

# The National FAA Safety Team Presents

## Topic of the Month – September 2022 Preflight After Maintenance

Presented to: WAFC and Friends  
By: Stephen Bateman, CFI  
Date: September 12<sup>th</sup>, 2022

Produced by National FAA Safety Team (FAASTeam)



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# Welcome

- **Steve Bateman, CFI, AOPA Director of Flying Clubs**
  - Safety and Maintenance Officer, Westminster Aerobats Flying Club
  - FAASTeam lead representative, Baltimore FSDO
- **Our monthly in-and-out safety meeting using the FAASTeam Topic of the Month**
- **Sponsor Acknowledgment – WAFC, AOPA, FAASTeam, Baltimore FSDO**
- **WINGS Credit: Yes...but give me a day...**
- **Probably no time for questions, but send email:**

**[steve.bateman@aopa.org](mailto:steve.bateman@aopa.org)**



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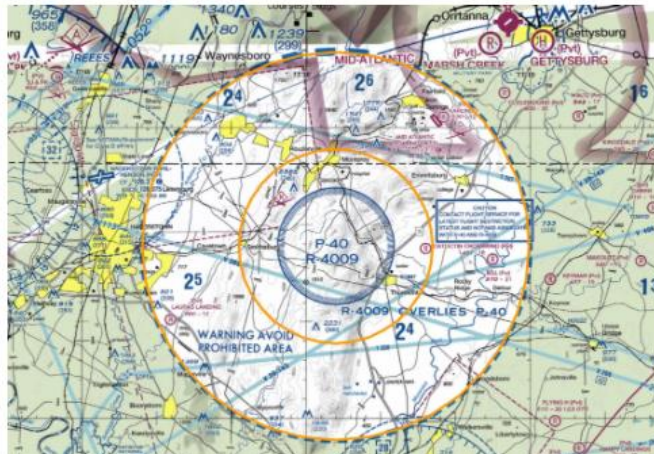
# Check NOTAMS!



VIP TFR OVER WILIMINGTON, DE BEGINNING TODAY SATURDAY, MARCH 6, 2021



VIP TFR OVER HAGERSTOWN/THURMONT, MD BEGINNING FRIDAY, APRIL 2, 2021  
(((CHANGE IN DEPARTURE TIME)))



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# Want a copy of these slides?

- **We provide links to these ToM presentations in the *Club Connector* safety section**
  - Search for AOPA Club Connector and sign-up

🏠 > Flying Clubs > Club Connector Newsletter

## FLYING CLUB CONNECTOR NEWSLETTER

Your source for the latest news on flying clubs all over the country. AOPA's research has shown us that flying club leaders are hungry to learn more about the practical experiences of other clubs. So, we have created this monthly e-newsletter.

[SUBSCRIBE](#)

### ARTICLES BY TOPIC

NEWS FROM HQ	QUESTION OF THE MONTH	CLUB SPOTLIGHT
AIRCRAFT SPOTLIGHT	SAFETY	EVENT SPOTLIGHT

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# Overview:

## Define and Discuss:

- **Set the scene...**
- **What is airworthy?**
- **What is “Condition for Safe Operations”**
- **Maintenance documents and entries**
- **Preflight after maintenance**
- **Limitations as related to maintenance**

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## Figure 1.4: General Aviation Accidents in 2019

2019 Non-commercial fixed-wing



	Accidents		Fatal Accidents	
Pilot-Related	614	62.1%	88	49.2%
Mechanical	194	19.6%	15	8.4%
Other / Unknown	180	18.2%	76	42.5%

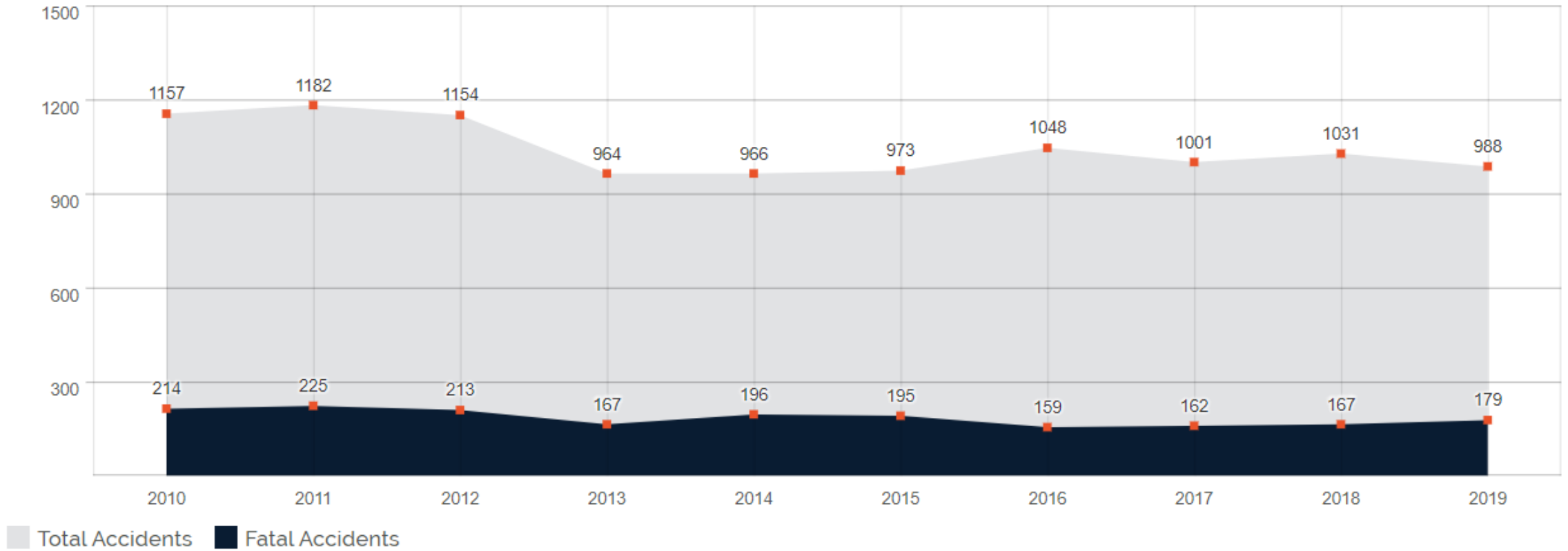
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# Figure 1.2: General Aviation Accident Trends 2010-2019

2019 Non-commercial fixed-wing



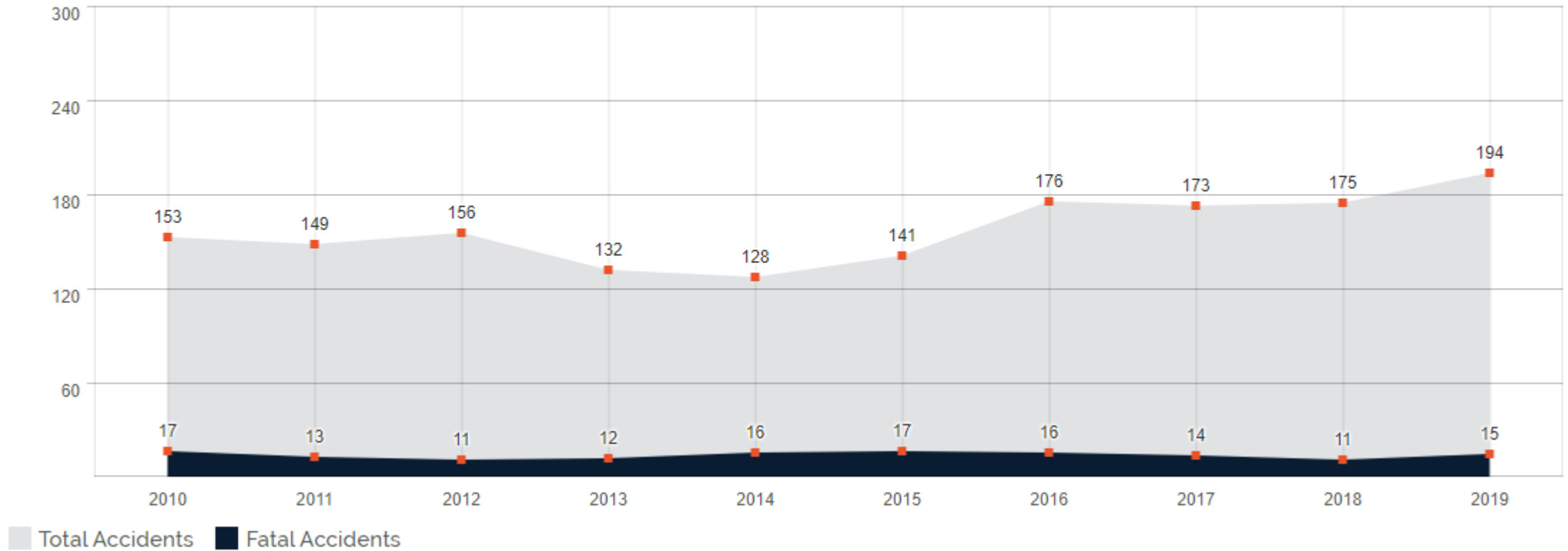
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## Figure 1.8.1: Mechanical accident trend

