AIRBORNE LAW ENFORCEMENT ASSOCIATION

The Safety Wire

March 2016

Maintenance Flights can be a hot topic of discussion. One of the reasons for debate is that often, people are not clear on what is ‘required’ or what is an industry standard. It doesn’t help that there is often very little guidance on the topic, depending on the category of aircraft you are flying, make and model, or legal framework by which you are governed (i.e. Part 135, public use, etc.).

The solution is, as with other safety topics (fatigue policy, flight time minimums for new pilots, maintenance requirements for surplus aircraft), to look at the existing policy, if it exists at all, as a minimum standard. The absence of a policy, or standard, is not a reason to refrain from implementing a specific risk control. And, frustratingly, a policy does not always guarantee that a risk control is effective or necessary.

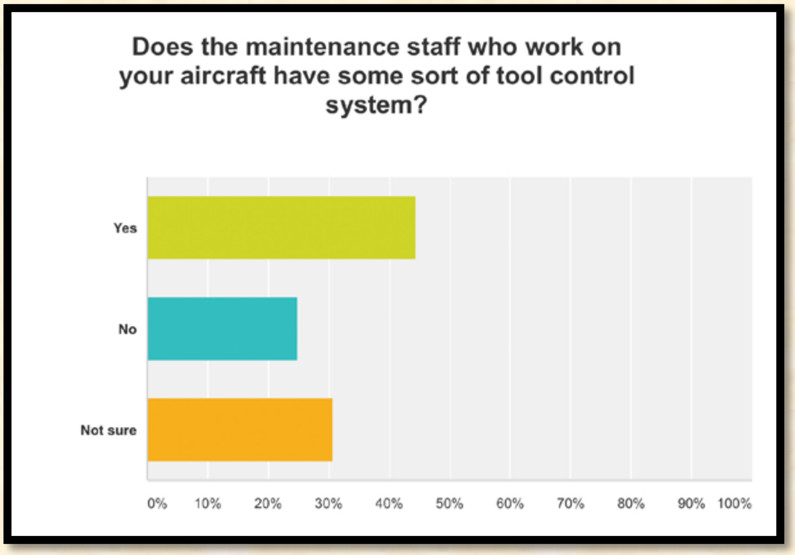
Often, when management is presented with an important safety idea, the first question asked is, “Do we HAVE to do it?” The question should really be, “SHOULD we do it?” Here is where SMS has a real world application that can help us make reasonable safety decisions that have tangible results. As outlined in the SMS guidance ALEA’s safety program has provided, a simple hazard analysis and risk assessment will arm us with the information we need to determine what kind of post maintenance tasks are the most reasonable methods of reducing risk, regardless of the absence of regulations.

First, we all need to look at our aircraft, the type of maintenance being done, how often is it done and under what conditions. How many people do you have working on your aircraft? Do you use contract maintenance or in-house? These discussions are best had in your safety committee which, of course, has at least one person representing maintenance. What you are looking for are potential 'points of failure' in the system. Places where a mistake *could* occur. If you do not come up with a fairly lengthy list, you missed something. If you are not sure what mistakes can happen, especially if your agency has never had one, use accident databases to find out (a list of resources is below).

This is not a criticism of our maintenance professionals. The people who maintain our aircraft are…people. Human error cannot be programmed out of any activity. We must anticipate and plan for it so reasonable controls can be put in place. For example, does your fatigue management policy cover maintenance? According to the latest ALEA safety survey, only 18% of respondents indicated their agency had a fatigue management policy for those who keep our aircraft airworthy!

