

# The National FAA Safety Team Presents

## Maintenance Related Accidents

Presented to: <Audience>

By: <Presenter>

Date: < >

**Produced by North and South Carolina  
and The Iowa *FAASTeam***



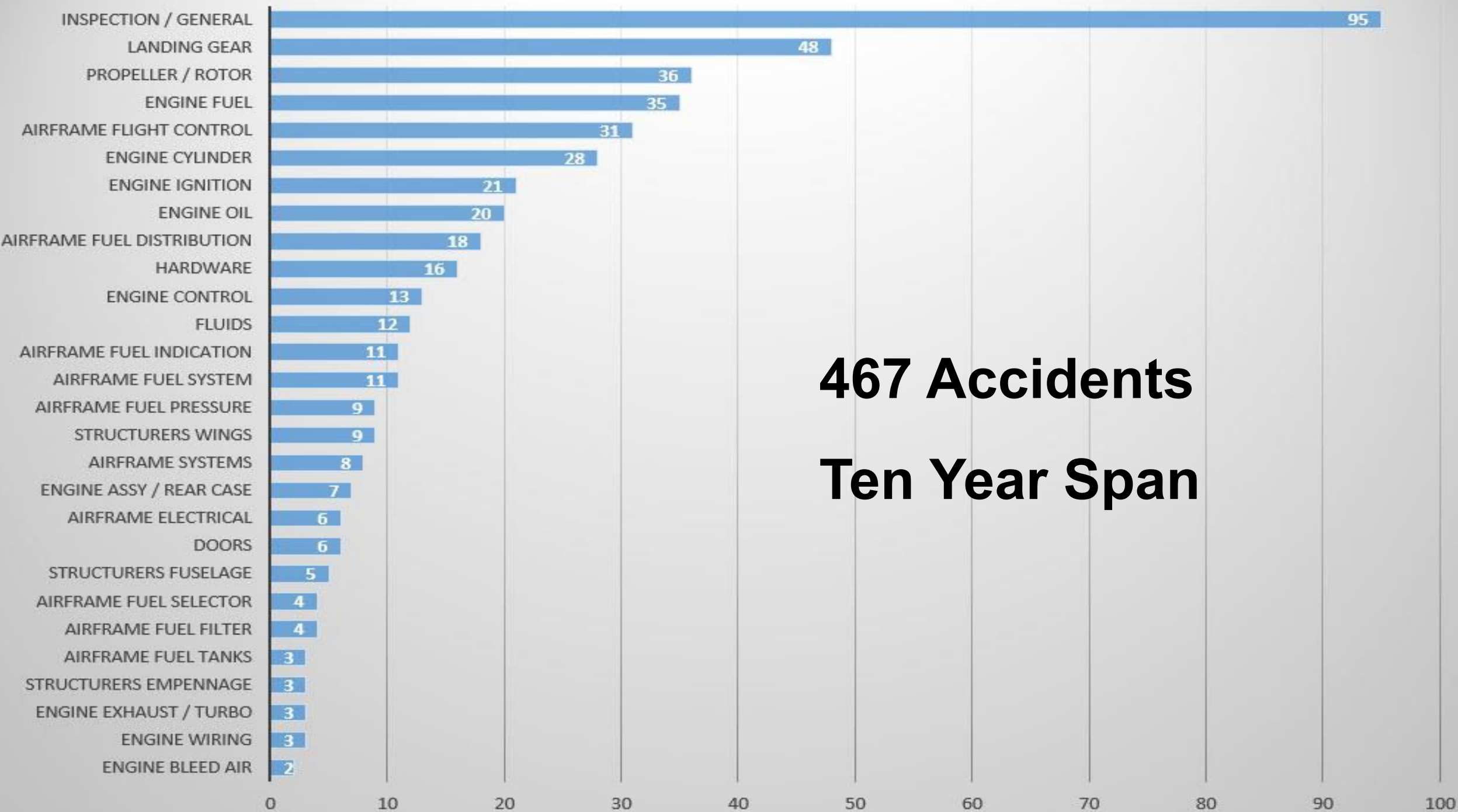
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# Overview

- Accident Review
- 467 “Maintenance Related” NTSB Accident Reports were reviewed and here is what was found.
- The Reports are from a Ten-Year Review
- How Do We Stop This





# Failure to Follow Service Instructions

- Improper torque of cylinders.
- Cessna 210
- 100 hours since Cylinder Replacement



Photo 2. The engine after cowling removal. Note separated number 2 cylinder.

