CYGNUS
BUSINESS MEDIA

Back to the Basics at Redstone College 26

AMT

Aircraft Maintenance Technology

Written by aircraft maintenance professionals for the professional maintenance team

Official publication for AMTSociety

November/December 2013

Aidan Muir, one of the students from Saline, MI, who won the opportunity to learn how to build a Glasair Sportman aircraft.

SUMMER OF THEIR LIVES

Eight students build two airplanes in just two weeks **16**

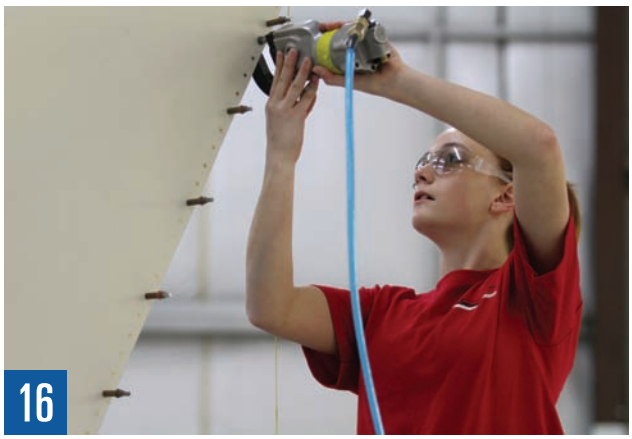

THE LEADER
STANDS BEHIND YOUR JET
Highest dispatch rate, and voted easiest to do business with.*
Largest company-owned global service center network.
Unsurpassed service speed and spare-parts availability.
*JetNet IQ 2013
cessna CITATION
Find us online at cessna.com/citation-service
Cessna

AMT Aircraft Maintenance Technology
Written by aircraft maintenance professionals for the professional maintenance team
Official publication for AMTSociety

November/December 2013

Contents

Cover Story



The Summer of Their Lives

Eight students build two airplanes in just two weeks

By Peter Bunce

Page 16

Leah Schmitt, a student from Canby High School, works on riveting for the Build A Plane project.

Industry Outlook

Industry Viewpoint

FBO Mechanics: Critical GA Maintenance Needs Second set of Eyes

By John Goglia

Page 42

Features

Departments

AMT EXCLUSIVE:

ARSA Outlook

Keep It Straight: The maintenance provider is only responsible for the work it performed, not for any and all work that needs to be accomplished.

By Sarah MacLeod

Page 20

Published By Cygnus Business Media
1233 Janesville Ave., P.O. Box 803,
Fort Atkinson, WI 53538-0803
Phone (920) 563-6388
For Product Information: (920) 563-1762 · Fax (920) 563-1704
Change of address or subscription information:
Toll Free: (877) 382-9187 or Local: (847) 559-7598
Email: circ.amt@omeda.com · Web: www.AviationPros.com

Associate Publisher ..... Karen Berg
karen.berg@AviationPros.com · 920.568.8338

Editor ..... Ronald Donner
ron.donner@AviationPros.com · 800.547.7377 Ext. 3315

Senior Editor ..... Barb Zuehlke
barb.zuehlke@AviationPros.com · 920.563.1641

Associate Editor ..... Stephen P. Prentice
aerolaw@att.net

Field Editor ..... Charles Chandler
amt3866.2007@gmail.com

Contributors: David Boudreaux, Peter Bunce, John Goglia, Steve Hankle, Sarah MacLeod


KAREN BERG


RONALD DONNER


BARB ZUEHLKE

Sales

National Accounts Manager ..... Michael Sasso
michael@AviationPros.com · 920.568.8339

National Accounts Manager ..... Rick Felt
rick.felt@AviationPros.com · 920.568.8333

National Accounts Manager ..... Steve Felt
steve.felt@AviationPros.com · 920.568.8325

National Accounts Manager ..... Michelle Kohn
michelle@AviationPros.com · 952.808.3344

International Sales

Lutz Krampitz - *Germany, Switzerland, Austria, Turkey, Scandinavia*
+49 (0) 203 456 82 66 · Fax +49 (0) 203 456 85 38
krampitz@krampitzVv.de

Stephanie Painter - *UK, France, Netherlands, Spain, Ireland, Italy*
+44 1634 829386 · Fax +44 1634 281504
stephanie@painter-lowe.com

Production

Art Director ..... Julie Whitty
julie.whitty@cygnuspub.com

Media Production Rep ..... Carmen Seeber
carmen.seeber@cygnuspub.com


RICK FELT


STEVE FELT

Production Director ..... Steve Swick

Circulation

Group Circulation Manager ..... Jackie Dandoy
Circulation Manager ..... Debbie Dumke
List Rental ..... Elizabeth Jackson
ejackson@meritdirect.com · (847) 492-1350, Ext. 18

Cygnus Transportation and Aviation Group

Executive Vice President ..... Gloria Cosby
VP Marketing ..... Gerry Whitty
Group Publisher ..... Larry Greenberger

Cygnus Business Media

CEO ..... John French
CFO ..... Paul Bonaiuto
VP Audience Development ..... Julie Nachtigal
VP Technology ..... Eric Kammerzelt
VP Human Resources ..... Ed Wood
VP Production Operations ..... Curt Pordes

Diversified Expo Group

Show Director ..... Michael Sasso

Cygnus Reprint Services
To purchase article reprints please contact Wright's Media at 877-652-5295 Ext. 102 or email niademarco@wrightmedia.com.


MICHAEL SASSO

Join the Celebration

Aircraft Maintenance Technology celebrates 25 years in 2014

Ron Donner, Editor

Ron Donner has held both technical and management roles in general aviation and during his 27 years with Northwest Airlines. He holds FAA certificates as an A&P/IA and a commercial pilot.

As I write my final editor's column for 2013, I'm encouraged by the many activities *Aircraft Maintenance Technology* magazine has experienced in recent years. We've broadened our coverage to include feature articles pertaining to all segments of the industry. But the greatest excitement will be coming in 2014. One year from now this industry-leading magazine will have been published for 25 years and we have many interesting things planned throughout 2014.

Beginning with the first issue for 2014 we will celebrate by featuring aircraft, technologies, people, organizations, and businesses having an impact on the aviation and aircraft maintenance industry over the past 25 years. We plan to regularly include then and now feature articles looking at the past 25 years of aircraft, technologies, people, and businesses, including an eye toward the years ahead.

25 years ago few of us knew what fly-by-wire was about and the use of advanced composite materials in aircraft construction was generally limited to flight controls and nonstructural items on aircraft. Today, 25 years later, fly-by-wire systems are common place in modern aircraft and primary structures including entire aircraft fuselages small and large are built using composite materials.

25 years ago many of us were using 80 octane avgas in our small general aviation airplanes. Today, 80 octane avgas is no more and the general aviation industry faces uncertainty regarding the use of aviation gasoline.

25 years ago the Concorde was used for supersonic transatlantic flights. Today it is merely a memory.

25 years ago most of us were stable in our chosen jobs and career paths. Few of us were concerned about company mergers leading to major life-changing decisions.

25 years ago little emphasis was placed on human factors in aircraft maintenance and the terms safety management systems and voluntary reporting were for the most part unknown. Today, these practices are widely used and even required in some situations.

The aviation industry has changed over the past few decades and so will this publication. The pages of *Aircraft Maintenance Technology* will appear different in 2014. The feature section of the magazine will be aligned with the segments of the aviation industry such as: General Aviation; Business Aviation, Airline and Commercial MRO, Helicopter, Military, and more. Our Industry Outlook, Management Matters, FAA, Safety, and Legal sections will remain.

Celebrate with us. We'd like to hear from you. Which aircraft, technologies, or people have positively impacted you or your business or the past 25 years?

Ron

Aircraft Maintenance Technology is published and copyrighted 2013 by Cygnus Business Media, 1233 Janesville Ave., Fort Atkinson, WI 53538.

Subscription Policy: Individual print subscriptions are available without charge to individuals serving as directors of maintenance, mechanics, technicians, certified inspectors and executive management in the parts and service departments at repair stations, FBOs, corporate flight departments, airlines, fractional operations, government and military in the United States, Europe, Asia and the Middle East. Complimentary electronic subscriptions are available to qualified subscribers in or outside of the United States. Please visit www.aviationpros.com and click on "Subscribe." Publisher reserves the right to reject nonqualified subscribers.

"A one year subscription for students is $25.00 per year. All other non-industry related subscribers in the United States may purchase a subscription for $40 per year. Subscriptions to Canada & Mexico are $55 per year. Subscriptions to all other countries are $85 per year (payable in U.S. funds drawn on U.S. banks). Single issues are available (prepaid only) for $10.00 each. Complimentary digital subscriptions are available online at www.aviationpros.com/subscribe."

Aircraft Maintenance Technology (USPS 004-989; ISSN 1072-3145 print; ISSN 2150-2064 online) is published 10 times annually in January/February, March, April, May, June, July, August, September, October, and November/December. Periodicals postage paid at Fort Atkinson, WI and additional entry offices. POSTMASTER: Please send change of address to *Aircraft Maintenance Technology*, P.O. Box 3257, Northbrook, IL 60065 3257. Printed in the U.S.A.

Canada Post PM40612608. Return Undeliverable Canadian Addresses to: *Aircraft Maintenance Technology*, PO Box 25542, London ON N6C 6B2.

Volume 25, No. 1, November/December 2013

GE
Measurement & Control

Simplicity, accuracy, and reliability. All in seconds.

Introducing GE's high-performance X-Ray Fluorescence (XRF) analyzer series.

The high-performance XL-PMI series of analyzers puts superior inspection technology in the palm of your hand. Powered by Thermo Fisher Scientific, these Positive Material Identification (PMI) analyzers offer exceptionally accurate elemental analysis and alloy grade identification instantly. Now you can test materials reliably and nondestructively with GE's XL-PMI analyzers.

