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Opportunity knocks for qualified students

THE PORT ALBERNI, BC-based aerial firefighting firm Coulson Aviation recently announced it has partnered with the British Columbia Aviation Council to introduce the Coulson Aviation Aircraft Maintenance Engineer - Structures (AME-S) Scholarship. This $54,000 CAD scholarship package covers tuition, hybrid apprenticeship training, and essential tools, ensuring recipients receive strategic support in their journey to becoming fully licensed AME-S professionals.

"We recognize the growing demand for well-trained aviation professionals," said Britton Coulson, President and COO of Coulson Aviation. "By providing this comprehensive scholarship, we're not just investing in individuals, we're strengthening the future of the aviation industry. Our training program ensures students gain real-world experience while working alongside experts, leading to a direct career path with Coulson Aviation."

Offered through the Coulson Aviation Academy in Port Alberni, this program provides a unique apprenticeship model that integrates classroom learning with hands-on experience on operational aircraft. Recognized as the first aviation company authorized to offer training in aircraft structures in Canada, its Transport Canada Approved Training Organization status allows students to train at no cost while earning an income as part of the Coulson team.

The key benefits of the scholarship include:

- Full financial support covering tuition, training, and tools.
- On-the-job learning through a hybrid apprenticeship model.
- Comprehensive exam preparation for Transport Canada certification.
- Guaranteed employment at Coulson Aviation upon successful program completion.

This scholarship is open to British Columbia residents who are Canadian citizens or permanent residents. Deadline for submittal the 2025 scholarship was May 11, but for more information regarding 2026 applications visit the British Columbia Aviation Council website or Bit.ly/BCAC-SCHOLARSHIPS. ■

— John Campbell, Editor

Departments

Features

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Upcoming Events

"Canada's National Airshow" returns to Abbotsford

Photo: Wingwalker Sam

Heads up BC aviation fans! The legendary Abbotsford International Airshow returns to this Fraser Valley community on August 08-10. Designated Canada's National Airshow, the annual aviation festival provides spectators an opportunity to watch some of the finest aerobatic performances in the world. Ranked among one of the Top Ten Airshows in the world by USA Today in 2013 – the event continues to distinguish itself. Through aviation excellence, aerospace advancement, and community participation, the Abbotsford International Airshow remains one of the best aviation events on earth and in the sky.

Among the scheduled performers this year are the Canadian Forces Snowbirds, the CF Skyhawks, F-35 Lightning II Demo Team, KC-46 Pegasus Demo Team, and the E/A-18 Growler Demo Team. Featured aircraft include the Mig-17F Fresco, F4U-7 Corsair, F8F Bearcat, and the P-38 Lightning.

Naturally, also on hand will be stunt pilots such as Nate Hammond, flying his famed Ghostwriter aircraft. GhostWriter is an exceptional two-act performer. His shows begin with a heart-stopping 350-hp, 200-mph aerobatics display featuring smoke trails, loops, rolls, and long verticals that demonstrate the extraordinary capabilities of this 1950s-era trainer on steroids.

When night falls, GhostWriter transforms into a mesmerizing celebration of light — adorned with 4,000 LED lights and over 250 pounds of pyrotechnics. He dances through the sky in a customizable light show tailored to the event's theme. This incredible display of light and motion leaves a lasting impression on audiences, showcasing the aircraft's true versatility and its talented pilot.

Other daredevils include **Wingwalker Sam**. Wingwalking is not for the faint of heart. Sam Tryggvason will be securely harnessed to the wings of the highly-modified Grumman "Showcat" biplane, experiencing speeds up to 150 mph and G-forces of up to 4G. The routine is a symphony of synchronized movements, with pilot Mike Tryggvason executing loops, rolls, and even inverted flight, all while Sam maintains her poise and precision. Moving from different positions on the aircraft – even onto the top wing – requires extreme daring!

For a complete list of this year's airshow performers, schedules, and ticket info, visit: **www.abbotsfordairshow.com** ✪

COMING EVENTS

North Bay Armed Forces Day
June 04, 2025
North Bay, Ontario, Canada
www.northbay.ca

CBAA 2025 Convention
June 10-12, 2025
Vancouver, British Columbia
www.cbaa-acaa.ca

Air Show Atlantic
June 28-29, 2025
Summerside, PEI
www.airshowatlantic.ca

Aerospace + Aviation Engineering Conference
July 12-13, 2025
Ottawa, Ontario
www.waset.org

Boundary Bay Airshow
July 19, 2025
Delta, British Columbia
www.czbb.com

Camrose Airshow
July 26-27, 2025
Camrose, Alberta
www.camrose.ca

Abbotsford International Airshow
August 08-10, 2025
Abbotsford, British Columbia
www.abbotsfordairshow.com

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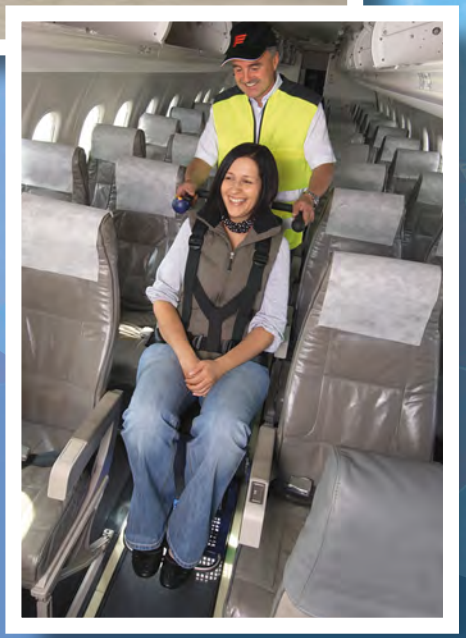

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STCs & new products

Multi-piece tool kit includes road chest

Snap-on Industrial's new 256-piece general maintenance kit includes: 14.4-volt micro-lithium impact wrench and ratchet, 18-volt impact wrench, 1/4", 3/8", and 1/2" drive tools and sockets. The 1/4"-drive sockets are chrome, the 3/8"-drive sockets are impact rated. Also in the kit are combination, flare nut, and adjustable wrenches, slip joint, angle nose, long nose locking and retaining ring pliers, wire crimpers, and diagonal cutters. There are slotted and Phillips screwdrivers, and specialty tools including hammers, punches, chisels and circuit tester and a heavy-duty road chest. **www.b2b.snapon.com**

FAA approves tail mount terminal for Gulfstreams

Gogo has confirmed Supplemental Type Certificate approval by the Federal Aviation Administration for its Plane Simple Ka-band tail mount terminal for Gulfstream GV and G550 aircraft. This is the latest iteration of the Plane Simple antenna series rollout. The terminal optimizes the SD modem unit which is integrated with the SD gateway router to distribute high-speed broadband to passenger and crew devices. Connecting with existing Viasat GX satellites powering the Jet ConneX service, the Ka-band antenna is said to optimize compatibility with Viasat next-generation GX satellites. **www.gogoair.com**

Preheat system STC awarded for Airbus H135

Hartzell Propeller has been awarded STC approval for its Tanis helicopter preheat systems for Airbus H135 helicopters. Hartzell offers Tanis preheat systems for numerous aircraft. Preheat is said to contribute to aircraft longevity, reliability, safety, and the ability to perform protected engine starts in colder weather. Another key benefit is the reduction of torque oscillations. The Tanis brand utilizes silicone pad elements to provide heat to critical components such as engines, gearboxes, hydraulics, avionics and batteries. Hartzell recommends continuous use of preheat systems when ambient temperatures drop below 50F (10C). **www.hartzellaviation.com**

Whisper prop targets noise and vibration levels

BLR Aerospace has received STC approval from both the FAA and the European Union Aviation Safety Agency for the seven-blade Whisper prop system, now available for the King Air 300 series aircraft. The new Whisper prop is said to be the quietest propeller available for the King Air 300 series. Each blade features a resin-infused wood core wrapped in carbon fibreglass composite skins, ensuring exceptional quietness, durability, and efficiency. The prop design not only targets noise reduction but also aims to minimize vibration for a smoother passenger experience. www.**BLRaerospace.com**

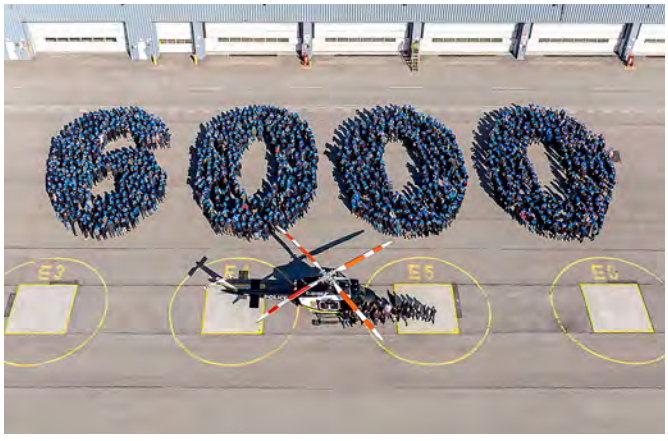
Branding panels offer customizing options

Jamco America has introduced a line of customizable branding panels designed to offer a versatile and aesthetically appealing way for airlines to refresh aircraft interiors while maintaining a high level of quality and customization. The branding panels can be installed in various locations throughout the aircraft such as forward entryways, mid-cabin sections, and galley walls. Certain versions of the panel feature a modular tile system that allows for easy swapping of branded inserts. The panel customization options include materials, finishes, colours, and design features. **www.jamco-america.com**

Hangar heaters produce no noise or fumes

Marley Engineered Products has expanded its line of Thermazone infrared radiant heaters with a variety of mounting options. These heaters provide a hidden heat source that preserves sight lines and maximizes usable space. Their adaptable designs accommodate various mounting needs, whether on the wall, ceiling, or integrated seamlessly into aircraft hangars architectural framework. With no moving parts or fans, these heaters deliver whisper-quiet warmth, making them ideal for sensitive aircraft maintenance environments where precision and minimal disruption are critical. Further, the heaters deliver optimal warmth without producing combustible emissions, flames, or noxious gases. **www.marleymep.com**

To announce your STC or new product, email a JPG photo and a product description to John at: amu.editor@gmail.com



BELL REACHES CRITICAL MILESTONE AT QUEBEC PLANT

With the construction of two Subaru Bell 412EPXs destined for operations by the Sûreté du Québec, Bell Textron Canada says it has now completed its 6,000th commercial aircraft at the Commercial Delivery and Assembly Centre in Mirabel, Quebec. Bell will deliver the aircraft to the Ministère des Transports et de la Mobilité durable, which manages a fleet of aircraft through the Service Aérien Gouvernemental. This milestone marks a nearly 40-year history of Bell Textron Canada in Quebec. The announcement coincided with news of the Bell 412EPX receiving Transport Canada Civil Aviation validation allowing it to begin flight operations throughout Canada.

WESTJET AIRLINES HALTS TEMPORARY FOREIGN WORKER PROGRAM PLANS

The Air Line Pilots Association Canada, who have worked alongside the pilot leadership of WestJet and WestJet Encore to halt WestJet management's efforts to hire pilots through the Temporary Foreign Worker Program (TFWP) recently announced that WestJet management will no longer pursue the hiring of any pilots through the TFW Program. "As the voice of over 95 percent of Canada's professional, unionized pilots, we know this issue goes beyond WestJet Encore—it impacts us all!" said Captain Tim Perry, ALPA Canada President. Founded in 1931, ALPA is the largest airline pilot union in the world.

CUSTOMERS CAN PLAY ROLE IN SAF PRODUCTION

Atlanta-based Wheels Up Experience has announced the launch of its new Sustainable Aviation Fuel program. Wheels Up will partner with Delta Air Lines to purchase SAF, ultimately allowing private fliers to participate regardless of their flight operator or departure airport. While SAF is expected to play a critical role in decarbonizing aviation, it remains scarce today – in 2024, it only accounted for 0.3 percent of global jet fuel production, and it has very limited availability. By integrating SAF, Wheels Up and its customers have the opportunity to help increase the demand for SAF.

DEMAND PROJECTED TO STEEPLY RISE AT STANDARDAERO

StandardAero is accelerating plans to grow its annual CFM International LEAP-1A and LEAP-1B throughput capacity significantly by 2029. These plans reflect the projected increase in demand for quick-turn shop visit and performance restoration shop visit events as the worldwide fleet of A320neo family and Boeing 737 MAX aircraft continues to grow. StandardAero's planned capacity ramp-up will leverage the two LEAP test cells and significant available footprint at its San Antonio, Texas facility. CFM is expecting LEAP shop visits to triple by the end of this decade partly due to 40 percent of the fleet being operated in hot and harsh environments.

