

Under-Eave Construction

The under-eave area of a house is often overlooked when addressing vulnerabilities that can cause damage or loss during a wildfire. Neglecting this structural component increases susceptibility to heat from flames, which can become trapped, allowing fire to spread through attic vents and into the attic. Embers lodged in gaps between blocking and joists can also result in ignition and fire entry into the attic.

TYPES OF UNDER-EAVE CONSTRUCTION

Open-Eave Construction: Roof rafters visibly extend out beyond the exterior wall. This option is typically less expensive and is commonly found in many parts of the U.S.

Soffited-Eave Construction: Material connecting and enclosing the space between the edge of the roof and the exterior wall.

SOFFITED-EAVE CONSTRUCTION IS BEST FOR HOMES WITH A WILDFIRE RISK

Wildfire research conducted by IBHS supports the use of soffited-eave construction. Additional research and guidance (e.g., FEMA P-737, Home Builder's Guide to Construction in Wildfire Zones — Fact Sheet No.6 https://www.fema.gov/media-library-data/20130726-1652-20490-2869/fema_p_737_fs_6.pdf) also suggests a soffited design as the best option. Vents located in the under-eave area can be entry points for embers and flames when limited effort has occurred to reduce risks in the home ignition zones (particularly in the near-home zone). Embers entering an attic can ignite stored combustible materials. Research has shown that open-eaves are

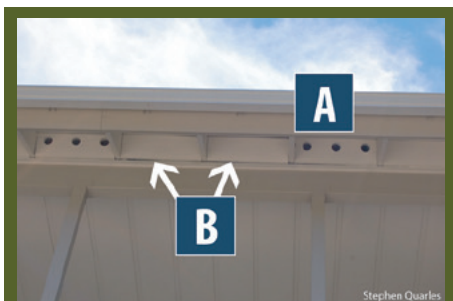
more vulnerable to both ember entry and direct flame contact exposures, relative to soffited-eaves.

With open eaves, use a sealant (such as caulking) to cover gaps, or enclose the underside of the roof overhang. In open-eave construction, embers can and do accumulate between blocking and joists and can ignite these members if sufficient accumulation occurs.

The open-eave blocking likely included vents, so remember to add an adequate amount of soffit vents as part of the project. Make sure the vent area ratio (vent into the enclosed soffit and enclosed soffit into the attic) follows the requirements of local building codes.

Time-to-ignition is faster with under-eave construction and lateral flame spread is quicker, exposing other areas along the length of the home. (Using the recommended 0 to 5-foot noncombustible near-home zone minimizes the likelihood of an ignition at the base of the exterior wall.)

Using noncombustible or ignition-resistant materials to enclose the eave is recommended. The enclosure should extend from the roof edge horizontally back to the exterior wall. The horizontal soffit member is attached to a ledger board that is itself attached to the exterior wall.



Open-eave construction with vents in blocking (A), and gaps between blocking and other wood members in the under-eave area (B).



Flame impingement exposure to the underside of the eave, and time-to-ignition of the joists, blocking and fascia was quicker; and lateral flame spread faster, when an open-eave design was used in research experiments.



Lateral flame spread was reduced when a combustibile soffit material ignited in this test of a soffited-eave with a combustibile soffit material.