Feedback

Canadian Aviation Service Difficulty Reports

The following content was published between 1 October 2022 and 31 December 2022. The full accessible version of each article is available on the Feedback website.

Table of Contents

Fixed Wing

Beech, B300

Air Intake Anti-Ice Lip – Weld Assembly Engine Air Inlet Cracked

SDR #: 20221026012

Subject:

During regular maintenance, maintenance personnel noticed that the bottom of the engine was covered with soot. Further investigation revealed that the lower cowl inlet duct was completely broken, shooting hot bleed air directly on engine oil lines and engine wiring. Wiring was inspected, no damage was found, and the oil lines were replaced proactively. This Service Difficulty Report (SDR) is the result of investigation following a recent event. Refer to SDRs 20221019001 and 20221026010.

Transport Canada Comments:

Similar failures have also been reported on other King Air models (not limited to King Air 300 Series aircraft) that utilize an inlet de-ice lip heated by exhaust gas from a collector in the exhaust stack. Failures include weld failure of the inlet/outlet tubes as depicted below, anti-ice flex hose failure, or connection points failure. Flight crews may be unaware that the air intake anti-ice lip heating function is degraded or completely unavailable as there are no shutoff, caution, or temperature indications for this system.

Operators and maintainers are reminded to remain vigilant when inspecting the surrounding areas. Soot is an obvious sign of exhaust gas leakage which should warrant a closer look to determine the exact cause. See Feedback Issue 3/2003 for related information.

Picture 1 – Soot, signs of exhaust gas leakage

Picture 2 – Approximate location of weld failure

Picture 3 – Weld failure, source of exhaust gas leakage

Diamond - CAN, DA 20 C1

Elevator Control Horn Attachment Bolt – Worn Through Lower Skin

SDR #: 20220318008

Subject:

During the performance of a 300-hour inspection, the forward elevator control horn attachment bolt was found worn through the lower skin of the elevator.

Transport Canada Comments:

The root cause of this failure is not entirely clear. Incorrect torque during the installation of the control horn bolt, and/or horizontal stabilizer water drain hole obstruction in combination with freeze/thaw cycles may have contributed to this failure. Maintainers are reminded to refer to the appropriate fastener installation torque values. In cases where specific torque values are not defined, standard torque values should be referenced.

Figure 1 – View of removed elevator (upside down). Elevator control horn as installed on elevator.

Figure 2 – View of removed elevator (upside down). Forward attachment bolt worn through lower skin.

Learjet, 45

Environmental Control System (ECS) Muffler Cracked

SDR #: 20220829024

Subject:

During routine maintenance, insulation was found blown into the hydraulic access panel and filter areas. Further investigation revealed that the cockpit ECS muffler assembly had cracked in two places (one crack was 2 1/8" long and the other was 3 1/8" long). No issues were noted in flight prior to the finding. This muffler was installed in 2000, in accordance with Service Bulletin 45-21-4 Modification of the Environmental Control System for Reduced Cabin Noise Levels and had accumulated 8178.0 hours since installation. The muffler was removed, inspected, and re-installed in 2020 due to other fleet muffler issues with no defects noted at that time.

Transport Canada Comments:

Additional reports of failure have been discovered after experiencing ECS anomalies in flight. Low airflow to the cockpit, inability to maintain selected heat settings and reports of cabin pressurization loss have been described by flight crews.

Learjet has noted that adequate cabin pressurization is available regardless of a rupture in the muffler assembly. It may cause the cabin air not to be routed through the

operator’s desired duct locations, but it will still reach the cabin, and with additional ECS ducting through the bulkhead, safe cabin pressure levels will be maintained.

This area is routinely accessed during a 300 hour hydraulic filter replacement. Damaged or loose outer insulation wrapping around the muffler or insulation material located near the hydraulic manifold is a good indication that the cockpit ECS muffler may be cracked.