MAJOR AVIONICS UPGRADE COMING FOR THE DASH 8S

De Havilland Aircraft of Canada has launched the development of a new avionics solution in cooperation with partners Universal Avionics and JANA Inc for the Dash 8-100 and 200 aircraft. The upgrade will increase navigational capabilities and enhance safety by providing improved situational awareness for pilots. The certification of the new avionics' solution

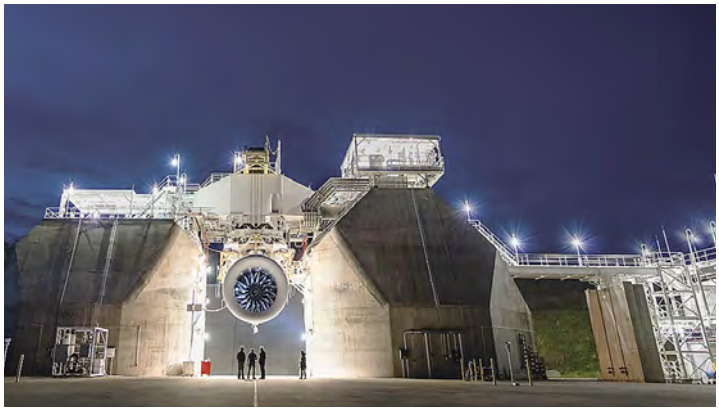
is anticipated to be obtained in the first half of 2026. Widerøe's Flyveselskap AS will be the launch customer for the upgrade program. Universal's InSight flight display system installation adds five high-resolution LCD displays with improved synthetic vision and digital engine indication, replacing aging CRT equipment.

ONE BILLION CUSTOMERS SERVED BY 787 FLEET

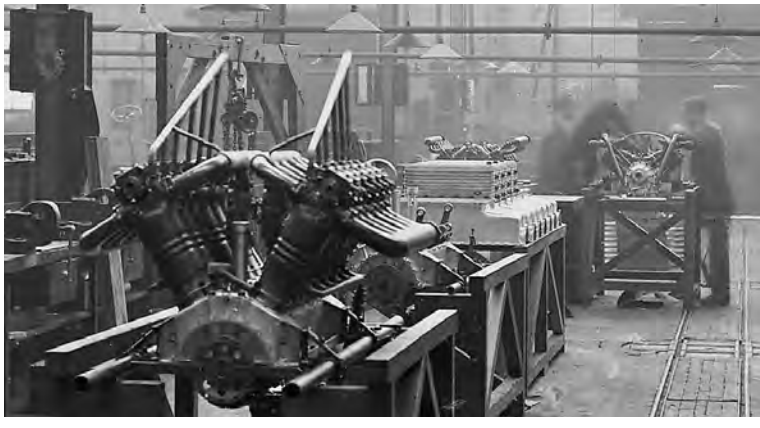
Boeing announced at the end of April that the 787 Dreamliner fleet has surpassed one billion passengers—faster, says Boeing, than any widebody commercial airplane in history, accomplishing the feat in less than 14 years since entering service. The global 787 fleet of more than 1,175 airplanes has flown nearly five million flights covering more than 30 million flight hours. The Dreamliner fleet operates across more than 85 countries at 520 airports, including 425 new nonstop routes to destinations that were never served previously. On average, each 787 is in the air more than 12 hours per day.

GE9X PRODUCTION TARGETED TOWARD 777X

GE Aerospace has confirmed its GE9X is expected to enter service next year on the wings of Boeing's 777X family, the world's largest twin-engine passenger jet. GE9X engines are currently rolling off the production line and being loaded onto trucks for a cross-country haul, first to Ohio for testing



and then onward to Boeing's factory in the Pacific Northwest. Cristina Seda-Hoelle, who leads the GE9X program, says plant activity in Durham, North Carolina will mirror that of Everett, Washington, where final assembly of the twin-engine 777X is underway. "We've started building," she says. "And we'll be aligning production with Boeing's production of the 777X.



WORK UNDERWAY ON ROLLS-ROYCE HANGAR MUSEUM

A significant collection of historic Rolls-Royce engines will soon have a new home at Aerospace Bristol. Work is in progress to develop Hangar 16R—home of the Rolls-Royce Aerospace Collection—into a new museum store. Hangar 16R will house engines from the Rolls-Royce Heritage Trust collection alongside museum objects and provide a space for volunteers to work on conserving the engines, which include radial engines like those used in the Wellington and Lancaster II, gas turbines used in combat and engines such as the Olympus that powered the Vulcan and Concorde, and the Pegasus from the Harrier. An opening date is not yet set. ■

Predictive Maintenance Revolution

In this opinion piece an international aviation recruitment consultant says digital twins and skilled technicians are a winning combination.

DIGITAL TWINS – virtual copies of real-life machinery – have become an integral part of many industries: from precision manufacturing to logistics. Research by McKinsey shows that investments in digital twin technologies will rise to more than $48 billion by 2026 around the world. More and more airlines and aircraft Maintenance, Repair and Overhaul (MRO) companies are introducing digital twins into their processes. But can the market supply enough skilled personnel to help companies truly benefit from this technology? Jekaterina Shalopanova Chief Business Officer at Aerviva, a Dubai-based international aviation recruitment consultancy shares her insights on the matter.

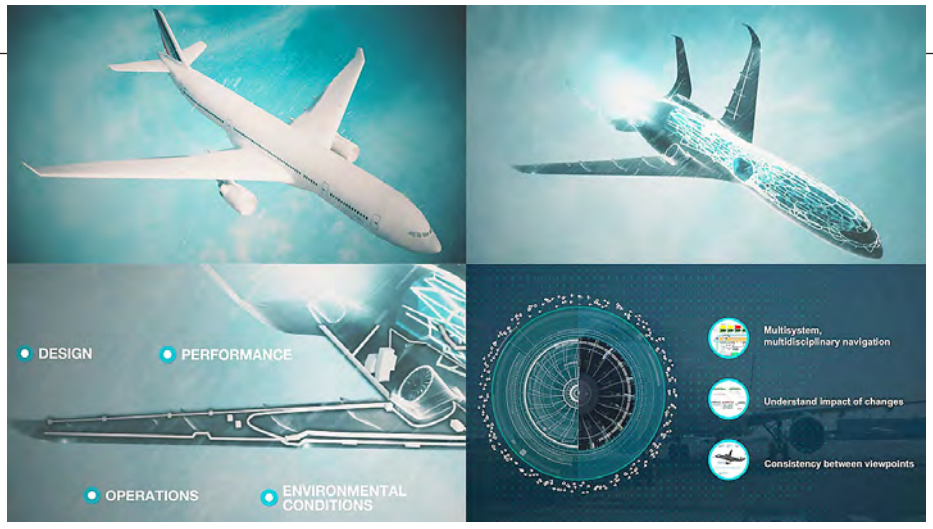
Research by McKinsey shows that investments in digital twin technologies will rise to more than $48 billion by 2026.

WHAT ROLE DO DIGITAL TWINS PLAY IN AIRCRAFT MAINTENANCE?

Before answering this question, we should first expand on what a digital twin is. In essence, digital twins are 1-for-1 virtual models of either the entire aircraft or a separate part, like an engine. OEMs like GE have even developed digital twins for such components as landing gear. These models are only as good as the input they receive, so they must be continuously updated with data from IoT sensors, informing the model both of regular wear-and-tear and any irregularities.

The model itself provides companies not only with an always-ready visual representation, but also with the ability to virtually test potential "what-if" scenarios. This digital twin technology is at the heart of predictive maintenance – an innovative approach to MRO, which not only saves money but reduces the likelihood and duration of Aircraft on Ground (AOG) situations.

"To say that digital twins are a must in aviation MRO would be an understatement," says Shalopanova. "In an industry where every hour of aircraft downtime can cost tens of



In essence, digital twins are 1-for-1 virtual models of either the entire aircraft or a separate part.

Another fascinating development related to digital twins and the vanguard of innovation is creating digital twins of… pilots. Lockheed Martin is exploring the concept of an "e-Pilot" digital twin that can monitor both the human pilot and aircraft performance during critical phases of flight. This technology aims to "assist the human pilot in awareness and provide enhanced aircraft control options during flight safety critical situations," according to the company.

thousands of dollars, the ability to predict, prevent and schedule AOG events makes for smoother and more cost-effective operations."

According to a Deloitte study, implementing predictive maintenance programs results in a 15 percent reduction in downtime and a 20 percent improvement in labor productivity. A McKinsey study further supports these benefits, indicating that predictive maintenance can reduce maintenance costs by 18-25 percent while increasing availability by five to 15 percent For airlines and MROs alike, this means fewer grounded aircraft and more efficient use of maintenance resources.

ARTIFICIAL INTELLIGENCE BRINGS DIGITAL TWINS TO A NEW LEVEL

Modern Machine Learning and Generative AI approaches are already being applied to predict simulation outcomes in seconds rather than hours. For instance, in engine maintenance, AI-powered digital twins can quickly assess whether slight deviations in turbine blade geometry will significantly impact performance, potentially reducing unnecessary component replacements.

Airlines, including such major players as Air France-KLM, operating a fleet of more than 500 aircraft, are already investing in sophisticated Artificial Intelligence solutions to bring their predictive maintenance efforts to the next level. According to a report by Reuters, using Gen AI capabilities from Google Cloud, the airline will be able to drop the time needed for data analysis in predictive plane maintenance from hours to minutes.

THE GLOBAL SHORTAGE OF DIGITALLY PROFICIENT AVIATION PROFESSIONALS

The tech behind digital twins will undoubtedly continue to advance rapidly, providing companies with an even more granular and actionable view. However, the aviation industry is facing a challenge of a different matter. Namely, the lack of skilled professionals to work alongside these sophisticated systems.

According to Boeing's 2024 Pilot and Technician Outlook, over the next 20 years companies worldwide are going to need 716,000 new maintenance technicians. More alarmingly, according to the Aviation Technician Education Council (ATEC), is the lack of qualified instructors who can train the next generation of mechanics.

"If in other industries, you will hear talks about AI replacing people, this cannot be said about aviation," notes Shalopanova. "Here, the advent of new technology might translate to higher requirements for everyone involved in the maintenance process. But it also makes this career all the more exciting and promising."

AI-powered digital twins can quickly assess the existence of slight deviations in turbine blade geometry.

Speaking of the next generation, they will have to soon become more than mechanics. This growing demand goes beyond a traditional MRO skillset, as technicians will be increasingly expected to be able to bridge the gap between mechanical systems and digital tools. Finding an aviation maintenance professional equally well-versed in data analysis, AI, and predictive analytics is going to be a difficult task for many companies.

"The skill gap in MRO is widening at precisely the wrong time," explains Shalopanova. "As digital twin technology becomes ubiquitous, the industry is grappling with the demand for technicians. Companies may invest millions in cutting-edge technology only to find they lack the human expertise to maximize its potential."

It must be noted that some MRO training providers are already incorporating digital twin technology and AI into their curricula. Solutions like AK View and AK GO use Augmented Reality to simulate real-life situations, providing a more streamlined and time-efficient experience.

The future of aircraft maintenance is digital, but it lies in the hands of skilled and irreplaceable professionals. For airlines and MROs to truly transform maintenance through digital twins, the industry must address this skills gap with the same urgency and resources it devotes to technological innovation. ■

Rust Never Sleeps

AIRPORTS GO THROUGH hundreds of thousands of gallons of jet fuel each day, requiring tank farms to store plenty of reserve fuel onsite. These aboveground storage tanks (ASTs) are under strict regulations to ensure physical and environmental safety, including the protection of tank floors from corrosion. While cathodic protection (CP) has long been a go-to for corrosion inhibition, here at Cortec Corp during the last two decades of tank protection we have seen our CorroLogic vapour phase corrosion inhibitors become what we believe is a new industry standard that offers a smart solution for protecting storage tanks at airports and beyond.

