LOGISTICS CENTERS

Module IV

CFCFA Training Program Tashkent – Uzbekistan

August 19 – 23, 2013

References:

1- Business Logistics/ Supply Chain Management by Ronald H. Ballou

2- Warehouse Management Systems Agility Logistics, Razziq International etc.

Definition of Logistics

Logistics is a branch of Military Science because in the early days all the soldiers , weapons were transported from one place to another by railways, trucks, airplane and ships from one place to another.

The council of logistics proposed the following definition

Logistics is a part of Supply Chain Process that Plans, Implement & Controls the efficient and effective flow of goods and services from point of origin that is supplier / vendor factory, to point of destination to fulfill customer consumption.

Logistics Centers / Warehouses

- **Logistics Center , defined here are facilities that provide:**

i- proper environment for the purpose of storing goods and materials.

ii- complete protection from the elements.

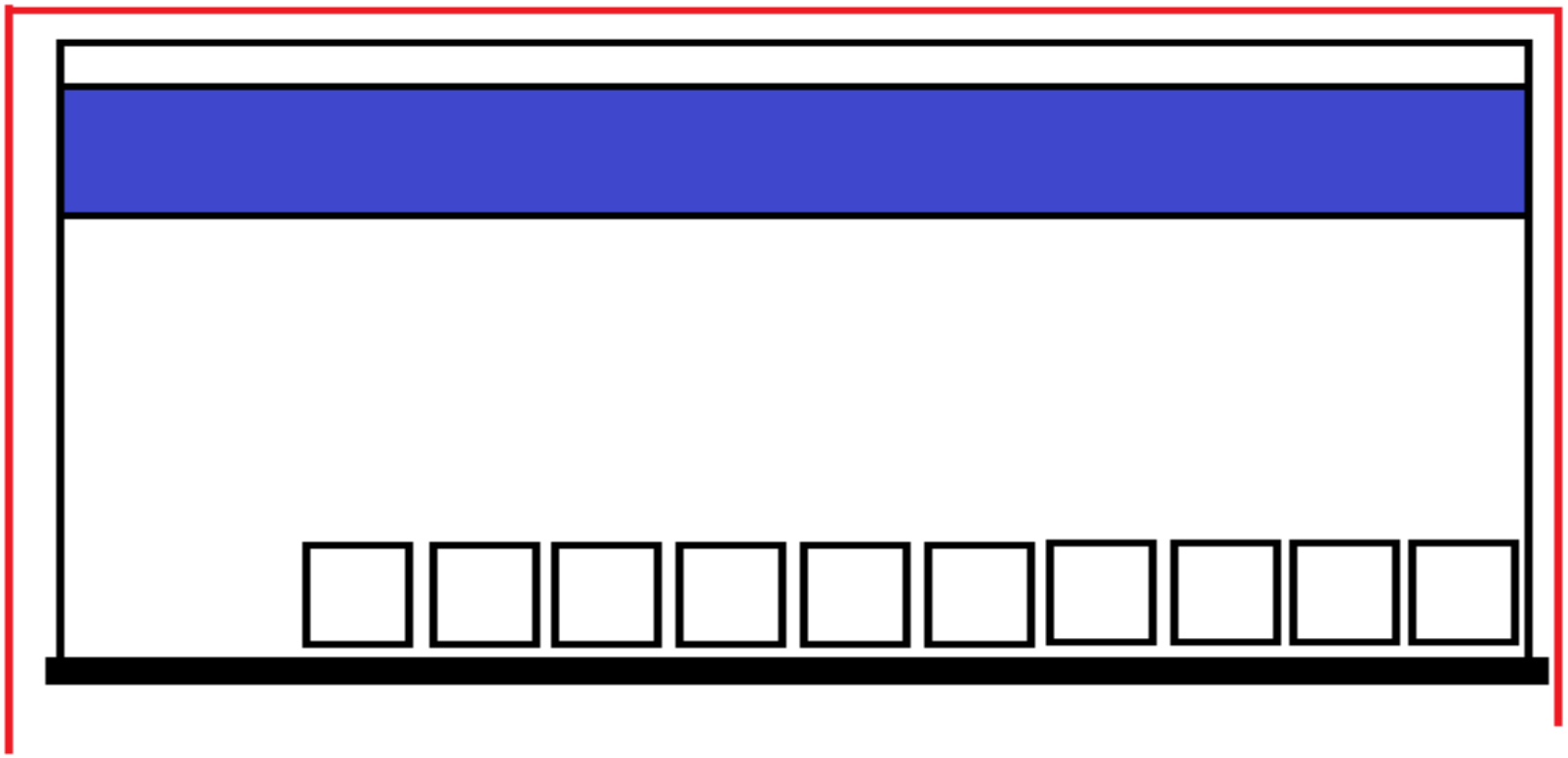
iii- segregation as per nature and specification of cargo

iv- consolidation services

v- transit and distribution services

proper environment for the purpose of storing goods and materials.

complete protection from the elements.



segregation as per nature and specification of cargo

FMCG - Fast Moving Consumer goods storage in Pakistan

Potato Chips

Shampoo

Baby Diapers

SKU identification

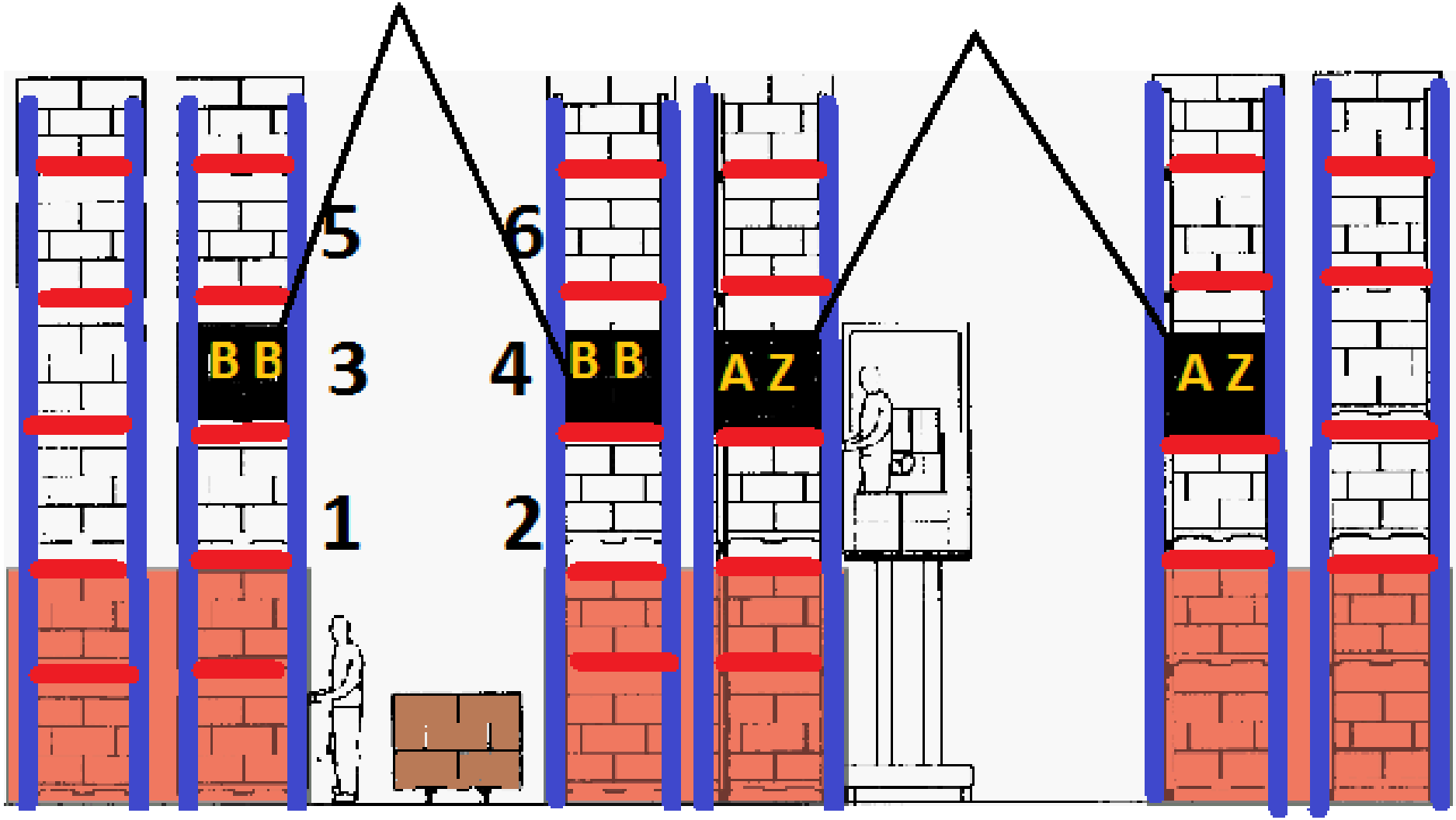
Flavor F1

Weight W2

Size S3

SKU - ID # F1W2S3

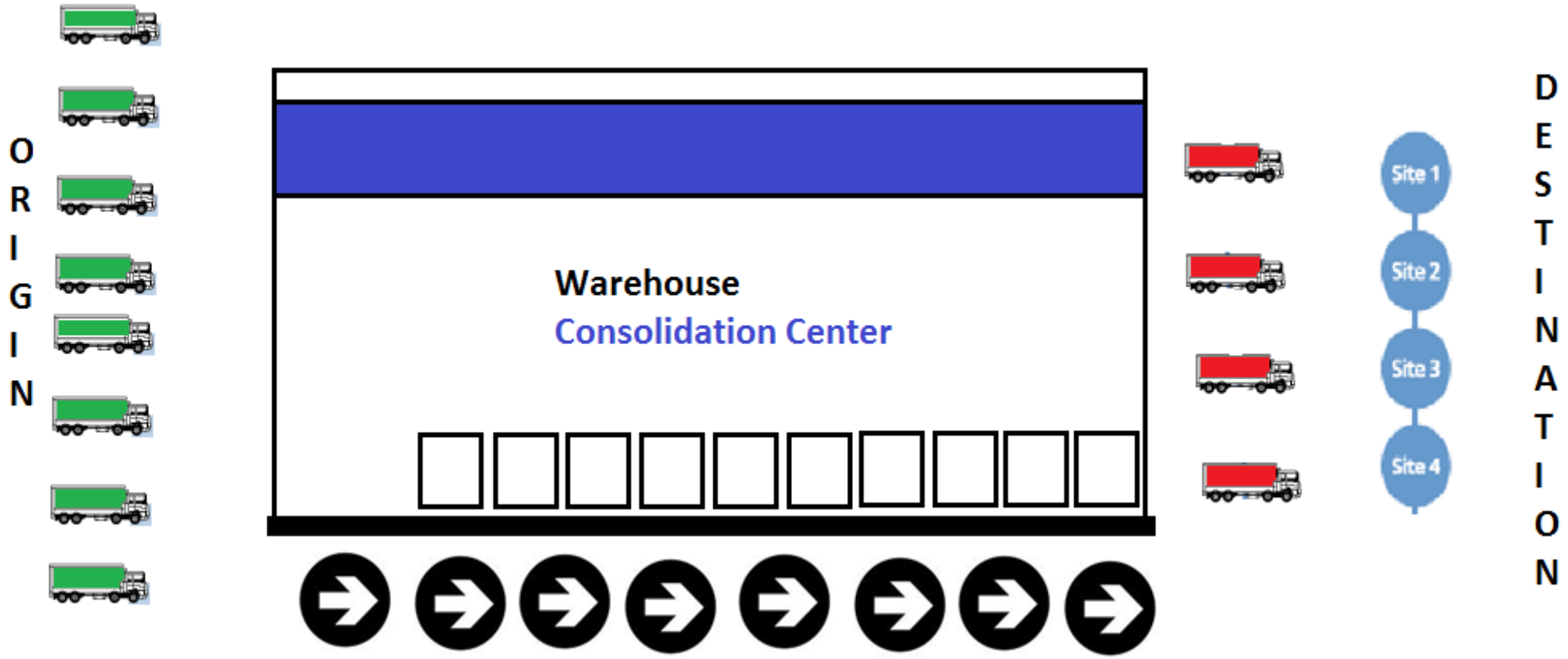
Aisle Identifcation



BB 1 BB 3 BB 5 AZ 1 AZ 3 AZ 5

BB 2 BB 4 BB 6 AZ 2 AZ 4 AZ 6

Consolidation services



Consolidation & Segregation for Shoes

Size & Pair segregation

Consolidation center Airport

Consolidation Center at Seaport

Types Of Logistics Center

1. Public Logistics Centers – Government own
2. Private Logistics Centers – Rent , Lease, purchase establishment
3. Custom Bonded Logistics Centers – Private – Public

Further classified as per nature of cargo.

