



Attachment advice

Understanding proper steel roof deck attachment

by Mark S. Graham

Proper attachment of a steel roof deck to a building's underlying structural framing is an important consideration for proper roof assembly design. Unfortunately, there appears to be a lack of clear guidance between steel roof deck installers and the roofing industry regarding proper steel roof deck attachment.

Existing guidelines

The Steel Deck Institute and FM Global provide two generally recognized but somewhat different approaches to steel roof deck attachment.

ANSI/SDI RD-2010, "Standard for Steel Roof Deck," is a code-recognized standard for the materials, design and erection of steel roof deck panels. This document specifies connections be designed in accordance with the American Iron and Steel Institute's specification AISI S100, "North American Specification for the Design of Cold-Formed Steel Structural Members."

ANSI/SDI RD-2010 requires steel roof decks be designed to resist required net uplift forces but not less than 45 pounds per square foot at eave overhangs and 30 psf for all other roof areas.

ANSI/SDI RD-2010's guidance does not specifically address increased design wind loads at roof area perimeters and corners or



nonuniform uplift loading conditions, such as those created with seam-fastened mechanically attached single-ply membrane roof systems. SDI's design guidelines are based on uniform loading, such as those provided by an adhered membrane roof system.

FM Global's Loss Prevention Data Sheet 1-29, "Roof Deck Securement and Above-Deck Roof Components," issued February 2020, provides guidelines for steel roof deck attachment for FM-insured buildings.

FM 1-29's Section 2.2.3.4 indicates one of two approaches—a performance-based approach or a prescriptive enhancement approach—can be used.

Using FM 1-29's performance-based approach, a specific RoofNav assembly should be selected based on the higher wind-resistance classification needed for Zone 2 (perimeter) and Zone 3 (corners). Individual RoofNav assemblies for roof systems on steel roof decks have RoofNav number-specific guidance for steel roof decks and roof deck attachment.

FM 1-29's prescriptive enhancement approach provides for the specific RoofNav assembly to be based on the wind-resistance classification needed for Zone 1 (field) and enhancing steel roof deck securement for the perimeter and corners as follows:

- Zone 2: Increase the roof deck attachment by a minimum of 50% (1.5 times)

greater than that required by the RoofNav assembly in Zone 1.

- Zone 3: Increase the roof deck attachment by a minimum of 100% (2 times) greater than that required by the RoofNav assembly in Zone 1.

In many instances, because of steel deck flange, rib and flute spacing, it is impractical to increase Zone 2 attachment 50%. In these situations, increasing Zone 2 and Zone 3 attachment by a minimum of two times greater than that required for Zone 1 is appropriate.

FM 1-29's Tables 2 and 3 provide several attachment options for 6- and 8-inch-wide rib spacing for steel decks, respectively. For example, if the RoofNav listing requires FM-approved deck fasteners at a 12-inch spacing for Zone 1, FM-approved deck fasteners at a 6-inch spacing with minimum 1/2-inch-diameter integral washers or 3/4-inch-diameter washers are permitted for Zone 2 and Zone 3 attachment.

Closing thoughts

Field experience shows many steel roof decks encountered in new construction and reroofing situations may not be attached according to SDI or FM guidelines. As a result, the wind-uplift resistances of these roof assemblies could be a concern.

Steel roof deck and roof system installers need better guidance from designers regarding the type and spacing of steel roof deck attachment and any perimeter and corner enhancements for specific buildings. This is not a decision that should be left to steel deck installers or roofing contractors.

In new construction situations, this determination is best made by the building designer in consultation with the building's structural engineer. In reroofing situations, roof system designers should evaluate the existing steel roof deck attachment and clearly specify

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whether any specific type and spacing of supplemental steel roof deck attachment is necessary. In many instances, supplemental deck attachment likely will be necessary because design wind loads have increased and

the methods of addressing roof area perimeters and corners have changed with recent editions of the codes.

If, in a reroofing situation, the designer cannot properly assess the adequacy of an existing steel roof deck's attachment, supplemental attachment methods should be specified and can be implemented as needed on a unit-cost basis.

In reroofing situations on occupied buildings, NRCA prefers designers specify mechanical fasteners rather than power-actuated fasteners or spot welding for any required supplemental attachment. For occupant safety, NRCA suggests spot-weld attachment and power-actuated fasteners be avoided on occupied buildings.

Additional information about steel roof deck and roof deck attachment is provided in Chapter 2—Roof Decks of *The NRCA Roofing Manual: Membrane Roof Systems—2019*. 🌟🌟

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