SUPPLY CHAIN MANAGEMENT

WAREHOUSING MANAGEMENT

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THE ROLE OF THE WAREHOUSE IN THE LOGISTICS SYSTEM

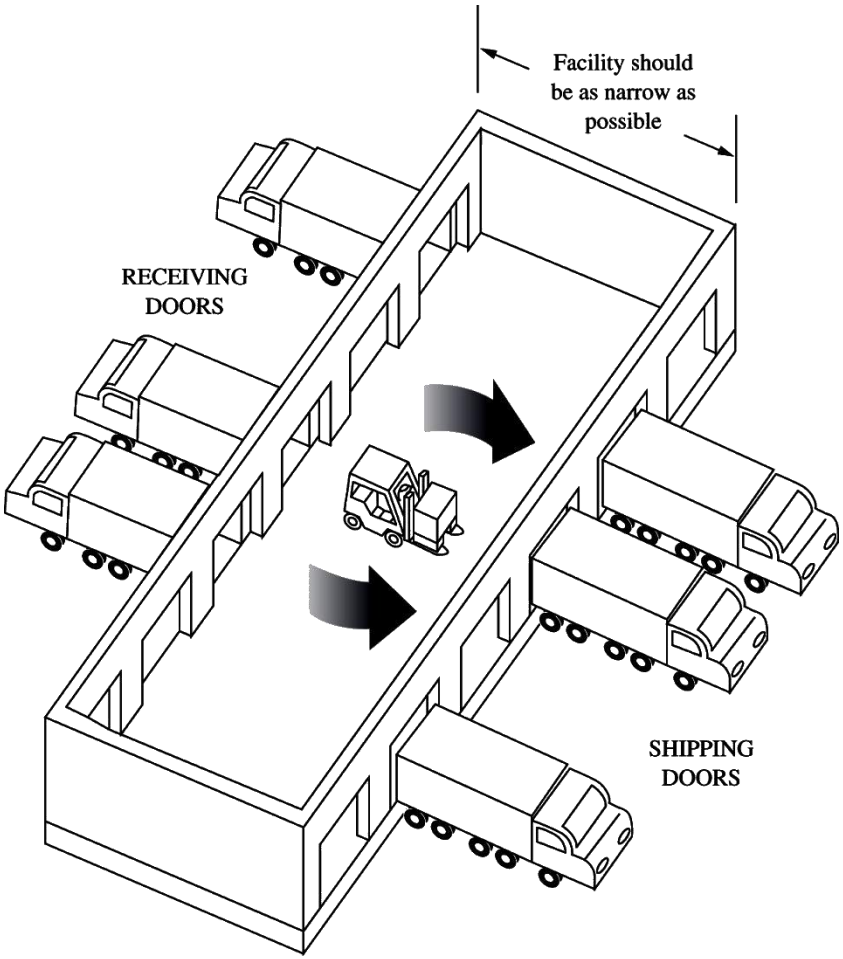
- The warehouse is where the supply chain holds or stores goods.

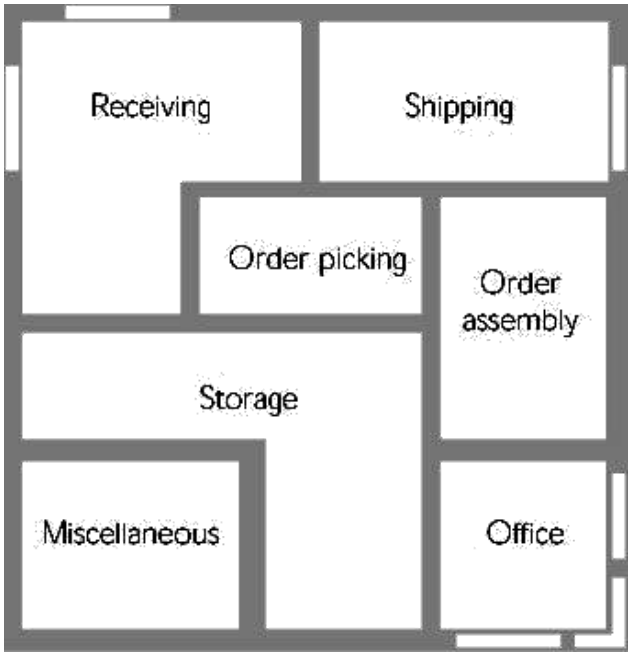
- Functions of warehousing include
  - Transportation consolidation
  - Product mixing
  - Docking
  - Service
  - Protection against contingencies

