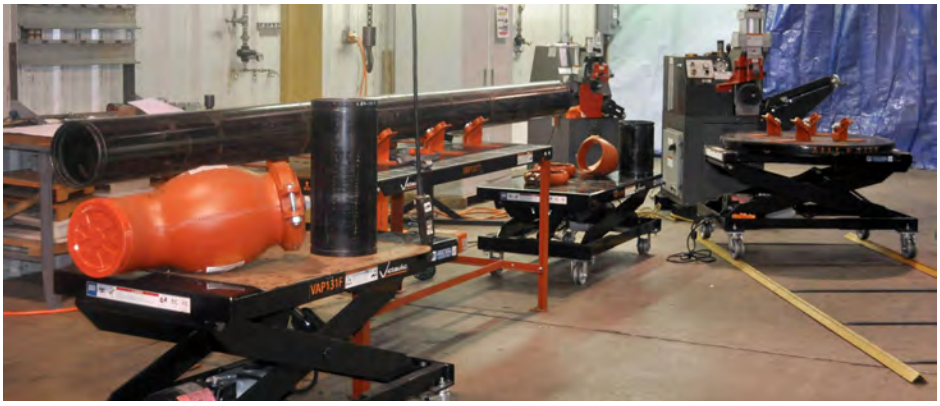
SMART SOLUTIONS

Helping contractors save money and enhance productivity

SUMMER 2012

Victaulic Prefab Strategies and Products Help Marelich Mechanical Speed Up Installation, Cut Costs



The lean layout of shop fabrication tooling by Victaulic helps Marelich Mechanical increase efficiencies, minimize risks, control project schedules, and decrease fatigue of shop workers.

Efficient prefabrication strategies and Victaulic products made it possible for California-based Marelich Mechanical to overcome a tight timeline and space constraints for a 43,000-square-foot data center project by speeding up the installation process and keeping costs down. Marelich Mechanical constructed all of the project's mechanical and plumbing systems in just three months.

Tight Schedules, Tight Spaces

The construction schedule included the installation of the chiller plant and a variable-flow split system on the mezzanine level to service bathroom and support areas. The piping systems were also required to have built-in redundancies, and all systems needed to be designed for future expansion. The equipment included five air-cooled chillers as well as 10 interior Data Aire units, with two on the mezzanine level. Other equipment included six cold/hot water pumps with variable frequency drives, 12 relief air fans with variable frequency drives, a split system, an outside condenser, two fan coil units, and two heat recovery pumps.

In addition to the tight timeline, the project's other largest challenge was the installation of 14-inch piping on the roof that would hang under and on top of the air-cooled chiller platform, which sat a mere five to six feet above the roof. To manage the process on a fast-track schedule, the contractors detailed the project's mechanical system during the prefabrication process and assembled the piping in

continued on page 16

Trautman & Shreve Slash Labor Time and Costs with Uponor Radiant Heating and Cooling Systems

Novel Prefab Method Cuts Installation Time Down to Two Days

With an impossible deadline to meet, Trautman & Shreve needed an ultra-efficient tool to meet the twin performance criteria of energy efficiency and cost control for the new Research Support Facility (RSF) at the National Renewable Energy Laboratory (NREL) in Golden, CO. So they prefabricated 42 miles of Uponor's cross-linked polyethylene (PEX-a) tubing

continued on page 20

A crew at Trautman & Shreve prefabricated 42 miles of Uponor radiant tubing into mats (shown here) customized for each zone of the Research Support Facility at the National Renewable Energy Laboratory, ultimately saving time and labor costs.

WHAT'S INSIDE

Manufacturer/Supplier Council
MCAA
Adding Value to Your Supply Chain

SMART SOLUTIONS

Helping contractors save money and enhance productivity

Smart Solutions showcases new technologies and promotes cost-saving and productivity-enhancing applications available from members of MCAA's Manufacturer/Supplier Council. *Smart Solutions* is published biannually for contractor members of MCAA and its subsidiaries.

All information in this newsletter was supplied by members of MCAA's Manufacturer/Supplier Council. MCAA is not responsible for any claims made regarding products or services mentioned.

Cynthia Buffington
Senior Executive Director

Jan Letow
Director, Membership

Adrienne Breedlove
Director, Publications

Dana Trevas
Consultant

1385 Piccard Drive
Rockville, MD 20850-4340
301-869-5800
Fax 301-869-3520
e-mail cbuffington@mcaa.org
www.mcaa.org

Manufacturer/Supplier Council
MCAA
Adding Value to Your Supply Chain

Tips, Tools, and Solutions Save More than Money

Several of our member suppliers provided us with valuable tips for this issue of Smart Solutions. CNA explains liability for non-owned vehicles, non-business use, and employees' use of cell phones while driving. Grinnell Mechanical Products describes how to get the most out of a supplier's technical services team. Lifting Gear Hire Corporation makes the case for renting over buying equipment to save time and money.

More contractors are seeing how prefabrication improves efficiency, such as Trautman & Shreve, which prefabricated Uponor's crosslinked polyethylene tubing into customized "radiant mats," dramatically cutting installation time. Efficient Victaulic prefabrication strategies and products also enabled Marelich Mechanical to speed up installation. Warwick Plumbing and Heating combined NIBCO products, prefabrication, and building information modeling to keep a major hospital expansion on track and on budget.

Suppliers are also coming up with new products to help contractors keep costs down, such as Jay R. Smith Mfg. Co.'s Quad Close Trap Seal Device, which helped Brandt minimize installation time. John W. Danforth Company employed Viega's MegaPress® carbon steel pipe joining system to save materials costs.

This issue demonstrates that cutting energy use and costs has become a priority for all types of projects, and new information technology is the tool that helps contractors achieve project goals. Straus Systems, for example, is expanding business by installing innovative Johnson Controls software that tracks energy use and spending. Limbach Company uses AirAdvice software and sensors to identify energy-saving fixes and drive business.

Soefker Services, LLC, is using Polar Technology software to manage their reclaim process for R-22 refrigerant. MMC Contractors overcame a museum's complex design and environmental challenges with Technical Sales International software and tools.

H&R Mechanical Contractors found the ideal solution for a building that needed a quiet, energy efficient HVAC system with Baltimore Aircoil Company's PT2 Cooling Towers. ACCO Engineered Systems solved a client's air conditioning problems with BITZER CSW Screw Compressors. By opting for Carrier's geothermal exchange system, Elliot-Lewis helped a historic landmark upgrade its heating and cooling plant and earn LEED® Platinum certification. With Greenheck products, an Iowa animal shelter cut its energy bills.

MCAA is happy to partner with suppliers that help you save—whether it's saving time, saving money, or saving the environment.

Frank Schaetzke
Chairman

Join me in welcoming our newest supplier partners:

- Graybar Electric Company, Inc.
- LEL International, Inc.
- Lifting Gear Hire Corporation
- Morrison Supply Company
- Reliance Worldwide Corporation
- Seton
- Service Automation, Inc.
- Uponor, Inc.

Elliot-Lewis Overcomes Challenges of Historical Renovation with Innovative Carrier Systems

Philadelphia National Landmark Earns LEED Platinum Certification

By opting for Carrier's geothermal exchange system, Elliot-Lewis helped The Friends Center in central Philadelphia upgrade its heating and cooling plant and earn LEED® Platinum certification, despite the challenges posed by an urban location and national landmark status. The Friends Center campus in central Philadelphia is owned and operated by The Religious Society of Friends, commonly known as the Quakers.

Friends of the Earth

Faced with the need to renovate the heating and cooling plant, the Friends decided to take this opportunity to eliminate their reliance on fossil fuels and secure the future comfort of worshippers, office inhabitants, and the children and staff of the onsite daycare center using 100-percent renewable energy. Environmental integrity, responsible use of resources, and the goal of carbon neutrality were driving forces in the Friends' decision-making process. In addition, their design solution had to take into account the campus's location in center-city Philadelphia.

The centerpiece of the $12.5 million Friends Center renovation is a Carrier geothermal exchange system designed to eliminate the property's reliance on fossil fuels for heating and cooling. Using deep wells installed directly below the Friends Center campus, the new system—which includes Carrier geothermal heat pumps, air handlers, air terminals, fan coil units, hot water coils, and digital controls—enabled the Friends to use geothermal technology despite their metropolitan location, in which the extensive surface water-loop of a typical geothermal system would have been impossible. In addition, the i-Vu® open protocol web-based building automation system was specified, enabling Friends Center staff to monitor and control every aspect of the geothermal system as well as other building functions.

The Friends Center campus includes three buildings: the Race Street Meetinghouse, a national historic landmark built in 1856, and two modern facilities that house office and conference space. The 54,000-square-foot facility is home to 19 nonprofit organizations and a daycare center. It is used by about 300 employees and 75 children each day, plus the congregation of the Central Philadelphia Monthly Meeting. In addition to the goals of eliminating the Center's dependence on nonrenewable resources and cutting greenhouse gas emissions to zero, the integrity of the Meetinghouse had to be preserved.

