

Report on

Store, Warehousing and Inventory Management System in Bangladesh:
Upgradation Approach in Bangladesh Civil Aviation Authority (CAAB).

by

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This report is submitted to the BRAC Institute of Governance and Development (BIGD), BRAC University, towards the fulfillment of the requirements for the degree of 'Masters in Procurement and Supply Management'.

BRAC Institute of Governance and Development (BIGD),

BRAC University

April, 2024

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Declaration

I hereby affirm that:

The internship report submitted represents my own original work completed during my degree program at BRAC University.

The report does not contain any material previously published or authored by a third party, except where appropriately cited through full and accurate referencing.

The report does not include material that has been accepted or submitted for any other degree or diploma at a university or institution.

I have duly acknowledged all primary sources of assistance.

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Letter of Transmittal

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MCIPS (Deputy Secretary, Govt. Of Bangladesh) Deputy Project Director,

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BRAC University, 66 Mohakhali, Dhaka- 1212.

Subject: Submission of PSM-665: Store, warehousing and Inventory Management System in Bangladesh: Upgradation approach in Bangladesh Civil Aviation Authority (CAAB) Report/Practicum.

Dear Sir,

I want to use this chance to submit my internship report, "Store, warehousing and Inventory Management System in Bangladesh: Upgradation approach in Bangladesh Civil Aviation Authority (CAAB)," in order to partially meet the MPSM requirement at BIGD, BRAC University.

I have made an effort to conclude the report with the most significant data and recommendations in the most concise and detailed manner possible. I think this report will fulfil the standard for an academic report in the best way feasible.

Sincerely yours,

Md. Golam Mostofa

Student ID: 22382013

BRAC Institute of Governance & Development (BIGD)

BRAC University

April 30, 2024

Non-Disclosure Agreement

This agreement is established between the Civil Aviation Authority of Bangladesh, herein referred to as the First Party, and the undersigned student at the BRAC Institute of Governance and Development, BRAC University, herein referred to as the Second Party.

The Master of Procurement and Supply Management program requirements include the completion of a report titled "Store, Warehousing, and Inventory Management System in Bangladesh: Upgradation Approach in Bangladesh Civil Aviation Authority (CAAB)." The First Party grants permission to the Second Party to undertake this project.

As part of this agreement:

The Second Party will closely interact with representatives of the Civil Aviation Authority of Bangladesh and will have access to official information and statistics necessary for the completion of the report.

The Second Party will utilize their professional experience, gathered statistics, and acquired information to prepare the report.

The Second Party will use all data and material obtained solely for academic purposes, ensuring the confidentiality and protection of the interests of the First Party by refraining from making any information public without authorization.

By signing below, the parties acknowledge and agree to the terms outlined in this agreement.

First Party:

Md. Moazzem Hossain

Director (Procurement, Stores and Supply)

Director (Procurement, Stores and Supply), Central Procurement, Engineering and Store Unit (CEMSU), CAAB, Kurmitola, Dhaka-1229.

Second Party:

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Acknowledgment

I extend my deepest gratitude to the Almighty for His consistent blessings, and to my dear parents for their unwavering motivation and inspiration during my pursuit of the Masters in Procurement and Supply Management (MPSM) degree.

I am immensely thankful to my supervisor, Engr. Md. Enamul Huque, MCIPS, Deputy Project Director at Dhaka Mass Transit Company Ltd (DMTCL), for his invaluable assistance and guidance throughout the production of this report. His detailed instructions were instrumental at every step.

I also express my sincere appreciation to my departmental supervisor, Mr. Md. Moazzem Hossain, Director (Procurement, Stores and Supply) at Central Procurement, Engineering, and Store Unit (CEMSU), CAAB, Kurmitola, Dhaka-1229. It was an honor to complete this practicum under his direction, benefiting from his professionalism, industry experience, knowledge, and motivation.

I am grateful for the learning opportunities provided by the MPSM program at BIGD, BRAC University.

To my MPSM peers and coworkers, thank you for your unwavering support, tolerance, and inspiration. I extend my gratitude to all who contributed to the completion of this report, particularly in the context of the PSM-665 practicum on Store, Warehousing, and Inventory Management System Upgradation Approach at Bangladesh Civil Aviation Authority (CAAB).

Thank you all for your invaluable contributions.

Warm regards,

Md. Golam Mostofa

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Executive Summary

The Civil Aviation Authority of Bangladesh (CAAB) serves as the regulatory body overseeing the country's aviation sector. Established in 1985, its primary mandate is to ensure the safety, security, and efficiency of civil aviation operations. CAAB manages and develops airports, air navigation services, and aviation infrastructure to foster a robust and sustainable aviation industry. Committed to international standards, CAAB collaborates with global aviation authorities and organizations. It plays a crucial role in promoting economic growth and connectivity by facilitating safe and seamless air travel. With a focus on continuous improvement, CAAB contributes to the advancement of Bangladesh's aviation landscape while prioritizing safety and compliance with international aviation standards.

Warehouses are essential for storing spare parts, equipment, and tools necessary for aircraft maintenance and repair. Having readily available parts ensures timely repairs and maintenance, minimizing downtime for aircraft. Efficient warehousing allows for proper inventory management of essential items required for aviation operations. This includes tracking stock levels, replenishing supplies, and ensuring that necessary items are always available when needed. Warehouses provide a secure environment for storing sensitive aviation equipment and materials. Proper security measures, such as surveillance systems and restricted access, help prevent theft, damage, or unauthorized use of critical aviation assets. Warehouses serve as distribution centers for receiving, storing, and distributing goods and materials to various locations within the aviation network. This ensures smooth logistics operations and timely delivery of supplies to different airports and aviation facilities. Effective warehouse management enables the optimization of storage space, allowing CAAB to utilize available space efficiently. This ensures that the maximum amount of inventory can be stored without overcrowding or wastage of space. Warehousing operations within the aviation industry must adhere to strict regulatory standards and guidelines. Compliance with regulations ensures the safe storage of hazardous materials, proper handling of goods, and adherence to security protocols. In the event of emergencies or unexpected disruptions, warehouses play a vital role in providing immediate access to essential supplies and equipment. Having well-equipped warehouses stocked with emergency provisions can help CAAB respond swiftly to crises such as natural disasters or aircraft incidents.

Overall, the importance of warehousing in the Civil Aviation Authority of Bangladesh cannot be overstated, as it directly impacts the efficiency, safety, and reliability of aviation operations within the country.

The Purpose of this report is to establish the efficient, cost effective and realistic store inventory and warehousing management system in Central Procurement Engineering & Store Unit (CEMSU) at CAAB. When it will be established in all portions of CAAB then it indirectly helps to achieve the vision-mission of CAAB. At present all stores unit & its inventory system are being operated manually and the existing warehouse is not well decorated, not full of modern facilities. So, it should be upgraded as early as possible.

Keywords: Inventory control, Stock Management, Safety stock, FIFO, LIFO, Warehouse management system (WMS)

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List of Acronyms

CAAB- Civil Aviation Authority of Bangladesh

EDS – Explosive Detection System

ARFF – Airport Rescue Fire Fighting.

DVOR – Doppler Very high frequency omni Range

VCCS – Voice Control Communication System.

NDB – Non-directional beacon.

SKU - Stock Keeping Unit

WMS - Warehouse Management System

ERP - Enterprise Resource Planning

ABC - Always Better Control (Inventory classification method)

RFID - Radio Frequency Identification

BOM - Bill of Materials

PO - Purchase Order

ROQ - Reorder Quantity

ROI - Return on Investment

KPI - Key Performance Indicator

LIFO - Last In, First Out

FIFO - First In, First Out

EOQ - Economic Order Quantity

MRP - Material Requirements Planning

QC - Quality Control

SP - Safety Stock

WIP - Work In Progress

Chapter-1:

1. Introduction to Civil Aviation Authority of Bangladesh (CAAB):

The Civil Aviation Authority of Bangladesh (CAAB) serves as the regulatory body overseeing all aviation-related activities within Bangladesh. Operating under the Ministry of Civil Aviation & Tourism, CAAB manages and supervises the country's nine operational airports, comprising three international and six domestic airports. Headquartered in Kurmitola, Dhaka, CAAB is a member of the International Civil Aviation Organization (ICAO) and has established bilateral air transport agreements with 52 states.

1.1 Functions of Civil Aviation Authority of Bangladesh (CAAB):

As the designated aeronautical authority of Bangladesh, CAAB is responsible for implementing government regulations, directives, and international aviation standards set by ICAO. The organization carries out its functions in accordance with the provisions outlined in the Civil Aviation Ordinance 1960 and Civil Aviation Rules 1984. The major functions of CAAB include:

Flight Safety and Regulation: Ensuring the safety and regulatory compliance of aviation operations within Bangladesh's airspace.

Air Traffic Services: Managing and coordinating air traffic control services to facilitate safe and efficient air navigation.

Communication and Navigation: Maintaining communication systems and navigation aids essential for air traffic management.

Airport and Anti-Hijack Security: Implementing security measures to safeguard airports and prevent hijacking incidents.

Facilitation of Passengers: Enhancing passenger services and facilities at airports to ensure a seamless travel experience.

Construction and Maintenance of Airports: Overseeing the construction, development, and maintenance of airport infrastructure across the country.

Development Planning: Formulating strategic plans and initiatives for the sustainable growth and development of civil aviation in Bangladesh.

By carrying out these functions, CAAB plays a pivotal role in promoting aviation safety, facilitating air transportation, and contributing to the overall development of Bangladesh's civil aviation sector in alignment with international standards and best practices.

1.2 Objectives of the Civil Aviation Authority of Bangladesh (CAAB):

The Civil Aviation Authority of Bangladesh (CAAB) is committed to achieving a comprehensive set of objectives aimed at enhancing the safety, security, and efficiency of civil aviation operations within the country. These objectives are vital for the development and sustainability of the aviation industry in Bangladesh:

Safety Oversight: CAAB's primary objective is to establish and maintain a robust safety oversight system. This involves monitoring and regulating all aspects of civil aviation, including aircraft operations, maintenance, and personnel licensing, to ensure compliance with international safety standards set by organizations such as the International Civil Aviation Organization (ICAO). CAAB's focus on safety aims to prevent accidents and incidents, ensuring the protection of passengers and crew.

Regulatory Framework: CAAB is responsible for formulating and enforcing regulations and guidelines that govern civil aviation activities in Bangladesh. These regulations cover areas such as airworthiness standards, licensing requirements, and operational procedures. By establishing a strong regulatory framework, CAAB promotes consistency, standardization, and adherence to international aviation norms, fostering a safe and efficient aviation environment.

