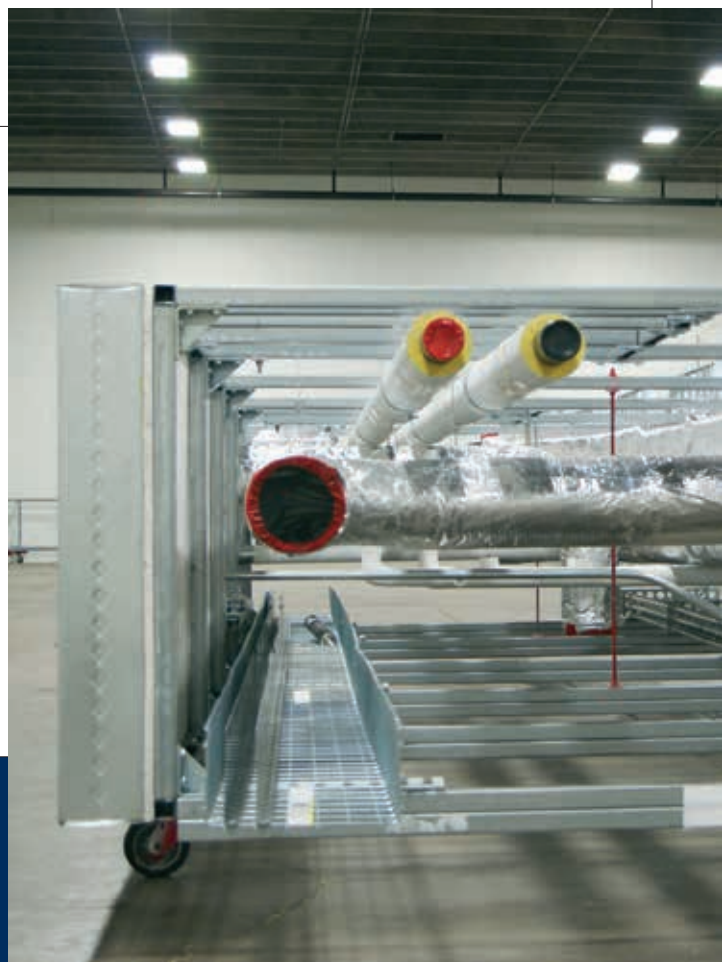


HVAC

MADE TO ORDER

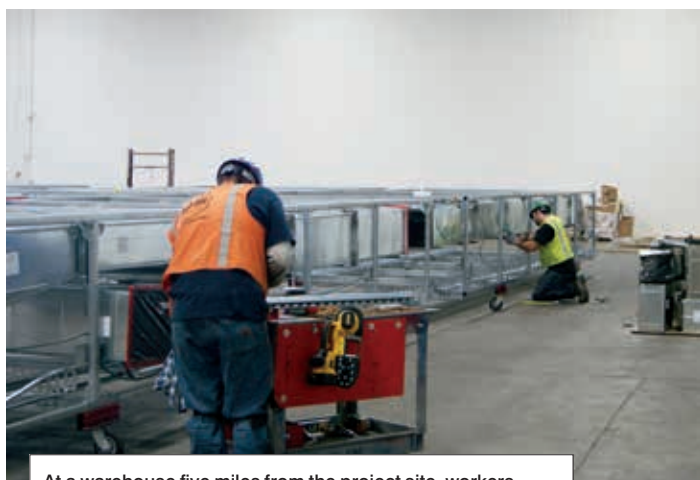
Prefabrication of HVAC, mechanical components setting new bar in healthcare facilities



Though not a new concept, prefabrication is a strategy that is taking off in commercial construction. Healthcare projects, with the potential to reach a critical mass of repeating features, such as multi-trade above-ceiling racks, patient bathrooms and headwalls, seem to offer good opportunities for a strong return on investment, particularly for mechanical and plumbing components.

Prefab becomes even more effective when successfully integrated with virtual design and construction and building information modeling processes, and any HVAC contractor involved with BIM understands how valuable it has become to avoiding field coordination issues, change orders and cost overruns. Prefabrication requires owner, design and construction teams to make decisions earlier than in a typical linear onsite delivery. The teams have to work through detailed design decisions including finishes, ceiling heights and the systems above-the-ceiling such as HVAC and hot and cold water.

