

# CALLBACK

From NASA's Aviation Safety Reporting System



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## The Merits of Maintenance Training



Thorough and comprehensive training is a crucial prerequisite, much like aptitude, ingenuity, skills, dedication, discipline, and drive, that Aviation Maintenance Technicians (AMTs) must have in order to master their craft. Its import and impact on day-to-day flight operations are unequivocal and can range from routine and unnoticed to profound.

Many aircraft today are labyrinths of connectivity. Aircraft systems are complex, and a failure in any one system may elicit complicated results across multiple dependent systems. Maintenance manuals and procedures are detailed by necessity, and yet, may occasionally lack clarity. From nose to tail and wingtip to wingtip, AMTs are charged with the solemn responsibility of ensuring that aircraft are airworthy. For the AMT, every day presents on-the-job training opportunities, adds experience to the toolkit, and hones the maintainer toward razor-sharp acumen.

This issue of *CALLBACK* showcases reported incidents that may have been prevented had specific maintenance training been implemented or improved. Notice the far-reaching effects and potential impact of errors and missteps, and discover the reporter-suggested, or implied, maintenance training solutions intended to mitigate specific risks.

### Barely Out of Sight

A Lead Technician and Inspector shares some preventive training measures designed to mitigate a concealed installation problem that was not immediately discovered.

■ *[This incident] occurred during [a] regular overnight maintenance shift. [Work included] the replacement of a left angle of attack (AOA) sensor. During replacement of a panel associated with this sensor in the pressurized part of the aircraft, improper fasteners with an excessive grip length were used by someone under my supervision, which I failed to notice due to performing other maintenance tasks in the hangar. Excessive grip length caused the screws to bottom out against their nut plates and record sufficient torque for installation before the panel was completely in place. My post-installation inspection of the work did not catch the improper installation, which was not visible once the panel was installed and sealed. This problem was discovered when mechanics pressurized the aircraft for other maintenance and felt a leak from the AOA panel as they passed by. They*

*installed a new AOA sensor and noticed that the screws had an incorrect grip length, so they replaced the attaching hardware to correct the problem. The causes of the event include a lack of knowledge about fasteners by an employee with about 7 months of experience, my failure to train this employee on types of fasteners, and a lack of good, standard procedures for verifying the correct fastener. This incident will result in everyone with limited experience getting a lecture and demonstration of different fasteners used on our aircraft. ... Procedures will be updated to require everyone to compare old fasteners with new ones for each installation. In the event of any doubt about whether the correct fasteners are available, Technicians are to consult a Crew Lead.*

### Foiling Fatigue and Inexperience

This General Aviation Eurocopter AS350 Technician was able to diagnose a complex problem, but required training on specific Company policies and logbook procedures.

■ *I received a call from the night pilot around XA:00 AM reporting that a Main Gear Box (MGB) chip light came on during flight and the pilot performed a precautionary landing in a grass field. I arrived on the scene around XA:45 AM. To my knowledge, the manager and my Maintenance Lead were informed at the time of the incident. I reviewed the logbook for a discrepant entry, but there was not one written for the current fault. I opened my laptop and setup my phone as a hotspot for internet. The service in the location was not the best, but eventually I was able to see the workbook. This is the first MGB chip light incident I have had. The fault found was that the lower electrical chip detector of MGB had a singular magnetic scale that was less than the prescribed limits. I had the pilot perform a ground run to make sure the chip detector would remain off. I told the pilot that I felt the issue was resolved and that he may return to base. Due to my lack of sleep and awareness, I did not inform [Maintenance Control] (MC) of the event, nor was the aircraft placed out of service, and the logbook did not have the proper entries. I feel that [due to] my lack of experience with chip lights, my awareness was lacking at the time of the event, [as was] following up with MC to ensure the work performed was recorded. I would need additional training on... Company policies and procedures, ... ensuring that the proper entries in the logbook are created before*

starting maintenance...and having the aircraft properly removed from service through our MC.

## Two Out of Three

An air carrier Aviation Maintenance Technician made a simple error that resulted in a serious consequence. While noting several distractions, the given analysis identifies some needed training for a newly instituted Company work card.

