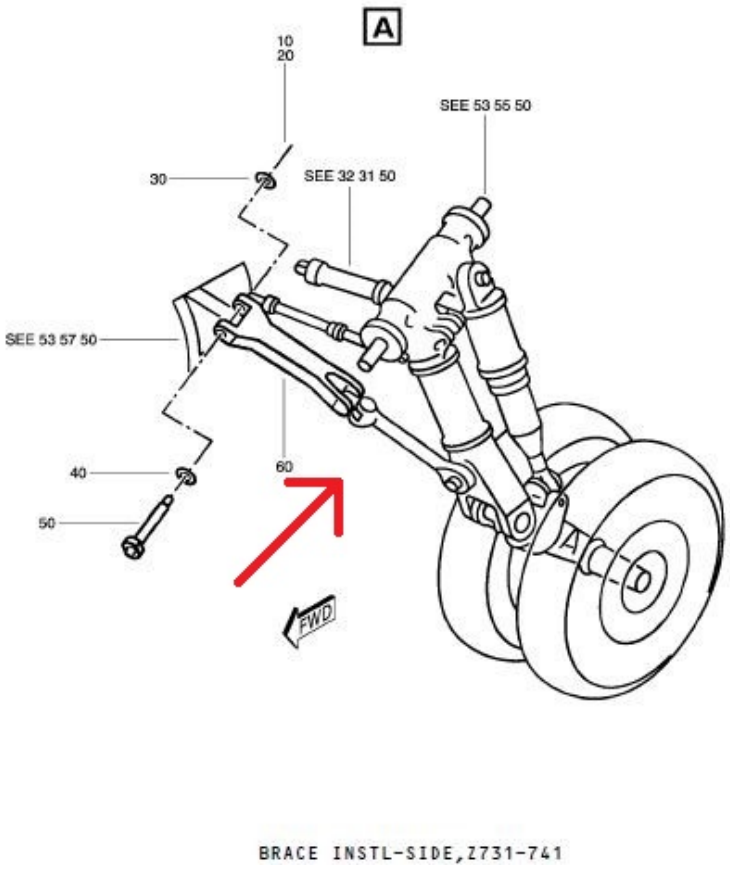
During a walk-around of the aircraft, the right-hand main landing gear (R/H MLG) side brace lower attach bearing brace was found to be migrating from the assembly bore. The R/H MLG side brace assembly was replaced and gear swings carried out in accordance with ATR42 AMM JIC 32-11-53 RAI 10000. No further faults.

Transport Canada Comments:

By finding this defect on the ground, observant maintenance staff may have prevented a failure that would have adversely affected the aircraft's ability to land safely.

Operators are asked to take their time when performing inspections and pre-flight walk-arounds.

Bearing seen migrating from housing



Parts Catalogue showing side brace location

Bombardier, CL600 2C100 (RJ700)

