Feedback

Canadian Aviation Service Difficulty Reports

The following content was published between July 8, 2020 and December 29, 2020.The full accessible version of each article is available on the Feedback website.

Table of Contents

Hangar Noise 3
Bombardier, CL600 2D24 (RJ900) 3
RJ900 – Passenger Door Inner Handle Cracking 3
Heads up 6
Airbus Canada A220-100 and A220-300 6
Airbus Canada Service Letter CS-SL-28-20-0004 – Improved Fuel Check Valve Retaining Wire 6
Bell Textron - USA, 412EP 8
Float and Life Raft Failure to Inflate 8
Bombardier, CL600 2D24 (RJ900) 8
Level 2 Corrosion – Passenger Door 8
Bombardier, CL600 2D24 (RJ900) 11
Ram Air Heat Exchanger Ducts Cracked 11
Fixed Wing 14
Airbus, A319 114 14
Missing Wheel Assembly after Departure 14
Beech, B200GT 16
Missing Nut at Elevator Bellcrank 16
Beech, B300C 17
Bent Rudder Horn Attachment Bolt 17
Bombardier, CL600 2B19 (RJ200) 19
RJ200 Gear Down Disagree due to Broken Nose Gear Door Spring Bracket 19
Bombardier, DHC 8 400 22
Dash-8-400 Tire Tread Separation 22
Bombardier, DHC 8 402 23
Dash-8/400 Main Gear Axle Corrosion 23
Canadair, CL600 2A12 (601) 24
CL601 – Brake Control Valve (BCV) Loss of Braking due to Failure of Internal Spring 24
Cessna, 172B 28
Cracked Plastic Control Wheel 28
Diamond - AS, DA 42 29
Engine Failure due to Crossed Fuel Lines 29

Pilatus, PC12 45 30
No Steering Leads to Surprising Discovery 30
Piper, PA31 350 32
Gear up Landing due to Broken Hydraulic Line Flare 32
Engines 33
General Electric, CF34-3B1 33
Chafed Oil Fill Line 33
Pratt & Whitney-CAN, PW150A 35
Cracked Fuel Transfer Tube Bracket 35
Pratt & Whitney-CAN, PW150A 36
Oil Pump Leak 36
Pratt & Whitney-CAN, PW150A 36
Scavenge Oil Filter Leak 36
Pratt & Whitney-CAN, PW306D 37
Fuel Filter Impending Bypass Switch 37
Rotorcraft 38
Aerospatiale HC, AS 350B3 38
Unserviceable Post-modification 079568 Hydraulic Pump Bearing 38
Bell Textron - CAN, 429 39
Expandable Blade Bolt Loose Pivot Pin 39
Eurocopter France, EC 120 B 40
Worn Tail Rotor Drive Splines and Coupling 40
Suspected Unapproved Parts (SUP) 41
FAA Unapproved Parts Notifications (UPN) 41
FAA Special Airworthiness Information Bulletins (SAIB) 41
EASA Safety Information Bulletins (SIB) 41
Equipment Airworthiness Directives (AD) 42
Service Difficulty Reports (SDRs) 42

Hangar Noise

Bombardier, CL600 2D24 (RJ900)

RJ900 – Passenger Door Inner Handle Cracking

SDR #: 20181114006

Subject:

While conducting a routine check, the passenger door inner handle lever was discovered with multiple cracks at the knob location and also at the inner handle shaft pivot point taper pin hole. Maintenance personnel replaced the door inner handle lever and the function check was carried out with no further fault noted.

Transport Canada Comments:

The passenger door mechanism and lever is a high use item on the aircraft and the areas where the cracks were found are reasonably accessible and visible. Regular and routine inspections are a good method to ensure the integrity of the mechanism.

Fig 1: Lever cracking on both sides

Fig. 2: Lever crack through taper pin hole

Fig. 3: Cracking and stress at pivot point

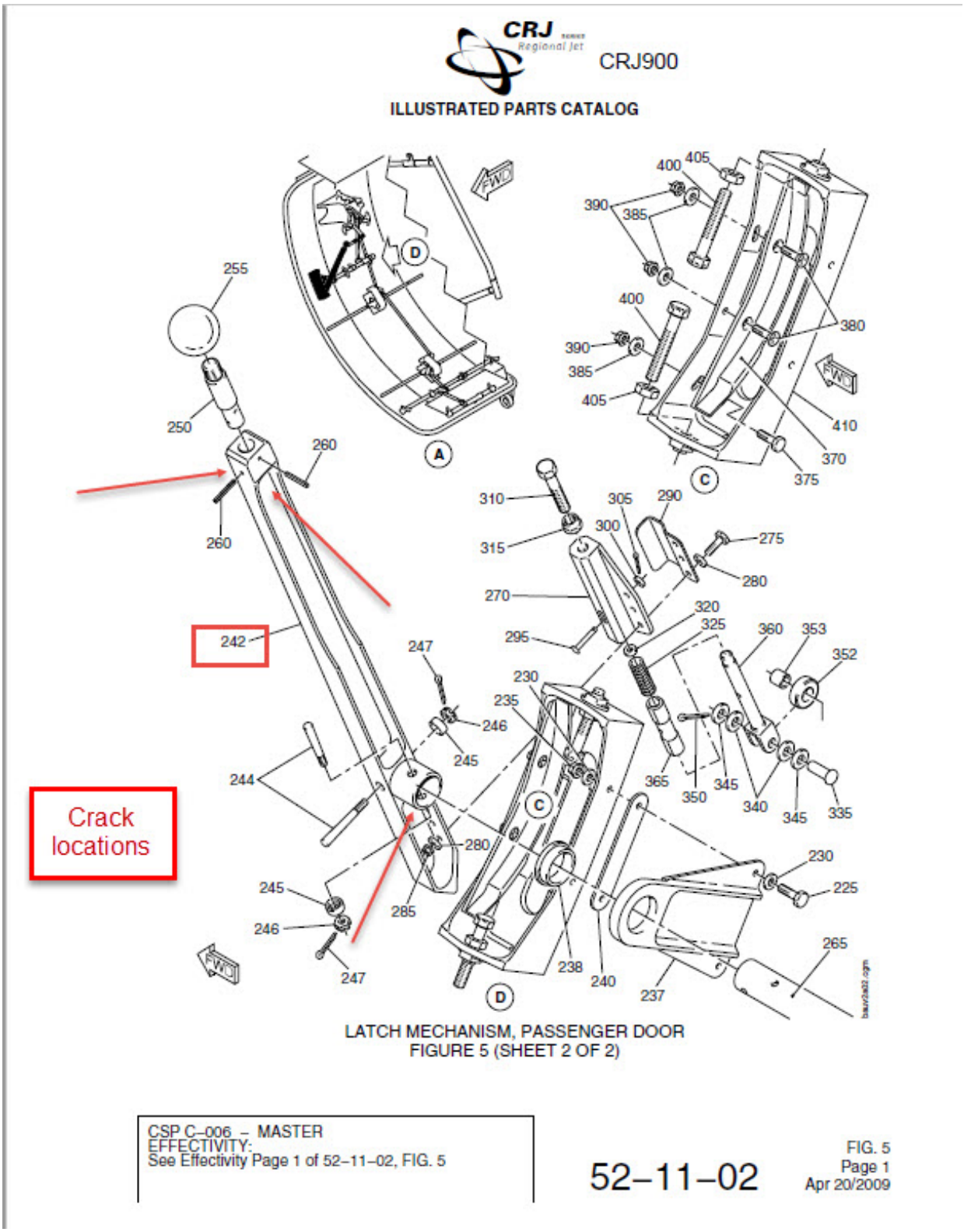


Fig. 4: Parts information and location shown

Heads up

Airbus Canada A220-100 and A220-300

Airbus Canada Service Letter CS-SL-28-20-0004 – Improved Fuel Check Valve Retaining Wire

SDR #: 20171221007, 20181211019, 20181221003

Subject:

The purpose of this article is to aid in the awareness of Airbus Canada Service Letter CS-SL-28-20-0004 applicable to the A220-100 and A220-300 series of aircraft.

Airbus Canada has received multiple reports of flight crew observing FUEL IMBALANCE master caution messages during flight. Upon landing, maintenance personnel discovered dislodged Fuel Check Valves (Part Number (P/N) 2090199-101) located within the fuel tanks.

There are 6 locations throughout the fuel system (3 in each wing) where the subject fuel check valve is installed. One valve is installed at the Transfer Ejector Pump in the centre tank and 2 are installed at a Tee assembly in the engine feed tubes located in the collector tank in each wing.

