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Aviation Safety

Maintainer

Learn from the mistakes of others and avoid making them yourself . . . **Issue 2/2003**

Heaven Can Wait! But for How Long?

Beware: Beech B99A and B100 stabilizer actuator may inadvertently be installed with the bolts passing behind the actuator mounting lug assemblies instead of through them.

Any work performed on flight or engine controls is subjected to a dual inspection as per Section 571.10(4)* of the *Canadian Aviation Regulations* (CARs) Standards. One would think that even common sense would dictate this obligation in the name of safety! Why would an aircraft maintenance engineer (AME), properly licensed and experienced, called upon to carry out this highly responsible task, fail at it entirely or partially. Why would a second AME, called upon to double check the work, do likewise. Is it because of fatigue, too much overtime on the previous work-shift, stress from overwork, or personal-family related problems? Beware of these human factors! Discuss them with colleagues! There is no shame in learning from others. Whatever the reasons for failure to follow procedures, none can be serious enough to justify the taking of a life, and in this case potentially six lives, can it?

A Beech B99A with a crew of two, along with four passengers, had departed Saskatoon, Saskatchewan on a flight to Prince Albert. The Beech B99A was on its 12th flight following major inspection and had flown 7 hr since completion of the work. As the crew was getting ready for an approach, the flaps were selected for landing and all h..l broke loose. A loud bang was heard from somewhere in the tail and the aircraft nose pitched up abruptly to a high angle. The crew immediately applied full forward elevator and reduced power. The aircraft's nose did not respond, but as the airspeed reduced and as it came to a near vertical attitude, the aircraft rolled left and pitched down steeply. Every effort to bring the nose up with

Photo courtesy of Transport Canada Aircraft Services, Training Centre Graphic Design /MultiMedia Communications

elevator failed, and as a last resort, the crew applied full power. This input slowly started to bring the aircraft's nose up and, to help reduce airspeed, gear down was selected. As it locked in place, the aircraft hit the ground in a farm field of the Saskatchewan prairies. The aircraft slid for half a mile before it stopped. The passengers and crew were able to exit the aircraft by the main cabin door, with minor physical injury but in some cases, surely, with very serious psychological distress. We should contemplate, just for a moment, the kind of ordeal and legacy that would have been left to the surviving heirs, had the crew and passengers died in the crash. Please take a moment.

What happened? The stabilizer trim actuator had detached itself from the fuselage structure allowing the stabilizer to move freely under the influence of air loads. Was it an isolated event? In the past four years there were two reports of similar events. In June of 1999, after the aircraft got airborne, it pitched up to approximately 70°, reaching a height of 500 to 700 ft. It then rolled to the left, pitched steeply nose-down, and descended to the ground within the confines of the airport. It

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contacted the soft and flat surface in a relatively level attitude and covered a distance of 500 ft. It came to rest in a wooded area. Everyone onboard escaped injury. In both cases, it was found that during the installation of the stabilizer actuator, the two upper attachment bolts had been incorrectly installed forward of the actuator mounting lugs, inadvertently trapping the lugs between the shanks of the bolts and rivets in the airframe channel structure. A double check confirmed the installation of the bolt, washer and nut assemblies but the proximity to the rear bulkhead, and the position of the trim actuator and channels made inspection with the use of a mirror difficult. The non-conforming installation was not detected. Under flight air loads, the (2) actuator lugs disconnected themselves from their anchoring points and left the pilots with uncontrollable horizontal stabilizer functions. Complacency? Possibly! Always be diligent about dual inspections!

*http://www.tc.gc.ca/aviation/REGSERV/CARAC/CARS/cars/571e.htm#571_10

Dizziness and Memory Loss: The Health Problems Associated with Noxious Gases Emitted by an Air Conditioning System

The crew of a Beechcraft Super King Air experienced dizziness and loss of memory during a flight on December 2, 2000. The aerial ambulance services flight was going well until an odour of burnt plastic or rubber slowly filled the cabin and the cockpit. The crew had to use the oxygen masks, and turn back towards the point of departure. The doctor who was accompanying the crew was losing consciousness against the rear bulkhead of the cabin. He was pale, his eyes were closed, and he seemed to be having trouble breathing and speaking. The nurse was feeling intoxicated and dizzy. Despite his condition, the nurse noticed the doctor's unstable condition and helped him put on his oxygen mask.

