



What 50+ Years of Wildland Firefighting & Fire Research Has Taught Me About Wildland Urban Interface Firewise Planning

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We Still Continue To Lose Lives
& Structures to Wildland Fire
Around the World.

WHY?

The Problem

- By Building Homes that are surrounded by or intermixed with flammable vegetation.





The Problem

- Homes without good primary and secondary road access for firefighter ingress and citizen egress.



Suggested Solutions



One Solution

- By Building Homes with non-combustible or fire resistive building materials.



**Next We Must Also Change the
Relationship Between the
Homeowner and the Fire
Department**

Traditional Roles

Fire Fighter = Protector “hero”

Homeowner = Helpless victim

Re-defined The Roles
Where the Fire Fighter and
Homeowner are

Partners

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Based Upon

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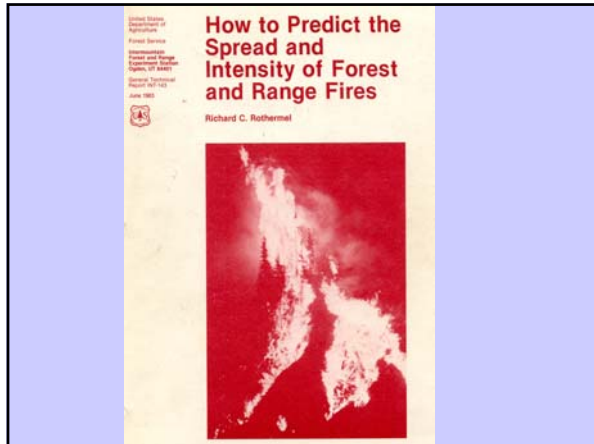
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Based Upon**

- My personal 50 years of firefighting experience.
- Well accepted Wildland Fire Research.
- **My evaluations and critiques of wildland fires throughout the USA, Europe and Chile.**

Wildland Fire Research

Wildland Fire Behavior

- Richard C. Rothermel showed us how wildland fire behavior can be predicted



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- Richard C. Rothermel showed us how wildland fire behavior can be predicted
- Patricia Andrews and others have given us BEHAVE and BehavePlus Fire Models to further predict wildland fire spread, intensity and flame lengths based upon various fire weather conditions.



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- Can help the fire manager to validate how much fuel treatment is needed around a home by various fuel models (types of vegetation).
- Fire managers decisions are based upon scientific radiant heat flux and flame length projections, plus their local knowledge and experience.

- This is where each homeowner or a group of homeowners **must** take on the responsibility for doing their part in protecting their home(s).

How?
Starting at the Home

- Hardened the exterior of the home, including the windows (Dual pane and/or shutters).



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- Landscaping the “Defensible Space”
- Extra Fuel Treatment
- **Fix the “little things”**

How?
Starting at the Home

- Landscaping & irrigating the “Defensible Space” Zone
- Hardened the exterior of the home, including the windows
- Extra Fuel Treatment Zone
- Fix the “little things”
- **Improving primary and secondary access**

Yard Landscaping
Defensible Space Zone

Defensible Space Zone
• **First 50 feet (15.2 m) around a structure.**

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- **Irrigating this zone.**

Defensible Space Zone

- First 50 feet (15.2 m) around a structure.
- Planting only fire-resistive vegetation.
- Irrigating this zone.
- **Annually removing all dead and dying material.**



Fuel Treatment Zone

- This zone is 50 ft (15.2 m) outward from the Defensible Space Zone or 100 ft (30.4 m) from the structure. BEHAVE and/or Behave Plus fire behavior modeling helps to determine if 30.4 m is enough.

Fuel Treatment Zone

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- Goal is to reduce the fuel loading of flammable vegetation. Not all vegetation.