Digging Deep

Geothermal technology was identified as the key to the Friends Center's sustainable future. A traditional geothermal system would have required a well field larger than possible in the middle of Philadelphia. Instead, six deep wells—the first in Pennsylvania—were drilled for the Center's system. Each well is six inches in diameter and more than 1,500 feet deep. Water from the wells is used to supply the geothermal heat pumps, which provide heating and air conditioning for the Center. Carrier geothermal equipment was chosen to transform the latent energy of the well water into comfort for the inhabitants of the Center.

Jonathan Salemo, project manager for Elliott-Lewis, said, "We chose Carrier because they provided heat pumps and controls that met our requirements in terms of efficiency, capacity, features, and cost. I was very impressed with the operation of the Carrier water-to-water heat pumps and with their ability to operate as both a chiller and a boiler, allowing the system to provide simultaneous heating and cooling." This ability enables Friends Center staff to manage the comfort of the highly diverse areas of the facility using one integrated system that draws solely on renewable energy.

Minimizing Waste

To avoid wastefully replacing equipment that was still in good working order, the new system was integrated into some existing components. The

continued on page 12

Elliot-Lewis helped the historic Friends Center in central Philadelphia upgrade its heating and cooling plant and earn LEED Platinum certification with a Carrier geothermal system, which uses the first deep (1,500 feet) wells drilled in Pennsylvania.

Soefker Services Ensures Supply, Cuts Costs of Refrigerant with Polar Technology's TrakRef Software

Soefker Services, LLC, of Memphis, TN, has taken a proactive approach to managing the diminishing supply and rising costs of R-22 refrigerant by using Polar Technology's TrakRef™ software to manage their reclaim process and get the recovered R-22 back for future use. For years, R-22 has been the refrigerant of choice for commercial and residential systems. With so much demand, production of new R-22 remained strong even as pending U.S. Environmental Protection Agency (EPA) regulations sought to reduce use of the refrigerant because of its high potential to contribute to global warming.

Recently, regulations have been put in place to reduce production and importation of R-22. These reductions signal that the use of R-22 is being phased out, so supply will continue to decrease and prices will continue to climb. The industry now faces the question of how to ensure adequate supply of R-22 for existing systems in the coming years.

Reclaimed R-22 Makes Up the Difference

With a limited supply of new R-22 available, reclaimed R-22 will have to make up the difference. By switching to a reclaim program that allows them to get their recovered R-22 back at virgin specifications, contractors like Soefker Services have found a way to manage margins, ensure their supply for future work, and be responsible stewards of the environment.

Traditionally, reclaim programs have been transaction-based agreements in which the recovered refrigerant is sold by the service contractor to a distributor or reclaimer. By selling the refrigerant, the contractor loses possession and cannot get that refrigerant back. The contractor must buy back the reclaimed product or replace it with newly produced refrigerant. The reclaimer owns the gas and can recycle it back to virgin specifications to re-sell it in the marketplace.

With TrakRef, Soefker Services is managing its own reclaim process and recovering R-22. "We have been very pleased with the cost savings on the refrigerant and ease of use of the program," says Steve Harvey, general manager of Soefker Services. "However, and equally important, we are now able to manage and protect our supplies of R-22."

With TrakRef, "we are now able to manage and protect our supplies of R-22."

—Steve Harvey, Soefker Services

Participating in a Greener America

As an MSCA GreenSTAR-certified contractor, Soefker Services works hard to promote sustainability. "It's an opportunity for us to re-use and recycle, and it allows us and our customers to participate in a greener America," said Harvey. Using recycled refrigerant to service HVAC systems means that less new material has to be produced. It can also be a differentiator in the service market for system owners with environmental stewardship programs.

TrakRef provides transparency throughout the reclaim process. From contractor to distributor to Polar Technology, everyone who needs access to the information has it. Controls are built in to ensure the privacy of proprietary information so that the administrator can allow access as needed to their service technicians. Because it's mobile-ready, the R-22 "bank" numbers can be seen when needed and where needed—at the office, on the road, or at the counter.

Simplifying Refrigerant Management

The TrakRef software family also gives contractors the option to control inventory, manage work orders, and maintain aggregate system records for their customers. Traditional record-keeping techniques—such as keeping a paper trail through purchase orders and sales orders or logging information in a computer program—has been a cumbersome process. TrakRef simplifies and organizes the information. Field technicians can enter their work-order information through a laptop or mobile device, view specifications about the systems they are working on, and provide relevant information to their customers.

For system owners, TrakRef is a hub of information, keeping records on system maintenance events, refrigerant usage, and leak-rate calculations. Many large system owners prefer that their service contractor maintain the system records for them, which creates another revenue stream and added value for the contractor.

The regulatory environment continues to get tougher on everyone who uses or handles refrigerants, from the system owner to the contractor to the reclaim company. Each version of the TrakRef software is designed with compliance in mind, meeting or exceeding the needs for EPA and California's AB-32 reporting demands.

Given the supply limitations on R-22, the increasing regulations around refrigerants, and the value of inventory such as R-22, refrigerant management is now a key part of business for successful mechanical contractors and service groups. Soefker Services' incorporation of TrakRef provides them the transparency they need for compliance while participating in a refrigerant banking program.

For more information, visit www.polarresponsiblerecovery.com.

Brandt Trims Installation Time with Jay R. Smith Mfg. Co. Quad Close Trap Seal Device

When Brandt needed a way to prevent sewer gas odors in the Forest Park Medical Center in Frisco, TX, they turned to the Quad Close Trap Seal Device manufactured by Jay R. Smith Mfg. Co.® The time saved installing the Quad Close when compared with trap primers "really makes a big difference," said Keith Rosson, general superintendent at Brandt.

The Frisco campus of the Forest Park Medical Center is the second in what will eventually be a network of campuses located across the state. The facility consists of a four-story, 137,000-square-foot hospital, a three-story medical office building, and a five-story parking garage. The hospital is now up and running, and the rest of the facility will be complete soon.

Construction on the project was design-build. Brandt met with architects and engineers to speed up the process of developing the design and construction plan, with the ultimate goal of satisfying the building owner. For design-build projects, Brandt regularly develops a best-practices schedule that describes the products they would like to use to improve efficiency. They review this schedule with the city to get approval for products. For this project, the Quad Close was approved for and used in patient rooms as well as for infrequently used areas.

The Quad Close Trap Seal Device is designed to be installed in the drain body outlet, inside the throat of the strainer, or inside the pipe. It is made to handle a wide range of pipe and internal body diameters. It will fit inside two-inch, three-inch, and four-inch PVC and cast iron pipe. The three-and-one-half-inch model is made to fit inside a strainer throat with an inside diameter of three-and-one-half inches.

Brandt selected the Quad Close Trap Seal Device manufactured by Jay R. Smith Mfg. Co. for the Frisco, TX, campus of the Forest Park Medical Center because the ease of installation saves time and money.

The Quad Close stays open when water is flowing into the floor drain and closes when the water stops flowing. When closed, the Quad Close prevents the emission of sewer gas, minimizes the evaporation of water in the trap, and helps prevent backup into a building.

Rosson observed that the Quad Close has saved them a significant amount of time. "We have to install trap primers in some jobs, but it really makes a big difference when we can use trap seals like the Quad Close. Trap primers just take so much more time to install, especially in multi-story buildings," he said.

Rosson was also impressed with the ease of use of the product for retrofit. "They are just really easy to use in multi-floor retrofit installations. It has less impact to the people in the building because you do not have to run the piping for trap primers or turn off the domestic water supply to tie them in."

The effectiveness of the Quad Close allows peace of mind for the contractor and building owner. Rosson noted, "We have used the Quad Close in several different scenarios and locations in the past and have had zero problems. The last thing you want to happen is to get a call from a building owner complaining about sewer smells in the building. We can use the Quad Close and not have to worry about that."

For more information on Quad Close Trap Seal Devices or to contact your local representative, visit www.jrsmith.com.

Thanks to Warwick and NIBCO, Hospital Expansion Doesn't Skip a Beat

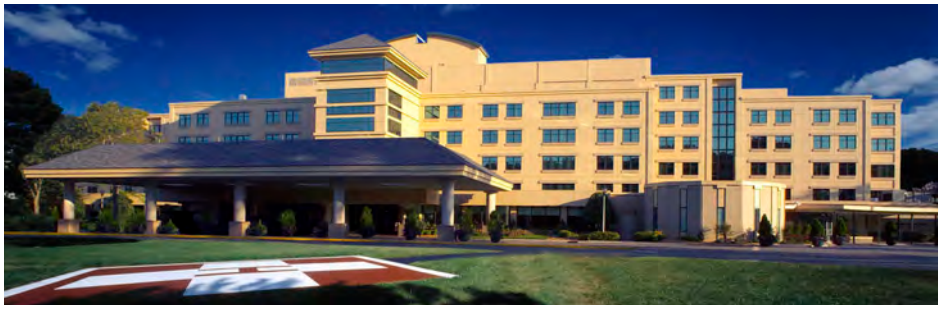
A major expansion of the 1960s-era Riverside Regional Medical Center in Newport News, VA, is on track and on budget, thanks in part to Warwick Plumbing and Heating, which relied on NIBCO products, prefabrication, and building information modeling (BIM) to keep the project running smoothly. Because lives are at stake, maintaining uninterrupted service during construction in the hospital is crucial.

