



Nuts And Bolts

WARNING FOR IA'S

Inside this issue:

WARNING FOR IA'S	1
Lucky's Corner	2
Ask The Feds - Post Maintenance Check Flight	3
FPM Contact Info.	3
Accident Case Study - Beech 18 Freighter	4
Tech Forum - Generations In The Workplace	5-6
What Is It?	6

March 2008 is almost here! That means if you hold an Inspection Authorization, you have to make sure that you have meet the requirements of 14 CFR part 65.93 for Inspection Authorization (IA) renewal.

If you looked at the back of your IA card after it was signed last March (2007) it says "Authority to exercise the privileges of FAR 65.95 has been endorsed or renewed to expire on the date shown below", which should say 03-31-2009. We all know that last year we went to a two year renewal program, right. Don't let that confuse you. The two year renewal program means that an FAA Inspector is only going to sign your IA card every two years. When we sign your card we are going to endorse it for a two year period.

Here is the important part: It's up to **YOU** to ensure that you have met the minimum requirements for renewal in March of 2008 for your Inspection Authorization to be valid for the inspections, alterations, or major repairs you approve in calendar year 2008. You are not required to bring your 8610-1 application and activity sheet to the FSDO for review and 8310-5 endorsement in March of 2008. If you did not perform, for every 90 days that you held the IA, 1 annual or 2 major repair/alterations, or supervise one progressive, or complete an 8 hr. IA refresher course, then your only option left is to make arrangements with your assigned FAA Inspector to take an oral exam to keep your IA valid.

We recommend that you go ahead and complete the IA application form, (FAA Form 8610-1) and an activity sheet and keep it in a safe place for renewal in March of 2009. This will make it a whole lot easier to remember what IA activity you had in 2007. Some IA's are wanting to drop off their 8610-1 and activity sheet at the FSDO to be placed in their file for safe keeping. If you want to do that please check with your FSDO first. Remember, the two year sign off was created to decrease work load at the FSDO.

A word of caution, if you had no IA activity in 2007 and you did not attend a refresher course or take an oral exam from an FAA Inspector, your IA is null and void. If this is the case, and you use the authority of your IA in 2008 and then apply for renewal in 2009. Guess what? Not only will you not get renewed, you will be the subject of legal enforcement action from the FSDO. Additionally, any annuals or other inspections you performed in 2008 will be subject to reexamination under Title 49, section 44709. Please don't let that happen! If you have any questions about the IA renewal process, please contact your local FSDO before the end of March 2008.

• If you are interested in safety and would like to help the FAASTeam spread the word in your local aviation culture, we need to talk to you. Contact your local FAASTeam Program Manager. See page 3.

LUCKY'S CORNER

HOW TO AVOID SURPRISES

The dictionary gives the definition of a "Surprise" as: (1) To catch or take unaware, (2) To attack without warning, (3) To cause one to be astonished or amazed! In this article we are going to re-live the "Surprise" that one of my customers had a few weeks ago in his Beech A-36 coming back from Durango, Colorado .

It was on the morning of August 31, 2007; he had beautiful weather and was at a cruising altitude of 13,500 just crossing Spanish Peaks in Colorado. The aircraft was performing normally when all of a sudden a very loud bang occurred. (The pilot said it was similar to a shotgun blast.) The aircraft suddenly started vibrating and shaking violently and then losing power. What now???? What had happened???? Scanning the engine analyzer, he noted that the # 6 cylinder had lost temps on the CHT and EGT! Reducing power way back seemed to reduce the vibration. Trinidad, Colorado lay ahead within reach, so that was his target. He had an uneventful landing in Trinidad. He then made the phone call to me for help from this "Unplanned Stop and SURPRISE". Upon looking at the engine I found that the # 6 Cylinder had blown the top of the cylinder head off of the barrel. The only other damage noted was to the exhaust stack collector (it was deformed from the cylinder head trying to exit the cowling) and the fuel injection line. Nothing else was noted except a circular worn spot in the center of the bottom cushion of the pilot's seat. There wasn't an apparent odor noted, however; if I had gotten there right after the landing, I bet there would have been.