The Transfer Ejector Pump check valve prevents backflow of fuel from the wing tank to the centre tank. The check valves located at the Tee assembly provide isolation between each wing when the feed ejectors are in operation and permits engine fuel cross feeding when the electrical boost pumps are in operation.

It has been discovered that the retaining wire which holds the check valve in its correct position is of insufficient diameter, thereby allowing the check valve to become dislodged during normal operation, which allows fuel to bypass the check valve.

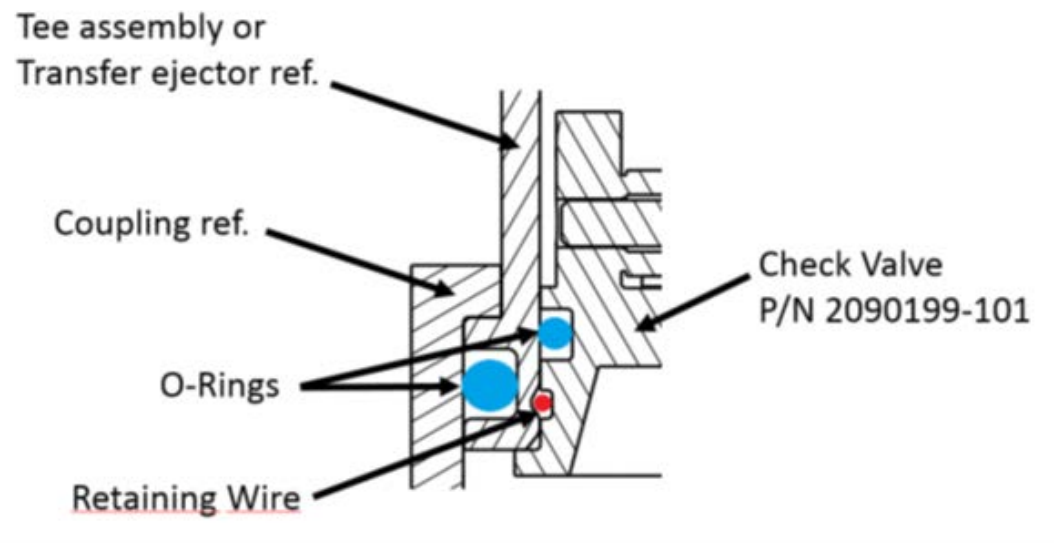
An increase to the diameter of the retaining wire has been made by the manufacturer to prevent the check valve from becoming dislodged. The P/N of the improved retaining wire is 2183023-101 and is red in color for ease of identification.

Service Letter CS-SL-28-20-0004 provides instruction for the replacement and installation of the new and improved retaining wire.

Transport Canada Comments:

Transport Canada recommends that all operators of the A220-100 and A220-300 series of aircraft follow Airbus Canada Service Letter CS-SL-28-20-0004 and replace the Fuel Check Valve P/N 2090199-101 retaining wire at all 6 locations (3 in each wing) with the new P/N 2183023-101 retaining wire.

Pic 1 – Fuel Check Valve



Pic 2 - Cross-section of a typical Fuel Check Valve installation

Bell Textron - USA, 412EP

Float and Life Raft Failure to Inflate

SDR #: 20191127002

Subject:

During the three (3) year functional check of the 412 emergency float and life raft system, the right-hand raft failed to inflate. Following the test, it was discovered that the inflation line to the raft inside the right-hand mid float was not connected.

Transport Canada Comments:

Dart Aerospace has identified a deficiency with the current float and life raft packing procedures. To address the deficiency, service bulletins (SBs) were published, SB2019-11 for service centres and SB2019-12 for operators. SB2019-12 requires operators to send affected floats and life rafts to an approved repair and overhaul service centre for repacking. In addition, operators and maintainers should ensure that any affected float or life raft has all required SBs completed prior to installation.

Bombardier, CL600 2D24 (RJ900)

Level 2 Corrosion – Passenger Door

SDR #: 20190313002

Subject:

During scheduled maintenance, level two corrosion was observed within the passenger door structure below the door handle cut-out. Repairs were carried out in accordance with the structural repair manual and required the replacement of channel part number 601R318057-1 due to the extent of the corrosion damage. The aircraft had accumulated 42 008 hours air time and 21 756 flight cycles at the time the corrosion was found.

Transport Canada Comments:

The corroded area exhibited extensive deterioration, including pitting and flaking of metal. Aircraft maintenance program inspection intervals should be sufficient to ensure that corrosion is found at level 1 or below before progressing to level 2 and beyond, as was found in this case.

Issues with excessive corrosion at the passenger door area are being reported more frequently, and the number of Service Difficulty Reports (SDRs) indicates an increasing trend. The passenger door is a high traffic area and can accumulate contaminants and moisture on a daily basis and at all times of the year. This area requires frequent and regular detailed inspections including cleaning of the drain holes. Following each inspection, preventive measures such as the application of corrosion inhibiting

compounds (CIC) is a recommended industry practice. By following these criteria, an operator’s maintenance program can prevent damage like was found here.

In Canada, if an operator finds corrosion such as was reported here, Transport Canada expects the operator to review all similar corrosion events to determine if there is a trend. If a trend is discovered, the operator’s Maintenance Schedule Approval (MSA) procedures should be reviewed and amended to perform shorter interval inspections to maintain corrosion at an acceptable level. The MSA amendment procedures are found in TP 13097 Chapter 2, Section 9 and are required by Canadian Aviation Regulation (CAR) 406.07 and CAR 706.07.

Fig 1: Corrosion damage

Fig 2: Close-up of corrosion showing depth and flaking

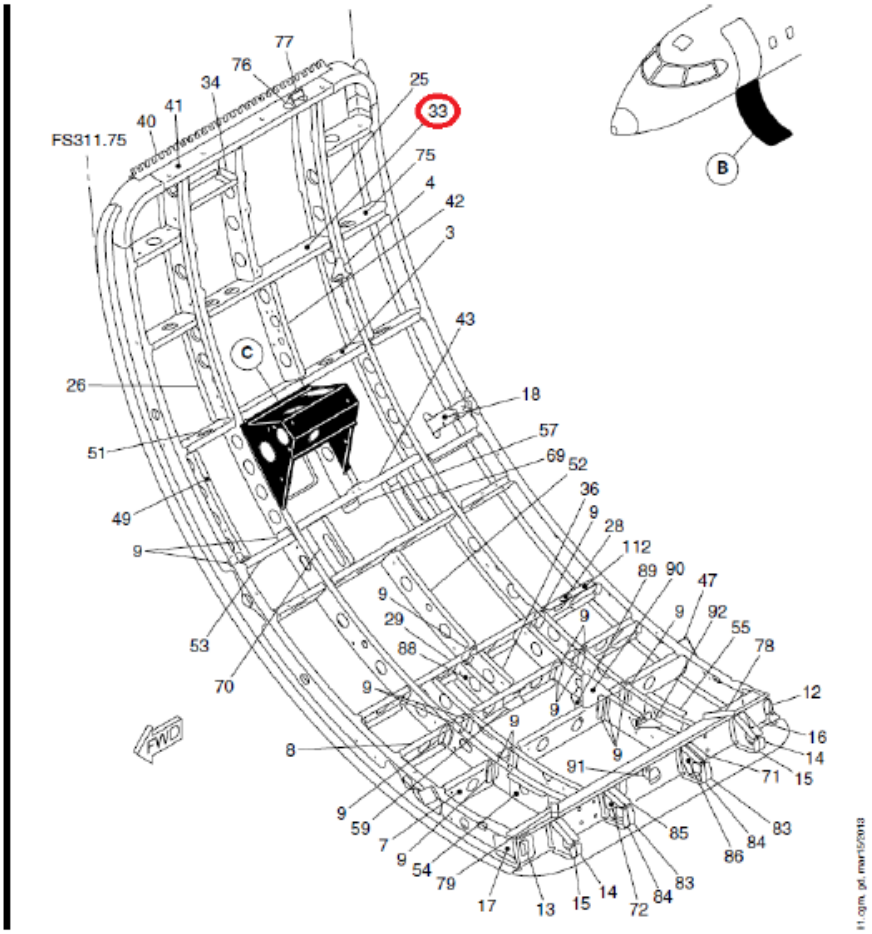


Fig 3: Location of corroded area

Bombardier, CL600 2D24 (RJ900)

Ram Air Heat Exchanger Ducts Cracked

SDR #: 20190412003

Subject:

During unscheduled maintenance actions in the aft equipment compartment, the aircraft maintenance engineer (AME) observed that the left and right ram air heat exchanger diffuser ducts were cracked and separated from their respective heat exchangers. The diffuser mating surfaces had pulled through the attaching hardware, the duct flanges were broken and the ducts were cracked.

