

**BOEING EMPLOYEES FLYING ASSOCIATION, INC.**

***BEFA***

**MAINTENANCE MANUAL**

**5/12/2001**



**PURPOSE:** It is the intention of the Boeing Employees Flying Association (BEFA) to assure that each of its members has access to maintenance records, and the knowledge required to interpret these records, in order to make an informed decision as to the airworthiness of an aircraft prior to accepting it for flight. This manual details the requirements for airworthiness, Pilot-in-Command responsibilities, explanation of Maintenance and "Squawk" forms, maintenance information and logbook locations, authorized maintenance personnel, and policies for the "grounding" and "ungrounding" of aircraft.

**REFERENCES:** The following discussion draws on these documents: Federal Aviation Regulation (FAR) Part 21, Part 43, Part 91 and the BEFA Rules of Operation. Specific FARs are cited by reference throughout in order to stimulate readers to reacquaint themselves with the specific language that governs their flying. Often, the applicable FARs are paraphrased in this discussion, and in a few cases it was appropriate to reproduce them. Pilots are responsible for direct familiarity with the FARs and the discussion presented here should not be regarded as a substitute for study of the FARs.

**PILOT-IN-COMMAND RESPONSIBILITIES:**

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

FAR 91.7 (a) No person may operate a civil aircraft unless it is in an airworthy condition.

(b) 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 unairworthy mechanical, electrical, or structural conditions occur.

The pilot in command is the "last word" as to the airworthiness of an aircraft. The last pilot to fly the aircraft can not determine airworthiness for the next flight. The aircraft and its supporting documents must be inspected by the pilot in command during the preflight inspection to determine the aircraft's suitability for flight.

**DOCUMENTS REQUIRED ON BOARD THE AIRCRAFT:** Use the mnemonic ARROW to remember the documents required to be on board the aircraft.

Airworthiness Certificate (FAR 91.203(a)(1))

Radio Station License \*

Registration Certificate (United States registration; The "N" number)(FAR 91.203(a)(2))

Registration Certificate (State registration; Washington State requirement)

Operating Limitations (FAR 91.9(a)(b)(1) and (2)) - POH

Weight and Balance document (FAR 91.9)

(\* This document is no longer required for domestic use of an aircraft, but may be required for some international flights.)

For the purpose of this manual, the Airworthiness Certificate and the Weight and Balance document are of primary importance.

**AIRWORTHINESS CERTIFICATE:** The Federal Aviation Administration (FAA) grants an Airworthiness Certificate to an aircraft that has been designed, manufactured and tested to standards set forth and agreed upon by the FAA and the manufacturer. In theory, the Airworthiness Certificate stays in affect as long as the aircraft receives the required maintenance. **(Part 21 Subpart H-Airworthiness certificates, 21.181 Duration)**

**REQUIRED MAINTENANCE:** Required maintenance and inspections are covered in Part 91, Subpart E. Key items are repeated below:

### **91.405 Maintenance Required**

FARs 91.405 and 91.407 refer to required inspections and the repair and/or handling of discrepancies that occur between required inspections.

Each owner or operator of an aircraft--

- (a) Shall have that aircraft inspected as prescribed in subpart E of this part and shall between required inspections, except as provided in paragraph (c) of this section, have discrepancies repaired as prescribed in part 43 of this chapter;
- (b) Shall ensure that maintenance personnel make appropriate entries in the aircraft maintenance records indicating the aircraft has been approved for return to service;
- (c) Shall have any inoperative instrument or item of equipment, permitted to be inoperative by 91.213(d)(2) of this part, repaired, replaced, removed, or inspected at the next required inspection; and
- (d) When listed discrepancies include inoperative instruments or equipment, shall ensure that a placard has been installed as required by 43.11 of this chapter.

### **91.407 Operation after maintenance, preventive maintenance, rebuilding, or alteration.**

- (a) No person may operate any aircraft that has undergone maintenance, preventive maintenance, rebuilding, or alteration unless--
  - (1) It has been approved for return to service by a person authorized under 43.7 of this chapter; and
  - (2) The maintenance record entry required by 43.9 or 43.11, as applicable, of this chapter has been made.

