



U.S. Department
of Transportation
**Federal Aviation
Administration**

Advanced Preflight M-Pamphlet



Did you know that maintenance-related problems are one of the most deadly causes of accidents in general aviation? Contributing to this is a pilot's failure to identify maintenance discrepancies because of a lack of knowledge and improper techniques used during the preflight of the aircraft.

*Note: For the purpose of this M-Pamphlet, any time the word "Aircraft" is used, the word is referring to the **entire aircraft**. This includes the airframe, powerplant, propeller, avionics, and all accessories.*

Introduction

Advanced Preflight refers to conducting a preflight that goes beyond the normal preflight checklist. This is accomplished by obtaining a valuable maintenance history of the aircraft and developing an **additional items checklist**. While developing the additional items checklist requires some time, once you have developed the additional items checklist it can be used in conjunction with the aircraft's preflight checklist for all future preflight inspections.

Using the additional items checklist discussed in this M-Pamphlet will guide you through an enhanced preflight inspection to help reduce your risk of undetected maintenance problems.

This M-Pamphlet provides information to owner/operators and AMTs on

- how to conduct a complete review of all maintenance-related data on the aircraft you operate and/or maintain,
- the steps in extracting the valuable information from this data, and
- how to develop an **additional items checklist** to be used in conjunction with the aircraft's preflight checklist for all future preflight inspections.

Whether you are an AMT or a pilot who owns, rents, or borrows an aircraft, **Advanced Preflight** is for you!

For the AMT, this pamphlet will assist in conducting a records review prior to beginning an inspection on an aircraft. This is vital if the aircraft to be inspected is new to the AMT.

For the pilot, remember to always use your preflight checklist. The additional items checklist does not replace your existing preflight checklist; it only enhances its use.

Collect the Records

An aircraft maintenance history consists of the maintenance records held by the owner and/or operator, all manufacturers service data, all FAA service data, Airworthiness Directives, and records retained by any repair facility for work performed on the aircraft, or components thereof.

Before You Begin Your Review

1. Locate all of the aircraft records, often referred to as airframe, powerplant, and propeller log books. This will normally include additional documents such as receipts, work orders, FAA Form 337s (Major Repair and Alteration forms), and approval for return to service tags (8130-3 Forms). Also locate any Supplemental Type Certificate (STC) data, including data on items no longer installed on or in the aircraft.

2. Order a DVD which contains all of the documents and information that has been sent to the FAA's Aircraft Registration Branch. The information maintained by the FAA is vital to this review. You can contact the Aircraft Registration Branch to order this DVD by phone toll free at **866-762-9434**, international/local **405-954-3116**, or by email by going to http://www.faa.gov/licenses_certificates/aircraft_certification/aircraft_registry/copies_aircraft_records/.
3. Obtain a copy of the Type Certificate Data Sheet for your aircraft **airframe**, **powerplant**, and **propeller**. This information will be referenced during this review to determine the aircraft has the properly installed components and equipment. It will also be used to obtain information from its notes section to add to your additional items checklist.
4. Using the FAA web site at www.faa.gov, search and print a copy of all the Airworthiness Directives that are listed for your airframe, powerplant, propeller, and all of the accessories. Your AMT may be of assistance to you in this step. Some AMTs subscribe to AD search data bases that make these searches easier and more thorough. They can also provide you with an AD compliance sheet which will assist you during your records review.
5. Using the FAA web site search all of the safety-related information the FAA has available to you listed below.
 - FAA Airworthiness Directives (AD)
 - FAA Advisory Circulars (AC)
 - FAA Aviation Maintenance Alerts (AC 43-16A)
 - FAA Safety Alerts For Operators (SAFOs)
 - FAA Safety Airworthiness Information Bulletins (SAIBs)
6. Referencing the ADs, obtain a copy of all the Service data; i.e., Service Bulletins (SB) referenced in the text of the ADs. When Service Bulletins are incorporated into an AD, the SB become mandatory to comply with. This information will be vital to your review
7. Have your Airplane Flight Manual (AFM) or Pilot Operating Handbook (POH) available for the review. If you rent or borrow an aircraft obtain an exact copy of the one in the aircraft. Be sure to include a copy of the most current aircraft Weight and Balance report and any supplemental data. If the aircraft is an experimental (i.e., amateur built, light sport, or exhibition), obtain a copy of the Operating Limitations attached to or kept with the Airworthiness Certificate. Operating Limitations are required for these aircraft, so if missing, and a copy is not supplied in the information supplied by the FAA in item two (2) above, you may have to contact the local Flight Standards District Office (FSDO) to correct this discrepancy.
8. Using all the available manufactures part and serial number information you have on the aircraft, powerplant, propeller, and accessories, contact the manufactures and request a copy of all service-related information listed below. Some manufacturers provide this information at no charge, and some can be found online by visiting the manufacturers' web sites. Due to the various makes and models of aircraft and their components, it is difficult to know all manufacturers' service data nomenclature, but by referencing the list below they will quickly understand what information you are requesting concerning their equipment.
 - Service Bulletins (SB)
 - Mandatory Service Bulletins (MSB)
 - Critical Service Bulletins (CSB)

