Residential Fire Sprinkler Systems

"Life Safety and Fire Protection: 24/7"

February 1, 2005

Oxford Township

FEMA

Fire Facts

How many people die annually from fires ?

- More than 4,000
  - Who are the victims ?
  - Children under 10 (14%)
  - Seniors over 70 (22%)
    - Where do they die ?
    - In single-family dwellings (82%)

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Fire in America

When do they die ?

- At night
  - How do they die ?
    - From smoke inhalation
    - From inability to escape

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America's Legacy

Home fires are low probability, high consequence events.

- The likelihood of injury, death and major property damage is great.
- Fire kills more people each year than all natural disasters combined.

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Fire: It's Faster than You Think

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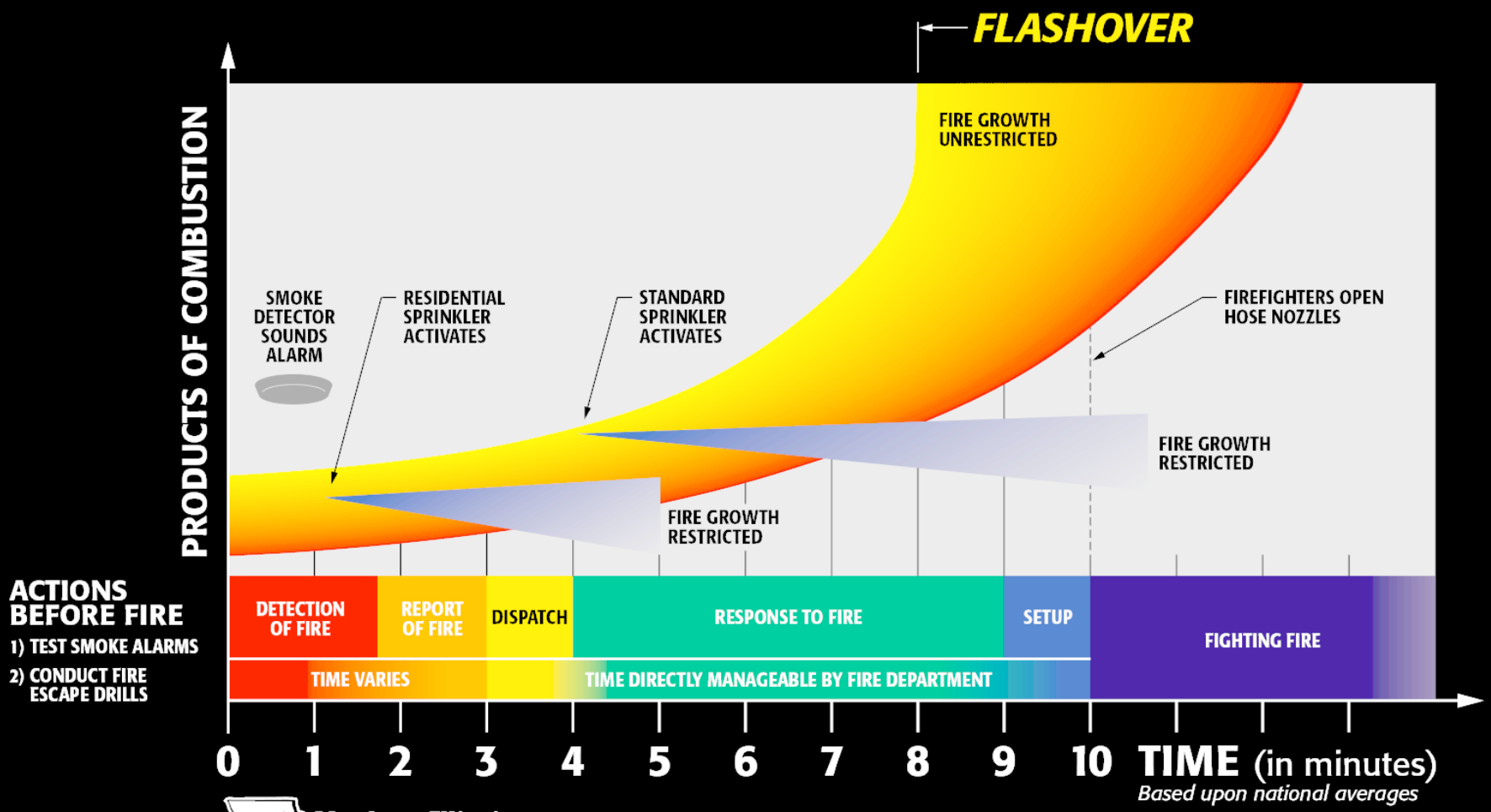
TIME vs. PRODUCTS of COMBUSTION



