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AirMaintenance

UPDATE

The Magazine for Aircraft Maintenance Professionals

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2020 Recurrent Training Exam

new fastener designs

PAMA and AME news

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A Crazy tale told with Flair

At some point this spring we officially entered the Whacky Season. At least that's how it must seem to Canadian independent low-fare air carrier Flair Airlines, whose summer schedule typically includes routes between Vancouver and Kelowna, Edmonton and Calgary, Charlotte-town and Saint John. So you might imagine the company's surprise to learn one of their aircraft was involved in an African scandal!

On May 18, 2020 an article was published by PM News Nigeria about the seizure of a foreign aircraft from the U.K. in the Federal Republic of Nigeria. "The article, and subsequent twitter posts, referenced a photo of a Flair Airlines Ltd. plane and, as such, have incorrectly implied involvement of our company," said a news release from Flair.

"Flair Airlines Ltd., a Canadian owned and operated company with no affiliations to organizations in the U.K., does not have authority to operate any aircraft – commercial, charter or cargo – to or from the Federal Republic of Nigeria or to any other country within Africa," the release went on to say. The airline in question by Nigerian authorities is not Flair Airlines Ltd., and its employees and aircraft are not involved or engaged in this situation.

Flair has asked the publication – PM News Nigeria – to correct their story and retract the image but received no response from the publication. "Given the damage these stories have inflicted on Flair Airlines Ltd., we remain hopeful that the Nigerian media outlets or the Nigerian government itself will issue an apology for this error and correct the record," said Flair. ■

— John Campbell
Editor



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Upcoming Events

NBAA-BACE back on the table



The National Business Aviation Association issued the following statement concerning industry flagship event NBAA Business Aviation Convention & Exhibition:

“We continue to make preparations for NBAA-BACE, with all participants’ safety and well-being as our highest priority. We believe the convention will be especially important in a year that has proven difficult for companies to connect and communicate with their customers in a meaningful way, and NBAA-BACE exhibitors appear to reflect this view in sharing with us their enthusiasm for the show.

“During this time, NBAA is in communication with government, medical and

With trepidation and preparation, the North American aviation industry’s top business convention will welcome visitors to Florida this fall.

other authorities to be equipped with the best decision-making regarding the show. NBAA organizers will provide exhibitors, attendees and other event participants with information as the event approaches. We sincerely appreciate your continued support and feedback in this challenging moment. We continue to receive exhibit applications, and we look forward to welcoming everyone to Orlando in October.”

UNITED STATES

Vietnam Legacy Event

August 1, 2020
Ionia, Michigan
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U.S. aircraft Expo

August 28-29, 2020
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www.usaircraftexpo.com

2020 NBAA Business Aviation

October 6-8, 2020
Orlando, Florida
www.nbaa.org



INTERNATIONAL

Farnborough Air Show (Connect)

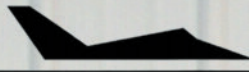
July 20-24, 2020
Hampshire, England
www.farnboroughairshow.com

(Any scheduled events this summer are subject to local COVID-19 protocols)

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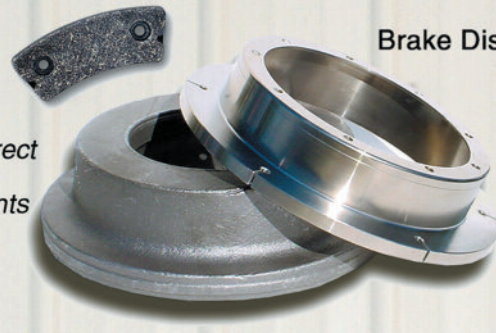
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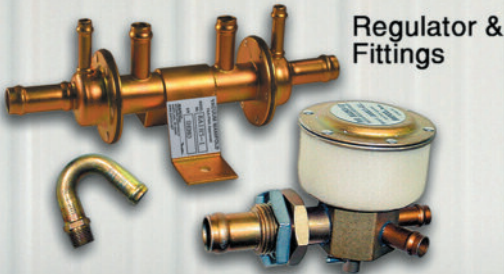
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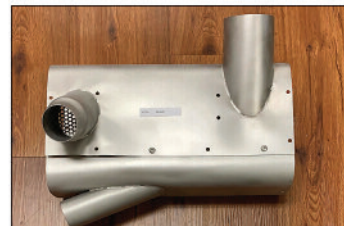
Dolly can lift big wheels

Stertil-Koni's WDA-500 model lift wheel dolly has a telescopic crane arm option that turns this model into a universal lifting tool. The crane arm offers efficiency and stable ergonomics when lifting disc brakes, brake drums, fuel tanks, toolboxes, calipers, and many other heavy parts. It can accommodate wheel sizes from 10.63 to 51.18 inches. The dolly stands 47.17 inches high with a width of 45.28 inches and length of 33.30 inches. Lifting height is 28.23 inches. It weighs 220 pounds. **For more information visit** www.Stertil-Koni.com



New connection eliminates lube requirement

Power Flow Systems has announced refinements for two tuned exhaust systems that were developed for the Cessna 172 Skyhawk and Cessna 177 Cardinal. Both systems' "classic" versions since 2003 originally featured ball joints where the tailpipe connected to an intermediate pipe coming out of the collector. Maintaining flexibility in the tailpipe connection required periodic lubrication. Without it, the ball joint would seize up, defeating the suppression of vibrations and eventually leading to cracks in the exhaust system. The new connection eliminates the need for periodic lubrication. **For more information visit** www.PowerFlowSystems.com



Commercial cargo seat bags for Airbus

Colibri Aero and J&C Aero have developed universal cargo seat bags for commercial and humanitarian cargo transportation inside Airbus A319/A320/A321 passenger cabins. The newly developed interior modification kit has already been approved by the European Aviation Safety Agency and has received its Supplemental Type Certificate. The cargo seat bag comes as a 30 x 30 x 58-inch kit for a triple seat, with up to 165 pounds of cargo to be stored on the seat. The kit can be easily installed and include cargo types from postal correspondence to medical equipment. **For more information visit** www.colibri.aero



Fans drastically lower temperature

Cold Front by Big Ass Fans brings a full range of customer options for use in spaces of all sizes and applications, delivering a dramatic temperature reduction up to 33F. Capable of covering anywhere from 600 to 6,500 square feet, the Cold Front lineup allows owners to cool at a fraction of the cost of air conditioning, plus take comfort outside and on the go with ease. With a chemically treated media coated in a thermosetting resin, Cold Front units feature locking swivel casters, automatic low-water shutoff, and an easily accessible drain plug. **For more information visit** www.bigassfans.com



Composite repair console is portable

BriskHeat announced it is partnering with GMI AERO to distribute two composite repair products widely used by major aerospace manufacturers. Designed for the repair of high-performance aircraft structures, the Anita bonding console is a portable system for smart patch repair bonding in the field. Optimized for ease of use by shop technicians, the Anita EZ09 features a large touch-screen display panel and sophisticated software. It contains all the necessary functions to control the bonding heating process under vacuum for the repair of composites or metal structures. **For more information visit** www.briskheat.com



Cutters produce minimal vibration

Enerpac recently released a broad range of cutters for use in construction, mining, manufacturing and many other industries. The range includes EB-Series bar cutters that consist of hydraulic and electric tools that quickly and easily cut through heavy-duty metal bars. EWC-Series wire and cable cutters offer a quick and clean way to cut cable and wire rope. The controlled cutting process enhances operator safety and produces minimal vibration to help prevent Hand Arm Vibration Syndrome. Complementing the new cutters is a ZE6-Series pump to provide power to the cutter models. **For more information visit** www.enerpac.com



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TC GRANTS LICENCE EXTENSIONS



Transport Canada Civilian Aviation reports it has granted an exemption for AME licences expiring between March 1st and August 31, 2020. During the exemption period, TCCA says it will continue to accept and process AME licence renewals but at a reduced capacity. AMEs are advised there may be delays in processing the requested service and other delays due to COVID-19 related circumstances. Further, TCCA will not issue interim paper licences as expired licences will be considered valid during the exemption period. TCCA will continue to print the credit card style AME licence but foresees delays in printing licences due to lack of personnel.

COLLEGE AND INDUSTRY COME TO UNDERSTANDING



Centennial College and Diamond Aircraft Industries of London, Ontario have signed a memorandum of understanding to collaborate on activities including program development, student work placements and research and innovation projects. As Ontario's first public college, Centennial has a long history of educating aircraft and avionics techni-

cians accredited by Transport Canada. Diamond Aircraft is a global leader in the general aviation market with its product line of modern, fuel-efficient aircraft designed for specific personal and training applications. Collaborative activities may also include curriculum development; technical training; donations of equipment or services in kind; and international engagement.

BOMBARDIER GRADUALLY RESUMES OPERATIONS



Bombardier says it will take advantage of the Canada Emergency Wage Subsidy (CEWS) program as the company returns 11,000 of its employees back to work, most of which were placed on furlough following government mandates enacted to slow the spread of COVID-19. Suspended manufacturing and service activities were scheduled to gradually resume with return-to-work schedules varying by site and subject to new safety procedures. "As we resume operations across many of our sites, the health and safety of our employees, our customers and the general population will continue to be our top priority," said Bombardier president Éric Martel.

CESSNA PROTOTYPE PASSES TOUGH TESTS

Textron Aviation's new twin utility turboprop, the Cessna SkyCourier, made its first flight in late May as a major step in the clean-sheet aircraft's flight test program. During the two-hour and 15-minute flight, the aircraft's performance, stability and control, as well as its pro-



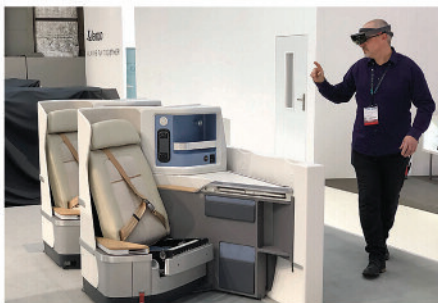
pulsion, environmental, flight controls and avionics systems were tested.

