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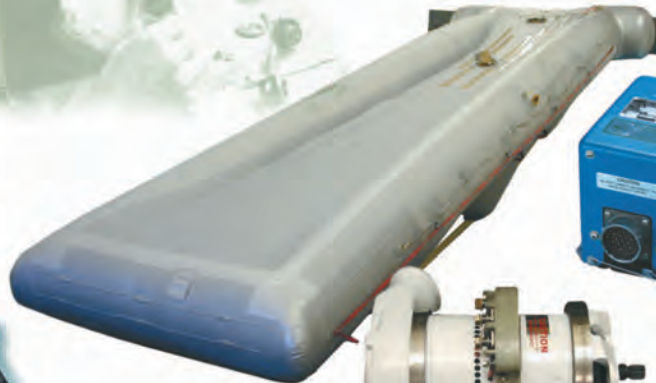
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Annual Snap-on Challenge Returns



TEST YOUR SKILLS, WIN MONEY: the Aerospace Maintenance Competition presented by Snap-on is back on for 2022! Over the past several years, this competition has grown to become a widely attended international aviation experience for both technicians and fans. The venue provides certified AMTs from major airlines, MROs and OEMs, as well as military personnel and students in FAA Part 147 schools, the chance to test their skills against their peers.

Participants compete in more than 20 events, including challenges such as airframe damage inspection, cable rigging, fibre optics, engine fan blade removal and many others that test their knowledge, skill and team work.

The team earning the overall best score takes home the William F. "Bill" O'Brien Award for Excellence in Aircraft Maintenance. The winning team receives the honour of displaying the five-foot-tall trophy in their facility for a year. In addition to the trophy, Snap-on is awarding more than \$75,000 in tools and equipment as prizes to the top finishers in the competition. In 2019, the five-member team from United Airlines Team Cleveland won the O'Brien Award for the third straight year.

The AMC coincides with the MRO Americas 2022 Convention, April 25-28, at the Kay Bailey Hutchinson Convention Center in Dallas, Texas. The annual competition for aircraft maintenance professionals and aspiring students has been cancelled for the past two years due to the COVID-19 pandemic.

Team registration opens October 1st. Visit: www.aerospacecompetition.com ■

— John Campbell, Editor



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Upcoming Events

CALIFORNIA AIRSHOW SALUTES HOLLYWOOD



PLANES OF FAME AIRSHOW in Chino, California has established itself over the past 25 years as one of the world's favourite air shows. Visitors flock to the Chino Airport from around the globe. Noted for the high number of flying World War II aircraft that perform, the show is also admired for flights of classic aircraft from the Golden Age of aviation as well as jets and other aircraft from the Korean and Vietnam War eras plus performances by current military aircraft.

The Airshow is an appropriate reminder of the need to honour the efforts and sacrifices of the men and women who designed, built, and flew these aircraft during some of the world's greatest conflicts. The Planes of Fame Airshow is also a wonderful way to introduce aviation to younger generations – from seeing the aircraft fly low overhead, strolling among the many displays, meeting veterans, and learning about aviation through some neat hands-on activities.

The Planes of Fame Airshow features dozens of static aircraft displays, a fun and educational "Re-enactor's Village"



full of military history, lots of vendors selling aviation memorabilia, tasty food and beverages, and plenty of special activities for the kids. This year's theme is "Saluting Aviation and the Big Screen!" and the focus from October 30-31st will be on the synergy between Hollywood and the aircraft industry over the past 100 plus years.

October 15, 2021
Snowbirds Home Closer
 Moose Jaw, Saskatchewan
www.rcaf-arc.forces.gc.ca/en/snowbirds

October 16, 2021
Future Pilots of America Fall Airshow
 Warm Springs, Georgia
www.futurepilotsofamerica.net

October 16-17, 2021
Florida International Air Show
 Punta Gorda, Florida
www.floridaairshow.com

October 16-17, 2021
Orlando Air and Space Show
 Sanford, Florida
www.floridaairshow.com

October 29-31, 2021
CAF Wings Over Dallas: WWII Airshow
 Dallas, Texas
www.wingsoverdallas.org

October 30-31, 2021
California International Airshow
 Salinas, California
www.salinasairshow.com

October 30-31, 2021
Planes Of Fame Airshow
 Chino, California
www.planesoffame.org

November 5-6, 2021
Blue Angels Homecoming Air Show
 Pensacola Beach, Florida
www.naspensacolaairshow.com

November 6-7, 2021
Thunder and Lightning over Arizona
 Tucson, Arizona
www.thunderandlightningoverarizona.com

December 3-4, 2021
New Bern Christmas Flotilla/Air Show
 New Bern, North Carolina
www.newbernnc.gov

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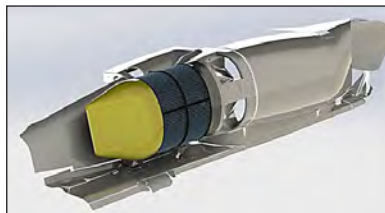



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Aerometals has added the S-70M airframe to their recently approved FAA Supplemental Type Certificate for engine inlet barrier filter protections. Benefits for the twin-engine Sikorsky S-70M include protection from erosion, foreign object damage, fouling and corrosion as well as a 96.8 percent airborne salt nuclei separation protection while operating in a salt laden environment. No impact to ram air cooling, no airspeed correction charts, no parasitic drag and a fuel burn savings of up to 40 pounds per hour are ancillary benefits. www.aerometals.aero



Spur gears are available in many configurations

KHK USA Inc. has a large selection of off-the-shelf metric spur gears available in many materials, configurations, modules and numbers of teeth. Materials include structural carbon steel S45C, structural alloy steels SCM440 (medium carbon steel) and SCM415 (low carbon steel), grey cast iron FC200, stainless steels SUS303 and SUS304, nonferrous metal C3604 (free cutting brass), engineering plastics MC901 and MC602ST. Materials conform to U.S. standards. KHK also offers a new method in which a five-axis machining centre is used in combination with gear manufacturing software. www.khkgears.us



Cessna Caravan gets pants

Whind LLC's new wheel pants for the Cessna Caravan series are said to offer a cruise speed improvement of up to seven knots, depending on initial configuration. Full STC approval is underway with completion and first delivery expected in 4Q 2021. The wheel pant also functions like the mud flaps on 208s, without the added drag. They are easy to install with no jacking required. Computational Fluid Dynamics optimization, 3D printing, and advanced CNC machining and fabrication created the shape for drag reduction. www.whindllc.com



Plasma cutters feature adjustability

Snap-on Industrial's line of plasma cutters can cut up to 3/4-inch thickness on a variety of ferrous, non-ferrous and high-strength materials. They feature depth-of-cut adjustability, which allows the top layer of material to be cut without disturbing the base layer. Making these cuts possible is inverter technology that drives a small yet powerful package size allowing for portability out in the shop or on the job site. Additionally, consumable kits are available for all three plasma cutters that include nozzle holders, nozzles, swirl rings and electrodes. www.b2b.snapon.com



QTA replaces aluminum barrel

Quiet Technology Aerospace has received FAA Supplemental Type Certificate approval for its eighth airframe specific carbon fibre engine inlet replacement barrel. This STC offers a terminating solution for Gulfstream G450 and the shorter range G350 aircraft over the plaguing issue of engine inlet cowl inner barrel corrosion on the Rolls Royce Tay Mark 611-8C turbofan engine inlets. QTA replaces the aluminum based inner barrel with a lighter weight state-of-the-art carbon graphite composite barrel which terminates the root cause of the corrosion issue; and comes with a lifetime warranty. www.qtaerospace.com



Parts washer operates in three stages

The new **Renegade I-Series Compact WRD SS** pass-through parts washer delivers continuous cleaning of parts transported through Wash, Rinse, and Blow-off stages via inline conveyor operation. The variable-speed conveyor can be configured with acetal plastic or a flat-wire belt. Each wash and rinse stage compartment contains spray manifolds with strategically-placed nozzles to deliver high-pressure force and high-temperature cleaning. The dry stage compartment contains a powerful air knife and/or blower to remove residual water from even hard-to-reach cavities. www.renegadepartwashers.com



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NEW CHALLENGER 3500 FITTED WITH “ECO APP”

Air transport industry IT provider SITA has announced that the newly launched Bombardier Challenger 3500 business jet will be fitted with its eWAS Pilot with OptiFlight, together dubbed the “eco app” by the Canadian aerospace group. It is the first time eWAS Pilot

with OptiFlight is offered as a feature on a business jet, helping pilots reduce fuel burn and carbon emissions.