a- General Logistics Center

b- Cold Storage Logistics Center

c- Dangerous goods Logistics Center

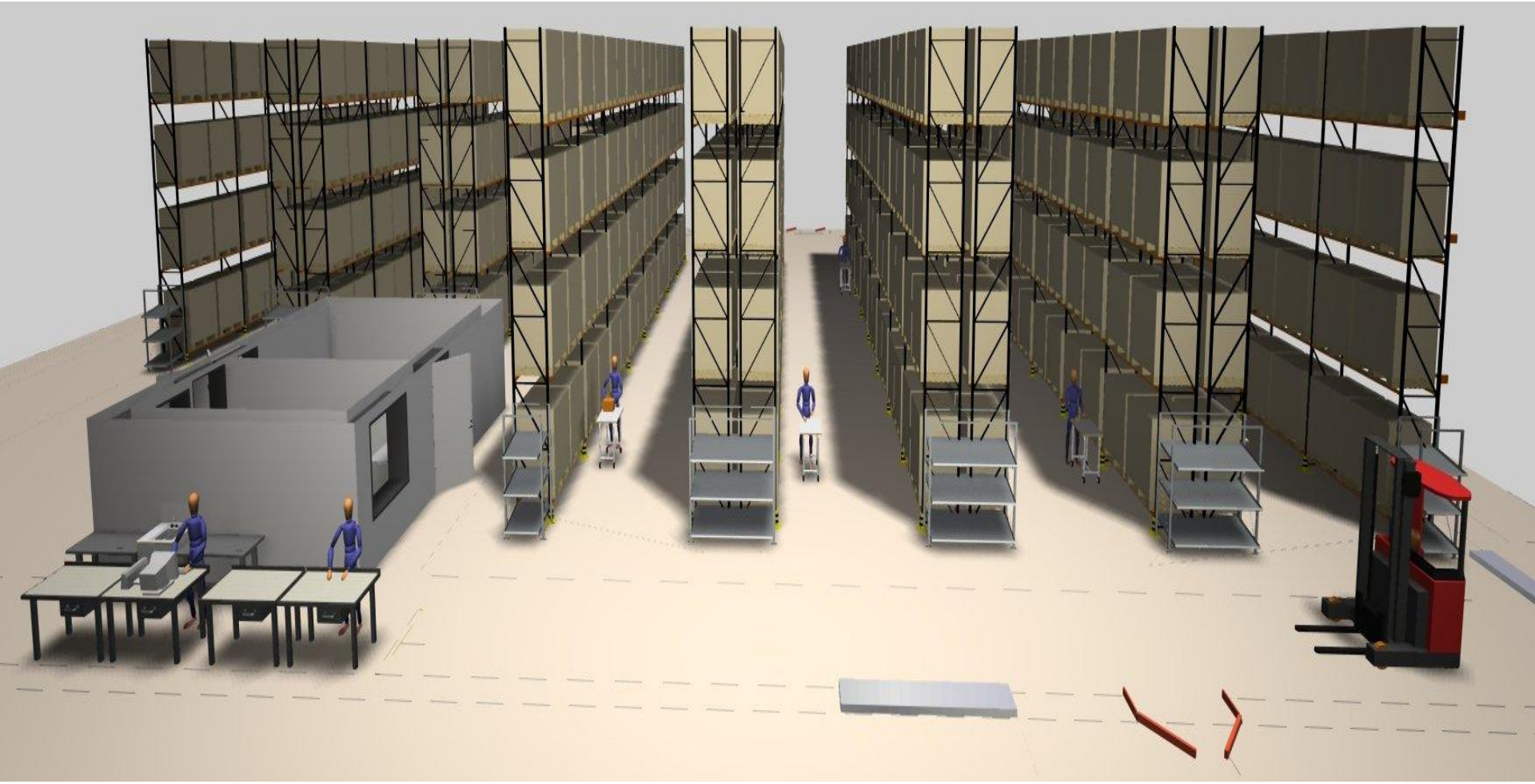
d- Radio Active materials Logistics Center

Site Selection

- Location of major market
- Nature of product
- Modes of transportation & Loading docks as per modes like rail, road, airport.
- Terrain Analysis – Mountainous, Plains
- Quality of labor (skilled, semi skilled, general)
- Cost of land
- Government Taxes
- Cost of construction potential of expansion

Design & Layout Consideration

- Horizontal storage
- Vertical storage
- Types of Spaces
- Dock Design
- Durable & Functional
- Energy Efficient
- Safety and Security
- Health & Comfort
- Sizing the Facility
- Space Layout



Horizontal Storage

The cargo is not placed on racks and shelves but placed on floors with proper segregation and as per requirement, usually cargo of heavy nature are proposed to be stored HORIZONTAL.

Vertical Storage

The cargo is placed on racks and shelves this makes proper utilization of space and more cargo can be stored VERTICAL

Types of Spaces

Storage space

1. **Designed to store goods and materials,**
2. **Allow for the regular circulation of occupants, vehicles, and machinery**
3. **Handling of these goods and materials.**
4. **Capacity to accommodate vertical storage, narrow isles & shelving**

Types of Spaces

Office Space

The Office space refers to a variety of spaces including:

- **meeting spaces**
- **reception,**
- **storage rooms,**
- **file rooms,**
- **mail rooms,**
- **copier areas,**
- **service units/coffee bar,**
- **Dress Lockers**

Loading Docks (Truck)

Loading docks are the arrival and departure point for large shipments brought to or taken from a building by trucks and vans. The loading dock space type described here includes a shipping and receiving dock for trucks and vans.

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Loading Docks (Rail)

The Pakistan Railway docks are usually with long length and are designed to load and offload from railway wagons and bogies of different size and shape. There are segregations based on product like wheat, sand, stones, coal.

The following picture are railway rolling stock (boogies) at Freight Station in Karachi

Durable &Functional

- Design of warehouses is to be based on the dead and live load requirements of the structure as it will be built. Snow, wind, and seismic loads shall be considered where they are applicable. Racking in seismic areas must be built stronger and be better braced.

- Wind uplift can cause great damage to roofs and metal roof copings at the roof edge. Building codes recognize that wind velocity is greater across open areas, typical for warehouse zones.

Durable &Functional

- Wind-driven rain can easily penetrate the vast surface areas of the warehouse walls. Design walls to permit any infiltrating water to evaporate harmlessly without collecting in the wall cavities or damaging stored product.

- Adequate space must be provided on-site for truck maneuvering, truck storage if the business owns a fleet, car parking for employees and future office space/population expansion (which might be driven by higher rent for center-city office space), and landscaped areas

Energy Efficient

- Possess light colored roof
- Use ceiling mounted fans to reduce heat stratification and provide air movement, Mount fans above highest forklift level for worker safety.
- Consider specifying white painted metal roof decking, thereby increasing ceiling surface reflectivity, lighting efficiency, and worker comfort without any added energy cost.
- Use energy-efficient fixtures, systems, and appliances, e.g., motion sensor instant-on lighting systems, wherever feasible.

Safety/Security of Personnel and Material

- Address the traditional life-safety and health concerns common to all buildings, including measures to prevent occupational injuries and illnesses (work-related musculoskeletal disorders (WMSD), trips, falls, etc.), ensure electrical safety, and eliminate exposure to hazardous materials.

- wear **(PPE)** personal protective equipment.

- Indicate signs specially for hazardous places.

Safety/Security of Personnel and Material

- Possess non-slip surface treatments on floors subject to wetting, such as outdoor docks, to eliminate slips and falls to personnel.
- Be designed with fire sprinkler systems
- Include appropriate security systems incorporated into the overall warehouse design.

Sign Indications

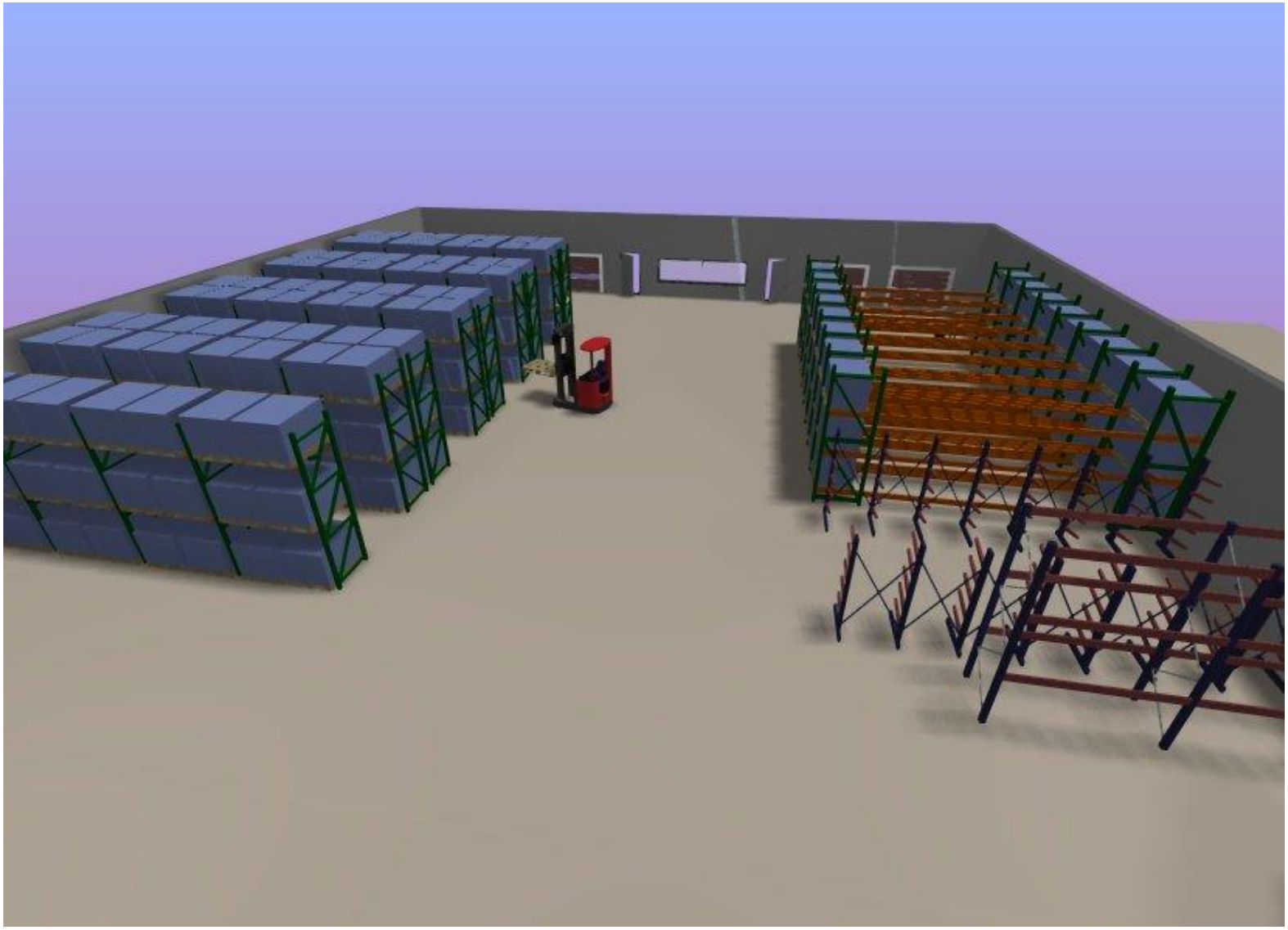
Personal Protective Equipment

Security System

Sizing the Facility

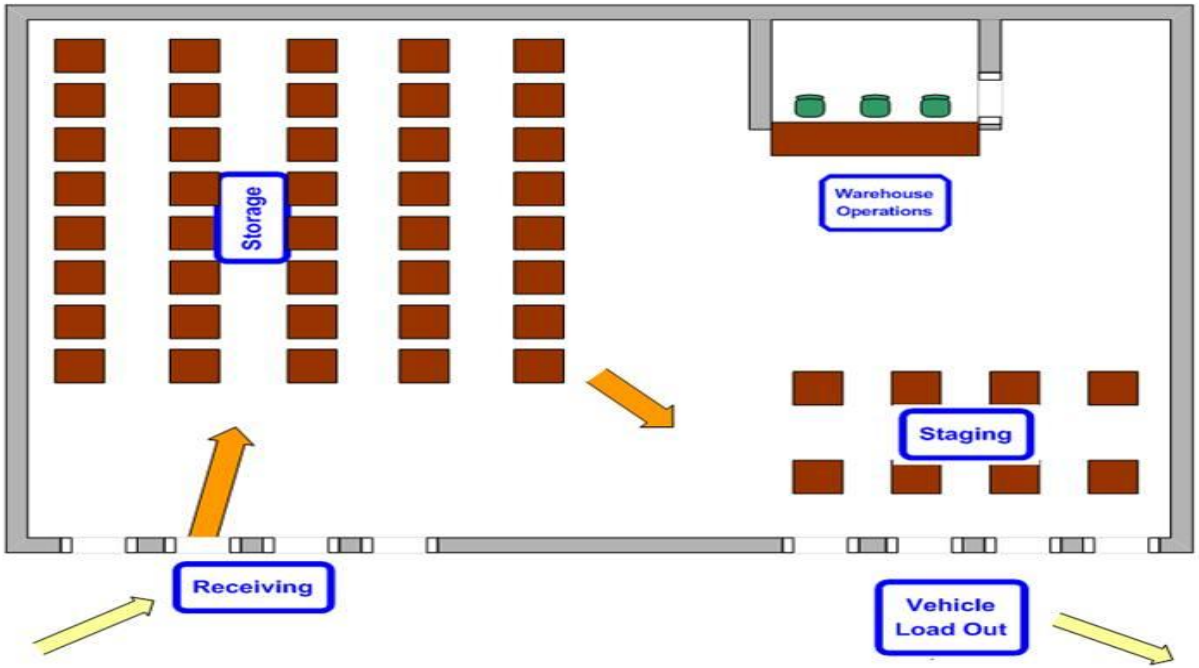
The sizing of facility depends upon

- Cube content of the building that is Length vs width and Ceiling height.
- Type of Material handling system used.
- Aisle narrow or broad
- Stock layout arrangement
- Product throughput (demand)
- Extra space can be leased out



