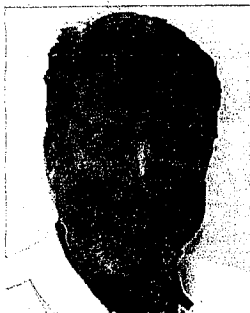


Water Conservation

– the Future of Fire Sprinkler Systems



David L. Asplund P.E.

The Reliable Automatic Sprinkler Company

Mankind has long been interested in what the future may hold in store for us. Whether one looks to the Ancient Greeks who consulted with The Oracle at Delphi or Doris Day who whimsically asks her mother, "Que Sera, Sera" (what will be, will be)? We as a species have a collective curiosity of what has yet to transpire.

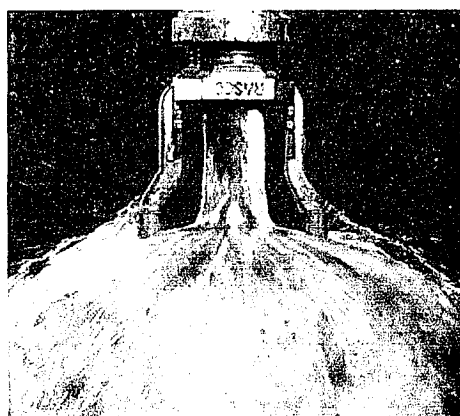
During my 35 year tenure in the fire sprinkler industry, I have often been called upon to envisage the future. How many sprinklers will be required for this set of building blueprints? How many man-hours will be required to install the pipe on this project? When will the steel be erected or when will the concrete slab be cured? Recently, the most common of these requests to foretell has been to provide a financial forecast for use as a planning tool in developing a budget and/or business plan. This process, to say the least, remains a very vexing task for me. I love the absolute predictability of Newton's laws of motion (remember, gravity is not just a good idea, it is the law!) or the innate beauty of The Scientific Method to provide the repeatability of experiments in which the control group always give consistent and expected results. The dictionary provides the definition of the word *predict* as: foretell on the basis of observation, experience or scientific reason. Perhaps I have observed and experienced enough change and evolution in my career to apply some of my scientific reasoning skills and extrapolate some current trends that may come to fruition for our industry in the not too distant future?

The Population/Water Equation

Human beings and fire sprinklers are forever connected to water and as changes occur to our supply of clean, fresh and safe drinking water, humankind and fire sprinklers morph along with these changes. Earth is a water planet with more than two thirds of the surface area covered by water. Yet only about two percent of that water is considered to be clean, fresh, safe drinking water.

Water, also known as H₂O, is a unique and interesting molecule. One that is bi-polar, meaning it has a positively charged end and a negatively charged end. This creates covalent bonds between the individual water molecules and gives water a very unique set of physical properties (such as, it expands when frozen and creates service and repair revenue for fire sprinkler contractors during winter).

The human body comprises 93 percent water. Clean, fresh, safe drinking water is an important and invaluable commodity that is essential to our existence. Last autumn, a significant milestone

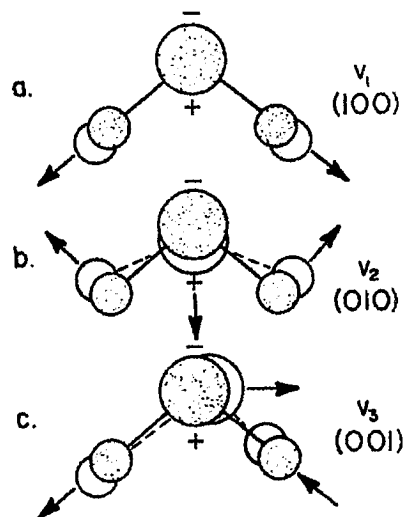


was passed when a baby was born that represented the seven billionth human being on our planet. Just over 100 years ago there were only two billion people on the planet. By the end of this decade we will exceed eight billion thirsty human inhabitants. Just like the law of gravity, microeconomics has a law, the law of supply and demand. Now let us think about that law as it relates to water. Is there more or less clean, fresh, safe drinking water today than there was 100 years ago? The answer to that question is no. Due to pollution, we have less clean, fresh, safe drinking water today than we did 100 years ago and soon we will have four-times more demand for it!

Green Building

In the past few years there has been a trend towards green building technology. Green building is a program to use sustainable, renewable and recycled building materials along with the intent to improve energy efficiency and water conservation in the construction industry. It is good to be green and I always feel like I am doing my part by recycling the various components of my trash, adjusting my thermostat and turning off the lights in empty rooms (I am still haunted by my father's voice bellowing, "electricity doesn't grow on trees you know?").

The fire sprinkler industry has been greatly affected by this green movement. Wastewater control is a paramount concern in green building.



