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7,000 SPRINKLER HEAD INSTALLATION
AT MASON WAREHOUSE

ALSO IN THIS ISSUE: A NOVEL RENOVATION AT PINCKNEY'S NEW LIBRARY



JACKSON ASSOCIATES:

Handling the Heat for Over Three Decades

By Mary E. Kremposky, Associate Editor

Photos Courtesy of Jackson Associates, Inc.

As a savvy fire protection contractor, Jackson Associates, Inc. knows how to take the heat. In business for over 35 years, this Walled Lake contractor has just completed possibly one of the largest fire protection projects in Michigan at the time of its construction. Working smart from July 2013 to January 2014, Jackson Associates installed over 7,000 sprinkler heads as part of a complex fire protection project for the Dart Container Corporation's massive new warehouse.

Dart's acquisition of the Solo Cup Company spawned construction of the new 500,000-square-foot warehouse and a 200,000-square-foot office on Dart's campus headquarters located on the outskirts of Mason. A home-grown Michigan company and an international powerhouse, Dart is the inventor of the Styrofoam cup. Other Dart patents include the Sip Thru® Lid common on every take-out coffee cup in the world, and the Performer™ foam-hinged carry-out containers used in restaurants across the globe.

The storage capacity of the new warehouse will be mind-boggling. Take the small stack of foam cups in your jobsite trailer or office kitchen and multiply by a million. The new warehouse will store exposed foam cups and other products in a series of towering 25-foot-tall stacks. Proper fire protection is critical for exposed foam products, because they have the potential to burn hot and fast, said Jackson Associates President Rick Jackson.

Working as a subcontractor to Clark Construction Company, Lansing, Jackson Associates value engineered the design and then installed a high-density Early Suppression Fast Response (ESFR) system for the new Dart warehouse. This type of sprinkler system is designed to suppress a fast-burning, hot fire by dousing it with a higher volume of water dispensed at a higher rate and under greater pressure, said Jackson Vice President of Estimating and Sales Michael L. Reinhard. For Dart Container, Jackson Associates designed an ESFR system above and beyond even the standard ESFR system.

The system's "first-responders" - the sprinkler heads triggered to discharge first by the initial blast of heat - are capable of dispensing pressurized water at the rate and volume rivaling the fire hoses of a professional fire-fighting department. "Dart's first sprinkler will put out 333 gallons a minute as compared to a standard sprinkler's 20 to 35 gallons," said Jackson.

"That's as much as a fire hose, or close to ten times the amount of water from a typical sprinkler head."

As an FYI for those unfamiliar with fire protection, a fire's heat actually triggers only a select array of sprinkler heads. The heat melts metal soldering in the sprinkler head, causing it to open and dispense its life- and property-saving



Jackson Associates hoisted the 20-foot-long shaft of a vertical turbine fire pump through the roof opening of a small building that is perched above an on-site, underground water reservoir.

water. "It's not like a Hollywood movie where all the fire sprinklers go off all at once and flood the building," said Jackson. "Surprisingly, even some people in the construction business believe that, and they become worried about water damage. Typically fires are put out by two or three sprinklers, because only those that get hot will open and operate."

In operation since 1979, Jackson Associates brings a wealth of knowledge to the important task of fire protection. The firm was clearly the company equipped to handle the Dart warehouse, having designed and installed innumerable industrial fire protection projects for tier one and tier two automotive suppliers, such as Magna, Bosch, TRW and AGS. Jackson Associates has conducted work in Michigan, across the country and even internationally in the Caribbean, Mexico and Canada, the two latter locations involving projects for Ford Motor and GM, respectively.

The company also handles retail, office, and nursing home projects, but "our forte is industrial," said Jackson. "We are good at specialty jobs, meaning projects that take more thinking and more engineering. That is where we excel."

As part its overall excellence, the firm is one of the few companies in Michigan that handle both sprinkler protection and Special Hazards in-house. "Sprinkler systems are strictly water-based, while Special Hazards involve carbon dioxide, foam systems, dry chemical, clean agent gaseous systems and water mist," Jackson explains. Jackson, himself, is an example of excellence in the fire protection industry. He is on the Board of Directors for the state Society of Fire Protection Engineers, and also serves on several National Fire Protection Association committees that write the fire codes. Jackson also has assisted Oakland Technical University by designing a fire protection lab for teaching students, industrial workers, fire departments and fire protection designers.

A HIGH-TECH BUCKET BRIGADE

Jackson Associates' capabilities include in-house design, engineering and installation of all facets of fire protection, including both mechanical and electrical work. "We handle everything that has to do with fire protection, other than kitchen hood systems," said Jackson.

Jackson Associates brought its capabilities to Dart's massive warehouse. Peering into the open aperture of a sample sprinkler head in Jackson's Walled Lake office gives one a clear understanding of just how much more water can flow through an opening four times the size of your standard sprinkler head aperture. Not as readily apparent are the expanded water mains and the more powerful pump needed to service this ESFR system on steroids.

