

Home Vent Structural Improvements for Wild Fire Safety  
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California adopted new building code in 2009. These codes are primarily defined for new construction, however communities with older homes can benefit greatly by upgrading their structures to meet the new code for fire safety. One component of home construction that is most vulnerable to intrusion of wind-born firebrands and embers (in addition to Spanish tile type roofing which cannot be resolved without replacing with another Class 'A' roofing material) is home venting. The most effective but most expensive retrofit is the 'boxing-in' of the under eaves and adding a second tier of venting. Due to the cost of this method this option is not feasible for many homeowners.

An option to boxing-in is double screening of the under eave vents of older homes. These older home vent systems with the internal normally ¼-inch wire mesh will keep birds and rodents from entering while allowing the homes to breath. They were probably never intended to function as ember and fire brand barriers. They were only 'sort-of-accidentally' identified as ember blocks when it was discovered that fire could enter homes through these orifices and weak as this system was, the single layer of ¼-inch mesh was the only protection.

Embers and firebrands can be as small as snow flakes making it easy for them to find there way into homes and especially through the single screen ¼-inch vents during fires. This is because of the difference in inside and outside air pressure, but homes must be allowed to breathe to prevent deterioration due to mold and rot so blocking the vents is not an option. Installing an exterior finer mesh screen, thereby double screening the vents, can easily be accomplished at much less cost than boxing-in the eaves and in many cases it can be done by the do-it-yourselfer. Basically, the process consists of installing 1/8-inch or less wire mesh over the current vents while leaving in tact ¼-inch mesh that is normally facing structure interiors. This then provides another barrier to help prevent the fire brands and embers from reaching into the attics, etc. Double venting of garage, gable vents (covering the louvers) and crawl spaces from the outside can similarly be accomplished.

### Discussion

The latest California building code Chapter 7A states:

**704A.2.1 General.** *When required by Chapter 15, roof and attic vents shall resist the intrusion of flame and embers into the attic area of the structure, or shall be protected by corrosion resistant, noncombustible wire mesh with 1/4-inch (6mm) openings or its equivalent.*

Yet experts have stated:

“Post-fire investigations have shown that ¼” mesh may not prevent the entry of embers that can result in ignition a loss of the building.” <http://groups.ucanr.org/Forest/files/60149.pdf>;

And

“... 1/4” mesh is inadequate, and suggest that 1/8” mesh steel screen (if codes allow) be used, but they must be cleaned occasionally, and should not be painted.” *A Homeowner's Guide to Fire-*

*Resistant. Home Construction* by Rich Fairbanks and Timothy Ingalsbee.  
[www.fusee.org/docs/Preparedness/homeowners\\_guide.pdf](http://www.fusee.org/docs/Preparedness/homeowners_guide.pdf).

Most venting whether with ¼-inch or less screening has the screen applied during home construction to the back of the vent opening facing the structure interior. See Figure 1, Typical Older Home Under-eave Vent. This is a definite problem since the interior screening is depended upon (1) for venting the interior of the space and (2) as the stop for embers and fire brands where debris, such as fallen insulation, or stored items on the inside can themselves become the unintended block for firebrands and embers. Notice in Figure 1 the blown-in cellulose insulation that has drifted against and protruded the ¼-inch interior wire mesh in a vaulted inaccessible ceiling. Fire brands can be sucked in during fire storms when the winds are high and the pressure inside to outside of a home is constantly varying. The insulation can smolder with the drafts due to changing pressures and the presence of the burning fuel. As smoldering through the cellulose spreads the internal space heats up and can ignite eventually pushing flames through the roof and into the residential structure. Many of the older homes, such as in Tierrasanta where homes are near forty years old, have blown-in cellulose insulation in these spaces.

#### NOTE

Regarding insulation the U.S. Consumer Product Safety Commission states: “Although each manufacturers' insulation products should meet acceptable criteria, an "acceptable" product may still be flammable and should not be installed near heat.”

<http://www.cpsc.gov/cpscpub/prerel/prhtml77/77102.html>



Figure1. Typical Older Home Under-eave Vent

#### Possible Solutions

Figure 2a, shows a louvered surface-mount vent that can provide the double buffering, but the louvered structure of the insert makes it difficult to clean especially if installed on upper stories. The louvering is not necessary except for aesthetic value and may even catch and hold embers against the screen.

