Know your steep-slope roof decks

Following plywood and OSB installation guidelines can help ensure a successful roof system performance

by Mark S. Graham

Plywood or oriented strand board structural panel sheathing are integral components of many steep-slope roof assemblies, and proper use of these products can help ensure successfully performing assemblies. If you use or encounter plywood and/or OSB structural panel sheathing roof decks, it is important to be knowledgeable of the applicable code requirements and APA—The Engineered Wood Association and NRCA guidelines applicable to them.

IRC 2018

The International Residential Code® provides specific requirements applicable to plywood and OSB structural panel sheathing used as roof decks for one- and two-family dwellings. In IRC's 2018 edition, specific requirements are provided in Section R803-Roof Sheathing.

IRC 2018 requires wood structural panels conform to the Department of Commerce's PS 1, "Structural Plywood," or PS 2, "Performance Standard for Wood-based Structural-Use Panels," or CSA Group™'s O325, "Construction Sheathing," or O437, "Standards on OSB and Waferboard." PS 1 and O325 generally are recognized to apply to plywood, and PS 2 and O437 apply to OSB.

Structural panels are required to bear a grade mark or certificate of inspection issued by a code official-approved agency.

The maximum allowable spans for wood structural panel roof sheathing must not exceed the values in IRC 2018's Table R503.2.1.1(1) or APA—The Engineered Wood Association's *Engineered Wood Construction Guide*, Form E30. Nominal roof sheathing thicknesses as thin as 3/8 of an inch thick are permissible for specific span, total and live load, and edge support conditions.

Roof sheathing attachment into wood roof framing is required to comply with IRC 2018's Table 602.3(1) Rows 30 through 32 or Form E30. For roof sheathing 3/8 of an inch to 1 inch thick, the use of 2½-inch-long 8d common nails installed 6 inches on center at supported panel edges and 12 inches on center at intermediate supports is a minimum requirement. IRC 2018 also permits the use of 2⅜-inch-long roof sheathing ring shank nails complying with ASTM F1667, "Standard Specification for Driven Fasteners: Nails, Spikes, and Staples."

Increased nail attachment schedules may be necessary in high-wind regions or where the roof deck is engineered to perform as a diaphragm (providing lateral support).

APA guidelines

Form E30 is the APA—The Engineered Wood Association's guide to engineered wood products. This 102-page publication (the latest edition was published in December 2019) provides separate sections addressing panel, glulam and cross-laminated timber selection and specification; floor, wall and roof construction; and additional considerations for fire protection and building systems.

The association also makes available roofing-specific excerpts from Form E30 titled "Roof Construction."

APA Data File T325D, "Roof Sheathing Fastening Schedules for Wind Uplift," dated March 2006, provides additional guidance about roof sheathing attachment for high-wind regions, including enhanced attachment for roof area perimeters and corners. This document is indicated to be based on ASCE 7-02, "Minimum Design Loads for Buildings and Other Structures," enclosed buildings and Exposure B; this may not comply with current code requirements.

APA Data File A410, "Retrofitting a Roof for High Wind Uplift," provides guidance for roof sheathing renailing during reroofing and roof sheathing retrofit without reroofing, which involves applying construction adhesives to the bottom of roof sheathing at framing members.

All APA—The Engineered Wood Association documents can be accessed from apawood.org.

NRCA guidelines

NRCA recommends structural panel roof sheathing for steep-slope roof assemblies comply with PS 1, PS 2 or APA PRP-108, "Performance Standards and Qualification Policy for Wood Structural Panels."

NRCA has concerns about the long-term performance of OSB panels, including those addressed by PS 2 and PRP-108. Although NRCA acknowledges the widespread use of OSB panels for constructing roof deck substrates, experience has shown OSB panels are subject to dimensional changes, ridging and fastener backout resulting from changing moisture conditions. If given a choice between an OSB panel roof deck substrate or a plywood roof deck substrate, NRCA prefers roof deck substrates constructed of plywood panels complying with PS 1.

> "NRCA recommends structural panel roof sheathing for steep-slope roof assemblies comply with PS 1, PS 2 or APA PRP-108"

Panel thickness should be the minimum required to comply with code requirements for span and loading. Furthermore, NRCA recommends specific minimum thicknesses based on roof system type. For example, NRCA recommends a minimum thickness of ½-inch-thick (actual thickness of 15/32 of an inch) plywood or OSB for 16-inch rafter spacing and four-ply, nominal thickness of 5/8-inch-thick (actual thickness of 19/32 of an inch) plywood or OSB for 24-inch rafter spacings. These minimum thicknesses are intended to provide adequate support for asphalt shingle roof systems and adequate pull-out resistance for asphalt shingle fasteners.

For new construction, NRCA does not provide specific guidance regarding roof sheathing attachment. This should be determined and clearly specified by a building's designer.

For reroofing, NRCA encourages consideration be given to providing roof sheathing attachment according to current code requirements or guidelines. Because existing deck attachments cannot readily be determined before removing an existing roof system, this additional deck attachment can be provided for either on a unit-cost or time-and-materials basis.