TYPE OF WAREHOUSING

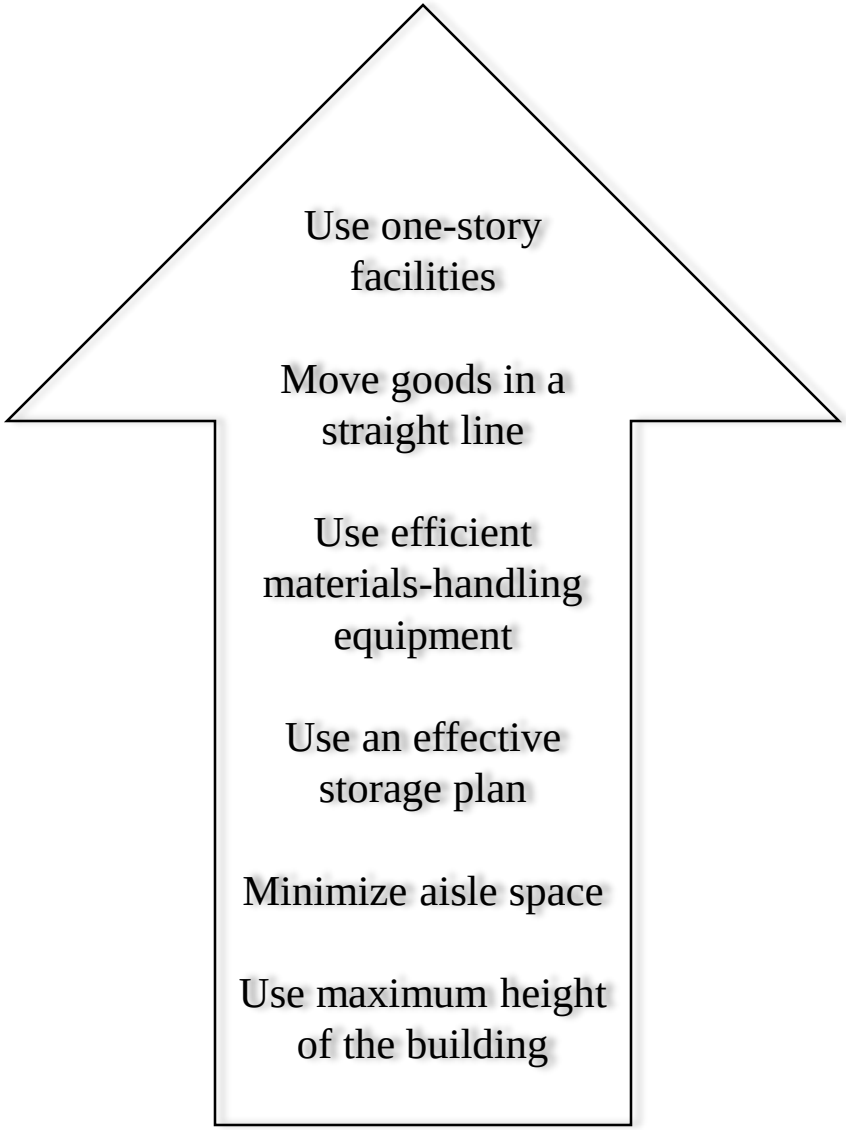
- Public Warehousing
- Private Warehousing
- Contract Warehousing
- Multi-client Warehousing