XL-PMI.ge-mcs.com

imagination at work

Building the Talent Pipeline

We need to share our knowledge and excitement, while looking for ways to help shape the maintenance technician of the future

By Karen Berg

Karen Berg, associate publisher of Aircraft Maintenance Technology, is a 27-year veteran in the aviation industry. She held leadership positions at Northwest Airlines before joining KLM Royal Dutch Airlines in the Netherlands. In recent years, she served as VP Sales North America for Air France Industries and KLM Engineering & Maintenance.

I recently had the opportunity to tour a new aircraft maintenance school. The classrooms were stocked with the latest chairs, tables, and whiteboards, waiting for their new students. The library still had some gaps on the shelves, but it was off to a good start.

When we walked back to the "hangar" where all the hands-on training takes place, they had a small stock of engines, a couple of GA aircraft, and a helicopter, and other miscellaneous training stations (sheet metal, welding, electronics, etc.). As much as they could to train their students in an overview of what it will be like, in the real world, working on aircraft. Many of the training benches were made at the school and most of the other equipment was several decades old.

Karen Berg, Aircraft Maintenance Technology *magazine associate publisher; Joanne Leming, executive director AIM Las Vegas campus; and Ron Donner, AMTSociety executive director.*

What struck me most about the equipment is, very little of it was anything remotely like what these students would be expected to work on in the real world, once they graduated. It is a real shame that many of our schools that are training our aviation future don't have access to the proper equipment and current technology to train their students.

I'm certain that all of us who read this publication are hooked on this aviation business, living every day with the thrill of making something fly.

But the problem is, none of us are getting any younger and the pipeline for our replacements is dwindling to a fast drip.

While aviation and a job in our field might not be as sexy as it was in the old days, and the military continues to cut back on aviation-related positions, it's up to us to build up the enthusiasm and excitement in the kids of today. We need to share our knowledge and excitement, while looking for ways to help shape the maintenance technician of the future.

Think about it - one conversation you share with a young person might sway them to consider a career in the maintenance field. Can you help to create the next Charles Taylor or Richard Branson?

We need to help these schools by getting them the tools they need to teach - are there some unused engines, aircraft, or helicopter parts where you work that could be donated and benefit your local maintenance school? What about those aviation books on your shelves? Would some eager, young mind be inspired by reading them?

Remember the days when you first became fascinated with things that fly, starting school, training, and learning how everything worked? Let's do what we can to pass that on to the next generation, to not only refresh our personal excitement for the business, but to also pass that spark on to the next generation to fire up that pipeline!

Karen
Karen.berg@AviationPros.com

No one knows your factory engine better than the factory that built it in the first place. Only Lycoming can rebuild your engine to factory-new specifications that come with a zero-time log book, a two-year factory warranty, and increases to your airplane's value. There is no comparison.

Visit your local distributor or call Lycoming at 1-800-258-3279 and ask how you can save up to $5,000 on a rebuilt engine*. Learn more at Lycoming.com

*Certain restrictions apply. Exchange engine core requirements will be dependent upon the selected offer. Contact your distributor or visit Lycoming.com for more details. Offer subject to change or end at any time.

LYCOMING

Addressing Safety Strategies Across Generations

AMT's Interview with Kimberly-Clark Professional

By Charles Chandler

Charles Chandler began his aviation career as a junior mechanic for American Airlines and retired after 27 years of service. He has a Master's of Science degree in adult and occupational education with a major in human resources development.

In 1970, the Occupational Safety and Health Administration (OSHA) and the National Institute for Occupational Safety and Health (NIOSH) were created. Today, almost four decades after the implementation of the OSHA Act, a safe place to work is a requirement and an expectation. Yet, each year we still have an incredible number of workplace injuries and deaths. The numbers have been trending down but are still unacceptable. What is not understood is why worker fatalities are so high and why workers continue to injure themselves?

In Workplace Safety, James T. Burnette writes that several behavioral theories suggest that workers "may not care about the consequences; they could misperceive the risks or the consequences; or they might intentionally sabotage the safety policies and procedures." Within any discussion of workplace safety, it's important to consider the implications that generational shifts are having on the number and type of work-related injuries, as well as attitudes, work practices, and performance.

Kimberly-Clark Professional safety survey

In 2012, Kimberly-Clark Professional (KCP) conducted a survey of safety professionals to better understand the complicated issue of workplace injuries. Of those surveyed, "82 percent of the safety professionals said they

Baby Boomers can transfer their job knowledge by becoming mentors to Gen Y and helping to train new-hires.

Photos courtesy of Kimberly-Clark Professional.

20

20 is the number of Aviall product repair facilities worldwide. Whether you need battery repair, wheel and brake service or hose fabrication, our expert technicians and cutting-edge technologies ensure you receive the highest quality repairs and service.

No other aviation product repair service provider works harder to give you exactly what you need, precisely when you need it. **Aviall Delivers.**

Proudly Keeping the World in Flight.

AVIALL
A BOEING COMPANY

aviall.com

North America Sales and AOG: 1-800-AVIALL-1
International Sales: +1-972-586-1985

had observed workers in their organizations failing to wear required personal protection equipment (PPE) during the past year. Even though it is mandated by OSHA, the vast majority of workers who have experienced on-the-job injuries were not wearing PPE."

Some of the reasons respondents cited for not wearing their PPE were: "uncomfortable, too hot, blamed for decreased productivity or an inability to perform tasks, unavailable near the work task, ill-fitting, and unattractive looking."

For further insight on workplace accidents and prevention, *Aircraft Maintenance Technology Magazine* reached out to safety expert Randy DeVaul, senior capability development manager, Global Industrial Safety for KCP. DeVaul has a doctorate in occupational safety and health, a master's degree in cross-cultural studies, is a commercial pilot ground instructor, and holds Commercial/Instrument Pilot, Airframe & Powerplant (A&P) mechanic, and multi-engine ratings.

AMT: Randy, thank you for taking time to help us better under-

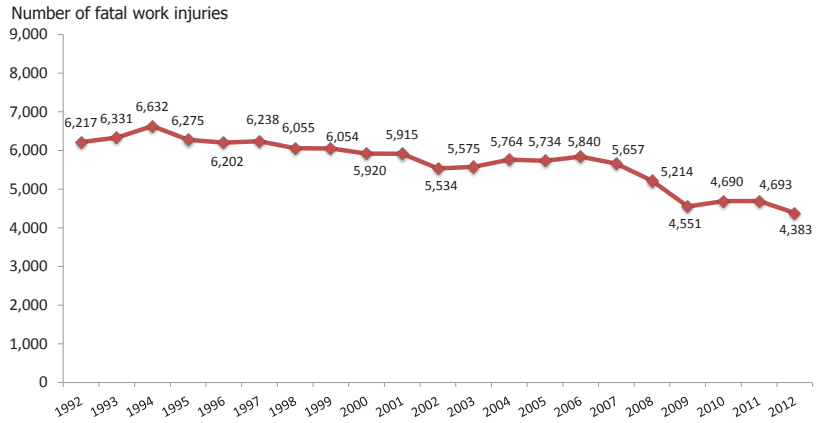
The Data Speaks

In 2012 a preliminary total of 4,383 fatal work injuries were recorded in the United States. This concerning news was just reported on Aug. 22 by the Bureau of Labor Statistics. In 2011, 3 million nonfatal workplace injuries and illnesses were reported by private industry employers. (Data for 2012 will be published in October and November of 2013). The Center for Disease Control and Prevention (CDC) stated that in 2010, a total of 4,547 U.S. workers died from occupational injuries, and each year approximately 49,000 deaths are attributed to work-related illnesses.

Comparing statistics, making inferences, and drawing conclusions is always an interesting activity. The Department of Defense reported that in the 10 years between 2001 and 2011, there have been about 6,000 U.S. combat fatalities in the Iraq and Afghanistan wars. During that same period there were approximately 64,000 fatalities in our U.S. work force. Could you infer that it is safer to be an American combatant serving in a hostile environment than an American worker?

The problem is more complicated than is presented by the gross data because some U.S. industries are more dangerous and some age groups are injured at higher rates than others. Therefore reviewing human factors and behavior may be a better way to comprehend this complicated and serious problem.

Number of fatal work injuries, 1992–2012*



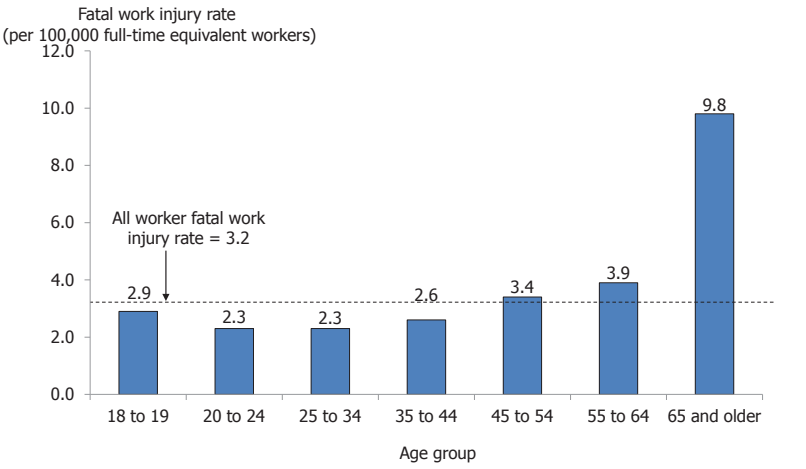
The 2012 preliminary total of 4,383 fatal work injuries represents a decrease of 7 percent from the final count of 4,693 fatal work injuries reported for 2011.

*Data for 2012 are preliminary. Data for prior years are revised and final.

NOTE: Data from 2001 exclude fatal work injuries resulting from the September 11 terrorist attacks.

SOURCE: U.S. Bureau of Labor Statistics, U.S. Department of Labor, 2013.

Fatal work injury rates, by age group, 2012*



Fatal work injury rates for workers 45 years of age and older were higher than the overall U.S. rate, and the rate for workers 65 years of age and older was more than 3 times the rate for all workers.

*Data for 2012 are preliminary.

NOTE: Fatal injury rates exclude workers under the age of 16 years, volunteers, and resident military.

For additional information on the fatal work injury rate methodology, please see http://www.bls.gov/iif/oshnotice10.htm.

