



CALIFORNIA OFFICE OF THE STATE FIRE MARSHAL

THE HISTORY OF RESIDENTIAL FIRE SPRINKLERS IN CALIFORNIA

Fire sprinklers are not a new concept. The National Fire Protection Association (NFPA) cites the first automatic fire extinguishing system was patented in England in 1723 and around 1852 the first form of a sprinkler system was introduced into the United States. In 1874 the first practical automatic sprinkler was patented by Henry S. Parmelee of New Haven, Connecticut. Since the late 1800s fire sprinkler systems have been used to protect structures and contents from the devastation of fire.

As early as 1932 residential fire sprinkler systems were on the horizon with the Grinnell Company advertising one of the first residential fire sprinkler systems. In a brochure developed by Grinnell, they publicized the effectiveness of these “junior sprinkler systems” and installed them in single family dwellings provided by the Union Oil Company to house their employees working the oil fields in Santa Paula, California. So began the California residential fire sprinkler history.

The residential fire sprinkler systems grew strong roots in California. starting with the 1970-71 California State Fire Marshal's (SFM) Office involvement in testing the application of plastic piping for residential use, the first quick response sprinkler head prototype tested in Southern California in 1978, and the Senate Concurrent Resolution # 23 (filed July 23, 1979) requesting the SFM to develop a set of voluntary standards for one- and two-family dwellings and provide a report to the Legislature by December 31, 1980. The push for life safety took an even stronger stand when Fire Chief Ronny J. Coleman was successful in establishing a residential fire sprinkler ordinance for the City of San Clemente. This ordinance requiring residential fire sprinklers to be installed in all new dwellings was the first in the nation.

Since those early years, California has taken the lead in the development and adoption of local ordinances requiring residential fire sprinklers. These ordinances recognize the importance of this life saving system in combating fire early, providing the necessary time for occupants to evacuate the structure, and reducing the dangers to firefighters in residential fires. The following historical information provides a brief overview of the development and implementation of residential fire sprinklers; and illustrates California's continued efforts in providing a safer environment for our visitors, citizens, and emergency responders.

(1874)

The development of a new technology – the automatic fire sprinkler system began in the late 1800s to address the significant fire problems involving the textile industry in the United States. Henry S. Parmelee, owner of a piano factory in New Haven, Connecticut, invented the first practical automatic fire sprinkler in 1874. For nearly 100-years “new” fire-fighting technology was focused on the industrial and commercial sector of this nation’s fire problem.

(1896)

The National Board of Fire Underwriters (NBFU) originally published “Rules and Regulations of the NBFU for Sprinkler Equipments, Automatic and Open Systems”; however, in 1896 the National Fire Protection Association first published NFPA-13 – Standard for the Installation of Sprinkler Systems.

(1932)

The Grinnell Company advertised one of the first “residential” fire sprinkler systems (Junior Sprinkler System) in a brochure dated October 1932 in which they discuss the loss of life and property in residences. Several of these systems were fabricated and installed in single-family dwellings in Santa Paula, California under the direction of the Union Oil Company who constructed houses for their employees working in the oil fields.

(1960)

The fire problem was further complicated by the lack of a nationwide fire data collection system. Therefore, the National Fire Protection Association (NFPA) proposed a standard fire reporting system called the Uniform Fire Incident Reporting System (UFIRS). The UFIRS system was a voluntary documenting system; however, several large metropolitan area fire departments began to compile fire data. This and other reporting efforts began to paint the fire picture in America, and revealed that dwelling fires were the predominant factor in loss of life.

(1972)

The document “AMERICA BURNING” – The Report of The National Commission on Fire Prevention and Control identified and “recommended that the U.S. Fire Administration support the development of the necessary technology for improved automatic extinguishing systems that would find ready acceptance by Americans in all kinds of dwelling units”.

(1972-1975)

Like many other ideas whose time had come, putting automatic fire sprinklers to use in residential occupancies was moving beyond the conceptual stage and into application. As early as 1970-71, experiments were conducted with plastic pipe for residential sprinklers by Robert Shaw of the California State Fire Training Program, and Don Shaw of the City of Palo Alto (California) Fire Department. They published their results in 1972. In 1975, the City of San Clemente (California) Fire Department - Fire Chief Ronny J. Coleman, also began to experiment with plastic pipe and conventional fire sprinkler technology; as did Fire Chief David Hilton of Cobb County, Georgia.