# Failure to Follow Service Instructions

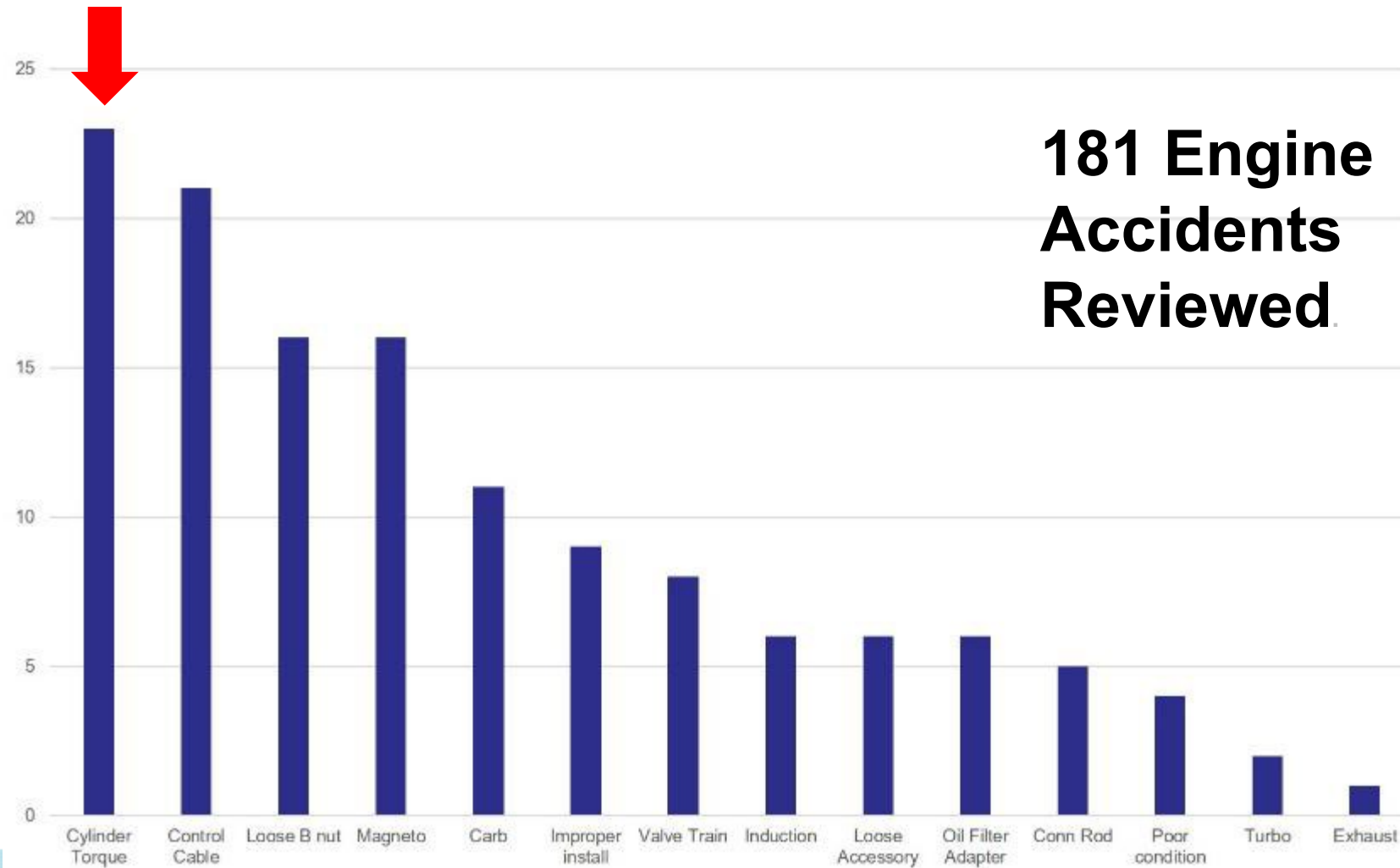
- Improper torque of cylinders.
- PA-28-180
- 16 hours since Cylinder Replacement



