EASA Part 145 Optimization of Line Maintenance & Capacity Planning

Sofema Aviation Services (SAS) www.sassofia.com considers the roles and responsibilities related to the Oversight, Management and Control of Line Maintenance Within an EASA Part 145 Production Control Environment.

Introduction

When considering capacity planning (and opportunities for optimisation) of line maintenance, it is crucial to explore the relationship between Part 145 (Production Planning) and Part CAMO (Maintenance Planning), both of which play a critical role in ensuring the smooth and efficient operation of aircraft maintenance activities.

Part 145 – Part CAMO Relationship

The relationship between Part 145 Production Planning and Part CAMO Maintenance Planning hinges on effective coordination of careful planning, resource management, and oversight.

Coordination of Maintenance Work:

- **Part 145 Organizations**: Responsible for performing the actual maintenance work, (example line maintenance).
- Must ensure that the necessary tools, facilities, and personnel are available and that maintenance tasks are planned and performed efficiently.
- 145.A.47 Production Planning focuses on ensuring that maintenance organizations maintain adequate planning procedures for managing the volume and complexity of maintenance tasks.
- This includes the following:
    - **Capacity Management**: The organization must have a system that ensures the capacity to undertake the maintenance, prevent overloading, and effectively allocate resources (staff, facilities, tools) to match the workload.
    - **Scheduling**: Proper maintenance scheduling must be in place to handle the continuous flow of work, with particular attention to unscheduled tasks like Aircraft On Ground (AOG) situations.
    - **Coordination**: The planning process should be integrated across departments, ensuring seamless coordination between logistics, engineering, and production teams.
    - **Staff Availability**: The system should ensure the availability of qualified personnel at the right times to match the planned maintenance schedule.

- **Tools and Equipment**: Adequate planning for the availability and readiness of the necessary tools and equipment must be accounted for.

145- CAMO Liaison

- A critical element in ensuring smooth operations is communication between the Part CAMO and Part 145 organizations. According to M.A.201 and CAMO.A.315, this relationship ensures that the CAMO receives timely maintenance reports, coordinates technical meetings, and conducts reviews of the aircraft's airworthiness.
    - Organizations should establish clear communication lines to address issues like deferred defects, technical problems, or changes in regulatory requirements.
- Specific Meetings between the stakeholders are recommended to review the maintenance status, future needs, and compliance issues.

Optimizing Capacity Management:

Optimizing capacity management ensures the organization can meet its maintenance obligations efficiently.

Personnel and Workforce Planning

- **Workforce Forecasting**: Part 145 organizations need to accurately forecast their workforce needs based on the volume of upcoming maintenance tasks, including both routine and unscheduled tasks.
    - This involves looking at the maintenance ordered by the Continuing Airworthiness Management Organization (CAMO) and matching it with the available workforce.
- **Skill Matching and Availability:** Maintenance tasks may require different levels of expertise (e.g., line maintenance versus heavy maintenance).
    - The organization must ensure that the right staff with the necessary qualifications and certifications are available for specific tasks. (This includes both certifying staff and support personnel).
- **Shift Planning:** Efficient shift management ensures that there is always an adequate number of qualified personnel available to cover the required maintenance tasks, especially in high-demand situations such as Aircraft On Ground (AOG) or urgent repairs.

- **Training and Competence Development:** To maintain flexibility in workforce deployment, Part 145 organizations need to continuously invest in training and development to enhance employee competence, ensuring that staff can handle a broader range of maintenance activities. Cross-training staff can provide more flexibility in scheduling and response to workload variations.

- **Equipment and Tools Management -**Resource Allocation: Part 145 organizations must ensure that the required tools and equipment are available and ready when needed.

    - Maintenance planning should involve scheduling tools in advance, especially those that may be in high demand or specialized, to prevent delays.

- **Tool and Equipment Maintenance:** Proper preventive maintenance for tools and equipment ensures their availability and reliability.
    - Part 145 organizations must have a system to track tool calibration and maintenance schedules to avoid operational disruptions due to equipment unavailability.

- **Inventory Control:** Tools and spare parts should be effectively managed through an inventory control system.
    - This includes maintaining adequate stock levels of high-turnover items and having a clear process for ordering and stocking long lead-time or critical parts.