RJ700 – Corrosion on floor support structure at door area

SDR #: 20171002006

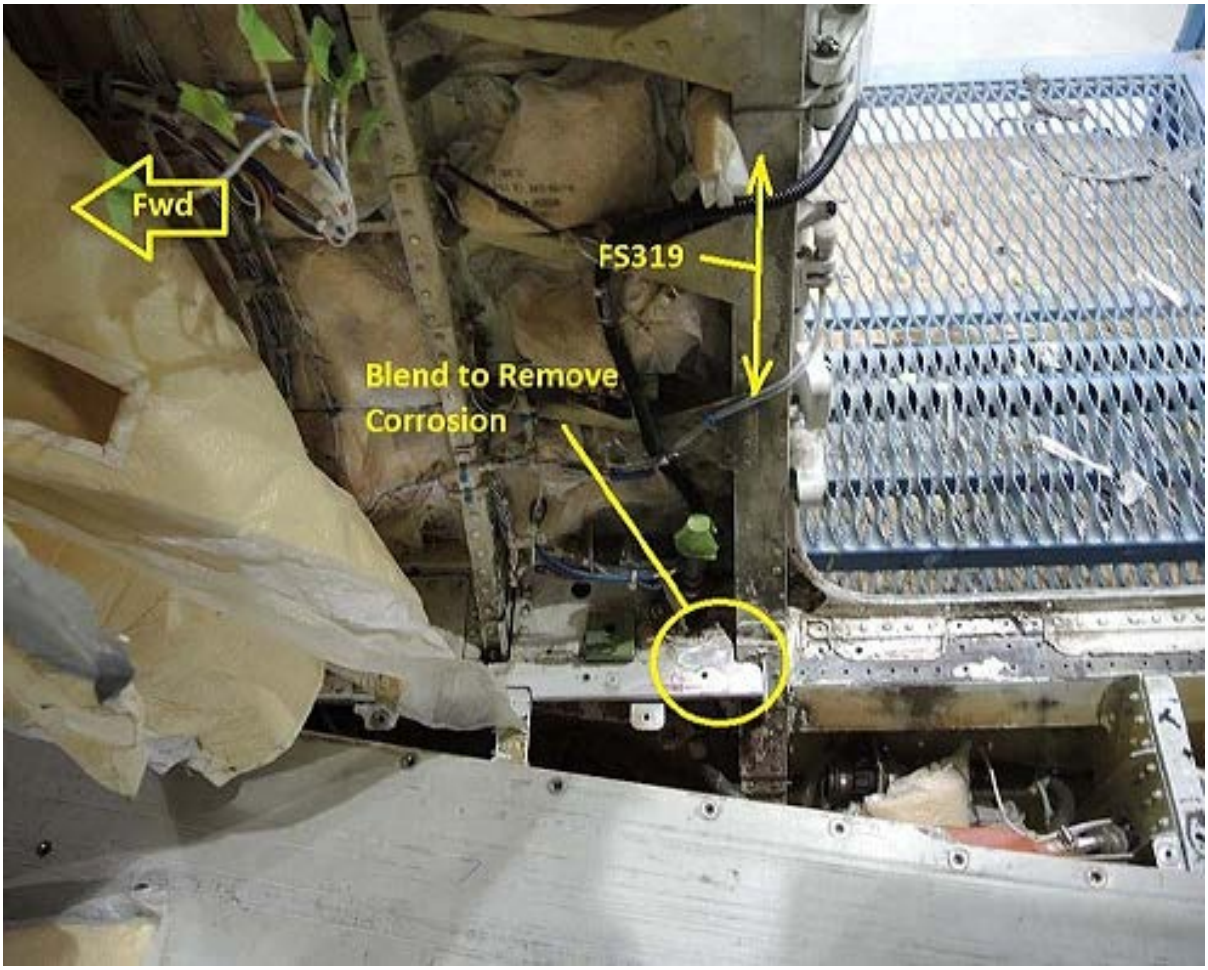
Subject:

Minor edits have been made to the text below taken from the Service Difficulty Report's Problem Description. Transport Canada Civil Aviation reserves the right to edit for spelling, grammar and punctuation to increase comprehension.

During a routine inspection, corrosion was found on the floor support sill between fuselage stations FS.317 and FS.319.7 at stringer 18R. The corrosion was deep enough to require blending.

Transport Canada Comments:

There are currently 40 similar reported events of floor support structure corrosion dating back to 2005. The corrosion in many cases was so severe that it required replacement of the floor sill, stringers and other structures. Transport Canada recommends a more frequent inspection interval of this area to maintain the protective finish to prevent corrosion. The application of corrosion inhibiting compound may also provide added protection to prevent the corrosion damage from occurring.



Area of corrosion shown

Blend to remove Corrosion

Bombardier, CL600 2E25 (RJ1000)

CRJ 1000 - Elevator Power Control Unit (PCU) #1 has broken rod end

SDR #: 20171012001

Subject:

Minor edits have been made to the text below taken from the Service Difficulty Report's Problem Description. Transport Canada Civil Aviation (TCCA) reserves the right to edit for spelling, grammar and punctuation to increase comprehension.

While performing the maintenance task for the operational test of the elevator power control units, the technicians found that the left elevator movement was abnormal when the test was performed with elevator PCU #1. When access was gained to inspect the elevator PCU, it was discovered that the PCU #1 rod end was sheared and the bearing was jammed. Evidence of light corrosion was also found on the rod end and this type of defect was not expected on such a low time aircraft. The aircraft had been operating briefly in a maritime environment with flights to the islands.

To remove the PCU, both the rod end and attachment bolt had to be cut and additional damage was found on the elevator PCU fitting. Bombardier was contacted and the fitting damage was repaired following their repair instructions. The other (5) PCUs from the left and right elevators were inspected as per Service Bulletin 670BA-27-074 with no additional findings. The left elevator PCU#1 and all the associated hardware was replaced with new parts.

Transport Canada Comments:

The interval at which this inspection was carried out was compliant with the recommended Maintenance Review Board (MRB) intervals and this aircraft was low time and relatively new. Aircraft operating environments sometimes require that tasks be performed on more frequent inspection intervals to ensure the integrity of the systems.