2019 Non-commercial fixed-wing



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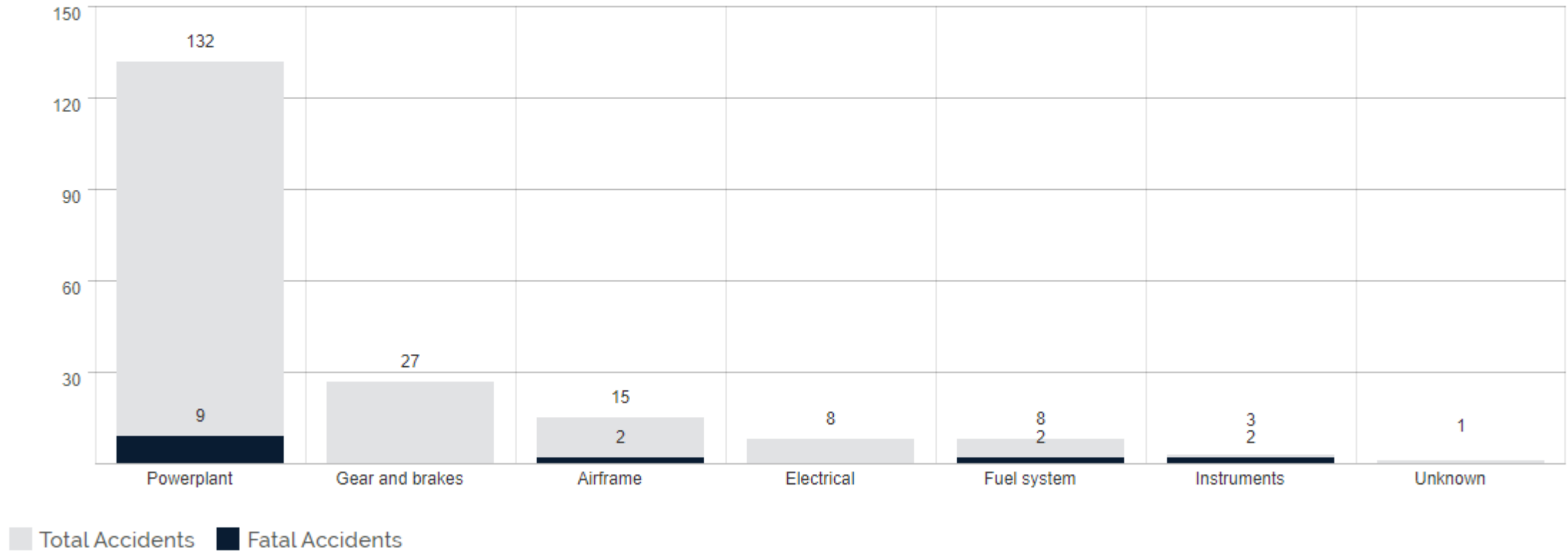


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## Figure 1.8.2: Types of mechanical accidents

2019 Non-commercial fixed-wing



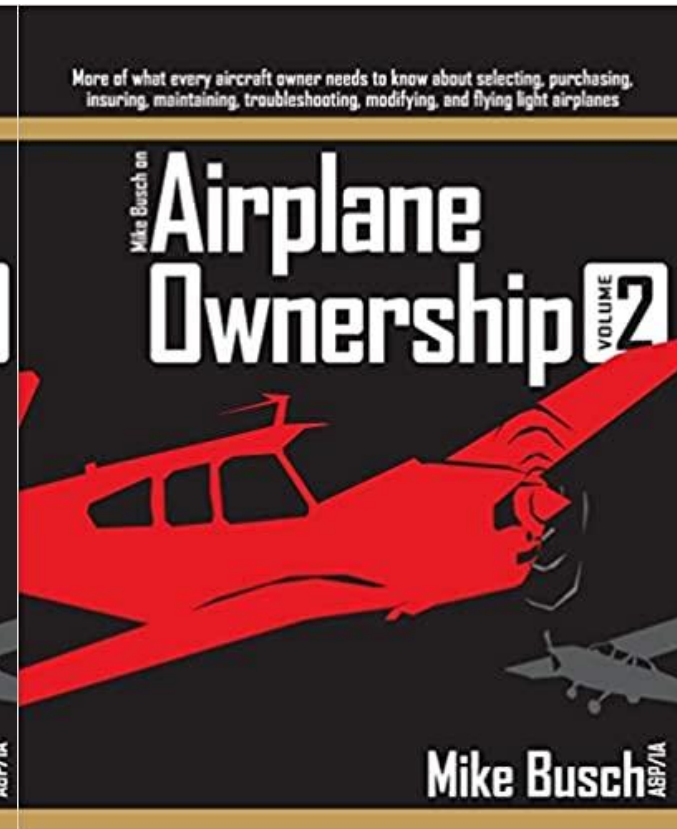
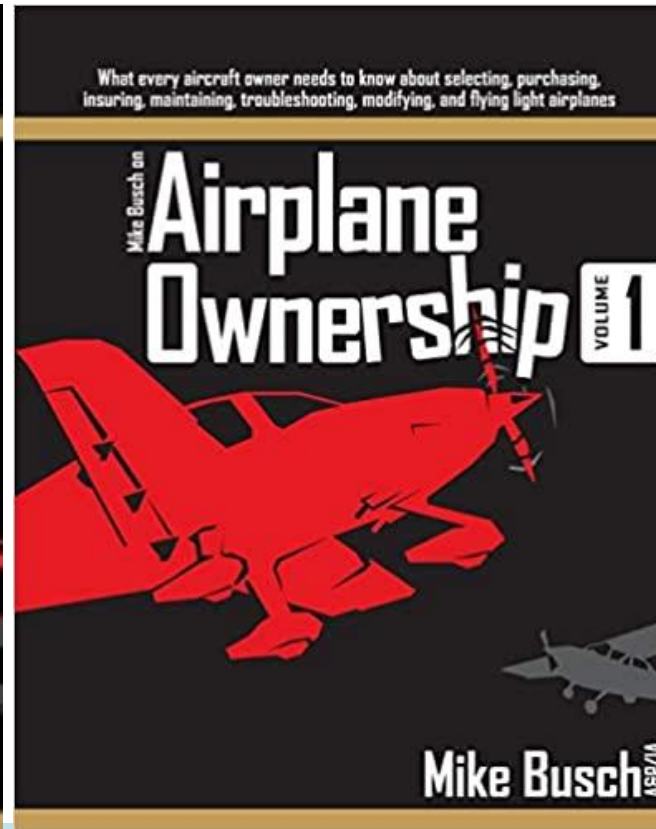
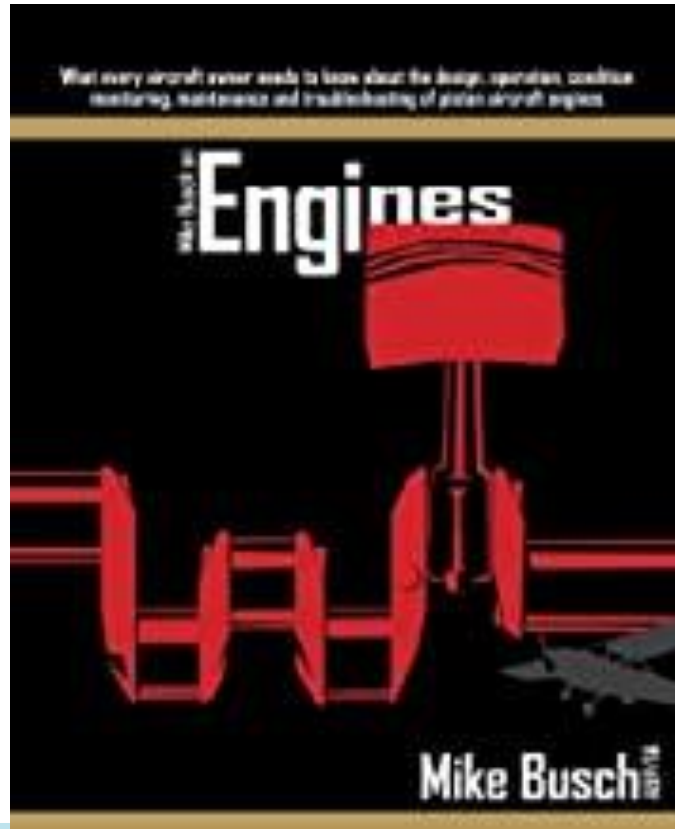
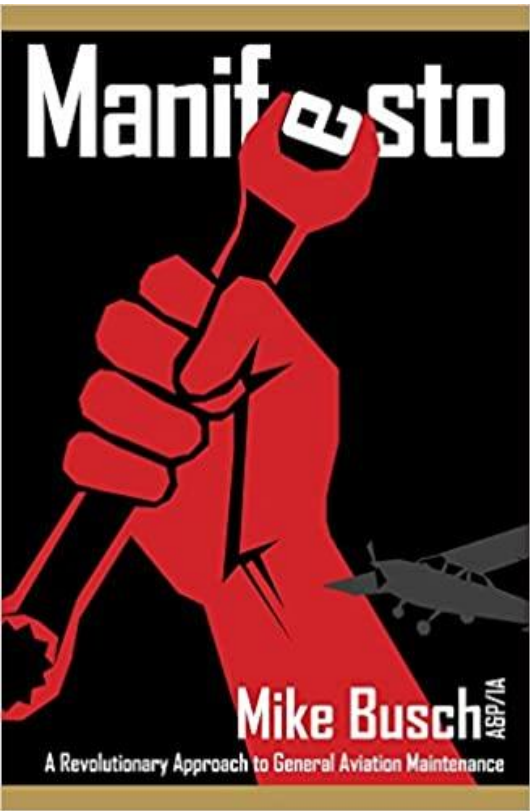
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# Become Educated:

- Mike Bush's books (and articles):



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# Become Educated:

- AC 43.13 1B/2B
- A “must-have” for your aviation library
- Curl up on the sofa and give it a solid read
- You WILL learn a lot!
- When is a washer not a washer?
  - When it is not an aviation washer



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# Become Educated: Part 43

- **FAR 43.3 permits a pilot to perform preventive maintenance on an aircraft provided the aircraft is used strictly for noncommercial operations under Part 91**
- **Pilots > PPL may do this all by themselves without any A&P involvement!**
  - Just because you can, doesn't mean you should
  - Be careful what you wish for...

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# Know before you go: Who's responsible?

- **14 CFR Part 91.403(a)** says the **owner/operator** is primarily responsible for maintaining the aircraft in an airworthy condition to include compliance with all applicable ADs
- **14 CFR Part 91.7** says: No person may operate a civil aircraft unless it is in an airworthy condition

**AND**

**The pilot in command** of a civil aircraft is responsible for determining whether that aircraft is in condition for safe flight. The pilot in command shall discontinue the flight when un-airworthy mechanical, electrical, or structural conditions occur.



