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School of Business

Master of Business Administration MBA Dual Specialization
Semester End Examination - May 2024

Duration : 180 Minutes
Max Marks : 100

Sem IV - MBAV6012 - Aircraft Maintenance Management

General Instructions

Answer to the specific question asked

Draw neat, labelled diagrams wherever necessary

Approved data hand books are allowed subject to verification by the Invigilator

- 1) Identify strategies for effectively receiving, distributing, and maintaining a library system for various publications received from aircraft manufacturer. K3 (6)

- 2) Role of MCC in GO FIRST: GO FIRST Airlines operates a fleet of commercial aircraft and has a dedicated Aircraft Maintenance Directorate responsible for overseeing major maintenance activities. The manager of hangar maintenance, line maintenance, and the Maintenance Control Center (MCC) play crucial roles in ensuring the airworthiness and operational efficiency of the airline's fleet. As the manager of hangar maintenance at GO FIRST Airlines, you are tasked with overseeing all maintenance activities conducted in the hangar, including modifications, engine changes, "C" checks, corrosion control, and painting. Your responsibilities also extend to managing various support shops and ground support equipment. GO FIRST Airlines has recently experienced an increase in maintenance requirements due to fleet expansion and aging aircraft. As the hangar maintenance manager, you need to efficiently allocate resources, coordinate with other departments, and ensure compliance with airline policies and procedures to maintain the fleet's airworthiness and minimize downtime. Questions: a) Explain the steps you take to ensure compliance with airline policies and procedures during maintenance activities in the hangar. (4) b) How do you prioritize maintenance tasks and allocate resources effectively to meet the airline's operational requirements while minimizing aircraft downtime in the hangar?(4) K4 (8)

- 3) Enhancing Material Directorate Functions in an MRO Facility: Skyworks MRO, a leading aircraft Maintenance, Repair, and Overhaul (MRO) facility, is seeking to optimize its material directorate functions to improve efficiency and reduce operational costs. Following are the possible suggestions proposed by the maintenance organizations :
1. Purchasing Optimization: MRO appoints a manager to enhance procurement, implement order tracking, and improve warranty claim handling.
 2. Stores Management Enhancement: New manager focuses on improving storage, handling, and distribution for quick access and minimal downtime.
 3. Inventory Control Enhancement: Dedicated manager ensures optimal stock levels with inventory software and data-driven forecasting.
 4. Shipping and Receiving Optimization: Manager streamlines logistics, improving packing, waybill preparation, customs clearance, and receiving inspection.
- K4 (8)

Questions

1. Examine the Impact: How does the appointment of dedicated managers impact the overall efficiency of SKYWORKS MRO's material directorate functions? (4)
 2. Analyse how inventory management software and a data-driven approach to forecasting contribute to optimizing inventory levels and in SKYWORKS MRO's operations.(4)
- 4) Examine the primary objectives of the Maintenance and Engineering (M&E) department in ensuring operational readiness and safety? K4 (4)

5) Caselet: The aviation industry is undergoing a transition towards digitizing business aviation maintenance records. To address this issue, Vision Aircraft Records has formed a strategic partnership with ARC Document Solutions, offering secure, on-site scanning services to streamline the conversion of paper records into digital formats. This partnership aims to alleviate financial and regulatory risks associated with transporting aircraft logbooks and improve the efficiency of recordkeeping practices in the industry.

K3 (9)

Questions:

1. What specific logistical and regulatory challenges are associated with transporting aircraft logbooks to scanning facilities?(3)

2. How can improved recordkeeping practices benefit aircraft owners and flight departments in terms of financial and operational efficiency? (3)

3. What measures can be implemented to ensure the completeness and accuracy of digitized maintenance records?(3)

6) Productivity issues with SOL Lineas:

K5 (10)

Similar to many start-up airlines, Sol Lineas Aereas initially focused on establishing its core operations and compromised on quality of maintenance. As a result, the airline faced challenges in maintaining aircraft utilization and controlling costs. To address these issues, the technical department was tasked to investigate solutions to reduce aircraft enhance maintenance management.

They formed a team of engineers, planners and maintenance staff for reducing turnaround times and ensuring user-friendly system by staff.

