THE PUMPING WORLD'S ONE STOP SHOP!™

Metropolitan Industries, Inc.

CURRENTS

SUMMER 2010

Reduce Boiler Energy Consumption by 50%

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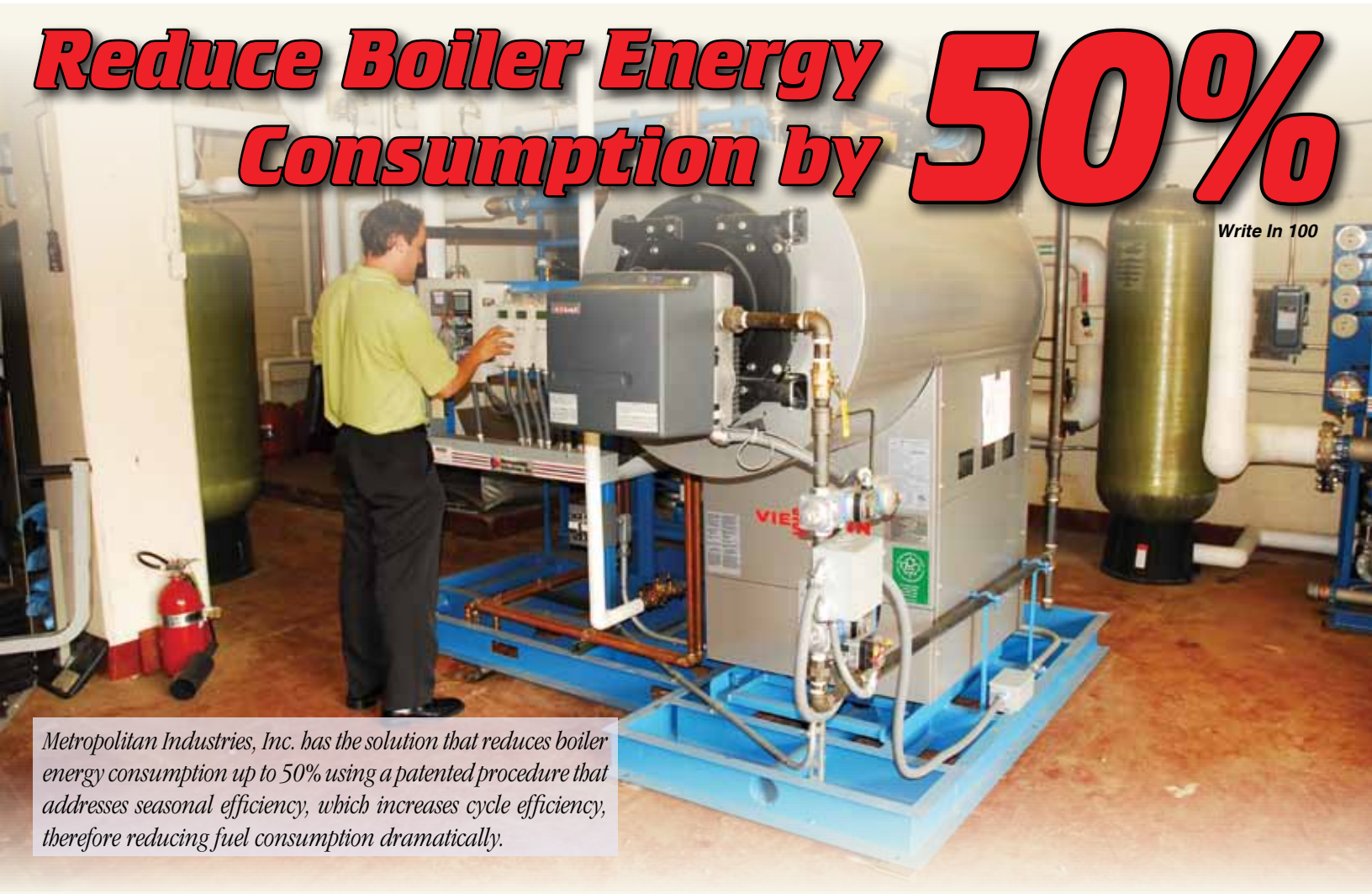

Metropolitan Industries, Inc. has the solution that reduces boiler energy consumption up to 50% using a patented procedure that addresses seasonal efficiency, which increases cycle efficiency, therefore reducing fuel consumption dramatically.

