



Nuts And Bolts

IT'S BEEN A GREAT YEAR FOR GENERAL AVIATION

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- 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.

This year has been one of the most exciting and rewarding that I have seen in my previous 17 years with the FAA. We have reduced the general aviation accident rate, which we all share as a common goal. This alone is the greatest reward that we as an industry could expect to accomplish. There is still a lot of work to be done in this arena, however, I think the FAA has turned the corner, with the FAASTeam and is on the right tract to accomplish our goal of 0 maintenance related accidents. All of you folks that are reading this newsletter are the professionals responsible for this major accomplishment and us Feds have our hats off to you. Thank you for your hard work and compliant attitude.

My inside feeling is that Big Brother has realized that the key to lowering the accident rate is awareness training about human factors and failure to follow procedures, (FFP). All of the smart guys have analyzed the data and it points directly at FFP and Human Factors. The Associate Administrator for Aviation Safety, Mr. Nicholas A. Sabatini was quoted saying "human factors may be the last frontier in aviation safety". This year The Southwest Region FAASTeam has embraced an active campaign to bring FFP and human factors awareness training to repair stations, 147 schools, and anyone else that will listen. If you have not attended one of these presentations check out www.faasafety.gov, or contact your FAASTeam Program Manager and get on board.

In 2007 the FAA created new chapters in aviation history by initiating the following programs: Certification of Unmanned Aerial Vehicles, (UAV's), Enacting the new Light Sport Aircraft rules, and Certification of Very Light Jets, (VLJ's). We are aggressively pursuing rulemaking to implement Safety Management Systems, a new way of doing business that may change the entire way that the FAA accomplishes it's oversight responsibilities. The program is already mandatory for ICAO countries.

With all of this going on, the industry is faced with a REAL shortage of AMT's. This makes you guys, with an A&P Certificate, as valuable as a rain suit in Seattle.

It's been a great and challenging year, I can't wait to see what happens next. The FAASTeam sincerely hopes all of you have had a safe and happy holiday season.

Author: Mike Jordan, FAASTeam Program Manager - SAT-FSDO

OWNER ASSISTED ANNUALS - AN OFFICIAL RESPONSE

As a result of complaints filed by customers of the FAA, this issue has raised its ugly head on numerous occasions in the halls of the FSDO. The conversation always starts out friendly discussing the legalities of the issue, and without surprise it always ends up with Inspectors that are good friends wanting to send their fellow Inspector one of our famous letters, notifying them that they are going to be reexamined on their qualifications to hold an Inspection Authorization, (44709) The issue: can an aircraft owner or an A&P Mechanic, remove the inspection plates, cowling, fairings, and interior prior to an annual inspection to save a few bucks on his annual inspection? There is definitely a mixed opinion on the issue from industry as well as in the halls of the FSDO.

This discussion was thrown on my desk by an angry Inspector who said, here Mr. FAAS Team Airworthiness Inspector, get us an answer. Moving at the speed of Government it only took 4 e-mails and 3 months to get a legal interpretation of the rule, which by the way is as rare as an FAA Inspector showing up at your facility with a dozen doughnuts, or a customer that wants to pay his bill when he picks up the airplane. An Atta-Boy goes to SW Region ASW-230 Regional Staff

Specialist, Mr. Jim Cahill. Jim did not give up on my request, and I think he even cashed in some IOU's from his contacts in Washington to get-er-done for us. Thank You Jim!

Lets put it to bed, here is the response:

To begin with, the term "Owner Assisted Annual" is a misnomer, a slang term unsuitably applied but used in industry for non-certificated individuals (usually owner/operators) that perform only collateral maintenance items such as support in preparation for inspection and correction of discrepancies under supervision of a properly certificated person. In all cases the IA performs the inspection and makes the sole determination of airworthiness.

