5. Operations

5.6 - Maintenance and Inspection Procedures

Structure & Formatting Reminder

This presentation is provided as a reference to help you prepare for the your exam. It seeks to go beyond memorization and provide explanation and rationale.

While this reference considers many of the points covered in the exam, given the bredth it is in no way exhaustive. It is suggested to consult a variety of resources when preparing for the exam.

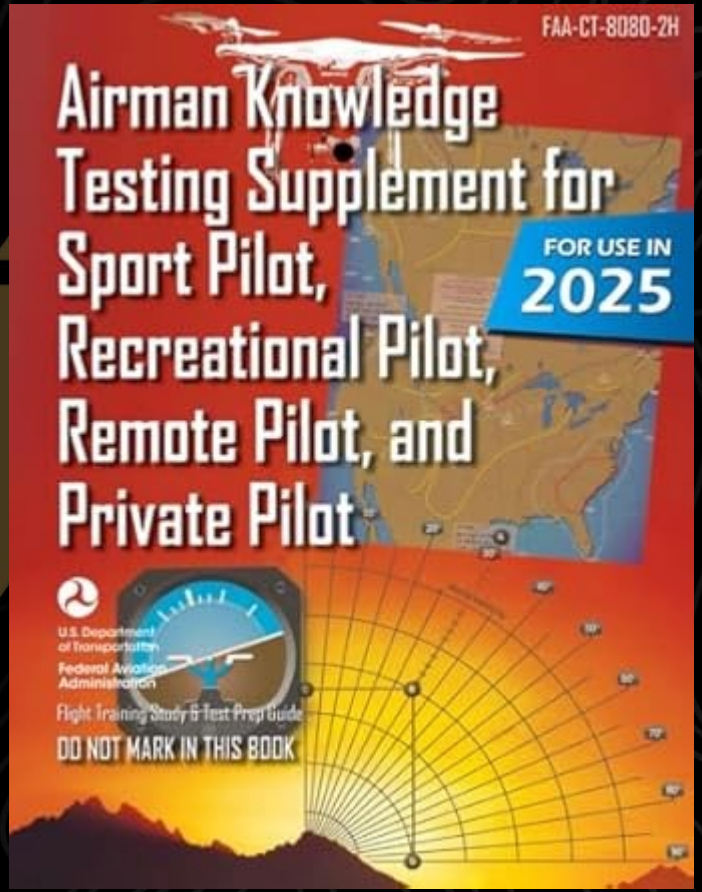
Text that is marked in YELLOW has a high probability of being referenced directly in one of the exam's nearly 400 possible questions.

Take the quiz at the end to gauge your understanding.

Airman Knowledge Testing Supplement

Many of the points covered in the slideshow and quiz reference images and concepts found in the “Airman Knowledge Testing Supplement”.

You can download the document from the FAA here. Alternatively, a hard copy can be purchased online for around $10.



5.6 - Basic Maintenance

Types of Maintenance:

- Inspection
- Replacement
- Repair
- Modification
- Overhaul
- System Software Upgrades

Patch

5.6 - Basic Maintenance

Many drone manufacturers provide instructions regarding maintenance with some even establishing a maintenance program.

If a program is not provided by the manufacturer the owner should establish a maintenance schedule of their own.

In both cases it is essential that documentation accompanies any work.

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5.6 - Basic Maintenance

Sometimes issues are found when doing preflight inspections.

Repair, modification, overhaul, replacement, or software updates should be done before flight is attempted.

Drewamstime

5.6 - Preflight Inspection

Before every flight the rPIC should inspect the UAV for damage or malfunction.

If a manufacturer inspection program is provided it should be followed, if not a owner-developed program should be utilized.

Any appropriate preflight inspection should encompass the entire system.

QuadX Drones

5.6 - Preflight Inspection

Mitigating Mechanical Failure

Condition	Action
1. **Structural or skin cracking**	Further inspect to determine scope of damage and existence of possible hidden damage that may compromise structural integrity. Assess the need and extent of repairs that may be needed for continued safe flight operations.
2. **Delamination of bonded surfaces**	Further inspect to determine scope of damage and existence of possible hidden damage that may compromise structural integrity. Assess the need and extent of repairs that may be needed for continued safe flight operations.
3. **Liquid or gel leakage**	Further inspect to determine source of the leakage. This condition may pose a risk of fire resulting in extreme heat negatively impacting aircraft structures, aircraft performance characteristics, and flight duration. Assess the need and extent of repairs that may be needed for continued safe flight operations.
4. **Strong fuel smell**	Further inspect to determine source of the smell. Leakage exiting the aircraft may be present and/or accumulating within a sealed compartment. This condition may pose a risk of fire resulting in extreme heat negatively impacting aircraft structures, aircraft performance characteristics, and flight duration. Assess the need and extent of repairs that may be needed for continued safe flight operations.
5. **Smell of electrical burning or arcing**	Further inspect to determine source of the possible electrical malfunction. An electrical hazard may pose a risk of fire or extreme heat negatively impacting aircraft structures,