Jackson Associates increased the overall water supply and water pressure to feed this high-capacity ESFR system. In this case, super-sizing is good, and not only includes larger than average sprinkler heads, but also involved increasing the diameter of the water mains from the originally planned 10 inches to 12 inches. Jackson also installed a new diesel-driven, 3,000 gallon per minute vertical turbine fire pump. "The vertical fire pump has a 20-foot-long shaft that is placed down into a 270,000-gallon underground water reservoir on site," said Jackson's Greg Siegel, SFPE.

The new vertical turbine pump replaces an existing one that didn't generate sufficient water pressure. "The water starts out at 170 psi at the new pump versus a typical 80 psi pump," said Jackson. "Because you are not allowed to exceed 175 psi on the system, we also ordered a special pressure limiting controller. This pressure limited pump will maintain 170 psi from zero gallons per minute to 3,000 gallons per minute."

The pump is equipped with a companion 530-horsepower diesel engine. In the event of a power outage, storm or other interruption of electrical

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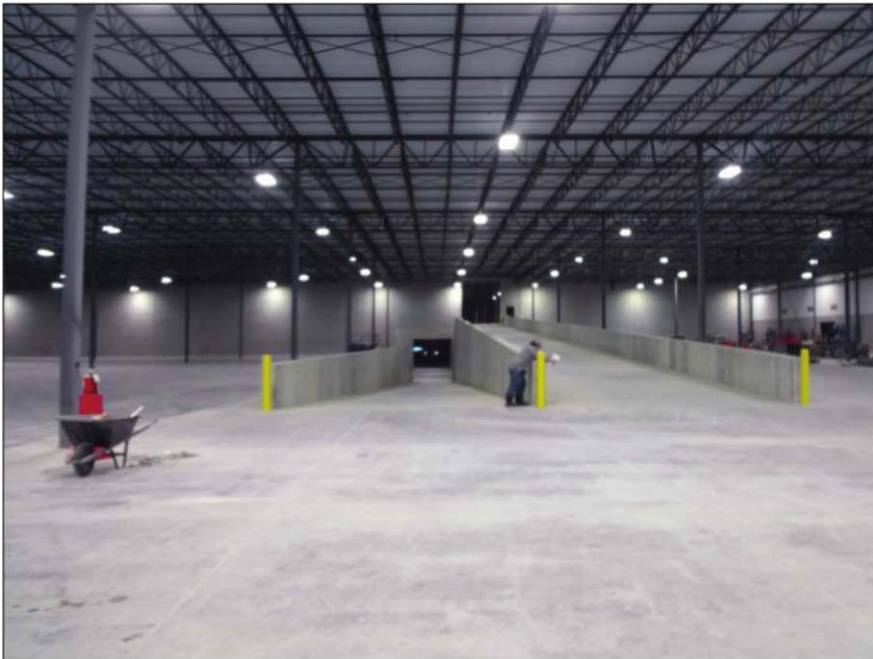
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Jackson Associates President Rick Jackson surveys the new 530-horsepower diesel engine that serves as a companion to the vertical turbine fire pump.



Jackson Associates installed over 7,000 sprinkler heads as part of a complex fire protection system for this new 500,000-square-foot warehouse on the outskirts of Mason.

service, the diesel-powered pump ensures continual fire protection capacity for warehouse staff and the building's valuable inventory, said Siegel. As part of installation, Jackson Associates removed and replaced the old diesel engine by squeezing a forklift into the small

building that is perched above this underground swimming pool or reservoir. After building a new pad and installing a more powerful diesel engine, Jackson Associates hoisted the 20-foot-long shaft of the pump into the building through a roof opening to complete this phase of the project.

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A TIGHT STEEL GRID

Larger than life piping – in both size and sheer amount – ruled the day within the warehouse interior. “The pipe size on this job is huge compared to a typical project,” said Siegel. “In about 98 percent of sprinkler jobs, the largest pipes are 6-inch and 8-inch. This project required quite a bit of 10-inch piping.”

For size, Jackson Associates had to fabricate some specialty hangers to support the larger piping, added Jackson. For sheer volume, Jackson Associates used savvy installation strategies to efficiently manage this massive undertaking where seemingly every component transcends the norm. “We went to the second floor and drilled holes in the metal deck and put

the hangers down through the deck before they poured the concrete,” said Jackson. “This saved us a great deal of time.”

The warehouse itself is atypical, being a two-story rather than the more usual single-story warehouse. Consequently, Jackson Associates had to install the sprinkler system in a tight grid of steel beams, closely spaced every 6-foot, three-inches on center to support the second floor.