The Challenger 3500 aircraft, launched in Montréal in September 2021, is also the first super mid-size aircraft to have an Environmental Product Declaration, with components such as eWAS Pilot with OptiFlight contributing to the overall efficiency of the jet.

IADA JOINS CANADIAN BUSINESS AVIATION ASSOCIATION

The International Aircraft Dealers Association has joined the Ottawa-based Canadian Business Aviation Association, Canada’s voice for business aviation. “Several of our member companies have executives that serve on the CBAA Board of Directors and our dealers are obviously active in Canada, so our board viewed membership in the organization a natural extension of the organization’s



activities in North America,” said IADA Executive Director Wayne Starling.

“In IADA’s 30th anniversary year, membership in CBAA furthers our reach into aviation industry affairs beyond involvement with the National Business Aviation Association and the European Business Aviation Association,” he added.

ASIAN MILITARY ORDERS TWO JB12 JETPACKS



California-based JetPack Aviation announced in September that it has closed a sale with an undisclosed military customer in Southeast Asia for two JB12 JetPacks. The USD \$800,000 order will take around six months to complete. Weighing 105 pounds and powered by six turbojet engines each delivering around 88 pounds thrust, the JB12 enables the pilot to hover and maneuver in all directions at speeds up to 120 miles per hour. The JetPack technology supports the ongoing development of the Speeder program. JetPack Aviation recently completed flight trials with P1, its first full-scale prototype Speeder, and plans to begin flying P1.5 later in 2021.



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EMBRAER'S ELECTRIC AIRCRAFT BEGINS FLIGHT TEST CAMPAIGN

On the journey to a net zero-carbon emissions future, Embraer has begun the flight test campaign of its electric demonstrator aircraft. Developed to evaluate new technologies that enable 100 percent electric and more sustainable aeronautical propulsion, the demonstrator conducts tests at Embraer's facility in São Paulo, Brazil. This technological project used an electric powertrain system from WEG and a set of batteries funded by EDP that were integrated into an EMB-203 Ipanema, an aircraft that is part of Embraer's history. In 2004, it became the world's first aircraft certified and produced in series to fly on fuel from a renewable source (ethanol).

VIKING AND PAL AEROSPACE SIGN TWIN OTTER CONTRACT



Viking Air and PAL Aerospace Canada have entered a contract to support the Twin Otter Fire Attack System. The agreement includes the design, manufacture, installation, and certification of the Aerial Firefighting System for the Twin Otter DHC-6 300 and 400 aircraft. It is anticipated that the Aerial Firefighting System will be certified in 2022 and an international customer will receive the first converted aircraft. The airtanker-configured Twin Otter aircraft will help mitigate and fight wildfires with the ability to drop up to 700 US gallons of water or retardant in challenging environments.

ROLLS-ROYCE'S ALL-ELECTRIC 'SPIRIT OF INNOVATION' TAKES TO THE SKIES



Rolls-Royce's all-electric 'Spirit of Innovation' aircraft completed its first flight taking to the skies September 15, propelled by a 400kW (500+hp) electric powertrain with the most power-dense battery pack ever assembled for an aircraft. The aircraft took off from the UK Ministry of Defence's Boscombe Down site and flew for approximately 15 minutes. The site has a long heritage of experimental flights and this first flight marks the beginning of an intense flight-testing phase in which Rolls-Royce will collect performance data on the aircraft's electrical power and propulsion system for its 'Accelerating the Electrification of Flight' program.

MODIFICATIONS ALLOW FOR WORK IN THE HOTTEST, HIGHEST ALTITUDES



StandardAero has delivered the industry's first UH-1H helicopter tailboom modified to be the lightest with the most heavy-lift strength to fly in the hottest and highest altitudes in the world. The first modification was delivered to launch customer Pinal County, Arizona Sheriff's Department's helicopter fleet. The major modifications were incorporated during tailboom refurbishment and paint, including the accompanying Supplemental Type Certificates

StandardAero 212 Vertical Fin, Tail Rotor and Push-Pull anti-torque control system incorporated onto a UH-1H Helicopter. The modifications improve hover-hold tasks, yaw control, high density altitude capability.

GULFSTREAM G700 SETS



FIRST INTERNATIONAL CITY-PAIR SPEED RECORDS

An all-new Gulfstream G700, the largest aircraft in Gulfstream's fleet, set its first ever city-pair speed records in early September, flying from Savannah to Doha, Qatar, and then from Doha to Paris. The fully outfitted G700 production test aircraft connected Savannah to Doha, a distance of 6,711 nautical miles at an average speed of Mach 0.88 in 13 hours and 16 minutes. The aircraft then set another city-pair record from Doha to Paris, flying 2,953 nautical miles in six hours and 15 minutes at an average speed of Mach 0.90. ■

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Feature



MACHINE SHOP

Maintenance



Spindles. You'll likely never get them a thought. Until they quit working.

By Del Williams

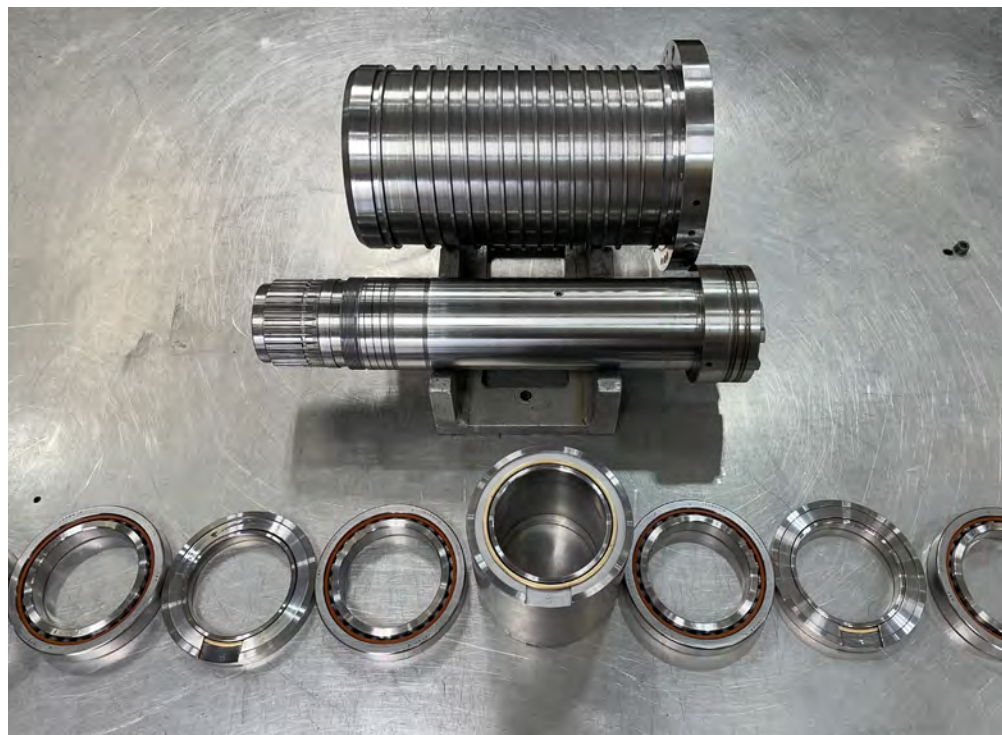


FOR machinists and fabricators serving the aerospace industry, CNC machine tool spindles are critical to any drilling, milling, boring, grinding, routing, cutting, or sawing process. However, when these systems deteriorate and fail due to contaminants, human error, improper maintenance, lubrication issues, or poor spindle design, a quality rebuild is often required.

Despite the availability of aerospace spindle rebuilders nationwide, not every firm provides the same level of quality. Even if a rebuilder has the equipment, they may not have the experience, technical knowledge, or attention to detail necessary to rebuild a spindle that performs reliably for many years.

