Feedback

Canadian Aviation Service Difficulty Reports

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

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Heads up

Aerospatiale, ATR 42 and ATR 72

Side Window De-ice Burnt Terminals

SDR #: 20190925002, 20171012009, 20190927006

Subject:

The side window anti-ice activated at approximately 4000 feet (ft). By approximately 2500 ft, the pilots could smell electrical smoke, followed by dark grey smoke emitting from the first officer's side window. At this point, the aircraft was clear of the cloud. The side window anti-ice was de-activated, and Air Traffic Control (ATC) was notified that the aircraft was on final approach with smoke in the cockpit. Upon landing, the side window and the electrical connection for the side window heat began to burn and melt. The aircraft taxied off the runway, with small flames becoming visible. The aircraft was shut down and the handheld fire extinguisher was discharged on the burning portion of the window and the associated electrical connection. The initial investigation points to the fire starting at the positive stud on the electrical connection. There is no evidence of arcing of the positive wiring to the airframe, and it appears to have started internally in the phenolic housing.

Transport Canada Comments:

Multiple events of flight compartment side window arcing have been reported. ATR-GIE and Saint-Gobain Sully (window manufacturer) initiated an extensive technical investigation to determine the cause.

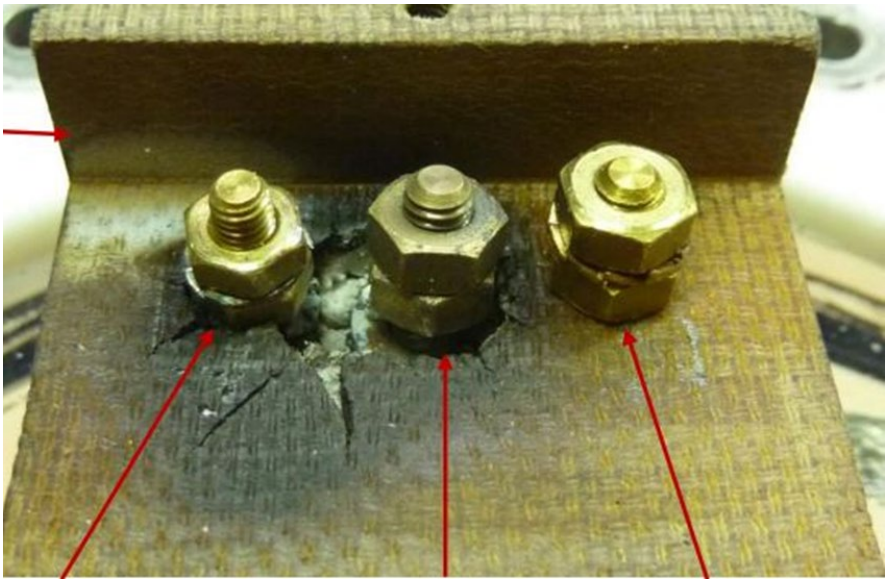
The origin of the arcing was located at the electrical connections between the aircraft power supply and the connector of the side window (fastener with three screws and nuts).

The technical investigation shows that a mechanical clearance between the aircraft crimp ring and the connector screws may cause an increase in the contact resistance and a local overheating/arcing at the level of the crimp rings (terminal lugs) and fasteners.