As soon as the pilot felt nauseous, he altered his flight plan, and reduced his altitude to 10 000 ft. He activated the automatic pilot until the final approach. He then took over the controls and landed without incident. The pilot admitted to having lost consciousness during the flight, and having no recollection of the approach or the landing. He even asked the nurse if he had used the flaps. The crew and passengers were taken to the hospital for observation because some symptoms persisted. Several months after the incident, some of the crewmembers were still experiencing after-effects of this unfortunate occurrence. They had headaches, their blood pressure was higher than normal, they had difficulty concentrating, and experienced anxiety when faced with the least amount of responsibility. The smoke they inhaled during the flight seriously affected their health.

At the beginning, the inquest revealed that the air conditioning system was defective and that several important parts were not working properly. A pneumatic bleed air control valve was leaking under the floor of the cabin and allowed the hot bleed air from the engine to contaminate the air of an important pipe of the air conditioning system. Laboratory investigations, as well as a flight test, showed that the temperature that was reached during the flight was insufficient to create this type of noxious gas, even if the parts of the air conditioning system were defective. Therefore, the two leaks found in the forward air-conditioning evaporator refrigerant pipes were examined. Drops of lubricant were found in the air conditioning system, close to a damaged pipe connection. This pipe brought the liquid refrigerant under high pressure to an expansion valve and to an evaporator.

The aircraft's air conditioning system used a new refrigerant called HFC-134a. This refrigerant replaced R12 gas, which had been taken off the market because of the high risk of damage to the ozone layer. Furthermore, the oil used to lubricate the system was made up of polyol ester and emitted the same odour as that which was detected by the crew when the temperature of the oil rose to a point where it changed into vapour.

The product's technical data contained a warning against all prolonged exposure, and described physiological symptoms similar to the ones experienced by the crew: dizziness, confusion, lack of coordination, drowsiness or loss of consciousness, irregular heart beat, feeling of intoxication, and other effects that may cause death. The air-conditioning unit's manufacturer published a warning against possible risks of corrosion if water or moisture seeped into the system during a servicing process. Hydrochloric acid or hydrofluoric acid could form, creating corrosion and considerable damage. Be on the look out for any report of crewmembers and passengers showing symptoms similar to those described in this article. The air conditioning system is an essential element of airworthiness of a modern aircraft and is indispensable for the health of the crew and passengers. It must be maintained to the highest level of performance recommended by the manufacturer!

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Letters to the editor

Comments on the article Fatigue and Complacency— A Potentially Sorrowful Mixture *in Maintainer 1/2002*

Two men lost their lives during a flight when the main rotor was ejected from the mast—the rotor assembly droop restrainers and mast nut assembly had been removed for painting.

Our reader mentions that he picked this tip up while working for Royal HMC, an approved repair and overhaul facility in Quebec City (YQB).

This organization always identified work in progress by attaching a visible length of trail marker to the item or area of the aircraft, with the associated discrepancy number written on it. Different colors indicated their status, i.e. to be actioned, ready for inspection, ready for test, ready to close, etc. The red/orange markers are inexpensive and can be bought in many stores. The method is easy to use and is a safety net to ensure that no items "in progress" are overlooked or missed.

Signed: Anonymous

It is a case that should never have happened. The senior aircraft engineer should have grounded the helicopter in the aircraft log book and made an entry for a dual inspection requirement. This should have been followed by ensuring that worksheets were to be used, elaborating the work to be performed and indicating the inspection requirements needed after completion of each step of the assembly and rigging process. The cockpit should have been flagged indicating control disruption and finally the aircraft logbook should have been signed to release the aircraft to service before the flight. It is strange to say all this in hindsight but it beats telling the pilot's or aircraft engineer's wife that he will not be coming home for supper. You can blame the assistant AME who worked on this helicopter, but he has to live with the memory of this tragedy forever. My last comment is of people trying to push or rush the job to put the aircraft back in service — which is often the main cause of this type of accident—yet they run and hide when it all turns sour.

Mr. H.W. J. Leverett
Sunrise Cottage, England

In This Issue

Mechanical Happenings

The following aircraft incidents, reported to Transport Canada from August 2002 to August 2003, are a heads-up for AMEs; they mainly focus on the maintenance outcome of the incident and do not include all of the circumstances of each flight. In most cases of component failure, it can be assumed that a Service Difficulty Report *(SDR) was submitted.*

Airbus A330 – While at the gate, the system management unit (SMU) of the entertainment system caught fire. The investigation found that the entertainment system had two internal six-volt (4.5 AMP Hour) batteries connected in series, which supplied power to the SMU for up to two minutes regardless of how the system was shut down. These batteries had enough power to start and sustain a fire and could not be shut off.