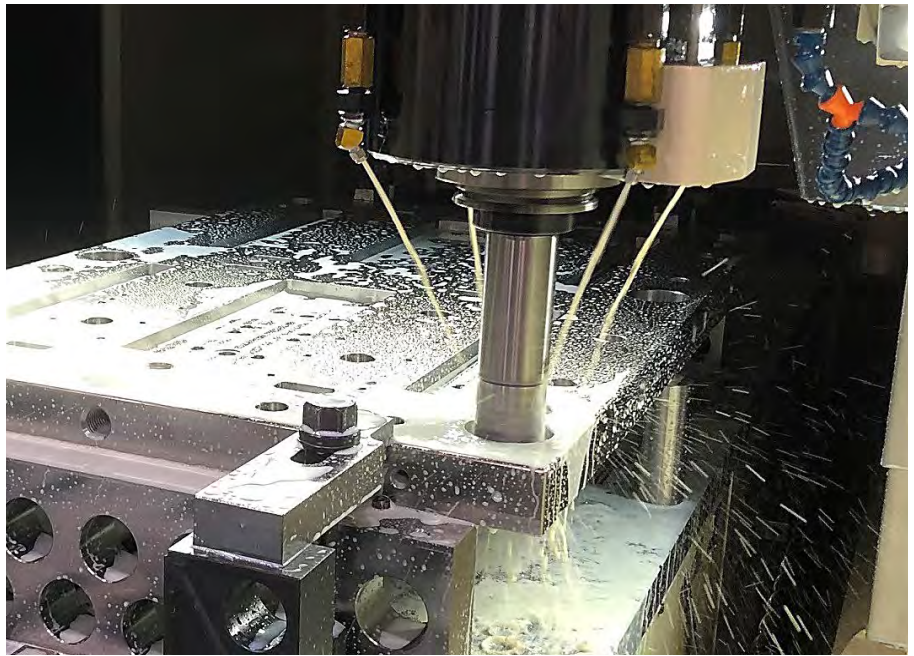
Even reputable rebuilders vary in the extent and quality of the initial inspection, accuracy of quotes, and level of communication with customers. Yet given the direct correlation between these factors and the ultimate quality and longevity of the rebuild, most machinists continue to believe that it makes little difference which shop they contact.

Opposite: Spindle repair involves making detailed measurements of every part of the spindle's shaft and housing geometry. Above: Machinists all have tales of failed spindle repairs. Below: Top notch spindle rebuilders use only high-grade replacement components and bearings.



In actual practice however, the difference can be significant and seriously impact shop productivity. As a result, most machinists can easily relate tales of failed spindle repairs that led to costly downtime.

“After one spindle rebuild, I had to pull the machine out of production within a short time for additional repair,” says Tom Collins, maintenance supervisor at Edro’s Engineering’s Walnut, California facility. This firm has an aerospace division that specializes in manufacturing large precision-machined components. Edro serves North America and Europe and is a one stop tooling solution shop for machining services, special materials, custom mold bases, PVD/DLC coatings, and additive manufacturing.



While most spindle rebuilders only take minimal time to wipe parts before inspection, during disassembly the rebuilders clean and polishes each component with emery cloth to clearly reveal even minute imperfections. Even the nuts are removed, polished, and then tested to ensure proper fit.



Top: Having a machine down for unexpected extra maintenance because the inspection missed something can be costly. Above: Sparks flying in the machine shop.

“Any time these CNC machines are down it costs us money, so we never want them down,” explains Collins, who is responsible for more than 50 milling machines, jig borers, and surface grinders. “Because we run our spindles often at high speeds and we do surface grinding of stainless steel and specialty materials, frequent rebuilds are necessary – even expected.”

“So, if we send out a spindle and it is not properly repaired, it has to be removed again for additional repairs and that is going to put the machine

down for even more time – and that’s even more money,” he adds.

Morgan Stipp, who supervises a grinding operation for Embee Processing—a subsidiary of Noble Aerospace— agrees that minimizing downtime is essential. Stipp oversees about 20 precision grinders at Embee Processing’s 124,000-square-foot metal finishing campus facility in Santa Ana,

California. This includes Studer CNC grinders, Okamoto NC OD grinding machines, centerless grinders, and other equipment with thread, surface and superfinish grinding abilities.

Most part configurations require the chrome or HVOF surfaces to be ground, polished, honed, and deburred after plating to achieve the desired surface finish. These operations are



CNC machine tool spindles are critical to any drilling, milling, boring, grinding, routing, cutting, or sawing process.

performed to ensure a flawless finish with tolerances as low as 50 millionths of an inch, according to Stipp.

“We are extremely picky with our precision grinding because it has to be essentially perfect for our customers. Without the right equipment and properly maintained spindles, we would not be able to stay in business,” says Stipp.

In this regard, Stipp believes the thoroughness of the initial inspection performed by the repair/rebuild shop not only impacts the longevity of the spindle after it is rebuilt, but also the accuracy of the price quote.

“Having a machine down for unexpected extra maintenance because the inspection missed something can

cost us a lot of money,” says Stipp. “We also do not want any surprise upcharges either, due to the original inspection and quote not being thorough enough.”

Both Stipp and Collins found the precision and attention to detail they required when they contacted MZI Precision of Huntington Beach, California, an experienced machine tool spindle rebuilder with a complete process to supply customers with a fast way back to maximum productivity.

While most spindle rebuilders only take minimal time to wipe parts before inspection, during disassembly the rebuilder cleans and polishes each component with emery cloth to clearly reveal even minute imperfections. Even

the nuts are removed, polished, and then tested to ensure proper fit.

The next step is detailed measurement and documentation of every part of the spindle’s shaft and housing geometry. Micrometers are used to take detailed size measurements, runout is checked using 50 millionths of an inch dial indicators. The shaft bearing shoulders are then checked to see that they are true and perpendicular. The housing bores are checked for size, alignment and shoulders squareness. MZI Precision also takes video, followed by digital photographs of each part during the disassembly process.

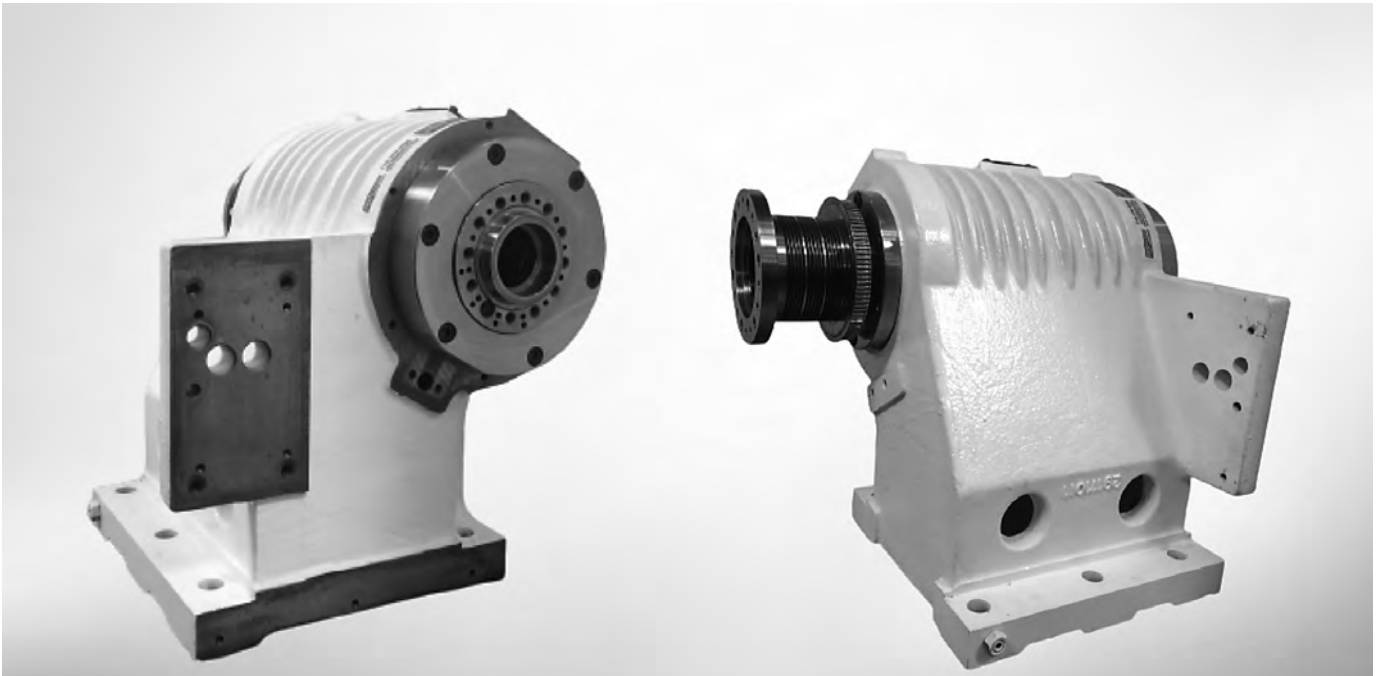
“If I have anything go wrong with our spindles, I will call them before



the manufacturer. They will diagnose the spindle at no cost and send me a detailed quote, which has been down to the penny on everything. I have never had a surprise charge," says Stipp.