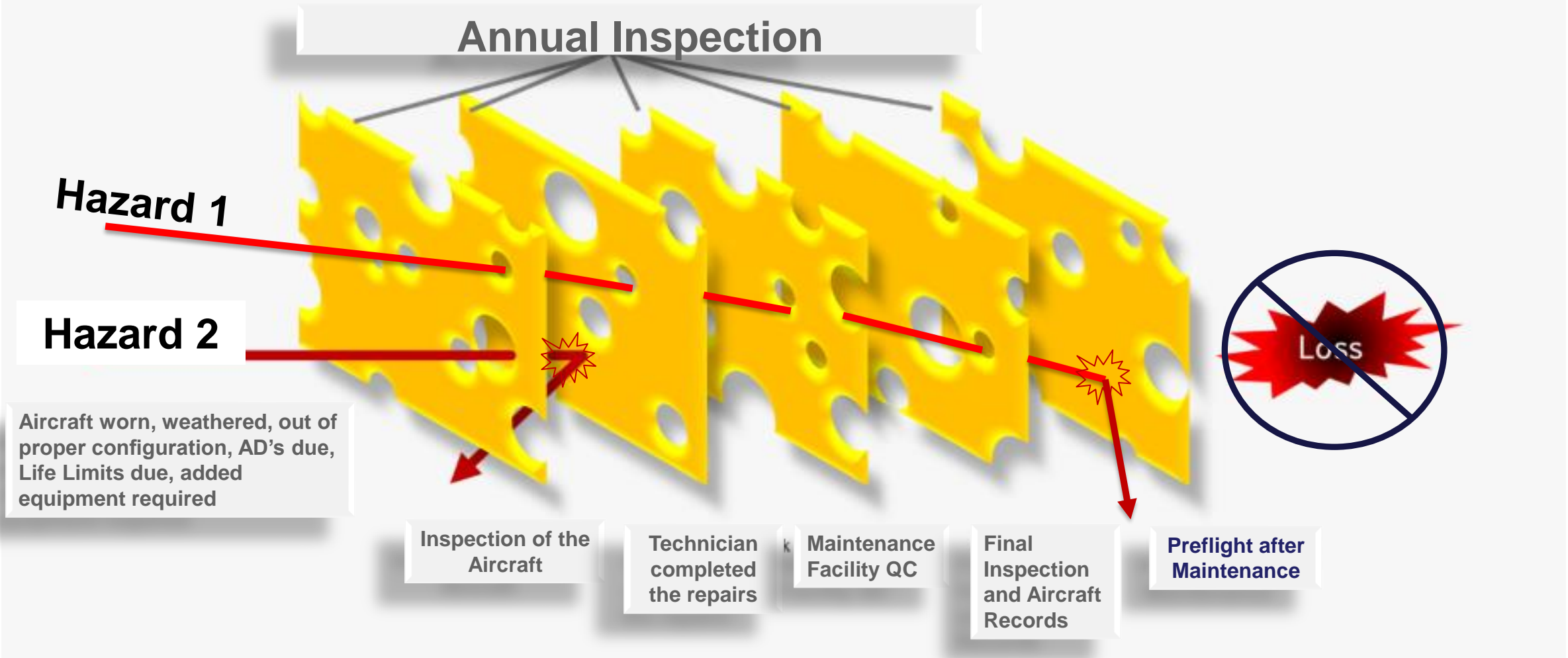
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# •Maintenance Event

## Annual Inspection



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# How would you define Airworthiness?



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# FAA's Definition of Airworthy...

**An aircraft with a Type Certificate (TC) is airworthy when:**

- **It conforms to its U.S. TC**
- **It is in a Condition for Safe Operation (CSO).**

**A non-type-certificated aircraft is airworthy when:**

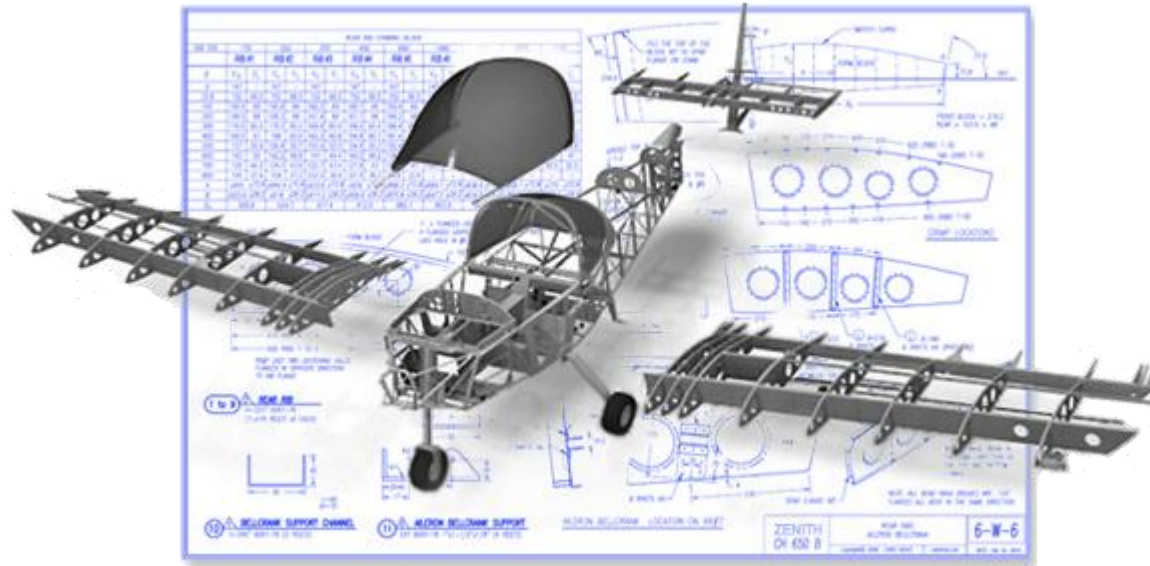
- **It is in a Condition for Safe Operation**  
**(14 CFR Part 3.5)**



# Condition for Safe Operation...

A Condition so as to operate in the manner intended by the

***manufacturer!***



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# Does Your Aircraft Have a Type Certificate?

- **TYPE CERTIFICATE DATA SHEET**

*The type certificate data sheet (TCDS) is like a birth certificate, and provides a formal description of the aircraft, engine or propeller that has received type certification by the FAA. It lists limitations and information required for type certification including airspeed limits, weight limits, thrust limitations, etc.*

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# Where to find the TCDS

Browse

[Expand All](#) [Collapse All](#)

Type Certificate Data Sheet ▼

▼ **Design and Production Approvals**

Type Certificate Data Sheets (TCDS)

### Type Certificate Data Sheets (TCDS)

#### Filters

Status <input type="text" value="Current"/>	TCDS Number <input type="text" value="Enter text.."/>	CFR Part Reference <input type="text" value="Choose"/>
TC Holder <input type="text" value="Textron Aviation Inc."/>	Office of Primary Responsibility <input type="text" value="Choose"/>	Sub-Status <input type="text" value="Choose"/>
Former TC Holders <input type="text" value="Choose"/>	Model <input type="text" value="152"/>	Product Type <input type="text" value="Aircraft"/>
Product Subtype <input type="text" value="Small Airplane"/>	Revision Date <sup>1</sup> <input type="text" value="Type or Select a date/date range"/>	Regulatory Basis <input type="text" value="Enter text.."/>

Click "Enter" or use pipe (|) symbol to separate values

#### Keyword Search

Keyword <sup>1</sup>

Click "Enter" or use pipe (|) symbol to separate values

[Apply](#) [Reset](#)

Sort By  [Save Results List](#) [Save Selected Results List](#)

Indicates current

Showing 1 - 1 of 1 results

TCDS Number : 3A19

**TC Holder:** Textron Aviation Inc.

**Status:** Current | **CFR Part Reference:** [Part 3](#) | [Part 21](#) | [Part 23](#) | [Part 36](#) | **Office of Primary Responsibility:** AIR-7K0: Wichita ACO Branch | **Sub-Status:** | **Former TC Holders:** Cessna Aircraft Company | **Model:** 150L | 150B | 150D | A150L | A150K | 150E | A150M | A152 ...[show more](#) | **Product Type:** Aircraft | **Product Subtype:** Small Airplane | **Revision Number:** 50 | **Revision Date:** 07/21/2017 | **Regulatory Basis:** FAR Part 23 | **CFR Subpart/Appendix Reference:** | **CFR Section Reference:** Sec. 23.1545 | Sec. 23.1559

# TCDS for A152 Aerobat

DEPARTMENT OF TRANSPORTATION  
FEDERAL AVIATION ADMINISTRATION

	3A19
	Revision 50
	Textron Aviation Inc.
150	150J
150A	150K
150B	A150K
150C	150L
150D	A150L
150E	150M
150F	A150M
150G	152
150H	A152
	July 21, 2017

\*WARNING: Use of alcohol-based fuels can cause serious performance degradation and fuel system component damage, and is therefore prohibited on Cessna airplanes.\*

## TYPE CERTIFICATE DATA SHEET NO. 3A19

This data sheet which is a part of type certificate No. 3A19 prescribes conditions and limitations under which the product for which the type certificate was issued meets the airworthiness requirements of the Federal Aviation Regulations.