The life blood of any commercial building is the mechanical systems running behind the scenes that include domestic water booster systems, fire suppression pump systems and HVAC systems.

Of the three mechanical components, HVAC is by far the largest consumer of energy due to the sheer nature of how they are specified and designed. The school of thought in the HVAC community is to size everything for peak demand without considering demand fluctuations, especially during warmer months when demand is at the lowest.

The biggest misconception when specifying a boiler system is, "If I specify a boiler at 90% efficiency then the plant will operate at 90% efficiency." This is false because during light load conditions, such as during warm months, boiler efficiency becomes random which results in poor overall, "cycle" efficiency. In other words, "Seasonal Efficiency," is only 50-80%

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Plus...

...Arlington Park Domestic Water Booster System

...Commercial Sump Pump Systems

Reduce Boiler Fuel Consumption

Continued from front

of measured efficiency resulting in no realized energy savings during the warm months when your boiler runs less.

Metropolitan Industries, Inc., has the solution that reduces boiler energy consumption by 20-50% using a patented procedure that addresses seasonal efficiency, which increases cycle efficiency, therefore reducing fuel consumption dramatically.

Case Study – Multi Occupancy Condominium

A great example of this technology is demonstrated by the work done at a 139 unit condominium located in Will County, Ill. At the request of the owner, the building name and location of the project will remain confidential.

The existing system had two problems. The first problem was that the plant ran inefficiently due to the boilers being the sole heat source for the domestic water. Due to this, they operated all year round, even during the summer months. The inefficient design caused the boilers to operate by pumping city water and boiler water through a shell and tube heat exchanger mounted near the ceiling. Since there was no way to prevent gravity flow of hot water through the heating system return lines, the radiation caused the building to stay warm all year, even in the dog days of summer. This resulted in increased fuel consumption and increased electrical consumption as well. Air conditioners witnessed an additional load imposed by the uncontrolled flow of unwanted heat from the boiler plant and needed to run overtime.

The second problem was that the existing heating pumps were leaking and had been since day one. There were eight pumps serving four zones. Three zones were for space heating and the other zone for domestic hot water heating. The reason they were leaking was because they were mounted near the ceiling without the proper supports. This made it difficult to service the pumps since a technician needed to perform the work on a ladder.

Green Performance Solution

To solve the inefficient operation of the plant, Metropolitan Industries had the contractor install a "summer boiler," sized to the requirements of the domestic hot water heating system. This allows the owner to turn off the heating boiler completely when there is no heating load. The result is energy savings up to 50% because the new boiler system handles the small summer loads efficiently and eliminates short cycling and cycle losses.

The summer boiler is so efficient that the owner can run it year round for more efficient domestic water heating. This means that the building can now be heated with only one boiler versus using both boilers in all but the most severe weather, which promotes more efficient boiler loading for improved energy performance.

To address the leaking heating pumps located in the ceiling, Metropolitan had the contractor move them to floor level for easier inspection and service.

Pictured is the variable-speed, duplex domestic water booster system with total system capacity of 220 GPM at a system pressure of 95 PSI.

Green Distribution Solution

To address the issue of the leaky heating pumps, Metropolitan had the contractor move the domestic water heat exchanger and blending valve to floor level for easier inspection so that service technicians no longer need to climb ladders when servicing the heat exchanger or blending valves. This not only improves staff and contractor safety but reduces maintenance costs overall due to the easier and less expensive service and preventative maintenance.

One of the biggest benefits is the control over domestic hot water temperatures. No longer will they have spikes or drifts of temperature regardless of no load or light load conditions. The elimination of spikes in temperature was important since residents were potentially at risk for being injured by scalding.

There were benefits as well with the relocation of the heat exchanger and blending valves to the floor. For one, it reduced the safety hazards associated with working on ladders when servicing the heat exchanger or blending valves, thus improving contractor safety. Also with the new pumps, the constant leaking of the old system was eliminated.

