Planning Your Rack System – Traditional and E-Commerce

Presented by:

John Krummell, President

Advance Storage Products

Carlos Oliver, President

Frazier Industrial Company







Seminar Objectives

- Discuss the changing distribution industry and how warehouse design is being adapted to meet the needs of omni channel and ecommerce
- Agenda
 - Rack Construction Options
 - Full Pallet Handling Systems
 - Case and Each Picking Systems and Configurations







Data analysis for 56 major U.S. markets shows that the majority of facilities built before the mid-2000s have certain limitations that hinder eCommerce and Each Picking distribution applications, including low ceilings, small footprints, uneven floors and inadequate docking.





*There used to be, as late as the 1990s, 7,000 items in a grocery store, and now it's 40,000 to 50,000 (MarketWatch, Grocery stores carry 40,000 more items than they did in the 1990s)





Change to E Commerce in Distribution

- Those retailers that thought that an E Commerce order could be conducted out of the same distribution center almost cost them their business.
- Providing an order for an E Commerce customer is not the same as providing product to a retail store.
- The only companies whose distribution systems were well suited to deliver E Commerce were mail order.
- Both mail order and E Commerce select orders based on each pick.





Examples of the selection challenge

- Grocery retailers could not compete with on line delivery early on. Years later they were forced to pick at the store in order to deliver customer orders.
- L.L. Bean, Lands End and Amazon rolled into E Commerce easily.
- Walmart, Home Depot, Macys, etc struggled early on and had to play catch up. Those that didn't transition were left behind.
- Every one of the above companies figured out that they couldn't deliver E Commerce through traditional facilities and opened centers specific to E Commerce.





E Commerce Distribution Design vs Retail Distribution

- Retail distribution relays on full pallet movements and/or picked cases. Typical design is pallet storage with floor level picking or man up order selection.
- E Commerce is usually comprised of reserve full pallet storage serving a pick module or other each picking options
- Frequently with conveyers sorting orders to boxes for shipment.





What are the available racking systems?





What racking system should I use?

- The number of pallets per sku is used to determine the correct racking system.
- Higher pallets per SKU allow the use of high density storage systems such as Drive- In, Flow Racks or Pallet Mole.
- Low pallets per SKU allow the use of single selective pallet racking and/or case flow racks.



Roll-Formed Racks

Pros:	Cons:
Most economical	Easily damaged
More versatility	
Easy to reconfigure	
Lower cost for installation	

Beams:	Uprights:
Sizes based on capacities	3x1-5/8, 3x3, 4x3
Range from 2.5" to 6" profile	Typically 11, 12, 13, 14 gauge
Typically 14, 15, 16 gauge	
Roll Form Styles:	
Teardrop (most common)	

Keystone







Structural Steel Racks

Pros:	Cons:
Heavy Duty	Weighs more/costs more
Damage resistant	More expensive to install
Bolted connections	
Higher capacities	

Beams:	Frames:
Size based on capacity	Size based on capacity
Range from 3" to 8" profile	F3 – Light & Heavy
Light & heavy for each size (ex. C3 has 3.5 lb. ft. &	F4 – Light & Heavy
4.1)	F5 – Light & Heavy









Full Pallet Handling Systems

- Selective
- Double Deep Reach
- Pushback
- Drive In
- Double Pallet Drive In
- Pallet Flow
- Pallet Shuttles
- High Rise AS/RS







Selective Racking

Loading

Unloading

Pros:

- High Selectivity
- Lower Cost

Cons:

- Less Cube Utilization
- More Aisles







Selective Double Deep

Pros:

- Higher Storage Density
- Less Expensive Than 2
 Deep Push-Back

Cons:

- Fork Extensions
- Wider Aisles
- Productivity Loss
- Wider Bays 102" vs. 96"







Push-Back Racks

Pros:

- More selectivity and higher utilization than drive-in
- Carts can be modified for various size pallets
- Up to 6 pallets deep
- Faster through-put than drive-in
- Less rack damage

Cons:

- LIFO (Last in, first out)
- Higher per pallet cost
- Needs more vertical space due to cart stacking and rail slope







Drive-In and Drive-Thru Racks

Pros:

- High density storage
- Best suited for common products

Cons:

- Narrow fork truck lane
- Slow through-put
- Possible damage to racks
- First in, last out (FILO)
- Requires pallets in good condition
- Requires large span of open space
- Poor utilization (60-70% typical)







Double Pallet Drive-In Racks

Pros:

- Faster storage and retrieval 2-4 pallets at a time
- Less posts = 20% more storage per square foot of floor area
- Wider lane = less damage to racks from forklift

Cons:

- Need same type products in each lane, low selectivity
- Slightly more expensive than standard drive-in





Pallet Flow Racks

Pros:

- High density storage deep lane
- First in, First out (FIFO)

Cons:

- Most expensive style racks
- Slope of tracks takes vertical space
- Pallets sometimes get stuck
- Pallet specs are CRITICAL
 - Style of pallet?
 - Plastic / Wooden? Board Direction?
 - Weight? Max and min.
 - Brakes? Pitch?







Pallet Shuttle Systems- Pros & Cons

Pros:

- Increased productivity and throughput
- Semi-Automatic loading and unloading
- Less forklifts and operators required
- Reduced labor costs
- Less damage to products and racks
- Depth of tunnel is limitless
- High density 85% space utilization
- FIFO & LIFO
- Multiple size pallets in the same lane









Pallet Shuttle Systems- Pros & Cons

Cons:

- Maintenance and recharging of shuttles
- Must move shuttles
- Limited to number of shuttles
- Productivity vs push-back is less
- Suited for clearing entire lanes not single pallets









Hi-Rise AS/RS and Pick Modules

- 40' 120' Tall
- AS/RS Cranes
- Pick Module Platforms
- Pallet Flow
- Carton Flow
- Conveyor Systems
- Rack supported buildings
- Highest cost racks per pallet
 position
- Tight tolerance requirements







Pallet Storage Rack Density vs. Selectivity







Case and Each Picking Systems

- Selective 2 Pallets On The Ground
- Selective Quad Pick
- Carton Flow In Rack

- Shelving In Rack
- Shelving Pick Modules
- Multi Level Case/Each Floor Level



- Multi Level Case/Each Man Up
- Pick Modules Pallet Flow
- Pick Modules Case flow
- Automated Goods To Man







Selective Case and Each Picking Systems









Selective Case and Each Picking Systems

Selective 2 Pallets on the Ground





Selective Quad Pick







Carton Flow Racks

Available with:

- Pencil Roller Beds
 - Fixed Track/Box Width
- Staggered Wheels
 - Easy to adjust lane size

Used for:

- Case picking
- Open case picking
- Back-up stock
- Multiple size boxes

Fits in standard racks or Separate support frames











Selective Case and Each Picking Systems





Selective Case and Each Picking Systems

Shelving In Rack

Shelving In Pick Module

Mezzanines for Optimizing Space

Mezzanine supporting racks above allows work area below

Double level mezzanine supporting conveyors above dock doors

Mezzanines

Rack Supported

Wide Span

Pick Modules

- Pick, pack and ship operations
- Multiple styles of rack (carton flow, push-back, selective, pallet flow)
- Integrated with conveyor systems
- Lighting
- Sprinklers

Pick Modules

Pallet Flow Picking

Pick Module – Case Flow

Design the system to meet the picking needs!

For More Information:

John Krummell: jkrummell@asprack.com Website: www.advancestorageproducts.com MODEX Booth 7027

Carlos Oliver: cpo@frazier.com

Website: www.frazier.com

MODEX Booth 8288