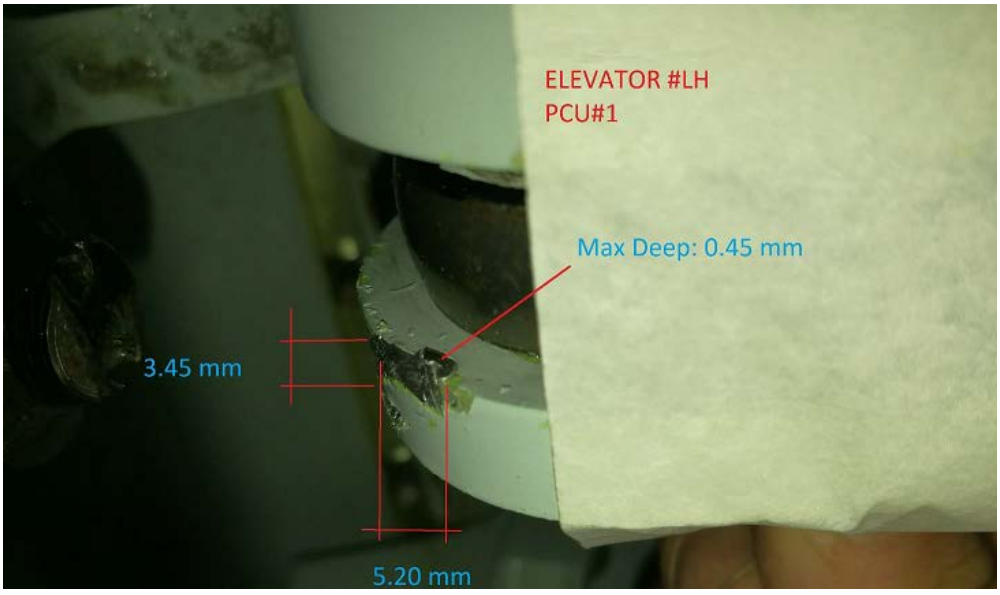
This is the third Feedback article written on this subject and all Bombardier CRJ model aircraft including the CL850 are known to have this problem. If you are finding this problem on your aircraft, Transport Canada recommends reducing the inspection interval and/or adding additional inspections. Some operators already perform abbreviated and similar flight control function tests on their pre-flight checks to ensure correct function of all PCUs. In one case, a broken PCU rod end defect was discovered by the flight crew during their pre-departure flight control checks. These operators have added additional inspections via function tests in order to ensure proper system function and integrity at a more frequent interval.

Please continue to submit SDRs for seized or sheared rod end bearings. TCCA continues to monitor this issue.

Sheared rod end with visible corrosion

Sheared rod end with visible corrosion (2)

Side view from elevator PCU fitting



Damage to PCU fitting

Bombardier, BD 500 1A11

C Series main landing gear door damage caused by loose fitting

SDR #: 20171003009

Subject:

Minor edits have been made to the text below taken from the Service Difficulty Report's Problem Description. Transport Canada Civil Aviation (TCCA) reserves the right to edit for spelling, grammar and punctuation to increase comprehension.

The right-hand (R/H) Main landing gear (MLG) door external fitting assembly part number (P/N): C01605015-N0007, was found loose, allowing the MLG middle door to migrate out of rig and contact the surrounding structure.

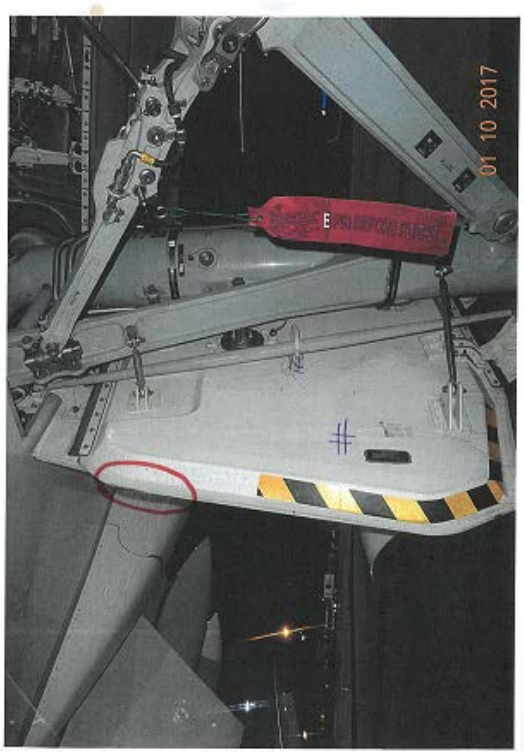
Some wear and delamination was found on the MLG door where it had contacted the other structure. The manufacturer was contacted and the damaged area was repaired.

