

WAREHOUSING AND STORAGE IN SUPPLY CHAIN MANAGEMENT

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WAREHOUSING AND STORAGE

“Warehousing and storage is an act of storing and assorting the finished goods so as to create maximum time utility at minimum cost”

- ▶ Need for storage arises both for raw material as well as finished products
- ▶ **STORAGE** involves proper management for preserving goods from the time of their production or purchase till actual use.
- ▶ When this storage is done on a large scale and in a specified manner it is called **WAREHOUSING**.

Now a days, many private firms are turning to distribution centers rather than constructing the warehouses.

WAREHOUSE MANAGEMENT

- ▶ Is a key part of the supply chain.
- ▶ AIMS: To control the movement and storage of materials within a warehouse
- ▶ The systems also direct and optimize stock put away based on real-time information about the status of bin utilization.
- ▶ A WMS monitors the progress of products through the warehouses.
- ▶ It involves the physical warehouse infrastructure, tracking systems, and communication between product stations.

DEFINITION AND ITS FUNCTIONS

- ▶ According to Robert Hughes-

“warehousing is the set of activities that are involved in receiving and storing of goods and preparing them for reshipment “

Warehousing is not only concerned with storage facilities but also involved in various other activities like -

- Receiving,
- identifying,
- Holding
- Assembling and preparing to meet the demand

FUNCTIONS OF WAREHOUSING

1. Receiving of goods:-

- ▶ Basic important function of warehousing
- ▶ Accepts and assumes the responsibility to deliver the goods
- ▶ Issues the receipts of the goods

2. Preparations of records:-

- ▶ Warehouse keeper check the items and prepares the records
- ▶ Records maintained properly to avoid problems at the time of delivery

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3. Identification:-

- ▶ All the items are marked separately
- ▶ Code numbers/tags attached for identification
- ▶ Identification helps to separate goods of different firms easily

4. Storing:-

- ▶ Major function of warehousing
- ▶ Goods are kept safely in warehouse
- ▶ Helps in proper protections of goods e.g. food crops , fruits, vegetable etc.

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5. Packing:-

- ▶ Provided by the warehouse keeper if owner requires such facilities
- ▶ Packaging is done in a reasonable way according to size and quantity of goods

6. Information about receipts:-

- ▶ Warehouse keeper checks and informs about the goods to the concerned department

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7. Breaking of bulks:-

- ▶ Generally goods delivered in bulk
- ▶ If owner wants in small quantity, keepers packs according to the requirements of customer

8. Search the goods:-

- ▶ Warehouse keeper searches efficiently and provides the goods to the owner, whenever he demands

9. Delivery of goods:-

- ▶ Documents are checked and prepared and
- ▶ Goods are loaded over transport

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BASIC FUNCTION PERFORMED

Movement function

**Receipt of
products from
manufacturing
plant**

**Transfer into
the warehouse**

**Placement at
designated
place**

**Regrouping
products**

**Transferring
on transport
vehicle**



Storage function

**Performed by storing products in the warehouse till delivery to
ultimate consumer**

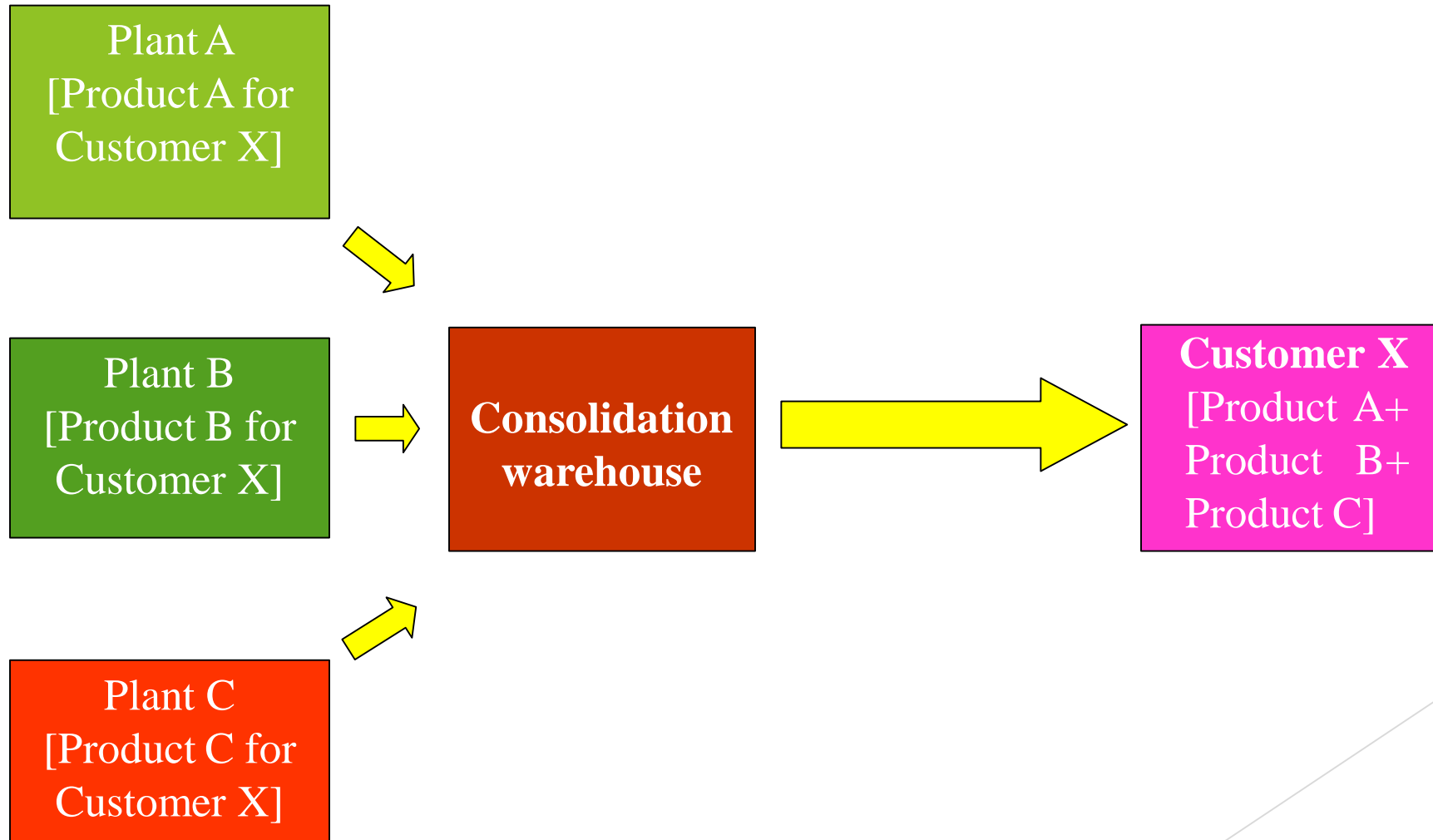
ECONOMIC AND SERVICE BENEFIT OF WAREHOUSING

