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AMT

Aircraft Maintenance Technology

Written by aircraft maintenance professionals for the professional maintenance team

Official publication for AMTSociety

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Maintaining aging GA aircraft is a specialty for Norm Julseth and Lyle Kiecker of Sierra Hotel Aero Inc. in St. Paul, MN.

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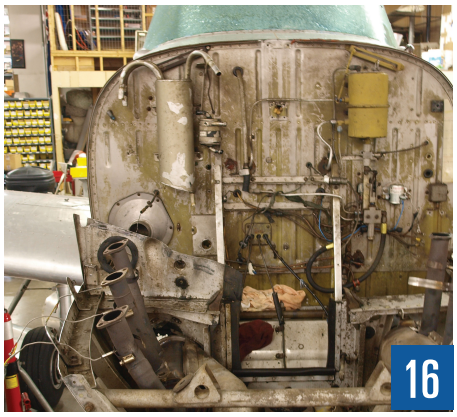

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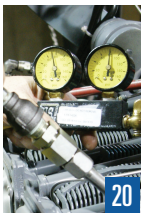

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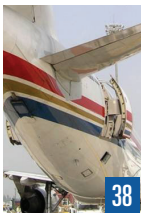

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Tips From Lycoming Technical Support

A list of the most frequently asked questions and issues from customers and a list of field practices that Lycoming Engines would like to see addressed, eliminated, or changed. *See page 20.*

By Charles Chandler

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The General Aviation Community Gathers in Wisconsin

Ron Donner, Editor

For the 61st year, the Experimental Aircraft Association will hold its annual summer gathering July 29 through Aug. 4. My first Oshkosh experience was in 1972 and although the Fly-In, as we then called it, has grown and changed significantly from those early days, many still consider it a must-attend event. In the early days Oshkosh was the place for General Aviation (GA) and recreational enthusiasts to exchange ideas and to show their homebuilt and restored aircraft to other like-minded enthusiasts. Today at AirVenture, recreational aviation is still proudly displayed, yet you can also see new aircraft manufacturers, suppliers, entrepreneurs, and regulators, and speak with a variety of aviation organizations, all there for the same common goal to promote and support aviation.

Over the last decade GA has experienced its share of challenges prompted by the economic downturn, high fuel costs, and unfortunately a lack of interest by new and younger people to experience or begin an aviation career in GA. Yet in this country GA continues to play a vital role in our economy. According to the General Aviation Manufacturers Association (GAMA), the GA industry contributes more than $150 billion to the U.S. economy annually and supports 1.2 million jobs. Recently, just up the road from Oshkosh, WI, state politicians joined GAMA officials for a GA jobs rally at the Gulfstream Aerospace Corporation facility in Appleton. A point made at the rally was in Wisconsin, GA contributes more than $3.5 billion to the state's economy annually and GAMA manufacturers alone employ more than 1,100 Wisconsinites.

Many companies exhibit their innovative GA products at AirVenture. One that I have been following for several years is the development of Jet-A fueled piston engines. In this issue of *Aircraft Maintenance Technology*, Steven Ells describes the SMA SR305-230E-C1 Jet A fuel piston engine selected by Cessna to power its JT-A Skylane. As explained in the article, SMA took a very long view of Jet-A fueled piston aircraft engine development and elected to keep these simplest of engines, the compression-ignition cycle engine, simple.

Another GA engine article I'm sure you will find interesting is Charles Chandler's conversation with the Lycoming Engine Technical Support Team. Charles asked them to explain the most frequently asked questions and issues from customers, along with some key field practices that Lycoming Engines would like to see maintainers in the field to be aware of.

AirVenture is not only about new technology and innovation. With the average age of the GA fleet in this country estimated to be 40 years old, maintaining the aging GA fleet is an important aspect for many GA maintainers. Also in this issue, Minnesota-based Sierra Hotel Aero Inc. provides some of its experiences along with some maintenance tips and best practices for maintaining the aging GA fleet. See you at AirVenture, *Ron*

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SMA's Compression-Ignition Engine

Jet A fuels the new piston engine Cessna JT-A

By Steven Ells

Steven Ells began his aviation career in the 1960s maintaining E-1Bs for the U.S. Navy. Steve holds his airframe and powerplant (A&P) certificate, a commercial pilot certificate, and he also holds his Inspection Authorization (IA) endorsement.

In July 2012 at AirVenture, Cessna announced that it would be installing a SMA SR305-230E-C1 Jet A fuel piston engine in its Cessna Skylane airframe. The SMA engine is a turbocharged four-cylinder air and oil-cooled diesel-cycle engine that produces 227 take off horsepower at 12.2 gallons per hour. If you want an idea of the motive behind Cessna's move, get this; it's certified to burn Jet A, Jet A1, JP8, TS1 (Russian) and #3 (Chinese) fuels.

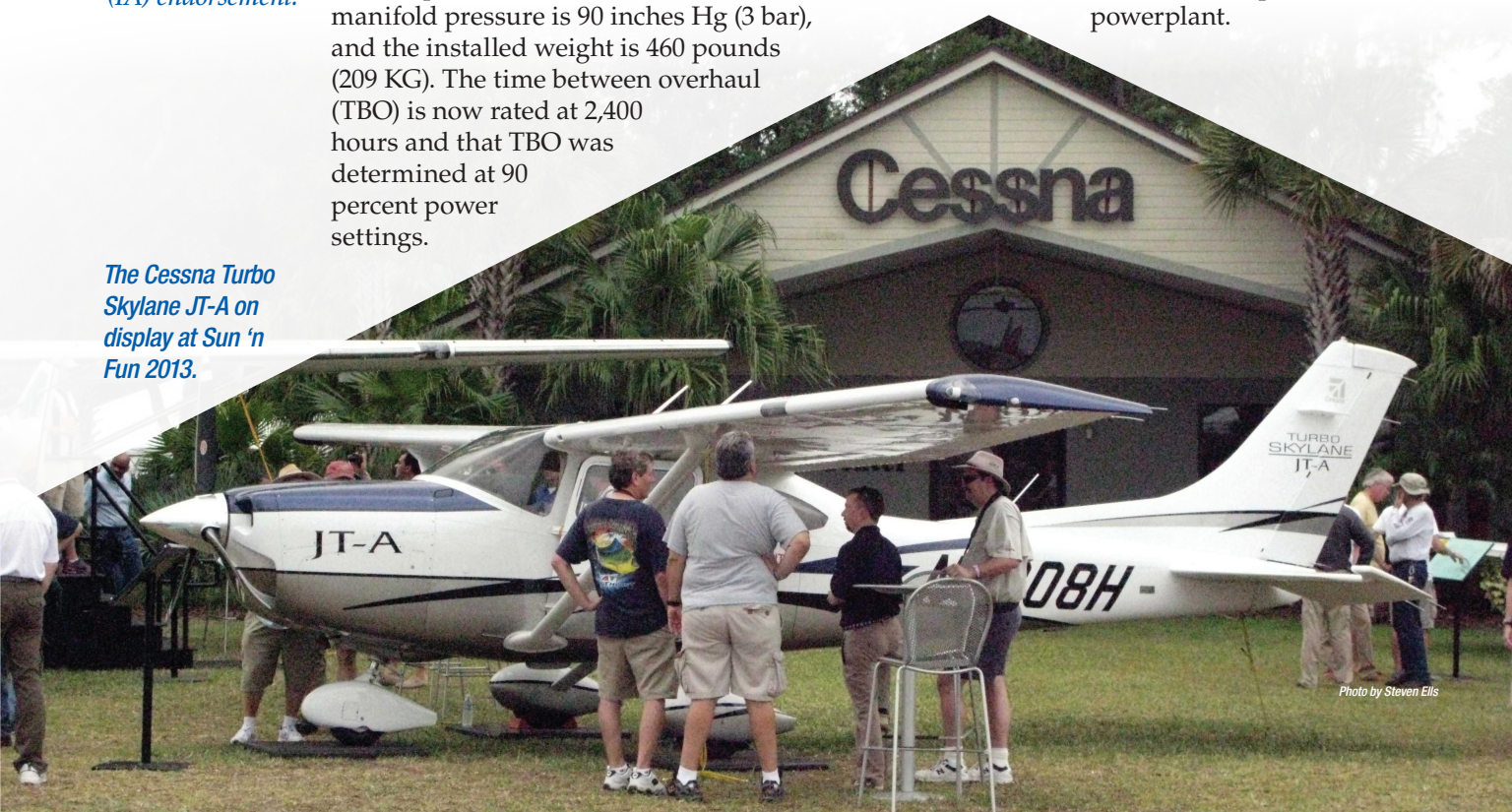
Cessna's announcement cited the environmental advantages of this switch in this sentence, "*The fuel technology used in this engine eliminates concerns about carbon monoxide emissions, fuel mixtures, propeller control, and exhaust gas.*" It also cited zero lead emissions and zero CO emissions as well as 30 to 40 percent greater fuel efficiency over the avgas-fuel engine it replaces. It's the Turbo Skylane JT-A.

The displacement of the four-cylinder SMA engine is 305 cubic inches (5 liters), the compression ratio is 15:1, the take-off manifold pressure is 90 inches Hg (3 bar), and the installed weight is 460 pounds (209 KG). The time between overhaul (TBO) is now rated at 2,400 hours and that TBO was determined at 90 percent power settings.

Cessna warrantees the JT-A for three years or 1,200 hours, whichever comes first.

SMA is predicting that this simple compression-ignition engine will not be hard to maintain for a couple of reasons. According to SMA, there has never been a major mechanical failure with the "E" (for enhanced) version or the earlier version of the engine. No cylinder failures or no valve failures. Second, this SMA engine is simple and it was designed as an aero engine. There's no propeller speed reduction unit (PSRU) or clutch nor does the 15:1 compression ratio put it at the cutting edge of compression-ignition engine development.

The checklist of required maintenance items is small and the maintenance intervals are long. The lack of a magneto-based ignition system — with its ongoing 500-hour magneto inspections and 100-hour spark plug cleaning and rotating chores — will save hundreds of maintenance man-hours over the TBO period of this powerplant.



The Cessna Turbo Skylane JT-A on display at Sun 'n Fun 2013.

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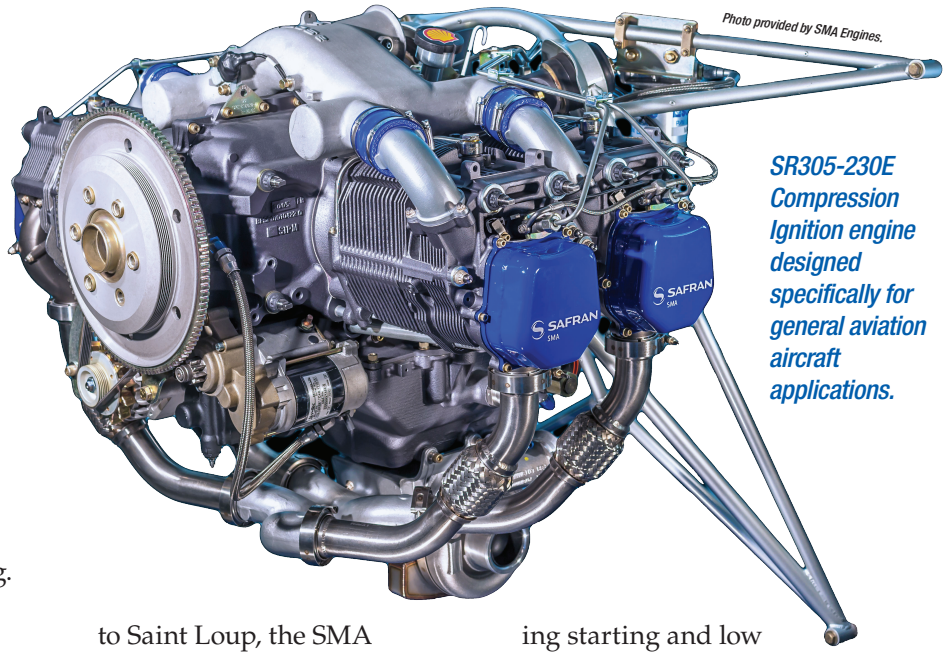

Photo provided by SMA Engines.

SR305-230E Compression Ignition engine designed specifically for general aviation aircraft applications.

Development log

SMA flew the first iteration of its SR 305-230 in 1998. That version was flown and tested extensively and was installed in nearly 50 Cessna 182s worldwide under a STC. Based on this operational data and requests from airframe OEMs, the engine was upgraded to the SR305-230E (enhanced) version in 2009. One upgrade was a larger turbo charger; the critical altitude is now 10,000 feet. 175 hp is available at the 20,000-foot certification ceiling.

