Clare Leavens Award • Joe Chase Award • Aviall High Achievement Award

AMU

AirMaintenance UPDATE

The Magazine for Aircraft Maintenance Professionals

Transport Canada Approved for R/T

NBAA 2013

a look at NextGen avionics

Restoration feature: Canadair North Star

Meet us at HAC Booth # 213

Publication Mail Agreement No. 0041039024
and Return Undeliverable Canadian Addresses to
Alpha Publishing Group Inc.
Unit 7, 11771 Horseshoe Way, Richmond, BC, V7A 4V4
email: amumagazine@outlook.com

October - November 2013
Volume 12/Issue 3

$7.95

RAPCO, inc.

REPLACEMENT AIRCRAFT PARTS CO.

Rapco, Inc. can help you reduce maintenance costs...this is good for you and your customer. With the impact fuel prices have had on general aviation flying, and the resulting impact on maintenance facilities, everyone needs to find a way to decrease their operating costs, without sacrificing quality or safety. Rapco can help.

All Rapco parts are FAA-Approved, warranted better than the OEM, to save you and your customers money. Call now to see how we can help you - 1-800-527-2726

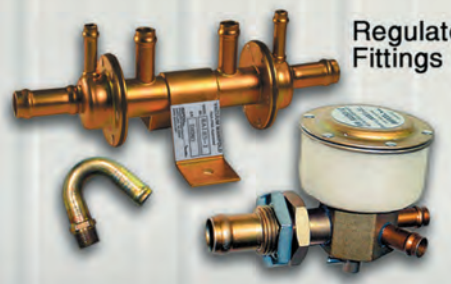
Vacuum Pumps

Easily check vane wear

Brake Discs

Over 80 direct brake disc replacements

Electroless Nickel plating



Regulator & Fittings

De-Ice Components

Leads, boots, modules, brushes & more

Visit: http://www.rapcoinc.com/acappguides.html for individual specific application guides for most popular aircraft

Request an e-card at www.rapcoinc.com

PARTS DEPARTMENT

RAPCO, inc.
REPLACEMENT AIRCRAFT PARTS CO.

1-800-527-2726

RAPCO, inc.
REPLACEMENT AIRCRAFT PARTS CO.

www.rapcoinc.com

NO PLANE NO GAIN

visit www.noplanenogain.org

Keep 'em coming!

We here at AirMaintenance Update are always interested to know what your concerns are, whether they're related to new technologies, Human Factors, Safety Management Systems, or general aviation.

Of particular interest among aircraft maintenance professionals — and the area that seems to generate the most feedback in the form of letters to the editor — are government regulatory agencies and the ways their personnel interact with those on the ground performing their maintenance duties while doing their best to adhere to "the regs".

In this respect, we always appreciate letters from readers, the following being a good example:

Dear Editor,

I disagree with some of Mr. Chalmers' comments from his article: "Who CAIRS?"

Per my observations, TCCA's well-established obfuscation cycle consists of: delay, deny, blame, threaten, punish and repeat as necessary; i.e., TCCA's obfuscation cycle starts immediately, at the point where Mr. Chalmers states that his being ignored is part of step one ("delay") while platitudes provided by TCCA to the CAIRS author are also part of the step-one "delay" process.

While I am familiar with TCCA's obfuscation cycle, I have never seen TCCA demonstrate accountability to their published commitments (ASPM-02, etc.) within a continuous improvement cycle that is focused on stakeholder needs and satisfaction as part of TCCA's IMS (Integrated Management System — the name for TCCA's internal SMS program) which is driven via CAIRS inputs from both internal and external stakeholders. Please forward this email to Mr. Chalmers for his response.

— (Name withheld by reqest)

Many thanks to our readers for sending in any comments you have related to regulations (and other matters). As an established contributor to AMU, Norm Chalmers welcomes your letters, and is always keen to respond to your concerns. So, as they say: "Keep those cards and letters coming!"

— Gregory Kero
Managing Editor

Departments

10

Features

AirMaintenance Update
Unit 7, 11771 Horseshoe Way
Richmond BC V7A 4V4 Canada
phone: (604) 214-9824 • **fax:** (604) 214-9825
toll free: 1-877-214-9826

email: amumagazine@outlook.com **website:** www.amumagazine.com

managing editor: Gregory Kero
art director: Gregory Kero
publisher: Bill Carter
sales manager: Bill Carter
Advertising inquiries: (604) 214-9824

production manager: Chrissie Harvey
circulation: Anne Gervin
contributors: Mike Broderick, James Careless, Norm Chalmers, Sam Longo, Brian McNair, Gordon Walker, Sue Yost

Publications Mail Registration No. 0007198278

Published by Alpha Publishing Group (2004) Inc.

Publication Mail Agreement Number 0041039024 and Return Undeliverable Canadian Addresses to:
Alpha Publishing Group (2004) Inc.
Unit 7, 11771 Horseshoe Way
Richmond BC V7A 4V4 Canada

Subscription Rates: 1 Year: $40 2 Years: $60
AirMaintenance Update is published 6X annually.

Corporate Member of:
HAC · Helicopter Association International · NBAA

This publication neither endorses nor confirms the information contained within. The appropriate authorities should be contacted prior to commencing work on any aircraft or aircraft part or procedure.

ISSN 1703-2318

AMU is viewable online: subscribe and download at www.amumagazine.com

Upcoming Events

CANADA

Canadian Aerospace Summit
October 16 – 17, 2013
Ottawa, ON
www.aiac.ca/summit

Ontario AME Association Annual AME Workshop and AGM
October 30 – November 1, 2013
Toronto, ON; www.ame-ont.com

Helicopter Association of Canada Convention & Trade Show
November 8 – 10, 2013
Vancouver, BC; www.h-a-c.ca

Air Transport Association of Canada AGM & Tradeshow
November 17 – 19, 2013
Montreal, QC
www.atac.ca

UNITED STATES

2013 AOPA Aviation Summit
October 10 – 12, 2013
Fort Worth, TX
www.aopa.org/summit

Commemorative Air Force (CAF) Show
October 12 – 13, 2013
Midland, TX
www.airsho.org/

Air Medical Transport Conference (AMTC)
October 21 – 23, 2013
Virginia Beach, VA
www.iafccp.org/

2013 NBAA Business Aviation Convention & Exhibition
October 22 – 24, 2013
Las Vegas Convention Center
Henderson Executive Airport
Las Vegas, NV, www.nbaa.org

Arizona Aircraft Expo & Ownership Conference
November 8 – 9, 2013
Landmark Aviation Scottsdale
Scottsdale, AZ
www.azaircraftexpo.com

AVM Summit USA
November 21 – 22, 2013
Orlando, FL
www.avm-summit.com/usa

Heli-Expo 2014
February 24 – 27, 2014
Anaheim, CA
www.rotor.com/heliexpo

2014 International Women in Aviation Conference
March 6 – 8, 2014
Orlando, FL
www.wai.org/14conference

INTERNATIONAL

AVM Summit Europe
January 21 – 22, 2014
London, UK
www.avm-summit.com/europe

2nd Aviation Training Congress China
October 18 – 19, 2013
Xi'An, China; www.cdmc.org.cn

49th Farnborough International Airshow
July 14 – 20, 2014
Farnborough Airport
Hampshire, England
www.farnborough.com

Advertisers Index

GFS®

GEN 5 Paint Booths

> Maximum Energy Efficiency

> Superior Contamination Control

> Shadow-Free Illumination

> Temperature & Humidity Control

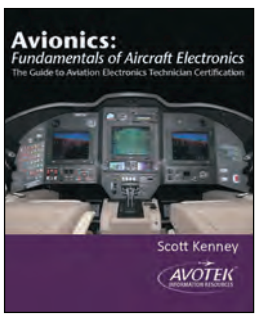
member of NBAA

The World Leader in Paint Booth Technology

WWW.GLOBALFINISHING.COM

STCs & new products

New book by Avotek delves into aviation electronics



Avotek has released its newest publication, "Avionics: Fundamentals of Aircraft Electronics; The Guide to Aviation Electronics Technician Certification". The first volume in a series, it provides concise instruction that focuses on key elements of basic aircraft electronics. Written by an educator and avionics technician, the easy-to-read text and clear illustrations cover material required for NCATT Aircraft Electronics Technician certification and creates a solid foundation for additional NCATT endorsements. Includes: basic electronic components and semi-conductors; generators and alternators; frequency generation; digital theory; and electrical technical data. **Order online at** www.avotek.com

Ruger portable cranes provide alternative to forklift trucks

Ruger Industries, Inc. has a new series of full-power floor crane products that can lift and transport up to 6,000 lbs. using electrically-actuated traction and hydraulics. These supply an ergonomic, strain-free solution to moving heavy loads and are easy to maneuver. They are safer, smaller and more economical alternatives to traditional forklift trucks. Suspended loads are held in place without motor or mechanical brakes. Cranes feature push-button lifting and lowering, on-board charging, a change-free battery system and all necessary safety features. Ruger manufactures adjustable leg-style, reverse-style and straddle-style cranes. **For more information visit** www.rugerindustries.com

Concorde announces higher capacity battery for Agusta A119, AW119 MKII

Concorde Battery announced a recently certified FAA STC SA01703WI for a new higher capacity RG-427 battery on Agusta A119 and AW119 MKII. Fleet customers with high cyclic operations needed more power and extended battery life to increase their efficiencies. Concorde's engineering team designed the higher capacity RG-427 34 Ah battery to deliver an additional 26 per cent power over the original 27 Ah nickel-cadmium battery in a footprint only fractionally larger than the RG-407. This makes the RG-427 a "drop-in replacement" for the original nickel-cadmium or Concorde's RG-407 (installed with STC SR09360RC).

For more information visit www.concordebattery.com

Twin Commander offers updated Fuel Tank Liner Install Kit

Twin Commander Aircraft has developed a new Custom Kit (CK) that improves the removal and reinstallation of the center fuel cell liner on affected models. Repeated removal and reinstallation of the center fuel cell and liner system can lead to damage to parts as well as oversized assembly holes. CK189 features reusable fasteners for reassembly of the liner encasing the center fuel cell. CK189 is applicable to the following models: 560A/E/F; 680; 680FL/FL(P)/F(P); 680T/V/W; 720; 681; 685; 690; and 690A/B. Installation of CK189 while the service bulletin work is being performed would be cost effective, according to Twin Commander. **For more information visit** http://twincommander.com/serviceCenters.html

Schweiss hydraulic and bifold doors have uses that go beyond aviation

With "Cottage Country" season coming to a close, those enjoying watersports know of the need to quickly tie up and unload the family boat. Or boat-owners can have a Schweiss hydraulic or bifold door mounted on their boathouse; all that's required to get a boat to safety is a click on a remote control opener. Schweiss can provide customers with the dimensions of doors prior to the construction of a boathouse so that the structure's opening can be made to the exact size and specifications of Schweiss's products. **For more information visit** www.schweissdoors.com

Shadin introduces AIS-360 Digital Discrete Switch Data Converter

Shadin Avionics, has released the Digital Discrete Switch (DDS) data converter with a purchase order from a major business jet manufacturer. The DDS was derived from Shadin's AIS-360 digital platform and requirements were defined by customer's needs to keep their aircraft introduction schedule on track. Shadin developed the family of AIS data converters to respond to a demand for flight-worthy data conversion applications on aircraft. The AIS-360 Digital Discrete Switch converter now joins the AIS-380 analog, AIS-360 digital and AIS-450 synchro in Shadin's family of FAA certified data converters.

For more information visit www.shadin.com

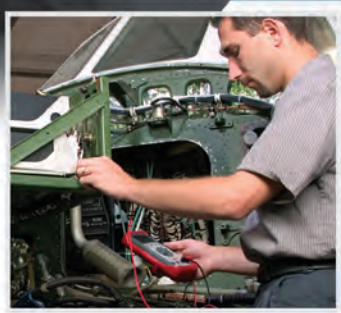
To announce your STC or new product, email a JPG photo and a product description to amu.editor@gmail.com or amumagazine@outlook.com

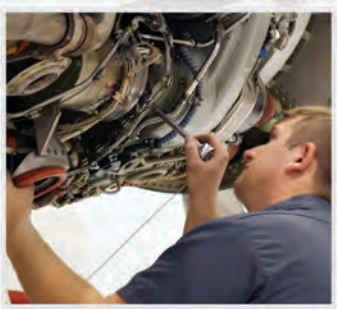
MURPHY'S LAW OF MAINTENANCE –

You Were Quoted 3 Days To Fix The Problem–6 Days Ago.

West Star Takes The Surprises Out Of Your Maintenance Event – That's Where Experience Pays Off.

Samuel A. Haycraft
Executive Vice President Maintenance Operations
38 years of experience





Experience is crucial in troubleshooting and correcting the malfunctions in today's complex aircraft. Knowing what to immediately rule out, and what specific component or sub-system to focus on, only comes with years of "hands-on" experience.

From a minor airframe inspection, engine overhaul, or window repair to the engineering and installation of a major structural modification, West Star Aviation will redefine your maintenance experience to something beyond what you're used to.

See for yourself what a difference experience makes, especially when dealing with good old Murphy.

For more information, contact Sam Haycraft at 618.258.8811.

To read more about the real "Murphy" and his aviation roots, like us on Facebook.

Falcon | Citation | Gulfstream | Learjet | Hawker | Challenger | Global Express | Embraer | King Air | Conquest | Piaggio

www.weststaraviation.com

WEST STAR AVIATION

BOEING SECURES 102 COMMITMENTS FOR 787-10

LE BOURGET, France, — Boeing, which announced the launch of its 787-10 Dreamliner at the 2013 Paris Air Show in June, has secured commitments for 102 airplanes from five customers across Europe, Asia and North America, providing a strong foundation to support development and production of the newest Dreamliner.

Customer launch commitments for the 787-10 include Air Lease Corporation, with 30 airplanes; GE Capital Aviation Services, with 10; International Airlines Group / British Airways, with 12 subject to shareholder approval; Singapore Airlines, with 30 and United Airlines, with 20 airplanes.