**Discrepancies** are things which could potentially affect the airworthiness of the aircraft.

The following "write-ups" are examples of **discrepancies**:

- (a) Left mag drop 300 RPM, right mag drop normal.
- (b) Applying carb heat resulted in no loss of RPM.
- (c) Ammeter indicates discharge during run-up, low-voltage light on.
- (d) Cord showing on left main tire.
- (e) No fluid showing in compass.
- (f) Engine covered with oil.
- (g) Severe nose wheel shimmy; full "up" elevator did not help.

**Squawks or Aircraft information** are items that do not affect airworthiness but would be classified as cosmetic or "nuisance" items.

Examples of **Squawks** (or aircraft information):

- (a) Left mag drop 300 RPM, engine rough, "cleared" plugs with mixture, run-up then OK.
- (b) Ammeter shows slight discharge at idle RPM, charging system normal during run-up.
- (c) Left main tire is "bald"; no cord showing.
- (d) 1/2" long crack in left wing tip fairing.
- (e) Exterior lock on pilots door inoperative.

- (f) Right window popped open during flight.
- (g) Volume knob on COM 1 is loose on post.

Note that all the **discrepancies** in the examples have a direct or potential impact on flight safety, or refer to equipment required by FAR 91.205. The list of **squawks** does not deal with items that have a potential impact on flight safety, but with items which could be classified as nuisance items, things which need to be watched or conditions which are normal but to an inexperienced pilot might seem abnormal; i.e. “discharge at idle, normal operation during run-up”.

Discrepancies and squawks at BEFA are now being recorded on a single form. The **Aircraft Discrepancy Log**. This form will be found in the Tach Book behind the Tach Sheets, and must be reviewed prior to preflighting the aircraft. Any condition found to be unairworthy during preflight, any unairworthy condition occurring during flight, or any information you want passed along to the next pilot or to the Maintenance Department must be noted on the **Aircraft Discrepancy Log**. Blank forms can be found in the book slots to the right of the Tach Books.

The illustration on the following page illustrates the **Aircraft Discrepancy Log** and explains how to fill out the form.

### **AIRCRAFT DISCREPANCY LOG**

- Item 1     The aircraft tail number
- Item 2     Pilots name
- Item 3     The date the information was written.
- Item 4     A description of the information or discrepancy to be passed to maintenance and/or the next pilots. Note that there is room for up to three (3) problems.
- Item 5     This area is used by maintenance personnel to briefly describe the "fix", repair or disposition for each problem described in item 4. Each problem requiring a repair or disposition will receive a response in the appropriately numbered box.
- Item 6     The mechanic (or pilot, if appropriate) doing the repair will sign in this area.
- Item 7     The date the mechanic completes the repair.
- Item 8     The time the repair is complete.

**USE OF THE AIRCRAFT DISCREPANCY LOG:** The Aircraft Discrepancy Log is a two-part NCR form. The top copy of the form is white, the bottom copy is yellow. When there is a requirement to write-up information or discrepancies, the pilot will write them on the white top copy in the Description of Problem box. Write up one problem for each box. Make sure that the aircraft tail number, your name and the date are filled out at the top of the form.

After completing the Aircraft Discrepancy Log, remove the top (white) page and put it in the maintenance "in-box"; labeled and found to the left of the Tach Books. Make sure that the bottom (yellow) copy is placed in the Tach Book. This serves two purposes. The yellow copy in the Tach Book indicates (1) that there is information that has not been reviewed by maintenance and (2), that information needs to be reviewed by the pilot prior to accepting that aircraft for flight. Unless the aircraft is grounded, the decision to accept the aircraft for flight is the responsibility of the Pilot-in-Command.