SMA took a very long view of Jet-A fueled piston aircraft engine development and elected to keep these simplest of engines, the compression-ignition cycle engine, simple. This is shown in the use of a Bosch high-pressure direct-delivery fuel pump instead of electrically pulsed injectors and a common rail fuel manifold; it's also shown in the direct-drive design. There's no engine rpm reduction gearing installed between the engine and the prop. The propeller rpm is governed by a standard hydro-mechanical governor to 2,200 rpm — a speed that marries propeller efficiency with a relatively low noise signature.

> **"It's not the most modern technology in some aspects, but it's the most efficient and most reliable technology for aircraft applications."**
>
> — Thierry Saint Loup, Vice President, SMA Engines

ECU control

Thierry Saint Loup is the vice president of SMA engines. SMA is a division of SAFRAN. According to Saint Loup, the SMA engine will require 50 percent less trips to the maintenance shop than an avgas engine. For example, recommended oil change intervals are 100 hours and the SMA maintenance manual (MM) requires compression checks every 600 hours. *[Editor's Note: FAR Part 43 Appendix D mandates that these checks be done at every 100-hour or annual inspection.]*

Saint Loup says the SMA engine is a "fly-by-wire" engine since the engine control unit (ECU), which controls the rack position on the Bosch fuel injection pump(s), is electrically connected to the pilot's primary power lever. Two potentiometers — for redundancy — on the power quadrant feed the ECU with the pilot's desired power. The ECU combines that signal with several signals from two variables: 1. altitude and air temperature data at the inlet of the turbocharger compressor from the P1/T1 sensor, and 2. fuel temperature ([Tfuel] for fuel density) to arrive at an adjusted fuel flow. The ECU then powers a servo motor that controls the fuel pump rack position which results in injecting the right amount of fuel directly into the combustion chamber to deliver the desired power. In addition, rpm sensor data is used by the ECU during starting and low speed (800- to 1,200-rpm) operations.

The fuel flow/power output curve in the SR305-230E-C1 engine is linear, just like a turbine engine. The ECU, unlike carburetors or fuel injection systems on avgas engines, does not richen the mixture at transition from idle to power up or at high power settings for detonation protection. Compression ignition engines run lean by design with a permanent excess of air (the battle about rich or lean of peak is over!).

The ECU does not monitor EGT, CHT, TIT, or oil pressure or oil temperature since they are not necessary for the fuel flow management. All those parameters are displayed on the G1000, except for EGT, for the pilot to monitor and ensure operating limitations are not exceeded. After an SMA maintenance software download to a laptop computer, data from the engine control unit (ECU) can be displayed live or downloaded through a cable through an aircraft RS-232 port during inspections.

Downloaded data includes faults (if any), sensor's data, and engine operating time. This data can then be entered into a spreadsheet type program to chart engine change parameters. It can also be sent to Lycoming or Cessna tech experts to aid in trou-

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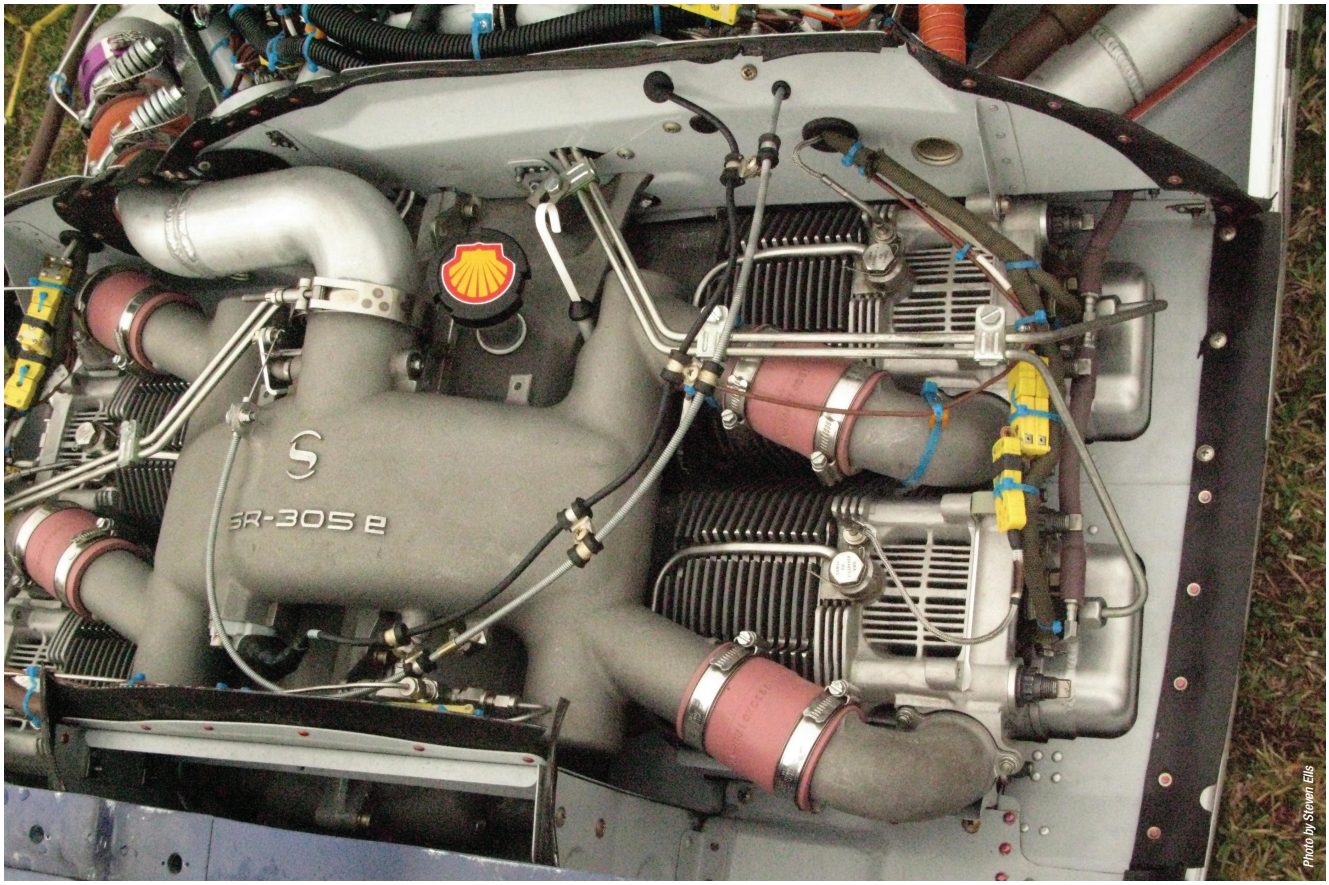

Photo by Steven Ellis

The Cessna Turbo Skylane JT-A with the top cowling removed.

bleshooting if needed. Lycoming has contracted with Cessna to support the SMA engine. This includes spare parts distribution, warranty administration, and field support.

In addition to the RS-232 data download cabling, a second specialized cable permits ECU map updates. The ECU and the continuously governed propeller results in a pilot workload that is greatly reduced — there's no mixture to adjust and no prop control knob to push and pull. Unlike avgas turbocharged engines, there is no waste gate so erosion and adjustment maintenance is nonexistent. All the exhaust gas goes through the turbine at all power settings.

However, on the far left side of the pilot's switch sub panel, there's a glow plug switch. It's used to activate an automated preheat sequence before starting the engine and provides the most significant benefit when starting in cold conditions.

ECU/engine fault modes and manual mode

All the engine sensor wiring is shielded. Engine control redundancy is provided with primary and secondary sources or sensors. If the ECU diagnostic system detects a fault in either the primary or secondary inputs, the pilot is alerted by a fault annunciation on the instrument panel.

If one sensor or component in any data leg fails for any reason, a "minor fault" light is illuminated. This lets the pilot know that there's a minor problem but that the ECU is still controlling the engine. The airplane can continue to be flown in the normal mode. After completion of the flight an A&P needs to find the fault and fix it. If the "major fault" annunciator is "on" it signals the pilot that the failure has compromised the ability of the ECU to control the engine. The pilot must switch to the manual mode of controlling the engine when the major fault annunciator comes on.

The engine control console has two levers. The left one is the power lever and has a

> **"The fuel technology used in this engine eliminates concerns about carbon monoxide, fuel mixtures, propeller control, and exhaust gas."**
>
> — Cessna Aircraft Company

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T-configuration. The right one is smaller, is red, and is the mode change lever. The switchover to manual control requires the pilot to pull the power lever back to a clearly marked spot in lever travel. The mode change lever is then moved aft to the manual backup position which disengages the electronic control from the pump, providing the pilot with direct control of the fuel flow through a cable connection between the power lever and the fuel pump. A power chart must be referred to to adjust the manual lever to the correct manifold pressure. There's no requirement to land immediately if a fault light is illuminated.

A sight not seen on most airplanes with piston engines.

Economy and ease of operation

According to Saint Loup, a fuel consumption rule-of-thumb for this engine is approximately 5 gallons per 100 horsepower. "The maximum full power fuel consumption at sea level on an ISA standard day is 12.2 gallons per hour which is approximately half the fuel flow of the turbocharged engine it replaces," says Saint Loup. This translates into big advances in range. Saint Loup cites figures showing that the SMA engine will beat the avgas engine in the T182T by 65 percent in range if both engines are flown at extremely high power (90 percent power setting). At more normal cruise power settings the number is around 40 percent.

Cessna should be applauded for bringing the Skylane JT-A to market. Small airplanes have always been vital in the growth of commerce. A "kerosene" burning airplane such as the Skylane JT-A will be the seed that sprouts small commercial aircraft service in countries that lack the avgas distribution and availability enjoyed by U.S. owners and operators.

Required maintenance plan

The SMA SR305-230E-C1 engine in the Cessna Skylane JT-A does present new maintenance challenges to A&P technicians. The Type Certificate Data Sheet (TCDS) is under Societe de Motorisation Aeronautiques.

100 hours:

1. Run up engine with laptop computer connected and record ECU data.
2. Change engine oil and filter.
3. Pull magnetic plug in sump check for metal — pictures in maintenance manual illustrate maximum allowable metal
4. Inspect oil filter — it's not a spin on, you can't cut it apart but the folds of the screen material

can be spread for inspection and it can be back flushed into a coffee filter or paper towel.

5. Visual inspection every 100 hours to check for:

a. corrosion — the engine is not painted and,

b. integrity of wiring and electric plugs. Unlike much of the non-ignition system wiring on avgas engines that is for information gathering for engine monitors and does not affect engine operation, every wire and plug on the SMA engine must be absolutely airworthy for proper engine operation.

6. Check turbo charger blades and housing for damage; when turbo time in service reaches 600 or 1,800 hours check shaft for axial play every 100 hours until TBO

7. Check and clean or replace inlet air filter

200 hours or at first 50 hours for new or over-hauled engines:

• Everything in 100-hour inspection and:

• R and R spin-on engine fuel filter (Hand Tight Only)

• Clean turbocharger oil return check valve

600 hours:

• Everything in 100-hour and everything in 200-hour services and:

• Compression check

• R and R injectors (Exchange program; or can be tested at service centers with proper equipment)

• If turbocharger axial play is out of limits, replace bearing pin

1,200 hours:

• Everything in 100-, 200-, and 600-hour servicing and inspections and:

• R & R Turbocharger (overhaul)

• Inspect electrical fuel control motor; replace if out of limits

Every 6-8 years:

• Replace battery in ECU by exchange (can't replace in field)

2,400 hours/12 years:

• R & R Engine (field overhauls are not approved)

Cessna has suspended production of the T182T, the turbocharged 6-cylinder 235 horsepower Lycoming TIO-540 AK1A powered 182.

Tools, manuals and lubricants

Special tools are required for some maintenance operations. One kit includes data download and ECU update cables. Kits are also available for tools needed during cylinder removals, and tools for fuel pump control unit and turbo-charger maintenance.

Engine parts, tools and supplies can be obtained through Lycoming and Cessna service centers. Maintenance, parts and tools manuals are available from ATP (www.atp.com) and are listed under SMA. Engine oil is Aeroshell Diesel Ultra 5W-40 synthetic. It comes in one liter bottles; to match the engine dipstick that is also marked in liters.

Additional tips:

1. Every wire and connector on this engine is critical for flight safety. Do not ignore routing, clamping and connections

2. Do not clamp or tie wrap anything to the fuel delivery tubing between the fuel pumps and the individual injectors. Fuel pressures in these tubes can reach as high at 16,000 psi; no wear, abrasion or cracking is permitted. **AMT**

For more information visit www.smaengines.com.

