

LECTURE 04

LAYOUT AND TOURS OF WAREHOUSE:

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OUTLINE

- 1 TYPICAL WAREHOUSE LAYOUT
- 2 WAREHOUSE INTUITION
- 3 MULTIMEDIA WAREHOUSE TOURS
- 4 SUGGESTION FOR SUCCESSFUL FIELD TRIP

source: General references [BH09, Mul94, Fra02, Kit18]

EXERCISE I: DEFINING FAST MOVING PALLET

Description	SKU A	SKU B
Dimension (L × W × H)	50 × 40 × 30	50 × 40 × 30
Price (dollar/pallet)	20	20
Annual Sale (pallet/year)	48	48
Quantity Per Order (pallet/month)	4	4
Space in Warehouse (pallet)	4	4
Demand	1 pallet/week	4 pallet/month

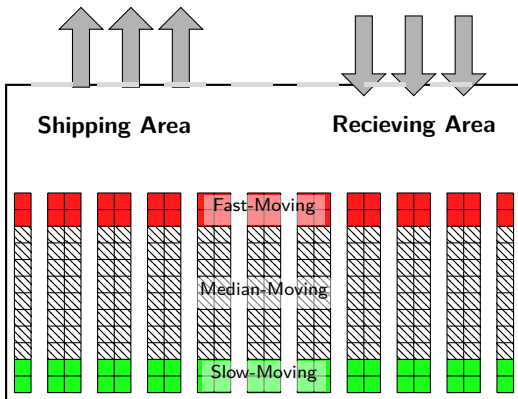
Which SKU should put in the convenient location? & why

EXERCISE II: DEFINING FAST MOVING CASE

Description	SKU A	SKU B
Dimension (L × W × H)	10 × 4 × 4	10 × 4 × 4
Price (dollar/case)	20	20
Annual sale (case/year)	480	480
Quantity per order (case/month)	40	40
Space in warehouse (case)	40	40
Space in warehouse (pallet)	1	1
Demand	10 cases/week	20 case/biweekly

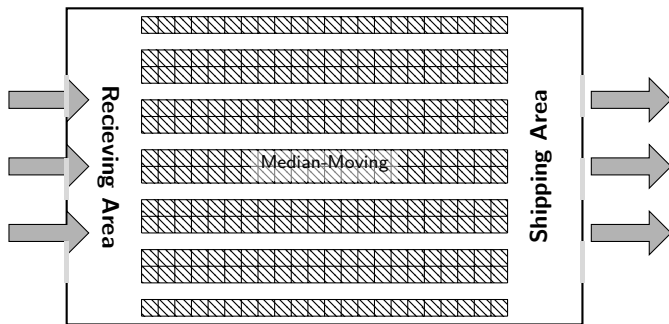
Which SKU should put in the convenient location? & why

U-SHAPED LAYOUT



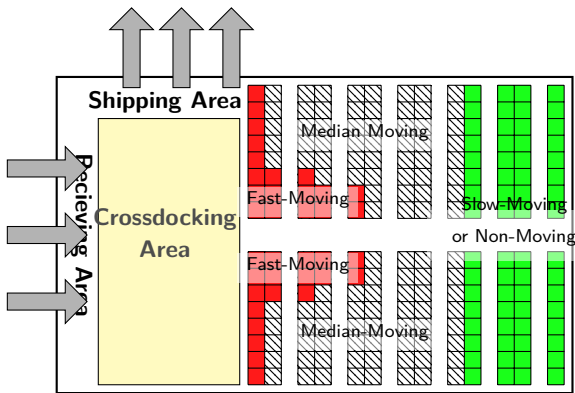
- **Idea:** single I/O point, very convenient locations
- **Where:** distribution network
- **Issue:** congestion near receiving & shipping