The Exemplar Saint Joseph Replacement Hospital, being built in downtown Denver, Colo. by Mortenson Construction, provides a case study for the benefits of large-scale prefabrication. At a leased warehouse about five miles away from the jobsite, work is underway on the assembly of multi-trade racks and headwalls, which will be installed on this new 830,000-square-foot, \$623-million hospital located in Denver's urban core. In addition, 446 bathrooms, prefabricated down to the toilet paper roll holder, will be shipped to the site from Eggrock



At a warehouse five miles from the project site, workers assemble ducts into 25-foot multi-trade racks to be installed above the ceiling at the new Saint Joseph's replacement hospital in Denver, Colo.

Bathroom Pods of Oldcastle in Boston, Mass.

"The prefabrication of patient bathrooms led to extensive mockups at very early stages, which allowed hospital staff from nursing to environmental services to adjust details from HVAC to tile color, and get it exactly right, before the bathrooms were prefabricated," said Rob Davidson, AIA, ACHA, principal at H+L Architecture, who, along with Davis Partnership and ZGF, is one of the three architectural firms on the joint venture design team.



A completely assembled 25-foot multi-trade rack that includes MEP and HVAC components. Approximately 250 multi-trade racks will be installed in the corridors of the new Saint Joseph Replacement Hospital.

at the site, and significantly reduces time spent off the ground.

“Some of the biggest benefits for us as a mechanical contractor are increased safety and risk mitigation due to the controlled prefabrication environment. Factors such as reduced ladder work, minimized clutter at the jobsite, easier mobility, reduced overhead work and protection from weather elements have all minimized risk of injury,” said Wendell Lanman, executive project manager with U.S. Engineering Company, the mechanical contractor directing the multi-trade prefabrication assembly at the leased warehouse.

Lanman said all piping and ductwork is prefabricated in U.S. Engineering Company’s warehouse and brought to the leased warehouse in Denver for assembly into the multi-trade racks.

“These racks are in 25-foot lengths, and stockpiled here until we can move them to the project where we install and hook them together very easily,” he said. “What this will do is cut down on the installation time in the field from months to weeks. It’s a state-of-the-art process that we need to utilize on fast-track projects to meet the schedule.”

The prefabrication of multi-trade racks that include HVAC ductwork, hot and cold water, electrical systems and cable trays raises the question if the traditional single-trade specialty contracting shop will transform into one-stop shops for commonly prefabricated trades.

“U.S. Engineering has been providing prefabrication since our inception, but has recently been seeing new opportunities with the increased adoption of multi-trade prefabrication,” Lanman said. “It’s a more efficient process where multiple trades work together to fabricate building sections, which are then delivered and installed in a modular fashion at the jobsite,” he added.

U.S. Engineering believes that those who don’t adapt to new technologies will be left behind. “Similar to BIM, prefabrication will become an essential part of the building process,” said Lanman. “Companies that choose not to adopt it will likely have to outsource or lose out entirely.”

PROJECT SCHEDULE CREATED CHALLENGE THAT LED TO PREFAB SOLUTION

The demands of an incredibly tight schedule pushed the owner and its design and construction team to consider prefabrication. Sitework started on the project in mid-December 2011 and it must be complete for the hospital to move from existing buildings and be open and operational by late December 2014.

“The fact that we are trying to put so much in such a short amount of time means that we have to work around the clock and stack trades,” said Jopy Willis, senior superintendent for Mortenson. “BIM gives us confidence that we know exactly what is going on so that when we build a rack that has HVAC and every other trade in it, we understand it’s all going to work when we get in the field,” he added.

Davidson added having all trades coordinated from the beginning makes for a seamless jobsite.

“Having the coordination of all the trades from the beginning, on a project this size — mechanical, electrical and plumbing — it has been a huge plus,” Davidson added. “It ties into the prefab because by the time we’ve worked out all of the conflicts through virtual design and construction, it will be exactly right before it’s fabricated.”

BUILT-IN SAFETY SOLUTIONS

Safety is one of the most obvious benefits of prefabrication. Assembly of some of a construction project’s most complicated and critical elements in an offsite controlled warehouse reduces congestion of both personnel and materials

The Exempla Saint Joseph Replacement Hospital project site, which is being built in downtown Denver, Colo.