Picture 1 – Muffler as installed, adjacent to the hydraulic filter manifold, outer insulation wrapping damage is evident

Picture 2 – Muffler outer wrapping removed, cracked at upper weld seam

Pilatus, PC12 47E

Pilatus PC 12 – Loose Anchor Nut – Rudder Hinge Attachment Bolt

SDR #: 20220819005

Subject:

During a maintenance check, the rudder was removed to inspect for play at the hinge point, and a Structural Repair Manual (SRM) repair was carried out by installing a bushing. During the rudder re-installation, when mounting the top rudder attach point bolt, a rattling noise was heard of something that had dislodged and fallen inside the rudder. Upon further investigation, it was noted that the anchor nut to which the bolt must be attached had fallen inside the rudder. After the anchor nut was retrieved, it was noted that the anchor nut was still riveted to the broken piece of rudder rib 6.

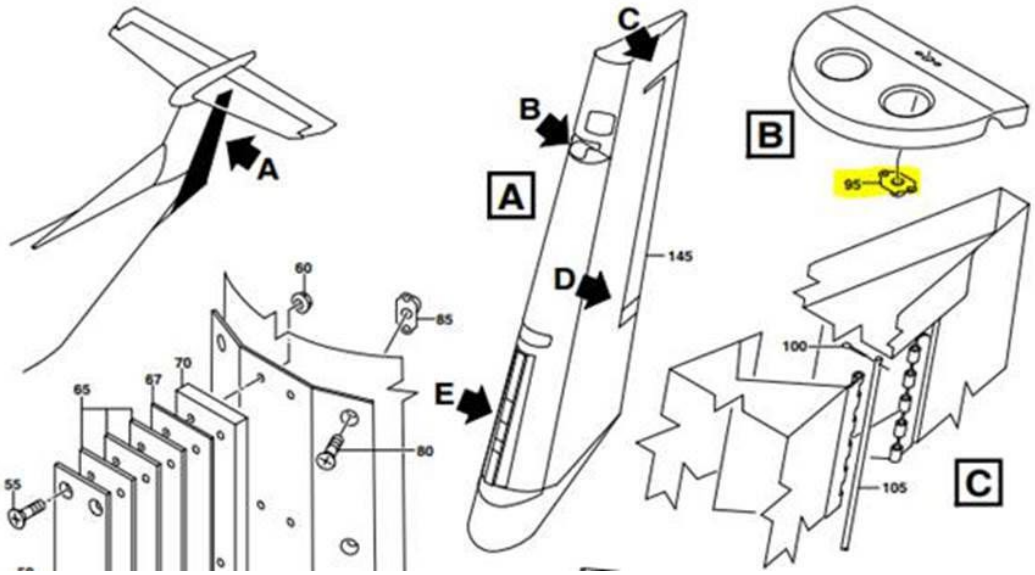
Transport Canada Comments:

The SRM repair mentioned by the submitter is Rudder Upper Hinge Fitting Repair RM06299 (Installation of an aluminum bushing). This repair has the operator increasing the top bolt hole to a larger size to accommodate a bushing, adding strength and preventing play-inducing wear.

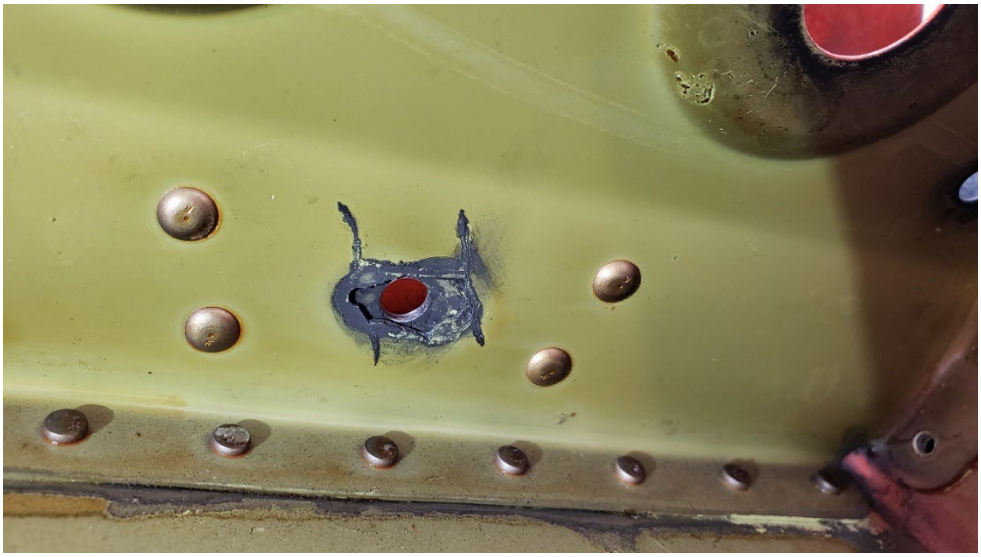
Pilatus offers another repair, Rudder Upper Hinge Attachment Repair RM05387 (Replacement of the nutplate with a self-locking nut and washer). This repair replaces