Transport Canada Comments:

The damaged ducts were found on a RJ900 that had been in service for 14 years. The cracking was so severe that at least half of each duct attachment was completely detached from the heat exchangers. The cracked ducts were found by alert maintenance personnel during the performance of an unrelated maintenance event. This finding illustrates the value in carrying out a general visual inspection (GVI) of the area when performing maintenance because something else needing attention may be discovered.

Fig 1: Left-hand (LH) duct aft and outboard showing separation from heat exchanger

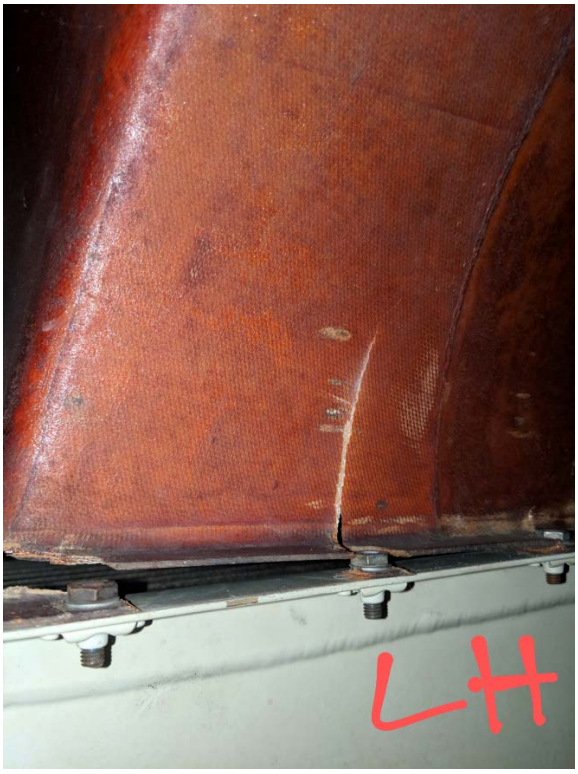


Fig 2: LH duct aft edge separated

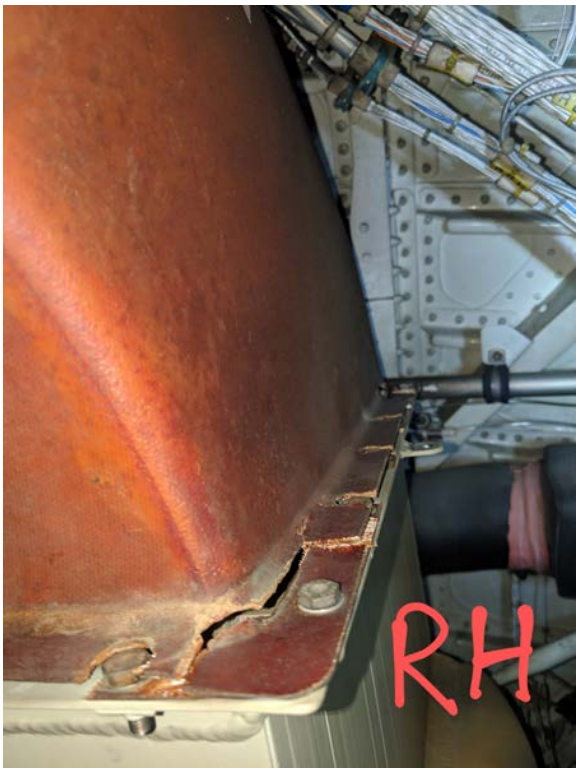
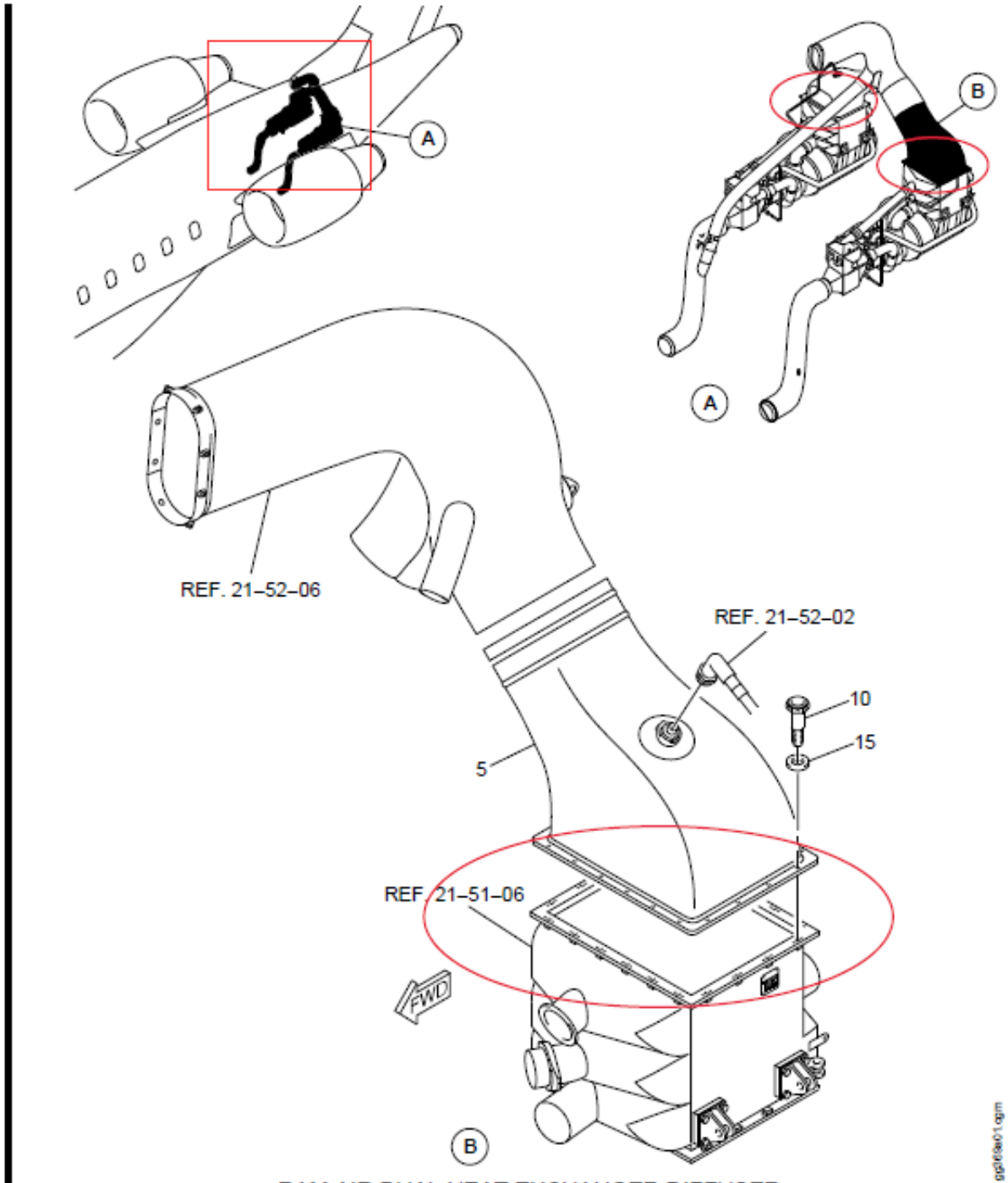


Fig 3: Right-hand (RH) duct outboard

Fig 4: RH duct inboard and front showing separation from heat exchanger



RAM AIR DUAL HEAT EXCHANGER DIFFUSER
FIGURE 1

Fig 5: Parts manual showing the cracked ducts

Fixed Wing

Airbus, A319 114

Missing Wheel Assembly after Departure

SDR #: 20200226014

Subject:

After departure, it was observed that one of the wheel assemblies had potentially departed the left main landing gear (MLG). The aircraft did a fly-by of the tower and the tower confirmed that the number four (#4) wheel assembly was indeed missing. The flight continued to its destination airport. The crew declared an Emergency and the aircraft landed uneventfully with Airport Fire Rescue standing by. The aircraft stopped on the runway and the damage was assessed before the aircraft moved to the operator`s maintenance facility. All passengers were deplaned on the runway and transported by bus to the terminal. Maintenance was on site after landing to inspect the landing gear. Upon visual inspection, wheel #4 was missing and the inner hub was found fractured in two (2) locations. The right-hand MLG assembly was replaced along with a new wheel assembly. The state authority reported that the wheel assembly had been found and retrieved fully inflated.

