

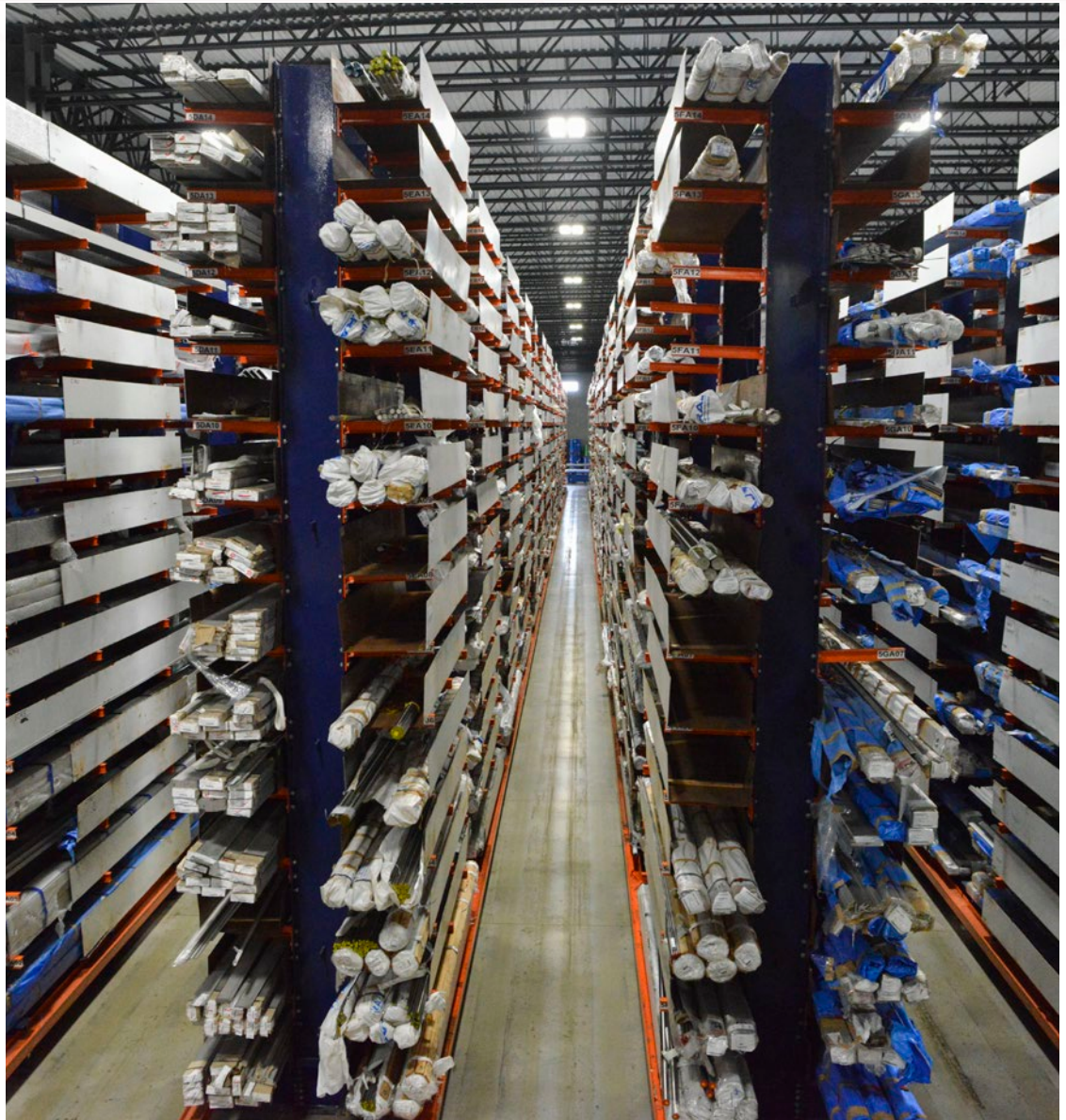
IMPORTANT CONSIDERATIONS FOR **OPTIMIZING STORAGE OF INDUSTRIAL RAW MATERIALS**

Engineered for wide and bulky materials, cantilever racks can easily help companies maximize floor space and increase profitability—but designing the right system isn't as easy as it seems.