The prototype aircraft, along with five additional flight and ground test articles, will continue to expand on performance goals, focusing on testing flight controls and aerodynamics. The aircraft features Pratt & Whitney Canada PT6A-65SC engines and will be offered in various configurations including freighter and passenger versions.

LARGEST-EVER COMPOSITE PIECE FORMS WINGMAN



A Boeing-led Australian industry team has rolled-out the first unmanned Loyal Wingman aircraft, which uses artificial intelligence to extend the capabilities of manned and unmanned platforms, and is the first to be designed, engineered and manufactured in Australia in more than 50 years. It is Boeing's largest investment in an unmanned aircraft outside of the United States. As the first of three prototypes for Australia's Loyal Wingman Advanced Development Program, the aircraft was engineered using a digital twin to model its structures, systems, capabilities and full life-cycle requirements; manufactured with Boeing's largest-ever resin-infused single composite piece.



AUGMENTED REALITY MEETS MAINTENANCE SERVICE

A partnership between Washington state-based aircraft interior and services provider Jamco America and “mixed reality” pioneer Object Theory has created a new augmented reality (AR) technology developed for aerospace interior training and maintenance. AR is the process of superimposing a three-dimensional computer-generated image onto a user’s view of the real world. This provides a composite view that can guide a user through key maintenance tasks. This technology can be displayed through a variety of hardware, so trainee mechanics can work on their product hands-free, in real time, and without the need to refer to a separate manual.

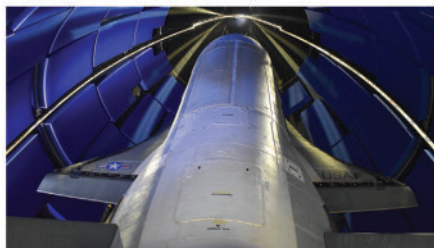


MANY DRONES FLY TOO HIGH, UNAUTHORIZED

A dangerously close encounter between a camera drone and six F/A-18 Hornets flying in formation during a recent US Navy Blue Angels demonstration over Detroit, Michigan, confirms the latest aviation safety research released by Embry-Riddle Aeronautical University. The study reveals that aircraft are too often forced to share airspace with unauthorized drones. The latest frightening example of this problem took place on May 12, when video shows a camera drone encroaching on the flight path of

six speeding jets performing aerobatic feats. The US Federal Aviation Administration is investigating the incident.

BOEING PLANE WILL STUDY SEEDS IN SPACE



The Boeing built X-37B autonomous spaceplane was launched May 17, on top of a United Launch Alliance Atlas V rocket. The X-37B’s sixth mission is the first to use a service module to support a variety of experiments including the NASA study on the impact of radiation on seeds used to grow food. Another experiment will transform solar power into radio frequency microwave energy, which could then be transmitted to the ground. ■

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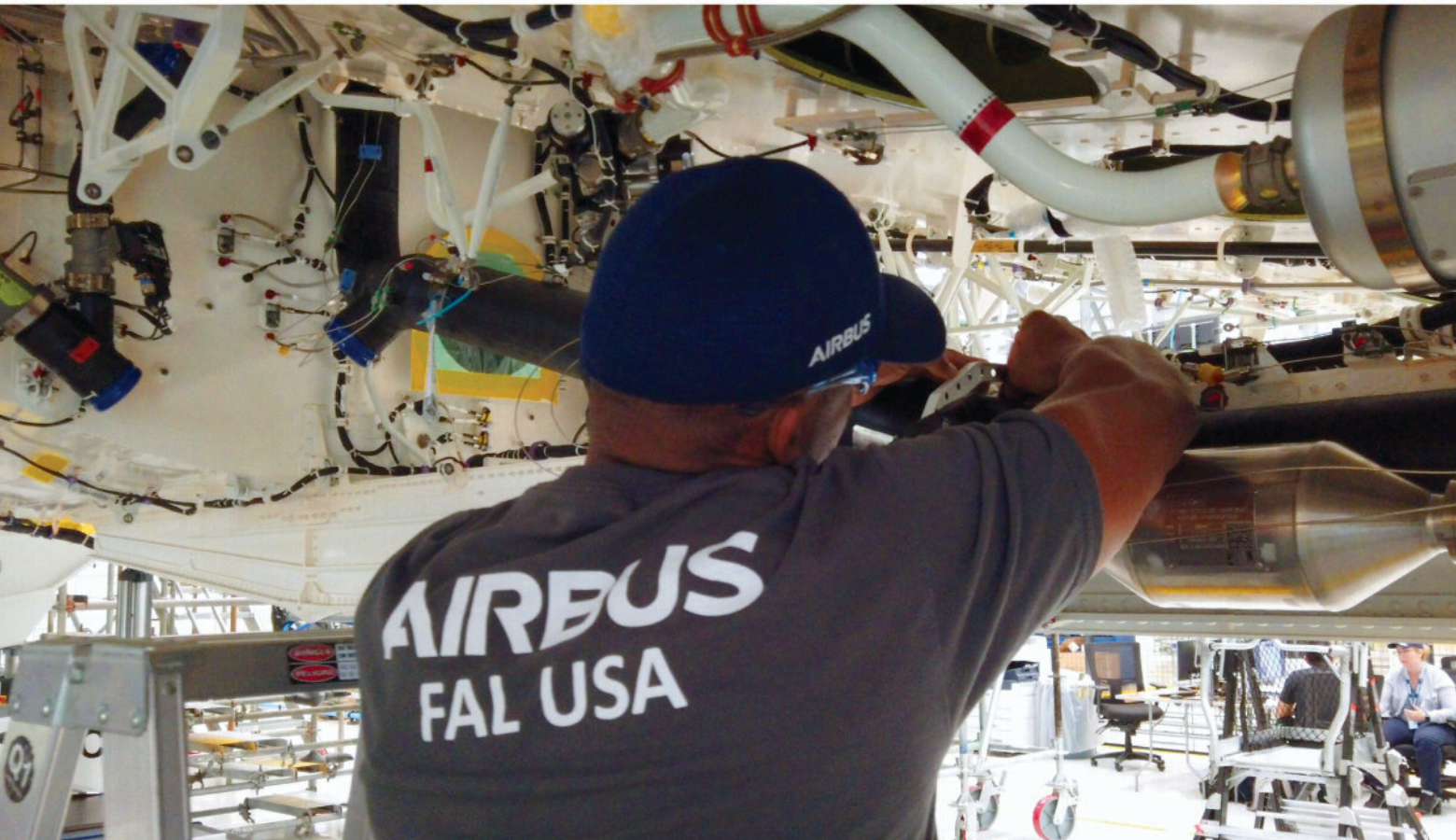
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Buttoned-Up

New fastener design claims to prevent bolt loosening without the traditional limitations of excess weight, complexity and length.



For land or air vehicles, “smaller and lighter” affects fuel efficiency, so heavier fasteners are a drawback



In any type of mechanical application – whether aircraft, motorcycle, airplane, military tank, farming machine or construction equipment – there can be severe consequences if critical fasteners loosen or fail during operation. If this occurs, it not only affects the function of the equipment and causes substantial downtime and costs for repair, but for the operator and any passengers it can be potentially life threatening.



Makers of the brand ForeverLok say they have a new approach to fastener design that purports to resolve issues of loosening due to vibration.

Yet this is exactly what happens when fasteners are subjected to vibration, shock, dynamic loading or thermal stress. The most frequent cause of self-loosening is the side sliding of the nut or bolt head relative to the joint, resulting in related motion occurring in the threads. The gradual rotation causes a bolted joint to lose its preload (the initial fastener tension when tightened) and subsequently lead to fatigue failure.

Although many OEMs view fasteners as commodity items, working conditions often demand superior solutions to prevent fasteners from loosening. In assembly processes alone, approximately two-thirds of the parts and half the labour are related to fastening in one way or another. So, applying the wrong type of fastener can have a negative impact on assembly costs, warranties, sales, liability and even the overall brand image.

But makers of the brand ForeverLok say they have a new approach to fastener design that purports to resolve issues of loosening due to vibration using a smaller, lighter and more compact fastener, without the use of adhesives.

Solutions for preventing loosening

OEMs have long used a variety of fastener designs that attempt to stop bolted joint loosening through the use of adhesives or added components that physically restrain the bolt or nut from loosening. However, these methods have significant drawbacks.

Locking adhesives attempt to hold fasteners in place once tightened, yet the adhesives progressively lose effectiveness as temperature rises. Bolts secured with a single use, dry patch adhesive that is activated when the bolts are tightened also add to assembly costs. With both options, if the item is to be removed and re-used the threads must be cleaned first at great cost in time and labor.

With mechanical locking approaches, the goal is to physically prevent loosening. However, this often means adding components that increase the size of the fastener and add weight and complexity to component design. For land or air vehicles, “smaller and lighter” affects fuel efficiency, so heavier fasteners are a drawback.



Dzus fasteners attach the cowling panels of the 1930s Hawker Hind.

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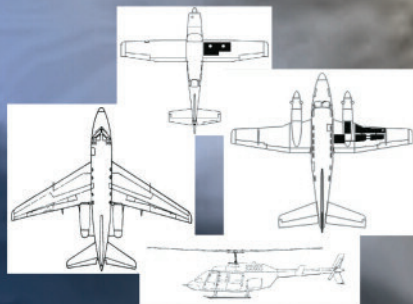
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The fastener design called Forever-Lok physically prevents vehicular bolt loosening without the traditional limitations of excess weight, complexity and length. It involves three items: a central threaded fastener, a threaded intermediate fastener and a retaining fastener.

