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Metropolitan Industries, Inc.

CURRENTS

FALL 2008

Metropolitan goes GREEN with Energy & Water Independent Facility

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An energy independent, water conservation facility constructed by Metropolitan Industries, Inc. is now open for viewing after a ribbon cutting ceremony held back in October that officially opened the 480 sq. ft. building to the public demonstrating advances in green energy and water technology.

The energy and water independent facility known as Metro-Green shows Americans how they can dramatically shrink their environmental footprint by reducing carbon emissions and the amount of energy and water consumption in their homes and businesses.

Features of Metro-Green are large solar panels that recharge two separate battery banks responsible for powering everything in the home relieving dependence on electricity. A "whole house" inverter system will allow users to easily switch between battery power and line power when necessary.

A large rainwater harvesting system is responsible for collecting, storing and distributing water inside the facility after it is recycled and filtered for use in sinks and toilets.

(From Left) Metropolitan Industries, Inc. President John Kochan, Jr., officially opens the Energy and Water Independent Metro-Green to the public while Romeoville Mayor John Noak, Ill. State Rep. Brett Hassert, Ill. State Senator A.J. Wilhelmi and Ill. State Rep. Tom Cross look on.

A solar powered, radiant heated floor will warm the inside of the facility during the winter months, eliminating the need for a furnace. The solar panels will help to preheat the water, reducing utilities dramatically.

The facility will process its own wastewater due to an aerobic wastewater treatment system that meets the NSF International's requirements for public health and safety. The unique treatment system uses a working drip system that allows all class 1 effluent to be utilized onsite. The drip system will irrigate the flowers, plants and garden.

Finally, a solar powered well pump will supply fresh water to outside storage tanks for everyday use inside the home when rainfall does not keep up with water demand while a sump pump system

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Above Grade Solutions eliminate confined space procedures

Write In 102

According to the U.S. Dept. of Labor, many workplaces contain spaces considered "confined" because their configurations hinder the activities of employees who must enter, work in, and exit them. A confined space has limited or restricted means for entry or exit, and it is not designed for continuous employee occupancy. Confined spaces include, but are not limited to, underground vaults, tanks, and storage bins such as those used in wastewater pumping applications.

OSHA uses the term "permit-required confined space" to describe a confined space that has one or more of the following characteristics: contains or has the potential to contain a hazardous atmosphere; contains a material that has the potential to engulf an entrant; has walls that converge inward or floors that slope downward and taper into a smaller area which could trap or asphyxiate an entrant; or contains any other recognized safety or health hazard, such as unguarded machinery, exposed live wires, or heat stress.

The greatest danger facing the person entering a confined space is a lack of oxygen. Several breaths of an atmosphere holding less than 6 percent oxygen can disable in seconds and can kill in minutes. Either the volume percent of oxygen can be too little (less than 19.5) or other gases (such as carbon monoxide) in the confined space may interfere with the body's uptake of an otherwise sufficient supply. Oxygen deficiency can also debilitate sensors: Thus, a space with very low oxygen levels can't be tested for combustible gases since standard instruments for this purpose require oxygen to function. (The sensor actually attempts to ignite a sample of the atmosphere and can't do so when the fuel/oxygen ratio is too high.)

Not only is it dangerous to operate in a confined space, but it is also costly and time consuming for owners to maintain, according to Metropolitan Industries Service Manager Mike Schiazzano. He says a permitted confined space requires a minimum three-man crew with the following safety gear: two multi function gas monitors, tripod with safety retrieval line, safety harness, a fresh air blower, a fresh air tank with airline, respirator and escape pack in order to comply with these very explicit codes. Training the crew to use all safety gear along with the retrieval equipment procedures is also an added requirement. He adds by eliminating the need to enter or work in a confined space an operator can save time and money.

Solutions to Confined Space Applications

Above-grade applications greatly reduce the danger, costs and manpower issues associated with confined space applications. Installations typically consist of a small control and generator building installed next to a wet well below grade containing pumps. The pumps are easily accessible and can be easily removed and installed without entering the well using a guide rail quick removal system.

Costs and labor to maintain such an installation are minimal. Given that it is above grade and anything below grade is accessible from above, typically one person can inspect and operate the entire station, reducing operating costs. Also further reducing cost is the elimination of the equipment and safety apparatuses associated with confined space entry.