Steven Ells worked as a line mechanic and director of maintenance for several DC-3 freight operators, and owned a small maintenance shop in Alaska. Steve has been a tech rep/editor for the Cessna Pilots Association, associate editor for the Aircraft Owners and Pilots Association (AOPA), and now keeps busy as a free-lance aviation writer, maintaining and flying his 1960 Piper Comanche, and helping a neighbor restore a 1939 Piper J-3. He lives on the Central Coast of California. Steve can be reached by visiting www.EllsAviation.com.

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MAINTENANCE

Tips for the Aging GA Fleet

With proper maintenance and upgrades most will continue to operate in a safe airworthy condition well into the future

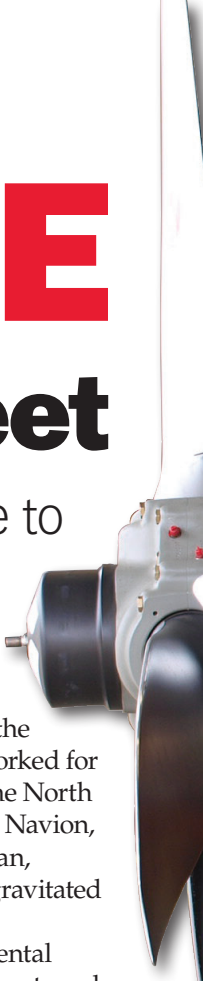
By Ronald Donner

Ronald Donner has spent his entire life devoted to aviation and he holds FAA certificates as an A&P/IA, and a Commercial Pilot with Single and Multi Engine Land, Instrument Airplane and Glider ratings.

Visit any general aviation airport and you'll undoubtedly find a variety of aircraft and a variety of aircraft ages. According to a General Aviation Manufacturers Association 2010 report, there are approximately 114,000 active personal use single engine piston aircraft, and 16,000 two engine piston aircraft in the United States. When you add the number used for business purposes the total is 155,000. The average age of the GA fleet in the United States is estimated to be 40 years old.

Vintage and antique aircraft have undergone restorations and many are in better condition today than when new. But what about the 30- to 50-year-old Piper, Cessna, Beechcraft, or Navion, built using aluminum and other materials of that era? With proper maintenance and upgrades, most will continue to operate in a safe, airworthy condition well into the future.

To learn more about maintaining the aging GA fleet, I visited Chris Gardner and his crew at Sierra Hotel Aero Inc. located at Fleming Field in South St. Paul, MN. Sierra Hotel Aero has become known as the Navion maintenance and restoration specialist offering routine and major maintenance and upgrades to keep this aging aircraft safely flying. I first ask Gardner why the Navion and he shares, "Years ago I worked for a company in California rebuilding the North American Aviation P51 Mustang. The Navion, also originally built by North American, shared similarities and I guess I just gravitated toward it."



In 1998 Gardner received Supplemental Type Certificate (STC) approval for an external baggage door, and in 2001 soon after moving to Fleming Field he received Parts Manufacturing Approval (PMA) for the door. At the end of 2002 he purchased the Navion Type Certificate (TC) along with all the drawings and production tooling. Currently he has PMA on most major assemblies for the Navion. To say that Sierra Hotel Aero only maintains these aircraft is an understatement. One Navion in the shop, shored in special made cradles, had the entire fuselage and wing lower skins replaced.

Gardner believes that during the 1960s and 1970s owners and maintainers of these types of aircraft didn't expect they would be flying another 40 or 50 years; after all they were already 20 years old. Perhaps this created a thought that many aircraft of this period were eventually destined for scrap and major maintenance and upgrades weren't needed. He explains the original documentation and history for the Navion indicates it was intended to last approximately five years.

Anyone working on older GA aircraft have experienced the aftermath of rodents when aircraft sit idle.

Photo provided by Sierra Hotel Aero Inc.

Replacement and substitute parts

Gardner shares that corrosion is common and regularly corrected but says the biggest challenges are the mechanical and electrical components and systems. Many are just worn out, have not been properly maintained,

Lyle Kiecker with one of the many Navion aircraft maintained at Sierra Hotel Aero.

or have been neglected over the decades due to several reasons including lack of direct replacement parts.

Original components such as wheels, brakes, valves, and hydraulic actuators are simply worn out and no longer serviceable. The supply of new/old stock has dwindled and reliance on STCs and PMA parts is a must. When preparing for modifications and replacement parts and materials, he stresses the importance with providing traceability for data and materials; basically everything you do relating to substitution and replacement parts and materials. He says, "Clearly describe the process you intend to use and include material data, prior approvals, and Instructions for Continued Airworthiness." Using data from previous approvals for a basis of a new approval is important.

Using fuel systems as an example Gardner describes how selector valves eventually wear out and hoses and lines deteriorate. New replacement valves have been developed and approved but this is only one part of the system. He also explains, that in the Navion, the fuel system cross feed tubes from the two main-fuel tanks to the header tank are rubber hose, and not easily accessible, and many times items like these are overlooked because of the appearance using a flashlight and inspection mirror they are OK.

Electrical systems are another area that needs special attention. Over the years electrical instruments, avionics, and components are replaced or added, and associated switches, circuit breakers, and wiring have either been replaced, repaired, spliced, or at times left original and can become a real mess.

Gardner says, "We've found flight control cables with a heavy coating of oil or a coating intended to protect cables when often times this only hides cable corrosion."

Best practices and guidance

When asked what best practices he could offer Gardner shares, "Inspect and document everything. Determine which items are airworthiness and safety of flight items, and which items can be considered *nice to fix*. Inspect all old repairs, look at their prior approval basis, and ask and answer the simple question, are they good quality approved repairs? If so leave them. And most important review the entire aircraft and your findings with the owner so there are no surprises later."

Earl Lawrence, manager of the FAA's Small Airplane Directorate Aircraft Certification, shares some of his views. He says, "New tech-

nology has migrated down into the aging systems of many older GA aircraft." Lawrence describes what he feels are three important items on the subject of maintaining older aircraft. They are: Keeping old systems properly working with reduced knowledge of these older components and systems; interface issues between new components and old systems particularly with electronics and avionics; and training of AMTs on modern technology components, systems, and materials, and how new technologies filter down into existing systems and aging aircraft.

Lawrence explains how the FAA has looked at numerous Airworthiness Directives as a result of interface related failures. Many, if not most, older GA aircraft have seen equipment changes, modifications, and significant repairs. Some interface problems can be easily detected such as chafing or rubbing of wire bundles or flight control cables, but interface issues with electrical or mechanical systems are more difficult to detect.

As for routine maintenance Lawrence suggests exercising items you would not consider on a newer aircraft such as circuit breakers to determine if they still function properly. He adds, "What's wrong with removing, inspecting, and protecting wing attach bolts every 20 years." He also stresses the importance of data and encourages AMTs to report all examples of fatigue cracking, corrosion areas, as well as manufacturer's quality escapes.

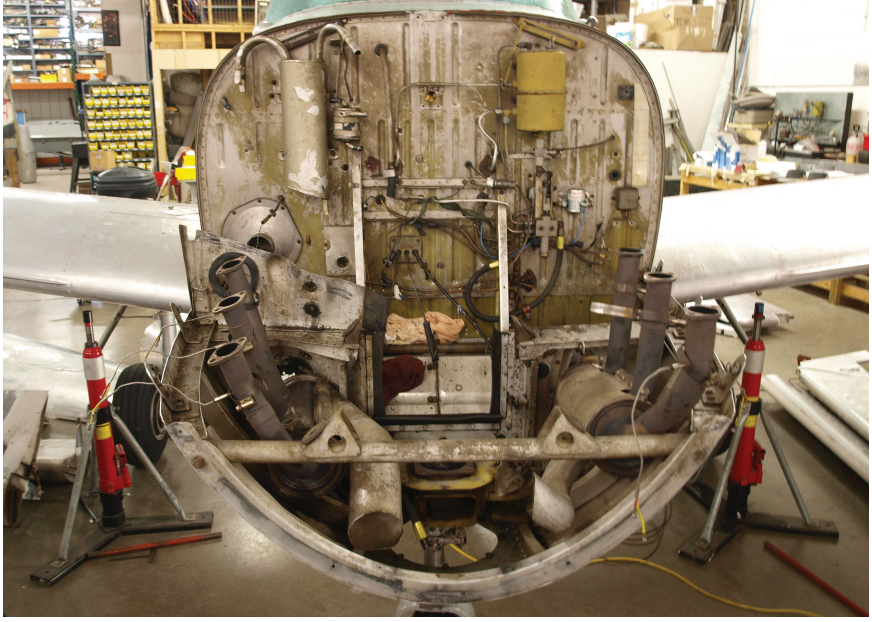


Photo provided by Sierra Hotel Aero, Inc.

Special inspections may be needed because of airplane history and use.

Information is available

The FAA as well as aircraft type clubs are great resources for information into inspecting and maintaining aging GA aircraft. Here are just a few applicable documents I found on the FAA web site:

Advisory Circular (AC) 23-27 titled "Parts and Material Substitution for Vintage Aircraft" is intended to make suitable replacement parts selection easer and expedite the approval process.

Best Practices for Maintaining Aging General Aviation Airplanes released in September of 2003 was the result of an effort between the FAA and several GA groups, and provides guidance about maintaining the airworthiness of aging single-engine GA airplanes. Among other points this guidance makes, one of the best practices I found applicable is called the Special Attention Inspection. According to this document, as an airplane ages the normal annual inspection minimum requirements specified in 14CFR 43.15 Appendix D or even by the manufacturer may not be enough, and inspection methods and techniques may change from what was originally required. Special inspections may be needed because of airplane history and use, inactivity, storage conditions, previous modifications, or poor maintenance over the decades. This document includes an Aging Airplane Inspection & Maintenance Baseline Checklist and states special criteria pertaining to a specific airplane or type can and should be included.

Roadmap for General Aviation Aging Airplane Programs released by the FAA in September 2006 is intended to be a guide for the FAA's future efforts to proactively manage the overall airworthiness of aging GA airplanes.

Even though many older GA aircraft have undergone upgrades and extensive repairs, they can be challenging to maintain and require a keen inspection eye, information, parts and material substitution, patience, and at times creativity.

AMT

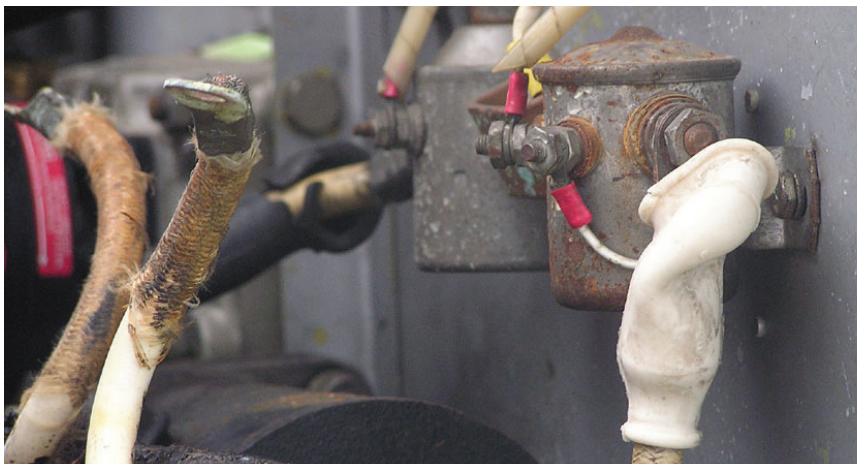


Photo provided by Sierra Hotel Aero Inc.

Old or neglected components and wiring are parts of an aging electrical system.

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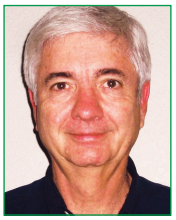
Tips From Lycoming Technical Support

A list of the most frequently asked questions and issues from customers and a list of field practices that Lycoming Engines would like to see addressed



By Charles Chandler

Charles Chandler began his aviation career as a junior mechanic for American Airlines and retired after 27 years of service.

AMTs are usually the tip of the aircraft maintenance iceberg with huge support organizations lying beneath to ensure we have the knowledge, training, tools, and equipment necessary to keep our aircraft safe and serviceable. This support comes from all directions and in many forms: manuals, service bulletins, regulations, best practices, tips, conversations with peers, and OEM technical staff.

Aircraft Maintenance Technology magazine asked Michael D. Everhart, vice president of products & services delivery with Lycoming Engines, for a technical discussion with him and Lycoming Technical Support about engine maintenance. In turn Everhart requested Technical Support to compile a list of the most frequently asked questions and issues from customers and a list of field practices that Lycoming Engines would like to see addressed, eliminated, or changed.

