National Research Council Canada | Conseil national de recherches Canada

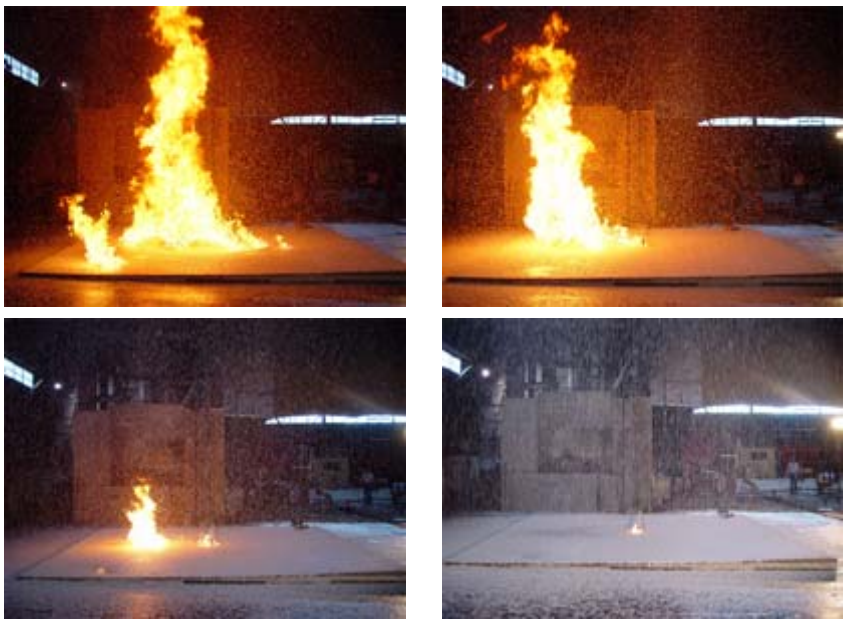
CONSTRUCTION INNOVATION Volume v 10, Number no 2, June 2005

On the cover

Compressed air foam an IRC commercialization success story

Sometimes it's the performance of a product that comes to IRC for testing that catches a researcher's eye. Sometimes it's the promise of real progress that attracts attention. Whatever it is, when a researcher sees something in a new technology and pushes it to reach its full potential, breakthrough discoveries can reach the Canadian marketplace.

This is certainly the case with compressed-air foam (CAF), a product developed to fight wildfires that came to IRC's Fire Research program as part of a project from the Department of National Defence. DND asked IRC to test and compare the effectiveness of CAF with sprinklers and water-mist systems. Although there were problems with CAF in the testing, IRC researchers George Crampton and Dr. Andrew Kim saw something in the performance of CAF that made it stand out.



CAF extinguishes a free-flowing heptane spill fire in 38 seconds.

Because of this potential, they have worked for over 10 years and conducted over 200 full-scale tests to develop and verify new ways of delivering CAF. Crampton has also developed several patented nozzles, a computational flow model and a fixed piping and distribution system to allow CAF to perform to its full potential.

These efforts have definitely paid off. In 2001, IRC signed a license agreement with a Canadian company called FireFlex Systems Inc., a sprinkler company with experience in halon and water-mist systems. The IRC team felt that this blend of expertise and reputation in manufacturing both gas and water-based systems would make FireFlex the right partner to develop commercial CAF systems.

Since 2001, IRC has conducted a further 100 fire tests. These tests have included power

transformer protection and Factory Mutual approval tests to evaluate the new technology for both fire-extinguishing performance and hardware ruggedness. In 2004, Factory Mutual approved the FireFlex CAF system.

"The system meets all existing performance criteria and offers many advantages. It can extinguish a fire in half the time of a conventional system using one quarter of the water, and the technology is a good fit for applications where water is in short supply or where there is a high cost to treat the water after it's been discharged"...

In January 2005, the first commercial CAF system in the world was installed at Hydro One's Pickering generating station and activated for demonstration. FireFlex is also scheduled to complete installations in a Yellowknife aircraft hangar and a Quebec flammable liquid storage facility in the summer of 2005. The environmental impact of each of these installations is an order of magnitude lower than that of a conventional system.

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The IRC researchers, in conjunction with Canada Mortgage and Housing Corporation (CMHC), are now adapting CAF for use in protecting residential housing across the Northwest Territories.

"The risk of fire in the North is eight times the national average, and most communities don't have a reliable water supply," said Crampton. "As well, there are the difficulties of fighting fires in extremely cold and isolated areas to contend with."

For more information on the CAF research project, please contact George Crampton at (613) 256-4464, ext. 224, fax (613) 256-1309, or e-mail george.crampton@nrc-cnrc.gc.ca.

What is compressed air foam?

A substance that resembles shaving cream, CAF is a mixture of water, foam concentrate and air in specific proportions. An operator or operating system sends the mixture through a hose or pipe to form the actual fire-fighting foam. The mixture uses up to four times less water and up to six times less foam concentrate than conventional foam systems, which greatly reduces the cost of the product and its environmental impact.

These benefits make it ideal for fighting fires in places where water storage or environmental cleanup of foam mixed with a flammable liquid after the fire could be an issue, such as aircraft hangars. In addition, the benefit of the material's light weight makes it ideal for use in high-rise towers because the amount of energy required to elevate it is greatly reduced.

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