- ▶ Economic benefits - Consolidation, Break bulk, Cross Dock, processing postponement, stock piling[seasonal storage]
- ▶ Service benefits - spot stocking, Assortment, mixing, production support, market presence

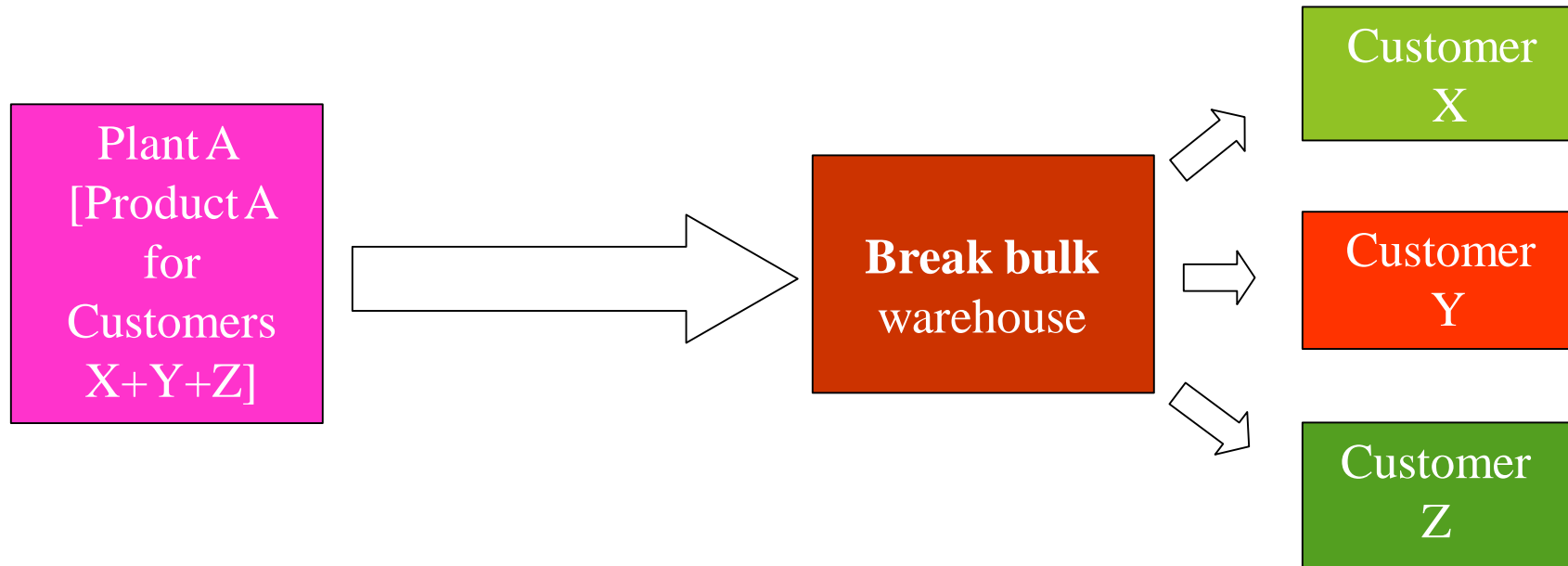
ECONOMIC BENEFITS

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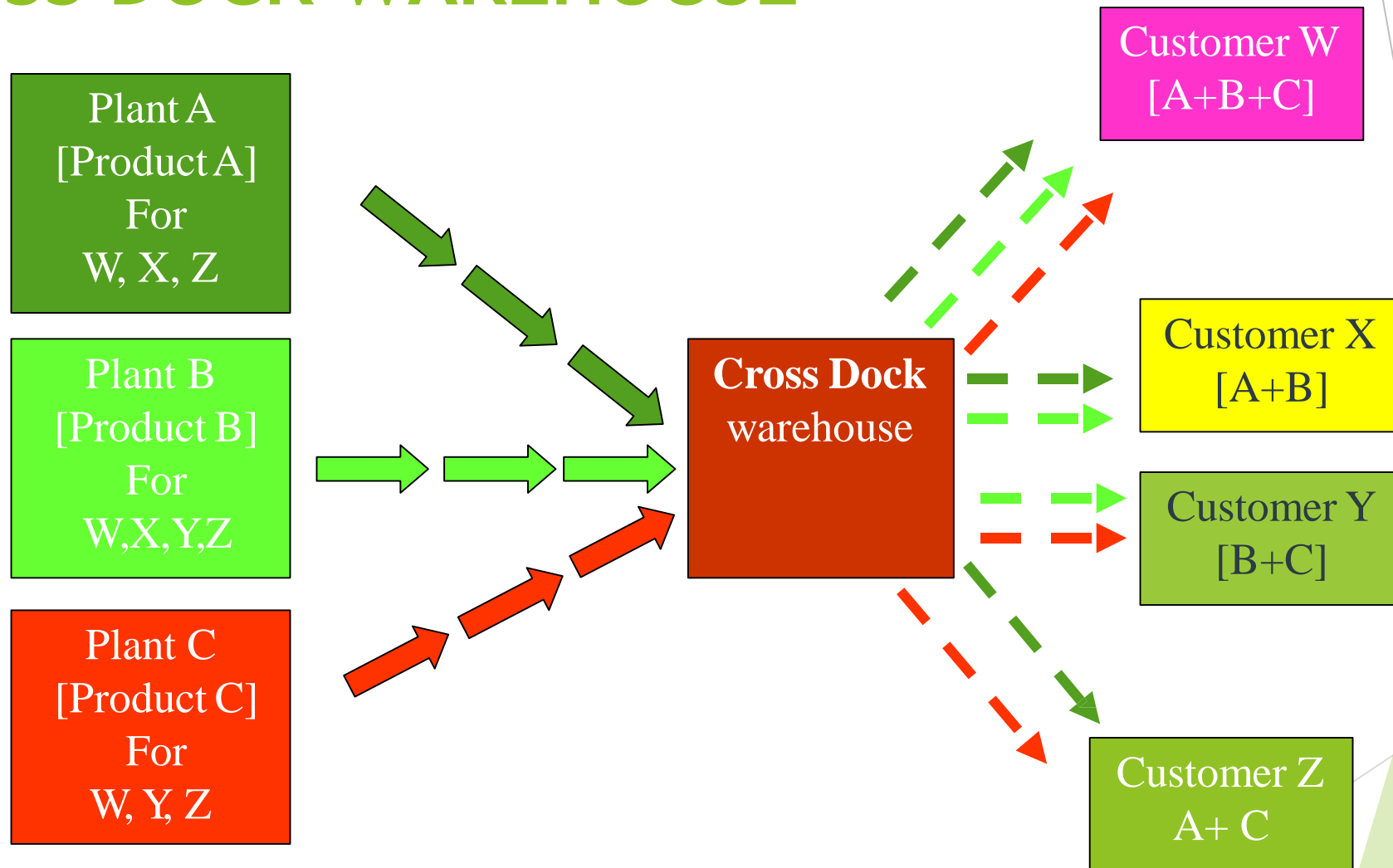
CONSOLIDATION