BEFA Aircraft Discrepancy Log	
AC Registration _____	Date _____
Pilot Name _____	Phone # _____
Pilot Type <input type="checkbox"/> Std <input type="checkbox"/> Pvt <input type="checkbox"/> Inst <input type="checkbox"/> ATP	
Description of Problem	
1	_____
2	_____
3	_____
Note: It is pilots responsibility to take AC off-line for flight critical items	
Corrective Maintenance or Action	
1	_____
2	_____
3	_____
Date _____	Name _____
Tach Time _____	Cert # _____ Type _____

Maintenance will review the problems described on the discrepancy log white sheet no later than the next work day following submittal. The planned corrective action or a response to identified problems will be noted on the white sheet which will then be returned to the Tach Book. The yellow sheet will be removed. The presence of the white sheet in the Tach Book indicates that corrective action has been taken in response to pilot "squawks". The white sheet must still be reviewed for information that may be pertinent to a given flight prior to accepting that aircraft for flight. Generally speaking, the white sheets will be retained in the Tach Book for 30 days or until maintenance that has been deferred has been completed. Thereafter, the white sheets are maintained by the Director of Maintenance as required as part of the aircraft records.

**VERIFICATION OF AD STATUS**

Pilots must check the AD status for the airplane and initial the "Initial AD Check" box on the tach sheet before flying.

**SUITABILITY FOR FLIGHT AND USE OF FAR 91.213:** Suitability for a particular operation refers to items of equipment or systems required for one type of flight operation but not for another. Example: There is no regulatory requirement for an operable turn coordinator for day or night VFR (FAR 91.205(b) and (c)) but there is a requirement for a turn coordinator (or turn and bank indicator) for IFR. (FAR 91.205(d)(3)) Therefore, an inoperative turn coordinator in an IFR equipped Cessna 172 would be entered in the Aircraft Discrepancy Log with a note: RESTRICTIONS TO FLIGHT-NO IFR. In addition, the turn coordinator must be placarded with a sticker with the word INOP or INOPERATIVE printed on it in order to comply with FAR 91.213(d).

It is important to understand what FAR 91.213(d) requires and permits. It must be read and understood by the pilot. Excerpts are paraphrased below:

### **91.213 Inoperative instruments and equipment**

No person may take off an aircraft with inoperative instruments or equipment installed unless certain conditions are met. The rule essentially says that, for the type of aircraft we fly, that do not have (or require) an “Approved Minimum Equipment List”, the aircraft may still be operated with equipment deficiencies as long as the subject equipment is not part of the mandatory VFR-day, type-certification-equipment prescribed in the applicable airworthiness regulations under which the aircraft was type certificated, and the equipment is not required under 91.205 or any other rule for the specific flight operation contemplated.. However, certain things must be done before flight is legal. The inoperative instruments and equipment must either be removed from the aircraft, and the cockpit control placarded, (and the maintenance be recorded in accordance with 43.9 of this chapter); or the equipment must be deactivated and placarded -"Inoperative". If deactivation of the inoperative instrument or equipment involves maintenance, it must be accomplished and recorded in accordance with part 43 of this chapter. In addition, a determination must be made by a pilot, who is certificated and appropriately rated under part 61, or by a person, who is certificated and appropriately rated to perform maintenance on the aircraft, that the inoperative instrument or equipment does not constitute a hazard to the aircraft. In other words, you as PIC must satisfy yourself that the aircraft is (a) legally safe to fly, and (b) meets your personal definition of safety for flight

FAR 91.213 is complicated and must be read by the pilot, but it does allow us to operate our aircraft with certain instruments and equipment inoperative. However, we must be careful about which instruments and equipment can be inoperative, appropriately placarded and still have an aircraft which is considered airworthy.

91.213(d)(2)(iii) says that **none** of the equipment required by 91.205 can be placarded inoperative. The following list is extracted from 91.205. This list contains instruments and equipment which if found inoperative for any reason **always** cause an unairworthy/grounding condition. No exceptions!

### **VISUAL-FLIGHT-RULES (day)**

- 1) Airspeed Indicator
- 2) Altimeter
- 3) Magnetic direction indicator
- 4) Tachometer for each engine
- 5) Oil pressure gauge for each engine using pressure system
- 6) Oil temperature gauge for each air cooled engine
- 7) Manifold pressure gauge for each altitude engine
- 8) Fuel gage indicating the quantity of fuel in each tank
- 9) Landing gear position indicator if the aircraft has retractable landing gear
- 10) For aircraft certified after March 11, 1996, an approved aviation red or aviation white anticollision light system
- 11) Approved seat belt for each occupant 2 years of age or older

12) For aircraft manufactured after 7/18/78, an approved shoulder harness

13) An ELT if required by 91.207

### **VISUAL-FLIGHT RULES (night)**

- 1) All instruments/equipment required for VFR day
- 2) Approved position lights (red light left wing, green light right wing, white aft tail light)
- 3) An approved aviation red or white anti collision (beacon).
- 4) An adequate source of electrical energy for all installed electrical and radio equipment
- 5) One spare set of fuses or three spare fuses of each kind required (Most of our aircraft have circuit breakers, which satisfy this requirement. For information on the Citabria, check the Pilots Operating Handbook.)