To accommodate the growth and changing needs of patient care, the hospital is transforming with a new five-story, 251,380-square-foot addition that includes a new entrance and reception area, pharmacy, 13 surgery suites, two gastrointestinal procedure rooms, pre-op and post-op areas, 72 patient rooms (and shell space for two more floors of patient rooms), and expanded parking areas. Several stages of the expansion have been completed, and considerable attention has been given to making a smooth transition despite the busy patient load.

Powering Up Smoothly

To supply power to the addition, Warwick helped expand Riverside's central energy plant, which provides steam, chilled water, and generator capacity. Riverside doubled the size of its existing central energy plant into a two-story, 17,500-square-foot building. The HVAC system consists of a new 40,000-gallon fuel oil tank, two 1,300-ton chillers, a steam boiler, new generators, and additional medical gas lines.

Warwick used BIM and prefabrication to enhance productivity and keep costs down. For example, with BIM, Warwick's technicians were able to route piping and duct before the walls and ceilings were in place. It was also used for prefabrication of the systems in a controlled environment at Warwick. With prefabrication, the process was streamlined to ensure that there were few scheduled shutdowns and a smooth transition. A utility bridge supported by a structural steel truss system extends across the roof of the existing structure to help provide uninterrupted service from the new construction.



Warwick Plumbing and Heating used NIBCO products, prefabrication, and BIM to maintain uninterrupted service during construction of a new addition to the Riverside Regional Medical Center in Newport News, VA, keeping the project on track and on budget.

Within a 72-hour time frame during the winter of 2011, the chilled water system had to be rerouted to the separator with 12-inch and 18-inch pipes. Prefabrication of the system for the chillers reduced the number of welds required from 30 or 40 down to five or six. During the transition from the old system to the new system, seven 12-inch and 18-inch butterfly valves in the system were used to reverse the flow, rerouting the water to make a complete primary loop instead of the primary header. According to Nathan Berryman, project manager for Warwick Plumbing and Heating, the use of the butterfly valves allowed the water to flow through the bypass with no need for a special shutdown.

The project involved more than 140 NIBCO butterfly, gate, ball, and check valves. Of those, 76 were butterfly valves, including 14-inch butterfly valves with sprocket rim and chain to provide remote operation on chilled water supply and return lines. "Because of NIBCO product reliability, it's easy to get submittals approved," said Bob Spencer, project manager at Warwick Heating and Plumbing. "That's something that helps expedite the process. Plus, it gives us peace of mind."

The NIBCO 14-inch LD-2000 lug-type butterfly valve with sprocket rim and chain provides remote operation on chilled water supply and return lines. Warwick specified NIBCO products for the Riverside Medical Center expansion because of NIBCO's product reliability, which has helped keep the project on time and within budget.

Warwick chose NIBCO's 8-inch LD-2000 lug-type butterfly valve with sprocket rim and chain because it allowed the water to flow through the bypass with no need for a special shutdown—a top priority for the hospital expansion project.

Expanding Capacity

The three-year-long, $107-million construction project is scheduled for completion in January 2013. When

continued on next page

Danforth Cuts Material, Labor Costs Using Viega MegaPress System for Black Pipe

Using black iron pipe for Buffalo General Hospital's expansion project saved John W. Danforth Company material costs, while the new Viega MegaPress® carbon steel pipe joining system helped them make clean, consistent black iron pipe connections. Rich Mueller, Danforth's project manager, said Danforth saved money in two different ways by installing Viega MegaPress. "First, we saved on the cost of the black pipe compared to the copper. And second, we saved on labor by using pressing instead of threading the black pipe."

Buffalo General Hospital is a 501-bed, acute care medical center located in downtown Buffalo, NY. It recently expanded its medical imaging capabilities, adding MRI and CAT scan equipment in the basement level of its facility. The hospital selected Danforth to handle the piping for its new heating and chilled water system. Danforth installed 200 feet of two-inch black iron pipe and around 20 reheat coils.

Viega MegaPress Saves Time

Scott Metro, Danforth's general foreman, explained that the project involved transporting steam to a set of heat exchangers to make hot water. The installers made the hot water connection off the heat exchangers and ran it to all the components of the system, such as the pumps and an air separator.

"Normally, it would have been an all-copper job using pipe that was two inches and under," Metro said. "The Viega rep introduced us to Viega MegaPress, and we really liked it. The materials savings helped us out enormously."

Viega MegaPress systems are the only carbon steel press fittings for use in both water and gas applications. Available in sizes from one half to two inches, Viega MegaPress allows installers to make secure, consistent black iron pipe connections in less than seven seconds.

"The speed aspect of Viega MegaPress over threading is definitely a plus," Metro said. "A while ago, we did a shutdown at a different hospital where we had to thread one-and-one-half-inch black pipe that was up in the air. We would have sped up the process if we could have pressed it. The job was spread out over two weekends. If we had used the Viega MegaPress system, we probably could have finished everything in just one weekend."

Clean Process, Easy Installation

As much time as Danforth saved by installing Viega MegaPress, Metro believes that the most convincing reason to choose the new carbon steel fitting system is cleanliness.

"You can't be clean enough when working in a hospital," Metro said. "Pressing eliminates the oil mess, because there's no need to thread the pipe. With threading, oil can drip onto the floors when you're carrying the pipe. You have to stuff rags in the pipe ends to keep the oil inside. There's no need for that with Viega MegaPress."

Safety and ease of installation were two more reasons Danforth chose the Viega MegaPress system. Some of the pipes were located 16 feet above the floor, making them difficult to reach.

"There were multiple layers of pipe up there," Metro said. "When you're up that high with pipe wrenches, you tend to work a bit slower. Some fitters aren't physically built to pull on those big wrenches. With pressing, it doesn't matter how strong you are. You just pull the trigger on the pressing tool and the connection is done."

For Mueller, the biggest benefit of installing Viega MegaPress is the ability to connect black iron pipe without draining the system completely.

"In the past, we'd have to try to solder the pipe with a stream of water coming through it," Mueller said. "With pressing, after you make your cut, you just slide an open Viega valve on and let the water flow into a garbage can. You make the connection with the pressing tool and shut off the valve. Then you can finish the rest of the work."

The flameless aspect of Viega press technology also made a huge difference to Mueller and his team, because Viega MegaPress can be joined without flame. "The tool does the same exact connection for every joint," Mueller said. "You don't have to worry about over-tightening and cracking the fittings or cutting a thread too deep or too shallow."

For more information, visit www.viega.net.

> *"First, we saved on the cost of the black pipe compared to the copper. And second, we saved on labor by using [the Viega MegaPress] instead of threading the black pipe."*
>
> — Rich Mueller, project manager, John W. Danforth Company

NIBCO

continued from previous page

completed, the Virginia Peninsula community will have access to one of the most comprehensive medical facilities combining advanced medical technology with modern facility design. All with a focus on uninterrupted patient care.

For more information, visit www.NIBCO.com, or contact Sally Boyer, manager, marketing communications, at boyers@nibco.com.

Company Liability for Non-Owned Vehicles, Non-Business Use, and Cell Phones

Legal actions sometimes cast a wide net, drawing an employer into a claim by alleging that the use of a vehicle in the case was for business purposes. Business use can be alleged as the result of something as simple as storing some small tools in the automobile, taking the mail to the post office, or being on a cell phone call with the office.

While you cannot control this exposure totally in any operating business, you can attempt to manage the risk at an acceptable level. One of the foundations of risk management is that you cannot manage a risk until you have identified it. To that end, here are some tips to assist you in identifying and looking at options for managing the risk. Any of the following situations may create non-owned auto liability exposure:

- Salespeople who drive their own vehicles on company business
- An employee who goes to the bank for the company on his way home
- An employee who buys supplies or runs an errand for the company
- An employee who is asked by management to do company-related activity that requires use of the employee's vehicle
- An employee who is reimbursed for driving his own vehicle to attend business meetings, visit customers, or pick up supplies or parts
- Volunteers who use their own vehicles when working for your organization

The best control is not to allow anyone to use a personal vehicle for company business. If this is not possible, consider taking the following steps:

- Review the individual's motor vehicle record before he or she drives. Anyone with a driving record that does not meet acceptable criteria should not be allowed to drive a vehicle on behalf of the company.
- Annually require proof of liability insurance.
- Regularly inspect the vehicle used for company business.

If someone driving his own vehicle for company business has an at-fault accident, the company may have to pay for damages that exceed the limits of the vehicle owner's auto liability coverage. Further, some personal auto insurance may exclude business use so that the company's policy may be at risk for the entire claim. CNA recommends that employee drivers carry auto liability insurance with at least $300,000 combined single limits. (The employer should keep proof of this insurance on file.) Also, recommend the following to individual employees:

- Regularly inspect the vehicle used for company business.
- Keep in mind that the condition and appearance of the vehicle is a reflection on the company.
- Verify that the vehicle is maintained and in safe condition to be driven on the road.