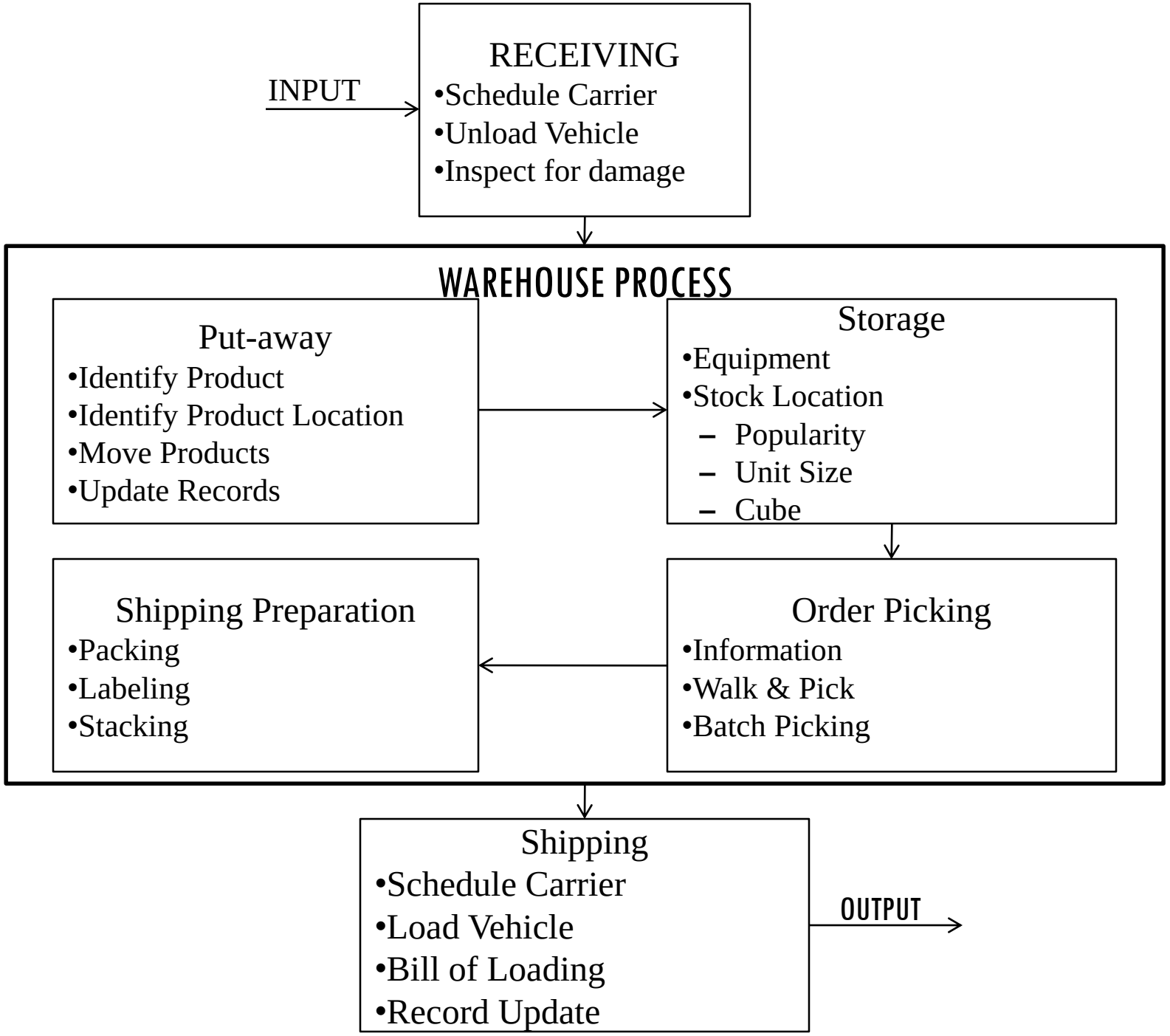
DESIGN CONSIDERATION





PRINCIPLES OF WAREHOUSE LAYOUT DESIGN




INPUT
RECEIVING
•Schedule Carrier
•Unload Vehicle
•Inspect for damage
WAREHOUSE PROCESS
Put-away
•Identify Product
•Identify Product Location
•Move Products
•Update Records
Storage
•Equipment
•Stock Location
– Popularity
– Unit Size
– Cube
Shipping Preparation
•Packing
•Labeling
•Stacking
Order Picking
•Information
•Walk & Pick
•Batch Picking
Shipping
•Schedule Carrier
•Load Vehicle
•Bill of Loading
•Record Update
OUTPUT

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

- Benefits of Warehouse Management
  - Provide a place to store & protect inventory
  - Reduce transportation costs
  - Improve customer service levels
- Complexity of warehouse operation depends on the number of SKUs handled & the number of orders received & filled.
- Most activity in a warehouse is material handling.