### **INSTRUMENT FLIGHT RULES**

- 1) All instruments/equipment required for VFR (day) and for night IFR, all instruments/equipment required for VFR (night) and
- 2) Appropriate two-way radio communication and navigation equipment
- 3) Gyroscopic rate-of-turn indicator
- 4) Slip-skid indicator
- 5) Sensitive altimeter adjustable for barometric pressure
- 6) An analog or digital clock showing hours, minutes and seconds
- 7) Generator or alternator of adequate capacity
- 8) Gyroscopic pitch and bank indicator
- 9) Gyroscopic direction indicator

The loss of any of the equipment or instruments required for visual-flight-rules (day) would require that the aircraft be grounded. The loss of any of the equipment or instruments required for visual-flight-rules (night) or instrument flight rules would result in excluding the aircraft from that particular realm of flight; i.e. loss of position lights would exclude an aircraft from VFR (night) while loss of the attitude indicator would exclude the aircraft from IFR. In excluding the aircraft from a particular type of operation (e.g. IFR) the pilot-in-command **must** placard the non-functioning instrument or equipment INOPERATIVE or INOP.

In addition to the instruments and equipment required by 91.205, 91.213(d)(2)(i) and (ii) also refer to instruments and equipment prescribed in airworthiness regulations under which the aircraft was certified and instruments and equipment indicated on the aircraft's Equipment List.

For most later model aircraft, Section 6 of the Aircraft Flight Manual contains information on both Weight and Balance and the aircraft's Equipment List.

On each page of the Equipment List there are five columns: Item number, Equipment List Description, Reference Drawing, Weight/Pounds and Arm/Inches. For the purpose of determining instruments and equipment that **CAN NOT** be placarded inop per 91.213(d)(2)(ii) the Item Number is of prime importance. The last two characters for any Item Number will be an -A, -O, -R or -S. Items with an -R are equipment that is required for certification; items with an -O are optional equipment items replacing required or standard items. Items with an -S are

standard equipment items whereas -A items are optional equipment items which are in addition to required or standard items.

Items with an -R **CAN NOT** be placarded inoperative; they are required items for certification. Items with -O **CAN NOT** be placarded inoperative IF they replace required equipment, i.e. a true airspeed indicator replacing a standard airspeed indicator.

For example, using the Aircraft Flight Manual for a 1981 Cessna 172P, Section 6, and looking under Section F, Placards, Warnings and Manuals, you would find Item Number F04-R: "Indicator, Audible Pneumatic Stall Warning". During preflight you tested the stall warning and found it to be inoperative. Consulting the equipment list you find the -R character. This indicates to you that the stall warning can not be placarded inoperative and that the inoperative stall warning horn must be written up on the Aircraft Discrepancy Log and the aircraft grounded.

On another flight, the preflight indicates nothing out of the ordinary but during the run-up you find that the suction gauge indicates 0" of mercury and that the Attitude Indicator and Heading Indicator have failed to erect. You determine that the vacuum pump has failed. Consulting the equipment list you find that the Vacuum System Installation is Standard Equipment. (-S) Since this is a VFR (day) flight and you are comfortable operating without the Attitude and Heading Indicators, you placard the instruments (Heading and Attitude Indicators, Suction Gauge) inoperative and continue your flight. On your return you fill out the Aircraft Discrepancy Log. As an additional entry you write NO IFR. **NOTE: If you are not comfortable operating without the Attitude and Heading Indicators, return to BEFA and fill out the Aircraft Discrepancy Log as noted.**

On yet another preflight you discover that the left main wheel fairing is badly damaged and appears to be ready to fall off. Consulting the Equipment List you find that fairings are standard equipment. (-S) But in this instance you can not remove the fairing because doing so would require a change in the Aircraft Weight and Balance. After notifying the mechanic (A&P) the right and left main gear fairings are removed, noted on FAA Form 337 and a revised Weight and Balance Document is completed and placed in the aircraft. The aircraft can now be flown. When the wheel fairing is repaired, they are reinstalled on the aircraft. The original Weight and Balance Document is placed in the aircraft and airworthiness is restored. This is an example of the use of 91.213(d)(3)(i) and (ii) and 91.213(4).