Rockwell Collins identified a manufacturing fault with a batch of integrated circuit power switches (U18) found in the SMU, which are located in the cabin, as well as in the system's data server units (DSU), which are located in the baggage hold. Rockwell Collins issued a *Service Bulletin* (SB) to replace the U18s in the SMUs as they come in for repair.

Various Federal Aviation Administration (FAA) *Airworthiness Directives*(AD) have been issued for a variety of transport category aircraft entertainment systems. None of these ADs addressed the inability to disconnect the internal batteries, which are thought to be common in most systems. There are no FAA ADs issued for the A330 in regard to entertainment systems. Heads up!

Aerospatiale AS 350 B-2 – The aircraft departed an Ontario airport with one pilot and three passengers. During the three-hour survey flight, the pilot reported that he had a hydraulic failure. The aircraft impacted the ground in a near inverted attitude with little forward speed and a high rate of sink. Rescuers were on the scene instantly. There were no survivors. The investigation found a failed hydraulic pump drive belt. It is unknown at this time if it failed prior to, or as a result of, the crash. The Transportation Safety Board of Canada (TSB) is investigating.

Aerospatiale AS350 – While on short final to land on a road, the helicopter is reported to have lost engine power, which lead to a hard landing. The helicopter landed on the slope of the shoulder of the road. The tail boom separated, the fuselage rotated and the aircraft rolled onto its right side into the roadside ditch. As the pilot and four firefighters evacuated the overturned helicopter, it caught fire. The ensuing fire incinerated the fuselage. The helicopter was on contract for fire suppression and returning to Slave Lake, Alberta in the evening. TSB is investigating.

Bell 205 A – During transit for fire bucketing, the crew was alerted to an engine fire warning light and burning smell. The pilot landed in a field and activated the fire extinguisher, then shut down the engine. The helicopter continued to burn after shutdown. The fire was extinguished by another helicopter's bucketing. The initial investigation indicated a fuel-fed fire from a damaged fuel line close to the accessory section of the engine.

Boeing 767 – The aircraft was on an IFR flight from Vancouver, British Columbia, to Toronto, Ontario, when the crew observed a C2 cargo area fire warning, at approximately 20 mi. from the airport. They immediately declared an emergency and discharged a fire extinguisher into the cargo area. The flight crew stopped the aircraft on the runway, where it was visually inspected. When the cargo area was opened, a significant amount of smoke was observed.

The investigation revealed that the water pipe insulation had been damaged by the thermal heating tapes wrapped around them. A second B767 was examined in the same area and damage similar to that found in the previous aircraft was discovered. There was discoloration and burn-through in several areas. The operator conducted a fleet-wide inspection and ordered the heater strips disabled until further notice.

Canadair CRJ CL 600-2B19 – The aircraft landed and made an uneventful touchdown. Approximately 1 000 ft down the runway, at 110 kt, after the thrust reversers were deployed, the landing gear collapsed. The left main wheel assembly remained attached to the side stay and was stuck between the fuselage and the inner edge of the inner flap. The flaps remained in the down position (at 45°) and the flaps, along with the flap actuator assemblies, helped to support the wing when the aircraft slid 4 000 ft down the centre of the runway. The Captain was able to remain on the runway using rudder control, the thrust reversers, the brakes, and the nose wheel steering system.

The investigation revealed a three-inch area of discoloured material, which had penetrated through the cross section of the main fitting of the left trunnion. This discoloured area is speculated to be a fatigue fracture showing signs of corrosion. The area surrounding the fatigue fracture appears to have sheared-off and showed signs of overload. TSB is investigating.

Cessna 185 – The aircraft had undergone maintenance on the pilot's control column on Friday, and had been parked for the weekend. It had been worked on by company engineers and been signed off by the Director of Maintenance. The aircraft was to be used on Monday morning by two company pilots who completed a pre-flight inspection. When the pilot attempted to correct a low-wing situation after getting airborne, the low wing dropped further and came in contact with terrain. The aircraft then collided with terrain and was substantially damaged. The two pilots were taken to hospital where they were treated for minor injuries. One of the pilots

was kept in hospital overnight and then released. It was revealed after the accident that the aileron controls had been inadvertently cross-rigged during maintenance. The situation was not discovered during maintenance functional checks, cable tension checks or pilot pre-flight checks.