Transport Canada Comments:

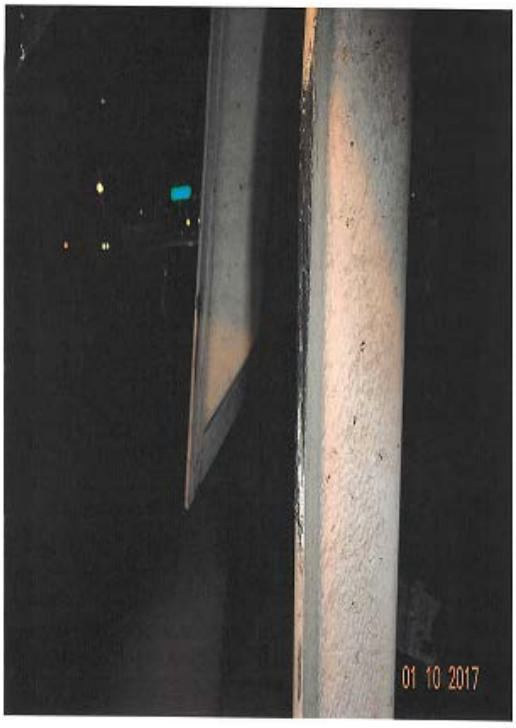
Immediately following this event, Bombardier issued CS-RIL-32-0005 to the affected operator to inspect and rectify suspect MLG middle doors. Another operator reported similar events on (2) aircraft with one event causing more severe gear door damage.

TCCA wishes to raise awareness of this event and request that any similar issues be reported to the manufacturer, directly to TCCA or to your local Civil Aviation Authority.

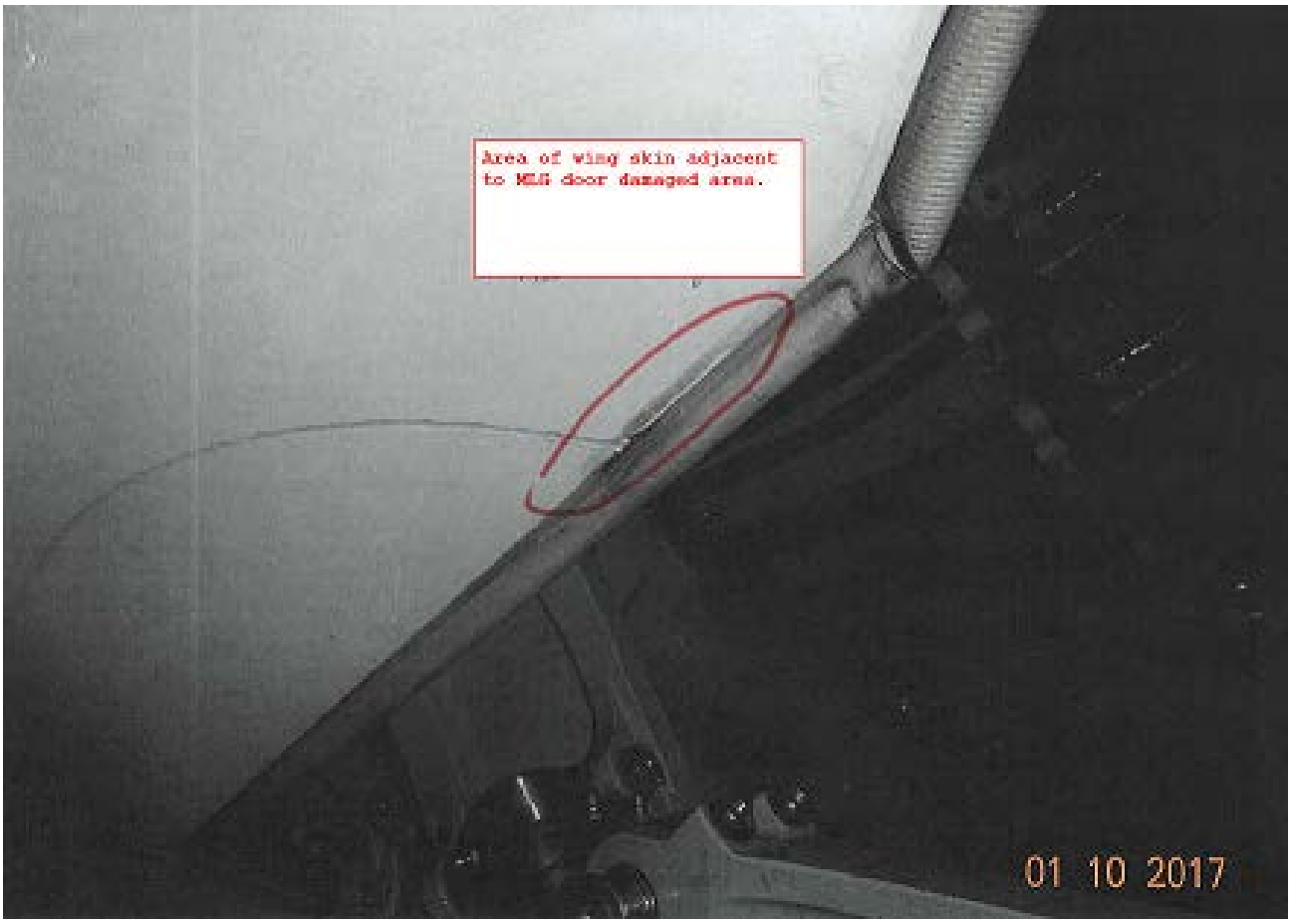
Loose main landing gear door fitting – notice gap