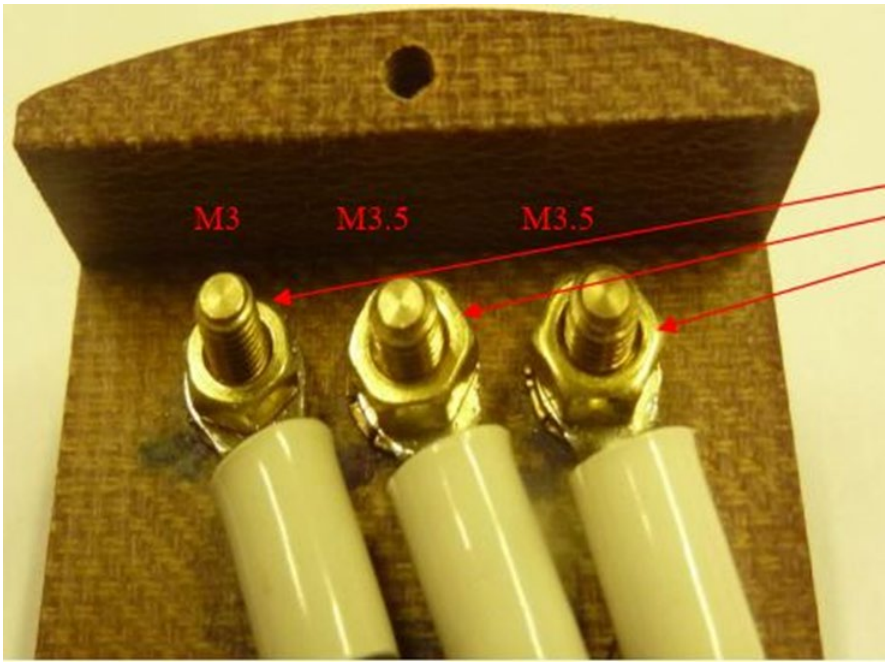
The technical investigation determined the most appropriate torque to be applied and added an additional nut to the terminals.

Transport Canada Civil Aviation would like to advise ATR 42 and ATR 72 series aircraft operators of the issuance of ATR Airworthiness Operators Message AOM 2021/08

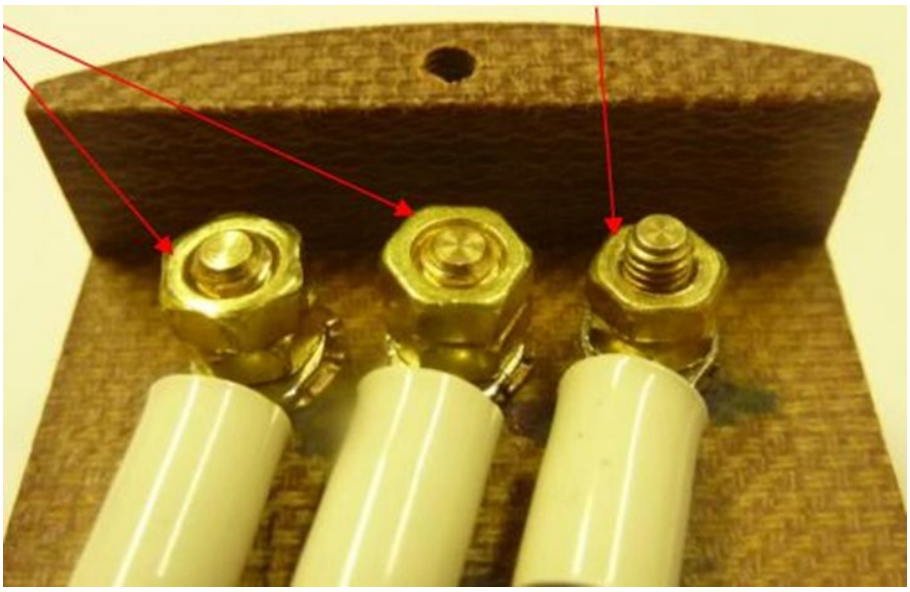
Issue 1. This AOM guides certain aircraft operators to Vendor Service Bulletin (VSB) 56-12-00-SPSATR42 and provides other operators with information on using the new torque values.



Picture 1 – Burnt window de-ice terminal lugs



Picture 2 – Side window de-ice terminal - old installation



Picture 3 – Side window de-ice terminal – new installation

Fixed Wing

Beech, 1900D

Incorrect Fuel Filter Assembly Leading to Low Pressure Condition

SDR #: 20211127002

Subject:

During flight, the L FUEL PRES LO annunciator came on, so the pilot turned on the standby pump, but the light did not extinguish. The airframe fuel filters were inspected, and the red (bypass) indication poppers were not popped though both filters were full of ice. The left-hand (LH) filter discs were severely deformed and bulged.

Further investigation determined that the incorrect part number airframe filter assembly was installed on the LH side of the aircraft. A right-hand (RH) filter assembly was installed on the LH side prior to the aircraft joining our fleet.