Forward Planning for Parts and Components

- **Parts Availability:** A key challenge for Part 145 organizations is ensuring that the required parts are available in a timely manner to match the maintenance schedule.
    - This requires close coordination with CAMO to ensure the necessary parts are ordered well in advance.
    - Delays in parts delivery can result in prolonged downtimes and increased costs due to grounded aircraft.

- **Lead Time Management:** Maintenance organizations need to account for the lead time required for ordering parts, especially those with long procurement times or those that require special handling (e.g., life-limited parts).
    - The production plan should accommodate these lead times to prevent last-minute delays.

- **Supply Chain Coordination:** Close collaboration with suppliers is crucial to ensure reliable part deliveries.
    - Establishing agreements with trusted suppliers for just-in-time deliveries or maintaining strategic stockpiles of critical parts can help manage supply risks.

Balancing Maintenance Demand and Capacity

- **Load Smoothing:** Part 145 organizations must work to balance maintenance workloads over time, preventing peaks in demand that could overwhelm available resources.
    - This might involve rescheduling non-critical maintenance during periods of lower demand to create a more even workload distribution.

- **Flexibility for Unscheduled Maintenance:** The organization needs to build in flexibility to respond to unplanned events such as aircraft on ground (AOG) situations, where immediate maintenance is required.
    - This can involve keeping certain resources on standby or having contingency plans for high-priority tasks.

- **Capacity Utilization Monitoring**: To avoid overloading the system, capacity utilization needs to be continuously monitored.
    - This ensures that the available resources (personnel, equipment, and facilities) are not stretched beyond their limits, which could lead to quality or safety issues.

- **Communication and Collaboration with CAMO** Seamless Communication with CAMO: CAMO plays a critical role in planning and scheduling aircraft maintenance.
    - Effective communication channels between the CAMO and the Part 145 organization ensure that the production plan aligns with the overall airworthiness and operational objectives.

- **Coordination of Maintenance Slots:** Part 145 organizations must work with CAMO to ensure that the maintenance slots assigned align with both operational requirements and capacity availability.
    - Regular reviews of planned maintenance tasks, timelines, and resource needs are essential to stay ahead of potential issues.

Risk Management

- **Risk-Based Resource Planning:** Effective capacity management also requires anticipating risks such as parts shortages, staff absenteeism, or equipment failures.
    - By assessing these risks and planning contingencies (e.g., having backup suppliers or overtime plans), the organization can reduce the impact of disruptions on maintenance operations.

- **Capacity Buffering:** A certain level of overcapacity or buffer should be maintained, particularly for critical components of maintenance operations.
    - This ensures that sudden spikes in demand or unforeseen technical issues can be accommodated without affecting delivery schedules.

Considerations Related to the CAMO's Role in Maintenance Planning

- **Maintenance Oversight**: The Continuing Airworthiness Management Organization (CAMO) is responsible for ensuring the aircraft's airworthiness by developing and overseeing the maintenance schedule.
    - This includes both planned and unplanned maintenance events.
    - CAMO must ensure that all mandatory maintenance is performed in accordance with regulatory requirements, such as airworthiness directives (ADs), service bulletins (SBs), and manufacturer recommendations.

- **Coordination with Part 145**: CAMO is required to coordinate closely with Part 145 organizations to ensure that maintenance tasks are scheduled, and the necessary resources (e.g., workforce, parts, and tools) are available.
    - This coordination ensures that maintenance tasks are carried out in a timely and efficient manner without negatively affecting the operational schedule of the aircraft.

- **Long-Term and Short-Term Planning**: CAMO is responsible for balancing immediate maintenance needs (e.g., routine inspections, defect rectifications) with long-term airworthiness objectives (e.g., major overhauls, modifications).
    - CAMO must ensure that maintenance planning is aligned with both operational schedules and regulatory requirements, taking into account the availability of resources and minimizing downtime.

- **Workload Distribution**: CAMO has a key role in ensuring that maintenance workload is distributed evenly across different timeframes and maintenance slots.
    - This helps to optimize the utilization of the Part 145 organization's resources, preventing bottlenecks that could lead to delays or maintenance overload.

Challenges in the Part CAMO and Part 145 Relationship

- **Communication and Coordination** Effective communication between CAMO and Part 145 is crucial to ensure that all planned and unplanned maintenance tasks are executed without delay.
    - Miscommunication or poor coordination can result in scheduling conflicts, delays in the maintenance process, and even potential regulatory non-compliance.

