

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.