Transport Canada Comments:

The maintenance error went unnoticed until ice buildup in the fuel filter assembly installed on the LH side significantly reduced the fuel pressure, resulting in a warning annunciation. Fuel bypass would not be possible as the direction of flow (IN/OUT) was the opposite than intended. The fuel filtering function would also flow in the opposite direction than designed; outwards versus inwards of each disc.

Unfortunately, it is possible to install an opposite filter assembly (LH instead of RH) and it may not be obvious on a post-installation leak check or ground run. Fuel pressure indication will continue to function, although without a functioning fuel filter bypass, ice build-up within the filter assembly can restrict fuel flow with consequences possibly being fuel starvation.

Please note that the IN/OUT markings on the fuel filter assembly casting are not visible when viewing through the under-wing filter access door as they are located on the top side of the casting inlet and outlet ports. The upper access panel on the top of the wing may need to be removed to see the markings on the casting.

Figure 1 – Bulged filter disc due to the fuel flowing in the opposite direction than designed

Figure 2 – View through under-wing filter access door

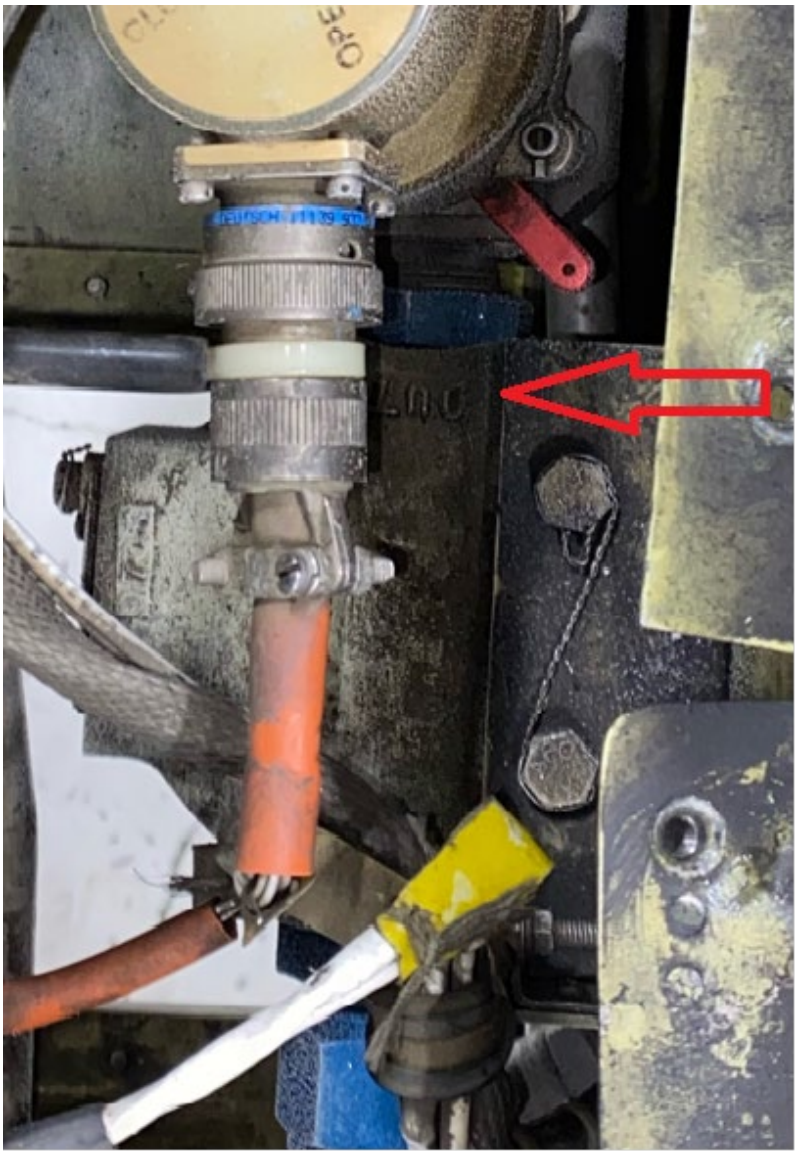


Figure 3 – View from upper access panel with OUT marking evident

Cessna, 150M

Rudder Pedal Torque Tube Failure

SDR #: 20211202020

Subject:

On the co-pilot's side, the right rudder pedal failed when fully depressed. Maintenance found the right rudder bar weld assembly broken at the pedal arm attachment location, on the tube. The rudder bar was replaced.

