Choosing The Right Storage Rack System

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Before selecting the storage medium for either a new distribution center or an existing facility, the first step is to analyze the products that will be handled. Whether it's 150-pound mattresses, cases of bottled water or 10,000-pound rolls of paper, the product determines the proper storage. To help facilitate the process, there are guidelines for evaluating which storage medium best meets your needs:

1. Is the product First In, First Out (FIFO) or Last In, First Out (LIFO)?
2. How much storage density (items stored in a given area) do you need?
3. Are there specific product flow requirements?
4. How much forklift access do you require?
5. What is the capacity of your loads?
6. Do you normally pick pallets, cases or pieces?

It's important to make sure that whatever rack storage medium you choose will fit in the footprint of the facility. Ask questions such as these: "What is the space allocated for storage?" and "What limits are there within the area?" In an ideal scenario, the storage medium should be identified and designed prior to site selection or building design, although this isn't always possible. Critical components of a building footprint as it relates to a storage medium are:

- Building column layout
- Building clear height (useable vertical space below the roof or ceiling)
- Overall square footage
- Permanent and semi-permanent obstructions (HVAC, offices, electrical, sprinklers, lighting, etc.)
- Simplicity of building layout (a rectangular building is typically more conducive to efficient storage design than one that has large square footage through multiple build-outs)
- Dock door placement
- Safety requirements (egress paths, forklift aisles vs. foot traffic, etc.)

Although conventional thought may be that racking is just racking and there is nothing very complex about it, selecting the most effective rack system is almost never simple. This is especially true when your business operates in a dynamic environment, as most do. Balancing building layout, product mix and type of access required for that product, warehouse and distribution managers have some tough choices to make.

For Penser SC, a 3rd Party Logistics company based in Jacksonville, FL, operating over one million square feet of warehouse space throughout the state, choosing a rack storage system presented a particular challenge.

"Since we deal with products of every size and shape, from pharmaceuticals, to food products, to paper, we face many challenges when designing a rack storage system," explains Penser SC's CEO Shawn Barnett. "We design by planning how much racking we will need, while making sure we can evolve that design to accommodate the different types of products we have in the mix. Some products can change every two years and then we have to be able to easily reset all of the shelves and racks."

Tom Single, Director of Solutions Development for Saddle Creek Corporation, a 3PL based in Lakeland, FL, concurs. "We work with everything from small items to 10,000-pound rolls of paper, so we need the flexibility to adapt quickly."

Adds Barnett, "When selecting a rack system we always look at the heaviest possible product we will have to store, to make sure we choose the strongest rack possible. We can't put ourselves in the dangerous position of being forced to place 2,500-pound pallets of canned food on the fifth beam up with a 1,500-pound capacity. We need to have the ability to literally morph our building to accommodate our client's products."

When choosing a storage system, it's also important to understand the specifications and limitations of the lift trucks that will be accessing the racks. All of the factors discussed thus far can affect the type, overall cost and utilization of lift equipment, so careful consideration should be taken to make the correct choices.

Different products offer different challenges in this regard. For Ken Cozart, Vice President of Operations for Addison, TX-based Mattress Giant, moving 150-pound king-sized mattresses from a shelf offered its own unique challenges, as racking had to be strategically located as not to impede the turning radius of a forklift.

"We need to get to the product quickly, and at the same time, make sure the forklift can easily navigate a 90-degree turn in a 12-foot, 6-inch aisle."

When choosing a rack storage system, here are some of the various types to consider:

- **Pallet Flow Rack**: With Pallet Flow Rack, the pick face is always occupied since gravity rollers or tracks allow products on pallets to flow to the front of the pick face. Since the lanes are slightly pitched and consist of gravity rollers or tracks, the pallet moves forward until slowed or stopped by a retarding device, physical stop or another pallet in front of it. When an operator removes pallets at the pick face, the remaining pallets accumulate forward. Since Pallet Flow Rack is the only dynamic rack system that offers a First In, First Out (FIFO) method of inventory management, this is beneficial when expirations are a consideration, as well as the risk of product

obsolescence.

- **Drive-In/Drive-Thru Rack**: As the name implies, Drive-In/ Drive-Thru Rack means that a forklift can travel inside a storage bay that is multiple pallet positions deep in order to place or retrieve a pallet. Often times, forklift drivers are guided into the bay through the guide rails on the floor and the pallet is placed on cantilevered arms or rails. Drive-In/Drive-Thru rack is typically used when space is limited and when there are many of the same type of products (SKUs) being stored. This medium also requires experienced fork truck drivers. Since every pallet requires the truck to enter the storage structure, damage is more common than with other types of storage. In designing a drive-in system, dimensions of the fork truck, including overall width and mast width, must be carefully considered.
- **Selective Rack**: Selective Rack is the most popular and widely recognized bulk storage solution in industrial environments. It is also commonly referred to as Static Rack and as that name implies, there are no moving parts. Selective Rack is an ideal solution for a warehouse that has a wide variety of products (SKUs). It offers direct access to all stored pallets, allowing warehouse operators the ability to handle one pallet without the need to move another. Selective Rack also offers ease and simplicity with respect to inventory location and designation as each pallet position can be assigned a dedicated SKU for storage.
- **Push Back Rack**: Push Back Rack utilizes between two and six carts that nest within one another and travel by gravity to the first position of a lane when empty. A warehouse operator can drop a pallet on the first cart just as if he would with Selective Rack. In the event another pallet needs to be stored, the warehouse operator gently pushes the first product resting on a cart back, thereby making room to place the second pallet on the second cart. When an operator needs to retrieve a pallet, he lifts the first pallet in the lane and gravity forces the carts behind to move forward and present a new pallet to the first position in the lane. This storage medium provides a Last In, First Out (LIFO) method of inventory management similar to Drive-In/Drive-Thru Rack. The advantages of Push Back Rack are the increased density in storage, very similar to Drive-In/Drive-Thru Rack, but coupled with the ease of selecting the pallet at the pick face instead of driving into the racking system. If floor space is not limited, warehouses often prefer Push Back Rack over Drive-In /Drive-Thru because it guarantees that all pick locations are full at the pick face, reducing the likelihood of fork truck damage to the system, as well as travel time.

Rack storage systems are designed to achieve specific advantages and accommodate specific needs, but only if they are planned carefully. Lift truck damage, overloading, and inadequately engineered and installed systems, account for nearly all rack system failures.

Ideally, by taking all of these factors into consideration, prioritizing them appropriately to develop the ROI you want to achieve, and then making an informed decision based on that analysis, the result will be the ideal storage situation, meeting both current and future needs.

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