

Fire Safe Building Materials & Design

The State of California is Burning: Is This Our Future?

California SAF Winter Meeting

Steve Quarles

Natural Resources Advisor Emeritus

IBHS Chief Scientist, Retired

Agenda

- Vulnerabilities of buildings to wildfire (potential exposures)
- Defensible space
- Building Spacing
 - “far”
 - “close”
- Wrap up / Summarize

Importance of Wind-Blown Embers



Importance of Wind-blown Embers



“Direct” and “Indirect” Ignition



Radiant Heat Exposure



Home Survival: A Coupled Approach



- Vegetation and other combustibles on the property: Selection, Location and Maintenance
- Home: Construction materials and design features

Mitigation Strategies



<http://calfire-forestry.maps.arcgis.com/apps/PublicInformation>



Home-to-Home Spacing



Home-to-Home Spacing: Wide



- ✓ Creation and maintenance of defensible space
- ✓ Installation details & design features. Ember-resistant materials.

Materials Versus Details – Ember Exposure

“... the resistance to (wild)fire is determined more by the details of construction than by the materials used in the walls.”

—G.J. Barrow, after the 1944 Beaumaris Fire in Australia



Wildland Fire-to-Home: Ember Ignition



Ember-resistant
construction and details

Defensible Space: 0-5 ft



Fire Rating



Roof-to-Wall

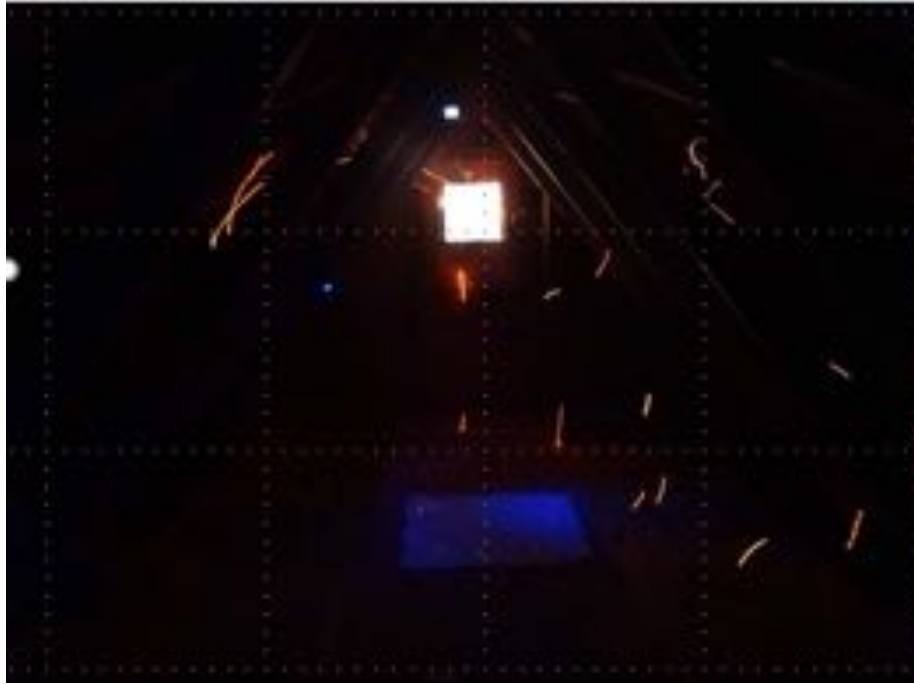


Roof Edge



Stephen L. Quarles

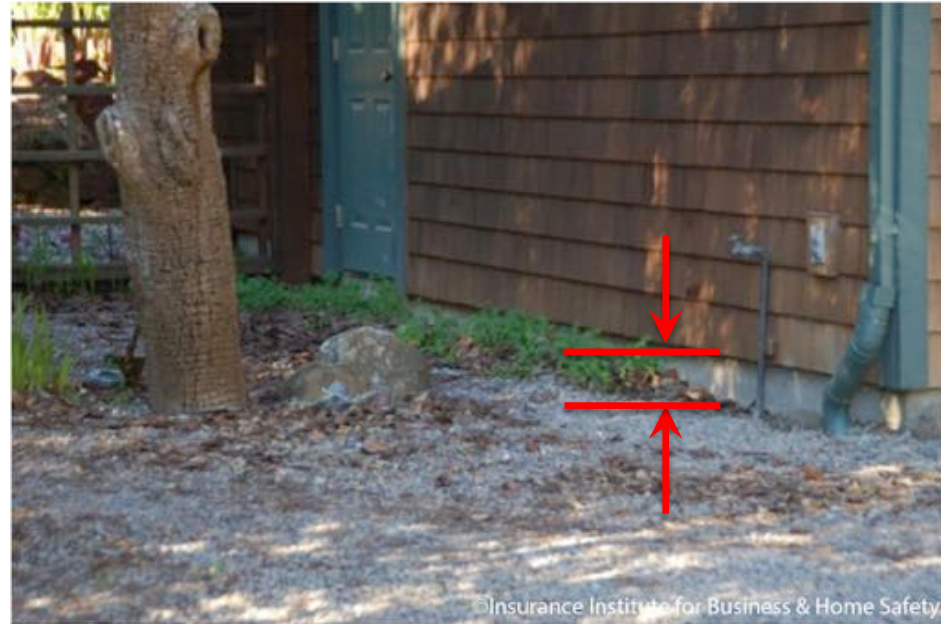
Vents – Ember Entry



Vents – CBC Chapter 7A



