FILLING a NICHE for CHALLENGING PROJECTS

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V. Paulius & Associates (VPA) delivers general contracting and construction management services as well as full architectural, engineering, and planning services. The New Jersey based firm has designed and constructed over $1 billion of customized storage, distribution and manufacturing facilities throughout the United States, Canada, and Eastern Europe for a wide range of clients including many Fortune 500 companies.

Written by Claire Suttles

VPA's in-house expertise and wide range of experience makes the company an ideal fit for challenging niche work. The team maintains a special focus on cold storage and processing facilities—both of which present out of the box challenges.

Cold storage facilities require special construction techniques to function properly. "You are basically building a giant refrigerator," explains Design Principal Raymond Paulius, AIA LEED AP. Only companies that understand the complex requirements of these projects can execute them successfully. "There are not many companies who do it; it is not a conventional building. There are a lot of issues regarding the building envelope from the subgrade all the way up to the roof."

For example, the structure must be vapor-tight and include an underground heating system to keep the subgrade warm so that the floor does not heave. The roof needs up to nine inches of insulation. "It could be 100 degrees outside and you've got minus ten [inside]. The temperature differential is tremendous and you need to make sure that envelope can withstand the vapor drive and thermal stresses. The vapor barrier and the thermal efficiency of the envelope are all critical elements of this design, so it is not just a simple building. There are a lot of factors that go into it."

The challenges around cold storage are only increasing as clients push for taller buildings and more closely spaced racking in order to store more products—particularly in the New York City area, where land is at a premium. "As a result, the buildings need to change," Raymond explains. "You ▸▸

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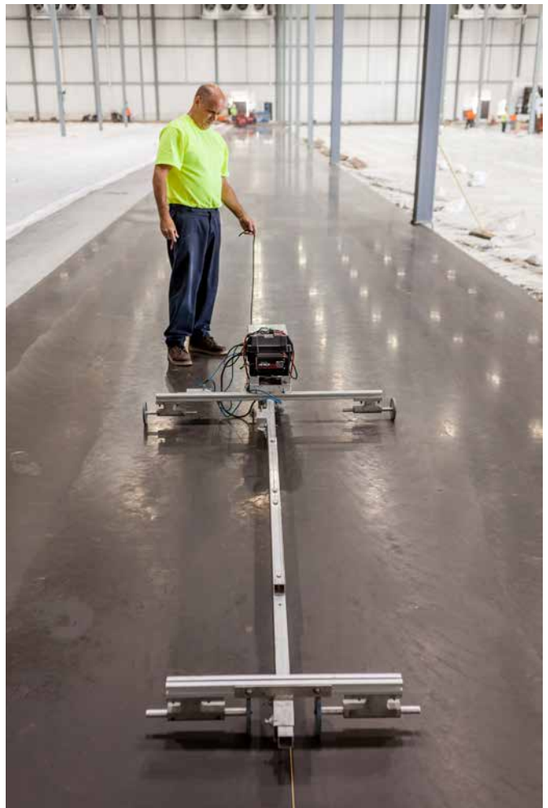

have to deal with the refrigeration system, lighting, fire protection and especially floor flatness, because the taller you get and the narrower the aisles are, the more difficult it is for the material handling equipment to access product."

One of VPA's recent cold storage jobs included all of these complications. The team designed and built a 50 foot freezer facility for a client at the Port Carteret Industrial Seaport Complex in Carteret, New Jersey. The FreezPak Logistics project included the construction of a 149,000 square foot very narrow aisle [VNA] freezer addition to an existing 200,000 square foot dry, cross-dock warehouse. Unlike most high-clearance facilities, the structure was not rack-supported. "Typically when they get so tall, the racks actually form the structural support for the building. But here, we elected to stay with a conventional steel frame superstructure for future flexibility."

The specifications for the defined-traffic floor called for an extraordinarily flat and level wheel-track tolerance. Traverse joints were undesirable because they would create ridges in the wheel paths of the wire-guided turret trucks. To make the design work, the team installed a nine-inch thick, 113,500 square foot super-flat, joint-free freezer floor slab consisting of reinforced (with both steel bars and fibers) 4,000 psi concrete on top of 6 inches of high-density extruded polystyrene insulation with a 10 mil polyethylene vapor barrier and an underfloor liquid glycol heating system. The amount of concrete used for the project (including parking aprons, lots, driveways, tilt-up panels and slabs-on-grade) totaled 7,900 cubic yards.

In addition to leading edge cold storage building techniques, the FreezPak Logistics project utilized sustainable building features and technologies. Most notably, the facility uses hydrogen fuel cells to power its forklifts, rather than traditional batteries. In addition to being sustainable, the power source is clean, convenient and space saving. With battery forklifts, the operator has to stop work and take the forklift to a separate charging room, which must be kept at room temperature and properly ventilated. The process is time consuming and tedious, lowering an operation's efficiency.

Hydrogen fuel cells, conversely, do not require a large charging room like traditional batteries. "They save space for critical storage areas, rather than wasting it on battery charging equipment." VPA provided a small area that will operate "almost like a gas pump" at a filling station. "It uses hydrogen supplied from a secure outdoor storage area to power the cell and it takes only minutes to fill up," Raymond explains. "As far as a sustainable technology that is being incorporated into a building, this was phenomenal."

Sterilization facilities are another challenging VPA specialty. Completed in 1990, the team's first project within the sector was to construct an irradiator that sterilized medical devices using gamma radiation from cobalt-60 'pencil rods'. "The irradiator shield was very unique. The walls were up to six feet thick to contain the radiation and a 23 foot deep stainless steel lined pool was required to store the gamma ray 'source' when not in use." VPA used tilt-up panels as forms to construct the unusual building.

VPA is currently constructing a second sterilization facility for the same client. "They approached us to build a new facility with a slightly different technology. They are using electron beam (E-Beam) irradiation rather than gamma irradiation. It is a more flexible and higher speed technology that uses high energy electrons rather than radioactive material."

The team will still build a thick shield around the radiation area, but will need to make some changes to the design. "The newer one is multi-story without a source pool and operates more like a 'microwave oven' that can be turned on and off," Mr. Paulius says of the new sterilization system. "With the other system you can't shut off the radioisotopes." The team is confident that they can handle the job's unique challenges. "We have done it for them before so there was a comfort level with us doing this." As with many of the company's projects, the 80,000 square foot building is being constructed using tilt-up concrete and utilizing sustainable building features such as a cool roof and tubular daylighting devices [TDDs].

The vertically integrated company is able to self perform the majority of its work, even on complex projects like this one. "We erected our own concrete plant on site so that we could produce our own concrete and be able to manage the pour ourselves for the shield. It was critical for us [that] we control that aspect of the project."

Originally launched as a one-man-show by Raymond's father, Vytautas "Victor" Paulius, VPA has made it to the second generation, remaining a close-knit, family business. "It is 50 years that we have been doing this," Raymond points out. "My brother and I have taken the reins of the company now and we are so grateful for what our father did and [that he] gave us this foundation to build on."

The new owners are prepared to evolve with the times but, at the same time, they understand the wisdom of the old mantra 'if it ain't broke, don't fix it.' "We are willing to learn… and we will be incorporating new technologies that come out in the future, but I think we are going to stick to these types of buildings that we are very comfortable with," Raymond predicts.

"We are very grateful that we are in this niche. If it leads us to other things, that is wonderful, but we plan to stick to what has brought this company great success." ■