Realized Energy Savings

With the installation of the "summer boiler", new heat exchanger and blending valve, the building owner realizes a 20-50% reduction in fuel consumption on any given day depending on load conditions. The entire package combines indirect water heating, condensing water heating and the blending valve function all into one complete system. Metropolitan Industries is the only company currently providing this technology. For more information, contact Matt Brickey at 815-886-9200 ext. 266 for a complete analysis of your system. ***Write In 100***

Pick a Winner! Place Bets on Energy

Referred to as "The Sport of Kings," thoroughbred horse racing is as American as apple pie and dates back to 1665, when the first race in North America was held in Long Island, New York.

Arlington Park Race Track, located in the Chicago suburb of Arlington Heights, is a historic track that opened more than 80 years ago in 1927. On that day, 20,000 fans braved the cold weather to see Jockey Joe Bollero guide Luxembourg to victory in the first race ever held there.

Some other highlights of the park include hosting the 2002 Breeders' Cup World Thoroughbred Championships, which came to the Midwest for the first time in its history. Five years later, Arlington Park became the first Midwest track to install a synthetic racing surface when the state of the art Polytrack surface was unveiled for the 2007 race.

More recently, Arlington Park has gone through an internal face-lift of sorts by upgrading its water distribution system in an effort to improve service and reduce energy costs by using modern control and pump technology.

The Old System

The old system was installed in the 1980s during reconstruction of the track after a devastating fire that destroyed it. It used out-dated variable speed technology. Although variable speed technology was highly advanced during that era, the old system had seen its best days and the customer wanted to be proactive as to avoid any possible system failures in the future. The old system consisted of (2) 20 HP pumps and due to the demand, one pump ran all the time and was a large consumer of energy.

Metropolitan Industries' Chicago Sales Engineers worked closely with Chicago-based Great Lakes Plumbing to specify and install a variable-speed system that would reduce energy costs due to the system's ability to match demand precisely by using only the minimal amount of energy necessary.

Metropolitan was able to design the new system based on a calculated flow of the park's requirements and match the building pressure requirements with minimum pressure fluctuations regardless of flow.

The New System

Work was done in two phases consisting of first retrofitting the existing controls with a new state-of-the-art variable speed controller on the existing two pump systems. The new controls were designed to accept a third pump and variable speed drive in anticipation of the second phase that included retrofitting the pump system with (3) high-efficiency, vertical multi-stage pumps. The third pump serves as a back-up and adds redundancy to the system. It allows a pump to be serviced without shutting down the entire system or reducing capacity.

The new variable-speed, triplex domestic water booster system consisted of three 15-HP vertical multi-staged pumps, each

Savings!

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Arlington Park's new variable-speed, triplex domestic water booster system consists of three 15-HP vertical multi-staged pumps, each rated 260 gallons per minute (GPM) at a system pressure of 80 PSI, reducing the park's demand for energy and saving them money.

rated 260 gallons per minute (GPM) at a system pressure of 80 PSI. Two 119-gallon bladder tanks were installed as well for low flow shut-down and stabilization of building pressure. The new booster system uses less power than the previous system saving the building owners money on energy while reducing maintenance costs overall. During 52 hours of trending, the new system only ran 26 hours of the 52, reducing energy costs dramatically. Compare that to the old system where one pump ran at all times.

Installation

The original plumbing had bypass piping but not the correct placement of valves that would allow bypassing of the booster system in the case of a service call, maintenance or other need.

Great Lakes Plumbing recommended installing new bypass valves in the correct location, which allowed the team to place the building back in service in just two hours while workers removed the old booster system and installed the new system. Without the correct bypass valves, the building would be without water for approximately eight hours. The building could operate on city pressure alone; however this is impossible during racing events due to the large volumes of water required for kitchens, washrooms, etc.

Due to the correct placement of the bypass valves, any new work required on the booster system in the future can be done without a building shutdown, should there be an expansion or a greater demand for water.

Conclusion

The new retrofitted pump and control system got its first test on April 29, 2010 during opening day of the 2010 season. A beautiful sunny day greeted thousands of fans as they came out to see the horses compete. While the horses raced outside, the team was inside the facility monitoring the performance of the new system. Metropolitan Program Engineers made all final adjustments during the opening day festivities as peak flows dominated demand. Overall, the new pump system will reduce the park's demand for energy, saving them money.