"Why did this happen is the million dollar question. I could have possibly caught this prior to it happening. I have been seeing this type of failure more and more. Not just on older cylinders but on new ones and not only Continental, but Lycoming as well. So it is not isolated to just one manufacturer. Several factors are showing up that I feel have a bearing on these types of failures. For instance, (1) Time in service: there are cylinders out there that have thousands of hours of time in service. Some of them, mechanics have no idea how many hours they have in service. (2) Actual age of the cylinders: there are some cylinders out there that are over 50 years old, possibly having corrosion problems between the steel barrel threaded area and the aluminum head area, which is where cracks can originate. (3) Thermal shock cooling; not knowing how many times these cylinders have experienced this and (4) Barrel replacements: mechanics don't know how many times that the barrel and head have been de-mated and re-mated, no records of this process are passed on with the cylinder history.

The cylinder that failed on this A-36 was an original OEM (TCM) cylinder that had about 3300 to 3400 hours total time in service and about 1600 hours since its last re-chrome and overhaul. Over the years I have come to the conclusion that it's not a question of "IF it will fail" but rather "WHEN it will fail". I have seen fresh overhauled cylinders fail this way after only 15 hours out of overhaul and others with 4,000 hrs on them and are still doing fine. With all of the new mods going on out there, such as turbo-normalizing, turbo inter-coolers, exhaust system mods like "Power Flow Exhaust", and running

rich of peak and running lean of peak, we have introduced these cylinders to new operating parameters for which they may or may not have been designed or tested to operate in. There are so many variables involved that I can't mention them all. What I do know is that to catch this problem before there is a failure, **a very simple test can be run.** This test was originated by a PMA holder and the FAA to catch premature failures of this type in some PMA'd cylinders. The test is to run a differential compression test and while the cylinder has pressure on it, take a spray bottle of soap and water mix and spray the cylinder head all the way around the head part where it is attached to the barrel. If a crack has started but isn't visible yet, you should be able to see bubbles and leakage in that area. Also pay close attention to the area at the fuel injector nozzle hole and at the spark plug holes. I have found leaks and cracks at these areas also. Any leakage or bubbles is cause for further investigation or cylinder removal before further operation. All of these barrel head separations start with a fracture or so called crack first which then progresses to the point of complete failure of the head.

My recommendation is to do the soap test while under pressure at every oil change. This will help you possibly avoid this "SURPRISE". Believe me, it is a whole lot easier to replace a cylinder at home in your own shop or hangar than at some airport 500 miles away where you have no tools, supplies or spare parts to work with. Happy flying and be safe!!!!!!

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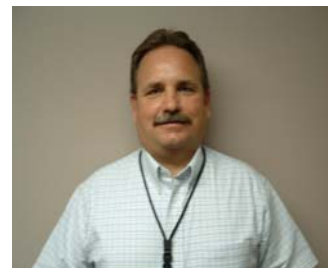
ASK THE FEDS - Post Maintenance Operational Check Flights