BREAK BULK WAREHOUSE

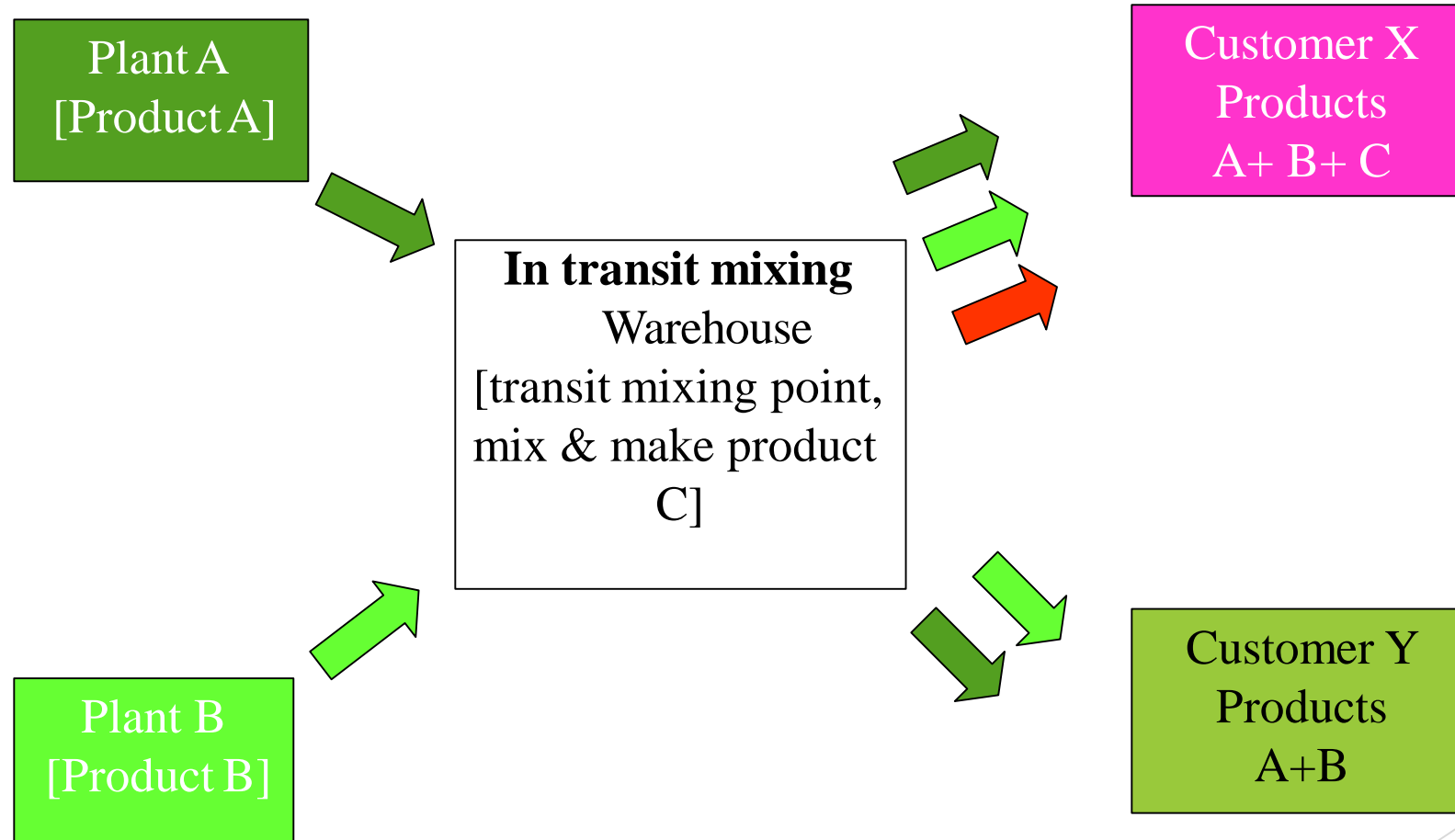


CROSS DOCK WAREHOUSE

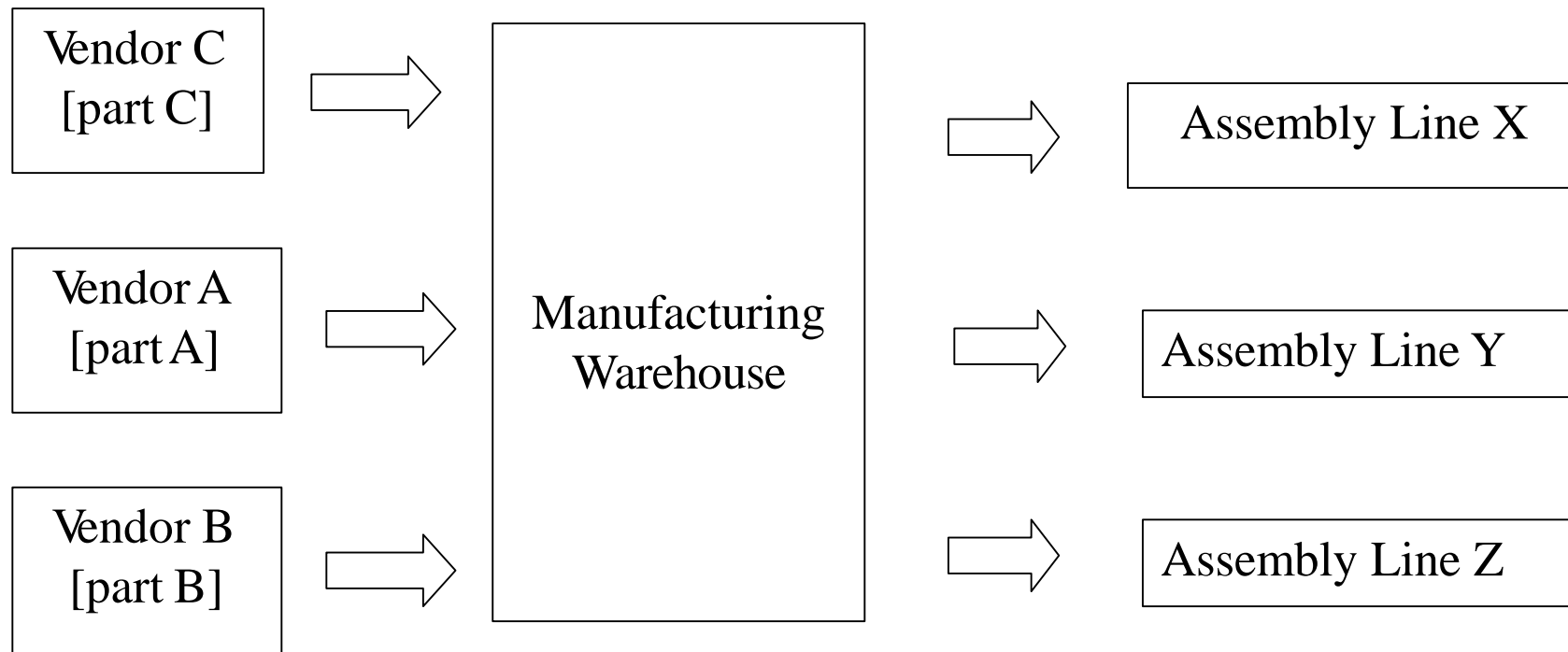


SERVICE BENEFITS

TRANSMIT MIXING WAREHOUSE



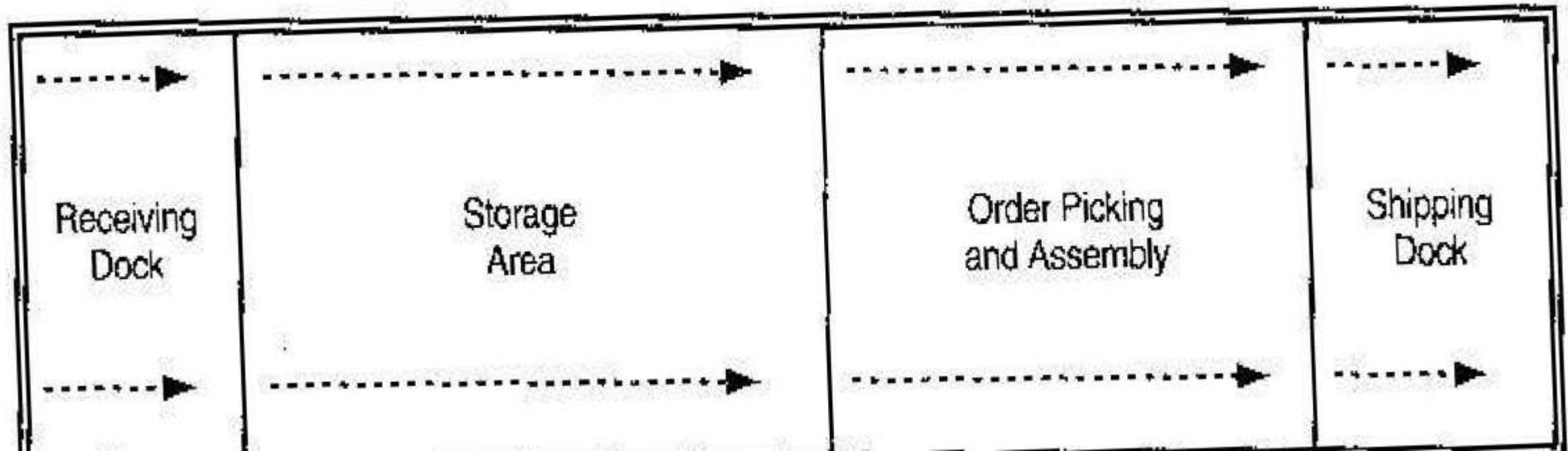
MANUFACTURING WAREHOUSE



OPERATING PRINCIPLES OF WAREHOUSE DESIGN

1. Design criteria

- Product Flow, Warehouse should be designed round Material Handling Flow



- ▶ No of stories, one is ideal as against limitations of space, cost of land
- ▶ Height utilization, principle of cubic space, principle of 'go vertical', limitation on height utilization due to fire safety and insurance regulations

