

SprinklerScene

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NFPRF Suppression and Detection Symposium Highlights

Possibly the most concentrated focus on fire suppression systems research since Sweden's 1990 Brandforsk/NIST First International Conference on Fire Suppression was held February 12-14, 1997 in Orlando, Florida by the National Fire Protection Research Foundation. A total of twenty-three papers were presented, at least half of which applied in whole or part to research involving fire sprinkler or water mist systems.

The symposium, which the sponsors announced will become an annual event sited in Orlando in February, included panel discussions and ample time for interaction between conference participants. Ten of the presentations dealt with water-based fire suppression systems.

Although most of the presenters were from the United States, the symposium included results of full-scale fire tests of sprinklered offices by the Canadian National Research Council, and a summary of the sprinkler-related work of three fire research institutions in Sweden: the Department of Fire Protection Engineering at Lund University of Technology, the Fire Engineering Section at the Sweden National Testing and Research Institute (SP) and the Swedish Defense Research Establishment.

Other research topics discussed included water mist nozzles for machinery spaces, testing of new window sprinklers, investigation of microbiologically-influenced corrosion of sprinkler piping, wet bench fire suppression for the semiconductor industry, performance-based code alternatives, and the NFPRF sprinkler/vent/draft curtain project. Copies of the proceedings of the symposium are expected to be available from the NFPRF in Quincy, MA within the next few months.

CPVC Sprinkler Piping Used in Industrial Applications in Australia

The previous issue of NFSA's *International SprinklerScene* reported on a fire sprinkler system installation in a warehouse in England, indicating that this was possibly the first industrial use of CPVC for sprinkler protection. Not so, say our friends from down under. David Robinson of the Adelaide, Australia office of the mechanical / fire protection engineering firm of Lincolne Scott reports that CPVC sprinkler piping was installed in two industrial systems in Mount Gambier, South Australia in 1993 and 1994. The systems utilized steel pipe ring mains at the eaves, gridded with CPVC range (branch line) piping. The systems were not in full compliance with AS2118, the Australian sprinkler standard, but were permitted as a performance-based alternative under the Building Code of Australia.



Sprinkler/Vent Study Attempts to Advance Sprinkler Modeling

An international fire sprinkler/heat and smoke vent/draft curtain fire test research project is currently underway in the United States, under the auspices of the National Fire Protection Research Foundation. Although intended to investigate the interaction of sprinklers, vents and draft curtains, the project also includes an aggressive effort to advance the state of the art of fire modeling capabilities with sprinklers. The National Institute of Standards and Technology (NIST) has made a major commitment of its own personnel and resources for a two-year period, acting in the role of Technical Director.

NIST is helping to develop the data needed for successful adaptation of a computational fluid dynamics technique known as Large Eddy Simulation (LES) modeling to the sprinkler/vent/draft curtain problem. This field modeling essentially divides large rooms into 6-inch cubes, and tracks fire development and hot gas movement through the space. Data from small-scale testing to determine the sensitivity and droplet distribution characteristics of sprinklers will be included in the model, and the actual results of full-scale tests of high-piled storage will eventually be compared against results predicted using computers.

To date, the work has included some gas burner tests in the new Underwriters Laboratories test facility in Northbrook, Illinois, studying the activation of extra-large orifice (ELO) sprinklers in simulated large rooms with and without interaction of ceiling vents. The next phase is expected to take place in July 1997, and will involve large-scale fire tests of 20 ft (6.1 m) storage of Group A plastics in racks under a 25 ft (7.6 m) ceiling protected by extra-large orifice (English K 11, metric K 160) spray sprinklers.

Upcoming Meetings, Seminars and Exhibitions of Interest

June 11-13, 1997 - 25th Meeting of ISO/TC21/SC5/WG1, London, England

September 11-13, 1997 - NFSA Annual Seminar and Exhibition, Baltimore, Maryland, USA,
FAX 1-914-878-4215

November 16-19, 1997 - National Fire Protection Association (NFPA) Fall Meeting, Kansas City, MO, USA, FAX 1-716-770-3000

November 26-28, 1997 - Fire Australia '97 and 5th Asia-Pacific Trade Fair, FPA Australia, Fremantle, Western Australia, (03) 9882-2800

December 3-6, 1997 - Security Brazil '97, ITE Security & Fire Safety Division, Rio De Janeiro, FAX + 44 171 286 0177

July 1-2, 1998 - 3rd International Fire Sprinkler Conference, Glasgow, Scotland, FAX 1-914-878-4215

