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AirMaintenance UPDATE

The Magazine for Aircraft Maintenance Professionals

Transport Canada Approved for R/T

OEMs and the TC Holder

Helicopter tail rotors Part 2

PAMA and AME news

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

August - September 2013
Volume 12/Issue 2

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Good-by Summer

As summer turns to fall, it's time once again to switch gears – from holiday fun and summer barbecues back to the world of turning wrenches and shift work. And for those interested in new products, services and technologies in the aviation industry, North America's premier showcase event is rapidly approaching: NBAA 2013.

Once again, AirMaintenance Update will be represented at NBAA with its own booth, and AMU's staff will be attending this important expo, touching base with current advertisers, and hopefully, making new connections with potential supporters of AMU.

And speaking of the connection between AMU and the many clients who support our publication, we'll be introducing new features and regular columns to better serve the aviation community. An important addition to our editorial line-up this year will be "Industry Spotlight", which will feature new products, and technologies in the field of avionics and aircraft maintenance. As well, we'll be adding an array of feature articles that deal with various areas of aviation that we have touched on before but haven't delved into on a more regular basis: "From the Cockpit" will deal with the relationship between pilots and maintenance personnel, and "The Rebuild" will feature the experiences of hobbyists who have restored vintage aircraft and other types of fixed-wing aircraft that owner-pilots own and operate.

If you'd like to submit an article about your experiences, or you'd like to share your knowledge and expertise, contact our magazine at amu.editor@gmail.com, and we'll see what we can do to fit your story ideas into our editorial line-up. In addition to including news articles about general aviation, AMU is a vehicle for teaching and sharing technical information regarding aviation maintenance, repair, products, services and technologies. Norm Chalmers' regular features on The Regs have gained a substantial audience, and we'll be certain to continue Norm's contributions to AMU.

In the meantime, it's farewell to the last few weeks of summer; and see you at NBAA 2013 in Las Vegas, October 22 – 24!

— Gregory Kero
Managing Editor

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Features

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

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Publications Mail Registration No. 0007198278

Published by Alpha Publishing Group (2008) Inc.

Publication Mail Agreement Number 0041039024 and Return Undeliverable Canadian Addresses to:
Alpha Publishing Group (2008) 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:
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Upcoming Events

CANADA

2013 Abbotsford Airshow
August 9 – 11, 2013
Abbotsford, BC
www.abbotsfordairshow.com

Canadian International Airshow
August 31 – September 2, 2013
Canadian National Exhibition
Toronto, ON
www.cias.org

SAE 2013 AeroTech Congress & Exhibition
September 24 – 26, 2013
Montreal, QC
www.sae.org/events/atc

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

UNITED STATES

Business Aviation Regional Forum
September 12, 2013
Landmark Aviation
Waukegan Regional Airport
Chicago/Waukegan, IL
www.nbaa.org

2013 New York Aviation Management Association Fall Conference & Exhibit
September 18 – 20, 2013
Desmond Albany Hotel
& Conference Center
Albany, NY
www.nyama.com

Southeast Aviation Expo
September 27 – 20, 20123
Greenville Downtown Airport
Greenville, SC
http://www.scaaonline.com/southeast-aviation-expo/

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

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
http://www.azaircraftexpo.com

INTERNATIONAL

10th Annual Latin American Business Aviation Convention & Exhibition
August 14 – 16, 2013
Congohas Airport
Sao Paulo, Brazil
http://www.aeropodium.com/cp/bala.html

Helitech International Helicopter Expo & Conference
September 24 – 26, 2013
Excel, London; London, England
http://www.helitechevents.com

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CPWA30338-TBAL
Hot Section Sling


C6GT1012-1-TBAL Jury Strut


SD12556-3-TBAL
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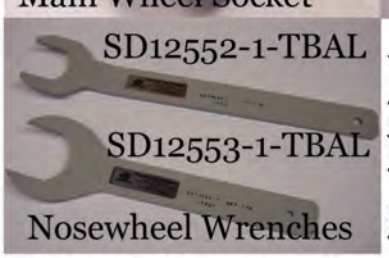
SD5534-1 –TBAL
Propeller Sling


SD12559-1-TBAL Beta Ring Puller 3, 4 & 5 blade


SD5523-1-TBAL
Main Wheel Socket


SD5506-1-TBAL
Nose
Jack Adapter


SD9001-1TBAL PT6A Engine Sling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STC awarded for Bell 430 night vision lighting

United Rotorcraft Solutions and partner Ahlers Aerospace were awarded their eighth FAA Supplemental Type Certificate for their Night Vision Lighting modifications on the Bell 430. As with the others, this modification incorporates externally mounted filters that improve daylight readability. The URS-Ahlers design reduces installation time and cost. The external filters allow the modified component to remain generic, retaining the advantages of local repair and/or overhaul. URS and Ahlers now hold FAA certification on the Bell 206, 407 and 430 models and the Eurocopter AS350B2/B3, BK117, EC130 and EC135. **For information visit** www.airmethods.com

Walter Surface Technologies unveils ultra-thin Cutting Wheel

The new Zip One Type 27 is the latest addition to the Zip One line of high-performance, extra thin cut-off wheels, designed for optimal cutting in thin-gage metal. With the same ultra-thin design as the current 1mm Zip One Type 1 (flat) cutting wheel, the Type 27 features a special raised centre for extra rigidity, durability and thinness. The unique design of the Type 27 center hub allows for a larger cutting surface than standard progressive hubs, while enabling straighter, sharper, more precise and higher speed cuts for flush cutting applications. **For information visit** www.walter.com

CMC GPS Landing System awarded FAA STC

Esterline CMC Electronics' IntegriFlight GPS Landing System has been granted an FAA STC for GPS Localizer Performance with Vertical (LPV) Guidance approach operations on Boeing B737 Classics. Logic-Air Aviation Services of Mirabel, Quebec, was responsible for the development and installation of the system and is the holder of the STC issued by ACS-NAI, a Transport Canada-approved Design Approval Organization. The CMA-5024 Space Based Augmentation System (SBAS) GPS Receivers, along with CMA-5025 Control Panels (designed and produced by Air Data, of Montreal, in partnership with CMC) allows the selection of LP and LPV SBAS final approaches based on a SBAS approach database hosted by the CMA-5024. **For information visit** www.esterline.com

Hartzell's Top Prop catalogue grows to more than 65 STCs

Hartzell Propeller's Top Prop program, which was launched in 1991, has grown to more than 65 company-owned STCs and more than 170 conversion kits.

The Top Prop program was launched to offer new, state-of-the-art alternative replacement propellers for maturing fleets of piston-engine aircraft, featuring 3-blade replacements for factory-installed 2-blade propellers, scimitar-shaped "blended" airfoils, and the latest carbon fibre construction technology. Hartzell's Top Prop line of STC'd two-, three- and four-bladed constant-speed propeller conversions reached 20,000 sales in July 2013.

For more information visit hartzellprop.com

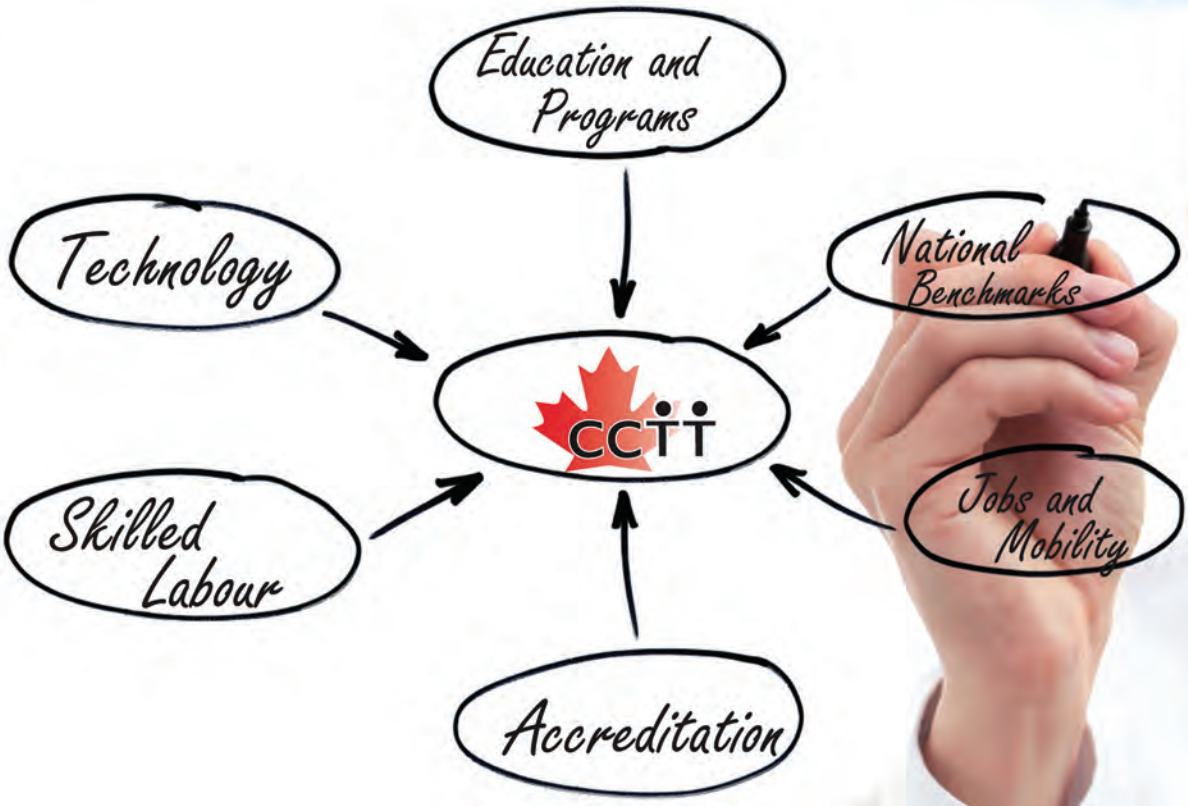
AvFab receives STC approval for Hawker Beechcraft 400A 3-Place Divan

Aviation Fabricators has received European Aviation Safety Agency STC approval for their Beechcraft 400A 3-place divan. The new STC allows for installation of the 2-place and 3-place divans in all Beechjet and Hawker Beechcraft 400 and 400A series aircraft. The divan is available with the option of close-out panels, and comes with shoulder harnesses. No airframe modification is necessary. Installation is as simple as removing the existing seats/furnishings, and then placing the divan into location by locking it into the seat tracks. **For more information visit** www.avfab.com

Sherwin-Williams Aerospace introduces new Epoxy Primer

Sherwin-Williams Aerospace Coatings has introduced a new chrome hazard free epoxy primer (CM0483790), which is a high performance, two-component, corrosion inhibitive epoxy primer. It provides outstanding sandability and provides Skydrol resistance in addition to excellent adhesion to treated substrates. The flexibility of the primer allows for aircraft bending, flexing, enlarging and contracting during flight. As well, it provides corrosion protection over Sherwin-Williams Aerospace Coatings' latest Wash Primer (CM0484646), which is also chromate hazard free. **For more information visit** www.swaerospace.com

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



30% of businesses indicate that they face a skilled labour shortage.