R/H main gear door wear area - Gear door wear – front view



R/H main gear door wear area - Gear door wear – side view



Area of wing skin adjacent to MLG door damaged area

Cessna 560

Citation Fire Extinguisher Squib Test

SDR #: 20160713025

Subject:

Minor edits have been made to the text below taken from the Service Difficulty Report's (SDR) Problem Description. Transport Canada Civil Aviation (TCCA) reserves the right to edit for spelling, grammar and punctuation to increase comprehension.

While carrying out the engine fire bottle activation test during a Phase 5 inspection, it was found that when the left-hand (L/H) fire bottle switch was activated, the L/H firewall shut-off circuit breaker popped and no activation voltage was present at the fire bottle squib. This was due to the positive and ground wires being crossed at the squib.

In 2005, Cessna issued mandatory service bulletin (SB) 560-26-01 for all Cessna 560 aircraft up to serial number 560 to label all the wiring to the fire bottle squibs precisely to prevent this problem. Our aircraft is serial number 702 and the labelling of the fire bottle wiring was carried out by Cessna at production. It was found that the wire labelling was original and the wires had been wrongly identified at production.

The second issue was why this problem had not been found during previous tests of the fire bottle activation. The method of test as per the C560 maintenance manual is to remove just the positive activation wire from the fire bottle squib, connect a multi-meter between that wire and ground, activate the fire bottle switch and observe that there is voltage indication on the multi-meter.

Through discussion, it seems that an alternate "industry standard" method of testing is being widely used, in which both the positive and ground wires are being removed from the fire bottle squib so the squib is not grounded during the test, reducing the risk of accidental squib activation. The multi-meter is then connected between the positive wire and the ground wire in order to also check the ground side of the circuit and the multi-meter is checked for voltage when the fire bottle switch is activated.

Using this method, it shows if activation voltage is present but not if the wires are crossed. An in-house review with staff of this maintenance procedure has been carried out.

Transport Canada Comments:

This SDR reports a very peculiar situation with respect to the fact that the affected aircraft should have been already configured in a manner that would achieve the same level of effect as with Cessna SB560-26-01. A review of the TCCA SDR database reveals no similar SDRs. The submitter also informs that the squib test had been previously accomplished, but surmises that the latent defect in the wiring connections may not have been identified due to the manner in which the alternate industry standard test procedure may have been carried out. Since the report indicates that work had

been previously accomplished in the area, it is possible that the labels could have been incorrectly installed at that time.

Although compliance with service information contained in a SB labeled as “mandatory” by the Original Equipment Manufacturer (OEM) is not actually mandatory unless it is mandated by an Airworthiness Directive (AD) or foreign equivalent notice, service information published by the OEM provides owners, operators and maintainers with valuable and useful information to consider in respect of their aircraft. This is also a great reminder of the reasons it is so important to follow the Instructions for Continued Airworthiness (ICA) for maintaining an aeronautical product. Cessna issued SB 560-26-01 specifically to address concerns about the system functionality due to the possibility of the wires being misidentified and incorrectly installed.

Owners, operators and maintainers are reminded that pursuant to Canadian Aviation Regulations (CAR) / Standard 571.02(1), a person who performs maintenance or elementary work on an aeronautical product shall use the most recent methods, techniques, practices, parts, materials, tools, equipment and test apparatuses that are (a) specified for the aeronautical product in the most recent maintenance manual or instructions for continued airworthiness developed by the manufacturer of that aeronautical product; (b) equivalent to those specified by the manufacturer of that aeronautical product in the most recent maintenance manual or instructions for continued airworthiness; or (c) in accordance with recognized industry practices at the time the maintenance or elementary work is performed.

Maintainers must exercise caution and due diligence when deciding to perform maintenance in accordance with a standard of airworthiness other than that which is specified for the product in the ICA pursuant to paragraph 571.02(1)(a). Maintainers are reminded that the standards referred to in paragraphs 571.02(1)(b) or (c) are not automatic. The maintainer must be prepared to demonstrate that the alternate standard is a bona fide equivalent or accepted industry practice. In this particular case, the fact that the industry practice alluded to in the SDR did not produce the same results as the ICA, makes it fairly evident that the alternate standard was not a legitimate equivalent or industry practice.