The new 787-10 will fly up to 7,000 nautical miles (12,964 km) — covering more than 90 percent of the world's twin-aisle routes — with seating for 300-330 passengers, depending on an airline's configuration choices. The second member of the family, the 787-9, is in final assembly in Everett, WA, and is set to make its first flight later this year.

"The 787-10 Dreamliner will be the most-efficient jetliner in history. The airplane's operating economics are unmatched and it has all the incredible passenger-pleasing features that set the 787 family apart as truly special," said Boeing Commercial Airplanes President and CEO Ray Conner. "The 787-10 is 25 percent more efficient than airplanes of its size today and more than 10 percent better than anything being offered by the competition for the future."

Design of the 787-10 has already started at Boeing, and international partners will be involved in detailed design. Final assembly and flight test of the

787-10 are set to begin in 2017, with first delivery targeted for 2018.

"Our ongoing investment in the 787 family is well-founded," said Conner. "With the 787-10, we've designed an exceptional airplane supported by an efficient and integrated production system that can meet increasing demands and create new opportunities for us. Our team and our customers are excited about growing the product line and expanding our presence with this family of airplanes."

The 787 family's unique interior offers passengers technologies that make their flights more enjoyable, including large, dimmable windows; cleaner air; higher humidity; lower cabin altitude; bigger stowage bins; soothing LED lighting and a smoother ride. The 787-10 will share a common type rating not only with the 787-8 and 787-9 but also with the popular Boeing 777, giving airlines additional flexibility in scheduling and training flight crews. For more information visit www.boeingmediaroom.com.

EASA ESTC FOR EUROCOPTER AS350 B, BA, B1, B2 & B3

WEST COVINA CA — Concorde has announced that Airlift AS of Norway has received EASA approval for ESTC 10044362, allowing for single and dual battery installations of Concorde's Sealed Lead Acid RG-350 or RG-355 battery on Eurocopter AS350B, -BA, -B1, -B2 and B3 models. The ESTC is now available through Concorde Battery Corporation's worldwide network of distributors.

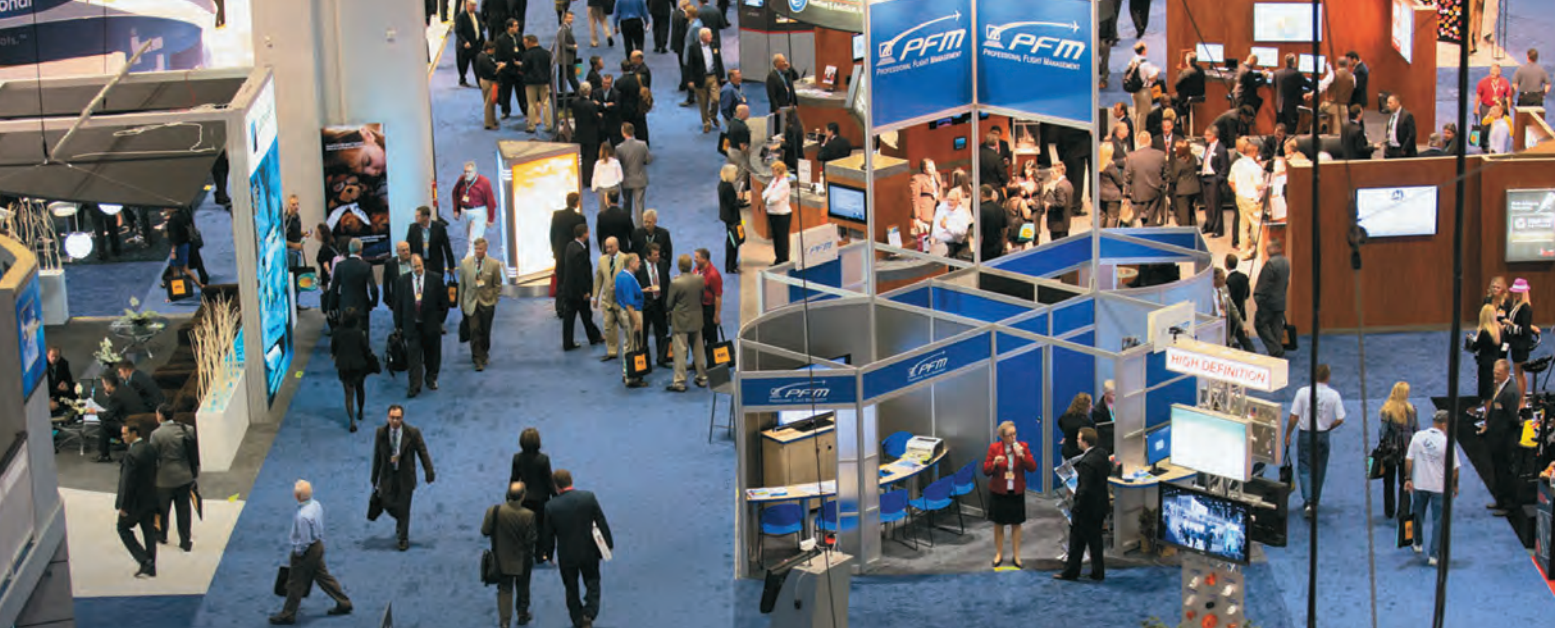
Many cold weather and high cyclic operators have requested a Lead Acid option for use in Europe, and Airlift has fulfilled this request with Concorde batteries. For conversions on a single battery installation ESTC 10044362 replaces the main 15 Ah nickel-cadmium battery with either the Concorde RG-350 or the RG-355 17 Ah Lead Acid batteries. If the aircraft has been modified with Eurocopter Service Bulletin 24.00.01 (starting in very cold weather) Airlift's ESTC allows for the replacement of both Nickel-Cadmium batteries with Concorde RG-350 batteries. RG-350 and RG-355 are TSO authorized and as such, have passed rigorous TSO C-173 testing for duty cycle, electrical performance, temperature extremes, shock/vibration and environmental requirements. Concorde's valve regulated lead acid (VRLA) recombinant gas (RG®) absorbed glass mat (AGM) technology has been proven as reliable, durable and safe for over 30 years.

Superior performance can be attributed to unique design features such as proprietary PolyGuard separators (an additional layer of protection against shorting, unique to Concorde) robust plate construction, over the cell wall intercell connections for reduced internal resistance and a commitment to quality standards.

The advantages of converting from nickel-cadmium to Concorde's RG Series batteries include lower cost of acquisition, zero maintenance and reduced battery costs per flight hour. Concorde batteries do not require deep cycling to remove the "memory effects" seen in nickel-cadmium batteries, do not require water or electrolyte replenishment and have no risk of thermal runaway. With the benefit of RG Series batteries shipping Hazmat Exempt, transportation is more cost effective regardless of whether shipping by land, sea or air.

Airlift AS, based at Forde Airport in Bygstad, Norway, is the largest North European domestic helicopter company and the sole Norwegian government contractor for search and rescue. The company is part of the Blueway Group and operates 16 of the group's helicopters.

For more information, visit www.airlift.no and www.airlift-doa.com. ■



NBAA 2013: Selected Highlights

North America's largest business aviation convention and exhibition offers a great reason to get out of the hangar and partake of the buzz with colleagues from all over the world about the newest developments in aviation. On show in **Las Vegas, Nevada, October 22nd to 24th**, the National Business Aviation Association's annual trade extravaganza has a number of events of particular interest to aircraft maintenance engineers.

Opening the confab this year will be the heads of the U.S. Federal Aviation Administration and the U.S. Transportation Security Administration. **Michael Huerta** and **John Pistole** will speak from their perspectives about the issues of greatest concern to the industry. In a separate session, a panel of **FAA safety representatives** will present an update on aircraft operations, maintenance and training for business aviation.

In addition to government representatives, experts will be on hand to discuss the latest technologies. **Justin Vena**, a veteran avionics technician, will brief participants on the evolution of future air navigation systems (FANS). He will explain the operation of controller pilot data link (CPDLC) and automatic dependent surveillance contract (ADS-C), including details about their initial set up and components included in a typical system. Vena will review certification as well as upcoming mandates for Europe and the North Atlantic.

A panel of leaders from Gulfstream, Honeywell and the International Business Aviation Council will examine issues surrounding sustainability and efforts being made to reduce carbon emissions by the industry worldwide. Alternative fuels – in conjunction with new aircraft design technologies, operational improvements and infrastructure modernization – are the focus of their debate.

The convention has an extensive agenda of maintenance and operations sessions scheduled to provide the latest service guidelines and repair procedures, plus other valuable technical information direct from manufacturers. **Members from the NBAA technical subcommittees and operator advisory boards** will be presenting their latest findings too. Companies presenting on a variety of aircraft and equipment types include: **Bombardier Challenger, Global Express and Learjet; Daher-Socata TBM 700 and 850; Dassault Falcon Jet; Gulfstream; Pilatus PC-12; Pratt & Whitney Canada PT-6; Honeywell Avionics and Engines; and Rockwell Collins Avionics.**

And as a tie-in to Gordon Walker's article on NextGen avionics on page 20 of this issue, Colt International is set to reveal OFP, the next generation in online flight planning and trip support technology. Full details will be given at a press conference at NBAA on October 21st at 9 a.m. in Press Room 1 of the Las Vegas Convention Center. Over the past 14 years, Colt has developed key technologies such as eFuel, Trip View and now OFP. This technology puts the control back in the hands of pilots, dispatchers and schedulers with access to powerful trip planning tools, key data and graphical information. Harnessing the power of Google Maps and Google Earth, OFP renders flight details, such as route, altitude and weather in 3D rather than text. This is displayed side-by-side with key data, such as regulatory requirements, fuel quote/set-up and airport information.

This year, both indoor and outdoor static displays of aircraft will complement the technical track, and NBAA promises "unprecedented access" to the models. **New this year**, the indoor exhibition will feature about **15 light business airplanes** – piston singles as well as light turboprops – and helicopters. For the outdoor display staged at Henderson Executive Airport, about 100 aircraft, from smaller types to intercontinental jets, will be showcased. Additionally, attendees will have the opportunity to visit the more than 1,000 booths spread across one million square feet of floor space. AirMaintenance Update will be there too, so feel free to stop by for a chat. We look forward to seeing what we can do for you. ■

DON'T MISS THE LARGEST BUSINESS AVIATION EVENT IN THE WORLD

NBAA2013

BUSINESS AVIATION CONVENTION & EXHIBITION [OCTOBER 22, 23, 24 | LAS VEGAS, NV]

WWW.NBAA.ORG

NBAA also hosts

ebace
14TH ANNUAL | MAY 20, 21, 22, 2014 | GENEVA, SWITZERLAND

ABACE
SHANGHAI CHINA
APRIL 15, 16, 17, 2014

To PMA or not to PMA

BY MIKE BRODERICK
Helicopter Engine Repair
Overhaul Services

Now that we've talked about helicopter tail rotors, how 'bout taking a break and discuss the subject of PMA parts?

So what is a PMA part anyway? What is a bogus part? How did PMA become an industry? Why have PMA parts enjoyed popularity? Are they safe? Are PMA parts acceptable outside the US? Ahhh, sit tight my faithful students; all these questions will be answered as well as why the original equipment manufacturer (OEM) really, really, doesn't like PMA. So get ready to navigate with me through the informational waters of PMA, soaking up facts about the PMA industry while also expanding our mixed bag of usable and useful cocktail knowledge (CK) along the way.

Now, of course, the first term we need to define is PMA. PMA is an acronym for "Parts Manufacturing Authority". A PMA part is an approved replacement for the OEM original. OK? As we proceed through the lesson, I will refer to a plethora (like that word? Go ahead look it up.) of Federal Aviation Regulations (FARs). But don't fret; I have purposely avoided publishing the written regulation itself, as we really don't have the time, space, or stamina to digest the amount of legalese that make up these policies. However, if you have a burning desire to read them you can find each one in its entirety on the FAA web site: www.faa.gov

Bogus (unapproved) Parts

Now that we know what the letters PMA mean, we need to define what a PMA part is. But, whad'ya say we kick start the conversation with what PMA IS NOT and talk about "unapproved parts" aka "bogus parts" first. And where better to start than with the example of the repair depicted in the above photo on this page. Now, this is a perfect example of using a bogus part as a replacement for the actual factory approved fuel system air inlet duct. Even though you will have to give the guy credit for being creative, this obviously does qualify as an illegal repair using a bogus part.

So just how do we define a bogus part? The term "bogus parts" is an expression which, loosely defined, has come to describe several parts categories, ranging from properly manufactured parts lacking

required documentation, known as unapproved parts, to defective and deliberately counterfeited parts.

Unapproved Parts are defined as follows: Under FAA regulations, all aircraft parts manufactured without FAA Approval (specifically, FARs part 21.305 or repaired under the terms of PART 43), are unapproved parts. This catchall classification includes counterfeit parts, stolen parts, production overruns sold without authorization, life-limited parts in exceedance of their time limits, approved parts improperly returned to service, and fraudulently marked parts, or parts which have no traceability.

Counterfeit Parts are defined as those made of inferior properties or materials and distributed with the intent of replacing an "approved part".

Some folks would have you think that PMA and bogus are interchangeable terms. And to quote one of my surfing buddies about this association of terminology, "that's totally bogus, dude." And in a little bit you will see that this assertion about PMA is refuted through an extensive investigation by the FAA. Also, as you might imagine, the biggest group of PMA detractors are the OEMs. We will discuss the contentious relationship between the PMA providers and the OEM a little later.

However, suffice it to say the only subject upon which both the PMA providers and the OEMs can agree is what do we do about people/companies who sell and or use unapproved and or counterfeit parts. And both concur that these purveyors of bogus parts need to be caught and punished.

Well, until 2000 there was no single systematic federal law that targeted this problem. In 2000, the Aircraft Safety Act encapsulated eight violations of the US Criminal code and set up a four-tier sentencing approach to punish violators. The punishment ranges from a 10-year imprisonment and fine up to $250,000 to life imprisonment and $1 million for an individual and $20 million for a corporation. The penalty is dependent upon the affect the unapproved part/parts have on the safety of flight and if failure of the part or parts results in no incident or injury all the way to death. The US government is not fooling around with purveyors of bogus parts, which is fine by me. Anyone who places profit over people's lives deserves punishment to the fullest extent of the law.