- Service Letters (SL)
- Service Information Letters (SIL)
- Special Service Instructions (SSI)
- Service Information Directives (SID)
- Change Notices (CN)

In the next step “Preparing Records for the Review” you will be shown how to organize all of the data you acquired in this step and how to conduct your review.

Preparing Records for the Review

1. Start by taking all of the aircraft records (log books), individual invoices and component release tags/forms (8130s), FAA Form 337s (Major Repair and Alteration forms). Also, some alterations may apply to Supplemental Type Certificate (STC) modifications or installations made to your aircraft, any separate loose maintenance documentation (record entries not permanently entered into your aircraft records), and all Airworthiness Directive compliance record sheets and divide them into individual groups. The documents should be separated into six (6) major groups.
 - Airframe records and documents
 - Powerplant records and documents
 - Propeller records and documents
 - Avionics records and documents
 - Accessories records and documents (if contained separately)
 - Airworthiness Directive compliance records
2. Once the groups are established, place the documents from each group into numerical date order, starting from the earliest dates to the latest dates.
3. Either using plain paper or a Word document, create a new Airworthiness Directive (AD) compliance record. You can also request your local Aviation Maintenance Technician (AMT) provide you with a new AD compliance record listing the ADs applicable to your aircraft and its component parts. (In most cases an A&P who also holds an Inspection Authorization (IA) will have an AD search program that will allow the printing of an AD compliance sheet. These documents will contain a list providing the AD numbers, whether it is a **one time** or **recurring AD**, method, date, and time of compliance, and a block for the signature of the person complying with the AD).
4. Do not rely solely on these searches for all of the ADs which may apply to your aircraft. Remember to search the ADs on any Supplemental Type Certificate (STC) modifications or installations made to your aircraft while conducting your search. Also, it is highly recommended you conduct your own AD search using the FAA AD search tool located at www.faa.gov. By individually searching for AD applicability to your aircraft on the FAA web site, while matching the information to your new and existing AD compliance records, you will assure a more detailed AD compliance check.

***Note:** To learn about searching ADs using the FAA web site, refer to searching Airworthiness Directives instructions information contained in this pamphlet.*

5. Once you have gathered all the Airworthiness Directives believed to be applicable to your aircraft, sort them into groups, one for each group as listed in step one (1) of this section.
6. Now on the front page of each AD, or on a separate document, list the serial number, make, and model of the aircraft's airframe, powerplant, and propeller. Then list Total Time In Service (TTIS) and Time Since Major Overhaul (TSMOH) of each item. Having this information readily available will make reviewing an AD much easier, requiring less time. Keep in mind, you are not going to be complying with the ADs, you are only transferring the data from your records to a new list. Always document on the new compliance sheet where you discovered the information for easy reference of the compliance information. If at any time you question the compliance of an AD, seek the assistance of an AMT to obtain compliance.
7. Obtain a copy of your Aircraft Flight Manual (AFM) or Pilot Operating Handbook (POH). If you choose to utilize your actual AFM or POH, please remember to take it with you when you fly.
8. Obtain a copy of your Airworthiness Certificate and Aircraft Registration. If you choose to utilize your actual Airworthiness Certificate and Aircraft Registration, again, please remember to take them with you when you fly.
9. Using the information obtained on the DVD you ordered from the FAA Aircraft Registration Branch, print and place these documents into their respective groups. Remember, these records should include all FAA Form 337s that have ever been submitted to the FAA on the aircraft being researched. If you find any additional 337s within the aircraft records paper copies that are not incorporated on the DVD, please submit a copy of those missing documents to the Aircraft Registration Branch to be made a part of the aircraft permanent records.