- CIBC World Markets Inc.

The Canadian Council of Technicians and Technologists (CCTT) will bring business leaders, educators and skilled technicians from across all sectors together this fall in order to ensure that the workforce of the future is ready for the challenges that lie ahead. For details, consult cctt.ca

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September 26-28, 2013

STANDARDAERO AWARDED C-130H (-30) CONTRACT

TEMPE AZ, June 24, 2013 — StandardAero announced that it has been awarded a multi-year contract for maintenance and engineering support of the Royal Netherlands Air Force's C-130H and C-130H-30 Hercules propulsion systems. The award endorses StandardAero's global, market-leading position on Hercules and Orion propulsion support. It also recognizes the benefits StandardAero can deliver to C-130 and P-3 operators over their life cycle, including improved performance and reduced support costs.

The RNLAF has a fleet of four C-130H and C-130H-30 aircraft, and the contract includes propulsion support for the Rolls-Royce T56-A-15LFE engines, Lockheed Martin quick engine changes (QECs), Hamilton Sundstrand 54H60 propellers and all related components. The primary support activity will be provided by StandardAero's Rolls-Royce T56/501D Authorized Maintenance Center and Lockheed Martin Authorized C-130 QEC Service Center, located in Winnipeg, Manitoba, Canada. Domestic support will be provided by StandardAero from the company's European Service Center, located in Tilburg, Netherlands. For more information visit www. standardaero.com.

LYCOMING ANNOUNCES NEXT SERIES OF AVGAS APPROVALS

WILLIAMSPORT PA, April 23, 2013 — Lycoming Engines, a division of Avco Corporation, released Service Instruction SI-1070R, which approved a wide variety of engines for use with ASTM D7547 UL 91 unleaded avgas. European Aviation Safety Administration Safety Information Bulletin 2011-01 has provided aircraft-level approval. Accordingly, Lycoming has announced that Service Instruction SI-1070S has been approved for release, adding 31 engines to the list of models approved for use on UL 91 unleaded avgas and bringing the total number approved to 63.

With the Lycoming engine model approvals, the EASA SIB immediately allows ASTM D 7547 Grade UL 91 use on European Union-based aircraft such as the Cessna 152, Cessna 172 Skyhawk and Cessna 182 Skylane; Diamond DA40 and DA42-L360; Hélicoptères Guimbal's Cabri G2; Piper Warrior and Archer; Robin DR 200, DR400-120 Dauphin and DR400-160 Major; Robinson R22 and R44- Raven I; Socata TB9 Tampico and Socata TB20 Trinidad; and many other models.

UL 91 originally entered into distribution in Europe largely to serve engines and aircraft approved to operate on automotive specification fuels. EASA Safety Information Bulletin 2011-01R1 and R2 provide aircraft-level approval on the basis of engine approval. In the United States, UL 91 will require an additional

approval by the airframe manufacturer to operate aircraft using that fuel. There are no known distributors of UL 91 in the US at this time. For additional information visit www.lycoming.com.

CONTINENTAL MOTORS EXTENDS TBOs TO 400 HOURS

MOBILE AL, April 9, 2013 — Continental Motors Inc. has announced TBO increases of up to 400 hours on Gold Standard factory-produced engines. The majority of engine models manufactured after February 2012 will see TBOs increase by 200 hours, with frequent flyers receiving up to 400 hours.

In 2012, Continental Motors introduced its Gold Standard factory rebuilt and new engines. These engines incorporate improvements in technology and manufacturing processes that have allowed the company to increase the TBO. The increased TBO is effective on nearly all Continental Motors factory-produced engines beginning in February 2012 as designated by serial number 1006000 and higher. Nearly all models will receive the benefit of a 200-hour increase over the existing TBO. Aircraft owners who fly 40 hours or more per month will receive up to 400 hours.

Complete details are included in Service Information Letter 98-9B. For more information visit www.ContinentalMotors.aero/TBOExtension.

WEST STAR LAUNCHES NEW "EXPERIENCE ON CALL" APP

EAST ALTON IL, June 19, 2013 — West Star Aviation recently launched a new and improved version of their "Experience on Call" app available at the iTunes Store. The app was designed to provide direct contact to a full directory of professionals at West Star, and allows users to directly contact the West Star team member who best fits their needs based on aircraft type, service needed, and location. In order to access the app, users can simply run the "update" on their existing "Experience on Call" app. To download the app for the first time, users can head over to the iTunes Store for a free download. For more information visit www.weststaraviation.com ■

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Helicopter *tail rotors*

or why the helicopter doesn't chase its tail

Part 2

BY MIKE BRODERICK
Helicopter Engine Repair
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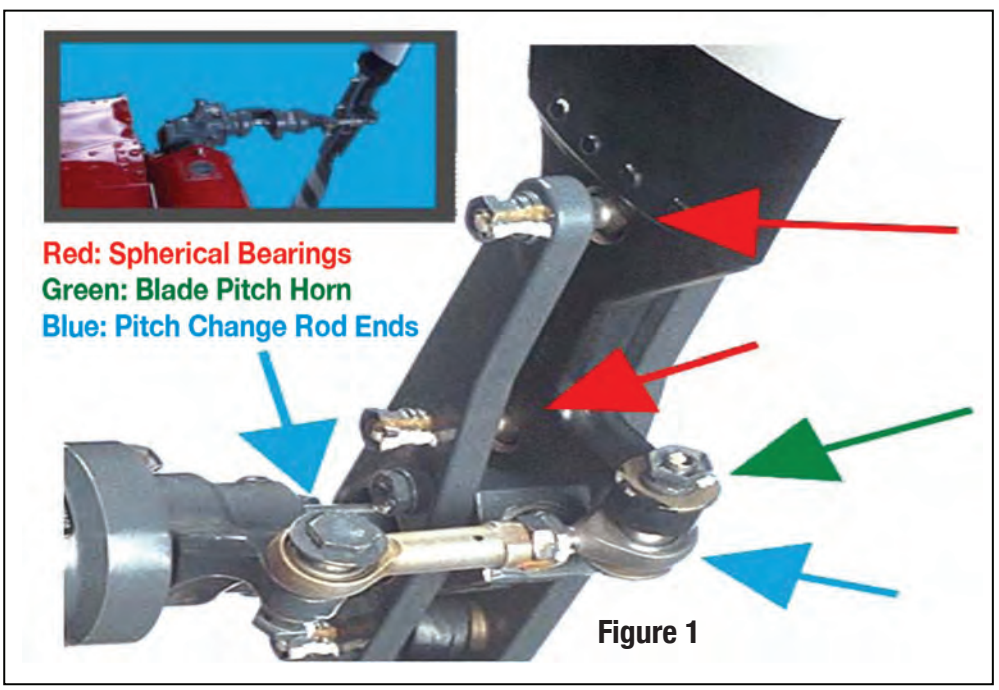


Figure 1

Well, I see you are here again for our continuing discussion on why helicopters, unlike my dog Roxy, don't chase their tails. Welcome back, and thanks for coming. Let's see: we finished up last time talking about how the tail rotor blades need to change pitch to control the yaw maneuver of the helicopter. Oh yeah, and I promised we would get into a more in-depth discussion about dissymmetry of lift. So whad'ya say we get started? But first, how 'bout a review on changing pitch of the tail rotor.

Changing the Pitch

Now be patient; I know we spoke about this the last time, but it has been a while and a little review never hurts. We know that to yaw the aircraft either right or left, the tail rotor blades need the controllability to operate in both negative and positive angles of attack. And how is this different from the main rotor blades? Ah, see? A little review does help. Remember we discussed that the main rotors are normally only capable of positive angles of attack.

The changes to the tail rotor blade angle of attack is affected by the pilot's anti-torque pedals, and please: all you fixed wing folks remember that these are not called rudder pedals in a helicopter. The pedals are connected to the pitch change mechanism by either push pull tubes or by cables. From the standpoint of controlling pitch, a tail rotor requires collective pitch control, but not cyclic feathering. Thus, the pitch control mechanism of most tail rotors is much simpler than that of the main rotor system. Now, here is a real statement of the obvious: The tail rotor blades must be mounted, and there must be a mechanism to change the pitch of the blades. Ya think? But this next statement may not be so obvious: Tail rotor blades also must be driven at an RPM ratio of about 3 times that of the main rotor.

The tail rotor assembly pictured in **Figure 1** is from a Robinson R22 tail rotor. You can clearly see how the blades are attached, and how the pitch change mechanism can pivot the blades. The red arrows point at the attachment points for the blade itself. These attachment points are bolts that go from one side of the yoke, through the blade, and into the other side of the yoke. The spherical bearing itself allows the blade complete freedom to rotate around the ball, to which the upper red arrow is pointing. Because there are two of these spherical bearings (you can see only the second one depicted by the red arrow) the blade is constrained to only move around an axis

that is aligned between the two bearings. This allows the blade's pitch (angle of attack) to be changed, but allows no other motion of the blade with respect to the yoke.

Notice that the bottom of the blade makes an "L" shape, with the green arrow pointing to the end of the "L" where a bolt goes through it. The "L" part of the blade, or pitch horn, gives leverage to change the pitch of the blade.

The bolt that goes through the pitch horn also goes through a pitch change rod end (the right-hand blue arrow), which has one of those spherical bearings in it. This allows the rod end to push and pull on the pitch horn, thereby changing the pitch of the blade.

The other end of the rod end (the left-side blue arrow) is attached to the pitch change yoke. The inset photo at the top left corner of Figure 1 shows another image of the same assembly from a very slightly different angle.

You can see the "L" shaped bottom of the blade better, and it's a little more obvious how it attaches to the pitch change rod.

Figure 2 is the same assembly, except that now we are standing behind the helicopter looking directly forward at the tail rotor assembly.

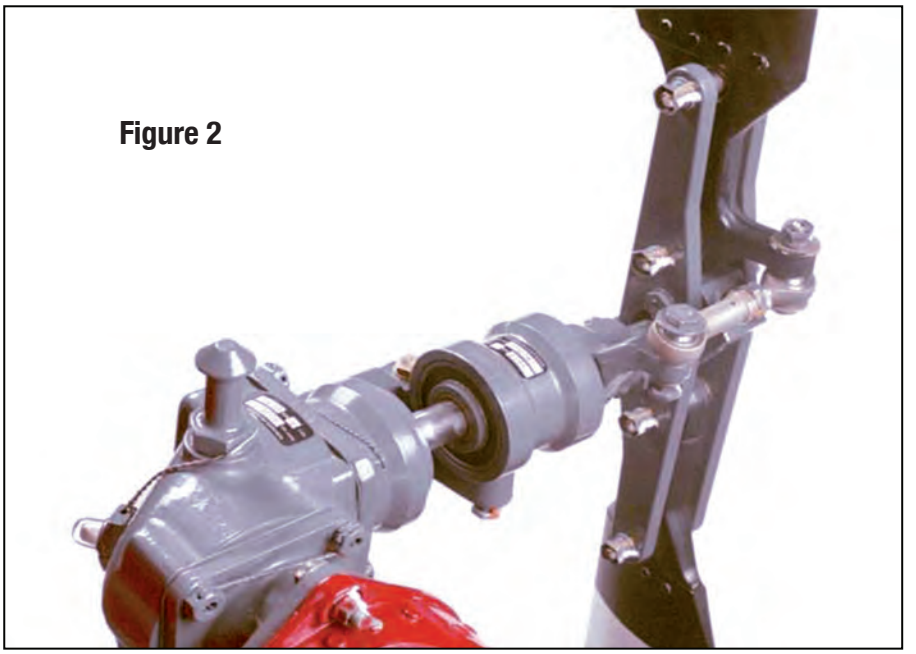
Figure 3: This picture shows how the pitch change mechanism moves the blades.