The Cortec Corporation claims to have a "smart" solution for corrosion protection at airport tank farms

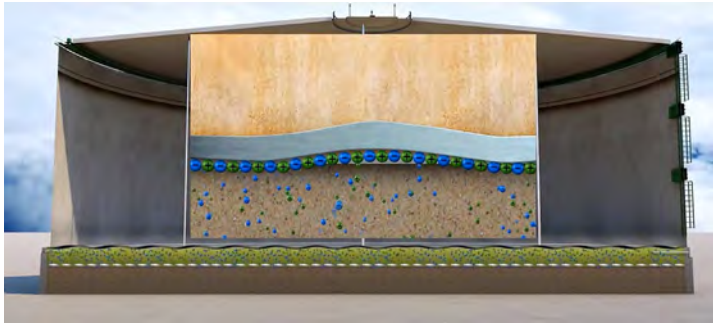
WHY PROTECT AIRPORT ASTS FROM CORROSION?

Corrosion protection of storage tank bottoms has many incentives. Corrosion eats away at the metal floor, ultimately leading to hazardous leaks if left unchecked and unrepaired. Any measures that prevent corrosion and reduce repairs can therefore save time, money, and hassle in the long run. CP is often used to inhibit corrosion by sending an electrical current through the tank pad that offsets the normal electrochemical reaction of a corrosion cell. If the tank floor stays in contact with the electrical current, corrosion is mitigated. However, because tank floors are uneven and can bend and create air pockets as the tank is filled and refilled, some areas of the tank floor will not be in constant contact with the treated sand pad, allowing for patches of corrosion.

WHY CORROLOGIC MAKES SENSE

CorroLogic, on the other hand, is distributed by vapour action. Once the corrosion inhibitors are present under the tank floor, they begin to diffuse throughout the void space, forming a protective molecular layer on all metal surfaces they reach. This allows CorroLogic to protect the bottom of the tank independently or in conjunction with CP. Research suggests these two methods may have a synergistic effect when used together.

Further to the user's advantage, CorroLogic does not require a power source and can be applied at any stage in a tank's lifecycle—



Above: VpCI Deposition on an Uneven Tank Floor. Corrosion will eat away at a storage tank's metal floor, ultimately leading to hazardous leaks if left unchecked.

during construction or even after the tank is filled and in service, minimizing the loss of time and money required to drain high volumes of fuel. With positive results seen from the last 20 years of CorroLogic field trials, the underlying vapour corrosion inhibitor (VCI) technology has recently been codified in industry standards: API Technical Report 655 and AMPP SP21474-2023. ■

(The corrosion protection firm Cortec Corporation is headquartered in St. Paul, Minnesota.)

CAAM National Board member Unither Bioélectronique completed the world's first flight demonstration of a piloted hydrogen-powered helicopter.

CANADIAN ADVANCED AIR MOBILITY (CAAM) reached a milestone in sustainable aviation this spring, as CAAM National Board member Unither Bioélectronique completed the world's first flight demonstration of a piloted hydrogen-powered helicopter. Quebec-based Unither Bioelectronics is focused on the development of an autonomous organ delivery airborne system. The flight took place at Roland-Désourdy Airport in Bromont, Québec on March 27, marking a pivotal moment for sustainable aviation in Canada and the world.

This milestone is not only the first flight demonstration of a piloted hydrogen-powered helicopter globally—it is also Canada's first piloted hydrogen-powered flight. The successful three-minute, 16-second flight validated the capabilities of a Proton Exchange Membrane (PEM) hydrogen fuel cell system to support the power demands of vertical take-off and landing (VTOL) flight.

"Our first test flight successfully demonstrated the hover and maneuver capabilities of our innovative hydrogen powertrain," said Mikaël Cardinal, Vice President, Program Management & Business Development, Organ Delivery Systems for Unither Bioélectronique. "Our next phase of development will focus on integrating a liquid hydrogen storage system, which we believe is an essential technology for enabling our extended-range missions to deliver manufactured organ alternatives to patients in need."

The historic flight was part of Project Proticity, a joint initiative between Unither Bioélectronique and Robinson Helicopter Company focused on accelerating zero-emission aviation through the use of hybrid hydrogen-electric propulsion systems. The successful demonstration—performed by test pilot Ric Webb under an experimental flight permit from Transport Canada Civil Aviation utilized an experimental Robinson R44 Raven II equipped with a dual PEM fuel cell/battery hybrid powertrain, with approximately 90 percent of the flight's energy coming from hydrogen fuel cells. As the national industry association driving sustainable innovation in Canada's skies, CAAM recognizes this as a transformative moment for the sector.

The first flight demonstration of a piloted hydrogen-powered helicopter globally, lasted three-minutes, 16-seconds.

"This historic achievement proves that clean aviation isn't a distant dream—it's a present-day reality taking flight right here in Canada," said JR Hammond, Executive Director of CAAM. "Unither's success is a shining example of the innovation happening across our ecosystem and demonstrates how Canadian leadership is shaping the global future of zero-emission air mobility." ■

(Canadian Advanced Air Mobility was co-founded in 2020 with the National Research Council of Canada.)

Focused on Growth

Bombardier's positive Q1 2025 report has the company all stirred up.

Bombardier reported revenues of $1.5 billion for the first quarter of 2025.

BOMBARDIER announced in early May strong results for the first quarter of 2025, marked by double-digit gains across many key metrics, including total revenues, earnings and free cash flow. Bombardier reported revenues of $1.5 billion for the first quarter of 2025, an increase of 19 percent year-over-year. This jump was driven in part by the delivery of 23 aircraft, 3 more than in the same quarter last year, and by a healthy delivery mix.

The company's Services business continued its steady growth, reaching revenues of $495 million, up $18 million from the first quarter of 2024. Adjusted net income for the first quarter of 2025 came in at $68 million, up 55 percent from the same quarter in 2024. Adjusted Earnings Per share for the quarter rose to $0.61, an uptick from the $0.36 recorded for the first quarter of 2024.

The company generated an adjusted EBITDA (earnings before interest, taxes, depreciation, and amortization) of $248 million in the first three months of the year, representing 21 percent growth year-over-year, and an adjusted EBITDA margin of 16.3 percent, up by 30 basis points year-over-year. Adjusted EBIT reached $177 million, a remarkable 25 percent year-over-year increase, leading to an adjusted EBIT margin of 11.6 percent, up by 50 basis points year-over-year.

Bombardier's free cash flow usage of $304 million demonstrated a 21 percent improvement year-over-year as the company stabilizes its production rates after four years of growth. First quarter free cash flow usage reflects the year's planned production sequence and required build in inventory.

GROWTH-FOCUS FOR 2025

Bombardier also announced its goals for 2025 and the focus is on on strong growth.

"As the world navigates through economic uncertainty, Bombardier has been diligent in its planning, developing multiple scenarios over the past few months," said Éric Martel, President and Chief Executive Officer, Bombardier. "We have

come a long way by focusing on what we control, and have everything in place to guide for a strong year in 2025 with an increase in revenues and free cash flow. Our targets reflect a disciplined approach to the economic environment, while positioning the company for success."

Bombardier anticipates delivering more than 150 aircraft in 2025. This delivery cadence, along with improved revenue mix including a contribution from Defence, higher pricing and continued growth in Services, will contribute to anticipated revenues of more than $9.25 billion.

Bombardier also aims to further improve profitability, with an adjusted EBITDA exceeding $1.55 billion. Adjusted EBIT is expected to surpass one billion dollars. In terms of free cash flow, the company expects to generate between $500 million and $800 million, with the low end of the range reflecting a weaker demand environment for the first half of 2025, tied to global economic uncertainty. ■

Opinions Vary:

The Path to Net Zero

A recent Royal Aeronautical Society report details current public attitudes to the decarbonization of aviation.

THE AVIATION INDUSTRY is firmly focused on sustainability and reaching Net Zero by 2050. For an industry currently heavily reliant on fossil-based fuels, reducing carbon emissions and then balancing any remaining emissions through their removal or offset to reach a point where the industry is responsible for no net increase in greenhouse gases, is a challenging goal.

Multiple Net Zero roadmaps have been created by different organizations, but it is generally acknowledged that none of the available paths to decarbonization are sufficient on their own, and will all be required to varying degrees, so the flying experience will evolve for passengers over the coming decades. It is therefore helpful to understand at an early stage how the public are likely to view the actions the industry takes to decarbonize and how they are likely to respond to the impacts that are most visible to them as airline passengers.

Toward that end, the Royal Aeronautical Society recently commissioned Ipsos UK to carry out a survey of over 2,000 UK adults aged 16-75, asking questions relating to the impacts of decarbonizing aviation. The survey yielded insights into how the public perceive the probable paths to achieving Net Zero in aviation, and their impact on the flying customer.

KEY FINDINGS

When shown a list of 10 areas and asked to rate their level of concern with each, 75 percent of respondents consider themselves to be concerned about climate change.

Many of the survey respondents appear to view air transport as producing greater carbon emissions than other forms of transport (road, rail and sea), with 58 percent selecting 'to a great extent' when asked the extent to which they think air travel produces carbon emissions which contribute to climate change.

The respondents appear to believe that it will also be the hardest form of transport to decarbonize, with 69 percent rating it as difficult when asked the extent to which they think it will be easy or difficult to reduce carbon emissions from air travel between now and 2050.

Only a minority (38 percent) of respondents say they would be willing to pay more to reduce the carbon emissions produced by their flight.

Around half of the respondents are willing to have their comfort or convenience impacted in various ways in order to reduce the carbon emissions of their flight.

Over half (57 percent) of the respondents say they would be willing to use an alternative form of transport in order to reduce carbon emissions produced by their flight.

There is more support than opposition to a frequent flyer tax, and also overall support to a lesser degree for increased taxation of aviation when the money raised is invested in decarbonizing air travel. However, there is net opposition to increased taxation of airfares used for general government spending.

Eighty percent of those surveyed trust the aircraft manufacturing industry and regulators to ensure continued safety standards while introducing new technologies to decarbonize air travel. They appear to be less confident in the industry ensuring that new technologies will not have a negative impact on comfort, reliability and environmental noise levels.

The survey respondents generally view SAF as creating fewer carbon emissions than fossil fuels but do not tend to distinguish between the relative sustainability of fuels derived from waste, plants and renewables (ie, Power-to-Liquid SAF).

Almost half of respondents viewed continued burning of fossil fuels, offset through carbon capture to be on the acceptable end of the scale as a means of reaching Net Zero.

Only just over a third (36 percent) of people view current airline carbon offsetting schemes as having a positive impact on the environment.

When asked about the emissions reduction that could be achieved through the use of SAF, 43 percent of respondents underestimated the emissions reduction, compared with only 11 percent who overestimated the benefit. ■

★ TRANSPORT CANADA ★

Reports and Comments

The following are selections of Canadian Aviation Service Difficulty Reports originally published as "Feedback" by Transport Canada.

Airbus BD500

REPORT: AIRBUS CANADA BD 500 1A11

Small Foreign Object Damage (FOD) Equates to Big Problem

Subject:

A fuel leak was observed at the gate, an emergency evacuation was conducted and the fire brigade was deployed. The aircraft was preparing for a flight and was parked at the gate after refueling with the auxiliary power unit (APU) running. The flight crew then noted an engine indicating and crew alerting system (EICAS) message suspecting a fuel leak.

One of the pilots went on the ramp to inspect the wing and reported a significant fuel leak coming from the right wing fuel vent. The captain ordered an evacuation of the 93 passengers. All passengers were evacuated safely without injuries. The airport fire brigade was requested and deployed to the aircraft. No fire was reported.

A post-incident investigation performed by the operator's maintenance crew, reported finding FOD in the right transfer float shut-off valve. The flight was cancelled and another aircraft was dispatched to pick up the passengers. A wing tank inspection was completed.

The centre tank was accessed for investigation to check the cleanliness of the centre tank, and to try to locate the fastener with a missing brush seal, paying special attention to the area, where service bulletin (SB) BD500-282003 was previously incorporated.

During investigation, the whole centre tank was inspected. No damaged seal caps or other damaged sealant was discovered. Most likely, the sealant was torn off at some point (either

Airbus. Piece of FOD found in fuel tank.

Airbus. Piece of FOD found in shut-off valve.

Beech. External Power cables disconnected at Terminal Strip.

during production or during incorporation of SB BD500-282003) and restored, while the fallen bit of sealant was not collected and left in the centre tank.

Transport Canada Comments:

Transport Canada would like to remind all operators the importance of FOD protection. Maintaining a clean working environment, both in the hangar and in the aircraft, is an essential part of safety.