Transport Canada Comments:

Cessna 150 aircraft Supplemental Inspection Document (SID) 27-20-01 describes the recommended inspection to verify the integrity of the rudder pedal torque tube assembly. As the SID states, typical failures occur at or close to welds.

The rudder pedal torque tube design is similar across 100 and 200 series Textron Aviation Inc. (Cessna) models. Transport Canada Civil Aviation (TCCA) suggests that owners, operators, and maintainers of all series 100 and 200 models review SID 27-20-01, pay special attention to this area, and incorporate its contents into the aircraft's maintenance program.

Figure 1 – Rudder pedal bar failure location

Figure 2 – Failure at weld

Pilatus, PC12 47E

Shocking Fuel Leak

SDR #: 20210707006

Subject:

The pilot discovered significant fuel leakage from the belly of the aircraft, inboard of the left-hand (L/H) wheel well area, while the aircraft was shut down on the ramp after a call. Upon investigation by maintenance, it was noted that a main fuel line had a small pinhole in it, causing a steady stream of fuel to jettison the aircraft. In the area of the puncture was a wire bundle that appeared to be chafed. It appeared that the wire chafed a hole in the fuel line, and the fuel was spraying onto the chafed electrical wires. The fuel spill was contained on the ramp, and the leaking fuel line was contained using temporary means to prevent further fuel loss on the ramp.

Transport Canada Comments:

The operator provided the following additional information:

A hole was found in the L/H wing fuel line part number (P/N) 528.24.12.173A caused by a chafing wire from the belly beacon P/N L78B18/I79A18N, which chafed through the insulation, exposing the bare wire, and had arced on the fuel line, causing the leak. The wire was able to chafe due to a rotated Adel clamp and standoff, which held the two beacon wires.

The aircraft was defuelled, the fuel line was removed, the wire was repaired with Raychem in accordance with standard practices, silicon fusion tape was applied to the hydraulic line, which the Adel clamp was attached to, and the Adel clamp was attached/reinstalled on the tape and positioned away from all lines. The Adel clamp cannot rotate due to friction from silicon tape. A new fuel line P/N 528.24.12.173B was then installed in accordance with standard practices.

The aircraft was refuelled, and the line was pressure tested with the boost pump. The engine run was completed; no further faults were found, and the aircraft returned to service.

This operator was fortunate that this difficulty did not progress into something much worse. A fleet campaign was initiated to inspect for proper clamp and wire position to ensure for necessary clearance between the two wires and fuel lines. No further findings were reported.

Clearance must be maintained between wires and adjacent components and structures. Please be vigilant for these types of dormant failures.

Picture 1 – Fuel stream from the chafe on the fuel line

Picture 2 – Chafe found on the fuel line

Engines

AVCO Lycoming, O-320-H2AD

MA-3 and MA-4 Series Carburetor – Liberated Accelerator Pump Discharge Tube

SDR #: 20210923020

Subject:

While landing, the student and flight instructor noticed that they were unable to reduce the engine speed to idle, revolutions per minute (RPM) could only be controlled between 2000-2200 RPM. They declared an emergency, shut down the engine in short final and landed safely. The company's maintenance technicians inspected the engine throttle control and noticed that it could not be pulled back. The carburetor was removed, and it was found that the accelerator pump discharge tube had detached and stuck in the butterfly.

Transport Canada Comments:

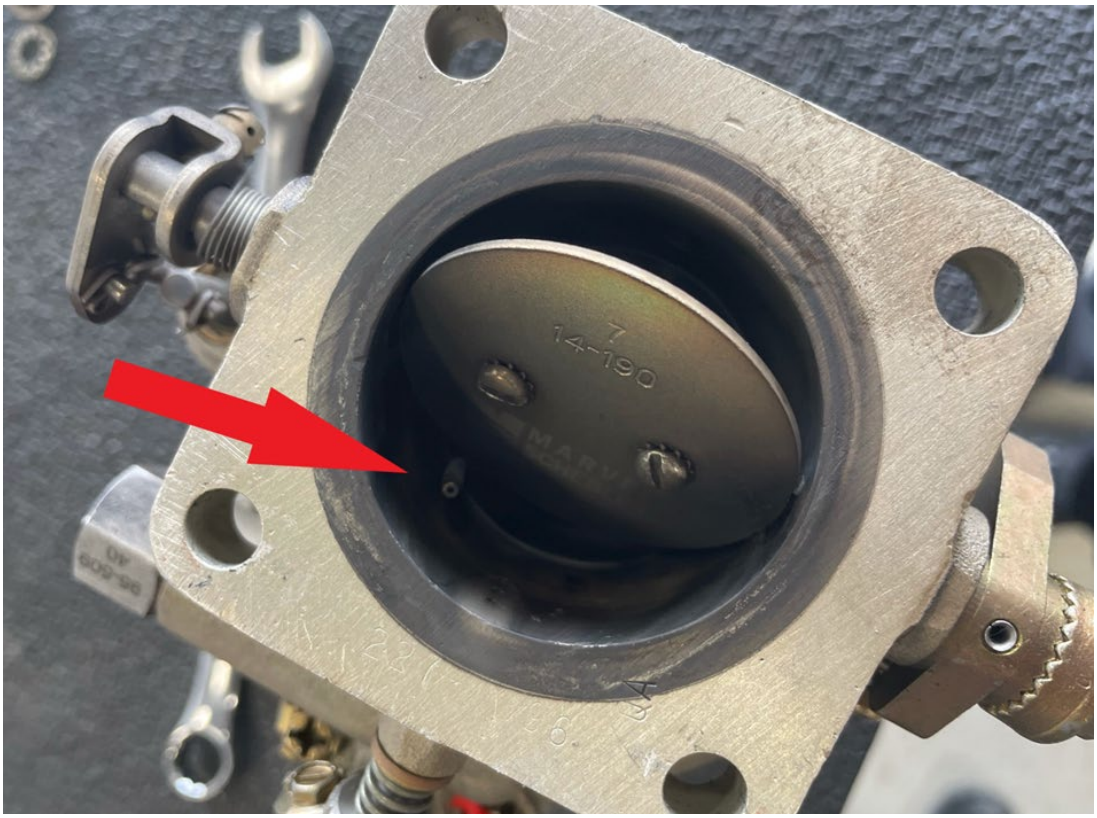
The MA-3 and MA-4 series are updraft style carburetors found on Lycoming, Continental, and other normally aspirated engines. They are currently manufactured by Mavel-Schebler Aircraft Carburetors (MSA) and were previously manufactured by Precision, Facet, and Volare.

The accelerator pump discharges fuel only when the throttle fly is moved toward the open position. In MA4-5, MA-5 and MA-6 series carburetors, this additional fuel is fed through the main discharge nozzle, and in smaller carburetors such as the MA-3 and MA-4 series, a separate discharge tube is utilized. This discharge tube is bonded in the sidewall below the venturi and main discharge nozzle.

Possible indications of a liberated discharge nozzle could include:

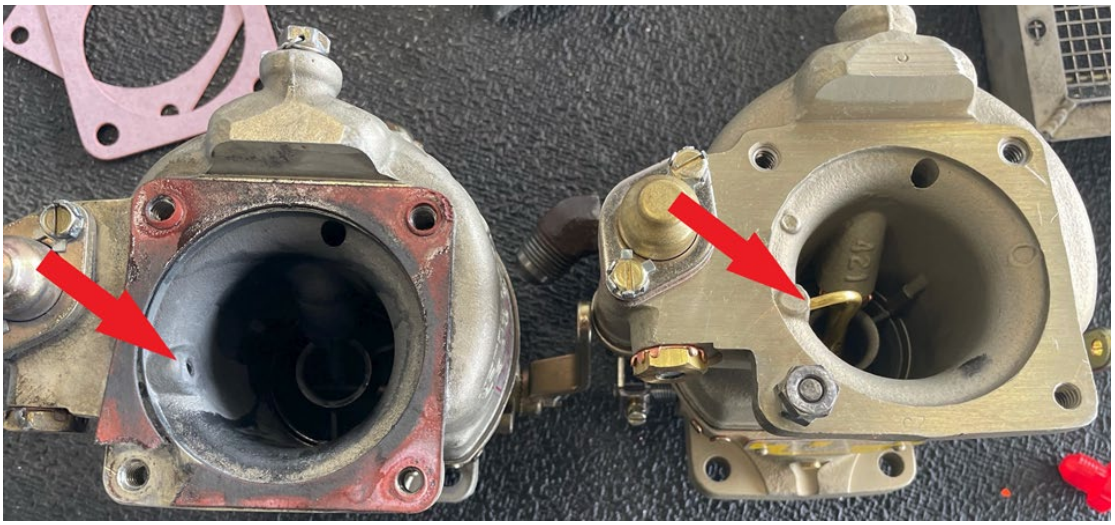
- Obstructed throttle fly, jammed throttle control
- Fuel found in airbox
- Cylinder Foreign Object Damage (FOD)
- Failure to start
- Sluggish acceleration during takeoff or other phases of flight