SOURCE: U.S. Bureau of Labor Statistics, U.S. Department of Labor.

More capabilities. More support.

Operating in today's challenging business environment, commercial airlines and OEMs need a partner that can provide cost-effective support and solutions that contribute to their success. With enhanced safety, improved reliability, increased productivity – and satisfied customers who keep coming back.

For many of the biggest names in commercial aerospace, AAR is the answer – for complete MRO, parts, engineering, logistics and fabrication services. And, especially, for a partner they can trust.

AVIATION SERVICES

Supply Chain Programs
Aircraft & Engine Parts
Aircraft Maintenance & Modifications
Aircraft Sales & Leasing
Expeditionary Airlift

TECHNOLOGY PRODUCTS

Specialized Mobility Products
Cargo & Transport Products
Precision Machining
Composites Fabrication
Communication Systems

AAR®
aarcorp.com

Many Baby Boomer aviation workers are able to retire but don't necessarily want to retire. Those employees are working longer because they enjoy what they do or they have postponed retirement for various economic reasons.

stand the complicated issue of workplace safety and some of the human factors that drive incidents. You have suggested that we need to consider the ages and attitudes of two key groups of workers. In so doing, safety professionals, company managers, and employee work groups can develop better safety solutions, resulting in higher acceptance and reduced risk or injury.

The work groups are: Generation Y (Gen Y) — defined as ages 15 to 30 years — which represent 14 percent of the U.S. labor force and are a high risk for workplace injuries; and Baby Boomers — defined as ages 49 to 67 years. Fatal work injury rates for workers 65 years of age and older was more than three times the rate for all workers.

AMT: What are the main challenges that the aviation industry is facing in terms of these generational differences?

Randy DeVaul: Many Baby Boomer aviation workers are able to retire but don't necessarily want to retire. Those employees are working longer because they enjoy what they do or they have postponed retirement for various economic reasons. One in five people in the workplace are over the age of 55. By 2016, one-third of the total U.S. work force will be age 50 or older, and the number of those workers will increase to 115 million by 2020.

Randy DeVaul, senior capability development manager, Global Industrial Safety for Kimberly-Clark Professional.

Another factor is that many manufacturing jobs have moved out of the U.S., limiting the opportunity for Gen Y to develop an interest in, or work in, manufacturing or other heavy industries. Therefore, we have an aging work force that isn't wholly retiring and a skilled labor gap. In the aviation industry, this is creating challenges related to general safety, airplane safety, and worker quality of life.

AMT: What are the safety implications of the Baby Boomer generation continuing to work past the age of retirement?

Randy DeVaul: As part of its Safe-Skilled-Ready Workforce Initiative, NIOSH conducted research related to aging, shift work, and fatigue. One finding was that after a person consistently works a 10- to 12-hour shift, their response times become similar to a person who is legally drunk. When an older worker is doing shift work while fatigued, it can be a challenge for them to perform their tasks as efficiently

Snap-on®

Honor Flight NETWORK™

Snap-on is proud to partner with Honor Flight Network.
We celebrate our military veterans who protected our freedom and helped make possible the America we enjoy today.

TO LEARN MORE
SCAN QR CODE
WITH YOUR
SMART PHONE

Older workers with decreased visual acuity can wear safety eyewear with close-fit prescription Rx lens inserts that can be clipped behind an eye shield.

The Jackson Safety V60 Safeview Safety Eyewear with Rx inserts is ideal for corrective lens wearers or workers that require close-up magnification.

and safely as they could 20 years earlier — especially when working in environments with exposure to hazards, lifting, carrying, and other injury triggers.

Injuries also tend to increase in severity, recovery time, and cost with critical older talent. This creates a quality of life challenge for the injured and their family and for their employer because an experienced worker is out on lost time and the employer incurs the expenses of that recovery. Recent estimates show that accident compensation amounted to more than $51.1 billion in direct costs annually for U.S. employers.

AMT: What are some of the differences in attitudes and behaviors between the two generations regarding workplace safety?

Randy DeVaul: In general, Gen Y is understood to be an entitlement generation that has grown up with everything being done for them or has the expectation that it will be. Part of that thinking carries over into the workplace. Employers are faced with a younger generation that is unskilled in certain tasks due to a lack of experience. These workers have the expectation that someone is watching out for them and may not understand the limitations of their PPE. Therefore, they may not take responsibility for their safety. Conversely, if Baby Boomers are injured, they feel that it is simply part of their job.

To them, it has always been this way. Because of this thinking, they may not be as careful as they could be when working. Gen Y is willing to wear PPE but expects someone to watch out for them,

while Baby Boomers tend to not want to wear PPE and may even take shortcuts developed over time to make work easier.

AMT: What are some recommendations for addressing these differences in work practices, attitudes, and workplace safety solutions?

Randy DeVaul: Baby Boomers should be given more responsibility for transferring job knowledge so they are more directly engaged with Gen Y. Baby Boomers can be mentors, new-hire trainers, and help develop job-specific training videos. Aviation schools also should be more directly involved in creating safety training programs for entry-level AMTs.

One way KCP is working to address some of these challenges is by talking with and learning from front line aviation workers to develop innovative PPE. An example of these professional-derived safety solutions is the Jackson Safety V60 Safeview Safety Eyewear. Given that older workers often experience decreased visual acuity, which includes having a harder time reading small print or discerning colors and signage that identifies hazards, this new safety eyewear features close-fit prescription Rx lens inserts that can be easily clipped behind an eye shield.

Ideal for corrective lens wearers or workers that require close-up magnification, the glasses help to reduce eye fatigue or strain so workers do not compromise on safety, performance, or comfort. In combination with these efforts, KCP is also developing training and mentoring programs that will help bridge the gap between the Baby Boomers and Gen Y aviation professionals.

Aircraft Maintenance Technology thanks safety expert Randy DeVaul for providing some insight and helping us better understand the many dimensions of workplace safety.

Each year employers, workers, and society pay the tremendous costs for workers' insurance, medical expenses, lost wages, and lost productivity associated with workplace illnesses, injuries, and deaths. We, the workers, must accept the responsibility for following safety precautions and wear the required PPE necessary to keep us safe. It will always be us, not the agencies or corporations that will endure the pain and suffering, psychological and family stress, lifestyle adjustments, and career-shortening implications associated with these workplace injuries. **AMT**

The Summer of

Eight students build two airplanes in just two weeks

By Peter J. Bunce

Peter Bunce is the president and CEO of GAMA, an international trade association representing 84 of the world's leading manufacturers of general aviation airplanes and rotorcraft, engines, avionics, components, and related services. For more information visit www.gama.aero.

For most high school students, summer is a time to sleep in, relax with friends, find a part-time job, or head off for camp. But for the eight student winners of the General Aviation Manufacturers Association (GAMA)/Build A Plane Aviation Design Challenge — and an old aviation head like me who was fortunate enough to work with them — the summer of 2013 was a life-changing experience as we built two Glasair Sportsman aircraft in just two weeks.

This wonderful opportunity came about when GAMA's 84-member companies partnered with Build A Plane, a nonprofit organization that promotes aviation and aerospace education, to create the competition. Our aim was to promote science, technology, engineering, and math (STEM) education among high school students and to inspire the next generation of aviation leaders and our future manufacturing and maintenance work force.

In just the first year, the competition attracted 27 entries from schools in 22 states. Schools used complimentary X-Plane software provided by Fly to Learn, along with curricula and training, to design and fly their own virtual aircraft. GAMA engineers judged the winners based on performance and aerodynamic parameters.

Mark Van Tine, president of Jeppesen, and Wyatt Johansen, a student from Canby High School, Canby, MN, work together on the Build A Plane project.

Their Lives

Canby and Saline High Schools the winners

Our Chairman Brad Mottier and Vice Chairman Steve Taylor announced the winners — Canby High School in Canby, MN, and Saline High School in Saline, MI — at GAMA's spring board of directors meeting. The design work these students did under the direction of their teachers, Dan Lutgen in Canby, MN, and Ed Redies in Saline, MI, was first-rate. As their prize, four students, a teacher, and a chaperone from each school received an all-inclusive two-week trip to Glasair Aviation in Arlington, WA, to build two Sportsman aircraft through the company's well-known Two Weeks to Taxi program.

GAMA member companies and other component sponsors generously contributed financial resources, equipment, and supplies to the build, including the kit airframe, propeller, certified avionics, parts, paint, and interiors for one of the planes. In addition, Glasair donated two weeks of staff time to support the build.

The winners had little idea what was in store for them. Some had never flown in an airplane before they touched down in Washington state. Others thought they would simply watch the Glasair technicians assemble the airplanes.

Few realized that each day would begin at 7 a.m. with a progress report on the build, along with a lecture from Glasair's Airframe & Powerplant (A&P) mechanics Ben Rauk or Ted Setzer on a specific aspect of constructing the plane, such as safety wiring or repairing a composite structure. The students took the same work breaks, cleaned the hangar bay, and left for the day just as the Glasair staff did, usually around 5:30 or 6 p.m.

Glasair Aviation

The experience was new for Glasair, too. While the company typically helps a customer build a Sportsman — an experimental metal and composite kit airplane that seats

The students' work passed the FAA inspection process, and successfully completed its first flight with only minor squawks.

four adults — over two weeks, it had never before built two birds simultaneously, and certainly not working with eight students.

The Glasair staff assigned each student, or groups of students, to work on certain tasks each day. The students, teachers, and chaperones from the two schools intermingled easily with Glasair staff, along with myself, Jeppesen CEO Mark Van Tine, Jeppesen's Tom Letts, GAMA's Director of Engineering Greg Bowles and GAMA's Director of Safety and Training Kate Fraser. GAMA and Build A Plane own the first plane; Van Tine owns the other.

The students quickly became experts at bucking rivets, fabricating both metal and composite brackets, running control cables, sanding the airframe, fabricating and attaching fuel lines, installing baffling on the engine, mounting the gear, and integrating the sensors and the propeller to the engine. As Brandon Stripling of Canby High School said near the end of the build, "It's boosted my image of airplanes and how much work has to go into making an airplane."