Additional information about structural panel sheathing roof decks for steep-slope roof assemblies is provided in *The NRCA Roofing Manual: Steep-slope Roof Systems—2017.*

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California seeks to improve fire resiliency of structures

Faced with the unrelenting threat of wildfires, California researchers and lawmakers are working to enhance protections for residential structures in risky wildland urban interface zones, according to the *North Bay Business Journal*.

During 2020, wildfires burned more than 4 million acres in California and damaged or destroyed more than 10,000 structures, according to ca.gov. The unprecedented level of destruction renewed calls for creating and remodeling structures with more fire-resistant materials and methods.

A model simulation of an active wildfire conducted by the Insurance Institute for Business & Home Safety® in 2019 confirms what many building experts already know: A structure built with fire-resistant materials has a better chance of surviving a wildfire than a structure built with traditional materials. Chances are as high as 90% a traditionally built structure will ignite once embers from a fire land on or by it, IBHS researchers found.

Certain parts of structures are especially vulnerable to fire, particularly when embers from a fire are blown onto a structure.

"The roof is extremely important," says Steven Hawks, staff chief of the California Department of Forestry and Fire Protection (CAL FIRE). "Embers, if they find a weakness, can start a fire."

Hawks emphasized the importance of using Class A fire-rated roofing materials, including slate, metal and tile, to enhance a structure's fire resistance. Wood shake roof systems will be banned by the California Fire Code beginning July 1, 2021. In addition, mesh gaps in vents attached to homes can be reduced from ⅛ of an inch to 1/16 of an inch to decrease the risk of ember intrusion.

Legislation taking effect in 2021 will help researchers develop best practices to boost community wildfire resilience. Signed into law in 2019, Assembly Bill 38 establishes a five-year pilot program requiring California's Office of Emergency Services and CAL FIRE to work together to create a statewide fire retrofit program to help building owners enhance their structures' fire resilience. The bill requires the state's fire marshal to identify building retrofit and structure hardening measures and CAL FIRE to identify defensible space, vegetation management and fuel modification activities eligible for financial assistance under the program.

"We need to help our homeowners and communities adapt to the new reality that wildfires are more common and more severe than ever, and the state can help by establishing new standards and identifying resources for that purpose," says assembly member Jim Wood (D-Santa Rosa), author of Assembly Bill 38.

Some fire-affected communities already have implemented research-based building enhancements. A residential complex with 46 homes in the Fountaingrove neighborhood of Santa Rosa burned down during the Tubbs Fire in 2017 when embers penetrated structures' attics during high winds. A new development, The Oaks, is being built there with state-of-the-art features and retrofits designed to ward off future fire threats.

At the direction of the homeowners association, builder John Farrow mandated the rebuilt homes include metal roofs and framing; vents removed from attics; fire-resistant spray foam as insulation in walls; concrete slabs in crawl spaces; a three-coated, stucco wall finish; garage door opener battery backup; automatic fire sprinkler systems; fire-tolerant landscaping; and tempered windows to avert massive heat.

"If there was a fire, [the houses] would have a better chance of surviving it," Farrow says.

To watch a video about IBHS' model simulation of an active wildfire, go to professionalroofing.net.

CPWR webinar to investigate causes of falls from heights

CPWR—The Center for Construction Research and Training held a webinar, Identifying Common Root Causes of Falls from Heights, Dec. 15 at 2 p.m. EST.

CPWR and the ANSI Z359 Fall Protection Standards Committee are working together to create and administer a new survey to collect detailed information about past fall incidents and their root causes. The survey aims to fill gaps in knowledge left by the Bureau of Labor Statistics Census of Fatal Occupational Injuries data and other traditional data sets by focusing on the experiences and observations of workers, contractors and other industry stakeholders who were victims or witnesses of a fall.

During the webinar, which included a Q&A portion, participants learned why this type of qualitative data is needed and how it will inform the ANSI Z359 committee's development of standards and CPWR's fall-prevention outreach efforts, among other topics.

Additional information is available at cpwr.com. Following the event, a recording of the webinar and presentation materials will be posted at cpwr.com/news-and-events/informational-webinar-series.

Fewer companies acted to enhance cybersecurity during 2020

The 2020 Travelers Risk Index found fewer companies took steps to mitigate cybersecurity threats during 2020 despite growing online safety concerns amid the COVID-19 pandemic, according to constructiondive.com.

In a survey of more than 1,200 business leaders, 48% reported using hacker intrusion detection software; 47% have undergone a cyber-risk assessment of their firms; 37% have undergone a cyber-risk assessment of their vendors; and 42% have written a business continuity plan that could help in a cyberattack.

Additionally, 22% of respondents said their companies had been victims of a hacker, the highest percentage since the survey's inception in 2014.

Hackers increasingly are going after construction companies, which often are underprepared for an attack. Contractors work closely and share vital information with subcontractors and owners, so ensuring all parties' data and information are safe provides an extra challenge. In addition, the disconnect between the field and the office can create lapses hackers can exploit.

After economic uncertainty, cyber risk is the second-highest concern among businesses. Business leaders worry "some or a great deal" about suffering a security breach (52%); unauthorized access to financial systems (50%); employees putting company information at risk (48%); becoming a cyber extortion or ransomware victim (47%); theft of the company's customer or client records (47%); and suffering a cyber event because of employees working remotely (47%).

To view an infographic depicting key findings from the 2020 Travelers Risk Index, go to professionalroofing.net.