Accelerator pump discharge tubes are bonded in place during assembly or overhaul and undergo a specified torque check to determine serviceability. Transport Canada Civil Aviation (TCCA) recommends that a detailed visual inspection of this area be performed whenever possible to detect a disbonded accelerator pump discharge tube and that such defects continue to be reported by submitting a Service Difficulty Report (SDR).



Picture 1 – Discharge tube lodged beside throttle fly

Picture 2 – Discharge tube



Picture 3 – Left-hand (L/H) unserviceable carburetor without discharge tube, right-hand (R/H) serviceable carburetor with discharge tube bonded in place

Honeywell, TFE731-20BR-1B

Drive Splines and Interconnect Couplings Inspection

SDR #: 20211102014

Subject:

During the pre-flight checks after engine start, the pilots report the engine computer switch is to be set to manual mode, and a slight engine acceleration is noted. When the switch for the left engine was selected to the manual mode position, the engine had an uncontrolled acceleration. The pilots moved the engine computer switch back to auto mode and the engine returned to its normal operating condition, and the engine was then shut down. The Honeywell Maintenance Manual includes a caution for the fuel control unit (FCU) installation, stating that if the coupling between the FCU and fuel pump is not installed, the engine will overspeed rapidly in manual mode. The left engine FCU was removed to inspect the coupling between the FCU and the fuel pump, and the drive splines on the FCU. The inspection revealed that the output shaft from the fuel pump, the interconnect coupling and the FCU drive splines were stripped.

Transport Canada Comments:

It is common practice for many manufacturers to mate components together using interconnect couplings. These couplings are made from a variety of materials depending on the application. Some couplings are designed to shear if a component seizes, to limit the extent of damage to its mated component.

The root cause of these stripped splines has yet to be determined, but improper alignment during installation and material defects are possibilities. As stated in this

event, the manufacturer's Instructions for Continued Airworthiness (ICA) does bring attention to ensuring interconnect couplings are installed to prevent overspeed of the engine. However, maintainers are reminded to inspect the condition of the mating surfaces and to pay attention when installing components to ensure proper engagement.

Photo 1 – Interconnect coupling

Photo 2 – Fuel pump drive spline

Photo 3 – Fuel pump drive spline close-up view

Pratt & Whitney-CAN, PT6A-67P

Leaking Propeller Shaft Seal

SDR #: 20200716009

Subject:

On July 11, 2020 the propeller shaft seal was replaced due to leaking, and an engine ground run and leak check were completed. On July 13, 2020 the aircraft took off from the airport and completed a turnback due to oil on the windscreen and the engine cowling. Maintenance replaced the faulty propeller shaft seal on July 15, 2020. During the replacement of the faulty shaft seal, a buildup of seal material on the mating surface of the seal was noted and grooves on the aft side of the seal mating surface had worn off.

Transport Canada Comments:

In this event, an oil leak was found, and a seal replacement was carried out by maintenance personnel. Unfortunately, the seal failed on the next flight even though ground runs had been performed after its replacement. Further inspection found a buildup of seal material on the mating surface, which probably resulted in the sealing grooves being worn off and another oil leak.

An investigation into the root cause could not rule out the possibility of both seals being defective. However, it was determined that improper maintenance practices likely contributed to the failure of the second seal. It was found that the replacement seal was

not repositioned according to the maintenance manual instructions. A third seal was installed, and the aircraft returned to service.

