

Post-Check Analysis and Manhour Optimization in EASA Part 145 Aviation Maintenance

Sofema Aviation Services (SAS) www.sassofia.com considers the key opportunities available during the post check review.

Introduction

Integrating post-check analysis with manhour optimization allows CAMO and Part 145 organizations to address inefficiencies in the maintenance process systematically.

- By analyzing manpower utilization, identifying lost time, investigating defects, and resolving logistical and documentation issues, CAMO can drive continuous improvements in maintenance planning.
- The role of the Production Planning Program Optimization Manager is pivotal in ensuring these lessons are acted upon, leading to better resource allocation, minimized delays, and enhanced operational efficiency in future maintenance checks.

The integration of post-check analysis with a comparison of actual manhour utilization against the manhours referenced in the Maintenance Planning Document (MPD) provides a structured approach to enhancing maintenance operations.

This process is crucial for optimizing manpower, reducing costs, and improving the overall efficiency of aviation maintenance.

1. Identifying Issues Arising Post-Maintenance Check

- **CAMO Responsibility:** CAMO must assess any issues arising during or after the maintenance check. This includes understanding what went wrong, why it occurred, and whether it affects the aircraft's operational schedule.
- **Key Question:** Did the issues impact the maintenance schedule or require follow-up actions from quality or safety departments? If so, internal reporting must be generated.
- **Post-Check Focus:** This should trigger a review of manpower utilization and parts availability to ensure similar issues are avoided in future checks.

2. Manpower Utilization: Actual vs. MPD Estimation

- **CAMO and Part 145 Coordination:** The MPD provides a baseline for the estimated manhours required to complete specific tasks. Post-check analysis involves comparing these estimates with the actual manhours recorded during the maintenance check.

- **Goal:** Identify any discrepancies between estimated and actual manhours. A higher-than-expected usage of manhours could indicate inefficiencies in the workforce, while fewer manhours could suggest an overestimation in the MPD or highly skilled workers improving efficiency.
- **Key Considerations:**
 - **Effectiveness:** How efficiently were human resources utilized? Were the right technicians assigned to the right tasks?
 - **Manpower Optimization:** A lower factor (MPD x organization factor) indicates a more economical use of manpower. If the actual manhours consistently exceed the MPD estimates, this may highlight the need for a deeper investigation into task complexity, training, or equipment availability.
 - **Action:** Any findings related to over or under-utilization of manpower should be forwarded to the Production Planning Program Optimization Manager to drive future process improvements.

Comparison of Manhour Multiples: Operators of large aircraft such as the Airbus A320, Boeing 737, or widebody aircraft (e.g., Boeing 777) often apply a multiple to the MPD manhours to account for real-world conditions. Typical multiples range from 1.5 to 2.0, depending on factors like non-routine work, aircraft age, and operating environment.

- **Non-Routine Work:** Routine tasks outlined in the MPD do not account for unexpected issues like corrosion or wear discovered during inspections. These non-routine tasks typically add 30% to 50% more labor hours, pushing operators to apply multiples of 1.5 to 1.75.
- **Key Considerations:**
 - **Manpower Efficiency:** Post-check analysis should identify whether labor resources were used efficiently. For example, if an operator applied a multiple of 1.75 to a task but only required 1.5 times the MPD manhours, this indicates an opportunity to refine resource allocation.
 - **Adjustment Based on Experience:** Skilled maintenance teams may complete tasks more efficiently, allowing operators to apply a lower multiple (1.5), while less experienced teams may need a higher factor (closer to 2.0).

Action: Post-check data should be forwarded to the **Production Planning Program Optimization Manager** for continuous improvement of manpower planning.

3. Lost Time Summary and Root Cause Analysis

- **Tracking Lost Time:** Delays or inefficiencies during maintenance, such as waiting for parts or instructions, contribute to lost time. Post-check analysis helps track these delays and understand their causes.
- **Post-Check Focus:** Each instance of lost time should be categorized (logistics, manpower, etc.) and analyzed. If a delay is recurrent, it should be escalated for potential procedural changes.
- **Actionable Insights:** The lost time data can help refine the multiple applied to MPD manhours, accounting for operational inefficiencies such as poor logistics or incomplete documentation.
- **CAMO Role:** The CAMO must investigate any lost time during the check. Lost time could arise due to delays in parts delivery, tooling unavailability, or even human factors such as staff waiting for instruction or clarification.
 - **Post-Check Focus:**
 - Identify and categorize lost time events.
 - Determine the root cause of each issue (e.g., logistics, personnel availability, etc.).
 - **Follow-Up Action:** For significant lost time events, consider whether procedural changes are necessary. If there are recurring issues, the Production Planning Optimization Manager should explore whether changes in planning or resource allocation could prevent future delays.