Type Certificate Holder: Textron Aviation Inc.  
One Cessna Boulevard  
Wichita, Kansas 67215

Type Certificate Holder Record: Cessna Aircraft Company transferred to  
Textron Aviation Inc. on July 29, 2015



- I. Model 150, 2 PCLM (Utility Category), Approved July 10, 1958  
Model 150A, 2 PCLM (Utility Category), Approved June 14, 1960  
Model 150B, 2 PCLM (Utility Category), Approved June 20, 1961  
Model 150C, 2 PCLM (Utility Category), Approved June 15, 1962

Engine	Continental O-200-A	
*Fuel	80/87 min. grade aviation gasoline	
*Engine Limits	For all operations, 2750 r.p.m. (100 hp.)	
Propeller and Propeller Limits	1. Sensenich 69CK	24 lb. (-32)
	Diameter: not over 69 in., not under 67.5 in.	
	Static r.p.m. at maximum permissible throttle setting: not over 2470, not under 2320	
	No additional tolerance permitted	
	2. McCauley 1A100/MCM	21 lb. (-32)
	Diameter: not over 69 in., not under 67.5 in.	
	Static r.p.m. at maximum permissible throttle setting: not over 2475, not under 2375	
	No additional tolerance permitted	
	3. McCauley 1A101/DCM	21 lb. (-32)
	Diameter: not over 69 in., not under 67.5 in.	
	Static r.p.m. at maximum permissible throttle setting: not over 2600, not under 2500	
	No additional tolerance permitted	

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Rev No.	50	43	43	41	42	41	41	41	41	41	41	38	50	30	50	32	32	37	50

# Yet more information about your specific aeroplane...

Lookup Aircraft By... ▾ Reports ▾ N-Numbers ▾ Other Aircraft Resources ▾			
<b>FAA REGISTRY</b> N-Number Inquiry Results			
Data Updated Each Federal Working Day At Midnight			
  N761GG is Assigned			
N-NUMBER ENTERED: 761GG			
AIRCRAFT DESCRIPTION			
Serial Number	A1520951	Status	Valid
Manufacturer Name	CESSNA	Certificate Issue Date	07/24/2018
Model	A152	Expiration Date	07/31/2024
Type Aircraft	Fixed Wing Single-Engine	Type Engine	Reciprocating
Pending Number Change	None	Dealer	No
Date Change Authorized	None	Mode S Code (base 8 / Oct)	52442734
MFR Year	1980	Mode S Code (Base 16 / Hex)	AA45DC
Type Registration	LLC	Fractional Owner	NO
REGISTERED OWNER			
Name	CHOCKS AWAY AVIATION LLC		
Street	6679 STONE RIDGE CT		
City	FREDERICK	State	MARYLAND
County	FREDERICK	Zip Code	21702-2989
Country	UNITED STATES		
AIRWORTHINESS			
Type Certificate Data Sheet	None	Type Certificate Holder	None
Engine Manufacturer	LYCOMING	Classification	Standard

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# Yet more information about your specific aeroplane ...

## AIRWORTHINESS

Type Certificate Data Sheet	None	Type Certificate Holder	None
Engine Manufacturer	LYCOMING	Classification	Standard
Engine Model	0-235 SERIES	Category	Acrobatic
A/W Date	09/05/1980	Exception Code	No

The information contained in this record should be the most current Airworthiness information available in the historical aircraft record. However, this data alone does not provide the basis for a determination regarding the airworthiness of an aircraft or the current aircraft configuration. For specific information, you may request a copy of the aircraft record at <http://aircraft.faa.gov/e.gov/ND/>

The information contained in this record should be the most current Airworthiness information available in the historical aircraft record. However, this data alone does not provide the basis for a determination regarding the airworthiness of an aircraft or the current aircraft configuration. For specific information, you may request a copy of the aircraft record at <http://aircraft.faa.gov/e.gov/ND/>

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# Yet more information about your specific aeroplane ...



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## Aircraft Records

Aircraft Registration  
Aircraft Inquiry  
Contact Aircraft  
Registration  
FAQ  
Registry  
Request Aircraft Records  
Home

### Request for Copies of Aircraft Records Entry Screen

For more information about requesting copies and a schedule of fees [click here](#).

Do you want these records on?

CD  Paper

Do you need these records certified? [What is Certified?](#)

Yes  No

Is this for a Government entity?

Yes  No

N-Number:

Serial #:

Add Aircraft to Cart

Go To Checkout

Cancel All

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# Airworthiness Certificate

UNITED STATES OF AMERICA  
DEPARTMENT OF TRANSPORTATION-FEDERAL AVIATION ADMINISTRATION  
**STANDARD AIRWORTHINESS CERTIFICATE**

## 6. TERMS AND CONDITIONS

Unless sooner surrendered, suspended, revoked, or a termination date is otherwise established by the Administrator, this airworthiness certificate is effective as long as the maintenance, preventive maintenance, and alterations are performed in accordance with Parts 21, 43, and 91, of the Federal Aviation Regulations, as appropriate, and the aircraft is registered in the United States.

DATE OF ISSUANCE

FAA REPRESENTATIVE

DESIGNATION NUMBER

Any alteration, reproduction, or misuse of this certificate may be punishable by a fine not exceeding \$1,000, or imprisonment not exceeding 3 years, or both.  
THIS CERTIFICATE MUST BE DISPLAYED IN THE AIRCRAFT IN ACCORDANCE WITH APPLICABLE FEDERAL AVIATION REGULATIONS.

FAA Form 8100-2

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# Airworthiness...ARROW

- ~~• (A) Airworthiness certificate~~
- ~~• (R) Registration~~
- ~~• (O) Pilot's operating handbook~~
- ~~• (W) Weight and balance data.~~

- (A) Airworthiness certificate
- (R) Registration (Three years)
- (R) Radio operator's license
- (O) Operating limitations, including PoH, (AFM) and Placards
- (W) Weight and balance for this flight

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*On Instrument Panel In Full View of Pilot:*

**WHEN UTILITY DOORS  
ARE REMOVED - AIR  
SPEED IS NOT TO  
EXCEED 167 KNOTS IAS**

C95E#02C0032



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# Understand why the aircraft was being worked on...



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# Going Into Maintenance (Owner)...

- Trusted facility?
- Trusted mechanic?
- Discrepancies?
- Time limited Items?
- Annual?
- 100 Hour?



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The FBO  
Just Called,  
You Are  
Good to Go!

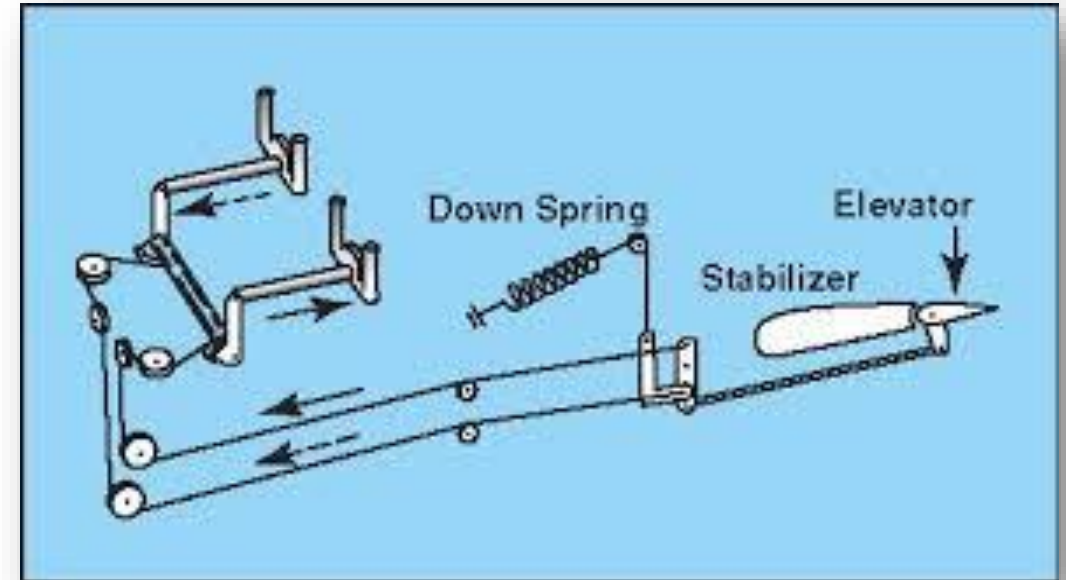
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# Preflight after maintenance

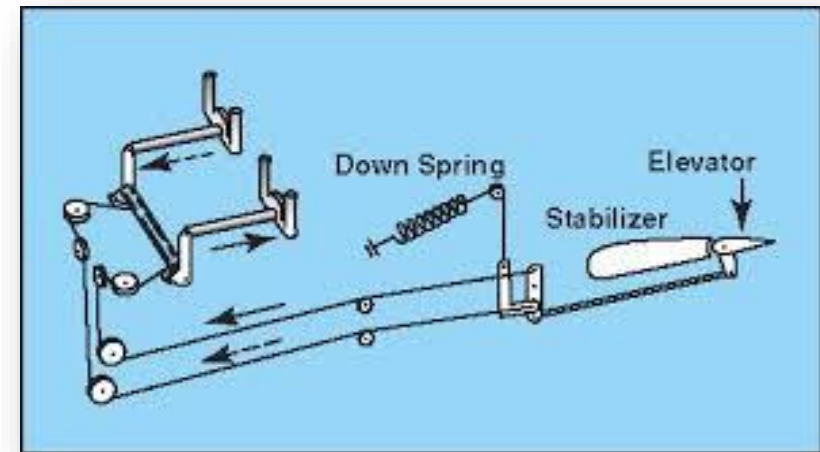
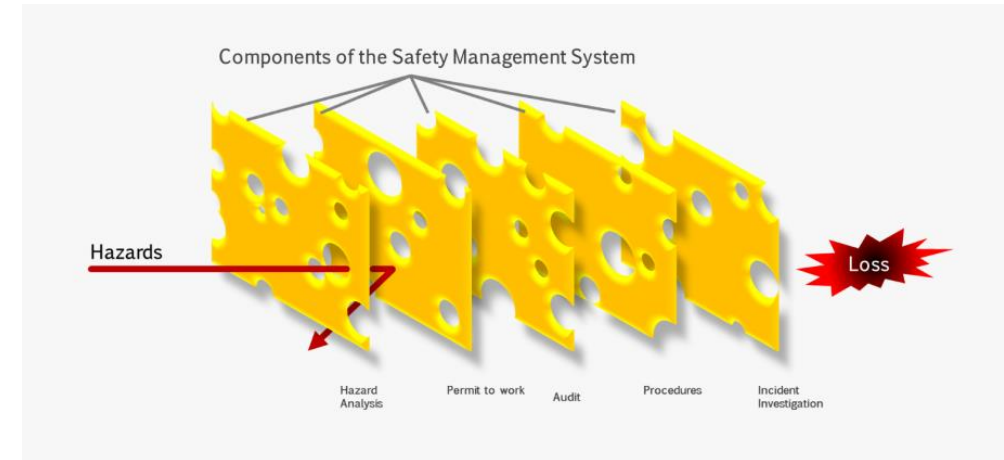
- Know what systems or structures were repaired or replaced during maintenance--they need special attention
- Discuss w/mechanic **ALL** work that was done
- Don't assume the part(s) replaced are the **ONLY** things that were taken apart or affected
- The trim tab likely checked "secure" but it wasn't the only part of the system affected



# First preflight after maintenance

**This preflight is unique and should be treated as such because:**

- It's vital to your safety
- It's vital to the health of your aircraft
- It's the last line of defense against a mechanical error/failure
- Where do we look?
- What do we look for?
- How do we do it?