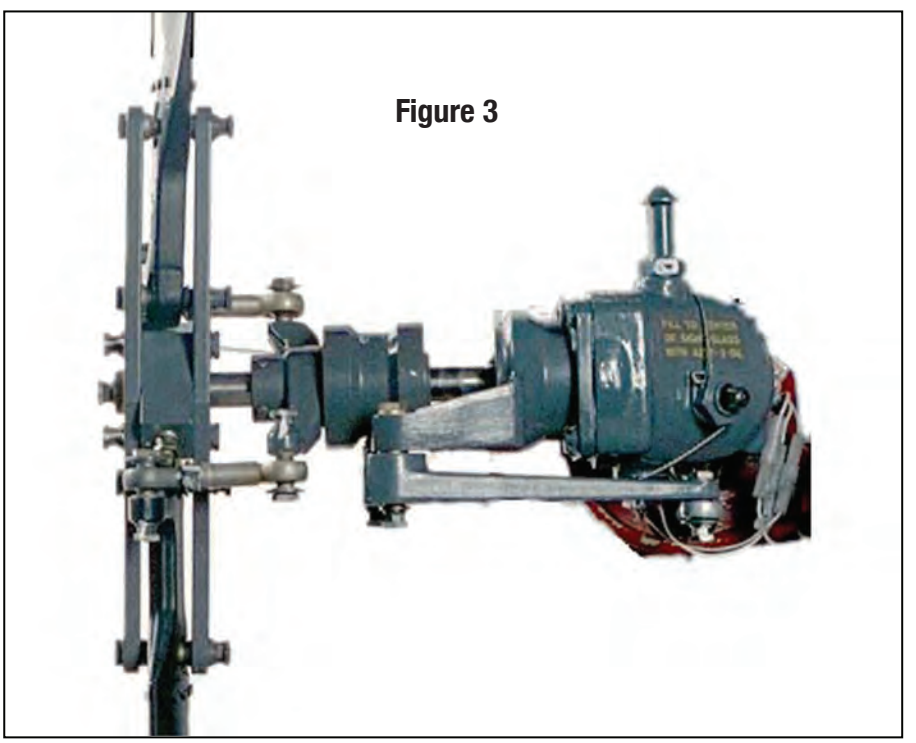
Figure 4: The red and green arrows show how the slider slides left and right on the shaft. The pitch change rods are connected to the slider, and so as the slider moves to the right, the pitch change rods move to the right, and take the blade pitch horn with them.

If you look carefully at the bottom orange arrows, you can see that the pitch change rod and the blade pitch horn have been moved to the right.

The upper orange arrow just points at the blade, which you can see is at a different pitch angle in the two pictures.

Figure 5: As you can imagine each manufacturer has its own idea as to how the tail rotor pitch change movement should be managed.





In the next example, we will examine the Bell Helicopter design. The two images in **Figure 6 on page 14** show components of a Bell 206 helicopter. Notice that the pitch change mechanism is quite different from the R22. The pitch change rod is actually a shaft which goes through the hollow shaft the tail rotor is mounted on. Note the tail rotor hub at two extreme pitch settings.

In the left hand picture, the red arrow shows that the inner shaft has been extended all the way to the right. The right-hand picture shows the same shaft has been retracted. As the inner shaft slides left and right, the pitch change rods are moved as well, and pull the blade pitch change horn along with the rod. The blue arrow points out how far the rod end has moved, taking the blade's leading edge with it. Like the Robinson, the blade is mounted on two spherical bearings, which cause it to rotate only in the pitch axis.

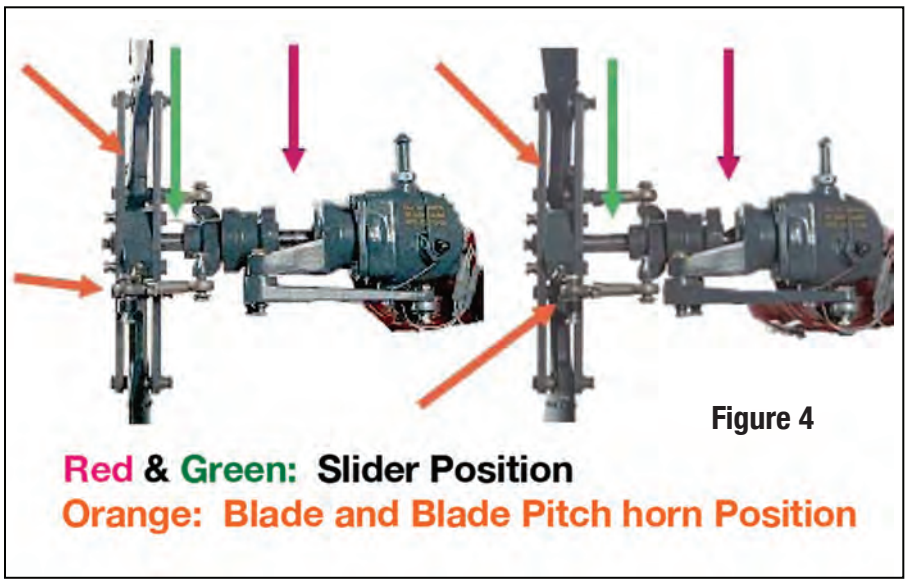


Figure 4

Figure 5

Figure 7 on page 14: This picture is from the Enstrom family of helicopters. The assembly pictured here is an F28A tail rotor. In the lower left corner of the picture, you can see the cable attaching to the pitch change mechanism. The Enstrom blades don't attach with spherical bearings the way the Robinson and Bell do, they utilize a bearing pack to allow the blade to feather.

Figures 8 and 9 on page 15: Next, let's see how the French do it on their ubiquitous Eurocopter AS350 Series Helicopters. If you take a look at their idea, it is by far less complex than any of the previous systems we have discussed. Eurocopter have designed and incorporated two-blade, hingeless seesaw rotor with fiberglass roving spar. Pitch change is affected through spar twisting. The system is greaseless fail-safe design.

Dissymmetry of Lift

Now, as promised, let's discuss dissymmetry of lift. The simple explanation is that this operational event during the rotation of both the main and tail rotor is the difference in lift that exists between the advancing half of the rotor disk and the retreating half. First, let's review what happens to the main rotor. Please note that the assumption for this explanation is the rotor is turning counter-clockwise. So, dissymmetry of lift is caused by the fact that in directional flight, the aircraft relative wind is added to the rotational relative wind on the advancing blade, and subtracted from the rotational relative wind on the retreating blade. The blade passing the tail and advancing around the right side of the helicopter has an increasing airspeed, which reaches maximum at the three o'clock position. As the blade continues, the airspeed reduces to essentially rotational airspeed over the nose of the helicopter. Leaving the nose, the blade airspeed progressively decreases and reaches minimum airspeed at the 9 o'clock position. The blade airspeed

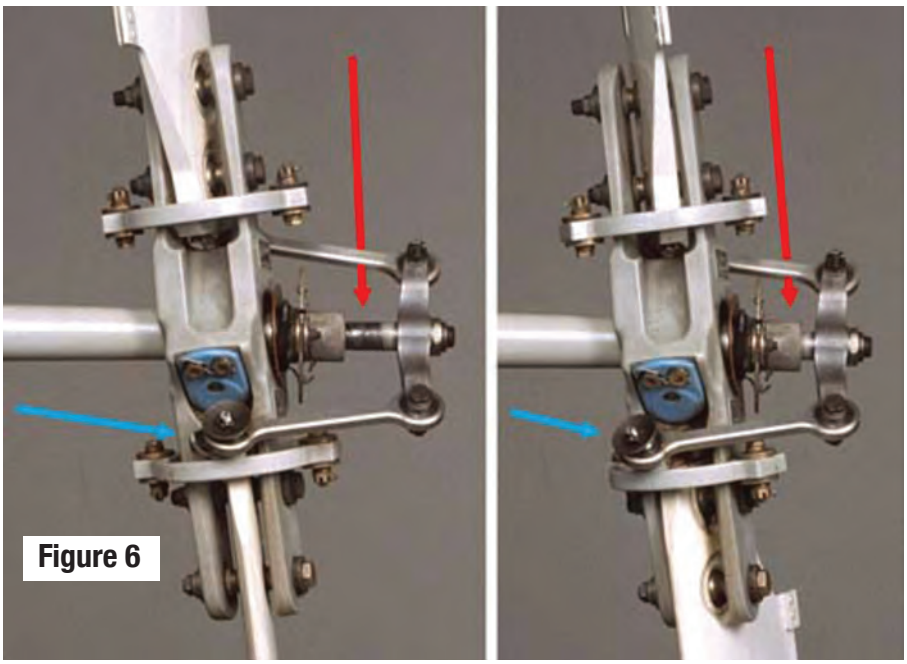


Figure 6

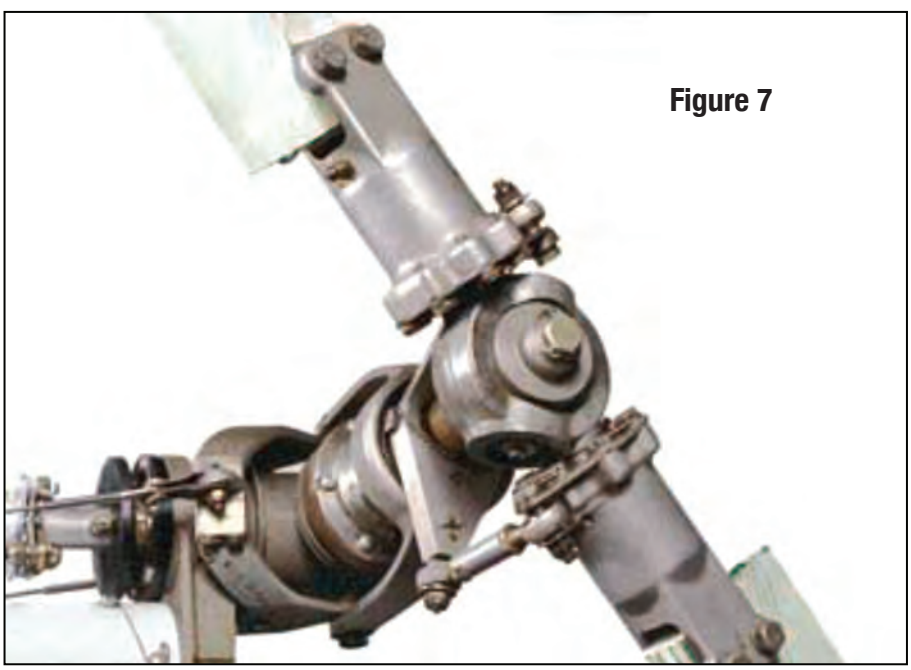


Figure 7

then increases progressively and again reaches rotational airspeed as it passes over the tail.