Approved Parts

An "Approved Part" is defined as a part which conforms to FAA approved production standards FAR 21.305, or repaired under the terms of Part 43. (Hint: These would be type certificated (TC'd) and PMA'd parts.) Well, are there parts that can be legally used in a certificated aircraft that are not PMA'd or TC 'd under a TSO? Yup, there are such parts that are neither PMA or produced under an FAA approved TSO. The following are examples of parts that are considered exceptions to the PMA rules for producing modifications and or replacements for TC'd parts.

1. An aircraft owner or operator may produce parts for installation on their own aircraft, or aircraft appliance, without a PMA. The installation of those parts must comply with 14 Code of Federal Regulations (CFR) Part 43. However, the owner may NOT sell these parts for general consumption on other certificated aircraft.

2. An Air Carrier operating under 14CFR Part 121 or part 135 may produce parts for installation on its own product without a PMA, provided the installation of those parts is approved in accordance with 14CFR part 43 and complies with the air carrier's accepted maintenance procedures manual and

instructions. Again, the air carrier may NOT sell these parts for general consumption on other aircraft not owned by this air carrier.

3. Finally, a part produced by an FAA-certificated repair station with the intent of installing it on a type certificated product or aircraft that the repair station has in house for repair. Such parts may NOT be offered for sale as separate items. However, before you venture into this activity, make sure to study the FAA Advisory Circular 43-18, Fabrication of Aircraft Parts by Maintenance Personnel of March 2006, for details and direction.

I am sure you noted that the recurring similarity of between these parts is that they cannot be reproduced for public consumption.

PMA Parts

Now that we know what a PMA part is not, let's talk about what a PMA part is. A PMA part is an approved part that is produced under a Federal Aviation Administration (FAA) design and production approval as defined earlier. Approved parts are established under a PMA, or Technical Standard Order (TSO), in conjunction with type certification procedures through FAA approval, or by conforming to recognized industry specifications.

As a side note, some approved parts have, in certain applications, a "life limit" placed upon them during the approval process. An example of these parts would be helicopter blades, some internal rotor head parts, turbine engine compressor wheels, blades and/or discs, and hot section wheels, blades and/or discs. The life limits can be in the form of a calendar time, operational/flight hours and or an engine RPM limit range and start events, also known as cycles. With respect to engine rotating parts, most have operational hours and cycles as limits, and must be removed from service, depending on which limit is reached first. These parts (and there are many more not named here) operate in a high-stress environment and thus can fatigue and fail before that part might exhibit observable wear or weakness. Typically, the FAA approval process for these life-limited parts is arduous and expensive for the manufacturer.

In order for a PMA to be issued to a particular part the following two conditions must be satisfied:

1. The FAA has reviewed the design of the part to assure that it is safe and meets the requirements of the FAA regulations, or as the saying goes, "equal to or better than the original." The design approval certifies that a replacement part or part modification complies with the airworthiness standards of eligible products, (aircraft, engine or propeller) and that the part or modification doesn't infringe upon the OEM'S patent. And here is the laundry list of FAA regulations, Advisory Circulars and FAA Orders used in this process.

TITLE 14, CODE OF FEDERAL REGULATIONS:

- Part 21, Certification Procedures for Products and Parts
- Part 21, Subpart K, Approval of Materials, Parts, Processes, and Appliances (Sections 21.301, 21.303, and 21.305)

- Part 21, Approval of material, Parts, and Appliances, section 21.502
- Part 43, Maintenance, Preventive Maintenance, Rebuilding, and Alteration
- Part 45, Subpart B, Identification of Aircraft and Related
- Products (sections 45.11 through 45.16)

ADVISORY CIRCULARS:
- AC 43-18, Fabrication Manufacturer Approval Procedures

ORDERS:
- 8110.42, Parts Manufacturer Approval Procedures

2. Next, the FAA must have reviewed the production quality system to make sure that there is a system in existence and established to verify that each part which is manufactured meets the FAA-approved design.

So, as a PMA manufacturer, what do I have to do to prove to the FAA that my part design and part is equal to or better than the original? Well, the hopeful PMA manufacturer shows this compliance by using a couple of techniques: a comparative analysis showing that the part in question is the same in form, fit and function as the original approved part, or qualitative analysis showing that through functional test and computation the PMA part meets the specifications of form, fit, and function. A PMA manufacturer may also rely on a licensing agreement with another approved manufacturer who has already obtained approval of the design in question, and thus can receive approval by demonstrating identicality. Identicality means, of course, that the part design, manufacturing process and the subsequent part is identical to that of the type certificated part. Some OEMs will license a supplier to produce a part that follows this process.

OK, if the PMA and the OEM part look the same, how do I know which part I am buying? Because there is no, or should be no, visual or dimensional difference between a part produced under a TSO from one produced under a PMA, a unique part number is assigned and permanently affixed to the PMA part. This distinctive identification system is mandated in FAR 45.15 and is in place so as to avoid any confusion between these two approved parts.

The History of PMA

PMA came about in July 1955 when the FAA, in an effort to help civilian owners keep out of production surplus military aircraft operational, considered it acceptable for companies that weren't OEMs to design and make spare aircraft parts. This created the PMA industry and produced two types of PMA suppliers: licensed suppliers (who work with the OEM), and those who would eventually compete with the OEMs (competitive suppliers). Licensed suppliers produce parts in collaboration with OEMs, not only removing the financial burden of providing support for these out of production aircraft, but also to help the OEM meet demand and reduce the cost of production of current inventory. Well, it wasn't long

Thunder Bay Aviation Ltd is your source for Twin Otter interior products manufactured by :

AERO PLASTICS & STRUCTURES
AEROSPACE PRODUCTS

"Look at this Twin Otter interior!" Check out the ceiling panels, clean, functional and so easy to remove and install! Your maintenance personnel will love your for this, it takes 2 seconds to get each panel down and about the same to put it back in place, WOW!
(Save time, save Money!)
Contact us for a quote on your new interior.

Aircraft Tool Manufacture

SD12559-1-TBAL Beta Ring Puller

CPWA30338-TBAL Hot Section Sling

SD5534-1 –TBAL Propeller Sling

We manufacture a wide variety of tools for the Twin Otter and the PT6A small series engines. Please contact us for a quote on the tools shown. Please visit our website for a full listing of the tools we currently manufacture. Don't see what you need? Please call as we can build to print for your tool requirements.

309 Hector Dougall Way
Thunder Bay, Ontario, P7E 5M6
Phone 807-475-5249 or toll free 1-800-465-3426
www.thunderbayaviation.com

THUNDER BAY AVIATION LTD.
SERVICE - OUR SPECIALTY

before the entrepreneurial spirit grabbed a few licensed PMA manufacturers as well as attracting other manufacturers to this innovative element of the aviation industry. They recognized a financial opportunity and began to challenge the OEM for market share on current production aircraft parts. Thus evolved the competitive supplier who, while providing acceptable alternative parts to the operator, also provides financial grief to the OEM. And it is this competition for market share that has strained the relationship between the OEM and the manufacturer of the PMA part.

So why have PMA parts become a popular alternative? As a rule, they are less expensive than the OEM original parts and they are generally more available. Less expensive, and readily available? Ah yes, this is true. How can they do it? Well, the PMA manufacturer only has to invest in the engineering and manufacturing costs to produce spare parts. And the PMA manufacturer will "cherry-pick" the parts, reproducing the ones that have the most replacement activity. The hapless OEM, on the other hand, has to fund the entire component, including engineering, research, etc. as well as an inventory of spare parts for the aftermarket support of said component. For example, an engine manufacturer has to pay for the engine development, production of the engine, and spare parts to support the engine in the field. Put these costs together, plus the financial burden of continuing airworthiness documents (overhaul, parts, and field maintenance manuals and bulletins) support personnel, inventory costs etc. As you can see, the list is long and costly.

I want you to notice that I did not use the term "cheaper" as an economic portrayal of a PMA part as I don't want any misconception about the quality of a PMA part. Contrary to what the OEMs say, a PMA part is of the same quality as the original, and sometimes better. Better? Why? Well, the PMA provider has the advantage of evaluating the OEM part, discovering and improving upon any weakness discovered during the evaluation process. Until recently, the OEMs continued to bash the PMA part with statements about warranty violations and safety concerns. In 2008, after an extensive FAA and EASA investigation which was requested by the OEMs, these regulatory agencies could find no statistical evidence that PMA parts are a safety concern, nor could they find any fault with their approval process of PMA parts. The FAA issued a Special Airworthiness Information Bulletin (SAIB) #NE-08-40 publishing these facts and extolling the quality of the PMA part. This SAIB really caused the OEMs to howl like frightened cats, although they have no one but themselves to blame. It is perfectly logical that they are opposed to PMAs, but as we have learned, their opposition has nothing to do with safety.

You see, enlisting the FAA's aid in this matter worked against them, as it caused the FAA and EASA to really research the safety record of PMA parts. What they found was that OEM's information in their maintenance manuals and service bulletins was anti-PMA. For instance, when an OEM issues formal instructions in their maintenance manual or service bulletin that you are not allowed to put PMA parts in the engine, that puts the installing technician between the proverbial rock and a hard place. Per Advisory Circular (AC) 43-13-1A, you are supposed to follow the OEM's instructions. However, AC43-13-1B says that you can use anything that will safely return something to its original condition.

Well, as I stated earlier, the result of the FAA scrutiny was that the FAA has had good oversight over PMA approvals, that PMA parts are safe, and that the OEM concerns are apparently driven by economics rather than by safety concerns. Careful what you wish for.

One thing resulting from this that does favor the OEM is that the PMA manufacturer can no longer tell the overhauling/maintenance community to use the OEM documents as the criterion for continued airworthiness, which, if you think about it, makes sense. The PMA part should be inspected to its own set of maintenance and overhaul standards. This added responsibility now causes the PMA folks to monitor the repair of their parts in the same manner as the OEM.

(Continued on page 45)

Helicopter Association of Canada is coming to

Vancouver, B.C.

Don't miss HAC's 18th Annual Convention and Trade Show November 8-10, 2013 at the Vancouver Convention Centre Vancouver, BC. Don't miss your opportunity to reach the World's 2nd largest fleet of helicopters.

Expanded Professional Development Courses & Workshops for all Sectors

Keynote Speaker: Sergei Sikorsky

Showcase Your Products & Services to the Largest Helicopter Event in Canada

Sponsorship & Marketing Opportunities Available

HAC

Helicopter Association of Canada

For details contact HAC at 613.231.1110 | *barb.priestley@h-a-c.ca* | **www.h-a-c.ca**

Air traffic management technology:

Next Generation avionics explained

BY GORDON WALKER, AME 'E'
Professor of Avionics,
Centennial College

The United States' Federal Aviation Administration is well underway with the implementation of its Next Generation air transportation system. This represents a radical overhaul of the manner in which air traffic is managed and controlled. By the time 2025 rolls around (the projected year of completion), the aviation landscape will be vastly different from the environment in which we presently operate.

Like all aspects of life in the 21st century, the world of aviation cannot help but be reshaped and restructured as a result of massive developments in electronic information technology. At the root of it all, it is these advancements in information exchange and transfer that are driving and mandating the changes proposed in the NextGen initiatives.

With the ever-increasing amount of air traffic, issues of safety and congestion become more acute. Traditional — or current generation — technologies associated with air traffic control (ATC), flight planning, collision avoidance (TCAS) and so on, limit the rate at which flights can be dispatched, controlled and separated. This results in congested taxiways, delayed take-off and landing clearances, longer routes and flight times, plus the associated costs of fuel burn, crew times, and passenger/cargo revenues.

The goal of the NextGen project is to employ technologies which will enhance air traffic control safety and coverage, enable more direct flight paths, expedite aircraft/ATC control communications, simplify and expand weather warning and avoidance systems, and reduce the amount of separation time and space between flights. This is all achievable using existing, albeit new technologies which undoubtedly will continue to advance over the course of the implementation schedule. Global Positioning Systems (GPS) have become an integral part of the aviation world as well as virtually every automobile and cellphone, and represent a key element in the structure of the FAA's NextGen model.

The most revolutionary aspect of the NextGen paradigm is the shift from the current ground-based ATC systems to the satellite-based Automatic Dependent Surveillance-Broadcast (ADS-B) technology.

To understand the scope of this change, let's review how these two systems operate.

The current ATC systems use ground-based interrogators (those big, rotating antennas seen at airports) that transmit radio signals, called interrogation pulses, as they spin around and around. When an aircraft equipped with an ATC transponder receives these interrogation pulses, the aircraft's transponder is triggered and it sends reply pulses back to the interrogator.

Based on the amount of elapsed time between sending the interrogation and receiving the reply, the ATC interrogator is able to determine the distance between the interrogator antenna and the aircraft sending the reply. The rotation of the interrogator antenna is synchronized with the air traffic controller's display screen and therefore the position of the aircraft can be displayed on the controller's screen. If the transponder is operating in Mode C (altitude encoding mode), the altitude of the aircraft is also displayed. This allows the controller to see the position, distance and altitude of the aircraft on their screen. This information is available only to the ATC controller, not to any other aircraft in the control zone.

ADS-B, on the other hand, uses information from the aircraft's GPS to determine its present position in three-dimensional space (latitude, longitude and altitude). This information is then transmitted not only to the ATC facility, but also to all other aircraft in the vicinity. In addition to position and altitude information, ADS-B equipped aircraft transmit heading and speed information. All of this data can be graphically displayed on the navigation screens in the cockpits of other ADS-B equipped aircraft. This means it is no longer just the air traffic controller who can see the position of traffic in the control zone, but all suitably equipped aircraft can also access this information.

The benefits of ADS-B based air traffic control are tremendous. Pilots will have the advantage of significantly increased situational awareness regarding the proximity of other aircraft. Air-to-air and air-to-ground data communications will allow for computer-controlled collision avoidance manoeuvres and eventually interval spacing co-ordination.