By the same logic, while preflighting the aircraft you notice that the wheel fairings are gone. Knowing that the aircraft normally has fairings, you consult the Weight and Balance Document and find no Form 337 indicating removal of the fairings and the resultant change in Weight and Balance. The Aircraft Discrepancy Log must be filled out and the aircraft signed out to maintenance until such time as the fairings are reinstalled or a certificated mechanic (A&P or I&A) has recomputed the Weight and Balance and placed that Weight and Balance Document in the aircraft.

Not all aircraft have the convenience of having an easily accessed Equipment List that can be consulted to assist in making decisions about the airworthiness of an aircraft. All aircraft have an Equipment List but oftentimes it is only available by consulting the aircraft's Type Certificate Data Sheet. This information is available to anyone through an I&A (Airframe and Powerplant mechanic with Inspection Authorization) or through the FAA Flight Standards District Office. (FSDO)

So what do you do in situations that are not as clear cut as the examples above? First, consult the Aircraft Logbooks, both for the airframe and the engine to determine if all the appropriate inspections have been completed and "signed off". Second, inspect the Aircraft Discrepancy Log

to determine if required repairs have been completed and that no items of required maintenance remain outstanding. Third, contact the Safety Officer or Operations Officer as to the current condition of a particular aircraft. Fourth, consult a BEFA CFI as to the airworthiness of the aircraft you intend to fly and fifth, use your best judgment. If you know that the aircraft meets all the obvious regulatory aspects of airworthiness and in your best judgment the flight you are proposing can be completed safely, then make the flight. But if there are nagging doubts; if you wouldn't feel comfortable taking friends or family along with you then exercise your Pilot-In-Command authority and sign the aircraft out to maintenance, following the Rules of Operation section 5.8.

**GROUNDING and UNGROUNDING of BEFA AIRCRAFT: Only a licensed mechanic can ground an aircraft. The following is from BEFA Rules of Operation:**

### **5.7 Maintenance**

- a) Squawks - All aircraft discrepancies, malfunctions and damage shall be recorded on the Aircraft Discrepancy Report Form and in the appropriate Tach Book
- b) When a pilot finds an unsafe condition, and believes the aircraft should be signed "out to maintenance" on the signout board, the pilot shall contact the Operations Manager, the Operations Officer or the Safety Officer. If none are available, the pilot will sign the aircraft "out to maintenance", and continue to attempt to contact one of these individuals.
- c) Aircraft Grounding - When a licensed mechanic grounds an aircraft, the word "GROUNDED" shall be entered in the Tach Book along with the description of the condition; the word "GROUNDED" shall also be put on the signout board for the applicable aircraft, and the mechanic shall notify the Operations Officer, or Safety Officer. Grounded aircraft shall not be released for flight except by a mechanic with airframe and powerplant certifications or inspection authorization, or his designee (as appropriate per Part 43).

Furthermore, no Board Officer or Club member may make the determination that an aircraft is airworthy when in the judgment of a certified mechanic, that aircraft is **not** in an airworthy condition.

Student pilots should not sign an aircraft out to maintenance unless they have contacted their CFI or an available CFI or have contacted BEFA's mechanic for a determination on the condition. If circumstances are such that a CFI or mechanic are not available then the student may sign the aircraft out to maintenance. The student pilot will contact a Board Member as soon as possible per BEFA Rule of Operation 5.8.b.

