



SNS COLLEGE OF TECHNOLOGY

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DEPARTMENT OF AEROSPACE ENGINEERING

19ASB303 AIRCRAFT MAINTENANCE ENGINEERING

UNIT V – AIRCRAFT MAINTENANCE

Airlines scheduling, Product support and spares

1. Introduction to Airlines Scheduling

Airlines scheduling is a highly complex process that involves multiple components and constraints. It is crucial for the profitability and operational efficiency of airlines. The process includes planning flight routes, assigning aircraft, scheduling maintenance, and managing crew rosters. The goal is to maximize the utilization of resources while ensuring safety, compliance with regulations, and customer satisfaction.

2. Key Components of Airlines Scheduling

- **Aircraft Fleet Management:** Airlines must consider the number and types of aircraft in their fleet, seating capacity, and different classes of service.
- **Maintenance Scheduling:** Aircraft require regular maintenance, and schedules must ensure that maintenance can be performed at appropriate locations.
- **Airport Constraints:** Factors such as the number of available gates, security checkpoints, and operational hours must be considered.
- **Crew Scheduling:** This involves creating pairings (work assignments) and rosters (individual schedules) for pilots and cabin crew, while adhering to labor laws and crew preferences.
- **Customer Demand:** Schedules must align with customer preferences, such as business travelers needing early morning flights or tourists needing flights that help with time zone adjustments.

3. Product Support and Spares in Airlines Scheduling

Product support and spares management is a critical aspect of airlines scheduling. It ensures that the necessary parts and equipment are available when needed, minimizing delays and disruptions.

- **Inventory Management:** Efficient inventory management is essential to prevent overstocking and stockouts. Airlines use forecasting tools to predict future demand based on historical data, maintenance schedules, and aircraft usage.

- **Spare Parts Procurement:** Airlines must procure the necessary spare parts either from external suppliers or through in-house production. This process involves selecting the right suppliers and ensuring timely delivery.
- **Inventory Control:** Real-time tracking tools, such as barcode scanners, are used to maintain accurate records of inventory levels. Airlines also need to manage the lifecycle of parts, removing obsolete items to avoid safety risks and storage inefficiencies.
- **Order Fulfillment Tracking:** Monitoring orders from placement to delivery ensures that parts arrive on time and in good condition, keeping maintenance schedules on track.
- **Compliance and Documentation:** The aerospace industry is heavily regulated, requiring airlines to maintain detailed records for each part, including airworthiness certificates and maintenance histories.

4. Modern Breakthroughs in Airlines Scheduling

Recent advancements in technology have led to significant improvements in airlines scheduling:

- **Clean Sheet Optimization:** Modern solutions can develop schedules without relying on previous year's data, allowing for more innovative and efficient planning.
- **Reliability and Profitability:** New models simulate schedule reliability, factoring in various operational constraints to balance profitability and on-time performance.
- **Operations-Friendly Schedules:** Modern systems ensure that crew and maintenance needs are integrated into the scheduling process, optimizing crew rotations and reducing operational costs.
- **Improved Forecast Accuracy:** Machine learning and AI algorithms enhance forecast accuracy, leading to better route selection and fleet assignment.
- **Commercial Integration:** Scheduling is now closely linked with commercial strategies, allowing airlines to optimize offers and improve customer satisfaction.
- **Post-Publication Optimization:** Airlines can now make adjustments to published schedules to capture additional revenue opportunities.
- **Automation and Streamlining:** Modern scheduling solutions use micro-optimizers to resolve conflicts and suggest changes, reducing the need for manual intervention.

5. Conclusion

Airlines scheduling is a multifaceted process that requires careful consideration of various operational and commercial factors. Efficient product support and spares management are integral to ensuring smooth operations. With advancements in

technology, airlines can now develop more reliable, profitable, and customer-friendly schedules, ultimately improving their overall performance and competitiveness.