Data communications also represent one of the more significant aspects of NextGen initiatives. Much of routine air-to-ground/pilot-to-controller communications will shift from a voice format to a data exchange format. The relatively narrow bandwidth available for aviation VHF communications (118–137 MHz) means that the only way to meet the demand for more channels was to decrease the spacing, from 50 kHz to 25 kHz to 8.33 kHz.

A more effective way to deal with this problem is to reduce and eliminate much of the voice communications and replace them with data communications. For example, at a busy airport, pilots must patiently wait for a suitable opening to key their mikes to request pushback/taxi clearance. The controller will then reply with appropriate instructions — the whole process taking a significant amount of time and contributing to departure delays. Alternatively, using data communications enables requests for clearance and ATC responses to be transmitted in microseconds.

Many instrument-capable general aviation aircraft have GPS receivers and moving map displays.

From an avionics perspective, the notion of data communications between airborne computers and ATC computers for the purpose of control, separation and collision avoidance is hugely exciting. With collision avoidance systems now being coupled to autopilots, we are seeing air-to-air data exchanges amongst TCAS computers, which result in commands being given to autoflight computers. In other words, the aircraft computers are "talking" to one another and actually executing flight manoeuvres based on these "conversations." With the

increased accuracy realized by the use of ADS-B based air traffic control, and the proposed increase in data burst communications, it seems inevitable that we will soon have commercial aircraft flying in tight formation, controlled by continuous stream data exchanges.

A third aspect of the NextGen avionics transformation involves weather information systems. Traditional airborne weather radar systems tend to be somewhat limited in range and effectiveness, and can be heavy, costly and even potentially dangerous. Once again, electronic information exchange and data transfer enables the assembling of weather information from multiple sources, such as satellite, airborne and ground-based weather monitoring facilities. All this information can then be transmitted to aircraft, enabling accurate, real-time weather condition information that is available for flight planning and execution purposes.

These are just some of the more salient aspects of NextGen technology that represent significant changes and developments from an avionics perspective.

While these transformations are tremendously exciting to those of us involved in the technical side of the operation, they are not without concern and controversy within other sectors of the aviation community.

The notion of reducing the role of pilots and air traffic controllers as we shift control from human to computer operations and controls remains a very contentious issue. The cost of implementing equipment changes is also something to be considered as airlines and private owners ponder modification and installation costs for new avionics systems.

Of course, the greatest controversy surrounding The Next Generation continues to be "Who's a better captain ... Kirk or Picard?"

Q: What are some of the advantages of ADS-B over ground based air traffic control systems?

From the previous article:

Q1: What is the voltage drop across a resistor of 4.7KΩ with 238mA of current running through it?

Q2: A hydraulic press has an input cylinder 1 inch in diameter and an output cylinder 6 inches in diameter. Calculate the force exerted by the output piston when a force of 10 pounds is applied to the input piston.

Answer to Q1: 1119 volts
Answer to Q2: 360 pounds

GORDON WALKER *entered the avionics industry after graduating from Centennial College in 1980. His career with Nordair, Air Canada, CP Air, PWA, and ultimately Canadian Airlines took him to many remote corners of Canada. Since leaving the flight line to pursue a career as a college professor, Walker has continued to involve himself in the aviation/avionics industry by serving on several CARAC committees concerned with the training and licensing of AMEs. As well, he has been nominated to the CAMC Board of Directors, and has been elected President of the National Training Association (NTA).* ■

ONTARIO AME ASSOCIATION
SYMPOSIUM
AND TRADE SHOW 2013




October 31 - November 1 **Delta Meadowvale Resort & Conference Centre**

Awards, Dinner and Entertainment Featuring the comedy and music of Bowser & Blue!

New this year

- **Full day of purchasing related training sessions on October 31**
- **SMS Best Practices - Working Group**

Other Sessions Include

- **Transport Canada**
- **Aviall Battery Couse**
- **Standard Aero APU Course**
- **Composites**
- **Cessna Update**
- **Eurocopter**
- **Bell Helicopter**

For more information, contact
Cara Tweyman, **Precision Aero Components**
Tel: (905) 405-1870 **Cara@precisionaerocomponents.com**

www.ame-ont.com

Ad designed by: www.altitudegraphics.com

Atlantic AME Association

News from the Rock by Mel Crewe

Hello fellow AMEs, apprentices and corporate members; it's newsletter time again and a chance to update happenings on this end of the granite planet.

In the spring, I attended the 35th Annual Atlantic Region Aircraft Maintenance Symposium held at the Delta Beausejour Hotel in Moncton, NB. The Symposium was held from April 17–19, 2013. It was an overwhelming success, as there were 41 displayers at the trade show and the technical sessions were well attended during the two-day event.

One of the major events at the symposium annually is the Awards Banquet where individuals / companies are recognized for their outstanding contribution to the aviation industry in the Atlantic region. The awards presentations were emceed by yours truly and it was an honor to present these awards.

The Roger Richard Memorial Award is presented annually to the retired AME who has distinguished himself / herself in their aviation career in the Atlantic region. This year's recipient was Claude Daigle. The award was presented by Jacques Richard on behalf of the Richard family.

The Newfoundland Government Air Services Memorial Award is presented annually to an individual / company who has shown outstanding support of the AME Association (Atlantic) Inc. and / or the Atlantic Region Aircraft Maintenance Symposium. This year's recipient is Atlantic Avionics Inc. of Halifax, NS. The award was presented to Uli Huber by yours truly.

The Aviall Canada Ltd. Award is presented annually to an AME who has distinguished himself / herself during his / her career. This award was not presented this year as no nominations were received. Certainly, there must be some deserving individuals out there. Let's get your nominations in to the committee.

The AME Association (Atlantic) Inc. Bursary Award is presented annually to a student from one of the aircraft maintenance colleges. This year's recipient is Conrad Morgan of Nova Scotia Community College. The award was presented by President Ben McCarty.

Congratulations to all of this year's award recipients. Although the attendance at this year's symposium was down slightly, the delegates in attendance enjoyed the technical sessions and displays, and from all reports, the information provided was very beneficial.

At this time, I would like to congratulate Chairperson Jacques Richard and his committee for an excellent job organizing this event. You deserve a well-earned rest.

The 36th Annual Atlantic Region Aircraft Maintenance Symposium will be held at the Sheraton Hotel in St. John's, NL, April 23-25, 2014. The organizing committee under Chairperson Mel Crewe will be sending out the registration packages later in the fall and early New Year. Circle the dates on your calendar to attend the symposium. Come on down and enjoy our famous Newfoundland hospitality.

Recently I contacted a few operators to get some news. Over on Major's Path near the airport, Universal Helicopters Newfoundland Limited is kept busy. They have a Bell 407 based here and also service another Bell 407 operated by Quinlan Bros. Fisheries. When maintenance is required, maintenance support staff normally comes from their base at Gander. This year marks the 50th year of operations and a reunion is scheduled for Gander in October 2013. Information on the reunion and activities planned are available on their website. The address is www.uhnl.nf.ca. If you are a former employee of the company, make plans now to attend and renew old acquaintances. It sure looks like it is going to be a great time.

Not all activity for aviation is focused around the airport. Out in Donavan's Industrial Park in Mt. Pearl, two companies call this area home. Pro-Arc Fabricating is located on Dundee Avenue and they specialize in aircraft welding. Most of their business is outside the province, but they do a considerable amount of work for local operators when required. Buffalo Airways of the North West Territories is a big customer.

Another operator who has recently opened shop in this area is Gas Tops Ltd. The company is involved in the calibration of equipment, NDT (Non–Destructive Testing), oil analysis, and condition monitoring and vibration analysis. Gas Tops is the holder of a Transport Canada AMO and have a mechanical shop and avionics shop at their facility. They supply services of oil analysis, NDT and calibration to local companies such as Cougar and Provincial Airlines.

Outside of the aviation sector, Gas Tops have contracts with Vale at the Long Harbour facility and at the Newfoundland Refining facility in Come by Chance. The move is definitely paying off. Good luck in your future endeavours.

Back at the airport, it seems all operators are busy. Over at Cougar Helicopters Inc., the fleet of Sikorsky 92As are kept busy supplying the offshore oil platforms. Seven S92As are being utilized while this includes one aircraft on SAR standby. This operation is from their main facility adjacent to the terminal building while the SAR operations are conducted from their new facility. Besides being an SAR facility, it also serves as the main office building. In conversation with their Training Supervisor, Bob Whittle, he informs me the company has been doing some extensive Fall Restraint Training for all maintenance crews. There is also some Human Factors Recurrent Training being conducted for crews that require the same. All maintenance staff are closely monitored for training requirements and for update needs.

My next contact was at Provincial Airlines Limited where I managed to track down the current Director of Maintenance, Carson Goodyear. Activities at PAL on the airline side of things are extremely busy. The company currently operates a rather large fleet.

The fleet consists of three Saab 340s on the schedule service, five DH -8s on the schedule service, one Saab 340 working out of Halifax, two DH-8s working out of Montreal, two DH-8s working out of Curacao in the Caribbean doing offshore surveillance, six Beech King Air 200s doing offshore surveillance, one Beech King Air Medevac aircraft on charter to EHS Nova Scotia, one Citation on contract with Newfoundland Government Health Services (medevac), one Citation 10 (charter ops.), five DHC-6 Twin Otters at Goose Bay, Lab., three King Air 350s working out of Halifax, and one Fairchild Metroliner available for charter at St. John's.

Provincial Airlines Limited has been awarded the Airline Reliability Performance Award by Bombardier for DeHavilland Dash 8 Series 100 / 200/ 300 aircraft. This award was presented at a ceremony in Munich, Germany, on May 28, 2013. Congratulations on this wonderful achievement. On the maintenance side of things, Myles Caines is Quality Assurance Manager, Robert Glasgow is Production Manager, David Coffin is Planning Supervisor, Dion Heffern is Avionics Supervisor, Wayne Green is Purchasing Manager and Cora Lee Quinlan is Stores Manager. It is the excellent work of the management team as well as the support of the maintenance team that ensures the overall success of the airline.

Provincial Airlines Ltd. is a large company operating from the following hangers: Hanger 1, 2, 3, 4 and 6. They also operate an FBO from Hanger 1 and is rated one of the top FBOs in the country. Nestled away in the corner of Hanger 2 is Skylink Express which operates a Beech 1900 on a courier service between Moncton and St. John's for the banks. The aircraft are on a daily service, and engineers Dwight Collins and Jason Lundrigan perform their maintenance tasks when the aircraft are on layover. Keep up the good work, fellas.

My next contact was at the Canadian Coast Guard Helicopter Section where I spoke with Senior Helicopter Engineer Tim Sheppard. Tim and his staff of engineers are busy getting ready for their regular Arctic summer deployment. Engineers from Ottawa, Shearwater and St. John's (Guy Beazley) will handle the Arctic assignment while the three newly hired engineers at the St. John's base will handle shipboard assignments around the island and Labrador. Brian Osmond, Chris Hann and Dan Ennis have recently returned from training courses in Texas and Ottawa. Not to worry, fellas: you'll have your sea legs in no time. Over on the west coast at the Stephenville, engineer Gerard "Jed" Sampson continues to maintain the BO-105 that is based there. Jed is like the Energizer bunny: just keeps on ticking.

Next, I contacted the Director of Maintenance, Corey Russell, at Provincial Aerospace. He informed me that the company is continuing to diversify operations, with the aerospace and airline sectors becoming separate entities. Provincial Aerospace are currently performing Heavy Maintenance checks on the Bombardier DH-8, Series 100-200 and 300. They are also performing "B" checks on CL-415s and modifications on CL-415s operated by foreign governments. While operations are slow locally, crews are currently doing a medevac conversion on a Beech King Air B-200. This work is being completed for an Emergency Health Services contract in Nova Scotia.

The success of Provincial Aerospace is a testament of the work performed by its crews. Under the direction of Corey Russell, his team consists of the following: Quality Assurance Manager, Sandy Hayward; MRO/MOD Production Managers Jody Garland (Structures), Phil Thorne (Mechanical) and Sean Hickey (Avionics). On line Maintenance Manager Darrin Tucker is responsible for keeping the crews at their maximum performance.

On a sad note, Mr. Jim Quirk, engineer with EPA and CP Air in Gander and Halifax passed away recently after a brief illness. Since retiring and moving to St. John's, Jim opened the Windsock Lounge on Water Street, and it was a pleasure to drop in and visit. The club was well decorated with aircraft models and memorabilia from the old EPA days. On behalf of the Association and ARAMS committee, I would like to extend our deepest sympathy and condolences to the family.

CCNB Camput de Dieppe Aircraft Maintenance Program Closed

The aircraft maintenance two-year program offered by CCNB Campus de Dieppe closed at the end of the current program year in September 2013.

The college has experienced a very low graduation-to-intake ratio for this program (approximately 5 to 12) over recent years. This — coupled with problematic placement of students after graduation (particularly in New Brunswick), the selection of satisfactory students capable of successfully completing the course and the high cost of maintaining training equipment — has made the continuation of the program unsustainable. The fact that the cost of the course delivery is significant and the large amount of the college campus being dedicated to the program makes it hard to justify graduating 5 students every two years.

The college is going to consider the future of the program and a final decision whether or not to completely abandon the Aircraft Maintenance Program will be made before 2014. It is very sad to see this facility not be in a position to continue to offer this training to persons wishing to pursue a career in aircraft maintenance, which is certainly in demand on a national basis.

Originally, the aircraft maintenance program was offered in English at the NBCC Moncton campus and later moved to Dieppe as a unilingual French program. One can't help but wonder if the original program had continued serving residents of New Brunswick from both linguistic backgrounds, we might still have a robust program similar to that offered in Halifax and Gander.

