

# CALLBACK

From NASA's Aviation Safety Reporting System



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If you have ever stepped back and considered the nose to tail complexity of the airliner you are about to board or perhaps peered beneath the cowling of a small aircraft or down the nacelle of a turbine engine, you've glimpsed the intricacies that Aviation Maintenance Technicians (AMT) diagnose, service and repair daily. The tools and equipment needed to do this work can be highly specialized, but also as simple as a screwdriver.

While having the right tool for the task at hand is critical, AMTs also need an array of specialized training, qualifications and skills, along with experience and an occasional burst of ingenuity for mission success.

Calibration of tools is another vital cog in the AMT's work routine. From machining to torque wrenches, many tools require regular calibration to ensure work is done accurately and in accordance with documented procedures.

This issue of *CALLBACK* presents AMT perspectives of the use and occasional challenges of tools on the job. Enjoy the insights and let your interest be piqued to learn more about this instrumental aspect of aviation.

## Hydraulics Unblocked

Lack of the right tool and confusion with a task card led a Technician crew to use alternate means to accomplish a hydraulics flush. The resolution revealed a need for proper tooling and procedures.

■ *Aircraft X had a log [write up] to flush blue system hydraulics due to contaminated hydraulic fluid. The procedure in the AMM [Aircraft Maintenance Manual] called out for a tool [hydraulic fluid purification system] to purify the hydraulic fluid which [our] company didn't have. The mechanics were then told to follow the AMM until they came to a "roadblock" and then figure it out from there. Eventually they used the Hydraulic Mule, which got contaminated, and figured out a way to flush it through the RAT (Ram Air Turbine) system. Capturing the contaminated fluid became another issue as no one could determine at*

*what pressure this fluid would exit the line.... There was no procedure in place for this task. No one could give guidance on what pressure to dial into the Mule in order to get the fluid pushed out.... Whoever wrote the task card should have ensured there was a viable AMM or procedure to accomplish this task and that the correct tooling was in place.*

## Gauging the Right Mix

A Technician discovered oxygen and hydraulic fluid gauges together in the same drawer. Concern was voiced about the potentially volatile mix.

■ *I went to retrieve a pressure gauge for the Aircraft X oxygen system and went into supply. The drawer I opened was in location cabinet XYZ for the pressure gauge. I found the gauge I needed and when I went to close the drawer, I saw another gauge there that is used for the hydraulic reservoir cap with gauge attached in the same location as a gauge we use for oxygen. This is a major safety concern with petroleum products like hydraulic fluid being near oxygen tooling and equipment can cause combustion in the right conditions. The oxygen equipment needs to be segregated from ANY hydraulic or petroleum product at all times.*

## Lost and Found

After discovering a tool left in the aircraft engine, this Technician proposed some preventive steps to avoid inadvertent misplacement or loss of tooling.

■ *While performing an inspection of the #2 engine VG (variable geometry) actuating system on Aircraft X, I found a screwdriver resting under the W1 harness. Upon discovery of this I removed the tool, inspected the area for damage, and brought the tool to my Supervisor. No damage was done to the harness, tubes, brackets, or components however it had the potential to become a serious issue. I suggest the following to help prevent any events in the future: Work areas such as engines, wheel wells, hydraulics bays should not be used to set tools in as a tray. Always*

account for the tooling used on the job after work is complete. Do a final inspection of the area that was worked in for FOD (foreign object debris/damage) or tools before you close the panel or engine.

## Calibration Chain Reaction

This Rotorcraft Technician's inspection yielded results within limits, but with a tool out of calibration. Late discovery of this fact resulted in the helicopter being taken out of service and the inspection performed again.

■ [There was] planned scheduled maintenance for...Main Rotor Hub and Blade Assembly inspection. [I] installed ...[the] vibration analyzer tool and proceeded with the inspection. Track and balance was well within limits after the first maintenance flight and no adjustments were needed or done. The vibration analyzer tool was then removed, inspection signed off in logbook and aircraft returned to service.... Later I was told to send the vibration analyzer tool to another base and...noticed the vibration analyzer I have received was overdue for calibration. I notified my... Director and informed him the situation and was then told to take the aircraft out of service until an up-to-date calibrated vibration analyzer tool was received and the...inspection was re-performed. The next day, a calibrated vibration analyzer tool was received and the inspection was re-performed and signed off in the logbook, and aircraft returned to service.

Special tools being received at the base should be reviewed for proper tool calibration certificate, decals and overall condition. Also, Tool Department and/or personnel shipping out special tools should be aware of its calibration date and overall condition before physically shipping tool out.

## Pressure Loss, Silent Let Down

A Technician team using a pressure gauge to complete a landing gear weight on wheels check noticed mid-task that the aircraft had settled onto a ladder. Air escaping unnoticed from the tooling was suspected as the culprit.

■ Aircraft X required a weight on wheels...check of the Nose Landing Gear and Right Main Landing Gear. We centered the ladder in between the Nose Landing Gear

Doors and I began to install the pressure gauge to the top fitting on the Nose Landing Gear Strut. While doing so the ladder must have shifted positions. During this time, I never heard any loud hissing to indicate to me that air was being released due to extreme noise from our aircraft and other aircraft and vehicles in the vicinity. My partner went up to turn off the aircraft power due to the noise level. A few minutes after coming down from the ladder I noticed the left Nose Landing Gear Door sitting on top of the ladder. I immediately moved the ladder to prevent any further damage. I suspect that air escaped from the t-handle on top of the tooling and due to the noise, I wasn't able to hear it. The very slow release of air may have caused us to not notice the plane had shifted.

## Training Before Hoisting

This Technician voiced adamantly the need to complete video training before operating a hoist. The plea for mandatory training was backed by historical evidence of operational issues involving untrained Technicians.

■ This is the second request to bring attention to the issue with a Fish Pole [hoist]. We continue to receive this tool in the shop that clearly has not been operated properly. In [report] we indicated an injury. There was a [request] sent to the calibration lab to install on the storage box which will lead the Technician to the video. There is an issue with this process. It does not update the training record on file. There is no guarantee someone will watch the video. This [now totals several] issues in the past...months.

We produced and supplied a training video on the proper operation of the Fish Pole after the first incident. It has still not been made mandatory for the Technicians in the field using the Fish Poles. Because of that, the Technicians have not received the proper training on the correct method of operation. Because of that we have seen bird caging/ back lashing on the spool, and damaged cables. The Auxiliary Power Unit or the other components being lifted could have dropped and caused very serious injury or damage. We have a safety responsibility to assure every Technician and supervisor reviews this video and understands the operation. [We suggest] mandatory annual recurrent training.

ASRS Alerts Issued in March 2022	
Subject of Alert	No. of Alerts
Aircraft or Aircraft Equipment	1
Airport Facility or Procedure	9
ATC Equipment or Procedure	1
Maintenance Procedure	1
<b>TOTAL</b>	<b>12</b>

508  
A Monthly Safety  
Newsletter from  
The NASA  
Aviation Safety  
Reporting System  
P.O. Box 189  
Moffett Field, CA  
94035-0189  
<https://asrs.arc.nasa.gov>

March 2022 Report Intake	
Air Carrier/Air Taxi Pilots	5,262
General Aviation Pilots	1,340
Flight Attendants	905
Controllers	400
Military/Other	270
Mechanics	242
Dispatchers	171
<b>TOTAL</b>	<b>8,590</b>