I was asked recently to assist a junior inspector from our office with an aircraft incident investigation. The incident occurred after an annual inspection/maintenance had been performed and during an operational check flight on a Mooney M20A. The owner supplied the A&P/IA with a recapped tire to install on his aircraft. The 30+ year experienced Mooney mechanic installed the tire on the left main of the aircraft not thinking anything about it. Along with the tire installation the mechanic also checked all of the flight control rigging very carefully since this was the first time he had seen this aircraft. So far so good, right? Since the flight controls had been re-rigged, due to they were found to be incorrectly rigged, the mechanic, which is also a highly experienced Mooney pilot, decided to test fly the aircraft to perform the final "tweaking" of the fixed trim tabs. The pilot/mechanic took off and retracted the landing gear when it suddenly "didn't feel right" after the gear went into the wheel well. He decided to extend the gear back down and land the aircraft to see if there was a problem. Upon landing roll out the weight settled back on the gear, the left gear collapsed and the left wing went down on the pavement but fortunately did not cause any injury to the pilot. The investigation found that the recapped tire that was installed was too large in diameter for the wheel well clearance and bent the down lock rod when it retracted. There is a very old Mooney Service Bulletin from the early 1960's "recommending" that recapped tires not be installed for this reason. The mechanic later admitted he'd forgotten about the service bulletin. Prior to take off the mechanic failed to return the aircraft to service in accordance with 14 CFR Sections 43.9 and 43.11, putting his pilot certificate in jeopardy for operating an un-airworthy aircraft. The mechanic/pilot admitted he had been doing it this way for years and thought it was an accepted industry standard to not sign off the log books prior to an operational check flight. But **14 CFR section 91.407(a)** states "**No person may operate any aircraft that has undergone maintenance, preventive maintenance, rebuilding, or alteration unless (1) It has been returned to service by a person authorized under section 43.7 of this chapter; and (2) The maintenance record entry required by section 43.9 or section 43.11, as applicable, of this chapter has been made.**" In other words, an aircraft cannot be flown unless it has been properly returned to service by an appropriately certificated mechanic. And that means a return to service signature for the work performed. Since this airman was so cooperative and had such a compliant attitude toward the investigation, he'll probably only get counseling and a letter of warning in his airman file for 2 years after which it will be expunged from his record. The point is that he, as an IA and pilot thought he was doing the right thing. And he had done it for years the same way and never had an issue. But as the old saying goes "It's not a problem, 'till there's a problem, and then it's a prob-

it's a problem."

Since we're on the subject of operational check flights, did you know that an operational check flight is required after maintenance that may have substantially affected the flight characteristics of an aircraft? **14 CFR section 91.407(b)** states "**No person may carry any person (other than flight crewmembers) in an aircraft that has been maintained, rebuilt, or altered in a manner that may have appreciably changed its flight characteristics or substantially affected its operation in flight until an appropriately rated pilot with at least a private pilot certificate flies the aircraft, makes an operational check of the maintenance performed or alteration made, and logs the flight in the aircraft records. (c) The aircraft does not have to be flown as required by paragraph (b) of this section if, prior to flight, ground tests, inspections, or both show conclusively that the maintenance, preventive maintenance, rebuilding, or alteration has not appreciably changed the flight characteristics or substantially affected the flight operation of the aircraft.**" It is saying that if an aircraft has some sort of maintenance procedure performed on it that may substantially affect how the aircraft handles in flight and you cannot simulate the check on the ground, it will require an operational check flight by an appropriately rated pilot. So if you, for examples, you rig fixed trim tabs, install a flight control performance enhancement STC, or rebuild an aircraft from a wreck, you may need to perform an operational check flight.

Please educate yourself in the requirements that you deal with everyday. Attend IA renewal seminars in your area. Get on-line training on Regulations and Human Factors. Attend FAASTeam Safety Seminars by registering on faasafety.gov and search for events in your area. Or better yet become a FAASTeam Representative yourself and help us educate others. Just be sure you are doing the right thing.



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Accident Case Study - Beechcraft G18S Freight Hauler

This accident involved a Beech 18 engaged in freight operations in west Texas while on an IFR flight plan at dusk. The following is a condensed version of the pilot interview in the hospital. While in cruise flight at 9,000 feet MSL, the left engine began to 'run rough and lose power.' The pilot said he interpreted the problem as carburetor icing and applied manifold heat even though he had mechanical trouble moving the lever all the way down, (heat on). With the engine still running rough, the left propeller was feathered and the left engine shut down. He repeatedly attempted to restart the engine, but the propeller would not un-feather. The pilot was unable to maintain altitude and was descending at 200 ft./min. The pilot requested to land at a nearby airport. After descending through IMC weather, the pilot realized that he would not make it to the airport, and executed a forced landing to rough/uneven terrain.



