



Nuts And Bolts

A Newsletter Written By Mechanics For Mechanics

HUMAN FACTORS - IT'S HERE TO STAY

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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.**

Put on your happy face and embrace it, because it's not going away. During the International Human Factors Symposium recently held in Orlando, panels of experts in this field recognized human factors as the # 1 casual factor in accidents and incidents in the transportation industry. If you drill down further, Failure to Follow Procedures surfaces more than any other element under human factors. Usually the investigation shows that the technician failed to follow the approved procedure because he or she succumbed to one of the "Dirty Dozen" issues that you have probably heard before. A few of those are, fatigue, complacency, lack of knowledge, distraction, pressure etc..

Here are a few facts that were shared at the symposium:

Mr. Mickey Cohen, President / General Manager, AAR Corporation - Ground damage to aircraft costs the industry four billion dollars a year.

Mr. Ray Marzullo, Vice President, Customer Service, NA The Boeing Company - A study of

276 in flight shutdowns shows 33% were due to incomplete installation and 11% due to improper installation.

Dr. Gary Eiff, PHD, Chief Executive Officer, RSBP,LLC - Dr. Eiff conducted a study of 20 years of accidents and incidents that involved maintenance as a casual factor. The data showed that 76.5% of those cases were because of "Failure To Follow Procedures.

Keep reading, there is good news. The accident statistics clearly show the U.S. has the safest aerospace industry in the world. The data shows that maintenance related accidents are only 12% of the total. That's what we are trying to reduce with awareness of human factors. If you look at it on a chart you would see that since 1903 the reliability of flying machines, thanks to technology, has gone from very low to very high. You would also see that due to our busy, complicated lifestyles (as compared to

1903), and trying to keep up with technology, the human factors related incidents have risen right along with the reliability. The human is undeniably the weakest link in the safety chain. Sooner or later you too may be attending a human factors awareness training course. It is required by EASA in part 145's and may be tied into SMS (safety management system) which is already required in ICAO countries and will be implemented by rule for US operators and agencies.

Get on board with it because it's coming to your neighborhood. Watch for a FAASTeam presentation in your area. Learn how you could prevent the next statistic building mishap and possibly save a life. Lets stamp out that 12%.

Author: Mike Jordan

FAASTeam Program Manager
San Antonio FSDO

CLARENCE J. SURY (CJ) - JOINS A VERY ELITE GROUP

Tarrant County College, Northwest Campus Aviation Department hosted a presentation and reception for Mr. Clarence J. Sury to receive the Federal Aviation Administration (FAA) highest awards for both a mechanic and a pilot. Mr. Sury, who goes by CJ, was awarded the Charles Taylor "Master Mechanic" Award and the Wright Brothers "Master Pilot Award".

Dr. Elva LeBlanc, President of the Northwest Campus, opened the presentation ceremony by welcoming Mr. Sury, his family and friends, the FAA and all the aviation department students.

The Charles Taylor "Master Mechanic Award" is named for the Wright Brothers mechanic who among other things built the engine that was used in the first aircraft recorded flight by the Wright Brothers. He is known as the first aviation mechanic. For a mechanic to receive this award, they must be an active aviation mechanic for 50-years and have been in good standing with the FAA.

Mr. Sury started his aviation mechanic career in 1953 in the United States Air Force (USAF). He served over 20-

years in the military but while serving his country he became certificated as a FAA civilian mechanic. During his military service career he maintained 15 aircraft at a USAF flying club while stationed in Hawaii, was selected as the FAA Aviation Maintenance Technician of the year in 1972, and was a FAA Safety Counselor while in Hawaii. He opened Aero-Plane Shop Inc. in 1974 where he has managed the maintenance for a 30-aircraft flying club, performed inspections, preventive maintenance, overhauled aircraft engines, and performed repairs and modifications. He has an Inspection Authorization certification from the FAA where he may return to service major repairs and alterations performed on aircraft. He is also a FAA Designated Mechanic Examiner that is responsible for testing applicants to become aviation maintenance technicians.

Mr. Barry Proctor, Southwest Region FAAS Team Program Manager for Airworthiness made the presentation of the Charles Taylor "Master Mechanic" Award to Mr. Sury and to his wife Dorothy.

The Wright Brothers "Master

Pilot Award" is named for Orville and Wilber Wright. They were inventors, engineers, and dreamers with a vision who made their dedicated convictions to flight a reality. This award recognizes pilots who follow the precautions and awareness to conduct their flights in a safe and efficient manner. For a pilot to receive this award, they must be an active pilot for 50 consecutive years and in good standing with the FAA.

Mr. Sury first soloed on 3 October 1956 and received his pilot certification on 14 December 1956. He has pilot ratings for: private, commercial, rotorcraft, multi-engine, and instrument. Mr. Sury has piloted on 40 different types of aircraft and amassed over 3195 hours as pilot-in-command.