Rated pilots should give careful consideration to the FARs, required equipment and BEFA Rules of Operation before signing an aircraft out to maintenance. Once you have signed an aircraft out to maintenance, return of that aircraft requires review by an appropriately certificated mechanic. If the aircraft was restricted because a radio was reported weak and unreadable or because Seattle Approach reported losing your transponder return on a Friday evening in the middle of the summer, a chance exists that that aircraft will not fly over the weekend, causing inconvenience to the pilots scheduled to fly that weekend and lost revenue to the membership.

Neither a radio or a transponder is required equipment. Any member with a handheld radio could operate within Class B, C or D airspace. In the Seattle area, there are many "dead spots" wherein Approach Control will "lose" your transponder return. A report from Approach that they have lost your return is not necessarily indicative of an inoperative transponder. In addition, you

may operate within the Class B "veil" if you request a deviation at least one hour before the proposed flight. (FAR 91.215(d)(3)).

The above points are not intended to discourage pilots from signing aircraft out-to-maintenance, but to remind you that you must use your knowledge, judgment and discretion in "writing up" information and discrepancies. It is also important to provide enough information in your "write-ups" so that the next pilot to fly the aircraft can make an informed decision as to the acceptability of that aircraft for flight. An example of an inadequate "write-up" might be: Engine runs rough, aircraft signed out to maintenance. Did the engine run rough in flight? During the run-up? Did the pilot lean the mixture in an attempt to clear the plugs? A more complete "write-up" might be: Engine ran extremely rough on start-up. Much Backfiring. Leaning mixture had no effect. Aircraft signed out to maintenance. This "write-up" tells the next pilot that you worked all the usual cures and that the aircraft is really "sick". It also gives the mechanic valuable information in diagnosing the problem.

**AUTHORIZED MAINTENANCE AND MAINTENANCE PERSONNEL:** The FARs are explicit in defining who is authorized to work on aircraft. The following excerpts text from FAR 43.3 having particular relevance to BEFA. As with other citations here, the pilot is responsible for complete knowledge of the full text of the FARs.

**43.3 Persons authorized to perform maintenance, preventive maintenance, rebuilding, and alterations.**

- (a) Except as provided in this section and 43.17, no person may maintain, rebuild, alter, or perform preventive maintenance on an aircraft, airframe, aircraft engine, propeller, appliance, or component part to which this part applies. Those items, the performance of which is a major alteration, a major repair, or preventive maintenance, are listed in Appendix A.
- (b) The holder of a mechanic certificate may perform maintenance, preventive maintenance, and alterations as provided in Part 65 of this chapter.
- (c) The holder of a repairman certificate may perform maintenance and preventive maintenance as provided in Part 65 of this chapter.
- (d) A person working under the supervision of a holder of a mechanic or repairman certificate may perform the maintenance, preventive maintenance, and alterations that his supervisor is authorized to perform, if the supervisor personally observes the work being done to the extent necessary to ensure that it is being done properly and if the supervisor is readily available, in person, for consultation. However, this paragraph does not authorize the performance of any inspection required by Part 91 or Part 125 of this chapter or any inspection performed after a major repair or alteration.
- (g) The holder of a pilot certificate issued under Part 61 may perform preventive maintenance on any aircraft owned or operated by that pilot which is not used under Part 121, 127, 129, or 135.

Preventive Maintenance is described in Appendix A in Part 43, and is repeated here, in abbreviated form, as an appendix. It lists the operations that can be performed by the pilot/owner of an aircraft. Anything not specifically called out in Appendix A requires that a certificated mechanic or repairman perform the operation.

Far 43.3 says that with the exception of **preventive maintenance**, all mechanical and electrical repair and inspections required by the FARs must be performed by a certificated mechanic or for mechanical and electrical repair, directly supervised by a certificated mechanic. Mechanic

certifications are covered in Part 65. Items (d) and (g) are of particular interest to BEFA members. Because of the way BEFA is structured, all of our members are considered owners. Therefore, in theory, if we had the appropriate knowledge and experience and tools, we could perform operations listed in appendix A without supervision.

However, in the interest of promoting safe maintenance practices at BEFA, members typically do not perform preventive maintenance as allowed by the regulations, except under an approved program. Before considering conducting any preventive maintenance, contact the Operations Manager, Operations Officer or Safety Officer for approval.