Figure 10 on page 16: Note the shaded circle in the picture labeled "REVERSE FLOW". Blade airspeed at the outboard edge of the shaded circle is 0 knots. Within the reverse flow area, the air actually moves over the blade backwards from trailing edge to leading edge. From the reverse flow area out to the blade tip, the blade airspeed progressively increases up to 294 knots.

At an aircraft airspeed of 100 knots, a 200-knot blade airspeed differential exists between the advancing and retreating blades. Since lift increases as the square of the airspeed, a potential lift variation exists between the advancing and retreating sides of the rotor disk. This lift differential must be compensated for, or the helicopter would not be controllable. Two factors, rotor RPM and aircraft airspeed, control blade airspeed during flight. Both factors are variable to some degree, but must remain within certain operating limits. Angle of attack remains as the one variable that may be used by the pilot to compensate for dissymmetry of lift. The pitch angle of the rotor blades can be varied throughout their range, from flat pitch to the stalling pitch angle, to change angle of attack and to compensate for lift differential.

Figure 11 on page 16 shows the relationship between blade pitch angle and blade airspeed during forward flight. Note that blade pitch angle is lower on the advancing side of the disk to compensate for increased blade airspeed on

Figure 8

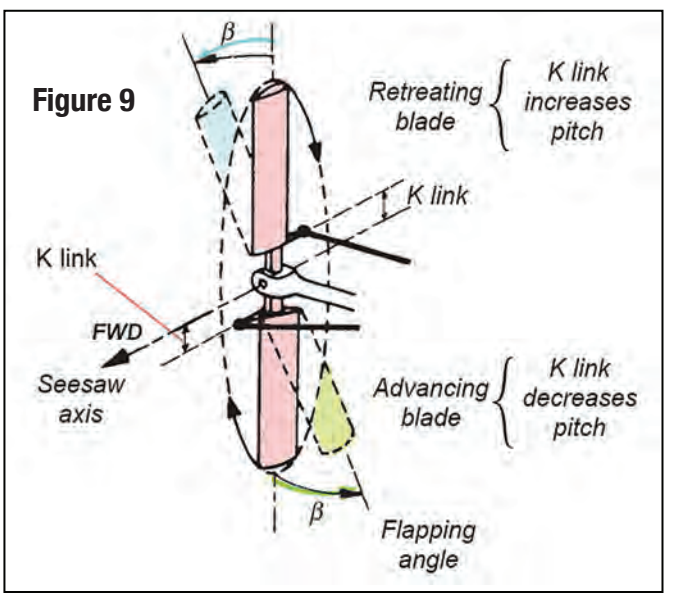


Figure 9

that side. Blade pitch angle is increased on the retreating blade side to compensate for decreased blade airspeed on that side. These changes in blade pitch are introduced either through the blade feathering mechanism or blade flapping. When made with the blade feathering mechanism, the changes are called cyclic feathering. Pitch changes are made to individual blades independent of the others in the system and are controlled by the pilot's cyclic pitch control.

OK, did all that make sense? Hopefully it did. One thing's for sure; there is at least a year's worth (or more) of cocktail knowledge (CK) in that explanation. Use it and let me know what happens.

Tail Rotor Dissymmetry of Lift

Now that we understand how dissymmetry of lift affects the main rotor system, let's move to the tail rotor. The tail rotor experiences dissymmetry of lift during forward flight because it also has advancing and retreating blades. Dissymmetry is corrected for by a flapping hinge action. Two basic types of flapping hinges – the delta and the offset hinge – are used on most contemporary helicopters.

> The airfoil is fixed for a given blade. The only remaining variables are changes in blade angle of attack and blade airspeed.

Figure 12 (top, opposite page): The delta hinge is not oriented parallel to the blade chord. **Figure 13 (middle, opposite page):** The hinge is designed so that flapping automatically introduces cyclic feathering, which corrects for dissymmetry of lift. The offset hinge is located outboard from the hub. To compare the lift of the advancing half of the disk area to the lift of the retreating half, the lift equation can be used. In forward flight, two factors in the lift formula – density ratio and blade area – are the same for both the advancing and retreating blades. The airfoil shape is fixed for a given blade. The only remaining vari-

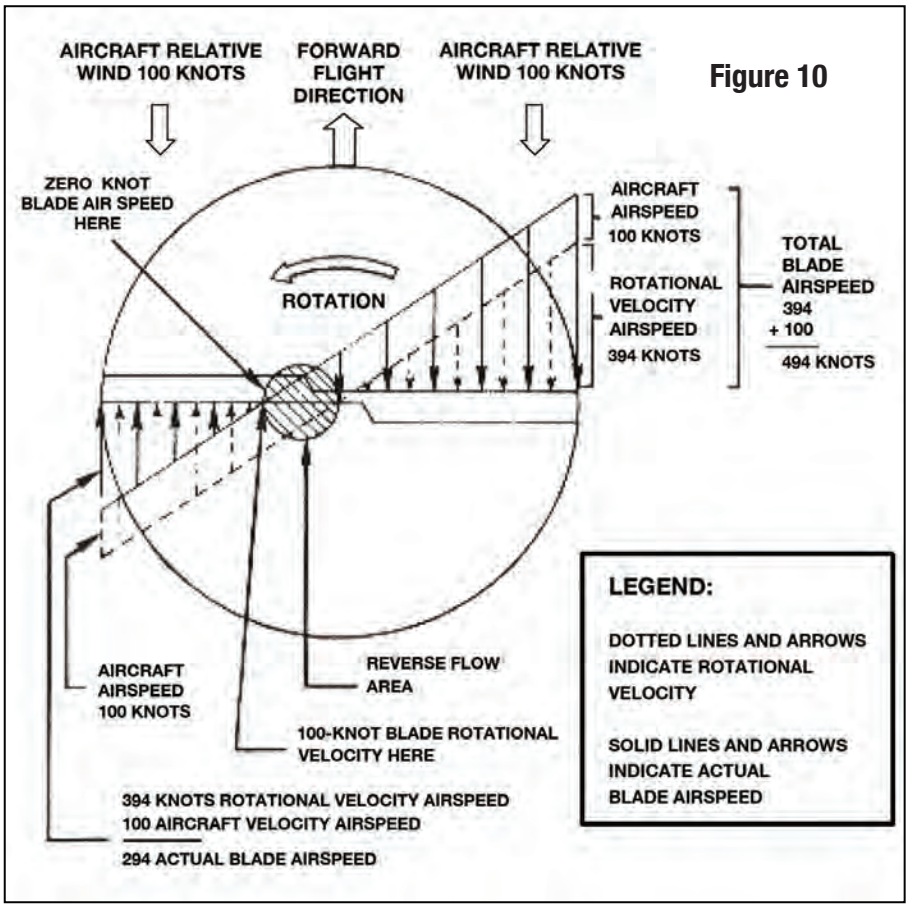


Figure 10

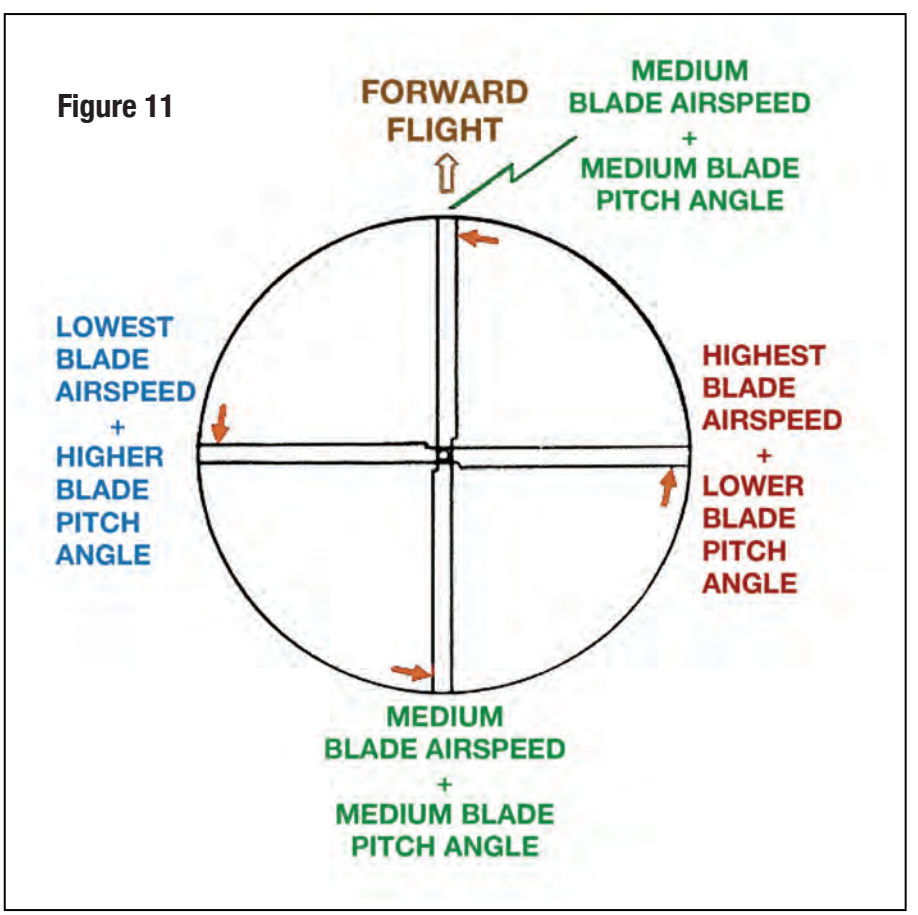


Figure 11

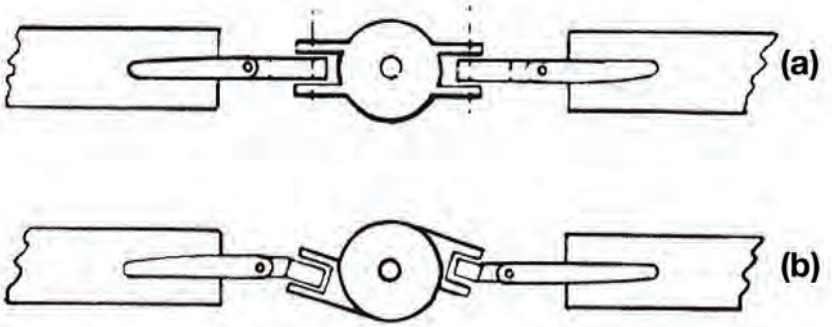
ables are changes in blade angle of attack and blade airspeed. These two variables must compensate for each other during forward flight to overcome dissymmetry of lift.

So ends another session on one of the many the mysteries of helicopter flight. But don't stray far, because next time we will finish our "tail" with an interesting discussion about two very inventive tail rotor systems. One from MD helicopters called a NOTAR, and one from our French friends at Eurocopter called the Fenestron. And then we will wrap up with an explanation about Loss of Tail Rotor Effectiveness (LTE). Now go forth my faithful students and remember: "A free ride and free food are two of the three things that no pilot ever turns down" … Dick Rutan.