ACTIONS BEFORE FIRE

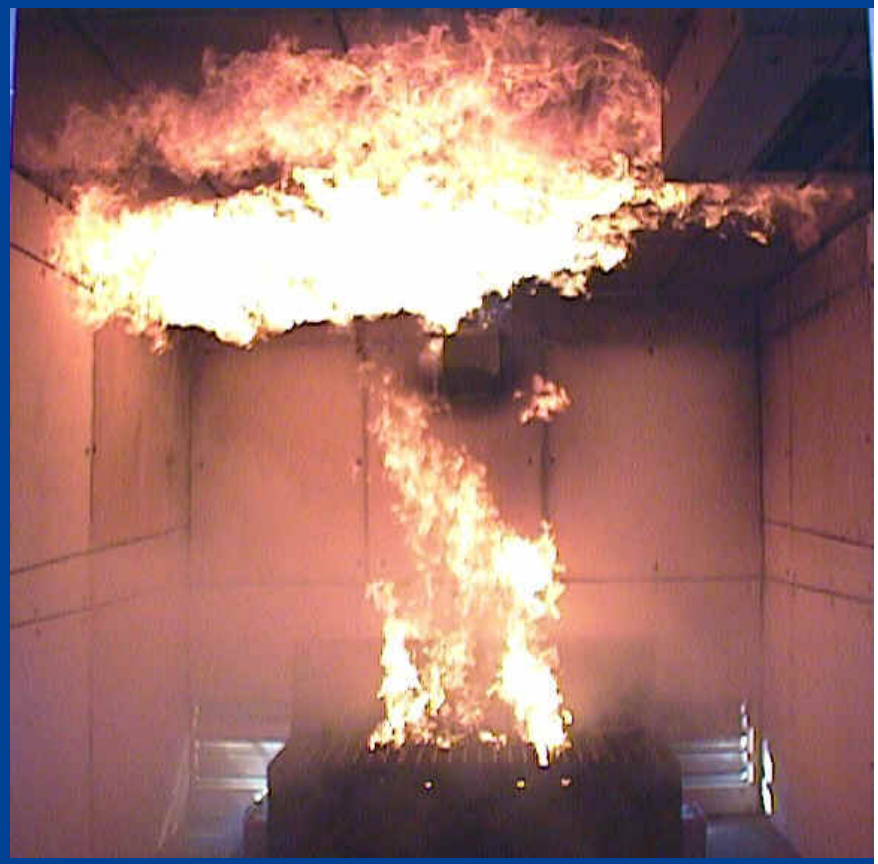
1) TEST SMOKE ALARMS
2) CONDUCT FIRE ESCAPE DRILLS

Northern Illinois Fire Sprinkler Advisory Board
www.firesprinklerassoc.org

Flashover: 1400 to 1600° F

Flashover occurs sooner in today's fires than in the past, typically within four minutes.

- Better insulation leads to more rapid heat build-up and reduced heat dissipation.
- Increased use of petroleum based contents and building materials burn hotter.



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A small fire starts in your home

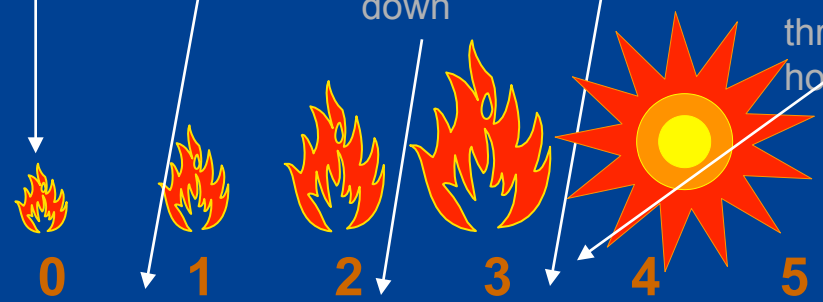
Smoke reaches the smoke detector

Ceiling temp. reaches 155 degrees. Smoke begins to layer down

Ceiling temp. reaches 1,000 degrees, visibility is reduced to zero

Ceiling temp reaches 1,400 degrees. Flashover occurs engulfing all contents of the fire room and extending fire throughout home

The fire room and all contents are completely destroyed. Heat damage extends throughout the entire house, burning or melting all items within 5 feet of the ceiling. Smoke has blackened all contents of the house. Windows and roof vent holes must be boarded-up. All drywall will need to be replaced and all contents replaced or restored. Extensive water damage exists from firefighting efforts. Average time of displacement...6 months to a year.