Although there are competitive products on the market that work in a similar fashion, this design is more compact than the traditional nut and bolt configuration.

Essentially, the fastener system holds the nut in place to physically prevent it from loosening. Although there are competitive products on the market that work in a similar fashion, this design is more compact than the traditional nut and bolt configuration. The locking design does not use special pins, bolts or tools to install/remove the nut, and only common tools are needed to fasten/unfasten.

The design allows the fastener to be smaller, lighter, and more compact than a larger fastener while providing a comparable torque value. For example, the torque value of a ½-inch fastener design



In assembly processes, half the labour is related to fastening



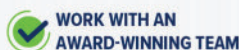
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A variety of fastener designs attempt to stop bolted joint loosening.

tested greater than the recommended torque value of a 5/8-inch bolt.

In addition, the fastener design is reusable as many times as needed. The fasteners can be made of many materials such as titanium, steel and other metals/alloys. The design also works just as well for plastic fasteners when weight or cost is a prime consideration.

The technology, which is available for licensing, is flexible enough for a manufacturer to create their own unique new product based upon it.

The effectiveness of the ForeverLok approach has already been put to the test in three rigorous anti-vibration tests. In a maximum torque test, involving a 1/2-inch grade eight bolt, the design tested at 159.9 foot-pounds, a 77 percent increase over the 90 foot-pounds of torque recommended for a standard 1/2-inch bolt. The higher torque value allows OEMs and design engineers to use a lighter, smaller fastener to save space and weight.



Aircraft panel fasteners with adjustable depth receptacles.

The design was also tested against the NASM 1312-7 standard, which involves accelerated vibration testing on a fastener system capable of providing a clamp-up load. In the test, the bolt/nut combination is installed in the fixture, and the fixture is subjected to controlled vibration and cycles/times until the assembly loosens. For this test, the fastener must not be able to be loosened by hand after 30,000 cycles, approximately 17 minutes of testing.



Above: Click Bond fasteners made from 300 Series Crest Stainless Steel (capable of 500 lbs. of pull and 1200 lbs. of shear) for mounting canard ailerons and rudders. Below: A jumble of specialty drilled fasteners and skin fasteners for interior and airframe applications.



Testing of the ForeverLok design, however, was suspended after over 420,000 cycles and four hours of testing with no loss of torque retention. NASM 1312-7 does not require the residual torque value to be reported. However, the testing facility provided the measurement: the fastener design retained 93.5 percent of its original torque value.

Against the tougher transverse vibration standard, DIN 25201-4, the design torque retention test results were 89.43 percent, clearly surpassing the certification standard which requires 80 percent retention or higher. This standard involves testing the fastener 12 times. The less strenuous DIN 65151 tests the fastener to a less exacting setup and verification standard, testing it once.

Although traditional locking fastener systems are available, OEMs and engineers searching for solutions to critical fastener loosening will find that considering a new design approach can result in lighter, simpler, more reliable fasteners in any type of service required. ■



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FITS LIKE A GLOVE

By Carrie Halle

You make a living with your hands, yet might be too casual about protecting them. It's important to make good decisions about the gloves you wear.



Injuries to hands account for nearly 25 percent of all lost-time industrial injuries.

HANDS are the most used tools in the workplace, making their protection from on-the-job hazards critically important to maintaining employee productivity. Hand dangers are around every corner. Depending on the workplace, employees' hands are endangered daily from chemicals, abrasive surfaces, splinters, broken glass, and cuts or scrapes, among countless other hazards.

According to the US Department of Labor, injuries to hands accounted for nearly 25 percent of all lost-time industrial injuries – a total of 110,000 annually. (Here in Canada, it's safe to assume these numbers are similar in proportion to our population.) Seventy percent of those injuries resulted when an employee was not wearing safety gloves, while the other 30 percent of hand injuries occurred while an employee was wearing the wrong kind of gloves.



Direct contact with chemicals poses a danger to the skin itself.

Hand injuries are preventable. Safety gloves, correctly sized and engineered with the right materials, will defend workers from virtually any type of hazard. Unfortunately, employees often have a very limited understanding of how to select a glove properly based on the dangers they confront. The number of glove choices is vast – and the standards governing personal protective equipment, including hand protection – are not always easy to decipher.

Protective gloves, like any safety product, must be selected properly for the specific application. To do so, first deter-

mine the scope of the work, and next, identify any potential hazards within that scope that may injure employees' hands. If it is possible to eliminate the identified hazard by engineering or substitution, this is always the best means to protect the employee. If not, gloves should be used only as a last resort, along with other required PPE. Protective gloves tend to be less effective than other control measures but if avoiding contact is impractical or is not enough to protect employees then gloves are needed.

Recognize that an employee may be exposed to more than one hazard. For instance, the jobsite may contain corrosive chemicals or biological exposure, as well as sharp metals, or broken glass. If you are not sure of the hazard or hazards, confer with an environmental health & safety coordinator or industrial hygienist. Once gloves are selected, inform employees how to use them properly to protect themselves. Let them know when gloves should be replaced. If the gloves are reusable ask employees to rinse them before removal and tell them how they should be stored.

Chemical proof gloves

A principle function of skin is to protect our bodies from exposure to potentially harmful components of the external environment. Skin does this remarkably well, but direct contact with chemicals poses a danger to the skin itself. Chemical reactions to skin can be a burn, dermatitis or chapping. Chemicals can also penetrate the skin and enter the bloodstream. Risk varies according to the chemical, its concentration, and time of



Unfortunately, employees often have a very limited understanding of how to select a glove properly.



A principle function of skin is to protect our bodies from exposure to potentially harmful components of the external environment.

contact among other safety factors. Refer to the product safety data sheet for specifics. Section 8 of the SDS provides what types of PPE are necessary to protect the user. Section 11 has toxicological information such as potential local skin effects, as well as potential absorption through the skin and resultant acute and chronic effects.

Because different glove materials resist different chemicals, no one glove is suited for all chemical exposures. Dependent on the chemical, gloves can be fabricated with natural rubber, neoprene, nitrile rubber, butyl rubber, polyvinyl chloride, polyvinyl alcohol, Saranex, Tychem, Trelchem. Key factors to review in selecting the material are breakthrough time, degradation and permeation rate. Refer to the glove manufacturer's test data for details.

OSHA 29 CFR 1910.138 (Hand Protection General Requirements) specifically addresses the need for hand protection or chemical protective gloves. This standard makes it mandatory to assess the job for chemical exposures, and then select the appropriate, chemical protective glove based on material, thickness, length and other traits. ANSI/ISEA 105-2016 (American National Standard for High-Visibility Safety Apparel and Accessories/ International Safety Equipment Asso-

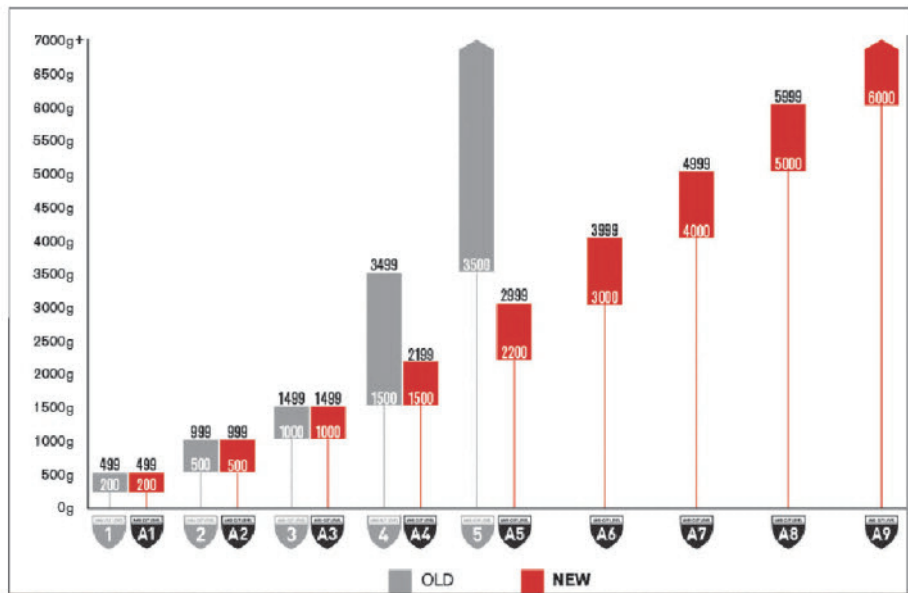
ciation) is another source of information that provides a consistent, numeric-scale method for manufacturers to rate their gloves against certain contaminants and exposures.

Cut resistant gloves

Tear, puncture, and cut resistant gloves are often constructed from materials such as high-grade stainless steel Kevlar, and may feature a mesh aesthetic. Resistant to damage from sharp or abrasive objects such as glass and knives, these gloves are often ergonomically designed for a precise fit. Cut-resistant sleeves, often worn with cut-resistant gloves, extend protection from the wrist up towards the elbow or shoulder.

There are two major global standards used to evaluate the protection levels of work gloves: ANSI/ISEA 105 (U.S. Standard) and EN 388 (EU Standard). Besides Europe, EN 388 is also commonly cited in other parts of the world such as Canada, AUS/NZ and South America. In 2015-2016, significant changes were made to both to ensure consistency between different standards and to reduce the gaps between protection levels.

The new ANSI/ISEA 105 scale, characterized by an 'A' in front of level numbers from A1 to A9, measures a glove's per-



Top, left: When looking at glove specifications, the ANSI cut level will be displayed inside a badge that resembles a shield.