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EFFECTS OF FLOOR STORAGE

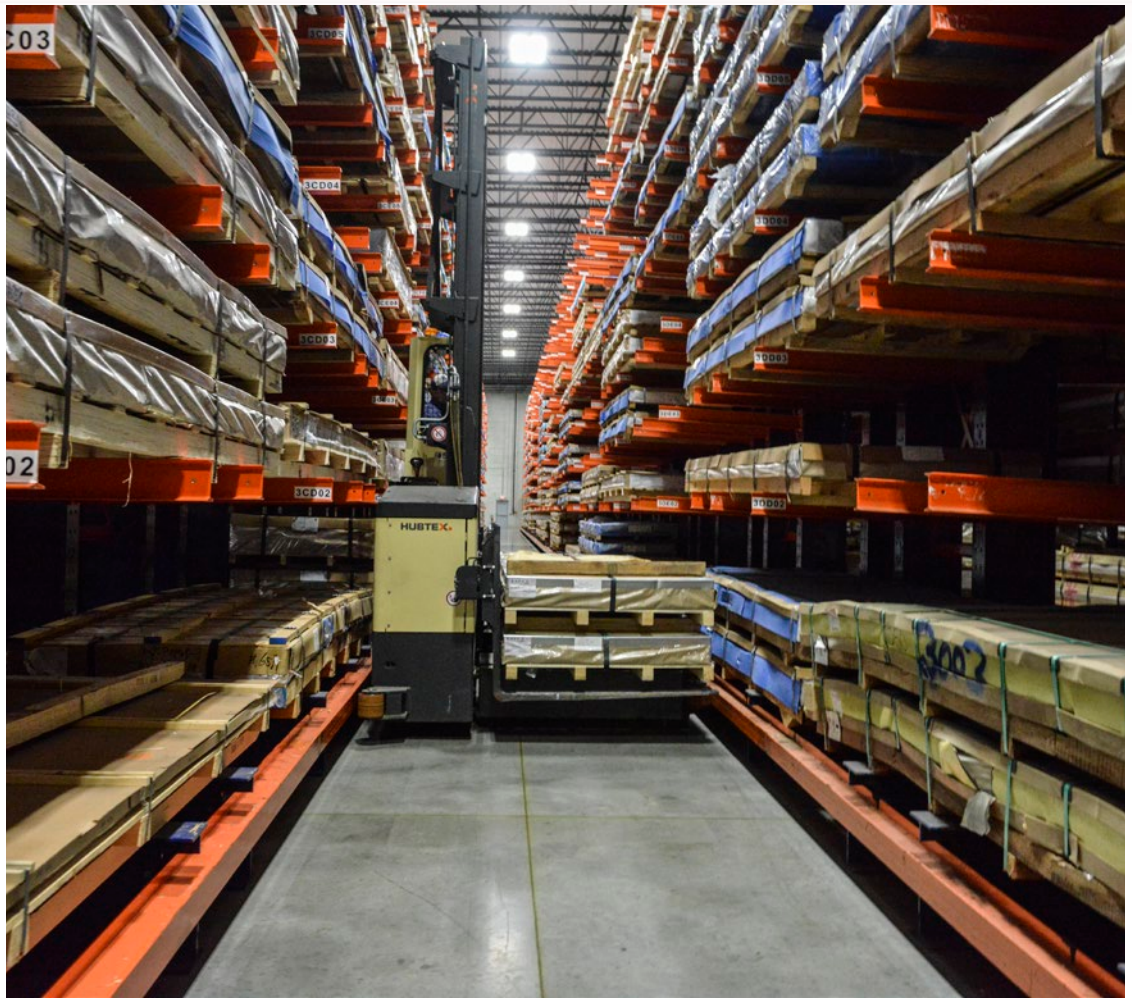


Despite their obvious differences, metal sheet, plate, bar stock and lumber have several things in common when it comes to being stored on the floor—their large footprint takes up valuable manufacturing space, and they can be very difficult to find when stacked on top of each other or scattered in random locations throughout a plant. All of these materials can also pose a safety hazard for employees and are susceptible to damage from material handling equipment.