By code, Jackson had to install sprinklers between each and every steel beam, dramatically increasing the number of sprinkler heads required in the warehouse. Adding to the challenge, the sprinkler heads, by code, had to be a minimum distance of 8 feet apart from neighboring sprinkler heads. “We staggered the sprinklers to meet this set distance,” said Jackson. Basically, every row of sprinkler heads is slightly offset in relation to neighboring rows.

“If the sprinklers are too close, the first one that goes off will spray water on the next, preventing that one from going off,” said Siegel in explaining the reasoning behind the placement distance. “Then only every other sprinkler head would open, because one head is cooling the other ones. This is why there are spacing limitations by code and from the insurance underwriters.”

Jackson Associates also crafted a creative piping design to avoid the steel obstructions and still keep the piping at the regulation maximum of 18 inches from the ceiling deck. Essentially, Jackson’s design ran branch lines and feeder mains around the obstructions on a single 45-degree diagonal rather than in two 90-degree pipe elbows. “Each of those elbows would result in tremendous friction loss as the water changes direction,” said Jackson.

Jackson Associates also used Building Information Modeling to coordinate its work with all the other trades. “We were given priority in the design of the warehouse, because our system just had no room for movement,” said Jackson. “That is unusual; we can typically move around the ductwork and other building obstructions easily. In this case, the sprinkler system had to be in very specific locations.”

With a crew of 15 employees supervised by Construction Vice President Ed Barry, Jackson Associates worked on site from July 2013 to the end of January 2014. Next on the agenda, Jackson Associates will bring their expertise to the four-story office building rising on the same campus as the warehouse.

A COLD MARKET BEGINS TO HEAT UP

The Dart project is only one example of an awakening marketplace. As for many other companies, “in the last four or five years, we saw things ‘go in the tank,’” said Jackson, “but we’ve been crazy-busy since last July.” Last summer, Jackson Associates finished a warehouse facility

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Dart Container Corporation's acquisition of the Solo Cup Company spawned construction of this massive new warehouse. Clark Construction Company is also constructing a new 200,000-square-foot corporate office headquarters for Dart Container on the same Mason campus.

for International Export in Howell, working with BRIVAR Construction. A Pittsfield Township project for Extang, a manufacturer of truck accessories, followed swiftly on the first project's heels. Jackson worked with JB Donaldson Company on this second project.

According to Jackson, one market trend turning up the heat in the fire protection market is the auto company requirement that the warehouse facilities of automotive suppliers must be fire sprinklered. "The auto suppliers frequently are audited by the automakers on fire protection design requirements," said Jackson. "We

recently ran into one project where the automotive manufacturer actually had people out to the supplier's facility to review its fire protection."

The automotive revival has unleashed a great deal of pent-up demand, meaning fire protection work must be done quickly and on short notice. "Definitely, the trend is compressed schedules and fast-track projects now," said Reinhard. In 2013, Jackson Associates was also kept busy meeting the so-called August deadline. Five years ago, the federal government mandated installation of fire sprinklers in all nursing homes,

giving senior care facilities until August 2013 to meet the requirement. "I am guessing that we've done more nursing homes than any other company in Michigan," said Jackson. "We have some large clients such as Ciena. It has actually been a boom for us for the last five years." Jackson Associates' work also includes apartment buildings, condominiums and retail, a market prone to "churn" as one store is replaced with another and the new layout requires a new fire protection design.

Beyond specific markets, another trend is the increasing propensity for cities and other

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FIRE PROTECTION

Jackson Associates crafted a creative piping design to avoid the steel obstructions and still keep the piping at the regulation maximum of 18 inches from the ceiling deck. Running on a diagonal, versus 90-degree pipe elbows, eliminated the tremendous friction loss that would result as the water changes direction in the elbow configuration.



government bodies to send fire protection design out for third-party review for the purpose of liability protection. This tendency can lengthen the amount of time needed for design approval, an important consideration for one of the very few trades that typically designs its own system. "Typically, fire protection is the only trade that does its own design," said Jackson. "Sometimes for larger companies, we have to submit to insurance companies for approval, and we must obtain water flow tests and design approval from cities. Contractors need to allow for that."

In terms of potential fires, more products in the plastic composite and non-metal family are becoming an increasing part of consumer products, leading sometimes to fast-moving, hot-burning fires if ignited in buildings without updated fire protection systems. "Our cars now have a great deal of foam rubber and plastic rather than metal and steel," said Jackson. "Many of the warehouse and industrial buildings were built in the '50, '60s and even into the '70s when steel in cars was more prevalent. If these buildings still have an old-style fire protection system but a plastic inventory, a fire can burn so intensely it can bring the building down."

Fortunately, Dart and other clients of Jackson Associates can erase that worry from their minds. With ESFR systems and up-to-date fire-fighting pumps, pipes and design approaches, Jackson Associates gives a building the ability to stop a blaze in its tracks, helping to shield people from danger and to protect valuable inventory from damage. ☘



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