I-SHAPED LAYOUT



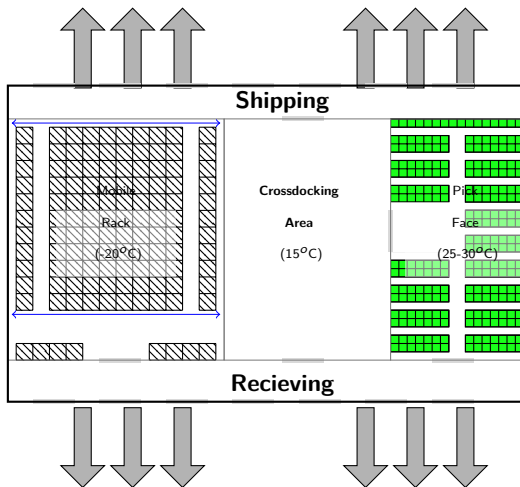
- **Idea:** two I/O point, many convenient locations
- **Where:** manufacturing warehouse
- **Issue:** traveling distance, # of admin, & combine works

CUSTOM LAYOUT

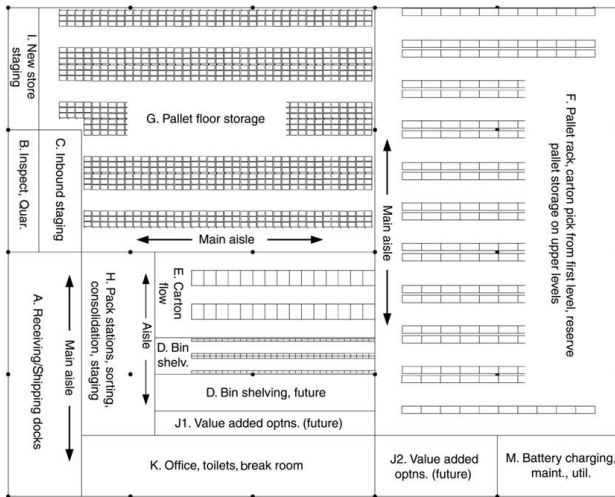


- **Idea:** combine 'U-shaped' & 'I-shaped' (a.k.a 'L'-shaped?)
- **Issue:** depends, mostly traffic/congestion

MODULAR LAYOUT

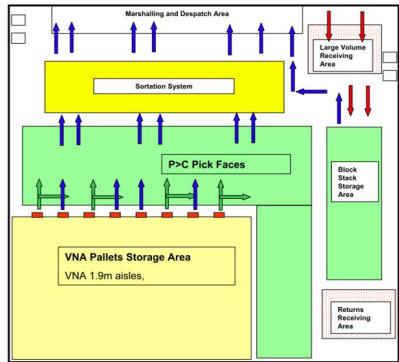
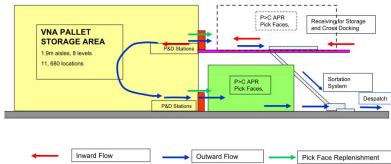


REAL LAYOUT

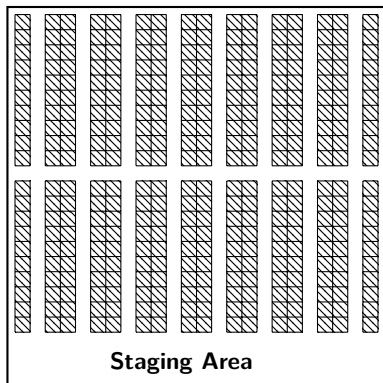


- What do you observe in this layout?

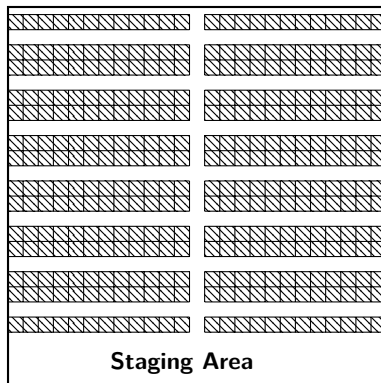
DOUBLE DECK LAYOUT



HORIZONTAL & VERTICAL LAYOUTS



Vertical Layout



Horizontal Layout

- **Idea:** layout implies many things

WAREHOUSE TOURS

- **Goals:** sharing experiences & problems, connecting to industry
- **Organization:** looking pro-con, brainstorm, discussion
- **Observe:**
 - What are F.A.S.T. aspects of each warehouse?
 - What are units handle in each warehouse?
 - What are equipments in each warehouse? (Is it make sense?)
 - What are the problems/issues in each warehouse?
- **Next steps:** Field trips, Project