Air Traffic Management and Navigation Services: CAAB oversees and manages air traffic services, air navigation facilities, and communication systems. Ensuring the smooth flow of air traffic and providing reliable navigation services are essential components of CAAB's objectives. By optimizing airspace utilization and enhancing air traffic management, CAAB contributes to operational efficiency, reduces congestion, and minimizes delays.

Airport Development and Management: CAAB is actively involved in the planning, development, and management of airports across Bangladesh. This includes the construction and expansion of airport infrastructure, ensuring facilities meet international standards, and creating a conducive environment for air travel. Airport development is critical for accommodating the growing demand for air travel and promoting economic activities linked to aviation.

International Collaboration: CAAB engages in international collaboration and cooperation with other civil aviation authorities, organizations, and regulatory bodies. Participation in forums, sharing information, and adopting best practices help CAAB stay aligned with global standards. This collaboration enhances knowledge exchange, fosters mutual understanding, and facilitates a harmonized approach to addressing international aviation challenges.

Capacity Building and Training: To maintain a high level of competence within the aviation industry, CAAB focuses on capacity building and training programs. This extends to personnel involved in various aspects of civil aviation, including pilots, air traffic controllers, engineers, and aviation management professionals. Continuous training ensures that the workforce is well-equipped with the skills and knowledge necessary for safe and efficient aviation operations.

Environmental Sustainability: CAAB recognizes the importance of environmental sustainability in aviation. It implements measures to reduce the environmental impact of aviation activities, including initiatives to enhance fuel efficiency, minimize emissions, and adopt eco-friendly practices in airport operations.

In summary, the Civil Aviation Authority of Bangladesh plays a crucial role in fostering a safe, secure, and efficient civil aviation environment. Its multifaceted objectives encompass safety oversight, regulatory framework development, air traffic management, airport development, international collaboration, capacity building, and environmental sustainability. By diligently pursuing these objectives, CAAB contributes to the growth and advancement of the aviation sector in Bangladesh, ensuring alignment with global standards and best practices.

1.3: Objective of this study report:

The objectives of this study report are twofold:

1.3.1 Assessment of Warehouse Management System (WMS) Limitations: The primary objective is to identify the current limitations of the Warehouse Management System (WMS) operated under the Central Procurement Engineering and Store Unit (CEMSU) at CAAB. This assessment aims to pinpoint deficiencies in the existing system and understand how these shortcomings can be addressed through procurement processes. The goal is to propose strategies for upgrading the store and inventory system to enhance efficiency and effectiveness.

1.3.2 Recommendations for Accountability and Effectiveness Improvement: Another objective of this study report is to propose measures aimed at ensuring accountability throughout the procurement process at CAAB. This includes identifying areas where accountability may be lacking and suggesting concrete steps to improve accountability mechanisms. Additionally, the study aims to recommend strategies to increase overall effectiveness in procurement operations, optimizing processes to achieve higher efficiency and performance.

By fulfilling these objectives, this study report seeks to contribute to the enhancement of the Warehouse Management System (WMS) and overall procurement processes at CAAB, fostering improved efficiency, accountability, and effectiveness in store and inventory management.

1.4: Organization Overview:

The Civil Aviation Authority of Bangladesh (CAAB) serves as the regulatory authority overseeing the civil aviation sector in the country. Established in 1985, CAAB operates under the Ministry of Civil Aviation and Tourism, with a mandate to ensure the safety, security, and efficiency of aviation operations.

CAAB's primary responsibilities include safety oversight, regulatory framework development, and air traffic management. It enforces stringent standards in accordance with international guidelines, particularly those established by the International Civil Aviation Organization (ICAO). This emphasis on safety oversight extends to monitoring aircraft operations, maintenance practices, and personnel licensing to prevent accidents and ensure the well-being of passengers and crew.

The regulatory framework set forth by CAAB covers a broad spectrum of aviation activities, including airworthiness standards, licensing requirements, and operational protocols. By

establishing and enforcing these regulations, CAAB contributes to the standardization and consistency of aviation practices within Bangladesh, aligning them with global norms.

In managing air traffic, CAAB plays a crucial role in optimizing airspace utilization, enhancing air navigation services, and reducing congestion and delays. The authority is actively involved in airport development, ensuring that facilities meet international standards and accommodate the growing demand for air travel, thereby contributing to economic growth and connectivity. International collaboration is integral to CAAB's approach, as it engages with other civil aviation authorities and organizations to exchange knowledge, adopt best practices, and maintain alignment with global standards.

Additionally, CAAB places a strong emphasis on capacity building and training programs to ensure a skilled and competent workforce across various aviation disciplines.

In summary, the Civil Aviation Authority of Bangladesh plays a pivotal role in fostering a safe, secure, and efficient civil aviation environment. Through its regulatory functions, emphasis on safety, and commitment to international collaboration, CAAB contributes to the growth and sustainability of the aviation sector in Bangladesh.

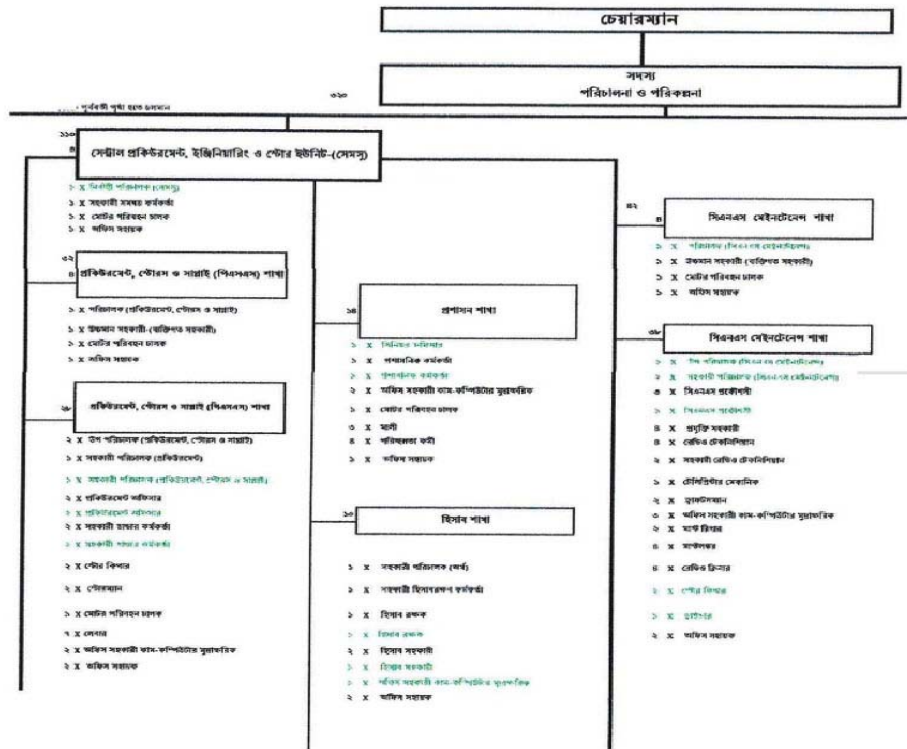
1.4.1 Mission:

Ensuring safe, seamless and efficient aviation services of international standards

1.4.2 Vision:

Making Bangladesh a major aviation hub.

1.4.3: Introduction to Central Procurement, Engineering and Store Unit (CEMSU):



Central Procurement, Engineering, and Store Unit of CAAB play a crucial role in ensuring the smooth functioning and development of the aviation sector within Bangladesh. This unit serves as a centralized hub responsible for the procurement of essential equipment, engineering services, and maintenance materials necessary for the operation and upkeep of aviation infrastructure across the country.

Procurement Management: The Central Procurement Unit is tasked with the responsibility of acquiring various goods and services required for the efficient operation of civil aviation activities. This includes the procurement of General and Specialized vehicle and its spare parts, navigation equipment, communication systems, and other essential items needed for airport operations.

Engineering Services: The Engineering Unit within CAAB oversees the planning, design, construction, and maintenance of aviation infrastructure such as airports, runways, terminals, and navigational aids. They ensure that these facilities meet international standards for safety, efficiency, and operational effectiveness.

Store Management: The Store Unit is responsible for the management and inventory control of spare parts, equipment, and materials necessary for the maintenance and repair of General

and Specialized vehicle and its spare parts. They maintain stock levels, track usage, and ensure timely replenishment to support uninterrupted aviation operations.

Quality Assurance: The Central Procurement, Engineering, and Store Unit also play a crucial role in quality assurance, ensuring that all procured goods and services meet regulatory requirements and adhere to international standards. They conduct inspections, audits, and quality checks to guarantee the reliability and safety of aviation equipment and infrastructure.

Compliance and Regulations: CAAB's Central Procurement, Engineering, and Store Unit operate in compliance with national and international aviation regulations and standards. They stay abreast of industry developments, technological advancements, and best practices to continuously improve procurement processes, engineering practices, and inventory management systems.

Overall, the Central Procurement, Engineering, and Store Unit of CAAB serves as the backbone of Bangladesh's civil aviation sector, supporting its growth, safety, and efficiency through effective procurement, engineering services, and inventory management. Their efforts contribute to the development of a robust and sustainable aviation infrastructure that facilitates safe and seamless air travel for passengers and cargo within and beyond Bangladesh's borders.

CHAPTER-2

Stores and Inventory Management

2.1 Introduction

Stores management is an integral component of materials management within the broader context of organizational operations. To comprehend the function of stores management, it is essential to grasp the concept of materials management.

Management involves the strategic processes of planning, controlling, and implementing activities to achieve specific objectives. "Materials management" is a relatively modern concept within management terminology.

Materials management encompasses the planning, implementation, and control of the efficient and effective flow or storage of inputs, facilities, services, and information from the point of supply to the point of consumption, aligned with the company's objectives.

A stores organization can be defined as the systematic coordination and integration of efforts designed to achieve optimal efficiency with minimal expenditure.

The terms "store," "storehouse," or "warehouse" refer to a building, room, or designated space where materials are stored. This space facilitates the orderly management and storage of inventory within an organization's supply chain.

2.2 Objectives and Responsibilities of the Store Function:

Stores within an organization serve as a crucial function aimed at supporting the production of goods or services. For any sizable public undertaking, efficient management is reliant on an effective store function.

The primary objective of the store function is to provide essential services to operational functions, a fundamental aspect that must be fully acknowledged. While other activities within the organization hold their own importance, they are subordinate to this core responsibility.