Transport Canada Comments:

The event detailed above is quite interesting. The investigation to determine the cause of the wheel assembly departure is ongoing. Preliminary inspection, performed by the wheel assembly manufacturer, points to a sudden lock-up of the wheel's outboard bearing. The pictures below show a crack radiating through one of the axle nut retention bolt holes. This crack could have been caused by the lock-up torque radiating from the bearing or the cause of the bearing being loose and failing.

Since the event, the operator has instituted numerous mitigation actions. These actions include:

- A flight crew alert message advising crew to be mindful of HOT BRAKES Electronic Centralized Aircraft Monitor (ECAM) message triggered during taxi-out; and
- A fleet campaign to inspect and replace all MLG wheel bearings

As stated above, the investigation to determine the cause of this failure is ongoing. Transport Canada recommends that operators of all types of aircraft be mindful of wheel bearing conditions upon wheel assembly installation. Always follow the manufacturer's recommendations when greasing bearings and installing wheel assemblies.

Main landing gear upon arrival

Main landing gear axle

Close-up of main landing gear axle with axle nut removed

Beech, B200GT

Missing Nut at Elevator Bellcrank

SDR #: 20190807006

Subject:

While conducting a Phase 4 Inspection on the empennage section of a B200 aircraft, one of the engineers opened a button size cover (approximately 1 and a half inch diameter) to have a look at the elevator bellcrank. After removing the cover, he found that there was no nut or washer on the end of the bolt that attaches the elevator bellcrank to the vertical stabilizer. Upon review of the Phase 4 Inspection and vertical stabilizer inspection for B200 aircraft, we realized that the cover to gain access to the bolt and nut for the elevator bellcrank system is never required to be opened during an inspection. The engineer doing the inspection took it upon himself to open up the cover to see what was inside and that is how he made the discovery of the missing nut and washer. Due to the fact that this is a new aircraft and the cover had not been removed since it was delivered to us, it would seem that the aircraft had this defect since it was manufactured. We have contacted Textron Aviation and informed them of our findings, a new washer and nut were installed on the bolt and the aircraft was returned to service.

Transport Canada Comments:

Transport Canada has contacted the responsible foreign airworthiness authority. The authority is currently investigating this issue but has not identified any other aircraft with this condition in the factory and do not have any indication of this happening on other aircraft.

Transport Canada reminds maintainers and operators that this incident exemplifies the need to remain vigilant, human factor errors do not discriminate between new or old aircraft.

Pic #1 Elevator bellcrank hardware location

Pic #2 Missing nut and washer

Beech, B300C

Bent Rudder Horn Attachment Bolt

SDR #: 20190925006

Subject:

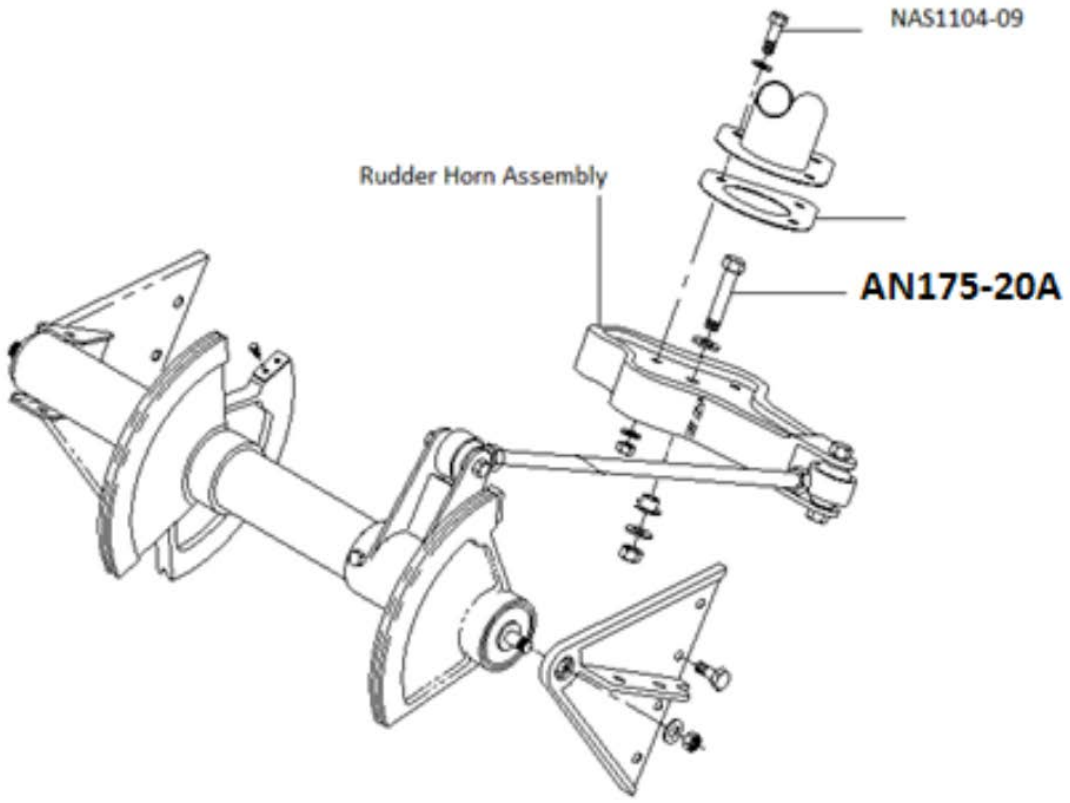
The B300C aircraft was undergoing a scheduled Phase 4 Inspection. During this inspection, maintenance discovered that the rudder horn assembly part number (P/N) 101-524059-1 rudder bearing bolt P/N AN175-20A was bent and the pivot bearing P/N MS28913-5C was seized and corroded. Given the fact that several examples of this type of damage was discovered in the past on the King Air fleet, the operator decided to create an in-house inspection of the rudder horn assembly that would be carried out in conjunction with the Phase 4 Inspection. No inspection of this nature could be found in the Beech program. As well, this bolt and bearing does not have a scheduled lubrication interval. The bearing is a sealed unit. An inspection of the surrounding area was carried

out and the bolt and bearing will be replaced with a serviceable unit. The operator believes that the bent bolt is a result of the rudder lock not being applied on the ground during high winds.

Transport Canada Comments:

Beechcraft King Air F90, 200, 300 and B300 series aircraft share this design and Textron Aviation published Model Communique KA-2015-01 in March 2015 describing this scenario. KA-2015-01 recommends the inspection of bolt P/N AN175-20A any time the rudder is removed. Transport Canada Civil Aviation (TCCA) recommends the use of a rudder lock as noted by the submitter of the Service Difficulty Report (SDR), and that particular attention be given to this area whenever possible.

Pic#1 – Lower rudder attach bolt P/N AN175-20A



Pic#2 – Lower rudder attach bolt location

Bombardier, CL600 2B19 (RJ200)

RJ200 Gear Down Disagree due to Broken Nose Gear Door Spring Bracket

SDR #: 20180913013

Subject:

During the approach, the gear disagree message appeared on the engine-indicating and crew-alerting system (EICAS) accompanied by the EICAS Display 1, an indication that the nose landing gear (NLG) was not in the down and locked position. The Quick Reference Handbook (QRH) was applied and a manual landing gear extension was accomplished. Upon inspection, the NLG door spring bracket was found broken and the associated web was found to be damaged.

Transport Canada Comments:

The damage found in this instance is uncommon and Transport Canada Civil Aviation (TCCA) would like to draw attention to the event for maintainers. It is possible that

cracking was present and detectable prior to the bracket failure. The area is readily accessible and can be easily inspected visually for damage.

Figure 1: Broken bracket viewed from front

Figure 2: Broken bracket viewed from below shows damage to fitting attachment

Figure 3: Broken bracket viewed from front showing bulkhead damage

Bombardier, DHC 8 400

Dash-8-400 Tire Tread Separation

SDR #: 20190912001

Subject:

The pilot reported that during takeoff the left-hand inboard main wheel tire ruptured. The aircraft landed back at the departure airport without additional failures and taxied to the bay. During the preliminary inspection by maintenance staff, it was observed that the rupturing tire had caused damage to the gear door composite, main leg fairings and nearby hydraulic lines and harness brackets. The tire that failed was a retread. Both main wheels were replaced prior to towing the aircraft to the hanger for further investigation and defect rectification. The main landing gear door is beyond repair and an order has been placed for a replacement door.