Non-Business Use of Vehicles

Unassigned personal use of a company vehicle may occur when an employee asks to borrow or use a company vehicle. For example, the employee is moving something and wants to use the company pickup or van. Should you let the employee use the company vehicle? No. If the employee needs to use a truck for moving, the employee should go to a car or truck rental company.

Cell Phones

More than 80 percent of the nation's 94 million cell phone owners use them while driving (at least sometimes). It is worth noting that:

- many states have legislation to regulate cell phone use while driving, and
- cell phone records can be subpoenaed to prove the employee was on the phone when an accident occurred.

In the past few years, cell phone usage has been an issue in several lawsuits, and employers may be held responsible if a worker causes an accident while talking on the phone.

So why aren't employers more concerned about cell phone usage in vehicles? Interestingly, the distraction problem may not exist as much with two-way radios, which are as much a staple of contractors as cell phones, because those calls are usually much shorter. However, some states that ban handheld phones may consider two-way radios in the same manner, so you should check your state's regulations on the use of two-way radios.

While there is no guaranteed defense against liability, developing appropriate policies, training, and enforcement mechanisms, such as the following, can help limit potential liability:

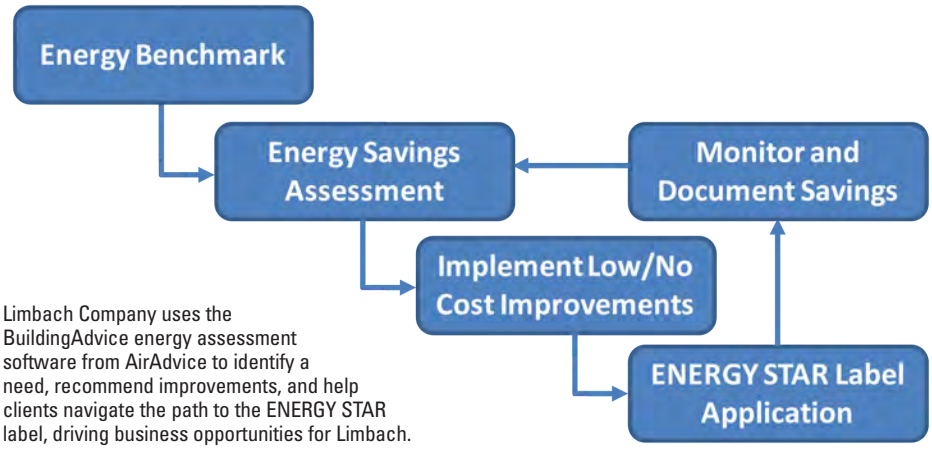
- Prohibit employees from using cell phones while driving on company time.
- Adopt cell phone safety guidelines, and focus on training and enforcement.
- Direct employees to comply with all state and local laws governing cell phone use.
- Require employees to pull over to the side of the road to take phone calls.
- Prohibit cell phone use in adverse weather or difficult traffic conditions.
- Prohibit texting, reading, or writing while operating the vehicle.

Each company should determine whether the benefit of employee cell phone use outweighs the risk.

To protect themselves, companies should consider establishing a written policy restricting any use of a cell phone incorporating some or all of the above suggestions and ensuring that employees read and sign the written policy. (MCAA's *Distracted Driving Reduction and Prevention Guide*

continued on page 19

Limbach Company Develops New Partnerships Using AirAdvice Energy Services



Limbach Company uses the BuildingAdvice energy assessment software from AirAdvice to identify a need, recommend improvements, and help clients navigate the path to the ENERGY STAR label, driving business opportunities for Limbach.

Limbach Company uses BuildingAdvice software and sensors to identify energy-saving fixes, helping a Columbus, OH, property management group ensure that its buildings meet ENERGY STAR requirements. That success was the "in" that Limbach needed to secure more opportunities for energy services that may lead to preventive maintenance and retrofit contracts.

Limbach purchased the BuildingAdvice energy services delivery platform from AirAdvice, Inc., in 2011 because, "we wanted to find a way to combine our energy solutions with our proactive maintenance programs," explained Lisa Schultz, Limbach's service sales manager for the Ohio Branch. "BuildingAdvice became the solution for our service team. They offered a simple approach along with technical and sales resources," she said.

Client Need Spurs Assessment

Paradigm Properties, a real estate services company managing a 19-building, 1.7-million-square-foot portfolio in the Columbus area, found they needed a better understanding of their buildings' energy use. A major tenant, who occupied one third of an entire building, notified Paradigm that they would require that the building achieve the ENERGY STAR label as a condition of their January 2012 lease renewal.

Paradigm "really had no idea where their buildings were, from an energy perspective," said Steve Bauman, a Limbach account representative. Limbach offered to provide an ENERGY STAR benchmark assessment for the building currently occupied by the tenant and two other nearby buildings to see how the buildings rated.

The building occupied by the tenant rated a 76, just above the level required (75) to achieve the ENERGY STAR label. Even though the other two buildings scored significantly lower and offered more immediate opportunity for operating cost reductions by reducing energy waste, the immediate focus was securing the tenant lease renewal. "Tenant renewal is a great motivator to take action," said Bauman.

Creating an Action Plan

Limbach and Paradigm developed an action plan to achieve the ENERGY STAR label for the higher performing building, following the energy services delivery model outlined in the BuildingAdvice sales training. After the energy benchmark, the next step in the process was to conduct an energy savings assessment to identify any additional energy savings opportunities.

The assessment was important because the building's energy performance was just over the minimum requirement. Any slippage in performance and the building would be at risk for not meeting the minimum requirement.

Limbach conducted the energy savings assessment using the BuildingAdvice wireless sensors and web-based software. They identified a number of low- and no-cost improvements that could be immediately implemented by in-house maintenance staff.

Once the recommendations were implemented, Limbach initiated the process to gain the ENERGY STAR label for the building. Following the award of the ENERGY STAR label in early 2012, the tenant signed a seven-year lease. As of May 2012, the building's ENERGY STAR rating had already improved to 86, and the annual energy cost had dropped by nearly $25,000, a reduction of 17 percent.

Results Drive Business

Through this process, Limbach demonstrated the impact that an energy services approach can have on the customer relationship. "Because we were able to solve a business issue for them in a way that none of our competitors could, we were able to move from being one of many contractors fighting for a preventive maintenance contract to the role of a trusted advisor," said Bauman.

continued on page 19

Using BuildingAdvice energy services shows "how bringing a solution not typically thought of as being part of a mechanical contractor's domain can drive a significant amount of revenue back into our core service and retrofit business."

— Jay Sharp, vice president of Limbach Facility Services

MMC Contractors Bridges the Gap Between Design and Fabrication With TSI Tools

Automated Systems Save 300 Percent in Layout Time

For the Crystal Bridges Museum of American Art, MMC Contractors met the demands posed by a complex design and environmental challenges by using tools from Technical Sales International (TSI). With Autodesk® Fabrication CADmep™ 2013 software, MMC Contractors was able to take the 2D drawings and detail the angles, hangers, couplings and air handling units in a fully-detailed building information modeling (BIM) 3D plan, then fabricate the entirety of the museum's mechanical systems.

In addition, MMC Contractors used the Trimble Total Station with TSI's JOB-Site Solutions™ for laying out all of the hangers, points, fittings, and equipment related to piping. MMC Contractors estimated that the automated system saved them over 300 percent in layout time.

MMC Contractors provided full mechanical HVAC construction and installation of the mechanical, electrical, and plumbing (MEP) systems that would simultaneously preserve the artwork, keep visitors comfortable, and limit the museum's impact on the surrounding environment. Because artwork is fragile, humidity, temperature, and light must be maintained at optimal levels to preserve it.

Ambitious Design

Nestled in a forest ravine in the middle of the Ozark Mountains in Bentonville, AK, the Crystal Bridges Museum of American Art takes its name from a nearby natural spring, and the concrete, glass-and-wood building is one of the most ambitious museum buildings in recent years. MMC Contractors' Kansas City office was responsible for the entire mechanical package—from creating the 3D model to fabrication and installation for the 201,000-square-foot state-of-the-art museum.

MMC Contractors relied on TSI's Autodesk and JOB-Site Solution software to model, prefabricate, and install HVAC and MEP systems for the Crystal Bridge Museum, meeting the complex demands of the design and saving time, labor, and money in the process.

The Crystal Bridges Museum campus is nestled between two hills across 120 acres, and the complex structure traverses a stream within the wild landscape. Two opposing galleries serve to both dam and bridge the stream, creating two ponds from the natural flow of water. The entirety of the museum frames, traverses, and dams those two creek-fed ponds. Additional structures are lodged into the steeply sloping terrain on either side and comprise galleries, classrooms, a library, curatorial and administrative offices, and a 250-seat auditorium.