Throughout the two weeks, the students were also treated to flights in Glasair's demo Sportsman, as well as rides from Lyn Freeman, Build A Plane's founder and president, and Steve Taylor, president of Boeing Business Jets and GAMA's vice chairman. On their day off, the teams toured local aviation highlights: Boeing's nearby Everett, WA, aircraft factory; the Museum of Flight in Seattle; and the Seattle Tacoma airport facility.

Passing the tests

The second week brought two big tests of the students' work: Could the aircraft they built taxi, and could they pass a rigorous FAA inspection? It turned out that their craftsmanship was of such high-quality that each plane not only taxied, one accomplished this milestone on Wednesday of the second week.

And then came the FAA inspection. After checking every detail of proper paperwork, the FAA inspector invited the students to follow his very detailed and comprehensive walk-around. Upon completion, the FAA inspector was highly complimentary of the students' work, telling them it was some of the finest riveting he'd ever seen. Thursday and Friday were consumed with getting the second aircraft ready for taxi and inspection. Another major milestone occurred on Saturday, the last day of the build, when the first aircraft, piloted by Glasair's Setzer, made its first flight, coming back with only minor squawks.

Sharing the story

The students' experience with general aviation didn't end in Washington state. In July, Jeppesen sponsored trips so that the teams could travel to EAA AirVenture in Oshkosh, WI, to show off the airplanes and share their story. They met with FAA Deputy Administrator Michael Whitaker, NTSB member Earl Weener, and Wisconsin Lieutenant Governor Rebecca Kleefisch. They were featured at press conferences for Piper Aircraft, Lycoming, Jeppesen, and Glasair Aviation, as well as at the Build A Plane Teachers' Day and the Living Legends of Aviation Kiddie Hawk exhibit.

The students no doubt got a lot out of the experience. "It was incredible," said John Deslauriers of Canby High School. "It let me do something I probably never would have been able to do."

But I think the experience was even more meaningful for all of the adults involved in the project. We saw firsthand what incredible young people these were, in terms of both their talent and their enthusiasm for aviation. If these students are the future of our industry, I am very encouraged and hopeful about what lies ahead.

Almost all of the students said they now plan to pursue an aviation-related career, whether as an engineer, a mechanic, a pilot, or a public relations specialist. "It's going to point me in the direction that I really need to go in life," Julia Garner of Saline High School, Saline, MI, said.

GAMA and its members continue to stay in touch with the students and plan to follow their careers, including setting up internships for them next summer. As Kyle LaBombarbe of Saline High School said, "I just hope they keep this going and it's not just a one-time deal." We at GAMA couldn't agree more. **AMT**

For more information about the build, please visit GAMA's Facebook page at https://www.facebook.com/#!/

Genuine Boeing parts.

When you order genuine Boeing parts, you get the same OEM parts that are delivered on a new Boeing airplane. Parts delivered with complete certification, built to the highest production standards and backed by a warranty of up to four years. The quality and support you get with genuine Boeing parts saves time and money and delivers what nothing else can: total confidence.

www.boeing.com/boeingedge/materialservices

BOEING EDGE
Material Services

Keep it Straight

All parties need to be straight about the roles and responsibilities set forth by the government; then the parties need to be upfront about the result of the work needed vs. that which can and will be performed.

By Sarah MacLeod

Sarah MacLeod is executive director of the Aeronautical Repair Station Association (ARSA), an organization she helped found more than 25 years ago.

When a mechanic with a powerplant and/or airframe rating from the Federal Aviation Administration (FAA) works on an aircraft for a fixed based operator (FBO), the company might receive payment but the individual is responsible to the government for what was accomplished. On the other hand, if the FBO holds a repair station certificate, the company will be responsible to the government for the work of its employees, including certificated mechanics or repairmen. While an FBO may be commercially responsible to the owner/operator for any work expected or completed, the FAA will look to the certificate holder for the proper performance of that work.

It is extremely important that the owner/operator, FBO, and its mechanics understand their roles and obligations. An owner/operator (usually a pilot) is responsible for operating an airworthy aircraft. That condition can be determined and maintained by reviewing the airworthiness limitations and maintenance records as well as flying the aircraft within its design parameters. If something goes wrong, that same party should be able to describe the problem in enough detail that a knowledgeable technician can figure out whether the problem can be fixed.

The FBO without a repair station certificate must understand that it is dependent upon its certificated mechanics to determine the extent and nature of the work needed and whether or not the individual can complete the actions with the housing, facilities, equipment, and data available from the company. Indeed, a repair station has to make the same determination; it will do so using knowledgeable technicians, some of which will hold either mechanic or repairmen certificates.

In other words, while the pilot is ultimately responsible for operating an airworthy aircraft, s/he won't be able to do so without the help of the FBO. The FBO needs knowledgeable employees, whether individual mechanics or repair station personnel, working within the parameters of parts 43, 65, and/or 145. Neither the pilot nor the company can perform corrective actions without a certificate from the FAA. Additionally, neither a repair station nor a mechanic can do everything on every aircraft.

Under the FAA rules, the maintenance provider is only responsible for the work it performed, not for any and all work that needs to be accomplished.

Under the FAA rules, the maintenance provider is only responsible for the work it performed, not for any and all work that needs to be accomplished. The owner/operator is responsible for ensuring all work necessary to keep the aircraft airworthy has been or is accomplished.

When the parties work together, things are wonderful; the FBO and its people are praised to the skies. When things go wrong, everyone involved in the process can get a black-eye merely because the expectations of the parties were misunderstood. All parties need to be straight about the roles and responsibilities set forth by the government; then the parties need to be upfront about the result of the work needed versus that which can and will be performed. **AMT**

For more information visit www.arsa.org.

Aircraft Maintenance Professionals
AMTSociety
Sharing Resources and Benefits

AMTSOCIETY AIRCRAFT MAINTENANCE EDUCATIONAL SEMINARS

AMTSociety's IA Renewal Consortium

Students, A&Ps, IAs, instructors, managers and directors – all aircraft maintenance professionals are encouraged to attend these valuable educational seminars.

COMING TO A CITY NEAR YOU!

AMTSociety's IA Renewal Consortium

January 8, 2014
Atlanta, Georgia
DoubleTree, Atlanta Airport

February 12, 2014
Kansas City, Missouri
Holiday Inn, Kansas City Expo Center

March 5, 2014
Aurora, Colorado *(Denver area)*
Summit Conference Center

March 25-26, 2014
Las Vegas, Nevada
AviationPros LIVE

April 5, 2014
San Antonio, Texas
Menger Riverwalk Hotel
Held in conjunction with the Aviation Technician Education Council's ATEC Conference 2014.

Some of the speakers & subjects include:

- Aeronautical Repair Station Association (ARSA) will present on topics such as maintenance regulations, major/minor, and maintenance recordkeeping (at each location)
- Lycoming Engines on service and operation tips
- Bell Helicopters on maintenance best practices
- NORDAM on thrust reverser maintenance best practices
- Aviation Training Academy on human factors in aircraft maintenance
- SMA compression ignition engines
- FAA representatives from FAASTeam, FSDO, or ACO

Some speakers and topics may change depending on location.

IA Renewal

Each seminar in AMTSociety's IA Renewal Consortium meets the requirements contained in FAR 65.93(a)(4) for Inspection Authorization (IA) renewal training and is acceptable towards 8 hours of training for IA renewal and the FAA AMT Awards Program.

$42.00 in advance for current members of the AMTSociety

$62.00 on-site registration

$91.00 for Non-Members (incudes a one-year membership to the AMTSociety)

Register at www.amtsociety.org

In aviation, “close enough” is never good enough. You have to be precise in everything you do. The unique cam design in our click-type torque wrench minimizes friction due to reduced contact area between the cam and internal tube wall. This reduced friction results in more accurate and repeatable torque values. And Snap-on’s patented high strength sealed ratchet head keeps out dirt and moisture while being virtually maintenance free.
(model QD2R100 pictured)

Serving Critical Industries Since 1920

Call your Snap-on Industrial sales representative for more information.
800-446-7404 • snapon.com/industrial

Snap-on INDUSTRIAL

Bird detection system

Xsight Systems offers a runway detection enhancement to FODetect that allows airports to more effectively address, track and reduce ground-level avian-related threats. BirdWize utilizes a dual technology sensor, with millimeter-wave radar and electro-optic capabilities, along with advanced radar and image processing, to detect ground-level threats from FOD and birds as they occur. RunWize sends real time detection alert to the airport's wildlife team so threats are addressed. The solution also features a comprehensive reporting system that documents all birds and other objects detected. For more information visit www.xsightsys.com.

directory.aviationpros/11218167

Fire containment bag

The HOT-STOP 'L' fire containment bag safely contains fires, explosions and smoke emissions from lithium ion powered devices as well as any combustible item aboard an aircraft, without the aid of a water supply. The product line consists of containment bags that hold laptop computers, flight deck tablets, defibrillators as well as cell phone containment bags that also shield incoming and outgoing cellular signals. The bags are made up of multiple durable fabrics with a felt inner core that has a 3,200 F melting point which is sandwiched between two outer layers that have a 2,080 F melting point. For more information call (972) 248-0457 or visit www.baker-aviation.com/maintenance.

directory.aviationpros/11221634

Welding helmets

Kimberly-Clark Professional is expanding the Jackson Safety line of welding helmets with two offerings: the Jackson Safety W-70 BH3 and the Balder W-40 SmarTIGer. They are lightweight (1.24 and 1.2 pounds, respectively), and solar-powered. Balder is affiliated with the Josef Stefan Institute, a scientific research institute in Slovenia. For more information visit www.kcprofessional.com or call (888) 346-GOKC (4652).

directory.aviationpros/11221619

Toolbox with rechargeable batteries

Snap-on Industrial's Level 5 Automated Tool Control (ATC) toolbox can now be powered by on-board rechargeable batteries, freeing it from a power cord to make it more mobile. The toolbox uses digital imaging technology and proprietary software to monitor and track tools as they are removed and returned – all in real time. Six rechargeable, interchangeable batteries provide up to 16 hours of battery life, enough for two shifts, and the batteries can be fully recharged in three and a half hours using the ATC's internal charging system when the box is plugged into an AC outlet. A hot-swappable feature allows a technician to replace an existing battery with a fully charged one without affecting productivity. For more information visit www.snapon.com/industrial or call (877) 740-1900.