Sol Lineas selected Volartec's Alkym® software for Aircraft Maintenance. The decision was based on the quick implementation of three weeks. This involved involved remote pre-implementation activities followed by onsite configuration, training, and support.

Questions:

1. What were the key challenges faced by Sol Lineas Aereas in managing its aircraft fleet maintenance, and how did the airline prioritize its objectives for improving maintenance management?(5)

2. Why did Sol Lineas Aereas select Volartec's Alkym® Management and Control System for Aircraft Maintenance over other options, and how did the implementation process align with the airline's operational requirements and constraints?(5)

7) Caselet: Operational Delay Due to Control Issue on Aircraft An aircraft pilot in command, flying for an airline, encounters a problem with the controls when he is just 2 hours away from his arrival station. Promptly, he documents the issue in the aircraft logbook. Upon arrival, they discover the control issue and begin repair actions. However, the repair process extends slightly beyond the scheduled turnaround time, resulting in a delay in the aircraft's departure. This delay could have been prevented if the maintenance crew had been informed about the issue in advance, enabling them prepare before the aircraft's arrival.

Questions:

1. What procedural changes can the airline and its Maintenance, Repair, and Overhaul (MRO) partner implement to ensure timely communication of aircraft issues to maintenance crews?(5)
2. How can the airline and its MRO optimize their workflow and coordination processes to streamline the identification of maintenance actions and minimizing turnaround time disruptions?(5)

8) Case Study:

K5 (15)

Title: "Enhancing Fleet Maintenance Efficiency: easyJet's Adoption of Aerogility"

EasyJet has embarked on a journey to optimize its fleet maintenance operations by implementing Aerogility, an advanced planning system originally developed for the defence market. In 2017, easyJet recognized the potential of Aerogility to enhance its operations and signed an agreement to implement the system. Swaran Sidhu, head of fleet technical management at easyJet, emphasized the importance of Aerogility in optimizing maintenance planning for the airline's fleet of over 300 aircraft, characterized by high daily utilization rates and short turnaround times. Aerogility revolutionized easyJet's medium- and long-term maintenance planning by running simulations of actual flight schedules to identify maintenance check timings and allocate hangar slots for heavy checks. The system's efficiency was highlighted by Ruth Martin, maintenance operations planning lead, who noted that an 18-month schedule could be generated in just 30 seconds. This contrasted starkly with traditional spreadsheet-based methods, which often took weeks to develop complex programs and were prone to errors.

EasyJet anticipates several benefits from using Aerogility, including optimizing retirement dates to coincide with new aircraft deliveries, thereby ensuring a smooth transition and reducing return periods by up to a week. This alignment of retirement and delivery dates is crucial for minimizing operational disruptions and maximizing fleet efficiency.

Based on above answer the questions:

1. Explain how easyJet recognized the potential of Aerogility to enhance its fleet maintenance operations?(3marks)
2. How does Aerogility utilize intelligent agents and various data sources to optimize maintenance planning, and what benefits does this approach offer over traditional methods? (3marks)
3. What specific challenges did easyJet face in its maintenance operations, and how does Aerogility assist in overcoming these challenges (3marks)
4. What are the anticipated benefits of using Aerogility for fleet program optimization,as highlighted by easyJet's maintenance operations planning lead, Ruth Martin? (3marks)
5. How does the implementation of Aerogility reflect easyJet's commitment to streamline operations and enhance efficiency? (3marks)

9) MRO IT Overhaul for Air India: Air India, Indian Airlines, Alliance Air, and Air India Express operated a combined fleet of 133 aircraft, conducting approximately 470 flights daily. Following the merger of Air India and Indian Airlines in 2007, the MRO-engineering functions of all four airlines were consolidated under AIESL. The management recognized the need to replace existing maintenance and engineering IT solutions to facilitate seamless integration. The main objectives were to establish a single harmonized platform across all locations, enhance aircraft availability and utilization, optimize inventory planning, reduce turnaround times, and improve supply chain visibility. In 2007, Air India and Indian Airlines were merged as far as operations were concerned, Alliance Air continued with separate operations using smaller aircraft and Air India Express similarly remained a low-fare airline. However, the MRO-engineering functions of all four airlines were merged into a single company 'Air India Engineering Services Limited' (AIESL). At the same time, management considered replacing the existing maintenance and engineering MRO IT solutions following the merger of the engineering functions of all four airlines. The country was divided into four regions (North, South, East and West) plus a central location in Hyderabad. For the MRO solution, the main objectives were to create a single harmonized platform across all the companies and locations; to increase aircraft availability and utilization; to achieve better and more accurate inventory planning with reduced costs; manage faster rectification of snags for a reduction in TAT (turn-around times); and have increased visibility of parts through all stages of the supply chain.