Spatial Constraints

To complicate matters, the Crystal Bridges Museum architecture harmonizes with the art collection it was designed to house; therefore, the MEP systems had to fit within the design seamlessly. Additionally, part of the aesthetic beauty of the museum is its natural surroundings, which inspired the design. Eight pavilions follow the ravine's contours, and the rooms are shaped to fit into the steep slopes of the ravine setting.

"With the spatial constraints, trying to fit everything in was extraordinary because of the shapes of the buildings. Mechanical fittings aren't made for this type of building," said Dennis Miller, project manager for MMC Contractors. But with TSI software, MMC Contractors was able to model everything to the most minute detail, create spool sheets, and fabricate—all from the same model—giving confidence and comfort in the field that all of the pieces were accurate and would fit. Miller noted, "In one area, we had to lower the ceiling elevation by 18 inches, and all fabrication was done precisely using the software—everything fit just right."

The polished architectural concrete walls, with varying radii and curvy roof lines, made it cramped, difficult, and delicate work to install piping and air systems. MMC Contractors coordinated the challenge of detailing and installing an air supply system to complement the lamella ceiling structure, made up of three-quarter-inch wood on three-and-one-half-inch spacing, providing thermal comfort without compromising the architecture of the space. The piping and HVAC systems have very exacting requirements. The HVAC is designed to be quiet, so duct work and grilles are oversized to reduce air velocity, thereby reducing

noise. Even the return air ducts are oversized. Because of the unique architecture and structure, conventional layout methods would not work. So MCC Contractors used the Trimble unit to layout piping, housekeeping pads, and hangers.

Prefabrication for a Remote Location

Not only were the MEP installation spaces tight inside the buildings, the jobsite was further constrained by its remote location. The terrain was steep and rough, with a 120-foot drop in elevation from the construction trailers to the jobsite half a mile away. The diverted streambed in the middle of the construction site left little room to maneuver. MMC Contractors' just-in-time delivery of prefabricated components provided the solution.

One of the benefits of prefabrication for construction assemblies cited by MMC Contractors is greater control over the process and schedule. Prefabrication could be planned and scheduled with precision in the shop environment without concern for delays caused by bad weather or uncertain labor supply. Other benefits of prefabricating the MEP components were especially important in the confines of the limited site space at Crystal Bridges:

- Labor savings
- Waste reduction
- Reduced manpower on jobs
- Improved ability to meet job schedules
- Fewer jobsite parking issues
- Reduced material handling costs
- Improved safety

Confluence of Running Water and Precious Artworks

Another serious challenge was the handling of storm water. Because the creek runs under the museum buildings, during construction the eponymous Crystal Creek was temporarily routed through a 36-inch low-flow pipe that could only handle about one inch of rainfall in four hours. Larger amounts would overflow and wash through the jobsite, requiring a close watch on the weather. Consequently, a pre-rain checklist was rigorously followed. Leaving equipment on the jobsite when a storm was predicted was not an option.

Two buildings of the Crystal Bridges Museum are located directly over the creek. In fact, the upper pond discharges straight toward the building, then disappears under it. To protect the building and its multimillion dollar contents from flooding, the project included a complex flood control system, including weirs under the buildings to protect against a 500-year flood.

Time, Cost, and Labor Savings

MMC Contractors developed efficient means and methods for construction to improve quality, minimize schedules, and lower costs—even in rugged, remote sites like the Ozark Mountains. Modular fabrication of entire components, such as restrooms, was completed at their 22,000-square-foot fabrication shop in Kansas City, MO. MMC Contractors also prefabricated the major mechanical equipment offsite on skids, which were then installed as single components instead of individual pieces. Prefabricated piping assemblies were then brought in and connected to equipment skids so that the Crystal Bridges mechanical rooms could be installed and functional much more safely and quickly.

For larger equipment that could not be skid-mounted, such as air handling units, chillers, and boilers, MMC

The unique architecture and structure of the Crystal Bridge Museum meant that conventional layout methods would not work, so MCC Contractors used the Trimble Total Station with TSI's JOB-Site Solutions software for layout, saving an estimated 300 percent in layout time.

Contractors used equipment piping connections that were prefabricated in their onsite shops to expedite the installation. With this project, MMC Contractors found that prefabrication clearly reduces labor costs, increases quality, reduces waste, and improves safety of the work force.

Proven Solutions

For sleeves, hangers, inserts, and equipment pad layout, MMC Contractors used the Total Station unit to triangulate orientation within the building. With TSI's JOB-Site Solution software, MMC Contractors simultaneously matched the points to the BIM model, which enabled installation accuracy to within one-sixteenth of an inch without ever using a tape measure. With all the angles and arcs and the limited space for the MEP installation, traditional layout methods would not have worked.

continued on page 12

The water features of Crystal Bridge Museum posed challenges for design, construction, and installation that MMC Contractors minimized with rigorous planning and prefabrication using TSI software.

12 Reasons to Rent vs. Buy Equipment

The question often arises within an organization, "For our next project, should we rent or should we buy equipment?" Renting equipment from companies like Lifting Gear Hire Corporation (LGH) comes with effective cost- and time-saving benefits. Keep these 12 reasons to rent in mind when organizing your next project.

Project Control

1. **Reduced after-job disposal.** What do you do with purchased equipment that is not needed after a job is complete? Do you keep it or sell it? What if it is broken and needs repair?
2. **No obsolete equipment.** When buying, you lock yourself into a long-term commitment. When you rent, you get the equipment you need only for as long as you need it.
3. **Accurate cost control.** Renting equipment allows you to determine costs easily and accurately for your project.

Productivity on the Job

4. **Right tool for the job.** By renting equipment, you can rent the exact piece and quantity needed.
5. **Well-maintained and ready to use.** Equipment operating conditions can be severe, so equipment must be tough to survive and perform well. Renting equipment from reputable outlets like LGH guarantees you'll receive equipment that is durable, certified, and ready for safe use.
6. **No breakdown problems.** Equipment comes serviced and ready to use. LGH carries branded equipment tested to ANSI standards.

Inventory Management

7. **Minimal equipment required.** Get the exact equipment needed for the job. Eliminate possible problems or extra expenses that may come from managing equipment inventory.
8. **No storage costs.** Renting equipment eliminates the need to store equipment after job completion. Rented equipment is delivered when and where you need it and retrieved immediately after use.
9. **Reduced maintenance expense.** Renting equipment eliminates the need for service and certification because it is taken care of for you.

Corporate Benefits

10. **Reduced property tax.** Did you know that property taxes are reduced on rented equipment? Renting your next set of equipment can help reduce expenses.
11. **Increased borrowing capacity.** Renting equipment instead of purchasing can be a convenient and easy process.
12. **Conservation of capital.** Renting equipment can help you conserve capital by avoiding the need to spend additional money on equipment that may not be used again.

Renting equipment can be beneficial for your organization. For your next project, keep these 12 reasons to rent in mind to save time and money.

For more information, visit www.lgh-usa.com or call 800-878-7305.

MCAA welcomes Lifting Gear Hire Corporation as a new member.

CARRIER

continued from page 3

facility could not use ductwork, so individual water-to-air geothermal heat pumps were used to provide efficient space comfort. In the two newer buildings, Carrier's Aquazone 50PSW water-to-water heat pumps replaced the existing chiller and city steam system. The existing air handler was improved with a variable speed drive, which increases efficiency and extends equipment life, while the air system was upgraded to variable air volume, another efficiency improvement. Finally, fan coil units were deployed in perimeter spaces to offset heating loads.

Robert Pry, senior controls engineer for Carrier, said, "One of the most significant challenges of the controls design at The Friends Center was the integration of water, air, and ancillary systems. The equipment was connected via the open protocol i-Vu system, which allows staff to observe and control the operation of the HVAC and rainwater collection systems."

In the end, the careful process of renovating The Friends Center paid off. The Center eliminated its fossil fuel emissions of 326 tons per year and is now positioned for a sustainable future in its center-city location. The Center was rewarded with LEED Platinum certification, indicating that the Friends have obtained their goal of responsible comfort and good stewardship of resources.

For more information, visit www.commercial.carrier.com.

TSI

continued from page 11

"When we started, we didn't expect to use the Trimble for laying out piping," said Kyle Speropoulos, BIM coordinator for MMC Contractors. "But we modeled the pipe, then placed the Trimble point along the center line of the pipe in order to lay it out."

The collection of the Crystal Bridge Museum is valued at many millions of dollars, so it was crucial that the art be protected by the climate control systems installed by MMC Contractors. To ensure that all the systems were working properly, Crystal Bridge ran a three-month trial period before any artwork was allowed in, and no problems arose.

For more information, visit www.technicalsalesinternational.com.

"Plug-and-Play" BITZER Screw Compressors Slash ACCO's Installation Time

Engineering Support Paves the Way for Retrofit Solution

Photo courtesy of ACCO E.S.

John Delmatoff, lead chiller technician for ACCO Engineered Systems, trimmed days off of installation time with the BITZER Screw Compressor, solving the customer's air conditioning problems with a reliable, low-cost product that minimizes power consumption.

