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SPECIALIZING IN FOOD FACILITY DESIGN AND CONSTRUCTION



AMERICAN AERIAL PHOTOS, LLC

A DESIGN-BUILD FIRM'S ROLE IN SELECTING AS/RS EQUIPMENT

When it comes to design-build firms, it's easy to assume that their expertise lies in just the construction aspect of a food facility. Features such as site selection, building materials, certifications and more are just a handful of skill sets today's design builders

bring to the equation.

However, experienced firms such as ESI Group USA, Hartland, Wis., provide more than just floors, walls, ceilings and roofs, or what is called the thermal envelope—in fact, they can play a pertinent role in assisting owners in the selection of an automated storage retrieval system (AS/RS).

— CAITO FOODS —



Manufacturing Innovator of the Year
Caito Foods Greenfield Commissary
Fresh Kitchen Facility has received two
awards since opening last fall.

TRUE CUSTOMER SERVICE

ESI, for instance, can help locate the building on the proposed site and work with the customer's team to

provide feedback on the type of building associated with making an AS/RS-type decision. Depending on the end result, ESI also outlines how the AS/RS equipment selection impacts building construction costs.

For a rack-supported building, where the pallets are stored two pallets deep on either side of the storage/retrieval (S/R) machine aisle, for example, ESI recommends either a "ladder rack" or single frame post and beam system.

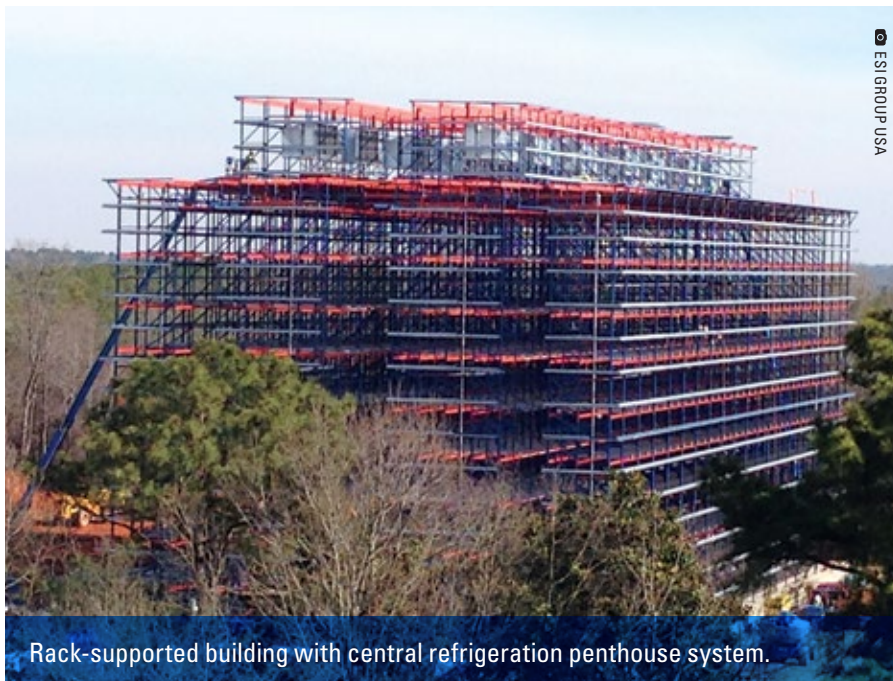
"The ladder racking is braced in the flue space between the rack frames in the down aisle direction for both the structural tube and rolled-formed racking. The post and beam racking does not require all of the flue bracing. When multi-deep pallet storage (up to 20 pallets deep on either side of the S/R machine aisle) is required, either rolled-formed racking or post and beam structural racking is used. The rolled-form racking utilizes bracing towers to dissipate the building loads into the structural mat slab. These bracing towers are located at both ends of the S/R machine aisles in the runout area," says Mark Livesay, vice president, automated warehousing for ESI.

Depending on the building size (height and length), there could also be bracing towers required in the middle of the system, Livesay adds, which will add to the overall S/R machine aisle length.

"Structural post and beam racking uses moment connections to take the building loads across the entire structural mat slab," he says. "With the rolled-form racking bracing tower scenario, the slab costs are greater due to the higher slab loadings in those areas, which require a thickened slab with additional reinforcement. Larger cast-in-place anchors may also be required, which adds to the slab finishing cost due to having to work around the embedded anchors."

AMBIENT VS. REFRIGERATED VS. FROZEN

A building's geographic location plays a big role in rack structure, whether it's situated near the coast and susceptible to high winds or in a seismic zone that requires seismic



Rack-supported building with central refrigeration penthouse system.

loading. However, ambient, refrigerated and frozen sites require different AS/RS features.

If the building is frozen, for example, costs are higher due to the mud slab floor warming grid and increased floor insulation.

"Depending on which refrigeration system is used and how the evaporators are installed on the roof of the AS/RS, a determination is required whether to use one big penthouse or individual separate mini penthouses. This affects the racking design because of the increased weight and wind loading on the rack frames," says Livesay. "A rack-supported AS/RS building can be unforgiving when it comes to differential settlement, and care should be taken to assure that the foundations and mat slab address that."

ESI recommends a geotechnical evaluation, so that the building's structural mat slab can be designed properly to accept all forces.

"When the soil conditions dictate, we have built rack-supported buildings on deep-depth foundations (piles, caissons, micro piles, piers), which can add considerable costs. However, all options should be evaluated when looking into alternatives such as ram aggregate piers (Geopiers) or even surcharging the soil if conditions and schedule will permit, which could save a considerable amount of money," Livesay adds.

It's also important to use an experienced design builder who understands the details of the facility, says Livesay, especially when it comes to concrete freezer slab design, refrigeration, sprinkler and insulated wall panel construction for AS/RS rack-supported buildings.

"These automated systems are highly reliable. They don't show up late or sick to work, workplace injuries are reduced and also repetitive injuries can be eliminated with automation, and there are no additional real estate costs associated with relocation or costs incurred for off-site warehousing and transportation," says Livesay. "Other benefits include 100% complete inventory control, reduction in product damage and shrinkage, increased production output and lower labor costs, especially with difficulties in finding a labor pool that wants to work." ●

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