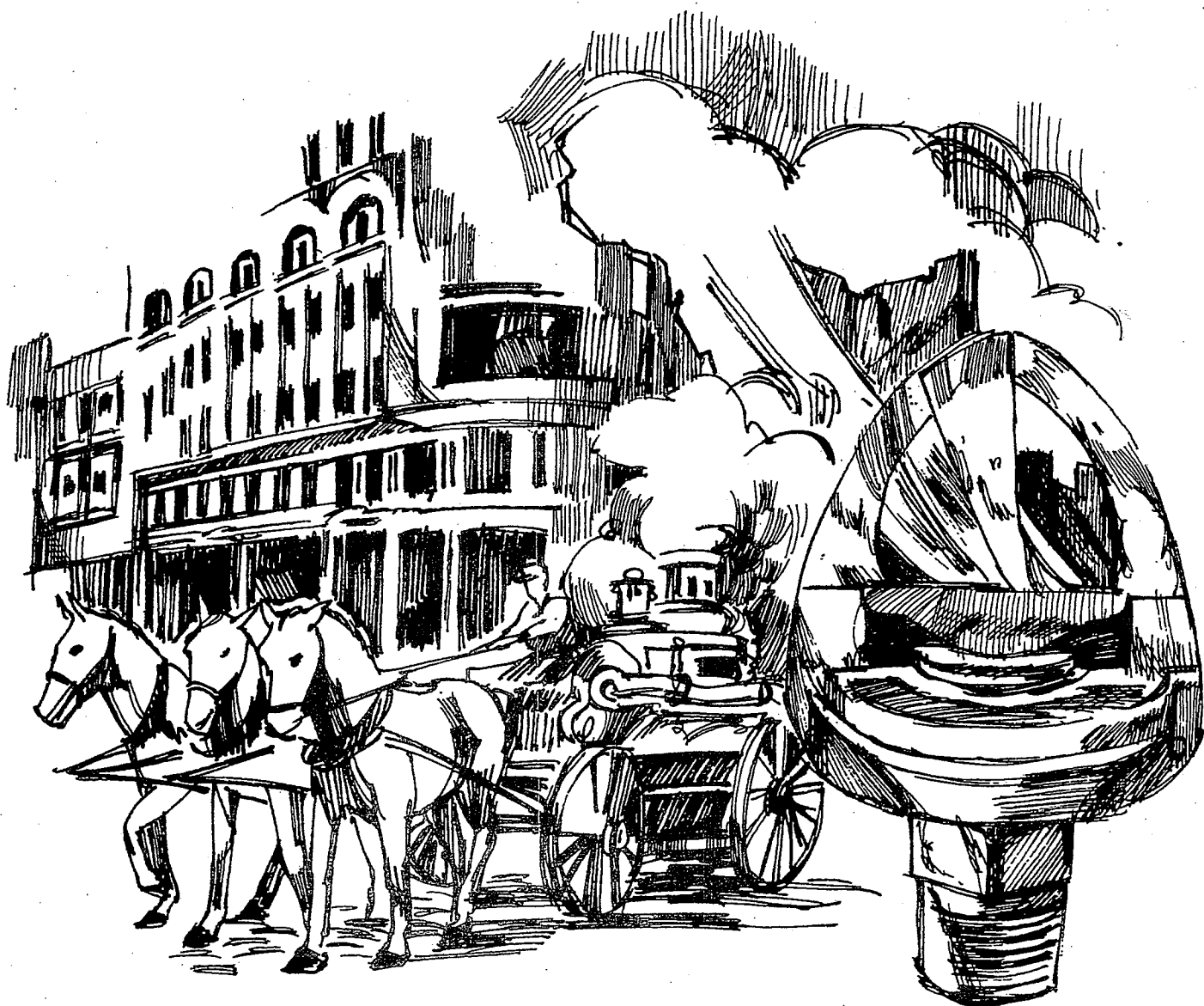


AN OLD IDEA WITH A NEW TECHNOLOGY

by

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I Historical Background

Automatic sprinkler systems have enjoyed an enviable record of protecting life and property for over one hundred years. Statistics demonstrate there has never been any multiple death fire in a completely sprinklered building where the system was properly operating.