The service rendered by stores can be broadly categorized into four main divisions:

Maintaining a Balanced Flow of Materials: Ensuring a continuous and balanced supply of raw materials, components, tools, equipment, and other necessary materials to meet operational requirements.

Providing Maintenance Materials and Spare Parts: Supplying maintenance materials, spare parts, and general stores as needed to support ongoing operations and maintenance activities.

Handling Finished Products: Receiving and issuing finished products from the store as per demand and production schedules.

Managing Scrap and Discarded Materials: Accepting and storing scrap and other discarded materials, managing them efficiently within the organizational framework.

These objectives and responsibilities underscore the critical role that the store function plays in facilitating smooth operations and ensuring the availability of resources essential for production and maintenance activities within the organization.

2.3 Major Tasks of Stores:

The tasks performed by the store function within an organization are essential for efficient materials management and operational continuity. Here are the major tasks undertaken by stores:

Identification of Stored Materials: Ensuring clear and accurate identification of all materials stored within the inventory.

Receipt of Incoming Goods: Receiving and documenting incoming goods and materials from suppliers or other sources.

Inspection of Receipts: Conducting inspections and quality checks on all received goods to ensure they meet specified standards and are in good condition.

Storage and Preservation: Properly storing and preserving materials to maintain their quality and usability over time.

Materials Handling: Efficiently handling materials within the store, including movement, placement, and organization to facilitate easy access and retrieval.

Packing: Properly packing materials for storage or shipment, ensuring they are protected during handling and transportation.

Issue and Dispatch: Issuing materials as per requisitions and dispatching them to respective departments or individuals.

Maintenance of Stock Records: Maintaining accurate records of stock levels, including receipts, issues, and current balances.

Stores Accounting: Recording financial transactions related to materials procurement, storage, and issuance for accounting purposes.

Inventory Control: Implementing inventory control measures to optimize stock levels, minimize excess or shortage, and ensure efficient use of resources.

These tasks collectively contribute to effective stores management, ensuring the availability, quality, and traceability of materials required for organizational operations while maintaining proper control over inventory and associated processes.

2.4 Duties and Responsibilities of Store Personnel:

Store personnel, particularly storekeepers, are entrusted with crucial duties and responsibilities to ensure effective management of materials within an organization. Here are the key duties and responsibilities typically assigned to store personnel:

Receiving Incoming Materials: Responsible for receiving incoming materials, which includes tasks such as opening packages, counting, and performing quality checks to verify the accuracy of deliveries.

Storing Materials Properly: Ensuring that materials are stored in the correct locations and in the prescribed manner to optimize space and facilitate efficient retrieval.

Preserving Materials: Implementing proper preservation methods to maintain the quality and usability of materials over time. This includes conducting periodic inspections and applying appropriate storage techniques.

Managing Material Movements: Overseeing all movements of materials within the store, including transfers from receipt to storage areas, and from storage to dispatch, packing, and forwarding locations.

Maintaining Records: Maintaining complete, up-to-date, and accurate records pertaining to physical inventory, financial accounts, receipts, issues, and stock levels. This includes documenting all transactions and movements of materials for tracking and auditing purposes.

Handling Correspondence: Attending to all correspondence related to store operations, which may involve communication with suppliers, internal departments, or external stakeholders regarding material procurement, delivery, and storage matters.

By diligently carrying out these duties and responsibilities, store personnel play a critical role in ensuring the efficient management and control of materials within the organization's supply chain, contributing to overall operational effectiveness and cost efficiency.

Objectives of Efficient Storekeeping:

Efficient storekeeping is crucial for smooth operations and cost-effective materials management. Key objectives include:

Uninterrupted Supply: Ensure continuous supply to departments without delays.

Preventing Stock Issues: Maintain optimal inventory levels to avoid over-stocking or shortages.

Quality and Quantity Checks: Verify incoming materials meet quality standards and are in correct quantities.

Minimizing Storage Costs: Optimize inventory and space usage to reduce storage expenses.

Continuous Control: Implement systematic inventory management for consistent control.

Resource Utilization: Maximize efficiency of storage space and personnel.

Preventing Loss and Wastage: Safeguard materials from damage or loss due to storage issues.

Efficient Retrieval: Enable quick and accurate material retrieval within store-rooms.

Risk Management: Protect materials against theft, fire, and other risks with proper security measures.

2.7 Types of Stores:

Store may be Centralized or Decentralized

Centralized Stores:

Centralized stores manage and store goods and materials for multiple locations or departments within an organization in a single facility. This approach offers advantages and disadvantages:

Advantages of Central Stores:

- **Economies of Scale:** Bulk purchasing and storage lead to lower procurement costs.
- **Optimized Inventory:** Better control over inventory levels reduces overstocking or stockouts.
- **Efficient Resource Allocation:** Consolidated inventory optimizes resource allocation.
- **Streamlined Operations:** Simplified logistics with a single control point for materials.
- **Improved Control and Compliance:** Better oversight of inventory accuracy and compliance.
- **Enhanced Visibility:** All inventory in one place enables accurate reporting and analysis.

Disadvantages of Central Stores:

- **Transportation Costs:** Higher costs for distributing materials to decentralized locations.
- **Lead Times:** Longer lead times for material distribution, potentially causing delays.
- **Dependency Risk:** Risks associated with dependency on a single storage location.
- **Storage Constraints:** Requires larger storage facilities and efficient handling systems.
- **Limited Flexibility:** Challenges in responding quickly to specific demands or emergencies.
- **Coordination Needs:** Effective communication and coordination are essential for operations.

Decentralized Stores:

Decentralized stores manage and store goods at multiple locations or departments within an organization, offering both advantages and disadvantages:

Advantages of Decentralized Stores:

- **Localized Control:** Tailored inventory management to meet specific location needs.
- **Improved Responsiveness:** Quick response to local demand fluctuations and requirements.
- **Reduced Transportation Costs:** Minimized shipping costs with materials stored closer to usage points.
- **Enhanced Flexibility:** Customizable inventory levels based on local preferences.
- **Risk Mitigation:** Reduced risk of disruptions affecting the entire inventory supply chain.

Disadvantages of Decentralized Stores:

- **Inventory Duplication:** Potential duplication of inventory across different locations.
- **Lack of Standardization:** Varied practices and systems may lead to inconsistencies.
- **Coordination Challenges:** Complex coordination of inventory levels and procurement activities.
- **Increased Overhead:** Higher administrative costs managing multiple stores.
- **Risk of Stockouts:** Higher risk of stockouts without centralized visibility and control.

In summary, centralized stores offer efficiency and cost savings but come with transportation, dependency, and storage challenges. Decentralized stores provide localized control and responsiveness but may lead to inventory duplication and coordination difficulties. The suitability of each approach depends on organizational size, geographic spread, and operational requirements.

2.8 Stores layout:

The layout and location of stores within an organization play a critical role in ensuring efficiency and minimizing costs associated with material handling and storage. Here are some key considerations and factors outlined from your provided text:

Utilization of Space: Efficient store layout aims to fully utilize available space without unnecessary waste. Unused or poorly organized storage areas represent wasted capital.

Work Criteria: The layout should support key operational activities such as receiving, inspection, storage, picking, issuing, dispatching, stock-taking, maintenance, turnover, and periodic inspection of materials.

Optimal Location: The selection of store location is crucial for maximizing efficiency and minimizing handling and other related costs. The location should be strategic to the operations it serves.

Nature of Stored Items: The nature, value, and frequency of use of items influence store location decisions. Raw materials are stored near production points, while finished goods are positioned close to shipping areas.

Access and Proximity: All departments should have convenient access to the stores, especially those dealing with heavy or bulky materials. This proximity reduces time and effort required for material handling.

Decentralized vs. Centralized Stores:

Decentralized: In this system, each department or section of the industry has its own attached store. This setup is beneficial when departments have specific needs or operational requirements.

Centralized: Here, a single main store serves all departments. Centralized stores can streamline procurement, inventory management, and reduce duplication of efforts.

Sub-stores in Decentralized System: In large industries with multiple departments, setting up sub-stores closer to specific operational areas can enhance efficiency. This approach reduces travel distances and time required for material delivery.

Handling Costs: The layout should be designed to minimize overall handling costs associated with transporting materials within the facility.

In summary, effective store layout and location decisions are driven by the need to optimize efficiency, reduce costs, and ensure seamless integration with operational processes across different departments or sections within the organization. Decentralized and centralized store systems offer different advantages based on the nature and scale of operations.

2.9 Storage Facilities:

Storage facilities must meet key requirements:

Items must be easily located when needed.

The oldest stock (FIFO) should be accessible without difficulty.

Stored items should be in good condition upon selection.

Storage equipment should be user-friendly and safe.

Essential storage facilities include:

Bins

Racks & shelves

Flat pallets & stillages

Post & box pallets

Block racks

Heavy lifts & specialized storage for bulky or awkward items

Bins: Bins are expensive & as many item as possible should be put into them, refilling being done on a regular basis. **Racks:** Racks can be used either as the picking face for items which are too big or heavy fir bin accommodation, or else for keeping reserve stocks for replenishing bins.

Static racking, live racking, drive through racking, Honey comb racking, self-erected racking.

Pallets: pallets are specially designed platforms for the stacking of goods, with view to the whole load being moved, wherever it is required, by a fork-lift.

Block stacking: here boxes or pallets are stacked directly one upon the other. In all block stacking the primary consideration arte the safety band stability of the stack, ease off access.

Heavy & Cumbersome items: the movement of such material is likely to block the flow in their immediate area for a little while. It may often be necessary to use arcane, lift, bringing it directly over the item concerned.

2.10 Classification of Materials:

Classification is the grouping together of materials of technical affinity.

These are divided into smaller categories for convenience.

- Purchase department: separate enquiries can be issued for specific groups or materials since separate purchase requisitions can be made of each group.
- Materials can be rooted to appropriate stores for stocking materials group wise.
- Inventory control: stock control cards can be grouped together for materials of the same nature.
- Stores: receipts & issues can be posted correct by coding or goods receipt notes.
- Accounts: the GRN's can be entered on the correct cards.

2.11 Codification:

Every item group under classification should have a material code number or reference number, it specifies what the material is. It helps by:

- Accurate identification of items.
- Long descriptions with detailed specifications.
- Accurate posting of receipt & issue documents in the appropriate records.

2.12 Receiving and Inspection:

Receiving and inspecting materials efficiently is crucial for operational effectiveness. Here are key considerations for these processes:

Receiving and Inspection Process:

Counting and Inspection: All incoming items must be accurately counted or measured and inspected for quality promptly to minimize storage delays.