Confronted with correcting the performance problems of an R22 direct expansion system with two magnetic levitation, oil-less centrifugal compressors at a building in Newport Beach, CA, ACCO Engineered Systems staff ran energy comparisons between oil-less, centrifugal compressor models and screw compressors. To their surprise, BITZER CSW Screw Compressors provided full load and part load efficiencies comparable to the oil-less, centrifugal compressors.

The BITZER screw compressors were easy to install, saving ACCO time and money. Moreover, John Delmatoff, ACCO's lead chiller technician, said, "being able to solve a customer's A/C problem with a much less expensive, positive displacement screw compressor without sacrificing power consumption is a win-win."

According to William Brown, P.E., CEM, chief systems engineer at ACCO, the compressor system at the Olen Properties Building suffered reliability issues that affected the building's tenants. ACCO's challenge was to find alternate R22 compressors that would provide reliable air conditioning to the building and still minimize compressor power consumption.

Dave Streby, lead screw application engineer at BITZER's Atlanta area manufacturing plant, had consulted on replacing other oil-less, centrifugal compressors, so he assisted ACCO with planning the conversion. Screw compressors are heavier than oil-less, centrifugal models, so ACCO had to plan for a crane to lift them to the rooftop penthouse. Streby recommended that ACCO go with the infinite capacity option rather than four-step capacity. Though BITZER offered a controller for the Screws, ACCO elected to develop its own compressor control logic program using the existing system.

Delmatoff had installed many oil-less, centrifugal compressors, but this was his first experience with BITZER. "BITZER's engineering support and documentation was fantastic, and I can't believe how quietly the BITZER Screw operates," he said. "It's nearly as quiet as the oil-less, centrifugal compressor."

The installation and commissioning were basically "plug and play," said Delmatoff. He did not have to spend days load balancing or tweaking the complex electronics, and the compressors pulled the building temperature down quickly. BITZER's regional sales manager, Steve Esslinger, even stopped by to support the start-up. "You can't beat the engineering support that BITZER offers," Delmatoff added.

Based on the results of this job, ACCO is preparing to commission two BITZER Screw Compressors for the United Talent Agency Plaza in Beverly Hills, which qualified for a substantial Southern California Edison Customized Solutions energy rebate.

For more information, visit www.bitzerus.com or contact techsupport@bitzerus.com.

Compressor Non-Standard Integrated Part Load Value (NPLV) Comparison

BITZER CSW7583-80-4PU								
Capacity (Tons)	Annual Hours (%)	% Load	SST (°F)	SDT (°F)	SH (°F)	Liq Temp (°F)	Power (kW)	kW / Ton
45.8	12%	25%	44	82	10	72	22	0.480
60.8	45%	50%	44	82	10	72	29.6	0.487
86.4	42%	75%	44	90	10	80	46.7	0.540
115.5	1%	100%	44	103	10	93	78	0.675
Full Load Eff.				0.675 kW / Ton				
NPLV				0.508 kW / Ton				

Oil-Less, Centrifugal Compressor								
Capacity (Tons)	Annual Hours (%)	% Load	SST (°F)	SDT (°F)	SH (°F)	Liq Temp (°F)	Power (kW)	kW / Ton
30	12%	25%	44	82	10	72	15.4	0.513
60	45%	50%	44	82	10	72	26.7	0.445
90	42%	75%	44	90	10	80	49.1	0.546
120	1%	100%	44	103	10	93	93.5	0.779
Full Load Eff.				0.779 kW / Ton				
NPLV				0.493 kW / Ton				

Chart courtesy of ACCO E.S.

ACCO Engineered Systems staff ran energy comparisons between oil-less, centrifugal compressor models and screw compressors; they found that BITZER CSW Screw Compressors provided full load and part load efficiencies comparable to the oil-less, centrifugal compressors.

With BAC Cooling Towers, H&R Mechanical Contractors Meets University's Demands for Energy Efficient, Quiet Systems

Science Building Earns LEED Certification with Recycled Materials, Minimum Waste

When faced with the challenges of installing a quiet, energy efficient HVAC system for Eastern Kentucky University's (EKU's) new, state-of-the-art science building, H&R Mechanical Contractors selected Baltimore Aircoil Company (BAC) PT2 Cooling Towers. The PT2 towers not only solve the energy challenges but are equipped with several features that keep noise to a minimum. The new campus facility, located in Richmond, KY, houses classrooms and labs for the departments of Chemistry, Science, and Physics & Astronomy.

H&R Mechanical Contractors selected BAC PT2 Cooling Towers for EKU's LEED-certified, state-of-the-art science building, meeting EKU's requirements for both energy efficiency and minimal noise.

Going Green

The university focused on building a sustainable, energy efficient facility. The new building meets the U.S. Green Building Council's LEED® certification requirements. More than 60 percent of the materials used in the construction were diverted from a landfill. The building was constructed using recycled materials, including the rubble from nearby demolished buildings to create the cement fill, which meant that EKU did not have to truck in expensive cement. The building also has a stream system that traps rainfall and stores it as stormwater and an energy recovery exhaust air ventilation system that allows hot or cold air from the airstream to be recycled using a glycol loop, saving on heating and cooling costs.

To ensure that the HVAC system aligned with the sustainable and environmentally conscious mission of EKU, H&R Mechanical reached out to the local BAC representative for help with the system design. The all-stainless-steel PT2 Cooling Towers are inherently green, as BAC constructs them out of 64-percent recycled content. They exceed ASHRAE Standard 90.1 and have Cooling Technology Institute-certified thermal performance. The PT2 also comes equipped with premium, efficient, cooling tower duty motors. The motors have variable-frequency drives (VFDs) that provide soft starts, conserving energy by gradually ramping up the start speed and preventing high stresses on the belts, bearings, and fans.

Anticipating Future Needs

Another challenge also arose during the design phase. While the new building is not currently located near any residence halls, plans were in the works to build a new residence hall next to it in the coming years. Thus, the project provided significant sound challenges that H&R Mechanical addressed with the PT2's various low sound options.

Cooling tower motors and fans, as well as the cascading water inside of the tower, can make the sound from the cooling towers noticeable. The BAC PT2 Cooling Towers for EKU were equipped with low sound fans and discharge attenuation to quiet the mechanical components. The issue of cascading water was eliminated with water silencers in the cold water basin. The soft starts from the VFDs on the motors also prevent loud start-up noises.

While energy efficiency and low sound were the primary drivers for selecting the BAC cooling towers, the EKU maintenance team was also concerned about the HVAC system's durability and ease of preventive maintenance. The team has worked with BAC products in the past on other parts of the EKU campus and wanted a partner they could trust for rigging, support, and service. The PT2 makes maintenance easier with a motor removal system; all motor removal system options include davit arms to facilitate motor rigging, maintenance, and replacement.

The towers are constructed of stainless steel, providing superior corrosion protection. To ensure that maintenance is accessible and safe, H&R Mechanical Contractors worked with EKU and BAC to equip the two cooling towers with ladders and access platforms, which include handrails and safety gates, all of which are OSHA-compliant.

Construction on the EKU New Science Building is complete, and other campus

continued on next page

Animal Shelter Cuts Energy Costs, Improves Environment with Greenheck Fans and Air Systems

For its new, expanded facility, the Almost Home Animal Shelter in Fort Dodge, IA, needed an air handling system that would heat and cool while saving energy, improve indoor air quality for employees and visitors as well as the animals, eliminate odors, and remove humidity. Not only did Greenheck products meet all of those needs, but the equipment paid for itself in less than two years, thanks to reduced energy costs.

The non-profit Humane Society of North Central Iowa opened the new 10,000-square-foot Almost Home shelter in September 2010. The new facility replaces two old buildings that had served as the community animal shelter with a combined size of 2,500 square feet. Although four times the size of the old shelters, the new shelter's annual energy bills for gas and electric are just $16,600 compared to the old shelter's annual bill of $25,000.

The new facility has 32 indoor/outdoor kennels as well as offices, a veterinarian room, a training room, and a community center for board meetings, community functions, and even birthday parties.

Separating kennel air from the office and the community center area was important to prevent odor infiltration.

Optimizing Energy Efficiency

Two Greenheck dedicated outdoor air systems with heating, cooling, and a total enthalpy energy wheel (Model ERCH) were installed at the new animal shelter to service the office area and the kennel area separately. The dedicated outdoor air systems employ total enthalpy energy recovery wheels, modulating supply and exhaust fans, and CO2-based demand control systems for optimum energy efficiency.

Model ERCH combines the benefit of a total energy wheel with supplemental heating and cooling. Fresh outdoor air is preconditioned year-round by the enthalpy wheel, recovering up to 80 percent of the heating and cooling energy contained in the exhaust air. The enthalpy wheel also removes the humidity from the warm Iowa summer air prior to entering the cooling coil, reducing the overall tonnage required to temper the fresh outdoor air and greatly reducing energy usage.

Factory-mounted variable frequency drives (VFDs), modulated by CO2 levels, further enhance the units' efficiency by only delivering the required amount of outdoor air to the space. Ceiling exhaust fans (Model SP) and an inline cabinet fan (Model CSP) were installed to remove stale air from all areas as well as excessive moisture from the frequently washed kennel area, ensuring fresh, comfortable, odorless air for both people and animals.