“Without an organized storage and retrieval system in place, manufacturers can miss out on additional revenue opportunities or risk-reduced profitability, a fact that is not insignificant given

the razor-thin margins that many industrial companies are faced with in this global economy” says Tracy Buck, Industrial Storage Sales Engineer at Ross Technology. “Storing these materials on the floor ties up expensive real estate, and if that’s not enough, costs increase when machines sit idle waiting for employees to locate the correct raw materials.”

Fortunately, these challenges can easily be overcome with a good cantilever racking system. However, designing and choosing a system is not quite as easy as it would seem, especially considering the number of options available on the market.



The Easiest Way to Access & Store Lengthy Material

For those who may be less familiar with cantilever racking, the beauty of the design lies in the fact that the arms are cantilevered, as the name suggests, and are not supported by shelf beams and columns along the aisle. The result is maximum flexibility for placing and removing elongated products, with a forklift or sideloader, because of the unobstructed access. Products can simply be lifted and loaded onto the cantilever arms, where there are few limitations on the length of the product being stored. Pallet racks, on the other hand, are not conducive to storing many types of metal materials and lumber because of their column and shelf configurations.

“The versatility of what can be stored on cantilever racking is pretty wide-ranging,” says Rod Smay, Industrial Storage Product Manager at Ross Technology. “Other types of racking can get the job done, but where this type of storage is really beneficial is for those long and bulky types of materials used in industrial manufacturing. We’ve had requests to design cantilever racks for all types of products from spools of cable, to engineered trusses, to spent nuclear fuel rods. They make an immediate positive impact on the storage and retrieval process because they’re so easy to load and unload product from.”

Cantilever racks are also available with a number of options that enhance their flexibility even further. Bolted arm connections allow future adaptability in accommodating a variety of load heights as facility storage needs change, while stop bars are also available for preventing materials from sliding or rolling off the rack arms.

4 Benefits of Cantilever Racking

1 Flexibility. The lack of front columns means no restrictions on the length of items being stored. Also, different-length objects or oddly sized items can be placed within the same rack system.

2 Accessibility. Because there are no vertical obstructions at the face of the rack, loading and unloading product is quick and easy.

3 Adjustability. Bolted connections allow for easy adjustment of the arms to accommodate a wide variety of load heights. Allow for future variations in product.

4 Modularity. Additional bays can easily be added when needed.





Load Capacity Design Impacts the Utilization of Space, Durability and Safety

When designing a cantilever rack system, the maximum load capacity is often the first criteria discussed, and the feature that garners the most attention. While this is certainly an important consideration for many good reasons, buyers should also look beyond the raw weight a given system is capable of handling and be aware of the type of steel used to support that weight, and how the system is designed to handle uneven loading.

Kilopounds per square inch (KSI) is the unit of measure that refers to a steel's yield strength, the amount of stress it can endure before permanently deforming. In other terms, the higher the KSI, the stronger the steel is and the more bundles of product it can support before permanent deformation is evident.

"A cantilever rack system should have an uptilt angle of 2 degrees," Buck says. "That leaves room for some deflection when heavy materials are placed on the cantilever arms. Over a period of time, as product gets loaded and unloaded repeatedly, you'll start to see some deformation in a cheaper grade of steel. A higher KSI steel will continue to bring that arm back to its 2-degree uptilt. When a cantilever rack is being used for round objects, a 4-degree uptilt angle is ideal. There needs to be added precaution when storing objects that can roll, and you definitely want to be wary of deformation in these cases."