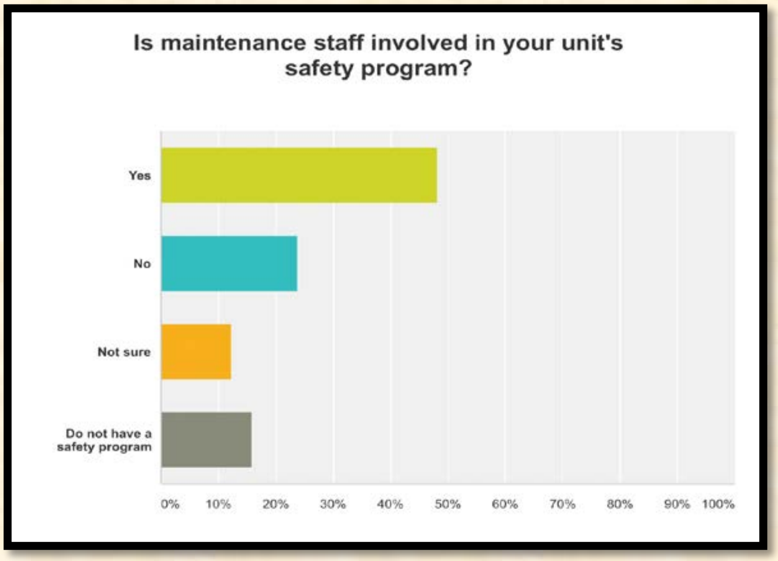
Part of my job with ALEA is to stay up to date on aviation accidents and mishaps, especially in our industry. During my travels, I have the opportunity to talk to our members and hear about their safety challenges and war stories. Of course, like many of you, my own personal experiences as a pilot have given me additional insight. Here are some conclusions drawn from this information:

When machinery gets disassembled, there is always potential for errors and/or damage during reassembly. This raises the risk of a mechanical failure following any such task. To reduce the likelihood of an error leading to a failure, one can add additional or augmented preflight inspections specific to post-maintenance



procedures. To reduce the severity if an incident does occur: minimize who is aboard the aircraft, fly over areas with favorable emergency landing terrain, do the flights in the daytime, have everyone wear appropriate protective equipment such as helmets, flight suits and gloves (including maintenance personnel that may be on the flight), etc.

Maintenance requires tools. This creates an opportunity for them to be left in the aircraft. All tool control systems, no matter how automated, require some sort of human interaction, which creates the potential for that protective barrier to fail. Utilizing two different types of tool control methods drastically reduces that chance of error, even if the second system is a simple one such as a quality control inspection checklist.



I could go on and on about this topic, but I am reminded that this is supposed to be a newsletter, not a novel. In the end, I can't tell you what is best for your operation. What I can suggest are the methods our agencies should use to determine how to keep our people safe. Telling people not to make a mistake will rarely prevent mishaps. Post-maintenance flights carry risk no matter how professional we are. Determine exactly what that risk is, and do some maintenance on it.

"An ounce of performance is worth a pound of promises."

~ Mae West

Resources

Databases you can use to research accident history for your type of aircraft or operation:

Aviation Safety Network (links to databases around the world)
https://aviation-safety.net/investigation/aaibs.php

Australian Transport Safety Bureau:
http://atsb.gov.au/publications/safety-investigation-reports/?mode=Aviation

Canadian Transport Safety Bureau:
http://www.tsb.gc.ca/eng/rapports-reports/aviation/index.asp

National Transportation Safety Board (USA):
http://www.ntsb.gov/_layouts/ntsb.aviation/index.aspx

Air Accidents Investigation Branch (UK):
https://www.gov.uk/aaib-reports

Free SMS Webinar

The next SMS webinar has been rescheduled for April 21st at 1:00 PM EST (1700 UTC). Click here to register, or go to www.alea.org, under the events section. This webinar will cover the third and forth steps needed to install your Safety management System.

If you missed the first two webinars, they are available on the website as well here, under *Resources – Online Course Presentations*.

Awards

Safety is hard work. Unfortunately, it is usually not as glamorous as an awesome thermal camera find, hair-raising hoist rescue or finding missing little kids in time for a scene on the evening news. There are not movies about intrepid safety officers keeping aircrews from doing stupid things despite all odds such as, “Safety Officers Strike at Dawn!”

