

## Home Fire Sprinklers: More Important Than Ever



Oregon Fire Sprinkler Coalition  
Fire Prevention Workshop  
2020



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Deputy Fire Marshal  
Medford Fire-Rescue  
Chair: Oregon Fire Sprinkler Coalition  
541-601-8045

1

## Home Fire Sprinklers: More Important Than Ever

**Audience:** Fire service



2

## Home Fire Sprinklers: More Important Than Ever

### Learning Objectives:

1. Understand the residential fire problem in the U.S.
2. Learn about effective current advocacy practices
3. Identify emerging advocacy practices that increase effectiveness
4. Discover ways that you can help

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Thanks to:  
-Stephanie Stafford, OSFM  
-Ray Bizal, NFPA  
-Bob Sullivan, NFPA  
-Lindsay Capland, NFPA  
-Peg Paul, HFSC  
-Robert Nolan, Las Vegas Fire  
-Greg Kleinberg, Medford Fire

3

### ABC's of Home Fire Sprinkler Advocacy

Advocacy is generally more productive with a balanced approach:

- **AWARENESS** – Be Aware of the fire problem
- **BENEFITS** – Advocate the Benefits of sprinklers – both safety and financial
- **COSTS**– Keep an eye on financial aspects of home fire sprinklers – they are important



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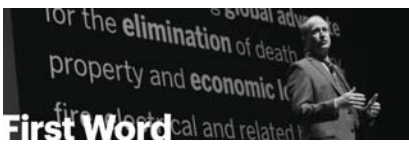
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BY JIM PAULEY

The last few months of 2019 were difficult for the fire department in Worcester, Massachusetts, a city not far from NFPA headquarters. In November, a Worcester firefighter, Lt. Jason Menard, died battling a home fire. Menard's death occurred just weeks before events to mark the twentieth anniversary of the Worcester Cold Storage and Warehouse Co. fire, a devastating event that killed six of the city's firefighters. Two decades later, the Worcester Fire Department was again mourning a loss.

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### Los Angeles – January 29<sup>th</sup>, 2020



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### NFPA Fire Sprinkler Initiative (Advocacy)

- Advocacy campaign aimed at increasing the number of new, one- and two-family homes protected by fire sprinklers.
- Assists 33 State Coalitions



firesprinklerinitiative.org

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### Home Fire Sprinkler Coalition (Public Education)

- Leading resource for independent, noncommercial information about home fire sprinklers
- Not involved in code development



homefiresprinkler.org

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### Oregon Fire Sprinkler Coalition

#### Mission

- Promotes life-saving benefits of home fire sprinklers
- Provides education to stakeholder groups
- Collaborates with key groups to overcome barriers



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### Sprinkler Advocacy – The Classic Approach

#### What Are We currently Doing

- Focus on the fire Problem
  - This is important – is it the only approach?
- What matters to opponents?
  - Take a big guess.....\$\$\$\$
- What are we up against?
  - Take a big guess!
  - \$517 Million spent opposing sprinklers 2005-2015



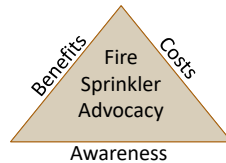
Source: ProPublica 2016

10

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11

### Sprinkler Advocacy – The Home Fire Problem

#### A Relevant and Continuing Concern

- Fatalities in the U.S.
- Escape time / tenability
- Furnishings then vs now – what has changed?
- Flashover
- Firefighter safety



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12

## The Home Fire Problem

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### Statistics

- National
  - 352,000 home fires (2016)
  - Each day 7 people die home fires
  - Each year 2,500 to 3,000 people die and 13,000 people are injured in home fires
  - Children and the elderly are most at risk
- Oregon
  - From 2004 to 2013: 350 fire deaths and more than 2,500 injuries



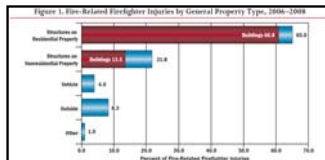
Source: NFPA

13

## The Home Fire Problem

### Statistics – Firefighter Casualties

- National
  - Approx. 100 firefighter fatalities
  - Many are related to residential structures
  - Approx. 65,880 firefighter injuries occur annually



Source: NFPA

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## Why Do We Still Lose People in Home Fires?