According to Edro Engineering's Tom Collins, the quality of the repair is also impacted by the expertise of the rebuilder and level of communication, traits he also found in MZI Precision.

"Communication is important, and it is a two-way conversation," says Collins. "The company wants to understand how the spindle is run, the conditions, the types of parts being made, what metals are cut, the depths of



Opposite, top: Edro has an aerospace division that specializes in manufacturing large precision-machined components.

Above: Even if a rebuilder has the equipment, they may not have the experience, technical knowledge or attention to detail necessary to rebuild a spindle that performs reliably for many years.

cuts, etc. so the rebuild can be tailored to my application. Also, when I have a question, they answer it quickly.”

Collins also appreciates the spindle rebuilder’s use of only high-grade replacement components and bearings, which help to increase equipment reliability and lifespan. The rebuilder utilizes aerospace-grade bearings that are ABEC rated 7 or 9, the highest classification. Depending on the

requirements, ceramic bearings are often recommended despite the nominal additional cost, due to longevity and higher running speeds.

“I have found their rebuilds to be as good as OEM and sometimes better. The spindles have run perfectly so I expect them to last a long time,” says Collins.

While spindle rebuild reliability and lifespan is essential, quick turnaround is also important since equipment

downtime must be minimized. “The turnaround for our spindle rebuilds has to be timely to keep our production on track,” says Collins.

Although aerospace spindle rebuilds are available from various sources, for manufacturers that seek greater production reliability, uptime, and lifespan out of their CNC equipment, working with an expert spindle specialist is usually the best option. ■



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New Tricks for Old Dogs



Expect to see more aircraft designed specifically to offer 75 seats to 150 seats.

There's a global trend now toward keeping older aircraft flying longer and using 'Crossover' narrow-bodies as cost-saving measures. That's why many airlines and aircraft operators look to MROs for repair solutions.

DESPITE the ever-changing challenges facing the aviation industry this year, not surprisingly it has been an “exciting time” for maintenance, repair, and overhaul (MRO) facilities not only here in Canada but around the world.

So says General Manager of Thrust Tech Accessories Stanley Kowlessar who works directly with airlines scrambling for what works best economically for them in order to safely keep their aircraft fly-status ready these days, amidst the constant shifts in flight schedules and routes.

“Private aircraft owners as well have had to look for new operational solutions and, of course, new revenue streams to offset operational costs in a changing marketplace,” said Kowlessar, whose firm is a 30-year-old FAA/EASA certified 145 repair station located in Ft. Lauderdale, Florida. The



Top airplane: a SkyWest N466sw over LAX. Above: One way commercial airlines have found success is by using regional aircraft instead of larger airframes. Right: The A320neo (new engine option) is one of many upgrades introduced by Airbus for its single-aisle aircraft family. The option includes the PW100G engine.

company supports a number of regional airlines across the U.S., along with overseas air carriers and rotorcraft operators in numerous countries around the globe.

SHIFTS IN AIRCRAFT TYPE

One way commercial airlines have found success is by using regional aircraft instead of larger airframes. In addition, Kowlessar says that “crossover” narrow-body jets such as the Airbus A220 and Embraer E-Jets E2 families, those on the upper end of the regional capacity spectrum, will increasingly become a key segment of the airline market, particularly as we move into the post-COVID-19 pandemic era.”

The big advantage is that aircraft designers focusing on this crossover segment can tap into technologies already in use by regional aircraft and larger single-aisle narrow-bodies. “So, moving forward, that could result in more aircraft designed specifically to offer 75 seats to 150 seats in the most economical fashion,” he says.

According to a recent investor note released by Morgan Stanley Research, the Boeing Company’s new aircraft development strategy is thought to be focused on the possibility of building a single aisle aircraft similar in size to the Boeing 757. That could help Boeing effectively compete with the Airbus A321XLR that boasts a range higher than any other narrow-body on the market – 4,700 nautical miles – yet is still able to access smaller airports.



Looking ahead, “It is evident that the size of aircraft coming off the assembly line will be much different than in the past,” Kowlessar notes. “Moving forward, we will see smaller passenger aircraft for more ‘boutique’ services, while larger aircraft may not be tapped for as many long-haul flights.

Right now, production of all types of materials, specifically including components needed to build new planes, is running way behind schedule. Delays are common. Bottom line? Airlines and airplane owners can’t buy new planes as readily as they did in the past.

TURNING TOWARD BUSINESS JETS

At the same time, the industry is also seeing an unparalleled influx of first-time buyers to business aviation, as these new

owners seek to dodge crowded commercial flights while securing needed flexibility and safety during this ongoing pandemic. That's propelled the business aviation segment's growth, but the "rush to buy" has also depleted the inventory of aircraft available for sale.

New business aviation buyers typically don't have an aircraft to trade, explains Jay Mesinger, president and CEO of Mesinger Jet Sales, who spoke at an August 21st National Business Aviation Association webinar entitled, "Business Aviation's Elephant in the Room – Buying Aircraft"

The low number of business aircraft for sale right now also is the result of booming charter demand, a reluctance among veteran owners to relinquish their old aircraft until they have certainty of receiving a new aircraft, restrictions on importing airplanes, and, yes, those pesky supply chain issues.



SOARING MRO DEMAND

Demand for aircraft maintenance and inspections has soared since the COVID-19 pandemic began, according to business-jet service provider Todd Duncan, chairman of Duncan Aviation, who was also a featured panelist during the August 21st National Business Aircraft Association thought-leadership webinar.

At the same time, the industry is experiencing material shortages, causing both delays in completion of new aircraft and in production of components and accessories. Consequently, airlines and aircraft owners are now having parts repaired that are normally thrown away and replaced with new ones – something that's not that much of an option anymore.

Kowlessar says that "as a direct result of material shortages, we're hearing from both airlines and business aircraft owners that they

Right: Pratt & Whitney's Geared Turbo Fan engines have played essential roles in the narrow-body regional aircraft market.



When that time comes, they retire those planes. But that's not the case this year. "What's happening in 2021 is that we're seeing airframes that the aviation market thought would be phased out continue to remain in the air," Kowlessar notes.

As maintenance needs for their older airframes and older fleets have soared, MROs have increasingly become essential in keeping planes in the air longer.



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UPDATE

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Narrow-body jets such as Embraer's E-Jets E2 families have become key segments.



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must maintain their airplanes much longer than normal.” Aircraft operators typically set a cut-off or expiration time for their older aircraft to be removed from service.

When that time comes, they retire those planes. But that’s not the case this year. “What’s happening in 2021 is that we’re seeing airframes that the aviation market thought would be phased out continue to remain in the air,” Kowlessar notes.

As maintenance needs for their older airframes and older fleets have soared, MROs have increasingly become essential in keeping planes in the air longer. That’s why many airlines and aircraft operators look to MROs for cost savings and repair solutions in cases where aircraft manufacturers and original equipment manufacturers might be too pricey or not have support for certain items any longer.

So what’s resulted is a strong demand for those MROs such as TTA



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The first of 45 single-aisle A220-300 aircraft for delivery to Air Canada takes off on its inaugural test flight.



The Air France-KLM Group's firm order for 60 Airbus A220-300 is a strong endorsement for the single-aisle aircraft.



that have successfully pushed through the pressures of operating during the pandemic to deliver the much needed repair support and technical support for airlines and aircraft operators to assist them in maintaining their fleets.

Servicing and replacing such aircraft accessories and components as hydraulic pumps and actuators, pneumatic valves, electric motors, starters, generators, and engine ignition exciters is what TTA specializes in for their

clients around the world – airlines and private/business jet operators alike.


Eventually, the aviation industry will fly out of the pandemic era, as there is certainly a supply-chain fix coming. Until then though, Kowlessar stresses there is great opportunity to do all that is necessary to support airline and aircraft operators who need to keep older aircraft longer – and safely in the air at a reasonable cost. ■

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Dec-Jan 2013


AMU Chronicles
 Aviation Terms – Part 2
 HRF Explained
 Human Factors
 The Regs

Upcoming Events

- 5 **Thu** - [Event]
- 11 **Tue** - Middle East Business Aviation Summit & Air Maintenance International Airport
- 16 **Sun** - Pacific AME 30th Year Celebration



Features



AMU Chronicles
 Not So Boring – Borescopes A large part of our job maintaining aircraft is the never-ending task [...]