Metropolitan Industries, Inc. specializes in the design and manufacture of above grade lift station/control packages and recently completed two such jobs in Merrillville, Ind. that eliminated previous confined space applications.

Broadfield Lift Station

Working with Robinson Engineering and contractor Hasse Construction, Metropolitan Industries, Inc. supplied a triplex, component lift station complete with a prefabricated building that houses the controls, valves and generator.

The triplex concrete lift station uses three 50 HP rated pumps for a total flow of 1442 gallons per minute (GPM) at 89.2 feet of total dynamic head (TDH). One submersible level transducer (and four level switches for back-up control) are inside the basin. Access hatches, a pump removal lift out system and guide rails allow easy access to pumps for maintenance without having to enter the 32' deep basin.

Pictured are two above-grade applications that eliminated the dangers, costs and manpower issues associated with confined space applications for the Town of Merrillville, Ind.

On the control/valve side of each building, state-of-the-art controls with programmable logic controllers and touch screen operator interfaces operate the system.

To further eliminate confined space entry, all controls, valves and a back up generator were housed in a prefabricated above-grade building measuring 19' 3" long by 13' 6" wide by 11' tall. The building itself was divided into two sections, one side for the controls and valves and the other side dedicated to just the standby generator set.

On the control/valve side of the building, a triplex control panel with programmable logic controller and touch screen operator interface controls the system. The discharge pipe and valve assembly are located above grade inside the building for easy access.

The generator side of the building houses a CAT 125kW, 3-Phase natural gas generator complete with accessories. A 400 amp automatic transfer switch allows for transfer to the generator during power outages.

Other features of the building include an HVAC system for climate control, high water alarm with dialer and battery back up, interior and exterior lighting and smoke detectors.

Access hatches, a pump removal lift out system and guide rails allow easy access to pumps for maintenance and repair without having to enter a basin.

John Wood School Lift Station

The John Wood School Lift Station is another example of an above-ground application that eliminates confined space applications. Working with Robinson Engineering and Woodruff & Sons Construction Co., Metropolitan Industries furnished a duplex component lift station, again with a prefabricated control, valve and generator building.

The duplex concrete lift station uses two 40HP submersible pumps, rated for a total 700 GPM at 113' TDH. One submersible level transducer and four level switches provide primary and back-up level control inside the basin. Two lift-out hydraulic sealing flange assemblies allow pump removal for maintenance and repair without entering the sump.

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Green pump system

As energy costs continue to rise at an alarming pace, businesses are turning their attention to strategies designed to reduce energy consumption. An example of this is the hotel industry, which can be a large consumer of energy given the number of people they serve during any given night, amenities offered and the large square footage of most buildings.

According to Xcel Energy, an electric and natural gas company serving the western states, hotels 8,000 sq. ft. and larger spend an annual average of $1.05 per square foot on energy. For a full service or luxury hotel, properties may see energy costs reaching 10 percent of their revenue! In a typical lodging facility, lighting, space heating, and water distribution represent close to 60 percent of total energy use, making those systems the best targets for energy savings.

The Embassy Suites Hotel in Chicago is one of those luxury hotel properties that fall into the category of "full service luxury hotel." Located in the heart of downtown Chicago, they offer 367 large suites, over 6,000 square feet of meeting space, indoor heated pool, fitness center and a premier restaurant and bar.

During the 1970s, Embassy Suites installed a constant speed domestic water booster system to supply water to the building. Using constant speed systems was a common practice during this time due to the rudimentary control systems available on the market.

A constant speed system will run the pumps at a speed intended for the highest demands even during low-flow periods such as during the middle of the night. A typical system incorporates pressure-reducing valves (PRVs) on the discharge of each pump to maintain a constant system pressure. At any flow less than peak flow, the pressure reducing valves will throttle flow and waste energy. This is similar to pressing the gas peddle in your car to the floor and controlling speed with the brake. This was a popular solution for this era; however, given the country's current green culture, this type of solution is considered the "SUV" of the industry due to the amount of energy wasted.

The existing constant speed system was in dire need of replacement. Not only was it noisy and a nuisance to guests, it would constantly leak and would force some flush valves in public bathrooms to run on their own or to not work at all. One 20HP pump never stopped running, and other problems included the constant maintenance and the possibility that the entire system could fail given it was over 20 years old.