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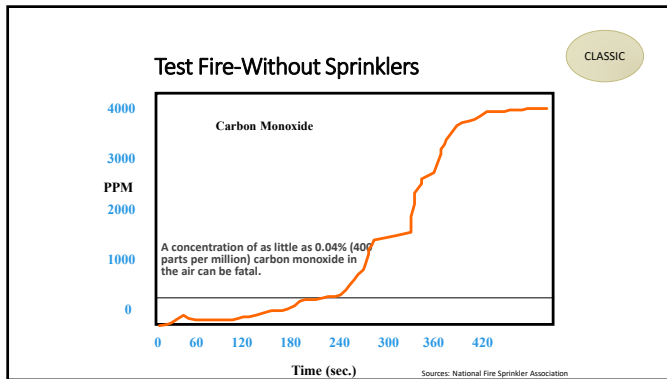
### Safe Window of Escape Time

- Less Time to Escape
  - Average safe window of time reduced from 17 minutes in the 1970's to as little as 3 minutes now.
  - Attributed to synthetic material in modern furniture, such as plastics and polyurethane foams.
  - These fuels cause more rapid fire growth. Smoke from these fires become deadly in minutes.
  - People are dying because they simply do not wake up or cannot get out in time.



Source: NIST

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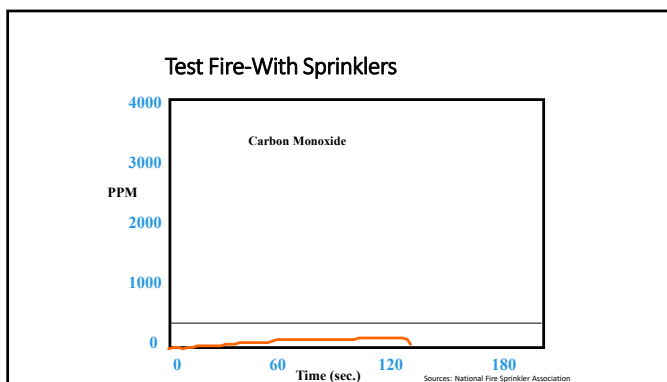
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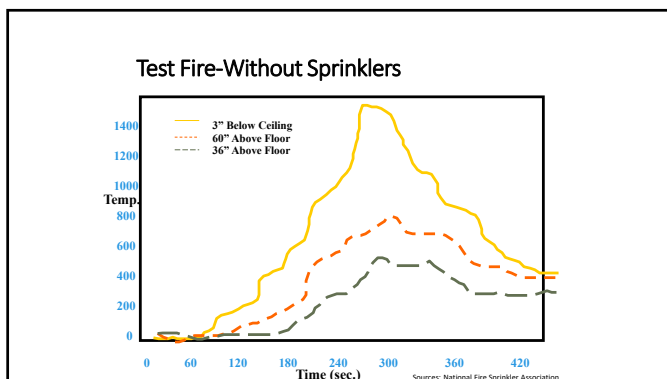
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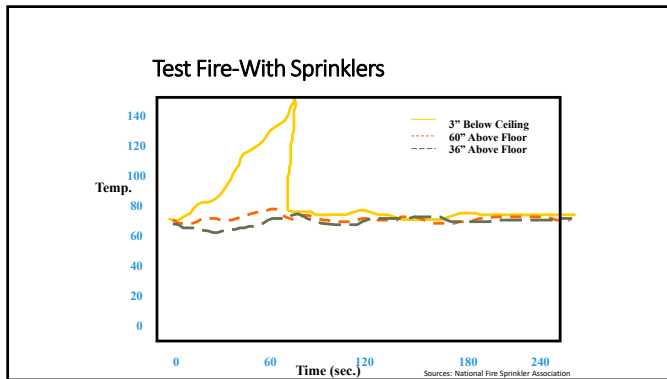
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### Why Do We Still Lose People in Home Fires?