Coordination: Efficient coordination between inspection staff and receipt clerks is essential to prevent bottlenecks and ensure smooth operations.

Receipt Section Responsibilities: The receipt section (Receipt Store or Inward Goods Department) manages all materials entering the company.

2.13 Location of Receipt:

- **Security:** Security is paramount, requiring restricted access for outsiders. The receipt store should be physically separated from main stores and distant from the dispatch section to avoid confusion between incoming and outgoing items.
- **Advantages of Separate Receipt Stores:**
 - Prevents unauthorized access to stores or production areas.
 - Reduces the risk of uninspected materials entering stock.

- Provides a double-check on all incoming materials.

Optimal Location Criteria:

- Avoid congestion and parking issues.
- Ensure adequate space for receiving, opening packages, and temporary storage to minimize double handling of goods.

Effective organization and location of the receipt area enhances security, streamlines processes, and ensures the quality and accuracy of incoming inventory.

2.15 Good storage procedures offer numerous benefits for organizational efficiency and control:

Smooth Operations: Clear task guidelines reduce delays and bottlenecks, ensuring consistent execution.

Speed and Execution: Defined procedures enable swift task completion, aiding trained staff in following instructions accurately.

Control and Oversight: Procedures act as checks, preventing fraud and enhancing operational control.

Cost Savings: Internal checks cut indirect labor and overhead costs, leading to expenditure economies.

Enhanced Coordination: Procedures foster coordination among departments like stores, purchasing, inventory control, and production.

Training Facilitation: Structured procedures simplify staff training and method implementation.

Error Reduction: Procedures minimize errors, enhancing overall operational efficiency.

Improved Accounting and Stock Control: Proper procedures ensure better accounting and tighter stock management.

Material Preservation: Good procedures enhance material storage and preservation, reducing waste and damage.

Efficient Material Issue: Procedures enable quick material issue and identification, boosting operational agility.

Reduced Material Damage: Proper handling procedures minimize material damage, preserving inventory quality.

Inventory Optimization: Effective procedures lead to optimized storage practices and efficient inventory management.

Implementing and adhering to these procedures results in significant efficiency improvements, cost-effectiveness, and enhanced operational performance across functions.

2.16 Storage and Preservation:

Storage and preservation are vital for maintaining goods safely and in good condition:

Definition: "Storage" broadly encompasses keeping goods, while "preservation" specifically focuses on maintaining goods in optimal condition.

Types of Materials: Storage involves housing various materials like machinery, liquids (e.g., petroleum), hazardous substances (e.g., sulphuric acid), or gases (e.g., oxygen), each with specific requirements for storage, handling, and issue.

General Aspects of Storage:

Preventing Falls: Ensure items are secure on shelves or in bins to prevent falls.

Segregation: Use bins with proper sides to prevent mix-ups and ensure material segregation.

Correct Bin Size: Use appropriately sized bins to avoid item protrusion or wasteful stacking.

Facilitating Handling: Storage layout should facilitate easy material handling.

Security and Safety: Ensure maximum safety for materials, equipment, and personnel.

Economy of Space: Maximize space utilization to avoid congestion and accommodate increased production.

Specific Storage Methods: Each material requires specific storage methods to optimize handling, shelf-life, and prevent deterioration.

Suitable Equipment: Use proper storage containers to prevent wastage during handling and ensure accurate measurement.

Preventing Spoilage: Prevent spoilage due to dampness by employing heating, air conditioning, and humidity control measures.

Loss Prevention: Implement controls to prevent losses from evaporation, pilferage, and theft.

Effective storage practices not only ensure material integrity and safety but also contribute to efficient handling, cost savings, and prevention of losses within the storage environment.

2.17 Inventory Management and Control:

Inventory management is vital for operational efficiency and cost control. Its main aim is to maintain optimal inventory levels to support operations effectively:

1. Operational Smoothness: Inventory ensures smooth operations by providing the right materials promptly, avoiding production or service delays.
2. Cost-Efficiency: Inventory control strives for operational smoothness at minimal cost, balancing adequate stock with avoiding excess inventory that ties up capital.
3. Definition: Inventory control uses policies and procedures to determine which materials and quantities to keep in stock, optimizing inventory levels for demand.
4. Policies and Procedures: Specific guidelines tailor inventory management to the organization's needs, covering stock levels, ordering, replenishment, and turnover.
5. Objectives:
 - Optimal Stock Levels: Determining appropriate stock quantities based on forecasts and lead times.
 - Cost Reduction: Minimizing storage, insurance, and depreciation costs while preventing stockouts.
 - Efficient Ordering: Setting reorder points and economic order quantities to minimize costs and optimize frequency.
 - Inventory Turnover: Maximizing turnover to reduce capital tied up and mitigate obsolete inventory risks.
6. Techniques and Tools: Utilizes ABC analysis, JIT, MRP, and software for demand forecasting and optimization.
7. Continuous Improvement: Inventory management requires ongoing monitoring, evaluation, and adjustment for better efficiency and cost-effectiveness.

Implementing effective inventory control enhances operations, reduces costs, and boosts customer satisfaction by ensuring timely availability while managing inventory investment wisely.

2.18 Inventory consists of various categories:

1. Stores Inventory: This includes raw materials, spare parts, components, and other necessary items used in production or operations.
2. Work-in-Process (WIP): Semi-finished goods that are in the process of being manufactured or assembled on the factory floor.
3. Finished Goods: Completed products stored in warehouses awaiting dispatch for sale.

The creation of inventory serves two primary purposes:

- Protection: Ensuring the availability of essential raw materials promptly to avoid production delays.
- Economy: Lowering product costs by leveraging economies of scale, such as ordering larger quantities to benefit from volume discounts.

2.19 Economic Order Quantity (EOQ):

EOQ is a fundamental inventory management technique used to optimize inventory decisions. It refers to the ideal quantity of inventory a company should order to meet demand while minimizing holding and ordering costs.

Key considerations for EOQ calculations include:

- Purchasing Cost: The cost associated with acquiring inventory, including unit cost and ordering expenses.
- Inventory Holding Cost: The cost of storing and managing inventory, such as storage space, handling, and potential obsolescence.

The EOQ is determined as the quantity where the total costs of procurement and inventory holding are minimized.

Selective Inventory Control:

Inventory control strategies vary depending on the item's importance and usage. Selective inventory control involves classifying items based on their significance and applying appropriate control measures. Some common classifications include:

1. ABC Classification: Categorizing items based on their value and prioritizing control efforts accordingly.
2. VED Classification: Classifying items based on criticality (Vital, Essential, Desirable) to prioritize management attention.
3. HML Classification: Sorting items into categories based on demand variability (High, Medium, Low) to tailor inventory strategies.
4. XYZ Classification: Segmenting items based on consumption patterns (High, Medium, Low) to optimize inventory management approaches.

By applying selective inventory control techniques like ABC, VED, HML, and XYZ classifications, organizations can allocate resources efficiently, focusing efforts on managing inventory based on its impact on operations, cost, and demand variability.

2.20 Stores accounting and records:

Stores accounting and records are vital for effective inventory management. Here are key types of records commonly used:

Bin Cards: These are straightforward inventory records that track individual items within a store. They include:

Item description (e.g., name, code number).

Unit of measurement for issuing (e.g., each, kg, meter).

Current stock quantity.

Transaction details like receipts, issues, and balances.

Stock Cards: These are more detailed records kept in the stores office and can include:

Quantity Only: Records item quantities received, issued, and remaining in stock.

Quantity and Unit Price: Adds the unit price alongside quantity details.

Quantity, Unit Price, and Stock Value: Reflects the total value of stock based on quantity and unit price.

Value of Stock Balance: Provides the remaining value of stock after transactions.

These records are essential for inventory control, providing real-time visibility into stock levels, transactions, and financial values. Bin cards enable quick item tracking, while stock cards offer insights into inventory movement and valuation. Accurate stores accounting and records optimize inventory management, streamline operations, and support informed decisions on purchasing and stocking. Stores accounting and records are vital for effective inventory management. Here are key types of records commonly used:

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2.21 Stock Taking and Stock Verification:

- Stock taking is the process of physically counting, weighing, measuring, and estimating to determine the balance of items in inventory. This involves verifying that the physical count matches the records maintained in the inventory system. The objectives of stock taking and verification include:
- Control of Stores Activities: Ensuring proper management and control of inventory-related activities.
- Prevention of Pilferage and Fraudulent Practices: Minimizing theft and unauthorized use of inventory items.
- Reconciliation of Stock Records: Verifying the accuracy of inventory records and documents.
- Identification of Discrepancies: Detecting any discrepancies between physical stock and recorded quantities, and assessing the condition of materials.

Techniques of Stocktaking:

- Annual Stocktaking: A comprehensive physical count conducted once a year.
- Perpetual Inventory Method: Continuous monitoring of inventory levels through regular updates.
- Daily Stocktaking: Daily verification of selected inventory items.
- Checking by Stores-In-Charge: Verification performed by the responsible personnel.
- Periodic Checking: Scheduled periodic reviews of inventory levels.

Stock Valuation Methods:

Various methods are used to value material issues, including:

- FIFO (First In, First Out): Assumes that the oldest inventory items are used or sold first.
- LIFO (Last In, First Out): Assumes that the most recent inventory items are used or sold first.
- HIFO (Highest In, First Out): Assumes that the highest-priced inventory items are used or sold first.
- NIFO (Next In, First Out): Assumes that the next most recent inventory items are used or sold first.

Stores and Inventory Management Techniques:

- Base Stock: Maintaining a minimum stock level to meet demand.
- Simple Average: Calculating the average cost or value based on historical data.
- Weighted Average: Calculating the average cost or value based on quantity-weighted averages.
- Standard Average: Using predefined standard costs or values for inventory valuation.
- Replacement Price: Valuing inventory based on the cost of replacement.

These techniques and methods are essential for effective stores and inventory management, helping organizations maintain control over inventory levels, prevent losses, and accurately value inventory items.

2.22 Conclusion:

From all the above mentioned concepts and advantages, it is clear that stores and inventory management plays a major role in proper functioning of any organization. In case of Civil Aviation Authority of Bangladesh Store & Inventory Management based on online portal is mandatory. Besides this upgradation of Warehouse Management System (WMS) is another indicator to achieve the vision-mission of CAAB.