2. Handling Technology

- ▶ Movement continuity
- ▶ Reducing runs
- ▶ Reducing short runs with intermediate stops
- ▶ Ensuring longer runs

-continue

- ▶ Movement scale economies
- ▶ Movement in large bulk
- ▶ Moving material in cases strapped on pallets or Containers
- ▶ Handling technology is addressing these issues

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3. Storage Plan

- ▶ Characteristics of product
- ▶ Open air storage for bulky products
- ▶ Heavy items closer to floor
- ▶ Light items on higher rungs
- ▶ Fast moving items in large bulk closer to aisles
- ▶ Hazardous items

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WAREHOUSE ALTERNATIVES

1. Private Warehouses

- ✓ Owned or leased by the product owner
- ✓ Control is fully with the product owner
- ✓ Changes can be made to integrate the warehouse with rest of the logistical system
- ✓ Provides market presence to the product owner
- ✓ There is no profit to be added to the cost

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2. Public Warehouses

- ✓ Available to companies on hire
- ✓ Overheads get distributed over a large customer base
- ✓ As warehousing is their core business public warehouses offer expertise in management
- ✓ Flexibility of location
- ✓ Significant scale economies, several users and resultant volume, benefits in transportation costs

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3. Contract warehouses

- ✓ Contract warehouse operators take over logistics responsibility from manufacturing company
- ✓ Long term relationship and customized service
- ✓ Expertise of management
- ✓ Shared resources with several clients

FACTORS TO BE CONSIDERED

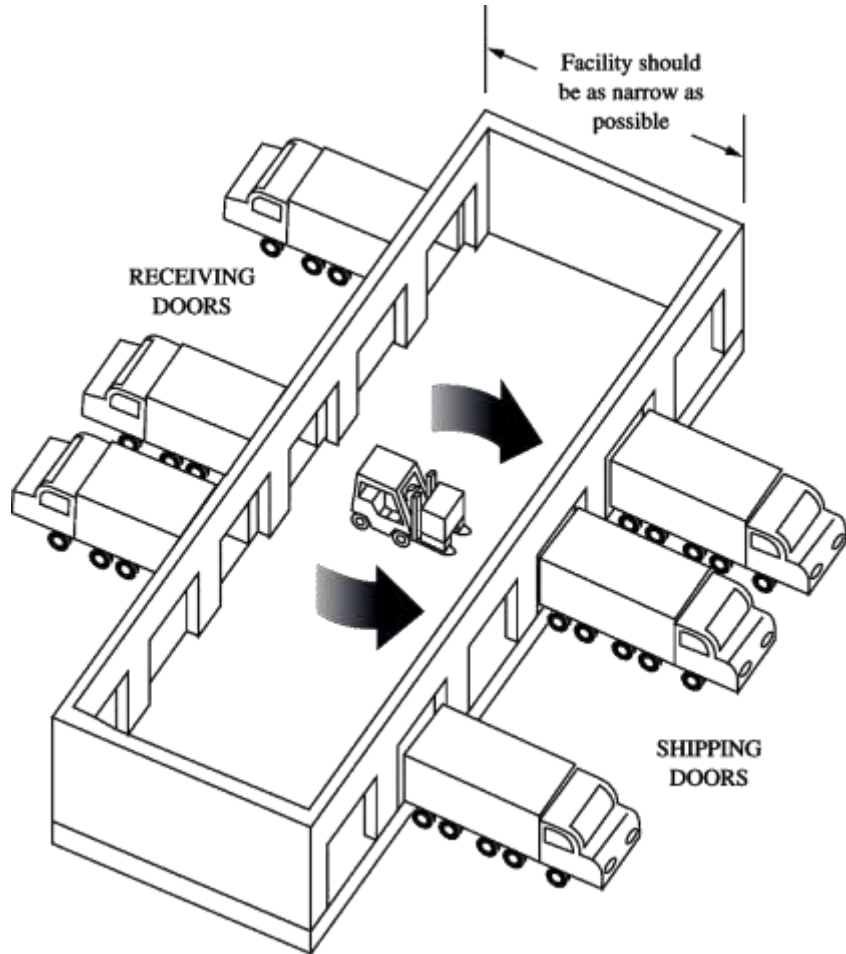
It is desirable to maximize the following factors-

1. Space utilization
2. Equipment utilization
3. Labor utilization
4. Accessibility of all materials
5. Protection of all materials

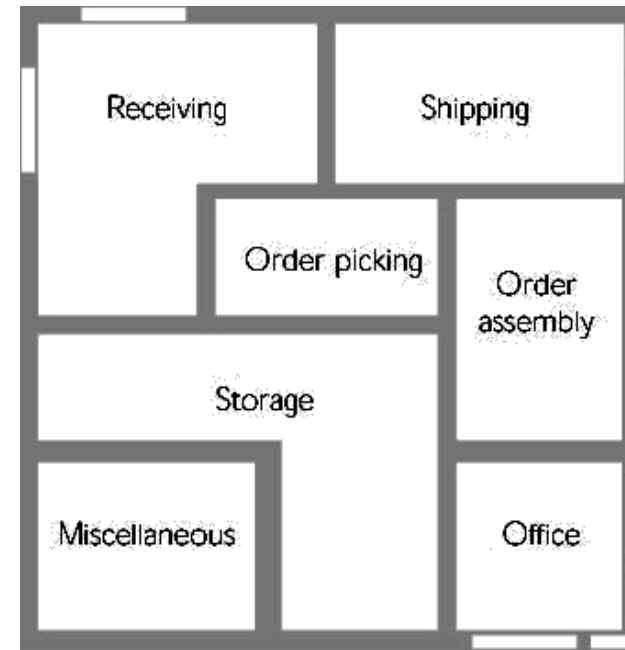
FACTORS FOR IDEAL WAREHOUSES

- ▶ Convenient Location
- ▶ Availability Of Mechanical Appliances To Load and Unload Goods
- ▶ Adequate Space
- ▶ Cold Storage Facilities
- ▶ Proper Arrangement for Protection
- ▶ Sufficient Parking Space
- ▶ Round the Clock Security Arrangement
- ▶ Latest Fire Fighting Equipment's