11-13-09	1370.7	-0-	3231.1	REMOVED & REPLACED 4 CYLINDERS WITH OVERHAUL EXCHANGE CHROME CYLINDERS 1AW MAINTENANCE MANUAL, OPERATIONAL CHECK OK, CHANGED OIL & FILTER 100 MINORAL OIL, REPLACED HEATER SCAT H03B
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# Engine Failures Broken Down



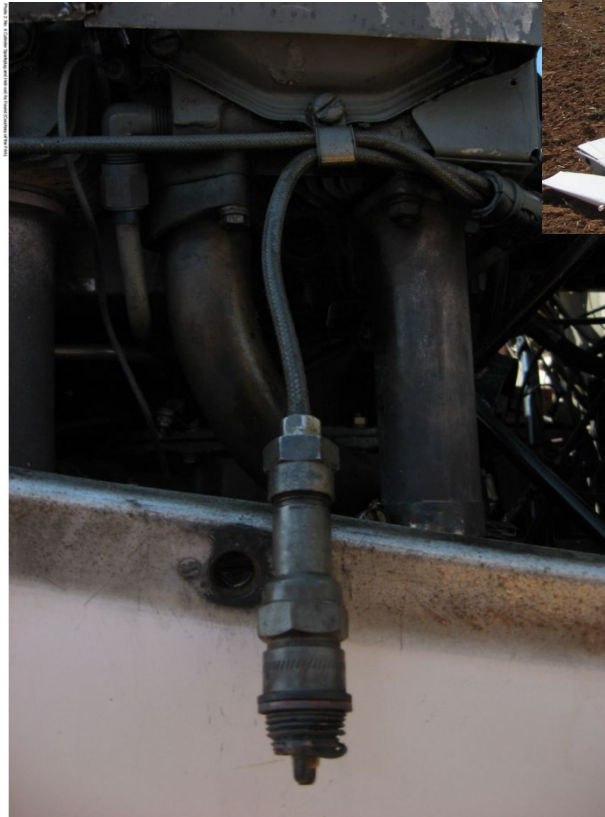
**181 Engine  
Accidents  
Reviewed**



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# Failure to Follow Manufacturer Instructions

- The certificated mechanic's improper installation of a standard Heli-coil,
- Engine manufacturer's recommendation to install oversize Heli-coil
- Cessna 152



# Failure to Follow Procedures

The mechanic's failure to re-connect a fuel line following an annual inspection.

Contributing to the accident was the pilot's improper decision to depart with a known mechanical deficiency. The pilot took off with no fuel pressure indication.