Chapter-3:

Warehousing:

3.1 The role of the warehouse:

The role of a warehouse extends far beyond simple storage—it plays a crucial part in an organization's logistics strategy and customer service delivery. Here are key functions performed by warehouses:

1. Collection and Distribution Point:
 - Warehouses serve as hubs for receiving and dispatching stock items efficiently.
2. Secure Storage:
 - They provide safe and convenient storage for valuable items, ensuring security and accessibility.
3. Administrative Activities:
 - Warehouses accommodate related administrative tasks such as issuing from stores and office activities.
4. Materials Handling:
 - They house equipment necessary for efficient handling of materials and goods.
5. Production Support:
 - Warehouses contribute to lowering production costs by enabling longer production runs.
6. Demand-Supply Linkage:
 - They help synchronize demand requirements with production capabilities.
7. Buffer for Supply-Demand Variations:
 - Warehouses act as buffers to manage fluctuations between supply and demand.
8. Procurement Efficiency:
 - They enable procurement savings through bulk purchasing.
9. Seasonal Demand Management:
 - Warehouses facilitate handling large seasonal demands economically.
10. Customer Service:
 - They contribute to good customer service by ensuring product availability and timely order fulfillment.
11. Transport Integration:
 - Warehouses allow for cost-effective trade-offs with the transport system.
12. Order Assembly:
 - They facilitate order picking and assembly to prepare shipments efficiently.
13. Product Variety and Consolidation:
 - Warehouses consolidate products from different suppliers in one location, providing a wide range of offerings.
14. Production Continuity:
 - Warehouses help cover for production shutdowns by ensuring continuous supply.

A well-designed and managed warehouse can enhance service levels, reduce inventory costs, and optimize operations. Factors like location, design, inventory management systems, and size contribute to transforming a warehouse into a distribution center that adds value to the overall product offering.

Depending on whether the warehouse supports manufacturing or distribution, its objectives vary. In manufacturing, the focus is on meeting production requirements efficiently. In distribution, the emphasis is on customer-facing activities like order picking and dispatch.

The role and scope of a warehouse operation should be clearly defined to inform decisions regarding design, staffing, and methodology. Warehouse location is critical, influenced by factors such as customer base, transportation access, and future expansion plans. Selecting the right warehouse location requires careful consideration to align with organizational objectives and minimize risks.

Ultimately, as organizations prioritize reducing inventory while enhancing customer service, warehouses must integrate seamlessly into the overall logistics strategy, ensuring accountability for service levels provided to customers. This shift toward a customer-centric logistics approach emphasizes the strategic importance of warehouses in delivering value to businesses and customers alike.

3.2 Warehousing in different types of organization:

All commercial warehouses have the principal objective of moving goods from suppliers to customers. In the manufacturing environment the principal objective of the stores operation is to hold goods, components and assembly items until they are required on the production line. However, these are not the only areas where storage is required and where different aims and objectives may call for a different approach.

The retail sector increasingly operates with small storage areas in stores and shops as the floor space can be utilized for selling. This leads to sophisticated centralized distribution centers for companies such as Sainsbury's and Tesco, making frequent container load deliveries of required items based on the feedback from national sales and electronic point of sale (EPOS) information. On the other hand, national clothing and shoe organizations make a large number of small deliveries.

Small local storage areas will require a professional and sophisticated storage and distribution system of centralized and/or regional depots to ensure demand criteria are being met.

3.2.1 Manufacturing versus service sectors:

Manufacturing companies use systems such as MRP (materials requirements planning) to cope with dependent demand. Each item to be manufactured produces a number of components or items that are required to manufacture that item. This gives an accurate assessment of the number of components or items to be ordered.

This predictability allows for the development of a stock management and procurement system that can be integrated across the organization. Controlled by the master production schedule (MPS) the MRP system indicates to purchasing when manufacturing will commence. Purchasing staff place orders (lead times have been considered as part of raising the MPS) and stores are notified of anticipated deliveries. The production department is updated throughout and the flow of information drives the system.

This approach does not apply in the service sector where the requirement is generally for independent demand items. Independent demand occurs when there is no clear predictability or understanding of demand. Demand is based on forecasts, often with little information to base the forecast on.

Independent demand is linked with fixed order point or periodic review approaches to stock control where minimum reorder points are fixed and/or reviewed at specific times. This enables an approach to be adopted that looks at operating with minimum stock levels within the framework of limited demand data being available.

3.2.2 Push versus pull environments:

In a 'push' system of manufacturing the goods are produced against expectations of demand. The MRP system outlined above is predominantly a push system, being largely based on demand forecasting.

More and more organizations are focusing on demand management, illustrating the increasing emphasis that manufacturers are placing on the accuracy of forecasts. Demand management uses specially designed software to complement the role of the demand planner. The software can recognize seasonal trends, the impact of economic fluctuations etc, and can extrapolate the data into predictions of future demand.

The reasoning behind this is clear. Waste (especially in terms of excess production) is hugely expensive. The more accurate the demand forecast, the greater the profitability. If demand is not forecast accurately then the result is customer dissatisfaction.

The 'pull' system of manufacturing is demand-led, with the goods being produced against known customer orders. With this system there is greater certainty and planning of deliveries, storage and movement to the production line can be accurately planned.

Just in time (JIT) manufacturing is a pull system. Here the objective is to meet demand instantaneously as goods are required on the production line. In practice greater emphasis is placed on the key items such as engines, brakes etc, rather than on smaller items such as screws, caps etc.

Storage is integrated by using the kanban system. Described by Roos as 'ordering a box, when one is left on the line' this two-bin approach replaces the used item with another when the first item has been used. With more general items a minimum quantity (eg 30 items) is held in a tote box. When the 30 units have been used the second box comes forward. The original box is then replenished.

Public versus private sector:

The private sector aims primarily to reduce waste and cost and to maximize assets in order to generate profit. The ethos of the public sector is concerned with the delivery of a service in a publicly accountable and auditable manner and is cost-driven by applying the concept of attaining best value.

Much of the demand for goods, publicity material etc, is independent demand with items stored locally on-site in small designated storage areas. Centralized approaches using storage and distribution depots are used to collate, store and distribute nationally required material although many suppliers offer 'call-off facilities on a local level.

The public sector produces considerable amounts of records and these require storage, often for defined periods of time. Responsibilities for records management in central government have been described as follows.

The (Public Records) Act places the responsibility on Government Departments and other organizations within the scope of the Act for making arrangements for selecting those of their records which ought to be permanently preserved and for keeping them in proper conditions'.

Each department has a responsibility for controlling the disposal and knowing the whereabouts of all its records. (For further details visit www.nationalarchives.gov.uk.)

For documents that do not require archiving but are required to be kept for regulatory or operational purposes, one widely used approach has been the use of microfiche techniques where documents are miniaturized and scanned onto photographic paper. Recent advances in technology are making this method obsolete as e-storage of documents gains acceptance.

Case studies produced by Graphic data (www.graphicdata.co.uk) demonstrate how management and processing services help in increased efficiency and cost savings. Documents can be electronically archived in a secure location offering reduced physical storage and easier retrieval of documentation.

3.3 Warehouse Design and layout:

Warehouse design is critical to ensuring efficient operations that support the movement and storage of goods effectively. Here are the major principles and factors to consider when designing a warehouse:

Major Principles in Warehouse Design:

Clear Purpose:

- Define the specific purpose of the warehouse, focusing on movement and storage operations.

Movement Efficiency:

- Emphasize the flow of goods throughout the warehouse to optimize operations.

Factors to Consider in Warehouse Design:

Purpose of the Warehouse:

- Define the intended functions and operations of the warehouse.

Materials Handling Systems and Equipment:

- Select appropriate handling systems (e.g., conveyors, forklifts) based on operational needs.

Size:

- Determine the required size of the warehouse based on inventory volume and operational scope.

Location:

- Choose a strategic location considering transportation access, proximity to suppliers, and customer base.

System Requirements:

- Identify necessary systems (e.g., Warehouse Management System) to support operations efficiently.

Overall Layout:

- Plan the layout to facilitate seamless flow of goods and optimize space utilization.

Design Process:**Understanding Operations:**

- Define the warehouse's purpose, operations, and anticipated workload.

Simulated Design:

- Develop an initial layout based on operational requirements and ergonomic principles.

Staff Involvement:

- Engage management and staff to provide input and ensure their needs are considered in the design.

External Considerations:

- Involve external stakeholders (e.g., planning authorities, fire officials) early in the process for compliance and safety.

Terms of Reference:

- Define clear terms of reference and usage guidelines to guide the design process.

Data Requirements for Warehouse Management System (WMS):

- Goods Handling Details (inventory levels, handling requirements).
- Order Characteristics (service levels, order frequency).
- Arrival and Dispatch Patterns (vehicle types, unit loads).
- Warehouse Operations (picking, packing, administration).

Developing Effective Warehouse Management System (WMS):**Data Analysis:**

- Analyze goods handling, order characteristics, and operational patterns to inform system design.

Layout and Equipment Selection:

- Propose layout, operating methods, and equipment based on data analysis and operational needs.

System Requirements:

- Define staffing levels, operational costs, and technology requirements based on proposed design.

Data Validation:

- Continuously validate and refine data assumptions to ensure accuracy and alignment with operational goals.

Warehouse design is an iterative process that requires collaboration, data-driven decision-making, and ongoing validation to create a functional and efficient facility that meets operational requirements and supports business growth.

3.3.4 Design and Layout Principles for Warehouse Efficiency:

Single-Story Building: Opt for a one-story building whenever possible, as it is cost-effective and maximizes cubic capacity.

Direct Flow of Goods: Implement a direct flow of goods from receiving to dispatch, considering ABC analysis for optimal storage and accessibility.

Effective Storage Plan: Maximize warehouse operations with efficient storage plans, incorporating racks that consider security, fire regulations, and pick-and-pack areas.

Efficient Materials Handling Equipment: Use appropriate storage and handling equipment to enhance efficiency and productivity.

Minimize Aisle Space: Minimize aisle space while accommodating materials handling equipment and product characteristics.

Maximize Building Height: Utilize the full height of the building to maximize cubic capacity, selecting suitable materials handling equipment to support vertical storage.

Product Identification System: Implement an efficient system for product identification to streamline operations and order fulfillment.

Plan for Growth: Design the warehouse layout with future expansion in mind to accommodate business growth.

Health and Safety: Ensure compliance with health, safety, and fire regulations, prioritizing worker protection and well-being.

Order Preparation Area: Design a dedicated area for order picking and packing, focusing on ergonomic design to enhance staff productivity and efficiency.