**BEFA CREW:** A group of members, known as the “BEFA Crew”, has been authorized by the Board to perform maintenance activities. The BEFA Crew operates under the direction and supervision of the BEFA Director of Maintenance to provide supplemental maintenance services for the club. This work provides an opportunity for members interested in the maintenance of aircraft to do so in a manner that maintains our high standards of safety. It also frees up our Director of Maintenance and the certified mechanics so that they can concentrate on more difficult tasks, and reduces our overall cost of maintenance.

Several restrictions apply to the work of the BEFA Crew. All work done by the Crew will be consistent with the limitations of FAR 43. In particular, each member of the Crew performing maintenance must hold at least a Private Pilot Certificate. All work will be performed consistent with FAR 43.13 “Performance Rules (General)” which requires the use of approved practices and tools. The Crew will be trained in approved practices, methods, and techniques before undertaking an assigned maintenance task, and will complete the work such that the condition of the aircraft is at least equal to its original or properly altered condition. All work shall be performed to the satisfaction of the Director of Maintenance.

In general, maintenance performed by the Crew will be limited to Preventive Maintenance as defined in part 43, Appendix A, (c) "Preventive Maintenance". This Preventive Maintenance can be in response to squawks identified by BEFA members and documented on squawk sheets (such as replacing Landing Lights), or in response to a request from the Operations Manager, Operations Officer, and/or Director of Maintenance for scheduled work (such as oil changes). When Preventive Maintenance is complete, a member of the crew will make an entry in the maintenance records per the requirements of 43.9 and will approve the aircraft for return to service per the requirements of 43.7.

The Crew may also perform repairs other than Preventive Maintenance when authorized by the Director of Maintenance. When such maintenance is performed, it will be performed under supervision per 43.3 (d). When such maintenance is complete, a member of the crew will make an entry in the maintenance records to describe the work performed per 43.9, and the holder of the mechanic certificate or inspection authorization that supervised the work will approve the aircraft for return to service per the requirements of 43.7 and 43.9.

In general, the Aircraft Discrepancy sheets generated by members will be used to document repair and return to service of those items identified as requiring service. Where direct entries in the aircraft logbooks are not used, a new Aircraft Discrepancy sheet will be used to document maintenance and return to service of scheduled preventive maintenance actions, or follow-up maintenance items that did not originate from a member. The Director of Maintenance will specify the form and place for documentation of maintenance performed under supervision on a case by case basis.

Members interested in joining the BEFA Crew should contact the Operations Manager or the Operations Officer.

**MAINTENANCE RECORDS:** FAR 43.9 refers to "Content, form, and disposition of maintenance, preventive maintenance, rebuilding, and alteration records (except inspections)" while 43.11 refers to "Content, form, and disposition of records for inspections conducted under Part 91 and 125 and 135.411 and 135.419 of this chapter."

FAR 43.9 describes entries that the person performing maintenance, preventive maintenance, rebuilds or alterations must make in the maintenance record. That person must note:

- (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 specified in paragraph (a)(4) of this section.
- (4) If the work performed on the aircraft, airframe, aircraft engine, propeller, appliance, or component part has been performed satisfactorily, the signature, certificate number, and kind of certificate held by the person approving the work. **The signature constitutes the approval for return to service only for the work performed.**  
(Boldface type added)

In cases where maintenance, preventive maintenance, etc. has been done, there is no guarantee that the aircraft is airworthy; only that the specific repair has approval for return to service. It is still the pilot-in-commands responsibility to determine the airworthiness of the aircraft and its suitability for a particular operation.

The entries for required inspections (typically Annual Inspections) are similar to those required for maintenance, etc. In addition, if the aircraft is found to be not airworthy, a list of discrepancies must be given to the owner or lessee.

All logbooks, maintenance discrepancies, squawks and open maintenance discrepancies are available to all members of BEFA. They are located in the aircraft logbooks found in the file cabinet in the simulator room off the main office area at BEFA. In addition, closed maintenance discrepancies are maintained by the Director of Maintenance and can be accessed through the Operations Manager, the Operations Officer, or the Safety Officer. If you, as a BEFA Club Member, ever suspect that the maintenance records for Club aircraft are incomplete, or if you feel that there is inadequate documentation to support a determination of airworthiness, it is your responsibility to sign the aircraft out to maintenance following the procedures in the Rules of Operation section 5.7! Notify the appropriate Board Member and explain the situation. There is never any penalty involved for signing an aircraft out to maintenance for any reason!