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News Update:

Vector Aerospace Hosts PTEA
 Vector Aerospace Hosted the PTEA Customer Day Event at Facility in Johannesburg, South Africa For Immediate Release – [...]

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Pacific AME Association



Mission Statement

The Pacific AME Association shall always promote and protect the professionalism of the AME, while developing, maintaining and improving our relations with regulatory bodies affecting our industry. We shall represent the views and objectives of our members while promoting proficiency through educational collaboration with other groups on matters of mutual interest. We shall promote honourable practices among our Members and others in the aviation industry, while remaining non-union, non-sectarian and non-partisan.

PAMEA is a non-profit association comprised of aircraft maintenance engineers, aircraft maintenance personnel and aviation industry corporate members. PAMEA is an active member of the Aircraft Maintenance Engineers of Canada (AMEC).

www.pamea.ca

Western AME Association



Purpose and Objectives

The purpose and objectives of this association are to:

1. Promote and protect the profession of the Aircraft Maintenance Engineer.
2. Develop, maintain and improve representation and consultation with regulatory bodies that affect or may affect the profession of the Aircraft Maintenance Engineer.
3. Represent the views and objectives of the membership of the Association.

4. Promote and develop the knowledge, skill and proficiency of the profession of the Aircraft Maintenance Engineer through education, publication and research.

5. Cooperate and associate with groups, associations and organizations on matters of mutual interest.

6. Promote honourable practices among the membership and between persons in the aviation industry.

The Association is non-union, non-sectarian and non-partisan.

www.wamea.com



Central AME Association



About Us

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 support 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 AMEs, AME apprentices, students, non-licensed persons working in the industry and corporate members.

Save the Date: annual Aviation Symposium

CAMEA will host the 26th Annual Aviation Symposium on March 3-4, 2022. The venue for this event is Canad Inns Polo Park in Winnipeg, Manitoba.

www.camea.ca



AME Association of Ontario

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email: association@ame-ont.com website: www.ame-ont.com



AMEs Return

In Ontario, as students headed back to school this September, so too did many AMEs get recalled to their airlines. Many of these individuals have been suspended for over a year, so recurrent training and qualifications had to be implemented prior to a full return to work. Fortunately Transport Canada had issued an extension to the six months in the last 24 rule for recency, this allowed many AMOs to have readily available ACAs to release the many aircraft that had been temporarily parked.

In the small and business aircraft areas, fewer AMEs were out of work and some found they were busier than ever. Perhaps it is because wages are lower and benefits are fewer in this category. In either instance we are now wondering if there will be adequately trained individuals to fill the positions available.

There seems to be a surge of new low-cost carriers accompanied by statements from the major carriers of new routes – Porter is starting

a jet division, Air Canada and WestJet are announcing increased services and new destinations.

Our AME / aircraft technician schools are doing their best to supply well trained students to fill the many new jobs that will be available. Hopefully better wages, benefits and working conditions will attract and keep these graduates within the aviation maintenance industry.

The AME Association of Ontario is continuing with plans for our Annual Maintenance Conference scheduled for October 27-29. The Ontario government has imposed several restrictions including mandatory vaccinations for all participants, mask wearing, distancing, room capacity limits and a maximum registered attendance requiring contact tracing registration. Although it will make additional work for our volunteers and the conference centre staff, we will be assured of a safe and secure event.

Submitted by **Stephen Farnworth**, for the Board of Directors
www.ame-ont.com

Atlantic AME Association



NCR-046-2021

Exemption from Subsection 403.05(1) of the Canadian Aviation Regulations

Pursuant to subsection 5.9(2) of the Aeronautics Act, and after having taken into account that this exemption is in the public interest and is not likely to adversely affect aviation safety or security, I hereby exempt holders of a valid Aircraft Maintenance Engineer (AME) licence, from the requirements of subsection 403.05(1) of the Canadian Aviation Regulations (CARs), subject to the conditions set out below.

Subsection 403.05(1) of the CARs states that holders of an AME licence must have recent experience in order to exercise the privileges of the licence granted under the CARs. The type of recent experience that is accepted is listed in the regulation and holders must have, for at least 6 months within the preceding 24 months, obtained one of the types of experience listed in the regulation.

The above mentioned provisions are reproduced in Appendix A.

Purpose

The purpose of this exemption is to enable holders of a valid AME licence, Approved Maintenance Organizations and aircraft owner/operators to continue operations in the environment created by the COVID-19 pandemic.

More specifically, this exemption will allow the recency period to be extended an additional six (6) months in order for holders of a valid AME licence to retain the privileges of their licence under the CARs while they gain the required six months of experience.

Application

This exemption applies to holders of a valid AME licence issued pursuant to Part IV, Subpart 3 of the CARs. This exemption ceases to apply to a holder of a valid AME licence that does not respect the condition of this exemption.

Conditions

This exemption is subject to the following conditions:

1. No holder of an aircraft maintenance engineer (AME) licence shall exercise the privileges of the licence unless:
 - a. the licence was issued within the preceding 30 months;
 - b. the holder of the licence has, for at least six months within the preceding 30 months:
 - i. performed aircraft maintenance;
 - ii. supervised the performance of aircraft maintenance;
 - iii. supervised in an executive capacity the performance of aircraft maintenance; or

iv. served as an aviation maintenance instructor or supervised another aviation maintenance instructor in an aircraft maintenance training course provided by an approved training organization.

Validity

This exemption is in effect until the earliest of the following:

a) July 31st, 2022, at 23:59 (EST); or

b) The date on which the exemption is cancelled in writing by the Minister where he is of the opinion that it is no longer in the public interest or is likely to adversely affect aviation safety or security.

www.atlanticame.com

Central Ohio PAMA



2021 Inspection Authorization Renewal in IACRA

The 10.4.1 IACRA release will allow applicants to apply for their Inspection Authorization renewal. This application path will be available to current IA holders as an alternative to mailing in a paper copy. (Visit: www.iacra.faa.gov/IACRA/Default.aspx)

As mandates are removed and we start the return to normalcy, we hope you have survived the pandemic; physically and economically! To our members, we look to start our planning for the future of COPAMA. To our supporting vendors, we hope you are returning to profitability and normal levels of production.

www.copama.org

SoCal PAMA Chapter



Michelin e-Learning Terminal

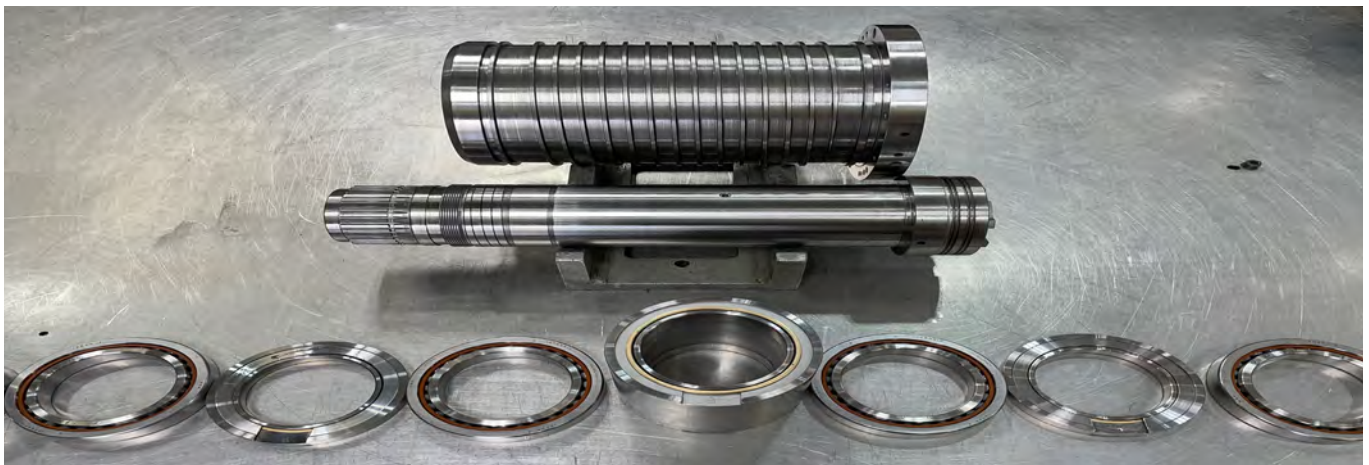
SoCal PAMA would like to announce the availability of online instruction via the Michelin Aircraft e-Learning Terminal. All those who would like to increase their knowledge regarding aircraft tire care and service can now easily have access to expert's technical modules anytime, anywhere, from any device, thanks to a digital training platform. Themes such as tire design and certification, tire removal reasons and logistic cares are examples of topics covered.