There is a simple equation that explains this: The better safety is done, the fewer noticeable safety events happen. For this reason, ALEA has a few opportunities to recognize those who go above and beyond to make sure others go home every day. Take the time to show your appreciation for safety excellence and nominate someone today:

ALEA Annual Safety Award: http://alea.org/award-information

ALEA Flight Safety Recognition Program: http://alea.org/alea-flight-safety-recognition-program

Bronze Level:	1,500 Hours
Silver Level:	2,500 Hours
Gold Level:	3,500 Hours
Platinum Level:	5,000 Hours

Safety Survey Results

Call for 'War Stories'

A large number of survey respondents asked for more real life stories from members. I agree that the, "There I was…" type of tale makes for powerful and entertaining reading. Over the last few years, I have included a number of these stories as they became available to me. Now, I'm going to follow the lead of the survey results and ask you all for help. Please send me your favorite story of a memorable event in your aviation career. Pilots, maintenance professionals, TFOs, anyone. If you are not comfortable with your writing skills, don't worry, we have a great editorial staff here that can help polish up any story (believe me, I keep them busy with my stuff!). I promise that I will not publish anything until you get to review it. I will remove any names or identifying information if you are concerned about that. It does not have to be only about safety, any good story is welcome.

So…what is your best 'There I was' story?

"In flying I have learned that carelessness and overconfidence are usually far more dangerous than deliberately accepted risk."

~ Wilbur Wright

Maintenance & UAS Professionals

ALEA will be hosting online meetings for those involved in, or interested in, aviation maintenance or UAS operations.

The first UAS meeting will be:
Mon, Apr 11, 2016
1:00 PM - 2:00 PM EDT (1700 UTC)

The first Maintenance meeting will be:
Wed, Apr 20, 2016
1:00 PM - 2:00 PM EDT (1700 UTC)

This will be an opportunity for ALEA members to get together and discuss issues they are working with, lessons learned, news, and share ideas. The safety officer group has proven to be very useful for those involved. We are looking forward to extending this concept to our maintenance and UAS professionals. Please send me an email if you are interested in participating in any of these groups.

Safety@alea.org

"Excuses for poor flying will be heard sympathetically, but will not affect the test results."

~ Richard Bach

Mental Health Project

Are you a musician? Going to the ALEA Expo in Savannah this summer? Please send me an email or call. Any skill level, beginner to pro. We are working on a "mental health" project that you might be interested in.

Reality Check...

Note: *The following reports are taken directly from the reporting source and edited for length. The grammatical format and writing style of the reporting source has been retained. My comments are added in red where appropriate. The goal of publishing these reports is to learn from these tragic events and not to pass judgment on the persons involved.*

Concern Network Report:
While on an IIMC training flight at a local airport, the pilots overheard someone making traffic calls at another nearby airport. When on final for the ILS and making calls for their approach airport, they had a near miss with the other aircraft, who had been calling the airport by the wrong name. Our aircraft ended the training flight and landed back at base uneventfully. The pilots submitted a Flight Incident Report.

Additional Info:
The other aircraft pilot either did not know where he was, or mistakenly and repeatedly called the airport by the wrong name. Our policy of having two pilots on training flights is reinforced by the safety pilot seeing the traffic thus avoiding a potential mid-air collision.

Aircraft: Cessna 182T
Injuries: 2 Uninjured
NTSB#: CEN15IA079

http://www.ntsb.gov/_layouts/ntsb.aviation/brief.aspx?ev_id=20141217X25544&key=1&queryId=5fc76974-f43c-4391-a209-71d72476eb19&pgno=4&pgsize=50

The pilot was conducting a postmaintenance test flight. He reported that the airplane was about 900ft above ground level in the crosswind turn after takeoff when it “began to pitch steeply toward the ground.” The airplane lost about 200 to 300ft of altitude. He pulled hard aft on the yoke to keep the nose level, and he confirmed that the autopilot was not engaged. He called for the pilot-certificated passenger to assist him in pulling aft on the yoke, which required “extreme back pressure.” The pilot maneuvered the airplane to land on the longest and widest runway available. During the flight, the pilot incrementally added nose-up elevator trim in an effort to relieve the nose-down pressure; however, this had no effect. The manual elevator trim wheel indicated that the trim was in the full nose-up trim position. The pilot turned the airplane onto the base leg and was still unable to relieve the “extremely strong” nose-down tendency. He remembered that maintenance had been performed on the elevator trim system and thought that there might be some kind of control-reversal problem. While on the base leg of the approach, he decided to apply nose-down trim using the electric trim on the control yoke. The nose-down control forces lessened, and he immediately realized that there was a control reversal. The pilot proceeded to make a normal approach and landed without incident.

