Maintenance Topics for Flight Instructors

Arnold Holmes IA/DAR

Introduction

- Arnold Holmes

- Airframe & Powerplant Mechanic with Inspection Authorization (IA). Designated Airworthiness Representative (DAR) with the Orlando MIDO and also soon to be with the Orlando FSDO.
- Owner of multiple general aviation maintenance shops.
- Builder of numerous experimental aircraft
- Private pilot since 1991 and currently own a Glasair II RG
- Currently Director of Maintenance for PRP Aviation located in Ocala FL, a Part 135 operation and also an Authorized Cirrus training center.

Topic Outline

- Where do we find maintenance information in the FAR's?
- Logbook requirements and logbook entries (AC 43-9)
- VFR/IFR/ FAR 91.411-91.413
- ELT requirements
- Airworthiness Directives
- Airworthiness Certificate and Registration
- Markings and Placards
- Walk around of aircraft
- Resolution of discrepancies
- Conclusion

FAR 43 and FAR 91

FAR 91.3--The pilot in command of an aircraft is directly responsible for, and is the final authority as to, the operation of that aircraft.

- a U.S. Standard Airworthiness Certificate is effective only as long as the maintenance, preventive maintenance, and alterations are performed in accordance with parts 43 and 91
- Qualified persons who perform the maintenance, preventive maintenance, and alterations shall make a record entry of this accomplishment, thus maintaining the validity of the Certificate of Airworthiness.
- Section 91.405 requires each owner or operator to ensure that maintenance personnel make appropriate entries in the maintenance records to indicate that the aircraft has been approved for return to service.
- 43.9(a)(1) requires the maintenance record entry to include "a description of the work performed." The description should be in sufficient detail to permit a person unfamiliar with the work to understand what was done and the methods and procedures used in doing it.

FAR 43 and FAR 91

- 43.9(a)(2) requires entries to contain the date the work was completed. This is normally the date upon which the work is approved for return to service.
- 43.9(a)(4) requires the entry to indicate only the signature and certificate number of the person approving the work for return to service.
- 91.417(a)(2). Requires six items to be made a part of the maintenance record and maintained as such.
  - Total time in service to be kept for the airframe, each engine, and each propeller.
  - Status of life-limited parts to be part of the maintenance record.
  - Indicate the time since last overhaul of all items installed
  - Current inspection status
  - Current status of applicable ADs
  - Copies of FAA Form 337, Major Repair and Alteration (Airframe, Powerplant, Propeller, or Appliance), issued for the alteration, be made a part of the maintenance record.

FAR 91.411 & 91.413 IFR/VFR Cert

- FAR 91.411(a) No person may operate an airplane, or helicopter, in controlled airspace under IFR unless—
  - (1) Within the preceding 24 calendar months, each static pressure system, each altimeter instrument, and each automatic pressure altitude reporting system has been tested and inspected and found to comply with appendices E and F of part 43.

- FAR 91.413(a) No persons may use an ATC transponder that is specified in 91.125(a) unless, within the preceding 24 calendar months, the ATC transponder has been tested and inspected and found to comply with appendix F of part 43.

FAR 91.411/413
Logbook Entry

I HEREBY CERTIFY THAT THE ALTIMETER, ENCODER, AND STATIC SYSTEM TESTS REQUIRED BY FAR 91.411 HAVE BEEN PERFORMED AND MEET SPECIFICATIONS.

ALTIMETER TESTED TO 20,000 FEET
ENCODER TESTED TO 20,000 FEET

SYSTEM TEST DATE 06-19-13

I HEREBY CERTIFIY THAT THE ATC TRANSPONDER TEST REQUIRED BY FAR 91.413 WAS PERFORMED THIS DATE AND FOUND TO COMPLY WITH FAR 43, APPENDIX F.