0 1 2 3 4 5 10 15 20

Time Line (minutes)

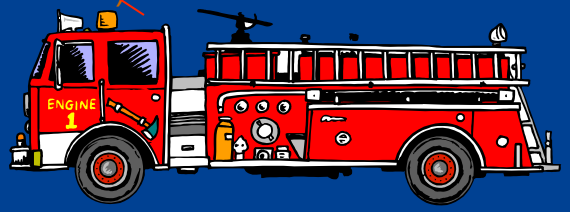
You are awakened by the smoke detector

You investigate and find a fire

You awaken other family members and go to a neighbor to call 911

You give the 911 operator the information and she notifies the fire dept.

The fire dept. responds



The fire dept. arrives, assesses the situation & applies 100-250 gpm to fire areas. Windows are broken and holes are cut in the roof to vent fire gases and smoke.

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Somewhere in America . . .

- A fire department responds to a fire every 16 seconds.
- A residential fire occurs every 67 seconds.
- A fire death occurs every 113 minutes.
- A fire injury occurs every 17 minutes.

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Fire Sprinkler Systems

- Developed in the late 1800s to protect mills and warehouses.
- Have long been used in commercial, industrial and storage facilities.
- Popular in multiple family dwellings since the early 1990s.
- Available for single-family dwellings since the 1970s.

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What are Residential Fire Sprinklers ?

Automatic sprinklers are *individually* heat activated devices that are attached to a network of piping with water under pressure.

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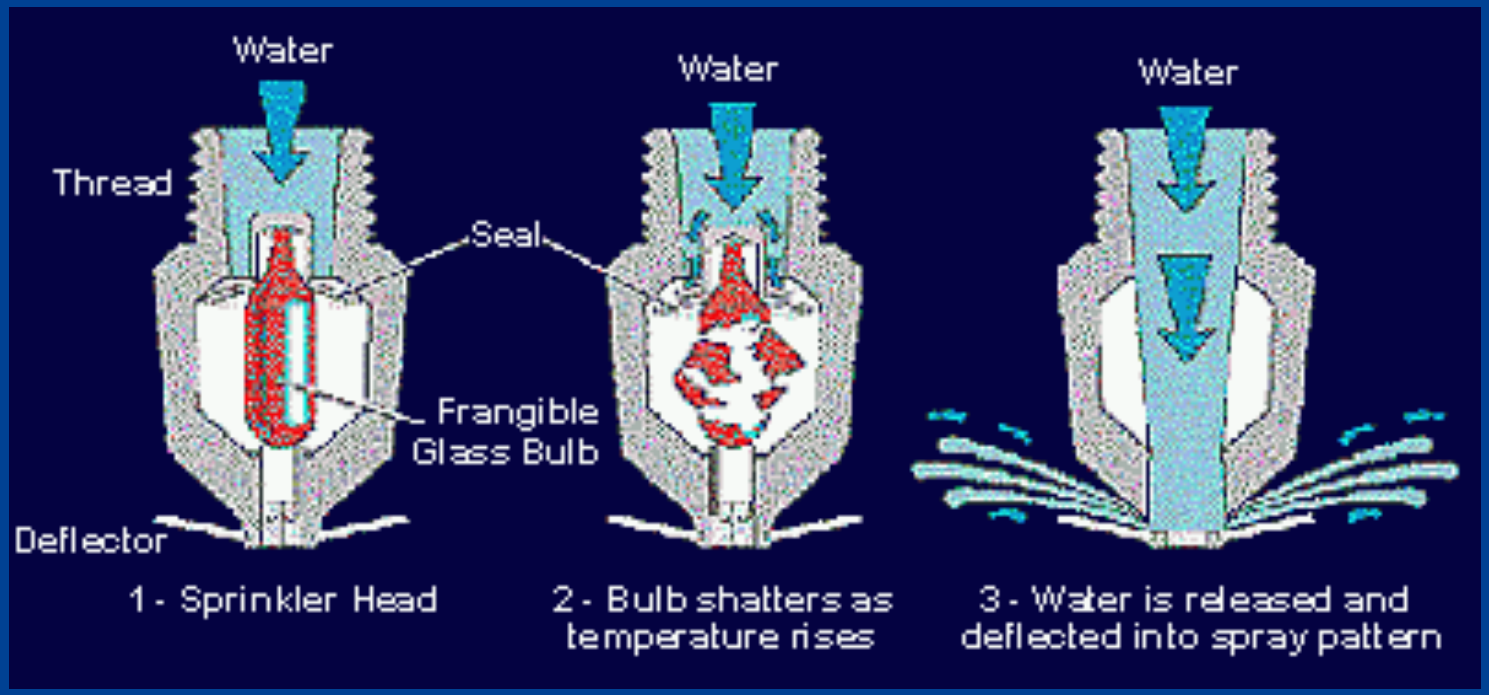
How Do They Work?