Transport Canada Comments:

There is a higher risk of tread separation with recap tires than brand new tires. Tire tread that separates from the recap tire can cause substantial damage to aircraft. Operators operating on gravel runways should consider using only new tires to reduce the risk of tire failure. Recapped tires can fail on any runway but are more likely to do so in rough conditions.

Image of the damaged tire

Bombardier, DHC 8 402

Dash-8/400 Main Gear Axle Corrosion

SDR #: 20190909009

Subject:

During scheduled maintenance, corrosion (pitting) in excess of allowable limits was observed on the left main landing gear axle, part number 46108-3. Similar findings were also observed on the right main landing gear axle. Both affected axles were replaced.

Transport Canada Comments:

Anytime the wheel is removed, the axle should be inspected for damage such as scratches, corrosion, damaged chrome or damaged threads. The axle nut should also be inspected for damage. Some aircraft have very high torque on the axle nut and this can damage the threads on the nut or the axle. In this case, the corrosion was under the paint and could only be seen clearly once the paint was removed.

Pitting on the painted part of the axle

Canadair, CL600 2A12 (601)

CL601 – Brake Control Valve (BCV) Loss of Braking due to Failure of Internal Spring

SDR #: 20151209013

Subject:

During an investigation of an aircraft landing overrun, the dual BCV, Tactair part number (P/N) HP1333100-9 (Bombardier P/N 600-75115-9), was found with a broken spring that reduced the brake pressure to the #2 brake. The #2 BCV (position left inboard) was shop tested and found that the brake performance was degraded as the output pressure was 150 psi instead of the normal pressure of 2850 to 3000 psi. During the pre-disassembly visual inspection, the input plunger (rod) on the BVC was found to be recessed and was asymmetrical when compared with the adjacent input plunger (rod). The vendor found that the root cause of this condition was determined to be a broken power brake spring inside the valve assembly.

Transport Canada Comments:

The final accident report for this incident found that the failed BCV (broken spring) was one of a number of contributing factors to the runway excursion. The report also concluded that the BCV spring failed (due to fatigue) during the incident as braking operation had been normal on the previous landing.

BCVs with broken springs have only been reported twice within the combined fleet of CL600/601 and RJ100/200 aircraft models, which use this same part. There have been a number of instances where relaxed springs have been found, but these occurrences have never contributed to a runway excursion due to lack of braking. The BCV brake pressure with a relaxed spring is less than rated maximum, but more than sufficient to stop the aircraft per the published landing distances.

Maintainers and operators should investigate any brake pedal issues reported by the crew as BCVs with high time in service may be prone to spring breakage. To check the integrity of the internal brake valve spring, depress both brake pedals and release. Then perform a visual inspection of the BCV with a light and mirror to confirm the brake valve plungers contact the brake levers. If both valve plungers are contacting the levers, the brake springs are not broken. (Refer to Figures 4 and 5 for a visual view of this condition.)

The CL601 model aircraft can be maintained on either a MSG-2 or a MSG-3 maintenance program. The accident aircraft was using the MSG-3 program. During the investigation, it was discovered that CL601 aircraft on the MSG-3 program do not have the same inspection task for the BCV as required in the MSG-2 program. The MSG-2 program requires an inspection of the BCV at a 300 hour interval per task 32-43-21-216, whereas the MSG-3 program does not use this task. After review of the aircraft inspection program requirements, Transport Canada is planning to mandate this

inspection task on all Challenger 601 model aircraft with an Airworthiness Directive (AD). The AD will add an inspection task to the CL601 aircraft MSG-3 program and have no effect on the MSG-2 aircraft as they are already performing this inspection task.

Fig 1: BCV showing misalignment of valve plunger positions.

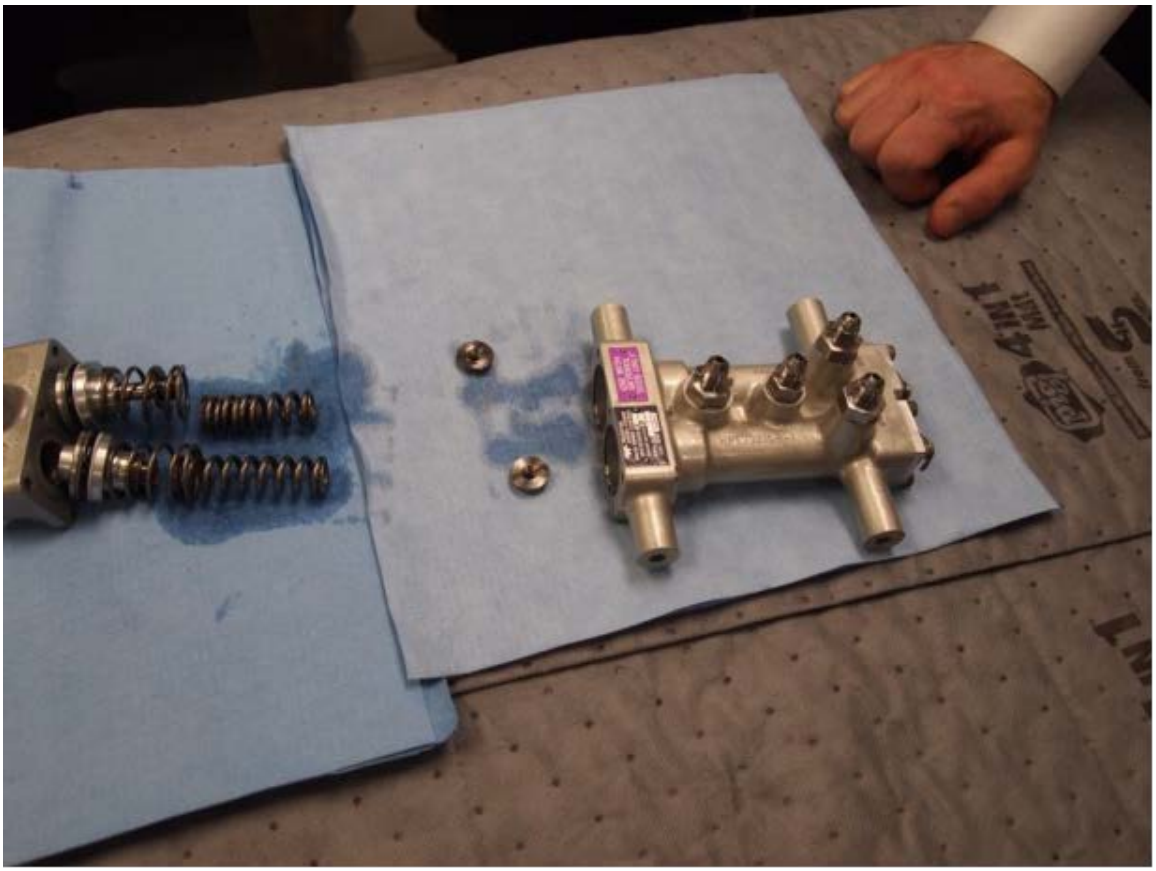


Fig 2: Disassembled BCV showing broken spring that caused the misalignment of the plungers.

Fig 3: Close up of broken spring of the BCV.

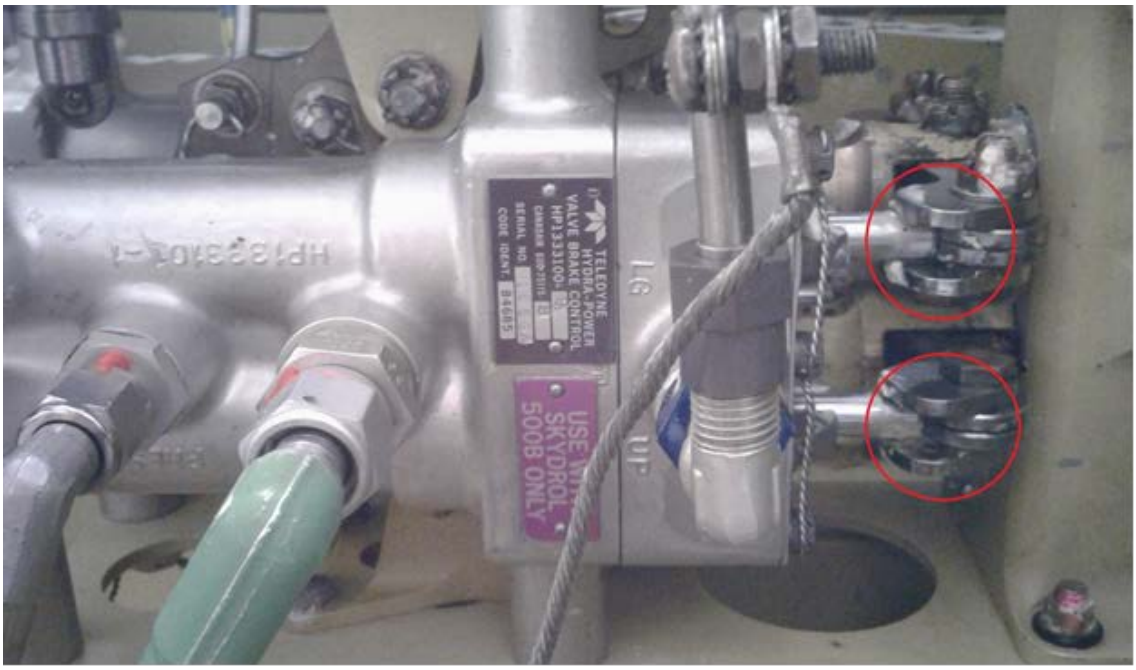


Fig 4: Challenger 601 brake valve installation showing plungers contacting brake levers.

