

# Burn Out!

## Well-maintained building sprinkler system critical

The fire sprinkler has been called the “silent sentry”: on guard at all times to defend buildings against fire. Before the 1870s – back when smokers, arsonists and fireplaces represented the only real fire dangers – there was generally no need for fire sprinklers. But with the spread of electricity, space- and hot-water-heating equipment, and the proliferation of modern appliances, the potential for fire has increased. And so have the presence of fire sprinkler systems and the need to properly maintain them.

Today, 10 U.S. manufacturers produce more than 900 different styles of sprinkler heads. The seemingly endless array is categorized by the occupancy of the structure to be protected by them: general use, institutional, residential, attics, special hazards and storage. Most of the various sprinkler

heads now installed contain a glass bulb with a measured amount of fluid inside. When heated, the fluid expands, shattering the bulb and activating the sprinkler system.

The National Fire Sprinkler Association (NFSA) considers sprinkler systems to be the single best tool to protect lives and property from fire. But for sprinklers to perform reliably, they must be properly installed, inspected and maintained. Unfortunately, a 1993 study by the National Institute of Standards and Technology found that improper sprinkler system installation or maintenance causes them not to operate effectively 8 percent of the time.

Those in the fire sprinkler industry are doing their part to ensure sprinklers can be relied on to perform when

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Photo by Lori Churchill.

*There are more than 900 styles of fire sprinkler heads, three of which are shown here. From left: a fast-response sprinkler head (the thinner, more fragile bulb reacts more quickly in the case of fire), a eutectic alloy (low-melting) sprinkler head, and a conventional glass-bulb sprinkler head.*



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# Driving Home a Point

*After-market auto parts may be unreliable, unsafe*

A beautiful, 1966 big-block Corvette is accelerating down the highway when, without warning, the rear axle shaft separates, causing the suspension to tip. The tire pounds its way through the fiberglass wheel well, causing the car to fishtail. The car spins repeatedly – finally coming to a stop with a severely damaged body and a completely stunned driver.

What happened? Forensic investigation concluded that a universal joint in the rear half shaft failed catastrophically. While this Corvette's original universal joints were designed without lubrication holes, after-market u-joints had been installed that were cross-drilled. This weakened the joints so they were unable to handle the added loads of suspending the vehicle. The car's remaining suspension components fell outward, the tire destroyed the rear wheel well, and the car lost control.

While original equipment manufacturers (OEMs) have component designs that can and do fail, for the most part they are safer than after-market products. After-market parts producers don't always maintain design integrity with their components. Many after-market universal joints have nowhere near the life expectancy or durability of OEM parts. Seal and other component failures can cause seized and damaged joints – even allowing the drive shaft to drop out of the car!

Cheap, inferior knockoffs of other replacement parts also abound. Some after-market suppliers copy planetary gear sets and pump rotors in dimensions that are not reflective of strength and durability requirements – with potentially disastrous consequences. Poor-quality

pump seals, for example, can completely fail, or result in a vehicle fire, in just a few thousand miles of use.

In their exhaust system components, a number of after-market companies use mild-steel, single-wall pipe. Especially in the typical northern environment, these have a much shorter life expectancy than OEM-specified pipe, corroding more easily and potentially exposing passengers to deadly carbon monoxide.

Inferior chassis parts can present another problem. Some after-market ball joints are sold separately – not already press-fit into the lower control arm – with the customer responsible for installation. These joints don't always fit properly, however, which can lead to control arm breakage.

In all of these cases and more, metal-

lurgy, testing and automotive engineering experts can determine if an inferior automotive component has caused or will cause a vehicle liability problem. ■

*-Jeff Wingfield, Mechanical Engineer*

Mechanical Engineer Jeff Wingfield is new to Crane Engineering, bringing with him 23 years of power transmission, machining,



hydraulic systems design, consulting and business management experience. Jeff has extensive background in automotive applications, with emphasis on vehicle driveline systems. He also has intensive training on intricacies of automatic-transmission hydraulic-control methodology. Just give Jeff a call at (763) 557-9090 or email him at <[jeffw@craneengineering.com](mailto:jeffw@craneengineering.com)> with your automotive questions.