DeHavilland Dash-8 – The aircraft was departing Toronto International Airport and as it lifted off, the crew felt a vibration similar to that of a bird strike. Air traffic control (ATC) reported foreign object damage (FOD) on the runway and the aircraft returned for landing. The investigation revealed that 38 in. of leading edge skin, along with de-icer booth assembly, had detached itself from the wing. The lower attachment screws had never been installed and this was the first flight since the maintenance had been performed. The company is reviewing its maintenance procedures.

DeHavilland Dash-8 – A DHC-8 lost its No. 3 main landing gear (MLG) wheel and tire assembly shortly after takeoff. The crew had noticed that the inbound anti-skid CL annunciator light had illuminated before takeoff, but proceeded with the takeoff. The flight continued on schedule and landed uneventfully. The pilot noticed the loss of the MLG wheel and tire assembly during the walk-around inspection. The wheel and tire assembly were later retrieved and a preliminary examination determined that the No. 3 axle broke right of the outboard bearing seat.

Subsequent investigation of the event found that when installing a wheel, and the outboard seal is allowed to drop off the bearing land, it will rest in the threaded relief area between the nut and the axle journal land. As the nut is tightened to the recommended torque value, it will compress the outer seal against the land and result in no load being applied to the wheel bearing assembly. This will lead to a very early failure of the assembly and possibly the loss of a main wheel as well as damage to the brake unit.

Eurocopter Lama S315B – The helicopter was on the last leg of a repositioning flight when the low rotor RPM warning sounded. The pilot completed an autorotation landing in a hay field. The helicopter was substantially damaged when the main rotor struck the tail boom. The pilot and two passengers sustained minor injuries.

The TSB examined the engine and found that the sleeve that delivers torque to the reduction and accessory gearboxes had fractured at the forward coupling. The splines in the coupling were almost completely melted and worn away. An adjusting washer had also disintegrated. The TSB lab is now examining engine components to find the cause of the damage, and the sequence of the failure.

Beechcraft King Air C90A – The crew experienced an in-flight emergency while en route IFR from Winnipeg, Manitoba to Prince Albert, Saskatchewan. The aircraft was in level flight at 22 000 ft with the autopilot engaged when the crew heard a loud "bang" followed by a sudden severe tail vibration. The aircraft pitched up and entered a steep climb. The flight crew regained control by disengaging the autopilot and applying forward nose-down pressure on the control column. An emergency was declared and the crew diverted to Dauphin, Manitoba. A controlled descent was made to 16 000 ft at which time the crew elected to lower the gear to determine how the aircraft would perform. This manoeuvre enhanced controllability. With the gear down, full down elevator trim, and full forward force on the control column, the aircraft was controllable. At approximately 2 500 ft (procedure turn altitude) it became VFR and the crew was able to carry out a visual approach with emergency services on standby. While on final, at approximately 200 ft AGL, the aircraft pitched downwards but the flight crew was able to recover, arrest the descent, and make a safe landing (1650 UTC).

After landing, the crew inspected the aircraft and found that the left elevator trim tab actuator rod had failed. The King Air elevator has two trim tabs, one on either side of the tail. With the aid of the right elevator trim tab and full use of the flight controls, controlled flight was maintained. TSB advised that the left elevator trim tab push-pull rod had failed at the threaded area. An abnormal wear pattern on the fork end was observed.

Piper Pa-31 Navajo – The aircraft, with a pilot and six passengers, was arriving at Winnipeg International Airport after an IFR flight. The pilot reportedly was high on the instrument landing system (ILS) approach and elected to overshoot. At some time during the missed approach, the pilot advised that he was having an engine problem and ATC provided him with vectors to land. Shortly after, the pilot further advised ATC that the second engine had quit. Witnesses on the ground reported hearing an engine backfiring as the Navajo passed overhead. The aircraft descended into the busy northwest residential/industrial area of the city and hit the top of a city transit bus, knocked down a traffic light, struck a large delivery truck, then struck a smaller delivery van and finally impacted the paved street. The aircraft came to rest on its left side, with the fuselage rolled on top of the left wing. The right wing and engine fell off the aircraft during the accident sequence. The seven occupants were injured with varying degrees of severity and all were sent to the hospital. There were no injuries to anyone on the ground. TSB is investigating.

