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Helicopter Technicians: Unsung Heroes

Okay; I am, or at least was, a fixed wing guy. The romance of aviation was exemplified when a big radial engine shuddered to life with a puff of blue smoke, and then shortly afterward rose from the water destined for a remote cove or lake. My part in it was to get my hands covered in black oil in order to keep these antiques flying.

Of course, I appreciated the technology required to get a jumbo jet to fly, never mind the superb airline safety record, but I didn't put too much thought into the helicopter. My mistake.

These are the ultimate, go-anywhere, utility vehicles. They do jobs ranging from executive transport to traffic surveillance, to drill rig transport at remote exploration sites, to fire suppression. And seldom do they make the general news. Of course, no news is good news.

I've mentioned the achievements of aviation and the unsung heroism of maintenance technicians on this page a number of times in the past, but haven't given helicopter technicians their due. When you think of the inherent instability of these aircraft and the number of lightweight, moving parts that compensate for this, it is indeed an achievement to have so few mechanical failures. Credit can go to three groups for this: the designers, the builders, and of course the maintenance crews that keep them flying.

Sometimes this maintenance work is done under less than ideal conditions, whether in a hangar in the middle of the night part way through your second shift in the past 24 hours, or out in the field with no hangar available, standing in mud or working in extreme cold or heat. We get the job done – and don't forget to put that cotter pin in place or perform a double check on wires or cables to make sure they aren't chafing. No, the helicopter technician, perhaps more than many other aviation technicians, gets the job done professionally and ensures that the next flight is uneventful. Keep up the good work.

— Ian Cook, Editor

Departments

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Features

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Upcoming Events

CANADA

Central AME Association Symposium and Trade Show
March 6 – 8, 2013
Victoria Inn, Winnipeg, MB
www.camea.ca

Western AME Association Maintenance Symposium
March 13 – 15, 2013
Coast Plaza Hotel
Calgary, AB, www.wamea.com

UNITED STATES

2013 Midwest Regional Aircraft Maintenance Symposium
February 15 – 16, 2013
Holiday Inn Conference Center
Des Moines, IA
http://www.iapama.com/symposium

Northwest Aviation Conference & Trade Show
February 23 – 24, 2013
Puyallup Fair & Events Center
Puyallup, WA
www.washingtonaviation.org

Montana Aviation Conference
February 29 – March 2, 2013
Copper King Hotel
Butte, MT
mdt.mt.gov/aviation/calendar

Heli-Expo 2013
March 4 – 7, 2013
Las Vegas Convention Center
Las Vegas, NV, www.rotor.com

56th Annual Aircraft Electronics Association International Convention & Trade Show
March 25 – 28, 2013
MGM Grand Resort & Convention Center
Las Vegas, NV, www.aea.net

Sun 'n Fun International Fly-In & Expo
April 9 – 14, 2013
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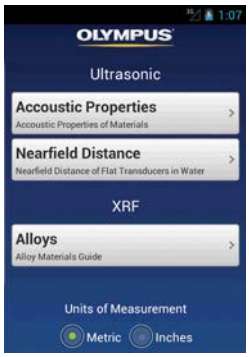

Olympus NDT is pleased to introduce the Industrial Tech Guide App for Android smart phones. Available for download on Google Play, this free Olympus mobile application contains two knowledge-based sections designed for technicians performing ultrasonic flaw detection and X-ray fluorescence (XRF) inspections. This easy-to-use app provides fast and accurate calculations for users and contains descriptions of all Olympus industrial instruments with quick links for detailed product information or to obtain a request for quotation. **For information visit** www.olympus-ims.com

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For information visit www.sunnen.com

Streamlight introduces Rechargeable Stinger® Lite Pipe

Streamlight has introduced the Stinger Lite Pipe system, an ultra-thin, rechargeable work light designed for use as a drop light or as a light source that will fit into tight spaces. The new light consists of a nine-inch-long light cone attached to the body of a Xenon Stinger flashlight and a removable, rotatable hang hook. Powered by eight C4 LEDs, it delivers 220 lumens of light in a broad, uniform flood pattern, and provides a run time of 3 hours and 15 minutes. The system measures 19.62 inches and weighs 12.3 ounces.

For more information visit www.streamlight.com

AvFab receives approval for Aft Jump Seat for Beechcraft B300 & B300c (350)

Aviation Fabricators (AvFab) has announced Indonesian approval for the installation of their STC-approved King Air aft jump seat kits in Beechcraft B300 and B300C (350) aircraft. AvFab received EASA approval for 100, 200, and 300 series King Air aft jump seat kits in April 2010. AvFab also has US and Brazil STCs. The jump seats fold down from the side wall of the aircraft in the aft baggage compartment. They are interchangeable with the OEM jump seat and can utilize the existing OEM installation hardware. If the aircraft has not been previously equipped with an installation kit, the AvFab kit can be used. **For more information visit** www.avfab.com

StandardAero receives EASA STC for King Air 200/B200 engine upgrade

StandardAero has announced that it has received European Aviation Safety Administration (EASA) Supplemental Type Certificate approval to upgrade King Air 200/200C/B200/B200C aircraft to Pratt & Whitney Canada PT6A-52 engines. This STC is fully compatible with numerous STCs, including Raisbeck Engineering modifications and Garmin G1000 avionics equipment. StandardAero's upgrade program provides operators with benefits that include increased aircraft value and increased performance, allowing for over 300 knots true airspeed in cruise.

For more information visit www.dubaiaerospace.com

Kitchener Aero STC's Garmin G-500H in Eurocopter EC-120

Kitchener Aero Avionics has announced the completion of a "Glass-Cockpit" upgrade for the Eurocopter EC-120. The heart of this mod is the Garmin G500H Flight Display system with Helicopter Synthetic Vision, an Altitude Heading Reference System and Air Data. Also STC'd were the Garmin GDL-69/69A XM Weather DataLink, an Avidyne TAS-605 Traffic Awareness System, and a Honeywell KRA-405B Radar Altimeter system. External video from a video camera or FLIR system can also be displayed. **For more information visit** www.kitcheneraero.com

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AIRWOLF STRAPS RECEIVE FAA APPROVAL

MONTREAL QC, November 19, 2012 — Airwolf Aerospace's Tension-Torsion (TT) straps for Bell 206 helicopters have received FAA approval for a 36-month/1,200-hour calendar life extension.

TT straps for the Bell 206 Jet Ranger, 206L Long Ranger and OH-58 helicopters previously had a 24-month/1,200-hour life limit. Airwolf's 36-month TT straps are a significantly better value than the OEM's straps.

Airwolf manufactures its straps under its FAA Parts Manufacturer Approval (PMA). The straps are STC'd by FAA, EASA, ANAC, and TCCA. Using its proprietary manufacturing processes, and extensive testing, Airwolf was able to prove to the FAA that its straps should have their life limit increased by 50 percent to 36 months. The result was the approval of the 50 percent life increase. For more information visit www.airwolfaerospace.com.

COMTEK ENTERS PARTNERSHIP WITH PRATT & WHITNEY

BURLINGTON ON, November 27, 2012 — Comtek Advanced Structures and Pratt & Whitney Canada have entered into a long term purchase agreement for the serial production of composite and hybrid structures for various Pratt & Whitney Engines.

Composites offer many advantages including structural weight reduction, fatigue and corrosion resistance, and lower life cycle costs for aircraft operators. Both Comtek and P&WC are committed to offering the highest quality products to their customers and will do so by providing innovative composite solutions.

"Comtek and Pratt & Whitney are synergistic companies and have worked together before," says Dennis Cicci, Business Development Manager at Comtek Advanced Structures. "We look forward to a mutually productive partnership.". For additional information visit www.comtekadvanced.com.

BOMBARDIER BOOSTS PARTS SUPPORT OVERSEAS

MONTREAL QC, December 7, 2012 — Bombardier Aerospace has continued to enhance its aftermarket offering for operators flying to Europe, the Middle East, and Africa.

Bombardier's Dubai parts depot has grown and has moved to a new facility located in the Jebel Free Zone in Dubai, United Arab Emirates. The expansion will allow for a greater inventory capacity and was successfully completed on September 30, 2012.

Bombardier has also taken further steps in bolstering its worldwide distribution network with the implementation of the Frankfurt parts hub earlier

this year. The Frankfurt facility is now able to accept customer part returns and part exchanges as well as certify parts and receive shipments direct from vendors, allowing for reduced turn time for units, and increased parts availability for customers in the region.

The Frankfurt hub implementation was launched in early 2011 to enable increased functionality and parts distribution capabilities in Frankfurt. Further execution of the project will be phased in over the next few years to optimize parts availability within the network in the region and around the world.

The newly expanded Dubai parts depot will be operated through an agreement with Transworld Aviation, a pioneering company in the supply of aircraft spare parts in the UAE that caters to both the commercial and military aviation sectors. The company offers service and support for parts distribution and supply chain solutions to customers in the Middle East, South Asia, Africa, and the Far East.

Transworld Aviation's facility is fully staffed and operational 24/7 to cater to the diversified needs of Bombardier operators. For more information visit www.bombardier.com.

FAA REVERSES MAINTENANCE DUTY TIME INTERPRETATION

ALEXANDRIA VA, December 26, 2012 — In a major victory for the aviation industry, the Federal Aviation Administration (FAA) withdrew its faulty legal interpretation of maintenance duty time limitations prescribed in Title 14 Code of Federal Regulations (14 CFR) section 121.377.

Specifically, the agency reversed course on its May 18, 2010 legal interpretation meant to clarify the application of the rest provisions and equivalency standards under the regulation. However, the FAA erroneously concluded that the rule rigidly required one day off out of every seven days.

A December 2010, complaint from the Aeronautical Repair Station Association (ARSA) prompted the agency's reevaluation.

ARSA noted that the agency's interpretation overlooked the plain language of the rule and presented an impermissible deviation from long-standing FAA construction and application. The rule clearly states the period of required rest is "24 consecutive hours during any seven consecutive days, or the equivalent thereof within any one calendar month." (Unfortunately, the FAA interpretation conditioned operation of the underlined phrase to emergency situations).

In response to ARSA's complaint, the FAA published a notice in the federal register on April 15, 2011 requesting comments on its interpretation.

On June 14, 2011, ARSA's comments reiterated its assertion that the interpretation changed the plain language of the regulation without following the Administrative Procedure Act and must therefore be rescinded.

After two years, the agency finally agreed with ARSA's position. In a December 26, 2012 response to ARSA, the FAA acknowledged its error and stated that, "The requirement for equivalency lies in the amount of rest given, not in the way the schedule itself operates or is developed."

This regrettable delay has already imposed serious consequences on the industry. Air carriers, and their maintenance providers, rewrote schedules at significant cost in order to accommodate a wrongheaded bureaucratic action.

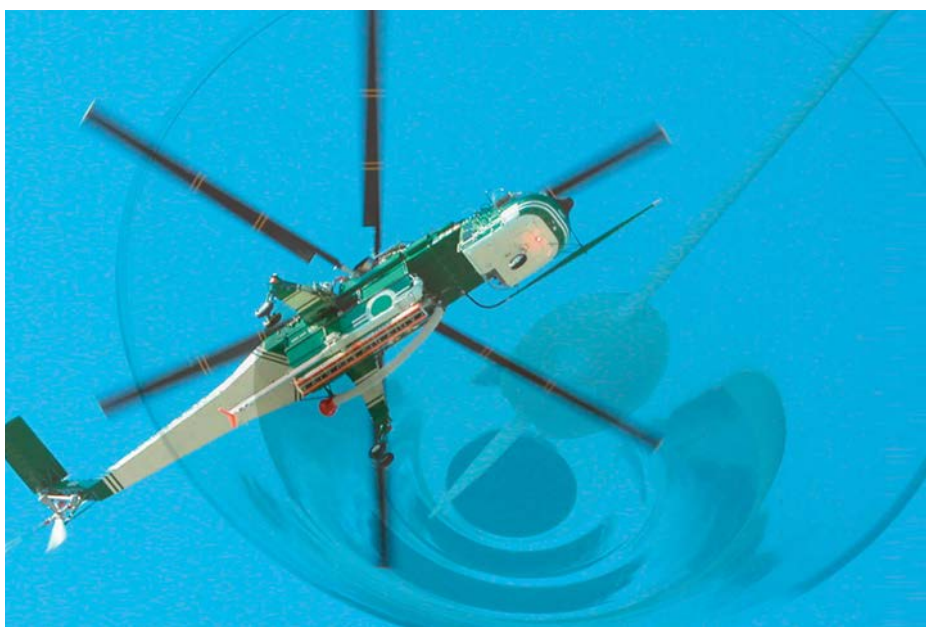
It is notable that many other groups including Airlines for America, the Transport Workers Union of America, and the Professional Aviation Maintenance Association joined ARSA's position in their comments to the regulatory docket.