Maintainers should also take note that when an alternate standard of airworthiness is selected, CAR 571.03(a) and Standard 571.03(c) effectively prescribe that the alternate standard of airworthiness must be referenced in the maintenance entry and/or maintenance release. Similarly, CAR 573.08(3) prescribes that where an Approved Maintenance Organization (AMO) elects to perform maintenance to an equivalent standard, other than the product’s ICAs, the Standard used shall be identified in the CAR 571.10 maintenance release. Where no alternate standard is referenced, the default position will be that the work was deemed to have been performed to the ICAs. If the work was not actually performed to the specified standard, it could expose the maintainer to possible CAR violations.

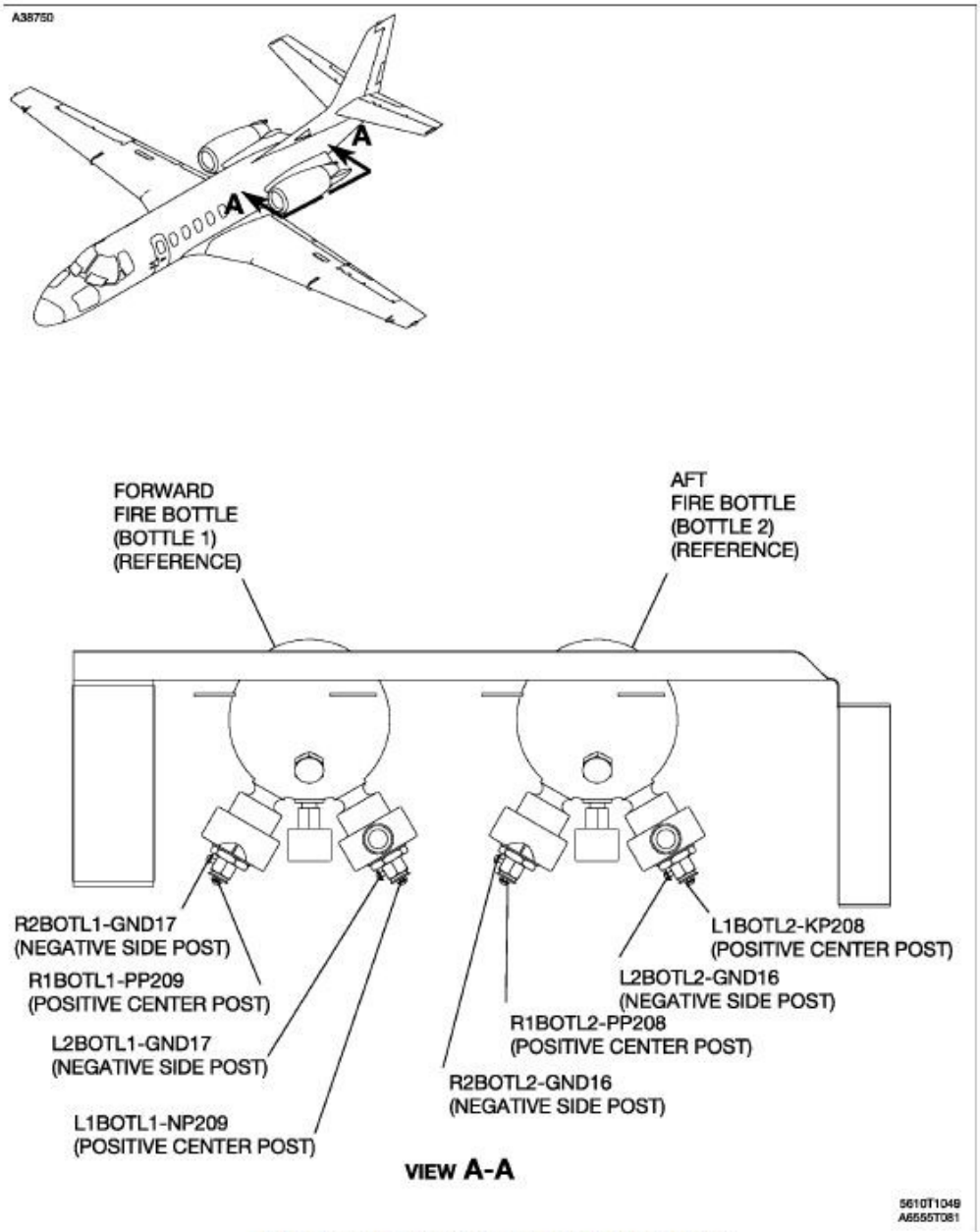


Figure 1. Fire Bottle ID Sleeve Installation (Sheet 1)

Fire Bottle ID Sleeve Identification

De Havilland - CAN, DNC 8 402

Broken exhaust trunnion mount

SDR #: 20171010009

Subject:

Minor edits have been made to the text below taken from the Service Difficulty Report's Problem Description. Transport Canada Civil Aviation reserves the right to edit for spelling, grammar and punctuation to increase comprehension.