Note: After the completion of your review, document your findings, add the aircraft component times, list all dates applicable, and send a copy of this information to the FAA Aircraft Registration Branch. The information will become a part of the aircraft permanent records. In the event your records are lost or destroyed, this record can be used to assist you in recreating your aircraft's history. It may also be beneficial to have this information notarized prior to sending.

The Review

Note: The following steps can be followed with each group of records. Be sure to document findings (findings include: Service Bulletin and Airworthiness Directive compliance information, overhaul dates, times, person who provided services of the overhaul, major repair, major alteration, and Supplemental Type Certificate data information), and insert sticky tabs into the pages as needed to assist you in locating the information needed for quick reference later in this review.

1. Select a group, and starting from the earliest date, read all documents, entries, and records. Each time you locate one of the following pieces of information, document it for future review.
 - Date of all overhauls
 - Time of all overhauls
 - Overhauling person or organization
 - Total time of aircraft at time of overhaul
 - If an accessory was installed new or after an overhaul, list the **part description, part number, serial number, date, and aircraft time** at installation.

Service Bulletin Compliance Dates, Times of Compliance, and Methods of Compliance

As you continue through your review you will find most ADs follow shortly or years after a Service Bulletin's issuance. Also you will notice most ADs require compliance with a Service Bulletin as the means of compliance with the AD. With this in mind, documenting this information as you process through your records will assist you with the AD compliance history of your aircraft.

*Note: Although the FAA does not require any Service Bulletin (SB) compliance mandatory unless the SB is incorporated into an AD, it is worth consideration. Because service information addresses concerns an aircraft or aircraft component manufacturer has discovered, it would be in the **best interest of safety** to consider compliance.*

- Airworthiness compliance dates, times of compliance, and methods of compliance. On all **one time** ADs, be sure to copy the name and certificate number of the person who complied with the AD. You will later be asked to transfer this information along with the above AD information to your new AD compliance sheet. Also review the AD to see what the compliance requirements were/are. Referring back to the Service Bulletin compliance information will assist you in determining compliance of the AD.
- Often, out-of-compliance ADs are overlooked for years because an accessory or component which was affected by an AD that was in compliance at the time of its replacement was replaced by an accessory or component the AD compliance had not been performed on. This is normally a one time AD which this occurs on, so is often never rechecked by the IA during future inspections. Your detailed review of the records capturing the information concerning components and accessories will help to detect any out-of-compliance issues with these items.

Note: When you read record entries that state an AD was not applicable because of a previously complied with service bulletin, refer to the service bulletin and verify the compliance is valid. If the compliance is by part replacement or modification and is accessible to view, go to the aircraft and see if the item remains in compliance. If needed, have an Aviation Maintenance Technician (AMT) assist you with this task.

AD Compliance Sign-Offs

During the review, look for the actual AD compliance record entries, not an entry that states PCW (Previously Complied With). PCW has also been known to mean "Partly Complied With." This is sometimes stated when an AD has various stages or time requirements for total compliance. If misinterpreted, a person may overlook AD compliance with the listed AD. If the AD states N/A (Not Applicable), document the reason given such as N/A by serial number, model number, date of installation, or overhaul. You may find because of part changes made after the AD was determined to be Not Applicable, now they apply.

*Note: AD compliance searches are often difficult. You may need to recruit the aid of an experienced A&P, Airframe and Powerplant mechanic (AMT) to assist. However, **remember this is your review**, do not accept anything less than seeing the actual compliance entry, and/or seeing with your own eyes, if externally mounted, the model or serial number on the component effected if this is the reason for an AD not being applicable. If you are in doubt, or can not find an AD compliance sign-off, then work with your AMT to inspect, and/or correct, and bring it into compliance.*

AD compliance is not only mandatory for the purpose of compliance. They address known unsafe conditions on aircraft that if left uncorrected will lead to undesirable outcomes. This is the very reason for the Federal Aviation Regulation requiring compliance with Airworthiness Directives.