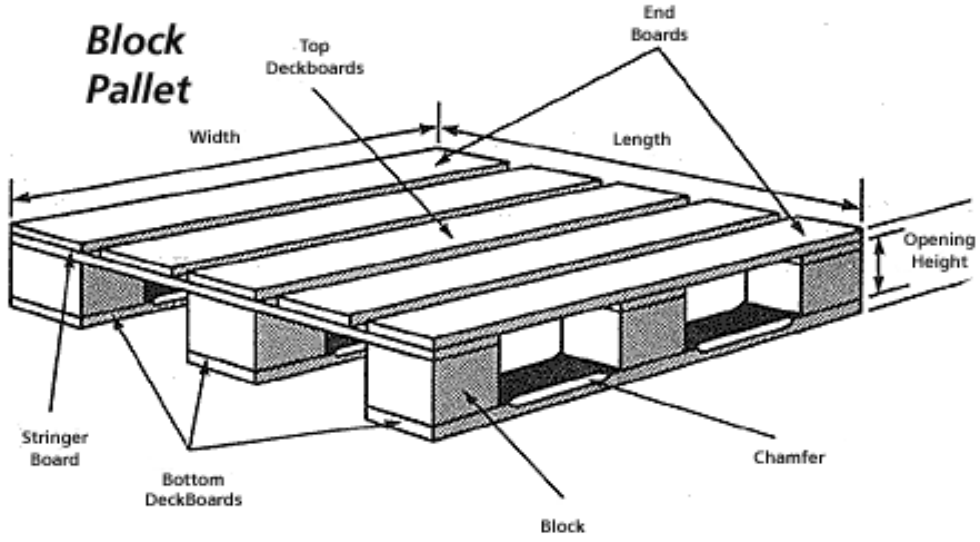
Space Layout

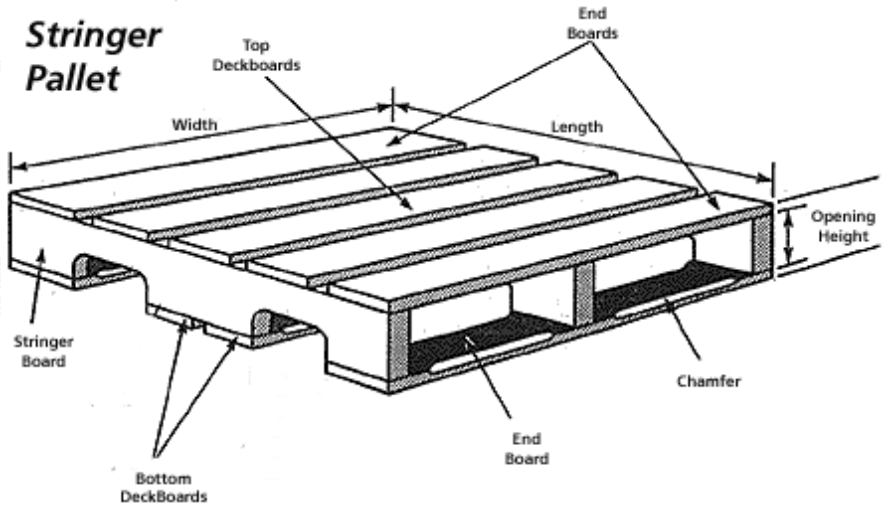
- Number of Storage Bays , shelves and aisles.
- Shelves should be parallel /perpendicular to the longest wall.
- Shelves should be single sided or double sided
- Minimize material handling cost & optimize revenue



Definition of Pallets

- a standard-sized platform of box section open at two ends on which goods may be stacked. The open ends allow the entry of the forks of a lifting truck so that the palletized load can be raised and moved about easily, there are available in different size and shapes and are further classified based on the characteristics of cargo loads





Pallets Material

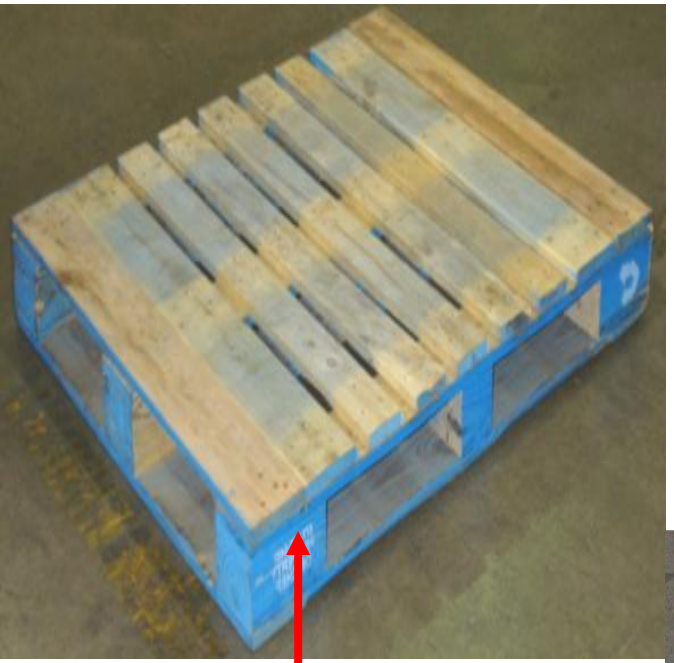
Wooden Pallets (Used and unused wood)
Dimensions: 1200 x 1000 mm
Weight: 18kgsApprox
Load Capacity: 1,000kgs

Plastics Pallets
Dimensions: 980 x 1150 x 130mm
Weight: 8kg
Maximum Load: 1000kg

Steel Pallets
Loading capacity: 2, 000kg
Dimensions: 1200 x 1000 mm

Paper Pallets
Load capacity : 1500 Kg Dimensions
1100mm x 1100mm Weight: 5 kg

Types of Pallets



4 way Pallet

Standard Pallet

Pallet Converter

Pallet Dimension Length x Width x Height

North America & Mexico	48 in. x 40 in. x 5.5 in.
Latin America & Asia	1200 mm x 1000 mm x 150 mm
UK (Note1)	1000 mm x 1200 mm x 162 mm
Europallet (Note 2)	800 mm x 1200 mm x 144 mm
Australia	1165 mm x 1165 mm x 150 mm
Japan & Korea	1100 mm x 1100 mm x 144 mm

Pallets Weight

North America & Mexico	65 lbs.
Latin America & Asia	35 kg.
UK	28kg
Europallet	27kg
Australia	43kg
Japan & Korea	Varies depending on material

Pallets Capacity

North America & Mexico	~2800 lbs.
Latin America & Asia	~1200 kg.
UK	~1500 kg
Europallet	1000 kg
Australia	2000 kg
Japan & Korea	1000 kg

Euro Pallet

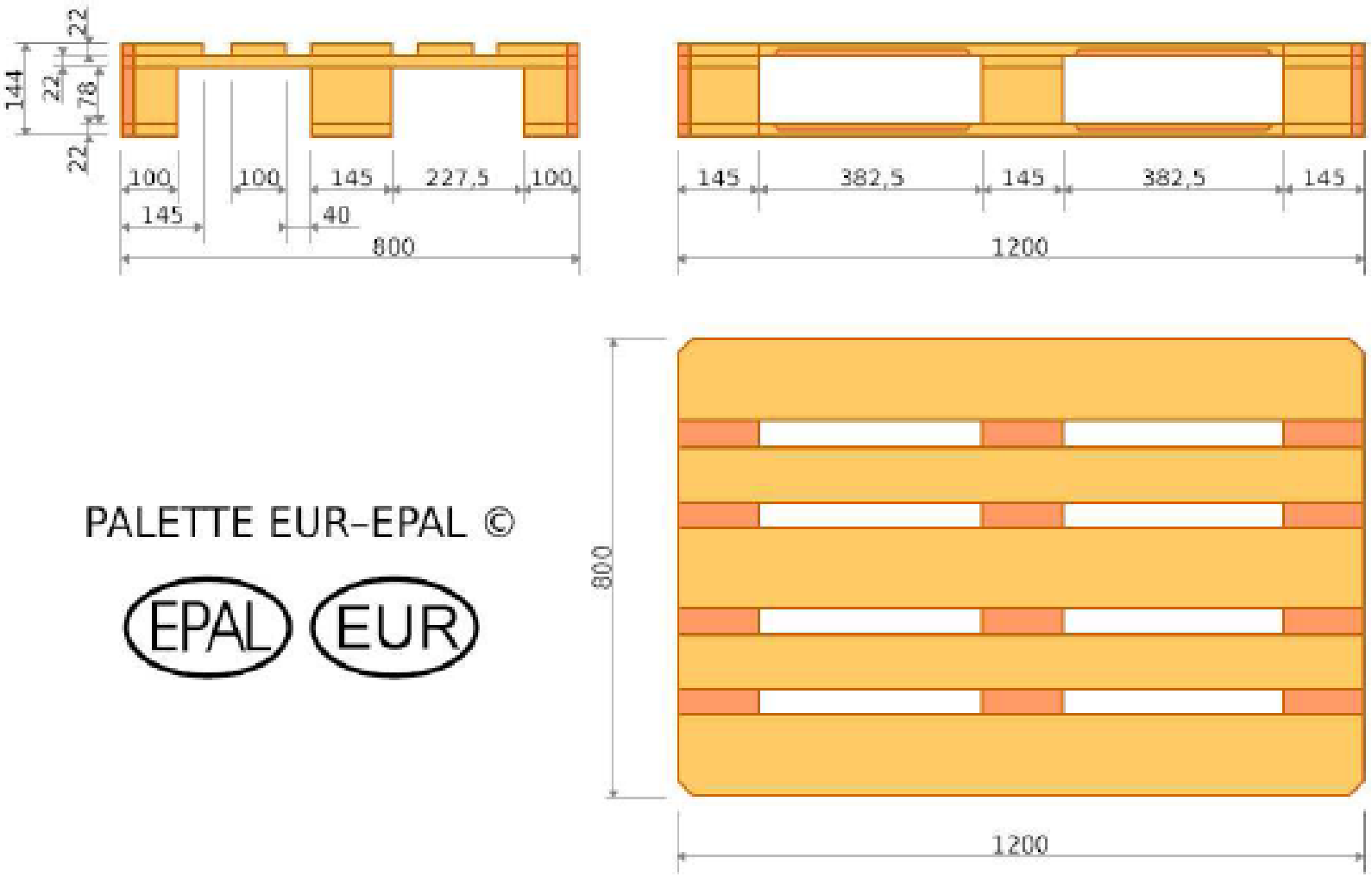
- EURO-pallets produced by EPAL (European Pallet Association) licensed manufacturers are inspected under strict quality procedures, at regular intervals.

  All EPAL-controlled wooden pallets are marked with a quality control staple bearing the EPAL quality mark. Repaired EURO-pallets are certified with an EPAL repair marking nail.

- Based on standardized quality-assured EURO pallets, the ”EPAL-System“ is a cross-sector open pallet exchange pool.

  EPAL (the European Pallet Association) was founded in 1991 to work with the European Railways to maintain a European-wide quality assurance and inspection standard for the EURO pallet.

Euro Pallet


144
22
78
22
22
100
100
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227,5
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145
40
800
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382,5
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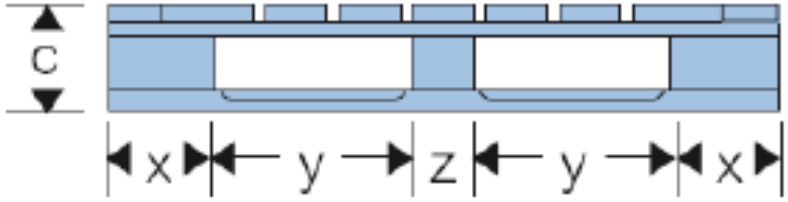
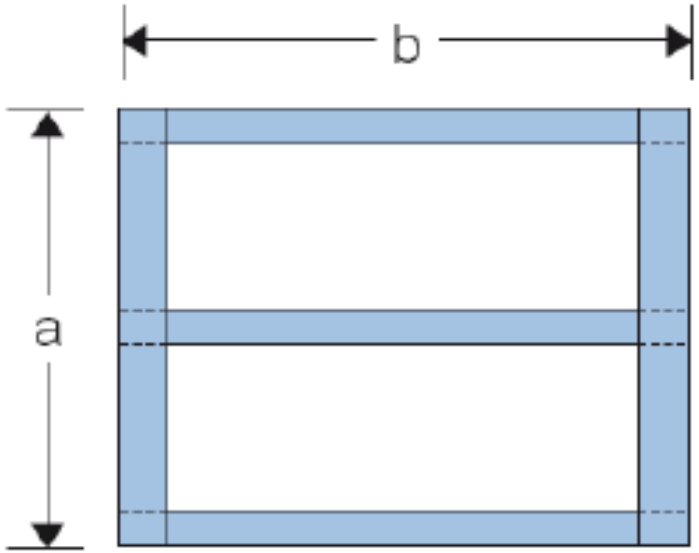
145
1200
PALETTE EUR-EPAL ©
EPAL
EUR
800
1200

UK Pallet



c = 162 mm y = 390 mm
x = 160 mm z = 100 mm



a = 1000 mm
b = 1200 mm

Pallet Inspection

No structural element should be broken across the full width of the board and all components should have flat load bearing surfaces.