DESIGN CONSIDERATION

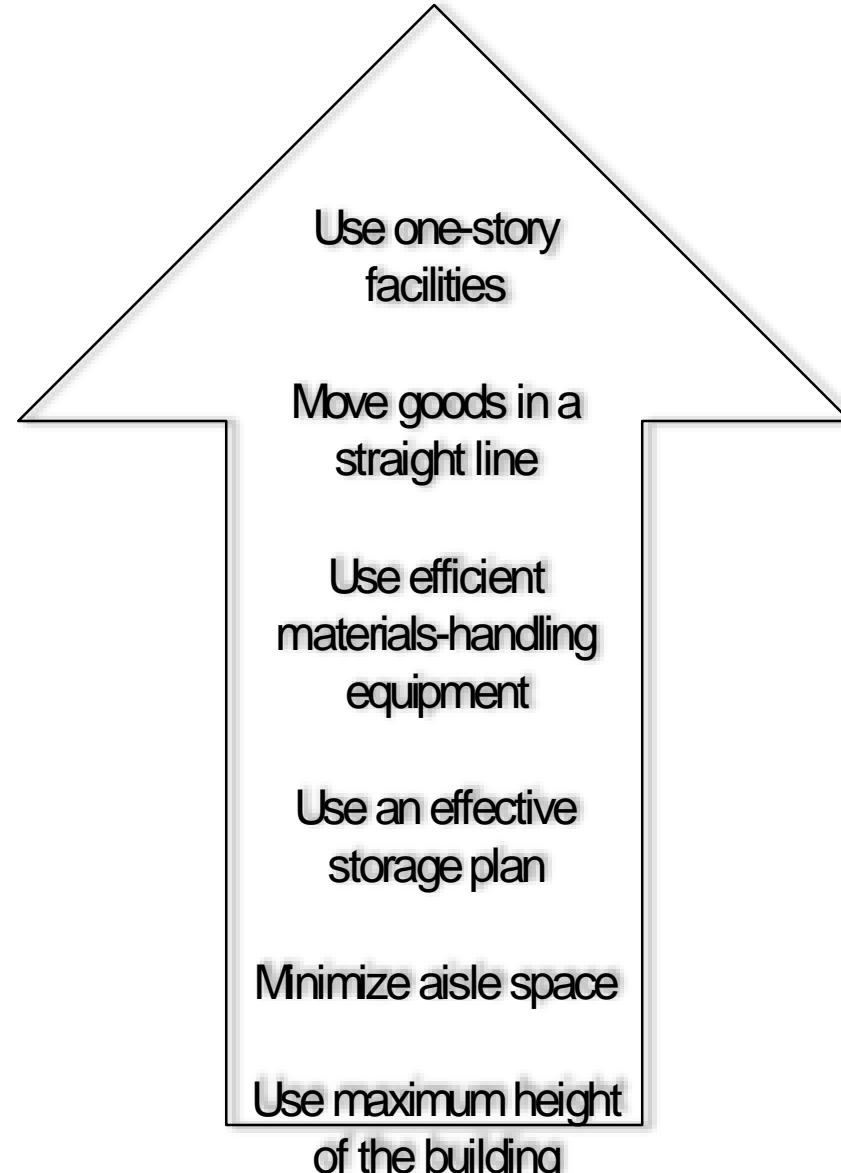


Ideal Facility for Pure Supplier Consolidation
(Full Pallet Movement)