World Sprinkler News

- ◆ The fire sprinkler system had not yet been turned on when a fire broke out in the 36-story Meridian President Tower in Bangkok, Thailand on February 23, 1997. Two people died in the fire the day before the scheduled opening of the hotel/office/shopping complex. Thai officials are expected to act soon to close a loophole in the 1992 Building Control Act that fails to specify when sprinklers and other protection features are to be activated.
- ◆ Lund University in Sweden has published a collection of research papers by Haukar Ingason entitled *Experimental and Theoretical Study of Rack Storage Fires*. Seven individual papers present the substance of research completed in fulfillment of Ingason's PhD requirements from 1990-1996, including modeling of rack storage fire plumes.
- ◆ In the aftermath of the November 1996 fire that caused an estimated \$80 million in property damage alone, Eurotunnel is reportedly preparing a request for bids on the installation of fire sprinkler systems. The fire originated on a shuttle bound for the United Kingdom, located approximately 12 miles from the French end of the tunnel. The reduction in insurance costs is expected to pay for the system installation over time.
- ◆ An investigation by the National Fire Protection Association into the fires following the January 17, 1995 earthquake in Kobe, Japan noted that water supplies were compromised quickly by a large number of breaks. The earthquake killed more than 6,000 people. The report contains the following summary of fire protection system damage: "As for sprinkler systems, local experts say that they were not commonly used. Even when they were, they were often so badly damaged that they were not functional. In one hospital that did have a sprinkler system, the fifth floor suffered a pancake collapse that rendered the entire system inoperable. Many high-rise apartment buildings were equipped with a number of standpipe systems, but the quake frequently offset these buildings at street level by several inches, and it is assumed that the underground piping was severely damaged".
- ◆ The British Building Research Establishment (BRE) is being privatized. A BRE management team has been successful in winning the right to purchase the research center.
- ◆ The New Zealand legislature is considering two acts that would restore an important fire sprinkler incentive. Prior to the 1980's, the national fire service was supported by a levy based on the insurance premium paid, which reflected risk and recognized the value of built-in fire protection in reducing the burden on public fire protection services. Since the 1980's, however, the fire service has been largely (90%+) funded by a levy on the insured value of buildings. The two proposals being considered would restore an incentive for built-in protection, giving a credit of 40 to 70 percent for fully sprinklered buildings.
- ◆ The newly-released 1997 edition of the NFPA 101 Life Safety Code requires sprinklers in all new detention and correctional occupancies, including those that were previously exempted due to fire-resistive construction.
- ◆ The NFSA home page is now accessible on the internet at <http://NFSA.ORG>. With new information being added on a weekly basis, use of the web site is increasing exponentially. Log on to sign the guest book - the welcoming fire sprinkler suppression graphic alone is worth the effort!

Central Sprinkler and UL Urging Omega Sprinkler Sample Testing

Central Sprinkler Corporation and Underwriters Laboratories are publicizing the need to sample test "Omega" type sprinklers that were manufactured prior to June of 1996 and installed in sprinkler systems. Four incidents of non-activation of the sprinklers have been reported, in which the sprinklers fused but did not operate due to sticking of the o-ring assembly seal within the shaft of the device. In all four cases adjacent sprinklers have operated, and the fires have not resulted in any injuries.

The problems of possible non-activations of the Omega sprinklers at low pressures have been attributed by Central to either reaction with residual hydrocarbons in the water from cutting oils or from improper use of stop leak products. For this reason, Central has been recommending sample testing of all Omega sprinklers installed in steel pipe systems. In June of 1996, the o-ring material was changed from EPDM to silicone, reportedly eliminating the hydrocarbon reaction problem.

In both copper systems and CPVC systems with copper risers or feed mains, there have also been isolated reports of higher required operating pressures blamed on dezincification, where, in areas with caustic water supplies, zinc may have leached out of the high-zinc brass sprinkler body. Although this phenomenon would normally make itself evident by leaks in the sprinkler body, it might also have permitted the formation of deposits potentially impairing sprinkler operation. Central reports that it changed its alloy in 1990, eliminating the potential for dezincification.

Underwriters Laboratories is recommending that samples be taken from all existing sprinkler systems with Omega sprinklers manufactured prior to June of 1996, and is providing sample testing free of charge.

The Omega sprinkler models are generally identified by their 3 circular heat collection fins, although other manufacturers make similar-looking models. Omega series models include the following: C-1, C-1A, C1A PRO, C1A PRO ID, EC-20, EC-20A, EC-20 AID, HEC-12, HEC-12 ID, HEC-12 PRO, HEC-12A PRO, HEC-12 RES, HEC-20, HEC-20 ID, R-1, R-1A, R-1M, AC, M, and Flow Control.

Central is recommending that they be contacted for proper removal and packaging procedures through Mr. Andy Post (215-362-0700 or 800-523-6512). Operational testing can then be completed if the samples are shipped to Mr. Kerry Bell, Underwriters Laboratories, 333 Pfingsten Road, Northbrook, IL 60062, USA.