Chart, above: Comparison of new and old ANSI/ISEA cut resistance standards.



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formance by the cutting force it can withstand in grams. For instance, an A1 glove can withstand from 200-499 grams of cutting force, while an A9 glove can withstand 6000+ grams of cutting force.

Thermal proof gloves

Thermal proof gloves protect against extreme temperatures and are fabricated from a variety of materials, including:

Neoprene: Neoprene gloves are used for protection against frost and burn injuries, as in the case of firefighting gloves.

Aluminized: Aluminized material is capable of handling and withstanding extremely high temperatures (depending on the specific formula, up to and exceeding 2,000F). Gloves made of this material are suitable for welding, furnace and foundry, and some laboratory applications.

When choosing the heat-resistant gloves for a task, you'll need to find out the precise temperature of the object, not just the ambient temperature. For example, an industrial oven might be 1000F but the object being handled is only 600F. Also, high temperature gloves are available as either gloves or mitts. Gloves are for applications that require dexterity, while mitts are for applications that require additional insulation for heat protection, added comfort, and longer wear. Heat-



Hands are the most used tools in the workplace.

If you'd like to contribute your professional association's newsletter to AMU magazine contact our editor, John Campbell via email :

amu.editor@gmail.com



Employees often have a very limited understanding of how to select a glove properly based on the dangers they confront.

resistant gloves should be tested to (American Standard for Testing and Materials) ASTM F1060-87 that establishes the maximum temperature at which a person can hold an object for more than four seconds before feeling pain, and for more than 15 seconds before getting a second-degree burn.

On the other end of the temperature spectrum, cold resistant gloves, commonly known as freezer gloves, protect employee hands from cuts and scrapes, while an inner insulation reduces the risk of frostbite. These gloves do not have the thickness or the high level of insulation associated with a ski type glove since that bulkiness would inhibit grip and dexterity when handling frozen foods. Polyethylene, glass fibre, polyester, and spandex are all used in the construction of cold



Once gloves are selected, inform employees how to use them properly to protect themselves.

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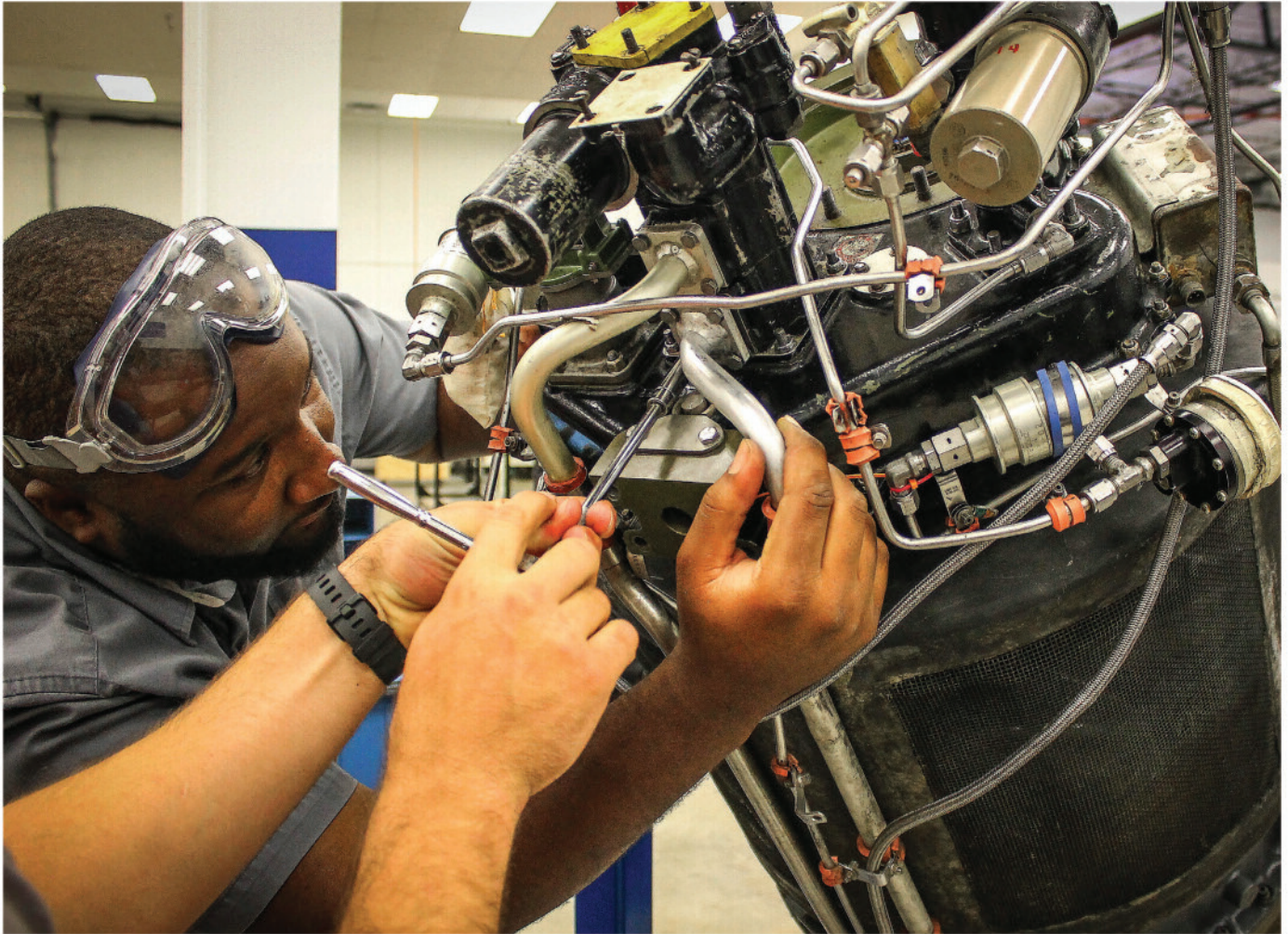


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storage thermal gloves. Water wicking on the glove's base layer moves moisture away from the skin, helping to keep hands dryer and warmer for a longer period of time.

Gloves and machinery

Machinists who are operating rotating machines should not wear gloves. If machinists are working with a CNC machine, a lathe, a knee mill, or a drill press, wearing gloves near a rotating spindle can spell disaster. Machinery must have guards installed or incorporated into their design that prevent hands from contacting the point of operation or other moving parts.

Glove maintenance

Like any tool, gloves must be treated properly for them to perform their function. Protective gloves should be inspected before each use to ensure that they are not torn, punctured or made ineffective in any way. A visual inspection will help detect cuts or tears but a more thorough inspection by filling the gloves with water and tightly rolling the cuff towards the

Recognize that an employee may be exposed to more than one hazard.

fingers will help reveal any pinhole leaks. Gloves that are discolored or stiff may also indicate deficiencies caused by excessive use or degradation from chemical exposure.

Wearing the right safety gloves is instrumental in preventing different workplace hand injuries, including cuts, punctures, burns, or abrasion injuries. It also saves costs incurred by the company each time a hand injury occurs, such as medical expenses that average \$6,000 and lost-time compensation expenses that average \$7,500. Hand injuries send more than one million workers to the emergency room each year. Your employees cannot afford to go barehanded or be wearing the wrong gloves, not when the cost of one preventable incident far exceeds the cost of an entire hand protection program. ■

(Carrie Halle is vice president of Rockford Systems, which delivers industrial plant safety solutions.)

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Atlantic AME Association



Visit our website for summer updates

The Atlantic AME Association is one of five similar associations across Canada; the others being the Western, Ontario, Central and Pacific associations.

These associations represent regional interests, as well as, concerns of national importance.

The purpose of the association is to maintain and enhance the standards of professionalism of the AME and the aircraft maintenance industry as a whole and to protect the rights and privileges of the AME.

www.Atlanticame.ca

Pacific AME Association



Joint Aviation Leadership Letter

We're proud to stand together and support Canadian Aviation. We've asked Justin Trudeau and our government to support our industry. We're in it together and stand ready to get Canadians and our economy moving again. Over the past weeks, members of the Canadian aviation industry, through individual sector associations, have been in contact with your office and with officials at Transport Canada, and the departments of Finance and Innovation, Science and Industry among others on short and longer term actions to support the aviation sector's efforts to keep essential services, trade and goods flowing to and through Canada. While we are focused on the essential services that the aviation community is delivering today, Canada's aviation leaders have begun to identify the elements needed in the near future if we are to emerge from this crisis ready to support Canada's economic recovery. Time is of the essence and our ability to respond effectively will translate to how quickly Canadians and our economy get moving again. To that end, we the undersigned, represent Canada's aviation associations and have come together to identify industry-wide actions that the government can take that would allow our businesses to help their passengers, customers, students and communities to return to a state of economic health and normalcy as quickly as possible. We are already reaching out to the ministers and departments who have direct oversight on these issues. But it is also important to share with the government how these actions will not only support aviation businesses and jobs, but how they in fact will bolster the Canadian economy as a whole. The following is a summary of requests to government from the combined aviation businesses that are represented by our associations for short-term relief as a matter of urgency:

- An extension to the Canadian Emergency Wage Subsidy set to expire June 5th
- Financial support for all of Canada's air operators, airports, maintenance, repair and overhaul organizations, and flight training units devastated by the impact of COVID19
- Ensure that all airports, regardless of ownership model, are eligible for all support programs implemented to combat COVID-19

- A suspension of all federal carbon taxes on jet fuel and av gas
- Federal financial assistance for air navigation charges incurred for essential and repatriation flights during this pandemic period
- Extended rent relief for National Airport Systems airports
- Extend the Canada Emergency Commercial Rent Assistance (CE-CRA) program to all airports, regardless of ownership model, helping Canada's air operators, flight training units and airports
- Subsidies to support upskilling and reskilling of our workforce
- An extension of the deferrals on current regulatory implementation and consultation processes that are not related to the pandemic.