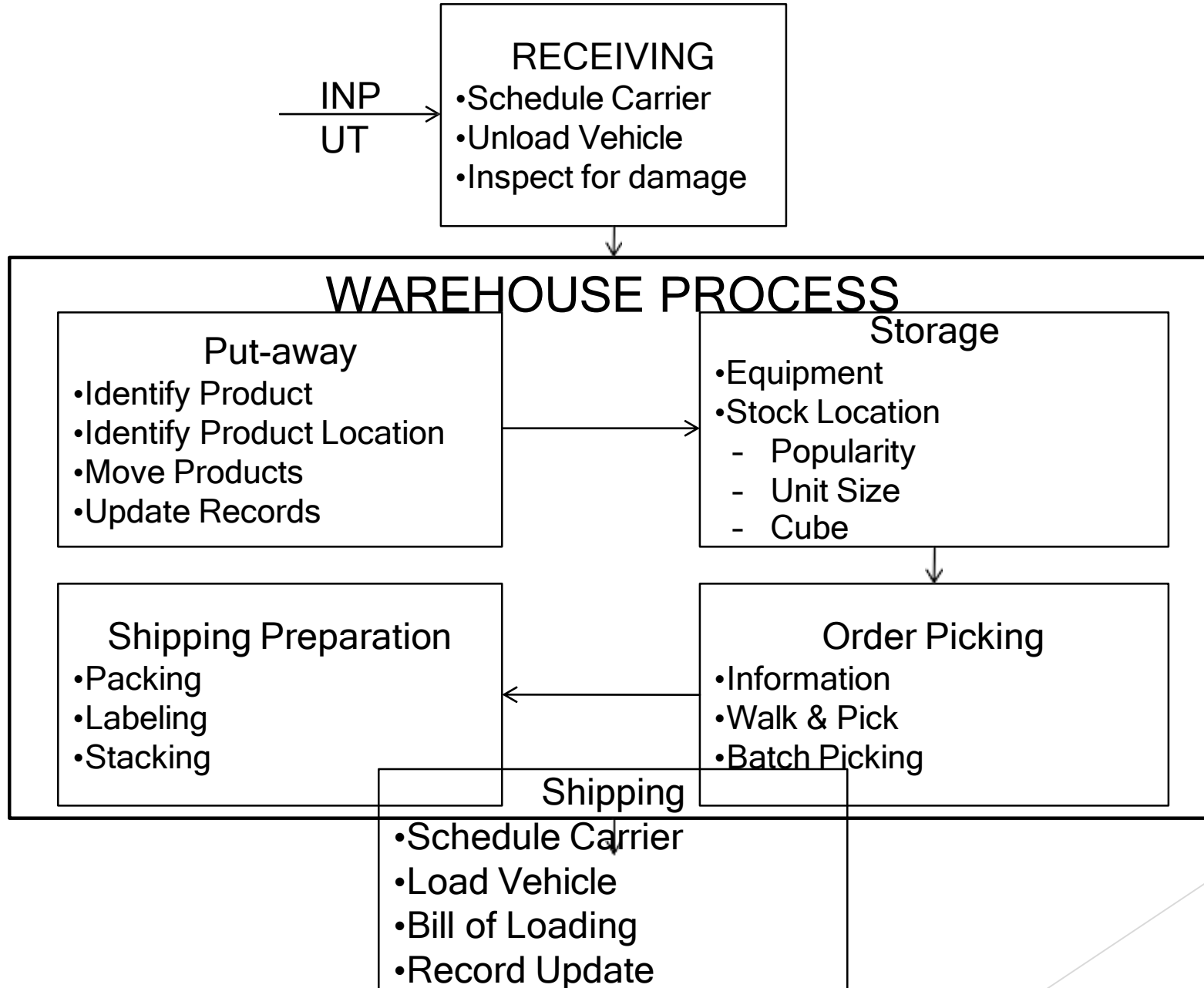


Warehouse Space Requirements

PRINCIPLES OF WAREHOUSE LAYOUT DESIGN



PROCESS OF WAREHOUSE: OVERVIEW



WAREHOUSE ACTIVITIES

- ▶ Receive goods
- ▶ Identify the goods
- ▶ Dispatch goods to storage
- ▶ Hold goods
- ▶ Pick goods
- ▶ Marshal shipment
- ▶ Dispatch shipment



Receive goods

- Accepts goods from
 - Outside transportation or attached factory & accepts responsibility
- Check the goods against an order & the bill of loading
- Check the quantities
- Check for damage & fill out damage reports if necessary

Identify the goods

- items are identified with the appropriate stock-keeping unit (SKU) number (part number) & the quantity received recorded

Dispatch goods to storage

- goods are sorted & put away

Hold goods

- goods are kept in storage & under proper protection until needed

Pick goods

- items required from stock must be selected from storage & brought to a marshalling area

Marshal the shipment

- goods making up a single order are brought together & checked for omissions or errors; order records are updated

Dispatch the shipment

- orders are packaged, shipping documents are prepared, & goods loaded on the vehicle

Operate an information system

- a record must be maintained for each item in stock showing the quantity on hand, quantity received, quantity issued, & location in the warehouse

REASONS FOR WAREHOUSING

- ▶ To support the company's customer policy.
- ▶ To maintain a source of supply without interruptions.
- ▶ To achieve transportation economies.
- ▶ To support changing market conditions and sudden changes in demand.
- ▶ To support any JIT programs.
- ▶ To provide customers with the right mix of products at all times and all locations.
- ▶ To ensure least logistics cost for a desired level of customer service.

FUNCTIONS OF A WAREHOUSING

- ▶ Receiving the goods
- ▶ Storing
- ▶ Order Taking
- ▶ Dispatch

While designing a warehouse, a manager ought to keep in mind these elements

- ▶ Land and Building
- ▶ Management and staff
- ▶ Operating methods and Procedures
- ▶ Equipment

TYPES OF WAREHOUSE

- ▶ General warehouse
- ▶ Specific warehouse
- ▶ Bonded warehouse
- ▶ Bulk storage warehouse
- ▶ Refrigerated warehouse

WAREHOUSE LOCATION

- ▶ Centralized warehouse
- ▶ Decentralized warehouse

CENTRALISED WAREHOUSING

Benefits:

1. It improves operating efficiency and inventory control is felt easier and effective.
2. There is no need to carry large stock and there are no dangers of stock outs resulting in low level inventories.
3. Transport facilities are optimally used as routing and scheduling becomes handy.
4. The firm is better placed to meet the demand fluctuations from different market segments at relatively short notice.

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Drawbacks:

1. It results in loss of customer service due to spatial considerations and delays are caused.
2. The firm is deprived of its potential market share.
3. It results in heavy transport costs unless each delivery is sizeable as the carrier has to cover long distance.

DECENTREALISE WAREHOUSE

Benefits:

1. The firm serves the customers better positioning the inventory in their proximity. This is the result of maximum time utility created by it.
2. The firm is likely to effect savings in freight charges because of bulk handling
3. It facilitates product movement by block rates

Drawbacks:

1. It adds to the administrative cost as the firm is to manage number of warehouses distantly located with the acute problem of maintaining high level efficiency
2. It calls for heavy investment as the firm is to hold inventory at different locations in larger lots.

OBJECTIVES OF EFFICIENT WAREHOUSE OPERATIONS

- Provide timely customer service.
- Keep track of items so they can be found readily & correctly.
- Minimize the total physical effort & thus the cost of moving goods into & out of storage.
- Provide communication links with customers

COSTS OF OPERATING A WAREHOUSE

- Capital costs
 - Costs of space & materials handling equipment
- Operating costs
 - Cost of labor
 - Measure of labor productivity is the number of units that an operator

Maximize productivity & minimize cost,
warehouse management must work with the
following

- Maximize use of space
 - space is the largest capital cost
- Effective use of labor & equipment
 - labor is the largest operating cost
 - material handling equipment is the second largest capital cost

