

# TECHNICAL BULLETIN



## Ventilating Attic Fires: Press-Formed Metal Panel Roofs/Fire Service General Procedures Guide

### Introduction

Modular or press-formed metal roof panels come in various shapes and sizes but are generally panels measuring 4 ft. long x 1 to 1½ ft. deep (Fascia to Ridge). They are formed to simulate the look of wood shakes, shingles and tile profiles. The panels are commonly manufactured from 26-gauge galvanized (zinc coated) or \*Zincalume®/\*Galvalume® sheet (55% aluminum/zinc coated) steel. One type of exterior panel finish consists of embedding stone granules in a polymer adhesive over the surface of the panel. This finish enhances the look of the roof product being replicated in metal. Examples of stone-coated panels are shown below. Metal roof panels are also finished in durable paint coatings.

For additional information, see NFPA 780 *Standard for the Installation of Lightning Protection Systems*. 1995 edition. National Fire Protection Association, Quincy, MA.



### Identifying a Modular Panel Metal Roof

One way to identify a modular panel metal roof is to examine the fascia or rake/gable sections of a structure. Many modular metal roof panels incorporate wide-faced painted or stone-coated metal flashing pieces installed around the perimeter of the roof (see photos).

*Tile-style stone-coated panel (approx. 15" x 52")*



*Wide-faced (5-in.) stone-coated or painted metal fascia covers batten framing on roof over applications. The flashing is narrower (3" deep) on new construction.*



*Shake-style stone-coated panel (approx. 15" x 52")*

## Accessing or Ventilating a Stone-Coated Metal Roof

The six (6) pictures in this section show various methods for gaining access to and ventilating modular panel metal roofs. The techniques shown provide a general guide for fire service professionals.



Firefighters investigate the roof assembly by cutting a small triangular inspection hole to reveal the substructure of the metal panel roof system. This photo shows a 1 x 4 and 2 x 2 wood batten grid system nailed to the roof's framing.



The metal roof may have been installed over old, existing roof materials, such as wood shakes or shingles, asphalt shingles, etc. The weight of the metal roof system would be less than 1.5 pounds per sq ft.



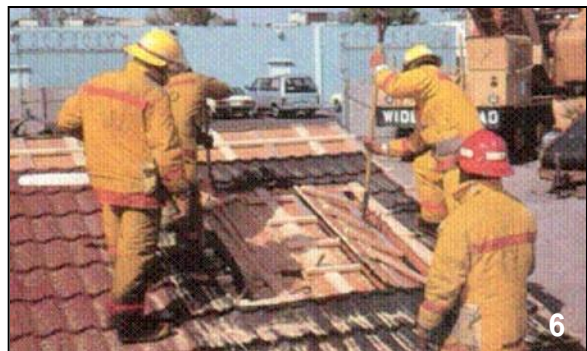
A "head" cut across and high on the roof makes it possible to peel back the metal roof panels (beginning at the top and working towards the bottom) with a rubbish hook.



While being lightweight, the shape stamped into the metal makes the panels strong. They can easily be cut with an axe or carbide-tipped chain or circular saw. Though an axe is more than adequate, carbide-tipped chain saws cut through the metal very fast and can remove the sheathing at the same time.



A pick-headed axe can easily lift the front of the panels away from the fasteners. Rubbish hooks are used to peel the panels away from the roof.



A "Louver" cut (shown here) opens a roof for ventilation without having to remove the roofing.

## Case Study: Internal Attic Fires

### Full-Scale Fire Testing

Fire testing was conducted in Palm Springs, CA, in September 1992 on two different roof assemblies. One roof assembly was a stone-coated metal roof installed over wood shakes. The other was a concrete tile roof that was used as a comparison control roof.

### Fire Test Design Detail

Test buildings, measuring approximately 400 sq. ft. in size, were constructed with walls consisting of steel framing that were enclosed with fire-resistant sheathing. The ceiling joists, rafters/trusses, and roof sheathing were constructed with wood materials that replicated common residential construction practices. Each building had an attic door in the ceiling where a gas burner was inserted to initiate an attic fire. The multi-jet gas burner was located so as to direct the fire source directly against the underside of the roof sheathing and framing members.

The objective was to simulate an internal attic fire. The duration for the attic fire test beneath the stone-coated metal roof was determined by burning the concrete tile-roofed building. After a pre-heat period, the concrete tiled-control roof was eventually engulfed in flames and collapsed inward after a 21-minute period. The fire in the concrete tile-roofed building was then brought under control after another 5 minutes.