This victory clearly establishes the value of actively engaging with the FAA when it strays from its regulatory perimeters.

ARSA is an Alexandria, Virginia-based trade association that represents aviation maintenance and manufacturing companies.

Founded in 1984, the association has a distinguished record of advocating for repair stations, providing regulatory compliance assistance to the industry, and representing repair stations on Capitol Hill and in the media. For information visit www.arsa.org. ■

Helicopter Cocktail Knowledge



BY MIKE BRODERICK
Helicopter Engine Repair Overhaul Services

I know that you regular students are familiar with CK, but for you newbies, CK (or Cocktail Knowledge) is that useful bit of arcane information and/or minutia, which when shared in the right situation, will give you a perfect opening to begin a conversation or to interject comments into a conversation that has reached a point of stagnation.

Stick around, because today's session is loaded with some really cool helicopter CK. Before we get started, though, you should know that the CK for today is provided by: my 40 years of hanging around helicopters and helicopter folks, some very good instructors at the OEM schools (like Bell Helicopters, Eurocopter, MD, Rolls Royce (formally Allison Engines), and Turbomeca, and finally that handy-dandy cornucopia of games and knowledge – the omniscient Internet.

So, please feel free to share this knowledge and impress your friends and family. And if you have some CK you want to share with me, you can find me at booth #N3615 during this year's Heli-Expo convention or via email at mike@herosinc.com. I am always open to expand my CK.

OK, for our first bit of CK we will discuss the pilot in command (PIC) protocol for helicopters. How come the PIC in a helicopter sits in the right seat in most helicopters? Because helicopters are designed for right-handed people – really. Read on. The reason is mostly thanks to Mr. Sikorsky, though there can also be some operational justification.

Now, we all agree that helicopters are more inherently unstable than most airplanes, right? Basically, a fixed wing airplane wants to fly, while helicopters beat the air into submission. So with this law of physics in mind, a helicopter pilot rarely likes to let go of the cyclic stick (sit tight; we will talk about the cyclic in a bit) with his or her right hand, even with trim, and particularly in hover operations, where near-continuous control inputs are required.

In a normal flight profile, with the pilot sitting in the right seat, it stands to reason that the left hand which controls the collective, is also free to play with

the radio buttons or mess with instrument knobs that are usually on a center console in a cabin with a side-by-side crew arrangement. Rotor brakes and clutches are also usually centrally located for the same reason.

OK? So how did Igor get involved? Well, when Igor Sikorsky built the world's first mass-produced helicopter, the R-4, weight and engine power were big concerns. The R-4 was intended as a trainer, but was so underpowered that Sikorsky was looking for any potential weight savings. So, Igor and his engineers decided to let the instructor and student share a single collective. The only place to put it, then, was in the middle, between the two seats. Given the coordination and strength required to manipulate an R-4 cyclic for any length of time, the student (whom it was assumed would always be right handed) always flew from the right. Therefore, the first generation of U.S. Army Air Forces, Coast Guard, and Navy pilots – along with those from Britain and its Commonwealth, who learned on the R-4 and its follow-on, the R-6 (also with a single collective) – flew exclusively from the right.

However, leave it to the Yanks to buck tradition. In 1946, with the arrival of Bell's Model 47 (the first civilian-certified helicopter), dual collectives were featured. From then on, dual collectives became standard for side-by-side seating, and a helicopter pilot could fly from either the left or right seat. See, I'll bet you never thought about that, did you? You like that?

Good, sit tight, 'cause here is CK #2. Did you know that the turbine engine is a 4-cycle engine like its cousin, the 4-cycle piston engine? Yup, it's true. Look at these illustrations:

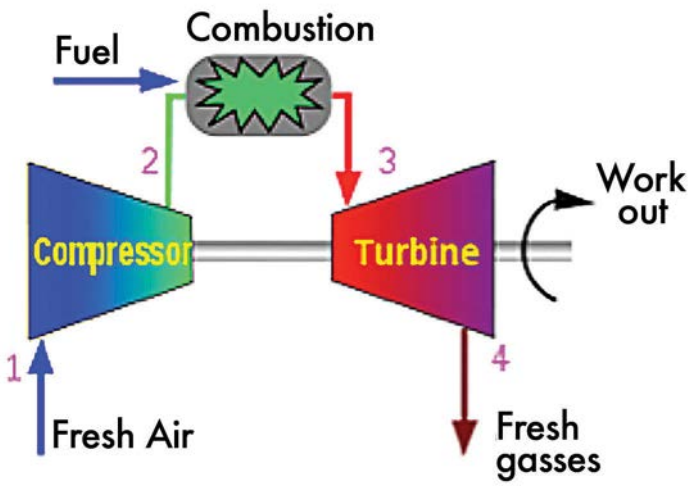


Figure 1: Turbine Engine

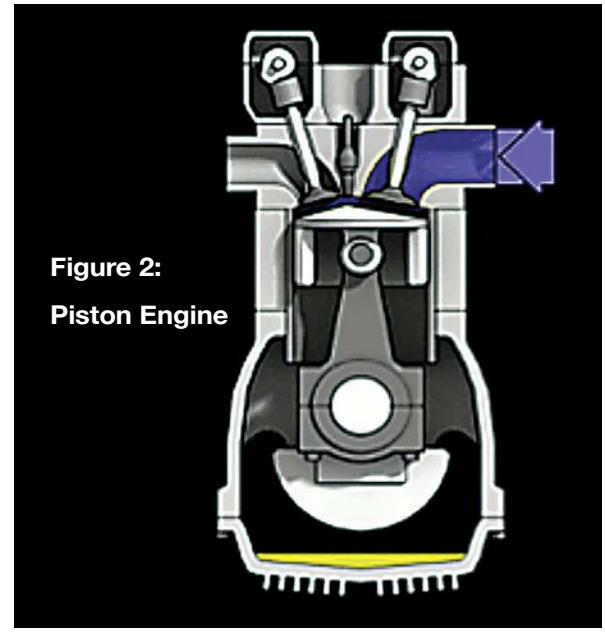


Figure 2: Piston Engine

(see Figures 1 and 2 above): intake (suck), compression (squeeze), combustion/power (bang), exhaust (blow). In the turbine engine, they call this process the Brayton or open cycle because each of these events takes place in a specifically designed section of the engine. And in the piston engine it is called the Otto or closed cycle because all of the action takes place in one spot, the cylinder affecting the movement of the piston.

OK, so you might have known this, but I'll bet you didn't know that George Brayton, an American engineer in 1872, is the guy responsible for identifying this activity in the turbine engine, and that Nickolaus Otto, a German traveling salesman in 1876 (go figure), is responsible for identifying this same action in the piston engine.

Now, interjecting that piece of interesting CK ought to spark enough energy into the even the most troublesome conversational doldrums.

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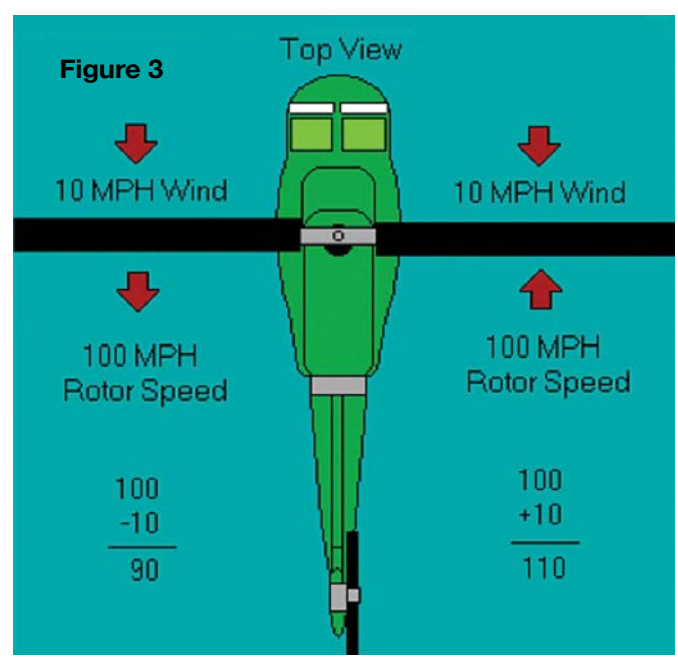
GOOD TO GO.

This next bit o' CK is something you have thought about but couldn't quite explain away. If you hover any distance above the Earth in a helicopter for a day or so, why aren't you and the helicopter occupants on the other side of the world if the Earth is going through its normal rotation? Hmm. Good question, right? OK, well here is the answer: When you hover in a helicopter you are hovering in the air that is moving along with the Earth; thus the Earth doesn't move under you. In other words, the Earth and the air above it are moving around and around on the Earth's axis together. I see some doubters out there, but it is true. Let's think about this for a second. What would it be like if the air did not circle the Earth with us. Let's consider what would happen if the air didn't move with the Earth. Now, get ready for some math.

The Earth's circumference is 24,901.55 miles (40,075.16 kilometers) at the Equator. The Earth travels this distance in one day, so that's 40 million meters divided by 24 hours, giving us about one and a half million meters per hour, or to you US students, about a thousand miles per hour. If the air in our atmosphere was not moving with the Earth, it would be blowing across the Earth's surface at 1,000 miles per hour. Tough to stand upright, let alone hover a helicopter. Still not sure? Let's say you are in a car, and your child is in the back seat, tossing a ball up and catching it. How come the ball doesn't end up in the front seat with you? Because the air (aka atmosphere) in the car and the car are moving together.

OK, we are on a roll. What next? How 'bout the term "dis-symmetry of lift". This is a sure-fire conversation starter. Dis-symmetry of lift means the lift of the rotating blades is not symmetrical or equal. You see, when the rotor system is experiencing the airflow conditions all around the perimeter of the rotors' arc, all things are equal, and the system is in balance. Once the system experiences a differential in wind speed from any angle, it becomes unbalanced, and begins to oscillate while in rotation. Take, for instance, forward flight. Imagine a two-bladed rotor system spinning at 100 mph (see Figure 3).