the anchor nut with a self-locking nut and washer. This repair also adds an inspection panel to access the lower portion of rudder rib 6.

Play in the rudder attachment fittings is checked while performing Pilatus Task: Rudder Inspection Check - 12-B-55-40-00-00A-313A-A. Operators are asked to keep this defect discovery in mind when finding play in the rudder upper hinge fittings of PC-12 aircraft.



Picture 1 – Illustrated Parts Cataloge (IPC) reference of rudder rib 6 and anchor



Picture 2 – Underside of rudder rib 6 with missing anchor nut

Picture 3 – Anchor nut with piece of rudder rib 6 still attached

Piper, PA44 180

Main Landing Gear (MLG) Strut Assembly – Fork and Piston

SDR #: 20210803019

Subject:

During an inspection of the gear down-lock switch on the right-hand (R/H) MLG, an aircraft maintenance engineer (AME) found, by chance, a crack on the lower strut assembly inboard of the axle, where the brake torque plate bolts attach. The crack is slightly above the bolt at the 1 o'clock position, and it is where the strut joins the axle. The location of the crack is in a significant load bearing area.

Transport Canada Comments:

Piper Aircraft published service letter (SL) 1263 due to MLG piston tube fatigue cracking. Shortly thereafter, an accident (National Transport Safety Board report WPR21LA117) involving the separation of a R/H MLG occurred. The root cause was identified as failure of the landing gear strut piston tube due to fatigue cracking from corrosion pitting.

It was noted in a subsequent Service Difficulty Report (SDR) 20210806009, that Piper has produced a replacement strut assembly, part number (P/N) 67037-006 (also referenced in the above SL), which appears to have a notable design improvement in the affected area of the lower fork.

Transport Canada Civil Aviation (TCCA) recommends compliance with SL 1263. Additionally, paying special attention to the area of the fork identified in this SDR is also recommended. High cycle aircraft, such as those used in a flight training role, may be particularly susceptible.

Figure 1 – Strut assembly fork – Crack location

Piper, PA44 180

Nose Landing Gear Centering Spring Bracket Installed Upside Down

SDR #: 20220822023

Subject:

The pilot was practicing slow flight and noticed that when the landing gear extended, only the main lights illuminated. He made several attempts to deploy the landing gear with no success in getting the nose gear extended. The pilot flew by the tower, which

confirmed that the nose landing gear was not fully extended. Only a small portion of the tire could be seen in the wheel well. The pilot elected to burn some fuel for an hour and then land. The aircraft landed and came to rest on its nose nacelle. The pilot feathered the engines on landing. Unfortunately, the propellers struck the ground, bending back the blade tips.

Upon inspection by maintenance, it was found that the centering spring (shimmy damper) bracket was installed incorrectly, which caused the nose gear to be turned off centre, and, consequently, the gear got stuck in the wheel well. Before this flight, there was a ground handling incident where the centering spring bracket had been bent. The bracket was removed, straightened, inspected, and reinstalled. It was at this time that the bracket was reinstalled upside down, causing the nose gear to spring off centre with weight off the wheel.

