The Five Least Expensive Home Hardening Projects

VENTS: UNDER-EAVE, ATTIC AND CRAWL SPACE (FOUNDATION)

WHAT YOU SHOULD KNOW

Attic, roof and foundation vents can be entry points for embers and flames. Embers that enter the attic or crawl space can ignite combustible debris that can accumulate in these spaces and also combustible materials stored in these spaces. Testing by IBHS and the National Institute of Standards and Technology (NIST) has demonstrated the vulnerability of vents mounted on vertical walls and surfaces to the entry of embers. These vents included gable end and foundation vents, and vents in the blocking in open-eave construction. Open-eave construction is one where you can see the rafter tails of your roof framing on the exterior underside of your roof. Vents in a soffited (boxed-in) eave were not as vulnerable to ember entry. Based on research conducted at the University of California and IBHS, there is increasing evidence that soffited eaves are less vulnerable to both ember and direct flame contact exposures.

Open-eave construction can be vulnerable even if vents are absent. If the blocking is improperly installed or if it has warped over time, gaps can develop where the blocking and rafter tails intersect. As a result, wind-blown embers could become lodged there and ignite debris and potentially the structural support wood members in these areas. Based on testing conducted at the IBHS Research Center, dormer-type through-roof vents are vulnerable to ember entry. Ridge vents rated to resist the entry of wind-driven rain will also resist the entry of embers.

WHAT YOU SHOULD DO

If you have vented openings to your attic or crawl space, make sure screening is present. At a minimum, these vents should be covered with ⅛-inch corrosion-resistant metal mesh screen. Chapter 7A of the California Building Code will allow 1/16-inch screening. Laboratory research has shown that embers large enough to pass through ¼-inch and even ⅛-inch screens are large enough to ignite fine fuels, so while screening will help, it won't be the perfect answer. While a finer mesh screen will offer better protection against the entry of embers, it will also require more maintenance to keep it free of debris. It is important to allow air to flow freely to help manage the moisture in your attic and crawl space (i.e., keep the moisture content low enough to minimize the chance of developing water-related damage to susceptible building materials).

GUTTERS

WHAT YOU SHOULD KNOW

Wind-blown vegetative debris and debris from overhanging trees will result in the accumulation of leaves and needles on your roof and in your gutters. If dry, this debris can be readily ignited by wind-blown embers. Even if you have a Class A fire-rated roof covering, such as tile, concrete, metal or asphalt composition shingles, the edge of the roof will be exposed to flames from the ignited debris.

Many checklists suggest replacing vinyl gutters with metal gutters. Debris in any gutter will be readily ignited by embers. Once debris in a vinyl gutter has ignited, the gutter will ultimately detach at the roof edge and fall to the ground. The debris and gutter will burn on the ground, potentially igniting surrounding vegetation and combustible mulch, and adjacent combustible siding or other components in the wall assembly. A metal gutter will remain attached to the edge of the roof and the ignited debris will continue to burn there, exposing the edge of the roof, including sheathing and fascia, to flames. The best solution is to minimize the accumulation of debris in the gutter. When dry, decayed wood and other wood-based materials that are commonly used in the under-eave and soffit can be more easily ignited.

WHAT YOU SHOULD DO

Remove tree branches that overhang your roof and remove any dead vegetation, including branches, within your defensible space. This should be part of a routine maintenance plan around your home or business. Do this at least annually at a time best suited for the health of the tree or plant.

Clean gutters and roof areas where debris collects. Inspect and remove accumulated debris in these areas at least twice a year, or more if necessary. Remove accumulated leaves, pine needles and any other combustible debris.

Inspect the roof edge to determine if a metal drip edge is installed, or included as part of your gutter. Some metal gutters have an integral flashing piece that serves the function of a stand-alone drip edge. If a drip edge is not present, install one. The drip edge will serve two purposes: (1) it will help protect the roof edge (sheathing and fascia) from a flaming exposure that could occur if debris is ignited by wind-blown embers, and (2) it will minimize the entry of embers into a soffited-eave construction by blocking the small gap that can exist between the edge of the roof sheathing and the top of the fascia. Inspect exposed portion of the under-eave or soffit periodically to make sure construction material is in good condition.