Note: 14 CFR 91 places the responsibility for AD compliance on the Pilot of an aircraft. Because of this, place yourself into the position of your AMT's Quality Assurance Inspector. Remember, AMTs work for you. You have the right to review your maintenance record entry prior to paying your maintenance bill. If the entry is insufficient, incomplete, or nonexistent, do not accept it. Demand a proper record entry be made. Holding an AMT to a higher standard is not wrong, it is expected.

91.7 Civil Aircraft Airworthiness¹

- 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.

91.417 Maintenance Records²

(a) (1) (v) The current status of applicable Airworthiness Directives (AD) and safety directives including, for each, the method of compliance, the AD or safety directive number and revision date. If the AD or safety directive involves recurring action, the time and date when the next action is required.

FAA Form 337 (Major Repair and Alterations)³

Note: 337 Forms are used by a person performing major repairs or major alterations on aircraft or aircraft components. Any major repair or alteration requires the person conducting the work to use data approved by the FAA. This data can be contained in, but not limited to the instructions of an Airworthiness Directive, Supplemental Type Certificate, engineering data, or field approval given by the FAA.

1. As you discover record entries stating a major repair or alteration has been complied with, list the type of work performed and the date of approval for return to service.
2. Separate and match all of your form 337s with the information listed in step 1.
3. Any missing form 337s from your records should be contained on the DVD you received from Aircraft Records.
4. If you have entries of this type and no FAA form 337 in your records or on the FAA provided DVD to support the approval of the work performed, the work was never properly documented, and may have been performed inappropriately. This is placing you at a high risk of an accident caused by the failure of the unapproved work accomplished.
5. The exception to the information in step 4 is if the major repair was accomplished by an FAA 145 repair station certificate holder, they are permitted to use their company work order for documenting this work. If this is the case, you should find a copy of the work order listing the repair stations certificate number listing the work performed.
6. If work was accomplished as described in step 5, it would be in your best interest to contact the repair station and request any other documentation they may have involving the work they accomplished. This information may be of value if an AD is issued on work performed by that repair station, or the serial number of an internal component effected by the AD.
7. All major repair and major alteration work accomplished by an AMT is required to have an FAA form 337 completed by that AMT, and approved for return to service by an AMT whom also holds an Inspection Authorization (IA). 14 CFR Part 43, Appendix B also requires a copy of the form be given to the aircraft owner, and another sent to the FAA within 48 hours of completion.

¹ 14 CFR, 91.7.

² 14 CFR, 91.417.

³ 14 CFR Part 43.

Appendix B to Part 43—Recording of Major Repairs and Major Alterations⁴

- (a) Except as provided in paragraphs (b), (c), and (d) of this appendix, each person performing a major repair or major alteration shall—
- execute FAA Form 337 at least in duplicate;
 - give a signed copy of that form to the aircraft owner; and
 - forward a copy of that form to the FAA Aircraft Registration Branch in Oklahoma City, Oklahoma, within 48 hours after the aircraft, airframe, aircraft engine, propeller, or appliance is approved for return to service.

Note: Paragraphs (b), (c), and (d) speak to the requirements of a repair station's recording of major repairs. This rule also states the repair station only has to keep a record of the repair for a period of two (2) years, and is not required to send a copy to the FAA for permanent recording. Therefore, it is in your best interest to contact the repair station as described in step 6 and request copies of all documentation applicable to the work performed.

This may include copies of all FAA form 8130s (Approval for Return to Service tags/forms). An example is a crankshaft installed in your engine at overhaul. If this part was inspected, machined, and a process in a repair station was flawed, an AD may be issued on all crankshafts overhauled or repaired by repair station X. If you could prove by your records that repair station X did not perform the listed process to your part, or your part was not applicable by serial number, an AMT would not be required to split your case to inspect for compliance. Following this step can save you unnecessary maintenance requirements and untold dollars.

8. During the review steps, be sure to list on a separate document in the order of discovery all information found. Examples would be a major repair or alteration, a reoccurring AD, or an applied STC on your aircraft discovered during the review. This information will be put to use in the next step of Advanced Preflight, “Developing Your Additional Items Checklist”.