There should be no loose, free hanging or splintered boards.

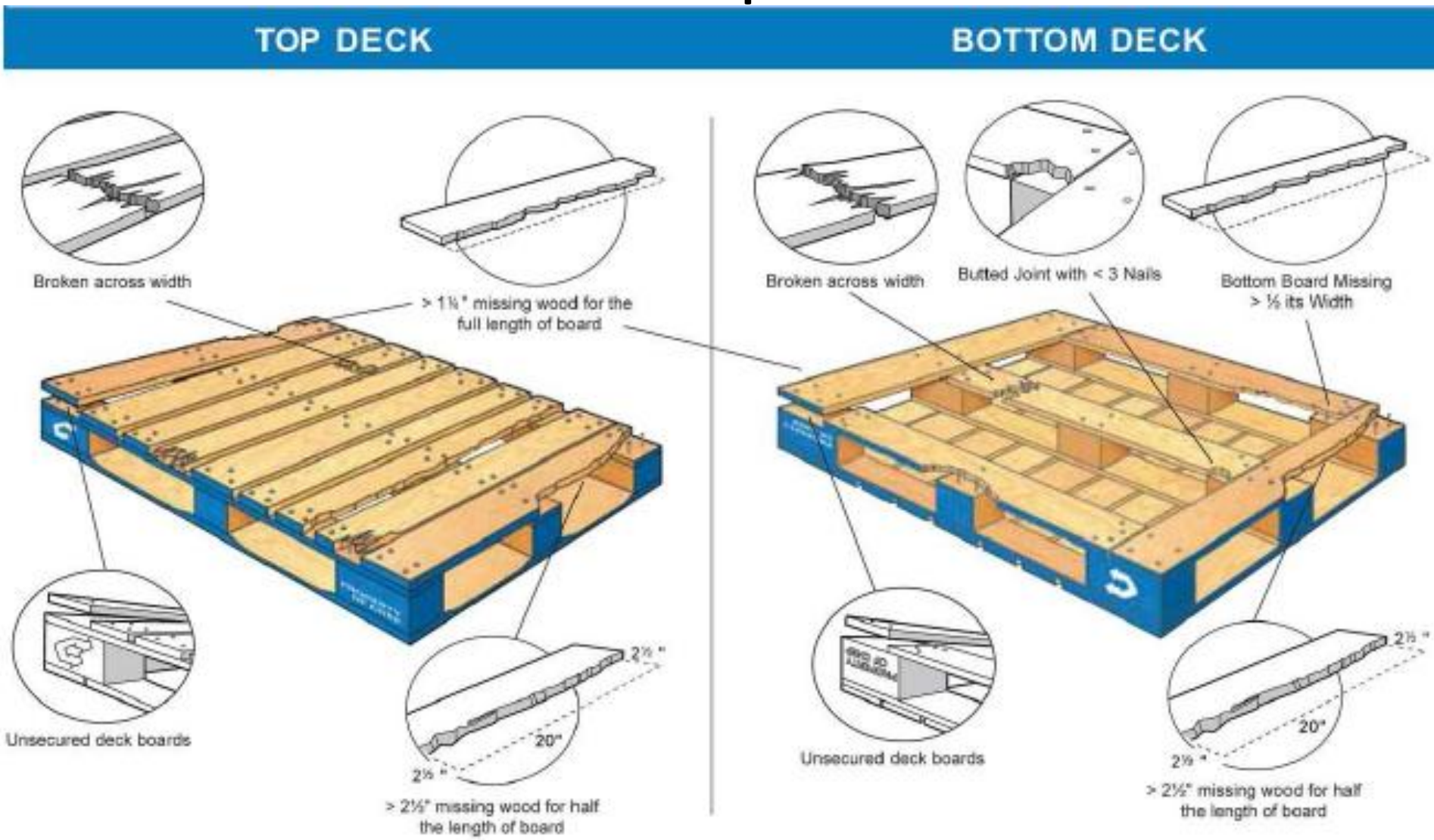
There should be no missing parts and all components are securely nailed with no free joints.

There should be no obvious distortion of the pallets and the blocks beneath the boards.

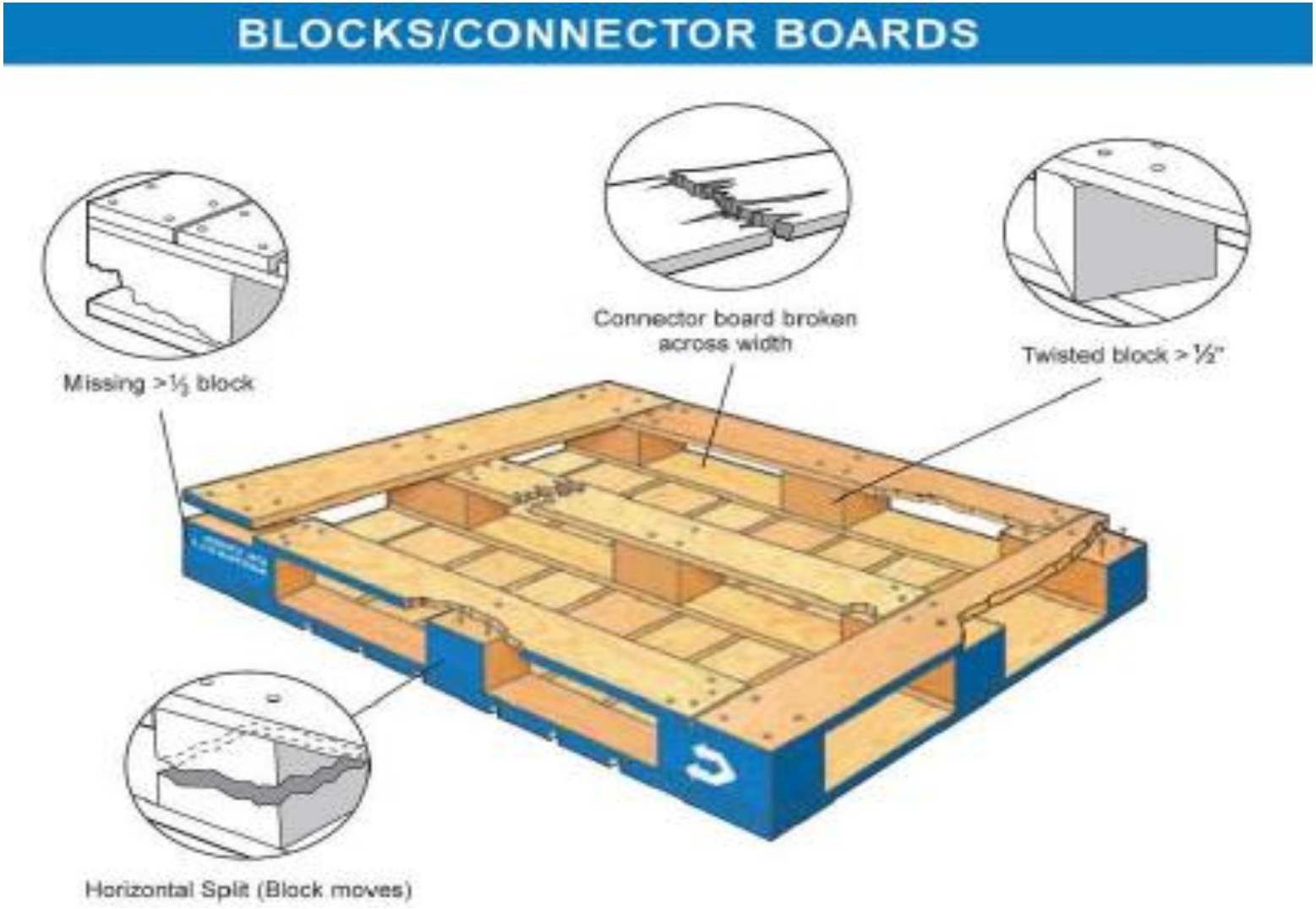
The pallets should not have any pungent smell and there should be no transferable contamination including dirt or dust.

The quality of the wood should be good to avoid any bending. Wood must be dry and not green. There should be no sign of wood protector, rot, mould, bark or infestation.

Pallet Inspection



Pallet Inspection



Low Height Pallets

What is MHE?

- Materials Handling Equipment is very important to any Warehouse's efficient Operation, both in terms of transferring goods in and out and in moving goods to various locations in the Warehouse.

- The types of MHE range from narrow-aisle stacking equipment, powered pallet trucks, order picking equipment to fork lift trucks

Material Handling Equipments (MHE)

Hand Pallet Jack

Rider Pallet Truck

Counterbalanced forklift

Reach Truck

Very Narrow Aisle Truck

Purpose

- Increase capacity of Warehouse.
- Minimize aisle space.
- Reduce number of times product is handled.
- Reduce movement involving manual labor.
- Improve logistics service - Reduce cost.

Hand Pallet Jacks

With a 2,250kg capacity and a 12.5cm lift the hand pallet jack is a very useful piece of equipment for moving palletised stock in the Warehouse.

Rider Pallet Truck

•Rider pallet trucks are the most popular equipment handling device for both low-level order picking and high-speed transporting.

•With a capacity of 2,700 – 3,600kg they are ideal for Warehouse Operations.

Counter Balance Forklift Trucks

With a range of 1200kg to 5000kg capacity, these are excellent all-round trucks for varying conditions, such as pallet and bulk handling indoors or outdoors, on smooth or uneven surfaces.

Reach Trucks

These trucks deliver the fastest acceleration and lifting speeds. Models are available with lifting capacities up to 2500 kg and lifting height up to 11.5 m.

Reach trucks offer the most advanced technology, used efficiently in drive in and selective racks.

Very Narrow Aisle Trucks

Designed for full pallet handling or a combination of case picking and pallet handling, turret trucks work in aisle widths only inches wider than the truck itself.

These are available in two models as
'Man-up' and 'Man-down'.

WAREHOUSE OPERATION AND OPTIMIZATION

The Warehouse Operation and Optimization can be achieved by:

1- Proper Utilizing of space that is narrow aisle and vertical racking usually ground plus 7 racking system is ideal but is subject to location and height limitations.

2- Warehousing of Selective products that will bring efficiency in operation reason being storage of many different products in single warehouse brings complication in handling and storing and utilize more time and work hours.


BB
BA
BA
AZ

Very Narrow Aisle (VNA)

Specifications

- Material Handling Equipment & Operation in Racking System.
  - Specialized High Cost Machine Requires Good Floor Surface
  - Operates within Guided Rail or Wire Induction Guidance System
- Good Stock Rotation
- Good Order Picking.
  - (100% selectivity; fast pick rate)
- Good Product Protection
- Average Floor Area Utilization
  - 50% net pallet area

Very Narrow Aisle (VNA)