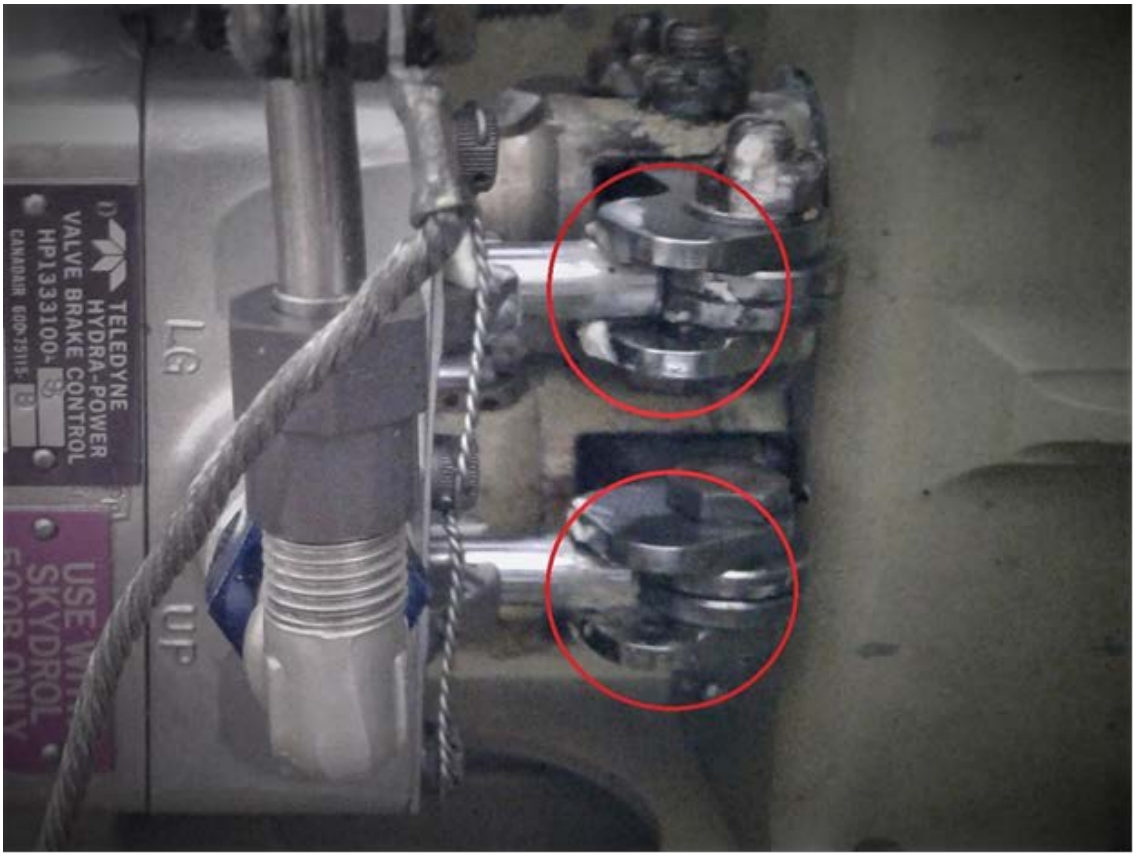


Fig 5: Close up of brake valve plungers in normal condition in contact with brake levers.

Cessna, 172B

Cracked Plastic Control Wheel

SDR #: 20180809019

Subject:

The control wheel (part number 0513168-2) cracked / broke in the lower left-hand (LH) area when the pilot was on final approach. The pilot grabbed the unbroken side of the wheel and landed without incident. The control wheel is the original plastic style and had not been replaced with the newer magnesium style in accordance with Cessna Service Letter SL64-8.

NOTE: The co-pilot's control wheel was inspected and found to be cracked and "glued" back together in the same spot.

Transport Canada Comments:

A cracked control wheel during a critical phase of flight such as landing, where control inputs are at their greatest, could result in sudden loss of control of the aeroplane. Transport Canada Civil Aviation (TCCA) would like to reiterate the gravity of the Federal Aviation Administration (FAA) Special Airworthiness Information Bulletin (SAIB) CE-01-41R2 published in October 2007, which focuses on fatigue cracking of plastic (acrylic) control wheels. As noted in the SAIB, owners, operators and maintenance personnel should place special emphasis on periodic 100-hour and annual inspections of plastic control wheels until they are replaced with metallic control wheels.

TCCA has received a limited number of SDRs, although due to reporting requirements, failures of plastic control wheels may go unreported by the general aviation community. The general aviation community is reminded of the benefits to aviation safety in reporting service difficulties.

Cracked Plastic Control Wheel

Diamond - AS, DA 42

Engine Failure due to Crossed Fuel Lines

SDR #: 20200609020

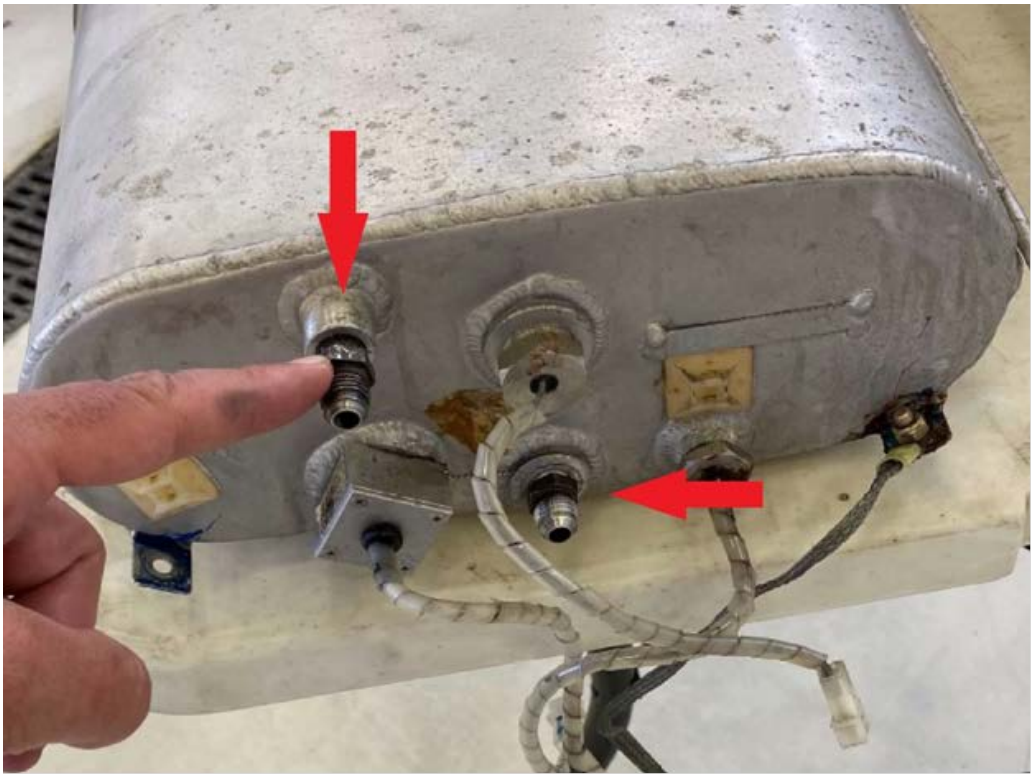
Subject:

ECU (Engine Control Unit) A FAIL and ECU B FAIL indications displayed during flight. Maintenance personnel discovered that the fuel supply line and the return fuel lines were found crossed (engine drawing fuel from return fitting) at the right wing root attach point connections. The lines are the same size and can be easily mixed up when being reattached following wing removal.