Obituary

SMITH, Ernest James — 79, of Dartmouth. August 1933-March 2013. With heavy hearts we announce the passing of Ernest in Dartmouth General Hospital on March 26, 2013. He was a wonderful husband, father, grandfather and brother. Ernie was born in Halifax to the late Hendry Smith and Barbara (Pettipas) Smith-Hatch. Grieving is his best friend and wife of 59 years, Jacqueline (Vaughn) Smith. He was a proud dad of sons, David, Fort Saskatchewan, Alta. Dale (Linda), Dartmouth, Kenneth (Lisa), Eastern Passage; grandchildren, Christopher (Andrea), Jason Amanda, Shannon, Evan of Dartmouth; Angela, Rachel, Kevin of Edmonton, Alta; half-brothers and sisters, Wayne Hatch, Lake Echo; Ken (Linda) Smith Belnan; Dorothy Smith, Shubenacadie. He started his career with Firey Aviation; he then worked to get his licence as an AME. This took him to airlines in Quebec, Alberta and British Columbia. He retired from Transport Canada as an aircraft inspector at Halifax Airport. Upon retiring, he shared his knowledge helping to restore the Firefly and Swordfish, which he saw fly. He was an honorary member of the Experimental Aircraft Association (Valley Chapter). He was a life member of the Photographic Guild of Nova Scotia. His family has many photos he took over the years. Ernie's wish to have his brain donated to the Neurological branch of Dalhousie to help others with Corticobasal Degeneration, a rare form of Parkinson's, has been fulfilled. Donations to the Parkinson Society of Canada, Maritime Division or Lung Association of Nova Scotia would be greatly appreciated. On-line condolences may be made by visiting www.atlanticfuneralhomes.com (Dartmouth Chapel).

PAMA SoCal Chapter

June 2013 Meeting Wrap

Thank You Scott Durham from Freedom Aero Service Inc.

The SoCal chapter would like to thank Scott Durham, Operations Customer Support, and all at Freedom Aero Service, Inc. for their time and generosity in hosting the June 11, 2013 Chapter dinner meeting, annual SoCal PAMA Scholarship Awards Presentation and excellent technical presentation on "Proper Handling and Maintenance of your Electrical Accessories and Instruments" at the 94th Aero Squadron Restaurant in Van Nuys, CA. To learn more about Freedom Aero Service Inc. log on to www.freedomaeroservice.com, and to reach Scott directly: ScottD@freedomaeroservice.com. And many thanks to Phil Samuliean, Chapter Photographer.

June 2013 Scholarship Fund

Raffle Drawing $303. Thank you chapter supporters: Aero-Nasch/Jet Brella, Aviall, VNY, Business Aerotech, Consolidated Aircraft, Corporate Air Parts, Extraord-N-Air, Gulfstream LGB, HRD Aerosystems, Rotorcraft Support, Universal Avionics, and Velocity Aerospace. 100% of the proceeds from raffle ticket sales and donations benefit the SoCal PAMA Scholarship Awards Program.

2013 Scholarships

Congratulations Scholarship Winners: Juana Abigail Hipolito (Crimson Technical Aviation College, Feb. 2014), Salvador Garcia (SCLA School of Aviation Technology, Oct. 2013), Julian A. Lopez (North Valley Occupational Center, March 2014), David Murphy (SCLA School of Aviation Technology, Oct. 2013 Matthew LaPrade (Crimson Technical Aviation College, Nov. 2013). Thank you SoCal PAMA for providing financial support for these outstanding students in their A&P scholastic pursuits. 2014 Scholarship Applications coming soon to SoCalPAMA.org

Employment and Educational Opportunities are broadcast via SoCal PAMA e-mail and posted on the SoCal PAMA website. To receive chapter meeting, employment opportunities and event announcements by email, go to SoCalPAMA.org and on the home page, click the "update email address" button.

Job Opening to Post?

Get the word out through SoCal PAMA. Send postings to SoCalPAMA@gmail.com Include company name, logo, position title, location of position, and contact information. The SoCal chapter offers employment and educational opportunity postings free of charge to the aviation maintenance community worldwide.

SoCal PAMA Website

Advertise your company on SoCalPAMA.org and support SoCal PAMA. It's only $50 for 12 Months. Contact Nikki King or Gail Erwin for posting a new ad, renewal fees, and artwork updates: nikki@extraordnair.com or gailjerwin@verizon.net

SoCal PAMA Calendar 2013

- November 12: Chapter meeting
- December 10: Holiday Social

Industry Events 2013

- AOPA Aviation Summit: Oct. 10–12; Ft. Worth, TX; AOPA.org
- IA Training – Rotorcraft Support: Oct. 16 Burbank, CA; RotorcraftSupport.com
- NBAA Annual Convention: Oct. 22–24; Las Vegas, NV; NBAA.org
- AVM Summit/PAMA National Symposium: Nov. 21–22; Orlando, FL; AVM-Summit.com
- Western Museum of Flight Monthly; Torrance, CA; WMOF.com

The SoCal chapter offers aviation event postings free of charge to the aviation maintenance community worldwide.

SoCal PAMA Board of Directors

- Greg Potter, President; greglpotter@verizon.net
- Bill Johnston, Vice President/Topic Chair; wdjohnston@raytheon.com
- Dan Ramos, Treasurer/Broadcasts; danwramos@verizon.net
- Gail Erwin, Secretary/Newsletter; gailjerwin@verizon.net
- Tina Campos, Sergeant At Arms; nathan_chris@msn.com
- Chris Cancelosi, Meeting/Prize Coordinator Chair; chris@rotorcraftsupport.com
- Veronica Lozano, Meeting/Prize Coordinator; veronica@rotorcraftsupport.com
- Sabrina Baiocco, Raffle Ticket Sales Co-Chair; sbaiocco@claylacy.com
- Luisa Benin, Raffle Ticket Sales Co-Chair; lbenin@claylacy.com
- Nikki King, Website Advertising Chair; nikki@extraord-n-air.com
- Phil Samuelian, Chapter Photographer; psamuelian@me.com
- Warren Horton, Chapter Governance Advisor; wchorton@hotmail.com
- Glenn Beckley, Chapter Governance Advisor; coptrmd@aol.com
- Warren Horton, Emeritus: Chapter President, Vice President
- Glenn Beckley, Emeritus: Chapter Sergeant At Arms

Special thanks to SoCal chapter supporters

AME Association of Ontario

2283 Anson Drive, Mississauga, Ontario L5S 1G6
tel: 1-905-673-5681 fax: 1-905-673-6328
email: association@ame-ont.com website: www.ame-ont.com

2013 Ontario AME Symposium and Tradeshow

The annual Ontario AME Symposium and Tradeshow will be held Oct. 30 to Nov. 1, 2013, at the Delta Meadowvale Resort and Conference Centre. This is a perfect opportunity to take in the networking opportunities available, participate in training sessions and meet with vendors that you deal with.

This year, our two-day training program will once again offer one room dedicated to the helicopter industry with half-day workshops. Other sessions include: composites, stress in aviation, CPR, Cessna update, APU36-100/150 half-day course, balancing, and Transport Canada updates.

We are also going to be offering a full day of purchasing-related training sessions on Thursday, Oct. 31. Topics include: supply chain logistics, certificate and paperwork, landed costs and purchase issues, and supply chain management.

The symposium will also be hosting a full day Aviall Battery course (pre-registration required) and an SMS best practices workshop (restricted access—please call for registration).

As always, we will be having our banquet and awards night, complete with amazing entertainment by the well know comedy duo of Bowser & Blue.

Once again, all members of the Ontario AME Association will receive a discount for the show registration. Please check our website www.ame-ont.com for updates and registration forms. You can also contact Cara Tweyman at 905-405-1870, or send an email to cara@precisionaerocomponents.com for more information. We hope to see you there!

Training for the Aviation Community

Education does not end when we graduate from school. The AME Association of Ontario supports the effort to offer training opportunities to the aviation community.

In addition to the seminars offered at our annual workshop, we have developed several courses that we offer to our individual members and corporate sponsors. We are always willing to develop additional courses on demand.

For more information, or to participate in a course, please contact our Director of Training, John Longo, via email: association@ame-ont.com

Charles (Chuck) David Leavens: 1929-2013

Charles David Leavens in his 84th year passed away peacefully at Brampton Civic Hospital on June 28th, 2013, while his wife Terri (Theresa) and daughter Lea Anne were with him.

Chuck had a long and varied career in aviation. He obtained his private pilot license in 1949 at the age of 18, and a commercial license in 1950. He was CFI for Leavens Bros. Air Services and flew different aircraft including Cessna Cranes, Seabees, and one of only two autogyros that operated in Canada. He towed banners in Toronto, dusted and sprayed, flew for the Toronto Star, operated float aircraft and flew charter flights for hunters and fishermen.

He set up and operated Leavens' branch in Montreal from 1960, and remained there until 1973, when he returned to Toronto after the death of his father, Clare, to help his brothers run the business. In 1974, he became president and general manager, taking over from his brother John upon his death. He is also predeceased by his brothers Robert and Douglas. He remained active in the business until his retirement in 1995.

He was a member of COPA since November 1959. He was also a director and past president (1982) of the Aviation Distributors and Manufacturers Association (ADMA). He was a member of the Canadian Aviation Historical Society, and a member of the Ontario AME Workshop Committee. He also volunteered at the Canadian Air & Space Museum at Downsview.

He loved to fly the 1929 WACO 10 biplane that was restored for the company's 50th Anniversary of Leavens Aviation. That aircraft can now be found on display at the Canada Aviation and Space Museum in Ottawa.

He was most proud that he was able to attend the Canadian Hall of Fame induction ceremony in 2012 and watch Leavens Bros. receive the Belt of Orion Award. He was so very proud of their family business and all the employees and family who helped them succeed through 84 years. He will be greatly missed in the aviation community.

Increased Demand for Aircraft Maintenance Engineers

Recently, there have been several newspaper articles forecasting the anticipated shortage of aircraft pilots. Supposedly, tens of thousands of pilots will be required to fly as a result of the anticipated increase in demand for air transportation. The general public seems to think that the only person needed for an aircraft to fly is a pilot; they fail to recognize that there are many other skilled individuals required to ensure a safe flight.

Do not be shy; the next time you hear that the local high school is holding a career day, contact the guidance counselor and offer to talk about the various professions required in aircraft maintenance. When you speak with the students, you will find that many of the articles in AMU Magazine can be used as reference. Time to "talk-up" the other professions required to make airplanes fly!

— Sincerely, Your Board of Directors

North Star Restoration

a labour of love – and precision MRO work

The Canadair North Star was an unusual beast, borne out of a desperate need for Canadian long-range air transport following World War II . . .

BY JAMES CARELESS

The airframe was either a military Douglas C54 Skymaster or its DC-4 civilian cousin. The four propeller engines were Rolls-Royce Merlin 622s: together they gave the North Star a 35 mph faster cruise speed than the DC-4's original Pratt & Whitney R2000 radial piston engines, but were much noisier due to the 622's superchargers; the ones mounted on the inner engines discharged against the fuselage. The result was a tough, reliable transport that was long on capability, but short on silence.

71 North Stars were built: The civilian versions used by Trans Canada Airlines (now Air Canada) featured pressurization, luxury appointments and extensive noise insulation along with the TCA-designed MacLeod exhaust crossover system. The military versions had no pressurization, webbing-and-aluminum "troop seats" and such thin noise insulation that "getting a headache from the roar of the Merlins went with the job," says Bill Tate.

Tate is vice president of the Project North Star Association of Canada, a volunteer group that aids the Canada Aviation and Space Museum (Ottawa) in the restoration of vintage aircraft like the North Star. For 10 years, these skilled volunteers have worked side-by-side with CASM conservators in the meticulous disassembly, component restoration/replacement, and refitting of RCAF 17515 — the last North Star in existence.

The level of care being shown in restoring 17515 to flightworthy display-only condition is akin to the restoration of a fine Swiss watch: every single element, whether seen or unseen, is being brought literally to a factory-fresh level.

18 Years of Service, 39 Years of Neglect

17515 joined the Royal Canadian Air Force in 1948, and served as a troop and equipment transport until 1965.

"This aircraft flew during the Korean War, supported United Nations operations worldwide, and worked with NATO," Tate says. "When the RCAF retired its North Stars, 17515 was flown to the Canada Aviation and Space Museum in 1965, here at the former RCAF Rockland airbase. Due to a lack of storage space, it sat outside for the next 39 years, enduring the winter cold and snow, and the summer sun and thunderstorms."

In 2003, local aviation enthusiasts formed The Project North Star Association of Canada, and persuaded the CASM to start restoring 17515. Since then, association volunteers have donated 60,000 hours working on the last North Star. In that time, they have restored the cockpit and three of the engines, and have also made substantial headway in cleaning and restoring/repairing parts of the airframe.

A look inside the cockpit, the galley and washroom, and the storage compartments reveals just how much they have done: "We've done everything that you don't see as well behind the walls," says Tate. "We want this restoration to create an aircraft where everything is up to standard." However, the amount that remains to be done — the interior, the outer skin, and the landing gear — is substantial.

A Nuts-and-Bolts Challenge

From an AMT perspective, restoring the 17515 North Star is an exercise in extreme precision. Whatever the component — engine, electronics, or airframe — it has to be carefully removed then cleaned using varsol baths, glass bead blasting, and Scotch Brite plastic scouring pads. Given that the aircraft has been parked outside for 39 years, the amount of cleaning is substantial. (To help the CASM with the projec's cost, the Project North Star volunteers raised the funds to buy one of the two bead-blasters being used in the restoration process.) Removing rivets by hand can also be mind-blogging, since even the smallest airframe section can contain hundreds of rivets of different types and thicknesses.

"After all this time, any oil remaining inside the engine has solidified to a

Bill Tate uncovers one of the North Star's restored Merlin superchargers.

Rolf Geiger with one of his hand-made troop seat dies.

kind of thick gunk," says Tate. "Meanwhile, the birds that have set up nests inside the aircraft have caused us real problems because the acid in their waste products literally eats through the aluminum."

Speaking of aluminum, the weathering on this North Star's aluminum skin is so severe that any cloth used to clean it turns black within seconds. Unfortunately, not all parts can be cleaned. Many are just too damaged by time to be brought back to life. Further, since Canadair stopped making the North Star more than half a century ago, spares are often impossible to find.

This is where expert volunteers such as retired machinist Rolf Geiger come into play. Using skills gained through decades of professional work as a tool and die maker, Geiger and a handful of volunteers/CASM conservators scan through the original North Star manuals and original parts to make replacements by hand. That's if they're lucky. Sometimes, the North Star crew has nothing more than an old photograph to go on, perhaps aided by a similar part in some other still-existing aircraft.