Some Would Say Smoke Alarms are Enough...

- They may not provide an early enough warning for everybody to escape today's fast moving home fires
- Smoke alarms were present and operated in 40% of home fire deaths
- 38% of fire deaths were in homes with missing smoke alarms

Source: NFPA's Smoke Alarms in U.S. Home Fires, September 2017

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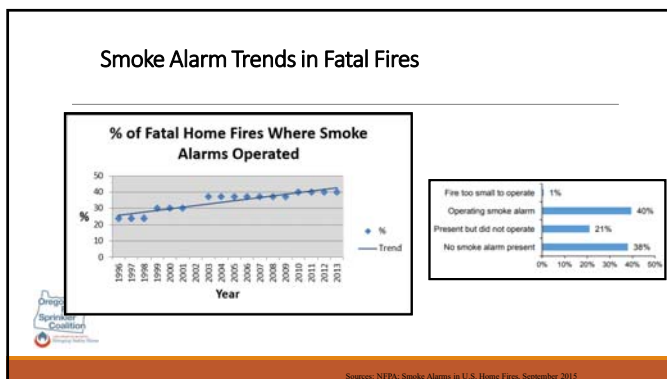
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### Building Trends and Implications

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Legacy	Modern	Result
Smaller homes	Larger homes	More fuel to burn, more oxygen
Compartmentalization	Open floor plans	More oxygen, easier smoke and heat communication, greater spans
Majority 1-story	Majority 2-story	Chimney effect, rescue challenges
Conventional lumber	Trusses/engineered systems	Quicker structural failure/collapse
Solid core doors	Hollow core doors	Quicker burn through
Larger setbacks	Reduced setbacks	Greater chance of multiple structures involved

2-Story Homes

- 1973 23%
- 2008 56%

Source: US Analysis of Changing Residential Fire Dynamics and its Implications of Firefighter Operational Timelines

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### Furnishings & Fuel Loads

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Heat Release Rates (HRR)	(Btu/sec)
• Small wastebasket	4-142
• TV set	114-275
• Cotton mattress	38-921
• <b>Polyurethane mattress</b>	<b>768-2495 (+271-2025%)</b>
• Cotton easy chair	275-351
• <b>Polyurethane easy chair</b>	<b>1281-1888 (+466-538%)</b>
• <b>Polyurethane sofa</b>	<b>2960</b>
• <b>Armchair (modern)</b>	<b>332-711</b>
• <b>Recliner (synthetic padding/covering)</b>	<b>474-949</b>
• Christmas tree, dry	474-617
• <b>Pool of gasoline (2 quarts on concrete)</b>	<b>949</b>
• <b>Living room or bedroom fully involved</b>	<b>2846-9487</b>

Source: NFPA 921; Kirk's Fire Investigation

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### 1970s vs. Current Fuel Loads

Comparison of Room Furnishings

Legacy Room      Modern Room

01:15

Source: UL

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1970s vs. Current Fuel Loads

CLASSIC

Comparison of Room Furnishings

Legacy Room      Modern Room

03:20

Source: UL

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1970s vs. Current Fuel Loads

Comparison of Room Furnishings

Legacy Room      Modern Room

03:40

Source: UL

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1970s vs. Current Fuel Loads

Comparison of Room Furnishings

Legacy Room      Modern Room

Underwriters Laboratories

10:00

3:40

Time to Flashover

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## 1970s vs. Current Fuel Loads



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## The Facts - Flashover

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## Residents Do Not Survive Flashover

- Flashover is caused when a fire produces enough radiant heat in a room to ignite all of the combustible items simultaneously
- Flashover can occur in as little as 3-4 minutes
- Conditions can become fatal in about 1/2 the time to flashover



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## The Facts - Flashover

## Firefighters Do Not Survive Flashover

- Charring of modern PPE fabrics >572°F
- 10% of firefighter deaths are a result of rapid fire development



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### Total Time to Firefighting Intervention (Minutes)

**How Long after Ignition Does it Take for Firefighter Intervention?**

- Ignition 0
- Alarm-Discovery 1
- Evacuation 1
- 911 call 1
- Dispatch Time 1
- Turnout Time 1.5
- Drive Time 5
- Setup Time 1
- Active Rescue/Suppression 11.5 min.