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★ TRANSPORT CANADA ★ Reports and Comments

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



Aerospatiale HC AS 350B2

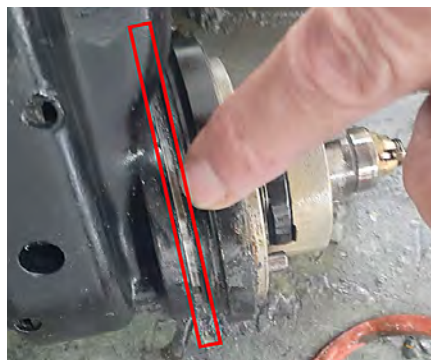
Aerospatiale HC AS 350B2 Starter generator updated overhaul and time between overhaul schedule

Subject:

Starter generator driveshaft sheared during start attempt.

Transport Canada Comments:

Airbus Helicopters published service bulletin (SB) No. AS350-80.00.12 providing a modified schedule for the next overhaul of installed and non-installed starter generators. The SB also introduces a calendar limit to the time between overhaul (TBO). A review of the SB is required to determine the overhaul compliance limit established by the starter generator part number and the production or latest overhaul date. Transport Canada Civil Aviation (TCCA) recommends that operators review the SB for potential updates to their scheduled starter generator overhaul and TBO limits.



Avco Lycoming. Flange to body. Split line gap highlighted.

Report: Avco Lycoming Magneto Mounting Flange Loose

Subject:

After flight, oil was observed to be leaking from the left engine. The Aircraft Maintenance Engineer who inspected the engine found the magneto to still be firmly fastened to the engine, but its case had split at a swaged joint, allowing oil to leak from the resultant gap.

Transport Canada Comments:

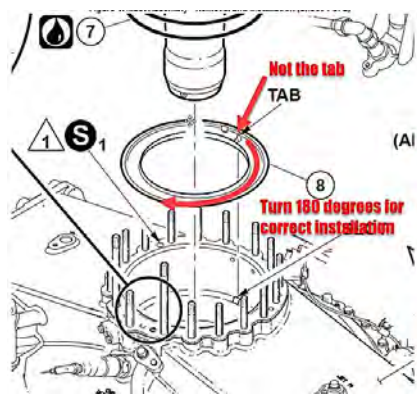
It was confirmed that all 3 internal wrenching screws part number (P/N) 10-349652, which secure the flange to the body of the magneto, were found loose. S-1200 series magnetos, which include 4, 6 and 8 cylinder models all use this method of attaching the flange to the body of the magneto. Possible scenarios involving loose or fully migrated P/N 10-349652 screws include: oil leak, metal contamination of engine oil system or magneto failure.

Service Difficulty Report (SDR) data indicates this event is not a trending defect, the majority of related occurrences were prior to 1997. The inclusion of the following information in the S-1200 Series Service Support Manual may have played a role in mitigating a continuing airworthiness concern.

Multiple notes and warnings are included in the published service manual, stating to remove and discard

the flange securing screws and washers, regardless of whether disassembly is for the purpose of inspection, parts replacement, or overhaul. Additionally, adherence to published fastener torque specifications is highlighted.

A daily pre-flight check may not specifically include checking for security of attachment of the magneto, although including such an item may be beneficial.



**Bell Textron - Canada
Main Rotor Transmission Debris Pan
Inspection**

Subject:

An operator found one debris pan incorrectly installed, which could prevent the mast chip detector from detecting metal contamination from the mast bearing. After Bell investigated, it was found that the maintenance procedure was clear and accurate, however the figure in support of the procedure could be misleading. Consequently, the maintenance manual figure will be updated to avoid repeating such an issue.

Transport Canada Comments:

The debris pan has a tab and a cutout, an incorrect installation of the debris pan is when the tab of the pan is not properly aligned with the slot in the main rotor transmission. Following their investigation, Bell published Alert Service Bulletin (ASB) 429-21-54 to provide instructions for completing a one-time inspection, and a figure showing the correct installation of the oil debris pan.

The ASB states that incorrect installation could result in the lubricating oil not being supplied to the mast chip detector and to the mast spline from the #13 oil jet. In addition to the ASB, Bell will be revising the potentially misleading figure currently published in the model 429 maintenance manual. Transport Canada, Civil Aviation encourages owners, operators and maintainers to review and accomplish ASB 429-21-54 to verify the correct installation of the debris pan.

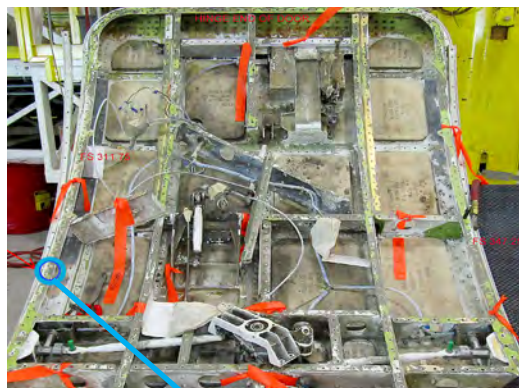


**Bell Textron.
An example
of the current
potentially
misleading
figure in the
maintenance
manual and the
debris pan.**

**Report: Bombardier CL600
Passenger Door structure found with
Level 2 corrosion**

Subject:

During scheduled maintenance, level 2 corrosion damage beyond allowable limits was observed on the forward former of the passenger door assembly at fuselage station (FS) 317. The damaged area was cut out and replaced with a new section of former, and the repair work was accomplished in accordance with approved repair engineering order (REO) 690-52-11-582.



**Forward frame location with damaged area
circled in blue.**

Transport Canada Comments:

The passenger door serves as the main entrance stairs to board and deplane the aircraft. It is often open to the elements and is subject to snow, ice, rainwater and many compounds that can be deposited by passenger footwear when using the stairs. This makes it an area that requires frequent inspections, frequent cleaning and recurring applications of corrosion inhibiting compounds (CIC) to prevent corrosion.

Transport Canada is not aware of the actual inspection interval frequency for this task for this operator. The service difficulty report did not indicate that a localized corrosive spill caused the corrosion, so this finding of level 2 corrosion suggests a more frequent inspection interval is likely needed and should be applied to this area.



**Garrett TPE331
Cracked tachometer generator drive
adapter inserts**

Subject:

Upon inspection of an engine for a gearbox repair, it was noted that the adapter insert for the tachometer generator drive was cracked in multiple places.

Transport Canada Comments:

These tachometer generator drive adapter inserts are a common component on numerous engine makes and models. They mate the tachometer generator drive to the engine or gearbox to translate rotating movement into a percentage or rpm displayed on a cockpit instrument.

These inserts are often overlooked due to their location and low failure rate. In this event, the insert was cracked but continued



Above: Rolls-Royce. 1 and 2 slot-bearing-housing-assembly-configurations.

to connect the tachometer generator drive to the accessory gearbox.

Due to the diligence and professionalism of maintenance personnel during the gearbox repair, the cracked insert was discovered and a possible event was averted. Well done to these maintainers for the effort to ensure they were releasing a serviceable product back to the customer.

Rolls-Royce 250-C300/A1 Compressor bearing housing assembly configuration

Subject:

The forward compressor bearing housing assembly is being discovered in many compressors with a modification that does not conform to the Commercial Engine Bulletin (CEB) that modifies the original part number 6853505. These items are installed in Rolls-Royce M250 C20 and M250 B17 models. The bulletin requires one slot to be added, however many parts are discovered with two slot cutouts. We have purchased parts in overhauled condition, and when the receiving inspection is performed, the same condition is discovered. The serviceability of the parts are suspect, as they do not conform to the design aspect of the product, but as indicated, they are frequently seen in service.

Transport Canada Comments:

There have been numerous Service Difficulty Reports (SDRs) submitted regarding the correct configuration of the forward compressor bearing housing



Rolls-Royce 250-C300

assembly P/N 6893617 for Rolls-Royce Corporation (RRC) M250 C20, C20B and M250 B17, B17B engine models. The original configuration used two roll pins to secure an oil seal in the bearing housing assembly, however this design lacked squareness control of the seal and caused damage.