We are prepared to discuss these and other measures with department officials in greater detail and look forward to working with the government on the actions required to build our new economy.

Sincerely,

Anthony Norejko, President and CEO, Canadian Business Aviation Association (CBAA)

On behalf of: John McKenna, President and CEO, Air Transport Association (ATAC); A.D. (Bram) Tilroe, Acting Chair, Alberta Aviation Council, (AAC); Sam Longo, President and CEO, Aircraft Maintenance Engineers of Canada (AMEC); Jean-Marc Dufour, Association Québécoise du transport aérien (AQTA); Dave Frank, Executive Director, British Columbia Aviation Council (BCAC); Daniel-Robert Gooch, President, Canadian Airport Council (CAC); Robert Donald, Executive Director, Canadian Council for Aviation & Aerospace (CCAA); Bernard Gervais, President and CEO, Canadian Owners and Pilots Association (COPA); Fred L. Jones, President and CEO, Helicopter Association of Canada (HAC); Joe Vodopivec, President, Manitoba Aviation Council (MAC); Mike McNaney, President and CEO, National Airlines Council of Canada (NACC); Glenn Priestley, Executive Director, Northern Air Transport Association (NATA); Janet Keim, President, Saskatchewan Aviation Council (SAC)

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The New Normal

The recent changes in our industry have shown us that it is possible to use many electronic means to continue to operate, communicate and educate. Many of us have been slow to take up the new technologies that are available to us. We can maintain distancing while using cellphones and tablets for video chats. Speech-to-text programs can be used for making work reports and keeping records. The possibilities are endless. It is time to embrace the new technologies. FYI, I am using speech-to-text to write this article.

Your cellphone light combined with a magnifier app makes looking for cracks in Cessna seat tracks, or other such inspections, so much easier. Click the photo button to keep a record! New borescopes costing less than \$200 are available for interior engine inspections or for use in hard-to-reach spaces in airframes and wings. These borescopes have cameras and lights similar to those on our cellphones mounted on the end of an 18-inch long stick, the end of which can be articulated allowing us to look behind corners and inside cylinders. We can save a still picture or even a video of what we see. Continental Motors recommends visual checks of the exhaust valve for condition, rather than pulling cylinders from a low compression test. (See Continental Maintenance Manual M-0 Paragraphs 6.4.11 and following.)

Instructions for Continued Airworthiness (ICAs)

Have you reviewed your Instructions for Continued Airworthiness (ICAs) lately? Well, you should do so every time you are working on an aircraft, engine, propeller, or their components. What are ICAs? Simply, they are the manufacturer's maintenance manual and other technical documentation needed to perform maintenance on aircraft, engines, propellers, and components. They are subject to approval by Transport Canada or by the airworthiness authority of the host country that holds the type certificate for the aeronautical product.

Have a look at CAR standard 525.1529 Instructions for Continued Airworthiness, Appendix H, where it describes the format and content for ICAs. As an example there must be information about the description and operation of the aircraft and its systems. There must be an Airworthiness Limitations section, servicing information, troubleshooting information and a listing of special tools, to name just a few of the requirements. In addition the ICAs must include an inspection program that includes the frequency and extent of the inspection necessary to provide for the continued airworthiness of the aircraft.

While you are reviewing the CARs, also look at 533.4 (& Appendix A) and 535.4 (& its' Appendix A). These sections describe the regulatory requirements for ICAs for engines and propellers respectively. What about the modifications and repairs to the aircraft and equipment after manufacture you might ask? Well, reference CAR Standard 521.368. The holder of a Supplemental Type Certificate, a Limited Supplemental Type Certificate or a Repair Design Certificate is obliged to document and make available any changes that may affect the maintenance requirements of the aircraft or component the modification applies to.

So when performing maintenance on aircraft, engines, propellers, components and any installations or modifications covered by STCs, make sure you are using the latest version of the ICAs. One final important point, should you discover a discrepancy or a lack of clarity in the manufacturer's manual, please take the time to inform the manufacturer and request that they correct or amend their ICAs. They'll appreciate the feedback and you'll appreciate knowing you've made an influence.

— Submitted by Stephen Farnworth
For the Board of Directors

Western AME Association



Transport Canada Guidance for new AME licence applications

Transport Canada has issued guidance for new AME Licence applications. The interim changes to AME licensing procedures include the acceptance of AME application forms and supporting documentation via email and the extension of the 12-month validity of application forms

and examination approvals. Transport Canada maintains an update site, which you can visit by entering this URL: www.tc.gc.ca/en/initiatives/covid-19-measures-updates-guidance-tc/aviation.html#toc3

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Central AME Association



About CAMEA

The Central Aircraft Maintenance Engineer Association is an organization dedicated to maintaining and enhancing the standards, rights and privileges of all AME members in the central region of Canada. Our chapter is one of six similar associations across Canada who collectively supports the national body CFAMEA (Canadian Federation of Aircraft Maintenance Engineers Association). Our organization

works with Transport Canada in the formulation of new rules and regulations and provides a collective viewpoint for all AMEs.

CAMEA is a not-for-profit organization run by a volunteer group of AMEs. We elect members of our organization to be part of our Board of Directors. Members of CAMEA are comprised of AME's, AME apprentices, students, non-licensed persons working in the industry and corporate members.

www.camea.ca

Central Ohio PAMA



COVID 19 and the 2020 COAGO event

COPAMA is currently soliciting the past vendors of the Central Ohio Aviation Golf Outing to get their input on holding the event this year. COPAMA President Joe Lippert sent out the following message:

We are beginning to look at our planning for a golf outing this fall.

With the planned outing set for the first Friday after Labor Day, and things seemingly changing almost daily, it seems impossible to know where things will be in the sense of being able to travel, or even have events of this type. Add to that different mandates in different states and I know we have a moving target.

Please share with us your thoughts on participation or even if we can effectively have the outing. Has your company made any budgeting plans for events like these in the second half of 2020? Do you anticipate attending as you have in the past if we can have the outing?

I will start communicating with the people at Willow Run and see where things are as we progress through the summer. Your best guess on answers to these questions might help us in our decisions when the time comes to make them.

Thank you for all your support over these years. Stay well.

— Joe Lippert
COPAMA President

www.copama.org



If you'd like to contribute your professional association's newsletter to AMU magazine contact our editor, John Campbell via email :

amu.editor@gmail.com



How Millennials can save an industry

By Lindsay Nixon

There are few things that we are reminded of as frequently as the opinion that the millennial generation (those between the ages of 22 and 39 years old) is inherently different than those who came before them. When a group of managers was asked to describe millennials in one word, the responses received were unflattering (to put it mildly).

What you may be surprised to hear is that the same adjectives used to describe millennials today are the same adjectives used to describe the younger generation in 1990. "Lazy, entitled, selfish, shallow... [who] have trouble making decisions" is a quote taken from the Time article "The Next Generation" in the summer of 1990. Life Magazine, in 1968, had a similar article using the same descriptors with the up-and-coming generation of that era. The true issue may not be generational, after all. The difference may be that as we age, we choose to take on additional responsibilities and zoom our lens out to view a larger picture. In doing so, we tend to shift our career focus from personal priorities (do peace, equality, or civil rights ring any bells?) to organizational priorities – a natural progression of sorts.

For employers, this is fantastic news; common ground exists. Many ideals most important to the young generation of today are the same ideals we held dear in our younger years – meaningful work, social justice, diversity, and the importance of education. In fact, the millennial generation has repeatedly shown the rest of us that they are more focused on personal and career growth and less focused on marriage and family – something never-before-seen in the workforce-entering generation.

In our industry specifically, we have no time to waste in welcoming this generation into our organizations. While the aviation industry loses mechanics and pilots daily to retirement and burn out, the logical place to recruit these replacements is in the generation that everyone loves to hate: millennials. Truth be told, we need them more than they

need us – and it's our responsibility to begin advocating and recruiting this generation to join our industry before it's too late. Below are my five steps to creating a millennial-friendly workplace:

1. Evaluate your mission. By injecting a personal feel into your brand – community outreach, charity work, and living your company values – you will not only define your company, but also attract talent that places importance on giving back (which has its own set of perks).
2. Review your benefits. Money isn't everything, so review what you're offering. You may find that you attract better talent with better benefits, vacation time, tuition reimbursement, retirement plans, career development opportunities, or flex scheduling.
3. Be prepared for departure. In aviation specifically, we all know that the supply of career opportunities is in excess of talent. It's your responsibility as the employer to create an environment that entices your employees to stay, instead of going to your competition.
4. Embrace technology. The inevitable result of the computer age, the faster you are able to incorporate technology into your organization, the more efficient and millennial-friendly your workplace will become.
5. Last but not least, listen. Truly listening to your employees and evaluating their feedback seems simple enough, but to this generation it means even more. Improving processes and promoting growth of your organization are two by-products of simply opening your ears to hear the good, the bad, and the ugly of your company's day to day from those on the front lines (or at least, those closer to them than you). The aviation industry doesn't have the luxury of being selective. We need to overcome our workforce shortage with optimism and resourcefulness, not stereotypical judgement. The fact is that things are projected to get worse before they get better. By adapting your workplace to welcome millennials with open arms and minds will only help you weather the storm.