**HOME FIRE TIMELINE**

0 1 2 3 4 5 6 7 8 9 10 11.5

TIME IN MINUTES

Source: Oregon Fire Sprinkler Coalition

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### The Facts – Lightweight Construction

**Firefighter Safety Hazards**

- Lightweight Construction
  - Began to appear 25 years ago
  - Vulnerable to fire conditions
  - Times to reach structural failure 35-60 percent shorter

5 minutes to failure

20 minutes to failure

Time of Roof Failure 16:47 Minutes

House #2 OSB / Asphalt

Source: National Institute of Standards and Technology (NIST) Tests, Dechene Community College Tests

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### The Facts – Lightweight Construction

Activity	Lightweight Construction	Legacy Construction
Subfloor Reaches 200	5 min. 30 sec.	12 min.
Surface Temperature: 5 Min.	85°	73°
Visible Smoke	2 min. 30 sec.	13 min.
Visible Flames	5 min. 50 sec.	17 min. 50 sec.
Collapse Time	6 min.	18 min. 30 sec.

Source: Underwriters Laboratories (UL) Tests

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## What If Homes were Sprinklered?



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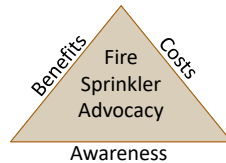
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35

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## 13D...Born of Necessity

- America Burning – 1973:
  - Nation Commission on Fire Prevention and Control
- In a letter to the President:
  - "...emphasize built-in fire safety-measures which can detect and extinguish fire..."
  - "...believe a continuing federal focus on the fire problem is a necessity"



Source: USFA

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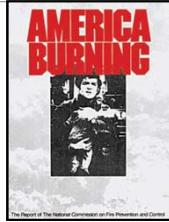
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### 13D...Born of Necessity

America Burning – 1973:

- Nation Commission on Fire Prevention and Control report:

“Appallingly, the richest and most technologically advanced nation in the world leads all the major industrialized countries in per capita deaths and property loss from fire.”



Source: USFA

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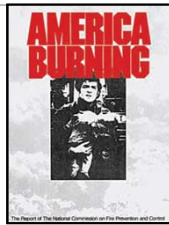
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### 13D...Born of Necessity

America Burning – 1973

Brought about:

- NFIRS - National Fire Incident Reporting System
- USFA – US Fire Administration
- NFA – National Fire Academy



Source: USFA

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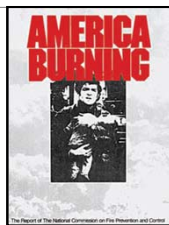
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### 13D...Born of Necessity

America Burning – 1973

- Identified a need to:
  - Reduce fire deaths in America
  - Make sprinklers more affordable
    - Sprinklers at the time were too costly for residential applications
  - Research to make sprinklers more aesthetically appealing



Source: USFA

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### 13D...Born of Necessity

- 1973 – NFPA
  - Based on the commission's report (America Burning)
  - Created a committee to:
    - Develop a standard that would produce a reliable but inexpensive sprinkler system for residential occupancies



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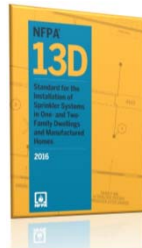
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### 13D...Born of Necessity