Aircraft downtime, delayed flight and environmental cleanup are just some of the potential costs associated with this incident. A one inch piece of FOD can be expensive. FOD control is an essential part of aircraft maintenance.

REPORT: BEECH A100

External Power Terminal Strip

Subject:

While completing Airworthiness Directive number CF-1981-25R6, it was noted after removing the wing panel inboard of the right-hand (RH) nacelle that 2 wires, (P83D0 and P83B0) were disconnected from the external power terminal strip. The wires had made contact with the wing spar and, by arcing, had burned a hole in it. A fleet inspection was carried out with no other defect found.

Upon further investigation, it was determined that the cables must have been removed during a previous maintenance

A Beechcraft King Air A100 on display at an aviation show.

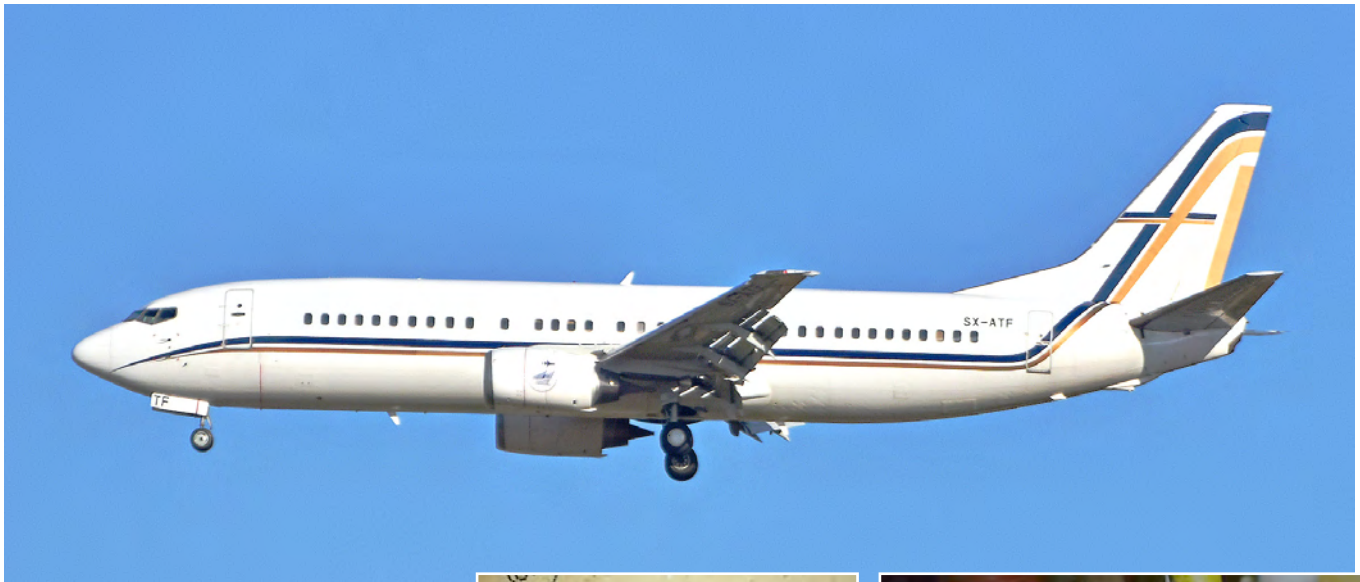
action. The area was thoroughly inspected and neither the washer nor the nut was found in the area. Also, by the condition of the stud (dirty) it was determined that the cables must have been off for quite a long time. The operator reviewed almost 2 years of maintenance records and did not find any evidence of maintenance carried out in the area that would have required removing those cables.

The operator suspected that the cables had been removed during the last heavy check visit of the aeroplane. The operator indicated that it was to discuss the situation with its heavy maintenance service provider and that it intended to bring it to the attention of its maintenance employees during recurrent training.

Transport Canada Comments:

Despite the best efforts of Transport Canada and the industry to educate and prevent human factor incidents from occurring, these types of maintenance errors continue to happen. This was a very avoidable and costly mistake and it could have turned out much worse.

Maintainers are reminded to be extra diligent when carrying out maintenance activities to make sure that any component or system that is disturbed is returned to its normal configuration or condition before closing up. In addition, taking simple precautions and best practices like recording any items that have been disturbed in the maintenance records, tagging disturbed wires or lines with streamers or flags and having good panel or zone close out inspection procedures could have caught the error before it became a mishap.



Right: Back side frame showing corrosion and arcing.
Far right: Battery ground wire front view.

REPORT: BOEING 737 406

Main battery ground wire problem

Subject:

On landing, the crew had the "DC FAIL" lights on both Inertial Reference Units (IRU). Soon after maintenance started troubleshooting, they began having intermittent battery disconnect followed by the external power going offline. A few minutes later the battery power died completely, with battery voltage indicating 10 volts.

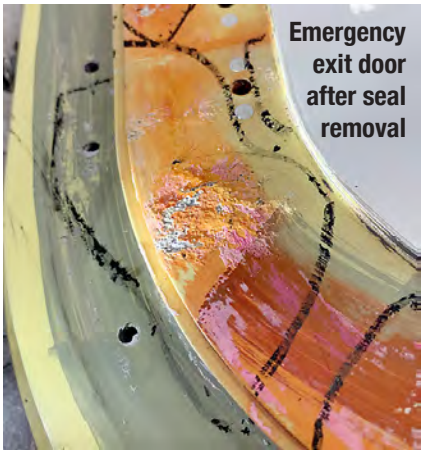
The battery was replaced, but the same thing repeated itself. After more troubleshooting it was discovered the battery negative cable was found isolated from the structure of the airplane. After disassembly and inspection, the grounding stud on the structure was found corroded on one side and significant pitting due to arcing damage was present on the other side of the bracket where it is attached. The grounding stud attachment was repaired.

Transport Canada Comments:

The issue occurred due to a poor battery ground wire connection and the frame structure where the wire was attached was found corroded and showed signs of arcing. The ground stud installation nut arrangement was non-conforming, and no washers were used per standard wiring practices.

The initial external visual inspection did not show any problems however when the wire was removed for inspection the problems were easily found. The only visible clue was the non-conforming ground stud connection and sometimes disassembly is the only way to find hidden problems.

Below: Battery ground wire stud back side showing 2 nuts installed.



Emergency exit door after seal removal

REPORT: CESSNA 680

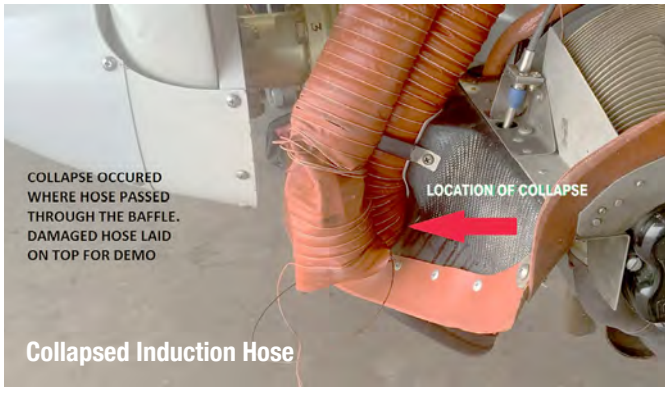
Emergency Exit Door Level 2/3 Corrosion

Subject:

During inspection document 5 (task 52-20-00-2201 Emergency Exit Door Detailed Inspection), the emergency exit door seal was found to have a 1 cm cut at the 11 o`clock position. Replacement of the seal was required. Upon disassembly of the exterior contour rings, which retain the seal on the emergency exit door assembly, hidden corrosion was visually found. It was quite extensive around the whole perimeter of the door with no obvious signs of corrosion from the exterior. Detection of the corrosion could only be discovered with the actual removal of the contour rings which is not a scheduled inspection item.

Transport Canada Comments:

Corrosion of the emergency exit door is not uncommon on Cessna Citation model 680 and 680A. Level 2/3 corrosion of the door frame, under the contour ring in particular, may not be evident without some disassembly. This service difficulty report highlights the importance of a detailed visual inspection for signs of corrosion, and possible problem locations that may be easily overlooked.



REPORT: DIAMOND DA 20 C1

Induction Air Hose Collapse

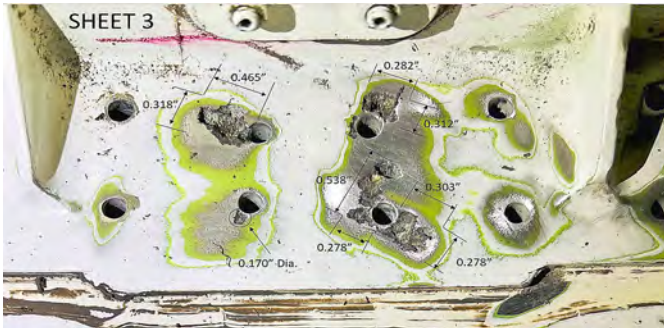
Subject:

During an initial inspection, a hose from the induction airbox to throttle body was collapsed, restricting most of the required airflow into the engine. With a new hose assembly installed, ground run carried out and max power was achieved with no faults found.

Transport Canada Comments:

It is important to note, selecting alternate air during operation would not bypass this section of the flexible induction air hose. Continued attention should be given to identify damage in this area as outlined in the applicable maintenance instructions. Similar observations should be submitted as a Service Difficulty Report.

Below: Close up of worst area of corrosion in center section.



REPORT: MHI RJ AVIATION CL600 2D24 (RJ900)

RJ900-Pressure bulkhead with deep corrosion on lower angle

Subject:

Maintenance found deep pitting corrosion on the forward pressure bulkhead just forward of the main landing gear bay at fuselage station 693 (FS.693) on the lower frame center section between stringers 26L and 26R.

Transport Canada Comments:

The corrosion found was very deep and not found all over the frame but localized and almost looks like it may have been caused by a corrosive material spill. This is quite likely an area in the fuselage where moisture and spills will accumulate. The subject aircraft was 14 years old and had accumulated 33 224 flight cycles at the time of this discovery. Fortunately, the inspection discovered the damage prior to the structure becoming weakened or damaged to the point of compromising safety. ■

AMFA

Aircraft Mechanics Fraternal Association

CIRB Authorizes Representation Vote for Air Canada AMEs and Skilled Trade Groups

On May 7th, the Canada Industrial Relations Board ("the Board") authorized a representation vote for approximately 2,250 maintenance employees at Air Canada.

As part of its order, the Board approved the fragmentation of the existing Technical, Maintenance, and Operational Support (TMOS) Bargaining Unit. While noting their general preference for broad-based units, the Board stated it "rarely grants such fragmentations," but found that "fragmenting the existing bargaining unit is appropriate in the specific circumstances of this case."

After approving the fragmentation of the TMOS Unit, the Board found that the following bargaining unit would be appropriate for collective bargaining: All Air Canada Technical Services Business Unit employees, excluding employees in the Airport & Cargo Operations Business Unit and the Logistics & Supply Business Unit and all management positions.

"For decades, Aircraft Maintenance Engineers and skilled trade groups have been overlooked, their wages and priorities overshadowed by larger workgroups within broad bargaining units," said AMFA National President Bret Oestreich. "AMFA stands apart. We are the only craft/trade-specific union solely focused on promoting, elevating, and unifying Aircraft Maintenance Technicians, Engineers, and related skilled trade groups across North America."

Board representation votes are conducted on an expedited basis. AMFA anticipates that the vote at Air Canada will take place within the next several weeks. We extend our sincere thanks all the organizers at Air Canada whose dedication and tireless efforts made this historic moment possible.

Air Canada is the flag carrier and the largest airline in Canada, by size and passengers carried. Air Canada is headquartered in the borough of Saint-Laurent in the city of Montreal. The airline, founded in 1937, provides scheduled and charter air transport for passengers and cargo to 222 destinations worldwide. It operates major hubs at Montréal–Trudeau, Toronto–Pearson, and Vancouver. Air Canada is a founding member of the Star Alliance.

About Aircraft Mechanics Fraternal Association

The Aircraft Mechanics Fraternal Association is a craft-oriented, independent aviation union representing licensed and unlicensed Aircraft Maintenance Technicians/Engineers and skilled trade groups actively involved in the aviation industry.

www.amfanational.org

PACIFIC

Pacific AME Association

PAMEA: We support Maintenance Programs

The association works with and is consulted by Transport Canada in the formulation of new rules and regulations to promote the viewpoint of the AME. We are represented on various committees and working groups involved with aircraft maintenance and licensing. We support the community college aircraft maintenance programs throughout BC through annual monetary awards and bursaries.