The rule does not differentiate between a 100 hr. and an Annual Inspection other than the authority to perform the inspection (100 hr. by A&P or Annual by IA). In fact, the items to be inspected in Appendix D, Scope and Detail are the same for Annual and 100-hour Inspections. Paragraph (a) states "Each person performing an annual or 100 hr. inspection shall, **before that inspection**, remove or open all necessary inspection plates, access doors, fairings, and cowling". He shall thoroughly clean the aircraft and engine. **"Before**

that inspection", indicates it is a prerequisite to, but not necessarily a part of the inspection itself. The imperative "shall" simply means this basic maintenance requirement will be done, under that person's authority, but does not require it to be specifically performed by the person authorized to perform the inspection.

In both Part 65.81 and 65.95 the permissive word "may" is used for the mechanic to supervise maintenance, as well as for the IA to perform inspection during a 100 hr. or an annual inspection. Neither of these statements prohibit the use of someone else to provide these basic maintenance functions in support of the inspection. It is important to recognize that a certificated mechanic under 65.81(a) may perform **or supervise** maintenance (65.85, 65.87) and they can **perform** additional duties (inspection) in accordance his/her IA (65.95).

It is clear that the intent of the rule is to allow the delegation of those basic maintenance tasks under that person's authority.

Bob Stockslager
AFS-350

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ASK THE FEDS - SAVED BY A CLICK

This question came from an IA in the Little Rock area. He asks, "I am not a repair station, just a one man shop that works on GA aircraft, do I need to have calibrated torque wrenches like a repair station? I can't find a requirement for it in the regulations."

The answer Mr. IA is yes, if required by the manufacturers instructions for continued airworthiness. All of the maintenance manuals that I have dealt with have a statement in them that says something like this: All torques should be accomplished using tools and equipment that is calibrated to a standard traceable to the National Bureau of Standards or it's equivalent. Then we go to the rule, 14 CFR part 43.13 (a) which states in part, Each person performing maintenance on an aircraft, engine, propeller, etc., shall use methods, techniques, and practices prescribed in the current manufacturers maintenance manual or instructions for continued airworthiness, or methods acceptable to the Administrator. What is acceptable to the Administrator is the manufacturer's maintenance manual.

The bottom line is this, if the manufacturer calls out a specific measurement such as torque on a prop bolt and their manual also contains the calibration statement described above, then you need to have a calibrated torque wrench to be in compliance with the Federal Aviation Regulations.

You might want to read the maintenance manual general section over carefully to make sure that

the same issue may apply to other precision measurements such as electrical, distance, and clearances.

True Story: Years ago I was the Director of Maintenance for a repair station. We had a mechanic that we called Smitty. Smitty was outstanding at fixing things but a little hard headed about following company procedures. I caught him on several occasions hanging from the longest wrench that he owned with his feet off of the floor while tightening the bolts on a propeller. When asked why he was not using a torque wrench he said it's too much trouble to go get one and it takes too much time. After a heated discussion about not using a torque wrench, we actually removed and replaced the bolts that he had stretched and necked down in the threaded area with new ones using a torque wrench. Smitty was told that his future with the company was in jeopardy if we caught him not using a torque wrench again.

About two months later I was in my office when an investigator from the NTSB walked up and introduced himself to me, and showed me his gold badge. This was the first time I had ever seen an NTSB guy, it was scary. The investigator explained that he was investigating a double fatal accident that involved an aircraft that we had recently completed an annual inspection on. He then pulled a part from his pocket and asked me if I knew what this is. Of course I recognized it right away. It was a threaded hat bushing from a crankshaft flange that still had the sheared off threads from a propeller bolt in it. The Investigator said that at the accident scene he found the propeller a long way from the wreckage and suspected that the propeller had departed the aircraft in flight.

Well at this point in time I'm thinking Smitty did it again and this time he killed two people. I'm thinking about either killing or firing Smitty or both. All I knew is that we were in big trouble. The Investigator asked for all of our work orders involving this aircraft. We pulled them from the files and identified that we had in fact removed and reinstalled the prop on this aircraft and the mechanic that did the work was Smitty. However, to my absolute amazement, the discrepancy block that contained the signatures for removal and installation of propeller included a little note in the lower right corner, "installed using torque wrench SN. 12345 and Smitty's initials". Smitty had done this without any mandate from me, I was shocked. When Smitty was interviewed by the investigator he confirmed the story and the use of the torque wrench.

