

The Welded vs. Bolted Debate

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Both technologies are effective for building racks. Preference and price are the determining factors in the buying decision.

Which is better when constructing racks: bolting or welding the side braces to upright columns? It's a simple question that sparks a surprisingly emotional debate about the best construction method. North American companies prefer welded racks, while bolted rack is used by Europeans and most of the rest of the world.

There are many factors that need to be considered. The short list includes customer acceptance, cost, material, and safety. Each fastening technology has its advantages and disadvantages for manufacturing, shipping, installation, and material usage. The key for companies is to use the fastening method that best meets their needs and budgets.

Perhaps the most pressing question is: Are customers buying into the idea of using bolted rack? Some of them seem to be. Today's high fuel prices and other costs are giving rack users new reasons to consider bolted rack.

Customer Acceptance

Increasingly, decisions about the type of rack to purchase are no longer driven by which fastening technology is "better." Cost is the big battle in the welded vs. bolted debate, says, Jim Green, president of Interlake distributor, Morrison Company (Willoughby, Ohio).

His customers tell him, if the rack holds product like it is suppose to, they don't care how the frame is built. Green, who has sold welded rack for the past 35 years, admits that it took awhile for both himself and his distributors to accept bolted rack, but not his customers. His company is currently working on its fourth bolted-rack installation. It only started to sell bolted rack in February, when it was first introduced by Interlake Material Handling (Naperville, Ill.).

Green speculates that another reason why bolted rack is starting to be accepted in the United States is that companies like Wal-Mart, Target, Home Depot and CVS are installing European-manufactured rack-supported ASRS systems. These systems are structured around secure bolted racks that can reach heights up to 100 ft.

Despite the increased use of ASRS systems, many people, like Mike Demetry, are still not convinced bolted rack is a viable product. Demetry is a 35-year industry veteran and national sales manager for Ridg-U-Rak (North East, Pa.), a manufacturer of welded seismic racking. He says there is no advantage at all between bolted over welded frames.

"It shifts the manufacturing function off to a third party, whether it is the customer, installers or someone like that who now has to assume the responsibility for assembling it correctly," he says.

Furthermore, he adds, "It's not a unique idea, and it is not going to save anybody any money because somebody has to pay for the manufacturing of the uprights. It takes away from the manufacturer's responsibility to provide a finished product."

Some people say that one of the advantages of bolted rack is that when it is damaged, it can be easily repaired by simply bolting in new struts. However, Demetry says, "The damaged components are going to be the diagonals, horizontals, and the columns. You still have to unload the rack on both sides, unbolt everything, then bolt it back in. You might as well replace it with another welded frame."

Material and production Costs

The costs in the welded vs. bolted debate center around manufacturing, materials, shipping and installation. Material costs for all types of rack are rising. The price of steel has more than doubled during the past three years due to increased demand and surcharges. In 2003, steel suppliers started charging a \$30 per ton surcharge. It peaked at \$450 and has leveled off to around \$325 per ton. Steel King Industries (Stevens Point, Wis.) even has a link on its home page that informs site visitors about current steel prices.

The supply of steel became so critical a few years ago, that steel manufactures were allocating how much steel they were going to give rack, car and appliance manufacturers. Fortunately, this is no longer happening and steel prices have been steady for the past eight months.

Manufacturing costs for welded rack are stable, but have been reduced for bolted rack thanks to more efficient automated manufacturing processes. The type of steel used—galvanized or not galvanized—is a factor in this debate. Galvanized steel does not rust, so it meets the strict codes regulating many industries such as food and pharmaceuticals. Galvanized steel cannot be welded easily because the zinc coating gives off toxic fumes. Also, welding destroys the integrity of the galvanized coating—the weld bead will rust if it is not hot dipped again to restore the coating.

Consequently, the uprights of welded rack must be galvanized after construction, at an added cost. On the other hand, galvanized steel can be used to manufacture the uprights for bolted rack since it only needs to be formed and holes punched in it. On the positive side, galvanized steel does not have to be painted, saving some material and labor costs.

Shipping, Installation and Safety

Shipping is a major expense for companies purchasing rack. Welded rack is more expensive to transport because it cubes out trucks before they are weighed out. Interlake distributor Jim Green says, "You may only get 20,000 lbs. to 25,000 lbs. on a truck [loaded with welded rack] compared to 40,000 lbs to 45,000 lbs. on a truck loaded with knock-down rack."