According to National Fire Protection Association (NFPA) statistics, the only fatalities in fully sprinklered and properly supervised properties have been the result of explosions or flash fires. Self immolation by a person who was too young, too old, too intoxicated or too handicapped in some other way to protect himself properly, has been the cause of death. Unfortunately, the inadvertent closure of a valve controlling the water supply to the the sprinkler system has also rendered the system ineffective in some fire conditions.

During the mid 1970s, the National Commission on Fire Prevention and Control conducted exhaustive research in examining the fire problems in the United States. They published "America Burning" which concluded that this nation, a world leader in technological advancement, suffered from one of the highest death rates and injuries due to fire. As a result of the Commission's work, legislation was enacted in the Congress of the United States which created the U.S. Fire Administration. This Administration's objective was to reduce deaths from fire by 50% before the decade of the 1990s. Although large life loss fires, such as those occurring in hotels and motels, become national media events, statistics clearly show that the residential fire has been, and presently is, what we have characterized as the fire protection community's public enemy No. 1. From 1977 to 1981 the National Fire Protection Association (NFPA) reported that there was an average of 7,700 civilian fatalities annually attributed to fire. This would be comparable to having two 747's crash in midair each month. As one fire protection expert commented: "In the course of a normal lifetime, almost a 1/2 million people will die in the United States from fire."

II A New Technology

In cooperation with the U.S. Fire Administration, Factory Mutual Research Corporation conducted a series of fire tests during 1978 in an effort to study current sprinkler technology and its application to residential type fires. Factory Mutual concluded as a result of this research that the then available commercial/industrial type sprinkler devices were simply not adequate to protect against the type of fire loadings expected in residences. The commercial/industrial sprinklers were too slow in their operation and did not provide the high enough wall wetting pattern which was needed to cut off the perimeter fire which could be commonly expected in homes. Additional test

II A New Technology - Continued

programs, funded by the U.S. Fire Administration, in cooperation with the National Fire Protection Association and Factory Mutual, were conducted. These tests substantiated the initial research conducted at Factory Mutual and demonstrated, without question, the need for a sprinkler device with a faster response time and the capability of delivering water which provides wetting higher on the walls to help counter the perimeter fire which is common in residential fire scenarios. Grinnell Fire Protection Systems Company, Inc., in cooperating with these agencies, developed prototype sprinkler heads for these test programs.

The National Fire Protection Association established a subcommittee of N.F.P.A. 13, which developed a new residential standard for one- and two-family dwellings and mobile homes. In November of 1980, at the N.F.P.A. meeting in San Diego, N.F.P.A. 13D, Standard for the Installation of Sprinkler Systems in One- and Two-Family Dwellings and Mobile Homes, was adopted. This new standard, which was based on the results of the fire test program, called for only listed new residential sprinklers for installation in accordance with the criteria established by the N.F.P.A. 13D Committee. Underwriters Laboratories (U.L.) established a new manufacturing standard, U.L. 1626, which set very stringent sensitivity, water distribution, and fire test requirements for manufacturers seeking a listing for newly designed residential hardware. In May of 1981, Grinnell Fire Protection Systems Company, Inc. became the world's first sprinkler manufacturer to successfully pass all of the U.L. tests and obtain a listing for the world's first residential fire sprinkler.

An old idea, utilizing a new technology whose time had come, was now a reality.

III Rationale

N.F.P.A. #13D Sprinkler Systems, One- and Two-Family Dwellings and Mobile Homes (1980) is "intended to provide a method for those individuals wishing to install a sprinkler system for additional life safety and property protection. It is not the purpose of this standard to require the installation of an automatic sprinkler system."

Simply stated, "where" fire protection systems are required is generally covered in building and fire codes, or local ordinances. N.F.P.A. standards, on the other hand, outline the design criteria for "how" the system should be installed in order to protect against particular potential hazard. A subtle, but important difference. Since the present scope of application of N.F.P.A. #13D (1980) deals with the design installation of automatic sprinkler systems for one and two-family dwellings and mobile homes, any system design for occupancies

III Rationale - Continued

which fall outside the scope of this standard should only be permitted with written authorization from the "authority having jurisdiction." Based on the research conducted in developing this new residential sprinkler technology, as well as fire tests and demonstrations coordinated by the U.S. Fire Administration and Factory Mutual Research Corporation, a number of "authorities having jurisdiction" are in the process of considering residential fire sprinkler ordinances. The concept of "access trade-offs", as well as "construction trade-offs" is gaining in popularity. As an example, such ordinances may include, but not be limited to, requiring the installation of residential fire protection systems in accordance with N.F.P.A. #13D (1980) in low rise, high density type construction as a means of mitigating one or more of the following fire protection specifications.