*This 1966 Corvette is in perfect operating condition. Some Corvettes and other vehicles, however, have experienced significant problems when they have been restored using defective after-market parts.*

# Alarming Results

*Carbon monoxide danger is real*

Study of nearly 3,600 households in six cities shows that of residents whose carbon monoxide (CO) alarms sounded, about 62 percent did not call anyone for help.

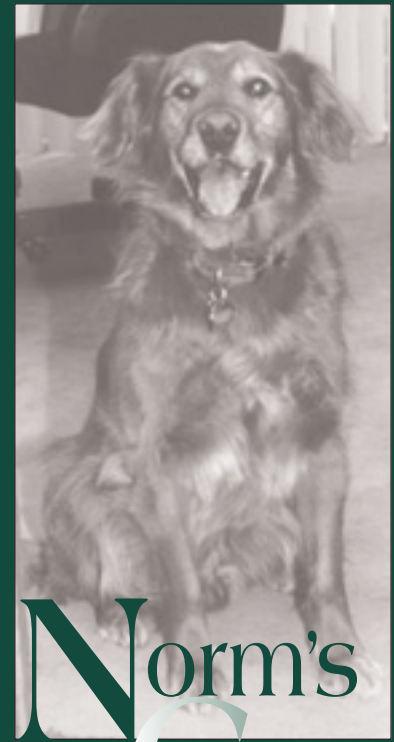
The study, sponsored by the Gas Technology Institute, was a followup to a study of residents in four cities released in 1998. Manufacturer instructions and the U.S. Consumer Product Safety Commission recommend that residents call emergency services.

The residents who did not call for help were asked to explain why. In about 23 percent of the cases, residents say they suspected a false alarm, while in 30 percent of the cases, the residents say they knew the source of the CO and fixed the problems themselves. The survey responses, however, cannot verify whether the alarm activations are truly false alarms or whether residents actually fixed the responsible source of CO.

The study, conducted by Resource Strategies Inc., surveyed households in Atlanta, New York, Oklahoma City, Albany, Chicago and Toronto in mid-1999. The last three cities have ordinances that require CO alarms in certain kinds of dwellings.

“Despite claims that the accuracy of these alarms has improved, large numbers of people still aren’t calling emergency services when the alarms are activated,” says Ted Williams, AGA director of codes and standards. “This indicates a continuing lack of consumer confidence in CO alarms, which in some cases may be placing residents at risk of CO poisoning.” ■

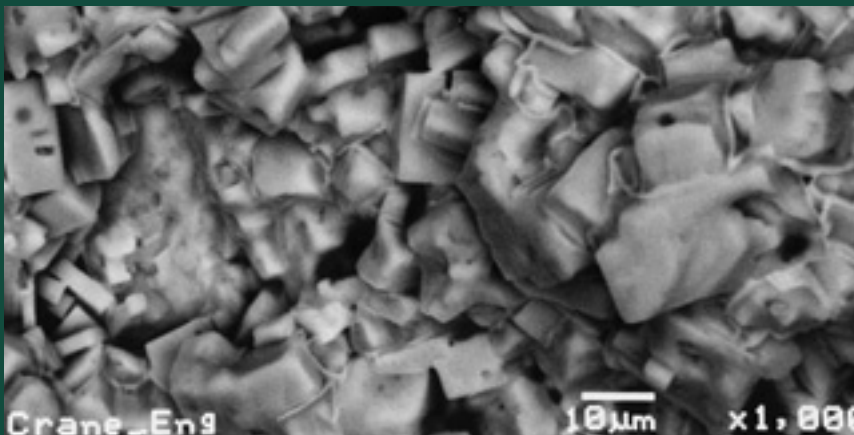
*-Reprinted from August/September 2001 American Gas magazine.  
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## Norm's Corner

This will be the last “Norm’s Corner.” In November, Norm passed away from what the doctors think was a brain tumor. We here at Crane are deeply saddened by his loss. Many of you have heard the news and have written or called to express your own sympathy and sadness, and we thank you for it. Norman was a wonderful dog to be with – whether it was every day in the office or just while dropping by for an inspection. His presence brought happiness to everyone around him. He is, and will continue to be, sorely missed. ■

## SEM MYSTERY IMAGE



**Slip slidin’ away.** Whether walking or driving during the winter, this can keep you on the straight and narrow. See p. 4 for the answer to this issue’s mystery image.