Selective

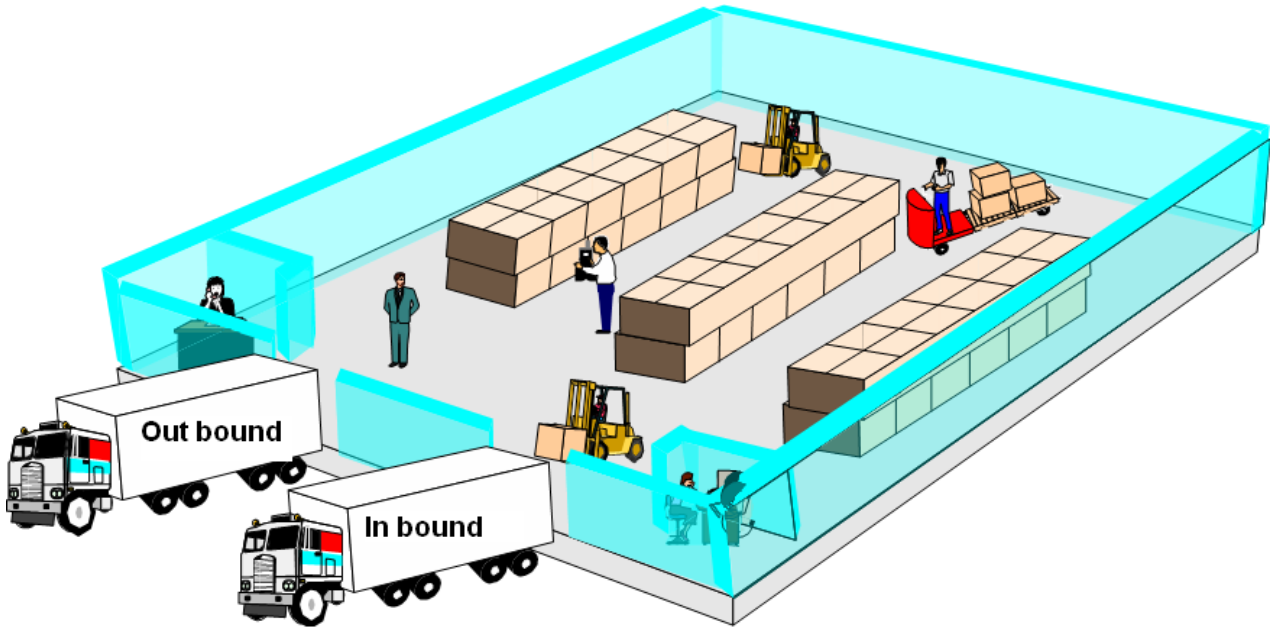
Specifications

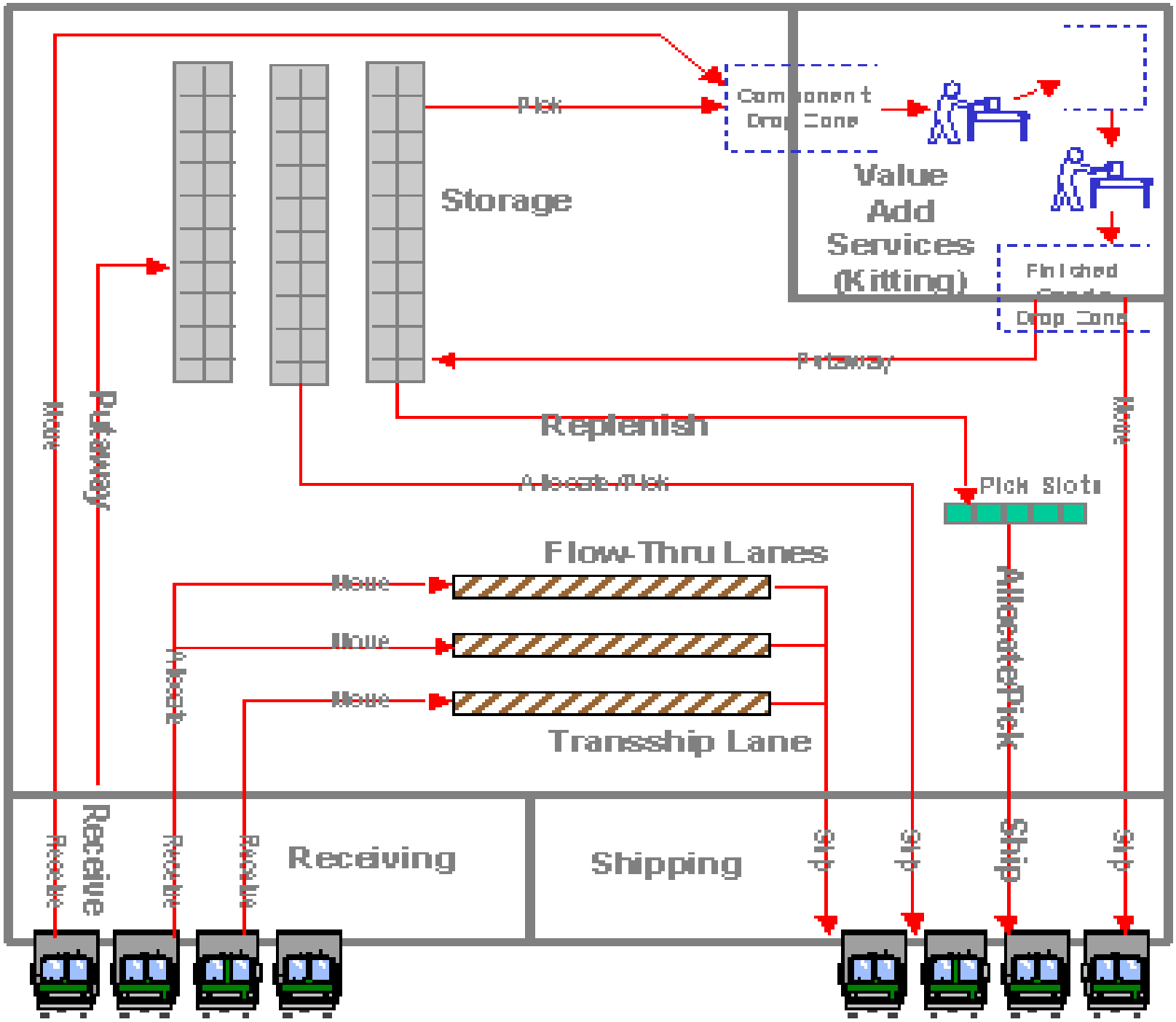
- Material Handling Equipment & Operation in Racking System.
  - Reach Truck or Counter Balance
  - Reach Truck Offers up to 30% improved use of floor space
- Good Stock Rotation
- Good Order Picking.
  - (100% selectivity; average pick rate)
- Good Product Protection

Warehousing of Selective Product

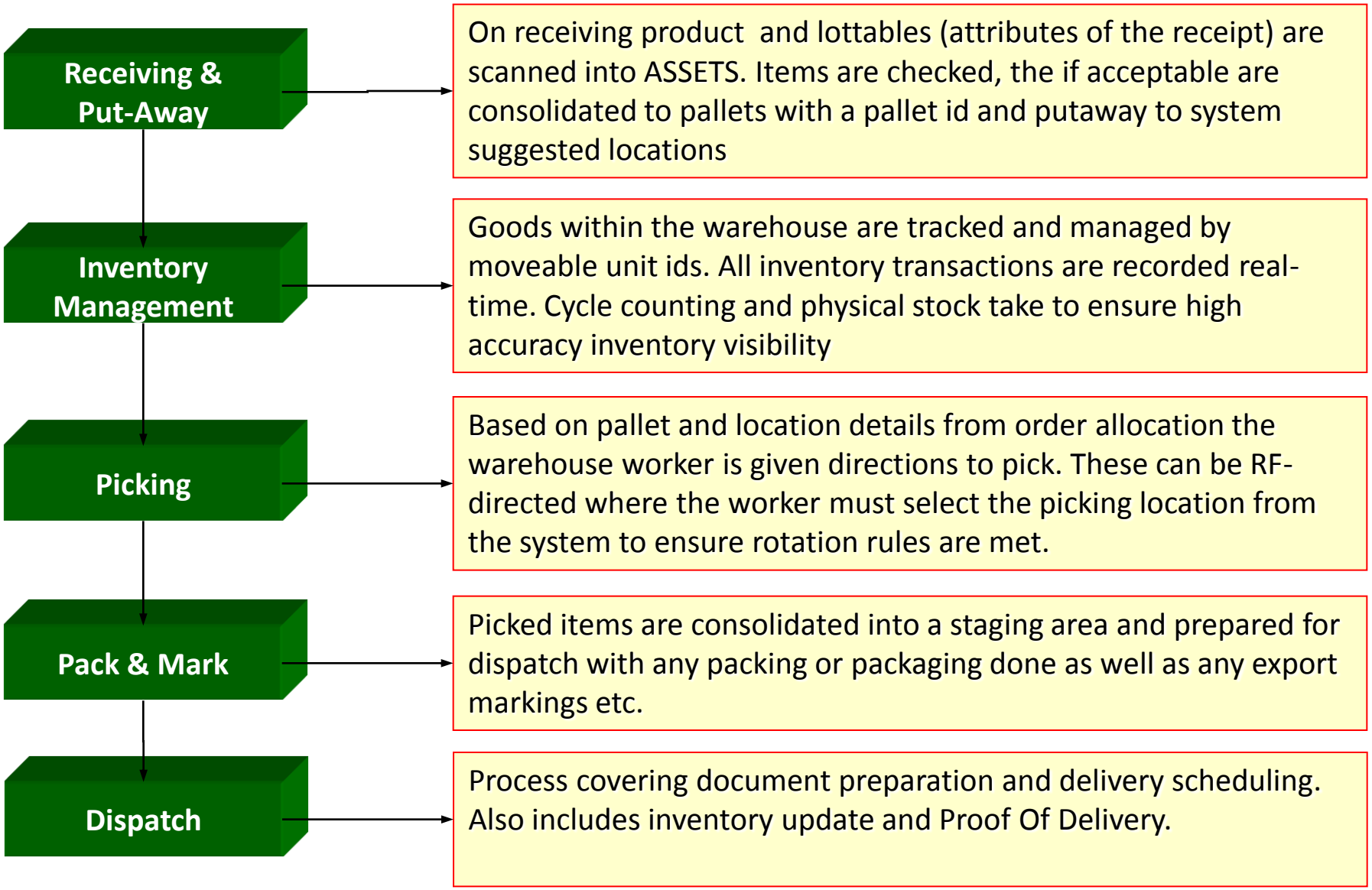
WMS Warehouse Management System

- In bound Logistics (Receiving)
- Out Bound Logistics (Shipping)
- Reverse Logistics

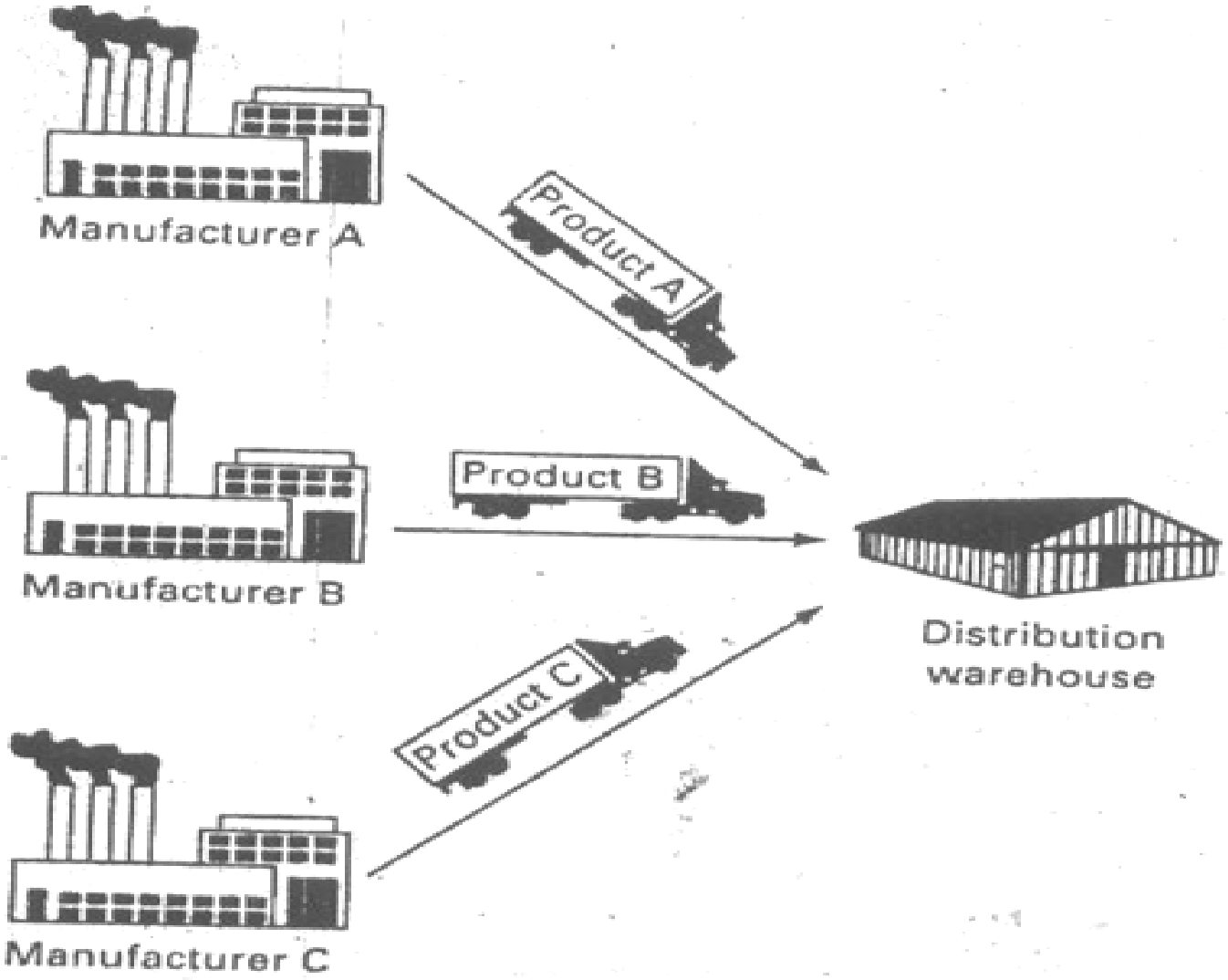



Component
Drop Zone
Pick
Storage
Value
Add
Services
(Kitting)
Finished
Drop Zone
Putaway
Replenish
Allocate Pick
Pick Slots
Flow-Thru Lanes
Move
Move
Move
Transship Lane
Allocate Pick
Receive
Receive
Receive
Receive
Receiving
Shipping
Ship
Ship
Ship
Ship