MAKE:GARMIN MODEL: GTX-327SERIAL NO.: 83707708

SYSTEM TEST DATE 06-19-13

TESTED BY [signature] CERTIFICATE# 2541642

ALTIMETER SCALE CORRECTON CARD

REFERENCE ALTITUED IN FT.	ALTIMETER READS	REFERENCE ALTITUED IN FT.	ALTIMETER READS
-1000	-1000	14000	14000
0	0	16000	16000
500	500	18000	18000
1000	1000	20000	20000
1500	1500	22000	-----
2000	2000	25000	-----
3000	3000	30000	-----
4000	4000	35000	-----
6000	6000	40000	-----
8000	8000	45000	-----
10000	10000	50000	-----
12000	12000		
Tested By:		N# 53455	Date:06-19-2013

ELT Requirements
FAR 91.207

- (d) Each emergency locator transmitter required by paragraph (a) of this section must be inspected within 12 calendar months after the last inspection.

- Trivia Question: When are ELT batteries required to be replaced?

- Answer: Upon 50% of their useful life or when used for more than 1 Hr cumulative.

ELT’s are mounted in the aft fuselage, must have battery expiration date marked on outside.

Transmit on 121.5 and/or 406 MHz

Airworthiness Directives
FAR 39

- Definition of airworthiness directives

  FAA's airworthiness directives are legally enforceable rules that apply to the following products: aircraft, aircraft engines, propellers, and appliances.

- Section 91.417(a)(2)(v). Requires the current status of applicable ADs to be a part of the maintenance record.

- Can find all ADs on the FAA main website

https://www.faa.gov/regulations_policies/airworthiness_directives/

Emergency ADs (0) | ADs Issued in Last 60 Days (82) | All Current ADs by Make/Model (16,048)

View by: Date A↓Z Make/Model

These 82 airworthiness directives were published in the last 60 days.

Pub. Date	AD No.	Eff. Date	Title
8/17/2021	2021-15-10	9/21/2021	GE Aviation Czech s.r.o. (Type Certificate Previously Held by WALTER Engines a.s., Walter a.s., and MOTORLET a.s.) Turboprop Engines
8/17/2021	2021-17-08	8/17/2021	The Boeing Company Airplanes
8/13/2021	2021-17-07	8/30/2021	Airbus Canada Limited Partnership (Type Certificate Previously Held by C Series Aircraft Limited Partnership (CSALP); Bombardier, Inc.) Airplanes
8/11/2021	2021-16-20	8/26/2021	PZL Swidnik S.A. Helicopters
8/9/2021	2021-15-51	8/24/2021	Bell Textron Inc. (Type Certificate Previously Held by Bell Helicopter Textron Inc.) Helicopters
8/9/2021	2021-15-05	9/13/2021	General Electric Company Turbofan Engines
8/9/2021	2021-16-15	8/9/2021	The Boeing Company Airplanes
8/6/2021	2021-17-01	8/23/2021	Austro Engine GmbH Engines
8/5/2021	2021-15-02	9/9/2021	Airbus Canada Limited Partnership (Type Certificate Previously Held by C Series Aircraft Limited Partnership (CSALP); Bombardier, Inc.) Airplanes
8/5/2021	2021-15-13	9/9/2021	Airbus SAS Airplanes
8/5/2021	2021-15-07	9/9/2021	Airbus SAS Airplanes
8/5/2021	2021-15-08	9/9/2021	Airbus SAS Airplanes
8/5/2021	2021-15-11	9/9/2021	Airbus SAS Airplanes

Emergency ADs (0) | ADs Issued in Last 60 Days (82) | All Current ADs by Make/Model (16,048)

A B C D E F G H I J K L M N O P Q R S T U V W X Y Z

- T.B.M., Inc.
- Tamarack Helicopters, Inc.
- Tandem Rotor, LLC
- Tarver Propellers, LLC
- Taylorcraft 2000, LLC
- Taylorcraft, Inc.
- Technify Motors GmbH
- TECO, Inc.
- Teledyne Continental Motors
- Tempo Design Corporation
- Terra Corporation
- Teryjon Aviation, Inc.
- Texas Instruments
- Textron Aviation Inc.
  - 100
  - 120
  - 140
  - 140A
  - 150
  - 150A
  - 150B

APPENDIX 1. AIRWORTHINESS DIRECTIVE COMPLIANCE RECORD (SUGGESTED FORMAT)

