CASE STUDY

Evacuation Alarm System Improves Personnel and Community Safety at Wastewater Treatment Facility

Application Specific Alarm Sizing and Coverage Leads to a More Effective, Economical Warning System.

Loudness of audible alarms and brightness of visual alarms, as well as effective coverage area satisfied by the devices, are the measures to which safety of personnel should be gauged

Chlorine is the lowest cost and most widely used oxidizing disinfectant in the treatment of wastewater. It serves to neutralize infectious agents such as bacteria, protozoa, parasitic worms, and viruses in the wastewater treatment plant's effluent stream prior to its discharge to the environment. Chlorine is also a highly corrosive and toxic chemical. Although there is some debate about the health impact of ingesting chlorine, it is certainly not as dangerous as ingesting the infectious agents that it destroys.

Exposure to chlorine produces tissue damage. A burning sensation is the result of contact with chlorine and the severity of this is proportional to its concentration and the duration of exposure.

SHARING COMPETENCE

Pfannenberg
ELECTRO-TECHNOLOGY FOR INDUSTRY

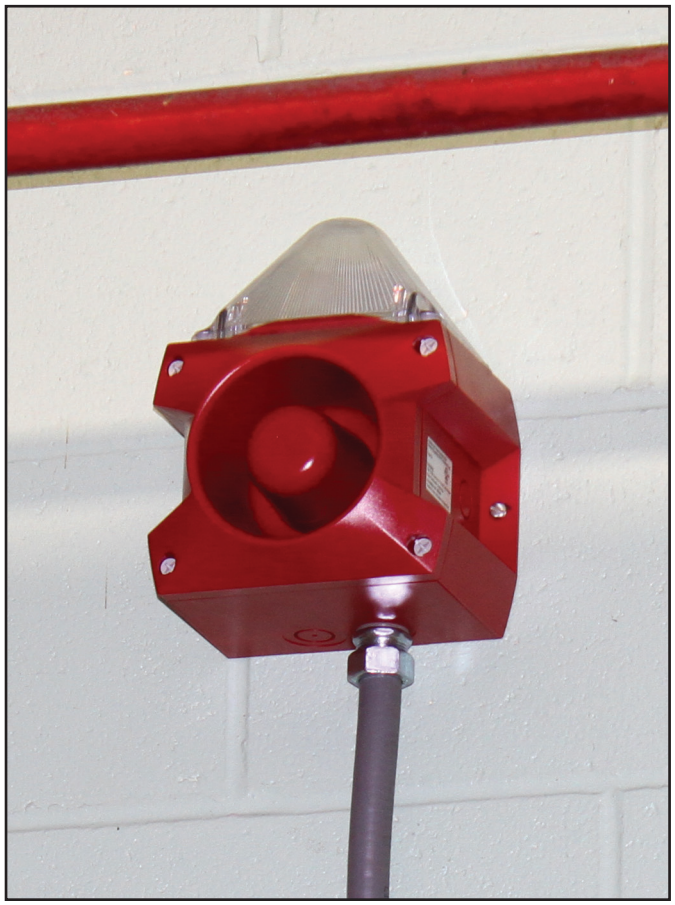
At wastewater treatment plants, chlorine is typically injected as a gas into the water to be treated. Bulk chlorine is stored as a liquefied compressed gas or as an unpressurized liquid consisting of sodium hypochlorite dissolved in water (also known as bleach). Liquid chlorine is evaporated into a gas prior to its use in wastewater treatment.

The concentration of chlorine used varies on the application from low for drinking water (< 3 ppm), to medium for a swimming pool, to high for wastewater treatment (5 – 20 ppm). Exposure time and other chemical characteristics have an influence on the effectiveness of chlorine disinfection. Since chlorine can also negatively impact fish and wildlife, there are limits as to how much can be present in the discharge stream. To bring effluent streams within discharge limits (<0.02 ppm), de-chlorination is commonly achieved after the disinfection has taken place by injecting sulphur dioxide gas into the water.

The density of chlorine gas is approximately 2.5 times greater than air – meaning that it will remain near the ground in areas with little air movement and pose a significant inhalation risk. **A chlorine gas leak within the confines of a building in a water or wastewater treatment facility represents a safety hazard that can quickly lead to injury or death.**

The safety manager of a wastewater treatment facility identified the need for an improved chlorine gas leak detection evacuation notification system to ensure the safety of both onsite personnel and the community. While already considering a prototype device that was essentially a mechanical vibrating horn and a strobe light – both mounted to a small enclosure, they discussed their need with one of their electrical service contractors. This contractor was also a signaling distributor for Pfannenberg's Signaling Products and recommend our complete line of signaling products for the notification application of their project. The distributor took photographs of the prototype device and determined that the PATROL series of flashing sounders would be a superior product designed to accomplish what they were trying to achieve. Demo units were brought to the facility and tested, the safety manager was impressed with the quality of construction, superior sound output level, and multiple tone capability.

After initially considering the purchase of 50 of the prototype units, **discussion turned to coverage area capability and sizing of the PATROL units to meet the needs of the facility. Since the treatment plant is a combination of various buildings and walled spaces, determination of the proper sound output levels and number of PATROL units was not an easy task to accomplish on paper. It was decided that the best technique for sizing units would be through actual testing.**



Pfannenberg PATROL Flashing Sounder Installed In Water Wastewater Treatment Facility

Pre-wired, AC-powered PATROL demo units of all four ranges were subsequently brought to the facility for testing. Facility managers then powered up units at the desired installation locations and walked or drove away to a distance that was deemed to be the limit of notification for the particular unit. By communicating back to the units' location by cell phone or two-way radio, the alarm effectiveness was either accepted or rejected and adjustments could be made to try stronger or weaker units in order to achieve effective alarm notification. After evaluating the entire facilityAla, it was determined that just 25 PATROL units of varying output sound levels would be needed to provide sufficient evacuation notification.

Pfannenberg subsequently received the order for the 25 PATROL units. After their installation, the safety manager noted that they were very satisfied with the alarm notification coverage area capability of the units. In addition they were pleased with the overall cost savings achieved since fewer units were needed to be installed and wired up - a savings in both labor and materials.



Pfannenberg Signaling Products Installed throughout Wastewater Treatment Plant for Gas Detection Application

Summary

In summary, an effective evacuation alarm notification system should start with an assessment of the notification appliances' ability to provide adequate warning to personnel, rather than a pursuit for the lowest cost devices. Loudness of audible alarms and brightness of visual alarms, as well as effective coverage area satisfied by the devices, are the measures to which safety of personnel should be gauged. Once this is understood, an economical valuation that includes equipment cost as well as installation cost will reveal the true price of the notification system. As encountered with this application, the more efficient system may prove to be the least costly.

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