Sprinklers activate when ceiling temperature reaches 155-175 degrees.

- Activated sprinkler head sprays water over an area of up to 20’ x 20’.

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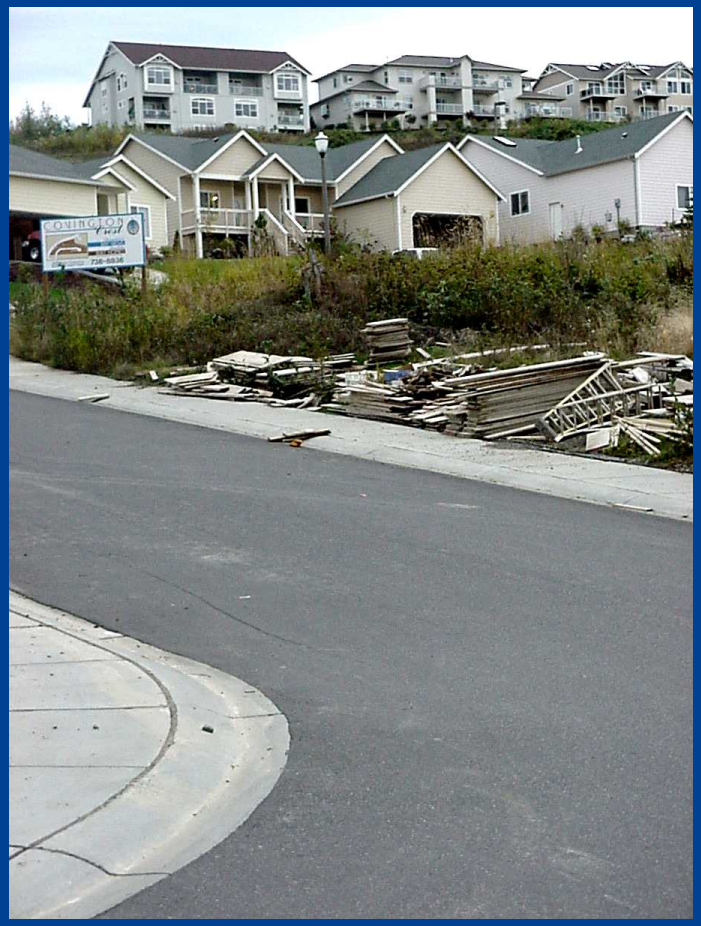
Where are Sprinklers Installed?

In all rooms of the house except:

- Attics
- Garages
- Bathrooms less than 55 square feet
- Closets less than 24 square feet
- Crawl spaces



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How Do Sprinklers Save Lives?

Sprinklers apply water directly to burning material in the early moments of the fire.

- This prevents fire growth and the production of excessive heat, smoke and toxic gasses.
- Sprinklers maintain a survivable atmosphere in the room of origin.