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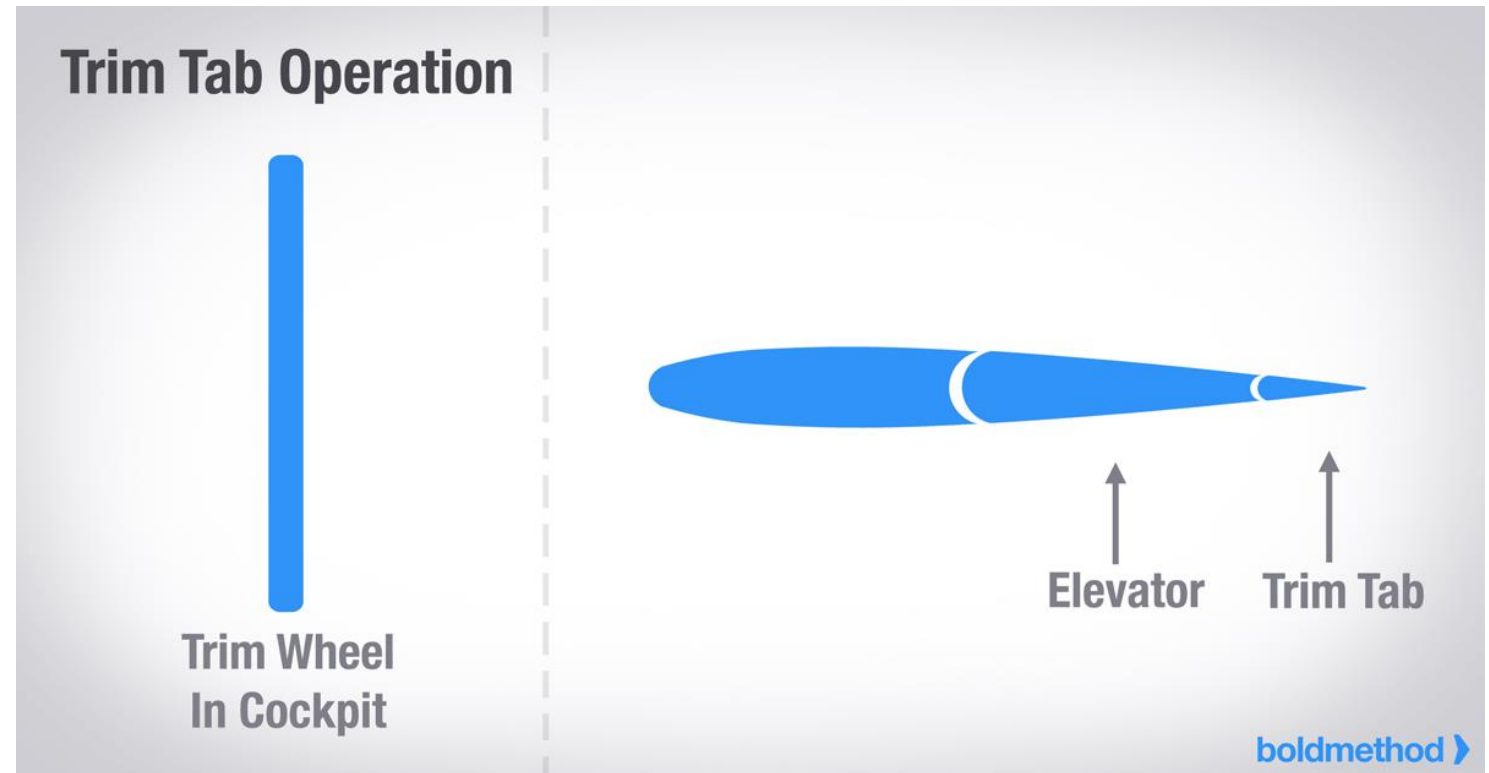


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# Elevator Trim Operation

Which way  
should it go?



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## Ask yourself the following preflight after maintenance questions:

- What was the purpose?
- Were there issues found?
- Were they corrected?
- Is there a time/hour limit?
- Annual?
- 100-hour?
- AD or SB?
- Has the aircraft been correctly returned to service?



# Aircraft Maintenance Log

DATE 19__	RECORDING TACH TIME	TODAYS FLIGHT	TOTAL TIME IN SERVICE	DESCRIPTION OF INSPECTIONS, TESTS, REPAIRS AND ALTERATIONS ENTRIES MUST BE ENDORSED WITH NAME, RATING AND CERTIFICATE NUMBER OF MECHANIC OR REPAIR FACILITY. (SEE BACK PAGES FOR OTHER SPECIFIC ENTRIES.)
<b><i>AIRCRAFT MAINTENANCE, INC.</i></b>				
12/27/17	Tach: 4180.4		PA-28-140 S/N:	
				#1) Removed ELT Battery replaced with new P/N: BS2166 Expiration date 01/2020, CW FAR 91.207 Para (d) by ops check
				#2) Removed aircraft clock replaced with new clock by Electronics International Inc. P/N: ASC-5A
				#3) Removed aircraft compass replaced with new P/N: PAI-700
				#4) Wired and installed 5 Nulite instrument lights P/N: 11-01099
				#5) Removed Directional Gyro sent to Castleberry Instruments & Avionics to be overhauled ~ reinstalled in aircraft
				OPS check good. No weight change
				Returned aircraft to service.

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# What Logbook Entries Must Contain

14 CFR Section 43.9(a) says for maintenance other than inspections:

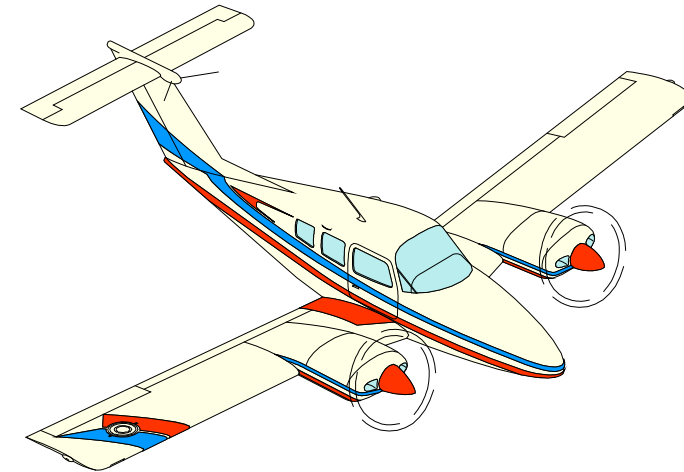
- (1) A description of work performed.
- (2) The date of completion of the work performed.
- (3) The name of the person performing the work if other than the person approving for return to service.
- (4) The signature, certificate number and type of certificate held by the person approving the work.

The signature constitutes the approval for return to service **only for the work performed.**

# What Logbook Entries Must Contain

14 CFR Section 43.11(a) says for inspections:

- (1) The type of Inspection
- (2) The date of the inspection and aircraft total time in service (not necessarily tach time)
- (3) The signature, certificate number, kind of certificate held by the person approving or **disapproving** for return to service



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# What Logbook Entries Must Contain

**(4) If approved for return to service...similarly worded statement –**

**“I certify that this aircraft has been inspected in accordance with (insert type) inspection was determined to be in airworthy condition”**

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**But what if there are still issues?**

**14 CFR Part 43.11(a)(5) in part states:**

**“I certify that this aircraft has been inspected in accordance with (insert type) inspection and a list of **discrepancies and unairworthy items** dated (date) has been provided to the aircraft owner or operator**

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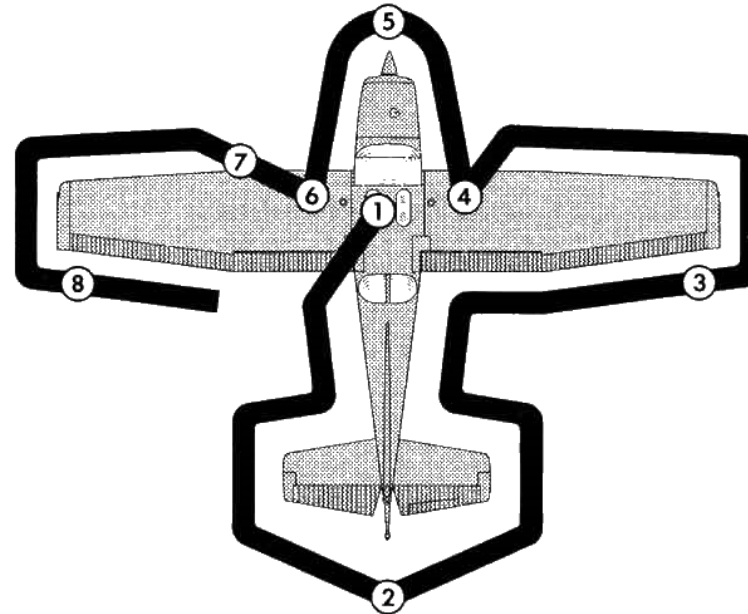


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We've reviewed what has been done...



# Is the aircraft Airworthy?



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# Which of these are part of being airworthy?