Figure 2b shows a louvered type vent where the home owner has removed louvers. This concept allows for removal and thorough cleaning [see the holes where screws can be used for attachment], meets the 1/8<sup>th</sup> inch suggested mesh size, and allows the ¼-inch mess on the interior to remain without being damaged. Any debris that has fallen against the ¼-inch interior mesh may be blown back from the mesh interface with high pressure air through the smaller screen if necessary. The

modification to remove louvers is time consuming and difficult to accomplish without sacrificing the appearance to prevent screen damage.



Figure 2a, Louvered Surface-mount Vent

(Cost approximately each or \$70 / 2000 sq. ft. home)

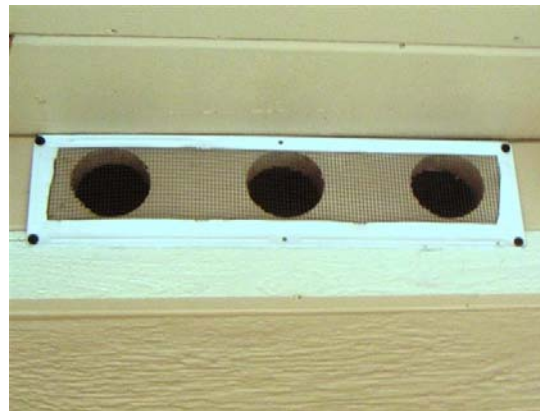


Figure 2b, Surface-mount Vent with Louvers Removed for Cleaning

(Cost approximately \$1.00 /vent hole each or \$70 / 2000

One manufacturer provides plastic vents with similar footprints without louvers and with 1/8-inch hole instead of screens for approximately the same price. When tested however, the material was flammable. This is a poor characteristic to have when the intent is to block burning embers and firebrands. Another manufacturer builds a similar assembly from galvanized steel with only 1/4-inch screen. Because of welding spots and overlapping frame parts it is not aesthetically pleasing even if painted.

Figure 2c, shows an example of an under eave vent insert. Some manufactures include aluminum fine-window screen sized mesh on the back side of the louver face. With the fine screen this provides a triple-buffered vent – the louvered face, the fine screen and the original interior fine mesh. This type vent is not easily cleaned; homeowners may never detect that it is clogged. Although if the under eave vent hole is drilled to the proper size these vents are easily popped out for cleaning otherwise these vents may require cementing in place. Again the louvering is not necessary except for aesthetics.

Other vent manufactures provide similar devices - some are heavy welded structures with welded baffles on the interior. These vents may require re-drilling the wooden soffit which could damage the 1/4-inch interior mesh and weaken the structure of the roof assembly due to the large diameter of the vent housing. The cost is approximately \$13.00 per vent or \$900/ 2000 sq. ft. home. Although effective both of these vent types are most suitable for new homes where the under eave areas can be drilled to fit.

Figure 2d shows a solution that can be manufactured by the do-it-yourselfer and can be a fun project by cutting out the bottom or top of a soda can and cementing a wafer of galvanized window screen inside. Notice the piece of cedar shake roof debris sandwiched between the mesh and the soffit/roof support. Another new building code requirement for new construction does not allow vents facing the Wildland Urban Interface (WUI). The soda can solution can be used to block these vents by

simply installing a blank can bottom. Note that the homeowner must ensure that the space having the vents blocked have adequate alternative vents such as gable vents facing away from the WUI.



Figure 2c, Louvered Face Under-eave Vent Insert  
(Cost is approximately \$3.00 each or \$210 / 2000 sq. ft. home)



Figure 2d, Soda Can Under-eave Vent Insert  
(Cost is approximately 10 cents each - cost of soda can redemption value or \$21.00/ 2000 sq. ft. home)

Of course the simplest method of venting upgrade is to tack a section of galvanized or stainless steel screen over each vent costing pennies per vent. This would not be aesthetically pleasing either; some type of frame installed around the screening might help this.

Double screening without louvers is a common sense approach to prevent embers and firebrands from entering attic, garage and crawl spaces. With external second screening applied these vents can be cleaned easily by the homeowner with a dry paint brush attached to a pole. The ¼-inch internal mesh debris block should continue to be used in all new construction and maintained in older structures where any of the above vent options are applied.

