Webinar Goal:
To provide an understanding of the Wildland Urban Interface Building Standard (WUIBS), Chapter 7A of the California Building Code. Upon completion of the course, participants will be better able to:

- Understand the CBC Chapter 7A WUI provisions as related to wood construction.
- Understand which exterior-use wood products meet the CBC Chapter 7A WUI provisions.
- Understand SFM standard test methods for materials and assemblies to comply with the WUI code.
- Understand how the SFM standard provides a way for combustible materials to comply with the provisions of the WUI code.

1. How buildings are exposed to wildfire
2. Applicability and Implementation
3. Related test procedures
4. Roof Coverings and Assemblies
5. Gutters
6. Attic Vents
7. Eaves
8. Exterior Walls
9. Windows
10. Decking
11. Doors
12. Projections
13. Other buildings on the parcel (other than primary)
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Chapter 7A applies to new construction

Residential ... and non-residential

Existing buildings: Chapter 7A doesn’t apply. Existing code already applies to replacement of certain components, such as the roof covering. Some jurisdictions have incorporated "significant remodel" language in their adoption language.
Acronyms ...

SRA – State Responsibility Area
LRA – Local Responsibility Area
FRA – Federal Responsibility Area
FRAP – Fire Resource and Assessment Program
VHFHSZ – Very High Fire Hazard Severity Zone
HFHSZ – High Fire Hazard Severity Zone
MFHSZ – Moderate Fire Hazard Severity Zone

Fire Hazard Severity Zones (FHSZ) have been mapped by CAL FIRE (OSFM Fire Resource and Assessment Program (FRAP)).
- Based on modeled fire behavior and brand (ember) development in wildland areas and more developed (urban) areas.
- New FHSZ maps are based on best available data.
- Procedures have been consistently applied across state.

FHSZ’s indicate areas of significant fire hazard, and are based on:
- fuels
- slope (topography / aspect)
- fire history (annual burn probability)
- ember production (based on vegetation)

"Flame" and "Brand" scores are generated.

For urban areas, vegetation density is used to evaluate the "burnability" or penetrability of wildland fire.

"Wildland" and "Urbanized" scores developed separately, and then lands are merged to form FHSZ maps for SRA and LRA.

WUIBS was approved by the Building Standards Commission in September, 2005.
Applicable in -
- State Responsibility Areas [SRA] (VHFHSZ, HFHSZ, MFHSZ), as defined by CAL FIRE.
- Local Responsibility Area [LRA] (VHFHSZ), as defined by CAL FIRE. These LRA maps may be modified by local legislative body (Government Code 51179.)
- Local Building Official will be able to determine applicability on an address basis.
**Summary of Chapter 7A applicability**

<table>
<thead>
<tr>
<th>Responsibility Area</th>
<th>FHSZ</th>
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<tbody>
<tr>
<td></td>
<td>Very High</td>
</tr>
<tr>
<td>SRA</td>
<td>Yes</td>
</tr>
<tr>
<td>LRA</td>
<td>Yes</td>
</tr>
</tbody>
</table>

1 Roof covering requirements also depend on provisions given in Chapter 15.

**Question**

In Local Responsibility Areas (LRA), Chapter 7A is _____ applicable in Very High Fire Hazard Severity Zones.

**Answer**

a) Sometimes  
b) Only  
c) Never

[Click on your county Alameda](http://www.fire.ca.gov/fire_prevention/fire_prevention_wildland_zones_maps.php)
For SRA and LRA …
GIS layer (Shapefiles in .zip folder)

Implemented in two phases -

Phase 1: Since December 1, 2005 -
- Roof coverings
- Attic vents

Phase 2: Since January 1, 2008 in SRA. LRA followed somewhat later -
- Exterior siding
- Exterior wall vents
- Exterior doors
- Windows
- Decking surfaces
- Floor projections

Prior to building permit final approval, the property shall be in compliance with the vegetation management requirements in PRC 4291 or GC 51182.