Transport Canada Comments:

This incident occurred during flight with an engine failure. Unfortunately, the error wasn't discovered during post-maintenance ground runs.

It is possible to mix up the fuel supply line and return fuel line connections on both left-hand and right-hand wing root connection points, although the part numbers are unique. This is also possible on DA 40 D and DA 40 NG model aeroplanes. Transport Canada Civil Aviation reminds maintenance personnel of the importance of labeling hoses / fittings during disassembly.



Fuel supply and return line fittings

Pilatus, PC12 45

No Steering Leads to Surprising Discovery

SDR #: 20191227003

Subject:

The flight crew of the subject aircraft reported that they lost all rudder steering control during ground taxi maneuvers. An investigation was performed and found that the forward rudder bellcrank part number 527.20.12.116 was cracked in half. The cracked bellcrank resulted in loss of steering and rudder control. The cracked bellcrank as well as a damaged rod end was replaced. A full rigging and control check was completed to return the aircraft to service.

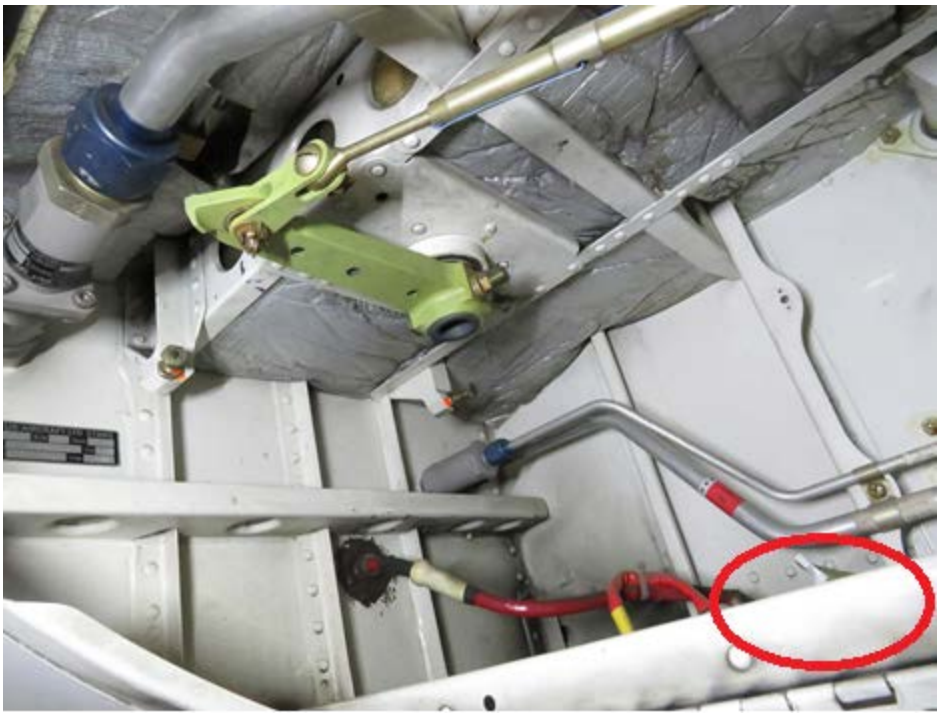
Transport Canada Comments:

The flight crew of this aircraft was fortunate that the bellcrank failed during taxi and not in the air. Inspection by maintenance found that the bellcrank did not appear over-stressed or bent. The aft flange of the cracked portion seemed to have distorted as the bellcrank was in the final stage of failing. Black residue in the area of the forward cracked pieces was also noted.

After removal, the failed bellcrank was sent to Pilatus headquarters in Stans Switzerland for failure analysis. Preliminary findings point to a very small corrosion spot as the starting point of the crack/fracture.

The subject aircraft at 29 959 hours air time is of particular importance as it has been running on an airframe life extension program since nearly 10 000 hours air time.

At this time, Transport Canada does not recommend operators modify their maintenance schedule as the investigation by Pilatus is ongoing.



Pic. 1 Bellcrank assembly as found by maintenance prior to removal. Broken piece of bellcrank (circled) found on floor of cavity.

Pic. 2 Bellcrank removed on bench. Crack evident.

Piper, PA31 350

Gear up Landing due to Broken Hydraulic Line Flare

SDR #: 20190506013

Subject:

The landing gear would not extent in flight. The pilots tried pumping the gear down using the emergency gear pump. There was no response. The pilots were forced to make a gear up landing on the runway.

Upon inspecting the aircraft during the recovery from the runway, there was hydraulic fluid leaking from the aircraft. An aluminum hydraulic line was found broken at the flare. Once the line broke, the hydraulic pumps expelled the fluid from the reservoir down to the top of the normal system standpipe. The rest of the fluid was expelled by the pilot while operating the emergency system.

Once the aircraft was lifted with a crane and placed on jacks, the broken aluminum line was replaced with a flex line temporarily and the system serviced with fluid. The emergency gear pump was actuated and the gear extended immediately. The powerpack was replaced 42.9 hours and 47 cycles prior to the incident, and no hydraulic leaks were noted during this time.

Transport Canada Comments:

Piper PA31 gear up landing events have occurred on at least 3 occasions due to a cracked hydraulic line flare at the powerpack. A failed line in the hydraulic system can allow all the fluid from the hydraulic reservoir, including that portion contained in the power pack emergency sump, to drain out.

Operators and maintenance personnel are reminded that improper alignment, clamping and torqueing of hydraulic lines and fittings can lead to torsional or bending pre-loads, and introduce fatigue cracking.

Hydraulic door open tube assembly failure at flare

Engines

General Electric, CF34-3B1

Chafed Oil Fill Line

SDR #: 20190813016

Subject:

A RH OIL PRESSURE warning message appeared while cruising at 33 000 feet. The message was intermittent. Once the message reappeared, we reduced the right-hand engine thrust to idle, performed immediate action and shut the engine down. Maintenance personnel found the oil fill line chafed and a defective check valve at the

engine. The small valve unseated from the springs inside the check valve causing the oil pressure to flow back to the chafed fill line, causing oil loss.

Transport Canada Comments:

It is important that maintenance personnel be thorough when installing or inspecting fluid or pneumatic lines with regards to security and the potential for chafing against the airframe, a component or another line/bundle.

Congested areas are prone to such events and maintainers must pay particular attention to the routing of lines and bundles when working in such areas.

Although not the only contributor to this event, had the oil fill line not been chafed it may have been able to contain the engine oil.

Chafed oil fill line

Pratt & Whitney-CAN, PW150A

Cracked Fuel Transfer Tube Bracket

SDR #: 20190524018

Subject:

During the accomplishment of a scheduled maintenance task (replacement of the Fuel Metering Unit (FMU) to the Fuel/Oil Heat Exchanger (FOHE) transfer tubes), an Aircraft Maintenance Engineer (AME) noted that the fuel transfer tube bracket on the left engine was cracked. The assembly was replaced with a serviceable component and the aircraft was returned to service.

Transport Canada Comments:

Pratt & Whitney Canada (P&WC) is aware that cracks develop occasionally on the weld, equally in the pre- and post-mod configurations (see P&WC Service Bulletin No.3533R1). These cracks typically do not affect the functionality of the bracket and are usually discovered during opportunistic inspections when the tubes/bracket assemblies are replaced.

Transport Canada would like to make maintainers aware of the possibility of these cracks and to pay particular attention to these transfer tubes when circumstances provide access to the FMU as well as during scheduled maintenance.

Photo 1 Transfer tube assembly

Pratt & Whitney-CAN, PW150A

Oil Pump Leak

SDR #: 20200212008

Subject:

During flight, the right-hand engine experienced fluctuating oil pressure. The pilot proceeded to land the aircraft uneventfully. It was decided to replace the engine and the aircraft returned to service.

Transport Canada Comments:

During cruise, the number two engine oil pressure fluctuated between 40 and 55 psi with the oil pressure light illuminating on and off during the flight. The number two engine was feathered in accordance with the Quick Reference Handbook (QRH) and the oil pressure increased from 50 to 60 psi and was noted as 62 psi on landing. During the troubleshooting, an oil leak was found at the oil pump drain. Further inspection of the area revealed that two bolts holding the oil transfer tube retaining plate had sheared and allowed the retaining plate to vibrate and chafe through the body of the oil pump leading to a hole in the pump casing.

Investigation into the event discovered that a non-mandatory service bulletin (SB) had been issued recommending a periodic visual inspection to check for fretting of the transfer tube retaining plate and ignition support bracket, and to verify the torque on the attaching hardware.