Transport Canada Comments:

Owners, operators, and maintainers are reminded to always follow the appropriate instructions for continued airworthiness (ICA). In cases where clarity of assembly cannot be positively ascertained, the type certificate holder should be contacted for assistance.

Although the outcome of this occurrence was likely burdensome on many levels, it was not catastrophic. Service Difficulty Reports (SDRs) should continue to be submitted for occurrences related to assembly / installation lack of clarity. The potential for mistakes and resultant consequences are not always apparent while completing complex tasks, especially if these tasks are new to the Aircraft Maintenance Engineer.

Figure 1 – Correct orientation of centering spring bracket

Figure 2 – Incorrect orientation of centering spring bracket

Engines

General Electric, CT58-140-2

Broken P3 Air Line

SDR #: 20210817009

Subject:

During forestry fire-fighting operations, after the load of water was picked-up and the climb was initiated, Engine Number 2 was not providing the required power. When compared with Engine Number 1, the torque was 40% lower and the T5 was 120 to 130 degrees Celsius below the Engine Number 1 T5 indication. The water load was released, the checklist for the low side governor failure was completed, and the helicopter returned safely to the base. An engine inspection revealed a broken P3 air line.

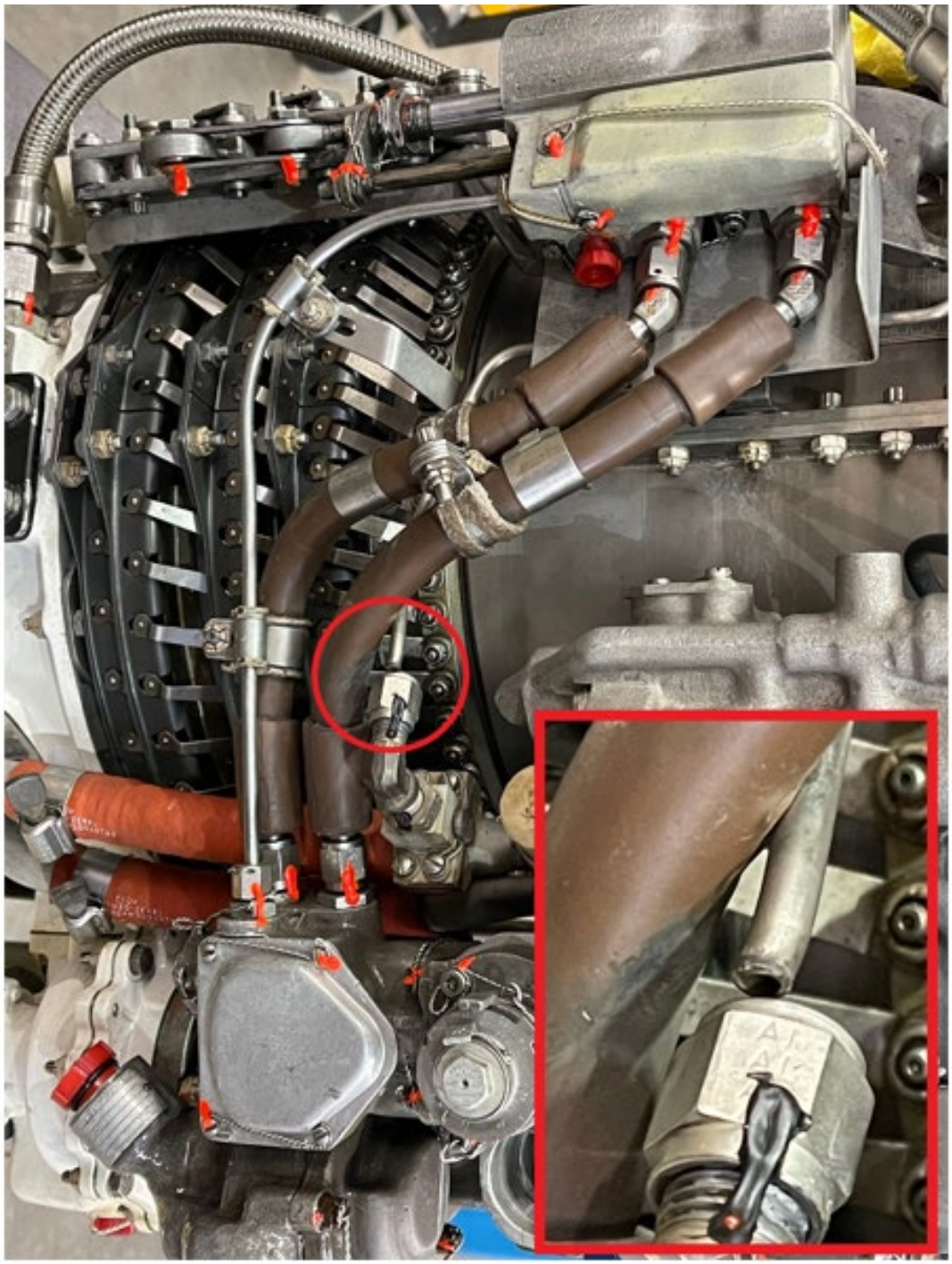
Transport Canada Comments:

The root cause of the broken air line has yet to be determined, however, fatigue and stress may have played a role in this failure. The photo shows the broken air line offset from the B nut, which may suggest a side load from installation.

Due to congestion of lines and bundles on many engines, it is sometimes difficult to have proper alignment when connecting fluid lines. A slight bend of a line to achieve contact, may induce stress and lead to a failure. Another common error is securing and

torquing one end of the line before connecting the other end, instead of connecting both ends and then securing and torquing.

Transport Canada Civil Aviation (TCCA) would like to make operators and maintainers of this model and similar models aware of this event. It is also recommended that close attention be paid to this line when inspecting in this area.



Broken P3 air line

Pratt & Whitney - USA, PW1524G3

Fuel Check Valves

SDR #: 20220921006

Subject:

A fuel imbalance was experienced in flight. The following log entry was submitted by the aircrew: During the whole flight, we had fuel imbalance. The maximum was a 200kg difference. The low side was always on the right-hand side. The system balanced fuel three times within 45 minutes. On the ground, the fuel imbalance was still 160kg less on the right-hand side and the fuel flow was the same on both engines. The removal of the engine feed/isolation check valve revealed that the check valve was not properly installed.

Transport Canada Comments:

Several Service Difficulty Reports (SDRs) have been received reporting “Fuel Imbalance” master caution messages during flight. Maintenance inspections found dislodged fuel check valves, which prevent backflow of fuel from wing tanks to centre tanks, as well as permit engine fuel cross-feeding when electrical boost pumps are in operation.

It was discovered that the retaining wire, which holds the check valve in its correct position, is of an insufficient diameter allowing the check valve to become dislodged and, consequently, allowing fuel to bypass the check valve.

Transport Canada Civil Aviation would like to make operators and maintainers aware of Airbus Canada Service Letter CS-SL-28-20-004, which provides instructions for the replacement and installation of an improved retaining wire part number P/N 2183023-101.

Photo 1 – Check valves

Photo 2 – Dislodged piece of check valve

Rotorcraft

Bell Textron - CAN, 407

Parts Manufacturing Approval (PMA) Tail Rotor Pitch Link for Bell 407

SDR #: 20220328031

Subject:

During the preflight walk-around, the pilot noticed that the tail rotor pitch link at the pitch horn did not look correct. Upon further investigation, it was found that the inner bearing had been separated from the housing. The bearing did not show excessive signs of wear at the last progressive inspection event #1, which was completed 150 hours prior to the incident. It is noted that the effected part is not an original equipment manufacturer (OEM) part however, it is a PMA part.