■ The [MD11] aircraft came in with a requirement to accomplish a known fuel quantity [procedure], due to the fact that the No. 2 Fuel Tank Quantity [Indicator] was [inoperative and deferred per the] MEL. Upon aircraft arrival, I walked into the cockpit to commence the procedure. This is my very first time performing this procedure with the new [Company] work card. ... The [outbound] flight required 78,500 pounds. Block-in fuel was 24,900 pounds calculated by the crew and noted in the maintenance release. I... miscalculated the fuel and added a total 6,939 gallons/45,100 pounds using a density of 6.5 [pounds per gallon]. The first error was the No. 2 Tank block-in fuel quantity. I noted 9,100 pounds on the fuel service form, and it was actually 6,700. Total [outbound] fuel after fueling was [completed] was 70,000 pounds, which was short of the 78,500 [pounds] required. The No. 2 Engine flamed out, and the crew diverted to ZZZ1. The aircraft landed without incident.... Fuel quantity in the No. 2 Tank was determined to be at zero upon arrival into ZZZ1, thus the No. 2 Engine flamed out.

The following factors contributed. I was overwhelmed by the new fueling job. It was my very first time using it, as it became effective [recently]. Besides a maintenance alert notice, no type of training was provided in understanding and/or using the work card. I would suggest training in using this new job card. Two fuel trucks were dispatched, which added to the work load. The weather at the time was very poor, [bringing] heavy rains and winds. The outbound flight crew was also onboard the aircraft, which was a distraction. In dealing with the distractions and trying to meet the departure time, I made the unintentional mistake of under fueling the aircraft. I suggest that the flight crew [not be] allowed in the flight deck until this procedure is completed.

## The Job's Not Finished Until...

This corporate Challenger 350 Technician reported an MEL deferral with far-reaching implications due to important details that were not accomplished. Added training and education were emphasized to help mitigate similar threats.

■ Company aircraft X...deferral per MEL 25-XX-XX was put in place for removing the two forward life-rafts (due

overhaul) while parked at ZZZ. The third life raft remained installed. Due to the remote location of the aircraft versus home base, the flight crews physically performed the life raft removal and transport to the service facility absent of direct Maintenance personnel. Acting as the Maintenance Director designee as requested, instead of talking the crew through performing the deferral per our operations manual, I performed the electronic paperwork side of the process without verifying that an INOP placard was applied by the crew to the empty cabinets. The lack of proper [Company] MEL placarding was not discovered until after an event revealed the lack of placarding several weeks later after aircraft X flew more than 50 miles from shore. I recommend adding routine discrepancy and MEL training for all [Company] personnel to build comfort with deferral writing and operating manual procedures in place, in this case, specifically as it applies to responsibilities for corrective and deferred actions. We could also emphasize how important it is for flight crews to monitor the deferral list prior to every departure and be free to ask questions about discrepancies... to our Maintenance Director. I will also ask for a picture of the in-place placard for the next deferral opportunity.

## Multi-Discipline Discipline

An air carrier Lead Technician reported a potentially dangerous multi-discipline hazard during routine offloading. The gravity of the hazard is asserted, apathy is condemned, and training and education are advocated for all.

■ As we were offloading mail out of the forward cargo [area], I noticed some boxes that had lithium-ion battery UN3481 labels and also a white label that said "LITHIUM-ION BATTERIES - FORBIDDEN FOR TRANSPORT ABOARD PASSENGER AIRCRAFT." There were at least 20 boxes that I could see. Some were individual boxes, and some were within the white mesh-like bags that USPS uses, [which I identified] while offloading the mail. I saw many boxes with the Dangerous Goods label on them. This event occurred because the Crew Chief and crew loading this aircraft...did nothing to stop this mail. I can see [who] the Crew Chief was who scanned the bags on this flight,...but I do not know if he was also in the forward cargo area or if he had another crew load the mail. I told a Customer Service Manager. He asked for no information. Mail went to the cargo facility to be given to the USPS.

More training and knowledge of why this is so important [is needed] for all of us to be aware of these hazards. With lithium-ion batteries becoming...more popular, I think this should be a reoccurring lesson in an in-person class.

ASRS Alerts Issued in March 2023	
Subject of Alert	No. of Alerts
Aircraft or Aircraft Equipment	3
Airport Facility or Procedure	12
ATC Equipment or Procedure	5
Hazard to Flight	1
Other	1
<b>TOTAL</b>	<b>22</b>

520  
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 2023 Report Intake	
Air Carrier/Air Taxi Pilots	5,602
General Aviation Pilots	1,595
Flight Attendants	743
Controllers	470
Military/Other	282
Mechanics	239
Dispatchers	136
<b>TOTAL</b>	<b>9,067</b>