Security and Environmental Considerations: Comply with security and fire regulations, ensuring adequate access control and environmental conditions (temperature, ventilation, lighting).

Warehouse Protection and Efficiency Objectives:

- Separate hazardous materials from other items to minimize risks.
- Allocate specific areas for items requiring special security or control (e.g., refrigeration).
- Educate warehouse personnel on proper stacking and storage practices to prevent damage.

3.3.5 Efficiency Aspects:

Space Utilization: Optimize space utilization to maximize storage capacity and accessibility.

Stock Placement: Place faster-moving items in accessible areas to reduce labor and handling costs.

Accessibility: Ensure easy access for vehicles, staff, and emergency services, with adequate maneuvering space and secure external access points.

Expansion Planning: Allow room for future expansion to accommodate business growth and evolving operational needs.

Efficient warehouse design and layout require careful consideration of space utilization, stock placement, accessibility, and compliance with safety and environmental regulations. By integrating these principles, warehouses can operate effectively, minimize costs, and support business growth and customer service objectives.

3.3.6 Types of stores facility:

Stores facilities can be broadly broken down into two categories; stores buildings and stockyards.

- Stores buildings may be physically separate from the manufacturing sites they serve or may be a section within the main manufacturing locations. In the latter case the term can be misleading as an alternative such as storeroom or simply stores may be preferred.
- Stockyards are exterior storage areas used for stock items that will not suffer from exposure to the elements. Examples include building materials, drums, heavy duty cable etc. The differentiation between the two becomes particularly important when looking at materials handling equipment. Often stockyards require more robust equipment and systems such as overhead cranes than would be the case when assessing a stores building requirement.

3.4 Storage and movement of stocks:

3.4.1 Maximizing storage capacity:

The time and effort put into planning and design are well spent when establishing and designing a warehouse facility. Changes can be made more easily during the early stages of the project and the aim should be to get the correct design and the right technology implemented from the outset, with room for expansion.

Ideally, warehouse facilities should be designed to meet the defined purpose of the warehouse, but this may only be practicable if new purpose-built facilities are being used. Many organizations are seeking to adapt to the limitations and constraints of an existing warehouse and to maximize usage within this remit.

Whether an organization is looking for a new purpose-built facility or adapting to work within the constraints of an existing facility the following features should be present.

- A building design that allows for maximum flexibility, not only to meet current needs but also to adapt to changes in purpose that may occur in the future, such as growth in the pick-and-pack area or the requirement for new office space.
- Good road and rail access.
- Ideally the location should be 'out of town' to allow access during less-congested periods.
- Doors and loading bays that allow ready access while offering security.
- Additional outside parking for vehicles that may need to queue to gain access.
- Clear access within the warehouse without obtrusive pillars, variations in floor levels or load-bearing walls that will influence the flow of operations.
- Durable and sealed floor surfaces that have been designed to bear the weight placed upon them and sealed to ensure that spilt lubricants or hazardous materials do not permeate through the floor surface.
- Adequate ceiling height that could permit high-aisle racking or the use of a mezzanine floor as required.
- Dry, well-ventilated atmosphere with adequate heating. Warehouses are often prone to temperature variations due to their size and the constant opening and closing of access doors. Additional heating in entrances and delivery areas may be a requirement.
- Good security features. Sound build, and adequate doors and windows together with an appropriate alarm system.
- Adequate lighting with natural light where possible.
- Compliance with building and fire regulations and any applicable health and safety regulations.
- Adequate parking facilities for staff and access via public transport.
- Office space.

Within the warehouse the use of storage systems is a major consideration because of the space utilized, their effect on work flow and the costs involved. Warehouses cope with a wide variety

of goods and materials and in consequence a wide range of storage equipment has been developed to meet these needs.

The choice of a suitable storage system will depend on a number of factors, all of which should be balanced with the cost involved.

- Type of goods handled
- Suitability of goods for unit loads
- Effective utilization of the 'cube' of the building, perhaps requiring high-aisle racking and hence appropriate handling equipment
- Accessibility
- Security considerations
- Personnel safety

The effective storage capacity of the warehouse may be constrained by:

- The use of fixed locations for certain stock lines;
- The application of ABC analysis classifying stock into high-, medium- or low-usage stock areas;
- Whether goods can be held at random locations.

Whichever application is deemed to be suitable the utilization of warehouse capacity will always be less than 100 per cent as the movement of goods creates a space that then needs to be refilled. The aim is to consider the type of product being held and to ensure that waste (in this case unnecessary movement and double handling) is minimized.

Considerations relating to effective and efficient stock location can be the subject of computer-simulated modelling to ensure that the operational design of the warehouse maximizes space availability in the majority of anticipated situations.

The positioning and type of racking is an important consideration. Racking, or shelving, as well as supporting handling equipment must be designed to meet the needs of the operation and will be examined in the next chapter.

Positioning stock in the warehouse

Although it is possible to move and reconfigure racking after installation this is a costly and time-consuming operation. Racking forms, for all practical purposes, a permanent internal structure within the warehouse. In consequence, considerable thought should be given to where the racking will be located together with the usage of the goods held on that racking. ABC analysis is often applied within warehouses to help in analyzing the flow of work.

3.5 ABC (popularity) storage:

Dividing goods held into A, B and C categories in terms of annual usage helps to formulate possible positions where stock should be located.

- High usage (Category A) items should be located close to entrances, dispatch areas or pick-and-pack areas as deemed necessary.
- Medium usage (Category B) items will be located further from the main areas.
- Low usage (Category C) items will be kept in less utilized areas.

Sometimes referred to as 'popularity storage', this method can give maximum use of space with more effective speed of issue. Owing to the closeness of the appropriate goods less stress is placed on labor and equipment. Another term sometimes used for this method is Pareto analysis, after the economist Vilfredo Pareto, who examined situations where a small number of items can account for a large proportion of the total value of a population.

3.6 Fixed-location storage:

Fixed locations, where goods are in a strict sequence with commodity cataloguing or coding, are used where the commodity groups are well defined and the product range is stable. Fixed locations enable staff to become familiar with product positions, and this can be an advantage in certain types of operation (eg spares for the automotive industry). However, fixed locations restrict flexibility and changes to the item profiles can cause major upheaval.

Similarity, size, weight or the nature of goods (hazardous, refrigerated, etc) may also be considered when positioning stock. The aim is to minimize movement and double-handling while aiding the flow of goods and work through the warehouse.

Fixed location storage can make it easy for staff to remember where each item is, often by grouping related items together. Different product characteristics can be accommodated by different types of storage areas.

'Random' storage:

Random storage, as the name suggests, involves putting incoming goods in storage in a random manner. If the warehouse handles standardized goods this method can offer optimization of racking, allowing for high rates of warehouse fill. The system requires an excellent stock control and location system as goods are placed wherever is convenient.

The weaknesses of the random system are that it cannot cope effectively with different sized goods and that it is ergonomically unfriendly in that goods are not categorized in terms of usage resulting in location and on-movement issues particularly where picking and packing is involved.

Importance of Flow in Warehouse Design:

Efficient flow within a warehouse environment is crucial for optimizing operations and improving safety. Different flow systems, such as straight-line, U-shaped, inverted T, and cross flow, offer unique advantages and considerations to enhance warehouse performance.

3.7.1 Straight-Line (Through Flow) System:

- Goods flow in a straight line from receiving to dispatch areas.

Advantages:

- Suitable for managing different requirements for goods in and out.
- Aligns naturally with operational processes.
- Ensures clear separation of receiving and dispatch areas, minimizing errors.

Disadvantages:

- Requires significant space for loading bays.
- May pose challenges for bay security and internal movement efficiency.

3.7.2 U-Shaped (Horseshoe) Flow:

- Goods flow from receiving (left) to dispatch (right) areas in a horseshoe pattern.
- Ideal when both receiving and dispatch are at the same end of the building.

3.7.3 Inverted T Flow:

Divides the warehouse into long-term storage sections, positioning items based on usage frequency.

Advantages:

- Efficient utilization of loading bays and equipment.
- Flexibility for expansion.
- Reduced movements due to popularity-based storage.

Disadvantages:

- Central aisle congestion.
- Requires modifications for expansion and tight control for item movement.

3.7.4 Cross Flow System:

Utilizes the full width of the warehouse, with areas categorized by usage frequency.

Advantages:

- Optimal use of loading bays and equipment.
- Flexibility for expansion.
- Clear segregation of high, medium, and low usage areas.

Disadvantages:

- Segregation challenges for high, medium, and low usage.
- Complexity in managing bulk and standard stock combinations.

Key Performance Indicators (KPIs) for Warehouse Operations:

Costs:

- Staff expenses (including overtime).
- Building and site maintenance.
- Equipment and resources.
- Pallets and repair.
- Packing materials and consumables.

Service:

- Customer service quality.
- Stock availability and lead-time.
- Order fulfillment metrics (on-time completion, order fill completeness).
- Back orders and damaged stock.
- Returns and customer complaints.

Efficient flow systems and robust KPIs are essential for measuring and improving warehouse performance, ensuring cost-effective operations and superior customer service. By implementing optimal flow designs and monitoring key metrics, warehouses can achieve operational excellence and meet organizational goals effectively.

CHAPTER- 4:

Upgradation of Stores & Inventory in CAAB:

4.1 Warehouse Management practice in Bangladesh:

Warehouse management practices in Bangladesh are essential for ensuring efficient operations and logistics within various industries, including the civil aviation sector. Here are some key aspects of warehouse management practices in Bangladesh:

Technology Adoption: Many warehouses in Bangladesh are increasingly adopting technology solutions such as Warehouse Management Systems (WMS) to streamline inventory tracking, order fulfilment, and overall warehouse operations. WMS enables real-time monitoring of inventory levels, improves order accuracy, and enhances productivity through automation.

Inventory Management: Effective inventory management practices involve maintaining optimal stock levels, conducting regular stock audits, and implementing inventory control measures to minimize stock outs, overstocking, and obsolescence. This ensures that warehouses have the right amount of inventory to meet demand while minimizing carrying costs.

Storage Optimization: Warehouses in Bangladesh focus on optimizing storage space through efficient layout design, shelving systems, and use of vertical storage solutions. By maximizing storage density, warehouses can accommodate more inventory within limited floor space, reducing operational costs and improving efficiency.

Safety and Security: Warehouse safety and security are paramount to protect goods, equipment, and personnel from theft, damage, or accidents. Bangladesh warehouses adhere to safety regulations and implement measures such as CCTV surveillance, access control systems, fire detection, and emergency response protocols to ensure a secure working environment.