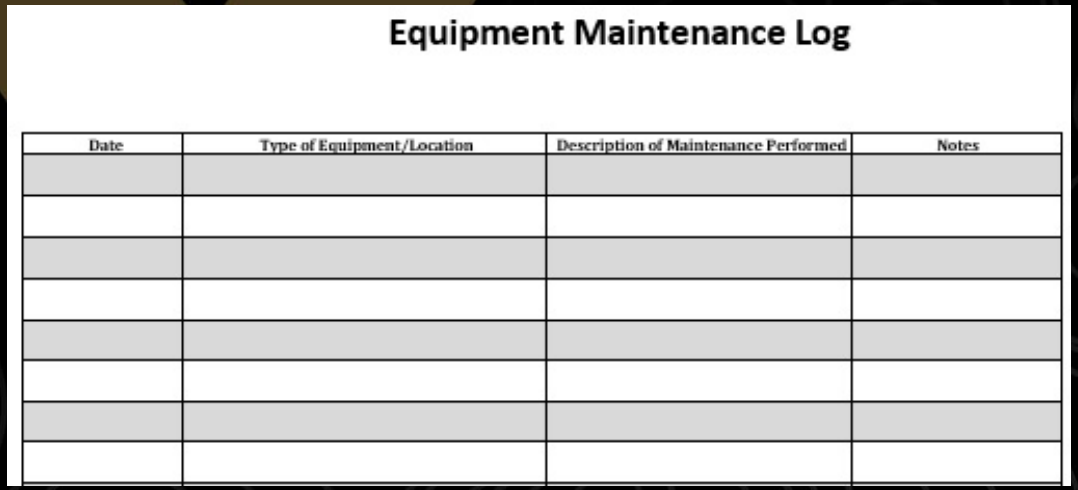
5.6 - Preflight Inspection

Mitigating Mechanical Failure

6. Visual indications of electrical burning or arcing (black soot tracings, sparking)	Further inspect to determine source of the possible electrical malfunction. An electrical hazard may pose a risk of fire or extreme heat negatively impacting aircraft structures, aircraft performance characteristics, and flight duration. Assess the need and extent of repairs that may be needed for continued safe flight operations.
7. Noticeable sound (decibel) change during operation by the propulsion system	Further inspect entire aircraft with emphasis on the propulsion system components (i.e., motors and propellers) for damage and/or diminished performance. Assess the need and extent of repairs that may be needed for continued safe flight operations.
8. Control inputs not synchronized or delayed	Discontinue flight and/or avoid further flight operations until further inspection and testing of the control link between the ground control unit and the aircraft. Ensure accurate control communications are established and reliable prior to further flight to circumvent possible loss of control resulting in the risk of a collision or flyaway. Assess the need and extent of repairs that may be needed for continued safe flight operations.
9. Battery casing distorted (bulging)	Further inspect to determine integrity of the battery as a reliable power source. Distorted battery casings may indicate impending failure resulting in abrupt power loss and/or explosion. An electrical hazard may be present, posing a risk of fire or extreme heat negatively impacting aircraft structures, aircraft performance characteristics, and flight duration. Assess the need and extent of repairs that may be needed for continued safe flight operations.
10. Diminishing flight time capability (electric powered propulsion systems)	Further inspect to determine integrity of the battery as a reliable power source. Diminishing battery capacity may indicate impending failure due to exhausted service life, internal, or external damage. An electrical hazard may

5.6 - Record Keeping

- It is important to document any repair, modification, overhaul, or replacement.
- Always record time-in-service for each component. Doing this will help establish a reliable maintenance schedule.
- If an accident or damage does occur its important to show due diligence has been done.



Equipment Maintenance Log

Date	Type of Equipment/Location	Description of Maintenance Performed	Notes

5.6 - Approved sUAS Maintenance Personnel

- Some manufacturers require that certain tasks be performed by either the manufacturer or a certified person or facility.
- If repair and maintenance is done outside of manufacturer recommendations it is possible that warranties can be made void.

Unit 5 Operations – 5.6 Review Quiz

- 5.6 - Maintenance & Inspection Procedure – QUIZ
- This quiz contains 15 questions.
  - You may take it as many times as you like.
  - The order of questions are randomized each time.
  - The large majority of the questions are worded exactly as they appear on the exam.