Access Trade-offs

<u>Without Residential Fire Protection</u>	<u>With Residential Fire Protection</u>
Units must be within 5 minute response of nearest fire station	Waived
Units must not be located more than 150 feet from closest vehicular access way.	Waived
Standard street widths required	Reductions permitted
Street grade of 15% or greater not permitted	Waived
Must adhere to hydrant spacing requirements	Greater hydrant spacing permitted
Fire flow requirements must be met	50% reduction in required fire flow
Hazardous areas - 75 units for single means of ingress or egress	Number may increase
Nonhazardous areas - 150 units for single means of ingress or egress	Number may increase
Access for ladder trucks - 50' from rear of parking stalls to face of unit	Extended to 75' or 100'

Access Trade Offs - Continued

When any portion of a building is in excess of 150' from a water supply, it may be required that on-site fire hydrants and mains capable of supplying the required fire flow be installed. Waived

CONSTRUCTION TRADE-OFFS

<u>Without Residential Fire Protection</u>	<u>With Residential Fire Protection</u>	<u>Savings/ Advantage*</u>
Tenant separation walls must be made of 5/8" Type X Fire Rated Gypsum Wallboard.	Half-inch standard Gypsum Wallboard may be substituted.	\$23.00 per 1,000 sq. ft.
5/8" Type X Rated Gypsum Wallboard and 3/4" plywood must be used in one-hour floor/ceiling assemblies.	Half-inch standard Gypsum Wallboard and 5/8" plywood may be substituted in floor/ceiling assemblies.	\$55.00 per 1,000 sq. ft.
Fire stops are required in the attic at every unit.	Fire stops in attic required every 3,000 square feet.	\$123.00 each fire stop.
Maximum tenant travel to a fire exit must not exceed 20 feet.	Exits may exceed the maximum required travel from a tenant with one exit may be exceeded by 15 feet for a maximum travel of 35 feet.	Design Freedom
Tenants may not travel by other tenants' doors unless those doors are 3/4-hour fire rated doors in 20 minute frames with 3 UL listed spring hinge closers.	Standard doors and frames with no closers may be used.	\$111.70 each door.
Interior finish must be Class "A".	Interior finish may be Class "C" or better.	Design Freedom
One-hour rating on walls and doors of hazardous areas.	No one-hour rating of doors or walls of hazardous areas.	\$23.00 per 1,000 sq. ft. (walls). \$111.70 each door.

CONSTRUCTION TRADE-OFFS - Continued

Hazardous area must be one-hour rated walls with 3/4-hour rated doors with 3 UL spring hinge closers. (Hazardous areas are: common storage, common mech. rooms, etc.)

Standard 1/2 inch sheet-rock and standard doors with no closers may be used.

\$23.00 per 1,000 sq. ft. on walls.
\$55.00 per 1,000 sq. ft. on ceilings.
\$111.70 each door.

Every 6,000 square feet a four-hour masonry fire separation is required.

The fire rated separation would not be required until 10,000 square feet and after 8,000 square feet a two-hour separation would be permitted.

\$8,345 each 4-hour wall.
Note: Cost of 2-hour sheet-rock wall-\$750.

Buildings must be placed on property to not exceed 50' from paved parking area for aerial rescue operations.

Buildings allowed up to 125' from street or parking area.

Allows maximum use of site and landscaping.

There can be no windows within 15 feet of other tenants travel.

Windows may be placed anywhere desired.

Design Freedom

*Builder/Developer, Cobb County, Georgia. (1982 Dollars)

IV Housing Trends

America is facing a severe housing crisis. If the demographic demands of the fertile 50s are not met, this country will face, during the decade of the 80s, a housing shortage unparalleled in the annals of the residential construction industry. Because of rising construction costs, coupled with high interest rates, affordable housing is beyond the economic reach of the majority of our population. Many builders believe that the days of the "sprawling single family dwelling" are coming to an end. In an effort to make greater utilization of skyrocketing land costs, many builders/developers are turning to "high density" construction in the form of low-rise condominiums, townhouses, triplexes, four-plexes, and garden apartments. It is hoped that this type of residential construction will make housing more affordable and provide a salvation for a severely depressed housing industry. Unfortunately, the extra burdens that this type of construction is placing on local fire departments is becoming very real indeed.