directory.aviationpros/11221935

PRODUCTS OF THE MONTH

Aviation wiping solutions

Kimberly-Clark Professional offers a line of aviation-certified wiping solutions that meet the requirements of Aerospace Material Specification (AMS) 3819C (Aerospace industry requirement) and Boeing Material Specification (BMS) 15-5F (Boeing). Kimtech Wipes for aviation are available in four categories: Abrasive Wipes, Surface Preparation Wipes, Cleaning Wipes and a Wet Wipe System. For more information visit www.kcprofessional.com or call (800) 241-3146.

directory.aviationpros/11221595

Engine wash equipment

AeroSafe Products Inc. has been awarded a contract by United Airlines to supply it with all of its new engine wash equipment including AeroSafe's Compressor Wash Units, unique patented Engine Wash Effluent Capture Systems and Engine Wash Probes. This equipment will distributed around United's maintenance bases including its five U.S., Guam, and Brazilian operations. For more information visit www.aerosafe.com or call (888) 666-7885.

directory.aviationpros/11222011

Battery pack

The SunSocket EnergyBar 250 portable battery pack is powerful enough to be classified as a generator and is extremely lightweight and safe for aircraft. It provides up to 30 hours of power for many USB devices, and up to six hours of power for larger electronic equipment. For more information visit www.aircraftspruce.com or call (877) 477-7823.

directory.aviationpros/11222003

Maintenance platforms

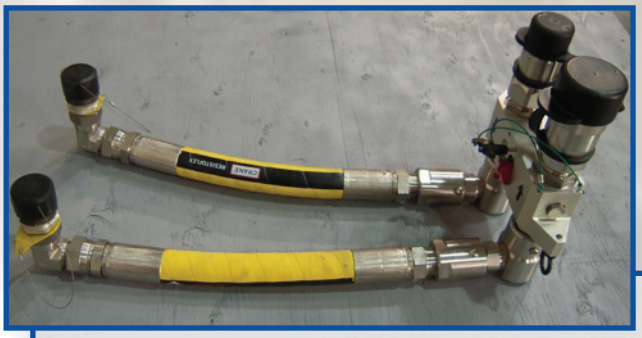
The Scissor Deck 4000 series model is available with three handrail designs. Product features: removable deck end or side attach type 1, 250-pound capacity extension ladder, locking multi height adjustability (30- to 44-inch range), and anti slip deck surface with locking wheel choices. For more information visit www.scissordeck.com or call (877) 730-2704.

directory.aviationpros/11221984

Malabar Provides Complete B787 Coolant Service Equipment

Malabar's B787 Coolant Service Cart (CSC) performs rapid aircraft coolant drain, fill, clean and de-aerate operations.

Malabar's B787 Coolant Top-Off Pack (CTOP) is a portable, convenient unit for line maintenance service.



K-Tools manufactured by Malabar to Boeing specifications connect the CSC and CTOP to the B787 aircraft.

IATA | Strategic Partner

MALABAR™ INTERNATIONAL

Malabar's Quality Management System is certified to ISO 9001:2008.

220 W. Los Angeles Avenue • Simi Valley, CA 93065 USA • 1-805-581-1200 • www.malabar.com

Juan Rodgriguez, a Redstone College student, works on a reciprocating engine, a core part of the A&P training.

Back to the Basics

Reciprocating engine theory and operation is essential in AMT training

By Steve Hankle

Steve Hankle has been an Airframe & Powerplant instructor at Redstone College in Denver for more than 12 years. For more information visit www.redstone.edu.

Looking back 40 years, I am thankful for having had the opportunity to work on aircraft that used large radial engines. My introduction to the R-2800 radial engine was during my enlistment in the Navy. It was not until my enrollment at an aircraft mechanic school that I was actually schooled in the theory and operation of reciprocating engines. General aviation, the sport pilot category, and unmanned vehicles all require technicians who are able to troubleshoot and repair reciprocating engines.

According to the General Aviation Manufacturers Association (GAMA) there are an estimated 157,123 aircraft powered by reciprocating engines certified by the FAA in the United States — from sport pilot, to home-built, to old War Birds still flying.

At the same time, many in the aviation industry predict a shortage of skilled AMTs due to the retirement of the Vietnam generation — the very technicians who were focused on reciprocating engines as the mainstay of their training. There are an estimated 5,000 airports in the United States available for general aviation flight operations, and this number is growing. These factors illustrate the need for trained technicians to fill the void.

As an instructor at Redstone College, I see students come through this facility who want to focus on the new technology — the leading-edge technology — which is great. But we stress the importance of learning basic reciprocating engine theory as an essential piece of training for today's AMT. With the number

of reciprocating engines still in operation, this training is critical, and also helps build a foundation for training on some of the more modern technology.

Reciprocating engine theory: the foundation for inspections, troubleshooting, and repair

Training today's AMT on reciprocating engine theory and operations is necessary to maintain the fleet of aircraft still using these engines, which operate using the same theory as the more common opposed engine designs.

This style of engine has been used since the Wright brothers' first flight. Engine design prior to and during the early stages of World War I were quite rudimentary as compared to the later designs developed prior to and during World War II.

In our Airframe and Powerplant (A&P) program at Redstone College, we start students out with basic physics, covering Newton's Laws of Physics and other foundational theories. We then move on to Theory of Operation, starting out with basics such as work power, horsepower, force, etc. to set the stage for basic engine theory, starting with the Otto Cycle. The Otto Cycle is a four-event cycle, intake, compression, ignition, and exhaust. It is the most popular style.

The current day A&P student must be able to fully understand in detail the intake, compression, power, and exhaust stroke for engine theory of operation.

Understanding the relationship between air density and power stroke

Reciprocating engine theory is an excellent introduction to turbine engine theory. Part 147 school students are tasked with understanding cooling, induction, fuel metering, ignition, and exhaust systems as applicable to reciprocating engine operation.

A&P students must learn about the relationship between engine power production and the density of the air. All aspects of flight are determined by the amount of air available for wings to generate lift, and engines to develop power. Students learn that atmospheric pressure, altitude, barometric pressure, temperature, and humidity all determine the density of the air.

It is equally important that the students understand the proper procedures when leaning the fuel and air mixture ratios at altitude. As the training advances, the lessons

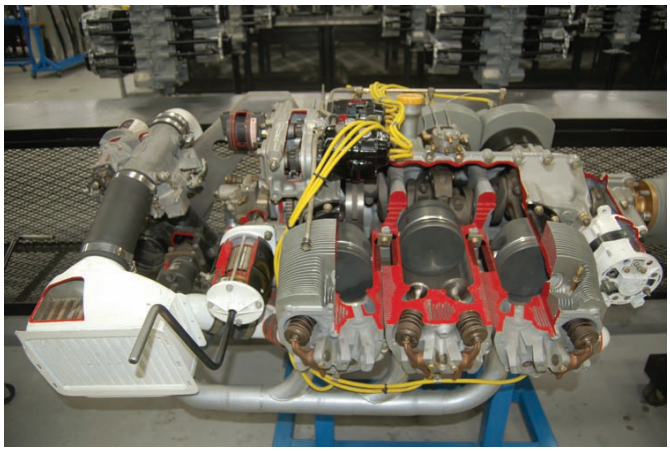
Philip Swan focuses his attention on a reciprocating engine. Redstone College places importance on old technology and new for its aircraft maintenance students.

explain the difference between a naturally aspirated engine, and a mechanically aspirated engine. In addition, the students learn that constant speed propellers and supercharged or turbocharged engines require additional instrumentation. These designs require a manifold absolute pressure (MAP) gauge. During these lessons the students learn about density altitude (DA), both high- and low-density altitude. Low DA enables the engine to produce more power, and then the airfoil surfaces can generate more lift. The opposite occurs during operations that have high DA.

Crucial to understanding DA are the differences between pounds per square inch gauge pressure (psig), and pounds per square inch absolute pressure (psia).

One example of a differential pressure indication is an oil pressure gauge. The pressure of the oil system is that which is greater than atmospheric pressure. The MAP instrument is not a differential pressure gauge and provides the pilot a means of determining the actual density of the air in the engine's induction system. An engine equipped with an exhaust gas temperature (EGT) instrument, enables the operator a more accurate means for adjusting the fuel/air mixture ratio when leaning the mixture using the mixture control system.

The A&P student is also introduced to the various mixture ratios used for engine operation. They learn that a 1:8 ratio is the richest mixture that will burn in a cylinder, and that a 1:18 ratio is the leaned mixture that can sustain flame propagation. Neither of these ratios is used for normal operation. Because an air-cooled engine has limitations at high power settings, the students learn that a 1:10 ratio — defined as take-off mixture — is used for maximum power settings to provide additional internal cooling. Once the airplane achieves cruise speed, they learn that a 1:16 best economy ratio is used. A 1:12 ratio, best power, is used when the engine is equipped with an anti-detonation injection system. A stoichiometric mixture ratio is defined as chemically correct. This fuel/air mixture ratio, 1:15, is not commonly used due to the high temperatures created because all of the fuel and air is consumed during flame propagation in the cylinders assemblies.



Redstone students receive a detailed study about the intake, compression, power, and exhaust strokes used in reciprocating engines.

Also included in the lessons are the reasons an aircraft reciprocating uses two spark plugs. They learn that using two magnetos for ignition provides a margin of safety should one system fail. Using two spark plugs ensures a more effective burning of the fuel/air change for increased power production.

Crucial to understanding the theory of operation for a gas piston engine centers upon the four strokes with an ignition event. The lessons in this area detail the Otto Cycle, used in the discussion of reciprocating engines. Students learn that the engines have a constant volume in the cylinders.