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.* ■

Figure 12

(a) Plain flapping hinge. (b) Delta-three hinge combines flapping and cyclic feathering.



Flapping hinge offset from center produces moments without disk tilt

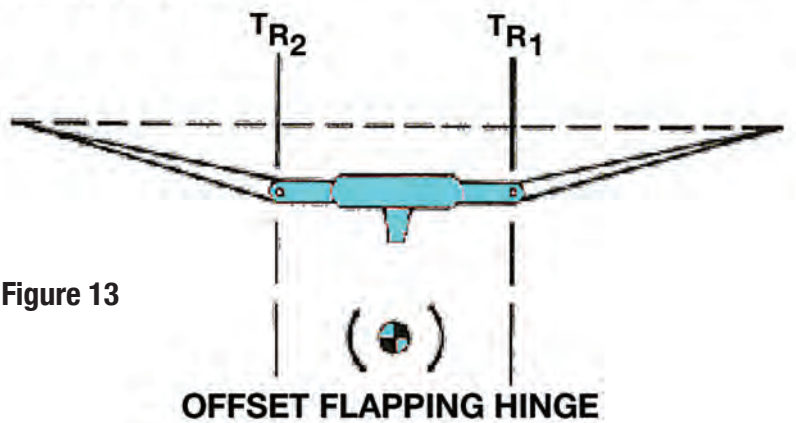


Figure 13

Maintenance Training Standards explained

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

Once upon a time, men were admired

and rewarded for their ability to make fire, club furry animals to death, and paint pictures of those animals on the wall of the family cave. Things evolved, and we shifted our admiration to those who could dance the Twist, play wicked guitar licks, grow cool facial hair, and perhaps roll a "special" cigarette with one hand. Now we admire those who become "dot-com" billionaires by age 24 without actually creating anything, propel a golf ball or football with a high degree of accuracy, or are willing to expose their darkest personality quirks and secrets on some cheesy reality TV show.

Similarly, the skills, knowledge and abilities of the aircraft maintainer also continue to evolve. To this end, many training organizations are striving to update their curricula to meet the demands of present-day industry. Transport Canada last updated its training standards in the mid-late 1990s, and the CCAA (formerly CAMC) continues to work toward maintaining occupational standards. But industry requirements are something of a "moving target", and the process of training a new generation of aircraft maintainers presents a great challenge for the country's aviation colleges.

One of the greatest drawbacks I see associated with the development of new curriculum packages is the propensity of old farts like myself to insist on maintaining the sacred cows of the traditional maintenance-training paradigm. Teaching things because "we always have" is an unfortunate reality, which is a waste of time and effort – time and effort that could and should be spent teaching competencies that **are** relevant and useful. For example, electrical and electronics programs tend to emphasize circuit calculations, often involving numerous resistors, capacitors and inductors, etc., in a ridiculously complex configuration. Having someone calculate the

voltage drop across a resistor of 4.7KΩ with 238mA of current running through it is absurd, when the reality is that person will spend the bulk of his career changing wheels and brakes, performing service checks, swapping out black boxes, and maybe, sometimes, using a meter to determine if there is power on one pin and ground on the other.

The "M" side of the business has similar questionable training "norms", such as having students perform horsepower calculations in their engine courses, or calculating pressure, force, etc., in their hydraulics class. We continue to include this training "because we always have". But let's be honest here. How many of us actually perform these tasks when we're in the field working on airplanes? The only time I ever used a calculator in the hangar was to figure out my overtime pay. I certainly never used it to calculate $Xc = 1/2\pi fC$.

What concerns me most about this approach to training is the realization that a young person entering into our trade(s) may be without the academic foundation to successfully perform these theoretical exercises, and will thus fail to graduate, despite the fact that he or she may be a mechanical whiz kid. I wonder how many potentially brilliant mechanics and technicians never made it into the industry because they couldn't calculate the resonant frequency of a tank circuit, or remember what percentage of the Earth's atmosphere is nitrogen.

Too many potentially great mechanics and technicians never make it to the field because they flunk out of college due to their inability to perform academic or technical exercises that they would never have occasion to apply in the industry.

Is it really necessary for an apprentice/learner in the 21st century to be able to read an analog multimeter? How about a micrometer? Are these just "dead horses" that we continue to flog because we always have taught students these skills? From an employment perspective, many graduates may be well versed in the complexities and intricacies of the inner workings of valves, black boxes, carburetors, etc., but are unable to perform the simplest of tasks required to actually maintain an aircraft.

The avionics manager who interviewed me for my first job actually chuckled when I proudly told him of all the King Radio Certificates I had earned in college. "You won't be chasing electrons here; we just change the black box and get 'er flying again" was what he said. Of course, nobody had shown me **how** to change a black box when I was in college, nor had I learned how to use lacing cord or lockwire. This was somewhat embarrassing when, on my first day of employment, they sent me into the engine shop to lace and install a harness on a JT8-D engine. Sometimes, we try so hard to cover the complicated stuff we forget about the basics. I've seen students who score A+ on all their exams looking at me with a puzzled expression when I ask them to check a fuse. Somehow, we forgot to tell them how to do that part.

Virtually all of the current, practicing AMEs in Canada have received approved, formal training. I would like to appeal to you all to share with me your own personal experiences concerning the relevance of your training for the job you ended up doing. What "sacred cows" were you forced to milk in college? What "dead horses" did your teachers force you to flog? Perform a fabric repair? Spend endless hours figuring out the firing order of a radial engine? Overhaul a component that you now regularly scrap and replace with a new one?

Let me know what aspects of your aviation college training were, in your opinion, a complete waste of time. I'd also like to hear from you about things you **didn't** learn in college, that you really wish you had. For me, it was lacing cord and lockwire. What was it for you? Reading a drip-stick without getting an eyeful of fuel? Pulling the pitot-heat circuit breakers before jacking the airplane? How to open a filter cartridge without losing the spring? Email your responses to **argofan@sympatico.ca** or AMU's editor, Ian Cook, at **amu.editor@gmail.com** and tell us about your own experiences. I will use your insights to help in the development of new curriculum packages, and I will publish the more interesting, informed, and especially funny ones in a future article. Let's see if we can rid our industry of the sacred cows and dead horses once and for all!

Here are a couple of questions in keeping with the gist of this 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.

From the previous article:

Q: Name two sources of input data to the Airshow Mapping feature of a passenger entertainment system.
A: Avionics sources, such as air data computers and inertial reference/navigation systems, provide input to what is commonly known as the airshow mapping feature of the PES.

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).* ■

PAMA SoCal Chapter

April 2013 Meeting Wrap

Thank you Paul and Steve. The SoCal chapter would like to thank Paul Zapata, Regional Account Executive, Steve Phillips, Sales Manager, and all at HRD Aero Systems, Inc. for their time and generosity in hosting the April 9, 2013 chapter meeting, dinner, and lively technical presentation on "What Breaks on Safety and Survival Equipment" and great scholarship raffle prize donations at the 94th Aero Squadron Restaurant in Van Nuys, CA. To learn more about HRD, log on to www.hrd-aerosytems.com. To reach Paul directly: paulz@hrd-aerosystems.com, mobile 661-510-8903.

April 2013 Scholarship Fund

Raffle Drawing $269. Thank you chapter supporters: Aero Distributor Services, Consolidated Aircraft, Corporate Air Parts, Extraord-N-Air, HRD Aero Systems, Maximum Aero Support Inc., Rotorcorp, Rotorcraft Support, Triumph Instruments, and Universal Avionics.

100% of proceeds from raffle ticket sales and donations benefit the SoCal PAMA Scholarship Awards Program. To receive chapter meeting, employment opportunities and event announcements by email, go to SoCalPAMA.org. On the homepage, click the "update email address" button.

Job Opening to Post?

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

Volunteers Welcome

Contact Greg Potter or Gail Erwin to get more involved with SoCal PAMA: greglpotter@verizon.net, gailjerwin@verizon.net

2013 Scholarships

Congratulations Scholarship Winners: Salvador Garcia, A&P Student, Class of October 2013, SCLA School of Aviation Technology; Juana Abigail Hipolito, A&P Student, Class of February 2014, Crimson Technical College; Matthew LaPrade, A&P Student, Class of November 2013, Crimson Technical College; Julian A. Lopez, A&P Student, Class of March 2014, North Valley Occupational Center; David Murphy, A&P Student, Class of October 2013, SCLA School of Aviation Technology.

2014 SoCal PAMA A&P and continuing education scholarship applications will be available in the fall of 2013 at www.SoCalPAMA.org.

SoCal PAMA Website

Advertise your company at 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, or artwork updates: nikki@extraordnair.com, gailjerwin@verizon.net.

SoCal PAMA Calendar 2013

- July/August: No Meeting – Summer Recess
- Sept. 10: Chapter Meeting
- Nov. 12: Chapter Meeting
- Dec. 10: Holiday Social

Industry Events 2013

- ALEA W. Regional Conference: Sept. 3–5; Napa, CA, ALEA.org
- Reno Air Races: Sept. 11–15; Reno, NV Airrace.org
- AEA W. Regional Conference: TBA; AEA.net
- 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 Natational 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.

From FAASafety.gov Maintenance Safety Tip Aging Aircraft, May 2013 Maintenance Safety Tip Notice Number: NOTC4760

Aging Aircraft in General Aviation Best Practices Part 2: Records Research: What is your first step in determining the condition of an aging aircraft? It should be records research. The records will help you determine the degree of inspection necessary, as well as what items may have already been inspected. Your research will help to identify certain maintenance and usage characteristics of a particular aircraft, as well as expose potential areas of attention pertinent to a model type or class. Inspection and overhaul recommendations contained in older GA aircraft maintenance instructions may not provide adequate guidance regarding aging issues. Therefore, assessing the quality of maintenance and inspections during an aircraft's life is important to determine which parts have been replaced, if corrosion was ever a problem, and other maintenance factors that could lead to a concern with aging. If you are going to work on an older aircraft, ask the owner for all available information so you can establish the maintenance history.

Your knowledge and experience will help to reveal if there are voids or missing information. Advise the owner about these discrep-

ancies and offer to assist getting the information. You can compare research from more general model type issues with individual aircraft information to identify similarities and differences. In effect, this helps answer the question: "Does the information I am seeing on this particular aircraft match the history of the aircraft and type, per available records?"

Once collected, the information will help you and the owner establish a baseline to determine what maintenance, repairs, and alterations have been done and how well the aircraft has been cared for. Next month's Maintenance Safety Tip, Aging Aircraft in General Aviation - Part 3, will highlight "Special Attention Inspections." We encourage you to review, as well as share with the aircraft owner, the publication titled "Best Practices Guide for Maintaining Aging General Aviation Airplanes" which can be found at: http://www.faa.gov/aircraft/air_cert/design_approvals/small_airplanes/cos/aging_aircraft/media/aging_aircraft_best_practices.pdf

SoCal PAMA Board of Directors

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- Chapter Governance Advisor: Warren Horton, wchorton@hotmail.com
- Chapter Governance Advisor: Glenn Beckley, coptrmd@aol.com

PAMA Mission Statement

The mission of PAMA is to promote continuous improvement in professionalism and recognition of the Aviation Maintenance Technician through communication, education, representation, and support.