Green Design

Working closely with Plumbing Contractor Emerald Mechanical, Metropolitan Industries Chicago Sales Manger Mike Ponx suggested installing a variable-speed system that would reduce energy costs by half due to the system's ability to precisely match demand using only the minimal amount of energy necessary. During low flow periods where little or no demand exists, a variable speed system shuts down entirely, saving energy and money while a bladder tank located on the upper mechanical floor helps maintain pressure while the system is in shutdown / low flow mode. Ponx was able to redesign the new system based on a calculated flow.

"The chief engineer supplied a fixture unit count for the hotel and we designed the system based on his flow requirements using the fixture unit count," said Ponx.

The new variable-speed, duplex domestic water booster system consisted of vertical multi-staged turbine pumps each rated 230 gallons a minute (GPM) at 140' of total dynamic head. System capacity is 315 GPM with total system pressure of 90 PSI and a suction pressure of 30 PSI.

The new booster system uses 1/3 less power than the constant speed system. The new system sustains accurate pressure by only running 1/3 of the time and, according to the Assistant Chief Engineer Jim Graehling, it saved the hotel over $2,000 on the energy bill the first month!

"We witnessed a $2,000 reduction in our energy bill the first month the system was operational," Graehling said.

With the use of variable speed drives and low flow shutdown tanks, the VFDs and pumps matched flow requirements and kilowatt usage thus saving approximately $2000 in energy consumption a month. More importantly, pressures are stable and the control system is able to hold accurate pressure

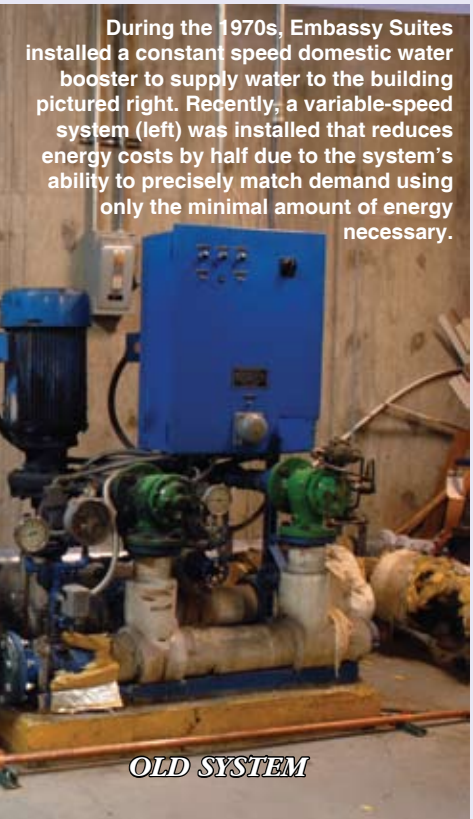
NEW SYSTEM

reduces energy costs

within 1-2 PSI versus 20-40 pounds swings using PRVs on the constant speed system. The other major benefit using VFD control is eliminating PRVs no longer requires maintenance and excessive costs associated with rebuilding them. The life of the motor and bearings are extended as well lengthening the life of the system overall.

Within a decade, the system will pay for itself based entirely on energy-savings. The expected life of this system is over 25-30 years so eventually the system will not only pay the end-user for the cost of the system but it will also pay the costs to replace itself in its lifetime!

For more information on how you can reduce your energy consumption while meeting the water demands of your building, contact Mike Ponx at 815-886-9200.



During the 1970s, Embassy Suites installed a constant speed domestic water booster to supply water to the building pictured right. Recently, a variable-speed system (left) was installed that reduces energy costs by half due to the system's ability to precisely match demand using only the minimal amount of energy necessary.

OLD SYSTEM

Located in the heart of downtown Chicago, the Embassy Suites offers 367 large suites, over 6,000 square feet of meeting space, indoor heated pool, fitness center and a premier restaurant and bar.

Columbia College upgrades domestic water systems

Write In 104

Many domestic water supply systems in Chicago's high-rises are as old as the buildings themselves. Most of these systems were state-of-the-art during their installations decades ago but buildings evolve over time adding water demands beyond their original specifications, which results in inefficient operation, higher maintenance and operating costs and the potential for a system shutdown.