Examination of the engines revealed that the alternate intake air doors were missing on the right and left engines. (see photo above) The hinges for the doors were attached to both carburetors and showed no evidence of distortion or impact damage. The doors were not found at the wreckage site. A missing alternate air door would allow ambient air to enter the carburetor, rendering the carburetor heating system ineffective. The aircraft was 28 hours out of its last inspection. According to carburetor icing probability charts, the reported temperature and dew point values would be favorable to the formation of induction system icing.

The National Transportation Safety Board determines the probable cause's of this

accident are as follows: "Inadequate maintenance which resulted in diminished carburetor heat effectiveness due to missing alternate air doors. Contributing were conducive carburetor icing weather conditions, low ceilings during the emergency descent, and the lack of suitable terrain for the forced landing."

The ATP rated pilot suffered broken ankles, wrists, collar bone, several ribs, and multiple lacerations. The pilot had a total of 3, 222 flight hours with 1, 328 of those in a Beech 18.

Remember what we said in past articles, "Nothing Happens Until Something Happens". Well as you have already guessed, the condition of this aircraft raised questions about the condition of the other Beech 18's operated by this freight hauler. An inspection was conducted on another 18 that was in revenue service at another location. What we found was horrifying. There is not enough room here to list all of the safety of flight discrepancies. There were cracks on top of cracks, there were huge



cracks next to huge welds on the cylinder heads, there were loose exhaust stack nuts, there were exhaust stacks hanging from the engine. There were rivets missing from the alternate air doors on the intake manifold, there was a scat tube for the manifold heat disconnected, and hanging loose in the cowling.

There are two tragedy's here, one



the company that failed to maintain their aircraft, and two, the pilots that accepted the aircraft and flew them. I know your saying "what about the mechanic/IA that had signed them off for their last inspection"? As it turned out the mechanic and the operator were the same person. Obviously a strong case of a lack of integrity in order to chase that all mighty dollar.

As a result of this accident there were multiple violations filed against pilots and mechanics, and



the company has since closed their doors and surrendered their 135 operating certificate.

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GENERATIONS IN THE WORKPLACE

Make sure you're communicating!

Have you noticed that communicating with your teenagers is vastly different than communicating with your parents? In addition to working with individuals, who all have their own behavioral style, the multi-generational nature of our workforce is a force to be reckoned with. Since communication is one of the major contributors to human error on the hangar floor, we need to constantly maintain and develop our communication skills across our workforce.

Trying to understand generation-specific frustrations, motives and values will help us work and communicate with colleagues in our multi-generation work force. To work together we must understand the following key factors that define a generation:

- Unique work ethics;
- Different perspectives on work;
- Distinct and preferred ways of managing;
- Unique ways of viewing quality;
- Different priorities that effect how and when they show up for work.

The remainder of this article discusses the characteristics that describe the four different generations; can you recognize those of your friends and teammates?

- Veteran Generation (veterans), born between 1933 – 1945 (ages 60-72)
- Boomer Generation (boomers), born between 1946 – 1964 (ages 41-59)
- Generation X (gen X'ers) born between 1965 – 1976 (ages 29-40)
- Millennial Generation Y (gen Y'ers), born between 1977 – 1998 (ages 7-28)

Veterans

Most veterans employ a “*Work first!*” attitude. If you are working with a veteran, take the time to get to know their background, experiences, work preferences, and personal needs. In the work place veterans like to contribute, are loyal, disciplined and appreciate courtesy. To communicate with them be patient and take the time to explain new ideas; they may be stubborn. Their work must be satisfying, utilizing their skill and expertise. They have a strong work ethic. They like to be asked for advice, then expect you to listen to them. Thank them in writing. Veterans want to work in an atmosphere with living, breathing humans, not voice mail or e-mails. Remember that they did not grow up with computers, video games, fly by wire systems, and advanced computer

controlled aircraft systems.