AD Number and Amendment Number	Date Received	Subject	Compliance Due Date Hours/Other	Date of Compliance	Airframe Total Time in Service at Compliance	Method Used to Comply with the AD	One Time or Recurring	Next Compliance Due Date Hours/Other	Authorized Signature, Certificate, Type and Number	Remarks

- Aircraft, Engine, Propeller, Rotor, or Appliance: Make _____ Model _____ S.N. _____ N_____

What should a logbook entry look like?
AC 43-9

N12345 Tach/Hobbs: _____ ACTT: _____

Enter the type of inspection(s) performed:

Enter accomplishment of all A.D.'s including the number, revision date, method of compliance, and if recurring, the next time/date it is due.

Enter replacement or inspection of any component part with Airworthiness Limitations (include part, serial number, and total time in service for that component).

Enter removal and installation of any serialized component replacement parts (include part, serial number, and total time in service for that component).

Enter description of any other general maintenance performed.

I certify that this aircraft was inspected in accordance with a (insert type) inspection and was determined to be in an airworthy condition. All work was accomplished in accordance with current Federal Aviation Regulations and manufacturer's maintenance instructions. Details of work performed can be found on XYZ Company work order _____.

_____ _____ _____

Signature Certificate # Date

McCLELLAN AIRCRAFT MAINTENANCE, INC. *4270 Torrey Rd. Flint, MI 48507*

07/01/2017 Tach:4152.6 N98297 PA28-140 S/N: 28-26254
ACTT: 4152.6 TSMOH: 628.2

ANNUAL INSPECTION performed.
#1) Inspected and lubed all controls and structure
#2) Checked **ELT** battery, expire date is **11/2017.** CW FAR 91.207 para (d) by OPS check.
#3) CW AD 69-22-02 R2 By inspection of control wheels per Piper SL # 427D dated 6/21/1979
#4) CW AD 76-07-12 Bendix switches by OPS check, due every 100 hrs, per Bendix SB No. 583, amend 39-3024 dated 8/30/77.
#5) CW AD 95-26-13 Oil cooler hose by inspection, due every 100 hours due again @ tach: 4252.6, Hoses to be replaced May 2018

#6) Removed and replaced Right nose wheel Bearings & Races
#7) Removed engine starter and replaced with New Sky-Tec Starter P/N: 122-NL ~ S/N: H-R052599
#8) Removed Starter Solenoid and replaced with new P/N: STS-S12 ~ S/N: S2S-361633
#9) Removed Nose gear bumper bracket, repaired, welded & painted, reinstalled
#10) Removed and replaced nose gear bumper P/N: 79072-000
#11) Removed and replaced AFT Engine baffle seal
#12) Removed exhaust system, disassembled & applied Anti-seize lubricant on all slip joints and ball joint per Power Flow Service Instructions using MIL-A-907E
#13) Removed air filter element replaced with new P/N: BA10

Run aircraft on ground. OPS check good. Returned aircraft to service.
IT IS CERTIFIED THAT THIS AIRCRAFT HAS BEEN INSPECTED IN ACCORDANCE WITH AN ANNUAL INSP. AND IS DETERMINED TO BE IN AIRWORTHY CONDITION.
----------END----------

Michael W. Wagner II A&P 2896059 I.A.

Airworthiness Certificate 8100-2
Registration 8050-3

Must be displayed

UNITED STATES OF AMERICA
DEPARTMENT OF TRANSPORTATION-FEDERAL AVIATION ADMINISTRATION

STANDARD AIRWORTHINESS CERTIFICATE

1 NATIONALITY AND REGISTRATION MARKS	2 MANUFACTURER AND MODEL	3 AIRCRAFT SERIAL NUMBER	4 CATEGORY
N12345	Boeing 787	43219	Transport

5 AUTHORITY AND BASIS FOR ISSUANCE

This airworthiness certificate is issued pursuant to 49 U.S.C. 44704 and certifies that, as of the date of issuance, the aircraft to which issued has been inspected and found to conform to the type certificate therefore, to be in condition for safe operation, and has been shown to meet the requirements of the applicable comprehensive and detailed airworthiness code as provided by Annex 8 to the Convention on International Civil Aviation, except as noted herein.