IV Housing Trends - Continued

It is well known that the tax reform legislation presently sweeping the country has caused substantive cutbacks in many municipal budgets. These fiscal constraints are dramatically affecting fire department funding in many cities and towns. Manpower reductions and the lack of ample funding for additional fire stations, new equipment and training programs has the potential of seriously hampering the fire fighting effectiveness in many municipalities; and high density type construction will not help the situation. Financially beleaguered fire departments simply do not have the necessary resources needed to fully protect these properties. As a result, many municipalities are turning to private fire protection in the form of residential fire sprinklers to supplement already strained public protection.

V Financial Motivations for Residential Fire Sprinkler Systems

In addition to access and construction trade-offs which are gaining popularity among the fire services, a number of financial inducements are being enacted which will provide financial motivation for individuals to install residential fire sprinkler systems.

Insurance Savings

Following the 1979 test program in Los Angeles, an Ad-hoc Committee composed of the insurance industry conducted a series of fire tests to consider the impact of residential sprinklers on fire losses in dwelling properties. Although it was acknowledged that the greatest benefit of residential fire sprinklers will be in the saving of lives and preventing injuries from fire, the major focus of this test program was on the single factor of determining the impact on property loss reduction.

Based on the results of this test program, it was the observation of the Ad-hoc Committee that residential fire sprinkler systems definitely had the ability to reduce claim payment expenses. The committee further recognized that an earlier (1977) I.S.O. discount was less than what seemed to be appropriate as a result of those tests.

Since 1977, the Insurance Services Office has had filings in many states providing a 5% discount on a total homeowner policy premium covering a dwelling with an approved and properly maintained sprinkler system that covers all areas of the insured structure. Their filings also allowed a 2% discount for a similar system that omits specified areas such as closets, attics and bathrooms.

After considering the report from the Ad-hoc Insurance Committee, and the U.S. Fire Administration's sprinkler comparison test program, the Homeowner's Committee of I.S.O. made a recommendation that could result in a tripling of the

Insurance Savings - Continued

discount for residential sprinkler systems installed in accordance with N.F.P.A. 13D (1980). Discounts of up to 15% would be applied to the entire homeowner policy premium for single family residences protected in accordance with N.F.P.A. 13D (1980). Since a homeowner premium is multi-peril in nature, it is estimated that the fire protection portion of the premium usually accounts for 40% of the entire policy. A 15% discount applied to the total homeowner premium translates into a fire insurance discount of almost 37%.

Water Damage

It has been suggested that the installation of a residential fire sprinkler system in a home would cause an insurance company to penalize a homeowner because of the threat of water damage due to inadvertent sprinkler leakage. Insurance statistics from commercial underwriting departments of several large insurance companies demonstrate that sprinkler leakage is one of the most profitable lines of coverage that insurance carriers underwrite. The payment of claims for the inadvertent discharge of sprinklers is minimal considering the number of exposure units (large numbers of sprinkler installations in commercial/industrial properties) carriers underwrite. As a result of this excellent experience, the ISO recommendation of a 15% reduction on a total homeowner premium when a residence is protected with a system installed in accordance with N.F.P.A. 13D (1980), does not include a penalty for sprinkler leakage.

Since I.S.O. provides rate making advice for its subscribing membership, the implementation of these recommendations will depend on individual carriers. I.S.O. has proceeded with state filings with a number of Superintendents of Insurance and several adoptions of this credit have already taken place. (See Table I enclosed)

Real Estate Tax Reductions

On January 1, 1981, the State of Alaska enacted into law a significant piece of legislation which will impact dramatically the installation of sprinkler systems throughout the state.

The law provides that 2% of the assessed value of any structure would be exempt from taxation if the structure is protected with a fire protection system. The word "structure" is significant in the law since it also applies to homes.

In effect, if a home was assessed for \$100,000, for purposes of taxation, the assessed value would be computed at \$98,000, provided it had a fire protection system.