(1975)

During this time, approximately 50% of the total loss of life in residential occupancies was due to fire. Recognizing the need to reduce the annual life loss from fire in residential occupancies, the National Fire Protection Association (NFPA) Committee on Automatic Sprinklers appointed a subcommittee in May 1973 to prepare the Standard for the installation of sprinklers in one- and two-family dwellings and mobile homes. The Standard for residential fire sprinklers in one- and two-family dwellings (NFPA-13D) was submitted and adopted at the NFPA Annual Meeting in Chicago, Illinois, on May 12-16, 1975.

(1978)

The first “residential” fire sprinkler was developed by Central Sprinkler Corporation, through the combined efforts of Bill Meyers, George Meyers, and Kathy Vernet as well as Harry Shaw, Acting Administrator – US Fire Administration (USFA). Their OMEGA residential sprinkler quickly became the technology leader, with other manufacturers such as Grinnell moving quickly to capture a portion of the market.

(1978)

The first quick-response prototype sprinkler systems were tested in Marina Del Rey, California between June 1978 and June 1979 with the cooperation and assistance of the Los Angeles City Fire Department under the supervision of then Division Chief Donald Manning. The National Fire Protection Association and Factory Mutual were active participants in these tests, sponsored by the U.S. Fire Administration who assisted in the funding of these tests. The Technical Report (FMRC J.I. OEORR3A.1) entitled "Field Evaluation of Residential Prototype Sprinklers – Los Angeles Fire Test Program" was published in February 1982.

(1979)

State Senator William Campbell, Chairman of the Senate Select Committee on Fire Services (33rd District, Los Angeles), authored Senate Concurrent Resolution No. 23 – Home Fire Sprinkler Systems filed with Secretary of State July 23, 1979, which requested the State Fire Marshal to develop a set of suggested voluntary standards for the design, installation, and maintenance of automatic fire sprinkler systems for one- and two-family dwellings, and to report thereon to the Legislature on or before December 31, 1980.

(1979)

Under the leadership of then Fire Chief, Ronny J. Coleman, the City of San Clemente, California, adopted the first fire sprinkler ordinance in the nation to require automatic residential fire sprinkler systems in all newly constructed one- and two-family dwellings built in the City of San Clemente. The philosophy presented by Chief Coleman to the City Council was: *"to apply water so as to confine the blaze to the room of origin during the first 10-minutes of the fire's growth and development, and to keep temperatures low enough to prevent flashover."*

(1982)

In January 1982 California State Fire Marshal Philip C. Favro (in conjunction with Fire Protection Engineer Joseph S. Sacco, P.E.) published the document California Voluntary Standards for Residential Sprinkler Systems – Design – Installation - Maintenance after months of research by Subject Matter Experts (Fire Service, Fire Sprinkler Industry, United States Fire Administration (USFA), National Fire Protection Association (NFPA), California Fire Chiefs Association (CalChiefs) Northern/Southern Fire Prevention Officers Sections, California Public Utilities Commission, California Department of Health Services, and California Department of Corporations). The "Voluntary Standards" described the minimum design, installation and maintenance criteria of a low cost automatic fire sprinkler systems, which, when used in conjunction with smoke detectors, is intended to reduce life loss and property damage in one- and two-family dwellings.

(1984)

In late 1984 the first Fire Sprinkler Ordinance Survey was completed by the City of Monterey Fire Department (California) in conjunction with the National Fire Sprinkler Association. The State population was 17.4-million. The survey results showed that one hundred sixty two (162) jurisdictions responded, which reflected approximately 82% of the states' population. Of those who responded forty-eight (48) indicated that they required "residential "occupancies to be sprinklered; however, the question did not break down the different occupancy classifications (one- and two-family dwellings, apartments, condominiums, and townhouses). This is roughly 29.6% of those jurisdictions who responded to the survey.