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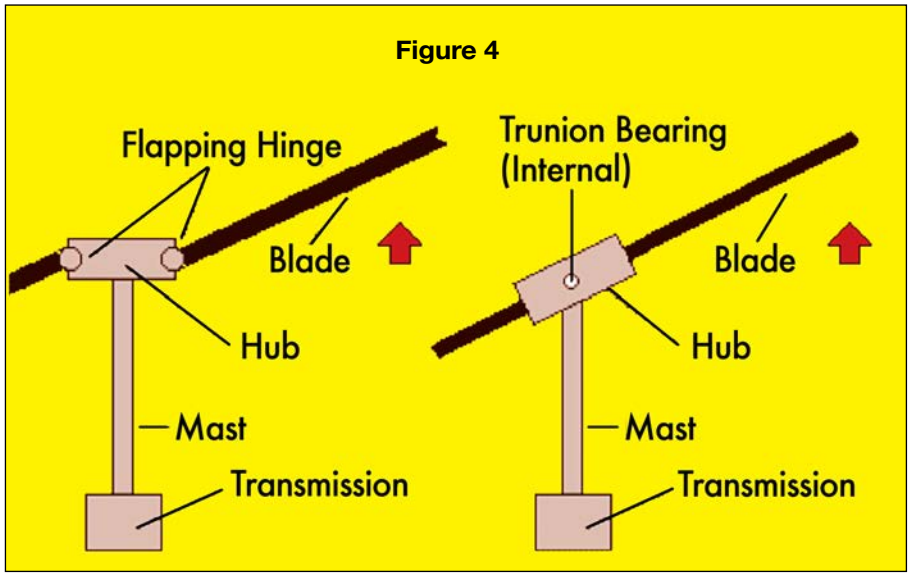


The blade moving toward the forward end of the aircraft is going 100 mph forward, and the blade moving toward the back of the aircraft is traveling at 100 mph in the other direction. This is just fine when the aircraft is not moving and there is in a no differential wind across the rotating disc. It is experiencing 100 mph of wind in all directions. The wind force across disc is in balance and the rotor is totally symmetrical in rotation. Once the aircraft moves forward though, it begins to change this balance. If we travel 10 mph forward, then the forward moving or advancing rotor blade is experiencing 110 mph of wind speed, and the rearward, or retreating blade, is experiencing only 90 mph of wind speed.

When this happens, we get an unbalanced condition, with the advancing blade experiencing more lift wanting to climb while the retreating blade experiences less lift and wants to drop. This is where we get the term dis-symmetry of lift. The lift is not symmetrical around the entire rotor system.

How do we counteract this situation? We compensate by allowing the rotor to flap. By allowing the advancing blade to flap upward and the retreating blade to flap downward, it changes the angle of incidence on both rotor blades, which balances out the entire rotor system. As you can see in Figure 4 at left, there are a few ways to allow for blade flapping. One is to allow the blades to flap on hinges (articulated rotor system). Another way is to have the whole hub swing up and down around an internal bearing called a trunion (semi-rigid rotor system).

However, (you know there is always a however with helicopters), we cannot compensate completely for dis-symmetry of lift by using blade flapping. Once the aircraft gets to a certain airspeed, and the rotor has flapped as much as it is gonna flap, we now get to experience another cute trick exclusive to helicopters called retreating blade stall.

Retreating blade stall is when the retreating blade can no longer compensate for dis-symmetry of lift, which causes the outer portions of the blade to stall. This situation, if not immediately recognized, can cause a severe loss of aircraft controllability and thus could cause you to descend with the aerodynamics of a painted rock. Not a good thing for sure. The retreating blade stall phenomenon is a major airspeed limiting factor for helicopters. For many years, aeronautical engineers have tried to figure ways to eliminate this problem and increase the forward airspeed for single rotor helicopters.

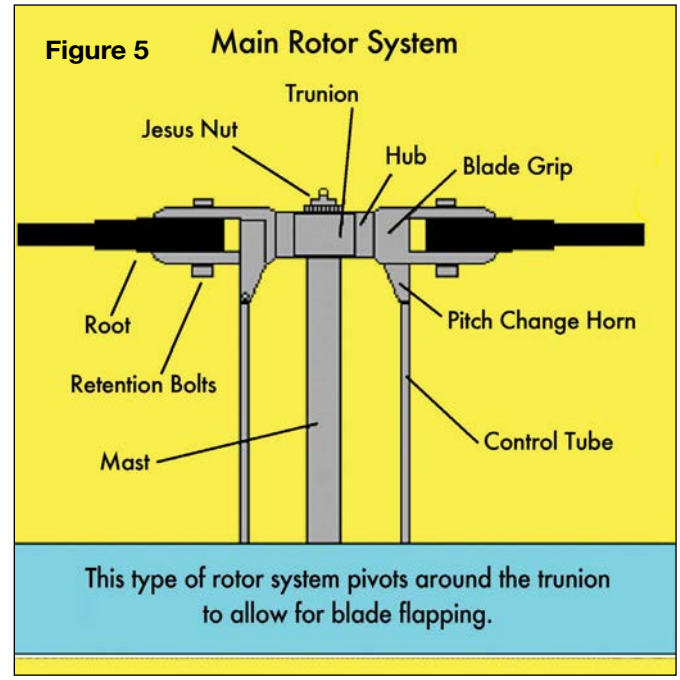
Although ingenuity and technology have provided some cool advances in blade design, the manufacturers of single rotor helicopters have not been too eager to change the entire design on their products because of the extra costs involved for what has proven to be minimal airspeed for the investment. Most have resigned themselves to slower

airspeeds for their aircraft, at a lower cost and less maintenance. Trust me, the operators like the idea of lower costs.

Well, I believe you have the beginnings of a great inventory of valuable CK for those awkward conversational moments. So whad'ya say: let's finish our helicopter CK with a review of some helicopter terminology. And how 'bout we start with the **main rotor system.**

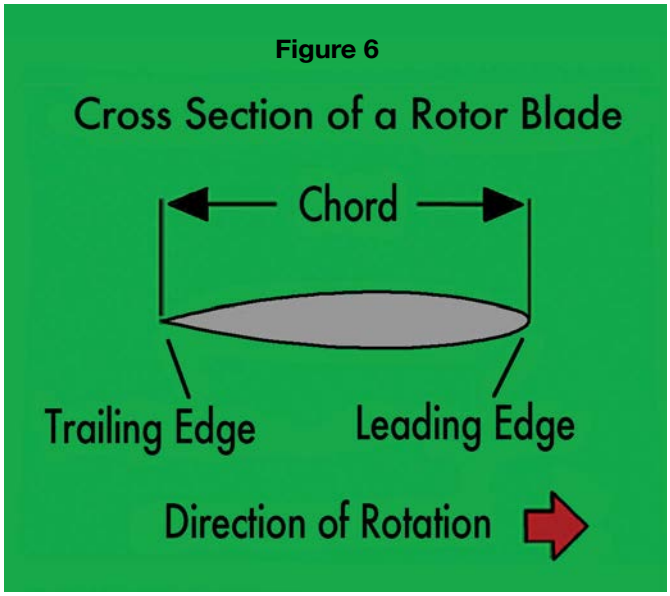
Main Rotor System (Figure 5)

- Root: The inner end of the blade where the rotors connect to the blade grips.
- Blade Grips: Large attaching points where the rotor blade connects to the hub.
- Hub: Sits on top of the mast, and connects the rotor blades to the control tubes.
- Mast: Rotating shaft driven by the main rotor transmission. The mast connects the rotor blades to the helicopter.
- Control Tubes: Push/pull tubes that change the pitch of the rotor blades.
- Pitch Change Horn: The armature that converts control tube movement to blade pitch.
- Pitch: Increased or decreased angle of the rotor blades to raise, lower, or change the direction of the rotor's thrust force.
- "Jesus" Nut (Main Rotor Retaining Nut): The singular nut that holds the hub onto the mast. Why is it called the Jesus Nut? Because if it fails, the next person you see will be Jesus.



Main Rotor Blade (Figure 6, next page)

- Leading Edge: The forward facing edge of the rotor blade.
- Trailing Edge: The back facing edge of the rotor blade.
- Chord: The distance from the leading edge to the trailing edge of the rotor blade.



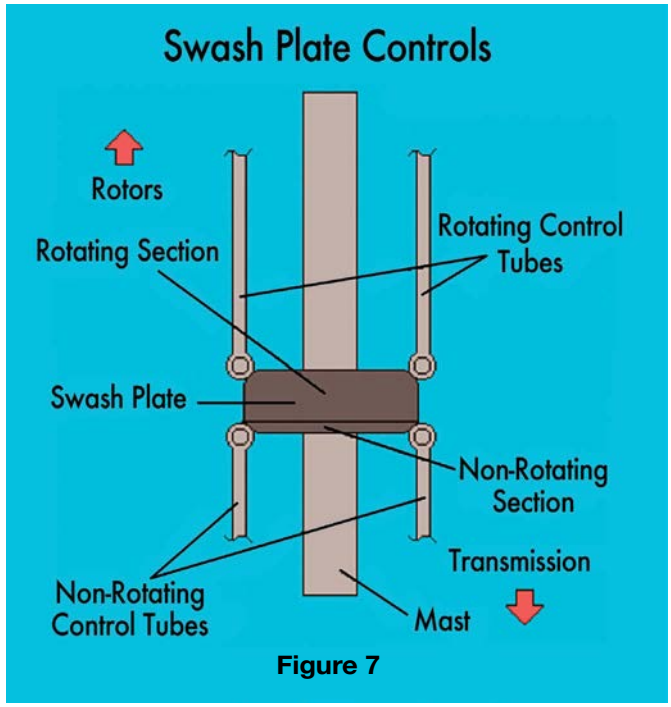


Figure 7

Controls (Figure 7)

• Swash Plate: Turns non-rotating control movements from the pilot into rotating control movements.
• Collective: The up and down control. It puts a collective control input into the rotor system, meaning that it puts either "all up", or "all down" control inputs in at one time through the swash plate. It is operated by the stick on the left side of both the pilot's and co-pilot's seat.
• Cyclic: The left and right, forward and aft control. It puts in one control input into the rotor system at a time through the swash plate. And as we have already learned that the cyclic stick sits between the pilot's legs, it is operated by the pilot's right hand. (I know it's a plot against us "lefties").
• Pedals: On helicopters we don't call them rudder pedals, although they are in the same place as rudder pedals on an airplane. A single rotor helicopter has no rudder. It has instead, an anti-torque rotor (also known as a tail rotor), which is responsible for counteracting the rotational forces of the main rotor. Pitch movement of the tail rotor blades is responsible for directional control at a hover and aircraft trim in forward flight. The pedals are operated by the pilots feet, just like airplane rudder pedals are. FYI: tandem rotor helicopters also have these pedals, but they operate both main rotor systems for directional control at a hover.

And with that, boys and girls, this class session on **Helicopter Cocktail Knowledge** is complete. Thanks for spending some time with me. Now your homework assignment is to go find someone to share all these now-known-to-you, arcane facts about the wonderful world of Helicopters.