## Beech C23



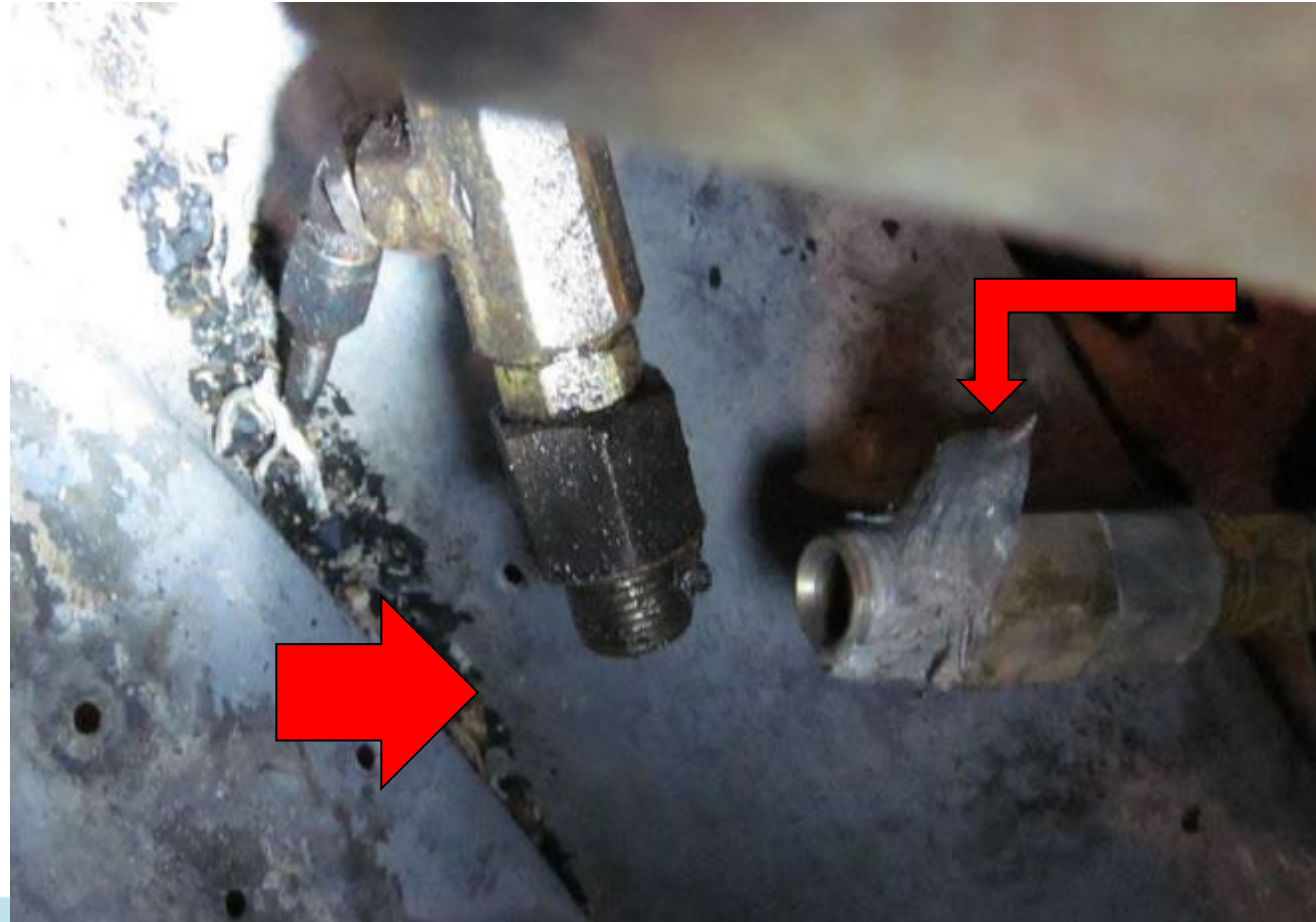
**Next slide for additional details**



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# Failure to Follow Procedures

Beech C23



Secondary  
fuel supply to  
carburetor

Molten metal  
on fitting  
indicating it  
was  
disconnected  
prior to fire.



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# Bad Things Happen to Good People

From this log entry, You can tell this helicopter was at a first rate shop

## Mechanics

- Experienced
- Training program

But Yet *next slide*

5/ [REDACTED] N [REDACTED] Helicopters [REDACTED]  
SN: [REDACTED] TT: [REDACTED] Eng. TT: [REDACTED] Starts: 3132 Hm: 183.3  
Performed 100 Hr/ Annual inspection per 14CFR91.409(f3) & BHT MM.  
Inspected optional equipment per instructions for continues airworthiness.  
C/W AD2007-25-07 by inspection of vertical fin per ASB206-06-107 Rev. A.  
Installed new airframe fuel filter. Drained TRGB. Serviced with Mobiljet 254.  
Adjusted MGB pressure & cleaned engine oil cooler. Replaced (2) Nav lamps on horizontal stab.  
Replaced turbine with 23038241 turbine SN: [REDACTED] with [REDACTED] TT & 1868.8 TSOH.  
Replaced bleed valve SN: [REDACTED] with SN: [REDACTED] with 489.4 TSOH.  
AD's current through 5/19/2012. I certify this aircraft was found airworthy and is approved for  
return to service in the restricted category. [REDACTED]

5/19/12 N [REDACTED] Engine SN: [REDACTED] Eng TT: [REDACTED] Starts: 3132 Hm: 183.3  
Removed Turbine Assy SN: [REDACTED] for OH. Installed Turbine Assy. SN: [REDACTED]  
with 12697.9 TT & 1868.8 TSOH after repair by [REDACTED] their W/O [REDACTED]  
Replaced bleed valve with serviceable 23053176 valve SN: [REDACTED] with 489.4 TSOH.  
Performed 100 Hr inspection. Serviced with MobilJet 254. Leak check & flight test good.  
Pwr check +8. AD's current through 5/19/12. I certify this engine was found airworthy & is  
app[roved for return to service. [REDACTED]



# It Can Happen To Any of Us!

## Bell 206B

The failure of maintenance personnel to properly torque an air tube fitting, which resulted in a total loss of engine power.