Lycoming is a major U.S. manufacturer of horizontally opposed, air-cooled, four-, six-, and eight-cylinder aircraft engines. Headquartered in Williamsport, PA, the company has produced more than 325,000 piston aircraft engines and powers more than 65 percent of the new general aviation aircraft. It has produced aircraft engines for 84 years and as the industry leader, continues to improve the performance and value delivered to its customers. In November of 2010, Lycoming received the Shingo Prize for Operational Excellence, referred to as the "Nobel Prize for Manufacturing."

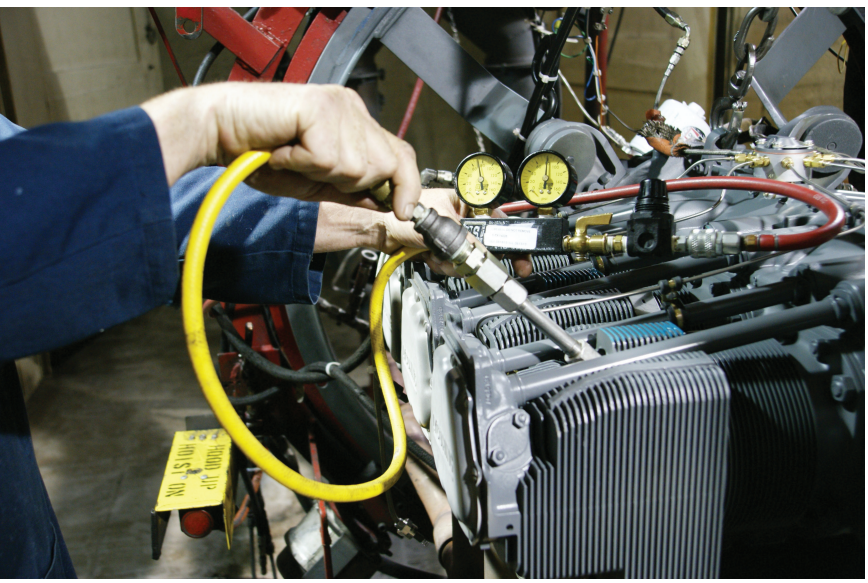


Photo provided by Lycoming Engines.

A most frequently asked question relates to acceptable criteria for cylinder compression checks.

Most frequently asked questions and issues from customers

Question: *How do we interpret cylinder compression readings? Based on Lycoming Technical Publications SI-1191, what are the acceptable criteria for cylinder compression checks?*

Lycoming: Start and run the engine until cylinder head (CHT) and oil temperature are stabilized then stop the engine and immediately conduct the compression test using an instrument with a specific orifice diameter of 0.040. There should not be more than a 10 to 15 psi difference between cylinders. If one cylinder tests below 65 psi, then troubleshoot to determine where the compression leak is occurring. Listen to the breather tubes or oil filler tube and if you hear leakage, the problem is the rings. Listen to the intake and if you can hear leakage then it would be an intake valve. Do the same for the exhaust.

Question: *When does a propeller strike require*

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an engine tear-down inspection?

Lycoming: The propeller OEM refers AMTs and owners and operators to Lycoming. Our Service Bulletin 533 is the defining document for the following situations:

With the engine running or not, if a strike occurs that results in propeller damage where a repair is required, an engine tear-down inspection is also required by Lycoming.

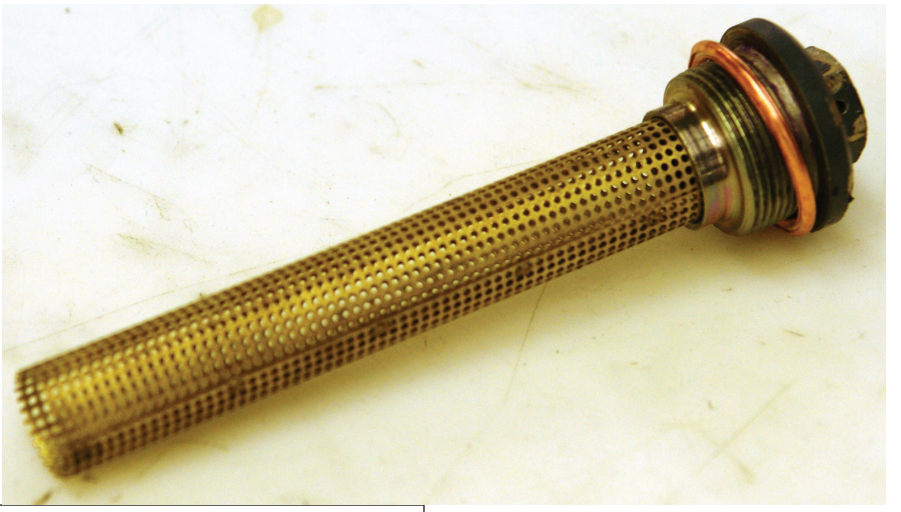

Photo provided by Lycoming Engines.

A typical Lycoming engine sump oil suction screen.

For example, if while being towed the prop hit the hangar door and had to be repaired, that would warrant an engine tear-down inspection as well.

With the engine running, any strike with a solid object that causes a sudden decrease in rpm and requires a repair to the propeller requires an engine tear-down inspection.

With the engine running, a strike with a yielding substance, like tall grass or water that results in a sudden drop in rpm will require an engine tear-down inspection.

If any of these events have occurred, Lycoming requires the tear-down inspection be done before the next flight using its approved inspection checklist.

Question: *Why don't the parts I ordered from the Lycoming Illustrated Parts Catalogue (IPC) match the parts in my engine?*

Lycoming: Some of the parts catalogs in the field are out of date. Some of our engines have been in service for years and during that time parts evolved, suppliers changed, and pictures were updated resulting in revisions to our parts catalog. Gaskets are a great example. The parts manufacturer will change the design, profile, and composition material of the gasket so what used to be Part A gasket has been superseded and now may be Part C. This is confus-

ing and a customer could think that they had received the wrong part. Lycoming's practice is to incorporate and communicate part number updates via service bulletins, service instructions, and service letters as an interim amendment to the periodic IPC revisions. To avoid problems, ensure that Lycoming's and all service providers' IPCs are current by ordering their catalog revisions.

Field practices Lycoming Engines would like to see addressed, eliminated, or changed

Practice: During the course of regular oil and oil filter changes, the suction screen inspection is frequently overlooked.

Lycoming: Most likely it is overlooked because it can be located in different places and be a different shape based on the engine model. Inspecting it is vitally important because these screens capture large debris and prevent it from entering the oil pump. Debris in the suction screen is an indication that your

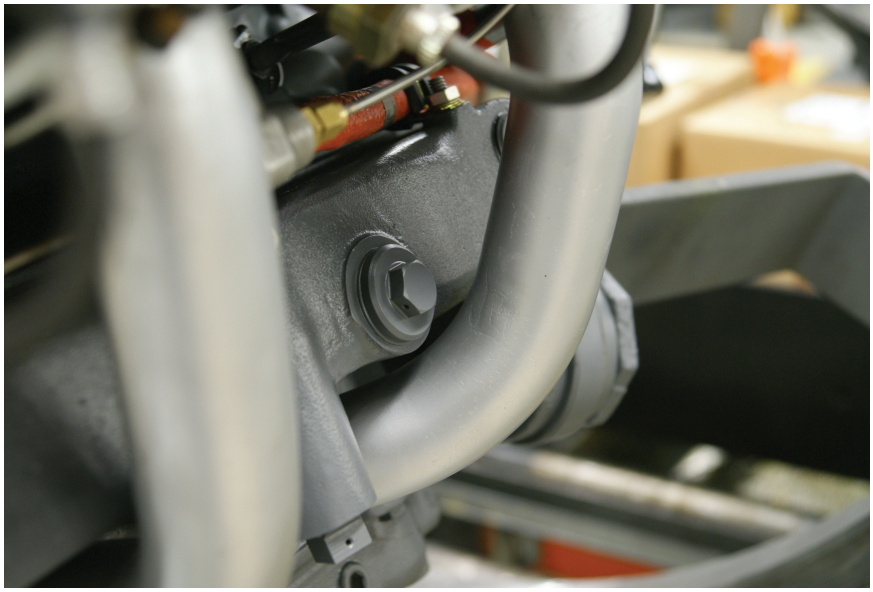

Photo proved by Lycoming Engines

During the course of regular oil and oil filter changes, the suction screen inspection is frequently overlooked.

engine has other problems that need further investigation.

Practice: An engine is running a high cylinder head temperature (CHT) and the normal suspects have been ruled out but not the engine baffling.

Lycoming: Service providers frequently undervalue the importance of "tight" baffling and its impact on proper engine cooling. We suggest an inspection of the sheet metal baffling with stapled seals that is attached by the airframe OEM to the engine that directs cooling air over the engine. If these baffles are missing, cracked, or have worn seals, the engine cooling is compromized. These baffles and associated seals conform to the cowling and must be intact and serviceable, or be replaced.

Practice: After an engine has experienced metal contamination, steps are frequently overlooked before returning an engine to service.

Photo provided by Lycoming Engines.

Disassemble the engine oil filter and carefully inspect the oil residue for any metal particles.

Lycoming: We occasionally see engines where service providers have overlooked checking propellers, governors, and oil coolers. We also suggest that you review the component or aircraft manufacturer's requirements for continued airworthiness. Metal particles can migrate to these airframe components and contaminate the oil systems the next time the engine is operated. When metal contamination is known or suspected, those items must be checked and flushed as well. In particular AMTs need to send the oil cooler out to be flushed by a service provider authorized to certify that the cooler is clean and approved for return to service.

Practice: When refurbishing rocker arms, or rocker arm tips, the original geometry is not always maintained as it relates to the valve cap interface.

Lycoming: While the overhaul manual does allow the replacement of worn rocker arm bushings, no resurfacing of the rocker arm tip is permitted. Replacement of the rocker arm assembly is required whenever the tip exceeds the wear limits provided in the overhaul manual as this is an airworthiness issue. Unauthorized repairs may result in misalignment or side loading and can result in a broken valve stem.

Aircraft Maintenance Technology: Lycoming has been in business a long time and there are thousands of your engines in service. How important is it that AMTs and services providers have and are using the most current Lycoming Technical Publications?

Lycoming: It is required and necessary to have the recommended manuals to maintain standards and specifications and follow the latest service instructions and OEM best practices. It is extremely helpful to have the current technical publication(s) in front of you so when you call Lycoming Technical Support we are looking at the same information. This helps to troubleshoot and solve complicated problems quickly. Contact Lycoming (lycoming.textron.com/support/publications) or Aircraft Technical Publishers (ATP) for the most up-to-date overhaul manuals, operator's manuals, illustrated parts catalogs, bulletin/letter/instruction, and special publications.

Aircraft Maintenance Technology: What information should AMTs and other maintenance service providers collect and have available before calling Lycoming Product Support?

Lycoming: First and most important is the engine serial number. All service data and maintenance history is tracked by the serial number.

Other important customer information:

- Caller's name, organization, telephone number, mail, and email address
- Engine hours
- TSO hours and who performed the last overhaul, Lycoming or another service provider?
- Name of the aircraft owner and when the aircraft and engine were acquired. If the caller is not representing the original owner, then please provide the name of the previous owner. **AMT**

Lycoming Technical Support hot lines are: Toll free (877) 839-7878 and local (570) 327-7222.

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Aging GA Aircraft

How old is too old?

By John Goglia

John Goglia has 40+ years experience in the aviation industry. He was the first NTSB member to hold an FAA aircraft mechanic's certificate. He can be reached at gogliaj@yahoo.com.

As the general aviation aircraft fleet ages, mechanics, and IAs especially, are increasingly faced with the question whether the aircraft in their shop is just too old for them to properly inspect and sign off. Many of these aircraft are not just up there in decades — 30, 40, and 50 years is not uncommon any more — but have also suffered from the economic slump that hit aviation especially hard after 9/11 and has kept many GA pilots, and their aircraft, grounded for long periods of time. (When I talk about aging aircraft in this article, I'm not talking about the meticulously maintained aircraft of collectors.)

The combination of an aging aircraft that has sat for long periods of time presents a particular challenge to mechanics, especially IAs signing off on annual or 100-hour inspections.

Where and how the aircraft has been stored can be critical to the condition of the aircraft but difficult to discern from the aircraft records or even from a detailed inspection. Problems caused by humidity or salt air or snow and ice might be hidden and difficult to find even with an in-depth inspection. Add to that an aircraft's age and the problems for a mechanic trying to do these inspections are compounded.

Where and how the aircraft has been stored can be critical to the condition of the aircraft but difficult to discern from the aircraft records or even from a detailed inspection.

What's a mechanic to do?