It's for this reason that a cheaper cantilever storage option can be costly in the long run. If the system isn't fully designed to meet your weight requirements, over time, the arm deflection will no longer return to its original uptilt angle and will need to be replaced.

Utilizing steel with a higher KSI also allows the rack design to handle heavier loads with less mass. For example, a cantilevered arm with 36 KSI steel will need to be larger to handle the same amount of weight as an arm fabricated out of 50 KSI steel. For this reason, choosing a system built with 50 KSI steel can help save space.

In the case of double-sided cantilever racks, another important consideration is to ensure that the system is engineered to support uneven loading, as there are definite safety risks involved if this is not properly addressed in the rack design. Double-sided cantilever rack systems should be designed so that the rack can be fully loaded on one side while the other remains empty, a condition that frequently occurs when loading a system for the first time. In other words, no credit should be given to materials on one side of the rack balancing out the other side.

Furthermore, ensure that cantilever rack columns and bases are designed for 100 percent load utilization, a condition where all of the arms are loaded to their maximum rated capacity for a given application. Column and base design engineered for "average loading" (less than 100 percent) should not be used in an attempt to economize a column and base design.



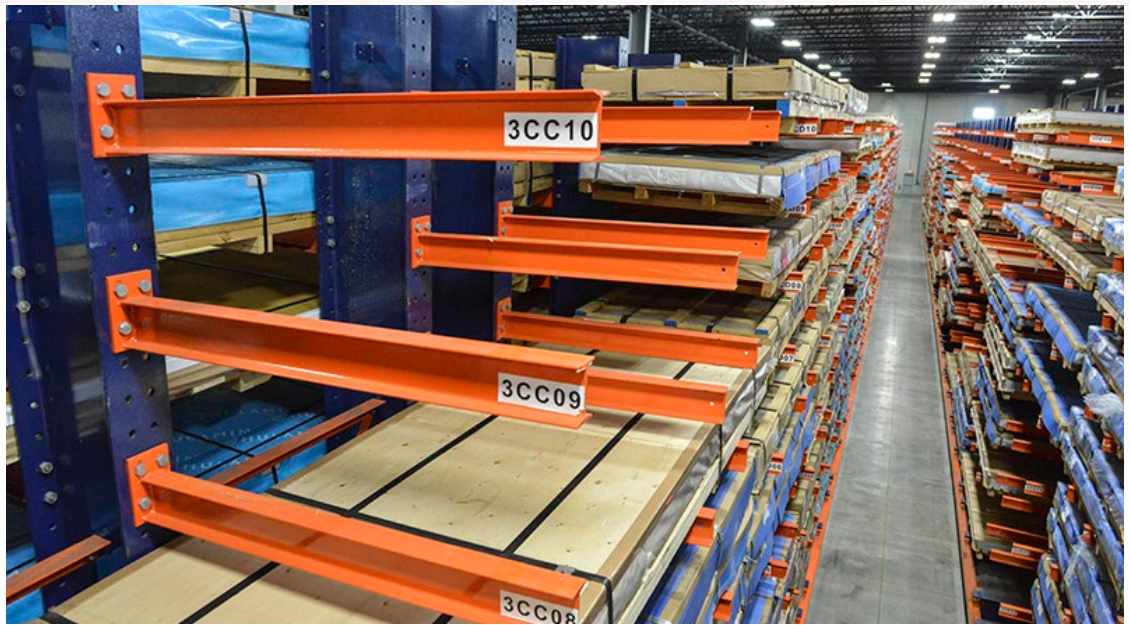
Narrow Aisle Design Maximizes Layout Efficiency

Cantilever racking can do wonders for organizing inventory and improving operating efficiency, but it's not the only investment to consider when addressing the aforementioned storage headaches. In many respects, the benefits of cantilever racking can be limited by the equipment being used to load it. Pairing a quality cantilever racking system with suitable material handling equipment is where peak efficiency will really be achieved.