Developing Your Additional Items Checklist

Referring to your list of discovered items you developed during your review containing the information on reoccurring ADs applicable to your aircraft, additional safety-related information you determined the need to inspect during the preflight (this information consists of additional safety data found in service information and FAA recommendations), any major repairs or alterations (this section includes any installed STC items), and all inspection times and types of inspections. This will include annual, 100-hour, and IFR test requirements if applicable to the aircraft.

1. Review your AFM or POH and assure all required operational information concerning installed or removed STC items is correct.
2. Record your tachometer and/or Hobbs times in order to begin tracking your next AD and inspection times. These times include any other timed inspection items like your cabin heater system be **added to the additional items checklist**.

⁴ 14 CFR Part 43, Appendix B.

3. Record the location and type of major repair or alteration complied with on the aircraft. During your preflight inspection, focus additional attention on this area of the aircraft. If you detect any abnormalities in the location of the work performed, bring it to the attention of an AMT prior to the flight.
4. Record the information regarding the item affected and the recommended inspection for any applicable ADs and additional service information you discovered can be visually seen during the preflight. Remember, you are not complying with the AD's instructions. You are only determining from a visual inspection point the item is not going to put you at risk during your flight. For some aircraft, it is as easy as lifting the rear seat, to assuring you have proper seat lock engagement, to adding the visual inspection of a known item susceptible to cracking.
5. Document all limitations involving additional installed equipment (an example would be how many vortex generators can be missing before the aircraft is rendered unairworthy).
6. Document any information permitting operations without installed equipment from your Type Certificate Data Sheet (TCDS), or print and keep in your possession a copy of the aircraft TCDS for reference. Some aircraft can be operated without normally installed equipment. This information may come in handy one day when you find yourself away from home with no parts available, but would like to continue your flight to your home airport. Also, familiarize yourself with the additional information on this topic from your POH or AFM.
7. Record a note reminding you to use your hands during the inspection to check for security of installation of the components you are inspecting.
8. Add inspection items to your additional items checklist on items you have added for your safety. These items may include over-water required items, fire extinguishing and other personal protective gear, flashlights, first aid kit, and survival equipment if applicable.

Inform everyone that is present during the performance of your preflight the importance of this inspection. Ask them to refrain from distracting you during this inspection. Inform them it is important for you to be able to focus your attention on the task at hand. Remember to use your eyes, hands, and ears during the preflight. If you discover by sight, feel, or sound any abnormal items compared to previous preflight inspections, or if something just does not seem right, contact an AMT to assist in determining the cause for this discovery.

Adding the items above and any other items you determine to be of value to your preflight inspections will reduce your risk of an accident and therefore save your life and those of your passengers.

Additional Resources

In addition to this pamphlet, there are Power Point presentations available in both standard and articulate from your local Airworthiness FAASTeam (FAA Safety Team) Program Manager for your use. You can also request to have your local FAASTeam assist you in conducting a seminar and/or a hands-on preflight clinic on this subject matter.

To locate your local FAASTeam Program Manager, go online to www.faasafety.gov and search the directory for the state you reside in.

Topics Include:

- What you need to conduct a thorough aircraft record and maintenance history review **before starting the review**.
- How to conduct the review.
- What valuable knowledge from the review you should add to an additional items preflight checklist.
- What additional preflight inspection methods and techniques you can apply to the aircraft based upon additional items discovered during the review.
- How to conduct a more detailed preflight inspection.
- Obtaining a better understanding of the role and responsibilities of your Aviation Maintenance Technician (AMT), and how you can assist them as their maintenance quality assurance person.
- How to develop an additional items checklist.

About This Series

The purpose of this series of Federal Aviation Administration (FAA) safety publications is to provide the aviation community with safety information that is informative, handy, and easy to review. Many of the publications in this series summarize material published in various FAA advisory circulars, handbooks, other publications, and audiovisual products developed by the FAA and used by the FAA Safety Team (FAASTeam) for educational purposes. Some of the ideas and materials in this series were developed by the aviation industry. The FAASTeam acknowledges the support of the aviation industry and its various trade and membership groups in the production of this series.

Comments regarding these publications should be emailed to ProductManager@FAASafety.gov. Additional copies of this publication may be downloaded or printed at <http://FAASafety.gov>.

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