Bolted rack is more efficient to ship because columns and struts are bundled together. However, distributors say that rack needs to be shipped more than 1,500 miles before a real freight savings occurs. "If you are manufacturing in the Midwest and shipping to a California distribution center, you can see the savings, and what fuel prices have been doing to truck-ers," Green says.

Installation is another cost companies need to take into consideration. Bolted rack may cost more to install, but bolted rack proponents point out that installers are paid at a lower hourly rate than certified welders in a manufacturing plant.

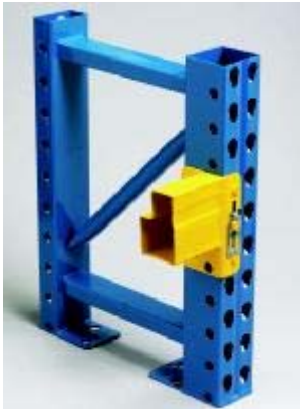
Arlin Keck, corporate engineer for Steel King, questions this assessment. He says installation costs for structural racks with bolt-on beams can be 1.5 times the installation costs for roll-formed, welded racks. "We're hearing ratios of 2:1 for bolted roll-formed racks vs. welded roll-formed."

Safety is another issue, particularly for bolted rack. Many people believe that bolts can become loose if the installers don't properly tighten them at assembly. Interlake says it uses zinc-plated bolts with a limited thread engagement design and matching serrated flange locknuts that keep bolts securely in place. Both bolted and welded rack meet the same Rack Manufacturers Institute (RMI) 2002 and AISI and AISC standards that govern steel design and construction.





Limited bolt threads and nuts with serrated flanges secure bolts.



Welded rack has lower installation costs.

Welded vs. Bolted Rack Advantages

Advantages: Welded

- Reduced installation costs. Less sorting of materials.
- Less staging area required
- Uprights with offset or slope-back front legs, or with seismic or full-depth base plates, are generally stronger
- Welded-on seismic base plates allow for beam placement at ground level
- Less hardware and reduced chance of short shipments due to fewer components
- Mis-manufactured frame braces discovered and corrected in the plant.

SOURCE: STEEL KING INDUSTRIES

Advantages: Bolted

- Lower manufacturing costs

- Easier and less expensive to transport
- Shipping savings outweigh additional installation costs
- Limited bolt thread prevent over tightening; nuts stay tight with serrated flange
- Easier to handle and unload
- Easier to reconfigure and repair.

SOURCE: INTERLAKE MATERIAL HANDLING

A Brief History of Bolted Rack in the U.S.



Ever since the 1950s, North American companies have use welded rack, while Europe, and most of the rest of the world, use bolted. The tradition has been so hard to break that until February, there was only one company in the United States manufacturing bolted frames, Mecalux, a Spanish company with U.S. headquarters in Chicago.

Mecalux was founded 35 years ago in Barcelona. It designs and manufactures warehouse storage systems that are distributed in Spain, France, Portugal, Italy, Germany, Argentina, Mexico, Poland, Austria, United Kingdom and the United States.

Now, Interlake Material Handling Solutions (Naperville, Ill.), one of the largest manufacturers of storage racks in North America is offering bolted rack—for the second time. In the 1970s it purchased, and later sold, bolted-rack manufacturer, Dexion because it needed to raise cash for a corporate restructuring. Currently, Dexion is part of Interlake's former owner, Brambles Material Handling (Sydney).

In April, Brambles finalized the sale of Interlake to United Fixtures Holdings (North Bend, Ind.), a storage rack and vertical carousel manufacturer. Over the years Inter-lake has continued its relationship with Dexion. The two companies have spent the past several years helping Interlake make the transition from welded to bolted rack, which will complement United Fixtures Holdings' other rack brands, National Store Fixtures and Monarch.

Interlake's two U.S. plants in Pontiac, Ill., and Sumter, N.C., now produce bolted rack. Its plant in northeastern Mexico that serves Central and South America, has not yet been converted. United Fixtures has a plant in Mexicali, in northwestern Mexico. In the future, Interlake says it may use this plant to supply California and the Southwest United States.

"There are a lot of synergies between our rack companies," says Vincent F. DePaola, manager retail sales, Interlake Material Handling Solutions (Naperville, Ill.). The clients for both companies are DCs and warehouses. What's more, National Store Fixtures, DePaola explains, "handles retailers, like Home Depot and Lowe's, which is an area where we don't have much of a presence."