4. Defects Found During the Maintenance Check

- **CAMO Responsibility:** Defects discovered during maintenance are normal, but the rate of defect detection can indicate the overall effectiveness of prior maintenance work and reliability trends.
- **Key Point:** A higher-than-expected number of defects could suggest underlying issues with aircraft systems or prior maintenance effectiveness. On the other hand, fewer defects indicate a healthy maintenance process.
- **Post-Check Focus:** CAMO should analyze defect data as part of the reliability process to identify trends that may require intervention, such as additional inspections or changes in maintenance intervals.

5. Defects Deferred During Maintenance

- **Challenges:** Deferred defects can represent a risk if they reflect the inability to support the maintenance product effectively due to time constraints, parts availability, or other factors.
- **CAMO and Part 145 Coordination:** Understanding why defects were deferred and addressing them promptly is critical to avoiding long-term airworthiness issues.
- **Post-Check Focus:** Follow up on the causes of deferred defects, assess the impact on airworthiness, and determine if these issues require procedural or resource-related changes to minimize deferrals in future checks.

6. Logistics and Material Availability Issues

- **CAMO Responsibility:** Logistics plays a significant role in ensuring the timely availability of parts and materials. Any delays in parts procurement or unexpected material shortages can disrupt maintenance schedules and inflate manhour usage.
 - **Post-Check Focus:**
 - Investigate logistics issues such as parts delays or urgent orders that increased costs.
 - Identify areas where logistical planning could be improved to ensure parts are preloaded and available when needed.
 - **Key Action:** Review supply chain management and consider whether changes in supplier agreements or inventory strategies could enhance the availability of critical parts.

7. Manpower Issues

- **Workforce Management:** Ensuring that manpower is allocated efficiently to a maintenance check is one of the largest operational challenges for CAMO and Part 145. Too few technicians can cause delays, while too many can result in under-utilization of resources.
 - **Post-Check Focus:**
 - Assess whether manpower was over- or under-allocated.
 - Investigate if skill gaps or misallocation of tasks contributed to inefficiencies.
 - **Key Action:** Enhance workforce planning by reviewing the actual workload versus planned workload, and refine shift scheduling, skill-matching, and overtime planning.

8. Documentation Issues

- **CAMO and Part 145 Responsibility:** Documentation issues can lead to inefficiencies, unnecessary rework, or safety risks. Incorrect, missing, or poorly organized documentation can significantly affect manhour utilization and maintenance outcomes.
 - **Post-Check Focus:**
 - Investigate documentation errors (e.g., incomplete task cards or missing technical instructions).
 - Determine if there is a need for improvements in documentation processes or training for staff.
 - **Action:** If documentation issues are systemic, implement process improvements or quality control mechanisms to reduce paperwork-related delays.

9. Lessons Learned

- **Post-Check Reflection:** One of the most important aspects of post-check analysis is identifying lessons learned to improve future maintenance processes.
 - **Questions to Address:**
 - Were there any human factor issues that affected the maintenance check (e.g., fatigue, miscommunication)?
 - What procedural changes can be implemented to streamline future maintenance checks?
 - **Action:** Translate lessons learned into tangible actions, such as refining planning procedures, enhancing training, or updating tools and equipment based on the insights gained.

10. Integration with Manhour Optimization

- **Manhour Analysis:** A comparison of actual manhours versus MPD estimates helps determine where inefficiencies lie. By incorporating the findings from the post-check analysis (logistics, manpower, documentation, and defects), CAMO can better understand why certain tasks took longer than expected.
 - **Actionable Insights:** Use post-check data to adjust the planning and resource allocation processes, ensuring that future checks are more closely aligned with MPD estimates. Optimizing manhour utilization involves refining not only task allocation but also addressing root causes of inefficiencies, such as parts delays or skill gaps.

- **Continuous Improvement:** This integrated approach allows CAMO and Part 145 organizations to continuously refine their maintenance planning strategies, reduce waste, and optimize the use of manpower and resources, ultimately leading to cost savings and improved aircraft availability.

Conclusion

Post-check analysis combined with manhour optimization provides EASA Part 145 organizations and CAMO with a robust framework for continuous improvement in aircraft maintenance. By carefully analyzing manpower utilization, identifying inefficiencies, and addressing logistical, documentation, and defect-related issues, these organizations can significantly enhance maintenance planning and execution.

- This structured approach to evaluating actual manhour usage versus MPD estimates helps uncover the root causes of discrepancies, whether related to workforce efficiency, non-routine tasks, or operational challenges such as parts delays.
- The key is to translate these insights into actionable changes that improve future maintenance checks, streamline processes, and ensure optimal resource allocation.