**CONCLUSION:** Safety must be the prime consideration for all Club members. With approximately 300 members flying the same aircraft, we have to watch out not only for ourselves, but our fellow members. Please take the little bit of extra time to make sure that your aircraft is safe and legal.

## **APPENDIX A (abbreviated)**

### **MAJOR ALTERATIONS, MAJOR REPAIRS, AND PREVENTIVE MAINTENANCE**

- (c) Preventive maintenance. Preventive maintenance is limited to the following work, provided it does not involve complex assembly operations:
- (1) Removal, installation, and repair of landing gear tires.
  - (2) Replacing elastic shock absorber cords on landing gear.
  - (3) Servicing landing gear shock struts by adding oil, air, or both.
  - (4) Servicing landing gear wheel bearings, such as cleaning and greasing.
  - (5) Replacing defective safety wiring or cotter keys.
  - (6) Lubrication not requiring disassembly other than removal of non structural items such as cover plates, cowlings, and fairings.
  - (7) Making simple fabric patches not requiring rib stitching or the removal of structural parts or control surfaces. ...
  - (8) Replenishing hydraulic fluid in the hydraulic reservoir.
  - (9) Refinishing decorative coating of fuselage, ... (excluding balanced control surfaces), fairings, cowlings, landing gear, cabin, or cockpit interior when removal or disassembly of any primary structure or operating system is not involved.
  - (10) Applying preservative or protective material to components where no disassembly of any primary structure or operating system is involved and where such coating is not prohibited or is not contrary to good practices.
  - (11) Repairing upholstery and decorative furnishings of the cabin, cockpit or balloon basket interior when the repairing does not require disassembly of any primary structure or operating system or interfere with an operating system or affects the primary structure of the aircraft.
  - (12) Making small simple repairs to fairings, non structural cover plates, cowlings, and small patches and reinforcements not changing the contour so as to interfere with proper air flow.
  - (13) Replacing side windows where that work does not interfere with the structure or any operating system such as controls, electrical equipment, etc.
  - (14) Replacing safety belts.
  - (15) Replacing seats or seat parts with replacement parts approved for the aircraft, not involving disassembly of any primary structure or operating system.
  - (16) Trouble shooting and repairing broken circuits in landing light wiring circuits.
  - (17) Replacing bulbs, reflectors and lenses of position and landing lights.
  - (18) Replacing wheels and skis where no weight and balance computation is involved.

- (19) Replacing any cowling not requiring removal of the propeller or disconnection of flight controls.
- (20) Replacing or cleaning spark plugs and setting of spark plug gap clearance.
- (21) Replacing any hose connection except hydraulic connections.
- (22) Replacing prefabricated fuel lines.
- (23) Cleaning or replacing fuel and oil strainers or filter elements.
- (24) Replacing or servicing batteries
- (25) Replacement or adjustment of non structural standard fasteners incidental to operations.
- (28) The installation of anti-misfueling devices to reduce the diameter of fuel tank filler openings.
- (29) Removing, checking, and replacing magnetic chip detectors
- (30) Removing and replacing self-contained, front instrument panel-mounted navigation and communication devices that employ tray-mounted connectors that connect the unit when the unit is installed into the instrument panel, (except automatic flight control systems, transponders, and microwave frequency distance measuring equipment (DME)). The approved unit must be designated to be readily and repeatedly removed and replaced, and pertinent instructions must be provided. Prior to the unit's intended use, an operational check must be performed in accordance with the applicable sections of Part 91 of this chapter.
- (31) Updating self-contained, front instrument panel-mounted Air Traffic Control (ATC) navigation software data bases (excluding those of automatic flight control systems, transponders, and microwave frequency distance measuring equipment (DME)) provided no disassembly of the unit is required and pertinent instructions are provided. Prior to the unit's intended use, an operational check must be performed in accordance with applicable sections of Part 91 of this chapter.