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.* ■

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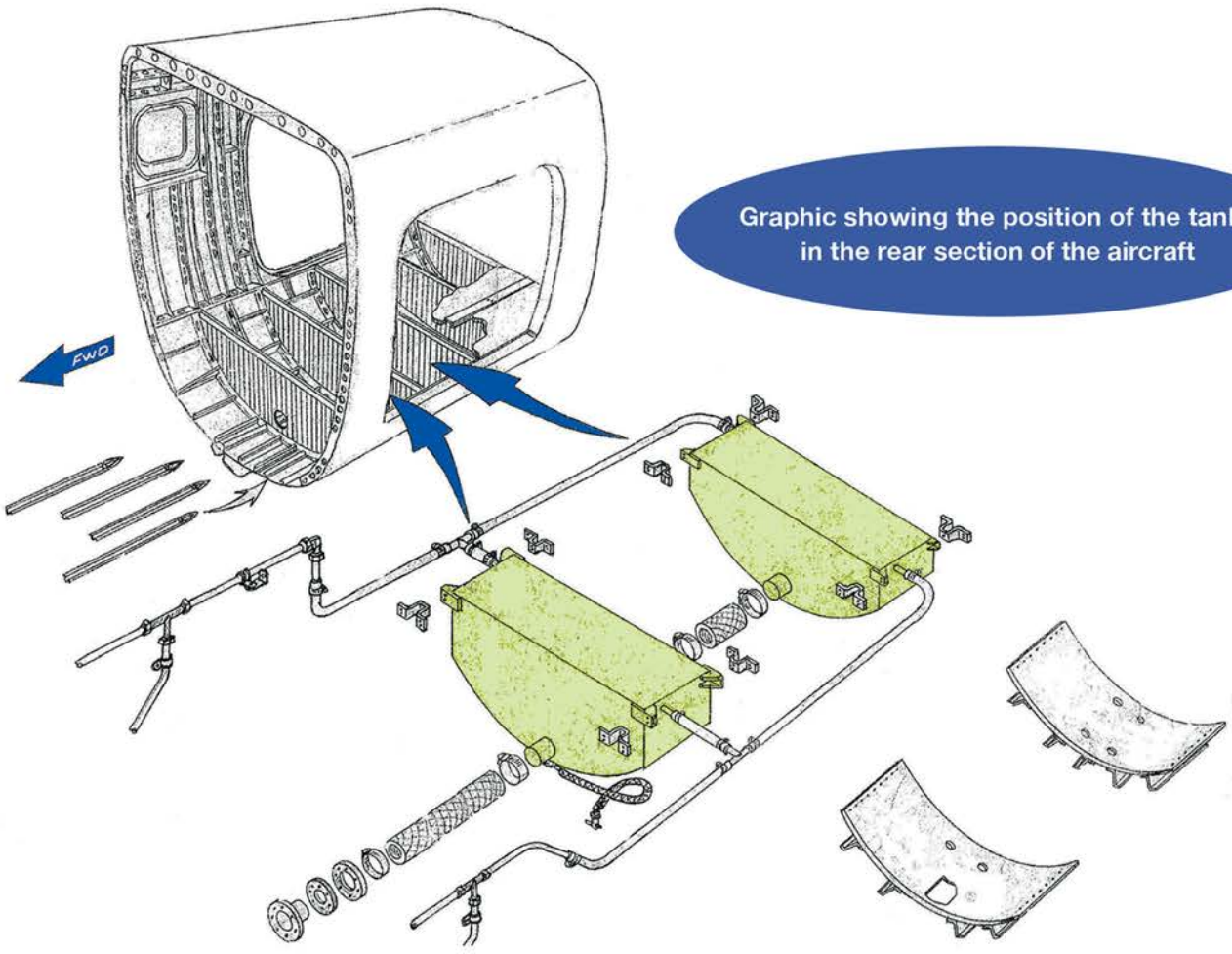

Graphic showing the position of the tanks in the rear section of the aircraft

For more information please contact:

Dave Breton, dave@thunderbayaviation.com

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Western AME Association

WAMEA Presidents Message

Well, I guess that everyone reading this update survived the holiday season and 12/22/2012 (the end of the world). It is my opinion that 2013 and 2014 are going to be exceptional years for the aviation industry in general. We have been collecting and stockpiling aviation statistics and information for the last 30-plus years. Now it's time to correlate this information and make positive changes. As professionals we now know what works and what does not.

With the budget cuts to TCCA we are seeing some of the policing of the 705 airline operators left to internal auditing procedures. Although for many this has been a slow and painful transition, the successful air carriers are the ones that saw the implementation of safety systems and quality assurance programs becoming mandatory, and have had these policies in place for a number of years.

It will be quite a number of years yet until this cascades down to the 702, 703, and 704 carriers. This, in my opinion is partially because TCCA's staff instruction SI/SUR001 does not allow for scalability. The scoring tables make it virtually impossible to be compliant in every aspect, one hundred percent of the time.

WAMEA Symposium 2013 is well underway and is coming together very nicely. The directors would like to thank Charles Millie and his team for what is shaping up to be another successful venue. All members should have received their Update 2013 brochure card in the mail. For those who didn't, it may be because you've moved or haven't updated your profile on our database. This can be done now on our new Western AME association website at www.wamea.com in a few seconds.

I would urge all members to visit our new website and tell us what you think, as it was structured to be user friendly and an avenue for most of your aviation maintenance needs. There will be more links added as we get feedback from you. This would be a good time to also invite you to visit the new CFAMEA web page.

There have been some rumors voiced about possible changes to the AME license back to a straight M license. This is not true and unless there is a request from the industry the current system is working and is not on the CFAMEA agenda for change. Another rumor is the "AME in training" issue being recognized in every province as a journeyperson profession (a student enrolled in a provincial recognized apprenticable trade). As vice-president of CFAMEA and president of the Western AME association, I feel that this step is necessary to attract new students to enroll in aircraft and aerospace training schools. At present, an AME in training is not recognized as a profession, and students are not eligible for provincial training grants, tool allowance, or tax credits. This avenue is in the works in Manitoba, with Brian Dean spearheading the project. Brian has, to the best of my knowledge, met with all the stakeholders in Manitoba, and it looks like TCCA is on board also. If successful other provinces will follow.

At our CFAMEA meeting in Toronto, it was put on the agenda nationally as a "go" project with the regional presidents to get feedback from their members. So far, most feedback has been positive, and we will be adding a discussion forum on this topic at the Airworthiness Symposium and Trade Show in Calgary, March 13th – 15th, 2013.

Another hot topic is the government's commitment to reducing "red tape", which includes looking into getting rid of outdated regulations. If you DOMs, PRMs, and QA people out there have an air regulation that irritates you, or can think of a better rewrite, I urge you to contact your regional AME association to get the "irritant identification template" to send to Mr. Steven Fletcher, P.C. M.P., who has been asked to spearhead the collection and implementation of your requests.

All in all, it is shaping up to be a busy next couple of years, with positive changes on the horizon to those who can think outside the box. From all the directors of WAMEA, all the best in the new year. We also look forward to trying to get more involvement from the AME training schools and their students as well as recruit new members.

Create a safe day,
Rod Fisher
President, WAMEA

ONTARIO AME

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

NW Area Workshop

Another successful AME workshop was held in Thunder Bay on November 15th and 16th. Our association president, Warren Couch, was in attendance promoting the association and informing attendees of our recent activities. He advised the board that the workshop was very good and he was pleased to meet many of our members and the students from the area.

Privacy Policy

At the board meeting in November, the association's directors adopted a privacy policy. Although it is not mandatory, the Personal Information Privacy and Electronics Document Act (PIPEDA) that came into force on January 1, 2004 recommends that federally incorporated non-profit organizations adopt a policy to protect their members. This policy deals with personal information collected by the AME Association of Ontario. The association will be expected to periodically update this policy as required. The accountable executive is the association president. The association is committed to protect the privacy of its members, individuals, and other organizations, both public and private. The association is accountable for all personal information under its control. Currently, our association collects personal information for the purposes of: administering association membership and providing member services, registering for association events, purchasing various association products/services, and complimentary magazine subscriptions. We will not use personal information for any purpose other than what was identified at, or before, the time of collection. We will not sell or provide personal information to third parties, except for transferring information to service-providers in order to provide member services. When we do provide such personal information, we require the service-provider to respect the privacy policy and we restrict them from using or disclosing the personal information for any purpose other than the assigned provision of services. A sample non-disclosure agreement is part of the policy. A current copy of the policy may be obtained from the association office or by visiting the association website at www.ame-ont.com.

Association Website

We are pleased to state that our website development team at Bravatech are in the final stages with respect to a new and improved website. Among other things, it will have the capability for a blog, allowing members to communicate via this forum with each other or with board members, a corporate members job postings area that allows members to scan for employment opportunities, and a members' area for posting résumés that employers are able to see. Other enhancements are in the works as well. Stay tuned for the roll-out in early 2013.

Sincerely,
Board of Directors
www.ame-ont.com

ATLANTIC AME

Atlantic AME Association

President's Notes by Ben McCarty

Jacques Richard has started his campaign for ARAMS 2013. As you know, our 2013 conference will be held in Moncton this year on April 17th – 19th at the Delta Beausejour Hotel. You will notice that the traditional "conference" wording will be changed to "symposium". We have always encouraged Transport Canada's participation at our annual event, and it appears TC is more receptive to participation at the "symposium" level.

AME Association Executive Meeting

The Fall 2012 Executive Meeting was held in Moncton, NB, on August 19, 2012. We missed Mel Crewe and Jason Crowell who were unable to attend.

Membership

The membership has increased in all categories, with 97 AME members, 14 technicians, eight apprentices, and 11 corporate members.

Financial Report

Anneke Urquhart presented the financial statement at the 2012 ARAMC Budget Report at our fall Board of Directors meeting. The 2012 budget showed a projected balance of approximately $14,000. This is better than usual, and is attributed to the very successful 2012 conference in Halifax.

ARAMS 2013

Jacques Richard presented his budget for the 2013 symposium in the amount of $44,000. To maintain the very high quality of our event,

the price structure has been changed using a two-tiered registration system with an early registration fee and an increased registration fee during the last 30 days before the conference.

It has always been our objective to provide a very high quality conference to our members, and in order to sustain this superior level of symposium and training, some fees have increased moderately in order to maintain the goal of a good return to the members.

HPIAM Training

We expect to present a 2013 HPIAM course on Wednesday, April 17th at the Delta Beausejour. This will be contingent on having a minimum of 16 students. The 2012 course was a huge success, with 21 students. Fees are the same as 2012. Students who attended this new HPIAM course in Gander and Halifax found it excellent, and we have had very positive feedback.

2013 AGM

The 2013 AGM will be held on the first day of the conference, immediately following the opening. Previously, the meeting was held in the late afternoon of the first day. Hopefully, the time change will provide for better participation by the members.

The annual memberships are valid until December 31st each year. Persons voting at the AGM must be in good standing and have paid their dues for the current year. Having said this, I encourage members to renew early from this mail-out or from the form on the website in order to fully participate at the AGM on April 17th.

Single M License

The Atlantic Region position on maintaining the status quo of the M1 and M2 license was presented at the 2012 CFAMEA AGM and was supported by the other directors. The single M license issue will not be pursued any further.

Golf Tournament

The 18th Annual AME Atlantic Golf Tournament was played at the Magnetic Hill Golf Club in Moncton on August 20, 2012. The winning team was Lorne and Floyd Amos. Second place was Jason Crowell and Alan Chaulk. Christian Doucet had the honour of the closest to the pin, while the men's longest drive winner was Jason Crowell. The ladies longest drive was Anneke Urquhart.

The 2013 19th Annual Tournament will be held at Granite Springs Golf Club in Halifax on Monday, August 29th.

Pacific AME Association

The 2013 Symposium that Wasn't to Be

To arrange a trade show of any kind takes a lot of dedicated experienced volunteers. There are many meetings, countless hours of contacting potential exhibitors, advertising for delegates, and just walking from hangar to hangar putting up posters and leaving registration forms. During this process, some people sign up right away and some people delay their application for various reasons. But at the end of the day, if we do not have enough registrations – either exhibitors or delegates – we have to make a business decision and see whether we should move ahead.

The fact is the numbers were not there; if we proceeded and there were no more registrations and not enough money in the pot, we could face financial ruin. And the numbers were not there after visiting the hotel and explaining the circumstances; and looking at the options, the decision was made to cancel or defer to the next year. The options included delaying another month or two weeks, hoping to get more people, but we were then competing with other conferences of the same type, and space was not available.

The hotel managers went back to the drawing board and looked at the contract. They came back with a very generous offer that would cut our losses and would allow us to hold the symposium in their hotel in 2014. The hotel also offered a room to hold a one-day training session for practically no cost. Also, Reneé from System Safety Services gave us an exceptionally good rate to provide that training. We are extremely grateful for that offer, Reneé.

This is your association and your career; this is your chance to make it happen for the future of aircraft maintenance in Western Canada.

— Bob Rorison
President, PAMEA

Social Report

First, a bit of good news: We welcome three new members: Ray Young, John Wenkoff and Rick Suh. Then the bad news: Brian Semple has resigned as director. Living up the valley makes for a major commitment to drive to YVR for meetings. We sincerely thank Brian for his effort.

Peter Sleeman, our treasurer for the past few years, has announced that he will be retiring at the next AGM. We will certainly miss Peter and thank him for his contributions.

From the Acting Editor, Gordon Dupont: The Changing of the Guard

This is my last newsletter, and a new editor will be taking my place. Marc Belanger has stepped up to replace your acting editor. I am sure Marc will do an excellent job.