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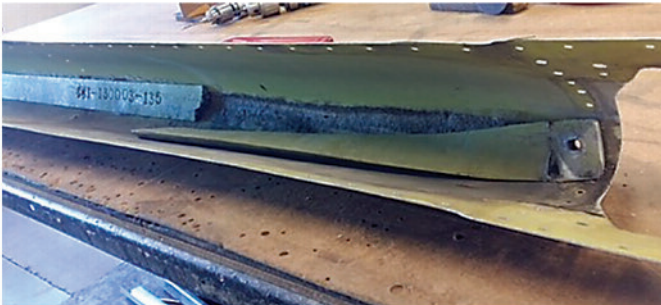


We invite you to contribute your expertise by writing an article for AMU. Keep your membership, and promote upcoming symposiums and activities.

Contact our editor, John Campbell, at:
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TC Feedback

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



Above: Example of a B300 Cracked Aileron Weight on a Beech B300. Right: A Bombardier CL600's terminal block (TB33) burnt wires. Inset: Terminal block (TB18) burnt wires.



REPORTS AND COMMENTS

Report: Beech B300 Aileron Balance Weight Cracked and Separated

Subject:

During unscheduled maintenance, abnormal noise was heard coming from the right-hand aileron. Removed aileron and found aileron balance weight broken into 2 pieces. Outboard 13 inches of balance weight was found to be held on with 1 CherryMAX rivet, which it was rotating on.

Transport Canada Comments:

It is important to note, flutter is a phenomenon that can occur when an aerodynamic surface begins vibrating. This can lead to failure of the control surface.

Other factors that could cause or contribute to control surface flutter:

- Improper tension on control cables
- Improper attachment security
- Balance out of limits
- Any other loose condition in the empennage

The addition of a loose aileron balance / nose weight dampener could contribute to this type of situation. Pilots and maintainers are reminded of the importance of a thorough pre-flight inspection.

Report: Bombardier CL600 2C10 (RJ700) Integrated Drive Generator power cable failures at terminal blocks

Subject:

Three separate Service Difficulty Reports (SDR) related to electrical failures on the CRJ700 have recently been reported. The failures occurred at terminal blocks located in the Integrated Drive Generator power circuit. As detailed below, wire lug terminals and/or terminal block studs were found burnt:

1. SDR 20160210001 - The left hand Integrated Drive Generator (IDG #1) power cable phase A was found burnt on terminal block (TB33). The cable identification is SCH001W-2 and SAV0001W-0.

2. SDR 20160202007 - The right hand Integrated Drive Generator (IDG #2) harness and terminal block (TB32) was found damaged and required replacement.

3. SDR 20150630002 - Damage found at terminal block 18 (TB18) for integrated drive generator for left engine in the aft cargo compartment. While performing another inspection task, one of the phase wires on TB18 was found with signs of overheating and due to the extent of the damage, the wires required replacement.

Transport Canada asked Bombardier to investigate the power cable failures at the terminal blocks and the investigation noted the following:

- Insufficient torque applied to the self-locking nut may result in an increase in contact electrical resistance leading to a “hot spot.”
- A “hot spot” can lead to expansion and contraction related to changes in current draw through the stud, which can cause the self-locking nut to further loosen.
- Loosened hardware can make the hot spot hot enough to char or melt the terminal block.

Transport Canada Comments:

Transport Canada asks aircraft maintainers to take note of the following:

- All affected terminal blocks were the same part number (MS2721253), they are used in various locations.
- These terminal blocks require a higher than standard torque to ensure a proper wire connection.
- The correct torque is located in Bombardier’s Electrical Standard Practices manual and must be followed at all times to ensure a secure connection.
- Transport Canada is monitoring this issue.



Above: Excessive wear resulting in drive shaft disconnect on a Cessna 172. Below left: A damaged battery from a Bombardier BD 700.



Report: Bombardier BD 700 1A10 Overheated Nickel-Cadmium (Ni-Cad) Battery

Subject:

The Auxiliary Power Unit battery was dropping to 9 volts on start and the operator decided to replace it with his spare. When they got access to the battery, they found the battery case deformed and one of the latches seemed to have detached from the case. It was confirmed that the battery heater circuit breaker was out at the time of the event.

Transport Canada Comments:

An aircraft should never be attempted to start an engine with a dead Ni-Cad battery. Here is an example of the kind of damage thermal runaway causes. They are fortunate that it did not damage the aircraft. Proper voltage and temperature monitoring can prevent battery damage from overheating caused by thermal runaway.

Report: 172N - Cessna 172 Fuel Selector Valve Inspection and Maintenance

Subject:

During flight, the pilot noticed fuel imbalance despite fuel selector in “BOTH” position. The Left-Hand (LH) fuel supply was significantly lower than the Right-Hand (RH) one. Reported to maintenance as per standard process, who discovered the ball-detent had separated from the fuel selector valve shaft, causing the actual fuel selector position to be on left only. This was caused by the breaking, due to wear, of the ball-detent, as part of the ‘knee’-shaft assembly between the fuel selector handle and the fuel valve. Item replaced and aircraft released as per the standing procedures.

Transport Canada Comments:

Several related Service Difficulty Reports (SDRs) have been reported, including:

- Engine power loss due to incorrectly positioned fuel valve – excessive wear
- Engine power loss due to incorrectly positioned fuel valve – selector stiff
- Engine power degradation, 20-30 seconds after advance to full power – detent wear

Cessna published Service Letter SE71-10 in 1971 highlighting the importance of regular inspections of the fuel selector valve and drive shaft linkage. Transport Canada would



Left: Dassault Falcon. Wheel after being found. Bottom left: Axle showing bearings still there and wheel missing. Bottom right: Inside of wheel showing residual materials from broken bearing. Note the different sizes of bearing races with larger diameter inner bearing.

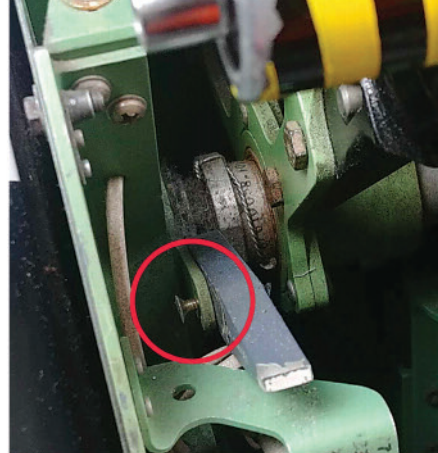


Image shows the screw backed out from the lever.

also like to emphasize the following points contained within the Service Letter:

- Valve control detent plate for cleanliness and excessive wear
- Drive shaft attach points for security, binding, excessive wear and lubrication
- Operate valve handle through all positions and check for proper operation, detent feel, and freedom of movement

Cessna Model 172 Series Service Manual recommends – Each 100 Hours: Fuel Selector Valve – Check controls for detent in each position, security of attachment, and for proper placarding.

**Report: De Havilland DHC 8 311
Jammed Elevator Trim**

Subject:

While positioned on the ground, the flight crew reported to maintenance that the elevator trim wheel was stuck. When the aircraft maintenance engineer (AME) investigated the elevator trim system, it was found to be jamming on the captain's side of the centre pedestal in the cockpit. The screw holding the indicator needle to the lay-shaft assembly was backed out and contacting the structure. This caused the elevator trim indicator to be disengaged from the captain's trim wheel indicator track. This discrepancy was rectified as per the Dash 8 Aircraft Maintenance Manual and Illustrated Parts Catalog.

Transport Canada Comments:

These screws are located in an area that is not accessed often and is easy to miss. Maintainers should make sure that free movement of the control levers or trim wheel is not restricted by loose parts. Also, when working in this area make sure that the screws and bolts have the correct torque when replacing parts.

**Report: Dassault Falcon 900EX
Main Wheel Found Missing
After Landing**

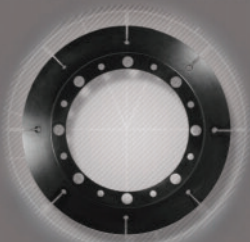
Subject:

The aircraft landed uneventfully but the crew reported a significant loss of braking action. During the crew walk around after landing, the right outboard main wheel assembly was noticed to be



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**Report: Pilatus SW, PC12 47E
Improper Wiring Practices**

Subject:

During a routine inspection of the windshield heat wiring and splice crimps, it was noted that the left-hand pilot windshield wires were crimped improperly. This is what this inspection was designed to look for, after finding some windshields that were installed improperly. The two separate splice crimps were found to have been crimped backwards.

Transport Canada Comments:

This special inspection proved its worth. Sometimes routine maintenance can seem mundane and uninteresting. This particular maintenance staff was able to find the exact issue the inspection was calling out. Following procedure and being attentive during inspections can save a crew from an in-flight failure. ■

missing. The missing wheel assembly was subsequently found at the departure airport and is being returned to the operator's maintenance base for further evaluation. The crew said they did not see any other damage.

The initial findings by maintenance personnel noted that all of the attaching hardware and locking devices were still in place. It appears that the outer bearing disintegrated and the wheel bearing cup diameter is sufficiently large enough that the wheel can pass over the retaining hardware. The aircraft manufacturer has been advised and the affected main gear assembly is being replaced by a manufacturer's repair team.

Transport Canada Comments:

The event was investigated and concluded that it resulted from an outboard bearing cone failure. The parts were sent for investigation but due to the high level of damage of the outboard bearing cone, it was impossible to isolate one specific root cause.

The most probable causes are improper tightening of the wheel to axle nut (under-torqueing), or improper inspection of the condition of the bearings during the last wheel installation (140 Flight Cycles (FC) before the event). The inboard bearing cone was found normally lubricated, so a lack of bearing grease in the outboard bearing cone is not suspected.

