# Exposure of Buildings to Wildfires: Vulnerabilities and Mitigation Strategies

Institute for Catastrophic Loss Reduction Webinar
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# Exposures / Vulnerabilities / Mitigation


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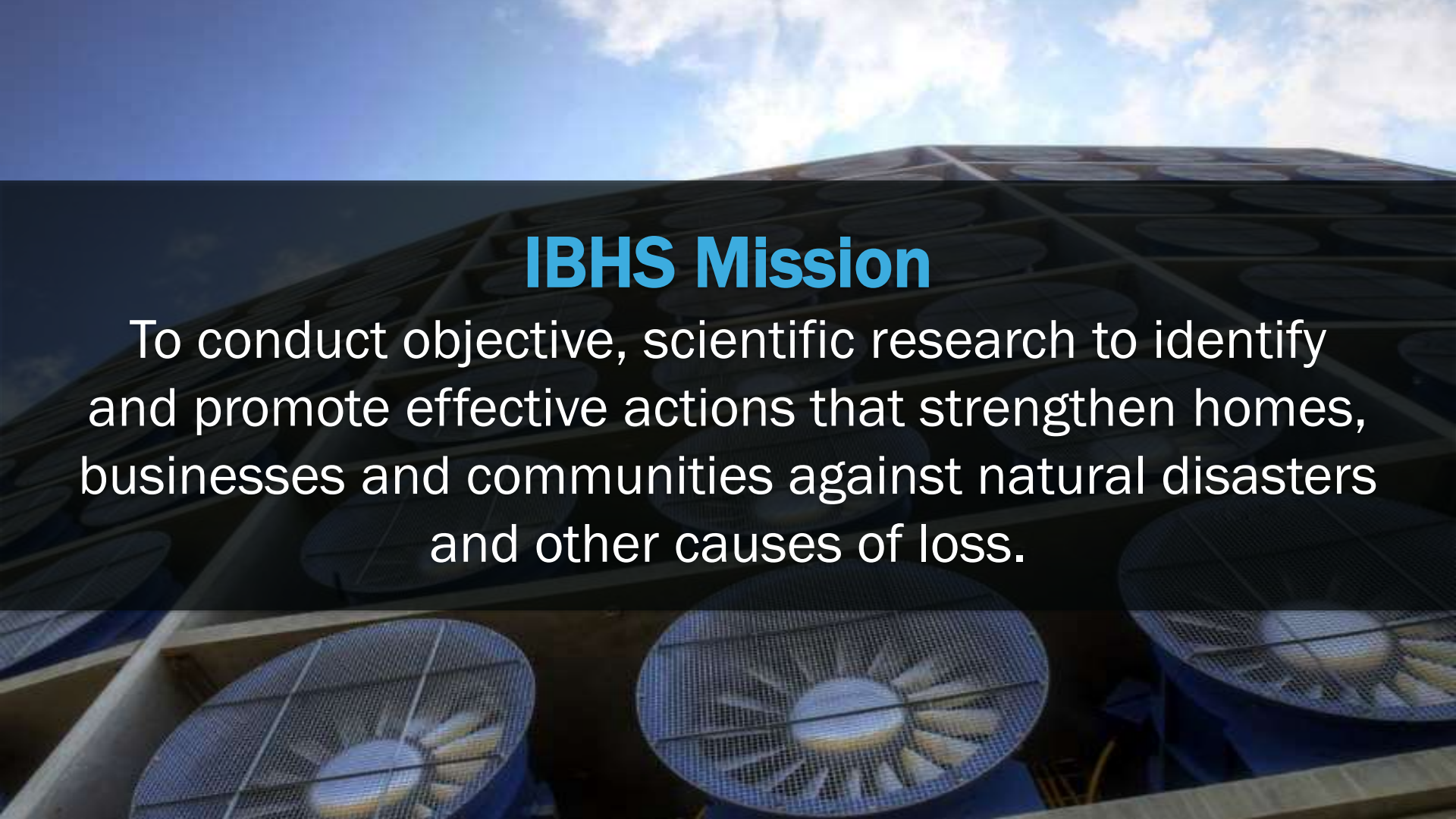

# IBHS Mission

To conduct objective, scientific research to identify and promote effective actions that strengthen homes, businesses and communities against natural disasters and other causes of loss.

# IBHS Research Center


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# Test Chamber


- Wind speeds up to 130 mph (~58 m/s)
- 105 fan array
- Diameter approximately 5.5 ft (~1.7 m)


- Full-scale buildings
- Residential or commercial
- One- to two-story

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# Wildfire Exposures: Embers



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# Direct versus Indirect



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# Indirect



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# Wildfire Exposures: Radiant Heat


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# Wildfire Exposures: Flame Contact