PAMEA is at a crossroads, and the next AGM will likely determine the future of our organization. Has it outlived its usefulness? Has apathy reached a point where no one cares what the future will bring? Or are we just too busy to belong and contribute to our professional organization?

Red Seal

Due to the fact that Canada has enacted a new not-for-profit act covering federal registered corporations, we have until October 14, 2014 to transition our corporation to comply with the new act. We now have the opportunity to review and change our by-laws to comply with this new act. There are default rules to which we must comply and address in our by-laws.

The following must be addressed:

1. Borrowing powers of the directors on behalf of the members
2. Annual financial statement must be sent to members 21 days before the annual general meeting
3. Membership called special meeting must be called by 5 percent of active members
4. Electronic participation at meetings can be permitted as long as all participants can communicate adequately with each other
5. Manner of voting: secret ballot, show of hands and electronic participation
6. Permit the use of electronic documents

Other suggested by-law amendments:

1. Where funds will be dispersed in the event of PAMEA dissolving
2. New membership category: any student who is attending a TC-recognized maintenance training school in the Pacific region
3. Any director to step down for one year after serving two terms
4. Removal of a director after not participating in three consecutive board meetings without a valid excuse

If there are other amendments that members would like to see addressed, please add to the list by contacting me at rjhills@citytel.net — Dick Hills, Bylaw Director

What is Red Seal?

Just what is Red Seal and what has it got to do with an AME? If you are an AME, probably very little, but if you are looking to become an AME, it can mean a lot, as it enables you to have your tuition paid for as well as collect EI while attending the training, AND you can deduct the cost of your tools from your income tax. There may also be some benefits for an AMO. Stay tuned to find out more.

Central Ohio PAMA

Meetings and Events

January 8th meeting featured Deicing Training

Our January meeting was held in Lane Aviation's Media Room, and featured a presentation on Aircraft Deicing by Mr. Walter Randa, president of Leading Edge Deicing Specialists, a provider of on-site training. The presentation included slides and video segments that discussed ice-related accidents, types of deicing and anti-icing fluids, safety issues, and application procedures. Walter was in town to conduct two days of training at the Lane Aviation facility for corporate operators and line service personnel.

These training sessions are normally four- and eight-hour courses that may include actual application of fluids to inflatable aircraft, preventing possible damage to a real aircraft during a training scenario. We'd like to thank Walter for his willingness to give us an overview of his training program and Limited Brands for bringing him in to conduct their training.

Information about Leading Edge may be found at their website which includes updates on their future training opportunities and the addition of on-line training coming later this year.

The evening ended with the drawing of a 50/50 raffle won by Dennis Curtin. We want to thank him for donating his portion of the proceeds back to the COPAMA Scholarship Fund.

In case of inclement weather, the board will decide on canceling a meeting and will send out email notifications to those in our address book if it is cancelled. This information will also appear on the website where you may always check for meeting status.

2013 Summer Tuition Fund Established

When all the State of Ohio colleges and universities changed from quarters to semesters, some AMT students at Columbus State Community College were left without means of funding for their 2013 summer classes. We've received several requests for tuition grants to help them through this financial dilemma.

With all the financial and tax unknowns that loom at this time over Washington DC, we have decided to create a special fund to help them as much as we can. You may make donations by check, payable to "COPAMA" with Summer Tuition Fund entered in the memo line. Send checks to COPAMA, PO Box 340494, Columbus, Ohio, 43234.

We have also set up a PayPal donation button on our website, so you may contribute whatever amount you wish to give. This may be used by individuals and corporate sponsors. Corporations who give a donation of $100 or more will be added to our Corporate Sponsor page with a link to their website.

Thank you for your contributions to this worthy cause; the full amount of your donations may be tax deductible. Please consult your tax advisor when filling out your 2013 tax return.

COPAMA Board Meets to Elect Officers, Discuss 2013 Schedule

The Board met December 4th at Nationwide to conduct an election of officers and plan the future of COPAMA in 2013. Officers will remain the same, with Gene Sprang – President, Joe Lippert – Vice-President,

Earl Redmond – Treasurer, and Paul Tursic – Secretary. We wish to thank Joe Lippert and Nationwide for the use of their facility for this meeting.

Board members shared concerns over the looming "Fiscal Cliff" and how any resolution would impact our vendors' and sponsors' abilities to support us in 2013. The Ohio Aviation Maintenance Symposium, Central Ohio Aviation Golf Outing and 2013 Holiday Dinner will continue as in the past. The six regular meetings are most vulnerable and several thoughts were exchanged on how to keep them viable with a questionable economic future.

The monthly meetings are reliant on the number of attendees we have and sponsors or presenters that we can schedule to fill out next year's calendar. The struggle will be to continue to have programs that may be used for credit toward the IA renewal and/or the FAA AMT Awards program. Mark Harden, our FAASTeam Program manager, will be supporting us, but we are still searching for vendors with presentations of aviation content to round out the 2013 schedule.

The board discussed dropping the sponsorship fee for regular meetings, use more FAASTeam programs, have presentations that are informative regarding subjects related to aviation but which are not approved for training credit, and reducing the number of regular meetings as a last resort. The options will be presented at one of the first regular meeting dates in 2013, so those who attend may offer suggestions and have a say on which course we take.

While we consider COPAMA as one of the stronger chapters of PAMA National, we also realize that we have more to lose, should the economy continue on its current path or take a turn for the worse. We ask for continued support and feedback from our membership, vendors, and aviation friends.

Please contact us at mail@copama.org with your thoughts, suggestions and input. Together we can endure and continue our programs to promote education and knowledge of aviation maintenance here in Central Ohio.

PAMA Hartford-Springfield

Thank you to all those who attended of the December Chapter Meeting at the Skyline Restaurant in Windsor Locks, CT. This meeting was graciously sponsored by the good people at API Worldwide.

Paul West, the Director of Sales for API Worldwide led us all through an in-depth overview of API's vast capability as aviation's industry leader in providing parts, innovative distribution, and supply chain management solutions – from direct shipping of anything from lubrication to a whole engine, providing on site NDT, to rebuilding landing gear assemblies. Mr. West made note of API's growth since its start in 1988, now employing 143 persons (113 in the U.S. alone).

Aside from a delicious dinner and a very informative presentation from Mr. West, raffle winners in attendance were also treated to a few early holiday gifts courtesy of API, such as a very nice miniature desk toolbox and gift cards to a local retailer. I, myself, must say that I was very impressed by the wide spectrum of services and products API offers and am very pleased to have had Mr. Paul West take time to come speak for us all.

Notice to All AMTs with an Inspection Authorization From the FAA Safety Team, Notice Number: NOTC4467

Recently, the FAASTeam Inspection Authorization Refresher Course Coordinator (IA RCC) was made aware that a course that had been previously accepted for use as an IA Refresher Training Course was still being taught as an "Accepted" course, almost two years after it had expired.

The course provider's name is AVTRAK, and they are no longer in business. The course title and number are as follows:

Title: AVTrak Regional Training Seminar, Maintenance and Compliance Tracking System; Course Number: C/Industry/MI/08/05/01/001/01 or C/Industry/MI/08/07/18/001/01; Expiration Date: 9/30/2010.

If you completed this AVTRAK training course after September 30, 2010, please note that it cannot be used to renew your IA in March 2013. You will need to complete other manufacturer or FAA IA accepted courses prior to March 31, 2013. If you have any questions, please contact Dr. Paul M. Foster, IA RCC, at 310-725-6633.

Reminder about Paper Mechanic Certificates

From the FAA Safety Team, Notice Number: NOTC4449
A&P Certificate Replacement

If you have already replaced your paper A&P certificate, then this message is not for you. On the other hand, if your A&P certificate is still printed on paper, please read carefully. The FAA is under a mandate to replace all paper certificates with plastic certificates. If you do not replace your paper certificate on or before March 31, 2013, you will no longer be able to exercise your privileges!

All certificated airmen, including mechanics, repairmen, pilots, etc., are required to replace their paper copy with a plastic copy or they will no longer be able to exercise the privileges of that certificate. The best way to get a replacement certificate is to follow the instructions at: http://www.faa.gov/licenses_certificates/airmen_certification/certificate_replacement/

The replacement cost is $2, unless you still have your Social Security Number on your certificate and you ask to have it removed. Avoid the rush. Apply today.

Acronyms AND Initialisms

BY NORM CHALMERS
Pacific Airworthiness Consulting

Occasionally, I discuss the lack of interest that Aircraft Maintenance Engineers (AME) have outside their own little world of work. This general lack of interest has led to the cancellation of the Pacific AME Association 2013 Symposium and has the potential of leading to the demise of the association. This may be a telltale of the future for other professional aviation maintenance associations, many of which are experiencing dwindling memberships.

"AMU" is an initialism. You will see, in each column, I clarify what each initialism and acronym means before I go on. This is because some readers are new to AMU and some others may be new to aviation.

In each issue of this column I depend on the readers' background knowledge. Some readers do not have the familiarity with my topics necessary to totally understand what I have written. Here I will try to clarify some of the basics before I get involved in the topic at hand. My problem is that I can't repeat all of this background information in every issue. I depend on you to either have read my previous columns or go to helpful back issues that I will refer to regularly when applicable. In each article I tackle specific issues but also provide some basic regulatory interpretations. If you find that there are gaps, errors or contradictions in this column, please contact me here at Air Maintenance Update (AMU) Magazine. At the same time, I encourage you to discuss my column with your co-workers to improve everybody's understanding of the subjects and pool your knowledge.

Most of us have used the acronym "CARs" to refer to a variety of Transport Canada (TC) aviation requirements. These range from the Aeronautics Act down through the Aviation Regulations and Standards to various advisory documents that TC produces. That usage is technically wrong. For the purposes of this column, I use "CAR" to signify the regulatory sub-part, which is the actual regulation. I use "standard" for the tag-along requirement that the CAR often refers to. On TC's website you will see that some of these documents are termed "Chapter" such as Chapter 566. That is an enduring name that refers to the chapters of the Airworthiness Manual that was first conceived in the 1980s. As you see on that website, the standards and chapters are all listed under the heading "standards", and that's what I call them.

Within the 500 series, I specify "CAR" and "Standard" because they share the same numbering system. I state CAR 571 and Standard 571. In the other series I often just use the number because the numbering system differentiates between them. The Standard for "CAR 706" is "Standard 726".

With that all clear, we move on to my rant. *This month I look to the Vancouver Island community of Courtney for inspiration. I thank David Nilson, the cogitative and inventive proprietor of International Aeroproducts Inc., for his perceptive analysis. David has verbally elucidated some commonly held opinions regarding the directions taken by TC in the last couple of decades.* **Below we reproduce David's letter in italics with my comments inserted in plain text.**

"Bureaucracies contain two types of people, according to author Jerry Pournelle, who penned the "Iron Law of Bureaucracy". To summarize: Organizations have two groups of people within them. Group One is devoted to the goals of an organization and Group Two is devoted to the organization, while the organization is always controlled by Group Two. Applying this Iron Law to TCCA, it seems that Group Two controls TCCA while the Group One people are now a species at risk.

The actual numbers of personnel in Transport Canada doing the actual job of safety inspection is difficult to determine since TC "reorganized" itself and mutilated its website. The number of airworthiness inspectors on the ground in Pacific Region is about 30. Extrapolate that to the rest of Canada, with five regions, and we get a total of about a 150 airworthiness inspectors. If we take that number and triple it to include the other specialized inspectors, we get 450.

According to the Auditor General's (AG) 2012 report, "Transport Canada has about 1,400 employees working in civil aviation". That gives us 450 people in David's group one and 950 in group two. Each TC inspector that you meet at work has more than two people managing what she or he does. As indicated in the AG's audit of TC, inspectors are going to be replaced by "systems evaluators" whatever they are. Now do you feel any better about your job? For more on that, go to the internet and search "Transport Canada admits to shortage". Observe the TC obfuscation regarding staffing. Are those vacancies in group one or group two. I ask, "Where are the job advertisements?"