Transport Canada encourages all operators to review SBs issued by manufacturers and recommends adopting these types of inspections as part of their maintenance programs. Although the aircraft landed uneventfully, it could have been much worse and would have likely been avoided had the SB been complied with.

Pratt & Whitney-CAN, PW150A

Scavenge Oil Filter Leak

SDR #: 20200320007

Subject:

The flight crew reported that during the approach to the airport, they received a low oil pressure indication on the number one (1) engine. The flight crew followed the Quick Reference Handbook (QRH) and shutdown the engine. A PAN PAN was declared and the aircraft diverted to an alternate airport and landed without further incident. During troubleshooting, maintenance personnel found an oil leak originating from the scavenge oil filter area. The packing and the oil filter were replaced in accordance with Aircraft

Maintenance Manual (AMM) 79-22-11-400-801 and a leak check was carried out serviceable. The aircraft returned to service.

Transport Canada Comments:

The operator confirmed that the low oil pressure event occurred on the first flight following the replacement of the scavenge oil filter. An investigation by the operator suggested that the scavenge oil filter cover packing was damaged during the installation and that environmental factors may have diminished the ability to perform an effective inspection during the leak check.

Maintainers often find themselves in situations where factors like weather conditions and accessibility create difficulties in performing certain tasks, however maintainers are reminded to take all necessary steps to perform these tasks, to be thorough when performing maintenance and follow all instructions for continued airworthiness.

Pratt & Whitney-CAN, PW306D

Fuel Filter Impending Bypass Switch

SDR #: 20170110013

Subject:

After takeoff, at approximately Flight Level 260, the crew observed a Fuel Filter Bypass Crew Alerting System (CAS) message on the right-hand engine and no other messages were indicated. The crew completed the checklist items, declared an emergency and diverted the flight for an uneventful landing.

Transport Canada Comments:

Transport Canada has received several similar Service Difficulty Reports (SDRs) with the Fuel Filter Impending Bypass Switch identified as the specific part causing difficulty for the illumination of the CAS message.

Pratt &Whitney Canada has published Service Bulletin (SB) SB25455 introducing a replacement switch which annunciates using a normally open contact and has an electrical inverter for interface compatibility purposes. The replacement switch alleviates the existing false annunciations due to the deterioration of the current switch's normally closed contacts.

It is strongly advised that particular attention be given to the SB's CAUTION statement which instructs maintainers to **NOT** remove the bypass valve to facilitate removing the switch.

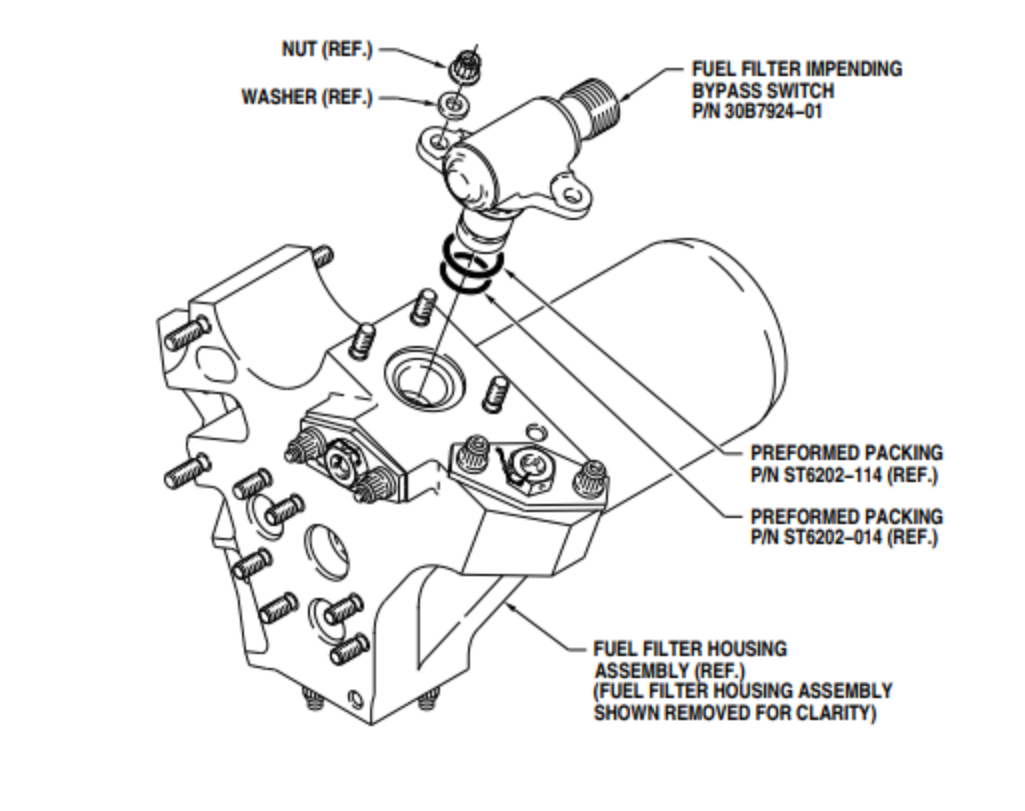


Figure 1: Fuel Filter Impending Bypass Switch

Rotorcraft

Aerospatiale HC, AS 350B3

Unserviceable Post-modification 079568 Hydraulic Pump Bearing

SDR #: 20151217011

Subject:

At 10 363.6 airframe hours, the affected pump support assembly was installed to upgrade the aircraft to post-modification 079568 status. Prior to installation, the bearing was inspected and greased to ensure it was fit for service. At 10 877.0 airframe hours, the bearing was inspected as per the Aircraft Maintenance Manual. It was noted that during the tactile check, the bearing felt rough. The bearing has subsequently been sent to Airbus for evaluation. We are awaiting the final analysis from Airbus France on the bearing. Note: the bearing had not been greased during the 513.4 hours in accordance with the Maintenance Service Manual. A small amount of grease was noted on the deck during the first 20 hours of service which would be considered normal.

Transport Canada Comments:

Airbus Helicopters published Alert Service Bulletin (ASB) No. AS350-63.00.24 following reports of the pre-modification 079568 hydraulic pump bearing being seized. The European Aviation Safety Agency (EASA) subsequently mandated the ASB with Airworthiness Directive 2014-0233. Transport Canada has recently received reports of post-modification 079568 hydraulic pump bearing part number 704A33651269 being removed from service. At the time of writing, none of the reports have indicated that the bearing was found seized. If a post-modification 079568 hydraulic pump bearing is removed from service, please evaluate the part and submit a Service Difficulty Report (SDR) if it is determined as reportable.

Bell Textron - CAN, 429

Expandable Blade Bolt Loose Pivot Pin

SDR #: 20200605011

Subject:

It was reported to Bell that during a main rotor blade removal, the expandable blade bolt pivot pin fell out on the bench. As a result, the compression handle became detached from the core pin. Inspection and comparison to the other bolts revealed that the end of the pivot pin had not been swaged.

Transport Canada Comments:

Through investigation, Bell has determined that a lack of swaging could exist on the pivot pin of some expandable blade bolt assemblies part number 429-310-004-101. As a result of the investigation, Bell has published Alert Service Bulletin (ASB) 429-20-53 to provide instructions for inspecting and in some cases replacing the expandable blade bolt. Transport Canada encourages owners, operators and maintainers to review and accomplish the instructions provided in ASB 429-20-53.

Eurocopter France, EC 120 B

Worn Tail Rotor Drive Splines and Coupling

SDR #: 20171103022

Subject:

During a transmission removal from the aircraft, it was found that the splines of the transmission output wheel and coupling were excessively worn. The coupling which is part of an Air Comm Corporation (Air Comm) air conditioning kit (Supplemental Type Certificate (STC) SR00491DE) was worn to a point that tail rotor drive shaft failure was inevitable.

Transport Canada Comments:

STC SR00491DE is for installation of an Air Comm air conditioning kit on an Airbus Helicopters model EC120B helicopter. Similar to this Service Difficulty Report (SDR), Air Comm received reports of wear at the spline joint that consists of the air conditioner drive pulley and the tail rotor output wheel. This spline joint is an integral piece of the power transmission components responsible for the tail rotor drive. Air Comm published Service Bulletin (SB) EC120-111815 to specify an inspection of the pulley-output wheel interface for wear. The Federal Aviation Administration (FAA) has mandated inspection of affected aircraft with Airworthiness Directive (AD) 2017-06-11. Owners, operators and maintainers should be aware that the corrective action and compliance time specified in the SB and AD are different. In addition, the FAA AD requires the inspection results to be reported to the FAA.

Example of the wear found on the tail rotor output wheel spline

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