The students receive a detailed study about the intake, compression, power, and exhaust strokes used in reciprocating engines. Understanding the Otto Cycle and the events of a four-cycle engine

are imperative for troubleshooting these engines. Simply stated, there are three items that the mechanic will use in troubleshooting: air, fuel, and ignition. A detailed communication with the pilot helps to determine if the engine needs repairs. Sometimes the pilot will report engine problems to the mechanic, but the error may exist in the manner by which the pilot conducts flight operations.

After learning the Otto Cycle, students will have a better understanding about turbine engine designs, which operate on the Brayton cycle — a constant-pressure engine. Both of these styles of engines are considered as air pumps.

The A&P student also learns about induction systems which could include the operation of super- and turbo-charger applications. Students learn that piston engine powered helicopters differ in operation than fixed wing versions. In a helicopter application all of the energy produced in the engine is needed to drive the helicopter's transmissions, and they operate at the 1:10 mixture ratio continually, and do not have a cruise setting.

When written instructions aren't enough

An integral part of basic reciprocal engine theory and training includes being able to read manuals and technical data.

The predominant engine manufacturers — Rotax, Lycoming, and Teledyne Continental Motors — continually refine their designs for increased reliability and safe operation. Each manufacturer, as mandated by the FAA, must provide written instructions for the inspection, troubleshooting, and repair of the engines.

Part 147 training is tied to regulations, and Part 43.13 tells us we must use everything from the manufacturer that is most current, including tools and instructions. Here at Redstone, one of our primary areas of focus is to get our students to be comfortable with reading, comprehending, and truly reliant on the manuals. Oftentimes, a new student doesn't want to take the time to do this — it's much more exciting to start digging in and taking things apart, but the foundation of all AMT expertise has to come from the ability to effectively use the manuals and instructions.

This can be a challenge for some, because manuals are often written in a passive voice, and can sometimes be left up to interpretation. Teaching students to understand and think analytically and critically about what they are reading will only stand to help them in every aspect of their career moving forward. Whether that is on the oral and practical exams, job interviews, or on the job, we see this as a critical skill.

Another reason we focus so specifically on the ability to read and understand written material is that it helps build confidence in the students. This is a highly regulated, high-stakes career with huge implications of a job not done right. Students can sometimes feel overwhelmed with the responsibility and pressure involved, and decide to leave the program. When we've focused heavily on comprehension and analytical skills, students feel more confident in their capabilities and are less likely to abandon this career path.

Back to the basics

It can be argued that the airline industry is the safest in the world. Those who accomplish the training and certification to become an AMT have a tremendous responsibility that provides great reward. We, as educators, have the responsibility to ensure that we are delivering the right training — not only the technical aspects, but the foundational and critical thinking skills as well — in order to hold our industry to the level of safety and standards we have today. Basic reciprocating engine theory is part of this foundational training, and we plan to continue to focus on this aspect as an important part of Redstone's overall A&P program. The more thoroughly we can train tomorrow's AMT, the safer we'll all be in the sky. **AMT**

AMTSociety Supports the Aerospace Maintenance Association's Aerospace Maintenance Competition in 2014

To better serve its entire membership and to enhance future offerings, *AMTSociety* is proud to lend its support to the Aerospace Maintenance Competition, presented by the Aerospace Maintenance Association in 2014.

Over the past six years *AMTSociety* has held its Maintenance Skills Competition in conjunction with Cygnus Business Media's AviationPros LIVE annual tradeshow. Once again next year a maintenance skills competition will take place at this event but will be organized and managed by the newly formed Aerospace Maintenance Association with support of Cygnus Business Media, Snap-On, and *AMTSociety*.

The Aerospace Maintenance Competition is a friendly but competitive event for teams of certificated aircraft maintenance technicians, aircraft maintenance engineers and students enrolled in either FAA, EASA, CASA or equivalently authorized schools as well as personnel of any country's Armed Forces that are involved in the aircraft maintenance and spacecraft maintenance field. The competition is an opportunity for today's and tomorrow's skilled aviation maintenance professionals to test their combined abilities against those of their peers.

The event is being managed by the Honorable John Goglia, former NTSB member and staunch advocate for the aircraft maintenance technician.

Ronald Donner, executive director of *AMTSociety*, says, "A maintenance competition has always been a key offering of AMTSociety and it's important the aircraft maintenance community continues to be provided such an event. This competition showcases the many talents needed for aircraft maintenance students and professionals to maintain the safe aircraft we all enjoy flying on. Collaboration with like-thinking people and organizations from the industry ensures the continuation of these types of events. We are very pleased to support the new AMC."

> **"Moving forward our two groups will synergize our efforts to produce the highest quality event which brings us together to highlight the professionalism and safety used in maintaining aircraft today."**
>
> — John Goglia

John Goglia says, "This is an exciting opportunity to add to the existing success of the competition to support the recognition for the profession of the aircraft maintenance technician. Moving forward our two groups will synergize our efforts to produce the highest quality event which brings us together to highlight the professionalism and safety used in maintaining aircraft today."

Michael Sasso, show director for AviationPros LIVE and *AMTSociety* board member, says, "As a second generation aircraft maintenance technician, I am proud to be continuing the tradition of hosting this outstanding and spirited event in conjunction with AviationPros LIVE bringing even more teams and a greater excitement level to the expo event."

The Maintenance Skills Competition will be held March 25 and 26, 2014 at the Sands Convention Center in Las Vegas. For information and to register your team visit, http://aerospacemaintenancecompetition.com/general-information/venue-information.

For information regarding AviationPros LIVE visit, http://aviationproslive.com. **AMT**

Corporate Sponsors:

ACES Systems · Dynamic Instruments · Aircraft Demolition · Consolidated Aircraft Supply Co., Inc. · Corridor Aviation Service Software · CribMaster · RAPCO, inc. Replacement Aircraft Parts Co. · AM · LiveWire Innovation · HEATCON Composite Systems Composite Repair Solutions · GLOBALPARTS.aero · Snap-on · Level 5 Tool Control System · spika · SPENRO Aircraft Tools · Obadal, Filler, MacLeod & Klein, P.L.C.

Abaris	Cessna	Kroger	Propellers
Abelag	Dassault Falcon	NCATT	Silvertronic
AMFA	Dayton-Granger	Nida Corporation	SkyOne
Aircraft Technical Book Company	Del Mar College	Northrop Rice Foundation	Snap-on Industrial
Alberth Aviation	FedEx	Pratt & Whitney	Spartan College of Aeronautics and Technology
ATEC	FlightSafety Intl.	Pro Tech Technologies	Spirit Avionics
Avjobs.com	Global Jet Services	Proto	Trade-A-Plane
Baker Aviation	Globalparts	Redstone College	Vincennes University
Baker's School of Aeronautics	Goodrich	Safety-Net Inc.	West Star Aviation
Barfield	Haggan Aviation	Salt Lake Community College	Wichita Area Technical College
Bell Helicopter	Hartzell Engine Technologies	Sensenich	
Boeing	Hertz		
CAE	Honeywell		

YOU POWER AVIATION.
WE POWER YOU.

Power up your business with the latest tools, technologies and resources on the ramp at the ultimate event specifically designed for aviation professionals. Improve safety, boost efficiency and develop your skills with cutting-edge solutions from hundreds of exhibitors, high-impact education sessions and invaluable networking opportunities.

AVIATION PROS LIVE

Powering Aviation from the Ground Up

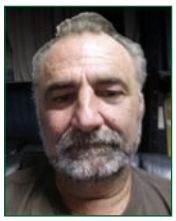
MARCH 25-26, 2014

The Sands Expo Convention Center
Las Vegas, NV

FOR FREE REGISTRATION UNTIL DEC. 31, 2013
PLEASE VISIT:
AVIATIONPROSLIVE.COM
& ENTER PROMO CODE: APLAMT2014

A Look at the Typical Maintenance FBO

The structure, challenges, and trends of the backbone of the General Aviation maintenance industry



David Boudreaux

David Boudreaux is currently the owner of Boudreaux Aviation Services, a general aviation FBO located in Orange, TX, at the Orange County Airport.

As you travel across the country today you will discover that there are thousands of airports to visit large and small, public and private. A significant number of these airports will offer numerous and various amenities one of which possibly being a general aviation maintenance facility known as FBOs or a fixed base of operations.

From a maintenance perspective it has always been my understanding that an FBO was a base of operations for an aircraft inspector, but often I find that what many of these airports call an FBO today is nothing more than an airport terminal building with facilities for pilots and no maintenance staffing or capability at all.

When I use the term FBO I am referring to a maintenance facility that is typically run by a licensed A&P mechanic with an inspection authorization (IA) endorsement. At many smaller county or municipal airports, the staffing may be just the mechanic or the mechanic and one helper. At the larger airports with an adequate customer base (30 aircraft minimum), there is usually the business owner or operator (the IA), one to three A&P mechanics, one or two helpers or trainees, and perhaps a secretary or book keeper. The IA alone is the backbone of these organizations. He or she is responsible for everything that happens at the facility including aircraft logbook entries, training of employees, AD research, safety issues, FAA and EPA regulations, and proper maintenance practices to name a few.

Challenges

The key to running a successful FBO is customer satisfaction, which is generally

accomplished by versatility. The majority of the aircraft maintained by these general aviation maintenance facilities are FAR Part 91 aircraft. They are privately owned by individuals who use them for their personal use. These aircraft have all the same needs as the ones used in commercial and corporate aviation but there are few FBOs that have the ability to meet all of their needs in one place.

It is not convenient or cost-effective to have to take your aircraft to one facility to have an inspection done, another facility to have paint work done, another to have sheet metal work done, and another to have avionics work done, etc. Therefore, the more capability that you have at your FBO, the better your chances of being able to keep your customers satisfied. This does, however, create a number of challenges.

The largest challenge for the typical FBO today is finding and keeping qualified mechanics. Good qualified A&P mechanics seem to be a dying breed these days. It has often been said that an A&P license is nothing more than a license to learn, and it has been my experience that this is only becoming more evident as time goes on. It seems that if you hire an A&P straight out of school, they generally have little or no experience and therefore there is a significant learning curve that has to take place before they are very productive.