# Failure to Follow Standard Practice

The bolt/nut hardware that connected the left rudder cable to the rudder pedal had separated because of a missing cotter pin.

**Good**

Pictured here is an additional issue with wrong type hardware installed. The manufacture calls for a castellated nut and cotter pin.



**Sketch**



# Improper Procedures

The indications are the cable slipped through the copper oval sleeve because of improper "nicopress" or use of improper sized press during cable fabrication.



# Missing Parts

The failure of maintenance personnel to properly torque the elevator attachment hardware, which led to the detachment of the elevator.

The flight crew's decision to continue the flight after identifying a flight control problem, and the flight crew's failure to perform an adequate preflight inspection at the intermediate airport.

## Aircraft flew with left elevator missing



# Previously Compiled With (PCW)

The failure to comply with an airworthiness directive (AD) by maintenance personnel and incorrect reinstallation of the fuel selector handle by unknown personnel, which resulted in fuel starvation.

The fuel selector handle was installed 180 degrees from its correct orientation



# Improper Rigging

- The improper rigging of the fuel selector.
- When in the “on” position, it was in the cross-feed position.



Photo 3-FAA Photo-Fuel Selector handles



# Owner Maintenance

The pilot's failure to properly secure the oil drain plug after changing the engine oil, which resulted in oil starvation and an engine failure during cruise flight.



# Owner Maintenance Improper Part

The pilot's use of a non-vented fuel cap, which resulted in a total loss of engine power due to fuel starvation.



# Improper Part Supplied by Owner

The pilot had provided an incorrect propeller for installation.

The pilot decided to fly the airplane after maintenance personnel advised him not to fly it.

The propeller attachment bolts subsequently failed, and the propeller separated in flight.

**However, the mechanic should have never installed the propeller.**



# Skipping Check List Items



Clearly, this fuel bowl was not inspected at the last annual as indicated by way too much corrosion to have developed in a single year.

# Skipping Check List Items



This is more corrosion than can be developed in a year. It was probably not inspected at the prior Annual Inspection.

# Skipping Check List Items



This is a Beechcraft Main Wing Bolt. A clogged drain hole in the “bathtub” fitting will cause this.

Close inspection is necessary every annual. It’s part of Beech’s checklist; is it in Part 43 Appendix D List?