SMS, a Group Two style of concept, is a beautiful and almost elegant thought that by definition adds an extra layer of bureaucracy that is intended to create a more comprehensive, robust and demanding regulatory framework. Some would say it adds an extra layer of safety, but that language would be one of sales and marketing, and would need to be backed up with data and proof to be used accurately in a title.

Those "some" that David refers to as spouting the "additional layer" party line include the TC management at the 39th Parliament, 2nd Session Standing Committee on Public Accounts.

For the longest time, SMS had been lingering around the corner, inspectors warning us of the impending regulation. We attended informative sessions and training seminars in preparation. Of course, no additional regulations would purport to add risk, complexity, inefficiency or cost but it is certain that it will increase the bureaucratic burden, for which I have seen no risk analysis. Someday soon we will completely self-audit our management of safety and quality systems. TC representatives will be nothing more than people ensuring that we have completed audits. Soon they will not need to visit and may subcontract audits to private organizations in time, or we may email TC our audit results and the culture that we know will have been completely dismantled. When the SMS proves to be successful, I propose we create an ethics management system for government through which they can self-audit their ethical conduct and that closed loop EMS will ensure efficiency and good behaviour in perpetuity. The RCMP investigates its own transgressions, albeit poorly, and I am not surprised that this methodology is spreading. It has huge upside for the organization.

The federal government and TC already have an "Ethics Management System", but it has been found dysfunctional, as seen in the news out of Ottawa last year.

Poor Group One at TC does not appear very enthusiastic about the SMS, and seems more worried, and rightly so, about their job security. While we witness this evolution of Transport Canada from a hands-on culture of knowledge-sharing to a culture wherein they promote methods designed to avoid connections to industry and litigation, it is our responsibility to try to maintain our industry to the best of our abilities without falling victim to cynicism and general malaise.

The evidence supports this with TC's gradual withdrawal from their audit and inspection activities. In the past, people have successfully sued TC for allowing errant aviation companies to continue in business until family members were killed in crashes. In the future, that will be less likely. See my note below about the TC inspectors becoming "systems evaluators".

Maybe this is the best direction. Maybe it is time we minimized government influence and simply had them provide auditors and regulations while industry did all the rest. This is certainly the beginning of the end of an era that has witnessed consistently improved safety trends over the decades.

"Improved safety trends" is the regularly stated assertion of TC. That is seldom stated in the proper context. Each time I hear TC senior management say that safety in Canada continues to improve due to SMS, to this claim I point out that most of the world has the same improved safety trend without SMS.

Let's hope this change affects safety positively because without adequate risk analysis we only have data and trends representing human lives to reference.

— David Nilson AME

Data and trends get public attention and motivate politicians. It will be many years before those SMS "data and trends" show themselves. "Safety" is gradually being purged from the TC minister's vocabulary. Like it or not, the public citizenry have put aviation safety near the bottom of the priority list.

As an addendum to this, the AG's report states that those 1,400 employees "represent one-quarter of the department's workforce, giving 5,600 employees total." It goes on to state "In 2010–11, Transport Canada spent approximately $148 million on civil aviation." The simple calculation $148 million divided by 5,600 employees shows spending of about $26,500 per year per employee. Does that include rent and pencils? Show me the line up for those jobs. The report goes on to describe the roles of inspectors as "auditors" and ignores the multitude of other regulatory tasks they do. In my view, these AG audits have not been thorough or accurate examinations of TC aviation oversight operations.

That report goes on to state that under the SMS approach, "Inspectors are system evaluators. As necessary, they may conduct traditional audits." TC does Program Validations and Program Validation Inspections (PVI). There are no more in-depth audits to be wary of. The inspectors may spend four days in your company doing a PVI and two weeks in the TC office doing the paperwork.

Now for something completely different. The following is to help clarify the implications of aircraft "possession".

As an AMO or AME, you might think that the Canadian Aviation Regulations (CAR) that apply to you are limited to Part V (that's Part 5 for us non-Romans), Subpart 571 Aircraft Maintenance Requirements and Subpart 573 Approved Maintenance Organizations. That is not entirely correct. My topic relates to aircraft ownership and who is responsible for what.

To begin, we examine CAR 101. As I stated in AMU February/March Volume 10 Issue 5, this is one of the all-encompassing regulations. It sets down interpretations that are applicable in all the other CARs unless specifically stated in a particular regulation. Here are some definitions in CAR 101 that you need to know about:

- "owner" – in respect of an aircraft, means the person who has legal custody and control of the aircraft; (propriétaire)
- "operator" – in respect of an aircraft, means the person who has possession of the aircraft as owner, lessee or otherwise; (utilisateur)

Aeronautics Act defines the "registered owner" as "in respect of an aircraft, means the person to whom a certificate of registration for the aircraft has been issued by the minister under Part I or in respect of whom the aircraft has been registered by the minister under that Part I". The act further refers to the owner and the operator separately in other sections. Thus, we seem to have levels of aircraft possession:

- OWNER – has "legal custody and control of the aircraft", with emphasis on the word "legal"
- OPERATOR – has possession of the aircraft as owner, lessee or otherwise (note the "or otherwise") has custody and control".
- REGISTERED OWNER – has name on the Certificate of Registration

• LEGAL TITLE HOLDER – the lessor in a lease arrangement or the person who has the money in it.

605.06(a) states: "No person shall conduct a take-off in an aircraft or permit another person to conduct a take-off in an aircraft in their custody and control unless the aircraft equipment required by these regulations . . . etc." It does not refer to the owner. It specifies "custody and control" as opposed to "legal custody and control".

Normally, an owner gives a maintainer physical custody and control of an aircraft in order for the maintainer to perform all required maintenance and, if the need arises, test flights. In that case, the maintainer will be the operator. This information is part of the base of a general understanding of the CARs.

Next issue, we will examine the "Basis of Certification" and the "Type Certificate Data Sheet". Until then, remember "Duty of Care."

On that uplifting thought, I leave you with my final and inevitable but important paragraph.

Please be aware that I am not a lawyer. My column is neither legal advice nor legal opinion. If you face a legal issue, you must get specific advice from a lawyer – one with experience in the aviation matters in your own country.

NORM CHALMERS *worked with Transport Canada as an Airworthiness Inspector for 25 years. From 1967 to 1983, he worked in the aircraft maintenance industry in Western Canada and 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.* ■

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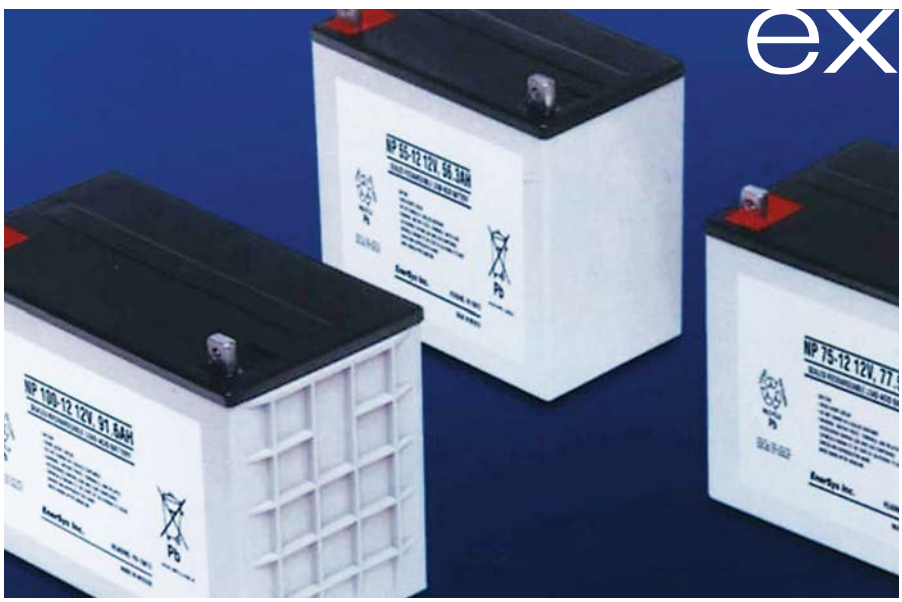
VRLA Batteries explained



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

"Overdressed, oversexed, overpaid bus drivers" was how airline owner Harry Steele referred to them, and I myself recently referred to them as "data entry clerks" (in a good-natured, tongue-in-cheek ribbing, of course). Those poor airline pilots take a lot of abuse from the rest of us in the airline business, but of course, the point that I was making was that their livelihood is being threatened due to advances in avionics technology. But before we maintenance types get too smug, let us consider the effect of technology on our own profession.

When I entered the avionics field in the late 1970s, many of the "old guys" I worked with were transitioning from the airline's fleet of DC-3s, C-46s, C-47s etc. to the newer Boeing 737-200. The experience and skills exhibited by these gentlemen (no women fixing airplanes in *those* days) were more akin to the expertise of an electrician, rather than that of an electronics technician. *My* generation of avionics technicians came largely from the community colleges, and were more familiar with transistors and circuit boards than vacuum tubes and wiring. The nature of the job was transitioning in order to accommodate the shifting technologies.

Perhaps the most valued skill a technician of this era could possess was the ability to troubleshoot systems. Continuity checks, a solid understanding of how a system was designed to operate, and vast accumulated experience enabled the skilled avionics tech to quickly and properly troubleshoot and repair snags. The greatest maintenance costs to an airline were the result of poor troubleshooting, rather than the cost of the actual repairs that solved the problems.

The ability to remove a component, test, repair, and re-install it has been the job of the aircraft technician for quite some time. In fact, an examination of Transport Canada's AWM 566 Appendix "C" will reveal the phrase "Test, Troubleshoot, Repair, Adjust, Remove and Replace" repeated throughout. However, with changes in technology, we now have extensive and effective built-in test equipment (BITE) checks which can be performed using plug-in or on-board computer systems. Computer memories now store ongoing and intermittent

faults which can aid the technician in locating problems that would previously have been signed off as "Unable to duplicate on ground at YYZ. Ground checked serviceable". (Don't pilots just love to read those words in the log book?)

Many of the components which were repairable in the past, are now disposable "consumables" which are simply replaced rather than repaired. Many snags that once required a physical adjustment by a technician now require manipulation of software commands, which in some cases can even be made from a remote location. Fly-by-wire technology has seen the need for the rigging and tensioning of cables, pulleys, and bell cranks all but eliminated. Even the simple but time-consuming task of checking and servicing the aircraft's batteries is being eliminated, which (finally) brings me to the subject of this month's article, "Valve Regulated Lead Acid Batteries Explained".

To receive accreditation from a Transport Canada-approved college, all students must service both lead-acid and nickel-cadmium batteries. Due to the safety hazards associated with these tasks, quite a bit of classroom time is spent preparing the students for the performance of these projects. For example, the student must demonstrate an understanding of the procedures and materials used in the event of an electrolyte spill (i.e., boric acid will neutralize nicad electrolyte; baking soda will neutralize a sulphuric acid spill).

Having recently replaced the battery in my car with a new maintenance-free unit, I decided to investigate the latest in maintenance-free aircraft battery technology.* Unlike the gel-cell battery I installed in my car, the maintenance-free valve regulated, recombinant gas aircraft battery uses a liquid sulphuric acid electrolyte solution. However, contained within the cells of this type of battery are layers of glass mat, which absorb and retain the electrolyte, not unlike a sponge. This means that there is essentially no free liquid electrolyte that could spill.