The examination of the airplane’s elevator trim system revealed that moving the elevator trim wheel to the full nose-down position resulted in the elevator trim tab moving to the down position, which would place the airplane in a nose-up configuration and indicated that the elevator trim control was reversed. The airframe and powerplant mechanic who had performed the maintenance on the airplane, which included replacing the elevator trim actuator, inadvertently misrigged the elevator control cables. The airplane’s maintenance manual instructed mechanics to “make sure that the trim tab moves in the correct direction when it is operated by the trim wheel" and contained a note stating that "nose down trim corresponds to the tab UP position." The mechanic did not ensure that the trim tabs moved in the correct direction during his postmaintenance inspection after he installed the elevator trim actuator.

Aircraft: **AS 350 B3**
Injuries: **3 fatal**
NTSB#: **WPR10FA371**

http://www.ntsb.gov/_layouts/ntsb.aviation/brief.aspx?ev_id=20100728X92614&key=1&queryId=66cb1592-38e6-4906-84ba-50a1043493d1&pgno=1&pgsize=20

The single-engine helicopter was operating near its maximum gross weight and was on a repositioning flight back to its home base. About 6 minutes into the flight, cruising at 800 feet above ground level (agl), the helicopter experienced a complete loss of engine power. Witnesses observed the helicopter, which had been flying steadily in a southeast direction, suddenly descend rapidly into a densely populated residential area. The witnesses reported that, as the helicopter neared the ground, its descent became increasingly vertical. Examination of the accident site revealed that the helicopter was in a level attitude with little forward speed when it impacted a 5-foot-high concrete wall, which penetrated the fuselage and ruptured the fuel tank. A postimpact fire consumed the cabin and main fuselage of the helicopter.

An open roadway intersection was located about 300 feet beyond the accident site, in line with the helicopter's flight path. It is likely that the pilot was attempting to make an autorotative approach to the open area; however, he was unable to reach it because he had to maneuver the helicopter over a row of 40-foot-tall power lines that crossed the helicopter's flight path near the accident site. This maneuver depleted the rotor rpm, which, as reported by the witnesses, caused the helicopter's descent to become near vertical before it impacted the concrete wall, which was across the street from the power lines.

The pilot had no training flights during the 317 days since his most recent 14 Code of Federal Regulations Part 135 check flight. The lack of recent autorotation training/practice, although not required, may have negatively impacted the pilot's ability to maintain proficiency in engine failure emergency procedures and autorotations.

External examination of the engine at the accident site revealed that the fuel inlet union that connected to the fuel injection manifold and provided fuel from the hyrdomechanical unit to the combustion section had become detached from the boss on the compressor case. The two attachment bolts and associated nuts were not present on the union flange nor were they located within the helicopter wreckage debris. Separation of the fuel inlet union from the fuel injection manifold interrupted the supply of fuel to the engine and resulted in a loss of engine power.

The helicopter's engine had undergone maintenance over several days preceding the accident. Another engine with the identical problem was also undergoing the same maintenance procedure at the time. A repair station technician was contracted to complete the maintenance on both engines. The operator's mechanics and the repair station technician disassembled the accident engine and set it aside. They then performed the required maintenance on the other engine, before returning to complete the work on the accident engine. The repair station technician was serving as both mechanic and inspector, and he inspected his own work. There were no procedures established by the operator or the repair station to ensure that the work performed by the technician was independently inspected. Further, although 14 Code of Federal Regulations 135.429, applicable to Part 135 operators using aircraft with 10 or more passenger seats, states, in part, “No person may perform a required inspection if that person performed the item of work required to be inspected,” there is no equivalent requirement for aircraft, such as the accident helicopter, with 9 or fewer passenger seats. An independent inspection of the work performed by the technician may have detected the improperly installed fuel inlet union.