Transport Canada wants to remind all operators that installation of aircraft wheels must be performed strictly in accordance with the Aircraft Maintenance

Above: Properly spliced wiring versus improperly spliced wiring (inset).

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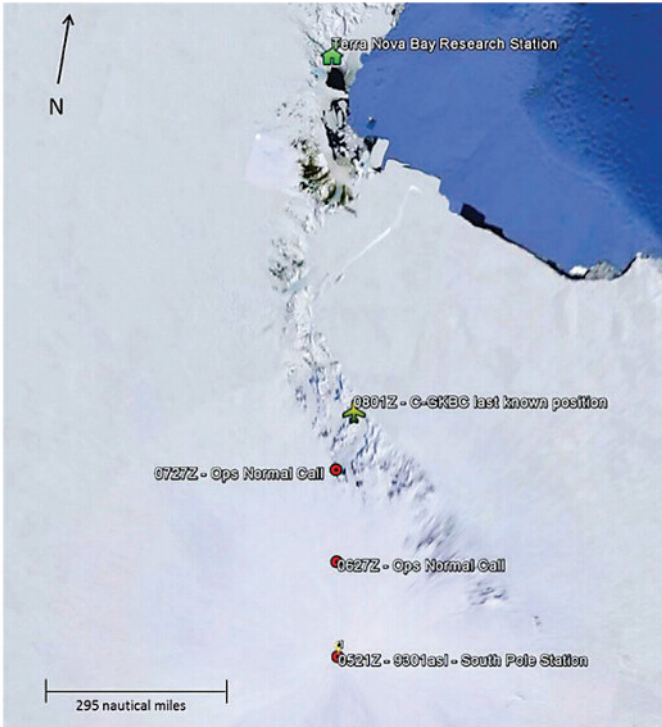
Fateful Flight of C-GKBC



The ultimate fate of a polar flight crew may well forever remain an Antarctic mystery.

Kenn Borek Air is an airline based in Calgary, Alberta. It operates regional passenger and cargo services, contract operations in the Arctic and Antarctic.

THE Kenn Borek Air Ltd. de Havilland DHC-6-300 Twin Otter, (registration C-GKBC, serial number 650) departed South Pole Station, Antarctica, at 0523 Coordinated Universal Time on 23 January 2013 for a visual flight rules repositioning flight to Terra Nova Bay, Antarctica, with a crew of 3 on board. The aircraft failed to make its last radio check-in scheduled at 0827, and the flight was considered overdue. An emergency locator transmitter signal was detected in the vicinity of Mount



Wreckage of C-GKBC at the occurrence site, looking southeast.

Route of C-GKBC from South Pole Station to Terra Nova Bay.

Elizabeth, Antarctica, and a search and rescue effort was initiated. Extreme weather conditions hampered the search and rescue operation, preventing the search and rescue team from accessing the site for 2 days. Once on site, it was determined that the aircraft had impacted terrain and crew members of C-GKBC had not survived. Adverse weather, high altitude and the condition of the aircraft prevented the recovery of the crew and comprehensive examination of the aircraft. There were no indications of fire on the limited portions of the aircraft that were visible. The accident occurred during daylight hours.

History of the flight

The purpose of the flight was to reposition the aircraft and crew to support an Italian research team located at Terra Nova Bay, Antarctica. The flight was conducted under visual flight rules. The

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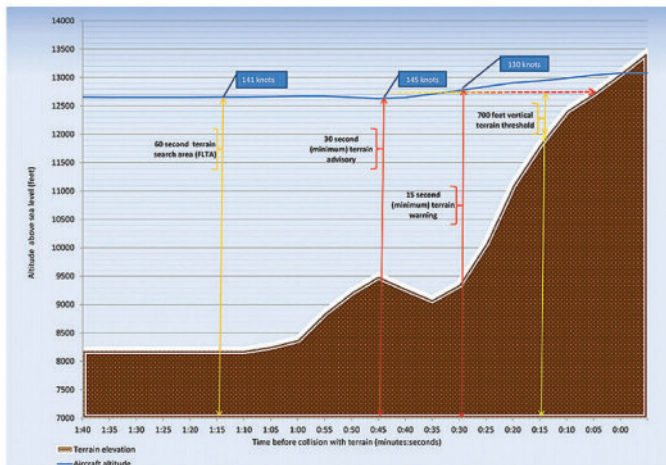
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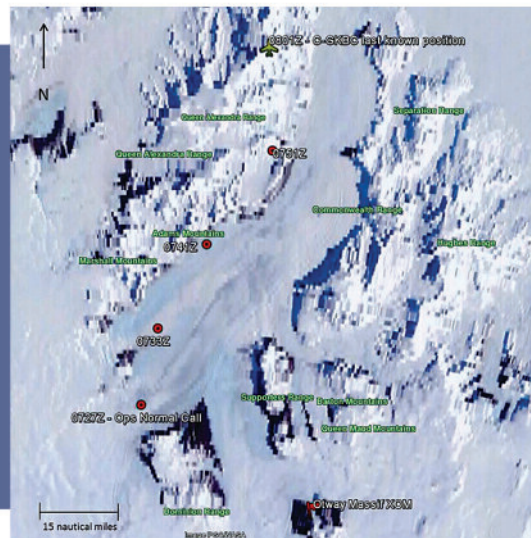
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Garmin GNS 430W forward-looking terrain alert and geography advisory and warning criteria.



Route of C-GKBC in last minutes of the occurrence flight.

route of flight had been flown by the captain approximately 16 times in 8 seasons in the Antarctic. Prior to departure, the aircraft had taken on 634 US gallons of fuel.

C-GKBC climbed to 11,000 feet above sea level (asl) and called into South Pole Station at 0627Footnote 2 via radio to report that operations were normal. The onboard SkyTrac ISAT-100 tracking equipment showed that C-GKBC proceeded along a track of 358° true (T) flying by position 87°23'3" S, 164°50'52" E at 0629, at which point the aircraft descended to 10,000 feet asl. At 0725, C-GKBC turned right to 032°T followed 2 minutes later by a descent to 9100 feet asl (85°05'32" S, 164°41'57"E).

Another position report was radioed in to South Pole Station at 0727 indicating that operations were normal. At 0749, SkyTrac showed a climb was initiated to 12,500 feet asl followed by a heading change to approximately 350°T. At 0801, the SkyTrac unit transmitted a final global positioning system (GPS) position of 83°53'30"S, 168°33'45" E. A position report for 0827 was not received, which initiated the activation of the Emergency Operations Center (EOC) at the United States McMurdo Station, and a communications search was begun.

Search efforts

The initial emergency locator transmitter (ELT) alert from C-GKBC was received at 0856. The position of the aircraft was fixed at 1000 in the vicinity of Mount Elizabeth. Poor weather conditions prevented search activities.

SKIER 33, a U.S. Air National Guard C-130 aircraft, de-

parted Otway Massif (92 nautical miles [nm] south of the accident site) at 1100 and overflew the site at approximately 1205. The crew of SKIER 33 was not able to make radio contact with the crew of C-GKBC and was unable to locate the site visually due to a cloud layer below the search aircraft.

Weather conditions had improved enough for a Kenn Borek Air Ltd. DC3T aircraft to depart and fly over the site at 2230. The aircraft orbited the site for 5 hours, but the crew was unable to see the site due to heavy cloud cover.

Kenn Borek Air Ltd. deployed a Twin Otter and a DC3T on 25 January 2013, in addition to a Petroleum Helicopters (PHI) Bell 212 helicopter and a New Zealand South Lake Helicopter Eurocopter AS350-B3, to the Central Trans Antarctic Mountains fuel cache in the Beardmore area to establish a search and rescue base camp. A Joint Antarctic Search and Rescue Team (JASRT), operated by the U.S. and New Zealand, was also deployed.

The occurrence aircraft was spotted by the crew of an LC-130 at 0235 on 26 January 2013. A second reconnaissance flight was conducted by a Kenn Borek Air Ltd. Twin Otter at 0426. No signs of activity at the accident site were observed.

On 27 January 2013 a search and rescue (SAR) team was positioned, via helicopter, on a ridge approximately 1000 feet above the accident site. The crash site was located at about 13 000 feet asl on a steep slope. The crash area exhibited signs of crevasses and avalanche activity.

The cockpit voice recorder (CVR) and a satellite tracking unit were recovered from the tail section of the aircraft, which was exposed above the ice and snow. The aircraft was



The South Pole Rescue Team of Kenn Borek Air made a daring rescue in June 2016 during the Antarctic winter, rescuing two ill researchers from the National Science Foundation's Amundsen-Scott South Pole Station in Antarctica.

equipped with long-range ferry fuel tanks, which had crumbled on impact and blocked access to the cabin area. Fuel was observed to be leaking inside the aircraft. The roof of the aircraft had collapsed into the cabin. The cabin was filled with, and surrounded by, packed snow. The SAR team evaluated the site and determined that recovery operations could not be safely continued and the recovery operation was suspended for the season.

On 06 October 2013, a Kenn Borek Air Ltd. aircraft overflew the accident site and reported that the occurrence aircraft was buried in snow and that a small portion of the tail was visible from the air. Given the location of the accident site and the inherent dangers associated with an attempt to recover the flight crew, a recovery operation was not planned.

Weather

Weather observations and forecasting in the Antarctic, despite the concentration of scientific activity, was relatively sparse. The atmospheric model indicated that, in the vicinity of Mount Elizabeth, the winds were generally from the east and not stronger than 35 knots at the time of the occurrence. It was likely that there was a widespread cloud layer over the

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The wreckage from the incident aircraft that crashed in Antarctica on Jan. 23, 2013 killing three Canadians on board. Investigators with the Transportation Safety Board have concluded the cause of the crash may never be known (CBC).