FACTORS INFLUENCING EFFECTIVE USE OF WAREHOUSES

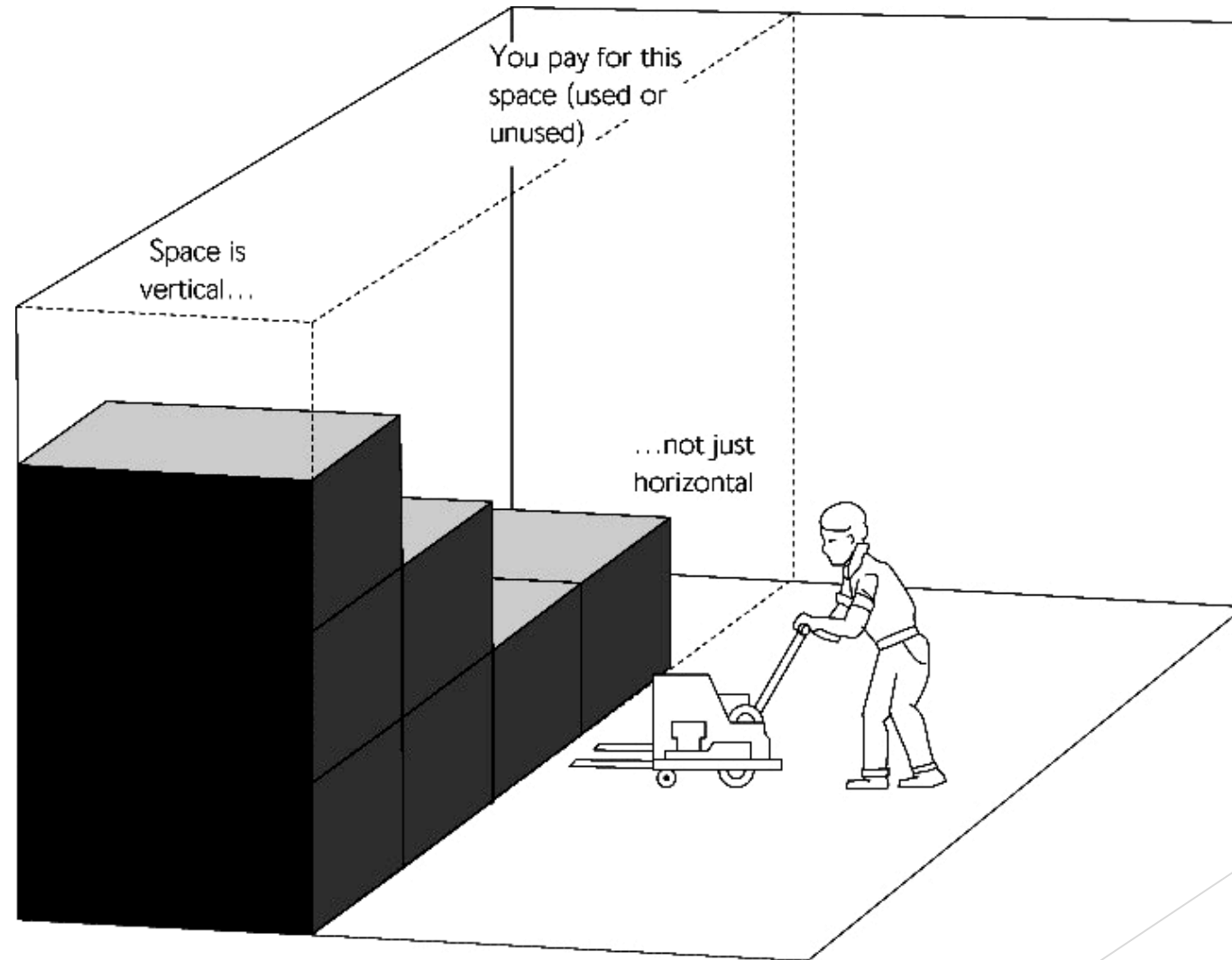
- Cube utilization and accessibility
- Stock location
- Order picking and assembly
- Physical Control & Security -
Elements

Cube utilization and accessibility

- Goods stored not just on the floor, but in the cubic space of the warehouse; warehouse capacity depends on how high goods can be stored
- Accessibility means being able to get at the goods wanted with a minimum amount of

Cube utilization and accessibility

continued...



Stock Location

- Objectives
 - To provide the required customer service
 - To keep track of where items are stored
 - To minimize effort to receive, put away, and retrieve items
- Basic Stock Locating Systems
 - Group functionally related items together
 - Group fast-moving items together

Stock Location

continued...

- **Fixed Location**

- SKU assigned a permanent location, & no other items are stored there
- Fixed-location systems usually have poor cube utilization
- Usually used in small warehouses; throughput is small, & there are few SKUs

- **Floating (Random) Location**

- Goods stored wherever there is appropriate space
- Advantage is improved cube utilization
- It requires accurate and up-to-date information
- Warehouses using floating-location systems are usually computer-based

Stock Location

continued...

- Two other systems sometimes used are
 - Point-of-use storage
 - Inventory stored close to where it will be needed
 - Used in repetitive manufacturing & JIT systems
 - Central storage
- Contains all inventory in one central location

Stock Location

continued...

- Advantages of Point-of-use Storage
 - Materials are readily accessible to users
 - Material handling is reduced or eliminated
 - Central storage costs are reduced
 - Material is accessible all the time

Stock Location

continued...

- Advantages of Central Storage
 - Ease of control
 - Inventory record accuracy is easier to maintain
 - Specialized storage can be used
 - Reduced safety stock, since users do not need to carry their own safety stock

Order Picking and Assembly

- When an order is received, items must be obtained from the warehouse, grouped, & prepared for shipment, systems used
 - Area system
 - Zone system
 - Multi-order system

Order Picking and

Assembly continued...

- Area system
 - Order picker circulates throughout warehouse selecting items on an order -- order is ready to ship when order picker is finished
- Zone system
 - Warehouse is divided into zones, & each picker works only in an assigned zone -- order is divided by zone, & the items from each zone are sent to the

Order Picking and Assembly continued...

- Multi-order system
 - Same as the zone system, except that each picker collects items for a number of orders at the same time



THANK YOU
for listening
-
ANY
QUESTIONS?