Exterior Wall — Ground-to-Siding



Ignition of Decking via Ember Exposure



Insurance Institute for Business & Home Safety

Ignition of Decking via Ember Exposure



Before Ignition



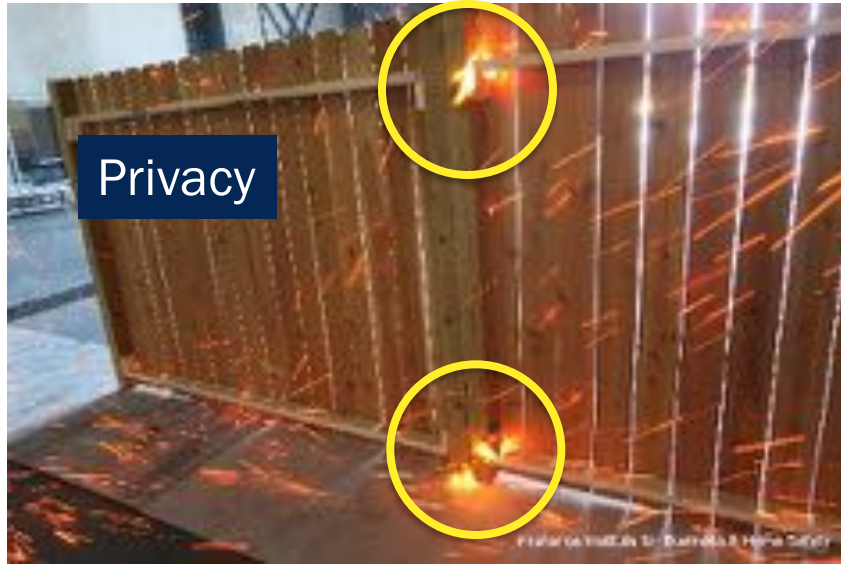
After Ignition



Fire Spread & Growth



Fencing



No Mulch



Mulch

Home-to-Home Spacing - Close



<http://calfire-forestry.maps.arcgis.com/apps/PublicInformation>

University of California

Agriculture and Natural Resources

<http://calfire-forestry.maps.arcgis.com/apps/PublicInformation>

Fire & Ignition Resistance



- ✓ Effective Defensible Space
- ✓ Noncombustible & Ignition Resistant Materials
- ✓ Multi-pane / Tempered Glass windows (minimum)

Ember Resistant vs Fire Resistant



The Building as a System



- Noncombustible cladding
- Foil-faced glass / windows
- Exterior sprinkler system
- Fire fighters on site
- Timber /wood in under-eave area (detailing at eave-to-wall connection?)
- Wood deck
- Wood shingle roof covering

Summary

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





Questions?

Steve Quarles

steve.quarles@berkeley.edu

Wildfire Exposures

Wind-blown Embers



Flame Contact



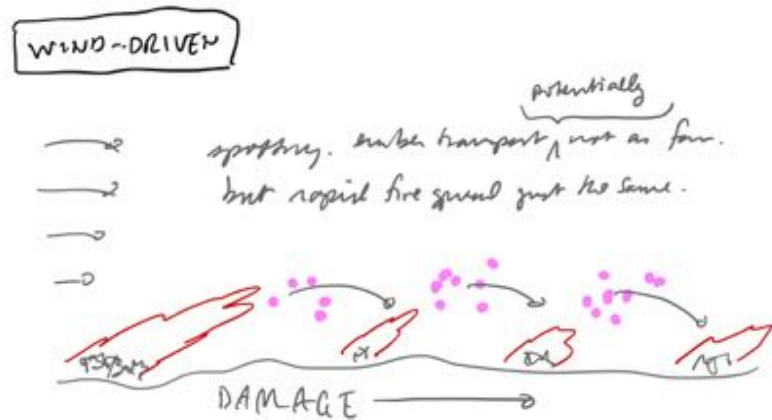
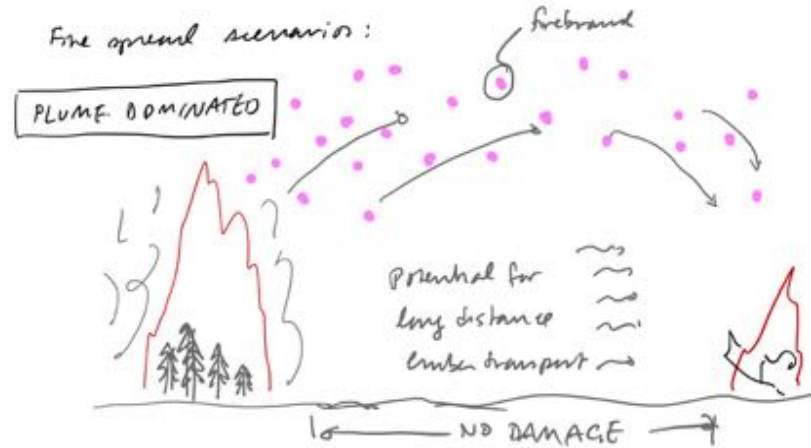
Novato Fire Protection District

Radiant Heat



Tennessee Division of Forestry

Wildfire Spread



Embers Through Deck Board Gaps



Fire Growth – Occurred in Under-deck Area



Insurance Institute for Business & Home Safety