## Airworthiness cert

- AWC Displayed
- Legibility

## Registration cert

## Approved AFM

## Limitations

## Placards

## Type certificate

## Radio station license

## Tires

	YES	NO	MAYBE
Airworthiness cert	X		
– AWC Displayed	X		
– Legibility	X		
Registration cert	X		
Approved AFM			X
Limitations	X		
Placards	X		
Type certificate	X		
Radio station license			X
Tires			X

# Which of these are part of being airworthy?

**Static wick**

**Logbooks in AC**

**POH**

**VOR check**

**Transponder check**

**Static check**

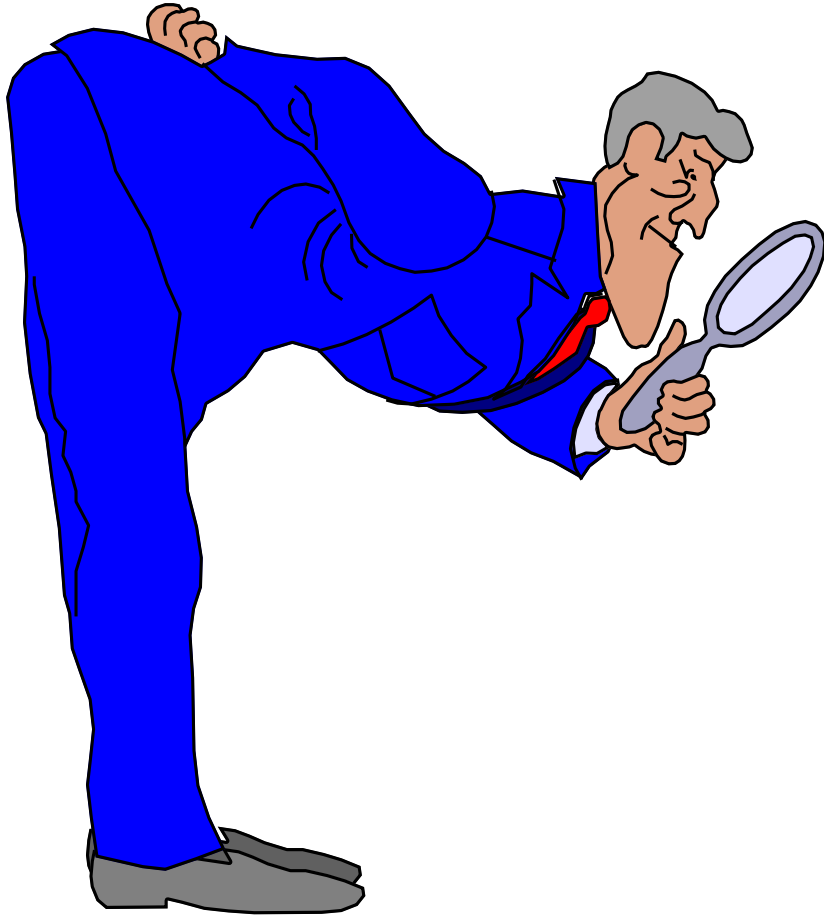
**Equipment list**

**Seat belt condition**

**GPS database**

YES	NO	MAYBE
		X
	X	
		X
	X	
	X	
	X	
X		
		X
		X

# Practices

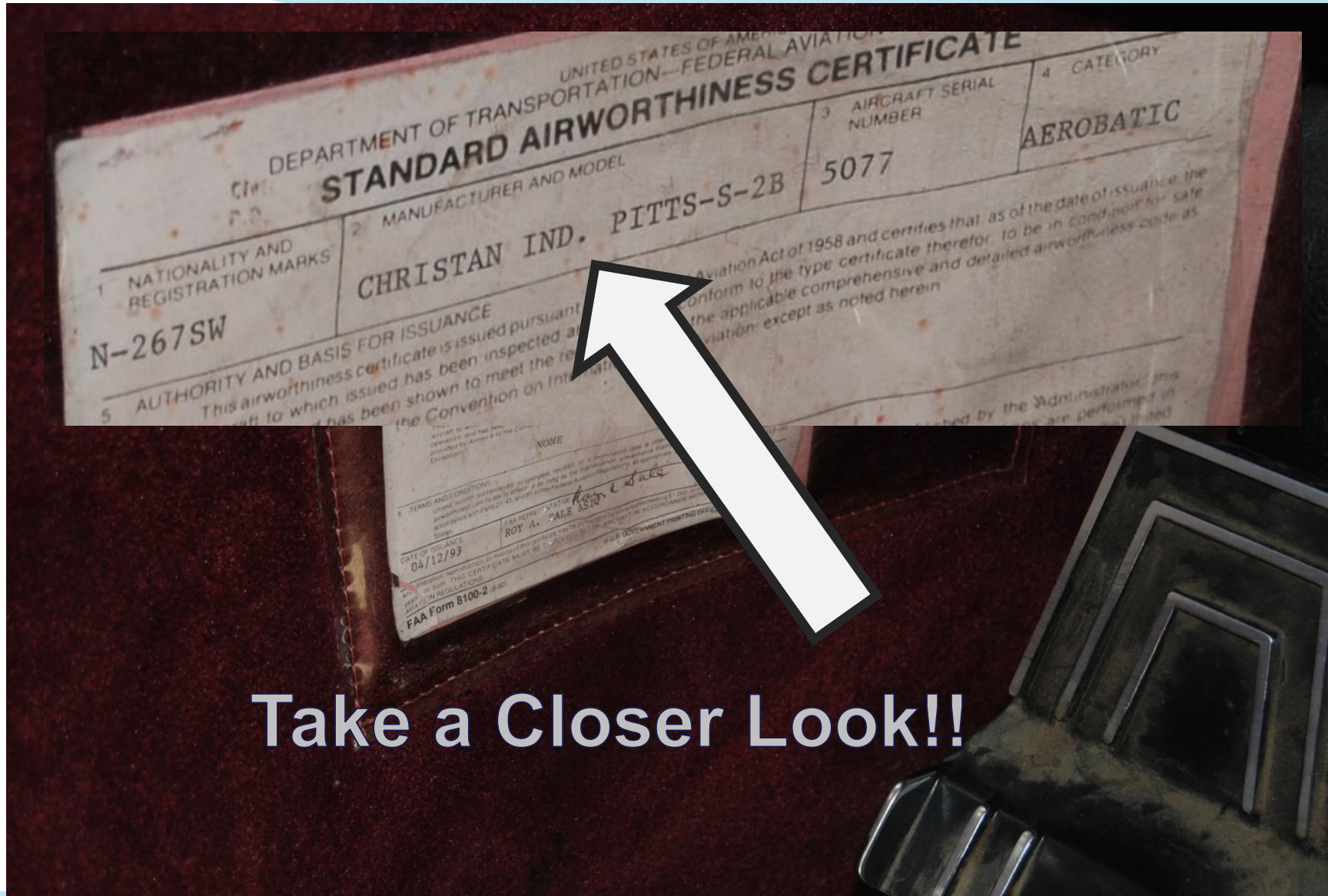


- **We are looking for something wrong.**
- **We're fault finders!.**

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Take a Closer Look!!

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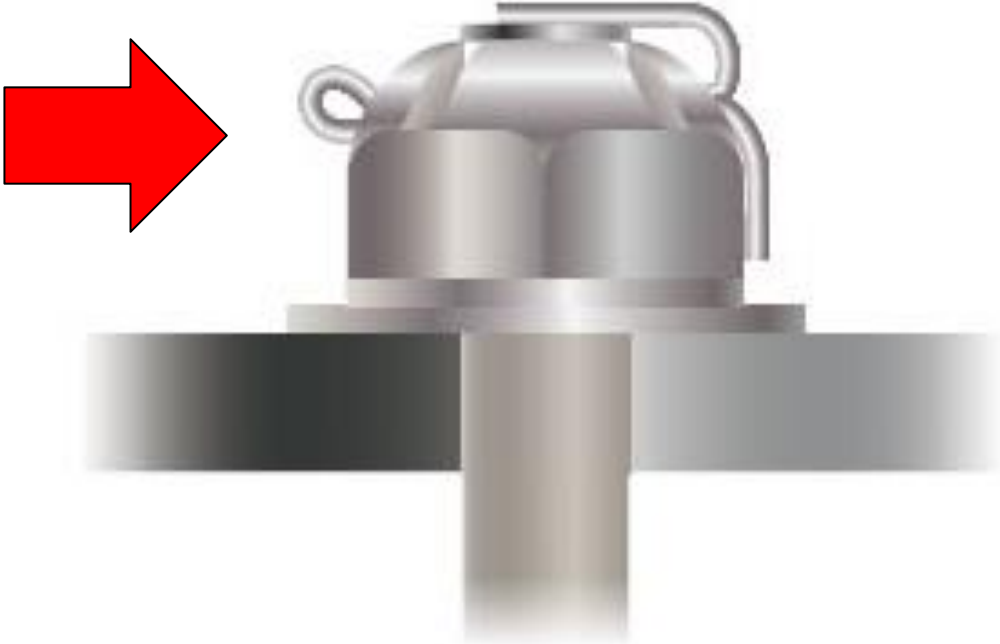