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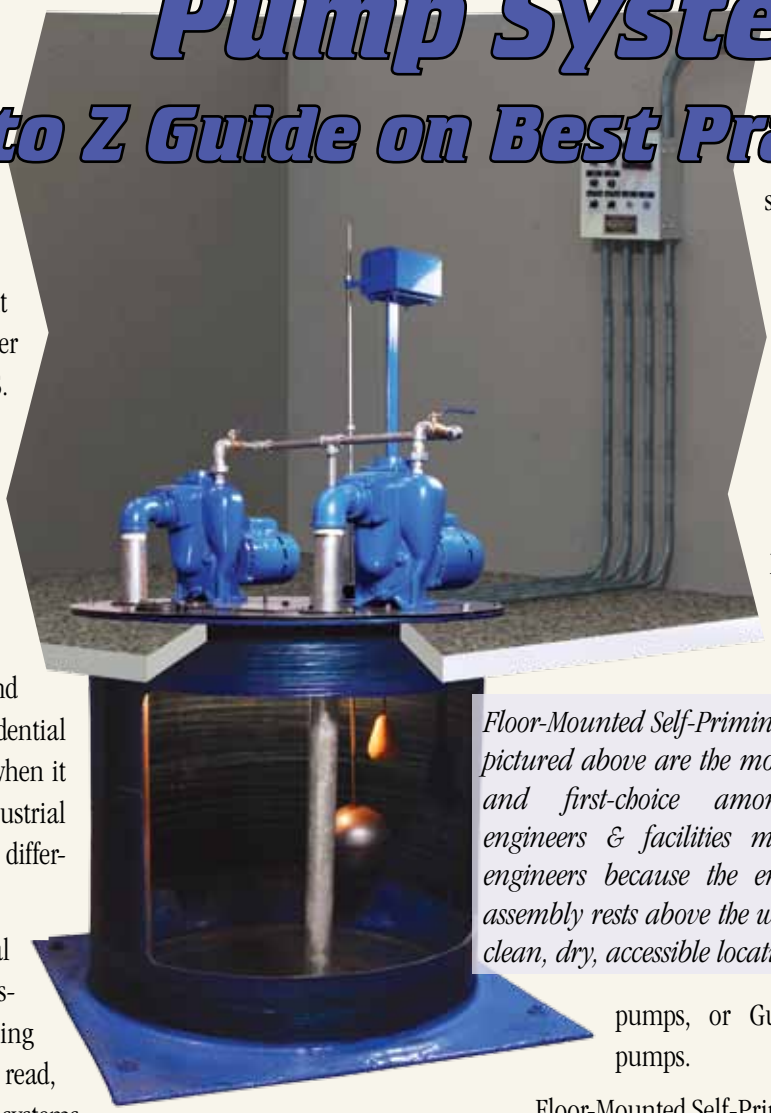
Commercial Sump Pump Systems

An A to Z Guide on Best Practices

Introduction

According to the Federal Emergency Management Agency or FEMA, the number one natural disaster in the U.S. is flooding. Whether you are a homeowner or a business owner, a flood can wreak havoc on your property causing many thousands or millions of dollars in damage.

Many Americans understand what it takes to protect a residential basement from flooding; but when it comes to a commercial or industrial application there are drastic differences.



Floor-Mounted Self-Priming pumps as pictured above are the most common and first-choice among design engineers & facilities management engineers because the entire pump assembly rests above the wet-well in a clean, dry, accessible location.

Commercial / Industrial sump pump systems are a necessity for any commercial building with a basement. As you will read, commercial grade sump pump systems differ from their residential counter- parts by the switching mechanism used, horsepower, control systems, style of pumps and more.

This article will discuss commercial and industrial sump pump system applications, types of pumps used, control systems, sizing of the wet well and variable speed pumping advantages.

Application Challenges

Many commercial/industrial applications requiring the installation of sump pump systems are large-scale facilities, which must be designed to evacuate subsoil drainage and/or surface water from the facility. Due to the large size of the facilities, the volume of water pumped is typically quite large. Due to this, a vast majority of these systems are designed as duplex arrangements, with two pumps in the same wet-well. If the application becomes excessively large, triplex or quadraplex systems can be installed as well.

