

GA Maintenance Alert

Safety and Security of Components

A review of recent helicopter accidents has revealed a number of improper maintenance practices and techniques. Contributing significantly to these accidents is the improper safety and security of critical flight control systems, engine systems, and drive system components. In some cases, proper torque was not applied, safety wire or cotter pins were not installed, self-locking nuts were reused numerous times where they lost their self-locking capability, and critical components were removed and reinstalled without following the Instructions for Continued Airworthiness (ICAs).

A preliminary review as to why these improper maintenance practices and techniques were performed and were overlooked indicates that human factors and failure to follow written procedures are potential factors. Fatigue, time constraints to perform the maintenance tasks, cell phone activity, and complacency were the serious factors related to these accidents.

Recommendations:

1. Although it may not be required by the company's Standard Operating Procedures (SOP's) or by regulatory requirements, it is a good practice to have a qualified person, other than the person who performed the maintenance, inspect the safety and security of critical systems that have had maintenance. This is similar to a Required Inspection Item (RII) policy that many commercial operators have implemented in their SOPs.
2. Pay particular attention to the safety and security of the items that undergo maintenance and any surrounding components that may have been disconnected (to ease access, perhaps) but may not have been documented in the paperwork.
3. Look for the obvious; if there is a castellated nut, there is generally an associated cotter pin required to lock in place.
4. Review and adhere to the manufacturer's standard practices for replacement of self-locking nuts. Most manufacturers provide procedures on how to inspect the nut condition and tare torque requirements.
5. Review the manufacturer's Instructions for Continued Airworthiness (Maintenance Manual) to ensure that the work is completed as specified.
6. When a component or system is in the work process, you should identify, mark (red flag) or disable the system so it is obvious that it is not serviceable. Also, complete the required paperwork as soon as possible. Double check your work after a system or component has been reinstalled or on which maintenance has been performed. If in doubt, go back and check your work on the installation processes and/or procedures.
7. Review the company's policies and procedures regarding the use of cell phones or other electronic media while performing maintenance on aircraft. If none exists, and because they are a major distraction during maintenance tasks, it is strongly recommended a policy be put into effect to prohibit their use.
8. When maintenance is resumed after being stopped, delayed or disrupted:

- a. Go back to step 1 and review the procedures to ensure no step or task in the maintenance procedures (ICAs) are overlooked.
 - b. Make a detailed log book/maintenance record entry that reminds you or describes to other mechanics not only what was performed but also what was NOT performed regarding the maintenance procedure.
 - c. Perform detailed face-to-face maintenance turnover briefings at shift changes to insure outgoing and incoming supervisors and mechanics are aware and understand the status of the maintenance activities.
9. Pilots should always carefully review maintenance records and then perform a very thorough and complete preflight inspection prior to any flight. They should direct special attention to systems integrity and functionality as well as accessible critical components that had recent maintenance. This is the last opportunity to detect potential safety hazards before flight.
10. To learn more about the Human Factors effect on maintenance performance and mitigation strategies, review the FAA Aircraft Maintenance Human Factors Web Portal at: <https://hfskyway.faa.gov/hfskyway/index.aspx>.
11. Use the “Personal Minimums” Checklist. It lists actions to accomplish before and after maintenance tasks to reduce maintenance errors. You can obtain a copy from your local FAA Safety Team Program Manager (FPM). Go to the web link below for the search directory to find your FPM:
<https://www.faasafety.gov/FAASTApp/directory/default.aspx>

The ultimate question the pilot or mechanic who performed the work to ask is, “Would I place my family in this aircraft on its first flight after maintenance?”