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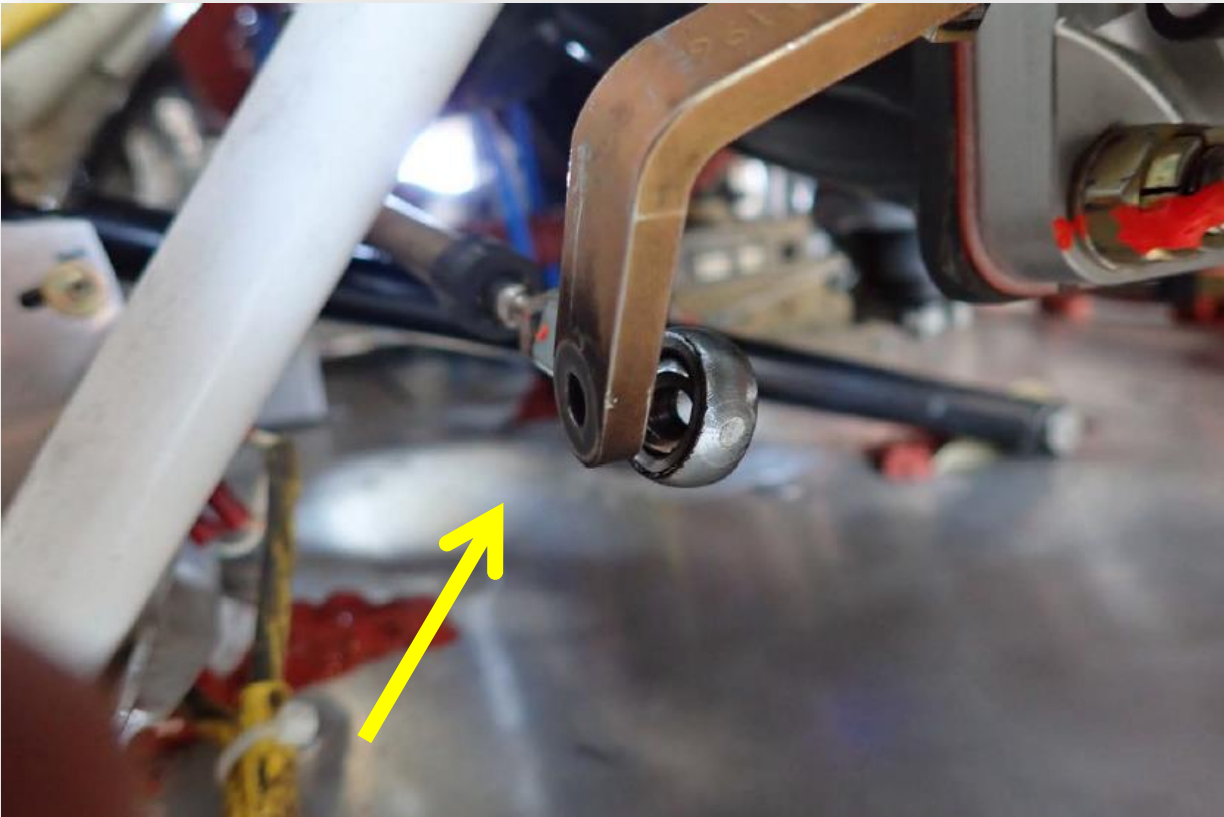


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# Castellated Nuts



# Throttle Cable Disconnected

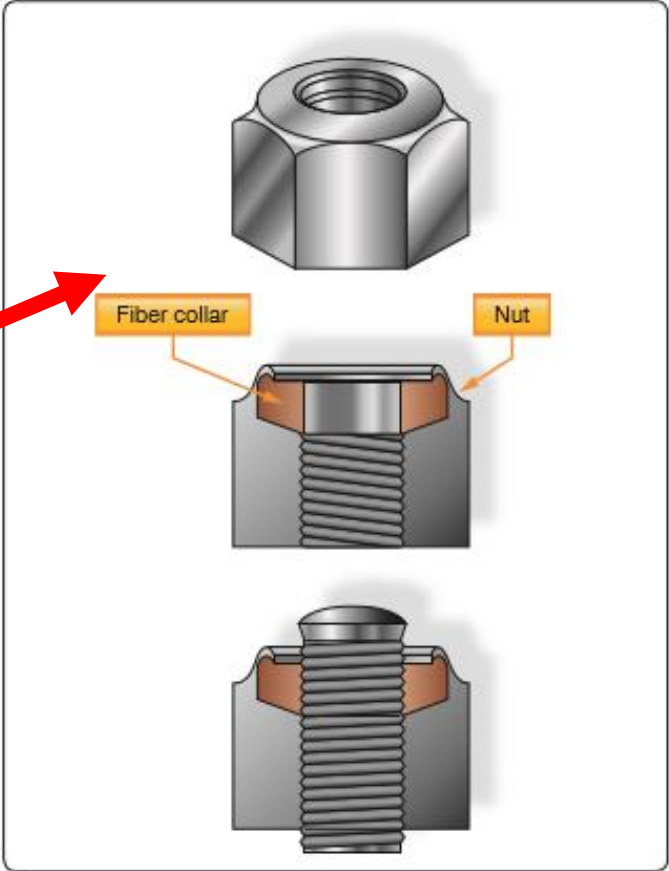
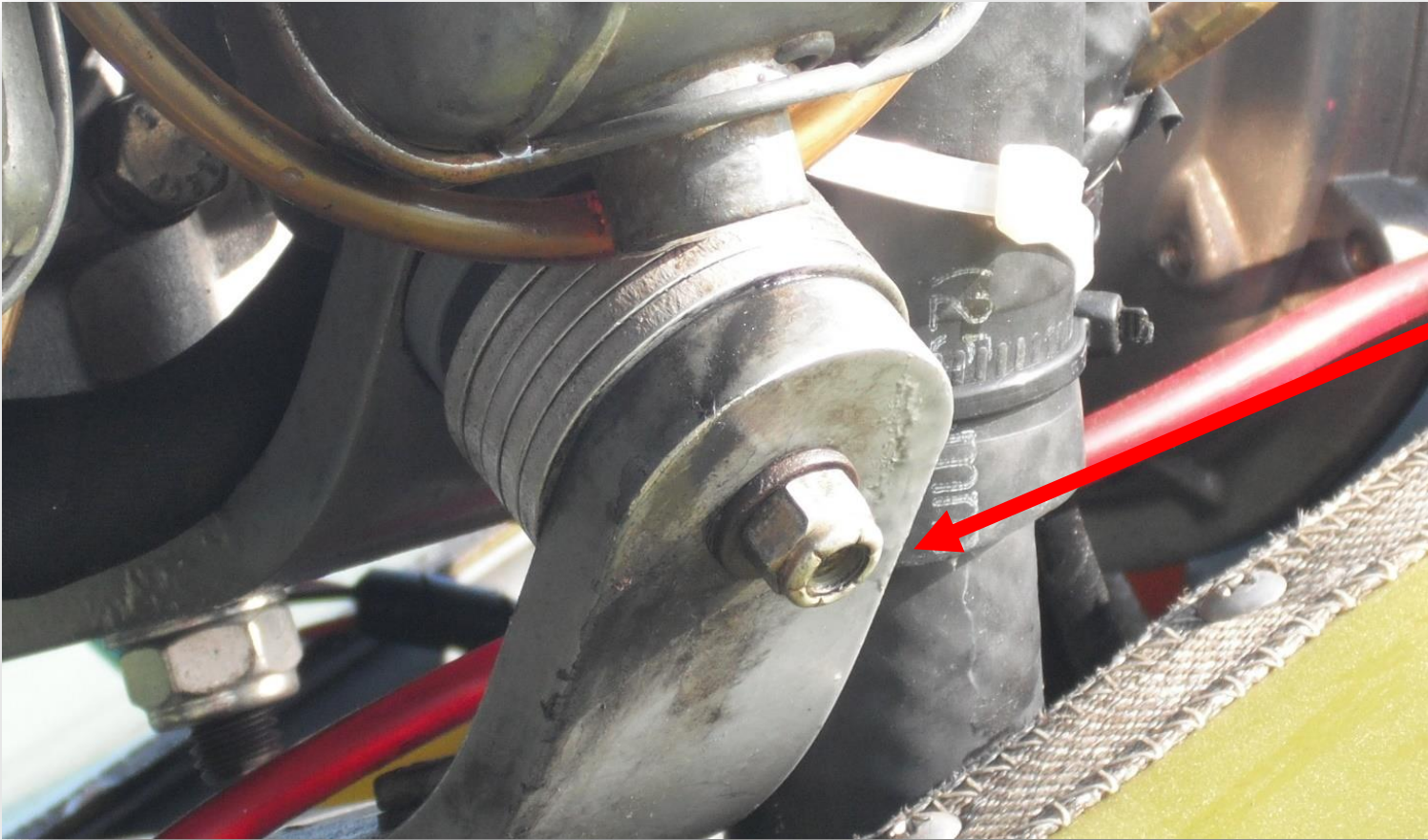


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# Lock Nuts







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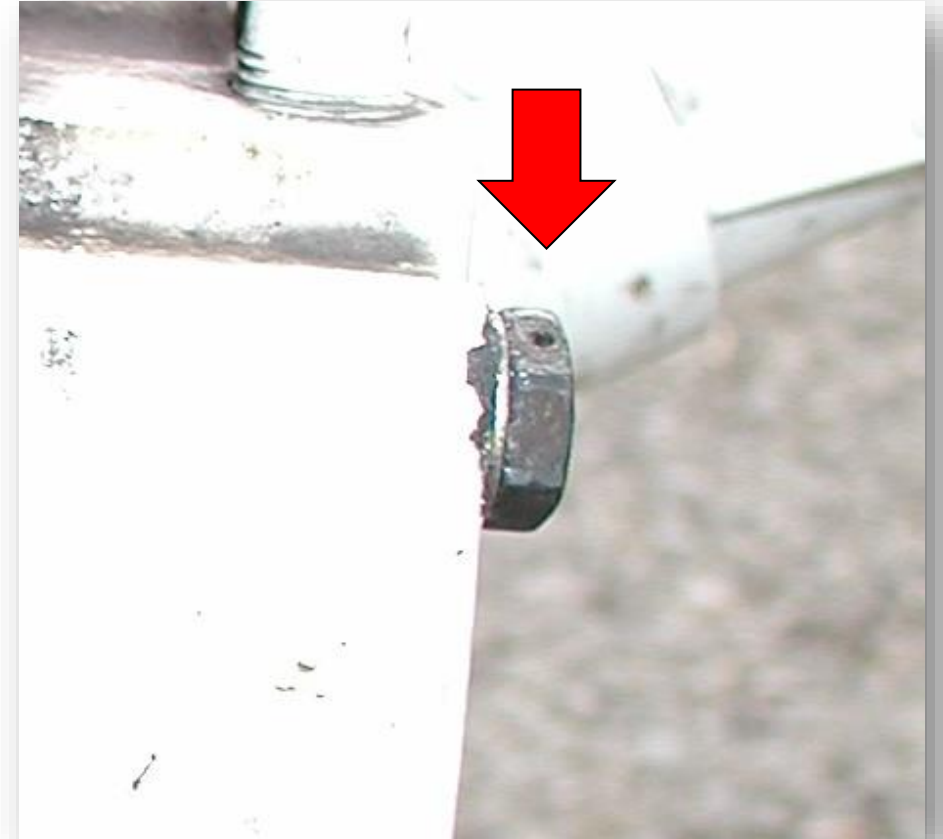


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## If there's a hole in the bolt...