- 1973 – NFPA
  - Subcommittee developed five philosophies for the standard:
    1. Cost is a major factor
    2. Life safety is the primary goal
    3. Design based on survivability
      - 10 minute water supply
      - Audible alarm
    4. Material compatible with residential construction techniques
    5. Protection areas based on historical data



41

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### 13D...Born of Necessity

- USFA
  - Began performing tests on:
    - Practicality of a type of residential sprinkler system
    - Evaluation of sprinkler discharge rates and thermal sensitivity
    - Full-scale fire testing



Source: NFPA

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### 13D...Born of Necessity

- Residential Sprinklers
  - Developed from a new, researched understanding of tenability thresholds for:
    - Carbon Monoxide
    - Temperature
    - Oxygen depletion



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### Minimum Level of Safety Since 2009

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#### Model Building Codes:

- National Fire Protection Association (NFPA)
  - Required fire sprinklers in all new homes in 2005
- International Code Council (ICC)
  - Required fire sprinklers in all new homes in 2009
- State Adoptions of Model Codes
  - CA required fire sprinklers in all new homes 2011
  - MD required fire sprinklers in all new homes in 2011
- Other States: Sprinkler requirement removed during code adoption

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### Minimum Level of Safety Since 2009

#### Where Are We at in Oregon?

- Statewide multi-family requirement (2010) for new construction (3+ units OSSC)
- No statewide requirement to protect one and two family homes

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### Impact of Sprinklers

#### Death Rates

- The civilian death rate of 1.4 per 1,000 reported fires was 81% lower in homes with sprinklers than in homes with no AES.

#### Civilian Injury Rates

- The civilian injury rate of 25 per 1,000 reported fires was 31% lower in homes with sprinklers than in homes with no AES. Many of the injuries occurred in fires that were too small to activate the sprinkler or in the first moments of a fire before the sprinkler operated.

#### Firefighter Injuries

- The average firefighter injury rate of 13 per 1,000 reported home fires was 79% lower where sprinklers were present than in fires with no AES.

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Category	With sprinklers	No AES
Death rates per 1,000 fires	1.4	7.3

Category	With sprinklers	No AES
Civilian injury rates per 1,000 fires	25	34

Category	With sprinklers	No AES
Firefighter injury rates per 1,000 fires	13	62

Category	With sprinklers	No AES
Percent of fires confined to room of origin	97%	10%

Source: NFPA Fact Sheet, Sprinklers in Reported Home Fires During 2010 to 2014

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### The Survival Solution

=> Survival

=> Survival

**Your Chances of Surviving a Fire Increase Significantly with:**

- A fire sprinkler system and
- Smoke alarms

Source: Oregon Fire Sprinkler Coalition

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### Impact of Sprinklers

#### Civilian Death Rates per 1,000 Reported Home Fires

- 90% lower where sprinklers and hard wired smoke alarms were present.

Category	Deaths per 1,000 fires
No alarm or AES	10.3
Battery alarm but no AES	8.5
Any alarm but no AES	6.3
Hardwired alarm but no AES	3.9
Hardwired alarm and any AES	1.3
Hardwired alarm and sprinkler	1.1

Source: NFPA Fact Sheet, Sprinklers in Reported Home Fires During 2010 to 2014

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## Public Perception

### 2014 National Harris Poll

- 74% of U.S. homeowners said they would be more likely to buy a home with fire sprinklers than one without
- Seven in 10 said a sprinklered house has more value
- Nearly 8 in 10 (78%) said fire sprinklers provide the ultimate protection for residents

### 2016 Stakeholder Perceptions of Home Fire Sprinklers Survey

- 94% who have sprinklers in their homes have a sense of improved life safety
- 68% of participants indicated that the presence of home fire sprinklers provides them with a reduction on their home insurance
- 68% of participants indicated that having home fire sprinklers adds value to their home



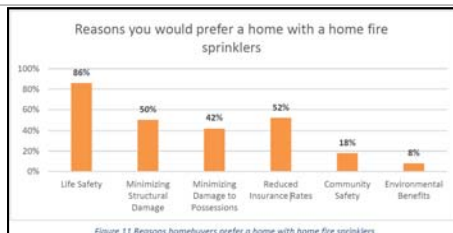
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Source: NFPA, Home Fire Sprinkler Coalition