With the demands of meeting schedules and deadlines in a very competitive market, many tasks are at risk of being rushed to completion. In this circumstance, it appears that a full inspection of the area including mating surfaces may not have been completed prior to installation and repositioning of the propeller shaft seal. Transport Canada Civil Aviation (TCCA) reminds maintenance personnel that they have a responsibility to accomplish tasks in accordance with the appropriate standards of airworthiness and to remain vigilant for human factor issues that may impact the quality of their work.

Picture 1 – Propeller shaft seal

Picture 2 – Buildup of material on seal

Pratt & Whitney-CAN, PW150A

Improper Generator Installation

SDR #: 20191010008

Subject:

The crew reported that the right-hand direct current (DC) generator caution light was illuminated followed by an oil pressure warning light during flight. The crew commanded shutdown of the engine and landed without any incident. Upon troubleshooting, maintenance found the right-hand DC generator separated from its mount on the reduction gearbox.

Transport Canada Comments:

An investigation by the engine manufacturer found the oil pressure warning was caused by an oil leak from the DC generator that was not seated on its mount. The root cause was determined as improper generator installation.

Generators or starters on most aircraft tend to be heavy, cumbersome to handle or install, and located in an area that is usually difficult to access and congested with lubrication and fuel lines as well as wire bundles. The securing hardware of the generator to its drive varies from basic stud mounts with nuts, to band clamps that encompass the generator and gearbox mounting flanges.

Although these different mounting systems may seem straightforward, you must follow the manufacturer's instructions to ensure proper installation. Normally, they need to be in a certain orientation for wiring hookup, which may or may not be aided by a locator pin. Many have specific torque procedures for clamps or specific torque sequences for stud mounted, and other components may require removal to facilitate an installation.

In this event, the crew was fortunate to land without incident but had the generator detached from the mount, it may have resulted in a very different outcome. Transport Canada Civil Aviation reminds all maintainers to be diligent and follow the manufacturer's Instructions for Continued Airworthiness (ICA) regardless of how simple the task may seem.

Rotorcraft

Aerospatiale HC, AS 350B2

Damaged Tail Rotor Control Rod Assembly

SDR #: 20211217008

Subject:

On a scheduled inspection, it was found that the protective sheathing was damaged and worn away to the point where the tail rotor control rod was damaged. The control rod guide had pressure on it as did some of the forward guides. It was found that the control rod was likely bent during a previous removal and installation. The maintenance manual describes the removal and installation, and if that process is followed, there is a risk of bending the control rod. To reduce this risk, the fin can be easily removed.

Transport Canada Comments:

The submitter of this Service Difficult Report has provided an excellent example of maintainers needing to remain vigilant during the performance of scheduled or unscheduled maintenance. As described by this submitter, the tail rotor control rod was only damaged because of the control rod being bent due to suspected improper maintenance during a previous installation or removal. Maintainers are reminded to always exercise good technical judgement and practices when performing any maintenance task to avoid inducing damage as described in this example.

Damage found on the tail rotor control rod assembly after the rod was found bent during an inspection

Bell Textron - CAN, 429

Bell 429 Battery Venting

SDR #: 20200311006

Subject:

During an inspection, battery acid was found leaking from the battery case lid. The acid had been spilled throughout the battery compartment and damaged the battery hold-down hardware. This is the third case of battery failure causing acid spillage on this airframe in three years.

Transport Canada Comments:

Bell has published Technical Bulletin (TB) 429-17-53 after receiving reports of moisture in the nose compartment through the battery door and vent system. Accumulated moisture in the vent system has a potential to prevent normal battery venting. Some model 429 helicopter operators have experienced and reported a service difficulty where the battery vented directly from under the lid instead of through the airframe venting provisions. The Accomplishment Instructions of TB 429-17-53 incorporate a modification to install a new gutter along with vent and drain improvements. Transport Canada Civil Aviation (TCCA) will continue to monitor for additional related Service Difficulty Reports.

Bell Textron - CAN, 505

Bell 505 Airframe Furnished Engine Oil Tank Cracked Mounting Tabs

SDR #: 20200617008

Subject:

Bell reports that during assembly it was noticed that there were cracks in the mounting tabs of the engine oil tank.

