

Fire!...Fire Sprinklers Can Save Property and Lives

SUMMARY

In the United States during 1999, one death occurred every two and a half hours due to fire, with over \$10 billion in property damage. Every 85 seconds, there was a residential fire that accounted for 80% of fire-related deaths throughout the nation.

In Orange County there were 2,320 fires in that same year, four deaths and 43 fire-related injuries.

Statistics show that fire sprinklers are at least 92% effective in controlling fires. Most of the time, just one sprinkler head extinguishes the fire within the first few critical minutes.

Neither Orange County nor most of the cities within the County require residential fire sprinklers. The cost of installing sprinklers in new construction is approximately one dollar per square foot, but cost offsets are available to the builder for the additional expense. The Uniform Building and Fire Codes provide design and construction alternatives for buildings with sprinklers that are not available for structures without sprinklers. If sprinklers were required in single-family residences, not only would cities and the County benefit, but homeowners might also gain by possible reductions in insurance premiums.

The 2000–2001 Orange County Grand Jury studied the fire codes within cities and the unincorporated areas of the County and recommends that fire sprinklers be required for all new construction and major renovations of residential property.



With Sprinklers

Without Sprinklers

Courtesy of FPC Magazine

PURPOSE/INTRODUCTION

The purpose of this study is to evaluate the use of fire sprinklers in Orange County and make recommendations for improvement. Installation of fire sprinklers is mandated in most commercial buildings as well as multi-family occupancies of three units or more in the County, however requirements in individual family homes differ from city to city and the unincorporated area of Orange County.

Threat of fire is a major fear for residents of Southern California. Firefighting is one of the most hazardous professions. Yet, it has been well established that fire sprinklers are extremely effective to control and extinguish a fire in its earliest stages and thereby limiting property loss and reducing deaths.

HISTORY/BACKGROUND

The United States has the worst fire-related life and property loss record of all industrialized nations. There were 3,570 deaths in our nation during the year 1999 due to fires. The nation suffered \$10 billion in property losses that same year with one death every two and half-hours. There was a residential fire every 85 seconds, which accounted for 15 % of the total fires and 80 % of the deaths.

Information provided by Orange County Fire Authority (OCFA) shows that the County suffered 2,320 fires in 1999 with \$13 million in property losses. There were 43 fire-related injuries in the County that year with four deaths. Over the years, the County has experienced improvements brought about through new safety code requirements, but they are not as dramatic as could be expected if fire sprinklers were required in all single-family residences.

Uniform Building and Fire Codes

The County of Orange currently enforces the automatic fire sprinkler requirements of the Uniform Building and Fire Codes as amended which requires fire sprinklers in:

- Buildings over 55 feet in height
- Buildings with over 5,500 square feet
- Educational occupancies with over 20,000 square feet or more than two stories
- Hazardous occupancies
- Institutional occupancies
- Amusement buildings
- Mercantile occupancies with over 24,000 square feet on all floors or three or more stories in height
- Single-family residences - no requirements if fewer than four stories in height
- Residential occupancies three or more stories in height or containing a specific number of units (apartments—3 units; hotels—20 rooms).

- Buildings with stages
- Woodworking occupancies with over 2,500 square feet

There are five cities in the County that require fire sprinklers in all new residential structures:

Buena Park	San Clemente
Dana Point	Stanton
Placentia	

San Clemente has one of the strongest building and fire code ordinances in the County. The chart below shows that the average residential fire loss in San Clemente is 60% less with sprinklers than without.

Fire Losses Since 1996

Residences	Total \$ Loss	Number of Units	Average Loss
Without Sprinklers	\$3,227,510	143	\$22,570
With Sprinklers	\$277,960	31	\$8,966

Source - Orange County Fire Authority

All other cities in Orange County have a wide variety of building and fire code requirements.

Cause and Effect

Fire sprinklers control a fire prior to flashover. Flashover is a phenomenon that occurs when so much heat is produced by a fire that other combustibles in the area are preheated to their ignition temperature through radiation and convection. The combustible material emits unburned and toxic gases. A critical level is achieved, and the entire area of the fire becomes involved. Flashover occurs within seven to ten minutes after the fire starts. Flashover is by far the most lethal stage of a fire's development and can best be prevented by the use of fire sprinklers.

Statistics show that fire sprinklers are 92% effective in controlling fires. In 91% of the cases, one sprinkler head controls the fire that allows an 85% savings in property damage to the rest of the building. In 1999, in the Orange County Fire Authority's jurisdiction, property loss in buildings with fire sprinklers average \$1,721, compared to \$16,064 without fire sprinklers.

A sprinkler head will use 17 to 24 gallons of water per minute versus 150 to 250 gallons from one fire hose. Only one in 16 million sprinkler heads activates accidentally.