SoCal PAMA News

Dan Ramos, Publisher; Gail Erwin, Editor

Central Ohio PAMA

National AMT Day

Friday, May 24th, was this year's National Aviation Maintenance Technicians Day. We hope you took a bow in observance of the anniversary of Charles Taylor's birthday to acknowledge AMTs and their contributions to safety in the aviation industry.

Receive AMT Award Credit for Attending May Meeting

For those members who attended the May Meeting at Spirit Avionics, you may request a credit for your 2013 AMT Award by visiting the FAASTeam website. Log in to www.faasafety.gov; go to Maintenance Hangar, My AMT, Enter Eligible Training and fill in the following:

- Completed Date: May 15, 2013
- Course Title: Garmin's Certified ADS-B Solutions
- Course Provider: Michael Kerrigan, Garmin Avionics
- Training Hours: 1.0
- Click Submit

A list of our members who attended was forwarded to Mark Harden and he will verify that the training credit is awarded. Thanks, Mark for your help in this process.

May Meeting Moved to Wednesday, May 15th, at Spirit Avionics

Without a committed presentation for our normal meeting night, the COPAMA Board decided to move the meeting to Wednesday, May-15th, and join the Garmin Avionics "ADS-B" presentation at Spirit Avionics on the south perimeter of Port Columbus airport off 5th Ave. This was an already established FAASTeam event, and of interest to our membership. The event started at 7 p.m. and ran until about 9 p.m.

The night included a presentation by Jim Schroeder on Youth Aviation Adventures and their organization that introduces youth to the aviation industry. Proceeds from a raffle held at the end of the meeting went to support YAA.

Darlene Ford, President of EAA Chapter 9 announced a presentation titled "The History of Aviation from Kites to the Space Age" to be held May 22nd at the McConnell Arts Center near downtown Worthington. Tom Crouch, a Senior Curator at the Aeronautics National Air and Space Museum will be the speaker. She also announced the return of the Ford Tri-Motor to OSU Airport for tours and rides July 11th to the 14th. The visiting aircraft is from the Air Zoo in Kalamazoo, Michigan.

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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 on October 30th to November 1st, 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, 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, October 31st. Topics include Supply Chain Logistics, Certification 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-known 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 email at cara@precisionaerocomponents.com for more information.

We hope to see you there!

Golf Season Report

The Ontario AME Association supports several charities by sponsoring holes at local golf tournaments. These tournaments are organized by different aviation-related groups. The first tournament was the Aviation "FORE" Charity tournament on May 24th. The Ontario AME Association sponsored a hole, and all the proceeds from that event were donated to "For the Love of a Child" based in the Durham region. Although the day was bitterly cold, 150 golfers took part and 43 hole sponsors were on hand to raise over $9,000 for the charity. Congratulations to all!

Self-improvement for the Aircraft Maintenance Engineer

In each newsletter, we include an article in an attempt to add to our knowledge base and add to our professionalism. We hope the following article from our association's Director of Training, "Uncle John" Longo, will help.

Sincerely,
Your Board of Directors

Safety Awareness

Staying "SAFE" requires constant attention for the many activities of daily living. Some general examples are: noticing how slippery it feels while in bare feet descending carpeted stairs in the dark with our arms full of clothes for the laundry, not remembering to stretch first before lifting the heavy carton over our head into seasonal storage, using an extension ladder without anchoring its base and while on it scaring yourself silly as it slips and comes crashing down.

Folks, we are talking about thinking and planning ahead to avoid risk to life and limb. Please consider the following to help you survive and thrive in our sometimes dangerous world and industry.

Personal

- Pay attention to, and remove jewellery, such as rings, watches, bracelets, and necklaces when on the job.
- Have with you: personal protective equipment, such as ear muffs, sunglasses, goggles, work gloves, approved footwear and work wear. Head protection should be considered as well – ball cap, bump hat, winter headgear etc.
- Buddy System: work with someone, or have visual or aural contact with someone, to ensure the safety of personnel and equipment.
- Tools System: Identify your hand tools (etching your name) to help ensure that you can account for them after a task. Organize your main and portable tool boxes so you can readily tell when something is missing. The concern is loose tools, which, if left on an aircraft, is a strict no-no. Agreed? Use approved safety flashlights and screwdrivers and pliers with insulated handles as appropriate when working around electrics. Develop the habit of checking your work; wear pockets for tools, especially before checking the coveralls in for cleaning.
- Communications: generally it is wise for an individual to stay in touch in some way such as radio, phone, or physically checking in. Priorities change. One minute you are doing a nose wheel change; the next minute, you may be called to form a TEAM to rescue a stranded aircraft on the runway with no hydraulics or lighting. You are a well-trained professional, and you can do both flawlessly.
- Qualifications: Keep up your operational skills, such as airside drivers licence, aircraft towing, ground equipment operation check-outs, first aid, fire-fighting, and more. You may need to speak up to ensure your qualifications remain active and effective by way of protecting yourself personally as well as others around you.

Operations

- When towing aircraft, use the approved communication setup and follow the company rules, such as speed limits by aircraft type and weather conditions. Always ground the aircraft when it is parked static on the gate or in the hangar.
- Conduct the "walkaround" before release to the operation by critically examining for anything irregular. You know the drill; leaks, flat spots on tires, damage, etc.

- Be sure to follow company procedures in advising visually, or by radio call, the aircraft are released to service by maintenance. Some operators use a chalk mark (an X) on the nosewheel as a visual indicator to the flight crew that all is OK.
- Other operators, such as seaplane or helicopter, may choose to follow other visual signalling to the flight crew. The journey logbook is the final indicator of aircraft serviceability and should always be available with the flying machine during operations.
- Remember to use the static lanyard clipped to your wrist when handling/changing electronic units to prevent a static discharge which may destroy these expensive devices.
- After you change units, always expedite the handling of the U/S back through stores for quick delivery back to the overhaul shop. Remember: you are part of a business, not a training school, and time is money.

Facilities

- There should be available to workers WHMIS documentation, material data sheets, first aid kits, and eye wash stations, all as per the established labour code and health and safety guidelines.
- There should be well-lit, organized workspaces/hangars with built-in fire protection and/or portable fire-fighting equipment at well-marked accessible locations. Fire extinguishers should be dry chemical and CO2, the ratio to be as required by local authorities or underwriters.
- A paging telephone system – including intercom with various identified stations or cell phones or two-way radios or a portable loud hailer (megaphone) system – should be part of a hangar.
- World-class operators paint tow-in guidelines on the hangar floor to ensure various aircraft types are lined up efficiently when parked inside for maintenance checks.
- World-class operators have policies and behaviours to maintain ongoing "**Good Housekeeping**".

Policies

- Operational leaders should obtain company health and safety policies and post them for customers and employees to see.
- New employee orientation is provided to effectively launch an individual to contribute and to avoid making costly mistakes. Consider that trial-and-error has no place in a modern enterprise unless it is a research and development lab. However, it is OK if conducted using a continuous improvement TEAM initiative.
- It is important to remember to keep paperwork updated as the task progresses. An example is when you are suddenly called from the nosewheel change to rescuing an aircraft on the runway. Prior to you assembling the tow crew, enter on the worksheet where you are on the wheel change.

We should strive to make professional, SAFE behaviour a habit.

John Longo, AME: About the author

John Longo has AME certification and many years experience in technical operations as a mechanic, technical trainer, operations manager and industry advisor. He is currently working as an aviation consultant with international clientele and volunteering as the Director of Training for the AME Association of Ontario.

Atlantic AME Association

AME Atlantic 2103 President's Report

The month of April has always been the commencement of a new year from a fiscal point of view for many of us, but it is also an operational beginning for many sectors of our industry. The annual ARAMC has been the sign of spring and the beginning of a new year the past 35 years in the Atlantic Region. The AMEs in our region have every reason to be extremely proud of continuing to deliver a first-class conference year after year. The bringing together of delegates, the displayers, the training session and the networking that takes place comes together to provide a program that is extremely beneficial to the AME apprentices and the corporate attendees.

The Moncton Symposium/Conference was another great success, thanks to the 2013 committee members chaired by Jacques Richard and supported by his hard-working and very valuable committee members: Josee Richard, Administration; Karen McCullough, Administration; Evelyn Wood, Special Events; Lacey Scoggins, Master of Ceremonies; Kim Kendall, Displays; Allan Chaulk, Speakers.

In reviewing the past 12 months, the 2012 ARAMC that was held in Halifax last year was no doubt an outstanding event. It was a tremendous success, with a lot of new initiatives undertaken, with the end result being probably one of our most successful conventions, and without doubt the most financially successful.

Our congratulations go to Anneke and the fine committee for their accomplishments in 2012. I'm sure that 2013 will be another great success due to the work and preparation that Jacques and his committee have put into preparing the ARAMS.

We presented a very successful and largely attended HPIAM course in Halifax the day before the 2012 conference. Many thanks to Lorne Amos for his continued support to the association and his expert delivery, as well as the one he and Dan Dackombe presented. Thanks very much Lorne and Dan. Norbert Belliveau, who designed the present HPIAM course, is already working on preparing a newly revised course which should be ready for the 2015 ARAMC in Halifax. Many thanks go to Norbert for his continued contribution to the training being offered by the association.

The 2012 Fall Directors Meeting was held in Moncton at the Beausejour Hotel, which provided the meeting space free of charge. Thanks to directors: Uli Huber, Dan Dackombe, Dave Hall, Jacques Richard, Bob Pardy, Mel Crewe, Jason Crowell, and Anneke Urquhart.

Their participation at the meetings and their input through the year is very important and appreciated. These directors are the people you should contact with suggestions and/or issues you would like dealt with. Anneke has done a great job looking after the financial aspects as well as registrations and memberships, etc.

The membership report at the 2012 fall meeting showed an increase in all categories of membership: 97 AMEs, 11 corporate members, 8 apprentices and 14 technicians. I hope that his trend continues for Atlantic. I believe the Atlantic region has the most robust association in the country and I feel confident this will continue. Unfortunately, the Pacific AME Association is having problems retaining members and cancelled their 2013 symposium due to lack of participation from industry and members.

We signed a contract with the Sheraton Hotel in St. John's for the 2014 conference, which Mel will chair. This is a new venue in St. John's for us, and I think it will be a big improvement. I hope you enjoy the new hotel next year in St. John's.

Last fall, Jacques presented a realistic budget for the 2013 conference, which was approved by the directors. We have every indication that everything is on track and will exceed budgetary considerations. If there was ever any question about Moncton being a successful venue for our symposium, those concerns have certainly disappeared.

By the way, when we were planning the 2013 conference, we also found a volunteer for a chairperson for the 2015 conference in Halifax; Anneke Urquhart volunteered to take command again. Anneke, we expect great things.

The Canadian Federation of AME Associations' (CFAMEA) Annual General Meeting was held in Toronto in October 2012. I chaired that meeting as president of CFAMEA and Uli represented the Atlantic region. Ole Nielsen was nominated for the position of president and was elected by acclimation. Ole has good background in the industry; he is recently retired after serving as a technical inspector with Transport Canada in the Ontario region for a lengthy period. Ole served as vice-president last year and is well acquainted with the national association.