This law has received widespread attention, particularly among the fire services and a number of jurisdictions are studying its implications for potential adoption in other states. (Copy of law is included)

TABLE I

ISO RECOMMENDED PREMIUM CREDITS
STATE ADOPTIONS*

Homeowners Insurance

Alabama
Alaska
Arizona
Arkansas
California
Colorado
Connecticut
Delaware
Georgia
Hawaii
Idaho
Illinois
Iowa
Kentucky
Maryland
Massachusetts
Michigan
Minnesota
Missouri

Montana
Nebraska
Nevada
New Mexico
New York
North Dakota
Ohio
Oklahoma
Oregon
Pennsylvania
South Carolina
South Dakota
Tennessee
Utah
Virginia
Washington
West Virginia
Wisconsin
Wyoming

Fire Dwelling Insurance

Arizona
Arkansas
California
Colorado
Connecticut
Georgia
Illinois
Kentucky
Maine
Maryland
Michigan
Missouri

Montana
New Hampshire
New Mexico
Ohio
Pennsylvania
Rhode Island
Tennessee
Virginia
Utah
West Virginia
Wisconsin
Wyoming

*As of January 1, 1983

Homeowner Insurance

Insurance paid by an individual who owns and occupies a dwelling. The ISO recommendation would allow a total premium credit of up to 15% if the dwelling has complete sprinkler protection and smoke detectors are installed.

Fire Dwelling Insurance

A fire dwelling policy is normally issued to an individual who owns but does not occupy a dwelling. The ISO recommendation would allow a premium credit of up to 20% if the unit is completely sprinklered and smoke detectors are installed.

Mobile Home Supplement

Sometime in 1983 ISO will be recommending to its member companies additional credits for owners of mobile homes.



**LEGISLATION
AND MODEL
RESOLUTION**

Original Sponsors: Malone and Duncan

Offered: 5/9/80

IN THE HOUSE

BY THE RULES COMMITTEE

SENATE CS FOR CS FOR HOUSE BILL NO. 648
IN THE LEGISLATURE OF THE STATE OF ALASKA
ELEVENTH LEGISLATURE - SECOND SESSION
A BILL

For an Act entitled: "An Act relating to fire prevention."

BE IT ENACTED BY THE LEGISLATURE OF THE STATE OF ALASKA:

*SECTION 1. AS 18.70 is amended by adding a new section to read:

Sec. 18.70.081. APPROVAL OF FIRE PROTECTION SYSTEMS.

Before October 30 of each year the Department of Public Safety shall prepare and make available a list of approved fire protection systems to the Department of Community and Regional Affairs, the Department of Commerce and Economic Development, and the public.

*SECTION 2. AS 29.53.020(a) is amended by adding a new paragraph to read:

(7) real property to the extent and subject to the conditions provided in (j) of this section.

*SECTION 3. AS 29.53.020 is amended by adding a new subsection to read:

(j) Two percent of the assessed value of a structure is exempt from taxation if the structure contains a fire protection system approved under AS 18.70.081, in operating condition, and incorporated as a fixture or part of the structure. The exemption granted by this subsection is limited to

(1) an amount equal to two percent of the value of the structure based on the assessment for 1981, if the fire protection system is a fixture of the structure on January 1, 1981; or

MODEL RESOLUTION... _____ FIRE CHIEFS' ASSOCIATION

WHEREAS... expanding and developing communities in our _____ States with underdeveloped public services are particularly vulnerable to catastrophic fire losses and...

WHEREAS... the maximum utilization of private fire protection systems minimizes fire losses and minimizes costs of operating fire department and water utilities and...

WHEREAS... legislation creating incentives for the installation of private fire protection systems will encourage an area wide shift towards maximum utilization of more efficient, less costly fire fighting technology, thereby stabilizing the cost of water utilities and fire departments; along with savings to life and property; the conservation of water and reduced cost of local government services with the widespread installation of private fire protection systems.

RESOLVED... that the _____ Fire Chiefs' Association in conference in _____ on _____ of 198__ actively promote legislative incentives to move towards the utilization of the best and most economical fire safety technology private fire protection by

- ... Actively promoting legislation that will assure tax credits by exempting the value of private fire protection systems from the true cash value of a building and
- ... Eliminating water stand-by charges that a utility may charge for the connection of a private fire protection system and
- ... Providing low interest loans that will cause financing to be available so that automatic fire sprinklers can be installed in both new and existing buildings.

RESOLVED... On _____ by the _____ in conference at _____ on _____, 198__.

Signed _____