Selecting a narrow aisle cantilever rack along with a sideloader is a great way to minimize retrieval time, as well as reduce aisle size. For example, transporting a 24-foot-long bundle of pipe, a forklift—perfectly capable of handling the bundle—still requires aisles of 30 feet or

wider to maneuver the 24-foot-long bundle down the aisle, turn to face the racking, and load it onto the arms. A sideloader, on the other hand, requires approximately 10 feet of aisle space to accomplish the same objective. The simple choice of pairing the most effective piece of equipment, with the proper storage solution, makes the entire operation much more efficient from the retrieval time to the use of floor space.

"Helping a client customize a complete system is incredibly gratifying," says Buck. "It goes beyond just helping them choose racking, but assisting them in mapping out the entire process. When it all gets paired together, that's when you see incredible benefits."



Choosing the Best Solution

While cantilever racking is the best solution to improve efficiencies for storing many industrial products, not all cantilever racking is made the same, and buyers should understand the differences.

Ross Technology's Dexco Racking Systems are designed specifically for heavy-duty industrial storage applications, and are manufactured using structural steel I-beams with a 50 KSI minimum yield to offer significantly higher load capacities and improved durability compared to roll-formed steel. All cantilever racks are engineered using American Institute of Steel Construction's standards, which were developed to guide the design of large steel structures such as bridges and buildings.

Dexco Cantilever Rack Systems can be engineered to support up to 20,000 pounds on each cantilevered arm. While every project is custom engineered, all systems utilize A325 hardware for the bolted connections. This is the same hardware used in bridge and building construction, and allows Ross to achieve greater strength in connections than standard bolts.

Ross engineering standards, combined with the use of structural steel I-beams, allows Dexco double-sided cantilever racks to be loaded unevenly without risk of tipping over. One side of a double-sided cantilever rack can be fully loaded with

product, with no risk of the racking system tipping over—assuming the maximum loading capacity restrictions are followed.

"Dexco racks are designed to make it as simple and efficient as possible for the end user," states Smay. "Oversized bases are unnecessary and can inconvenience the customer. We make it our responsibility to custom design and engineer a cantilever system that benefits the customer and what they need, and with safety as a top priority. The safety benefit to this type of design cannot be understated."

As a result of engineering for large weight capacities, and using 50 KSI steel, Dexco cantilever rack systems often require half the cantilever arms and support columns compared to other systems. This smaller footprint is vital when the objective is to maximize existing storage space.

Dexco cantilever racks offer manufacturers and distributors several noticeable benefits in their efforts to maximize operational efficiency, including:

- Reduced downtime, because product is no longer being uncovered from floor storage
- Greater use of vertical storage space
- Improved safety for employees, especially in uneven loading scenarios
- Reduced chance of damage to materials

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DESIGN DECISIONS WHEN CHOOSING CANTILEVER RACKING

Several design factors make up a cantilever rack, each one as important as the other. To ensure the racking system works as intended, and in an efficient manner, work with an industry expert and consider these design elements for any cantilever system.

CLEAR OPENING BETWEEN ARMS

Factor enough room for personnel to safely maneuver the load with ease.

ARM LENGTH

Determined by the size of materials being stored and strength of a manufacturer's rack components.

COLUMN HEIGHT

Influenced by the forklift's fully extended mast height and ceiling elevation.

ARM UPTILT

Uptilt compensates for arm deflection – 2 degrees is used for standard products and 4 degrees for products that can roll.

UPRIGHT CENTERS

If centers are too close together, product will extend too far over the arms and droop. If the arms are too spread out, product will sag in the middle.

ARM LOAD

Ranging from 1,000 to 20,000 pounds, understanding the type of product that will be stored helps determine the desired arm load capacity.



Optimize your operations and meet all of your industrial-sized storage requirements with the strength and efficiency of Dexco racks. Find your solution at RossTechnology.com/Dexco or call us at **866-248-5088**.