Retrofitting wood panel roof decks

by **Mark S. Graham**

In recent years, steep-slope roof assemblies, particularly those incorporating asphalt shingles, have been increasingly scrutinized because of their relatively poor performance in high winds. To ensure acceptable wind performances of steep-slope roof assemblies, it is critical roof sheathing be adequately secured to roof framing to prevent wind forces from pulling sheathing off a structure.

APA guidelines

Before the early 1990s, there were no accepted roof sheathing fastening guidelines available for buildings located in high-wind areas. As a result, determining sheathing attachment typically was left to building designers and builders. In 1994, APA—The Engineered Wood Association (APA) published minimum fastening schedules for using plywood and oriented strand board (OSB) roof sheathing in high-wind areas. These schedules have been adopted by the U.S. model building codes and are included in *The NRCA Roofing and Waterproofing Manual, Fifth Edition*.

In 2000, APA published Data File A410, "Retrofitting a roof for high wind uplift." This technical bulletin provides guidelines for evaluating and retrofitting plywood and OSB roof decks for high-wind resistance. The document is useful when considering roof sheathing installed before the current fastening schedules were in place.

APA indicates the easiest, surest and most inexpensive method of retrofitting roof sheathing attachment for high-wind performance is by renailing sheathing during reroofing. When sheathing is exposed, such as during roof system tear-off, it can be evaluated and additional nails added to meet the fastening schedule for a given area and roof slope.

The document provides APA's recommended fastening schedules based on roof fastening zones. These zones account for higher wind pressures at roofs' eaves; corners; ridges; and gable ends, which require more restrictive fastening schedules than at roofs' interior portions.

For example, 8d (eight-penny weight) common nails should be placed into framing in a 6-inch (152-mm) on-center pattern except at ridges on hip roofs and gable ends on gabled roofs, which require 8d ring-shank nails in a 4-inch (102-mm) on-center pattern at panel edges. This applies to roofs with mean heights of 25 feet to 35 feet (7.6 m to 11 m) with framing spaced at 24 inches (610 mm) on center or less and using wood structural panels ⅞ of an inch (16 mm) thick or less.

APA cautions that more nails are not always better. When renailing roof sheathing, care should be taken to avoid nail spacings less than 3 inches (76 mm) to minimize framing splitting and only the nails needed to achieve appropriate nail spacing should be added. Unless nails are extremely overdriven or corroded or miss the framing, existing nails that are 8d or larger can be counted toward meeting fastening schedules.

In high-wind regions, existing 6d or smaller nails should not be counted toward meeting APA's fastening schedules when renailing roof sheathing.

Other situations

For situations where retrofitting roof decks for high winds is necessary but renailing roof sheathing is not possible, such as when roof system replacement is not contemplated, APA suggests a construction adhesive be applied from the bottom side (for example, from an attic) to form adhesive fillets along each side of framing lumber-to-sheathing joints.

Similarly, at least one manufacturer has developed a proprietary two-component polyurethane foam system where foam is applied from the bottom side along the joints between roof sheathing and framing. The foam fills the space between sheathing and framing, creating an adhesive bond.

These construction adhesive and foam retrofit attachment methods most appropriately are used when reroofing is not contemplated and the bottom side of roof sheathing is accessible.

Using the guidelines

Roofing professionals are encouraged to use the evaluation methods and fastening schedules in APA Data File A410. These guidelines help ensure adequate wind performance of roof sheathing in high-wind areas and provide a conservative approach to roof sheathing attachment in inland areas.

APA Data File A410 and additional information regarding structural wood panels is available from APA by writing 7011 S. 19th St., P.O. Box 11700, Tacoma, WA 98411-0700; calling (253) 620-7400; or accessing www.apawood.org.



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