In making replacement troop seats for instance, Geiger has created his own dies to cast the seat brackets, and hand-curved the aluminum seat spars into the right shape.

"He can create anything out of virtually nothing," says Tate. "Often times, we'll be stuck trying to come up with a specific tool suited to working on the North Star. Rolf will listen to us, think a bit, and then ask what colour we'd like it in!"

Once the restored part is ready to go, it may have to be painted to an appropriate period finish, including

stencilling warning labels with the right lettering. Then the tricky part comes: fitting the parts back together. The problem is that 17515 is 65 years old. With 18 years of hard military flying under its belt, followed by decades of settling, many parts have changed shape over time.

A High-Level View

In addition to the nuts-and-bolts challenges of restoring the 17515 North Star, there are also challenges on the macro level, namely, finding the money and facilities to do major system and airframe repairs.

"One thing we really need is help overhauling the landing gear," says Tate. "This is a massive job where a helpful MRO would make all the difference, just as Hope Aero of Mississauga did when they restored the North Star's 12 propeller blades." Restoring the rest of the cabin — (the cockpit, front galley and washroom are done, but the rest of the interior including the aft washroom needs work) — is another big undertaking. But again, the work has to be done to bring 17515 to flight display worthy condition.

That said, the goal is not to fly this aircraft again: "There is irreparable damage by corrosion to one each of the propeller hubs that makes it unsafe to start the engines," Tate explains. "If we start the engines, the propeller could lose a blade. The imbalance would take the engine out of its mounts."

Instead, the goal is to restore every single element of this North Star so that, 100 years from now, someone could ask,

One of the North Star's restored engine cowlings.

Bill Tate points out corrosion caused by bird droppings.

The North Star's immaculately restored cockpit.

"how did they make this kind of airplane work?" and get the answer just by looking at its components, both visible and invisible. Think of this North Star as a physical prototype that could be duplicated and then the duplicate can be flown: that's where 17515 will fit into the historical record.

"The Canadair North Star was an incredible aircraft that shaped our aviation history, and stands as a monument to the engineering skill and innovative imaginations of post-WW2 Canadian engineers," says Tate. "That is why we want to preserve this last example in as close to perfect working order as we can — as a tribute to their genius, and as physical proof of what they achieved." ■

AIRPARTS NETWORK LTD.

GREAT QUALITY AT A GREAT PRICE

IN STOCK FOR SAME DAY SHIPPING

AIRPARTS NETWORK IS AN AUTHORIZED DISTRIBUTOR FOR THE FOLLOWING:

LYCOMING · SUPERIOR AIR PARTS INC. · HARTZELL ENGINE TECHNOLOGIES · PHILLIPS 66 · LAMAR

TEMPEST

Powerflite Starters approved on TCM models feature a 5 year TBO Warranty! Spark plugs, filters, pumps and more also in stock!

electroair

Direct Fire Ignition Systems

4 cylinder electronic ignition systems for certified aircraft provide a 10-15% gain in fuel efficiency!

Electroair will have 6 cylinder electronic ignitions for certified aircraft coming soon!

APS

aviation products systems, inc.

Experience the strength, corrosion resistance, and precision manufacturing of these brake pads and discs at a fraction of the competitor's price.

SKYTRONICS INCORPORATED

Airparts is the only Canadian Authorized distributor for these quality harnesses and alternator kits.

HUTCHINSON aerospace

BARRY CONTROLS Aerospace

Barry engine mount rubbers are a quality product at an affordable price.

CJ Aviation

CRS# YPGR715L · EASA.145.5330

Affordable new outright hydraulic pumps so you don't have to worry about the core!

Fuel boost pumps also available.

GREGORASH AVIATION

ENGINES PARTS SUPPLIES

WWW.GREGORASHAVIATION.COM

CONTACT US

560 Marjorie St. Winnipeg, MB | R3H 0S9

toll free 1.888.744.9944 phone 204.772.0800 fax 204.772.0600 email info@airpartsnetwork.com

AIRPARTS NETWORK LTD. IS A GREGORASH AVIATION COMPANY

AERO RECIP · ULTIMATE Oil Coolers · CANTHERM DISTRIBUTORS · DYNO POWER XPERIMENTAL · AIRPARTS NETWORK LTD.

What to look for on propellers *before flying*

BY FRED SEBUS JR.
A-1 Aircraft Propeller Services

As vital equipment, propellers must be maintained in tip-top shape at all times. In this day and age, it seems pilots continue to think all they need to do is check roughness on the blades. To do this, they run their hands over the blades. This is dandy, but not fine enough.

It's necessary to look closely at what you are inspecting. In some cases, you need to use a 10x magnifying glass if you come across something out of the ordinary. Normally, the rule of thumb is depth x 10 width for blending out a nick on the blade or blades. When doing so, do not use a screwdriver to slide over the blades because that may cover up any cracks that may have started and leave the door open for possible blade failure.

The cost of propellers and prop blades has become costly, and service shops don't like to remove material if they can avoid it. Technicians still have to deal with normal conditions like sand, grass, rain and so forth. Nowadays, some pretty good products are available out there to help prevent certain types of blade erosion. For example, erosion tape seems to work quite well.

The key is proper application. When blade erosion occurs and material needs to be removed, use a body file or rasp to remove only what is necessary. Do this by applying the file or rasp lengthwise, not chordwise, along the blade. When removing any material from the blades, it is very important to maintain the contour of the blades' leading edge so the air will flow smoothly over it. After removing the damage or erosion, this area must be polished to a smooth scratch-free surface. Once this is done, it is ready to be prepped for a protective coating.

Loose Blades

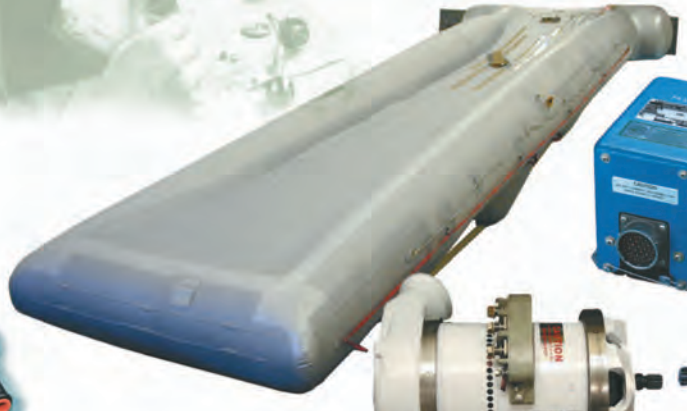
Quite often, loose blades can create fore and aft movement. This is not uncommon. Any blade movement under 1/16 inch is not enough to set off any alarms, however, it should still be investigated. This movement is normally removed by shimming up the blades. Consult a propeller repair shop if you have any concerns or questions. *(Continued on page 36)*

Canadian Aero Accessories Ltd.

Component Sales

Overhaul & Repair

Trusted
Experience
Since 1964



CALL US FOR THIS & MORE !

- Fire Bottles • Oxygen Bottles • Escape Slides • Life Rafts
- Starter Generators • AC Generators • Generator Control Units
- Boost Pumps • Fuel Pumps • Blowers • Valves • Brakes
- Hydraulics 5606 and Skydrol • Electronics/GCUs
- Actuators - Hydraulic and Electrical

Authorized repair Station For

GOODRICH

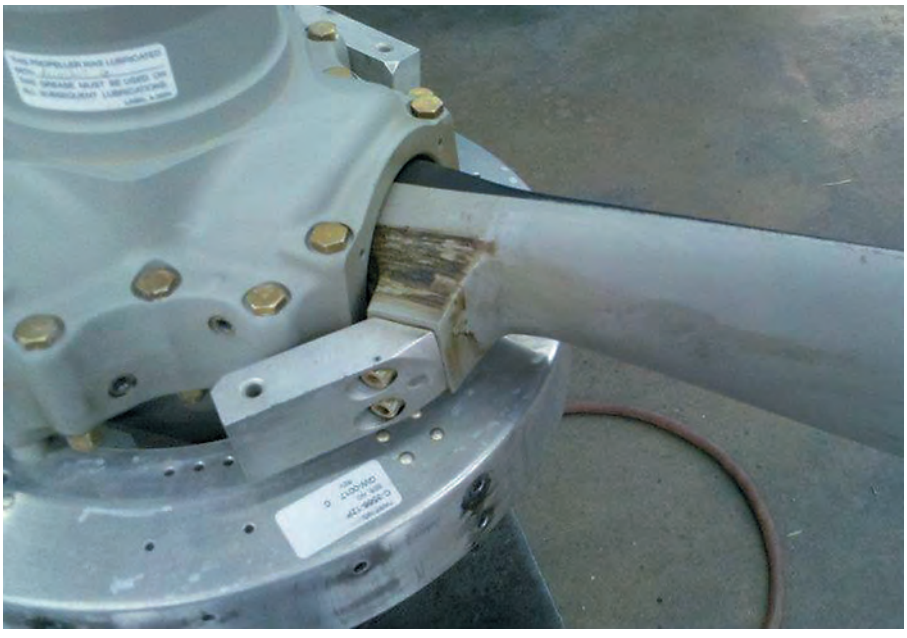
Ice protection systems **PowerSystems**

170 George Craig Blvd. N.E., Calgary, AB, Canada T2E 7H2

ph: 403.250.9077 • fax: 403.250.6841

sales@cdnaero.com

www.canadianaero.com



A common blade grease leak caused by over-greasing.

Rotational Movement

When internal or, in some cases, external parts are wearing beyond their limits, rotational movement will normally occur. Depending on the type and model of propeller, the maximum angle limits will vary. Again, consult a propeller repair shop.

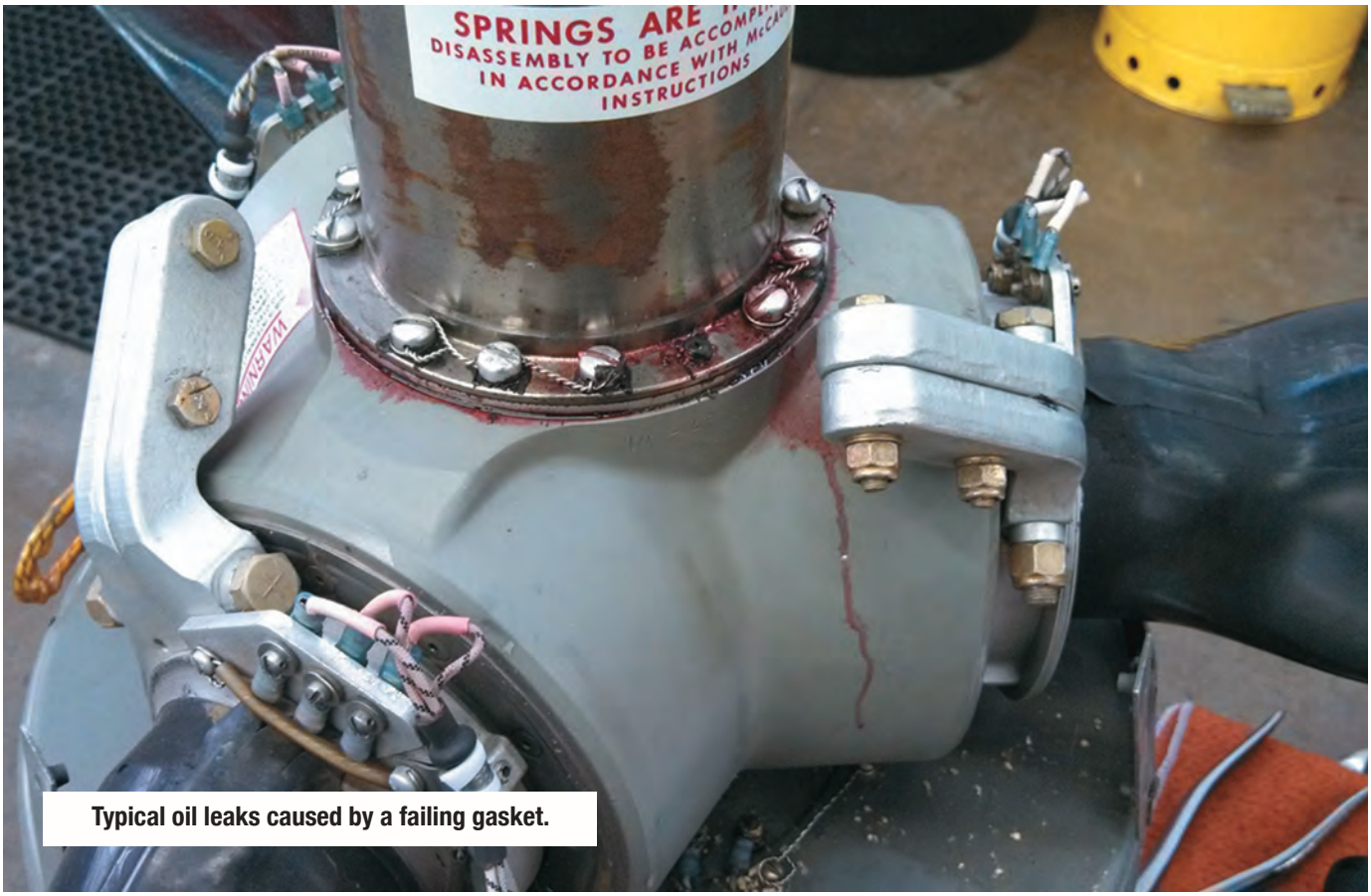
Grease Leakage

Several things can cause grease leakage. In most cases over-greasing is the reason. Steel hub propellers have a two-piece clamp assembly that contain the bearings and hold the blade onto the main hub assembly. The clamps have two grease fittings to pump grease into the bearings. Between the clamp halves there is a gasket and behind the clamp there is an O-ring. One of the fittings must be removed to prevent pressure inside of the clamp.

If pressure builds up, either the gasket or O-ring will blow out causing grease to escape from the clamp.