Sikorsky S76 – The flight crew of a twin-engine helicopter was conducting a single engine approach to a pad landing at London International Airport. The single engine approach was part of a local training exercise. While conducting the single engine approach, the main rotor RPM drooped in the flare and the helicopter landed hard sustaining substantial damage. There were no injuries. TSB is investigating.

Electrical Discharge Causes In-flight Shutdown

Comparison of a new bearing (left) with a bearing that has suffered from electrical discharge damage (right).

PT6A-60 engine operators should be aware of possible in-flight engine shutdown following accessory gearbox bearing failure. An Australian Airline, operating Short 360s, experienced four engine shutdowns over the course of 13 months. The Civil Aviation Authority of Australia (CASA) investigated the occurrences and found that operators overseas had experienced similar difficulties. The premature failure seems to be caused by an electric current discharge along the output shaft of the starter generator unit into the engine accessory drive train. The bearing and gears become pitted; as there is an electron flow transfer that takes place between bearing surfaces, races and in the gear drive system. The failure becomes imminent as soon as a threshold of wear is reached. High vibrations and imbalance of the assembly create overload. There is spalling and overheating, followed by the failure.

The study found that two types of starter generator armature defects could be the cause. The first case, which is the most common and preventable, is armature leakage due to the accumulation of brush dust. This build up of carbon dust will provide a path for electron flow between the commutator and the output shaft that will end as it reaches the gearbox and a grounding plane. The second case is when a short occurs because of an insulation breakdown in the commutator or lamination slots. Periodic field cleaning and resistance check detailed in the Lucas maintenance manual is a simple and effective response to both of these serious problems.

Examination of failed engines revealed a complete breakdown of the number one bearing that lead to an engine failure. The manufacturer, TRW Lucas, is developing a new starter generator shaft that will insulate the armature from the engine drive gear. This modification will be directly interchangeable with existing installations. Pratt and Whitney Canada has issued a series of SBs that require oil system monitoring of engines identified as being at risk and is studying a proposal to develop a modification that will insulate the engine gear train from electrical discharge. Raytheon has issued a Safety Communiqué for B1900D operators recommending that those who have had a starter generator removed for reasons other than scheduled maintenance, comply with the Pratt and Whitney SB, detailing the oil filter patch check inspection. It has also amended the maintenance manual to include starter generator output shaft spline inspection. B300 and B1900/B1900C maintenance manuals are also being revised.

Pilatus has reviewed the potential for electric discharge and has amended the maintenance manual to require the periodic cleaning of brush dust from the starter generator. The potential for electrical discharge is at its maximum when the accumulation of brush dust is large and there is a corrosive environment present. Elimination of such factors and scheduled inspection should prevent this type of engine failure.

Call For Nominations for the 2004 TC Aviation Safety Award

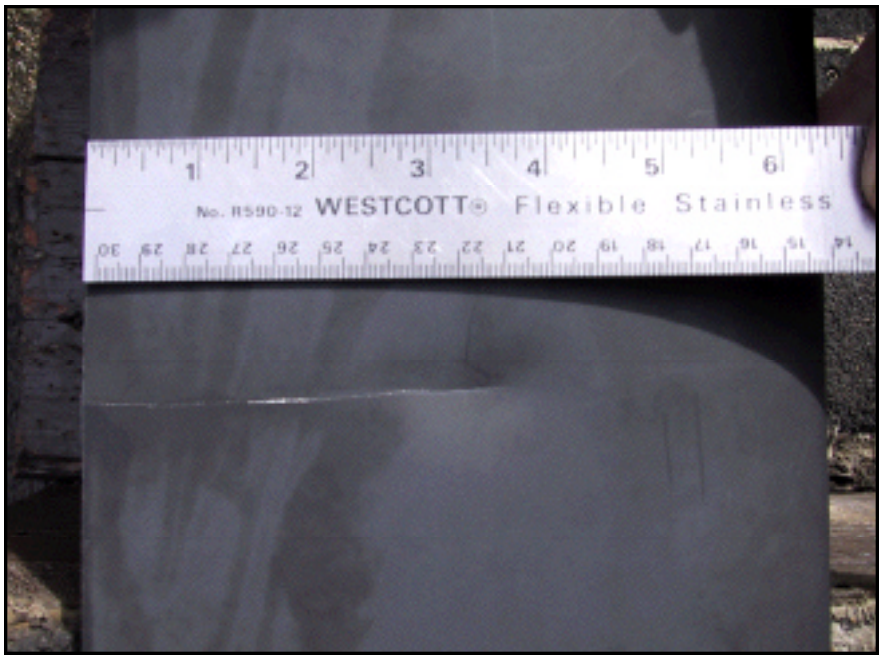
Do you know someone who deserves to be recognized?