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Common Sprinkler Misconceptions

Accidental Discharge

- Only 1 in 16,000,000
- All sprinklers in the building activate
  - Sprinklers are <u>individually</u> activated by heat
  - Over 90% of fires are controlled by 1 sprinkler
    - Obtrusive
      - Available in many styles and designs
      - Can be flush mounted and match decor

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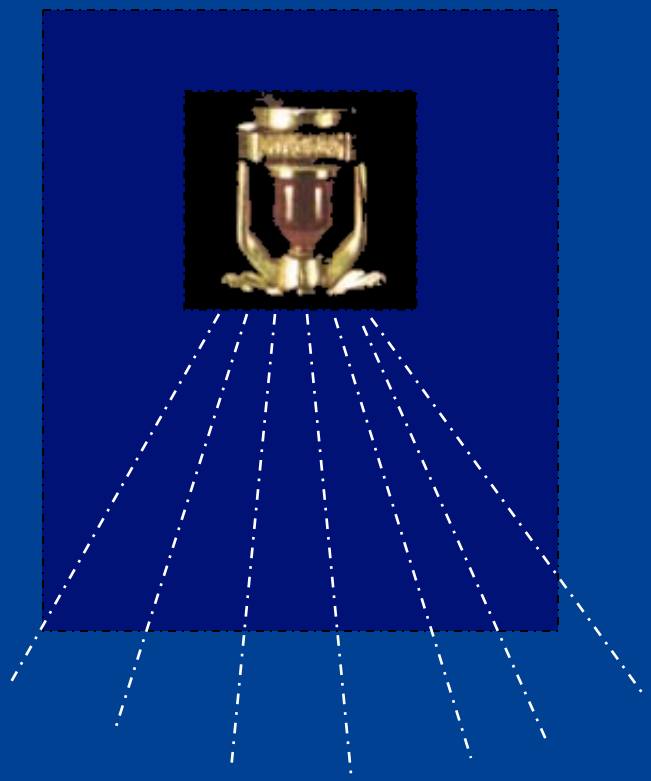
Water Damage Misconceptions



7-18 gallons per minute

125-250 gallons per minute

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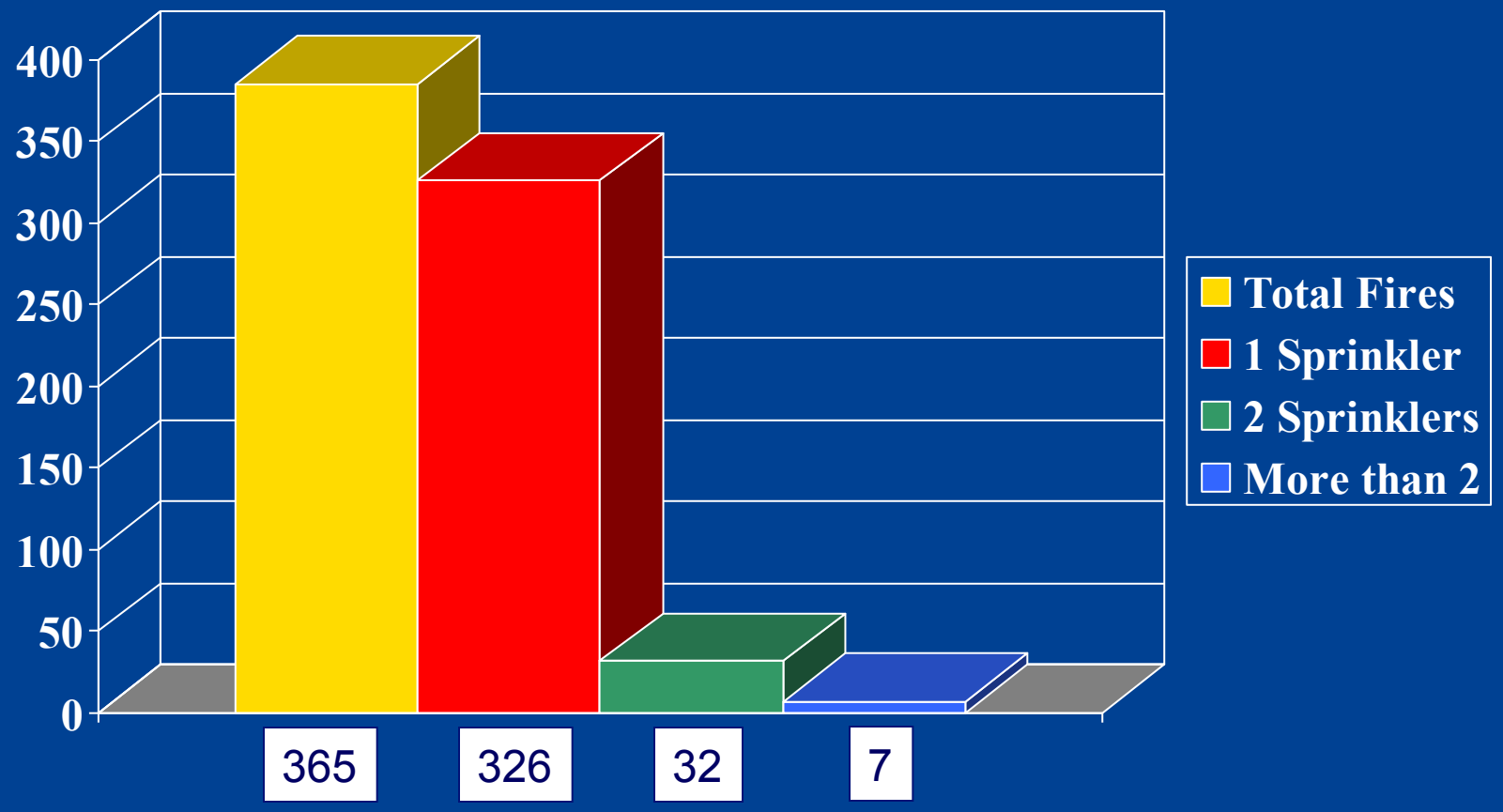
Operating Sprinklers Per Fire