Transport Canada Comments:

Bell investigated and found that on some model 505 helicopters a condition exists where cracks in the engine oil tank mounting attachment flanges may have developed during the manufacturing process. Alert Service Bulletin (ASB) 505-20-15 was published to provide instructions to detect damage (cracks) and where possible, repair the mounting attachment flange. Following the release of ASB 505-20-15, Bell published Technical Bulletin (TB) 505-21-28 to introduce a new engine oil tank design with a manufacturing process that eliminated the stresses that created this condition. Installation of the new engine oil tank meets the terminating action requirements for the repetitive inspection of ASB 505-20-15 and incorporates a new maximum level line to clarify sight glass markings. Transport Canada Civil Aviation (TCCA) encourages owners, operators, and maintainers of Bell model 505 helicopters to review ASB 505-20-15 and TB 505-21-28 to detect this condition and rectify as needed.

Bell Textron - CAN, 505

Air Conditioner Tube Fouling with Electrical Harness and Cargo Hook Release Cable

SDR #: 20210506023

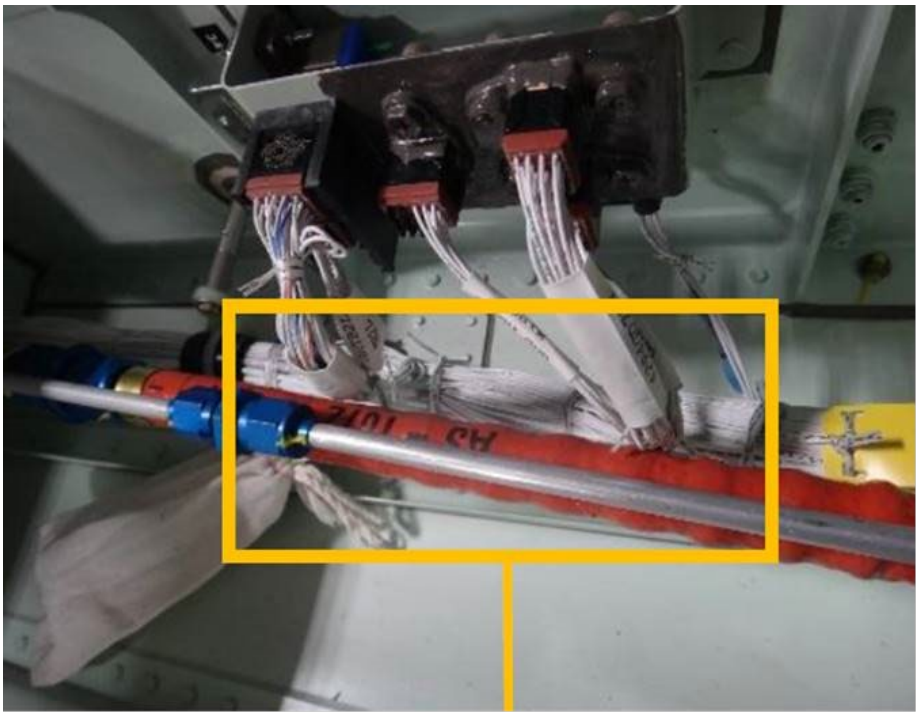
Subject:

A potential fouling condition of an electrical harness was found at four locations between the air conditioner kit (505AC-101) and the cargo hook kit when installed. The aircraft was inspected but no visible chafing damages were present.

Transport Canada Comments:

Bell investigated the possibility of some air conditioner system tubes chafing various locations of wire harnesses and cargo hook release cables on the model 505 helicopter. The investigation revealed that chafing could exist and if not corrected, could lead to damage of the wire harnesses and cargo hook release cables protective shielding. Following their investigation, Bell published alert service bulletin (ASB) 505-21-24 to provide instructions to inspect for damage due to chafing, and the installation of additional clamps when the air conditioning system kit is installed. Transport Canada

Civil Aviation recommends that owners and operators review ASB 505-21-24 and complete the Accomplishment Instructions of this ASB for the affected helicopters.



View of air conditioner tube and wire harnesses without the additional clamps

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