Beardmore Glacier from 13 100 feet asl to 14 700 feet asl. A cloud layer over the Ross Shelf at the base of the Beardmore Glacier may have been at approximately 9800 feet asl.

Weather conditions observed by SAR aircraft 4 ½ hours after the accident in the vicinity of Mount Elizabeth was a solid cloud deck, topping at approximately 16,000 feet asl, with a break in the clouds in the east grid. Mountain wave conditions with high winds and associated turbulence existed.

Flight crew

Records indicate that the flight crew was certified and qualified for the flight in accordance with existing regulations.

Aircraft

The de Havilland DHC-6-300 Twin Otter C-GKBC, serial number 650, was certified in Canada under Type Certificate A-82. Supplemental Type Approval SA96-103 authorized the installation of 2 Pratt & Whitney Canada PT6A-34 engines de-rated to limit available power to 620 shaft horsepower. Records indicate that the aircraft was certified, equipped and maintained in accordance with existing regulations and approved procedures.

Prior to deploying to the Antarctic, C-GKBC had undergone an extensive pre-deployment inspection at its home base in Calgary, Alberta, in October 2012. Routine maintenance

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in the Antarctic was carried out by the Kenn Borek Air Ltd. AME who was on board the occurrence flight.

The aircraft had accumulated in excess of 28,200 flight hours since manufactured in 1979. The aircraft was normally configured for 9 passengers and 2 flight crew, with a maximum take-off weight of 12,500 pounds. Passenger seats were removed for the installation of a long-range ferry fuel system, which increased the maximum take-off weight to 17,500 pounds. The installation of the long-range ferry tanks was under a Transport Canada Ferry Permit. At the time of the occurrence, the aircraft weighed approximately 14,600 pounds and was within the centre of gravity limits. At an altitude of approximately 12,500 feet asl and an operational weight of about 14,600 pounds, the aircraft would have been capable of a 700-feet-per-minute climb.

“

None of the records recovered by the investigation team indicated that the failure of the CVR was noticed by the flight crew.

The occurrence aircraft was equipped with a Fairchild L3 Model A100 (S/N 6024) CVR. The unit was recovered during the search and rescue operations and transported to the TSB Laboratory in Ottawa, Ontario. This unit was capable of recording 30 minutes of audio data on 4 channels. The unit was last certified in January 2012 and installed in October 2012. The last recorded data was determined to have been from a flight conducted on 01 December 2012; therefore the unit did not contain any data related to the occurrence flight.

None of the records recovered by the investigation team indicated that the failure of the CVR was noticed by the flight crew. The company operations manual did not contain direction to the flight crew requiring a periodic functional check of the unit. The occurrence flight was required by regulation to have a functioning CVR.

C-GKBC was equipped with a Canadian technical standard order (CAN-TSO) C151b certified Sandel ST3400 terrain awareness and warning system (TAWS) and two Garmin GNS 430W navigation receivers with the capability for terrain advisory. An analysis of GPS performance by the U.S. Air Force Space Command determined that at the time of the occurrence the position error was less than 2.2 metres. There were no significant solar or geophysical weather events that would have affected GPS accuracy.

Evolution in the technology underlying ground proximity warning systems (GPWS) has given rise to the terrain awareness warning system (TAWS). Improvements include earlier

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aural and visual warnings under more conditions than GPWS; forward-looking terrain display based on aircraft position and a terrain database; and the development of a terrain clearance altitude relative to a runway, which provides alerts and warnings regardless of landing gear and flap settings.

Regulations requiring the installation of TAWS in private turbine-powered aircraft and all commercial airplanes configured with 6 or more passenger seats were introduced in 2012. As the occurrence flight was a VFR ferry flight to Terra Nova and was not configured for 6 or more passengers, a TAWS was not required under existing regulations.

The Sandel ST3400 TAWS unit was certified to meet the new regulations' Class B requirements, which include a forward-looking terrain avoidance (FLTA) mode. To enable the FLTA mode's aural and visual warnings, a terrain database for the area of operation has to be installed. The database available for the ST3400 unit did not cover the area beyond 70°S latitude which meant that the TAWS system would not function there: the unit would not have generated warnings or advisories for the accident location, and would have displayed "Terrain Fail" because it was operating outside the geographic region captured by the database.

Analysis

The circumstances surrounding the accident were difficult to determine given the limited access to the accident site

and lack of data, which could have revealed details of the last moments of the flight. Data from the cockpit voice recorder would have been particularly useful. The unit was not functional on the occurrence flight; consequently, details of the flight crew's interaction and decision making were not available to the investigation.

Information recovered from the SkyTrac ISAT-100 tracking unit enabled the investigation to reconstruct C-GKBC's route. The reconstruction did not indicate any aircraft performance anomalies. Flight track, altitude, and ground speed remained relatively constant throughout the flight. At 0749, C-GKBC initiated a turn to the left that would have led directly to Terra Nova, but the aircraft's altitude was insufficient to clear Mount Elizabeth.

Weather model analysis suggests that after the turn into the Beardmore Glacier, C-GKBC may have entered an area covered by cloud, and the crew's view of Mount Elizabeth was likely to have been obscured. The occurrence aircraft was equipped with an FLTA system, and the initiation of a climb approximately 45 seconds prior to impact suggests that the crew might have responded to a terrain warning, but aircraft climb performance was not sufficient to avoid the terrain. ■

(These are excerpts from the Transportation Safety Board's investigation into this occurrence. The Board authorized the release of this report on 21 May 2014. It was officially released on 20 June 2014.)

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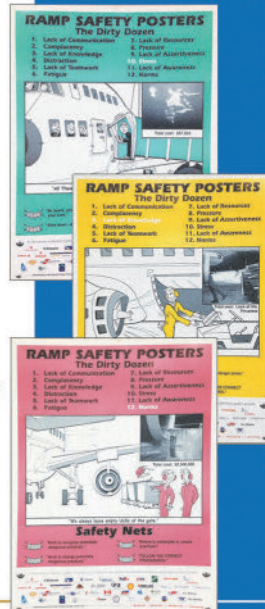
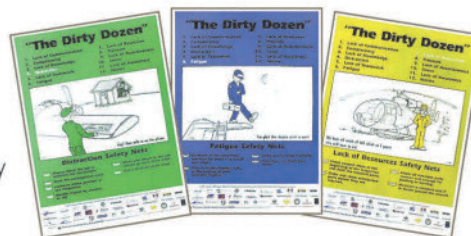
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Message from the President

Here, AMEC president Sam Longo writes in response to all the uncertainty stemming from the COVID-19 pandemic.

Hello fellow AMEs across Canada. As you all know 2020 is shaping up to be an extremely challenging year. In addition, the last month in particular has also been life-threatening due to COVID-19. Many of you have had to continue working to maintain aircraft working shoulder to shoulder with your fellow technicians. Many of these flights are more crucial than ever to get Canadians home safe and sound to their families. For this, all Canadians are eternally grateful.

Now as the aviation world slowly grinds to a halt many of you are facing lay-offs and uncertain futures once the immediate danger has passed. I urge you all to hang in there; this industry has always had its ups and downs, and it will bounce back as it always does. Your dedication to your profession will see you through to better times.

Take this opportunity to enjoy time with your families, devoid of shiftwork, and try to make the best of it. Reach out to friends and family through social media and check in on those who may need a helping hand. Please remember that whatever challenges you are facing we are all in this together. Be compassionate, as there may be others with much greater needs and concerns.

I urge you all to practice social distancing; do your best to be good Samaritans, good citizens and strong Canadians.

Stay Safe!

— Sam Longo, President AMEC/TEAC

An open letter about COVID-19.

Human factors reminder about the coronavirus

By Gordon Dupont

Hello fellow AMEs:

The jokingly called “Mexican beer flu” is no longer a joke but has shown that it can and does kill. This very real threat can cause various degrees of stress in an individual. The greater the degree of stress, the more the mind focuses on the stressor

and not the job at hand. As an AME your work calls for your full concentration on the job.

So what to do? Your human factors training has given you Safety nets to help you avoid making a human error when stressed. Number one is to be aware of this stress and take just a minute for Safety:

- a) What could go wrong doing this task?
- b) Go over each step taken to ensure no error has been made.
- c) Ask a workmate to check your work



Stress is a major contributing factor to human error and as a human remember: YET – You’re Eligible Too.

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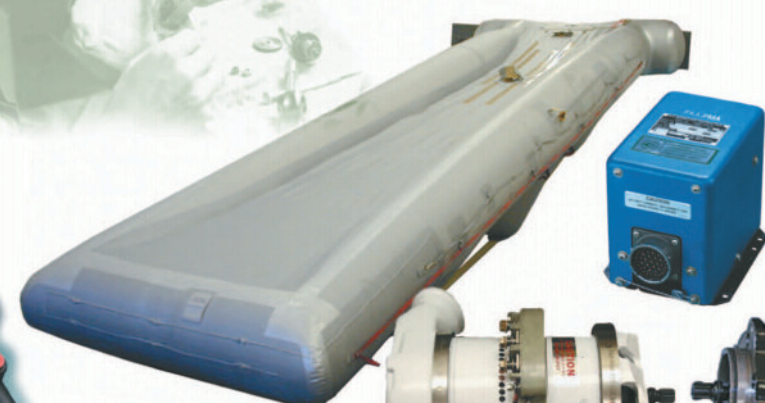
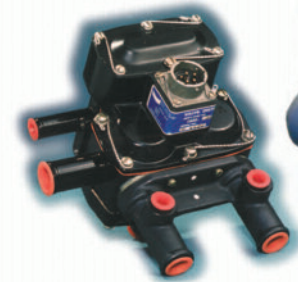
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