The chemical reaction that takes place within a lead-acid battery during

discharge results in hydrogen ions combining with oxygen ions, which, of course, creates water (H2O). This water dilutes the sulphuric acid electrolyte solution, causing a decrease in specific gravity and a reduction in the battery's ability to deliver current. (This explains why checking the S.G. of a lead acid battery enables us to determine the state of charge: the more discharged the battery is, the more water there is, and thus, the lower the S.G.) When the battery is recharged, hydrogen gas and oxygen gas are generated. In a traditional battery flooded with liquid electrolyte, these gasses are vented to the atmosphere, reducing the amount of water (H20) in the battery, and necessitating a "top up" of distilled water from time to time. In a recombinant gas battery, the hydrogen and oxygen gasses are recombined within the cell, eliminating the need to add water, resulting in a maintenance-free battery. The fact that there is no liquid electrolyte to spill, no need to add water, and that the battery case is a non-vented sealed unit makes it not only maintenance-free, but also means it can be operated at any attitude, including those encountered during aerobatic manoeuvres.

The advances in battery technology have resulted in some operators electing to switch from nicads to these VRLA/RG batteries. Could we one day perhaps see viable electric airplanes as a result of the continued advances in the technology? Moves are underway toward that end, at least in the private, recreational flying arena. The trend toward eliminating the repair and servicing of not just batteries, but many major aircraft components, is a reality that we are already facing.

How will this affect the aircraft maintenance profession? Will we see a shift away from the traditional role of the AME/A&P? Will we see the role of the troubleshooter replaced by computer/software analysts? Will we see mechanics replaced by technician/parts changers? Will we see the occupation of the aircraft maintainer go the way of the wireless operator, navigator, flight engineer and pilot? I welcome your thoughts.

**Thanks to Patty Montbriand at Concorde Battery for providing me with technical information, and training aids.*

Q: How do recombinant gas, relief valve lead acid batteries prevent the spillage of electrolyte?

Answer to previous question:
Q: What is the most effective way of reducing HIRF interference?
A: Properly installed shielded wiring is the most effective way of reducing HIRF interference.

GORDON WALKER *entered the avionics industry after graduation 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 concerning the training and licensing of AMEs, being nominated to the CAMC Board of Directors, and being elected President of the National Training Association. (NTA).* ■

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Identifying Errors in the workplace *and getting to know* The Dirty Dozen

BY MIKE BRODERICK
Helicopter Engine Repair Overhaul Services

Say what? OK, I know what you're thinking.

Where is this crazy guy taking us today? Well, the short answer is, today we are going to discuss the Concerns of Human Influences (aka Human Factors) on all of us AMTs. And specifically, today we are going to concentrate on the influence of the infamous "Dirty Dozen." Never heard of 'em?

Well sit tight, because by the time we are finished, we will all be real familiar with what they are and how they have a negative impact on our performance as aircraft maintenance technicians. But why, you ask, am I venturing out of the technical operation of the mechanical and into the technical operation of the mechanic? Because how the mechanic manages the challenges of the mechanical directly affects not only the lives of those who fly the product of our work but also the lives of those who are flown.

How do human factors affect us at work? Well, it is universally agreed that 80 percent of maintenance errors involve certain factors of human behavior. Post-accident investigations – where maintenance activities were determined to be the cause – have identified the 12 major human factors most directly responsible for maintenance errors. These particular human factors, if not detected and addressed, can cause, at the very least, wasted time and or wasted money, and at the worst, an injury to the AMT or cause an aircraft accident resulting in an injury or possibly death of the pilot, crew and passengers. These 12 negative dynamics of human behavior have been christened "The Dirty Dozen." We will identify and discuss each one in some detail.

Now the study of human factors has become an industry within our industry and there are several individuals specializing in the education and implementation of systems to mitigate the effects of negative human behavior on aircraft maintenance. One of the best in this field is Richard Komarniski of Grey Owl Aviation Consultants. Trust me, I will not attempt to put myself on his level of expertise. However my intention for today's class is to insert my perspective as an AMT into the science of human factors.

My research for today's lesson involved information from the FAA website as well as the anecdotal information I have gleaned from not only from Richard's presentations and articles, but from several other authorities within the discipline of human factors.

So without further preamble let's open the discussion on:

The Concerns of Human Influences

In our session today we will:

- review a definition of human factors
- define human error and discuss the types and kinds of human error
- identify, define, and discuss the "Dirty Dozen"

What are Human Factors?

The term "human factors" refers to the overall environment of the job, which includes the company's organizational structure and the individual human characteristics that influence behavior at work in a way that can affect health and safety.

Say what? Don't you just love psycho-babble? OK, in plain AMT speak, it's the interaction of three elements: the job, the individual, and the organization, which have been consolidated and packaged under the term "human factors". Breaking this down to its core, human factors is really the study of the individual's behavioral response within the maintenance environment, created by a particular job's responsibilities, combined with the individual's state of mind while interacting with the objectives of the organization.

By applying this knowledge we are able to design, develop, and implement systems and services into the maintenance working environment, which will result in a safer maintenance product that is provided with greater efficiency.

Hmm, that sounded less like AMT-speak and more like psychobabble didn't it? Well, let's keep going and see if we can't put some plain English to this stuff.

Human Error

We have said that certain negative elements, either human behavior or the work environment, can lead us to make errors in the performance of our maintenance duties. So what exactly is an error? Well, according to my trusty dictionary an error is "a mistake; the state or condition of being wrong in conduct or judgment." So then a human error can be defined as a human action (mistake), resulting in unintended consequences. And errors can be further categorized into types and kinds. The types are unintentional and intentional, and the kinds are active and latent. Let's talk about the types first.

Types of Errors

Unintentional error: An unintentional error is an unintended wandering or deviation from accuracy. For example, because you are distracted, you don't notice the expired calibration date on the torque wrench you are going to use. This mistake causes you to under-torque a set of split-line nuts and bolts.

Intentional error: An intentional error is knowingly deviating from safe practices, procedures, standards, or regulations. Let's use the out-of-calibration torque wrench example again. Only this time you see the sticker, but ignore it for whatever reason, and under-torque the same set of split-line nuts and bolts. The result is the same as the first example, only this time you knew you shouldn't have used this wrench.

Kinds of Errors

Active error: An active error is the specific individual activity that is an obvious event. In the previous examples above, it is obvious that the split-line bolts were under-torqued, whether it was intentional or unintentional.

Latent Error: A latent error can be less obvious to detect, as latent errors are company issues that can lead up to the event.

Once again, using the same examples about the torque wrench, let's propose the idea that the torque wrench, which was out of calibration, should not have been available for use and thus could be a company issue. Perhaps company policy may not be clear as to who is ultimately responsible for monitoring the tool calibration dates; therefore removing this torque wrench from the active group of precision measuring tools was overlooked, resulting in the tool's availability for use. Make sense?

The Dirty Dozen

Having looked at types and kinds of errors, we now have the basic concept behind the dirty dozen. These are considered to be the 12 specific human factors which have been determined to degrade an AMT's ability to perform effectively and safely. So let's go over them, define each one, and then discuss ways to eliminate them from our daily maintenance activities.

1) Lack of Communication: We must communicate with one another and explain what work has and has not been completed when passing the job on.

a) Never assume the work has been completed.
b) Ensure that you are discussing exactly what has been completed and what needs to be completed in order. for the next AMT to work on the job.
c) Complete all worksheets so the next AMT knows for sure what has been done.

2) Complacency: We all have a tendency to become overconfident when we do the same job repeatedly: "I know this system like the back of my hand; I don't need no stink'n manual."

a) Always use the worksheets and the current edition. of the maintenance manual when working.
b) Always expect to find something wrong.
c) Always double-check your work and have another AMT follow behind you
d) Never sign off on something you did not fully check.

3) Lack of Knowledge: The technology in our industry is constantly changing. We must remain current on new products and what new maintenance procedures are required.

a) If you do not know how to fix something, ask for assistance from someone who does.
b) Ensure that all your work documents and maintenance manuals are up to date.
c) Do not let your ego exceed your ability.

4) Distraction: A distraction is anything that takes your mind off the task at hand. Distractions can cause us to think we are further ahead in the process than we are.

a) Keep off your cell phone when working. This means no talking, texting, tweeting, or liking your friends on Facebook. Cell phones should be kept from use

while you are working. Make your calls on your break. Personal emergencies should come through the company system to your manager to you. Cell phone usage at work is my favorite thing to hate.

b) Use a detailed checklist.

c) If you leave a job or take over a job, review all the previous steps to ensure nothing has been overlooked to this point.

5) Lack of Teamwork: Personality differences in the work place need to be left in the parking lot. It is imperative that you learn to play well with others while on the job. Lack of teamwork can and does affect the safety of maintenance.

a) Ensure that lines of communication are open and free-flowing between members of your maintenance team.

b) Be sure to discuss specific duties when jobs require more than one person. Make sure each person knows what their assigned task is. Encourage questions before the job starts.

c) Watch your buddy's back with respect to safety while you are working together.

6) Fatigue: Sometimes our job calls for long hours and late nights. Fatigue can cause a decrease in your attention span and a decreased level of consciousness. Working while you are exhausted can be dangerous. Pretty obvious I know, but we have all been guilty of this at one time or another.

a) Don't do complex tasks if you know you are exhausted. It is far better to explain the cause of a late departure than to explain the cause of a final departure.

b) Know your limits and those of your team. Don't push the fatigue envelope.
c) Keep yourself in good physical shape, exercise, eat right, and get plenty of sleep. This will help when the occasional late night comes along.

7) Lack of Resources: Do not improvise when it comes to using the correct tool or part for the job.
a) Maintain a sufficient supply of parts and anticipate the need for standard replacement parts.
b) Do not substitute a part with one that is "close enough and should work."
c) Ensure that all the special tooling required for the job is in proper working order. If you break it, make sure you let management know so they can replace the tool or get the broken one fixed.

8) Pressure: There is always a schedule to be met. As AMTs, you cannot let the pressure of time constraints get in the way of finishing the job safely.
a) Make sure that the pressure applied is not caused by lack of planning or execution on your part.
b) Ask for extra manpower if it will help get the job done.
c) When asked how long a certain task will take, be truthful. Don't over-promise and under-deliver.

9) Lack of Assertiveness: Don't be afraid to speak up if you see something wrong, either with a piece of equipment or with the way somebody is doing a job. If it doesn't seem right, say something.
a) Provide a clear explanation when you see something that is unsafe or incorrect.
b) Never compromise your standards.
c) Allow for others' opinions of your work or actions. Accept constructive criticism; however, refer to "b" above, should you be asked to compromise your standards.

10) Stress: Can be self-induced or caused by an outside source. Stress is a subconscious distraction that can cause you to lose your place in the flow of the maintenance task.
a) Take a short break, or if required, take time off if the stress is caused by a personal issue. Family problems, financial issues, or relationship problems all can cause stress and all need to be dealt with – only not while you are working on an aircraft. Try not to bring these difficulties to the job.
b) Tell your manager or a team member that you might be under some stress and to watch your work.
c) Keep yourself healthy and well rested, this will help mitigate stress.

11) Lack of Awareness: Lack of awareness and #2 (Complacency) go hand-in-hand here. Sometimes being so proficient at a certain task causes us to take no notice of a recently issued change notice issued or bulletin.
a) Always refer to the maintenance manual and the latest publications, letters, and bulletins released by the manufacturer or AD notices.
b) Always ask for other team members to check your work, including your paperwork.
c) Don't assume you are doing the job right – double check.

12) Norms: This is short for normal: the way things are normally done. These are the unwritten rules that are followed or tolerated by a good number of organizations even though these procedures are possibly unsafe. Because nothing has happened to change the norms they stay in place. Unfortunately, in a most cases, negative type norms are changed by accident, and not before.
a) The correct way of doing something may not be the easiest way or the "normal" way. Make sure you are doing it the correct way.
b) Challenge the norms and make sure that everyone follows the same and correct standard.
c) Don't accept "this is the way we have always done it…." if that way is unsafe.

So there it is: a short discussion of how we are influenced by our personal and professional environments, and how these influences can impact the way we perform our duties. We have a huge responsibility to ensure that every pilot who asks us if this aircraft is OK to fly, that when we say: "You bet; enjoy your flight. See you when you get back," they are able to concentrate on their job, knowing we did ours right.

