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The critical role of R&D in fire protection: How innovative technologies are setting new standards

Text by Susan Schierwagen, Vice President of Coupling and Suppressions Systems at Victaulic

For any company in the business of developing fire protection systems, substantial investment in research and development is key to the execution of an effective business strategy. The introduction of new codes and standards, such as those governing the use of hybrid fire suppression technology, has fueled the growth of the fire protection market, prompting companies to invest more heavily in the creation of new solutions. Let's take a closer look at the evolution of the industry and what type of work is currently being done.

Recent innovations

Fire protection engineering has evolved throughout the years in many respects, trending toward the adoption of technologies that are safer for the

environment, easier to maintain, and non-toxic to human occupants.

We have seen the introduction of alternative piping and fitting materials, such as PEXs (Crosslinked polyethylene), HDPE (High-Density Polyethylene), PPR (Polypropylene), and CPVC (Chlorinated Polyvinyl Chloride). In the area of fluid dynamics, innovation continues with the introduction of flexible sprinkler drops, flexible dry sprinklers, couplings and fittings which are ready for installation right out of the box, as well as prepackaged water mist and pump systems on skids. Mechanical joining solutions incorporating grooved couplings and fittings are increasingly used for fire protection systems and in fact today are considered the norm, reflecting a shift from traditional threading.

Perhaps the most innovative new

technology is hybrid fire suppression for special hazards, which utilises a combination of an inert gas such as nitrogen and a small volume of water to create a nebulized suspended mist. The introduction of fire suppression solutions for data centers, plants, and other facilities where water damage is a major concern has fueled the growth of these systems. With the introduction of the industry's first hybrid, water and inert gas fire suppression system in 2009, the industry has responded by developing an applicable standard for this technology; the NFPA is working toward the creation of a new code for hybrid systems – the NFPA 770 Standard on Hybrid (Water and Inert Gas) Fire Extinguishing Systems.

Standardisation of new technologies

As we have seen with the effort to create the NFPA 770 standard, the development of new fire protection solutions can actually guide and improve the evolution of NFPA codes. Companies which create new technologies look to have them standardised and incorporated into the internationally recognised set of fire codes.

The biggest challenge with developing a new technology in fire protection systems is that some of the most innovative ideas and solutions typically do not fit into these already existing codes, standards and practices. Due to the risks involved in the fire protection market, owners, engineers, inspectors and contractors tend to adhere to the status quo.

In order to gain acceptance from these owners and engineers, a company developing the technology must demonstrate how the new technology either complies with the existing norms or offers significant value. Generally, a timeline must be provided for when agency approvals and listings will become available. As a result, new product development in the fire protection market requires an understanding of the limitations of existing codes and standards and coordination between customers and regulatory agencies.

The time from development in the lab to introduction into the marketplace can be as short as nine to 12 months or can last up to several years, depending on the innovation that is under development.



New product solutions are generally subject to a robust and rigorous testing process prior to installation, ensuring the highest level of reliability. Companies work with internationally recognised approval agencies such as UL (Underwriter’s Laboratory), FM (Factory Mutual), VdS (In German: Verband Der Schadenversicherer), and LPCB (Loss Prevention Certification Board) to ensure that newly developed and existing products meet all regulatory requirements.

Manufacturers of fire protection systems conduct research in conjunction with universities and work with organisations such as NFPA, ASTM International (American Society for Testing and Materials) and AWWA (American Water Works Association) to develop new standards and codes. Fire engineers from around the world are consulted due to the importance of understanding the local codes and installation practices in different markets. As a result, engineers are spending more time outside of the U.S., visiting jobsites and interacting directly with the engineering firms and contractors that are specifying or installing products.

What lies ahead

In the future, we will see the use of more software for the development of fire protection technologies, as well as alternative materials that will be created for piping. The most important trend will be the continued development of solutions that minimise the use of water, with much research being put into finding alternative chemical-based firefighting systems like foams or aerosol based solutions.

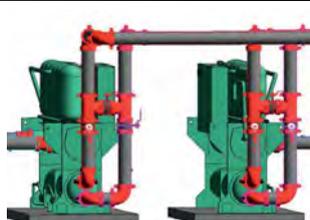
With no significant lack of new talent in the engineering community, the fire protection industry should continue to grow. But for this to happen, manufacturers of fire suppression systems must continue to collaborate with organisations around the world to adopt innovative and environmentally friendly technologies to push the industry forward.



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