Pre-Covid, two workshops were conducted annually. Usually one in the Lower mainland and one elsewhere based on demand and corporate requests. These workshops are run by volunteers and are single day events and feature speakers and interactive presentations on a variety of topics. Attendance at these can be counted towards the recurrent training requirements by Transport Canada. We publish periodic newsletters which contains items of current interest to our members as well as commentaries and articles on maintenance procedures.

Reminder

This is a reminder that PAMEA has decided to formally transfer Membership Administration to AMEC/TEAC which is currently handled by the Ontario Association. What this means for the Membership is that our web site page will send you to the Ontario Association Membership pages for you to sign up if you are a new member or to complete your renewal as a PAMEA Member. Visit: **www.amec-teac.ca/pacific**

WESTERN

Western AME Association

www.wamea.com

temporarily email = md@werkasset.com

Various items found on our LinkedIn page

CIRB has ruled in favour of Air Canada Tech Ops workers application to be represented by AMFA. This required the fragmentation of the existing union bargaining unit which includes ramp operations workers. AMFA could only have succeeded in its representation of Air Canada Tech Ops workers with a professional submission explaining the history of the current situation with arguments that persuaded the Board it had no reasonable justification to reject the application. Not an easy task.

There were those who were convinced that CIRB would never agree to fragmentation of the existing union bargaining unit due to precedent. Others pointed to the enigma of the Air Canada situation and that the broad employee group was too broad, and today, is out of step with the norm.

This application and decision thankfully ends a disputed situation that has existed for decades and its hoped time will show this decision to be the right one. The Board must have been satisfied that Air Canada's unionized ramp operations workers would not be materially disadvantaged by its decision.

Hartzell Propeller has received a Supplemental Type Certificate (STC) for its 46 pound Pathfinder 80 inch three-blade carbon fiber Top Prop propeller for Aviat Husky aircraft. The Pathfinder replaces existing two-blade composite, aluminum, and wood propellers on Aviat Husky models A-1, A-1A, A-1B, A-1C-180, and A-1C-200. It is approved for aircraft powered by Lycoming O-360-C1G (180 hp) and IO-360-A1D6 (200 hp) piston engines. Flight testing demonstrated a

15 percent shorter takeoff roll and a 20 percent increase in climb rate.

Boca Raton Plane Crash Exposes Rudder System Risks in Aviation: NTSB preliminary report stated: "The left rudder cable was fractured near the rudder pedal attach point and at the rudder bellcrank. The separated cable ends exhibited a splayed, broomstrawed appearance, consistent with tension overload separation."

What has this failure got to do with "maintenance protocols for aging systems?"

The rudder is a primary flight control system that must be inspected annually. On a twin, the rudder control system is much more critical that a single. AMEs must treat primary control systems as inspection items that must be personally Detail Visually Inspected. The three senses: eyes, ears and touch.

Any aircraft new to you is an aircraft that presents considerable risks to you as an AME. That requires caution and thoroughness that mitigate that risk. Lives depend on it.

To which "Steve C." responds:

"Many tend to 'only look' at that which they can easily see. Sometimes you need to remove the cable to properly inspect the cable — all of it. This 'actually inspect the thing' philosophy was learned the hard way (accidents, injuries deaths etc.) long ago. Lubricants attract dirt/grit which causes wear. Lubricating grease dries out and thickens, oil thickens, evaporates and hardens. Cables under constant tension wear on the inside between strands.

"It is not enough to know 'how to change a part.' Inspection processes / methods and procedures and why the inspection(s) are being done must be taught / learned and understood as a fundamental foundation of aircraft release privileges. Annual and other regulatory required inspections and tests do not say how long an inspection will take, but they do say what is required to be inspected.

"You need to know the certification regulations/requirements/standards that the aircraft — as well as its sub-components etc — was certified to in order to determine if that particular requirement is still being met and how to accomplish the condition compliance and conformance tests and inspections required to be performed and when to dig deeper when something isn't right."

Website still down

Due to our website crash, please temporarily email WAMEA at md@werkasset.com. The Western Aircraft Maintenance Engineers Association (WAMEA) is an organization equipping its members with the knowledge and professionalism which distinguishes the occupation of Aircraft Maintenance Engineers (AMEs) in the aviation industry (AME-M1 and/or M2 ,AME-E and AME-S and AME-Baloon).

www.wamea.com

WESTERN

Central AME Association

CENTRAL

Association Objectives

1. To promote an protect the profession of the Aircraft Maintenance Engineer
2. Develop, maintain and improve representation and consultation with regulatory bodies which affect the profession of the Aircraft Maintenance Engineer
3. To represent the views and objectives of the membership of the association
4. Promote and develop the knowledge, skill and proficiency of AMEs through education, publications and research
5. Cooperate and associate with groups, associations and organization on matters of mutual interest.
6. To promote honourable practices among the membership and between persons in the aviation industry

www.camea.ca

AME Association of Ontario

ONTARIO

#613 - 7360 Bramalea Road, Mississauga, Ontario L5S 1W9
tel: 1-905-673-5681 email: association@ame-ont.com website: www.ame-ont.com

Outreach and Skills Development Fund Project

The Ministry of Labour, Immigration, Training, and Skills Development of Ontario has awarded a second Outreach and Skills Development Fund (SDF) contract to the AME Association of Ontario. As with the first contract, the project has two distinct purposes:

First is an "Outreach" program which will help individuals interested in becoming an AME to learn more about the AME vocation. We will be traveling to various Approved Training Organization (ATO) colleges, secondary school events and aviation themed events such as airshows and career fairs in Ontario. We will be offering awareness information to interested young people who are looking for a challenging and successful career as an Aircraft Maintenance Engineer.

The second, and equally important purpose, is to offer a "knowledge and wellness improvement" program. This will offer both on-line and in-person technical, safety, and personal wellness courses to recent ATO grads and existing AMEs. The aim of this program is to ensure that the province has access to a continuously growing base of highly skilled and well trained AMEs. This type of professional development program exists within many other industry sectors … so it is time for our sector "to catch up". As an added benefit, those people completing these courses may then wish to become mentors to yet other AMEs.

Due to the amazing success of our first outreach and skills development program, the AME Association of Ontario submitted its second bid package for funding. The new package includes several up-

ONTARIO

dates from the previous program. This new contract will be in force for several years and will allow the program to build into a sustainable package available for multiple years.

Dependant upon several performance requirements this project has a potential three-million-dollar budget (a substantial amount of monies in comparison to our typical annual budget), so separate bank accounts have been set up for this project. The association executive and directors are closely monitoring the budget and activities.

To our President Louis Anderson, various members of the executive team, and our various volunteers who presented the previous programs' credit, this bid application submission has been very successful. A "high five" to all who contributed to the construction, review, and internal approval of this SDF project's bid package and the successful completion of our first project!

Website Updates

Our board determined that the previous platform hosted by SilkStart was not meeting the needs of the association. A committee was formed to review our existing website and identify what was good, bad, or missing. The committee put together a request for proposal (RPF) outlining the details of what we needed to move forward. This was distributed to companies, and the committee reviewed all bids, eventually electing to award the contract to Computer Elite.

The timeline was quite tight to try to get the new site up and running, but Computer Elite delivered. We appreciate notification of any issues that members may run into so that we can improve the finished site. There are a few features we are still ironing out. Thank you for your patience.

www.ame-ont.com

Submitted by Stephen Farnworth, for the Board of Directors

QUÉBEC

Quebec AME Association

Association des Techniciens/Techniciennes d'Entretien d'Aéronefs du Québec

C.P. 34510, 3131 Côte-Vertu; CSP Place Vertu, Saint-Laurent, Qc, H4R 2P4
email: info@ame-tea.com website: www.ame-tea.com

Mission Statement

The association's mission is to represent all AMEs in Quebec regardless of the company or the contracts on which they work. Regardless of the type of aircraft on which the AME works, he/she will be welcome. We will simply recognize ourselves as a holder of an AME Transport Canada M1/2, E or S license with an attachment in Quebec.

The Association will ultimately become the AME's voice to Transport Canada's ears and will work with existing AME associations from coast to coast to make our profession stronger and more cohesive. One of the great goals of our association is to elevate ourselves to the status of a professional and to be recognized as such by the various federal government bodies. The other major mission of our association will be to make our profession better known to the public and to get involved with young people so that they know what AME's work is and consider it as a career choice.

Cette association se donne pour mission de représenter tous les TEA au Québec quelle que soit la compagnie ou les contrats sur lesquels ils travaillent. Quel que soit le type d'aéronefs sur lequel le TEA travail, il/elle sera bienvenu. Nous nous reconnaîtrons simplement en tant que titulaire d'une licence de TEA de Transport Canada M1/M2, E ou S et ayant un attachement au Québec.

L'Association deviendra à terme la voix des TEA aux oreilles de Transport Canada et travaillera de concert avec les association de TEA existantes d'un océan à l'autre afin de rendre notre profession plus forte et en y insufflant une plus grande cohésion. L'un des grand objectifs de notre association est de nous élever au rang de professionnel et d'être reconnu comme tel par les différentes instances gouvernementales fédérales.

www.ame-tea.com

ATLANTIC

Atlantic AME Association

Personal Information Privacy Guidelines, Atlantic AME Assoc.

Introduction: The accompanying protocols have been developed to direct the handling of personal information collected in the normal operations of the AME Association (Atlantic) Inc.

This privacy statement demonstrates the Association's commitment to protect the privacy of its members, individuals and other organizations, both public and private. This policy and related procedures are consistent with the Personal Information Privacy and Electronics Document Act (PIPEDA) that came into force on January 1, 2004.

Privacy Statement: This policy deals with personal information collected by the AME Association (Atlantic) Inc. (hereafter called 'the Association'). Personal information is defined as: information about an identifiable individual, excluding business contact information. In accordance with changes to the PIPEDA, the Association may periodically update this policy: a current copy may be obtained from the Association office or, by visiting the association web site at www.atlanticame.com

Accountability: The Association is accountable for all personal information under its control. The Association's privacy officer is the President who is responsible for the Association's privacy policy. Any questions about the Association's handling of personal information should be directed to the privacy officer. Contact:

E-mail: bob.pardy@atlanticame.com
Telephone: (709) 699-7648
Mail: Robert Pardy PO Box 94 Enfield, NS B2T 1C4

www.atlanticame.com

SoCal PAMA Chapter

Flight Safety Detectives Episode 269:
Offshore Oil and Aviation Safety

Helicopters and offshore oil platform operations can be a deadly combination. In this Podcast episode Flight Safety Detectives John Goglia and Todd Curtis discuss two accidents to illustrate aviation safety concerns.

In a 2010 accident discussed, maintenance and managerial failures resulted in minor damage and no injuries because of the pilot's skill. Another is a fatal accident that killed all on board due to the pilot not following the helicopter operator's standard procedures for landing and taking off.

In the 2010 accident there were multiple missed inspections by mechanics and pilots over several days, including the accident flight. The poor maintenance effort led to system malfunctions that prevented the pilot from fully controlling the helicopter, forcing the pilot to make a running landing at about 45 knots.

In a 2022 accident, the pilot landed away from the centre of the helideck and the rear of the right skid was over the edge of the helipad and adjacent to a raised perimeter light. When the pilot took off, the right skid contacted a perimeter light, causing the helicopter to roll sharply to the right. The helicopter struck the helideck, rolled off the oil rig, and sank. The pilot has a documented history of not following takeoff and landing procedures on most of his flights to and from oil rigs.

Flight Safety Detectives Episode 268:
Smart Pilot Makes Bad Decision

A pilot with many hours of experience and an instructor rating died following the bad decision to fly his newly purchased airplane without first understanding how the aircraft systems operate. He also did not review the logbooks or have the plane looked over after 10 years sitting idle.

The pilot had purchased a Piper PA-30 Twin Comanche. Key facts in the NTSB report and public docket show that the pilot did not have a pre-buy inspection, was not familiar with the aircraft's systems, and ignored the advice of his friend and former CFI to not fly.

The pilot knew about a landing gear indication light problem before takeoff. He proceeded without resolving it or reviewing the appropriate emergency procedures for operating the landing gear. The plane stalled and crashed while he tried to troubleshoot the issue in flight.