See you next time; now go enjoy a tall cool adult beverage on me, after you have finished for the day, of course. ■

Crash During Take-off of Firefighting Helicopter:

Sikorsky S-61N under contract to the U.S. Forest Service

History of the Flight

On August 5, 2008, a Sikorsky S-61N helicopter impacted trees and terrain during the initial climb after takeoff at an elevation of about 6,000 feet in mountainous terrain near Weaverville, California. The pilot-in-command (PIC), the safety crewmember, and seven firefighters were fatally injured while the copilot and three firefighters were seriously injured. Impact forces and a post-crash fire destroyed the helicopter, which was being operated by the U.S. Forest Service (USFS) as a public flight to transport firefighters.

The mission was to reposition a number of hand crew firefighters working on a forest fire in the area. When they arrived at the pick-up point, a brownout required them to abort the landing and then touch down about 100 feet south of the original spot on a comparatively dust-free rock outcrop.

The first load of 10 firefighters boarded. According to the CVR transcript, while on the ground at H-44, the copilot asked the PIC if the helicopter would have "enough power" to depart vertically out of the LZ. The PIC responded, "Absolutely, yes."

The CVR transcript indicated that, during the initial departure, the copilot announced, "seventy five percent torque," referring to the engine torque gauge indication, followed by, "everything looks good." As the take-off continued, the copilot announced, "eight seven," again referring to the engine torque gauge, and then "one hundred and two percent power's good," referring to the main rotor speed (NR).

According to the sound spectrum analysis of the CVR recordings, the engines reached topping about 30 seconds after the power began to increase and remained at topping for about 14 seconds, with the gas generator speeds (NG) steady at 102 percent and 101.4 percent on the individual engines. As the NGs increased and topped out, the NR gradually decayed, or "drooped," over about 51 seconds from 108.6 to 101.5 percent. NR then began to increase and stabilized about 103.2 percent. Within two seconds of the increase in NR, both NGs decreased below their topping speeds. The CVR did not record any discussion by the pilots regarding the fact that the engines had reached topping.

One of the firefighters on board the helicopter during this departure reported that "the helicopter felt heavy, slow and sluggish" and that his eye level was "approximately five to eight feet below the tree tops." Another firefighter on board reported that, as the helicopter lifted off, "it seemed very slow" and "took a little bit to get up above the tree line."

The pilots calculated that darkness would require them to shut down in about 2 hours 20 minutes. They decided to go to Trinity Helibase for fuel before transporting the remaining three loads of firefighters. After refueling, they had an allowable payload of 2,552 lbs., which was more than the 2,400 lbs. that the helitack crewmembers had been loading that day.

Also, they would have an additional margin after burning 400 lbs. en route to the pickup point.

While the helicopter was being refueled, two mechanics performed a routine visual inspection. They both noted a layer of ash on the leading edges of the main rotor blades and around the engine inlets. One mechanic stated that both engine intakes were covered in ash, but the compressors' first stage stators were clean. He further stated that the amount of ash on the blades was more than he had seen previously during this particular fire but was equivalent to what he had seen when the helicopter was working on other fires. He began wiping the blades with a rag, which easily removed the ash, leaving the wiped area of the blades free of debris. The mechanic stated that, while he was wiping the blades, he asked the PIC how the helicopter was running, and the PIC replied that it was operating well.

The other mechanic reported that he had asked the copilot if any problems existed with the helicopter, and the copilot replied, "she is flying great." The mechanic stated that, as he began to wipe the ash from the engine inlets, the PIC asked the two mechanics to finish their work so that the helicopter could depart since the required shutdown time was nearing. They stopped wiping the ash off the blades and inlets and finished preparing the helicopter for flight.

During the approach, the copilot told the PIC that the outside air temperature (OAT) gauge was reading 20°C, and the PIC replied, "So it's gotten cooler." The copilot stated that the helicopter would have "quite a bit of performance with the drop in temperature." After the helicopter landed, a helitack crewmember asked the pilots if he should get another helicopter to aid in the transportation, as dark was nearing. The copilot responded that they should be able to complete the mission. The crewmember then informed the pilots that the manifested weight of the firefighters and cargo being boarded was 2,355 lbs.

After the pilots were notified of the manifested weight, the copilot stated that the performance load calculation indicated a maximum payload of 2,552 lbs at 32°C. He added that the temperature was 12 to 13 degrees cooler and their payload 200 lbs. less than calculated. Both pilots restated that they were indeed 200 lbs. lighter than the previously calculated maximum payload, and the copilot confirmed that the helicopter was "good to go."

At 1940:46, the PIC began to increase the power for take-off. At 1940:47, the copilot stated, "okay, just nice and smooth here." At 1941:03, he stated, "okay there's seventy five–there's eighty," and then, at 1941:06, "there's eighty five," all of which were engine torque readings. About 4 seconds later, he stated, "there's ninety showin' ah hundred and three percent," referring to an engine torque reading of 90 percent and an NR reading of 103 percent. About 9 seconds later, he informed the PIC that NR had decreased to 100 percent and was drooping. The CVR recording ended 20 seconds later at 1941:39.

Sound spectrum analysis of the CVR recording indicated that the engines reached topping 22 seconds after power was applied and remained at topping until the end of the recording, with NGs steady at 102.1 percent and 101.5 percent on the individual engines. Between 1940:46 and 1941:31, the NR drooped from 106.9 to 95.0 percent and remained there for about 3 seconds. At 1941:34, about 5 seconds before the end of the recording, the NR started to droop again, reaching a final value of 93.5 percent.

Ground witnesses stated that, as the helicopter began to lift off, the rate of climb appeared very slow, and the helicopter's movement was labored. One witness stated that the take-off was at "extremely slow speed and low altitude," while another witness stated that the helicopter was "moving extremely slow, inconsistent with the last two departures." The witnesses reported that the helicopter began to move forward in a nose-low configuration and drift sideways to the right. The helicopter continued to move forward and then began losing altitude as it continued down slope. One witness described the take-off as follows:

After a vertical ascension of about 20 feet, the helicopter began to move forward and about 40 feet to the right. As the helicopter continued forward toward a section of lower trees, the belly of the fuselage contacted trees; it appeared as though the helicopter would fit between the trees, though the main rotor blades were not high enough to clear the trees. Debris began to fly from the surrounding trees and the helicopter settled into the vegetation.

The helicopter collided with the trees and subsequently impacted the down sloping terrain, coming to rest on its left side. Almost immediately after the impact, witnesses saw smoke and fire coming from the wreckage. One witness reported that both engines continued to run for about 30 seconds after the helicopter impacted the ground.

Probable Cause

The National Transportation Safety Board determined that the probable causes of this accident were the following actions by helicopter operator:
1) the intentional understatement of the helicopter's empty weight,
2) the alteration of the power available chart to exaggerate the helicopter's lift capability, and
3) the practice of using unapproved above-minimum specification torque in performance calculations that, collectively, resulted in the pilots relying on performance calculations that significantly overestimated the helicopter's load-carrying capacity and did not provide an adequate performance margin for a successful takeoff; and insufficient oversight by the U.S. Forest Service and the Federal Aviation Administration.

Contributing to the accident was the failure of the flight crewmembers to address the fact that the helicopter had approached its maximum performance capability on their two prior departures from the accident site because they were accustomed to operating at the limit of the helicopter's performance.

Contributing to the fatalities were the immediate, intense fire that resulted from the spillage of fuel upon impact from the fuel tanks that were not crash resistant, the separation from the floor of the cabin seats that were not crash resistant, and the use of an inappropriate release mechanism on the cabin seat restraints. ■

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Employment

BY SAM LONGO, AME A&P

Flying High in Seven Heaven

It all began one evening at Air Canada as we rolled down Golf taxiway towing a Boeing 727 to the hangar for midnight shift. Fellow aircraft mechanic Paul Morris and I were talking cars. As fate would have it, other wheels would soon be turning as a result of our cursory conversation.

"How's the BMW running?" I casually inquired. "It's for sale," he replied. "I am buying a Super Seven kit car."

His statement caught me off guard and my envy escalated as he fed me the technical details. "It's a Canadian-built Lotus Super Seven replica with a Toyota twin cam engine and a five-speed gearbox. It will do 0 to 60 mph in six seconds flat, and it's affordable!"

It sounded too good to be true. He taunted me further, his next statement sealing my fate: "Sam, what could it hurt to check out this guy's shop?"

George Fejer had a small shop in Newmarket, Ontario, just north of Toronto. Smitten with curiosity, I ventured up for a peek during my next set of days off. Well, I have seen tidier garages in my time, but none so magical. These shiny little Lotus replicas were rolling out, and people were buying them up as fast as they could be built. I was now officially hooked.

You have to be pretty crazy to buy a Super Seven in the best of climates. With no heater and limited protection from the elements, the word "obsessed" comes to mind. None of that mattered because our emotions had clearly clouded our better judgment. Paul sold his mint, modified BMW 2002. I sold my Mustang Cobra, and we ordered two of the high-performance Twin Cam versions. A rusty old Honda Civic was purchased as my winter transport, and the wait began.

As I recovered from horsepower withdrawal, I fabricated a custom burled walnut dashboard for my Seven. Many other parts were removed from the unfinished car for chroming. The front A-arms, springs, roll bar, grill, and other bits were plated and reinstalled. A good friend returned from England with a lovely walnut Lotus shift knob. An architect in California sent me reproduction MGA twin cam badges for the dash and engine cowl. Slowly, it all came together.

Spring finally arrived and so did our cars. Paul's Seven was dark metallic gray with black interior and mine was British Leyland blue with chrome and wood trim. Original Lotus crests from San Francisco and stainless steel fender guards finished the detailing.

Our own modifications continued, some to make the cars better and others to set them right. We formed our own quality control organization. When I found a problem, I'd tell Paul, and he would do the same. We had lengthy discussions about differential failures, loose carb jet holders, fried alternators, and broken throttle cables. We would reluctantly put them up on blocks for the winter, happily sharing our crusty communal axle-puller. I diligently kept a logbook of every repair and modification. Its pages filled fast. It amazed me how a Canadian replica, built with Japanese internals, could be so true to its unreliable British sports car roots. It broke a lot, I fixed it often and drove it with abandon every chance I could.

Our fellow aircraft mechanics had mixed reactions. When the cars were broken, they all thought Paul and I were crazy. When the cars were running and we went wailing out of the parking lot, smoking tires, we only confirmed their suspicions. The senior mechanic on my crew took me aside one day and with fatherly advice said, "Sam, if I owned that car, I would never drive it that hard." My response was honest: "Tom, if you owned it for more than a week, you just couldn't help yourself." Its power and handling were intoxicating.

It was a dream-come-true for sports car fanatics. They were the holy grail of bare bones performance sports cars. They were loud, brash, pretty, and very fast. Whenever mine was parked, it always attracted a crowd. When it was rolling, hunting for Porsche on warm Toronto nights, it was absolute heaven on wheels.

Reality soon caught up with me. When my son Spencer was born, responsibilities prevailed and the Seven had to be sold. My last jaunt was a brisk November delivery, driving from Toronto to Montreal. Its new owner was the foreman of Air Canada's Engine Overhaul Shop in Dorval. In his pristine garage, I turned the key for the last time, tried to ignore my backache, and signed the papers. Ironically, I climbed aboard an Air Canada 727 and was back in YYZ before my kidneys had fully thawed.

The ownership of that car remains a positive memoir from my days at Air Canada. As aircraft mechanics, we all tend to be geared toward bland reliability, but sometimes you just need to go for the gusto. Trust me, none of us will be lying on our deathbed saying "I should have bought another Chevy".

Fortunately, Paul still has his Seven. It continues to run strong after over 30 years of flogging and fixing. Our friendship is sealed forever because for three hot grease-stained summers, we flipped the bird to common sense and shared the same automotive passion.

Whatever your version of Seven Heaven might be, don't wait. Life is too short. Let 2013 be your year. Take that chance and reach for your dream.

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