Quality Control: Quality control practices are crucial to maintain the integrity of stored goods and ensure compliance with regulatory standards. Warehouses in Bangladesh implement quality assurance processes, including inspection, labelling, and segregation of goods, to prevent contamination, spoilage, or deterioration of inventory.

Transportation and Logistics Integration: Warehouse management practices often integrate with transportation and logistics networks to facilitate seamless movement of goods within the

supply chain. Efficient coordination between warehouses, transportation providers, and distribution centers helps minimize transit times, reduce transportation costs, and improve overall supply chain efficiency.

Environmental Sustainability: With growing awareness of environmental issues, warehouses in Bangladesh are increasingly adopting eco-friendly practices such as energy-efficient lighting, waste management, and sustainable packaging solutions to reduce environmental impact and promote sustainability.

Skilled Workforce Development: Training and development programs are essential to equip warehouse staff with the necessary skills and knowledge to operate equipment safely, handle inventory accurately, and comply with regulatory requirements. Continuous training helps improve productivity, reduce errors, and enhance overall warehouse performance.

In summary, warehouse management practices in Bangladesh focus on leveraging technology, optimizing inventory, ensuring safety and security, maintaining quality standards, integrating with transportation networks, promoting sustainability, and investing in workforce development to enhance operational efficiency and meet the evolving needs of the supply chain.

Why warehousing activities are important for Civil Aviation Authority of Bangladesh?

4.1.1 Warehousing activities are vital for the Civil Aviation Authority of Bangladesh (CAAB) for several reasons:

Inventory Management: Warehousing facilities allow CAAB to store spare parts, equipment, and materials necessary for the maintenance and repair of aircraft, airport facilities, and navigation systems. Proper inventory management ensures that essential items are readily available when needed, minimizing downtime and disruptions to aviation operations.

Emergency Preparedness: Having well-equipped warehouses enables CAAB to stockpile emergency supplies and equipment, such as spare parts for critical aircraft components or emergency response gear. This ensures that the authority can quickly respond to unforeseen events such as natural disasters, accidents, or security incidents that may impact aviation operations.

Cost Efficiency: Effective warehousing practices help CAAB optimize its inventory levels, reducing the need for rush orders or last-minute procurement, which can be costly. By storing materials in bulk and managing inventory efficiently, CAAB can take advantage of economies of scale and negotiate better prices with suppliers, ultimately saving costs for the authority.

Operational Continuity: Warehousing activities contribute to maintaining operational continuity by ensuring that essential supplies and equipment are always available, even during periods of high demand or supply chain disruptions. This resilience is critical for sustaining uninterrupted aviation services and minimizing the impact of external disruptions on passenger and cargo movements.

Regulatory Compliance: Proper warehousing practices help CAAB comply with regulatory requirements related to inventory management, safety standards, and security protocols. This includes ensuring the safe storage of hazardous materials, maintaining proper documentation and records, and implementing measures to prevent theft, damage, or unauthorized access to stored goods.

Support for Expansion and Development: As Bangladesh's aviation sector continues to grow and evolve, adequate warehousing facilities are essential to support the expansion and development of airport infrastructure, navigation systems, and other aviation-related projects. Warehouses provide the necessary storage space for construction materials, equipment, and supplies required for ongoing development initiatives.

In summary, warehousing activities are crucial for CAAB to effectively manage inventory, ensure operational readiness, optimize costs, comply with regulations, and support the growth and development of Bangladesh's civil aviation sector. By maintaining well-equipped and efficiently managed warehouses, CAAB can enhance the reliability, resilience, and sustainability of aviation operations across the country.

4.2 List of Common Procurement done by CEMSU at CAAB:

Different types items, materials, Goods and related services, works and physical services, intellectual and professional and physical services are being procured by the central procurement Engineering and store unit (CEMSU) at CAAB. Some of these important items mentioned below which are very important for achieving the vision and mission in Civil Aviation authority of Bangladesh.

SI No.	Name of Items
1.	Supply of Wind Sock for different Airport.
2.	Supply, Installation of 8 Nos. Dual View Cabin baggage Scanning Machine for different Airport.
3.	Supply, Installation, Commissioning and technical support of Bird Monitoring and Deterrent System for (CAAB) on Turnkey basis.
4.	Supply of VHF Walkie Talkie for different Airport.

5.	Transportation of one set serviceable Single View Hold Baggage Scanning Machine Model - Rapiscan 628XR-from HSIA, Dhaka to Barisal Airport.
6.	Supply & Commissioning of 03 Nos. 10,000 ltr, Capacity ARFF for HSIA, Sylhet & SDP.
7.	Supply of Shotgun Cartridge for different Airport.
8.	Supply, Installation, Configuration & testing of CCTV Camera System at Saidpur Airport, Saidpur, Nilphamari.
9.	Dismantling of Old DVOR & NDB system at Saidpur Aripport, Nilphamari.
10.	Dismantling of 90 feet & 60 feet HF antenna mast and 15 feet feeder pole of transmitting station at HSIA.
11.	Providing, fitting, fixing, installation of earthing system with lightning arrester for CNS equipment in ECR and DVOR & DME at different Airport, CAAB.
12.	Providing, fitting, fixing, installation & Extension of FIDS controller & Monitor with existing FIDS at Jashore Airport, Jashore.
13.	Flight Inspection and Calibration of RADAR (PSR & SSR) including Approach and En-Route for Commissioning at Hazrat Shahjalal & Shah Amanat International Airports in Bangladesh.
14.	Providing, fitting, fixing, installation and testing of spare parts (X-ray Controller unit) for Smith detection Dual View Scanning Machine at International Airports.
15.	Providing, replacement, fitting & fixing of Conveyor belt for X-Ray Scanning Machine at SAIA, Chattogram and different Airports.
16.	Providing, replacement, fitting & fixing of Conveyor belt for X-Ray Scanning Machine at Saidpur, Cox's Bazar & Barishal Airports of CAAB.
17.	Emergency Supply & stock of spare parts for Repair, Maintenance and smooth operation of Two EDS Machine (Brand-Morpho Detection LLC Model-CTX9800 Dsi) at Cargo at HSIA.
18.	Repair, Maintenance with consumable items & Spare parts of EDS Machine No-2 (Brand-Morpho Detection, Model-CTX9800 Dsi) at export cargo village of HSIA.
19.	Supply of Spare Parts for Runway Sweeper for different Airport (S: H: Providing fitting/fixing of Spare Parts & Repair of RUNWAY SWEEPER-4 at Hazrat Shah Jalal International Airport, Dhaka.

20.	Providing & Installation of Floor level 5 ton capacity Digital Pit type Scale & others related Civil Works at Cargo Complex RA-3 Area, HSIA, Dhaka.
21.	Supply of servicing materials (Filter, Oil Lubricant etc. for daily time to time use in ARFF Fire Vehicles at HSIA and different Airport)
22.	Supply of Spare Parts and other related works for Iturri Red-1 at Cox's Bazar Airport.
23.	Providing, fitting / fixing of Spare Parts, ECM & Different Type of Sensor i/c. other related works of TITAN 4 X 4 Fire Vehicle at Osmani International Airport, Sylhet.
24.	Repairing, Overhauling & other related works for Fire Vehicle TITAN 4 X 4, RED-1, Engine Model No. 8V92T Detroit Diesel at HSIA, Dhaka.
25.	Supply of Spare Parts and other related works for Iturri Red-2 at Cox's Bazar Airport.
26.	Providing, fitting / fixing of Spare Parts & repair of Protector 6 X 6 Fire Vehicle at Saidpur Airport, Saidpur.
27.	Supply of Tire-Tube & Spare Parts ARFF different Airport
28.	Providing & Installation of A/C Unit at Shah Amanot International Airport, Chittagong & Osmani International Airport, Sylhet.
29.	Repairing Overhauling & other related works of Fire Vehicles of different Airport outside of Dhaka SH Repair Maintenance & Replacement of Spare Parts for TITAN 4 X 4 Fire Vehicle at Jessore Airport, Jessore.
30.	Repairing, Overhauling & other related works for Fire vehicles for different Airport.
31.	Providing & Installation of A/C unit for Communication Equipment at Saipur, Rajshahi, Jashore, Barisal, Ishardi and Cox's Bazar Airports.
32.	Relocation of Floor level Scale & Roller Scale necessary Civil works at Osmani International Airport, Sylhet.
33.	Supply of Spare Parts for Runway Sweeper for Osmani International Airport, Sylhet.
34.	Providing, fitting / fixing of Spare Parts & repair TITAN 6 X 6 Fire Vehicle at Saidpur Airport, Nilphamari.

35.	Supply of 1 No. 10,000 Ltr. Capacity ARFF (Aircraft Rescue & Fire Fighting) Vehicle for Shah Amanat International Airport, Chittagong & 5 (five) Years maintenance & repair.
36.	Supply of 2 Nos. ARFF (Aircraft Rescue & Fire Fighting) Vehicle for different Airports of CAAB.
37.	Unseen/Unexpected EM Works-Providing, Installation & Commissioning of SS Power Roller Conveyor Bed and Roller Bed at EDS Machine i/c. other related works at Export Cargo Complexes RA-3 at HSIA, Dhaka on turn-key basis.
38.	Providing, fitting / fixing of Spare Parts & repair of TITAN 4 X 4, Red 3 ARFF Vehicle at Shah Amanot International Airport, Chottogram.
39.	Supply of different type of Electrical & A/C Items for EM Workshop at CEMSU.

4.3 Upgradation of Stores in CAAB:

There are 4 Stores unit in central Procurement Engineering and stores unit (CEMSU) at CAAB. All Stores unit Purchase different kinds of Goods, works and services through Executive Director, CEMSU. Normally all requisition comes from the different airport (3 International (Dhaka, Chittagong, Sylhet) and 7 domestic (Rajshahi, Saidpur, Barishal, Jessore, Cox's Bazar, Comilla and Ishwardi).

Due to the active the routine works of all stores, CEMSU unit has to preserve some important items. These are shortly briefed here.

E/M Stores: Electro mechanical stores of CEMSU is an important part of CAAB. Because it plays a critical and decisive role in Aviation field. All A/C System, Fire fighting vehicles are required and maintained by this unit for maintaining category II and following the instruction of ICAO (International Civil Aviation Organization). It is necessary to keep 24/7 in operation for ARFF vehicle (Airport Rescue and Fire Fighting Vehicle). Otherwise no domestic or international flight can land in Runway. So that E/M stores preserve some important spare parts of ARFF vehicles. Because when Emergency starts then situation can be handled easily. Normally these spares is not available in Bangladesh. Only vehicle Manufacturer or Local agent can provide these parts but it is true that it takes long time for import from abroad. So in that case proper inventory management and upgradation of inventory management system is essential. Besides this, it can stores some A/C spares and other important items related with E/M functions etc.