- **CAMO Responsibility**: CAMO must ensure that there is a continuous flow of information to the Part 145 organization regarding maintenance needs, timelines, and priorities. Any changes in the maintenance schedule must be communicated immediately to allow Part 145 to adjust their planning.

    - CAMO must ensure that the aircraft remains airworthy without causing operational disruptions. However, balancing maintenance requirements with the aircraft's operational schedule can be challenging, especially in high-utilization environments where aircraft are required to be available frequently.
    - CAMO must work within operational constraints, such as flight schedules or aircraft availability, to plan maintenance slots that minimize disruption to flight operations.

Resource Availability

- A significant challenge for CAMO is ensuring that the necessary resources—such as qualified personnel, parts, and tools—are available when needed for maintenance activities.
    - This is particularly critical for tasks requiring specific expertise or hard-to-source parts.
    - CAMO must coordinate closely with Part 145 to ensure that maintenance requirements are aligned with available resources.
    - This requires both short- and long-term planning, ensuring that parts are ordered well in advance, and personnel requirements are communicated to the Part 145 organization to ensure sufficient capacity.
    - CAMO must also consider supply chain risks, such as long lead times for parts or unexpected equipment shortages, which could delay maintenance and affect the aircraft's airworthiness.

Handling Unplanned Maintenance

- **Unplanned maintenance events**, such as AOG (Aircraft on Ground) situations, can cause significant disruptions to both the maintenance plan and the operational schedule.
    - CAMO must have contingency plans in place to handle such events efficiently. This could involve keeping certain maintenance slots or resources available for emergencies, ensuring quick communication with the Part 145 organization to deploy resources immediately, and coordinating with suppliers for expedited part deliveries if needed.
    - CAMO must build flexibility into the maintenance planning process to respond to unexpected maintenance events without severely impacting the operational schedule.

Summary The relationship between Part 145 and Part CAMO is critical for ensuring the maximum availability of the aircraft while optimizing resource use.

- Clear communication, detailed planning, and well-defined responsibilities help align maintenance activities with both operational demands and regulatory requirements.
- This synergy allows for efficient capacity planning and minimizes downtime, particularly in high-demand situations such as line maintenance.
- Line maintenance often requires flexibility due to the operational nature of the work.
    - Unscheduled maintenance tasks or last-minute changes to the aircraft's schedule require CAMO and Part 145 to be adaptable.
    - One-time work orders can be used by CAMO to request specific maintenance tasks without a long-term contract, ensuring timely repairs .

Check Sheet items for Review and Evaluation

Coordination of Maintenance Work

- Is the organization ensuring seamless coordination between Part 145 and CAMO for maintenance planning?

Capacity Management

- Does the organization have a system to manage maintenance capacity effectively?

Scheduling

- Is proper scheduling in place to manage continuous maintenance flow, including unscheduled tasks?

Staff Availability

- Are qualified personnel available for the planned maintenance schedule?

Tools and Equipment Readiness

- Are tools and equipment available and ready for use when needed?

Communication with CAMO

- Are there clear communication lines established between Part 145 and CAMO?

Workforce Forecasting

- Is workforce forecasting being performed based on upcoming maintenance tasks?

Skill Matching & Availability

- Are the required skills and certifications matched to maintenance tasks?

Shift Planning

- Is shift planning effective in covering maintenance tasks during high-demand periods?

Training & Competence Development

- Is there a system for continuous training and competence development?

Tools & Equipment Maintenance

- Is preventive maintenance for tools and equipment scheduled and monitored?

Inventory Control

- Is the inventory control system managing tools and spare parts effectively?

Parts Availability

- Are necessary parts available to meet the maintenance schedule in a timely manner?

Lead Time Management

- Are lead times for part procurement considered and planned for in advance?

Supply Chain Coordination

- Is there a process for effective supply chain coordination for parts and tools?

Load Smoothing

- Is the organization balancing the maintenance load to avoid peak overload?

Capacity Utilization Monitoring

- Is capacity utilization being monitored to prevent overloading?

Risk-Based Resource Planning

- Is risk-based resource planning in place to mitigate disruptions (e.g., parts shortages, absenteeism)?

CAMO Coordination for Maintenance Planning

- Is CAMO closely coordinating with Part 145 for timely and efficient maintenance planning?

Handling Unplanned Maintenance

- Does the organization have contingency plans for handling unplanned maintenance (AOG situation)