I published the minutes of the 2012 CFAMEA AGM in our last newsletter, so you are all aware of the progress being made in respect to the CFAMEA objections to the Fatigue Risk Management System (FRMS). I spoke with Jeff Phipps (TC Ottawa) last week and he said a meeting between Jackie Booth (the author of the SUR 007 dealing with FRMS), Aaron Maquarrie (Director of the Standards Branch, who has replaced Don Sherritt) and Jeff Phipps is scheduled for the next month to discuss NPA 2004-049 (FRMS and SMS). He said if TCCA decides to proceed with the NPA as written, they will still go out for comments and then decide on a focus group.

CFAMEA is also part of the working group which has been tasked with developing regulations for the future of UAVs (Unmanned Air Vehicles). Ole Nielsen and I are on the UAVWG. The work so far has not dealt with the regulations in respect to maintenance, which is where our interest will be. The next meeting of this WG is scheduled for October 8th in Ottawa. There should be a fall CARAC meeting which may have some agenda items for the maintenance side of the business.

A SMOOTH FLIGHT STARTS WITH BALANCED ROTORS.

Zing
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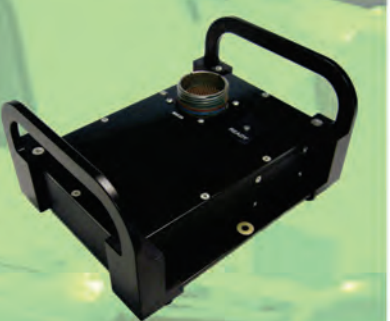

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OEMs & the TC Holder

BY NORM CHALMERS
Pacific Airworthiness Consulting

I am providing this preamble

to clarify my usage of abbreviations, etc. These abbreviations are all commonly used in the aviation industry and you may come upon them in your day-to-day work.

Preamble and Acronyms

(Italicized type denotes a quotation.) **AD:** Airworthiness Directive; **CAR:** Canadian Aviation Regulation, which is a law of Canada; **CofA:** Certificate of Airworthiness; **EASA:** European Aviation Safety Agency; **FAA:** Federal Aviation Administration; **FAR:** Federal Aviation Regulation (USA); **ICA:** Instructions for Continued Airworthiness (including maintenance manuals et al); **STC:** Supplemental Type Certificate; **STD:** TC-approved standard; **TATC:** Transportation Appeal Tribunal of Canada; **TSB:** Transportation Safety Board of Canada; **TC** or minister or "tower of darkness" or "the Tower" indicates Transport Canada headquarters in Ottawa; **TC Data Sheet:** Type Certificate Data Sheet; **TC Holder:** Type Certificate Holder/Owner; **USA:** United States of America.

One term that is not included in my preamble above is "OEM", which is the initialism for the phrase Original Equipment Manufacturer. OEM is an abbreviation that is used extensively, but it is also often used incorrectly, even in official publications emanating from the Tower. That is to be expected from TC, because they allow official publications to quote from the Merriam-Webster Collegiate Dictionary. Please note that the Gage Canadian Dictionary is the official Government of Canada English dictionary, but very few TC offices have a copy on hand. Most inspectors and managers do not have access to one because book stores charge for current copies. They are also hard to find on Kijiji or Craigslist for cheap.

Back to my topic, the term that OEM is most often confused with is "TC Holder" which is the same TC as in the term "TC Data Sheet". Understanding the difference between these terms will also help you to understand the official basis for numerous documents.

First, we examine "TC holder" or "type certificate holder". This is the entity that is named on the type certificate document and in the TC data sheet, both of which I have explained in previous AMU issues. This entity has the rights to all of the type certification data and is held responsible for the design and continued airworthiness support of the aircraft or other aeronautical product. This support includes the maintenance manuals, parts manuals, wiring diagrams, service bulletins and all of the other data that you, as the owner or maintainer, receive in support of your aircraft. The TC holder is the entity that the responsible CAA communicates with on design matters such as ADs.

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Next, we examine the OEM. For most aircraft or aircraft parts, the OEM is also the TC holder. In many cases, the TC holder has moved onto new designs and no longer wants to make and sell parts for an ageing aircraft. They may enter into an agreement with another organization that wants to take over the manufacturing and sale of the parts. In that situation, the TC holder licences the right to make and sell the product. Usually this is limited to only parts and not complete aircraft. For some old designs of small single engine aircraft, the actual manufacturing has passed through numerous companies making the picture confusing. To help you determine which of these organizations made your aircraft, look at the original factory (OEM) aircraft data plate, or part number if it is still there, for the manufacturer identification.

One example that may help me explain this is the venerable DHC2 Beaver. The original TC holder and manufacturer was the de Havilland company based near Toronto. To get out of making that aircraft and move on to their newer and more lucrative models, de Havilland licensed manufacturing rights to Viking Air on Vancouver Island, British Columbia, over 4,000 kilometers away. Viking received the rusty jigs and took over the business of making Beaver parts. One of the requirements that Viking was also responsible for was to identify parts they made with a discriminating mark such as a "V" adjacent to the part number. If your part has the "V", it was made by Viking. If it doesn't, hopefully it was made by de Havilland. Both are OEM parts, but of different OEMs.

The problem for de Havilland was that they were still being held responsible for the design and continued airworthiness of the Beaver. The problem for Viking was that they didn't have direct on-site access to all the historical design documentation or the ability to make changes. The solution for both organizations was to transfer the type certificate from de Havilland to Viking, and that was done.

This leads us to another related topic. Who actually made the part? That OEM part you're holding in your hand may not have been made or fabricated by the OEM. That OEM may have contracted out the fabrication of that part, or some special process, to another company. Once again, we get onto the topic of making money. Often, aviation companies want to do this. The key factor is scale of production. In many cases, smaller companies are more able to produce small numbers of parts at a profit. The OEM can become an assembler of parts that have been fabricated or processed by smaller companies. In this situation, the OEM is still the only entity that can certify the parts. Just to add clarity, you may buy parts for your de Havilland Beaver made in Ontario from the aircraft part OEM (specifically, Viking Air) residing in Sidney, BC, when parts are also fabricated down the street and around the corner from you in Campbell River.

Now for something completely bromidic; we will examine the TC form 24-0019 Letter of Notification. This is the document that TC Airworthiness inspectors use to notify aircraft operators of particular conditions that the inspectors have observed and believe may be airworthiness defects of concern. Notice that I use the term "may be". When inspectors inspect aircraft, they use their experience – however shallow

or deep that may be – to judge whether a defect is an airworthiness issue. The 24-0019 is their notice to you of those concerns, and is fair warning that you may have a problem that compromises the effectivity of your CofA. The form states "Pursuant to section 8.7(1) of the Aeronautics Act, the aircraft described above has been inspected and the following defects or deficiencies have been noted:"

Blank lines are provided so that notes regarding observations can be written.

"In accordance with the Canadian Aviation Regulations, entries relating to these defects and deficiencies shall be made in the aircraft technical records and, where appropriate, corrective actions have to be taken before further flight of the aircraft."

This only applies if the defects written on the form are valid. At that time, you have become aware of the defects and you need to note them in the journey log and get them fixed, as per the form, before flight. If the inspector is wrong and the observations noted are not defects, then you don't need to do anything. As a courtesy, and to keep the TC office from wasting time chasing the aircraft down with the intention of grounding it, you should return the 24-0019A reply form to the TC office with your explanation of the mistaken assumptions. It's easier to keep your aircraft flying than it is to get it back in the air.

Finally, here is a parting comment on the abdication of their safety responsibilities by the royalty "working" in TC headquarters in Ottawa. The minister recently issued Civil Aviation Safety Alert CASA 2013-01 hot on the heels of CASA 2011-03 back in 2011. Once again, the minister avoided being saddled with safety responsibilities. These two documents are the minister's way of saying "Be careful, boys and girls. Play nicely, but don't hurt anyone," or "We don't want to appear heavy-handed or move toward regulation by directive". If they try to convince the families of crash victims, I'd be doubtful of their success. Better to keep their crowns in the sand with their heads in them.

Note that I know some of the individuals working in the Tower who daily battle to address safety concerns but are overruled by the policy mandarins. My sympathies are for aviation victims and their families and then for all the TC employees who labour away daily wearing bureaucratic straitjackets and gags. Nuff said.

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.pacific-airworthiness.ca. ■

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Moving forward
after mental illness

BY STUART McAULAY

The concept of moving forward helps us to discover new opportunities in the days ahead and put back into practice our successes from days past. This applies directly to our personal lives as they mesh with our professional activities.

Mental illness in its various forms continues to erode our sense of duty and overall productivity in the Canadian workplace. Both personal and corporate stressors have become the norm as many of us continue to navigate a losing battle with our circumstances.

Last year, I shared a series of articles pertaining to my own experience with the prickly subject of mental illness in an effort to downplay its stigma and to gently promote its complex reality. Several months have passed since working through those daunting reflections, and I am thankful to report that I have turned a corner for the better in my own path to recovery. It was only earlier this year that the right choice of medication seemed to help lift the dark cloud that had clearly overstayed its welcome as an overwhelming influence on my thoughts and feelings. Unfortunately, a simple diversion to medication is not the stand-alone answer to recovery from symptoms of mental illness. The process towards recovery has also been dependent upon a careful dissection of influencing factors which are unique to each person. I remain fortunate that, after having several discussions with my employer similar to these thoughts that were put to paper, we were able to weather the storm together. We made difficult decisions involving the temporary suspension of my signing privileges and surrendering many of my duties to the rest of the team. We altered some plans that I was primarily involved with and ensured the continued operation of the business through others who agreed that personal recovery was paramount to a few inconvenient changes. I would suspect that the explanation of my condition was not fully recognized by those affected by these changes in routine, yet it was obvious that something of a supporting nature had to be done. I had, after all, been diagnosed with a severe depressive disorder that could no longer remain untreated. A sincere response from key individuals both in and

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out of work was necessary. If you struggle with, or think you may have, a depressive or anxiety disorder, let others in who are willing to help. Sincere human interaction is of more immediate value than relying upon your continued muted participation in routine activities.

One of the toughest steps in overcoming our own perception of stress overload is often misinterpreted as personal failure – a failure that we feel will be realized by letting our guard down with our peers who, we believe, should expect nothing less than our steady uninterrupted contributions to the workplace. Perhaps, when given the opportunity, many of them would provide support when called upon during times of difficulty. This can be very humbling, but it is also very necessary to the recovery process. I had to go through the uncomfortable season of talking to my employer about how my unpredictable condition was affecting my contribution to the workplace. Though unfamiliar with the effects surrounding my mental health and wellbeing, my employer was ready to invest in a reasonable accommodation strategy that prioritized the person before the position and its associated duties. If you become affected by mental illness, keep on working through your circumstances with whatever hope you can muster and whatever encouragement is directed your way. If time away from work is necessary, keep on working on yourself. Be sure to keep up with doctor visits and any suggested counseling or therapy sessions. If you are able to continue in your job function, even with limitations, keep on working on that strategy until it can be shaped back into something more comfortable

and normal. I would like to reinforce the thought that mental illness manifests itself in different ways for different people and that it is imperative to deal with any unusual feelings sooner rather than later. It is likely that someone dealing with chronic depression or compounding anxiety may fare better if steps are taken to intercede before it becomes a deep-rooted and uncomfortable concern.