CNS Stores: Communication, Navigation and Surveillance stores are important for

CEMSU. This store purchase different kinds of CNS equipment like RADAR, ILS, DVOR, NDB etc. This equipment is closely related with the vision, mission of CAAB. Due to the failure of the availability of spare parts, filling fixing of these above equipment's at right time the landing and flying of all aircraft will be hampered. For this reason this stores can preserve some major items which are taken Only from Manufacturer or local distributor can supply this spares. At present all store and inventory management system are handled manually. It often creates complexity. So upgradation of this stores is essential. It should be online based inventory management system.

Central Stores: It is one of the crucial stores of CEMSU. All new equipment's and regular old Unserviceable equipment are procured by this unit through Executive Director CEMSU.

Different types of products, machines are purchased by Central store. Some of them are EDS Machine, Hold Baggage, Dual view cabin Baggage, Hand held metal detector, Archway, walkie-talkie, Luggage Trolley, Lounge Chair, ARFF vehicle, Runway sweeper etc. Some of these procurement is closely related with the vision and mission of CAAB. Shotgun cartridge and Wind shock are examples of this. Because of lacking supply of these within proper time the landing and flying will be hampered and shortage of shotgun cartridge bird removal system must be fall .So in that case stock and inventory is essential and it must be needed to upgrade.

4.4 Upgradation Approach in CEMSU (CAAB): As before the previous discussion we may know that different types of Goods, works and services are being procured through CEMSU. At present store and inventory Management system are being handled manually. So it creates a many problems which are not organized. It can be reduced by implementing modern store and inventory management system. As all procurement are being completed through above 3 stores (EM store, CNS store, Central store) CEMSU after taking the administrative approval of Chairman, CAAB through Executive Director CEMSU, sometimes it over laps with different wings. It creates complexity in the whole procurement Process.

Due to the lacking of modern procurement process, total procurement system may fail to fulfill the emergency procurement needs of CAAB. So the procurement and warehousing system should be upgraded. An ICT Enabled WMS should be introduced which can be monitored in real time through an online portal. For going to the online based procurement and implementing it store and inventory management system must be organized.

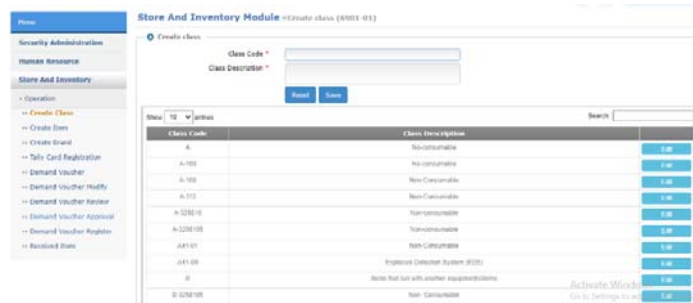
For implementing this, a proposal is given below:

A robust software can be installed to control the whole procurement and warehousing process of CAAB. The store and inventory software may be consists of two modules.

A) Operation Module:

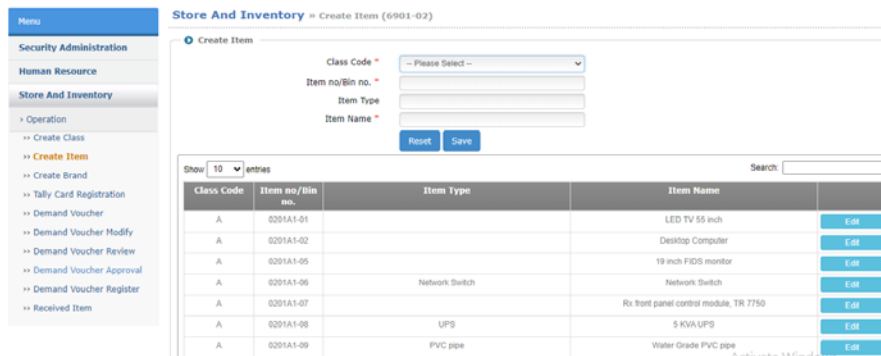
This module may consists for following sections:

- Create Class section (To categorize the procured items into different classes)



Example: let us consider CEMSU takes decision for procurement. On the basis of price and longevity, lets say class A Sections item be EDS (Explosive Detection System), Class B item be a Computer etc. will put in the Create Class Section. It would be seen like above the figure.

- Create Items section (differentiate the procured items as per category)



Example: In the Create Item Section Name of the items should be categorized shown in the Picture.

- Create Brand section (Differentiate the procured items into model, Brands)

Store And Inventory » Create Brand (6901-03)

Create Brand

Class Code *

Item no/Bin no. *

Item Name

Brand No

Brand Name *

Show 10 entries

Brand No	Brand Name	Item no/Bin no.	Item Name	
5	CISCO	1	Blade Chassis	<input type="button" value="Edit"/>
5	CISCO	2	Chassis Interconnect Switch	<input type="button" value="Edit"/>
5	CISCO	3	Blade Server Type-1 M	<input type="button" value="Edit"/>
5	CISCO	4	Blade Server Type-2 D	<input type="button" value="Edit"/>
5	CISCO	5	Blade Server Type-3	<input type="button" value="Edit"/>
5	CISCO	6	Active Directory	<input type="button" value="Edit"/>

Example: In the Create Brand Section, the Brand Name of items is shown.

- Tally Card Registration (Enrolling the items into tally card in exchange of manual tally card)

Store And Inventory » Tally Card Item (Vocabulary) Register (6901-04)

Tally Card Item (Vocabulary) Register

Airport/Station *

Class Code *

Item no/Bin no. *

Brand No

Item is used with

Item Reference No/Part No.

Unit *

Reorder MIN *

Reorder MAX (Don't Order) *

Location

Store *

Building

Room Number

Rack Number

Example: All above information will be shown in Tally Card Registration. So, storing is completed in this section. This the final section of input process. Reports are generated from this part.

- Demand Voucher (Creating demand for purchasing from different airport)

Store And Inventory » Demand Voucher Creation (6901-05)

Demand Voucher Creation

Internal Demand External Demand

Airport/Station *

Send DV

Date *

Part no/Serial No.

For Whom/Section *

Purpose *

Description

Urgent

Vocabulary

Item Name

Vocabulary	Item Name	Unit	Store	Stock

- Demand Voucher Modify (it can be modify whichever appropriate)

Store And Inventory » Demand Voucher Modify (6901-06)

Demand Voucher Search Criteria

Airport/Station:

From Date: To Date:

Item Name:

For Whom:

Purpose:

Demand Voucher Information

Demand Register Number: For Whom:

Demand Voucher Details

Vocabulary	Item Name	Unit	Demand Unit	Store

- Demand Voucher Review (it is to be needed to review the demand voucher for judgment the need analysis)
- Demand Voucher Approval (approve the demand voucher and initiate the procurement process)
- Demand Voucher Register (include the demand voucher into online inventory)

Store And Inventory » Demand Voucher Registration (6901-09)

Approved and Delivery Pending Demand Vouchers

Show entries Search:

For/Office	Station Demand Registration Number	DV Date	Vocabulary	Item Name	Demand Unit	Approved Unit	Reviewed By	Approved By	
Manager Store Section	0002/1998220004/29	2017-08-20	I-55-26	Cabinet-24 U	1 EACH	1 EACH	Golam Mohammad Khan	Md. Tito Mia	<input type="button" value="Issue"/>

Showing 1 to 1 of 1 entries First Previous Next Last

- Received Item (after procurement received the item)

B) Reports Module:

This module will be able to produce various standard and custom reports required for the decision makers, for examples:

- Item wise stock report (create stock report according to item)
- Store Inventory stock report (Create inventory stock report as per inventory)
- Item wise store and inventory stock report (compile both stock report)
- closing stock report (creating closing balance)
- Item issued report (issue the procured item as per requirement)

From the above discussion, we conclude that a product in keeping record by the software and also issued by online. Then Authentication & Requirement of CAAB will be justified. Then procurement process will start. By this way the system will be upgraded to digital system from existing manual system.

Here's a comprehensive conclusion summarizing the process:

1. Assessment and Planning:
 - Identify the shortcomings of the current manual store management system, such as inaccuracies, inefficiencies, and lack of real-time data access.
 - Determine the goals and requirements of the new online system, including scalability, accessibility, and integration with other business processes.
2. Selection of Software Solution:
 - Research and evaluate different online inventory management software options based on your needs and budget.
 - Choose a software solution that offers the features such as real-time inventory tracking, automated reporting, and integration with other business systems.
3. Data Migration:
 - Transfer existing data from the manual system to the online platform. This may involve cleaning up data, organizing it properly, and ensuring accuracy during the migration process.
4. Training and Onboarding:
 - Train employees on how to use the new online system effectively. Provide comprehensive training sessions and documentation to ensure a smooth transition.
 - Assign dedicated personnel to handle any questions or issues that arise during the onboarding process.
5. Testing and Quality Assurance:
 - Conduct thorough testing of the new online system to identify and resolve any bugs or issues before full implementation.
 - Ensure that the system performs as expected and meets the defined requirements.
6. Implementation:
 - Roll out the new online system gradually or all at once, depending on the complexity and size of your organization.
 - Communicate the implementation plan to all stakeholders and provide support during the transition period.

7. Monitoring and Optimization:

- Continuously monitor the performance of the online system and gather feedback from users.
- Identify areas for improvement and optimization, such as streamlining processes, adding new features, or integrating with additional systems.

8. Security Measures:

- Implement robust security measures.

Regularly back up data to prevent loss from system failures or cyber-attacks.

9. Compliance and Regulations:

- Ensure the new online system complies with industry regulations, especially regarding data privacy and security.

10. Continuous Improvement:

- Stay updated with advancements in inventory management technology and continuously look for ways to improve the efficiency and effectiveness of the system.

So, upgrading from a manual store warehousing and inventory management system to an online platform requires careful planning, implementation, and ongoing maintenance. By following a structured approach and leveraging the right technology solutions, CAAB can streamline its operations, improve accuracy, and enhance overall productivity. Such a modern WMS will contribute significantly in achieving the mission, vision and objectives of CAAB.