Types of Fuel Treatment

- Hand labor (thinning & clearing)
- Agriculture/Mechanical (tractor, brush masticators, etc.)
- Biological – **Let's look at one of Europe's most logical brush removal tools.**

**Mechanical
and/or
Agriculture Crops**





Biological - Animals











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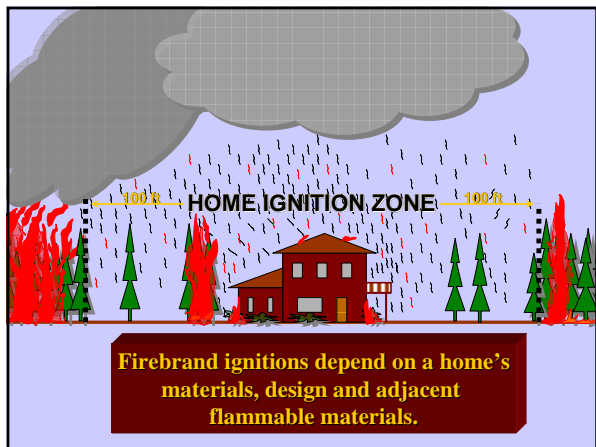
Firefighters Can Use Fuel Treatment Zones

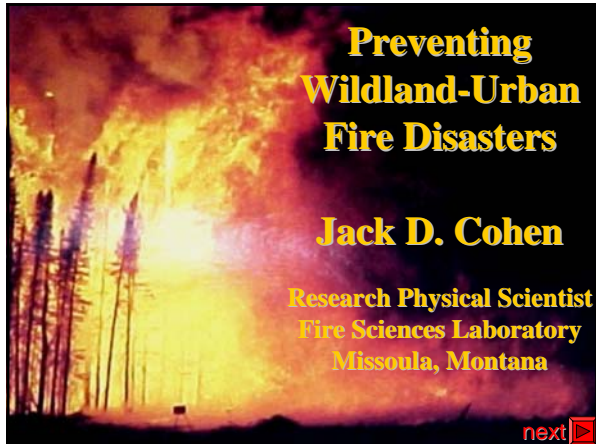
- As fire containment lines
- **To burn out (back fire).**
- **As Safety Zones**

Now That We Have Minimized
the Potential of Structure Ignition
from Radiant Heat Through
Fuel Treatment

What About Flying Embers?







Case Study Results:

Given a nonflammable roof

- **86%** home survival with at least **30 ft (9.1 m)** of clearance

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Case Study Results:

Given a non-flammable roof,

- 86% home survival with at least 30 ft (9.1 m) of clearance
- 95% home survival with 30-60 ft (9.1-18.2 M) of clearance
- **Most recent studies with at least 100 ft (30.5 M) of clearance – Homes have more than 96% chance of survival**

Conclusion

Our past thoughts convinced us that ignitions from flames (radiant heat) would occur over relatively long distances – 100 ft. (30.4 m) or more.

S.I..A.M Modeling at **100 ft** less:

- * **Experiment** – no ignition beyond 33 ft.
- * **Case Studies** – **86-95%** survival at 33+ ft.
- * **More than 95%** survival at **100 ft.**



Home ignitability suggests that a home need not be a victim of a wildland fire, i.e., a severe wildfire need not equate to a wildland-urban fire disaster.

**Research and Case
Studies Tell Us**

That **non-combustible** roofs are
less likely to burn.

That **non-combustible** siding
(brick, stucco & rock) are highly
• resistant to flame impingement

Jack Cohen's research validates that **vegetation clearance** minimizes ignition from **radiant heat**

What about the flying embers (**firebrands**) that are able to find a combustible fuel bed or entrance into a structure?



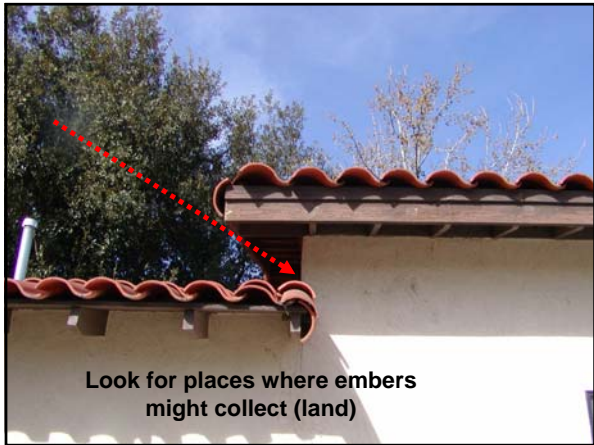
Then Why Are Homes Still Burning?