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# Home-to-Home



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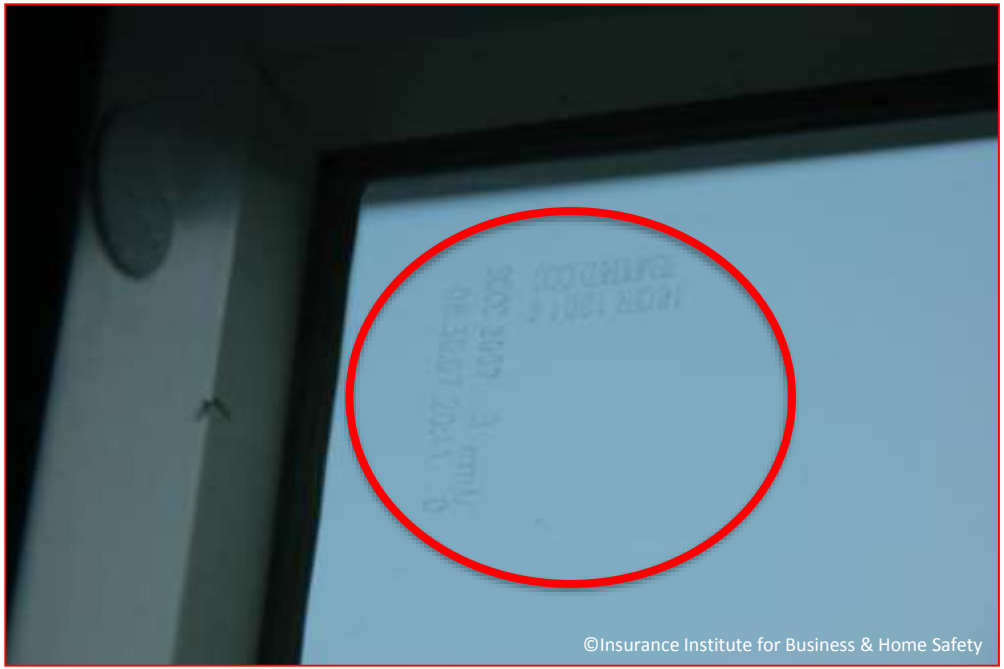
# A Coupled Approach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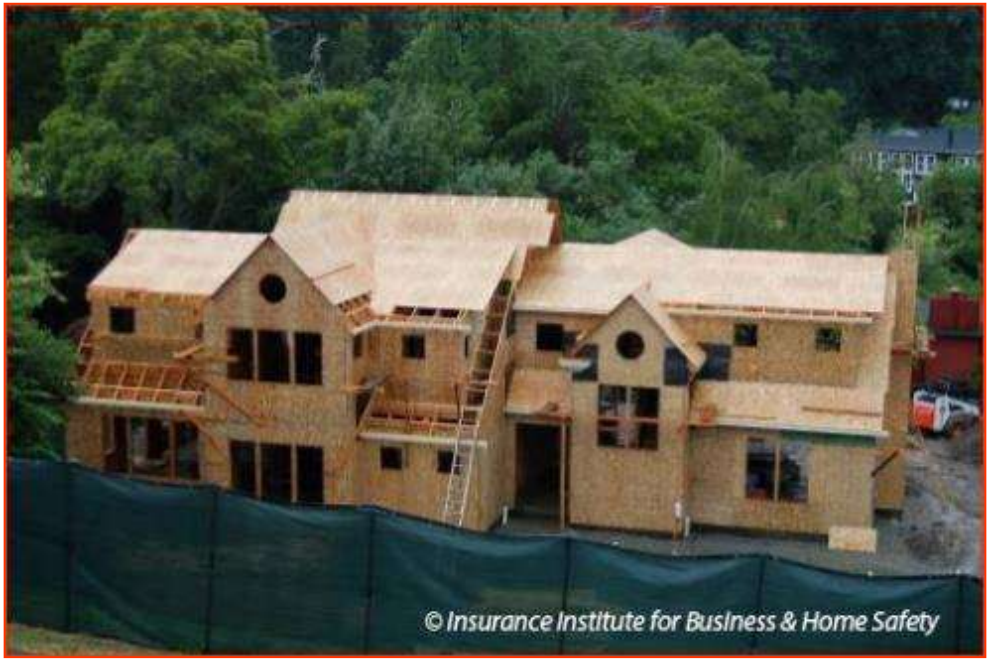
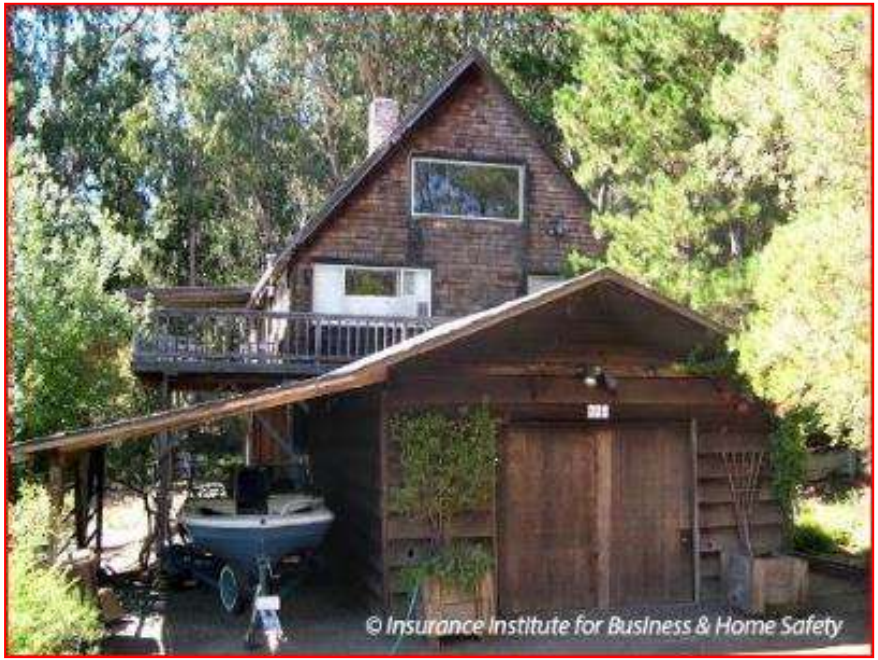
# Building Codes / Guidance