(1985)

State Assembly Member Frank C. Hill (52nd District – Los Angeles) authored House Resolution No. 7 which resolved: *"That the State Fire Marshal and the State Board of Fire Services are requested to study the feasibility of requiring the installation of fire sprinkler systems in all buildings hereafter constructed for human occupancy, and report the results of that study to the Legislature on or before January 1, 1986."*

(1985-1986)

In the 1985/86 Session of the California Legislature Senate Bill No. 2579 was introduced to require the installation of automatic fire sprinkler systems in all buildings and structures intended for residential occupancy constructed on or after January 1, 1987. This Bill authored by Herschel Rosenthal (22nd District – Los Angeles), failed to pass the Fire Committee and was therefore defeated.

(1986)

On March 31, 1986 the California State Fire Marshal and the State Board of Fire Services issued a Report to the Legislature in response to House Resolution No. 7, entitled: “An Analysis of the Feasibility of Requiring the Installation of Fire Sprinkler Systems in all Buildings Constructed for Human Occupancy.” The concluding statement in the summary of the Report stated: “Until local communities educate the public on the benefits and economics of residential sprinkler systems there will be little support in mandating the use of those systems.”

(1986)

On September 29, 1986 the State Fire Marshal Advisory Committee on Residential Sprinkler Systems was given a “draft copy” of a new Underwriters Laboratories Standard: UL-1626 – First Edition (Residential Sprinklers for Fire-Protection Service - dated May 19, 1986) and asked for comment to utilize the draft standard. This draft was utilized by the Committee in the development of a California State Fire Marshal Residential Sprinkler Standard.

(1987)

On August 12, 1987 Deputy Director Edward F. Seits distributed a “Draft” copy of the “Residential Sprinkler Standard and the report from the Tradeoffs Subcommittee” to the Members of the California State Fire Marshal Residential Sprinkler Systems Advisory Committee for review and comment. Following the review, the document was to go to California State Fire Marshal James F. McMullen for approval.

(1988)

In January 1988 the California State Fire Marshal published the document “Recommended Residential Sprinkler Standard – One- and Two-Family Dwellings” after months of research by the State Fire Marshal Residential Sprinkler Advisory Committee. This recommended standard described the minimum design, installation and maintenance criteria of a low cost automatic fire sprinkler system, which, when used in conjunction with smoke detectors, is intended to reduce life loss and property damage in one- and two-family dwellings.

(1988)

A new test standard, UL-1626, First Edition (Residential Sprinklers for Fire-Protection Service), was developed by Underwriters Laboratories, Inc. to evaluate a residential sprinkler. The new standard incorporated criteria such as: 1) maximum of two sprinklers operating during the test, 2) Response Time Index (RTI), 3) Required Delivered Density (RDD), and 4) Actual Delivered Density (ADD).

(1989)

On September 15, 1989 an Executive Summary Report on the 1989 Fire Sprinkler Ordinance Survey was issued by the Fire Sprinkler Advisory Board of Southern California (FSABSC), which reflected roughly 89% of the State population (the 254 surveys received represented 23.5-million people). The survey results showed that one hundred thirty one (131) jurisdictions required “residential “occupancies to be sprinklered; however, the question did not break down the different occupancy classifications (one- and two-family dwellings, apartments, condominiums, and townhouses). This is roughly 57.2% of those jurisdictions who responded to the survey.

(1989)

In June 1989 the California State Fire Marshal published the document "California Voluntary Supplement NFPA-13D (1989) Residential Sprinkler Standard – One- and Two-Family Dwellings", which revised the previous publication. This document was a supplement to the NFPA-13D, 1989 edition and was intended to serve as a model for California local jurisdictions, especially those that require residential occupancies to be sprinklered. It was designed to address the residential fire protection problems that are common throughout the State.

(1993)

On May 31, 1993 An Executive Summary Report on the 1993 Fire Sprinkler Ordinance Survey was issued by the Fire Sprinkler Advisory Board of Southern California which reflected roughly 87.5% of the State population (the 274 surveys received represented 26.7-million of the estimated 30.5-million population). The survey results showed that seventy-six (76) jurisdictions required "ALL" newly constructed single-family dwellings to be equipped with automatic residential fire sprinkler systems. This is roughly 29.4% of those jurisdictions who responded to the survey.

(1995)

In May 1995 California State Fire Marshal Ronny J. Coleman published a document "Design Alternatives Relevant to One- and Two-Family Residential Fire Sprinklers" for the purpose of identifying guidelines to encourage the installation of residential fire sprinklers in a cost-effective manner, thus providing an improved level of protection to the occupant(s), community, and firefighter(s).