So, is draining a wet fire sprinkler system across the parking lot and down the storm drain system in conformance with our new collective green consciousness? Many water purveyors are not letting fire sprinkler contractors drain black, smelly, mineral and bacteria fire sprinkler water into the storm water system. Storm water treatment facilities are just not set up to deal with all of the nasty stuff that is in used fire sprinkler water. The choices facing the sprinkler installers are few: drain the system down the sanitary sewer or drain the system into a holding tank and pump it back into the system. What will the cost of a simple tenant improvement project be under these rules? Please don't shoot me, I'm only the messenger.

Now is the time to apply some of our scientific methodology and analyse this trend to predict the future. How long will it be before these same water purveyors who enforce the "no fire sprinkler water down the storm drain" rule, begin to expand on it and say, "Hey, why should we let you fire sprinkler guys connect to our beautiful fluoridated, chlorinated, clean, fresh, safe drinking water supply and turn it into that nasty black smelly fire sprinkler water? Why don't you guys go green and use recycled, reclaimed and/or harvested rain water with your own tank and your own pump to supply the fire sprinkler system?" Hmmmmm, how long will it be? When our world population hits 1 ten billion or 20 billion?

Tomorrow's World

The demand to conserve water has spread to how current fire sprinkler research is being conducted. FM Global is the leader in applying real 21st century science to fire sprinkler technology. They have implemented much of this thinking with the publication of their new Data Sheets 2-0 & 8-9 in April 2010. Their intent has been to simplify and improve fire sprinkler protection for storage occupancies. To provide a better level of fire sprinkler performance while utilising less total water demand.

FM Global has a "future vision" of fire sprinkler technology that most likely will include a return to embracing intermediate level or in-rack sprinklers. Obstructions to the discharge of ceiling-only storage type fire sprinklers are a paramount concern.

Obstructions that are thin as a wire can disrupt the downward thrust and momentum of a ceiling-only storage fire sprinkler discharge and cause lateral dispersal of the water spray. So much so, that the lateral movement of the water spray will land on adjacent sprinklers and cause them to be cooled to the point where they do not operate in a fire. This scenario is known as a sprinkler skip. Skips in ceiling-only storage sprinkler protection due to obstructions to the spray discharge are very detrimental to the performance of the fire sprinkler system and can lead to catastrophic failure of the sprinkler system resulting in over-heating the roof structure to the point of collapse.

The buildings of the future will be taller than ever before, exceeding by far the limitations of ceiling-only fire sprinkler protection. Property owners will want to maximise storage volume and minimise cost by stretching the walls skyward. Thus paying nearly the same for the foundation slab and roof systems, while adding cost for the extra height to the walls.

Storage buildings of the future will exceed 30 meters in height and will utilise the storage racks as part of the building structure to support the roof. Sophisticated computer-driven robotic pickers will, by far, outperform their human counterparts in filling and unloading the racks. Robots do not break in-rack sprinklers like their very human counterparts do, therefore eliminating the negativity towards the use of in-rack sprinklers.

Ceiling-only storage fire sprinkler protection schemes have much too high a water demand requirement for the future. Ceiling-only storage sprinklers can demand as much as 8,900 litres-a-minute and require a 60-minute storage capacity in excess of 535,000 litres of water storage. Future protection schemes that include ceiling sprinklers and in-rack sprinklers will have water demands in the neighbourhood of 2,500 litres-a-minute and 90-minute storage capacities in the range of 225,000 litres. If FM Global's true "Future Vision" comes to fruition, we may see water demands for storage fire sprinkler systems that include a water demand for either the ceiling sprinklers or for the in-racks. Not both. Fire sprinkler water demand could be as little as 1,300 litres-a-minute with stored water capacities as low as 118,000 litres.

I predict that the best years of the fire sprinkler industry lie ahead of us. Buildings will have more pipes and more fire sprinklers installed in them than ever before. Yes, more sprinklers and more pipes, but the pipes will be smaller in diameter to deliver the smaller overall water demands of these future fire sprinkler systems. More sprinklers and more levels of sprinklers will improve performance by lessening the distance from the sprinkler to the burning fuel surface and thus requiring less total water to extinguish the fire.

All fire sprinkler systems will be supplied by their own local fire pumps and water storage tanks and not be connected to the drinking water supplies. There is always risk when one tries to predict the future. Will my prestidigitations be accurate for the remainder of my career or life span? Will there be a singularity event where all of the robotic pickers of the world rise up to enslave the human race? Who knows? I just hope that on the morning of December 22, 2012 I am more correct in my predictions than the Mayans are in theirs. **IFP**

David L Asplund P.E. is
Director of Technical Services
at The Reliable Automatic
Sprinkler Company

For further information, go to
www.reliablesprinkler.com