Harmonizing the processes had to take account of the fact that the culture in each of the companies was different. For instance, whereas Air India was a centralized business, Indian Airlines had been decentralized over four regions. The fleets were also different with Air India using mainly wide body Boeings on its international services while Indian Airlines used mainly narrow body Airbus aircraft for its domestic services. When it came to approvals, Air India had delegated financial power to individuals while Indian Airlines worked through a committee structure

Once management had decided to introduce new software work was started to compile the requirements and to list the shortcomings of the existing system as ideas were invited from the shop-floor on new requirements. Company then undertook a market survey of available solutions including feedback from other airlines and MROs because not only was Air India maintaining its own fleet but was also maintaining engines and aircraft, and conducting line maintenance for the aircraft of other international airlines.

The next task was to establish a Software Selection Team and, in this, the company demonstrated the seriousness with which it regarded this project with three Board members sitting on the steering

committee which comprised:- Director- Engineering – Airframe; Director- Engineering – Engine & Components; Director- Finance; Executive Director –IT; Executive Director – Materials. In the working group, as well as the overall project manager, there were expert members from all of the engineering areas that would be impacted by the software change:- Project Manager; Experts from... Quality; Maintenance; Engine; Component; Contracts; Training; Material planning; Material Procurement; IT; Tech Services; Production Planning

Software selection steps

More than thirty vendors of which nine met technical requirements after commercial evaluation process, three were shortlisted. Those three were invited to make detailed demonstrations of their solutions after which selected one vendor, Ramco Aviation Solution. Having made final selection in October 2010, the project was started in December 2010 and it gave ourselves eighteen months to implement the new solution.

This was a crucial step because, with representatives from four companies' engineering, materials and finance functions as well as Ramco, Airline had to select just one business process that would be acceptable to all four companies.

By April 2011, Air india had completed the solution definition and started with the User Champion training at multiple locations. This was crucial for a successful change management while moving from disparate systems to one integrated solution.

Based on the case above, answer the questions below:

1. What were the main objectives behind Air India's decision to integrate maintenance and engineering operations into a single entity?
(3)
2. Discuss the challenges faced in harmonizing processes across the four airlines, considering differences in organizational structure, fleet compositions, and approval mechanisms.(3)
3. How did the selection process for the new IT system unfold, and what criteria were used to evaluate potential vendors?(3)
4. Explain the significance of defining standardized business processes acceptable to all four airlines during the integration of IT systems.(3)
5. What were the key challenges encountered during the implementation phase, particularly in solution definition and user training, and how were they addressed?(3)
6. Reflect on the role of change management in ensuring the successful adoption of the integrated IT system across multiple locations and organizational units within Air India.(3)

10) Case Study:

SKYJET Airlines incurs significant expenses on engine restorations, which contribute to overall maintenance costs. To address this challenge, SKYJET Airlines will implement Engine Fleet Planning and Costing (EFPAC) which will integrate operational, technical, and financial data to create efficient shop visit plans, considering factors such as degradation, unscheduled maintenance activities (e.g., bird hits), and end-of-lease requirements. By automating the process it will streamline decision-making and help SKYJET Airlines optimize its maintenance schedules. As a result SKYJET Airlines will successfully reduce its annual engine maintenance shop visit costs by up to 15%. Additionally, EFPAC will allow SKYJET Airlines to update its maintenance plans easily and quickly in response to changing operational and financial requirements.

Based on above answer the questions:

1. How does Engine Fleet Planning and Costing (EFPAC) help SKYJET Airlines optimize its engine maintenance shop visit plans?(4)
2. What are the key factors contributing to the significant cost savings achieved by SKYJET Airlines through the implementation of EFPAC? (4)
3. How does the automation of shop visit planning processes improve operational efficiency and decision-making at SKYJET Airlines?(4)