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A small fire starts in your home

Smoke reaches the smoke detector

Ceiling temp. reaches 155 degrees. The sprinkler head over the fire activates

Fire is controlled or completely extinguished. Sprinkler head continues to spray water at 7-15 gpm.

Fire damage is limited to the objects in or near the initial fire. Heat damage is limited to the fire room. Heavy smoke damage is limited to the fire room. Water damage is limited to the sprinkler flow of about 10 gpm (approx. 100 gal total). Average time of displacement from home...1-2 days.

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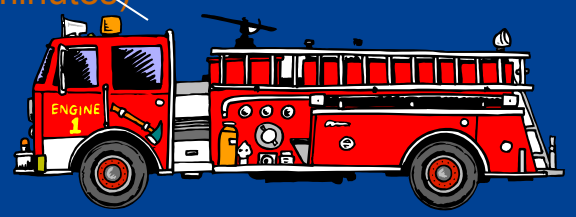

The fire dept. arrives, assesses the situation and limits water damage by shutting down the water supply to the sprinkler system. The fire department then assists with initial clean-up operations.

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What About Smoke Alarms?

Since smoke alarms became common in the 1970's, fire deaths have declined from 6000 to 4000 annually.

- Smoke alarms can notify occupants of fires, but occupants must take appropriate action to survive.
  - Infants, the elderly and the infirm may not be able to escape without help.
- Smoke alarms can't stop fires: sprinklers can without any human intervention.

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Potential Insurance Discounts*

- Allstate 5%
- Hartford 13%
- Liberty Mutual 8-13%
- Prudential 8-15%
- State Farm 5-10%
- Kemper 10-12%

* National statistics; vary by state.

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Scottsdale, AZ, Statistics 1986-1996

- No Sprinklers
- 554 Fires
- 10 Fatalities
- Average Loss: $17,067
- Average Water Used: 3290 Gallons

- With Sprinklers
- 44 Fires
- 0 Fatalities
- Average Loss: $1,945
- Average Water Used: 209 Gallons

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Typical Sprinkler Installation

System Riser (separate tap)

- Plastic pipe
- Installed along with electric, plumbing, and heating and air conditioning equipment.
- Located in utility area.
- Includes water flow switch, 110 volt bell, and pressure gauge.

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Combination Systems

- Employ the domestic distribution so water flows within the pipe during normal use.
  - Prevent stagnation
  - No separate connection required
  - No water flow alarm yet

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Rob Neale

Water Supply Requirements

- Sprinkler system needs 14-28 gallons per minute regardless of home size.
- Supply pressure of 10-20 psi depending on building elevation and system design.
- Typical systems require 1” or 1-1/4” water service.
  - Combination systems employ normal water service size.
- Fire pumps would not typically be needed.

No Water Service?

- Stand-alone systems can be used.
  - At least one already installed in Carroll Valley.

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Sprinkler Appearance

- Sprinkler are available in many designs and colors.

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Questions?

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U.S. DEPARTMENT OF HOMELAND SECURITY

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