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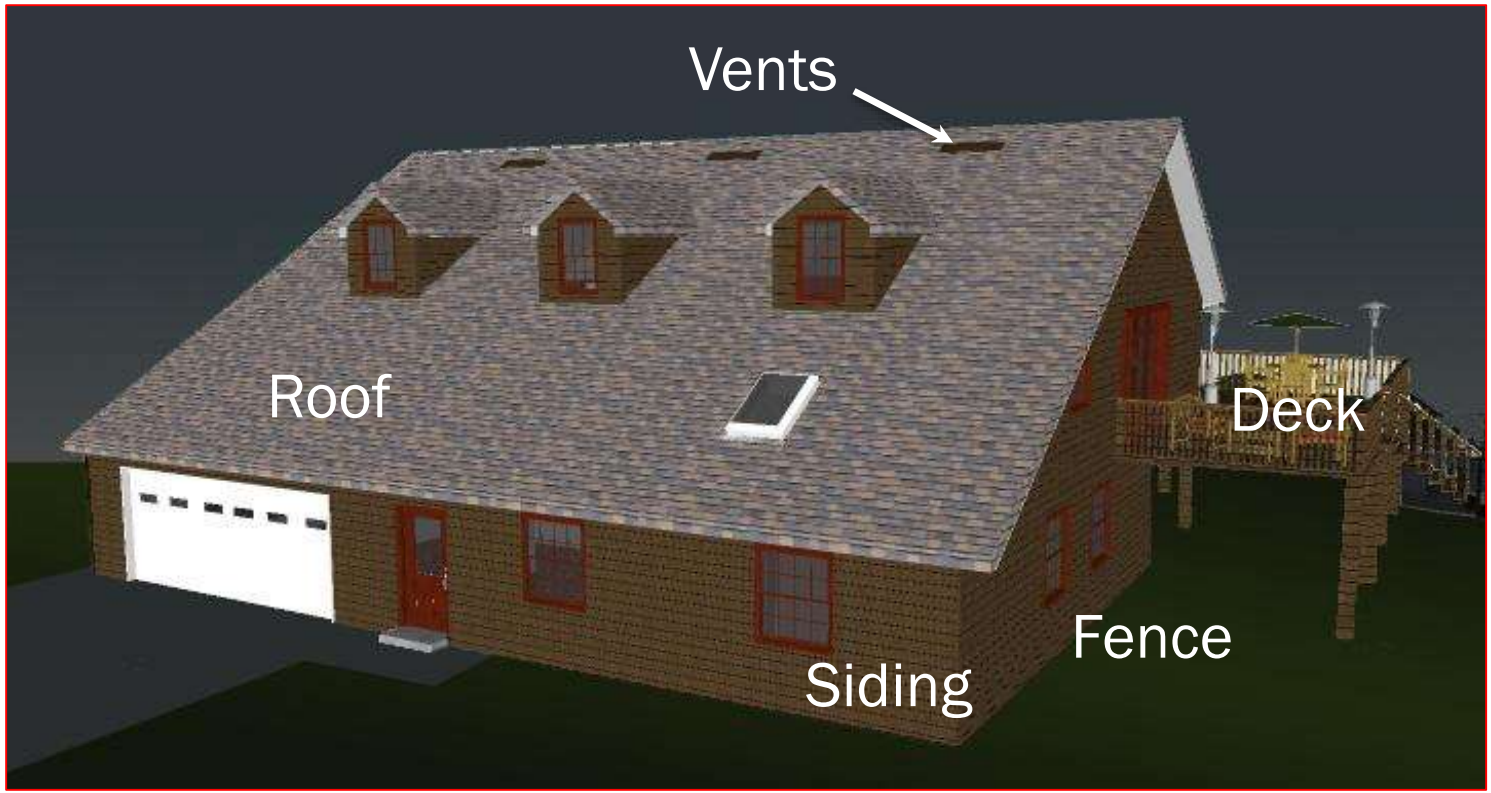
# Our House

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# Defensible Space Zones (In Canada "Priority Zones")