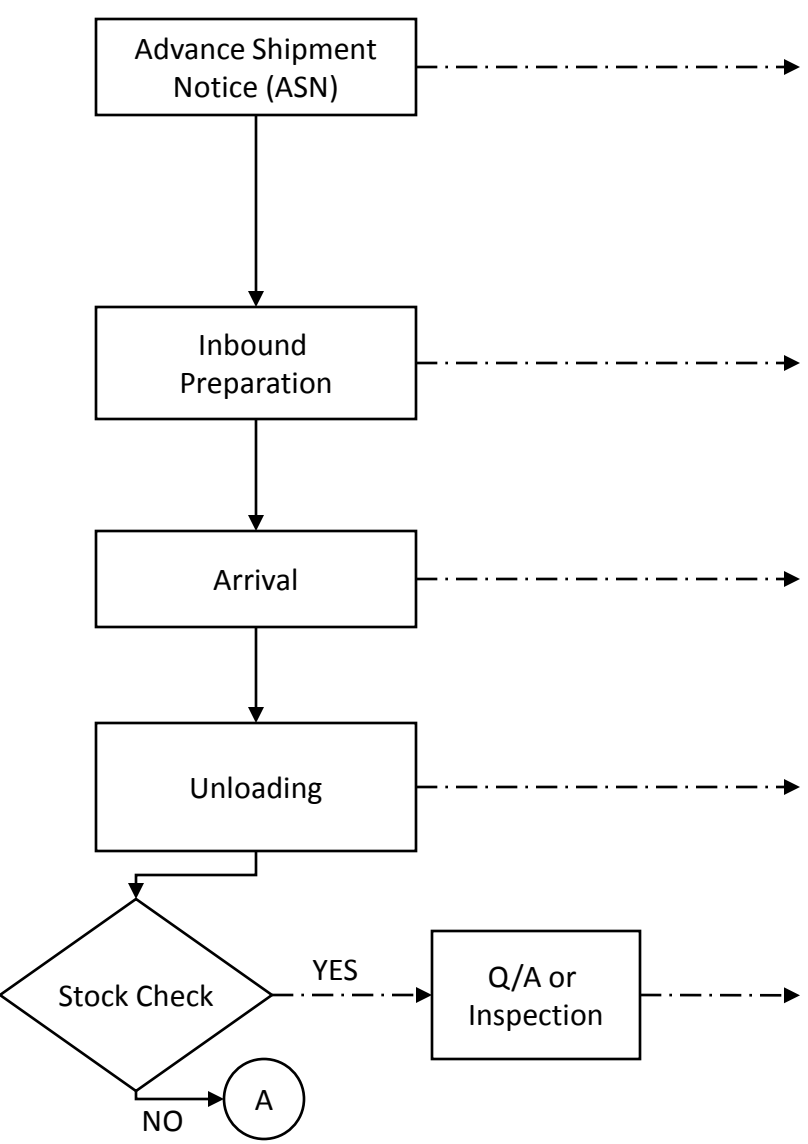
Warehouse Processes



Inbound Logistics



Receiving and Putaway



- Inbound Delivery Order (D/O) or received from owner of stock.
- D/O states : i) Stock Description
  ii) Quantity
  iii) Estimated Date and Time of Arrival
- D/O received prior to Actual Date & Time of Arrival.
- Details entered into ASSETS via manual input or flat file.
- Verbal instructions are not acceptable.

- Actual Date & Time of Arrival confirmed
- Receiving area prepared.
- Receiving team allocated.
- Storage Method checked, identified & calculated.
- Stock Location's allocated.
- Pallet ID created (if required)

- Stock arrives
- Receiving team and area ready
- Document check with driver
- Seal and container check (If applicable)

- Stock removed from delivery vehicle/container.
- Stock loaded onto pallets (if required).
- **Physical stock** check against D/O.
- **Receiving inspection**

- Physical stock checked against D/O.
- Stock inspected according to client's inspection/ Q/A req.
- If damaged – take photographs as proof.
- Once completed, go to A.

Creating Advance Shipment Notice -ASN

ASN is created by populating single or Multiple PO as per the consignment load expected in the warehouse

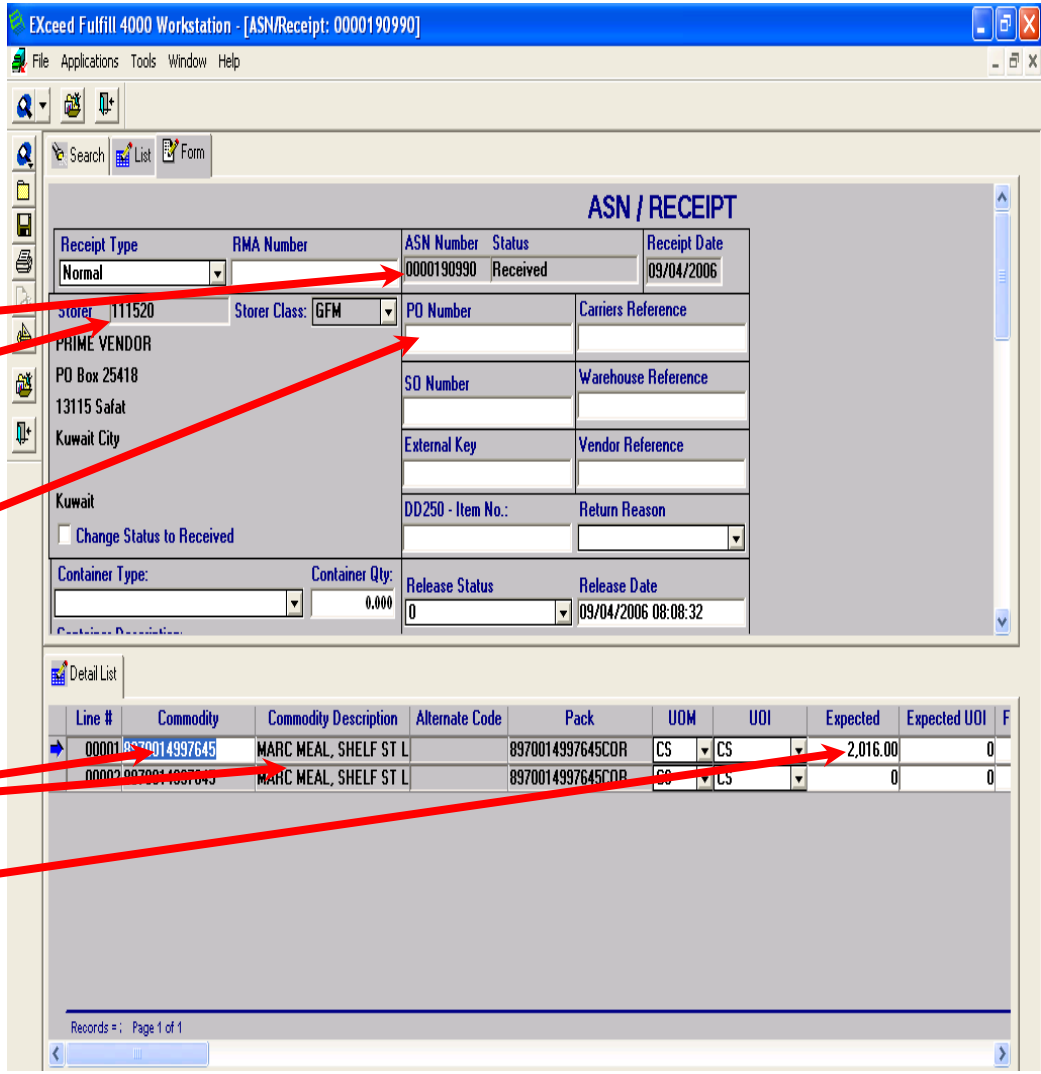
WMS generated ASN Number

Storer Code

PO Number to be populated

Stock Key Unit with description

Expected Qty



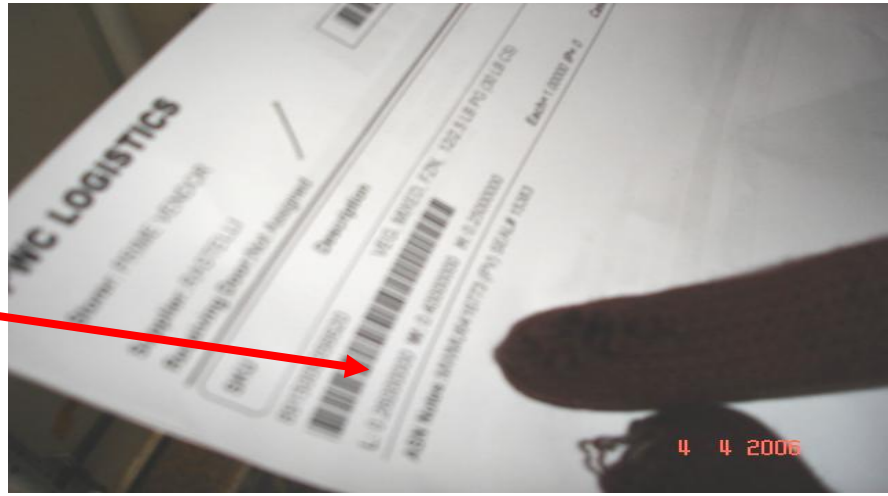
Vehicle Docking

Allocating the dock to the consignee driver based on dock availability.

Driver will dock his vehicle by chocking the wheels and handing over the vehicle key to the Team Leader.

Vehicle and container verification

Verify the Container Number/Plate Number

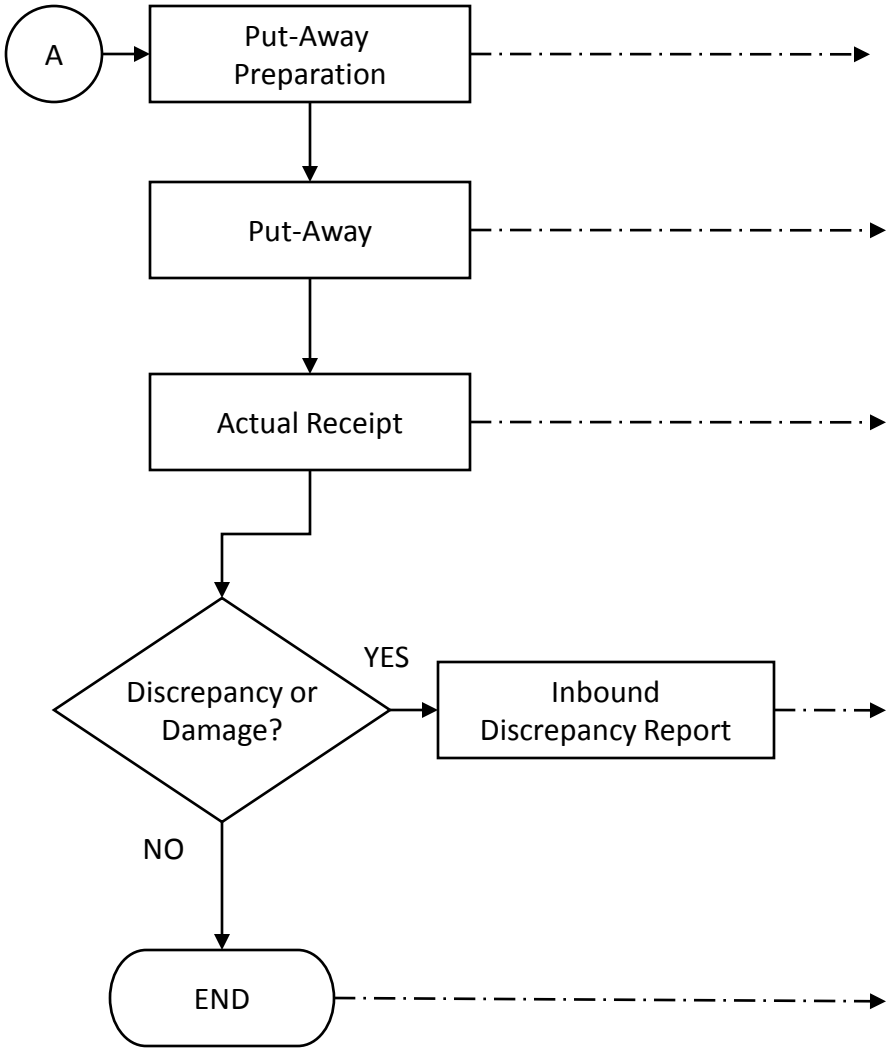


Verify the Seal Number

Off-Loading Products

After breaking the Seals, MHE Operator offload the products from the docked vehicle and kept in the wishbone

Receiving and Putaway



- ***Inbound Tally Sheet (ITS)***, ***ASN*** and ***Storage Note*** Printed.
- **Pallet ID** Attached.
- Refer to Empty Location report.

- Stock Put-Away into pre-identified Stock Locations. As performed in Preparation box of this flow.
- Stock Location written on ITS as verification of Put-Away.