We then provided calibration records for torque wrench SN.12345 which showed the wrench came back from it's last calibration within limits. We later sent the wrench out to confirm calibration, and again it came back as found to be within calibration. We were exonerated by the NTSB. The Investigator thanked us for our time and left. We were "Saved By A Click" of that torque wrench.

That day I took Smitty to lunch and bought him a nice steak.

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Accident Case Study — Nothing Happens Until Something Happens

This is a case that involves a Robinson R-22 helicopter. The Operator was using the aircraft for predator control, (hunting coyotes), at the time of the accident. The Pilot in Command, who was used to low level operations said he heard a loud bang followed by a reduction in rotor RPM and an increase in engine RPM to near red line. The PIC did not have sufficient altitude to complete an auto-rotation and landed extremely hard. Both occupants suffered serious injuries.

Post accident investigation on scene showed that one of the two drive belts had failed and the other one had rolled out of the pulley which eliminates power to the rotors, thus turning the machine into a gyrocopter.

I've always told folks at safety meetings that nothing happens until something happens. But when it does, look out. That is because the FAA can not be everywhere at once. If there is an aircraft accident, the event, by law, invites the FAA / NTSB into your house with the full authority of the law to scrutinize everything about the aircraft, aircraft records, the flight crew, and the mechanics whose names are in the maintenance records.

In this case the Investigating Inspector did not have to look too

hard to discover an issue. As you can see from the photo, the skid gear on the left side of the helicopter has a modification that was not documented in the aircraft records. I am pretty sure that Robinson did not offer a piece of angle iron and a couple of hardware store clamps as an option at the time of purchase.

The operator did not think there was anything wrong with the angle iron modification and admitted that he had it on other aircraft as well. He was very compliant and committed to either getting it approved or removing it. The IA that had performed the last annual was interviewed and he responded that the modification was not there when he recently approved the aircraft for return to service. The issue is still un-

der scrutiny by the local FAA, and my guess is that someone is going to be the subject of a violation for the illegal mod.

The point here is that you need to make sure if the aircraft you are inspecting has any modifications, ensure those alterations are properly documented and approved in the maintenance records and be aware that there may be additional maintenance / inspection items required by the Instructions for Continued Airworthiness for those alterations. Please review 14 CFR part 43.15 (a)(1). Inspector Beware: Nothing Happens Until Something Happens.

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Raytheon Cobra UAV Receives Experimental Certificate

On October 26, Brad Roon from the Phoenix MIDO issued an experimental Certificate to the Cobra unmanned aircraft. The aircraft has a wing span of 10 ft. and is 9ft. long. The Cobra will be used as a test platform for Raytheon to conduct research and development , crew training, and market surveys. The aircraft is restricted to operate in the National Airspace in southeastern Arizona. This brings the total experimental certificates issued to unmanned aircraft to 17 in the last several years.



Tech Forum COLLECTING DATA

Author: Jim Sparks, Co-Author: Ms. Dianne Martindale

In today's fast and furious society the collection and dissemination of information is a part of daily life. It is a person's prerogative to determine which information is suitable and will satisfy the needs at hand. Although life is full of variables and uncertainties, the business of aviation is based on physical properties along with well defined principles and regulations.

Most associated with the repair and operation of aircraft are well versed in the theory of flight. Aerodynamic specialists analyze mission profiles for new aircraft and adapt varying wing designs to compensate for operations at various speeds, altitudes and weights. Airfoils have varied areas, chords, sweep and even lift enhancing devices to assist in performing their essential function.

Lift is a result of airflow over the wings' surfaces accompanied by setting a specific angle of attack to the relative airflow.

In other words: $Lift = (1/2) \text{ Wing Area} \times \text{Airspeed squared} \times \text{Density} \times \text{Angle of Attack}$.