**IBHS Guidance on Defensible Space**

**Zone 1:**

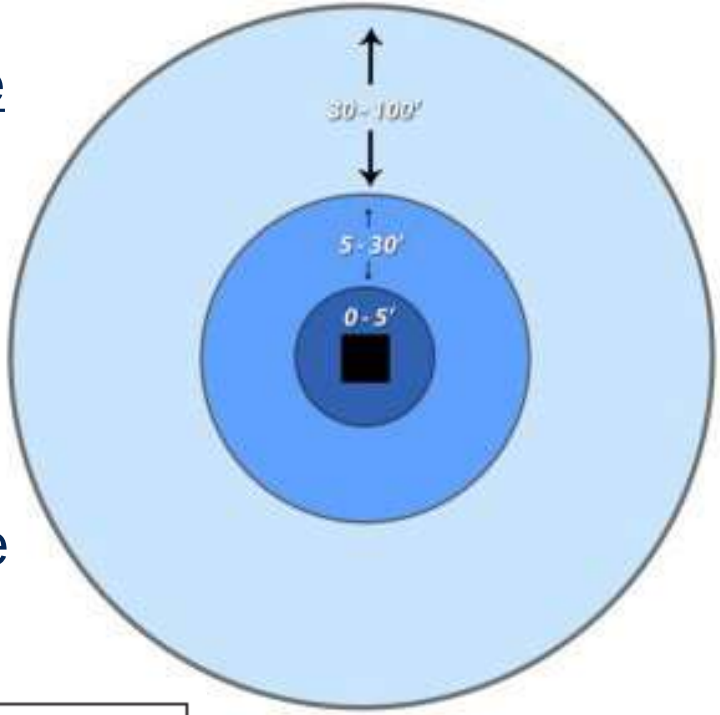
0-5 feet (0-~1.5 m), near-building

**Zone 2:**

5-30 feet (~1.5 – ~9 m)

**Zone 3:**

30-100 feet (~9 m - ~30 m) or to the property line

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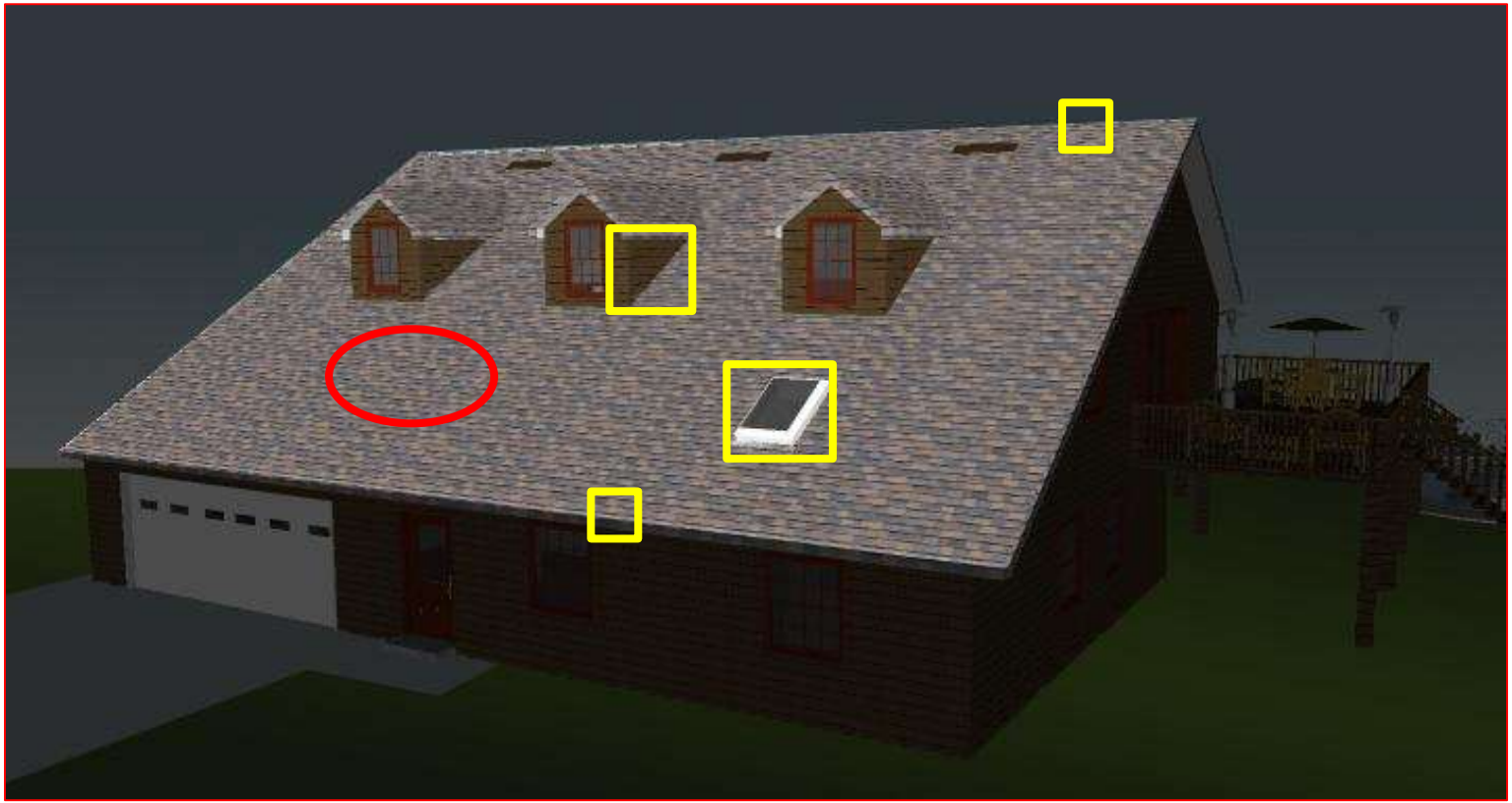
# Defensible Space: 0-5 ft (0-1.5 m)