To reduce the potential for damage, RRC issued CEB1100, which introduced a new bearing housing assembly, P/N

6893617, and provided the instructions necessary for the rework of the original bearing housing assembly, P/N 6853505. The rework included the removal of the roll pins, machining a groove on the inside diameter, and the cutting of an access slot for installation and removal of a retainer ring. Upon completion of the rework, the bearing housing assembly was to be identified as P/N 6893617.

Various revisions of the above-mentioned CEB have been issued, revision one provided rework instructions to add two retaining ring access slots to the original bearing housing assembly P/N 6853505, and to identify the reworked part as P/N 6893617. Revision three changed the rework from two slots to one slot but retained the instructions to identify the reworked part as P/N 6893617.

Since there have not been any instructions to remove either a one slot or two slot configured bearing housing assembly, both configurations are in circulation, both will be found during overhauls and both are being received from vendors as overhauled parts.

Transport Canada Civil Aviation would like to inform maintainers and operators that after a lengthy investigation by the Federal Aviation Administration (FAA), both configurations have been found to conform to the approved type design and are acceptable for installation. ■

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Mixed Signals

A pilot reports engine trouble, then makes an ill-advised low-altitude left turn. The result is loss of control and collision with terrain.



The occurrence aircraft was a 2-seat tandem, low-wing aircraft made mostly from carbon fibre.

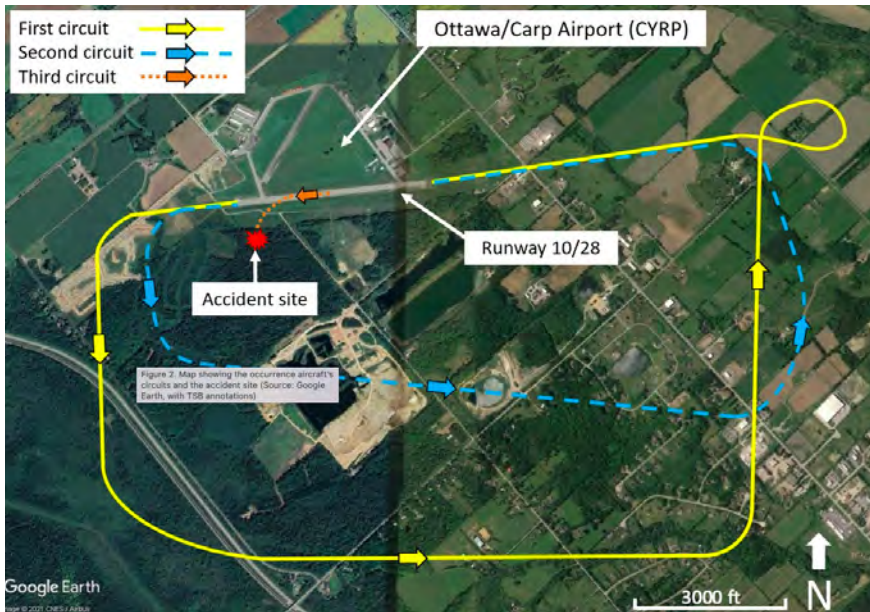
ON 10 FEBRUARY 2021 at approximately 1249, a privately registered Blackshape S.P.A. Prime BS100 aircraft started conducting circuits on Runway 28 at Ottawa/Carp Airport (CYRP), Ontario, with only the pilot on board. The first 2 circuits were both normal. After the touch-and-go following the 2nd circuit, the aircraft climbed straight ahead likely to conduct a 3rd circuit. Before the aircraft reached the departure end of Runway 28, the pilot initiated a left turn. At the same time, the pilot made a radio call on the CYRP aerodrome traffic frequency, reporting an unspecified engine issue.

At approximately 1300, when the aircraft was approximately 787 feet (240 m) south of the runway and still in the left turn, a loss of control occurred and the aircraft entered a near-vertical descent, impacting the ground in a wooded area.

The exact altitude at which the loss of control occurred could not be determined; however, based on primary radar data supplied by NAV CANADA, it was determined that the loss of control happened at an altitude below 550 feet above ground level (AGL). The pilot was fatally injured. The aircraft was destroyed by a post-impact fire, and no signal was received from the 406 MHz emergency locator transmitter.

AIRCRAFT INFORMATION

The occurrence aircraft was a 2-seat tandem, low-wing aircraft made mostly from carbon fibre. It was equipped with a Rotax 912 ULS3 engine, a retractable landing gear, a bubble canopy and an optional ballistic parachute. It was manufactured and received its flight test certificate in Italy in 2015, and



Above: Map showing the occurrence aircraft's circuits and the accident site.

Top right: The Blackshape Prime is a series of Italian ultralight aircraft.

Chart at right: Stall speeds at different weights and flap configurations for the Blackshape S.P.A. Prime BS100.

Aircraft weight	Flap configurations	0° bank angle (level flight)		30° bank angle		60° bank angle	
		KCAS*	km/h	KCAS	km/h	KCAS	km/h
620 kg	Flaps up	50	93	54	100	71	131
	Flaps takeoff (10°)	48	89	52	96	68	126
	Flaps down (30°)	45	83	48	90	64	118
500 kg	Flaps up	46	85	49	91	65	120
	Flaps takeoff (10°)	44	81	47	87	62	115
	Flaps down (30°)	41	76	44	82	58	108

* KCAS: knots calibrated airspeed

was imported to Canada in 2019. It was 1 of 3 Blackshape S.P.A. Prime aircraft registered in Canada. The aircraft had accumulated approximately 65 hours of total air time before the occurrence and had been owned by the occurrence pilot since August 2019. A review of the aircraft technical records indicated that the last annual inspection was conducted in January 2021.

The maximum certified take-off weight for the aircraft was 620 kg, and at the time of the occurrence, its weight was estimated to be approximately 538 kg. An estimated weight and balance calculation was completed and it was determined that the aircraft was being operated within the weight and balance limitations at the time of the occurrence. The aircraft was registered with Transport Canada and had been issued a Special Certificate of Airworthiness (C of A) – Limited.

The Limited classification means that the aircraft model must meet specific eligibility criteria outlined in the Canadian Aviation Regulations (CARs) Standard 507, or those in an exemption to that standard. Except where specifically stated in the operating limitations, aircraft issued any Special C of A, including one with a Limited classification, are subject to the same operational and maintenance regulations as aircraft with a normal C of A issued pursuant to section 507.02 of the CARs.

BALLISTIC PARACHUTE

The aircraft was equipped with a Magnum 601 ballistic rescue parachute system made by Junkers. The system is designed to be used in the event of an in-flight emergency and can be

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activated by the pilot from inside the cockpit. When the pilot activates the system, it triggers a ballistic charge that launches the parachute, which is harnessed to 3 anchor points attached to the aircraft's structure. The system is designed to slow the aircraft's descent to the ground in an upright controlled manner.

The parachute and associated ballistic charge are mounted in a compartment forward of the cockpit canopy. The Blackshape S.P.A. Prime Pilot's Operating Handbook and Airplane Flight Manual explains the sequence for operating the system in the event of an airborne emergency.

The minimum altitude required to deploy the ballistic parachute is 80 metres or 262 feet AGL.

The examination of the wreckage from this occurrence suggests that the emergency rescue system was not activated by the pilot.

FLIGHT DISPLAY AND ANGLE-OF-ATTACK INDICATOR

The occurrence aircraft was equipped with a Dynon Skyview Classic electronic flight instrument system display, which provides the display of primary flight instruments with an angle of attack (AOA) indicator displayed on the same screen. The AOA indicator provides a visual indication of the AOA and improves pilot awareness of the situation when the aircraft is approaching a critical AOA. Such systems provide continuous visual information on the stall margin, regardless of attitude, airspeed, or power, and can help pilots avoid an aerodynamic stall.

The AOA audio alarm can be configured either as a steady tone that sounds very near the critical AOA or, in the case of the occurrence aircraft, as a system-generated beeping tone that increases in frequency as the AOA becomes higher until, very close to the critical AOA, it turns into a solid tone. Beyond this point, the aircraft will enter an aerodynamic stall if corrective action is not taken.

STALL SPEED

The Blackshape S.P.A. Prime Pilot's Operating Handbook and Airplane Flight Manual contains a performance section that includes a table indicating the calculated stall speed for the aircraft at 2 different weights: 500 kg and 620 kg. The table references 3 different flap configurations: level flight, a 30° bank angle, and a 60° bank angle.