49

## Public Perception

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Source: NFPA Stakeholder Perceptions of Home Fire Sprinklers, September 2016

50

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# Home Fire Sprinklers: Let's Talk Money

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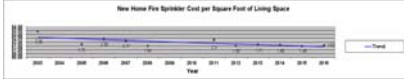
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# Costs of Home Sprinkler Systems

**Nationally - \$1.35 per sq. ft. of living area**  
 – Lowest \$0.74 in San Clemente CA

**Locally (Medford) - \$1.70 per sq. ft. of living area**





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Source: Fire Protection Research Foundation, NFPA

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# Costs of Home Sprinkler Systems

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**Expected Increase in 30-year Mortgage**

- \$5-10 month after interest deduction and insurance savings

**Comparable Costs**

- Many people pay similar costs for such home amenities as:
  - Upgrading carpet
  - Upgrading cabinets
  - Upgrading countertops
  - Upgrading driveways
- Other comparable costs:
  - One large popcorn at the movie theaters per month
  - Two mochas per month






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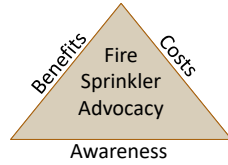
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## Affordability is a Team Effort

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Work with what you have:

1. Stick to the codes – avoid local amendments
2. Use low-flow sprinklers to design through small water meters
3. Have a list of sprinkler contractors / plumbers
  - “Get three bids”
4. Talk with your water purveyor
  - Ask them to join you in supporting sprinklers



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## Build Relationships

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Listen to adversaries

1. Our critics can be our benefactors
2. Reach out to key stakeholders – even our opponents
3. Ask them for input – then
  1. Delays in construction
  2. Permit costs
  3. Staffing inspections
  4. Inconsistent code enforcement



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## 2020 Oregon Residential Specialty Code

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### Oregon Coalition Code Team:

1. Reached out to Building Codes Division, Oregon homebuilders, Oregon fire Marshal's Association to:
  - Suggest addition / retention of items in the code that would potentially help builders
    - Setback options
    - Structural independence options for townhouses
    - Reduction in basement rescue openings
    - More



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## Have a Solid Media Message

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### Support sprinklers:

1. Sprinkler Save vs Water Damage!
2. Arm your PIO with the facts



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## Keeping Costs Down

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### Insurance generally rewards or stays neutral

- Insurance Savings (Typical 5-15% reduction in homeowner's insurance)
  - Oregon (2008)
    - State Farm 10%
    - Farmers 5%
    - Allstate 10%
    - American Family 10%
    - Country Insurance 5%



Source: Fire Protection Research Council

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## Sprinklers as part of a Community Risk Reduction Strategy

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### Sprinklers are one piece:

1. Avoid the 'sprinkler' blinders – they are one aspect to community safety
2. What about development?



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## Development Trade-ups and Incentives

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### Home Fire Sprinkler Coalition Polling Found:

1. 55% of developers would build with fire sprinklers if offered incentives  
Only 6% had been offered them
2. 8% of Authorities Having Jurisdiction Offered Incentives



What are these incentives?



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## Incentives: Street-Width Reduction



Traffic lanes may be narrowed, substantially reducing the amount of pavement in every linear foot of street in the development.



HOME FIRE SPRINKLER INCENTIVES

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**Incentives: Longer Dead End Streets**



Dead-end streets may be increased in length, allowing additional building lots to be accessed.

**Home Fire Sprinkler**  
FOR THE SAFETY OF YOUR HOME  
Promotes Water-Safe, Sprinkler-Ready Homes

HOME FIRE SPRINKLER INCENTIVES

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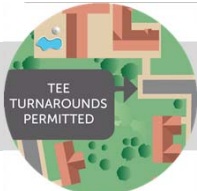
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**Incentives: Tee Turnarounds Permitted**



The permitted use of tee turnarounds in sprinklered developments can create at least one additional lot per cul-de-sac.