# Roof



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# Fire Rating


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# Roof Edge



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# Roof Edge – Complex Roof



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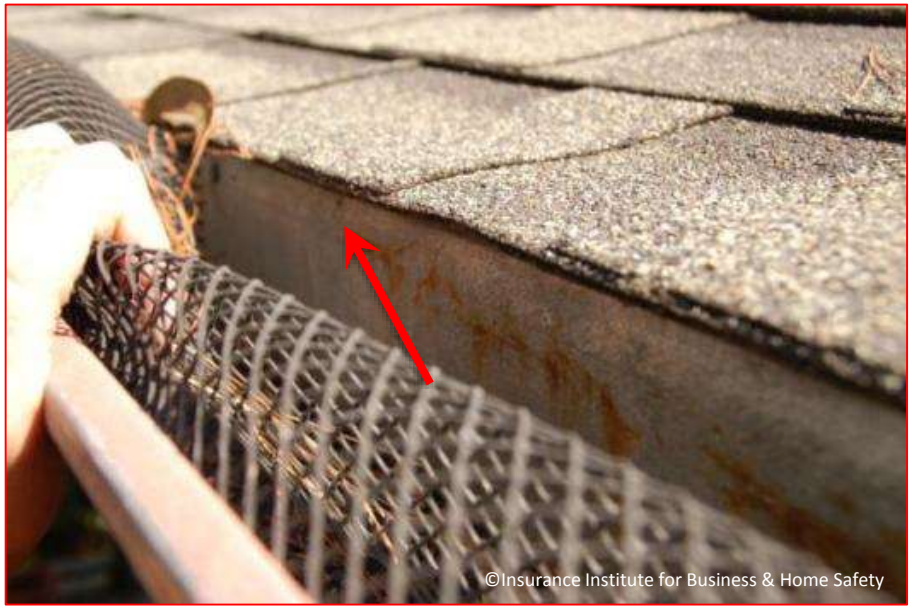
# Roof Edge - Gutter

# Roof - Drip Edge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# Roof - Skylights



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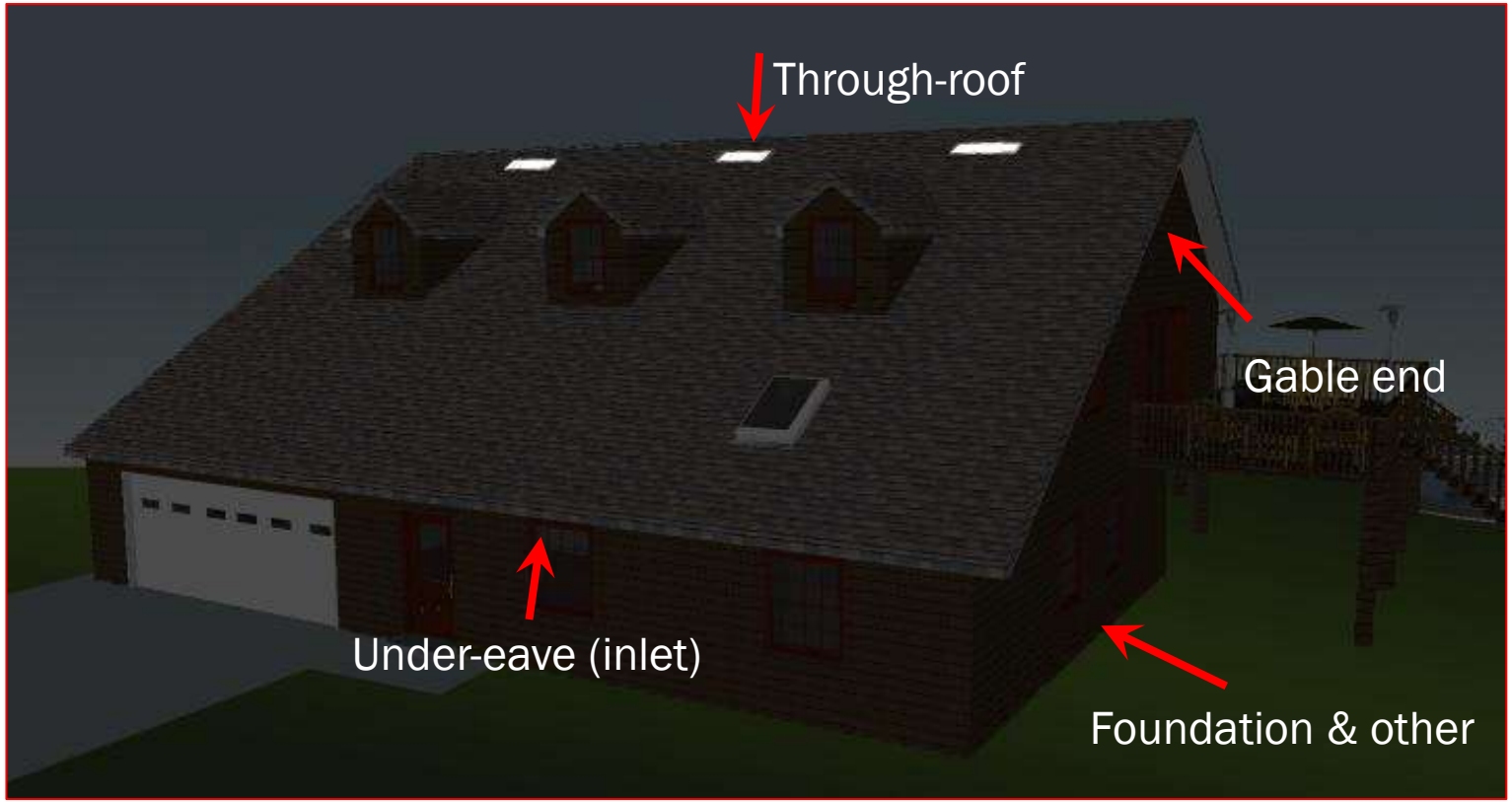
# Vents