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 can move in a day

WAREHOUSE ACTIVITIES

- Receive goods
- Identify the goods
- Dispatch goods to storage
- Hold goods
- Pick goods
- Marshal shipment
- Dispatch shipment
- Operate an information system

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
- Inspect goods if required

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

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

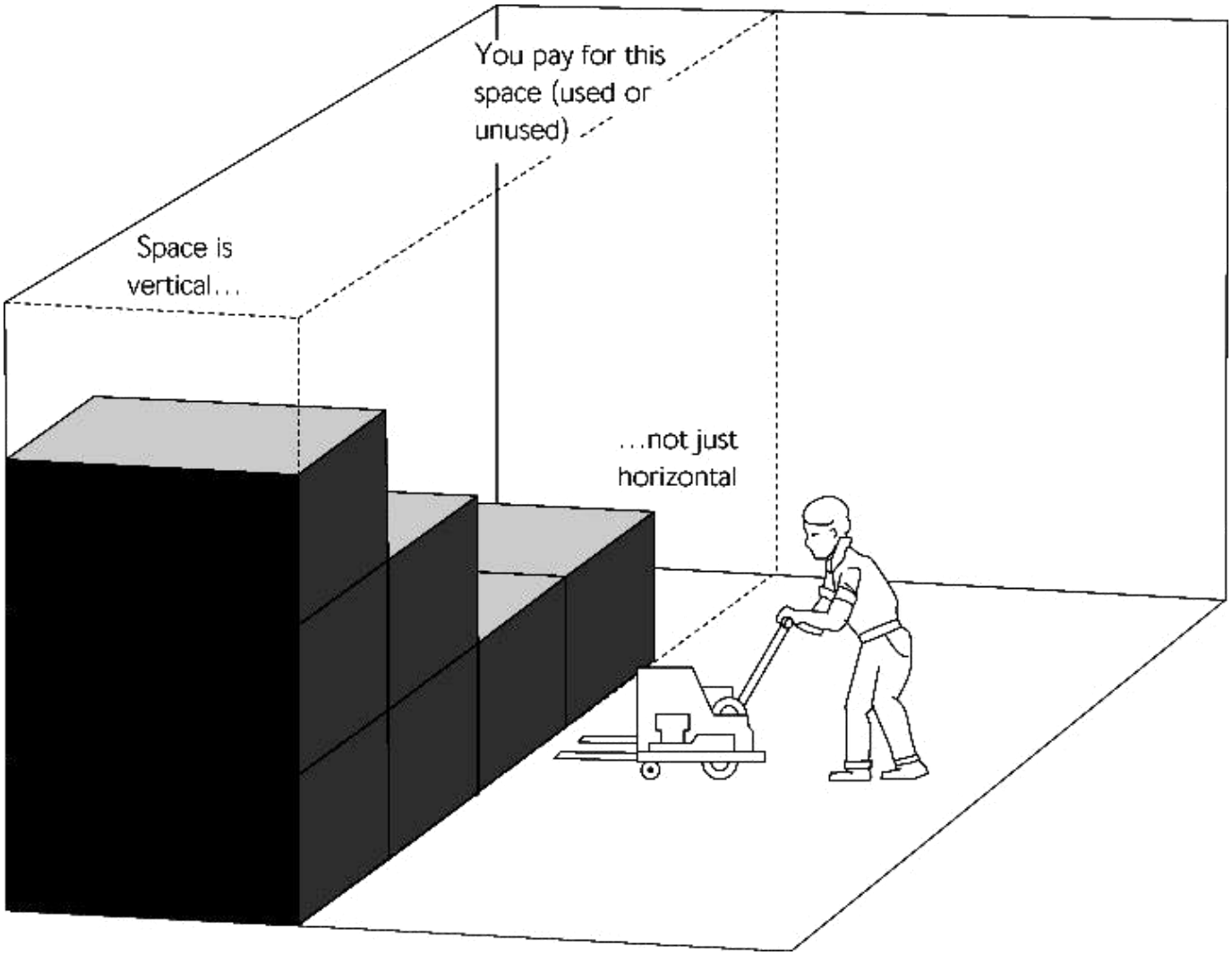
- Cube utilization and accessibility
- Stock location
- Order picking and assembly
- Physical Control & Security - Elements

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 work

Cube utilization and accessibility



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
  - Group physically similar items together
  - Locate working stock and reserve stock separately

Stock Location

- 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

- 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

- 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

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

- 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 marshaling area

- Multi-order system

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

PHYSICAL CONTROL & SECURITY - ELEMENTS

- Good part numbering system
- Simple, well-documented transaction system
  - Identify the item
  - Verify the quantity
  - Record the transaction
  - Physically execute the transaction
- Limited access
  - Inventory must be kept in a safe, secure (locked) place with limited general access

THANK YOU