When the original domestic water supply system at Chicago's Columbia College began to show its age, owners opted to replace 1929 technology with a state of the art system for two campus buildings at 600 South Michigan Avenue and 33 East Congress.

With more than 120 academic programs and nearly 11,000 students, Columbia College Chicago is the largest and most diverse private arts and media college in the nation. The college offers an unparalleled array of courses with exceptional technological resources in the heart of one of America's greatest cities.

The building at 33 E. Congress needed to replace the domestic water booster system and wooden gravity tanks located on the top floor that filled off of an antiquated level controller. This practice was common in the day but is outdated technology by today's standard.

Working alongside the plumbing contractor, Bobby DeGuiseppe of Great Lakes Plumbing, Metropolitan Industries, Inc. of Romeoville, IL supplied a new duplex, 5-HP energy-efficient variable speed booster system. In order to remove the wooden tank, DeGuiseppe re-piped the

The new duplex, 5-HP energy-efficient variable speed booster system.

33 E. Congress

With more than 120 academic programs and nearly 11,000 students, Columbia College Chicago is the largest and most diverse private arts and media college in the nation.

up-feed and down-feed risers and installed bladder tanks that serve to maintain pressure during low flow periods, allowing the system to turn off and save additional energy.

The new system is set to deliver 20psi to the top floor of constant pressure. Using bladder tanks combined with variable speed drives on the booster system saves thousands of dollars a year on energy costs and adds life to the system because it does not run at a constant speed but rather a constant pressure, while varying pump speeds.

The building at 600 S. Michigan required a domestic water booster system as well and replacement of a wooden gravity tank on the top floor. The booster system however was fabricated and assembled onsite in place. The pump and mechanical room had limited access and this was the only option. Once again DeGuiseppe eliminated the gravity tank and took the up-feed risers and crossed them with down-feed risers. The system utilizes three 20HP, stainless steel, multi-staged booster pumps with variable speed drives and controller to maintain a maximum flow rate of 380 gallons per minute.


600 S. Michigan

It allows for redundancy while maintaining a constant discharge pressure of 140 psi. Two 119 gallon bladder tanks took the place of the wooden gravity tank. After a one time shut down, all connections were made and the system was placed online.

Both systems, now in operation for just about a year, maintain consistent pressure throughout the building. Running a system at variable speeds reduces energy costs and saves money. Over approximately a decade, the system will pay for itself entirely on energy savings alone.

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BEFORE


AFTER

The system utilizes three 20HP, stainless steel, multi-staged booster pumps with variable speed drives and controller to maintain a maximum flow rate of 380 gallons per minute.

Above Grade Solutions eliminate confined space procedures

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Just as the last example, all controls, valves and a back up generator were housed in a prefabricated building of similar size and layout as the previous example. The building as well was again divided into two sections, one side for the variable speed controls and valves and the other side dedicated to just the natural gas CAT generator inside.

Other features of the building include an HVAC system for climate control, high water alarm with dialer and battery back up, interior and exterior lighting and smoke detectors.

Conclusion

Above grade applications eliminate the dangers and costs associated with confined space procedures. Towns and villages save money by eliminating the special safety gear and reducing the personnel required by OSHA on a service call. Municipalities will save time by eliminating the requirement of obtaining a "confined space permit" that designates what is to be done, when and by whom. No longer will the local fire and police departments need to be involved as sometimes this type of permit may dictate. As demonstrated a "permitted confined space" requires special handling, equipment and a fair amount of extra time and work if all the rules are followed. Reduce these hurdles at your station with an above grade application.

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In an above grade installation, the discharge pipe and valve assembly are located inside the building for easy access.

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Metropolitan goes GREEN with Energy & Water Independent Facility

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powered with its own battery back up supply will power pumps during a storm.

"Given the rising costs of all types of energy such as natural gas, electricity and heating oil plus given the limited supplies of fresh water in various locations, this event will be a timely showcase of what steps Americans can take in the future to relieve the demand on vital resources," says Metropolitan Industries, Inc. President John Kochan, Jr.

"This exhibition showed the country that it can be done with a little ingenuity, time and investment but will pay back dividends to households and businesses in the future," he said. ***Write In 100***