On the other hand, in most of the aviation maintenance facilities across the country everything is specialized. In other words, you have sheet metal technicians, electricians, an avionics shop, hydraulics shop, etc. All of these guys are considered good qualified A&P mechanics, but as an FBO owner who wants to have the versatility to provide all of these services to customers in one place, an A&P who can only trouble shoot and work on hydraulic systems doesn't possess the training necessary to be a valuable asset to the success of the business.

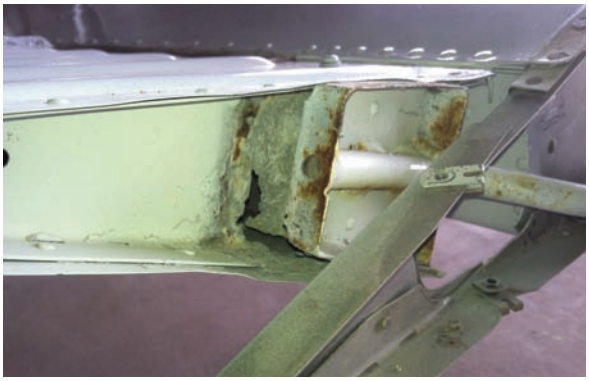
Another significant challenge to the FBO today is the state of the economy. As mentioned earlier, most of the aircraft maintained at these facilities are for personal use, and that being the case, when the economy turns south so does the business for the FBO. It is not cheap to own, maintain, or operate an aircraft of any type and so when finances become limited the first thing to go is the items of convenience or pleasure.

In today's economy, at almost every airport you go to and every FBO you visit, you will find several aircraft projects that have been started and put on hold or abandoned altogether due to the lack of funds. When a project is delayed this is not good for the customer, the business, or the aircraft. At a typical FBO, just doing annual inspections and routine maintenance is not sufficient to keep the lights burning. A large percentage of the annual income of FBO facilities is generated through major repairs or alterations or rebuild projects.

Small FBOs are generally located at small county or municipal airports and the facilities which are supposed to be maintained by the local government authorities aren't always getting the support they need. I went to a FAA sponsored flight safety seminar a while back and had a conversation with the FBO operator there about local politics and the lack of support from the local authorities. Apparently the challenges associated with trying to maintain a decent facility and pleasant environment to work in are not geographically sensitive.

Unfortunately the airport facilities seem to be on the bottom of the list as far as the authorities are concerned. It would make sense to me that the local airport should be a big part of having a thriving community. Many local business owners have businesses in other places or live in other places, and use their aircraft for their business travel, not to mention vacationing. You would think that the governing authorities would realize the importance of having a working rest room, a roof that doesn't leak, or a taxiway that isn't gravel and full of holes. These items should be considered necessities but frequently don't make it through the budgeting process.

And, the operators of these facilities frequently aren't even allowed to do some repairs themselves out of their own pockets. With more stringent environmental concerns, authorities no longer allow operators to wash airplanes or engines at their facilities due to EPA hazardous regulations.



Examples of corrosion. The best way to prevent corrosion from being a major issue is to do extensive inspections using a flash light and mirror or even a borescope in difficult-to-see places.

Industry trends

In my opinion, East Texas is a wonderful place to live, especially close to the coast, but it is also very hard on aircraft. One of the things that we do at our facility is corrosion prevention, treatment, and repairs. Aircraft located and maintained in this area require special attention pertaining to corrosion issues because just like humans, they are a product of their environment.

At the last IA seminar I went to there was a representative from Cessna doing a segment on corrosion and its impact on the aging general aviation fleet. The best advice I can offer is nip it in the bud. The best way to prevent corrosion from being a major issue is to do extensive inspections

using a flash light and mirror or even a borescope in difficult-to-see places. If you see signs of corrosion, clean and treat the area immediately.

In the last year we have disassembled and repaired three Cessna wings for corrosion on the front spars and the leading edges at the lower lap joint, and I have two more in the shop now. Other areas to pay particular attention to are areas with dissimilar metals such as the steel fittings on the aluminum flight controls on Piper aircraft and foam-filled trailing edges on some Cessna controls.

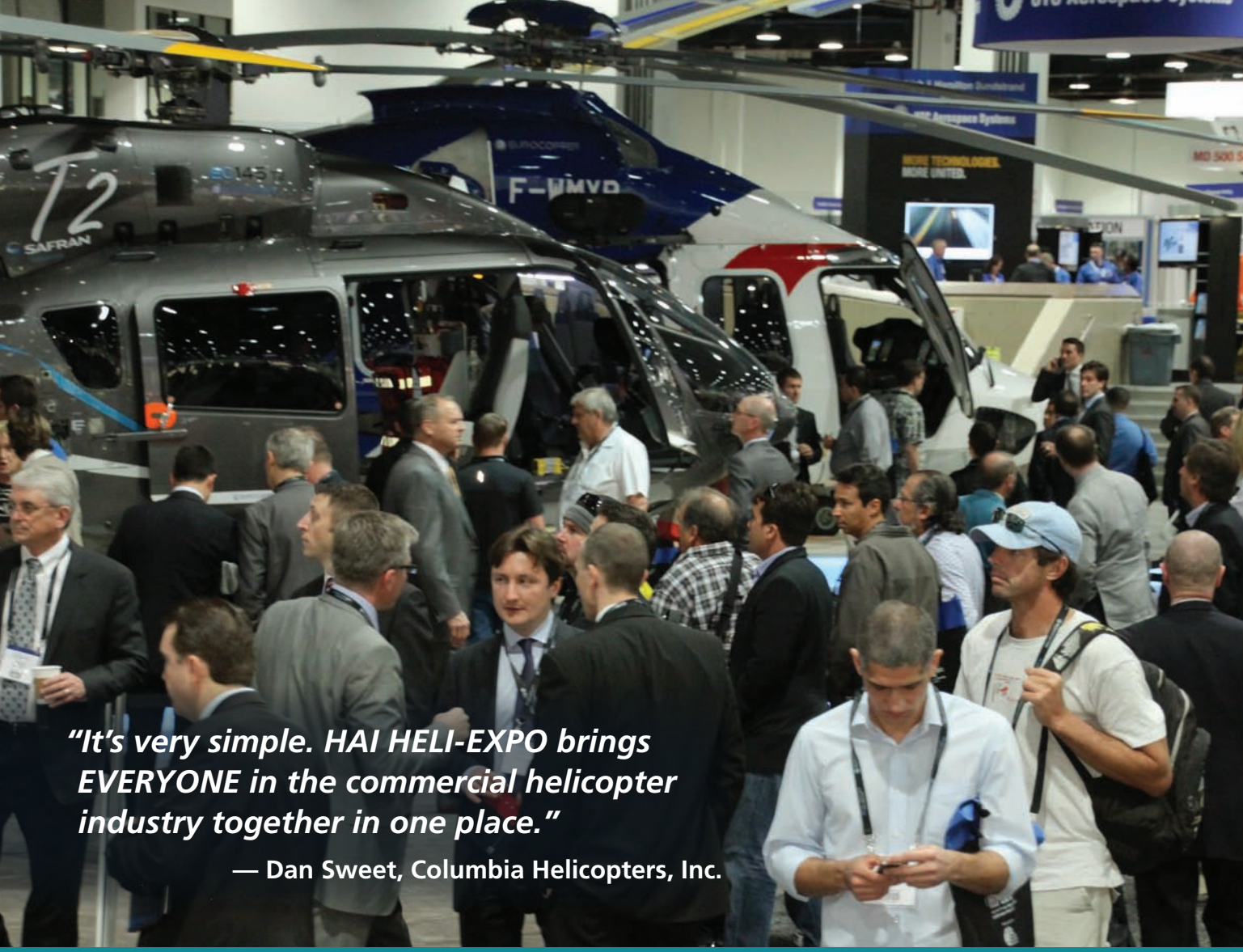
Another trend that I have noticed in the last year is cylinder compression failure on large bore engines. In the past few years there have been several bulletins addressing the issue of low compression on fairly new cylinders and even stated in one bulletin that sometimes a compression reading slightly below the minimum, according to the aircraft maintenance manuals, may still be airworthy.

I just want to say that we have had a larger than normal volume of failed cylinders in the last year and in each case the cylinders were pulled and found to have cracks or wear that was out of limits. Many of these cylinders only had 300 or 400 hours on them. I would encourage anyone who is having issues with engine compression being border-line to consider pulling the cylinder for further investigation.

A great resource

Your local FBO is a great place to work, a great place to take your aircraft, or even a great place to just get advice. I believe the IAs that run these FBOs are the only people you can go to with your general aviation aircraft that can probably repair anything that is broke. They can answer any question that you may have regardless if it is concerning operating, repairing, or regulatory issues. No one can answer every question about every aircraft but the IA will be your best shot.

If you are looking for a career opportunity where you can learn to work on every part of the aircraft and possibly get the training required for your A&P ticket or even your IA endorsement, the FBO is the place to go. **AMT**



"It's very simple. HAI HELI-EXPO brings EVERYONE in the commercial helicopter industry together in one place."

— Dan Sweet, Columbia Helicopters, Inc.

ENGAGE IN THE FUTURE OF VERTICAL FLIGHT

February 24–27 • Anaheim, CA

Exhibits open February 25–27

HELI-EXPO 2014

PRODUCED BY Helicopter Association International

Access 20,000 Industry Professionals Under One Roof

Apply for Exhibit Space Today!
Applications accepted on a first-come, first-served basis.
Apply online at rotor.org/heliexpo

Questions? Call 703-683-4646 or email heliexpo@rotor.org

AMTSociety and AMT visit new Las Vegas AIM campus

Ron Donner, along with Karen Berg, associate publisher of *Aircraft Maintenance Technology* magazine, recently visited the new Aviation Institute of Maintenance Las Vegas, NV, campus. Berg also serves on the advisory committee for the new program.