In this analysis with John Goglia and Todd Curtis, Greg Feith shares that he is currently in the process of buying a used airplane. Like the accident pilot, the aircraft has not flown in several years. Unlike the accident pilot, he is working closely with an experienced mechanic to make the aircraft airworthy and to examine all systems on the aircraft.

www.socalpama.org

Central Ohio PAMA

COPAMA to cease operations in 2025

After much deliberation, the COPAMA Board came to a unanimous vote concerning the continuation of COPAMA as a Non-Profit organization. Since we have ongoing commitments to a few student awardees till next June 30th, the Board will meet again at that time to finalize the close of operations. The 2 members, Lowell Dowler and Gene Sprang, who were not seeking reelction, will remain on the board through closing.

Our thanks go out to Alex Teffenhardt, Robert Everett, Todd Worthington and Tyler Worthington who were in attendance to contribute to the discussion. The minutes of the meeting will be published once approved by the board.

Our final event will be the 2025 Ohio Aviation Maintenace Symposium. It will be held Monday March 24th at the Eastland Career Center off Hamilton Road near Groveport, Ohio in Southeastern Franklin County.

Doctoral student still needs your input on aviation safety

Whitney Lee, a doctoral candidate in the Graduate Studies in Education department at Southern Nazarene University, is seeking your participation in her study regarding how leadership styles in the aviation industry potentially impact safety.

The purpose of her study is to explore perceptions of aviation safety leaders regarding their supervisors' leadership styles contributing to the organization's safety culture. She is seeking individuals who are aviation safety leaders currently working in aviation with five or more years of industry experience. If you are willing to participate, you will be asked to share your insights in this area.

If you are willing to participate, Whitney would like to send you four questionnaires to fill out. The data collected from the questionnaires will be carefully and respectfully guarded. If you decide to participate in this study, your identity and responses will not be revealed. She will use pseudonyms to protect your identity.

If you would like to participate or have any questions regarding the project, please contact her for further discussion at 405-567-5974 or wlee950@mail.snu.edu.

www.copama.org

Transportation Safety Board of Canada | Bureau de la sécurité des transports du Canada

Bird Dog Down

The occurrence aircraft, one of the Air Tractor AT-802A SEATs, was operating as Fireguard 673.

When a Cessna 208 Caravan on firefighting duties loses power and is forced to ditch, the subsequent investigation leaves many questions unanswered.

On **02 AUGUST 2022,** a visual flight rules (VFR) aerial firefighting operation was being conducted by Conair Group Inc. (Conair) approximately 20 nautical miles south of Cranbrook, British Columbia (BC), in the area of Connell Ridge, the site of multiple wildfires. The operation involved a team of 5 aircraft: a Cessna 208 Caravan bird dog Air Tractor, Inc. (Air Tractor) AT-802A Fire Boss, single-seat, single-engine air tankers (SEATs) equipped with amphibious floats and configured with the Fire Boss system.

The occurrence aircraft, one of the Air Tractor AT-802A SEATs, was operating as Fireguard 673. It flew as the 4th aircraft in the group of 4 SEATs. The bird dog crew, which was composed of a pilot and an air attack officer, planned and directed the fire suppression activity. The 1st flight of the day consisted of 10 scooping runs in which the 4 tankers dropped a total of 40 loads of water onto the same fire. They flew in a circuit-like pattern in formation between the location of the fire and Lake Koocanusa, where they conducted water uploading.

Each trip from Lake Koocanusa to the Connell Ridge fire took approximately 9 minutes, with a climb from the lake elevation of approximately 2500 feet above sea level to a cruise altitude of 7500 feet above sea level. The return flight to the lake took approximately 8 minutes, and for almost the entire duration, the tankers were in descent and at a low power setting.

The group stopped at 1533 to refuel and take a lunch break at Cranbrook/Canadian Rockies International Airport (CYXC), BC, and departed at approximately 1716 with full fuel and full foam for the 2nd flight of the day. Their plan was to continue the same operation they had conducted in the morning.

At approximately 1919, immediately following the 7th water drop of the 2nd flight, the occurrence pilot advanced the power lever forward to increase engine power, and the aircraft experienced a 2-second reduction of power. The power reduction may not have been discernible to the pilot. The engine power returned and the aircraft operated normally. The pilot continued with the firefighting mission.

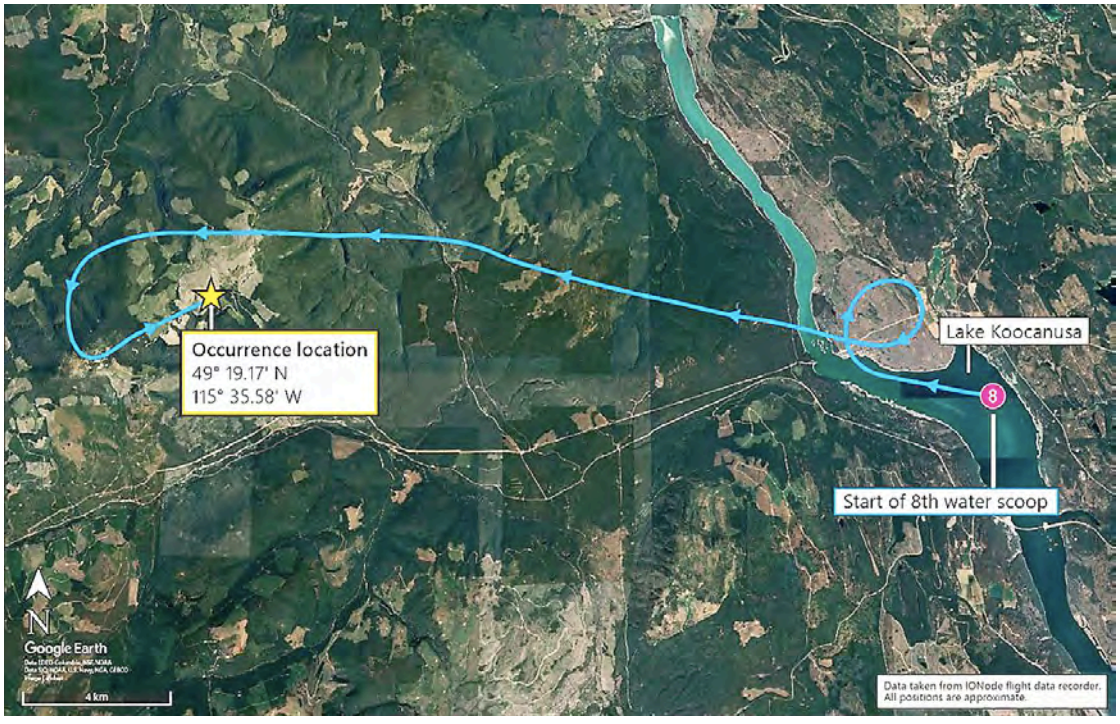


Figure 1. Map showing the aircraft's flight path for the 8th scooping run and the occurrence location.

After loading up with water at Lake Koocanusa, Fireguard 673 returned to the Connell Ridge fire for the 8th water drop. Upon completion of this water drop, at approximately 1937, the pilot advanced the power lever, and the engine power initially responded accordingly, but then rolled back in a similar fashion to the earlier power reduction that had occurred after the 7th water drop. This time, however, the engine power did not return. The aircraft was approximately 350 feet above ground level (AGL).

The pilot moved the power lever to the idle position, turned the igniters to the CONTINUOUS position, and advanced the power lever. There was no change in engine power. He next moved the power lever to idle and applied the fuel control unit manual override lever (also known as the emergency power lever [EPL]); however, engine power was not restored.

Unable to determine the cause of the power reduction, the pilot then selected a reforested area and began to perform an emergency landing, managing his descent rate and speed carefully to ensure he would reach the site. During the descent, the engine flamed out, and due to time constraints, the pilot was unable to scan the flight instruments for fuel or fuel flow information. The stall warning horn sounded several times as the pilot gradually brought the aircraft into the trees, which the aircraft struck at approximately 1938.

As the aircraft descended into the trees and toward the ground, a small tree was cut, and it penetrated the windscreen, grazing the pilot's helmet. The pilot was covered in shards of glass from the shattered windscreen. The aircraft came to rest approximately 200 m from the edge of the forest fire.

The pilot cleared glass and tree debris from his face and checked himself for injuries. He then used the aircraft radio to call the bird dog aircraft; however, the radio transmission was not received. He next used an FM radio to call the pilot of one of the other SEATs who relayed to the bird dog that the aircraft and pilot were down on the ground. The occurrence pilot then turned off the aircraft battery. The bird dog assisted in arranging for a helicopter to pick up the occurrence pilot, who walked to a nearby logging road. He was then transported to CYXC to receive medical attention for his injuries.

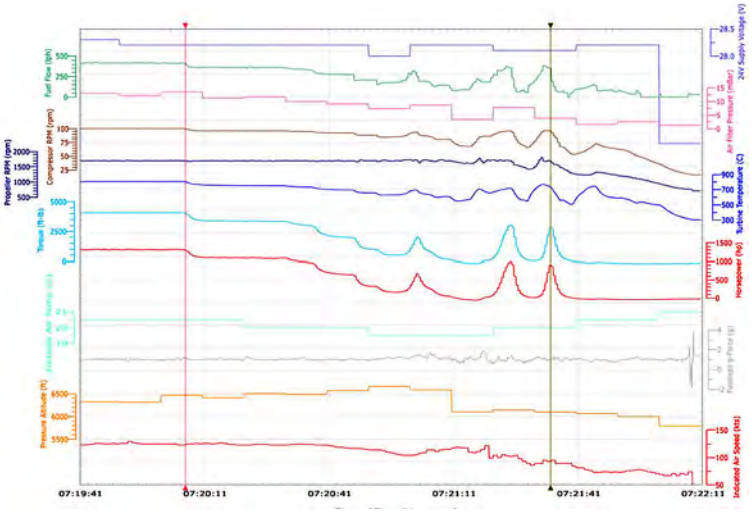
AIRCRAFT INFORMATION

The Air Tractor AT-802A is a single-seat, low-wing aircraft with a tail-wheel undercarriage and is intended specifically for agricultural spray applications. Its design was certificated under the United States (U.S.) Federal Aviation Regulations in the restricted category. The aircraft operates in Canada under a Special Certificate of Airworthiness—Restricted classification. The hopper, located between the cockpit and the engine, has a capacity of 814 U.S. gallons (3081 L). The fuel tanks are located in the wings and have a maximum capacity of 380 US gallons (1438 L). The airplane had no known deficiencies before the occurrence flight.

FIRE BOSS CONVERSION

The factory version of the occurrence aircraft had been modified for a firefighting role. The AT-802A was converted to the Fire Boss water scooping system, which incorporated the following changes: installation of amphibious floats with hydraulically actuated water scoops, installation of a fire-retardant delivery system, installation of a foam system and controls, which incorporate a 30 U.S. gallon foam tank in the right float and an 18 U.S. gallon firewall tank, modifications to the hop-

Conair recently purchased 11 Dash 8 Q400 aircrafts to be converted into airtankers for aerial firefighting.



Time history plot of engine failure event.

per venting system, addition of a bilge pumping system and water-in-floats warning system.

Conair developed an independent supplemental type certificate (STC) for the Fire Boss conversion, which increased the engine power from 1350 shaft horsepower to 1600 shaft horsepower (for takeoff) by modifying the equipped engine. The aircraft's maximum take-off weight remained at 16 000 pounds.

ACCIDENT SITE

When the pilot was conducting the forced landing, he reduced the approach speed as low as possible, striking the trees just above the aircraft's stall speed of 68 knots calibrated airspeed.

The aircraft struck the trees in a near-level attitude. The floats broke off, separated from the fuselage, and rolled upside down, coming to rest near the trailing edge of the right wing. As the fuselage decelerated, it turned approximately 45° to the right but remained upright. There was significant damage to the leading edges of the wings and the fuselage lower skins.

Calculations indicate that, at the time of the forced landing, the aircraft was carrying approximately 315 L of fuel.

The aircraft came to rest approximately 200 m from the edge of the Connell Ridge wildfire. In that location, the entire aircraft was at risk of being lost to the fire. However, the shifting winds and continued fire suppression operations in the area allowed for a successful recovery a few days later.