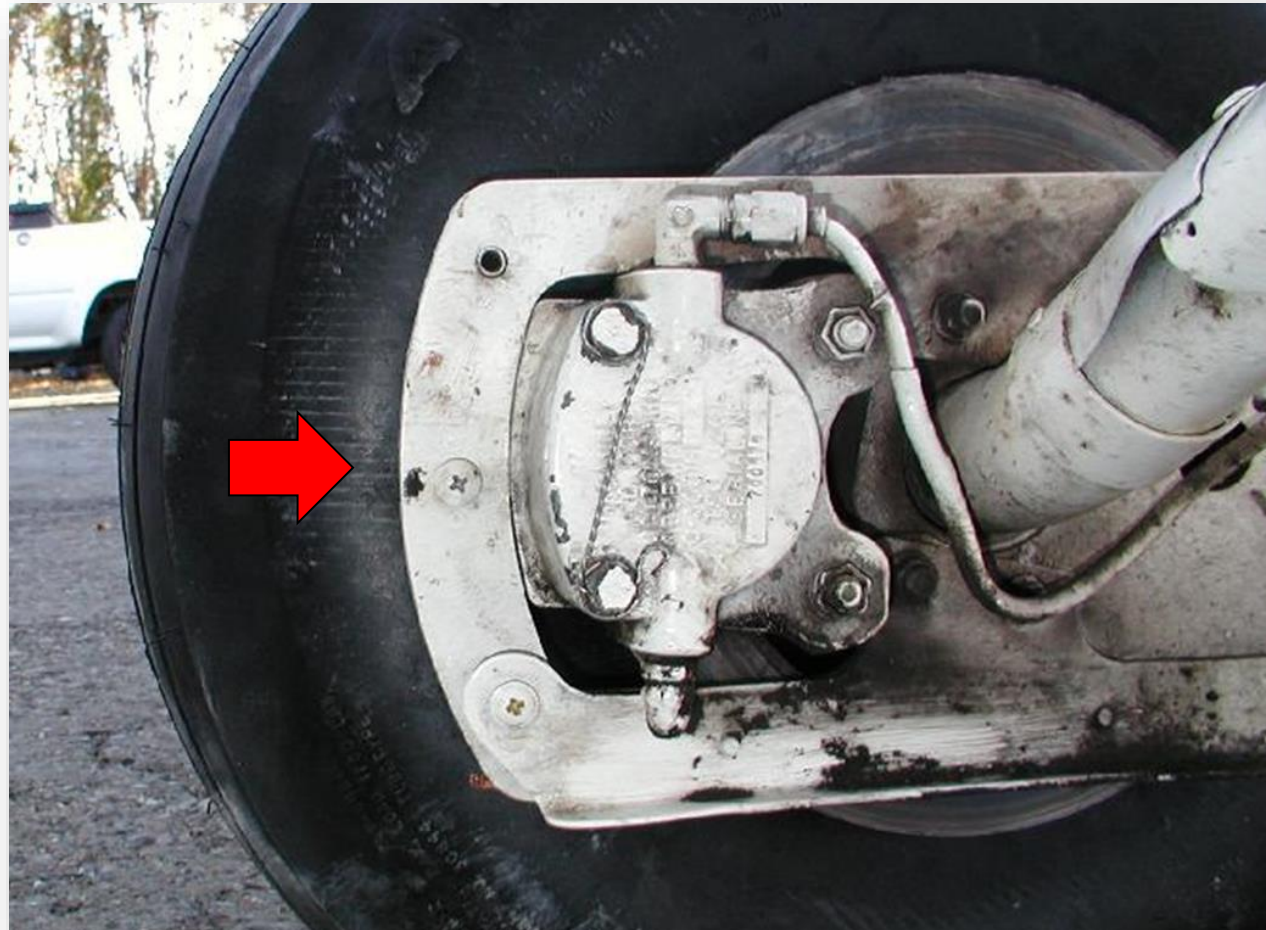
•Rule of  
Thumb



...it should have wire in it



•Rule of  
Thumb



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***“Limitations”***

**AFM/POH Section 2:**

**This is the ONLY section of  
the AFM that is**

**“FAA APPROVED”**

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# Required VFR Day Equipment

- VFR Day: **“A TOMATO FLAMES”**

**A** - Anti-collision lights (beacon, strobes)

**T** - Tachometer (for each engine)

**O** - Oil pressure gauge (for each engine)

**M** - Manifold pressure gauge (for each turbo/CSP engine)

**A** - Altimeter

**T** - Temperature gauge (for each liquid cooled engine)

**O** - Oil temperature gauge (for each air-cooled engine)

**F** - Fuel gauge (for each fuel tank)

**L** - Landing gear position indicator (for retractable gear)

**A** - Airspeed indicator

**M** - Magnetic direction indicator (compass)

**E** - Emergency Locator Transmitter (ELT)

**S** - Seatbelts (and shoulder harness)



# Required VFR Night Equipment

- All VFR Day Equipment, Plus:
- VFR Night: “FLAPS”

**F** - Fuses (spare set) or circuit breakers

**L** - Landing light (if for hire)

**A** - Anti-collision lights (beacon, strobes)

**P** - Position lights (wingtip and tail nav lights)

**S** - Source of electricity – battery, generator...

# Equipment Inspections

- **ELT:**
  - Test every 12 months. Test during first 5-min of the hour. Replace batteries if “On” for > 1 hour or when >50% useful life. (91.207)
- **Transponder:**
  - Test every 24 months. (91.413)
- **Altimeter:**
  - Test every 24 months. (91.411)
- **Pitot-Static:**
  - Test every 24 months (91.411)
- **Annual:**
  - Every 12 months. (91.409 a)
- **100-Hour:**
  - Aircraft for hire. (91.409 b)
- **VOR for IFR use:**
  - Within 30-days of the flight (91.171)
- **Airworthiness Directives (ADs):**
  - As per the specific AD



# Supplemental Type Certificates (STC)...

United States of America  
Department of Transportation - Federal Aviation Administration  
**Supplemental Type Certificate**

Number SA3-483

This certificate issued to W. F. Bilquist  
R. R. #2, Box 113  
Blue Springs, MO 64015

certifies that the change in the type design for the following product with the limitations and conditions specified herein meets the airworthiness requirements of Part 03 of the Civil Air Regulations.

Original Product - Type Certificate Number 803  
Make: Mooney  
Model: M-19C 55

Description of Type Design Change: Install Continental C85-12 engine.  
Bilquist data required: Copy of this Supplemental Type Certificate, Data Sheet No. 1 (2 sheets) dated March 7, 1960  
Fuel System Sketch dated March 17, 1959  
Fuel System Dwg. No. 2 dated March 5, 1960  
Airplane Flight Manual Supplement dated Feb. 29, 1960, revised March 15, 1960.

Limitations and Conditions: Empty weight of altered airplane must not exceed 631 lb., including 0.5 gal. unusable fuel. This approval should not be extended to other specific airplanes of this model on which other previously approved modifications are incorporated, unless it is determined that the inter-relationship between this change and any of those other previously approved modifications will introduce no adverse effect upon the airworthiness of that airplane.

This certificate and the supporting data which is the basis for approval shall remain in effect until amended, suspended, revoked, or a termination date is otherwise established by the Administrator of the Federal Aviation Administration.

Date of application: 27 January 1965  
Date of issuance: 10 March 1960

Sub issued: 18 December 1972  
Date amended: 3 February 1965

By direction of the Administrator  
WILLIAM J. THIEVESS, Chief  
Engineering and Manufacturing Branch

(Title)

Any alteration of this certificate is punishable by a fine of not exceeding \$1,000, or imprisonment not exceeding 3 years, or both.

This certificate may be transferred in accordance with FAR 21.47.

FAA Form 8130-3 (10-69)



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# Have you ever had your Airspeed Indicator, or a gauge replaced?

Old



New



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# Weight and Balance

Think Section 6 – Weight and Balance and Installed Equipment:

FIGURE 21. Typical equipment list.

ITEM	CHK	DESCRIPTION	WT	ARM
001		Engine, Continental, O-200-A	200.0	-18.5
002		Propeller, McCauley IA 100	20.0	-32.0
003		Spinner, Propeller	1.0	-34.5
003A		Spinner, Propeller, Large	2.0	-34.5
004		Generator, 35 Amp, 14 Volt	12.5	-6.0
005		Regulator, Voltage, 35 Amp, 14 Volt	1.0	-1.0
006		Battery, 12 Volt, 24 AH	24.5	-4.5
007		Filter, Carburetor Air	0.5	-23.5
008		Heating System, Carburetor and Cabin	10.5	-20.0
009		Wheel, Brake & Tire Assy, (two), 6.00 x 6, 4 Ply Rating, Main	35.5	48.5
010		Wheel & Tire Assy, 5.00 x 5, 4 Ply Rating, Nose	9.0	-10.5

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# What we've covered

- **What is Airworthy?**
- **What is “Condition for Safe Operations”**
- **Maintenance Documents and Entries**
- **Preflight after Maintenance**
- **Limitations as related to Maintenance**

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# Proficiency and Peace of Mind

- Fly regularly with your CFI
- “Revert to training” ...only works if...?
  - a) You've seen it before
  - b) You've done it recently
- **Practice, practice...**
  - Get in your head
  - ...and keep it there...
- Document in **WINGS**



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# WIN – Wings Industry Network

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FAA Pilot Proficiency Program

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# Next Month's ToM:

## The National FAA Safety Team Presents

Topic of the Month - October  
Aerospace Medicine and You

Presented to: WAFC and Friends  
By: Stephen Bateman, CFI  
Date: Monday October 10<sup>th</sup>, 2022

Produced by:  
The National FAA Safety Team (FAASTeam)



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**Thank you for attending!**

**You are vital members of  
our GA safety community!**



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