Exceptions:

None

6 TERMS AND CONDITIONS

Unless sooner surrendered, suspended, revoked, or a termination date is otherwise established by the FAA, this airworthiness certificate is effective as long as the maintenance, preventative 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
9 Jan 2015	E.R. White *E.R. White*	NE-XX

Any iteration, 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 (04-11) Supersedes Previous Edition

SAMPLE

REGISTRATION NOT TRANSFERABLE

UNITED STATES OF AMERICA
DEPARTMENT OF TRANSPORTATION - FEDERAL AVIATION ADMINISTRATION
CERTIFICATE OF AIRCRAFT REGISTRATION

This certificate must be in the aircraft when operated.

NATIONALITY AND REGISTRATION MARKS: N505DH
AIRCRAFT SERIAL NO.: 8806

MANUFACTURER AND MANUFACTURER'S DESIGNATION OF AIRCRAFT
PITTS SIS
ICAO Aircraft Address Code: 5199999

ISSUED TO:
LINBERGH, DANIEL E.
800 GATEWAY ROAD
OKLAHOMA CITY, OK 73125

This certificate is issued for registration purposes only and is not a certificate of title. The Federal Aviation Administration does not determine rights of ownership as between private persons.

It is certified that the above described aircraft has been entered on the register of the Federal Aviation Administration, United States of America, in accordance with the Convention on International Civil Aviation dated December 7, 1944, and with the Federal Aviation Act of 1958, and regulations issued thereunder.

U.S. Department of Transportation
Federal Aviation Administration

DATE OF ISSUE: JUNE 3,1995
David Hinson ADMINISTRATOR

AC Form 8050-3(11/93) Supersedes previous editions

SAMPLE

Maintenance Walk-Around

Things to watch out for

- Spinner/prop
- Cowling
- Presence of fluids on aircraft or ground
- Inspection panels
- Nose strut/Scissor links (Nose Wheel Shimmy)
- Brakes
- Tires
- Controls/Hardware
- Placards and Markings
- Resolution of descrepancies

Spinner and Prop

- No cracks allowed!!
- No missing screws allowed!!
- Spinner cut-out should not be cutting into prop surface

Cowling

- No missing screws or camlocks allowed
- Securely fastened
- Look for fluid stains, oil streaks
- Check fitment between spinner and cowling
- On Pipers, make sure latches are secured!