The Transport Canada Aviation Safety Award is presented annually to stimulate awareness of aviation safety in Canada by recognizing persons, groups, companies, organizations, agencies, or departments that have contributed in an exceptional manner to this objective.

You can obtain an information brochure explaining award details from your Regional System Safety Offices, or by visiting the following Web site:
http://www.tc.gc.ca/CivilAviation/SystemSafety/brochures/tp8816/menu.htm.

The closing date for nominations for the 2004 award is December 31, 2003. The award will be presented during the sixteenth annual Canadian Aviation Safety Seminar, CASS 2004, which will be held in Toronto, Ontario, April 19 to 21, 2004.

MD369D Torque Events Dictate the Life Cycle of Your Blades



Two days prior to the incident, the McDonnell Douglas MD369D had been subjected to a 300-hr inspection and nothing was amiss. However, during the occurrence flight an abnormal vibration was felt and the pilot immediately noticed that the main-rotor blade was out of its track by six inches. He proceeded with the utmost caution and landed immediately. The helicopter was based on the coast of British Columbia and usually stationed on a floating barge where it was often subjected to high winds and bad weather. One day prior to the flight, the maintenance crew had removed the main-rotor blades because of high prevailing winds. On the day of the occurrence, they had reinstalled and secured the blades to prevent flapping. Following the mishap, the maintenance crew inspected the blades and found that one of them had four-inch cracks at the upper and lower skins extending from the trailing edge to the spar.

Torque events had not been recorded accurately on this helicopter during the first 2 000 hr in service; however, the current owner has been keeping track of them for the past two years. The blades had a recorded time in service of only 2 266 hr but the torque event cycle was estimated at close to 32 523 cycles. Examination of the blade using X-rays, electron and optical microscopes revealed a fatigue crack that had started from a nick or a rough radius on the edge of a lightening hole on the C-channel structure of the blade, about three inches inboard of the data plate. The fracture propagated to the top and bottom skins and subsequently across the chord of the blade, causing a separation at the trailing edge. The fracture stopped at or near the D spar structure near the leading edge of the blade.

McDonnell Douglas calculated that the blades had probably been subjected to operations and to torque events that likely exceeded the design limits. The manufacturer has since issued a SB 369D-201R1 that should ensure the operator optimal helicopter dispatch while at the same time maintaining the highest level of safety. To quote McDonnell Douglas: "This bulletin references criteria to assist operators in understanding their level of usage, the impact of the usage on the main-rotor blade life and the corresponding inspections required to locate cracks that might occur." In this incident, the recent inspection failed to reveal the crack. This leads us to believe that it can develop very quickly and with disastrous results. Since the manufacturer has not yet established a torque event maximum life cycle retirement phase, and because the complete failure of a blade is likely to lead to a tragedy, strict adherence to the McDonnell Douglas Helicopter SB is mandatory. As the picture shows, the crack stopped at the spar location. How long would the spar have held under heavy load? That's the question! The helicopter was lightly loaded on this flight and the pilot took immediate action, which saved the day. Recording torque events and compliance with this SB is a must! Keep up the good work.

Aviation Maintenance Conferences

1. The AME Association of Ontario will host its annual Ontario AME Symposium on October 22, 23 and 24, 2003 at the International Plaza Hotel in Toronto. For more information please call Cara Tweyman at 905 405-1546 or Jasper Megelink at 905 677-8747.
2. The annual Canadian Aviation Maintenance Council Symposium and Annual General Meeting will be held in Ottawa at the Westin Ottawa Hotel, November 12 to 14, 2003. For more information call Jeff Kendall at 613 727-8272 ext. 223. E-mail: jkendall@camc.ca
3. The annual Pacific Aircraft Maintenance Engineers Symposium will be held January 28 to 30, 2004 at the Best Western Richmond Inn Hotel in Richmond, B.C. For more information, please call Karen at 604 279-9579, or visit the Pacific AME Association Web site at www.pamea.com or communicate via e-mail at pamea@telus.net

The Tool Management Program

The System Safety Division staff is spread across Canada. It is responsible for researching and analysing safety-related information of large and small aircraft flight operations, as well as those of aircraft manufacturing and maintenance agencies. System Safety focuses primarily on the compilation of useful safety-related data as well as the development of educational aviation safety programs and the publication of safety matters addressed to members of the aviation community.