Most cases of mental illness are treatable, given some time and positive inputs from family or friends, and yes, even a willing employer. Some cases may require the introduction to, and continued use of, new medications, whereas some of us may react better to cognitive therapies and/or lifestyle changes. Part of the mystery of why we get depressed continues into recovery as we are unsure of which recourse will be most effective for a select individual. I am now performing as normal, yet am also aware of the need to continue my improved responses to everyday stressors.

It's all about moving forward, even when it seems like a formidable mission. By all means, continue to seek expertise and heed the recommendations of doctors and therapists. Good ones can work with you to effect the best changes possible based upon your circumstance. Employers, as well as employees, should begin to realize the effects of these most unpleasant mental conditions while working towards informed and capable responses to those in need.

The reality of mental illness and its effect on aircraft maintenance deserves further study in the same realm as other advanced human factor principles. This type of condition does not just go away, nor can we afford to ignore these debilitating symptoms any longer. The experiences and outdated attitudes of our past must be transformed into the realities of today and continue in the essence of actively moving forward in support of our peers. As life happens, we are not immune to its emotional influences, but it is our courageous resolve that permits us to forge ahead in a discreet manner. I trust that anyone relating to or affected by the issues from this series will be encouraged to talk more, listen more, and realize that we are not alone in working things out. ■

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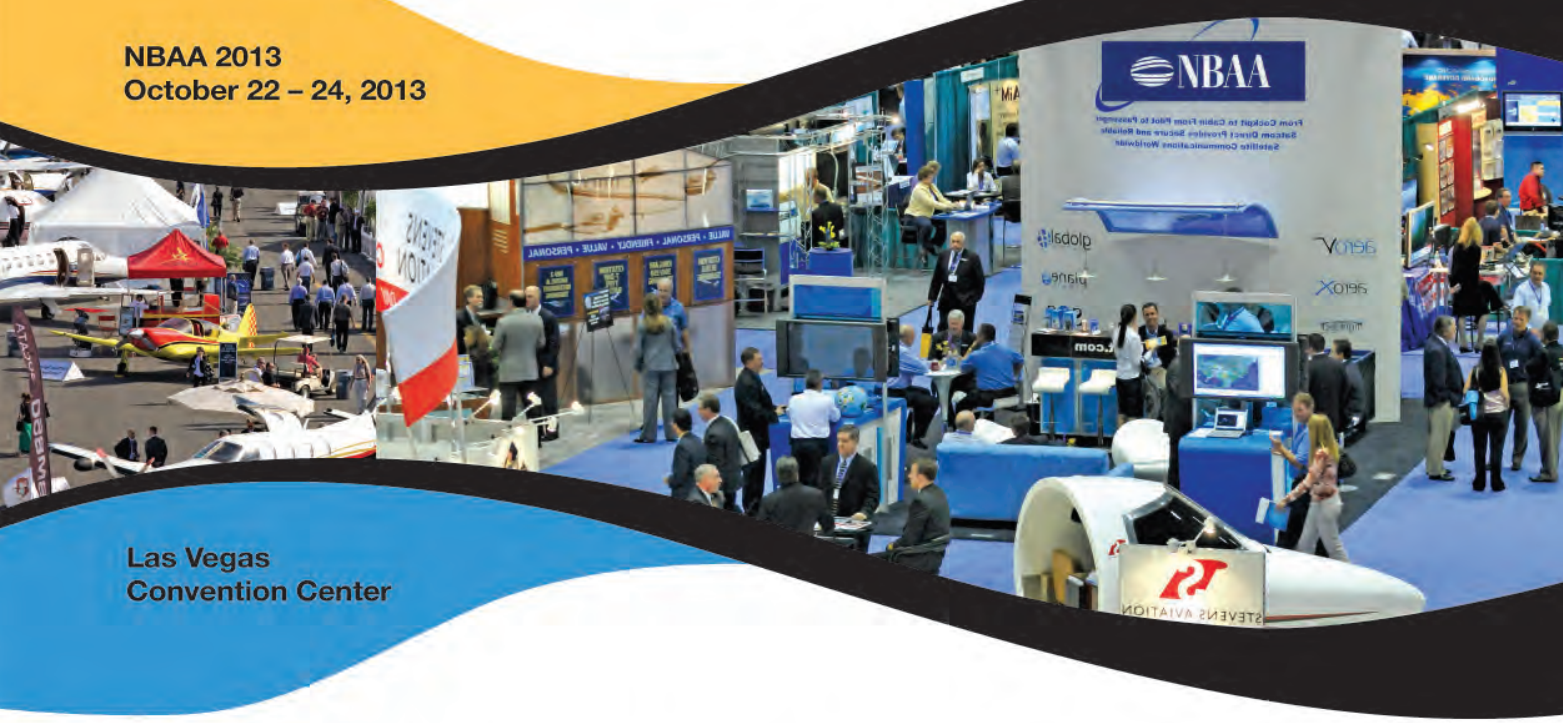

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BY SAM LONGO, AME A&P

Slide Rule Revelation

High school can be an intimidating and overwhelming experience of course selections and future directions, but with a little luck and intuition you stumble down the ideal path . . .

I am still not sure what possessed me to check off the box for Advanced Electronics on my Grade 11 electives sheet. Perhaps because my father had been a television and radio repairman or possibly because I had excelled and enjoyed two previous years of wiring mock houses in Electrical Class 1 & 2.

The mere fact that Advanced Electronics was even offered was due to a lucky break on my part. I was attending a brand new high school that opened at the start of my Grade 11 year, right in my neighbourhood. Stephen Leacock Collegiate was bristling with all manner of high-tech options, even boasting a state-of-the-art television production studio.

It was clear from Day One in Mr. Pfisterer's class that Advanced Electronics would be a challenging learning experience. Our Austrian-born teacher was a stern taskmaster expecting nothing short of excellence from each of his students. Of course, we all thought he was a bit of a crazy old codger. He was incredibly fit from a lifetime of skiing, and he often impressed us by walking on his hands around the classroom to relieve his boredom. Being a tech class, in those days, meant that there were no females in the group, which was probably a good thing, as he felt it necessary to provide sexual analogies to every theory he taught, always followed by his perceived reality that for young men of our age group, it would be the only way we would remember anything.

Besides building basic circuit boards from schematics and learning the resistor color code ("bad boys rape our young girls," etc.) we all worked hard on our theoretical and practical assignments as the weeks progressed. Our class was always slotted in the last periods of the day and there were never any early departures. In fact, he would often select a small group of volunteers to hang around after class to help him get his car started. He drove an ageing VW Karmann Ghia coupe with a high compression Porsche motor shoe-horned into the rear engine compartment. As his diligent pit crew, we would push him down the parking lot, precluding the ear shattering bump start and his subsequent flamboyant hand-waving departure.

His other pet peeve (or passion) was the intrinsic value of mastering the art of the slide rule. Of course, for those of you weaned on modern calculators (or smart-phone apps) the slide rule was the hot ticket for all manner of math calculations back in the days before lithium-ion batteries and touch screens. Our Austrian commandant drilled us mercilessly until each one of us could glean complex mathematical solutions from our wondrous sliding sticks. Unbeknownst to me it would be a valuable skill in waiting.

After high school, a year of unloading trucks for the Hudson's Bay Company gave me the necessary capital and added incentive to enrol in Centennial College's Aviation Technician program in 1974. Of the two entrance tests required, my math results were a marginal pass, resulting in a consultation with the resident math teacher. He advised that I delay my start in the program and take a semester of math upgrading for fear that I might not make it through his course. My cocky 20-year-old smart-ass response was that if he was a good teacher, I would be fine. Waiting any longer to get into the course was not an option, and because I had actually passed, albeit marginally, he had no recourse but to let me continue.

My rather cheeky comment to him about being a good teacher was based on my sordid past math history. I had either excelled or failed miserably depending, it seemed, solely on the quality of my instructors. And so the stage was set for my jubilant upcoming triumph or catastrophic defeat.

In a rather miraculous twist of fate, more than half of the aviation math program was based on the intricate secrets of the slide rule. Mr. Pfisterer would have been proud as I "slid" my way to a final mark in the high eighties while simultaneously becoming the ace slide rule mentor to many of my confused and floundering classmates.

This "Slide Rule Revelation" was an interesting lesson from my fledgling ascent into aviation maintenance and my subsequent teaching career. Learning new things and acquiring knowledge is always a good investment. That pastime is paramount to future growth in any field of endeavour. Never reject learning on the basis of the adage, "I will never use that," because the reality is, you just might. In fact, in extreme cases – as in the previous tale – it might very well make the difference between success and failure.

That old slide rule now collects dust on a shelf in my office. Its usefulness is now eclipsed by so many modern electronic devices. Still, I cannot bring myself to discard it. For sentimental reasons, it has become my talisman, denoting the discovery and delights of lifelong learning.

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

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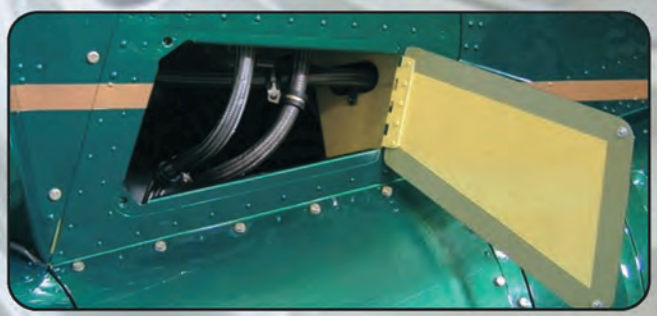

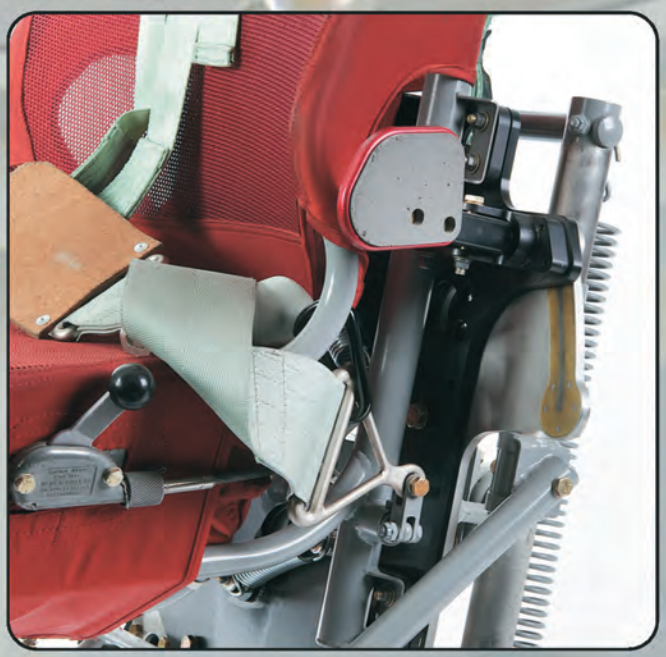

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