**Burn Out!** *continued from page 1*

needed. Nine U.S. manufacturers have joined forces to fund an outside audit of their industry's quality assurance practices and testing. And fire sprinkler installers continually strive to keep up with the strict guidelines pertaining to new and rapidly advancing sprinkler technology.

Individual building owners and managers must also take an active role in sprinkler maintenance. Sprinkler systems need to be inspected regularly for leaks, rust or microbiologically influenced corrosion. Left unrepaired, these conditions could have catastrophic consequences. By performing periodic checkups, building operators can ensure their systems are ready to uphold the fire sprinkler's excellent record of saving lives and property.

Crane Engineering is a member of the NFSA and has an active role in the Minnesota chapter. The company has been called on to perform failure analysis of defective sprinkler heads. ■

*-David J. Kramer, P.E.,  
Metallurgical Engineer*

## NOTES

**Welcome, Vern!** Crane Engineering is pleased to welcome its newest employee, Vern Gothman, mechanical technician. Vern has nearly 20 years of experience and will assist with mechanical engineering projects and evidence handling. We're glad he's on board!

**Area 51A Opens.** Crane Engineering recently added 5,000 sq ft of testing and storage space at a separate facility near its current office. The new space, named "Area 51A," is being used to further improve cataloging and retrieval of investigation evidence (as per ASTM Standards). Area 51A also allows a greatly expanded product-testing facility.

**Presentations and Trade Shows.** Dave Kramer gave a presentation on fire metallurgy at Minnesota International Association of Arson Investigators'

### Sprinkler Manufacturer Announces Replacement Program

Central Sprinkler has announced a replacement program for sprinkler models GB and others that contain O-rings and have been manufactured since 1988. The company will supply replacement sprinklers and the labor needed to install the new equipment.

Testing by Underwriters' Laboratories has shown that some of these sprinklers require unacceptably high operating pressures when activated by heat. The problem is reportedly associated with leakage past an O-ring seal that results in corrosion – which may or may not be visible during normal system inspection.

For more information on the replacement program, call Central at (866) 505-8553 or visit the company's Web site at <[www.sprinklerreplacement.com](http://www.sprinklerreplacement.com)>.

### New Email System Debuts

Please note Crane Engineering's new email addresses for your records.

#### General Information

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**Thomas R. Crane, P.E.**  
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quarterly meeting in December. In February, John Brynildson participated on a panel of experts at a Minnesota Institute Legal Education seminar titled "Fire!" and gave a presentation on fire metallurgy to the Association of Women in the Metal Industries. Also in February, Scott Sollars gave a presentation on propane fires at the West Central Claims Association Conference in Willmar, Minn. Crane Engineering participated in several February trade shows: NACE International Twin Cities Chapter Corrosion Seminar, Minnesota Defense Lawyers Association Annual Mid-Winter Conference, Northwest Loss Association and ASM International-Minnesota Chapter.

**NFPA Launches Risk Watch Web Site.** The National Fire Protection Association has launched a new Web site at <[www.riskwatch.org](http://www.riskwatch.org)>, which addresses child-safety issues. The site supports the program Risk Watch®, the first comprehensive injury-prevention

program for children in preschool through grade eight. Check out the site for all kinds of helpful hints - for parents, teachers and kids!

**Fire Code Participation.** Tom Crane, president of Crane Engineering, has been a member of the National Fuel Gas Code Committee (NFPA 54) for four years. He is now involved with the completion of the committee's work for the current cycle of this governing document for gas system installation in the United States. ■

The answer to "Slip Slidin' Away"  
Taken using Crane's SEM/EDS, the mystery  
image in this issue is ice-melt salt. Be sure  
to look for another mystery image in our  
next Probe newsletter.

SEM MYSTERY IMAGE

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