The duty pilot performed a 7.5-minute abbreviated post maintenance check flight the evening before the accident. A full maintenance check flight conducted in accordance with the manufacturer's flight manual should, under normal conditions, take 30 to 45 minutes to complete. Had a full check flight been performed, it is likely that the union would have detached from the boss during the check flight. Because the helicopter would not have been operating near its maximum gross weight and the check flight would have been conducted over an open area, the pilot would have had greater opportunities for a successful autorotative landing.

The National Transportation Safety Board determines the probable cause(s) of this accident as follows:
The repair station technician did not properly install the fuel inlet union during reassembly of the engine; the operator’s maintenance personnel did not adequately inspect the technician's work; and the pilot who performed the post maintenance check flight did not follow the helicopter manufacturer's procedures. Also causal were the lack of requirements by the Federal Aviation Administration, the operator, and the repair station for an independent inspection of the work performed by the technician.

Aircraft: **Cessna T210L**
Injuries: **1 Uninjured**
NTSB#: **CEN10LA014**

http://www.ntsb.gov/_layouts/ntsb.aviation/brief.aspx?ev_id=20091015X45544&key=1&queryId=50a8609e-4aae-47eb-b53b-4908654825f8&pgno=3&pgsize=50

The single-engine airplane had just undergone an annual inspection, which included several landing gear retraction and emergency gear extension tests. The commercial pilot performed an extensive pre-flight inspection before he departed on its first post-maintenance flight and found no anomalies. Shortly after takeoff, as the pilot retracted the landing gear, the hydraulic pump stopped and the "gear-up" light did not illuminate. He then tried to extend the gear and nothing happened. The pilot referenced an inspection mirror on the right wing and realized all three landing gear were dangling between the up and down positions. The pilot stabilized the airplane and used his cell phone to call Cessna Aircraft Company. An engineer provided troubleshooting techniques, but the pilot was unable to secure the gear in the down-and-locked position. The pilot then made a partial gear-up landing, which resulted in substantial damage to the left horizontal stabilizer. The airplane had been modified under a Supplemental Type Certificate in 1987, which removed the main landing gear doors and replaced them with fairings. As a result, some of the landing gear hydraulic lines were capped. A Federal Aviation Administration inspector performed an examination of the airplane and found a hydraulic line in the landing gear system that was not properly capped and was leaking. The line was re-capped and several gear extension/retraction tests were successfully performed. The uncapped line should have been found and repaired during the annual inspection.

Aircraft: **MD 369E**
Injuries: **3 Minor**
NTSB#: **WPR13LA290**

http://www.ntsb.gov/_layouts/ntsb.aviation/brief2.aspx?ev_id=20130625X05535&ntsbno=WPR13LA290&akey=1

Before the accident flight, maintenance personnel exchanged the helicopter's air inlet barrier filter system, during which the engine was removed from the helicopter. A preflight inspection was completed before departure of the postmaintenance check flight, and no discrepancies were noted. The engine start and pretakeoff checks were normal, and, after departure, the flight appeared to progress normally.

About 1 to 2 minutes after completing an in-flight power check, the pilot heard a "distinct loud pop." Subsequently, the engine lost total power, and the pilot entered an autorotation. The helicopter landed hard, its right skid collapsed, and it rolled on its right side. A postaccident examination of the helicopter's engine air inlet found that cloth material had been ingested into the engine air intake. During further examinations, more cloth material was found in the engine in a sufficient quantity and location to block the airflow through the engine and cause it to flame out. The cloth material found in the engine was consistent with maintenance rags found in a box at the operator's hangar facility. It is likely that, during the maintenance of the helicopter's engine, maintenance personnel covered vulnerable areas of the engine with shop rags to prevent contamination, and, during the reinstallation of the engine, they did not remove all of the shop rags. The engine then ingested the rags during the postmaintenance test flight. Due to the installation of the engine air inlet barrier system, the shop rags would not have been visible during the preflight inspection nor could they have made it into the engine from the outside of the helicopter with the system in place.

Note: During an interview with the mechanic who was on this flight when the accident occurred, he showed me a picture of the helmet he was wearing. The helmet had a major impact mark on it from where his head hit the doorframe. He attributes his survival to wearing the helmet.


There are no new ways to crash an aircraft…
…but there are new ways to keep them from crashing.
Safe hunting,
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