Actual energy savings were much greater than originally anticipated. The original ventilation plan did not include the two Greenheck energy recovery units, and annual energy costs for the building were projected to be $40,000–$50,000. Larry Clement, a board member for the animal shelter, says the two Model ERCH units paid for themselves in less than two years based on the actual annual energy costs they experienced since the shelter opened.

"We know that the savings will continue for many years to come, and that's important to our operations budget," Clement said. "We couldn't be happier with the quiet operation and the quality of indoor air. You don't hear the fans running at all. And with 12–15 air exchanges per hour in the office area and the kennel area, there are absolutely no odors present in the office or community center area. We had a lot of respect for the quality of Greenheck products prior to installing them, but this ventilation system has exceeded our expectations, and those expectations were high."

For more information, visit www.greenheck.com.

With Greenheck fans and air systems, the Almost Home Animal Shelter dramatically reduced its energy costs and improved the indoor air quality for the animals, employees, and visitors.

BAC

continued from previous page

construction continues with more projects on the horizon. Energy efficiency and sustainability remain the driving focus of EKU's mission, and partnering with local contractors and vendors is important. H&R Mechanical Contractors will continue to provide HVAC support and assistance throughout the life of the equipment, helping EKU conserve energy and resources.

For more information on Baltimore Aircoil Company, visit www.baltimoreaircoil.com/mcaa.

VICTAULIC

continued from page 1

spools long enough to lower below the platform. Once fabricated in the shop, Bob Goldsberry, welder and piping superintendent, and the site foreman developed a 2D layout identifying how to sequence the piping onto the truck so that it could be delivered to the field in the right order at the right time.

During the prefabrication process, all pipe spools were uniquely itemized with the 2D layout so that all materials could be easily located. Additionally, Victaulic product was selected and delivered to the fabrication shop or the field based on the spool drawings so that it arrived when and where it was needed. This process of "bagging and tagging," along with the truck sequencing, provided a seamless transition from fabrication shop to field. Victaulic's new 3D software helps with trucking layouts, including cribbing and spool placement, to enhance productivity while reducing material handling.

Once on site, the piping was placed on the roof using a crane. The roof setup was quickly configured under the platform using the identification process, and all prefabricated pieces were strung underneath the platform. After the pipe was hung, the contractors secured the connections using Victaulic Advanced Groove System (AGS) couplings. The only grooved piping system to offer two-piece housing segments in all 14–60-inch sizes. The work was completed within three days, and ultimately, Marelich Mechanical completed the job on schedule. Goldsberry credited Victaulic for speeding up the process, saving costs, and reducing the crew size needed to handle and install the piping.

"Victaulic AGS couplings were a fast and simple joining system," said Goldsberry. "The alternative was to use 14-inch flanges, which would have required much more time and labor than the Victaulic couplings."

Victaulic Demonstrates Lean Strategies

It was a trip to Easton, PA, that radically changed Marelich Mechanical's piping fabrication strategies, making the data center project possible. Goldsberry toured the Victaulic manufacturing facility to learn how to shop-fabricate and assemble pipe more efficiently.

As part of the visit, Victaulic demonstrated ways to increase efficiencies in the fabrication process, minimize risks, control project schedules, and decrease fatigue of shop workers. The tooling that Victaulic demonstrated uses a minimal footprint to deliver one-man fabrication on 24-inch and down pipe. The lean layout of the shop fabrication tooling maximizes cell throughput and minimizes travel and set-up time between sizes/spools.

"The first time I saw it, I liked it right away. I've assembled grooved piping systems enough in the field that I could easily see the advantages of using the lean principles Victaulic was demonstrating and applying them in our prefabrication process," said Goldsberry.

After witnessing the productivity of Victaulic prefabrication strategies, Marelich Mechanical made the decision to work with Victaulic to implement the same strategies in their own fabrication shop. The new tooling and work cell layout allowed Marelich Mechanical to fabricate and assemble grooved piping systems larger than 10 inches in the shop, something they had previously been unable to do because of the size and weight of the larger components.

Goldsberry said it would have been impossible to get all the pumps connected for the data center within one week without the Victaulic prefabrication strategies.

"There was no way we could complete the project in the scheduled time frame without fabricating in the shop with Victaulic," said Goldsberry. "For our first large project using the new strategy, the process went extremely well. There is no way our people in the field could have welded the joints fast enough to be successful."

Another benefit of fabricating in the shop with Victaulic, noted Goldsberry, was the ability to decrease excess material and garbage at the jobsite. Trash remained in the fabrication shop where it was easily managed, rather than getting in the way and wasting precious time in the field.

Prefabrication Is the Future

Because of the success they have had, Marelich Mechanical tries to put Victaulic prefabrication strategies to work on as many jobs as possible, particularly those that have a lot of small offsets or big equipment connections.

continued on next page

Prefabricated Victaulic pipe spools were loaded onto the truck in sequence so that they could easily be delivered to the jobsite in the right order at the right time, saving Marelich Mechanical time on the job.

Take Advantage of Expert Advice for Mechanical Piping System Design

Planning Support Helps Reduce Waste and Save Time

"Measure twice, cut once" is perhaps the oldest adage in the construction industry. Companies like Grinnell Mechanical Products offer a technical services team of experts who work with engineers and contractors to think through every detail, and the result is improved project management that reduces scrap, decreases labor, and saves money. Here are some tips to help you get the most out of mechanical services.

Use the Right Tools and Technical Team to Avoid Rework

The second most familiar saying in construction is, "The devil is in the details." Failing to attend to the minutiae can send your project spiraling over budget and past deadline. Rework costs your company in three different ways: you pay for twice the labor and twice the materials and get off schedule, causing a ripple effect that usually goes right to the bottom line.

Building information modeling (BIM) minimizes this risk. Using BIM, the services vendor and the design and engineering teams at the commercial construction company can expedite plan development and identify conflicts in project documents before they become problems on the jobsite.

When considering a mechanical services provider, look for a vendor that can provide BIM information in the most useful form possible. Grinnell Mechanical Services offers Virtual Layout Process, which lets companies identify interferences and space constraints before they become work-delay issues. Vendors should also be able to provide the data in multiple file formats, such as AutoCAD® and Revit®, to ensure that files can be shared with all subcontractors in the format that best suits their needs.

Your Technical Expert Should See the Big Picture

The mechanical design services provider can and should help companies stay on schedule and on budget with reporting that addresses every aspect of the build—not just the plumbing, HVAC, or electrical.

In a mechanical room, for example, a mechanical services team should help resolve conflicts by focusing on a systems approach. The plumbing component of a BIM plan, for instance, must address vents, drains, gauges, sensors, and other parts beyond the pipe. The plan should identify the right solution and provide system controls, so that one solution does not create a problem in a separate system.

Further, mechanical services providers should always recommend the best technology available for a system—not just their own products. The provider's solution must be specific to the details of the situation. For example, a piping problem may need to be resolved with connections that are welded, flanged, pressed, or some combination thereof. A plan that employs just one type of solution is probably not the best solution and may result in a less efficient or more expensive system that will be difficult to maintain and repair over the long run. A quality mechanical services provider should also bring creativity and in-depth knowledge to problem resolution.

Ensure a Smooth Transition From Planning to Project Site

One of the most difficult steps in any job is moving it from the planning phase to the actual build site. Thousands of details can derail the process. A full-service vendor can provide a roadmap for the transition, as well as tagged cut-to-length materials that allow contractors to use less manpower, produce less scrap, and stay on schedule.

Your services provider should supply drawings and bill-of-materials documents that let supervisors eliminate multiple shipments, back orders, and overages. Pre-fitted materials, bagged, tagged, and delivered to the jobsite, increase productivity by 25 percent or more, minimizing change orders, field cutting, and scrap.

While costs for materials, handling, and labor continue to rise, schedules keep getting shorter, and good skilled labor keeps getting harder to find. Using BIM and 3D planning documents will enable engineers and job planners to save money and avoid rework. It's the modern way to measure twice, cut once.

For more information, visit www.grinnell.com.

VICTAULIC

continued from previous page

Being a welder, Goldsberry anticipated some initial skepticism surrounding the new processes, but he says that everyone on his team likes it. There was a minimal learning curve, and the process was simple and safe for fabricators in the shop. Goldsberry suggests that welders and mechanical contractors just starting to use grooved in their prefabrication processes approach it with an open mind.

"I credit our Victaulic fabrication strategies for getting the data center work," said Goldsberry. "Prefabrication is the future of where our industry is going, and we plan to take advantage of it."

For more information, visit www.victaulic.com.

Straus Systems Grows Business with Johnson Controls' Innovative Technologies

The Central Plant Optimization™ (CPO) software from Johnson Controls that is helping a global marketer and distributor of food service products significantly reduce its central plant energy consumption is also helping Straus Systems of Stafford, TX, advance their position as a leader in the installation of new technologies. "Straus Systems has been in business since 1933, and we continue to build our job resume," said Vice President of Operations Management Paul Alexander. "Projects like this one that incorporate innovative technologies like CPO30 can help us differentiate our company and grow our business. Our success serves as a springboard to capture new business, particularly among companies interested in best-in-class, energy-saving solutions."