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# Vents – Under-eave



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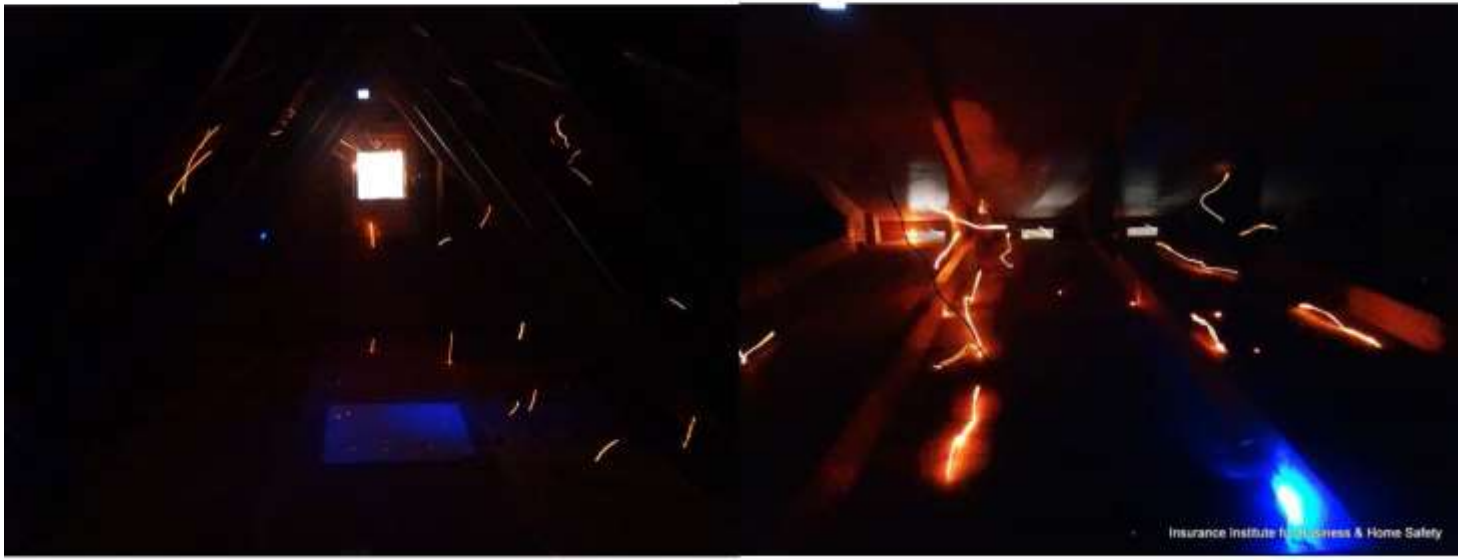
# Vents – Ember Entry

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# Vents – Mesh Size



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# Vents – California's Chapter 7A





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# Vents – External Baffle



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# Vents – Debris Accumulation