Explicit link between vegetation management and protection of home

The local AHJ will determine who will indicate compliance with PRC 4291 and GC 51182.
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SFM Standards Referenced in Chapter 7A -
12-7A-1 Exterior Wall Siding [ASTM E2726]
12-7A-2 Exterior Windows [No ASTM option]
12-7A-3 Horizontal Projection Underside [ASTM option being developed]
12-7A-4 Decking, Parts A and B [ASTM E2632-Underdeck & ASTM E2726-Brand]
12-7A-4A Decking Alternate Method A (underdeck) [ASTM E2632-Underdeck]
12-7A-5 Ignition Resistant Material [ASTM E2768 ("extended" ASTM E84)]

The same basic apparatus is used for Wall, Window and Eave Tests [SFM Standards 12-7A-1, 2, and 3].

Glass failure in window, during test

Wall test

Horizontal Projection
Exterior-rated FRT wood allowed, either as stated here, as IRM, or other test (e.g., roofing). Weathering step required.

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• Phase 1 ...
  – Roofs and Attic Vents, effective since December 1, 2005
  • Class A (in VHFHSZ) - stand alone or assembly
  • Protection of valleys – Underlying roll roofing where metal flashing used
  • Gutters - statement regarding accumulation of debris
  • Attic Vents - “Resist building ignition from intrusion of burning embers and flame…”
    – Noncombustible mesh screen, openings between 1/16-inch and 1/8-inch.

Roofs shall comply with the requirements of Chapter 7A and Chapter 15.
Fire Retardant Treated wood shake roof – Class A fire rating “by assembly”

Natural weathering prior to ASTM E108 testing

Where roof profile allows for a space between roof covering and deck, the spaces shall be construction to prevent the intrusion of flames and embers.

Roll roofing (cap sheet) over entire roof deck also ok.

Valley Construction

One layer of roll roofing (cap sheet) applied under metal flashing

Chapter 7A – No requirements for skylights
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Roof gutters shall be provided with the means to prevent the accumulation of debris.

- No specific wording on how to accomplish this, but typical interpretation is to require gutter cover device.
- No standard procedure to evaluate performance.
- No restriction on gutter material (i.e., metal or plastic gutter ok).

Attic Ventilation:

“Resist ... from intrusion of burning embers and flame...”

- Noncombustible mesh screen, openings between 1/16-inch and 1/8-inch.
- Materials shall be noncombustible. Exception is ridge vent under roof covering, if exposed surfaces covered with noncombustible wire mesh, vent may be combustible.
Vents shall not be installed on underside of eaves ...

Exceptions:
1) shown to *resist* the intrusion of flame and burning embers
2) Screen option ok if a) automatic sprinkler system installed in attic *or* b) exterior siding and exposed underside (soffit) is noncombustible or IRM *and* vent is more the 12-feet from ground / walking surface.

ASTM E2886 - Standard Test Method for Evaluating the Ability of Exterior Vents to Resist the Entry of Embers and Direct Flame Impingement (*not for ridge and off-ridge vents*)

Any questions so far?

Phase 2: In effect in all SRA beginning January 1, 2008. Compliance in LRA will follow once maps have been finalized by OSFM / FRAP and approved locally, but no later than July 1, 2008.

- Eaves
- Exterior walls (siding, doors, openings)
- Windows
- Exterior doors
- Decking surfaces
- Floor projections

- Performance standards for products
  [http://osfm.fire.ca.gov/codedevelopment/wildfireprotectionbuildingconstruction.php]
  Search “OSFM Wildfire Protection Building Construction”
- “or” statements will provide options for compliance, both performance and prescriptive.
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Eave Protection. Meet the requirements of SFM 12-7A-3 or shall be protected by ignition resistant material or noncombustible on the exposed underside.

Open-eave allowed if solid wood rafter tails, minimum 2-inch, and solid wood blocking, minimum 2-inch.
Exterior walls shall be *one* of the following …

- approved noncombustible or ignition resistant material (weathering required as per code definition of IRM), *or*
- heavy timber or log wall construction, *or*
- shall provide protection from the intrusion of flames and embers in accordance with SFM 12-7A-1 [Exterior Wall Siding and Sheathing]. Weathering not required when complying with this option.

Exterior portion of “one-hour” construction, one layer 5/8-inch Type X gyp ok.

SFM 12-7A-1 … evaluates potential for flame penetration into the stud cavity. Flame spread not part of criteria.