Mr. Steven Buckner, Southwest Region FAAS Team Program Manager for Operations made the presentation of the Wright Brothers "Master Pilot Award" to Mr. Sury and his wife Dorothy.

These presentations represent an extreme rarity in aviation. Mr. Sury is among a select

few to be awarded both of these prestigious FAA awards. The family, friends and aviation students at the Northwest Campus witnessed a historical event as Mr. Clarence J. Sury was recognized for his achievements to the aviation community by the Federal Aviation Administration. What is the capstone beyond the presentation is that Mr. Sury is still active as both a mechanic and as a pilot today.

Author: Curt Landrum,
FAAS Team Representative,
Tarrant County College, Aviation Program



Mr. Sury, who goes by CJ, was awarded the Charles Taylor "Master Mechanic Award" and the "Wright Brothers Master Pilot Award".

C.J. SURY



C.J. And FAMILY





ARE YOU WIRED?

By Brian Capone

At all functions I ask who has a computer and utilizes email? Well, all hands go up except for one or two and I suspect they just won't admit it! As I transition through this mid-life phase, I have a tough time remembering all the things I have to do and want to do! Sometimes this technology stuff really helps my memory, especially since I do check email every day at work and home. And I get these messages reminding me to order that new product or to be somewhere I want to be, like a fly-in! I haven't gone as far as looking like Captain Kirk's crew with the ear things for cell phones!

So get to the point Capone you say! Well, I will ask, if there was a maintenance seminar within 25 miles of your home and the frig was empty, would you go if someone reminded you? That's one of the things faasafety.gov is about. You know those www dot things on that internet that your kids live on! The FAA Safety Team's tool www.faasafety.gov is a portal to aviation information. One part of that portal is the Safety Program Airman Notification System, better known as SPANS. You can visit the website and search for safety events anywhere in the country, heck, maybe even out of the country! And better yet, you can set your preferences (internet talk for telling the computer what to do) to be notified of information of your choosing. Items like Unapproved Parts Notices, this Nuts and Bolts (a Southwest Region FAASTeam Newsletter for mechanics), Safety Event Topics with date, time location and map.

Another section of the "portal" contains on line courses and a resources page with links to numerous useful information links. I will tell you right off, nothing new, the maintenance side is second in line to operations. Up to this point in time most all of the information is geared toward pilots. But hang on; we are working hard to get some good things for us mechanics. An on line course on Failure to Follow Procedures is forthcoming: one of the areas that comes to light as a maintenance causal factor in accidents. The AMT awards program is being automated so you won't have to wait for the local FAA to let your applications pile up and then process. And possibly having the automated Form 337's you submit feed a system for IA's to automatically credit you towards IA renewal! Maybe a place you can list your annuals and when that odd renewal year comes around, no sweating that you met the even year requirements, heck just pull it up in faasafety.gov!

These are just some ideas we are working. Go and register or at least take a peak at the site portal and see what you think. Remember, it's a work in progress and changes being made as money and programmers can accommodate! If you have any ideas of what the system can do for us mechanics, send them to me at brian.t.capone@faa.gov.

Mr. Capone is an active A&P Mechanic / IA, Commercial Pilot, and Civil Air Patrol member . He is the Assistant Regional Manager for the Southwest Regions FAASTeam. Additionally, Brian is the FAASTeam Program Manager Airworthiness and Operations, for the great state of Louisiana based in Baton Rouge.

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Accident Case Study — Failure To Follow Procedures,,,,,,,,,Again!

This accident occurred in the Texas panhandle. The accident involved a Cessna 172 that was on a cross country flight.

The aircraft had just come out of an annual inspection and a major engine overhaul by a local Mechanic that held an A&P certificate with Inspection Authorization.

This was the first flight after being approved for return to service.

43 minutes into the flight, at 4500 ft. AGL, the Pilot and one passenger heard a loud bang, felt the aircraft shake violently, and saw the propeller instantly freeze. The Pilot ran through his emergency procedures attempted a restart, and began a controlled descent for the off airport landing. The landing area was unimproved farm land that was void of trees and obstacles. After touch down the nose gear dug into the soft dirt and flipped the aircraft over on it's back. The two occupants suffered only minor injuries however the aircraft damage was substantial.

Post accident investigation on scene showed a large hole in the crankcase above the #4 cylinder. The propeller would not rotate. All other factors of the aircraft were normal, adequate fuel, flight controls, etc. The engine was transported to a teardown facility. The tear-down was conducted by a local Mechanic and witnessed by the Lycoming Engine Representative and an FAA Airworthiness Inspector.