Boomers

The boomers “*Live to Work!*” In the workforce they are driven to compete, seek to improve, and are hard workers. They grew up knowing that to survive they had to work hard. They want to be challenged and valued, they want to be part of success. To communicate with boomers show them respect for their skills, knowledge and potential. Give them clear goals and guidelines with the freedom and flexibility to do things their way. Give constructive feedback; take interest in them as a friend. On the shop floor, they probably learned to do tasks without the aid of computer diagnostics and now have had to learn how to use computers.

Generation X'ers

The Gen X'ers “*Work to Live!*” In the workplace they are independent, diverse, flexible, outcome oriented and focus on having a life – today. When opportunities for growth, mobility, challenge and responsibility dry up so does their motivation. Give them clearly defined goals and the freedom to achieve them in their own way. To get through to them, show that you trust them, have confidence in them by allowing them to do the job on their own and recognize their development. Respect their time and be straightforward. Reward with training and increased responsibility. They expect a lot of feedback from managers. They have grown up with computers, cell phones, and e-mail. They view computers as an integral part of the work environment and embrace technology. They may not have learned how to do some tasks without a computer since computers have always been part of their work environment. Their motivation is to have fun at work, make money and have a life.

Generation Y'ers

The Millennial Generation Y “*Live, then Work!*” In the workplace they are informal, digitally savvy, multi taskers, teamwork oriented, enjoy group endeavors, are well educated and like freedom and flexible work schedules. Very demanding, they want a wide range of projects to work on as well as challenging and meaningful work. They need structure, supervision and look for immediate gratification and feedback. Gen Y'ers claim that the relationship they have with their immediate boss is a critical factor in whether they stay on or leave a job. The best managers create an environment where people “want to come to work”. They need to be entertained and enlightened. They have grown up with laptop computers, text messaging and video games. They are completely at home with

fly-by-wire, advanced computer diagnostics, and expect even more through the use of computer technology in the work place. They like opportunities to learn and develop new skills more through the use of computer technology in the work place. They like opportunities to learn and develop new skills.

All generations want:

- Work that provides personal satisfaction
- Employers who understand that personal lives are important
- Work that is valued by employers and customers
- Clear sense of purpose from employers

Benefits of multi-generation work teams include:

- The team can attract and retain talented people of all ages with different strengths.
- The team is more flexible.
- The team can gain and keep greater market share because its members reflect a multi-generation market.
- Decisions are stronger because they're broad-based.
- The team is more innovative.
- The team can meet the needs of a diverse public.

Companies are tapping into the positive potential of a multi-generational workforce. They are harnessing the power of diverse viewpoints, passions and inspirations. The diversity of the workforce in a company challenges how the company thinks, what they do and their ability to achieve exceptional performance. Each generation has its strengths in understanding sheet metal and composite design, electronic controls and repair. Where a diverse workforce has developed appreciation for differences and learned to bridge the gaps, everyone wins. Learn to communicate across these generations in your work teams and you too will win.

The author:

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WHAT IS IT?

If you know, send me an e-mail at "michael.r.jordan@faa.gov". and we will publish it in the next issue and give you credit for your aviation savvy.



The response to the 07- 04 edition photo was great. The first to respond was Robert "Hoss" Kleinschmidt, Chief of Maintenance Jet Aviation Business Jets / XRS Holdings, LLC, Austin TX. "Hoss" was right on. It is a Goblin XF-85 that was carried in the belly of a B-36, and was launched and recovered in flight. The program was not



very successful. There were 59 other people that responded and many were very familiar with this aircraft.

Do you need to find or get information about any FAA office?

http://www.faa.gov/about/office_org