At the same time that inspecting these aircraft can be a challenge for mechanics, those inspections may also be their bread and butter. A lot of mechanics' economic survival depends on keeping these old birds in the air. So what's a mechanic to do?

Saying no to an aging aircraft may mean the loss of significant revenue for the airman.

Saying no to an aging aircraft may mean the loss of significant revenue for the airman. At the same time, taking on an aircraft with age-related issues can mean putting the mechanic's license at risk if an incident or an accident occurs and the FAA determines that the mechanic missed something during, say, an annual inspection.

The cost of fighting the FAA or surrendering your A&P for a suspension can both be expensive choices that an airman may be able to avoid by realistically reviewing a few key factors before agreeing to maintain an old aircraft.

- Does the general condition of the aircraft jive with the aircraft records? In other words, does it look like the prior work done on the aircraft was properly recorded, inspections were timely, ADs properly accomplished?
- Do the flight logs indicate long periods of time on the ground over a long period of time? If so, ask how the aircraft was housed during those periods. Take the time to look at the climactic conditions in that area during the time period the aircraft was on the ground.
- Can you realistically charge for the time it will take to completely and thoroughly comply with Appendix D of FAR 43, given the age and condition of the aircraft? If you can't, the tendency is often to take short cuts; aging aircraft can be much less forgiving of those short cuts.

These might not be bad questions to ask any time you do an inspection. AMT

More on S-LSA Maintenance

Part 1: Manufacturers' authority under the ASTM Light Sport Consensus Standards vs. the FARs

By Ed Leineweber

Ed Leineweber is an aviation and business attorney practicing in Madison, WI. He is a CFII and holds the LSRM certificate. A retired Wisconsin Circuit Court Judge, he previously operated two FBOs and managed both airports.

My friend Doug Hereford, an A&P/IA with a particular interest in the development of maintenance practices under the Light Sport ASTM Consensus Standards, contacted me after the publication of my article in the July 2012 issue of *Aircraft Maintenance Technology magazine*, "Opportunity With Light Sport Aircraft Maintenance Under the ASTM Consensus Standards," a primer on the ASTM LSA Consensus Standards system.

Hereford took issue with several statements in my article about the extent of manufacturer authority to dictate who is authorized to perform maintenance and when such maintenance must be performed. It is his position that S-LSA manufacturers are overstepping their authority in these areas, and creating safety concerns in the process.

Providing maintenance for Special Light Sport Aircraft is increasingly important for many general aviation maintenance shops.

Photo by Ron Donner

Since Hereford's well-researched and articulated ideas on this topic have been accepted in principal by the FAA Office of Legal Counsel, I thought it worthwhile to bring them to the attention of the AMT community. While this controversy is far from definitively resolved, at this point I am inclined to believe that Doug has it right.

Background: Conflicting legal authority

We are all familiar with the Federal Aviation Regulations, adopted pursuant to an administrative rule-making process authorized by Congress to implement the powers granted by it to the FAA. We might not be as familiar with the origin of the ASTM Consensus Standards.

Two federal laws, also adopted by Congress, encourage the use of industry-developed consensus (voluntary) standards in federal government regulatory and procurement activities. These are the National Institute of Standards and Technology Act (NISTA), and the National Technology Transfer and Advancement Act (NTAA). The ASTM Light Sport Aircraft Consensus Standards were developed pursuant to these federal laws.

While these two maintenance systems can co-exist in the industry, it would be much easier on field technicians if the same terms were at least consistently defined.

Consensus standards adopted through this process are not approved by the FAA, but are instead "accepted." (FAA personnel sit on the various committees and participate in development of the standards.)

You can already see how things are starting to get murky. Perhaps none of this would make a difference in practice if it were not for the stark conflicts in terminology and directives contained in relevant FARs and consensus standards. An FAA Office of Legal Counsel letter released Feb. 27, 2012, appears to settle the issues in favor of the FARs. But since this opinion came as a surprise to many in the S-LSA community and appears to

contradict at least the spirit of the consensus standards movement as well as the explicit language of the relevant standards, both of which envision a system of manufacturer-controlled maintenance, it is fair to say that these questions are not finally resolved. Future legislation, rule-making or both is likely, if only to clarify the situation.

The details: The who, when, and how of S-LSA maintenance

The opinion expressed in the FAA OLC letter is straightforward: FARs trump consensus standards since FARs are adopted pursuant to the familiar rule-making procedure, and the consensus standards are not "approved" by the FAA, but only "accepted." So, here's what the FARs say, despite contrary language in the consensus standards.

Definitions

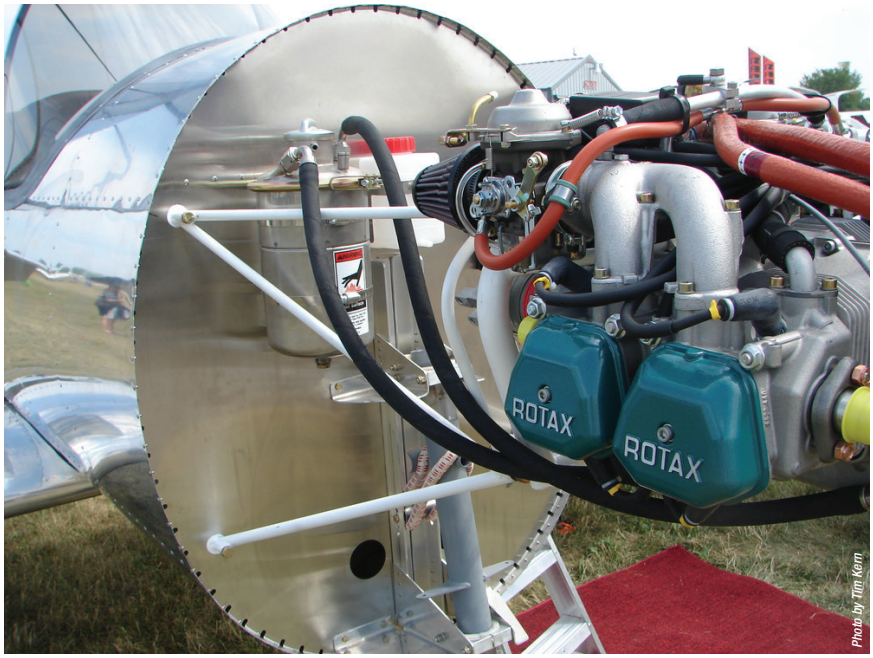
We're in trouble from the beginning. For example, FAR 1.1 defines *Major repair* as a repair (1) that, if improperly done, might appreciably affect weight, balance, structural strength, performance, powerplant operation, flight characteristics, or other qualities affecting airworthiness; or (2) that is not done according to accepted practices or cannot be done by elementary operations. *Major alteration* is similarly defined.

But ASTM Consensus Standard F2626 defines these terms as any repair, alteration, or maintenance for which instructions to complete the task are excluded from the maintenance manuals supplied to the consumer. *Minor repair, alteration, or maintenance*, terms not defined in the FARs, are defined in F2626 as any such activity for which instructions are provided in the maintenance manuals supplied to the consumer.

There are other examples of trouble arising from terms found in the consensus standards that have no similar counterpart in the FARs, or found there, but defined substantially differently. Take, for instance, the terms *heavy maintenance, line maintenance,* and *overhaul.* F2626 defines these as follows:

- *heavy maintenance:* any maintenance, inspection, repair or alteration a manufacturer has designated that requires specialized training, equipment or facilities;
- *line maintenance:* any repair, maintenance, scheduled checks, servicing, inspections, or alterations not considered heavy maintenance that is approved by the manufacturer and is specified in the manufacturer's maintenance manual; and
- *overhaul:* maintenance, inspections, repairs, or alterations that are only to be accomplished by the original manufacturer or a facility approved by the original manufacturer of the product.

These terms the first two of which are unrecognized in the FARs, become important when we look at the authority of AMTs under the FARs to conduct such procedures, and the efforts on the part of S-LSA manufacturers to limit their authority. The third term, "overhaul," has a well-established definition familiar



The popular Rotax engine in this Canadian-built SAM LS is widely used on both Special and Experimental Light Sport Aircraft.

to AMTs, found in FAR 43.2, that is very different from the ASTM definition.

While these two maintenance systems can co-exist in the industry, it would be much easier on field technicians if the same terms were at least consistently defined.

AMT authority: FARs vs. consensus standards

In Hereford's view, apparently shared by the FAA lawyers, you don't have to look past the provisions of Parts 43, 65, and 91 to answer the who, when, and how questions of aircraft maintenance, whether it's type-certificated Standard Category aircraft, or S-LSAs with their Special-Light Sport Aircraft airworthiness certificates. Under this view, except for the how questions, restrictions on AMT authority found in the ASTM consensus standards, manufacturers' maintenance manuals or other instructions, or experience and training requirements specified by manufacturers, to the extent that they conflict with or purport to limit the authority granted under the FARs, are simply invalid and may be ignored by the AMT in the field.

More to come

Next month we will take a brief look at a few specific FARs to flesh this view out. We'll also offer some suggestions on what an AMT is to do in this confused situation. **AMT**

Ed Leineweber is an incurable Bowers Fly Baby aficionado; currently completing a Fly Baby project and restoring a nearly 50-year-old Fly Baby. Ed regularly writes a SP/LSA column for the Midwest Flyer Magazine. He can be reached at eleineweber@bmrlawyers.com and (608) 604-6515.

Foreign (Non-U.S. Citizen) A&P Applicants Followup

Title 14 CFR Part 65 mechanic certificates/ratings

By Denny Pollard

Denny Pollard is a retired FAA airworthiness inspector from the Western Pacific Region. He lives in Yamagata Prefecture, Japan, and can be reached at stacheair@gmail.com.

As a followup to my article "Foreign (Non-U.S. Citizen) A&P Applicants" in the May 2013 issue of *Aircraft Maintenance Technology*, I have been requested to discuss non-English speaking A&P mechanics with certificates "Valid Only Outside the U.S."

Having a certificate "Valid Only Outside the U.S." are special certificates and requires different procedures for both the FAA inspector, Designated Mechanic Examiner (DME), and the applicant.

After an applicant passes the written exams, the foreign applicant endorsed in the United States must take the practical test with a DME located in the United States in most cases. This only applies if you were signed endorsed by a Flight Standard District Office (FSDO) inspector. However, if you were endorsed by an International Field Office (IFO) inspector you can take the oral and practical test in your native language outside the United States. It sounds confusing, but keep reading.

The Federal Aviation Administration has procedures that are unique to foreign applicants located outside the United States. The current edition of FAA Order 8900.2 of the General Aviation Airman Designee Handbook establishes certification policy.

This policy does not apply to foreign applicants in the United States. Any applicant who is in the United States and meets the English language and experience requirements is entitled to take the examinations for a mechanic certificate. The current editions of Advisory Circulars (AC) 65-2, Airframe and Powerplant Mechanic's Certification Guide and AC 65-30, Overview of the Aviation Maintenance Profession provide further guidance regarding foreign applicants within the United States.

When foreign nationals are physically located outside the United States at the time of the examination, the FAA IFO inspector must determine that the mechanic certificate is needed for the continued airworthiness (maintenance) of U.S.-registered civil aircraft and that the applicant is neither a U.S. citizen nor a resident alien.

For an A&P authorization, the FAA must determine the applicant's ability to read, write, speak, and understand the English language. Applicants who do not meet this requirement but are employed outside the United States by a U.S. air carrier may be eligible if they present a certified statement (original document) from a company official or supervisor attesting to their employment status. Certificates issued to applicants shall be endorsed "Valid only outside the United States" and ensure the following are accomplished:

- The certificated U.S. air carrier has submitted documentation regarding the applicant's employment status and need for certification.
- The knowledge test is accomplished in accordance with Order 8080.6 via the Computer Medium, current edition, as it relates to applicants who do not read, write, speak, or understand English.
- The oral and practical tests are administered by an inspector or examiner (DME) in the applicant's language, or through the use of a neutral interpreter selected or accepted by the inspector or examiner.
- Applicants must be notified that the authorization to test is applicable only to Designated Mechanic Examiners (DME) who exercise privileges in the International Field Office (IFO) and the Flight Standards District Office (FSDO). Should the

applicant wish to test with a DME in another district, additional FAA approval will be required.

The FAA must also determine the applicant's experience eligibility. The FAA inspector must ensure foreign applicants provide a signed, dated, detailed statement substantiating the specific type and duration of experience.

- Determine that these statements come from both an employer and either the airworthiness authority of the country in which the experience was gained or an airworthiness advisor of ICAO.
- The FAA will not accept information that cannot be verified or documented. The FAA does require each document presented to verify experience to be a signed and dated original, traceable to the originator.
- If the foreign civil authority will not provide the statement listed above, the inspector may determine eligibility through whatever means he/she deems appropriate.