The occurrence aircraft was equipped with a Pratt & Whitney Canada PT6A-67F turboprop engine with 1055.2 hours total time since new. After the accident, the engine and engine accessories were shipped to the Pratt & Whitney Canada facility in Saint-Hubert, Quebec, for further evaluation. This evaluation was supervised by the TSB. The engine was inspected for damage externally and internally and found to be relatively undamaged. The engine compressor section was clean and free of debris. The igniters were found in working condition. The

The fleet of aircraft are broken down into two categories; air attack a.k.a. bird dog, and airtankers a.k.a. waterbombers.

chip detectors were found to be free of debris and the pneumatic lines were found to be tight and without leaks.

It was then prepared for a test run in the available test cell, but before the start of this test run, it was discovered that the reduction gearbox had suffered a crack as a result of the impact, causing an oil leak. The engine was therefore unable to be run.

Internally, the engine did not appear to have any pre-impact mechanical anomalies that would have precluded normal engine operation. The engine air filter was examined and found to be serviceable with no contamination.

The constant speed unit was removed from the engine and shipped to the manufacturer. The unit was tested and disassembled under the supervision of the TSB. No anomalies were found.

Accident site.

Tree protruding through the front windscreen and into the cockpit of the occurrence aircraft after its collision.

On 10 July 2022, the occurrence aircraft experienced a series of momentary in-flight power reductions, similar to those in the occurrence flight, when the pilot advanced the power lever. At that time, the aircraft had accumulated 1041.6 hours total time. Conair maintenance employees replaced the fuel control unit (FCU).

The removed FCU was shipped to Pratt & Whitney Canada for testing; at the time of the occurrence flight, it had not yet been tested. After the 02 August occurrence, both this FCU and the replacement FCU, which had been on the aircraft at the time of the forced landing, were tested by Pratt & Whitney Canada. During these tests, which were also supervised by the TSB, no faults were found with either FCU.

FUEL PUMPS

The AT-802 incorporates an engine-driven fuel pump and an electric fuel boost pump. Both pumps are capable of supplying the fuel control pump with sufficient fuel at a minimum pressure of 15 psi.

The engine-driven fuel pump operates at all times when the engine is running. The electric fuel boost pump is used for starting and as a back-up to the engine-driven pump.

The aircraft DAAM data logger revealed a significant dip in fuel flow prior to the reduction of engine power.

The engine-driven fuel pump was forwarded to the TSB Engineering Laboratory in Ottawa, Ontario, for analysis. No anomalies were found during the testing; however, some wear was found on the fuel pump guide vanes during the disassembly examination. The fuel pump was shipped to the pump manufacturer for further examination, supervised by the TSB. The additional examination revealed that the wear observed on the vanes was normal and not significant enough to prevent the pump from operating as designed.

During the occurrence, the electric fuel boost pump was not on during flight, nor had it been selected on by the pilot. The pump was removed from the aircraft and tested by the TSB to ensure it was not restricting fuel flow. No anomalies were found during testing.

AIRCRAFT FUEL SYSTEM

Numerous components of the aircraft fuel system were examined by the TSB. These included:

- The fuel filter
- The high-pressure fuel filter
- The fuel lines
- The fuel selector valve
- The fuel strainers
- The fuel flow divider
- The fuel nozzles

All of these components were found in serviceable condition with no contamination or apparent blockages.

The occurrence aircraft was fuelled at CYXC. All of the Conair aircraft operating in the area were also fuelled at the same source before flight. A fuel sample was collected from the wreckage and visually inspected for contamination. No anomalies were found.

GENERAL

In this occurrence, the Air Tractor, Inc. AT-802 aircraft's engine examination included the compressor section, ignitors, chip detectors, pneumatic lines, and the constant speed unit. The fuel control unit (FCU), fuel pumps, and the aircraft fuel system were also examined. No defects were identified that would have affected the normal functioning of the engine. The investigation was not able to determine the source of the engine power reduction or the reason for the FCU manual override system's ineffectiveness.

During the forced landing, the pilot's use of a helmet, the

Above: The AT-802A, equipped with floats and configured with the Fire Boss system.

Below: The Air Tractor AT-802 is an American agricultural aircraft that may also be adapted into fire-fighting or armed versions. It first flew in the United States in October 1990 and is manufactured by Air Tractor.

5-point safety belt, the aircraft's windscreen, and the slow impact speed all reduced the injuries to the pilot. The pilot's decision making, experience, and recent training assisted in a successful outcome.

ENGINE POWER REDUCTION

In July 2022, the occurrence aircraft's FCU was replaced by maintenance staff after the aircraft had suffered a series of momentary power reductions in flight. The aircraft had accumulated approximately 13.6 flight hours with the replacement FCU when it suffered a significant power reduction and eventual flameout during the occurrence flight, resulting in a forced landing.

At the time of the forced landing, the aircraft had been conducting an aerial firefighting operation in clear skies and areas of moderate turbulence and with sufficient fuel on board for the flight. In addition, the aircraft's maintenance was up to date and the aircraft had no known defects. Component and airframe examinations conducted as part of the investigation could not determine the cause of the power reduction.

LOW-LEVEL OPERATIONS

Firefighting aircraft are required to operate at low levels, which is inherently risky. To fight forest fires effectively, aircraft need to operate close to the fire. Their altitude while dropping water on a fire can be as low as 150 to 200 feet above the ground, leaving little room for error. At such low levels, recovery from an aircraft malfunction becomes extremely challenging. In such a situation, where a pilot's decision making and reaction time are critical for a successful outcome, the ability to make decisions under time pressure is heavily dependent on mental models and the need for immediate action.

In this occurrence, 40 seconds passed from the time the aircraft suffered the engine power reduction to when it struck the trees. Because of the time constraint, the pilot was unable to consult the cockpit instruments and warning lights, or his checklists. As a result, he was unable to fully determine the origin of the power reduction. His focus was on successfully performing a forced landing and managing the aircraft's rate of descent.

The power reduction occurred at approximately 350 feet above ground level, leaving insufficient time for the pilot to complete the checklists, determine the reason for the power rollback, and restore power. As a result, a forced landing was accomplished in a reforested area, resulting in significant air-

craft damage. The combination of the aircraft's thick windscreen and the pilot's flight helmet minimized the pilot's injuries when the tree penetrated the cockpit.

FINDINGS AS TO RISK

These are conditions, unsafe acts or safety deficiencies that were found not to be a factor in this occurrence but could have adverse consequences in future occurrences. When emergency checklists and training do not reflect the guidance provided by aircraft manufacturers, there is a risk that actions taken in the cockpit may not effectively resolve an emergency situation.

When flight crews do not complete each item on an emergency checklist, there is a risk that important tasks that may rectify the situation will be omitted.

As a result of the accident, Conair Group Inc. took the following actions:

1. A flight operations briefing on engine failures in general and the accident specifics was introduced to initial and recurrent pilot training.

2. All AT-802 pilots received low-level engine failure training in the AT-802 simulator.

3. The AT-802 maintenance team worked with Perkins Technologies to implement a new alarm from the Data Acquisition Alarm Monitor system. Using historical data from previous momentary power fluctuations, an alarm was created that will alert the pilot when the engine Ng value is above 90% with a corresponding fuel flow of 190 L/h or less. The software update was applied to the AT-802 Fireboss fleet first. Once the update is ready, it will also be installed on the AT-802 wheeled fleet.

4. A fleet campaign has been implemented to check all fleet emergency locator transmitters for labels with an incorrect Hex Id. Any incorrect Hex Id will be corrected. ■

(These were excerpts of the report from Transportation Safety Board of Canada's investigation into this occurrence. The Board authorized the release of this report on 20 March 2024. It was officially released on 01 May 2024.)

Pen in Hand

Why a proper lightweight grinder in your toolbox can make all the difference.

By Kemma Dodds

Select air pencil grinders have a "Time to Reach EAV" of at least two to three times the standard eight-hour workday.

IMAGINE WRITING FOR HOURS with a pencil that's heavy, loud and vibrates so much it leaves your hand and wrist aching. Unbearable, right? Now, consider pencil grinders—essential tools for deburring, sanding, polishing and grinding. Just as you wouldn't tolerate a poorly designed writing instrument for extended periods, workers shouldn't have to endure long shifts using subpar pneumatic tools.

Prolonged use of high-vibration tools causes serious health problems and reduces workplace productivity. Workers experience hand arm stress, nerve damage, circulation issues in their hands and arms, fatigue, and are at risk of Carpel Tunnel syndrome. Morale declines too. These challenges not only jeopardize employee well-being but also disrupt overall efficiency.

Investing in ergonomic, low-vibration tools improves worker safety, comfort, and productivity while boosting employee morale and retention.

Offerings from hand tool manufacturers such as Florida-based Air Turbine Tools feature governor control technology that ensures consistent speed and torque, even under demanding conditions such as cutting through hard materials or working in tight corners.Therefore, investing in ergonomic, high-performance pencil grinders should be a serious consideration. Switching to low-vibration, lightweight tools enhances safety and comfort while delivering greatly improved control and precision.

SUPERIOR PERFORMANCE

Air pencil tools, grinders and routers, with a governed turbine maintaining rated high-speed rotation in cut, offer clear advantages over several electric tools and traditional air tools with vanes.

Well-designed air tools deliver high-speed performance without the need for costly electrical control boxes or wiring. They also avoid overheating problems and hand burns common with electric tools, ensuring reliability in long-term use. Electric tools operate with high-frequency vibration causing stress, generate heat and rely on high-frequency brushes that wear out quickly, requiring frequent repairs. These old technologies have become obsolete now that new solutions have arrived.

ADVANTAGES OVER VANE TOOLS

Vane air tools operate like a high-speed windmill and are notorious for their noise and high vibration, leading to hand fatigue and Repetitive Stress Injury risk. They require frequent maintenance and constant replacement with expensive parts due to wear. Vane-driven tools are not only heavy and noisy— they are hot to the touch. In addition, vane tools need constant lubrication. This lubrication often releases an oil mist, which contaminates both the workpieces and the air that operators breathe in the workplace.

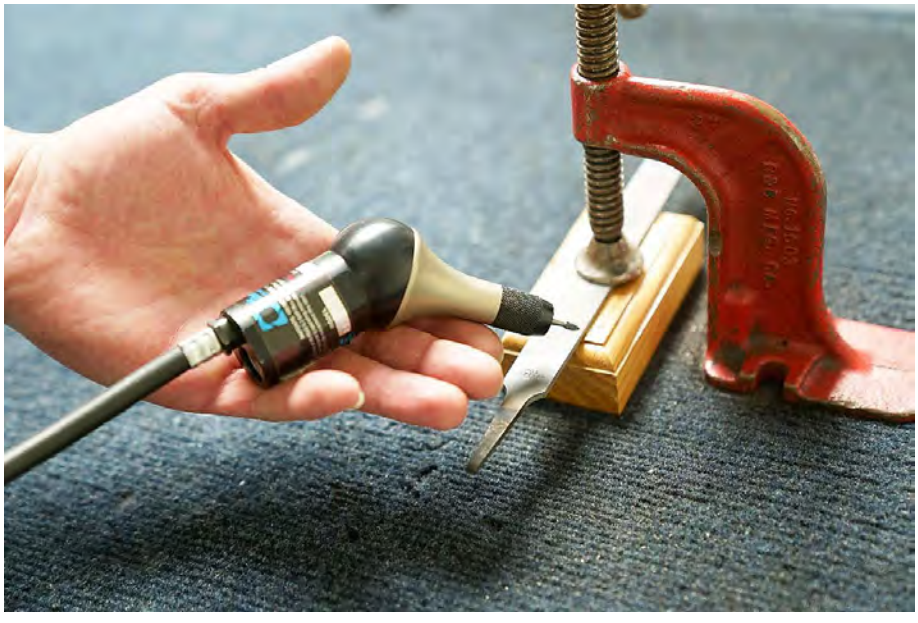
Tools with minimal vibration are essential for worker safety.

LOW VIBRATION

Tools with minimal vibration are essential for worker safety. Hand-arm vibration syndrome (HAVS), formerly known as Vibration White Finger (VWF), affects the nerves, blood vessels, muscles and joints of the hand, wrist and arm. The term was updated since symp-

toms are not limited to the fingers. Vibration exposure can also cause carpal tunnel syndrome, leading to pain, tingling, numbness and weakness in the hand.

Staying compliant with the Exposure Action Value (EAV) of 2.5 m/s² A(8) and the Exposure Limit Value (ELV) of 5 m/s² A(8) is key to managing risks, as specified by ISO 2631 and Directive 2002/44/EC. Simply put, the EAV is the point where action is needed to address potential risks, while the ELV is the high-risk limit that should never be exceeded. The "A(8)" just means the exposure is averaged over an eight-hour workday.