The 37,000-square-foot facility is conveniently located near McCarran Airport in Las Vegas. According to Joanne Leming, executive director, the first A&P class began on June 17 of this year. Classes begin monthly, and at the time of the visit 41 local area students were enrolled. AIM anticipates 80 to 100 students during the second quarter of 2014 with an eventual capacity for up to 400 students. Currently the school has eight instructors and for those who may be interested is actively seeking additional instructors for the program. This is the only such aircraft maintenance school in the state of Nevada.

WITC receives airplane donation

Ronald (Ron) Donner recently coordinated the donation of an airplane to the Wisconsin Indianhead Technical College (WITC) for use as a training aid in its newly developed Composite Technology program. The airplane, a Flight Design Light Sport Aircraft, was donated by Stanton Sport Aviation, Inc. located in Stanton, MN, just south of the Twin Cities where Donner volunteers on the board of directors. The airplane was manufactured using the latest composite materials and will be used for education and training purposes.

Stanton Sport Aviation is the upper Midwest distributor for the Flight Design series of LSAs. The un-airworthy airplane was acquired by Stanton from a private owner for its engine, avionics, and various other components. It was deregistered, will never fly again, and for the last year the bare fuselage and wings had been placed into storage.

Tim Wright, the composites instructor responsible for developing the Composite Technology program at WITC, regularly contributes composite repair articles to Aircraft Maintenance Technology magazine. Several months ago the subject of training aids for the new program was discussed between Wright and Donner. Students enrolled in the program can now learn composite repair techniques on real airplane parts.

Announcement of the donation was made during

AMTSociety Executive Director and Chief Editor for Aircraft Maintenance Technology (AMT) *magazine Ronald Donner, WITC Composite Student Tom Hudacek, WITC Composite Technology Instructor Tim Wright, WITC Associate Dean of Continuing Ed Charlie Glazman.*

Donner's visit to WITC in September. The Superior and Douglas County Chamber of Commerce and WITC hosted an open house to showcase many of the school's technical offerings, including the new Composites Technology course, along with local companies typically employing graduates from WITC. On display in the composite lab during the event was a fuselage mock-up for Kestrel Aircraft's all composite turbo-prop aircraft.

Next AMTSociety Education/Roadshow Seminar Jan. 8, 2014 in Atlanta, GA

Jan. 8, 2014 at the Double Tree Atlanta Airport in Atlanta, GA, will be the next live AMTSociety Education/IA Renewal training event. Any aircraft maintainer, student, instructor, manager, or director is encouraged to attend. The schedule of speakers and topics is set. Hear from ARSA on maintenance regulations, recordkeeping, and major/minor repair, along with sessions from Bell Helicopters, NORDAM, Aviation Training Academy, and the FAA. Each seminar in AMTSociety's IA Renewal Consortium meets the requirements contained in FAR 65.93(a)(4) for Inspection Authorization (IA) renewal training and is acceptable toward eight hours of training for IA renewal and the FAA AMT Awards Program. Preregistration is encouraged. http://www.amtsociety.org/roadshow.jsp.

AviationPros.com/company/10133850

AviationPros.com/company/10136580

AviationPros.com/company/10134757

AviationPros.com/company/10134945

AviationPros.com/company/10134815

AviationPros.com/company/10134527

Advertisers' Index

Software

Tools & Equipment

Aircraft/Engine Parts

Facilities/Facilities Maintenance

Schools & Training

FBO Mechanics: Critical GA Maintenance Needs Second Set of Eyes

GA accident rates remain at approximately 1,500 accidents per year with almost 500 annual fatalities

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 general aviation accident rate remains stubbornly high despite numerous attempts to reduce it by the FAA, the NTSB, and various pilot and maintenance organizations. Among the problems found by the NTSB that contribute to GA accidents are maintenance mistakes to critical systems that subsequently fail in flight.

Up until recently, recommendations were generally limited to complying with the federal aviation regulations, manufacturer's recommendations, and maintenance best practices. But with the GA accident rate remaining at approximately 1,500 accidents per year with almost 500 annual fatalities, it was clear that more needed to be done.

I have been pleased to see that one of the NTSB's recommendations to lower the GA accident rate is for maintenance technicians to have "a qualified person, other than the person who performed the maintenance, inspect the safety and security of critical items that received maintenance." For someone who spent 30 plus years as an airline mechanic used to the system of required inspection items — those items deemed so critical to safety of flight that a separately qualified inspector needed to sign off on them — this recommendation is a long time coming. I know that as an RII-qualified inspector for a number of airlines, the requirement resulted in numerous occasions where mistakes were caught by virtue of having that second set of eyes. For a while, the air carrier industry was tracking the number of so-called re-works and they were alarmingly high.

NTSB: Have "a qualified person, other than the person who performed the maintenance, inspect the safety and security of critical items that received maintenance."

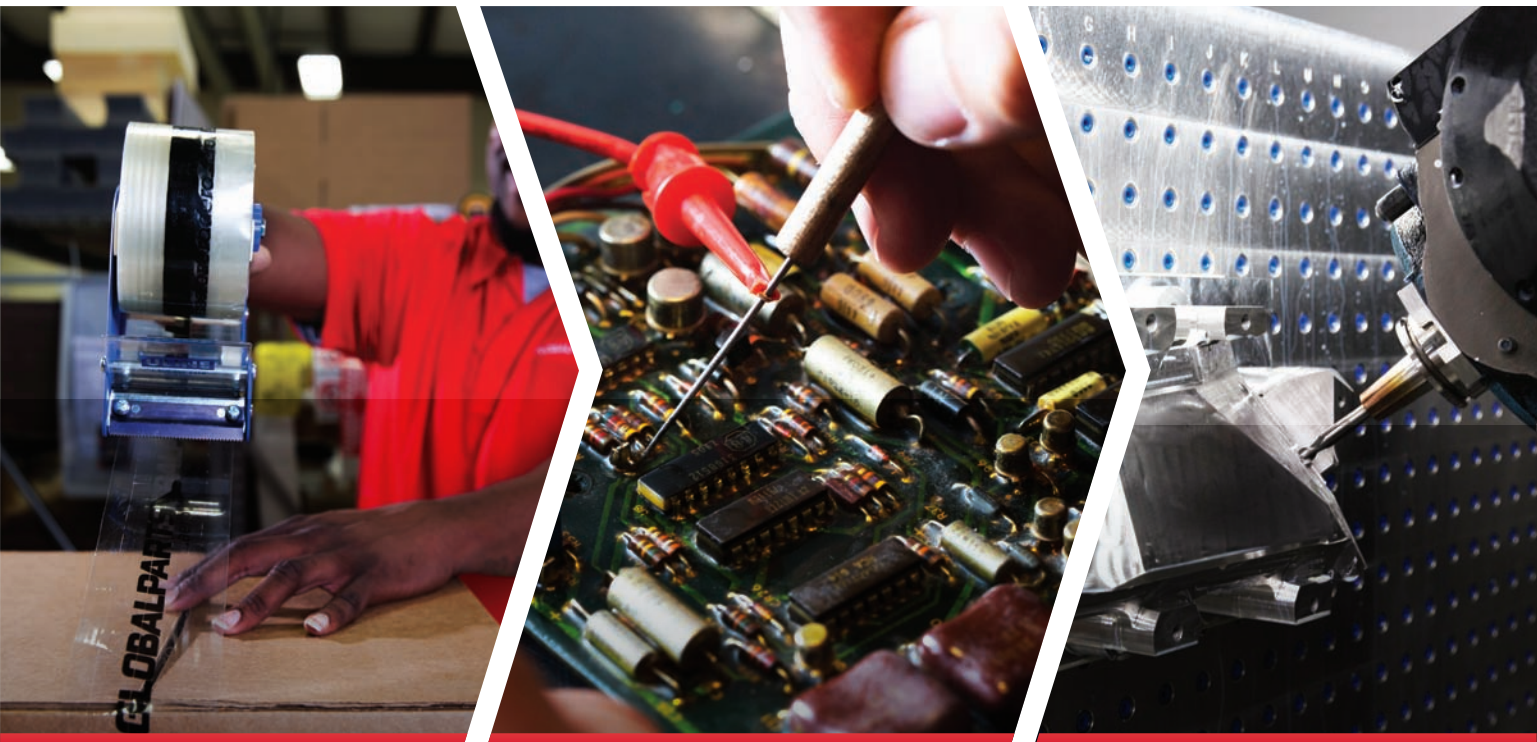
It would not be surprising to find a high rate of re-works, if GA had a similar RII system and began tracking these numbers. Of course, air carriers are required by regulation to have RIIs, while GA is not. However, air carriers have learned the importance of those second sets of eyes and frequently add RIIs to their maintenance programs even when not required by the aircraft manufacturer or the FAA. So voluntary adoption of such a system by individual mechanics or FBOs could be a major step forward in aviation safety and preventing GA accidents caused by maintenance errors.

Aside from the emotional toll of being responsible for an aircraft accident, especially if it results in injury and death, there are clearly financial penalties from accidents. Even if insurance covers any ultimate liability, there are so many uninsured costs — especially time away from work answering to NTSB investigators and FAA inspectors, not to mention media attention and any lawsuits that may result.

Many of you are probably thinking that it's tough to find a second set of eyes when you work at a small company or for yourself. I know. I ran my own FBO at Logan International Airport for more than 12 years. Even with a dozen mechanics it would have been difficult to schedule a second set of eyes. But in retrospect there are a number of situations which, while not resulting in an accident, did result in problems that might well have been caught earlier by a second set of eyes. **AMT**

Through parts distribution

WE'VE EVOLVED.



DISTRIBUTION | **REPAIR & OVERHAUL** | **MANUFACTURING**

GLOBALPARTS .aero

www.globalparts.aero | +1.316.733.9240 | RFQ@GLOBALPARTS.AERO

Your one source aviation parts solution.
24-Hour AOG Line +1.316.351.5511

AVGROUP®
FOR JETPARTS

YOUR AVIATION PARTNER SINCE 1971

SINCE 1971 AVGROUP INTEGRITY INSIGHT INNOVATION

Over 40 years of professional experience combined with world class quality standards and customer service make Avgroup the clear choice for reliable, efficient aviation support.

1-800-458-6177
After Hours AOG: 1-800-AOG-LINE
www.jetparts.com