In a previous issue, we mentioned that System Safety was developing a program to help reduce the risk of FOD. A PowerPoint presentation is now available on CD. It suggests ways of managing the use of tools and parts in a way to prevent mechanical difficulties caused by such objects forgotten after maintenance, in an airframe, engine or in some cases, in electronic assemblies or electro-mechanical accessories. You may benefit from the help of one of our Regional System Safety Specialists in presenting the program to your personnel, or you may choose to make the presentation on your own. Decals are given to all personnel during the presentation so that they can affix them in strategic places, such as on the side of a toolbox, the walls adjacent to the store, or the panel where tools are hung. This serves as a reminder of the importance of making an inventory of tools and accessories after all maintenance work. Adopting such a proactive program, will significantly reduce the risk of FOD to your aircraft and ensure the efficiency of your operations.

Please do not hesitate to contact our Regional System Safety Specialists for information concerning the Tool Management Program. The specialists are:

- Atlantic Region: Norbert Belliveau, tel. 506 851-7554
- Quebec Region: Dorval, Guy Lapierre, tel. 514 633-2837; Québec, Patrick Kessler, tel. 418 640-2107
- Ontario Region: Will Boles, tel. 416 952-3858
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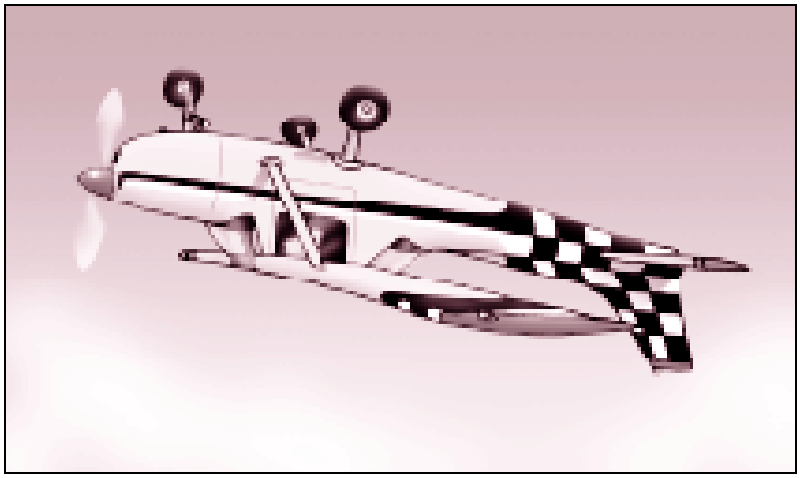
- Pacific Region: Neil Hughes, tel. 604 666-3286.

FOD in a Cessna 152



No one is immune to the danger of FOD. An experienced aerobatic pilot had performed a thorough pre-flight inspection of a Cessna 152 before setting out on a flight. While performing a roll manoeuvre at an altitude of approximately 4 500 ft, the ailerons jammed in the full-deflection position. The pilot tried repeatedly to return them to neutral, but to no avail. Fortunately, through the use of considerable force and at an altitude of approximately 3 500 ft, he was successful and with the skilful use of the rudder, he made a safe landing.

Following a close examination of the aircraft and the controls by an AME, the cause of the incident was located. It was an upholstery screw lodged in the aileron control chain on the control column that had jammed in the control wheel mechanism. Further inspection revealed that several upholstery screws were missing from upholstery trims and interior panels. The screws had probably fallen out of enlarged screw holes caused by the repeated removing and reinstalling of the aircraft's interior upholstery panels and by the vibration and flexion of the fuselage structure created as the aircraft moved through the air. FOD can be deadly. It can easily create a hazard that will render an aircraft or system un-airworthy at the most awkward moment and possibly create a situation that will endanger human life. It takes a little hard work, diligence, professionalism and the belief in a job well done to eradicate this menace. This tragedy was averted through sheer luck and a strong will to survive. Be proud to say that your aircraft are always free of FOD.

Ref.: TSB Report A02C0226

If you think Safety is too costly, try an accident!