Transport Canada Comments:

Transport Canada Civil Aviation (TCCA) has received service difficulty reports (SDRs) of excessively worn bearings on PMA part number (P/N) 4AA-312-103-101 tail rotor pitch link assembly. The SDRs are limited to the Bell model 407 helicopter, however, this PMA tail rotor pitch link assembly is also eligible for installation on model 206L4 and 427 helicopters. Supplemental instructions for continued airworthiness (ICA) are not published for these PMA tail rotor pitch links, the current ICA from Bell helicopter are applicable for each model. The PMA holder, Able Aerospace Services, has been made aware of the recent SDRs. To raise awareness, TCCA reminds operators and maintainers of the PMA P/N 4AA-312-103-101 tail rotor pitch links to remain vigilant when inspecting, and to report any service difficulties for this product.

Tail rotor pitch link housing found dislodged from the bearing during preflight inspection.

Bell Textron - CAN, 429

Worn Directional Control Idler Bearing

SDR #: 20210211015

Subject:

The following was reported to Bell upon the 800-hour inspection. Excessive wear was found on the bearing of the directional control idler.

Transport Canada Comments:

The worn bearing, part number (P/N) MS14101-5A, is a component of the tail rotor directional control idler assembly, P/N 429-001-721-105. Several Service Difficulty Reports (SDRs) were received describing a worn bearing, P/N MS14101-5A, in the idler assembly. Bell investigated these reports and published Operation Safety Notice (OSN) 429-19-04 to highlight the importance of completing the scheduled detailed inspection of the bearing. In addition to publishing the OSN, Bell has indicated the possibility of a future design change to replace the existing bearing. Transport Canada Civil Aviation (TCCA) will monitor this service difficulty and reminds operators and maintainers to continue submitting a report for each reportable service difficulty.

Bearing, MS14101-5A, installed in the tail rotor directional control idler assembly, P/N 429-001-721-105

Bell Textron - CAN, 505

Bell 505 Fractured Main Rotor Hub Bearing Roller

SDR #: 20220216008

Subject:

Feathering bearing, part number (P/N) 206-011-118-001, was removed from a main rotor hub of a Bell model 505 helicopter. The main rotor hub has not been disassembled since new. Total time is 197.2 hours since new. The feathering bearing was found damaged upon removal. Bell Helicopter has been notified.

Transport Canada Comments:

Bell investigated this service difficulty and indicated that it may have been possible for the bearing to have been inadvertently damaged during the assembly of the main rotor hub. Although the roller was found fractured, an inspection of the rollers mating surface on the main rotor yoke showed no damage. Transport Canada Civil Aviation encourages owners, operators, and maintainers to submit a Service Difficulty Report if a fractured bearing roller is discovered during inspection of any helicopter model with a similar designed main rotor hub.

Fractured roller in bearing P/N 206-011-118-001

Suspected Unapproved Parts (SUP)
In Canada, SUPs are reported in accordance with section 571.13 of the standard of the Canadian Aviation Regulation (CAR).

When you suspect an unapproved part, the SUP report can be submitted on the SDR form or through the Web Service Difficulty Reporting System

To view the most recently published Suspected Unapproved Parts, click here or go to this website https://tc.canada.ca/en/aviation/aircraft-airworthiness/continuing-airworthiness/feedback-canadian-aviation-service-difficulty-reports/suspected-unapproved-parts-sups

FAA Unapproved Parts Notifications (UPN)
Unapproved Parts Notifications are published by: FAA, AIR-140, P.O. Box 26460, Oklahoma City, OK 73125. They are posted on the Internet at: https://www.faa.gov/aircraft/safety/programs/sups/upn/

To view the most recently published FAA Unapproved Parts Notifications (UPN), click here or go to this website http://www.tc.gc.ca/eng/civilaviation/certification/faa-unapproved-parts-notifications.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). They are posted on the Internet at: https://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 Bulletins (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). They are posted on the Internet at: https://ad.easa.europa.eu/sib-docs/page-1

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

Equipment Airworthiness Directives (AD)
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.

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

Service Difficulty Reports (SDRs)
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 (SDRs), click here or go to this website http://www.tc.gc.ca/eng/civilaviation/certification/service-difficulty-reports.html