- Recorded Stock Location from ***ITS*** entered onto Inventory Management System.
- Inventory position updated.

- Quantity discrepancies reported to the system
- ***Inbound discrepancy Report (IDR)*** raised and sent to owner of goods.
- Inventory adjustment.

- All paperwork filed according to arrival date.

Quality Control for Receiving Goods

Quality Control checks are constantly performed to ensure that all items received have the correct description, quantity, quality & expiry date (in case of food items).

Incase of any discrepancies the products are held until the issue is resolved with the concerned party (Warehouse – Customer).

Incase of any damage found, the product will be isolated.

Product Segregation as per Stock Keeping Unit (SKU)

- Once the goods are segregated as per SKU and inspected for damage the same is noted on the Inbound Tally Sheet.

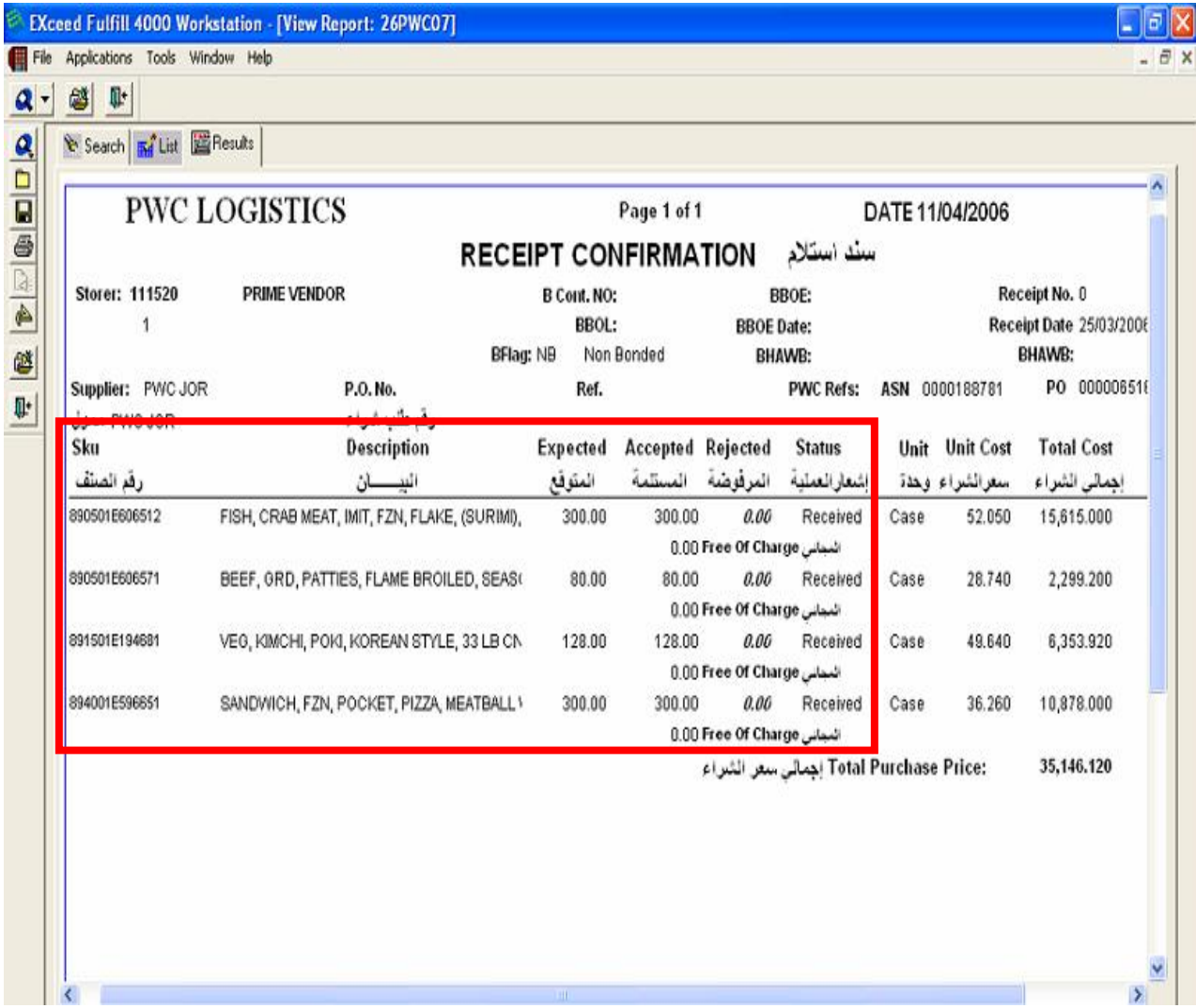
- Product will be physically moved to the damage location.

Receipt Confirmation Report

After receiving the product Warehouse returns ITS to ops cell signed by the supervisor.

Ops cell prepares the receipt confirmation for the product taken into the Inventory and does final verification of the Qty, SKU as per the packing list.

Storer receives the Receipt Confirmation signed by the CSE



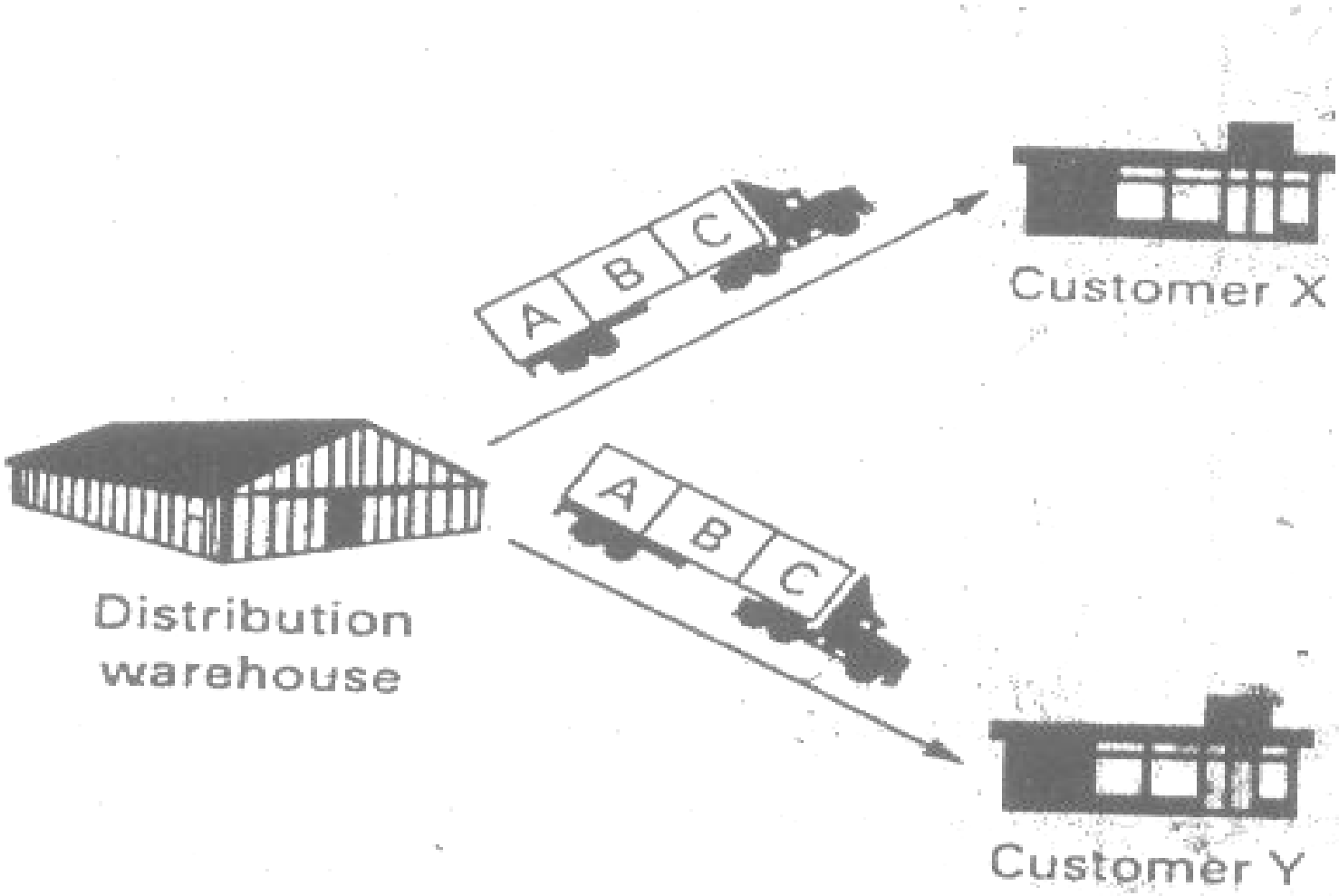
Put Away

Put Away means Transferring of the product from Stage Area to the final location.

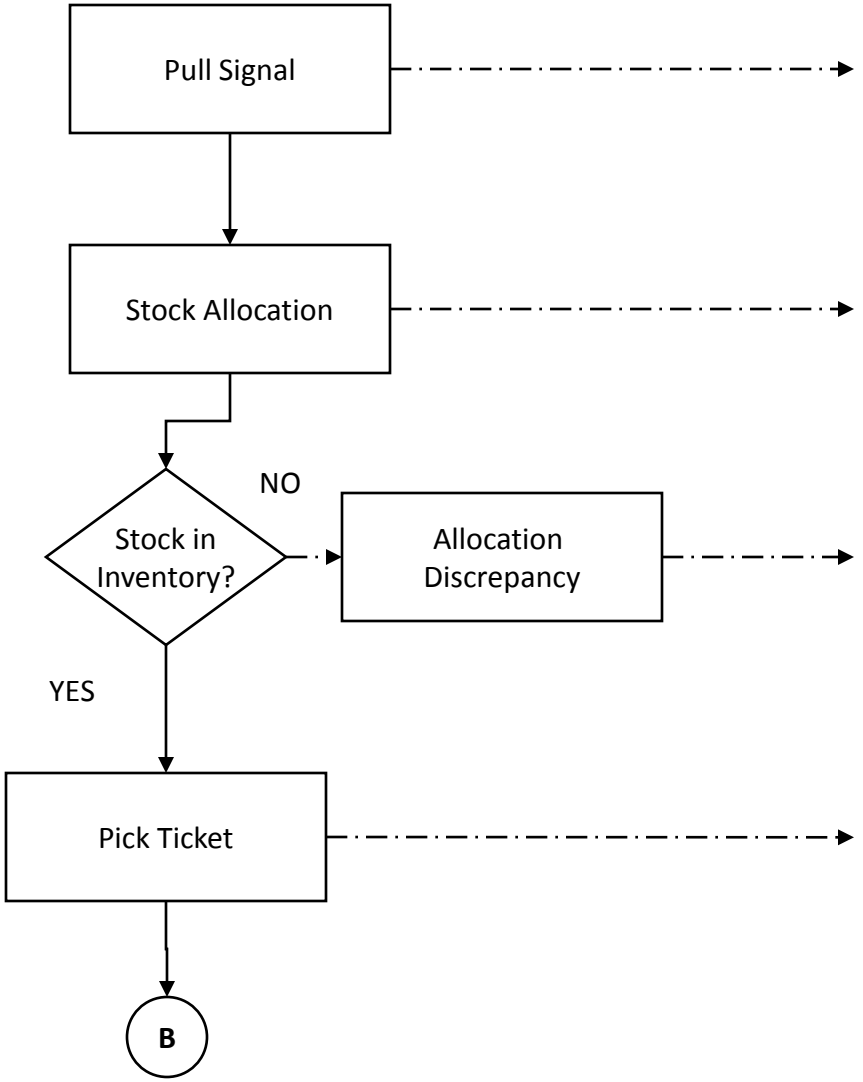
The VNA Very Narrow Aisle Lifter Operator moves the received pallets physically to the final location on the availability of the empty locations by considering the nature of the products.

He scans the final location through the RF to effectively record in the WMS.