During general visual inspection task DH4-000-05-410-302 of the left-hand nacelle, maintenance discovered that both trunnion mounts of the aft jet pipe assembly had broken off. Upon further investigation, both of the right-hand aft jet pipe assemblies trunnion mounts were also found broken.

Transport Canada Comments:

Once one of the mounts breaks off, the tailpipe is allowed to vibrate and can cause the other mounts to break off. Timely discovery of the damage is essential to limit the amount of damage.

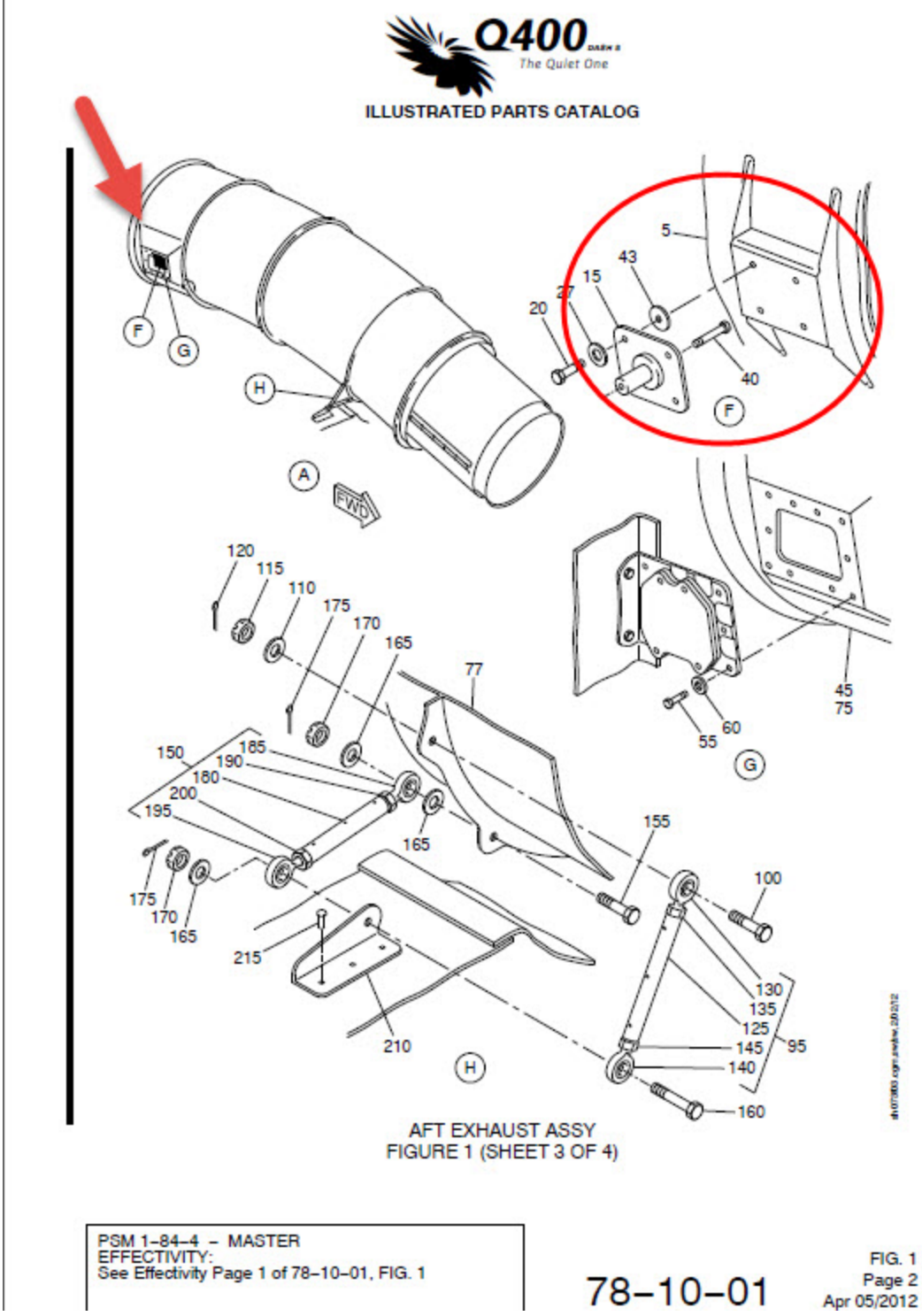
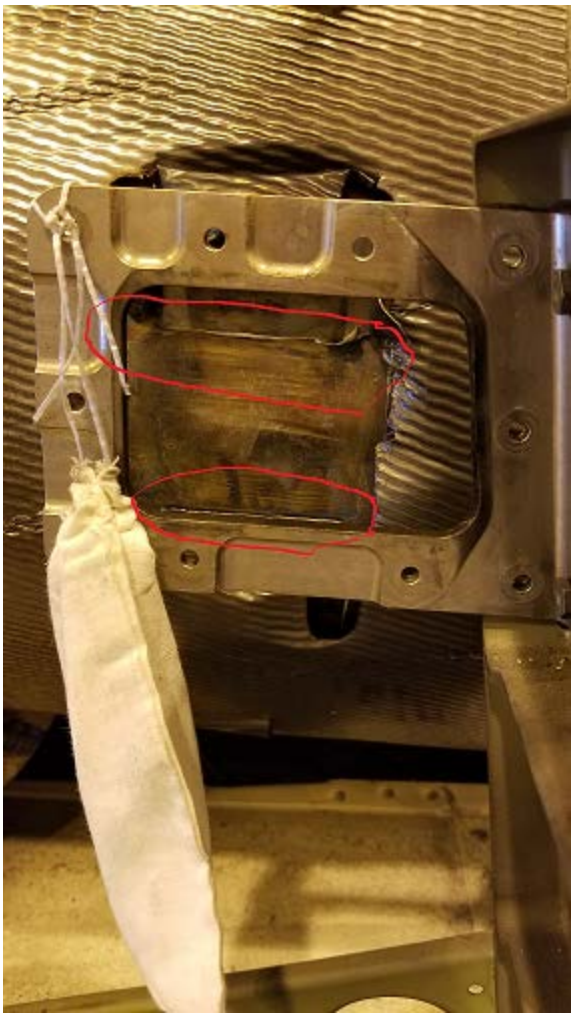