A recent survey of the National Fire Sprinkler Association, the Residential Fire Sprinkler Institute, the American Fire Sprinkler Association, plus several local sprinkler contractors indicate that the approximate cost is one dollar per square foot to install sprinklers in new residential structures.

Cost offsets are available to the builder for the additional expense of constructing a home with fire sprinklers. The Uniform Building and Fire Codes provide design and construction alternatives for buildings with sprinklers that are not available for structures without sprinklers. Fire code requirements may also be modified when sprinklers are installed. The Uniform Building and Fire Codes provisions that may be modified are as follows:

DECREASE

- Interior wall covering requirements
- Fire resistance of tenant separation walls
- Location and quantity of firewall
- Standpipe and fire hose requirements
- One-hour corridors

INCREASE

- Maximum floor areas
- Travel distances to exits
- Allowable locations of windows
- Building height limitations

As residential property development continues, the fire problem increases and the cost of protection rises accordingly. Population growth will increase protection costs unless other methods, such as automatic fire sprinklers, are implemented.

If emergency medical aid and other demands allow, the number of fire stations, equipment, and manpower may be kept to a minimum in communities with fire sprinklers without affecting service levels. As an example, the installation of sprinklers in the hill and canyon developments would eliminate the need for a fire truck company. Eliminating the need for one company reflects an annual saving of approximately \$1 million. With current operating costs for a single fire company for a year being approximately \$1 million, it could result in considerable savings for the County and cities.

If fire sprinklers were required in all residences, not only would cities and the County benefit, but the homeowners might also gain through reductions in insurance premiums. The Grand Jury contacted five different insurance companies and found that a savings of up to 15% for policies on homes with fire sprinklers could be realized.

If there were fire sprinklers installed in all new residential structures throughout Orange County, there could be several major benefits:

- Reduction of the costs associated with fighting fires
- Reduction of property loss
- Substantial elimination of accidental deaths related to fires
- Increased property value

METHOD OF STUDY

The Orange County Grand Jury interviewed personnel from the Orange County Fire Authority and the Anaheim Fire Department. A former California State Fire Marshal made a presentation to the Grand Jury on the subject of residential fire sprinklers.

Site visits organized by the Orange County Fire Authority were conducted. Data from various sources as outlined in the Appendix were studied and reviewed. Videotapes demonstrating fire sprinkler technology were reviewed.

FINDINGS

In accordance with *California Penal Code* Sections 933 and 933.05, responses are required to all findings. The Orange County Grand Jury has arrived at three findings:

1. Only five Cities within the County require fire sprinklers in all new residential structures.
2. The minimum requirements in the Uniform Building and Fire Codes, as amended, are applicable in the County's unincorporated area.
3. In the unincorporated area of the County, only those new one and two family residential structures of 5,500 square feet or more are required to have fire sprinklers installed.

Responses to Findings 1 – 3 are required from the Orange County Board of Supervisors and from the Orange County Fire Authority.

RECOMMENDATIONS

In accordance with *California Penal Code* Sections 933 and 933.05 each recommendation requires a response from the government entity to which it is addressed. These responses are submitted to the Presiding Judge of the Superior Court. Based upon the findings, the Orange County Grand Jury recommends that:

1. The Orange County Board of Supervisors, working in concert with the Orange County Fire Authority, should consider adopting a County ordinance requiring all new one and two family residences be constructed with residential fire sprinklers in place. (Finding 2)
2. The County and Orange County Fire Authority should encourage the cities that do not have such an ordinance to adopt ordinances based on the County ordinance. (Finding 1)
3. The Orange County Board of Supervisors, working in concert with the Orange County Fire Authority, consider adopting a new County ordinance

that all single and multiple family residences, with a 50% or more floor area remodel, require the installation of fire sprinklers.

4. The County and Orange County Fire Authority should encourage cities that do not have such an ordinance to adopt ordinances based on the County Ordinance. (Finding 3)

Responses to Recommendations 1 — 4 are required from the Orange County Board of Supervisors and from the Orange County Fire Authority.

COMMENDATIONS

The 2001–2001 Orange County Grand Jury recognizes and commends:

The Orange County Fire Authority

- The cooperation of staff was very helpful in the collection of facts for this report.

The Anaheim Fire Department

- The cooperation of staff was instrumental in providing data and video used in the preparation of this report.

APPENDIX

Background and Recommendations of Automatic Fire Sprinklers by Anaheim Fire Department.

Residential Fire Sprinkler Presentation by Orange County Fire Authority.

Coleman, Ronny J., *Residential Sprinkler Systems, Protecting Life and Property*.

Copyright 1991 National Fire Protection Association.

FPC (Fire Protection Contractor) Magazine, March 2001.

Statistical data from the Orange County Fire Authority.

Videotapes on fighting residential fires with sprinklers.