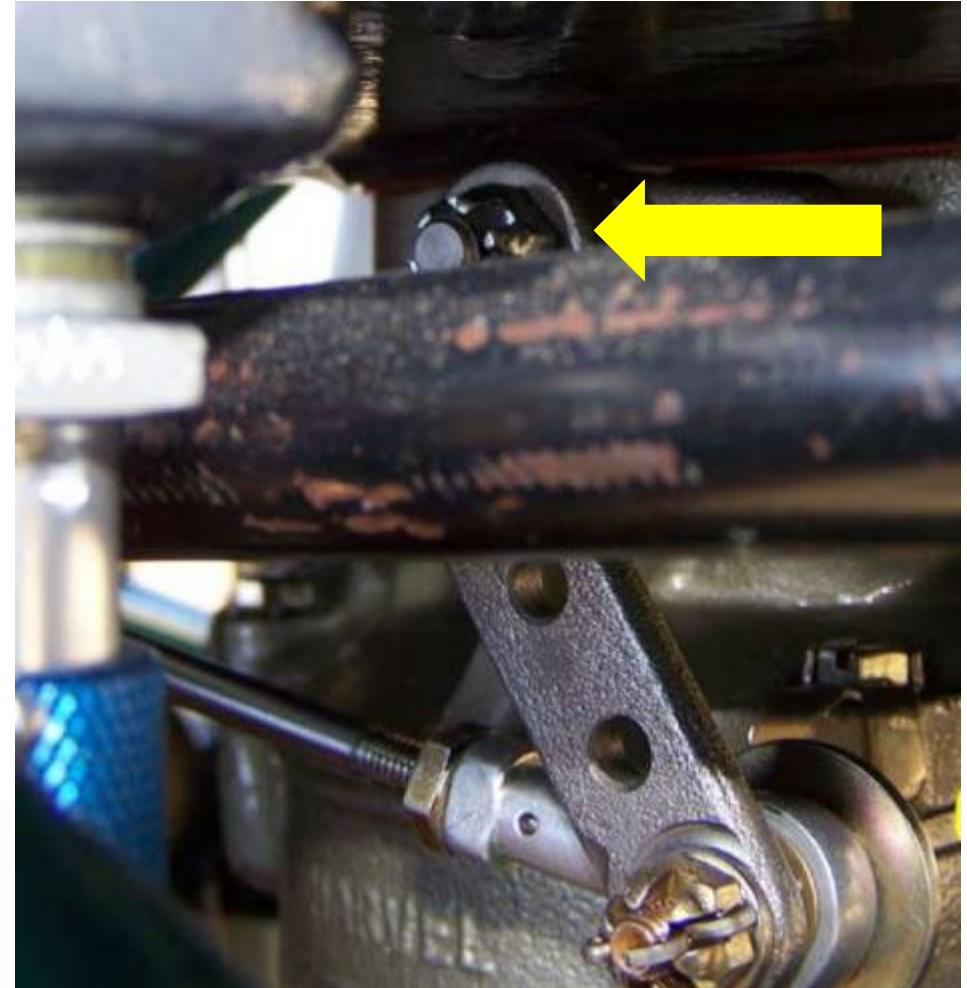
How many old Bonanzas and Barons are sitting outside and have the same bolt and nut corrosion?



# Improper Maintenance

The mechanic's failure to install a cotter retaining pin in the throttle arm retaining nut resulting in excessive throttle play and loss of engine power control.

PIPER PA-22-150



# Even Old Piper Cubs Have Issues



Improper Repairs led to this Cub not being able to fly from the rear seat as called for in the Type certificate Data Sheet



# Improper Maintenance

An Improperly installed intake coupling and a hole in the exhaust pipe, led to the ingestion of exhaust gases, which led to the partial loss of engine power.

This is an indication of the type of maintenance this aircraft had been receiving.



PIPER PA-32R-300 with Turbo Charger Installed

# Look For Clues



This oil filter is not properly safety wired per standard practice as list in AC43.13. To a Pilot or mechanic, this should be an indication of what type of maintenance has been performed in the past. Too few twist per inch. Section with no twist.



# Look For Clues



This oil filter is not properly safety wired per standard practice as list in AC43.13

The safety wire is pulling the filter loose.



# Experimental Aircraft

- Out of the 467 aircraft accident reviewed, some were experimental aircraft. We chose not to include them in our presentation for the most part.
- But what our research revealed is that the same maintenance issues held true for the experimental category aircraft as well.
- It's not a Standard Certificated Aircraft issue or a Experimental Aircraft issue;

IT'S A **HUMAN FACTOR** ISSUE



# Safety Management Systems (SMS) Coming to General Aviation



<https://www.faa.gov/about/initiatives/gasafetyoutreach>



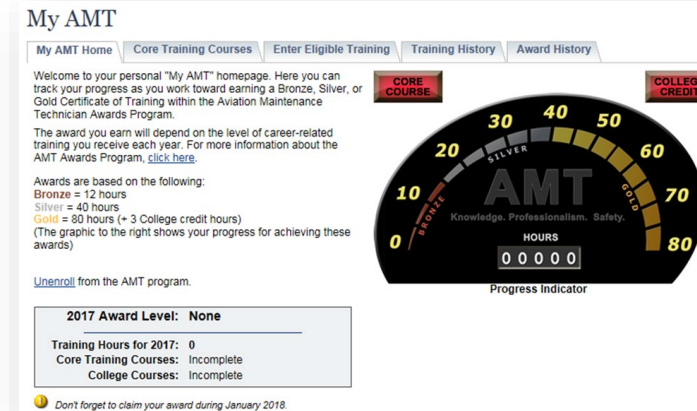
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# Questions?



# Training and Peace of Mind

- Technical Training
- Safety Related Training
- Document in My AMT



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# Thank you for attending

- You are vital members of our GA safety community



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