Image of the tailpipe from the parts manual



Mount broken off the tailpipe

Broken mount

De Havilland – CAN, DHC 8 314

Leaky fuel line

SDR #: 20171026007

Subject:

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During cruise flight, the crew noticed a strong fuel smell and also noticed a leak coming from the left-hand (L/H) engine nacelle vent.

The L/H engine fuel motive flow line from the firewall to the Fuel Control Unit was found to be leaking

Transport Canada Comments:

Most of the time, it's impossible to detect if fluid lines are deteriorating. These fuel lines are on-condition, however, they should still be carefully inspected during inspections.

Leak in a braided fuel line

Equipment Airworthiness Directives (ADS)

Transport Canada (TC) endeavors to send copies of new Airworthiness Directives (ADs), which are applicable in Canada to the registered owners of the affected products. Equipment/appliance ADs are often only distributed to our regional offices because the owners of aircraft affected by this type of AD are not generally known.

Aircraft Maintenance Engineers (AMEs) and operators of the affected products are encouraged to obtain further information or a copy of the ADs from their regional TC office, their local Transport Canada Centre (TCC), their Principal Maintenance Inspector (PMI), or from the Civil Aviation AD website at: *www.tc.gc.ca/cawis-swimn*

To view the most recently published Equipment Airworthiness Directives (ADs), click here or go to this website http://www.tc.gc.ca/eng/civilaviation/certification/equipment-airworthiness-directives.html

FAA Special Airworthiness Information Bulletins (SAIB)

A Federal Aviation Administration (FAA) SAIB is an information tool that alerts, educates, and makes recommendations to the general aviation community. It is non-regulatory information and guidance that does not meet the criteria for an Airworthiness Directive (AD). www.faa.gov/aircraft/safety/alerts/SAIB/

To view the most recently published FAA Special Airworthiness Information Bulletins (SAIB), click here or go to this website http://www.tc.gc.ca/eng/civilaviation/certification/faa-special-airworthiness-information-bulletins.html

EASA Safety Information Notifications (SIB)

A European Aviation Safety Agency (EASA) SIB is an information tool that alerts, educates, and makes recommendations to the general aviation community. It is non-regulatory information and guidance that does not meet the criteria for an Airworthiness Directive (AD). http://ad.easa.europa.eu/sib-docs/page-1

To view the most recently published EASA Safety Information Bulletin (SIB), click here or go to this website http://www.tc.gc.ca/eng/civilaviation/certification/easa-safety-information-bulletin.html

Service Difficulty Reports (SDR)

Service Difficulty Reports are submitted by Aircraft Maintenance Engineers (AMEs), owners, operators and other sources to report problems, defects or occurrences that affect aircraft airworthiness in Canada.

To view the most recently published Service Difficulty Reports (SDR), click here or go to this website http://www.tc.gc.ca/eng/civilaviation/certification/service-difficulty-reports.html