Above: A new generation of lightweight and easy-to-handle pencil grinders is now available. Below, right: Some air pencil grinders operate at 75-82 dBA.

Select air pencil grinders have a "Time to Reach EAV" of at least two to three times the standard eight-hour workday. Advanced, state-of-the-art models can operate theoretically for 24 hours—or even up to 345 hours—without surpassing the EAV threshold.

Reducing vibration not only minimizes the risk of injury but also reduces worker fatigue, enhancing both productivity and precision throughout shifts. Beyond protecting the operator, it also safeguards the quality of the work itself. Low-vibration tools provide greater stability and control, allowing operators to handle equipment with confidence and consistently achieve exceptional accuracy.

Ultra low-vibration tools are renowned for their ability to create smooth and consistent finishes without channel marks. Perfect for tasks such as burr removal and chamfering, these tools eliminate the need for secondary operations to correct surface defects. By streamlining the process and enhancing surface quality, they speed up productivity while ensuring flawless results.

LIGHTWEIGHT DESIGN

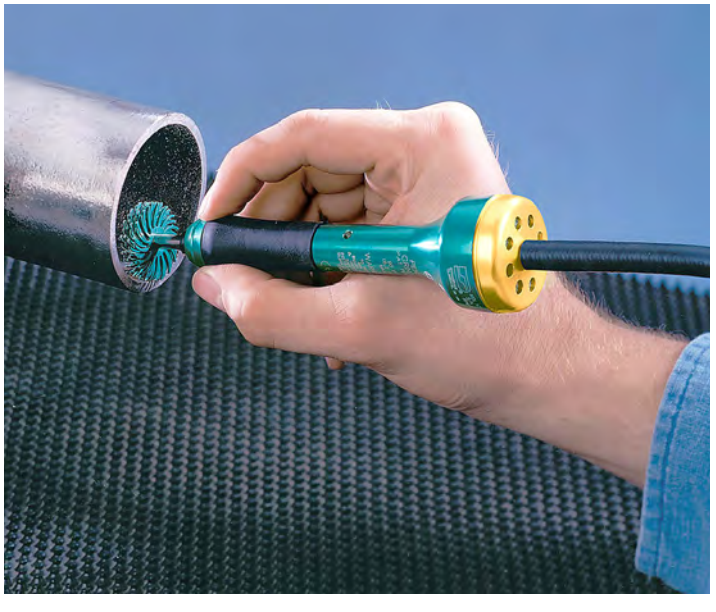
A new generation of lightweight and easy-to-handle pencil grinders is now available, offering exceptional maneuverability without compromising power or durability. Despite their compact size, these tools combine high torque and speed to tackle demanding tasks with ease. Their minimal weight—some models as light as 5.4 oz (0.15 kg) allows for a relaxed grip and precise control, significantly reducing fatigue and strain on the hand and arm.

The designs from Air Turbine Tools, for example, are intended to deliver durable tools that feel solid yet light and comfortable in hand. Ideally, a pencil grinder should be as durable and easy to hold as a six-ounce iPhone and provide the comfort and precision of a six-ounce sash paintbrush, designed for steady, focused work over extended periods.

THROW AWAY YOUR EARPLUGS

Ergonomics isn't just about preventing injuries—it is about creating a workspace that supports precision, focus, and overall well-being. Noise plays a critical role in this. Excessive tool noise not only disrupts concentration and morale but can also cause long-term hearing damage.

Some air pencil grinders operate at 75-82 dBA or higher, far above the recommended threshold. The EPA advises keeping noise levels at or below 70 dBA to prevent hearing loss, while OSHA's action level for implementing hearing conservation measures is 85 dBA. Advanced tools operate with noise levels as low as 67 dBA creating a



safer, more comfortable environment where employees can stay focused, communicate easily and perform at their best.

DON'T FEEL THE BURN

Heat management is a crucial factor to consider when choosing handheld air tools. Poorly designed tools can become noticeably hot during operation, especially those with rotating vanes, where friction generates excessive heat. This can lead to discomfort, potential burns and the need to wear gloves, which not only reduces comfort but also impacts control and maneuverability.

Look for the tools with the fewest moving parts, the ones that consequently generate no heat. This ensures the operator is comfortable even during extended periods and under high speed and high load. The absence of heat in these power tools allows users to maintain a secure grip and precise handling without the distraction of overheating or needing to switch off for cool-down.

Pencil grinders should be solid yet light and comfortable in hand.

SPEED DOES THE CUTTING

In manufacturing environments where productivity and quality are essential, high-performance pencil grinders are indispensable. These tools deliver reliable, high-speed operation and consistent torque, offering the accuracy and control needed to handle even the most demanding tasks with ease.

High speeds and power enhance cutting performance and produce superior surface finishes. Operators simply guide the tool along the desired path, letting high-speed rotation—up to 90,000 RPM—handle the cutting. This minimizes the need for significant pressure, reducing operator fatigue while improving surface quality and cutting tool life.

Consistent speed and power are also critical. When tools lose speed or torque under load, operators often compensate by applying additional pressure, which can lead to surface damage, uneven finishes, distorted contours and increased worker fatigue. To avoid these issues, it's essential to use tools designed to maintain at least 95 percent of their rated speed and torque, even when navigating corners or tackling tough materials.

Quality air tools maintain consistent speed and torque, even under demanding conditions such as cutting hard materials or working in tight corners. Governed turbines eliminate slowdowns, delivering steady performance and consistent high-quality results on the toolpath.

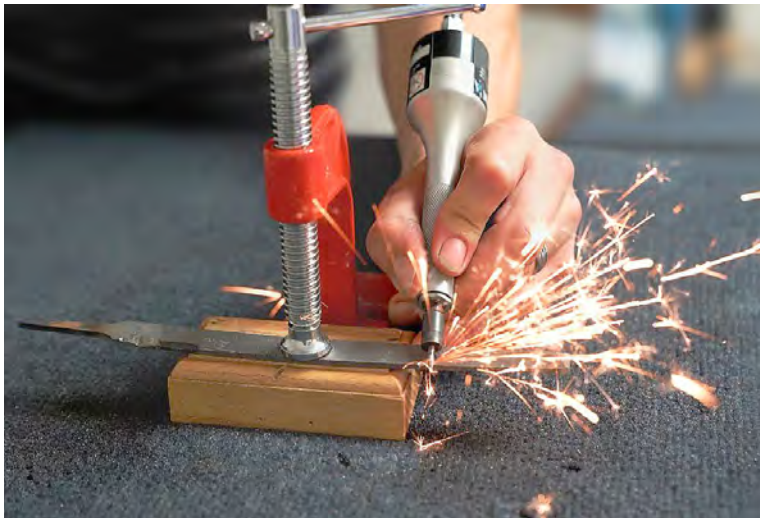
Pencil angle grinder.

Fast start-up is another key factor. Tools that provide instant torque and speed not only ensure smooth, consistent results but also enhance workflow efficiency, maximizing productivity.

CLEAN AIR AND LUBRICATION-FREE

Most pneumatic air tools require lubrication, which can lead to messy, unpleasant and unhealthy conditions, creating challenges with maintenance and loss of

Reducing vibration not only minimizes the risk of injury but it also reduces worker fatigue.



Look for tools that ensure consistent speed and torque, even under demanding conditions.

productivity. These tools release contaminants into the air, affecting worker health and damaging workpieces, making them unsuitable for clean environments such as laboratories, medical facilities, or electronics manufacturing.

Additionally, oil mist from lubricated tools creates the need for extra cleaning, adding time and effort to operations. Lubrication adds maintenance cost and effort, and the risk of over-lubrication may even harm the tools themselves.

The solution? Choose pneumatic tools that don't require lubrication, ensuring the only byproduct is clean, dry air.

PRIORITIZE WORKER SAFETY

Prolonged use of tools with high weight or vibration harms worker health and lowers productivity, but now, smarter solutions exist. Investing in ergonomic, low-vibration tools keeps employees safe, comfortable and efficient. By prioritizing worker well-being, businesses can boost output, improve quality and retain a satisfied workforce ready to perform every day. ■

BY THE NUMBERS: Key attributes of air pencil grinders

25,000 - 90,000 RPM: Delivers exceptional high-speed performance.

95% speed retention: Maintains consistent speed and torque even under heavy load.

2-3x EAV Limit: With minimal vibration levels, users can operate the equipment for at least double or triple the allowable hours.

<67 dBa noise: Operates quietly for a more comfortable working environment.

Zero oil spray: Lubrication-free design eliminates contamination of work pieces and work environment.

Zero heat: Advanced engineering ensures cool operation, eliminating need for gloves.

Aviation Services

Aviation Services

Aviation Services

Cabin in the Woods

This cabin designer has introduced what it calls, "The aviation industry's first heat-release-compliant wood veneer." As you might guess, it's targeted toward luxury flights

F/LIST, an Austria-based designer of cabin interiors has launched what it calls the aviation industry's first fully heat-release-compliant wood veneer for commercial cabins. F/LIST says it has developed new technology to ensure that its F/LAB wood veneer portfolio complies with all aerospace heat release rate tests with the ultimate goal being to create an "at home-like" atmosphere.

"An increasing number of airlines are eyeing natural and bio-based materials to improve the passenger experience, stand out from competitors, and to attract passengers who could opt to fly privately," says Anita Gradwohl, Group Director, Sales F/LIST. "With our new heat-release-compliant wood veneer, airlines can now use natural wood instead of plastic, synthetic, or printed designs for more comfort and a calming environment. This is especially important for first class and the emerging super business class suites…"

Using proprietary technology to ensure heat-release compliance, F/LIST says it can source a variety of wood types, including locally sourced or region-specific varieties, such as bamboo in Asia or silver birch in Europe. According to the company, heat-compliant technology does not add weight to the aircraft, with the wood veneer being comparable to the weight of decorative foil.

Gradwohl adds, "We work closely with designers and airlines to develop tailored concepts that optimize the use of natural materials. We ensure they are aesthetically pleasing, durable enough to withstand heavy use and can meet the regulatory demands of commercial aerospace customers."

Unlike synthetic materials, the heat-release-compliant F/LAB wood veneer is intended to add a multi-sensory experience that engages sight, touch, and even scent to bring the external natural environment inside the cabin. Wood's natural properties are often credited with stress reduction and F/LAB's goal is contribute to a more peaceful cabin atmosphere.

"Although some aircraft interiors appear to have wood finishings, they are in truth thermoplastics or decorative foils," says Managing Director, F/LIST Aviation Michael Müller."Which is why, in our discussions with industrial design studios and commercial airlines, the response to the heat-compliant offering has been overwhelmingly positive. Natural materials align with the interior design trends we're seeing in premium commercial aircraft cabins, and we are helping airlines ensure flying becomes more than just a journey with cabins offering true comfort and refinement." ■

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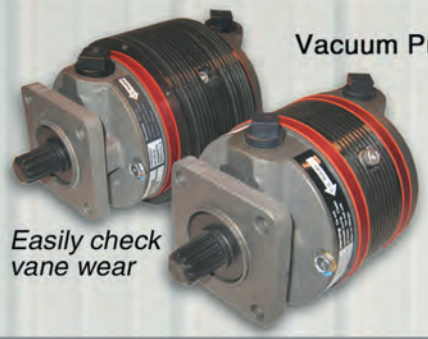

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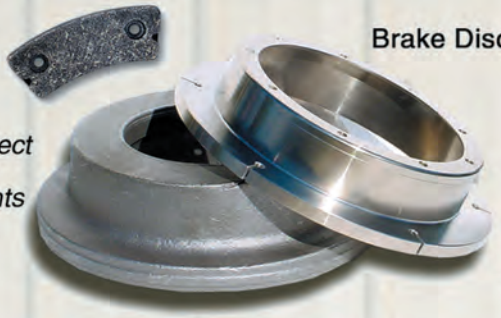

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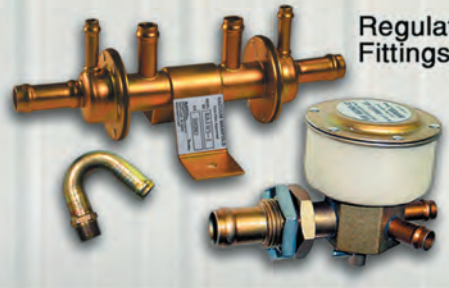

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