



Decks

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Reduce the Vulnerability of Your Deck to Wildfire

MANY HOMES LOCATED IN WILDFIRE-PRONE AREAS HAVE ATTACHED DECKS, WHICH CAN POTENTIALLY SPREAD FIRE TO THE HOUSE WHEN IGNITED DURING A WILDFIRE.

A burning deck can ignite siding or break the glass in doors or windows, allowing fire to gain entry into the house. Consequently, making decks less vulnerable to wildfire also makes your house less vulnerable. Reducing the deck's vulnerability requires an approach that focuses on the materials and design features used to build the deck, and creating a noncombustible zone around and under the deck.

EMBER EXPOSURE AND IGNITION

Walking surfaces of decks are either solid surface or constructed using deck boards (with between board gaps). Solid surface decks are commonly light weight concrete or tile. Combustible deck board types include: solid wood and wood-plastic composites (these products are more widely used than noncombustible deck boards). Noncombustible deck board types include: metal and fiber cement.

Recent testing at the IBHS Research Center showed embers mostly lodge between deck board gaps and where deck boards rest on joists. Embers can accumulate and potentially ignite decking and combustible joists. Embers can also fall through board gaps and land on materials stored beneath the deck. It's critical to remove all combustible materials from the under-deck area to minimize the opportunity for ignitions; where resulting flames would impinge on the decking (some wood-plastic decking products are vulnerable to flaming exposures).

IBHS tests also showed that even without vegetative debris in between deck gaps, medium density softwood decking products, such as redwood or western redcedar are vulnerable to ember ignitions. Most wood-plastic composites, along with higher density tropical hardwood, and fire-retardant treated decking products are less vulnerable to embers. The vulnerability to embers in these locations is a reminder to remove debris that accumulates in these areas.

BUILDING CODE REQUIREMENTS

The International Wildland Urban Interface Building Code (IWUIC) and the California Building Code are the most commonly referenced construction codes for wildfire-prone areas; both include requirements that focus on the walking surfaces of decks. Noncombustible products are allowed by both codes.

The California Code provides provisions for accepting combustible decking products. These types of products are more commonly used by homeowners living in wildfire-prone areas across the country. Their requirement governs the amount of heat released when

combustible decking is ignited by a gas burner. This mimics burning debris that could be located under the deck, or burning vegetation impinging on the underside of the deck, but does not mimic ember exposure. Combustible decking products that comply with the California Code can be found at: http://osfm.fire.ca.gov/licensinglistings/licenselisting_bml_searchcotest.

The IWUIC prohibits common combustible deck boards with the exception of fire-retardant treated decking (rated for outdoor exposure) and other materials

- Photo Captions:**
- A** Embers that pass through deck board gaps will land on the ground, or on combustible materials stored under the deck, as shown during this IBHS test.
 - B** The near home noncombustible zone that surrounds the foundation should include a noncombustible area underneath the deck.
 - C** Vegetative debris in between deck board gaps will make this location even more vulnerable to ember accumulation.

RECOMMENDATIONS FOR YOUR DECK:

- 1** Combustible materials should not be stored beneath decks. This will effectively create a noncombustible zone under the entire footprint of the deck.
- 2** Routinely remove debris that accumulates in between deck board gaps and debris that can accumulate at the intersection between the deck and house.
- 3** If the deck is a non-fire-retardant treated softwood deck, consider removing and replacing deck boards within a few feet of the house. Be careful to match the deck board thickness.
- 4** When building new decks, select deck boards that comply with the California Building Code requirements. If using wood joists, cover the top and part of the sides with a foil-faced bitumen tape product.

that meet the requirements of an Ignition Resistant Material. However, as of this date, no other materials meet these requirements. The IWUIC allows an enclosed deck option that uses a horizontal construction attached to the bottom of the deck joists. This option should only be used with a solid surface deck. Using this option with deck boards (and the associated gaps), will cause moisture-related degradation problems (corrosion of fasteners and wood rot). Water from rain or melting snow will easily get into the enclosed space and will have a much harder time getting out.