This is an easy fix. The clamp must be removed and the gaskets and O-ring must be replaced by a propeller tech. At the same time, the technician will check for broken, worn or damaged parts.

Aluminum hub-type propellers also have grease fittings to lube the internal bearings. This hub is a two-piece assembly bolted together. There are also two grease fittings per blade mounted on the



Typical oil leaks caused by a failing gasket.

side of the hub. Each blade contained in the hub will have two fittings. For example, a two-blade propeller will have a total of four fittings, while a three-blade propeller will have six fittings.

When pumping grease into the hub, one of the two fittings must be removed to prevent pressurizing the inside of the hub. If pressure builds up, the grease will pass by the main blade seal causing grease to be thrown onto the blades, cowling and wind screen. If this happens, the only way to correct this is to dismantle the propeller.

Once dismantled and cleaned, all seals will be replaced, then the propeller is reassembled and bench tested. Newer model propellers, such as the McCauley, have a red-dyed oil inside of the hub. This oil is used for two reasons: one is lubrication and the other is for means of crack detection.

In most cases, on these types of propellers, leaking oil is caused by a pinched O-ring. Normally, not until the propeller is under a load or not being cycled at a constant speed will it start leaking. When a constant speed propeller is not being cycled properly, the seals dry up and the propeller leaks. If upon inspection, no cracks are apparent, run the propeller for approximately 10 hours and cycle the propeller as much as possible.

If signs of oil are still there, the propeller must be dismantled and seals replaced. If signs of dye are showing up and looking like scratches, this should not be taken lightly and further inspection must be done as a crack may be developing or already be formed.

Vibration

A common problem with propellers is vibration. Many things can bring this on. Steel-hub propellers that have the clamp set-up quite often encounter blade slippage. This is when the blade slightly moves in the clamp, causing a difference in blade angles. If the blades are more than .02 degrees of each other, this will cause vibration. In order to correct this, the outer clamp bolts must be loosened and angles corrected. The bolts will then be retorqued to the specified torque. A tape mark is installed on the clamp and blade for future reference if this should happen again so that a visual will determine if the angles are off from each other.

Another common problem is tracking of the blades, when the tip height of the blades is not the same. Check this by hanging one blade down and making a reference mark. Carefully rotate the propeller until the next blade reaches that reference point. The difference should not be more than 1/16 inch between each other. If it is greater than this, a qualified technician must correct the track. Fixed-pitch propellers quite often will get too much angle difference between each other. This will be corrected by twisting the blades back to their specified pitch, again within .02 degrees of each other.

Probably the most common cause of vibration is caused by filing the blades to remove any damage. By counting the number of file strokes on each blade and keeping them as close as possible, it should help prevent vibration problems.

A rough running propeller may also lead to many other problems on the aircraft. With these simple steps, you should get many safe and trouble-free hours of flight time and save money in the long run.

FRED SEBUS JR. *is a propeller technician with 32 years of aircraft propeller overhaul, repair and sales experience. He looks forward to many more years of serving his past customers and new clients in the near future. Contact fred@a1prop.com.* ■

PROPELLERS | WHEELS & BRAKES | NDT | DYNAMIC BALANCE EQUIPMENT

Now All Under One Roof @ 7605 Bath Road, Mississauga, Ontario L4T 3T1

Hope Aero is Canada's largest propeller and governor overhaul specialist,
optimally located to serve Canadian operators best.
Organized into specialized teams using the latest and most innovative equipment,
our expert staff ensure your job gets done on time, the first time.

When schedules matter – and they always do –
You need a partner who knows what matters most.

1-800-268-9900

HOPE AERO

GOOD TO GO.

Issues related to Quality Assurance

BY NORM CHALMERS
Pacific Airworthiness Consulting

The International Organization

for Standardization develops and publishes the International Standards including ISO 9000, which are the top documents in use worldwide and include definitions of terms.

ISO 9000 uses the following definitions:

1) Quality: the degree to which a set of inherent characteristics of a product or service fulfils requirements.
2) Quality management system (QMS): management system to direct and control an organization with regard to quality.
3) Quality assurance (QA): part of quality management focused on providing confidence that quality requirements will be fulfilled.
4) Quality control (QC): part of quality management focused on fulfilling quality requirements.
5) Quality manual: the document that provides consistent information, both internally and externally, about the organization's quality management system.

Although the meanings of the above may be clear, please consider the following additional information:

1) Quality is not another word for "good." It is merely a measure of conformity. With AMOs, quality measurement is a fork with two tines: one, the measurement of service quality and, two, the measurement of product quality. Both of these can be measured against standards.

Commonly used abbreviations in aviation:

AMO: Approved Maintenance Organization as approved by Transport Canada

CAR: Canadian Aviation Regulation, which is a law of Canada

CASI: Civil Aviation Safety Inspector (from Transport Canada)

MCM: Maintenance Control Manual (of commercial operators)

MPM: Maintenance Policy Manual (of AMO)

TATC: Transportation Appeal Tribunal of Canada

TC: or the minister, or "tower of darkness" or "the Tower" – Transport Canada Headquarters in Ottawa

the Amazon staircimber

the AUTOMATED lifting solution

- safe, dignified passenger transfer
- self-propelled: no lifting required
- versatile: used on commercial and corporate aircraft
- simple and easy to operate: training provided
- lifts 350 lbs. / 160 kg with the push of a button
- portable: use at base or take it with you

- compact and lightweight
- transports passeners quickly
- ensures fast and efficient turn times
- reduces risk of injury to staff and passengers
- unique, specialized design
- patented braking system

Tel: (604) 247-2128
Fax: (604) 214-9825

BKD Aerospace Industries Inc.

Call us for a quote or visit our website for more details.
Watch our online videos at www.bkdaerospace.com

info@bkdaerospace.com
203 – 4360 Agar Drive
Richmond BC V7B 1A3 Canada

2) A quality management system (QMS) includes all of the company rules, policies, procedures and "the way things are done" to manage a company; everything from the top quality policy to sweeping the floor.

3) A quality assurance (QA) program includes an internal audit and how to deal with "findings." Also included are non-conformance reports (NCRs) that many companies utilize to record periodic quality non-conformities.

4) Quality control (QC) includes mandatory tasks that need to be performed and recorded to get the product out the door. Prime examples of this are inspection check lists and unscheduled maintenance work cards that need sign-off.

5) Seldom do maintenance policy manual (MPMs) meet the above definition of a quality manual. All MPMs, maintenance control manuals (MCMs) and other manuals required by the Canadian aviation regulations (CARs) have been written to get Transport Canada approval. This has meant pleasing a TC Inspector, which I will elaborate on later. It also has meant that almost every company is in "non-compliance" with its manual in some way. I say "almost" because I have not seen every company out there. More companies are adopting additional manuals of detailed procedures that can address everything in the QMS to the degree necessary in order to guide employees on compliance. The added benefit of a detailed procedures manual is that it provides a standard for audits.

- CAR 573.10 requires a quality manual, therein referred to as a "maintenance policy manual" or MPM (MCM in CAR 706). CAR 573 enables standard 573.10, item (m), which requires a detailed description of the quality assurance program required by section 573.09 of the CARs.

- CAR 573.09 and Standard 573.09 contain numerous requirements, most of which ought to be self-explanatory and some of which I elaborate on below:

1) audits conducted at intervals set out in the MPM:
I have seen intervals ranging from six months to three years, but one year is the most common and most easily managed. Twelve months with a plus or minus window of one month allows auditing based on a repetitive cycle.

2) checklists of all activities controlled by the MPM:
Checklists are a guide to controlling the audit progress. They need to clear with each item on the list referencing the requirement. They need to be worded in such a way as to remove the need to have that referenced requirement in hand and still be understandable. I recommend that you extend your checklist to embody other guidance documents including CARs, company procedures, contract requirements and any other written requirement that you want to maintain compliance with.

3) a record of each occurrence of compliance or non-compliance with the MPM:
Although this only mentions the MPM, you ought to record all activities or occurrences that are in non-conformance with any requirement of your company. That gives you the tool that makes you better and better over time.

4) procedures for ensuring that each finding of an audit is communicated to them (the PRM):
Because the PRM is the person held responsible for resolution of these findings, a record of this communication needs to be created to be able to show compliance.

5) findings resulting from the quality assurance program are distributed to the appropriate manager for corrective action and follow-up in accordance with the policies and procedures specified in the MPM:
This is an important detail to note. The person in charge of the area of non-conformance is given the job of resolving the issue to the satisfaction of the PRM who still has overall responsibility. Note that the manager also needs to do the follow-up inspection. Often these tasks are dumped on the quality assurance personnel, which is wrong and usually leads to conflict.

6) follow-up procedures for ensuring that corrective actions are effective:
This procedure needs to be flexible enough to allow variable time periods for the follow-up inspection. If the non-conformity occurred one or two times each year then you need to allow sufficient time for it to have the opportunity of re-occurring and to allow the related personnel to forget about the corrective action. This may range from a month to the day before the next audit; whatever you think is effective.

7) a system for recording the findings of initial and periodic audits, corrective actions and follow-ups:
The record for this is often the "Non-Conformance Finding" (NCF) form similar to TC's documents. Some larger companies also have "Non-Conformance Reports" (NCR) which immediately report operational problems. To avoid confusion, you might refer to this NCF as an "Audit Finding." I like that.

8) The duties related to the quality assurance program that involve specific tasks or activities within an AMO's activities shall be fulfilled by persons who are not responsible for carrying out those tasks or activities; this refers to the auditor. Large companies usually have dedicated auditors. Small companies can achieve this in a variety of ways such as having a person in one area such as stores audit the other parts of the company, have a customer do the audit or hire a consultant (advertisement). You can have your dear old granny do it while she is serving tea. The very smallest one-person companies are exempted from this requirement.

9) The records required ... shall be retained for the greater of ... two audit cycles ... and two years:
Every company I have seen keeps records as long as living memory goes back to protect against lawsuits. This can also assist your customers to rebuild lost technical records.

HELI-EXPO 2014

PRODUCED BY Helicopter Association International

ENGAGE IN THE FUTURE OF VERTICAL FLIGHT

February 24–27 • Anaheim, CA

Exhibits open February 25–27

Plan Now to Attend. Register at

rotor.org/heliexpo

10) The audits ... may be conducted on a progressive or segmented basis, provided that the entire organization is audited within the applicable interval; some companies have been on an all-inclusive, once-per-year audit and want to move to a segmented or progressive audit. To do that, they need to schedule the new program segments to start immediately after the big audit and conclude within the approved time period. Thereafter, each area needs to be audited with that period in mind ensuring that each area is done within the timeframe. That's all that is required by the regulations. Companies are usually intimidated by including other activities into MPMs. These actions often include separating corrective actions into short term and long term corrective/preventive actions. These actions are included in the TC Program Validation Inspection NCF forms. This is path by which the anonymous TC management in the Tower have imposed additional beatings including "Root Cause Analysis" and numerous other whims. Too often, quality management systems, as described in MPMs, are a mess of additional requirements and end up being a problem. As I have stated before, many of these manuals are written to please the CASIs tasked with approving them. If you had an inspector that wanted to manage your company, your manual probably does not "direct and control" your organization as per the above ISO definition.

Your quality assurance program ought to measure your organization's quality and provide that measurement to senior management. To be useful, each of the characteristics needs to be measurable in such a way as to be able to audit it. You need some standard to measure it against to be able to determine the degree of conformance. To find that measurable standard you ought to be able to refer to your quality manual or in one of the sub-tier documents such as a procedure.

That's it for now. Next issue, I will look at further examples of the minister trying to avoid responsibility for aviation safety. We will also examine one ongoing and absurd example of the minister's mandarins' obsessive persecution of a private pilot who forgot his journey log. Until next time, be good.

Please be aware that I am not a lawyer or legal expert. What I write in my column is not legal advice or legal opinion. If you face a legal issue, you must get specific legal advice from a lawyer and preferably one with experience in the aviation matters in your own country.

NORM CHALMERS *worked with Transport Canada as an Airworthiness Inspector for 25 years. Before this, from 1967 to 1983, he worked in the aircraft maintenance industry in and around Western Canada and in the Arctic. His industry experience includes the operational maintenance of normal and commuter category aircraft and smaller transport category aircraft in the corporate sector as well as several years working in major repairs in the helicopter sector. As an Airworthiness Inspector, he has been responsible for most duties related to the position, including the approval of all aspects of maintenance, manufacturing, training, and responsibilities related to distribution organizations. Norm now operates Pacific Airworthiness Consulting; www.pacificairworthiness.ca.* ■

Maintenance costs are under a constant spotlight from accounting departments, so if PMA parts can save money, you can bet they will look at the possibility of using them. The most common use is, of course, in the maintenance/overhaul of engines.

To PMA or not to PMA

(Continued from page 18)

During the last 12 years, requests for PMA approvals to the FAA have soared. While the ramp-up for new aircraft production has increased lead times on OEM spare parts, more than 550,000 PMA parts have been brought to the marketplace. There are industry estimates that the FAA is approving about 1,500 applications a month from over 2,600 companies. OEM apathy to the operators' complaints about increasing prices, coupled with poor parts support and topped off with the support of the FAA, has fueled this increase in PMA parts usage. PMA has enjoyed such growth that one of the biggest opponents to the PMA, Pratt & Whitney, has decided, "if you can't beat 'em join 'em." P&W have placed one manufacturing foot in the PMA bucket via an ongoing program to produce and market PMA parts for the General Electric CFM 56-3 engine. And with over 12,000 CFM 56 variants in service, this is a heck of a good market in which to jump. P&W made the decision not to develop an engine in competition to the CFM 56 series, but rather redirected its resources from developing an engine to developing PMA parts for the competitor's engine. Pretty good use of capital and manpower, I would say.

As with all PMA manufactures, P&W has targeted the parts most often replaced during maintenance and overhaul. They have studied the reasons the parts need replacement, as well as the rate at which they are replaced. Then armed with these statistics, they can devise structural improvements for the parts they are manufacturing under PMA. This research also is used to improve their own parts, which helps defend against a PMA assault on their product.