FENCES

WHAT YOU SHOULD KNOW

Your fence can be a hazard if it connects directly to your home or business. The bottom of fences can collect debris, which when combined with combustible fencing material, can become a fuel source that can result in fire burning directly to the building. Similar to a burning building or burning vegetation, burning fencing will also generate embers that can cause other ignitions. Ember ignitions more easily occur where a horizontal member meets a vertical member. Subsequent spread to the building is facilitated when combustible debris is on the ground below the fence. For combustible fencing materials, designs with more between-member openings or gaps (i.e., it is more porous), such as a lattice fence, make it more difficult for lateral flame spread to occur. Some checklists recommend inserting a metal plate where the fence connects to the exterior wall of a building, particularly when combustible siding is used. How effective the flashing will be will depend on the size of the metal strip. Depending on how it is attached to the exterior wall, over time it could result in other moisture-related degradation problems with the siding. For example, without appropriate attachment, water will be able to get behind the flashing and will likely be absorbed by wood siding; over time, decay of the wood siding or corrosion of the fasteners could occur.

WHAT YOU SHOULD DO

New fences should be constructed of noncombustible or ignition-resistant materials. The most common product meeting the ignition-resistant material requirements is exterior-rated fire-retardant-treated wood. 4-inch by 4-inch (or larger) support posts intended for ground contact use should be treated with a preservative—wood treatments for both a fire retardant and preservative are not available. Another option would be to attach the wood column to a concrete footing using a metal connector, avoiding a ground contact exposure for the column.

A wood frame with steel mesh infill is an option that would minimize the possibility for an ember ignition; however, if vegetation is allowed to grow on the mesh infill, this advantage will be negated. Existing wood fences that are attached to the home or business should be modified so that the fence ends with a noncombustible component, such as masonry or metal, to minimize the chance of fire spreading to the home or business. A common technique is to use a metal gate with one side attached to the combustible fence and the other to the exterior siding.

It is important not to store firewood or other combustible materials against the fence and to regularly clear away debris and dead vegetation at the bottom of the fence. Ignition from ember accumulation most easily occurred at the intersection of the vertical planks and the

horizontal lumber. A gate made from noncombustible materials should be used where a connection is made to the house.

ENCLOSING DECKS AND PORCHES

WHAT YOU SHOULD DO

If you choose to enclose your deck or porch, with the exception of screens, make sure you provide sufficient ventilation to avoid the accumulation of excessive amounts of moisture. If you do not allow for the drying out of the structural support members and boards, fungal decay and corrosion of metal fasteners will become the biggest threat to your deck. The building code requirement for a crawl space is 1 square foot of vent area for each 150 square feet of horizontal floor area. You should have at least this much ventilation, or more if you are in a particularly wet area. Use of a fine mesh screening as “cladding” for a vertical enclosure would allow for ventilation and minimize entry of embers and wind-dispersed vegetative debris. Laboratory research has shown that embers large enough to pass through ¼-inch and even ⅛-inch screens are large enough to ignite fine fuels, so while screening will help, it won’t be the perfect answer.

Enclosing your deck or porch will not reduce the risk of the top being exposed to embers. For that, the best protection is to keep the surface clear of leaves, pine needles and other vegetative debris. Higher-density deck boards (including wood-plastic composite and tropical hardwood deck boards) are more resistant to direct ember ignition.

Move combustible materials such as furniture cushions, brooms and door mats inside. Smaller furniture, such as chairs, should also be moved inside, particularly wicker furniture, which could be more easily ignited by embers.

CHIMNEYS, BURN BARRELS AND OPEN DEBRIS BURNING

Many wildfires are caused by human activities. Reducing the number of wildfires and losses begins with taking precautions to reduce this cause of fire.

WHAT YOU SHOULD KNOW

Spark arrestors reduce the size of embers that can escape from your chimney. The spark arrestor concept also applies to burning debris and garbage in an open barrel. Embers

generated during burning can result in ignitions in adjacent woodlands. Fire can also escape when doing debris burning in open piles.

WHAT YOU SHOULD DO

Install a spark arrestor that has a ½-inch mesh size. These are available at lumber yards, hardware stores and fireplace specialty stores. In the case of burning in barrels, a heavy metal screen with ½-inch mesh should be placed on top of the barrel. Debris should also be cleared from the area immediately surrounding the barrel. Care should always be taken when conducting open backyard debris burns to minimize the chance that the fire escapes. State and local ordinances may require a permit for open burning. Contact your local fire department for additional information, particularly for information regarding any restrictions on use of burn barrels.

Follow these guidelines from CAL FIRE for safe debris burning:

- Clear a safe zone that is wide enough to prevent the escape of fire
- Keep a supply of water and a rake or shovel readily accessible
- Stay with the fire until it is completely out and never leave a fire unattended
- Burn only when the wind is calm and the humidity level is high
- Extinguish fire completely if conditions become windy
- Keep brush piles small to allow quick control of the fire if necessary
- Locate brush piles an adequate distance from buildings and utilities
- Obey all outdoor burning laws including forest fire laws, air pollution and open burning regulations, and local ordinances
- Understand that you are liable for damages and cleanup if the fire escapes

Source - Wildfire Retrofit Guide California, FireSafeMarin