Note: If the applicant shows only foreign military work experience on aircraft that are not manufactured to U.S. standards, that is not an issue, the experience still has to meet §65.77.

In addition I should point out that Title 14 CFR part 187, appendix A, prescribes the methodology for computation of fees for certification services performed outside the United States. The actual fees are in the current edition of FAA AC 187-1, Flight Standards Service Schedule of Charges outside the United States. These fees will be charged to all applicants for such services outside the United States, whether U.S. citizens or foreign nationals. The payment of fees is addressed in §187.15. The IFOs do charge for all services outside the U.S. including A&P authorizations.

For additional information on foreign mechanics it can be found in FAA Order 8900.1 Volume 5, Chapter 5, Section 3. This order is available on the Internet at: http://fsims.faa.gov.

At the time of this article, there is one DME located in Germany that is allowed to test foreign applicants out of the United States in his approved FAA testing facility. A DME can be approved to test in a foreign country if they have a facility, tools, and equipment that has been inspected and accepted by the IFO that has oversight of the host country. In addition, the DME will have to pay a fee to the FAA for this inspection, which is passed on to the applicant or applicants as a cost of doing business in charging a reasonable fee for services in accordance with FAA Order 8900.2. **AMT**

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Denny Pollard was the FAA maintenance field Inspector of the Year in 2004 and holds the ratings Airframe and Powerplant (A&P), Senior Parachute Rigger and two authorizations Designated Mechanic Examiner (DME) and Inspection Authorization (IA). He teaches an accepted Inspection Authorization refresher course on behalf of the FAA. He is an author of two aviation books, both of them have sold worldwide and reflect his devotion and interests in aviation safety.

Criminal Liability and Aviation Safety

Can they exist together in accident investigations?

By Stephen P. Prentice

Stephen P. Prentice is an attorney whose practice involves FAA-NTSB issues. He has an Airframe and Powerplant certificate and is an ATP rated pilot. He is a USAF veteran. Send comments to aerolaw@att.net.

In November of last year a French appeals court overturned the involuntary manslaughter conviction of Continental Airlines in the Concorde crash disaster of 2000. It also overturned the conviction of a Continental mechanic who had been involved with the repair of part of a Continental DC-10.

The part came loose, fell on the runway and was hit by the Concorde on its takeoff. French aviation authorities concluded that this caused the Concorde to catch fire and crash. The court found that the piece of metal left on the runway led to the events that caused the crash. They said however that the criminal manslaughter charges were unjustified. Continental was required to pay a civil fine of $1.3 million.

This was of course France … which, like many other European countries, treats all transportation accidents as a crime as well as a civil accident until proven otherwise. France is one of a few countries that routinely seeks criminal indictments in transportation accidents, regardless of whether or not there is evidence of criminal intent or negligence.

Most airlines and in particular ours, the NTSB, and the aviation safety community were alarmed at the indictments. They all maintained that the threat of prosecution in accident cases discourages witnesses from providing information to crash investigators. Well, what else is new? Would you give out information that might contribute to your criminal indictment? Apparently in France and other countries the element of specific intent is not necessary for guilt. As many have said … human mistake or failure is clearly not a crime.

Air France was not found at fault in any way, but it did settle all the passengers' claims. It was not accused of any wrongdoing. It was compensated by Continental for *damage to its image*. It joined the lawsuit in order to recover money damages from Continental and it did. It settled claims by the passengers for $150 million, roughly equal to the amount of the so-called fine paid by Continental. The fatal crash was the only one ever sustained by Concorde. Flights were halted in 2003.

Valujet

Here in the USA, the case that is presumed to be the progeny and premier example of federal and state joint criminal investigation in an accident case is the prosecution of SabreTech Inc., and three of its employees after the May 1995 crash of the Valujet DC-9 in the Florida Everglades. SabreTech was Valujet's contract maintenance provider, and their employees packaged and labeled expired chemical oxygen generators and returned them to Valujet for shipment and further repair. NTSB concluded that these canisters ignited shortly after takeoff and were the cause of the crash.

This was the first large criminal investigation into the facts and circumstances of a major U.S. aircraft disaster. The State of Florida decided to join the feds in the prosecution by leveling felony murder and manslaughter charges against SabreTech on the same day that the federal government brought a 24-count indictment stating the charges against SabreTech and three of its employees for conspiring to falsify maintenance records, violating haz-mat regulations and unlawfully placing destructive devices aboard a commercial aircraft.

The defendants were convicted but the convictions of SabreTech and its employees in the trial court were vacated on appeal. The appellate court said that the repair people made mistakes, but they did not commit crimes. Further, the court said that they did not intend to kill the victims of the accident. Fortunately, our criminal justice system still requires a specific intent to do harm. It was a clear slap in the face of the criminal prosecutors.

The fear that most in the aviation safety investigation field have is that as time goes on the trend toward criminal investigations

in aircraft accidents continues to become a routine part of the process. Many feel that this will direct more effort toward the criminal investigation of the accident rather than finding the probable cause of the accident.

The U.S. Attorney in Florida, after the Valujet case, stated that criminal prosecution of aviation professionals after an accident would be a top priority of his administration. We can only wonder where he is on the subject today?

Payne Stewart case

The third case we look at is another Florida case. In April 2000, the FBI and local police and state officers raided the premises of Sunjet Aviation Inc. This was after one of Sunjet's Learjets crashed apparently as a result of the emergency oxygen system not working when all aboard died as a result of oxygen deprivation.

Payne Stewart, a prominent pro golfer, was killed along with the crew and other passengers when the aircraft, on autopilot, ran out of fuel and crashed in an open field.

On entering the Sunjet facility at the Sanford, FL, airport, the officers gathered up all the operating records and logs of all the aircraft on site, and seized other property including computers. The employees were frightened and intimidated and the affair was instrumental in the shutdown of the business.

Both of the cases resulted in no convictions and the cases were subsequently dismissed. The whole matter was slowly reduced to an FAA enforcement action for minor regulatory violations.

Again, a totally useless criminal proceeding that resulted in destroying a going business and upsetting the lives of many people. In addition, the finding of the probable cause of the accident through a secure investigation was delayed and impeded by the continuing presence of law enforcement on the scene threatening witnesses and generally delaying the investigative process to determine the cause of the accident.

Grants of immunity

The threat of criminal convictions for what are nothing but honest mistakes by professional pilots, mechanics, and others does not serve to produce cooperation in finding out the causes of accidents. The result is that nobody wants to talk and provide information. Their lawyers would clearly suggest no response to any questions.

When accident investigators interview people involved after an accident, the lawyers would take over and prevent their clients from

saying anything. This procedure has to change if any progress in accident investigation is to produce useful results. The presence of the threat of criminal investigation after an accident must be kept at a distance and the people involved must be granted some sort of immunity from prosecution for their statements regarding the accident.

Military rules

The U.S. Air Force has led the way in aircraft accident investigation by providing for the nondisclosure of witness statements so that they may not be used for any disciplinary or criminal actions, or any other administrative proceedings. There is a logical exception for false testimony or investigative misconduct. Also they may be releasable to comply with a valid court order in a separate, unrelated criminal trial. The Air Force has relied on their *safety privilege* to withhold the release of its accident reports to the general public. This privilege continues to be a vital part of the military safety program and allows for open and unfettered statements to safety officers.

When one is promised that information provided will not be released or used against him or her, there is usually a sense of duty to be open and detailed about statements to investigative people. In the cases involving military contractors or other personnel, the courts have consistently upheld the confidentiality of witness statements provided to safety investigators. (The *Machin privilege* … Machin v. Zuckert 316 F2nd, 1963). However, in October of 2000, the Department of Defense did open the door slightly when it revised its order to allow the release of safety information only under stringent *exceptional circumstances* (after 9/11).

FAA grants of immunity

Although rarely given, the FAA has authority to grant immunity from administrative action to witnesses in accident cases when it believes it will aid in finding out the cause of an accident. In addition, the FAA has the authority to grant immunity in criminal cases to a witness when the U.S. Attorney General gives approval.

For years the Aviation Safety Reporting Program (ASRP) has provided very limited immunity from administrative sanctions to pilots and other certificated persons if a report is timely filed after an accident or other event. The FAA wants the reporter to bring to their attention facts that might prevent future accidents. However, there is

no immunity provided for criminal actions, lack of qualifications, or intentional actions. An ASRP report should however always be filed under all circumstances where there is a threat of administrative enforcement action, even if late. It can't hurt and may help.

The FAA has also provided several other programs that provide some protection to the provider of information. One is called Flight Operations Quality Assurance (FOQA) and the other is called the Aviation Safety Action Program (ASAP) (AC 120-66).

Under FOQA, air carriers routinely provide data from on board recorders to the FAA. This is designed to enhance their operational safety, training effectiveness, procedures, maintenance, engineering, and ATC procedures. Analysis of this data is designed to detect unsafe practices or operating procedures early to allow timely intervention to prevent accidents. This program has been marginally successful in providing immunity protection from administrative action. There is no witness immunity provided in criminal investigations in the statute but it could be granted in certain cases. Since this is a voluntary program some carriers do not participate for fear of divulging proprietary information to competitors.

ASAP provides employees and participating air carriers and repair stations with immunity from any actions when they report safety issues and or events that are considered dangerous and could lead to accidents. The report contents cannot be used for any purpose in any enforcement action. There is no provision for criminal case witness immunity.

The CAS program cited in Part 121.373 and 135.431 which is required by the regulation is a self-reporting process that has been in effect for some time. However, it does not provide any meaningful protection from enforcement or witness criminal prosecution.

Another self-disclosure program is covered under AC 00-58. This program is designed to promote self-disclosure of maintenance safety discrepancies in return for immunity from administrative enforcement action. There is no provision for witness immunity in criminal investigations.

Blanket immunity needed

Many in the safety community feel that a Congressional mandate should be established that will provide blanket immunity to witnesses involved in all aircraft accident investigations. So far there does not appear to be any action on this in the Congress. AMT

Success with Standardization

Standardized practices form a baseline for continued improvement

By DeborahAnn Cavalcante

DeborahAnn Cavalcante earned her Masters in Aeronautical Science, with a specialization in Safety Management from Embry-Riddle Aeronautical University in Daytona, FL, and her Bachelor of Science from VA Tech in Business and Risk Management.

It is not uncommon for maintenance and repair facilities to find themselves plagued with struggles training new employees, failure to deliver expected outcomes on time, or the inability to work with consistent cycle times. I might suggest that these types of challenges could be corrected with the standardization of procedures, training, and documented best practices. Establishing standardized practices involves collecting and recording data, which then forms a baseline for continued improvement.

Tribal knowledge vs. a better way

Many times the responsibility to train others within the organization falls on those who have become "fixtures" in the company or repair facility. They possess what is commonly known as "Tribal Knowledge," which would disappear with them should they leave, or as the saying goes, get hit by a bus tomorrow. But more importantly this type of training or passing on of ways to accomplish a task fails to guarantee consistency in content or maybe even quality. Many times tasks are done a certain way just because that is how it has always been done. But does anyone ever ask "Why"? And does anyone ever ask what the consequences of doing it that way are? Has anyone ever considered there might be a better way?

Let me share a story. This old country boy's wife sent him to the store for a ham. After he bought it, she asked him why he didn't have the butcher cut off the end of the ham. This old boy asked his wife why she wanted the end cut off. She replied that her mother had always done it that way and that was reason enough for her. Since the wife's mother was visiting, they asked her why she always cut off the end of the ham. Mother replied that this was the way her mother did it; Mother, daughter, and "this old boy" then decided to call grandmother and solve this three-generation mystery. Grandmother promptly replied that she cut the end of the ham because her roaster was too small to cook it in one piece (Ziglar 1975).

In the early 1960s, when practical light twins started becoming popular, there was no such thing as a Multiengine Flight Instructor rating. If you were a CFI for airplanes you could teach in single or multiengine, land, or sea based on your pilot ratings. Many people were killed during training accidents as instructors developed their own methods of teaching in dramatic fashion what they had just so recently learned themselves. Many instructors gave their first multiengine instruction the day after they became a multiengine pilot. Some instructors had several thousand hours of multiengine flying and some had less than 10 (King Povenmire).

Continual improvement

Running a successful repair facility is about how the organization functions at every level. Standards for behavior, procedures, and training go a long way toward promoting a culture of continual improvement. We all know too well of the risks inherent in the aviation world, whether we fly the airplanes or repair the airplanes. Creating standards opens the door to identifying those risks, managing them, and best of all mitigating or eliminating them. Today many organizations are "self-insured" for a significantly high amount of consider this; how would your facility be economically affected by a disastrous incident or accident that could have been prevented by an employee complying with a documented procedure.