**Home Fire Sprinkler**  
FOR THE SAFETY OF YOUR HOME  
Promotes Water-Safe, Sprinkler-Ready Homes

HOME FIRE SPRINKLER INCENTIVES

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**Incentives: Increased Street Grades and Building Setbacks**



Steeper street grades and building locations allowed further from where the home's access leaves the main road.

**Home Fire Sprinkler**  
FOR THE SAFETY OF YOUR HOME  
Promotes Water-Safe, Sprinkler-Ready Homes

HOME FIRE SPRINKLER INCENTIVES

66

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**Incentives: Additional Units Permitted/Higher Density**



Development plans that allow homes to be closer together.

**Home Fire Sprinkler**  
FOR THE SAFETY OF YOUR HOME  
PROTECT YOUR HOME FROM FIRE

HOME FIRE SPRINKLER INCENTIVES 67

67

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**Incentives: Expansion of Existing Water Supply May Not Be Needed**



Required fire flows for fully sprinklered developments can be greatly reduced compared to non-sprinklered developments.

**Home Fire Sprinkler**  
FOR THE SAFETY OF YOUR HOME  
PROTECT YOUR HOME FROM FIRE

HOME FIRE SPRINKLER INCENTIVES 68

68

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**Incentives: Increased Hydrant Spacing**



Supply mains may be reduced and hydrant spacing can be increased.

**Home Fire Sprinkler**  
FOR THE SAFETY OF YOUR HOME  
PROTECT YOUR HOME FROM FIRE

HOME FIRE SPRINKLER INCENTIVES 69

69

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### Incentives: Gated Communities



Gated communities can delay Fire Department Access. A fully sprinklered subdivision provides mitigation for this impact allowing developers to utilize this security option when desired.

**Home Fire Sprinkler**  
2010-2011, 2012-2013, 2014-2015, 2016-2017, 2018-2019, 2020-2021  
Protects What You Value Most

HOME FIRE SPRINKLER INCENTIVES

70

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### Incentives: Subdivision Single Access Point



A fully sprinklered subdivision allows for a single public access road. This decreases infrastructure costs and significantly increases the number of single family dwellings allowed.

**Home Fire Sprinkler**  
2010-2011, 2012-2013, 2014-2015, 2016-2017, 2018-2019, 2020-2021  
Protects What You Value Most

HOME FIRE SPRINKLER INCENTIVES

71

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### Incentives: Reduced Basement Windows



Fire sprinklers reduce rescue openings in every basement sleeping room.

**Home Fire Sprinkler**  
2010-2011, 2012-2013, 2014-2015, 2016-2017, 2018-2019, 2020-2021  
Protects What You Value Most

HOME FIRE SPRINKLER INCENTIVES

72

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### What Can I Do?

Side by Side Burn – Visit [firesprinklerinitiative.org/oregon](https://firesprinklerinitiative.org/oregon)

CLASSIC

73

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### What Can I Do?

Get Involved with the Coalition - [firesprinklerinitiative.org/oregon](https://firesprinklerinitiative.org/oregon)

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### What Can I Do?

Get Involved with the Oregon Life Safety Team

NEWER

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## Home Fire Sprinklers: More Important Than Ever

### Learning Objectives:

1. Understand the residential fire problem in the U.S.
2. Learn about effective current advocacy practices
3. Identify emerging advocacy practices that increase effectiveness
4. Discover ways that you can help



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 -Greg Kleinberg, Medford Fire



76

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## Summary

### Wrapping Up:

1. Fire in our homes is still problem
2. How we talk about sprinklers matters
  - a. Might be part of an overall community strategy
  - b. Sprinkler saves vs water damage
  - c. Listen to our opponents
3. Relationships matter
4. Lots of incentives exist
5. Stick to the standards



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## Questions?



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