Upon removal of the engine oil sump the first thing found was

an undamaged connecting rod nut. Further investigation showed that the connecting rod cap and rod bolts were missing from the #4 rod. The cap, sheared off bolts, and the broken rod were also found in the sump. The #3 rod cap was visibly loose with a gap in the mating surfaces. The other rod nuts were checked with a calibrated wrench and were found to only have the torque offered by the resistance of the locking nuts. Barely enough to register on the wrench. It was determined the engine failed due to under torque of all of the connecting rod nuts.

Additional inspection revealed that AD 91-14-22 on the crankshaft gear that was applicable and due at the time of the overhaul had not been complied with. Additionally the propeller bolts were discovered to be negatively safety wired, the engine mount had unapproved fasteners holding it to the firewall. There was an automotive alternator installed.

This was clearly a case of failure to follow procedures tied in with a laundry list of human factor issues from the dirty dozen list.

After we interviewed the aircraft owner/pilot, we learned that he took the aircraft to this individual because he got a really good price on the inspection and overhaul that was performed.

The Mechanic / IA fits the profile that is unfortunately not too uncommon and that the FAASTeam is trying to reach. This individual had worked alone for many years under the

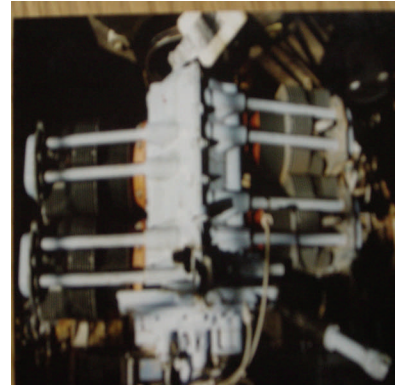
authority of his Mechanic / IA certificates. He is virtually unseen by the FAA Inspector other than his annual IA renewal. He had never attended an IA renewal seminar. He surely started out his career with excellent integrity but seemed to have lost it over the years.

In this particular case this individual lost the privileges of his Mechanic certificate and Inspection Authorization for a period of 120 days, and then faced the litigation from the aircraft owners attorney.

There is an old saying in aviation that applies here, "Learn from the mistakes of others, because you won't live long enough to make all of them yourself". I think all of us can take something from this case, 1. Never compromise your integrity or professionalism and 2. Run an audit on yourself to determine if you are falling into the trap of the "Dirty Dozen" human factors.

The career or the life that you save might be your own.

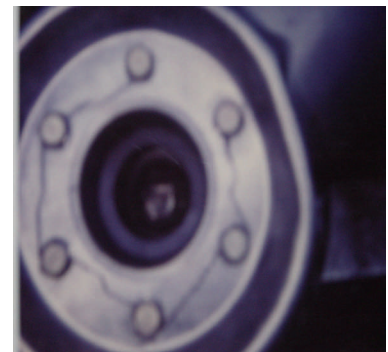
 Author: Mike Jordan
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Hole in Case Above #4 Cyl.



#4 Rod Missing, #3 Rod Bolt Broken



Improper safety Wire On Prop



Automotive Alternator



AD Not CW on Crank Gear

Ask The Feds

The following inquiry came from Bill, a Mechanic/IA in the San Antonio area. Bill said I'm confused about where to send my FAA Form 337. Some of my buddies say to the FSDO and some say to Oklahoma City, I send them to the FSDO and have not had any come back. What's the scoop?

The answer is, send them to the aircraft registration branch in OKC. The rule is 14 CFR part 43, App. B which became effective November 3, 2006. It states in section (a)(3), "Forward a copy of that form to the FAA Aircraft Registration Branch in Oklahoma City, Oklahoma, within 48 hours after the aircraft, airframe, aircraft engine, propeller, or appliance is approved for return to service".

I know that in the San Antonio and Dallas FSDO's we are still receiving 6 to 8 Form 337's a week.

We simply forward them to the registration branch. If we get a lot of them from one IA we will call that person and explain the new process to them, even though it's not new anymore. You can also submit the form electronically on the internet. This requires a fee for the electronic signature and a sign up/registration process. If you want the details of either of these processes, Google up a copy of AC 43.9-1F. The link to the electronic process is

<http://eformservice.faa.gov/eForm337.aspx>

Here are the addresses you will need to process your 337's by mail:

Aircraft Registration Branch, AFS-750

PO Box 25504

Oklahoma City, Oklahoma 73125.



Eclipse Very Light Jet (VLJ)



**Cessna Skycatcher 300
Special Light Sport Aircraft
(SLSA)**

Tech Forum GREMLINS by George Tilton

We have seen a resurgence in aviation maintenance human factors in the past few years. What does this mean to us, the A&P/IA's and more importantly, do we have anything to gain from giving our attention to this? Let's look at the basics so we can decide for ourselves if there is any real merit in this HF stuff.