Transforming an Outdated Building

The client is wrapping up the third phase of a multi-phase renovation that began more than two years ago with the purchase of a 20-plus-year-old former call center facility. The company purchased the 660,000-square-foot structure to create a shared services facility for its North American distribution centers. When completed, the building will house centralized functions, such as customer service, accounts payable, and accounts receivable, and include a 24/7 mission critical data center.

During the first two phases of the renovation, Straus Systems installed three 350-ton air-cooled chillers to help get the data center operational and meet the challenge of transforming an outdated, vacant building into a code-compliant, state-of-the-art facility with built-in redundancy and building automation that protects against data center downtime and ensures the reliability of call center operations.

As phase three of the renovation nears completion, Straus Systems continues to provide HVAC support to the company. According to Alexander, phase-three accomplishments include the installation of two 1,200-ton water-cooled chillers, two two-cell stainless steel cooling towers, and new pumps, as well as a complete upgrade to the central plant control system. When installed and commissioned, the water-cooled chillers will provide primary cooling to the structure, with the air-cooled system assuming backup responsibilities and providing cooling during off hours.

Upgrading and Innovation

Straus updated the original Metasys® building management system from Johnson Controls with the newest version of Metasys to better manage the facility and provide critical redundancy. The new Metasys system will allow building staff to access, report, and use data on how the building is performing, including energy usage and spend by energy type. The system will help reduce energy consumption and costs while maintaining safe, comfortable, and sustainable environments. And because the system uses the latest web-based and wireless technologies, Metasys will ensure compatibility with mobile devices, allowing users to access the information they need anytime, anywhere.

"In this particular case, the Metasys system is also providing important continuity as we complete the water-cooled system changeout, helping to maintain proper chilled water flow throughout all parts of the building," noted Alexander. The need for redundancy means the central plant displays twice the number of controllers as would ordinarily be required in a non-critical central plant, providing a myriad of backup scenarios that will ensure data center uptime and maintain call center operations.

"My experience with Metasys has demonstrated that it is a great system, tried and true in installations around the globe," said Alexander. "But just as important as the product and how well it performs is my relationship with the supplier of that product. I have worked with the Johnson Controls rep on a variety of projects for a number of years, and I know him pretty well.

Dashboards like this one on the Central Plant Optimization software from Johnson Controls let users see plant performance and operating efficiency on a real-time basis. Experience with such technology has earned Straus Systems a reputation for understanding the technology needs of clients interested in best-in-class, energy-saving solutions.

"Added to the more efficient chillers that we've installed, [Johnson Controls'] CPO30 should really help the facility shine as a result of energy savings, and the customer is going to be delighted with those same energy savings when they see their utility bills."

— Straus Systems Vice President of Operations Management Paul Alexander

So I have faith in what he says and the recommendations he makes. To me, contractor/supplier relationships like this go a long way toward achieving success and bringing value to the products we install and, more importantly, the customers we serve."

This solid relationship and his successful track record with Johnson Controls products made it easier for Alexander and his customer to embrace another innovative technology that the renovated facility features—Johnson Controls CPO30 software. It features patented relational control technology to help significantly reduce central plant energy consumption. Algorithms will make continuous real-time automatic adjustments to the central plant based on building load and weather, while web-based dashboards will enable staff to efficiently measure, verify, and manage the building's performance in real time.

Real-time data are especially important as the company strives for efficiency and works closely with their local utility to take advantage of rebates that reward improvements in energy efficiency. "CPO30 will help them achieve these rebates in two ways," explained Alexander. "First, and what I'm most excited about, is the fact that the software will significantly improve operating efficiencies of the central plant. Added to the more efficient chillers that we've installed, CPO30 should really help the facility shine as a result of energy savings, and the customer is going to be delighted with those same energy savings when they see their utility bills. In addition, CPO30 will help them document these efficiencies and support their rebate application."

"I look at this facility as the company's front door—the place where customers gain access to an enormous product line and register their needs," Alexander said. "If the facility shuts down, the door is locked, access is denied, and eventually, revenue is impacted. The door needs to remain open, and it most likely will, thanks to the combined efforts of Metasys and CPO30."

For more information about Johnson Controls, visit www.johnsoncontrols.com.

CNA

continued from page 8

provides sample policy language and other information about the hazards, liability, and regulatory initiatives associated with distracted driving.)

After an accident involving, for example, driver A, an employee of your company, and driver B, one of the first steps that driver B's attorney usually will take is to try to obtain the cell phone records of driver A. The attorney may attempt to prove negligence on the part of driver A to seek recovery of damages from you, the employer.

Responsibility for Punitive Damages

One of the issues that all fleet owners need to consider is that, depending on the state and circumstances of the claim, if gross negligence or other severe conduct is proven, the award from the court may include punitive damages. By law, several states will not allow your automobile insurance carrier to pay the punitive damages portion of an award. Based on the theory that punitive damages are meant to punish people for their "bad acts," it is against public policy for someone to be protected from the consequences of their bad acts.

For more information, visit www.cna.com.

AIRADVICE

continued from page 9

Thanks to that relationship, Limbach is currently completing an energy benchmark analysis of the entire Paradigm portfolio. From there, the two companies will build out an action plan to determine which buildings will be the next to undergo an energy savings assessment. To get the most out of the partnership, Limbach hopes to combine the assessment with the preventive maintenance agreements. Bauman noted, "While we know that there may not be a good fit with all the buildings, we are going to do whatever we can to help Paradigm lower their energy costs. Due to the consultative role we've played to get to this point, we have developed a new partnership that we would not have had without using the energy services approach that AirAdvice gave us."

Jay Sharp, vice president of Limbach Facility Services, explained the strategic importance of the energy services initiative. "This shows the power of a differentiated service message—how bringing a solution not typically thought of as being part of a mechanical contractor's domain can drive a significant amount of revenue back into our core service and retrofit business," he said.

For more information, visit www.airadvice.com.

UPONOR

continued from page 1

into customized "radiant mats" and installed them in just two days, dramatically cutting both labor time and costs.

The NREL is the nation's only federal laboratory dedicated to the research, development, commercialization, and deployment of renewable energy and energy-efficient technologies. When it came time to build the $64-million, 220,000-square-foot RSF, NREL engineers looked to Uponor radiant heating and cooling to help meet their energy-neutral goals.

"In designing and building the new facility, our aim was to move the needle in how America uses energy to heat and cool buildings," NREL Senior Engineer Paul Torcellini said. "It isn't enough to be energy-efficient when commercially viable technology exists to make buildings energy-neutral."

High-Performance Design

Housing 800 staff members in an open work environment, RSF boosted NREL's campus square footage by 60 percent but increased campus energy use by only six percent. Achieving this outcome wasn't accidental. Thorough planning with the following mission-critical goals helped guide the design process:

- Design and build a safe work environment
- Achieve a LEED® Platinum rating
- Aim for ENERGY STAR "Plus" in terms of energy usage

Unique Radiant Installation

Tony Barela, project manager for Trautman & Shreve, said, "The job schedule was critical on this project," Barela says. "We knew that the five days allocated to us were not enough time to build all the radiant heating and cooling zones. It was critical we find another way."

Barela and superintendent Don Martinez worked with the local Uponor representatives to devise a prefabrication plan for the radiant zones. After mapping out all zones, Trautman & Shreve purchased Wirsbo hePEX™ tubing in standard 1,000- and 500-foot rolls, then, using three-foot plastic rails (with loops in six- to 10-inch spacings to hold the pipe together in an even width), they prefabricated their own radiant mats.

A crew of five people spent three months in the yard at Trautman & Shreve prefabricating each zone—laying out the tubing, tying it to the rails, and rolling up each mat for storage until the decks at RSF were ready for the tubing installation.

"Zones on this project ranged anywhere from 48 to 250 feet long and up to 24 feet wide," Barela explained. "We customized each mat in whatever dimensions were needed." For example, on the widest zone, four 6-foot mats were connected to complete that zone.

Once the RSF decks were ready, Trautman & Shreve used a crane to lift the large bundles of tubing. A crew unrolled the tubing, tied it down, and quickly made the necessary connections. The entire radiant tubing installation took only two days, enabling Trautman & Shreve to beat the deadline by three full days.

"Overall, we saved 28 days in the construction schedule," Barela said, estimating the true day-savings was much more like 60 versus the time required in a conventional radiant installation. These savings, in turn, helped NREL meet its budgetary goals and tight construction schedule.

For more information, visit www.uponor-usa.com.

MCAA welcomes Uponor as a new member.

By prefabricating Uponor's PEX-a tubing into the customized "radiant mats" shown here, the entire radiant tubing installation for a new facility at the National Renewable Energy Laboratory took only two days, enabling Trautman & Shreve to beat the deadline by three full days.