Customer Base for PMA

Well, with the FAA firmly behind them, more favorable pricing, and plenty of parts on the shelf, the customer base for PMA is growing. So who is the customer base? The airlines, the cargo carriers, the military, the commercial/business operators, and the general aviation communities, that's who. Let's look at each of these groups to see how they are reacting to PMA.

The Airlines

As you know, the airline business is one of the most competitive in the world. Profit margins are thinner than the hair on a frog's chin. Maintenance costs are under a constant spotlight from accounting departments, so if PMA parts can save them money, you can bet they will look at the possibility of using them. The most common use is, of course, in the maintenance/overhaul of engines. What does concern the maintenance department, though, is the OEM hitting them with the billion dollar question: "Are you willing to risk lives, law suits, and ruining your good name because you decided to use cheap parts?" So, to remove any doubt about who might be right, the PMA manufacturer who says their parts are safe and inexpensive or the OEM who claims that PMA parts are unsafe because they are inexpensive, the airlines will commission a side-by-side comparison in a controlled evaluation. In many cases, the quality between parts is comparable, so it becomes a simple application of economics. If you are an airline and are saving 30 percent on a PMA part (which is about the industry average) versus an OEM part, and are spending about $5 million in PMA parts, you have just saved the company over $1.5 million a year. Kind of an economic no-brainer, huh? So the fact that the airline folks also use PMA as a bargaining stick to beat the OEM with should not be a surprise. If the OEM wants to keep PMA out of the airline's maintenance department, they will make a concerted effort to control costs for their support parts as well as improve availability because the other factor that will cause an OEM to turn to PMA is availability. An aircraft on the ground (AOG) costs money and is the other side of the economic coin.

Cargo Carriers

The freight haulers have slightly different issues from airlines when it comes to PMA parts. First, the cargo operators have much smaller fleets, which prevents them from enjoying certain economy of scale benefits that the large fleet airlines have available to them. Second, they tend to have healthier profit margins than those of the airlines. Together, on the surface, these factors make the financial consideration of PMA parts not quite as pressing as their people moving compatriots. However, the real motivator with this group is parts availability. As with the airlines, an AOG costs money, making availability of the part the key issue with these guys as well. So although they are happy about the cost savings of PMA, they are really motivated by the fact that PMA is more accessible.

The Military

If there is one group with a real vested interest in saving money it is the US Department of Defense. Some would credit the air force for making the PMA industry as successful as it is. Remember the infamous $6,000 hammers and the $2,000 toilet seats? I do, and I remember the taxpayer outrage and demand for improved military accountability with regard to spending. Well, thanks to that fiasco, the air force is a world leader in the use of PMA parts, but truth be known, all the

US military rely heavily on PMA parts. And considering that 29 percent of everything flying over the US belongs to the Department of Defense, this is not only a good customer base, it is another endorsement for PMA.

The Commercial/Business Operators

Safety, aircraft availability, cost; it seems like we have discussed these three factors before. Well, it is no different with this customer base. The aircraft flying in fractional ownership programs are faced with keeping a safe aircraft available without breaking the bank. And as for expensive business jets that are wholly owned and operated by one company, holding the cost of their upkeep to a minimum while simultaneously maximizing availability is extremely important as well.

With both types of operations, the OEMs assert that even though using their parts may be more expensive, the OEM part is more reliable, and in the end, will fetch a better price for the aircraft. However, the bean-counters contend that an FAA-approved part that is available today for a lower price trumps the OEM's allegations. Of course the chief pilot, who is interested in safety and keeping the flight department from going away (in that order of course), is for anything that satisfies both priorities.

The General Aviation Community

Whether it is the flight school, the operator trying to make a buck with a government contract or the weekend enthusiast, PMA parts are the answer. As with the other members of the aviation world, safety followed very closely by cost, are the driving factors for which a part is purchased and installed.

PMA Approval Outside the US

With PMA acceptance growing globally, using the existing structure for type certificate confirmation becomes very important to the progress of opening up new markets for PMAs. Even though validation has been focused on validating type design for complete products, the same principles apply when a PMA design needs to be validated in an importing nation. The PMA design might need to be validated in the event that the importing nation does not have a bilateral agreement with the nation whose regulatory agency issued the PMA. A PMA design may also need to be validated where the special nature of the PMA part requires it, such as the acceptance of a PMA part in Europe if the PMA is for a critical part.

The issue of international validation has been the subject of discussion between the EASA, FAA, and TCA, during a meeting at the 2009 Europe/US/International Aviation Safety Conference. Although the focus of discussion was on type design validation, without specifically spotlighting PMA, the principles of the process are the same. Without getting into the specifics from each of the representatives, the consensus was that validation should be approached with an open mind on acceptance of the technical data from the regulatory agency that issued the PMA. The metric to acceptance should not be efficiency as much as it should be effectiveness. Each validation should proceed more smoothly than the previous event as lessons should have been learned and the application of these applied to the next occurrence.

Conclusion

The fact is, PMA has become a globally accepted alternative. As competition heats up for the operator, the distance between the cost of doing business and the profit from that business is shrinking — also a fact. The one cost that owner/operators have found they can control, somewhat anyway, is the cost of the parts for maintenance through the use of PMA. The stigma of PMA = UNSAFE has been challenged and refuted, and not by anecdotal journalism but through hours and hours of safe operation, much to the annoyance of the OEM.

The OEM is also in a tough economic situation. Competition between OEMS for market share is intensifying and they too are watching the erosion of their profit margin. They need the revenue of aftermarket parts sales to help support research and development as well as the cost of producing and bringing to the marketplace a type certificated component.

As we learned, Pratt & Whitney has taken a look at PMA as another unique opportunity to remain profitable. One other positive note for the aircraft owner is that the advent of PMA has caused the OEM to look hard at improving their parts and reducing their production costs. So either way, whether PMA parts or OEM parts, the winner from both a safety and economic standpoint is the customer.

Now, economics tells us that the less expensive parts will replace their more expensive counterparts. However, just as there are those who go to the local NAPA parts store to buy parts for their cars, there are also a good number of people who won't use anything but genuine Ford, Chevy, or Dodge parts in their cars. It is the same for a certain population of aircraft owners, operators and airlines — nothing but OEM parts for their aircraft. This is an interesting scenario for technicians to watch, that's for sure. Because if you think about it when it comes to maintenance, our job is twofold:

First, make sure that whatever part we use is safe for use in the aircraft we are working on.

Second, that our maintenance allows the pilot to do his job safely and effectively.

And so until next time, class is dismissed.

MIKE BRODERICK *is Vice President of Business Development at Helicopter Engine Repair Overhaul Services (HEROS). Over the past 35 years, he has served as a shop technician, engine shop supervisor, Engine Program Director, Director of Maintenance, Director of Operations, and owner of a Rolls-Royce engine overhaul and MD Helicopter component overhaul shop. He is a certified A&P, and holds a Bachelor of Science degree in Aviation Administration. As well, Mike has been appointed as an FAA representative for the FAA Safety Team (FAAST) and is a member of the HAI Tech Committee. Mike is a regular contributor to Air Maintenance Update.* ■

Aviation Services

Aviation Services

Aviation Services

Employment

BY SAM LONGO, AME A&P

October Memories

Fall is one of my favorite seasons. The weather gets cool, the leaves begin to turn, and it's always a great time of year for bargain prices on motorcycles.

It was the autumn of 1976, and I had just returned to Toronto from Nordair in Montreal. Flush with remaining funds and a promising new job at de Havilland, it was time to buy another motorcycle. I was 22 years old and my younger brother, Chris, drove me to see the bike in his well-used 1967 Pontiac Acadian. The motorcycle in question was a metallic green 1973 Honda CB750 with 8,000 miles on the clock and in nice original condition. The battery on the bike was dead, so we boosted the bike from Chris's Acadian. The marginal battery was a great bargaining tool and I managed to talk the owner down from $1,500 to $1,400. The deal was struck and the bike was mine. It's hard to believe now, at the age of 59, I have not missed a single riding season on that same motorcycle for 37 years.

We have definitely experienced a lifetime of changes together but, through it all, my trusty Honda Four has persevered. I almost sold it once when I was laid off from de Havilland for three months. At the last minute I came to my senses and sold my car instead.

Every winter, without exception, the bike has been modified and improved, often under strange circumstances. It was stored in furnace rooms, friends' garages, my apartment, and finally in "Honda Heaven", my current workshop. The Barnett clutch was installed in my first wife's courtyard behind her apartment. The black paint job was done in a buddy's back yard after someone stole my right side cover. The Wiseco 836 kit was done in my basement a few months after my son was born. (Ever try installing an overbore kit without making noise that might wake the baby?) My son, Spencer, 26 years later, has ridden the bike numerous times and now quite likes the noise that 836 kit makes.

So many changes have been made to the bike, sometimes it's hard to remember them all. I bought the electronic ignition in the early '80s when I was working for Air Canada. I flew to Los Angeles one weekend just to get a good price on it. For the first two seasons after installing it, I kept the points plate stashed under the seat, just in the case the newfangled electronic component crapped out. I have since come to trust it. Once a season, I put the timing light on it just to verify perfect timing, and then forget it.

As best as I can figure, I have gone through about eight sets of tires in approximately 75,000 plus miles, redone the brakes a few times, changed the oil twice a season and synchronized the carbs at least 20 times. And although I've had my share of close calls, I only crashed once. It went out from under me at Spadina and Front streets in downtown Toronto. I watched horrified as it slid and hit the curb breaking the original speedometer. I still have that gauge sitting on a shelf with 32,494 miles peeking through the shattered glass. It's a great reminder to take it easy.

There is definitely something special about owning and riding one bike for such a long period. It becomes your benchmark for all other motorcycles. Many other more modern Hondas have come and gone in my collection, yet it is often difficult to choose my ride when I see old faithful gleaming beneath the shop lights. Just like a favourite pair of comfortable old shoes, sometimes you just can't help but select them over the shiny new ones.

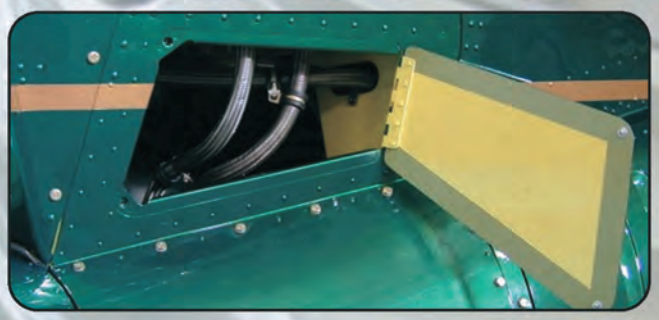
Speaking of selection, when I asked my son, Spencer, which two bikes he wants from my Honda collection once "my odometer" runs out, he didn't hesitate: "I'll take the 650 Hawk and the old 836, Dad!" With a bit of luck and regular oil changes, that old Honda hot rod may well last into his 50s and beyond.

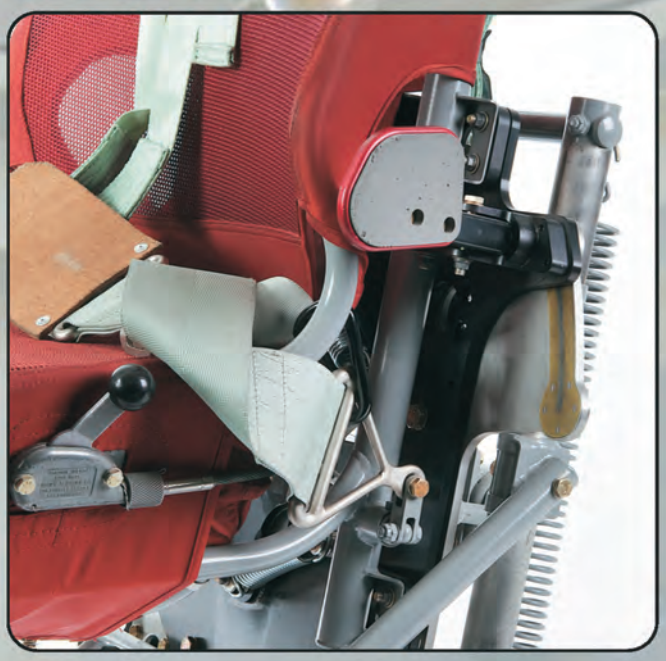
Of course, I am not quite finished with it just yet. It seems the older we get, the harder it is to let go of the past. Out for a ride on a beautiful Sunday morning, that old bike and I can transcend time. I can be 22 again, riding the hottest motorcycle on the planet. Winding through those gears, all is well with the universe, and life is good. Sometimes on those really special days I can even imagine hair under my helmet.

I guess it is true what they say about old couples. Being together for a long time often does cause them to look alike. It seems that phenomena can transcend all types of relationships. It certainly explains why, after 37 years together, the old Honda and I are both showing a lot more chrome!

For more published writing by Sam Longo, please visit www.samlongo.com ■

ALPINE AEROTECH LTD.





"ANOTHER ALPINE AEROTECH SOLUTION"

Authorized Bell Helicopter CSF

- Composite Repairs
- Full Paint Services
- Approved Repair Fixtures
- Instrument & Radio Repairs
- Component Overhaul Services
- Radio & Avionics Installations
- Major Inspections & Overhauls
- Import and Export of A/C
- Manufacturing

BELL HELICOPTER PLATINUM 2012-2013 Bell Helicopter ★ PLATINUM ★ CUSTOMER SERVICE FACILITY

Bell Helicopter A Textron Company Customer Service Facility

1260 Industrial Road, Kelowna, B.C., Canada V1Z 1G5
Phone: (250) 769-6344 Fax: (250) 769-6303
admin@alpineaerotech.com www.alpineaerotech.com

PT6A • PW100 • JT15D

A Fully Authorized Pratt & Whitney Canada Distributor & Designated Overhaul Facility

Our reputation for superior customer service continues to grow at Vector Aerospace Engine Services – Atlantic.

We're proud of our past – working hard for your future.

24/7
READY TO SERVE AROUND THE WORLD

MAINTENANCE
REPAIR
OVERHAUL

VECTOR AEROSPACE

Toll Free: 1.888.769.0999
WWW.VECTORAEROSPACE.COM