WAREHOUSE INTUITION: ACE DC



source: Tours of warehouses, distribution centers, crossdocks. <http://www2.isye.gatech.edu/jjb/wh/sites/sites.html>

WAREHOUSE INTUITION: PEPSI, ATLANTA



source: Tours of warehouses, distribution centers, crossdocks. <http://www2.isye.gatech.edu/jjb/wh/sites/sites.html>

WAREHOUSE INTUITION: SUPER CLUB CD

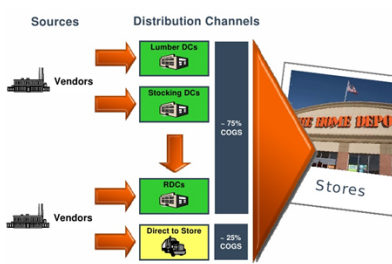
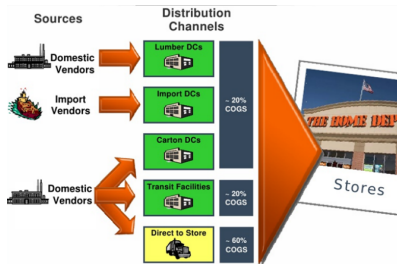


WAREHOUSE INTUITION: TOY 'R' US



source: Tours of warehouses, distribution centers, crossdocks. <http://www2.isye.gatech.edu/jjb/wh/sites/sites.html>

WAREHOUSE INTUITION: THD



WAREHOUSE INTUITION: BOON THA VORN



WAREHOUSE INTUITION: PINE PACIFIC



WAREHOUSE INTUITION: HEFELE



WAREHOUSE INTUITION: THAI WACOAL



MULTIMEDIA WAREHOUSE TOURS

- **Warehouse Tour:** Amazon.com, IKEA, Liquor DC, Office Depot, WestLog DC
 - How each warehouse handle items?
 - What are equipments& operational processes in each location?
- **Equipments:** unit load, high-bay rack, carousal, Kiva, conveyor, pick-to-light, pick-to-voice
 - How each equipment intergraded to the layout?
 - What are advantages& disadvantages of each equipments?
- **Accident:** Forklift accidents

WHY DO WE NEED FIELD TRIP

- To broaden our warehousing aspects understand real applications
- To survey important operating issues
- To study the integration between human& technology

What you should look at?

- **Business:** history, purposes of warehouse, customers
- **Policy:** storage policy, picking policy
- **Area usage:** storage, shipping, admin,
- **Equipments:** numbers, types, & location of equipments
- **Flow & Information:** document, IT, # SKU,
- **Others:** waste, chart, empty location, broken items, KPI

FIELD TRIP, ITSELF

Our actions present IE Chula

- **Schedule:** bus **always** leaves on time
- **Attendance:** field trip is an **important part** of this class

Field trip report

- **Purposes:** connect real world with lectures in class
- **General:** group effort
- **Format:** less than 3 pages (cover/ figures/ tables are excluded)
- **Due date:** noon, two weeks after field trip

PROBLEMS

1. What are benefits & disadvantage of 'I'-shaped layout comparing to 'U'-shaped layout?
2. What are common problems found in warehouses? & how to observe them?
3. Explain the following these features affect warehouse operations activities
 - pack size of product
 - value added logistic (VAL)
 - regulation

SUMMARY:

- Operating warehouse faces many **trade-offs**
- Main activities and their main purpose in warehouse are:
 - **Receiving:** defined downstream activities
 - **Put-Away:** location to pick
 - **Picking:** labor intensive
 - **Sorting & Shipping** last chance to check

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