Types of Pumps

Due to the large flow-rates being pumped, the physical size & weight of the pumps being provided becomes a major consideration. In order to facilitate ease of maintenance, the pumps provided are typically one of two different types: Floor-Mounted Self-Priming pumps, or Guide-Rail Accessible Submersible pumps.

Floor-Mounted Self-Priming pumps are the most common first-choice among design engineers & facilities management engineers. The beneficial design of this type of pump allows the entire pump assembly to rest above the wet-well in a clean, dry, accessible location. All pump maintenance & repair is accomplished without the need to lift the pump, or remove the pump from the piping.

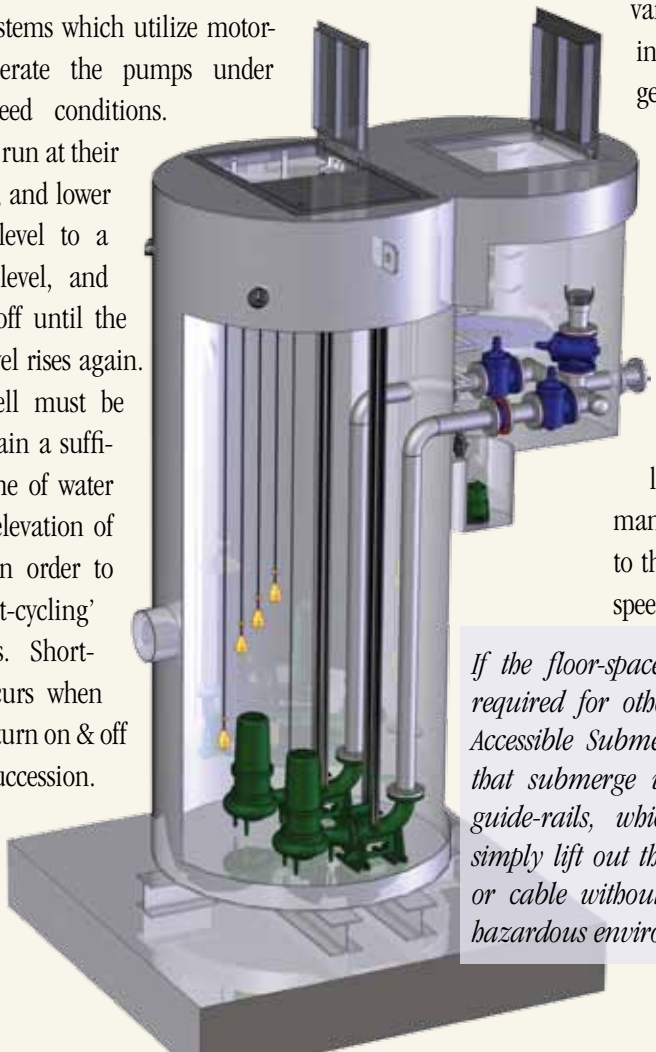
Guide-Rail Accessible Submersible pumps are sometimes selected, especially if the floor-space above the wet-well is required for other purposes, such as a walkway or hallway. These pumps are submerged within the wet-well; however, they are installed with guide-rail systems, which allow personnel to simply lift the pumps using a chain or cable to remove them from the wet-well without the need to enter the hazardous environment of the wet-well to disconnect the pumps from the piping.

Typical Control Systems Utilized

High flow rates typically require large pumps with 3-phase motors and starters. These systems are designed to operate the pumps on a constant-speed basis. The typical duplex installation utilizes a duplex wall-mounted control panel, which includes dual circuit-breakers, starters, current-overload protection, and an integrated control-logic system which monitors the level-switches in the wet-well to control the operation of the pumps. Capabilities which are essential to the control-logic system include lights which indicate the failure of each of the level-switches, the status of each of the pumps, the status of any faults or pump-failures, and a high liquid level alarm. The control-logic system must be designed to override any level-switch failure, and continue uninterrupted automatic operation of the system, until the switch failure can be addressed. A majority of duplex pump systems utilize four level switches which are suspended at different elevations within the wet-well. The control-logic system uses the signals from these switches to start, stop, and alternate the pumps, as well as to signal a high liquid level alarm condition.