The essentials that go into making an aircraft fly are all too often taken for granted.

So what data is critical to defying the law of gravity? Wing design parameters are for the most part a given. Airframe manufacturers typically publish performance data for their products and this information includes minimum airspeed required for the wing to produce adequate lift to overcome the weight of the laden aircraft. Air density and temperature are other variables to be considered as more lift is required in a situation where the air is thin. Considered by many to be the most important variable, angle of attack is an essential part of the equation directly controlled by the pilot.

Making this data available to the flight crew is as critical as the wings ability to produce lift. Flight deck indications almost always include an airspeed indicator and an altimeter. All of these devices interpret significant aspects of air data and can vary in design from a pneumatic and/or mechanical gage to a sophisticated electronic display fed from a complex air data computer. In any case, the means of sampling the air is very similar in most aircraft and referenced by a pitot tube and static port.

Most aviation personnel are aware of Federal Aviation Regulation (FAR) 91.411 which deals with required

checks to insure validity with the altitude indicating system. Although the FAR describes what must be accomplished and when, it is in fact FAR 43 Appendix E that defines how it should be accomplished. With the onset of Reduced Vertical Separation Minimums (RVSM) allowing world wide aircraft traffic routes to accommodate up to twice the number of aircraft, altitude indicating systems have to operate with a very high degree of accuracy. One of the checks required for RVSM compliance is a detailed inspection of the aircraft in a typically defined area forward of the static ports. Wavy skin, structural alterations and even improper rivet installation can result in an airflow pattern over the static port becoming distorted which can result in an altitude error. Even a minor obstruction or deformation in the static port's air inlet can cause altimeter error. In one particular case involving a twin engine turbojet aircraft, the radome had been replaced. The static ports were located in the pressure vessel just behind the nose section. Unfortunately, the new radome had a slight offset from its surface to that of the nose section. This mismatch resulted in a step causing airflow to separate from the fuselage resulting in a burble over the static port. As the aircraft flew faster the flight crew began to notice an altitude split between the pilot and copilots altimeters and with the autopilot engaged, the aircraft experienced a porpoising problem that was aggravated with speed increase. Refitting the radome solved the problem. Static ports installed in the pressurized section of a fuselage may also be susceptible to errors induced by pressurization leaks. After all, an aircraft pressurized to eight pounds differential can produce very high velocity airflow through a small opening. In the event this leak is in line with the static port, the result may be a distorted air path over the sensor.

Anomalies involving airspeed sensing systems can also be problematic. A partially obstructed pitot tube can result in a lower than normal indicated airspeed. The National Transportation Safety Board (NTSB) accident data base has identified situations where inaccurate airspeed displayed to the crew results in either an exceedance of aircraft aerodynamic or structural limitations as well as evidence of the onset of a stall caused by the airspeed indicator displaying higher than actual airspeed. Pitot tubes should always be checked as part of the preflight. Damage may result during ground handling, aircraft cleaning or even something as simple as improper removal or installation of a protective cover. In some aircraft, the pitot tube location makes it an excellent coat hanger. It is important to note, a relatively minor change of the position of the air inlet on one of these tubes can have a significant result on how the pilot will implement the lift formula. The process of checking a pitot probe for proper alignment can be an extensive process and in some cases may involve sophisticated measurements or utilization of a laser sight and is often not part of the airframe manufacturer's inspection criteria for continued airworthiness. However, considering the **possible impact** (intended to be a serious pun) of not having a properly aligned air data sensor, the cost of the inspection should be justifiable.

One undisputable law of physics is; "*what goes up must come down*". It's the means of carrying out the "comes down" part that determines the successfulness of the true aviation professional.

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.

Last editions response to this photo thing was overwhelming. The
fastest airplane savvy mechanic was Dan Garza from L3 Com
Vertex Aerospace in Houston, TX. followed by believe it or not,
Nathan D. Wilburn with L3 Vertex Aerospace in Great Falls MT.

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

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