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# Vents – Dryer Exhaust



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# Exterior Walls


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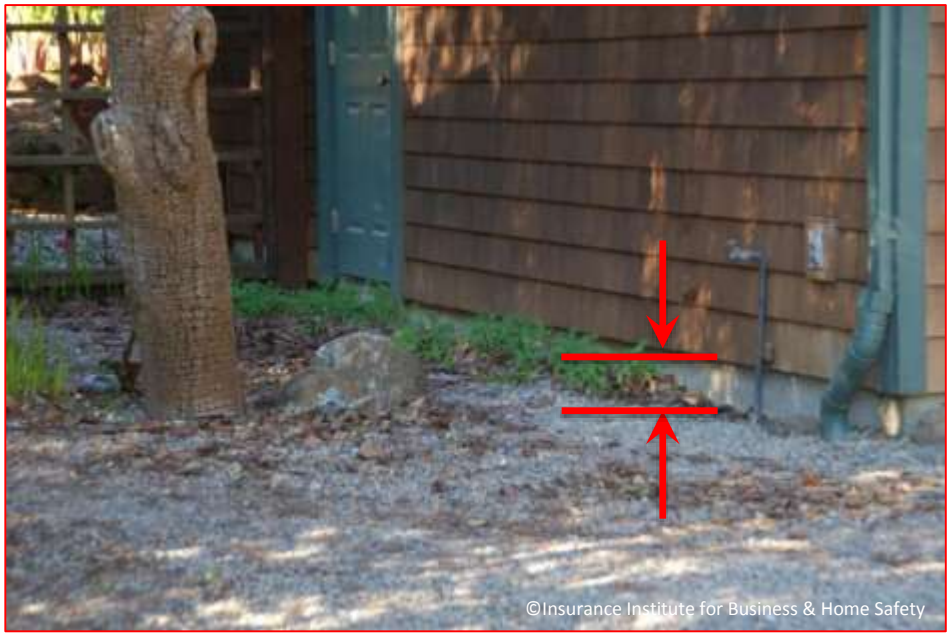
# Exterior Wall – Ground-to-Siding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# Exterior Walls – Near-Building



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# Exterior Wall – FR Coating



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# Exterior Wall – Gel Coatings



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# Exterior Walls - Windows


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# Exterior Walls – Window Screens



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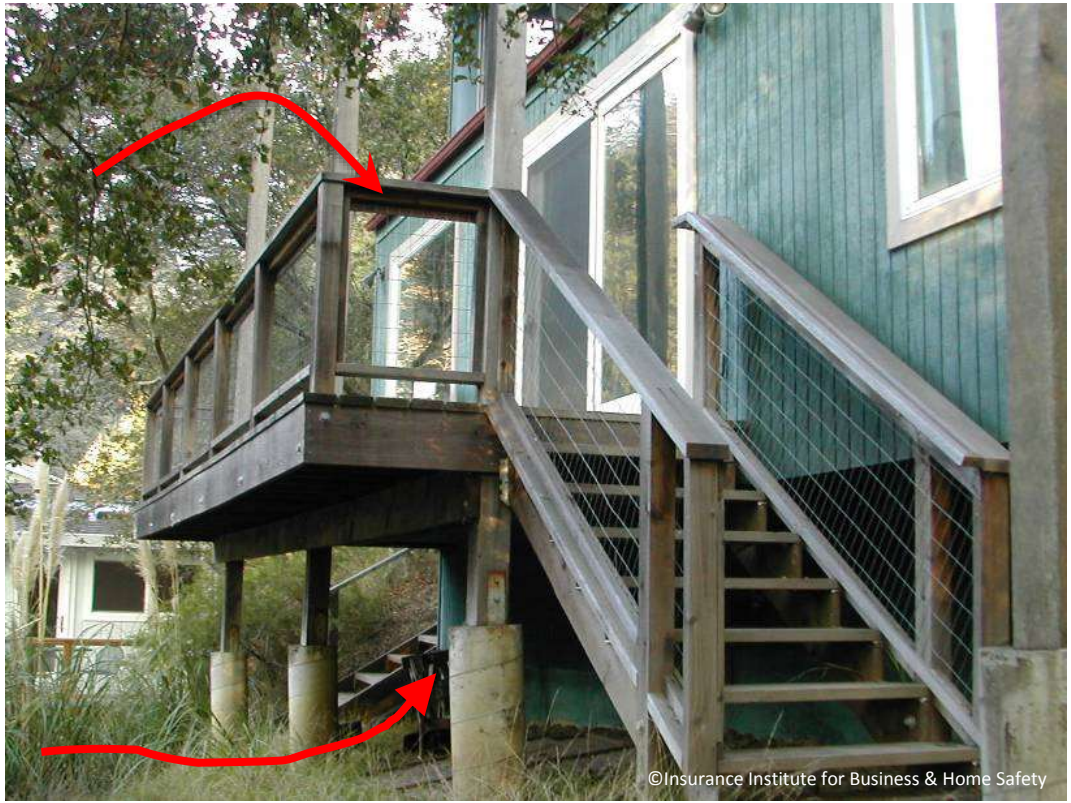
# Deck Vulnerabilities





