

WATER CONSERVATION AND FIRE PROTECTION SYSTEM RELIABILITY



Green programs have become an important strategic initiative for cost savings and environmental stewardship. C-suite executives have accepted the business case that being environmentally conscious increases profitability and enhances their global citizenship efforts over the long term. The benefits specific to water conservation are twofold: It can reduce costs to the bottom line, especially in areas with limited and expensive water, and support a brand image of being “green-centric,” leading to greater customer acquisition and retention.

The US consumption of water in 2005 was reported at 410 billion gallons per day, according to the US Geological Survey, 31% of which was attributed to irrigation and 50% to thermoelectric power generation. California, Texas, Idaho, and Florida alone accounted for 25% of this usage. Despite the larger demand for water in certain industries and locations and the costs related to the acquisition of this vital resource, there are opportunities for companies operating in any sector and location to lower their impact on the environment and increase profitability. While doing so, companies must also consider how they maintain fire protection capabilities at their sites. This is particularly important

during times of drought and state action on water conservation, as currently experienced in many Southwestern states.

Marsh Risk Consulting’s (MRC) Property Risk Consulting (PRC) Practice understands the need to balance water conservation while maintaining sound fire protection practices, especially when meteorological conditions cause scarcity. Companies have made great strides at their sites to reduce process use and potable consumption through controls, and recent events demonstrate their increased attention to fire protection water use. Further lessons can be learned from Australia, which leads the world in its research and approach to balancing fire suppression needs with water conservation.

The task can be challenging. However, companies will find that it is manageable to make targeted improvements to fire protection systems. The largest areas for improvement include system maintenance, testing, equipment modifications, and implementing catch and reuse procedures.

SYSTEM MAINTENANCE

Water-based fire suppression systems are normally closed systems. That is, until the systems are called upon to react to fire. During a fire emergency, they are designed to consume a preset amount of water, over a specific amount of time. The best opportunity for conservation is the control of wastage through leaking underground piping, pressure relief valve operations, and water used for fire pump cooling. Despite being permissible by regulatory agencies, underground systems experiencing leaking not only waste treated water, but can also lead to undermining

and eventual pipe failure. Pipe failures create large water flows, property damage, and major impairments to protection systems. With some systems having thousands of feet of underground main, leakage from a pipe failure can be measured in tens of thousands of gallons and the high costs associated with repairing damages.

Pressure relief valves are designed to operate in the event that a fire-pump-supplied system produces pressure beyond that for which the system is designed. The valve is intended to open, drop the pressure, and then close, protecting system components from over pressure and possible component breakage. A faulty valve, or one improperly set, can operate for extended periods discharging large quantities of water and resulting in significant extraneous costs.

Leading practices to improve system maintenance include:

- Having regular recorded inspections of underground mains and sprinkler systems to identify leaks and making repairs immediately upon any being found.

- Maintaining specialty sprinkler systems, such as dry pipe and pre-action systems, to a high degree of reliability. This will help avoid false activations that necessitate flushing and draining of the systems.
- Adjusting pressure relief valves to avoid unneeded discharge.

TESTING

Testing of sprinkler system components is vital to ensure continued reliability and is required to meet local fire codes and insurer requirements. Most tests involve flowing limited quantities of water; however, in the case of annual fire pump flow tests, they can disperse thousands of gallons. To the uninformed, these tests may appear wasteful.

Leading practices to improve water consumption during testing include:

- Perform tests only when required based on applicable codes and insurer requirements.



- Add maintenance to systems that have a history of test failures to avoid the likelihood of retesting.
- Preplan tests so that water consumption is minimized.
- Maintain tanks, service ponds, and reservoirs to minimize evaporation and leakage. Open sources should be covered and linings maintained. All check valves should be regularly serviced.
- Conduct internal inspections of storage tanks using remote video cameras, ultrasonic technologies, or even qualified commercial scuba divers as opposed to the traditional drain and inspect method.

EQUIPMENT MODIFICATIONS

As noted above, regular maintenance and testing can prevent an inadvertent waste of water resources. There are also several equipment modifications that may conserve water and actually improve the reliability of the fire suppression systems. The cost effectiveness of the upgrade is dependent on the configuration of the system. One example is with sprinkler system waterflow alarm tests. This type of test typically does not discharge significant quantities of water. However, in areas where even this discharge quantity needs to be controlled, there are innovations where circular flows can be arranged to test the flow detection device. This piping must be carefully designed and installed such that the intent of the jurisdictional authority and/or the insurance protocols is not compromised.

CATCH AND REUSE

Several communities and contractors are now providing services where they will capture the water from fire system tests and recycle it, leading to more potential cost savings. This service can take several forms:

- Capturing fire pump test water involves one or more large tanker trucks or portable “ponds” as these tests discharge large quantities of water very quickly. Depending on the arrangement of the system, the captured water may be considered acceptable for use in cooling systems or other industrial uses, but is not normally acceptable for human consumption.
- Hydrant flushing is another test where innovations provide a means to avoid waste. Several companies provide a truck-mounted system where hydrant discharge is piped through a series of tanks and filters and actually reintroduced into the underground fire main system.
- Sprinkler system test water is not potable, but if captured may have use as a “grey” water source. Uses may include irrigation and or introduction into a plant’s grey water system.

CONCLUSION

Implementing a combination of general-water-use and fire-protection-water use conservation strategies can yield positive, long-term financial returns for organizations, whether or not they are in a resource sensitive area. To maximize the return on such investments, typically companies conduct cost-benefit analyses of the various approaches to account for any additional costs or impact on their sites. MRC’s PRC industry and hazards experts are prepared to assist clients with carrying out the necessary inspections and analyses if they are interested in exploring the possibility of improving water conservation at their facilities while maintaining reliable fire protection systems.

Our PRC professionals specialize in a number of relevant areas that tie into risk identification, use, and management of natural, human, and capital resources. Our natural hazards experts can help you understand and keep your staff and local operations informed of optimal strategies and best practices to meet the changing regulatory or climatological environment. Our fire protection specialists can help you assess the risks at affected facilities and increase the confidence in your decisions regarding how best to manage your water usage through the entire life cycle of the protection system or building. From designing systems, to retro-fits, ensuring compliance and effective fire control, and all the way through building business cases for installation and long-term maintenance, our services help you maximize capital use and investment, leverage your water conservation efforts, and reduce fire risk to your business.



For additional information about water conservation and fire protection system strategies and other solutions provided by MRC, please contact your local Marsh representative or PRC expert.

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