WRECKAGE INFORMATION AND FLIGHT PROFILE

The occurrence happened after the 2nd touch-and-go, during the departure for the 3rd circuit while the pilot was making a left turn. The aircraft entered a near-vertical descent and



An estimated weight and balance calculation was completed and it was determined that the incident aircraft was being operated within the weight and balance limitations at the time of the occurrence.

collided with the ground at the base of a stand of large trees. The maximum angle of bank during the left turn could not be determined; however, the approximate airspeed at the time of the loss of control was calculated to be 45 knots indicated airspeed (± 5 knots) based on analysis of a video recording from a nearby security camera. The calculated descent rate was between approximately 4000 and 6000 fpm at the time at which the aircraft struck the ground. The wreckage was examined to the extent possible, given that the aircraft had been almost entirely consumed by fire.

Due to the level of damage to the occurrence aircraft, the investigation was unable to determine the flap position at the time of the occurrence. As well, a flight control continuity check could not be performed due to the level of damage. However, no problem had been reported with the flight control system. The landing gear was in the down position at the time of the occurrence.

The Emergency Procedures section of the Pilot's Operating Handbook and Airplane Flight Manual lists 65 knots calibrated airspeed as the speed to be kept during an emergency procedure for an engine failure after takeoff with the flaps in the take-off position.

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ENGINE AND PROPELLER EXAMINATION

The Rotax 912 ULS3 engine sustained significant damage from both the collision with terrain and the post-impact fire. It was disassembled and examined to the extent possible at the TSB Engineering Laboratory in Ottawa, Ontario. The engine examination did not find any mechanical failures of the crankshaft, pistons, valves, gearbox, or any other major engine components. There were no signs of catastrophic engine failure. Damage to the propeller indicated the propeller was rotating at impact; however, it could not be determined how much engine power was being produced.

The investigation was unable to assess the integrity of the associated engine components such as the fuel and ignition systems due to the extent of heat damage. The reason for pilot's reported engine issue could not be determined.

AERODYNAMIC STALL DURING A TURN

An aerodynamic stall occurs when the wing's AOA exceeds the critical angle at which the airflow begins to separate from the wing. When a wing stalls, the airflow breaks away from the upper surface, and the amount of lift generated is reduced to below that needed to support the aircraft. The speed at which a stall occurs is related to the load factor of the manoeuvre

being performed. The load factor is defined as the ratio of the aerodynamic load acting on the wings to its gross weight, and represents a measure of the stress (or load) on the structure of the aircraft. By convention, the load factor is expressed in g.

In straight and level flight, lift is equal to weight, and the load factor is 1g. In a banked level turn, however, greater lift is required. It can be achieved, in part, by increasing the AOA (by pulling back on the stick/elevator control), which increases the load factor. As the load factor increases with bank angle, there is a corresponding increase in the speed at which the stall occurs. As a result, steep turns are often accomplished with the addition of engine power to maintain or increase airspeed.

A stall that occurs at a higher speed as a result of a high load factor, such as bank angle increased beyond 30°, is called an accelerated stall. Accelerated stalls are usually more severe than unaccelerated stalls and are often unexpected. As an example, a stall from a steep bank angle (greater than 30°) can result in one wing stalling before the other, leading to a spin and the aircraft rapidly losing altitude.

TURNING BACK FOLLOWING ENGINE FAILURE

In this occurrence, an examination of the departure flight paths flown during the previous circuits and the last



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Blackshape aircraft are equipped with an optional Magnum 601 ballistic rescue parachute system made by Junkers.



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The occurrence aircraft.



Blackshape aircraft feature a cantilever low-wing, a two-seats-in-tandem enclosed cockpit under a bubble canopy, retractable tricycle landing gear and a single engine in tractor configuration.

departure, combined with the fact that the landing gear had been left in the extended position, suggest that the pilot may have attempted to turn back to the runway after reporting an unspecified engine issue shortly after becoming airborne.

If a mechanical problem occurs during takeoff that necessitates an immediate landing, pilots are faced with either attempting to carry out a forced landing in an unsuitable location—risking damage to the aircraft and injury to themselves—or attempting a 180° turn back toward the departure point.

TRANSPORT CANADA'S FLIGHT TRAINING MANUAL STATES THE FOLLOWING

Numerous fatal accidents have resulted from attempting to turn back and land on the runway or aerodrome following an engine failure after take-off. As altitude is at a premium, the tendency is to try to hold the nose of the aircraft up during the turn without consideration for airspeed and load factor. These actions may induce an abrupt spin entry.

Experience and careful consideration of the following factors are essential to making a safe decision to execute a return to the aerodrome:

1. Altitude.
2. The glide ratio of the aircraft.
3. The length of the runway.
4. Wind strength/ground speed.
5. Experience of the pilot.
6. Pilot currency on type.

SAFETY MESSAGE

In this occurrence, the pilot reported an unspecified engine issue shortly after becoming airborne and conducted a low-altitude left turn. Numerous fatal accidents have occurred involving pilots attempting to turn back to the runway or aerodrome following an engine failure after takeoff. Given the aircraft's low altitude and low airspeed during the initial climb, turn-back manoeuvres during this phase of flight involve a high level of risk and often lead to a loss of control and collision with terrain. ■

(This report concludes the Transportation Safety Board of Canada's investigation into this occurrence. The Board authorized the release of this report on 25 August 2021. It was officially released on 09 September 2021.)

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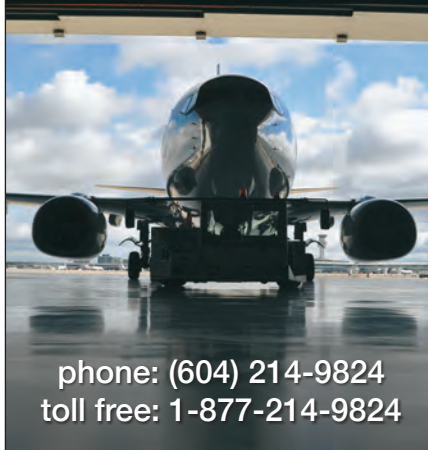
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From Prototype to Production

Beechcraft has moved its Denali closer to first flight with a series of successful ground engine runs in Wichita, Kansas.



LATE THIS SUMMER, Textron Aviation completed initial ground engine runs on the prototype Beechcraft Denali single-engine turboprop powered by GE Aviation's new Catalyst engine. The ground engine runs, which took place at Textron Aviation's west campus in Wichita, Kansas, verified the functionality of the fuel system and engine, as well as the interface with the avionics and electrical systems. The testing moves the clean-sheet design aircraft closer to its milestone first flight, which is anticipated by the end of the year.

The Catalyst engine has completed over 2,450 hours of testing and is prepping for a first flight on its Beechcraft King Air flying test bed. The engine is said to be a more environmentally friendly engine that burns less fuel than older turboprop technologies. It can also use sustainable aviation fuel, which results in lower emissions. The 1,300 shaft horsepower rated turboprop engine eases pilot workload with its single-lever power and propeller control. The Full Authority Digital Engine Controlled (FADEC) engine provides trend monitoring, which allows for on-condition maintenance with no mid-life Hot Section Inspection required.

The Beechcraft Denali development program has achieved several important milestones in recent months. Earlier this summer, the Catalyst engine was installed on the Denali prototype airframe and the aircraft was powered on for the first time. Two other Denali flight test articles are

also in development. Three additional ground tests will be used for the airframe static and fatigue tests, and for cabin interior development and testing. The company anticipates certification for the Denali in 2023.

The Denali cockpit features the Garmin G3000 intuitive avionics suite featuring high-resolution screens and touch-screen controllers. An integrated Garmin autothrottle is now a standard feature, which interfaces with the Automatic Flight Control System (AFCS) and Flight Management System (FMS) to provide easy speed control throughout all regimes of flight from takeoff to touchdown.

Other standard G3000 features include a 10-inch weather radar, Terrain Awareness Warning System (TAWS-B), and dual transponders with automatic dependent surveillance-broadcast (ADS-B) capabilities, which are compliant with the latest air traffic control requirements.

The aircraft is equipped with McCauley's new 105-inch diameter composite, five-blade, constant speed propeller, which is full feathering with reversible pitch and ice protection. The propeller will undergo a series of certification tests, and several are already underway.

The Denali's flat floor cabin is designed to be the largest in its segment and offers the versatility to easily convert between passenger and cargo configurations. The cabin features a standard seating configuration of six individual reclining seats and offers a nine-place high density seating option. ■

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