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# Deck: Attachment Detail



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# Decks: Ember Exposure



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# Decks: Experimental Results

| Name | Composition | Chapter 7A Compliant | Easily Ignited by Ember Exposure |
|---|---|---|---|
| WPC1 | PVC | Yes | No |
| WPC2 | PE-1 | No | No |
| WPC3 | PE-2 | Yes | No |
| WPC4 | PE-3 | Yes | No |
| WPC5 | PE-4 | No | No* |
| HW | Wood | Yes | No |
| SW | Wood | Yes | Yes |
| SW1 | FRT Wood | Yes | No |

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# Deck: Ember Intrusion



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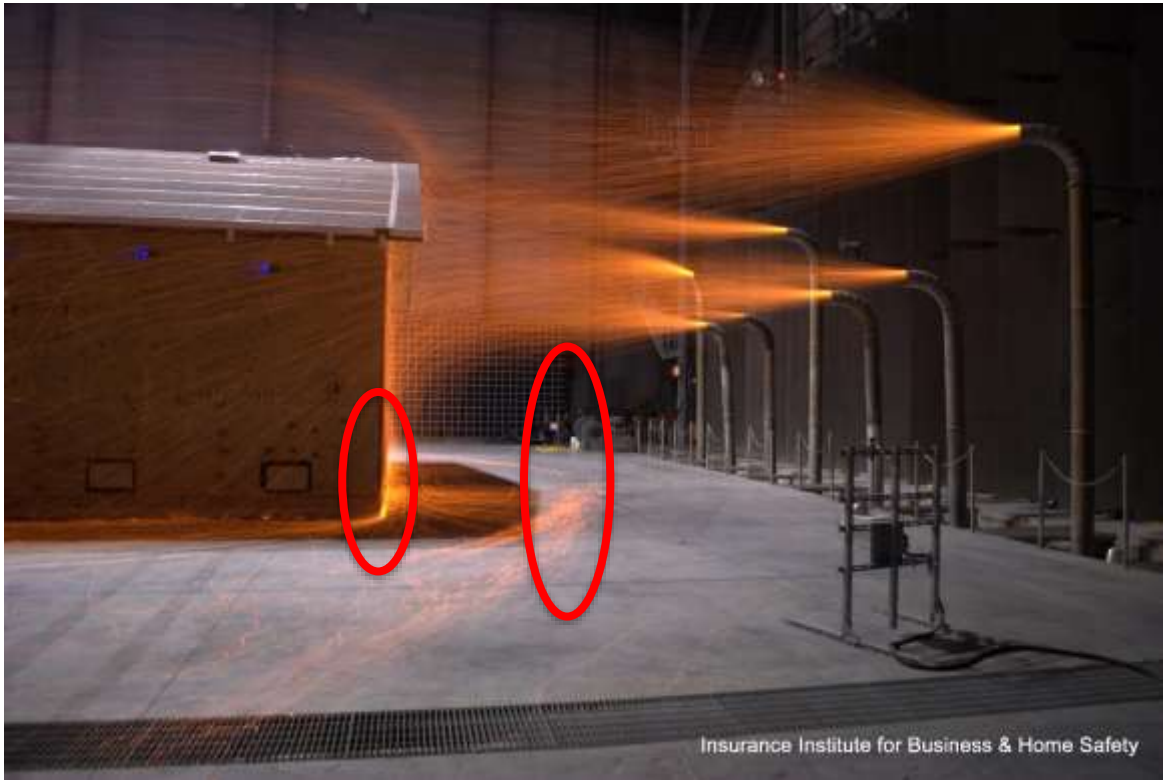
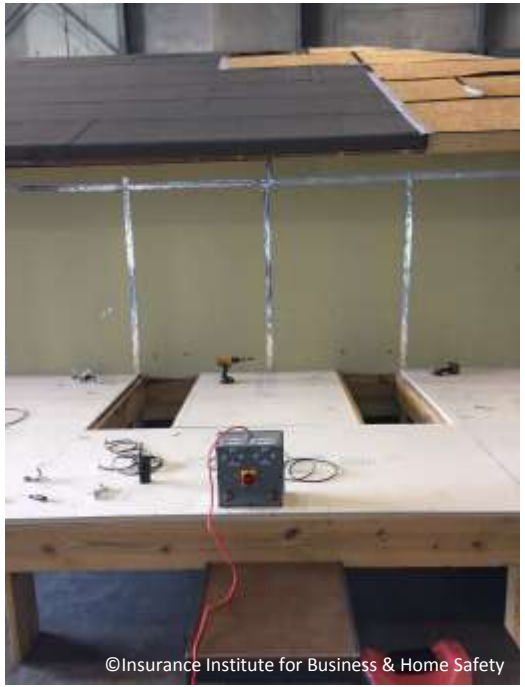
# Wind Flow & Propagation

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# Fence Vulnerability



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# Fence: Ground Condition / Design



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# Fence: Flame Spread



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# Fence: Guidance


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# Summary

- Exposures
  - Direct and Indirect
- Coupled Approach
  - “Defensible Space”
  - Materials & Design
- Wildland fire-to-home versus home-to-home


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# Thank You

Please visit www.disastersafety.org
Email: squarles@ibhs.org

## Questions?

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