The stone-coated metal roof was subjected to the identical pre-heat period, and the structure was allowed to burn for the same 21-minute period as the concrete tile-roofed building. The fire was then extinguished by firefighters employing specific suppression techniques.



1. Test building constructed with practices commonly used in California during the 1960s.
2. Test building with a stone-coated metal roof during a simulated attic fire.
3. Firefighters cut into the roof to ventilate the attic using a carbide-tipped chainsaw (avoiding the rafter) with a depth guard set to 3". A slit is cut along the entire ridge line, and the ridge roofing panels are peeled back to allow water to flow down inside the roof assembly.
4. After the fire is extinguished, the entire fire service team assembles on top of the stone-coated metal roof without fearing the threat of roof collapse.

## Fire Protection from Press-Formed Metal

### Panel Roofs

Fire-safe roof products perform the following functions during firestorm conditions, which are a common occurrence in many western states.

### High-Wind Resistance

Most metal roofs can withstand wind speeds over 120 mph.

### Lightweight

Metal roofs weigh only 1.5 lbs per sq. ft., which can allow a limited safe entry inside of a building during a firestorm. Firefighters need to verify the sub-roof construction and determine that the structure is safe to enter.

### Impact Strength

Metal roofs resist hail and will not crack when impacted by flying debris. However, a standard fire service pickaxe can be used to slice through a metal roof panel.

### Ember Entry

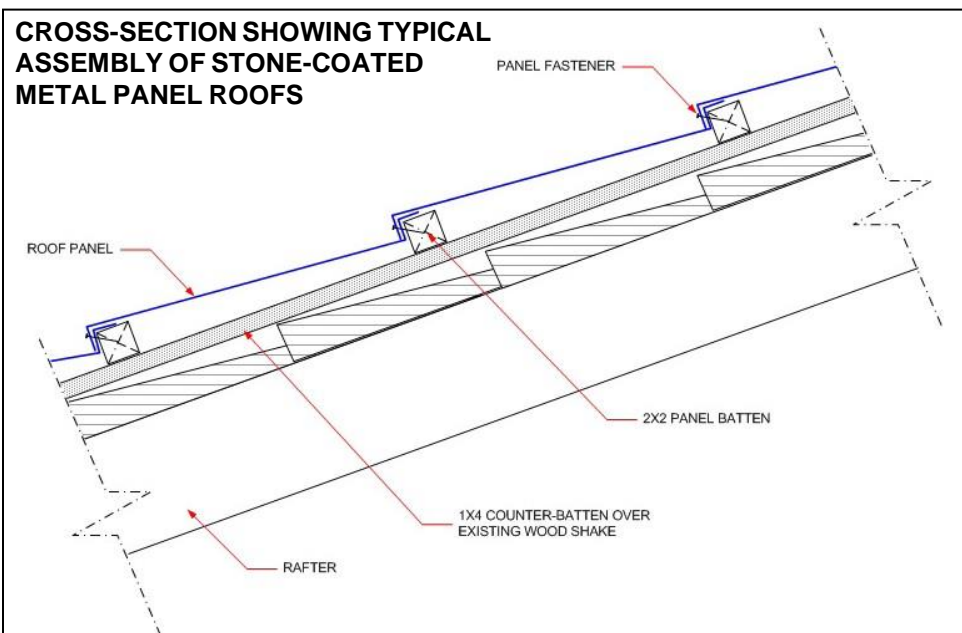
Due to the overlapping and interlocking design of modular metal panels, embers are blocked from entering through the roof surface during firestorm conditions.

### Combustibility

Metal roofs are not combustible.

### Containment

Because of the overlap/interlock design, a metal roof remains intact during firestorm conditions and contains the fire within the structure. During an interior fire, metal panels will not allow burn through or cause inward collapse, nor will it spread embers to nearby homes.



### ***For More Information***

*For training materials, including copies of this brochure, and actual panels for use on your training decks, contact MCA headquarters at the address below. Residential metal roofing information can be obtained by visiting the Web site of the Metal Roofing Alliance, a sister organization to MCA, at [www.metalroofing.com](http://www.metalroofing.com).*

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*This information was created from materials developed by the Steel Roofing Manufacturers Association (SRMA) of Southern California. SRMA Founding Members - Decra Roofing Systems, Corona, CA, and Gerard Roofing Technologies, Brea, CA. The aforementioned members are also members of MCA and have granted permission for MCA to revise, develop, and reproduce the SRMA “How to Ventilate” materials and data under the MCA name. Copies of this document are archived in the MCA library and are available on request.*

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