Appropriate Sizing of the Wet-Well

Pump systems which utilize motor-starters operate the pumps under constant-speed conditions. The pumps run at their rated speed, and lower the liquid-level to a particular level, and then turn off until the wet-well level rises again. The wet-well must be sized to retain a sufficient volume of water below the elevation of the inlet, in order to avoid 'short-cycling' the pumps. Short-cycling occurs when the pumps turn on & off in rapid succession. This type of operating condition often leads to a build-up of temperature extremes within the pump's motor. The build-up of heat, over an extended period of time, can lead to eventual motor damage, resulting in premature motor-failure. In a majority of applications, it is important to design the wet-well to retain enough liquid below the inlet, to ensure that none of the pumps in the wet-well are allowed to start more than ten times per hour. For a typical duplex system, neither pump should start more than once every three minutes. Calculating the wet-well size can become a somewhat complicated process, because new liquid enters the wet-well while old liquid is being pumped out. An experienced pumping system sales-engineer or design-engineer should be consulted to verify proper wet-well sizing. It's important to note that proper calculation methods can sometimes result in surprisingly large wet-well requirements.



If the floor-space above the wet-well is required for other purposes, Guide-Rail Accessible Submersible pumps are used that submerge within the wet-well; on guide-rails, which allow personnel to simply lift out the pumps using a chain or cable without the need to enter the hazardous environment of the wet-well.

Variable-Speed Pumping Advantages

The recent development of relatively low-cost variable-speed control systems has ushered in the use of this technology to solve a number of common operational problems typically associated with large-scale project applications: The advantage of using variable speed control includes reducing wet-well sizes, reducing the effects of large flow-surges, reducing the size of emergency stand-by generator systems, and reducing the electrical-costs associated with large-capacity pumping:

In many cases, improperly calculating the wet-well size can result in massive wet-well sizes which can tend to be very expensive to purchase & install; or may not fit well within the geometry of the facility's architecture. In these instances, it is often more logical and much less costly to utilize pump systems which use variable-speed control systems to operate the pumps. The use of variable-speed controls allows the size of the wet-well to be dramatically reduced; in many cases to a size which is amazingly small when compared to the traditional wet-well sizing method. When using variable-speed controls, the speed of pumps is modulated, which means they are controlled in such a way that the discharge-flow of the pumps exactly matches the flow of the liquid into the wet-well as closely as possible. During this modulation of flow, which may last for extended periods of time during major

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Commercial Sump Systems

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rainfalls, the pumps may run semi-continuously, thus eliminating the possibility of short-cycling completely.

During major rainfalls when extremely large pumps are cycled on & off at constant-speed, the wet-well is evacuated in large 'surges' of flow. This not only requires that the wet-well be excessively large to avoid short-cycling, but the surge-flow out of these pump systems often tends to exceed the capacity capability of storm-sewer systems down-stream of the pumping system. This can cause the storm-sewer systems to become over-taxed and may result in surcharged sewers. This becomes a catastrophe during major storms; at a time when gravity flow from other locations on the sewer-grid can least afford to be hindered. Major flooding of these gravity sewer grids may be the unfortunate result. In most instances, variable-speed pumping will eliminate this phenomenon, by creating a nearly-constant continuous flow of water, instead of major flow-surges.

Due to the critical nature of most large-scale sump pumping systems, it is desirable, or possibly essential, to have an emergency stand-by generator system provided for the pumping system, to ensure continuous availability of electrical power during times when power-outages are more likely. The kilowatt requirement & size (and therefore the cost) of these large equipment items can be greatly reduced on variable-speed systems, due to a direct reduction or elimination of high inrush amperage loads on the electrical gear.

Pictured is a high-volume duplex self priming pump system for the well-known Brookfield Zoo near Chicago.

Large pumps which require large motors, tend to create large electric utility invoices. The use of variable-speed controls reduces the electrical demand of the system, and therefore will reduce the cost of operation as well. The bottom line is a vast majority of projects which use variable-speed control systems, greatly reducing overall install cost, due to the cost savings associated with the benefits outlined above.

Even the most critical of commercial or industrial sump pump applications can be successfully addressed with the appropriate and properly-engineered pumping equipment & controls.

For more information about Commercial / Industrial sump pump systems, contact Brendan Bates, senior systems engineer, at Metropolitan Industries at 815-886-9200, ext 257 or by email at bbates@metropolitanind.com.

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