Fluids and Leaks

Inspection Panels

- No panels missing
- No hardware missing

Scissor links

Nose Wheel Shimmy

Brakes

Brakes

Tires

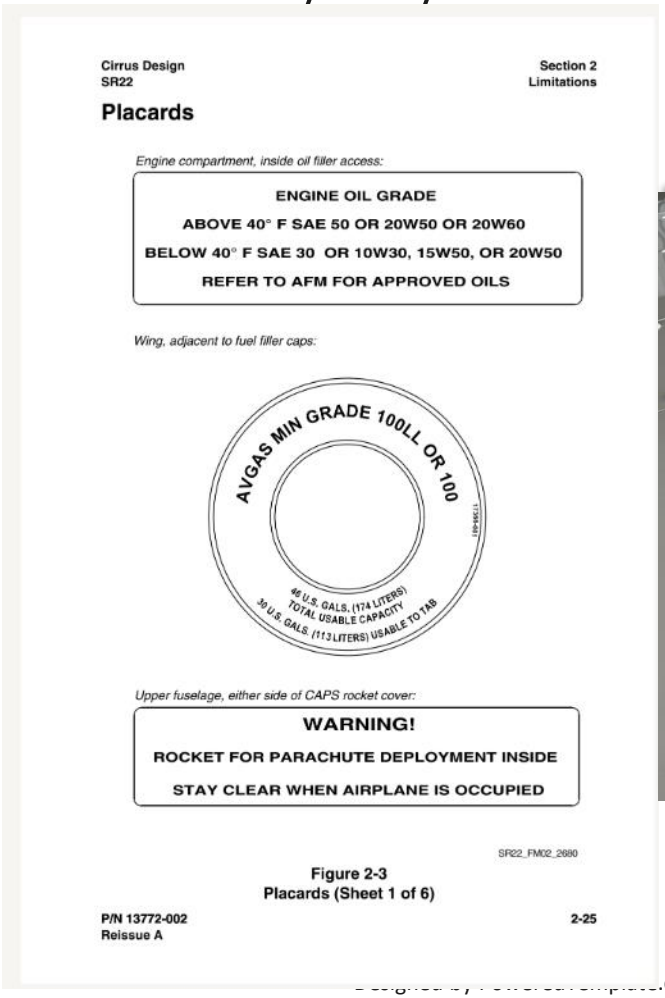
Tire Flat Spots

Controls and Hardware


Cessna
ANE

Placards and Markings

- Check AFM/POH/AOI limitations chapter



Cirrus Design
SR22

Section 2
Limitations

Placards

Engine compartment, inside oil filler access:

ENGINE OIL GRADE
ABOVE 40° F SAE 50 OR 20W50 OR 20W60
BELOW 40° F SAE 30 OR 10W30, 15W50, OR 20W50
REFER TO AFM FOR APPROVED OILS

Wing, adjacent to fuel filler caps:

AVGAS MIN GRADE 100LL OR 100
T2564-01
46 U.S. GALS. (174 LITERS) TOTAL USABLE CAPACITY
39 U.S. GALS. (113 LITERS) USABLE TO TAB

Upper fuselage, either side of CAPS rocket cover:

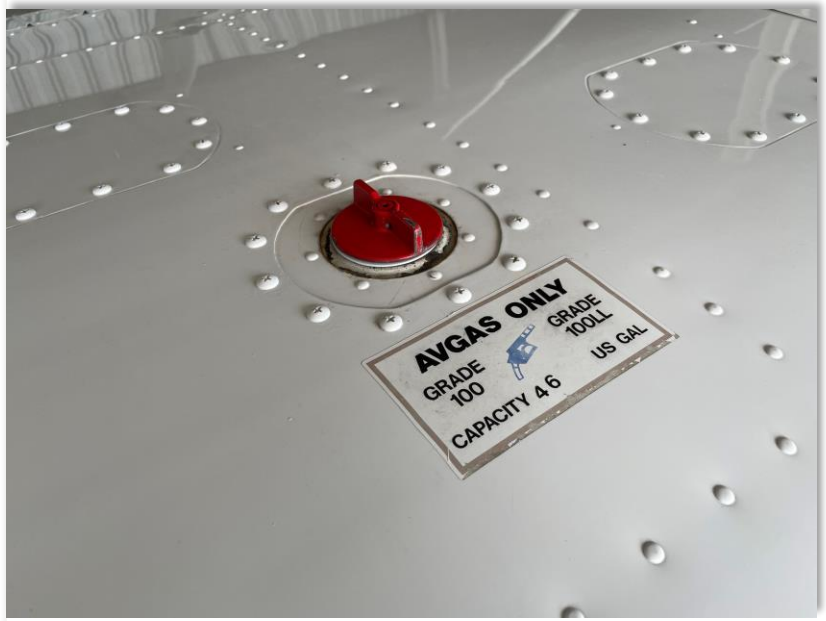
WARNING!
ROCKET FOR PARACHUTE DEPLOYMENT INSIDE
STAY CLEAR WHEN AIRPLANE IS OCCUPIED

SR22_FM02_2680

Figure 2-3
Placards (Sheet 1 of 6)

P/N 13772-002
Reissue A

2-25



Markings and Placards

- N number on aircraft 12” letters
- Data plate-Manufacturer/Model/S/N and Production # and TC #
- Proper markings and labels on IP per AFM

Conclusion

- Ensure your are in compliance with Regulations
- Never fear a ramp check by the FAA
- Ensure your safety by proper inspection of aircraft
- Stop excessive wear and abuse of aircraft
- Have confidence in your aircraft
- The pilot in command of an aircraft is directly responsible for, and is the final authority as to, the operation of that aircraft.

- Thank you