With the institution of standards, your organization becomes more efficient and

saves money. You are likely to notice less re-work, improved completion time for tasks, enhanced quality of work, and more positive employee attitudes as a result of decreased frustration in knowing what is clearly expected.

Henry Ford once said, "Today's standardization, instead of being a barricade against improvement, it is the necessary foundation on which tomorrow's improvement will be based." This is as true today as when Mr. Ford first said it.

As a repair facility we are in the service industry. That means we need to satisfy our customers time after time. Back in the day we could almost get by with minimal damage to our reputation if we failed to satisfy a customer on occasion, because customers did not have the technological ability they have today to instantly share an experience, good or bad with an infinite number of people. Now with blogs, tweets, Facebook, YouTube, and a multitude of other ways to distribute a less than desirable service experience, setting service standards for our employees is paramount to continued success.

We all know too well of the risks inherent in the aviation world, whether we fly the airplanes or repair the airplanes. Creating standards opens the door to identifying those risks, managing them, and best of all mitigating or eliminating them.

Expect and enforce standards

But just setting standards is not enough. There must be an expectation from senior management that noncompliance means the employee may be best off to consider a different place to work whose culture is better suited to that employee. One way to accomplish this is by incorporating standards into the organization's HR policy manual. Compliance with set service standards then becomes quantifiable and an integral element in employee performance.

One word of caution: don't set standards you have no intention of enforcing. This will likely destroy management's credibility and minimize the effect of other directives, as they will not be taken seriously. A simpler way to say this is to inspect what you expect.

As repair facility operators, we are not only dependent on our own employees to deliver quality work and service, but we depend equally on outside vendors for parts and other services. Establishing standards with outside vendors will establish benchmarks for good practices, professionalism, and reduced issues with purchase orders and billings. Such standards may take the form of specifications, guidelines, accounting and billing procedures, delivery methods, insurance requirements, and communication processes, just to name a few.

Words of wisdom

Remember everyone must practice the standards consistently before standardization truly exists. Let me offer some words of wisdom from experts who teach lean efficiency.

- Establish an agreed upon set of work procedures
- Each step in the process should be defined and performed repeatedly in the same manner.
- Remove variability which is an enemy of consistency.
- Maximize performance while minimizing waste, requiring costly re-work or scrap.

Define the task and the details of the task; include how long it should take, where it should take place, and the expected outcome. Identify work processes that need improvement and document customer expectations. Do not fail to solicit customer feedback. This can prove to be an invaluable tool in identifying where your team is weak and where they are strong. Many managers fear customer feedback because it may be negative. All customer feedback is positive as it presents an opportunity for change and improvement. It is a gift to become the observer and look at your operation as others see it.

All of us have our core competencies. Many managers may read this article and realize yes, I see the benefit, and our organization would enhance both efficiency and service levels with the institution of standards, but in reality cannot carve out the time to engage in such an initiative. There are companies such as Aviation Training Academy, Diversified Aviation Consulting, BSI, and a host of others who are experts in this area and can make it a simple and affordable process, that when implemented will not only improve the bottom line, but increase both employee and customer retention. **AMT**

DeborahAnn Cavalcante leads Diversified Aviation Consulting (DAC) and along with her associates has firsthand experience in air carrier operations, private charter aircraft, general aviation operations, military/civilian interface, FBO management, maintenance repair station training, safety training, human factors training, and customer service training. For more information on DAC visit http://www.dac.aero.

The Mission Continues

As many of you know I have accepted the position of *AMTSociety*'s next Executive Director and Business Manager. As I mentioned in the May 22 announcement, I am honored and excited to take a leadership role in this premier aircraft maintenance organization. I will continue the hard work of the past seven years, toward the vision of Tom Hendershot and the *AMTSociety* Board of Directors, while looking to create new opportunities and benefits for our members and industry partners.

Ron Donner, Executive Director and Business Manager

Our industry experiences its share of challenges affecting companies, organizations, and individuals. Successful organizations must adapt to industry trends, economic factors, and member needs. *AMTSociety* is now progressing through its own period of transition. As with most industry groups, we operate with a talented group of volunteers who dedicate their time and expertise to not only help guide *AMTSociety* but to also work on programs and initiatives.

It's common during periods of transition for those closest to reevaluate their own personal role. Turnover is an expected outcome of volunteerism. With the unexpected loss of our past Executive Director, several of those dedicated individuals who have tirelessly volunteered their talents for many years have chosen this time to focus on other important parts of life such as family and careers. I want to personally thank Peter Zeeb, Joe Hawkins, and Ken MacTiernan for all they have done for *AMTSociety*.

One thing should be clear, *AMTSociety* is moving forward! Transition presents an opportunity to consider new people and new ideas; a healthy trait of a progressive organization. We are evaluating what talents and expertise are best suited for board members, advisors, and volunteers as *AMTSociety* continues with its important mission. The schedule for the next *AMTSociety* Roadshow Consortium which provides relevant training sessions for all AMTs is currently being established. The student scholarship program will continue. And finally the crown jewel which Ken and others did such a fine job with, *AMTSociety*'s Maintenance Skills Competition, will be held just as in the past.

If anyone has a question, comment, or just feels like talking you can contact me directly at ron.donner@aviationpros.com.

Thank you, Ronald (Ron) Donner, AMTSociety Executive Director and Business Manager

Human Fatigue

Did you know that human fatigue can be just as dangerous as metal fatigue? Sleep loss and extended duty hours can leave you with progressive and localized structural damage to your body and your organization. Repeatedly not getting enough sleep is believed to increase the risk of a variety of chronic medical problems, including obesity, depression, gastrointestinal problems, compromised immune function, substance abuse,

SNAP-ON SOLUTIONS

FOR AVIATION PROFESSIONALS

Snap-on is a global innovator, manufacturer and marketer of tools, diagnostics, equipment and service solutions for professional aviation technicians. From designing cutting-edge tools, equipment and technologies made specifically for the aviation industry, to supporting efforts that further the professional development of technicians, Snap-on continues to lead the way in bringing forth solutions to this critical industry.

ASSET MANAGEMENT

Snap-on's Level 5™ Automated Tool Control (ATC) system uses digital imaging technology for superior tool control and accountability. The Level 5 ATC system provides the simplest and most user-friendly solution for detecting tools issued from and returned to a tool box, providing a critical enhancement to any MRO's foreign object damage (FOD) program. Using digital imaging technology, the tool box automatically keeps track of its inventory by user, and records which tools are removed and replaced.

MAINTENANCE SKILLS COMPETITION

Snap-on is the official tool of AMTSociety's Maintenance Skills Competition, an event that gives teams of licensed AMTs, AMEs, international military personnel and qualified aviation maintenance students the chance to test their skills against each other, March 13-14, in Las Vegas. For the next three years, Snap-on is also sponsoring the William O'Brien Trophy for Aviation Tech Excellence, which will be bestowed to the team with the overall winning score from the competition, and awarding more than $75,000 in tools and equipment to other top finishers.

"We are very pleased to expand our relationship with AMTSociety and strengthen our involvement in the Maintenance Skills Competition," said Andy Ginger, president, Snap-on Industrial. "When it comes to aviation, Snap-on is much more than simply a tool and equipment supplier. We pride ourselves in working closely with the industry to develop solutions and become a true partner with aviation techs. That's the added value Snap-on brings to this critical industry."

TECHNICAL EDUCATION

Snap-on's commitment to technical education and training remains high in 2013 as it continues working with trade schools to develop content that augments their course curriculum. The result is that more than 70 technical schools from across the country now offer specialized Snap-on certifications in several disciplines, such as torque, diagnostics and FOD. These innovative new certification programs enable students to broaden their technical skills when enhancing their employability.

For more than 90 years Snap-on has been the leader in developing innovative tools and solutions for technicians around the world. We are a true partner in the aviation industry. When it comes to aviation, we have the right tools to get the job done. Let our resources and technical expertise benefit your company, both in the air and on the ground.

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and cardiovascular disease.

Fatigue risk management systems are widely used to manage fatigue among flight crews, the railroad industry, and drivers of commercial vehicles, among others. Successful implementation of an FRMS in these industries has yielded substantial improvements in personal health and well-being, as well as significant improvements in safety and reductions in organizational costs.

Dr. Bill Johnson, the chief scientific and technical advisor for Maintenance Human Factors at the FAA, stated in a March 2013 article in *Aircraft Maintenance Technology (AMT)* magazine, the FAA has created a variety of products and tools to address human factors within your organization. These FAA human factors products are available at www.mxfatigue.com. Another source of information is www.faasafety.gov, the web site maintained by the FAA Safety Team. This site offers many online courses, access to CDs and information about safety events in your area.

AMT Day

Baker's School of Aeronautics once again held an AMT Day picnic. Approximately 140 people attended. Ronnie Wilson and the Under the Hill Gang played country and rock and roll music from the '60s. 125 door prizes were given out, including tools, gift certificates, hats, and t-shirts.

The **National Airline History Museum** at the Wheeler Downtown Airport (MKC) is honored to display this exhibit dedicated to Charles E. Taylor and the Kansas City Area recipients of this distinguished award. Most of the honorees pictured in the display (shown at left) were associated with the former TWA Overhaul Base at Kansas City International Airport (MCI). During guided tours, guests at the museum are given a presentation which details the history of Taylor and his contribution to the aviation industry.

San Joaquin Valley College Aviation Campus in Fresno, CA, has approximately 75 students at this time and on May 30 it held its AMT Day celebration. There was cake for all the students and staff, and then afterwards SJVC had an academic decathlon with the General, Powerplant, Airframe classes competing along with the instructors. There were competitions between the four teams in safety wire, fluid line making, hardware identification, weight and balance, electrical troubleshooting, and FAR Jeopardy game. All had fun, but unfortunately for the students, the instructor team showed they had the right stuff by winning in the majority of the competitions.

Banyan celebrated its 8th annual AMT Day on Friday, May 24, 2013. It uses the day to honor its aircraft maintenance technicians, Avionics team and Parts team for their dedication to quality and safety. AMT

(Left) Teams competing at the San Joaquin Valley College AMT Day academic decathlon.

(Below) Banyan honors its maintenance staff.


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Ground Safety Affects Us All

Remaining keenly aware of the potential danger in our everyday workplace takes not just focus, but procedures and training in best practices

By DeborahAnn Cavalcante

DeborahAnn Cavalcante earned her Masters in Aeronautical Science, with a specialization in Safety Management from Embry-Riddle Aeronautical University in Daytona, FL, and her Bachelor of Science from VA Tech in Business and Risk Management.

There are times when we are doing everything right: crossing in the crosswalk, with the light. We should be able to let our guard down, knowing we are safe, but accidents still happen. Life can find a way to turn things upside down when least expected.

And so it is with aviation. We work in what can be an unforgiving environment each day. Spinning propellers, engine exhaust, heavy equipment, and flammable fuels can pose more risks than we can count. The old cliché "out of sight out of mind" proves most dangerous as it breeds complacency. The more comfortable we become with the danger, the easier and further from our focus it drifts, and the easier it can be to fall into it. Remaining keenly aware of the potential danger in our everyday workplace takes not just focus, but procedures and training in best practices.

Once the airplane lands, and after the engines stop whining, there are areas of risk that require situational awareness at all times. They include marshalling and parking; safety and security of the passengers; servicing of the aircraft; aircraft security; fueling; and maintenance operations. In comparison to an aircraft crash it may sound like small potatoes, but direct costs associated with aircraft damage on the apron and in maintenance facilities are upward of $1.2 billion a year. Factoring in the indirect costs of the aircraft being out of service, increased insurance, temporary replacement, injuries, and other expenses that number can approach $5 billion. The sad reality is that much of it is preventable with training and standardization of best practices.

The most significant risk factors for ground damage occur in towing, ramp movements, ground service equipment, and hangar movements, which include maintenance facilities

and operations. One common thread running through all of these risk areas is a lack of training. Mitigating these ground type risks begins with awareness. Some pertinent questions to be considered may be:

- Who is handling the airplane? Are they properly staffed and trained? Do they train to industry best practices?
- What is the safety culture of the FBO or maintenance facility? Do they tolerate work-arounds and shortcuts?
- Do they have the proper type and size of equipment for the task to be accomplished?

Self-assessment

Assessing and managing risk is the responsibility of every employee. As a manager, the training of those employees is paramount to a safe operation. Once training is completed, and the employee has demonstrated proficiency at the task, the employee should

incorporate a self-assessment as part of every task. Self-assessment is an excellent tool for determining if standards have been met to accomplish a task. You can easily self-assess by asking yourself the following:

- Am I properly trained?
- Am I adequately equipped to perform the task?
- Are the tools or equipment I am about to use in good working order?
- Do I need assistance?
- Do I have the appropriate personal protective equipment to keep myself safe?