(1995)

The International Association of Fire Chiefs (IAFC) Operation Life Safety (OLS) received a United States Fire Administration (USFA) contract with the goal of gaining acceptance of the building code for fire sprinkler requirements for one- and two-family homes.

(2003)

On September 1, 2003 an Executive Summary Report on the 2003 Fire Sprinkler Ordinance Survey was issued by the National Automatic Sprinkler Industry Promotion Fund (NAS-IP), which reflected roughly 65.8% of the State population (the 215 surveys received represented 23.1-million of the estimated 35.1-million population). The survey results showed that sixty-four (64) jurisdictions required "ALL" newly constructed single-family dwellings to be equipped with automatic residential fire sprinkler systems. This is roughly 31.8% of those jurisdictions who responded to the survey.

(2004)

On September 20, 2004 a Resolution by the California Fire Chiefs Association, jointly endorsed by the Executive Boards of the Northern and Southern Divisions of the Fire Prevention Officers Section, resolved that the California Fire Chiefs Association, fully endorses the utilization of, and encourages the installation of Residential Fire Sprinkler Systems in residential properties in accordance with NFPA-13R and -13D.

(2006)

The 2006 International Residential Code (ICC/IRC) contained a provision in Appendix P which stated: "*AP101 Fire sprinklers. An approved automatic fire sprinkler system shall be in new one- and two-family dwellings and townhouses in accordance with Section 903.3.1 of the International Building Code*" (ICC/IBC). The provisions contained in the appendix are not mandatory unless specifically referenced in the adopting ordinance. (Note: *Due to time and workload constraints, the 2006 ICC/IRC was not moved forward as a State of California Building Standard.*)

(2007)

During the review and adoption of the 2007 California Building Code/Fire Code (based on the 2006 IBC/IFC) the provisions defined in Section 903.2.7 were amended to read: "*Group R. An automatic sprinkler system installed in accordance with Section 903.3 shall be provided throughout all buildings with a Group R fire area. Exceptions: 1. Detached one- and two-family dwellings (town houses) not more than three stories above grade plane in height with a separate means of egress, unless specifically required by other sections of this code or classified as Group R-4.*"

(2008-2010)

As a result of the California State Fire Marshal Residential Fire Sprinkler Task Force (Phase I – Water Purveyor [10/09/08 thru 03/30/09], Phase II – Installation [04/06/09 thru 05/21/09], and Phase III – Training and Education [07/21/09 thru 03/17/10]) Meetings and Final Report Documents, Division Chief Kevin Reinertson, CAL-FIRE – Office of the State Fire Marshal, Code Development and Analysis Division, Regional Manager (West) Bruce Lecair, National Fire Sprinkler Association (NSFA), and Consultant Steve Hart, National Automatic Sprinkler Industry developed a 4-hour “Awareness Level Course” which would be delivered in twenty-four cities throughout the State to targeted “stakeholders” who would be expected to be impacted by the new residential fire sprinkler regulations as of January 1, 2011.

(2010)

From June 1 thru November 22 the California State Fire Marshal Code Development and Analysis Division coordinated and presented twenty-four Residential Fire Sprinkler Awareness Level Classes (4-hours in length) throughout the State presenting an overview of the California Residential Code fire sprinkler provisions to well over 1,200 stakeholders (Building Departments, Fire Agencies, Water Purveyors, Architects, Professional Engineers, Homebuilder Contractors, Fire Protection Contractors, Plumbing Contractors, and other interested persons).

(2010)

By December 2010 the number of communities in California which required a residential fire sprinkler system in “All newly constructed one- and two-family dwellings” had reached approximately one hundred sixty prior to statewide application. The NFPA Fire Sprinkler Initiative website (<http://www.nfpa.org/fsi-map/index.php?p=search&state=CA>) identified one hundred fifty three.

(2011)

The California Building Standards Commission approved and adopted the 2010 California Residential Code (California Code of Regulations, Title-24, Part 2.5) based on the 2009 edition of the International Residential Code (published by the International Code Council) with an effective date of January 1, 2011. The provisions of Sections R313.1 (Townhouse) and R313.2 (One- and two-family dwellings) reads: “An automatic residential fire sprinkler system shall be installed in townhouses and in one- and two-family dwellings” respectively.