Out Bound Logistics



Picking



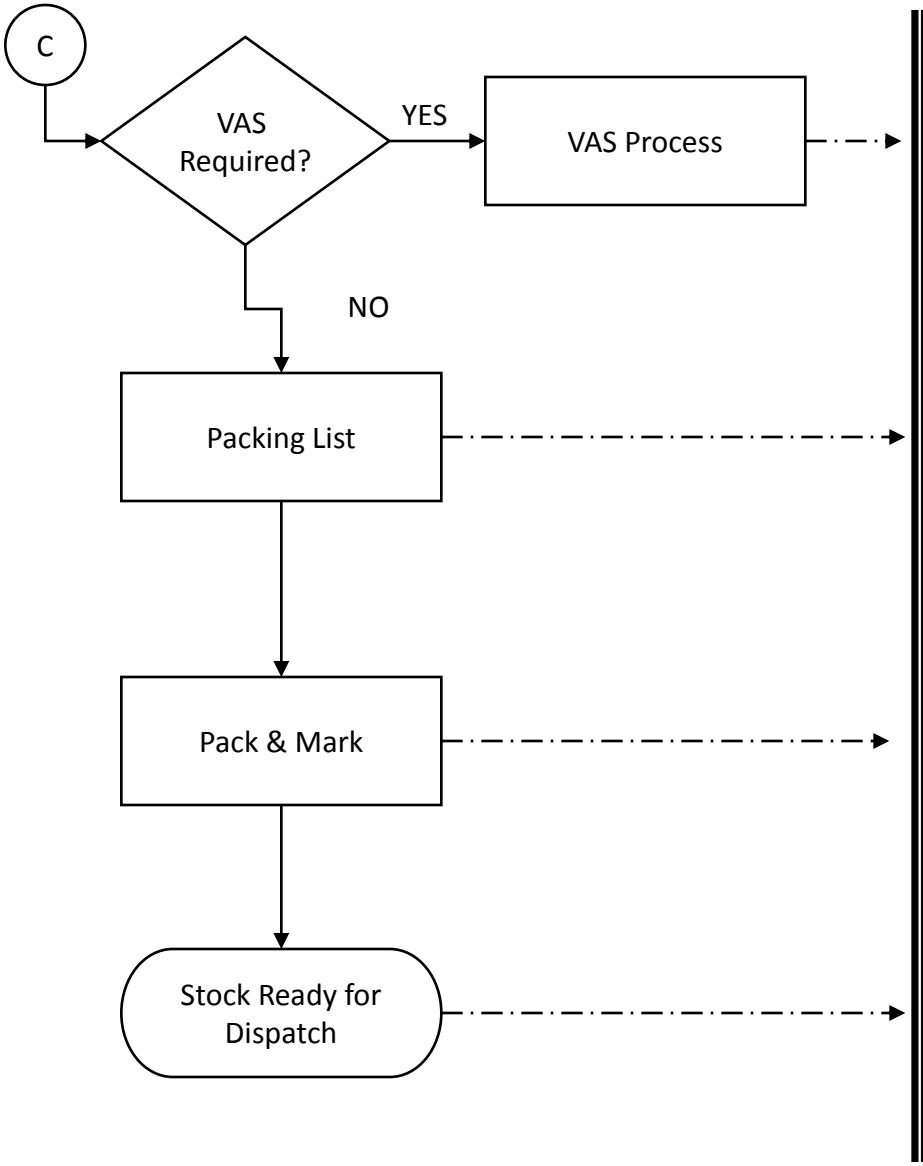
- ***Pull Signal*** received from owner of ***Stock***.
- ***Pull Signal*** states: I) ***Stock Description***
  ii) Quantity
  iii) Delivery Address
- ***Pull Signal*** received prior to agreed ***Picking Cut Off Pt.***
- If using ***Geo-Assets*** CSV. Flat file can be used.
- Verbal instructions are not acceptable.

- ***Pull Signal*** is checked against ***inventory*** to ensure there is stock available to picked.
- After ***Inventory*** has been checked the ***Stock Location*** is to be identified.
- ***Stock*** and ***Stock Location*** allocated against ***Pull Signal***

- ***SKU, Pull Signal*** and quantity checked
- ***Team Leader*** investigates
- Client advised of discrepancy

- Pick Ticket issued with:
  i) Individual ID or ***Pick Ticket*** number
  ii) ***Stock Description***
  iii) Quantity to be picked
  iv) ***Stock Location***
  v) Delivery address (unless wave picking)
- ***Dispatch Note*** can also be printed.

Pack and Mark



- **VAS** process identified on separate process flow
- **VAS** process carried out

- ***Packing List*** raised for all ***Out-Bound Shipments***
- If using ***Geo-Assets Packing List*** can be raised from system

- ***Physical Stock*** prepared according to customers pre-defined Packing Requirements
- ***Packing List*** (and other required documents) attached to to first carton / pallet of Out-Bound Shipments
- Cartons marked with Delivery address and identification number (usually the Pick Ticket number)

- ***Physical Stock*** ready to be dispatched

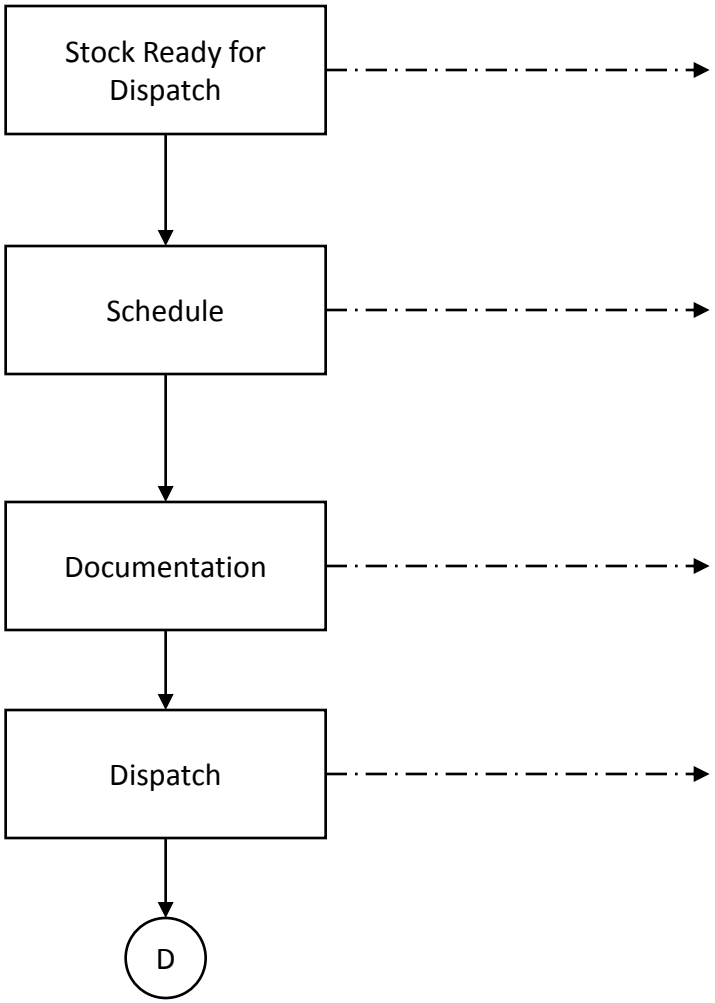
RF (Radio Frequency) Directed Sortation

Picked pallets will be taken to Sortation area by Forklift Operator. The Sortation person will sort the pallet by destinations. The Sortation person will use RF to move the records from pick ID to drop ID

(Every pallet will have separate drop ID)

The Sortation process is RF directed. The system will give destinations with quantities to be sorted, after physically moving the qty to each destination it is moved into drop ID and on confirming the criteria required in the RF, the drop ID thus built up will give a pallet manifest for physical Quality Check

Dispatch



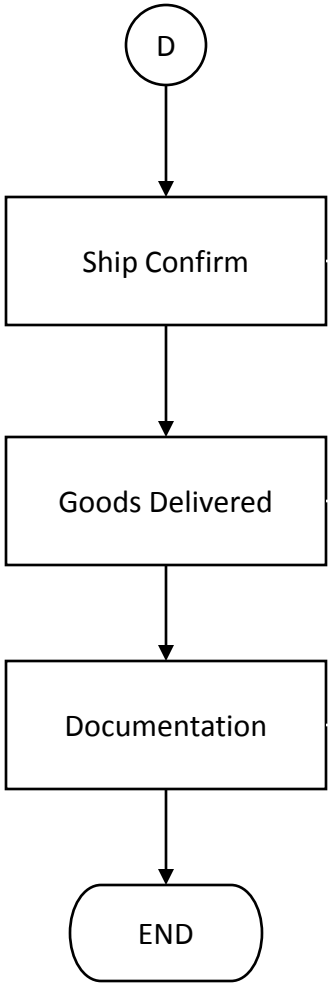
- ***Stock*** Picked and Packed waiting for Dispatch in designated ***Staging Area***

- ***Dispatch Schedule*** completed
- ***Load Plan*** raised
- Delivery schedule planned according to customers delivery requirements
- Vehicle requirements calculated and booked
- ***Materials handling Equipment*** and Dispatch Team scheduled

- ***Dispatch Documentation*** raised and completed. This may typically include:
  i) Client Specific Documentation (i.e. ***Sales Invoice****)*
  ii) ***Packing List***
  iii) ***Dispatch Note***
- Documentation placed in first piece (carton / pallet) of consignment

- Vehicle arrives at scheduled time
- ***Dispatch Note*** used to verify physical stock being loaded
- Driver acknowledges receipt of stock onto vehicle
- Vehicle leaves

Dispatch



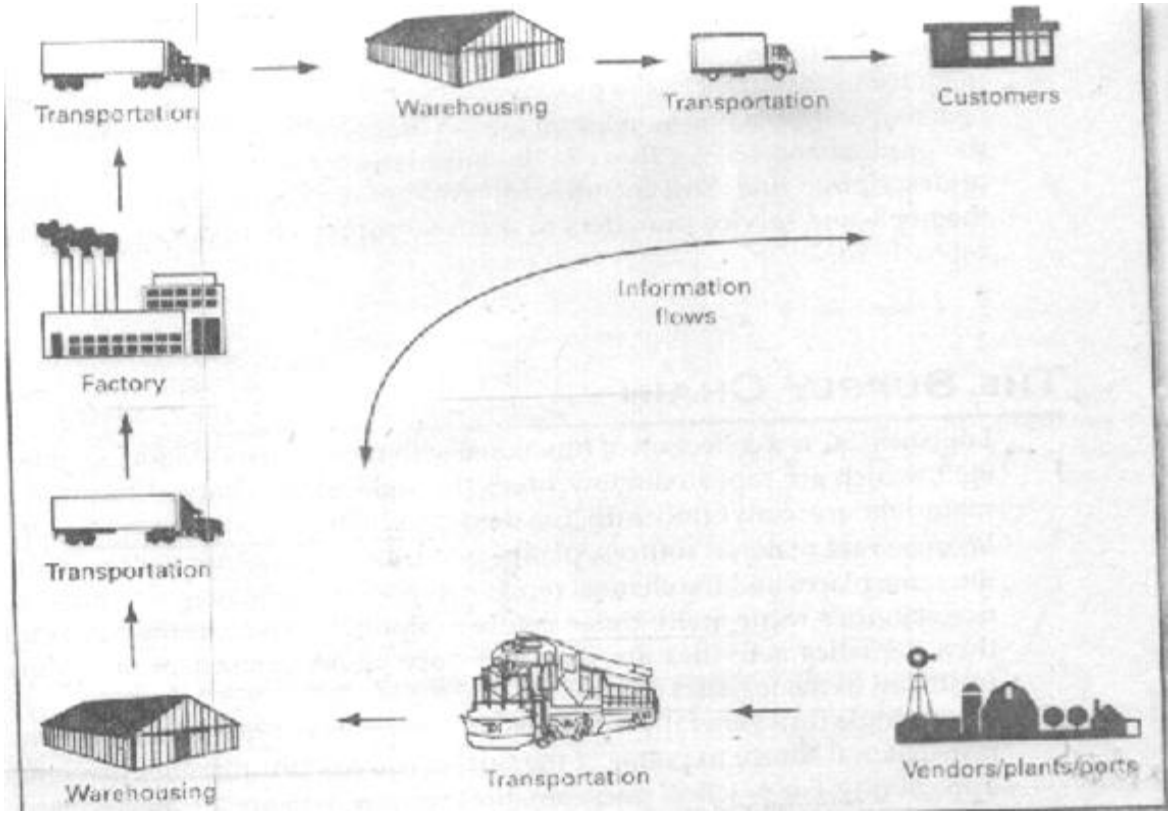
- ***Stock*** removed from ***Inventory***

- Delivery made to correct address according to scheduled time
- ***Dispatch documentation*** given to ***Consignee***
- ***Stock*** checked and counted while unloaded
- ***Consignee*** checks and signs ***Dispatch note***

- ***Dispatch Note*** returned to warehouse
- Time and condition of delivery recorded
- Paperwork filed

Reverse Logistics

Reverse logistics is the logistics process of return new or used products such as:
- returns from consumers,
- over stocked inventory,
- outdated merchandise
- non delivery to customers
- Obsolete Products
- Damage goods
- non functioning products and either repair and ship out again or to be disposed



Some Brief Definitions

Postponement

The principle of postponement can be stated as follows:

“ the time of shipment and the final product processing in the distribution of a product should be delayed until a customer order is received.”

The idea is to avoid shipping goods in anticipation of when demand will occur and to avoid creating the form of the final product in anticipation of that form like Labeling, Packaging, Assemble, Manufacturing, Time are different types of Postponement.

ASRC

Automated Storage and Retrieval Systems (AS/RS) are reshaping the ways in which goods and services are manufactured, stored, and distributed. AS/RS have become a means to control and immediately report the movement of material, providing a critical link in the chain of information systems that control work-in-process, manufacturing schedules, and distribution. AS/RS warehouses are designed for maximum storage and minimum personnel on site. They are built for lower temperature operation with minimal heat and light needed, but require a tall structure with super level floors.

Just in Time – JIT (Zero Stock)

JIT is an operating philosophy that is to maintain use of inventories for meeting the goal of having right goods at the right place at the right time. The entire supply chain is synchronized to respond to the requirement of operations or customers.