Best practices

There are some basic best practices that go a long way in reducing ground associated accidents and incidents, the foundation of which is to never ask anyone to do a job or task they have not been trained to do. Keep an open door to questions. Be approachable. Teach others to stop if they are unsure, and embrace a request for assistance. Safety procedures like the chocking of the main gear at all ramp parking situations or while the aircraft is in maintenance sound a bit elementary but this is an area that is subject to being ignored.

Moving aircraft

A ground marshaller should be used as aircraft arrive and depart from parking spots. Wing walkers are especially helpful when pulling or backing an aircraft into or out of a hangar. An industry best practice tells us that we need two plus a tug driver when maneuvering the aircraft on the ramp or removing it from a hangar, and three plus a tug driver when pushing an aircraft into a hangar or tight parking location. Often while in maintenance, mats are used or placed outside the aircraft air stair to prevent grease and soil from being tracked into the aircraft. Be sure to remove them before engine start.

The use of warning cones at wing tips and tail to avoid wing overlap hazards are considered preventative best practices. Confirm with the pilot that the brakes are off before beginning to tow the airplane. A trained person in the cockpit as a brake monitor for heavy aircraft is recommended. If you are not familiar with the aircraft type, and have not been properly trained, do not attempt to move the aircraft, leave the aircraft where it is and seek out someone who is familiar before towing.

Getting around

Many operations use golf carts for getting around the ramp areas quickly. Although you may think it safe, injuries and a fatality have happened with golf carts. You can enhance your safety as well as those around you by always placing the vehicle in neutral or park, turning off the ignition, and setting the parking brake when leaving the golf cart (or any piece of equipment) unattended, even for a minute … every time.

Any of us working at the maintenance facility may occasionally be asked to drive on the ramp. Be sure you have completed a driver's education course for your airport if your job includes operating a vehicle in ramp areas. Be sure to check the requirements and regulations at your airport.

Five-second rule

One way to check yourself and your situational awareness of danger and risk is to learn to use the five-second rule. The rule: Before you begin any task, ask yourself what harm or damage could result from your actions. This is yet another great self-assessment tool that does not cost time or money but pays priceless benefits.

Today more than ever security of aircraft and access to keys both on the ramp and in maintenance facilities are significant pieces of mitigating risk. Many employees in maintenance facilities know their customers but it is a good practice to be aware of out of the ordinary behavior and unusual questions from anyone.

All of the above can be culminated in an integrated and comprehensive safety program for the entire organization. It may not be possible to eliminate all risk as it is inherent in what we do, and the tools and equipment we use to do it, but documenting procedures establishes expectations and sets standards for operational behavior. Furthermore it provides a framework with which to measure accountability and strive for continued improvement.

Remaining safe on the ground is everyone's responsibility. **AMT**

Electronic Distractions

Distractions in the hangar as dangerous to aviation as distractions in the cockpit

By John Goglia

John Goglia has 40+ years experience in the aviation industry. He was the first NTSB member to hold an FAA aircraft mechanic's certificate. He can be reached at gogliaj@yahoo.com.

The recent NTSB finding that an EMS helicopter that crashed in 2011 was caused at least in part by a pilot texting during critical phases of flight has put renewed emphasis on the dangers of distraction in the cockpit, particularly from the personal use of electronic devices, such as cellphones, tablets and laptop computers. Four people were killed in that accident.

Although Congress and the FAA have decided to focus rulemaking on eliminating distractions caused by these personal electronic devices in airline flight decks, the problem of these distractions is just as significant in the hangar and anywhere maintenance is performed, whether performed by an airline or repair station employee or a general aviation mechanic.

Unfortunately, cell phones are now a frequent cause of distraction while maintenance is being performed.

While I have not heard of an accident specifically traced to a maintenance technician's use of a cellphone or other electronic device, it seems to be just a question of time before that happens. We already know that distractions are a leading cause of mistakes in aircraft maintenance.

Based on a number of maintenance-related accidents in the 1980s and early 1990s, Transport Canada (the Canadian version of the FAA) created a list of the most common sources of maintenance errors, the so-called *Dirty Dozen*. I'm sure most of you are familiar with them. In that list, distraction ranks as number four, after lack of communication, complacency and lack of knowledge. Distraction is defined by the FAA on its human factors web site as: *one's attention is drawn away; mental or emotional confusion or disturbance occurs. When working among many people, with frequent work interruptions, or when coping with stress, it is easy to become distracted.*

When this list of maintenance human factors errors was developed, cell phones were not yet common in the general population as they are today. It would have been the rare mechanic to have a cell phone in his or her pocket in those days. Today, it's probably fair to say that it would be rare to find a mechanic without a personal cell phone. Unfortunately, those cell phones are now a frequent cause of distraction while maintenance is being performed. Even though many companies prohibit cell phone use while mechanics are working, my observation is that enforcement of those policies is spotty at best.

Even at major airlines that prohibit cell phone use on the job, mechanics can be seen talking or texting while performing maintenance. I was recently visiting the maintenance department of a major airline and observed a mechanic working on an engine pause, reach in his pocket, answer his cell and then continue on with his engine work.

It's unlikely that the FAA will have a rule any time soon prohibiting personal electronic devices from intruding on maintenance workers. (The proposed rule prohibiting the use of personal electronics on the flight decks of airlines is still in the proposal stages.) But mechanics and repairmen shouldn't wait for such a rule; they need to turn off their cell phones before doing any maintenance work on an aircraft. The risk of fatal distraction is just too great. **AMT**

Transportation Secretary

Charlotte Mayor Anthony Foxx easily won Senate confirmation to become the next secretary of transportation. The Senate vote was 100 to 0. In his nomination, President Obama praised Foxx for breaking ground on opening a third parallel runway at Charlotte-Douglass International Airport.

UND makes donation

A contingent from the University of North Dakota (UND) Aerospace Foundation in Grand Forks traveled to Southern California to donate $25,000 to the Los Angeles Unified School District's struggling aircraft mechanics school. The donation will be used to award scholarships to low-income students preparing for a variety of high-paying, high-skilled jobs as trained A&P mechanics. Recently threatened for closure by budget cuts, the vocational school was saved by a large private donation, strong advocacy campaign, and rent relief from Los Angeles World Airports.

PPG donates $15,000 to Air Force Museum

The PPG Industries Foundation has donated $15,000 to the Air Force Museum Foundation for construction of a fourth major building at the National Museum of the United States Air Force, located at Wright-Patterson Air Force Base near Dayton, OH. The grant was made on behalf of PPG's aerospace business. The new LEED silver-certified building will feature four galleries illustrating the U.S. Air Force's contribution to the space program, its role in transporting the president and other leaders, its contribution to global airlift missions, and R&D aircraft such as the XB-70, Valkyrie. The building, scheduled to open in 2015, also will host specialty tours, demonstrations, and hands-on educational programs.

Reno Air Racing videos

Mark Chiolis, a fan of Reno Air Racing with the eye of a professional photograper and the ear of a journalist, has compiled a DVD set on the races. Filmed during the 2012 races, and covering the events of race week as well as complete races, this pair of DVDs distills a week of Reno experience into six-plus hours. The discs are full of interviews with pilots, mechanics, officials, and fans. It's $34.95 in DVD; $44.95 in H-D Blu-Ray. For more information or to order: http://justplanefun-videos.com/videos.html or email: Mark.Chiolis@grassvalley.com.

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Words Matter

The way through the maze will depend upon the communication ability of the pilot, mechanic, particular government agency asking for the flight, and the FAA

By Marshall Filler

Marshall Filler is a managing member of Obadal, Filler, MacLeod & Klein, P.L.C., where he represents aviation industry clients in matters pending before the agencies of the federal government, the Congress and the courts.

Humans have a difficult time communicating in the best of circumstances; the communication between government and industry is even more problematic. The bottom line is that the government communicates with its citizens through laws and regulations; citizens show compliance with those mandates through records. Unfortunately, many of the regulations that govern the communication between aviation companies and the Federal Aviation Administration were not written with the care needed to ensure clarity. The propensity of the legislators to dictate the regulations a government agency should enact compounds the problem.

Many of the regulations that govern the communication between aviation companies and the FAA were not written with the care needed to ensure clarity.

Public aircraft

Let's look at an example of how this works. "Public aircraft" is a common phrase that actually means an aircraft is being used for a governmental purpose and therefore is not subject to oversight by the FAA. It is not the aircraft that is public, but the particular flight. The public flight exception has existed for a long time; however, due to accidents associated with university sports teams, travel clubs, and similar entities that used to be able to operate under the exception, Congress narrowed the ability to fly outside parts 43, 91, 121, 125, and 135. The new restrictions have created more confusion and some government agencies don't even want to take the responsibility for oversight of the flights that do happen to fall into the exception.

The irony of the situation is that the FAA is left in the unenviable position of explaining it doesn't have jurisdiction over some flights but still must oversee the "continued airworthiness" of the aircraft. Thus, we use the phrase public aircraft to cover the design, operations, and maintenance of a fixed wing or rotorcraft that will be used in regular operations as well as public flights. The latter can require equipment or operations that would never be approved by or acceptable to the FAA, yet somehow the agency and the industry have to work the issues or the aircraft could be grounded for days changing from one configuration to another.

The way through the maze will depend upon the communication ability of the pilot, mechanic, particular government agency asking for the flight, and the FAA. If we start the conversation with the term public aircraft, the nuances will be lost. If we use the term public flight or public operation, we can narrow the issues associated with each party. Of course, since we are human, there will be those who vehemently disagree with me, but that is OK, at least we can start to resolve the problem! **AMT**

Marshall Filler performs extensive consulting work for clients in the safety regulatory area, advising air carriers, repair stations, manufacturers, distributors, and individual airmen on a variety of issues pertaining to certification, maintenance, and flight operations. He has also represented certificate holders in accident investigations conducted by the NTSB. Filler serves as managing director & general counsel of ARSA. For more information visit www.arsa.org.

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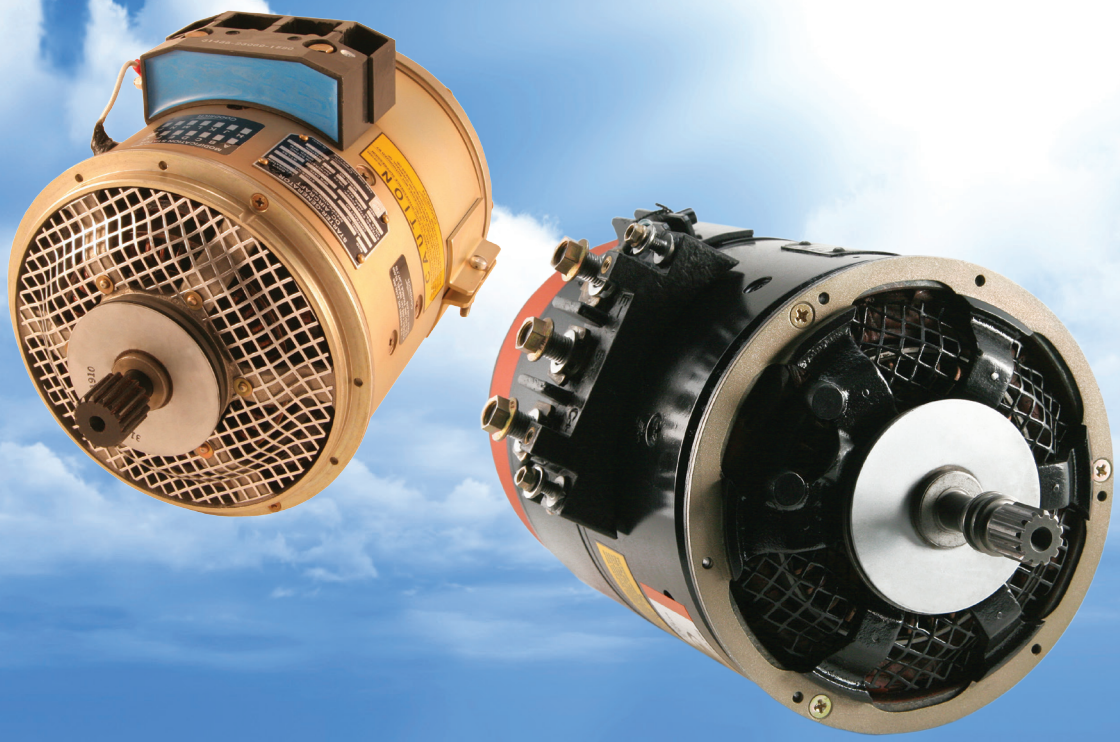

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