Fire Spread on Ember-Ignited Decks

Wind-blown embers generated during wildfires are the single biggest hazard wildfires pose to homes, and homeowners should never overlook the potential risk that an attached deck can create. Recent testing by the Insurance Institute for Business & Home Safety (IBHS) offers important findings that can help minimize risk from wind-blown embers to decks.

Nothing that can ignite should be stored under a deck. This action, along with development of effective and well-maintained home ignition zones, will minimize the chance of all but a wind-blown ember exposure to your deck. An ignited deck can result, for example, in the ignition of combustible siding, or glass breakage in a sliding glass door.

ABOUT THE RESEARCH TESTS

IBHS's tests evaluated how an ember-ignited fire on an attached deck can spread to the home, and yielded important guidance to minimize the chance of fire spread to the house. Tests showed that the fire was typically small (Figure 1), sometimes just smoldering (not flaming). It spread slowly, taking more than an hour to travel the 4 to 6 feet from the ignition point to the home. Research from IBHS showed all ember-ignited deck fires occurred in the gaps between deck boards and initially started as a small smoldering fire that transitioned to a flaming fire. Although these small fires self-extinguished during IBHS tests that did not include any wind, wildfires almost always involve elevated wind speeds. During lab tests, even mild wind speeds of 12 mph, enabled fires to spread. Under certain conditions, the small fire did grow, always in the under-deck area (see Figure 2). Our results demonstrated that fire growth occurred in the under-deck area when joist spacing was 8" to 12", less than the typical 16".

Wind blowing against a building has a return flow component, so if fire were able to burn to the home, it would have to travel there as a backing fire, or against the wind. Research shows the "fuel" has to be close together for this to occur. That "fuel" could be the deck boards, or a combination of deck boards and support joists.

HOW DOES THE FIRE SPREAD?

IBHS tests demonstrated that fire spreads both toward, and away from, the house

regardless of the deck board's orientation (parallel or perpendicular). When deck boards were perpendicular to the building, the fire would spread in the gap between boards. The 1/8" gap between deck boards was narrow enough for the fire to continue burning into the unburned wood (the fuel), in both directions from the ignition point. The fire spread pattern was more complicated when deck boards were parallel to the test building. In this case, fire could spread parallel to the test building, or directly to it. Fire spread directly to the building included a smoldering mode that occurred in the space between the top of the joist and the bottom of the deck board. Flaming combustion occurred when smoldering reached a gap between deck boards. Lateral flame spread can result in the ignition of joist members, resulting in fire growth.

IMPORTANCE of the HOME IGNITION ZONES

To minimize the possibility of deck ignitions, reduce fuels in the home ignition zones by carefully selecting and positioning vegetation and implementing regular maintenance. Pay particular attention to the area under the footprint of the deck, where storage of combustible materials should be avoided.

Although there are noncombustible deck board and decking options, many of the commercially available deck board products are combustible. IBHS research on deck materials is available at: disastersafety.org/ibhs/wildfire-ignition-potential-decks-subjected-ember-exposure.

CONSTRUCTION RECOMMENDATIONS

IBHS research shows that, for medium density softwood decking products (such as redwood and cedar), which can be vulnerable to ignition from embers, the associated fire spread on the deck can be minimized by the following:

1. Increase the gap between deck boards from 1/8 inch to 1/4 inch.

Fire spread in the gap between deck boards. Note the small flame burned all the way to the test building.



2. Increase joist spacing from 16 inches to 24 inches.



Narrow joist spacing was a condition that could result in fire growth in the under-deck area.

3. Apply a foil-faced self-adhering adhesive flashing tape (foil-faced bitumen tape) on the top of each joist.

Using a foil-faced self-adhering bitumen flashing tape reduces flame spread by removing the joist as a fuel source for both parallel and perpendicular deck board installations.

FOIL-FACED BITUMEN TAPE