What about firebrands?

Firebrands that result in ignitions can originate from a fire over a kilometer away depending on wind speed, fire Intensity and type of fuel burning.

It's the Little Things That Most Likely Ignite the Structure

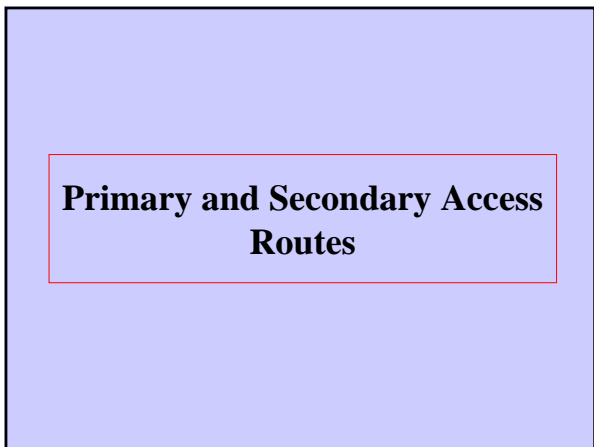










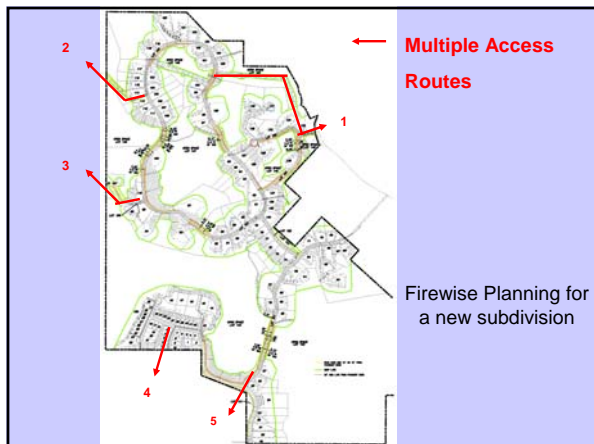


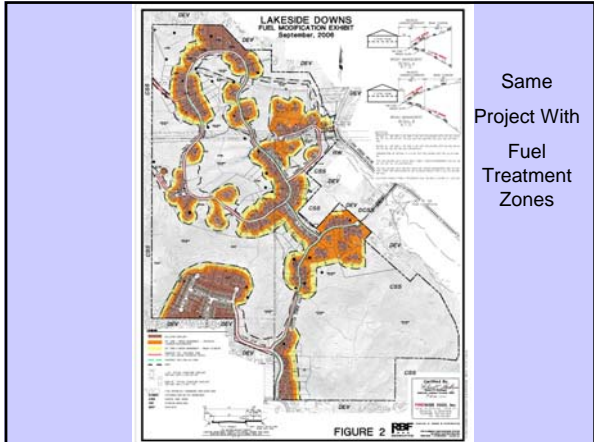
Primary and Secondary Access Routes

- Establish a minimum of two routes of escape.

Primary & Secondary Access Routes

- Option of two routes of escape
- Prevents being trapped or cut off by fire





Same Project With Fuel Treatment Zones

Access Road Fuel Treatment Zones

- Treat the fuels on each side of the roadway (nine (9) meters or more).

Access Road Fuel Treatment Zones

- Treat the fuels on each side of the roadway (nine (9) meters or more).
- Provides for safer travel for firefighter ingress and citizen evacuation egress

A Real Life Example
of How A Home Can Be Saved







Home surrounded by fire

No Homes Where Lost or Damaged

**By Doing All The Right Things
We Can Go From**











Looking for help?

We certainly can learn new things from each other and not repeat the past.

For More Information:

www.firelab.org

Technical articles related to how home ignitions occur and the implications for reducing wildland-urban fire destruction.

www.firewise.org

General information regarding advice for reducing the wildland-urban fire threat.

Bibliography 