Plain bevel lap joints are vulnerable to flame penetration at the joint. Joint penetration ~1 min.

More complicated lap joints, such as this shiplap joint, are more difficult to penetrate. Joint penetration ~ 21 min.

Source for figure: Dost and Botsai, 1990, Wood: Detailing for Performance
Log wall ok. Heavy timber ok.
• Log wall: Diameter > 6 inches
• HT: Smallest nominal dimension 4 inches.

Exceptions include fascia and trim

Question
Exterior walls shall be one of the following:

a) Approved noncombustible or ignition resistant material.
b) Heavy Timber or log wall construction.
c) Shall provide protection from the intrusion of flames into the stud cavity when tested in accordance with a State Fire Marshal test standard.
d) All of the above.
e) a. and c.

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Exterior windows, glazed doors and glazed openings within exterior doors, windows in exterior garage doors shall be …

- insulating-glass units with a minimum of one tempered pane *(either inner or outer pane)*, or
- glass block units, or
- have a fire resistant rating of not less than 20 minutes with tested in accordance with NFPA 257 (using the vertical furnace) or
- Meet performance requirements of SFM-7A-2 (Exterior Windows)

Any frame material is ok.
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Decking surfaces. The walking surface material ... any portion of such surface is within 10 feet the building ...

1. Constructed with ignition resistant material and pass performance requirements of SFM 12-7A-4 and 12-7A-5, or
2. Exterior FR treated wood, or
3. Noncombustible material, or
4. Complies with SFM 12-7A-4A. Siding must be noncombustible or IRM, or flame spread index Class B or better (so, <75).

Under deck surface fire exposure

Option 1

Ember exposure to top of deck

IRM (12-7A-5) and
SFM 12-7A-4:

Part A. Under-deck flame impingement exposure.
- Acceptance criteria:
  1. HRR < 25 kW/ft²
  2. Self-extinguish after 40 minutes
  3. Cannot drop flaming debris
  4. Cannot break under own load

Part B. Brand test (top of deck)
- Acceptance criteria:
  1. Self-extinguish after 40 minutes
  2. Cannot drop flaming debris
  3. Cannot break under own load
Performance of decking – SFM 12-7A-4:

Part A. Under-deck flame impingement exposure.
- Acceptance criteria:
  1. HRR < 25 kW/ft²
  2. Self-extinguish after 40 minutes
  3. Cannot drop flaming debris
  4. Cannot break under own load

Part B. Brand test (top of deck)
- Acceptance criteria:
  1. Self-extinguish after 40 minutes
  2. Cannot drop flaming debris
  3. Cannot break under own load

San Diego County Compliance

Question
Chapter 7A only addresses the walking surfaces of decks.

Answer
a) True
b) False
Exterior door assemblies. ... shall

Standard 12-7A-1, or

- Be of approved noncombustible construction, or
- Solid core wood having stiles and rails not less than 1 3/8" with interior field panel thickness no less than 1 ¼" thick, or
- Have a fire resistance rating of not less than 20 minutes when tested according to ASTM E 2074 (uses ASTM E 119 vertical furnace)

Exterior doors:

- Exterior surface / cladding noncombustible or IRM
- Solid core, stiles & rails > 1 3/8-inches; raised panels >1 ¼-inches, taped tongue > 3/8-inches
- Fire resistance rating > 20 minutes
- Meet performance requirements of 12-7A-1
Unenclosed underfloor protection / underside of appendage. Buildings shall have underfloor areas enclosed to grade with complying exterior wall, or underside consisting of:

- Noncombustible material, or
- Ignition-resistant material or
- One-layer 5/8-inch Type X gyp or exterior portion of one-hour wall assembly
- Underside of floor assembly comply with SFM 12-7A-3

Ancillary Buildings and Structures: “… which pose a significant exterior exposure to applicable buildings… shall …” be constructed of:

- Noncombustible or IRM

Gazebo should not threaten the primary building.

Chapter 7A of the California Building Code was developed by the SFM Urban-Wildland Interface Building Standards Committee, appointed in January of 2005 by then Chief Ruben Grijalva. These members included:

Kate Dargan, Co-chair (former State Fire Marshal)
Ethan Foote, Co-chair
Thank you very much for your attention! Questions?

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