When we work we are normally accomplishing a task. Most of us have been involved in aircraft maintenance for many years and performing these tasks is old hat to us, or at least we think they are.

How many times do you consider the situation you find yourself in prior to beginning a task? Do you have the right tools? Do you have the right instructions? How is the place where you have to perform the task; is it clean, quiet, lighted, ventilated, etc? What kind of shape are you in physically and mentally?

All of these things and more, when not correct, can undermine your knowledge, experience, and training. In other words the great guy or gal you think you are may have some gremlins creeping around that are doing what they can to ensure that you will not perform as well as you think you are. Typically these gremlins are known as the "Dirty Dozen".

Let's just look at one of them and I think you will begin to get the idea.

Here is an easy one. "Lack of Knowledge". This can occur from not being experienced on the particular task, not having the proper maintenance manual or IPC, or from not being trained adequately. Another way to look at this is if you are performing a task and you do not fully understand what you are doing, why you are doing it, and what the expected outcome is – then you have opened the door for the "Lack of Knowledge" gremlin to creep in.

Translated into task performance means that we do not have all the information we need to perform the task safely. Safely meaning that we are protected from injury and the product we are working on will be safe for its intended use.

Here are some examples:

1) An aircraft arrives at you facility for an inspection but one of the older logbooks is missing. If you can't determine type design (properly altered) of the aircraft prior to beginning an inspection you lack the knowledge to perform the inspection properly. Later a minor accident occurs and it is determined that a contributing cause was due to improper maintenance of a component added after the aircraft was manufactured.

2) You have a maintenance manual but you don't know if it's current or where to check for its currency. Information today changes very rapidly and if yours truly is not current you lack the knowledge to perform the task safely. Injury to you or others is expensive and can be career ending.

3) In order to save some time you wrote down the torque values, pressures, etc. a couple of weeks ago in your notebook. Information may change hourly. If you keep notes for later use you lack the knowledge of current information. This is not being professional let alone being safe.

4) You noticed a repair on the aircraft that looked proper to you but you haven't the time to check the records. If a repair is not in the aircraft records you lack the knowledge to determine if it was an approved repair, thus increasing the risk to safety. Consider the consequences of a resulting accident on you.

You get the idea?

That lack of knowledge gremlin is one of the most aggressive in the group and he will continue to try and stay out in front causing trouble.

What can we do to put him back in the bag? First, we need to understand that as fast as things are changing in this day and age, we need to develop a knowledge base foundation. We need a simple system that will allow us to retrieve the right information when we need it. It is hard to stay completely technically current, but if we can have some basic information available such as: phone numbers, e-mail addresses, websites, and any other systems that will help us retrieve the information quickly, than the greater the likelihood that we will use it the next time we lack the knowledge to perform the job task safely. We don't all work for repair stations that are always required to make sure we have the right tools at the right place at the right time. We need our own personal system.

If you cannot get the knowledge you need under your working time constraints an opportunity exists for this 'Lack of Knowledge' gremlin to lead you into making the wrong choices; choices that may cause you personal injury or choices that may play a role in hurting others.

Just remember, when you get ready to perform a task. Ensure that you have stepped back, opened your eyes wide and you fully understand the conditions in which you are being asked to perform. Then ask yourself, Do I have the knowledge or am I going to wing-it with my gremlin buddy?

Remember when you make a return to service sign off, you are signing that you followed all procedures correctly. This can only be accomplished if you have all the knowledge you need to perform the task.

Finally, do you rehearse in your mind what you are going to do sometime before you do it? HF researchers will tell you that rehearsing a job task in your mind is almost equivalent to performing the task. This rehearsal may also let you know if you have the proper knowledge.

That's just one of the Gremlins and to be quite honest with you there are more than 12 but the 12 are the most notorious.

The Dirty Dozen is a list of the 12 most common causes of maintenance technicians making an error in judgment resulting in a maintenance error. This list is not complete but it does cover major key areas. It was created by the Maintenance and Ramp Safety Society (MARSS).

This "Lack of Knowledge" gremlin has a buddy called "Lack of Awareness" we will look at him in another article.

In conclusion, it is pretty simple if we are not 100% sure of what we are doing before we do it; we lack the knowledge to perform the task safely. The consequences of not fully understanding what we are about to do can not only affect our careers, but can affect others with the cost, not only measured in dollars, but sometimes in lives.

Lets all work today for a safer tomorrow by keeping the Gremlins off the hangar floor!

George Tilton is Executive Director of the Airworthiness Standards Institute, LLC. and has been involved in maintenance human factors for the past 7 ½ years. He holds an A&P, IA and ATP.



WHAT IS IT?

If you know, send your FAAS Team Program Manager an e-mail and we will publish it in the next issue and give you credit for your aviation savvy.

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

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