Considerations for steel roof deck

by **Mark S. Graham**

Q: *My company will be involved in a roof system replacement project where deteriorated steel roof deck will be replaced as necessary. The existing deck's individual pieces typically are supported by four joists (i.e., they span three joist spaces). If only a portion of an existing deck panel is deteriorated (e.g., over only one span), is it appropriate to cut out and replace a single-span portion of a multiple-span piece of deck, or is it necessary to remove and replace the entire piece?*

A: A review of the load tables in the Steel Deck Institute's (SDI's) *Design Manual* reveals that the design load capacity for most types of steel roof deck supported by two joists (i.e., one span) is only about 80 to 85 percent that of the same type of steel deck supported by three or more joists (i.e., two or more spans).



Changing the span condition will reduce the deck's load capacity. Unless it can be determined that the steel deck was designed with excess capacity to offset this reduction, replacing a single-span portion of a multiple-span deck is not recommended.

To determine if the steel deck has excess load capacity, the specific type and gauge thickness of deck, design loads and spans need to be known. From these variables, the design and excess load capacities can be determined using the appropriate load tables from the specific steel deck manufacturer or SDI's *Design Manual.*

Determination of design and excess load capacities is best left to a professional engineer or someone knowledgeable of steel roof deck design.

Editor's note: *SDI's* Design Manual *is available from SDI, P.O. Box 9506, Canton, Ohio 44711; telephone (216) 493-7886.*

Q: *What type of finish is recommended for replacement steel deck: prime-painted or galvanized?*

A: At a minimum, the finish on replacement steel roof deck should be the same as that of the material being replaced.

SDI recommends that steel roof deck be prime-painted, galvanized or aluminized. In the event prime-painted steel deck is used, the primer coat is intended to protect the steel for only a short time in ordinary atmospheric conditions. In addition, it should be considered an impermanent and provisional coating.

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NRCA recommends that steel roof deck be factory-galvanized or -coated with aluminum zinc alloy for corrosion protection. Galvanizing should conform with ASTM A 525, Class G-60 or G-90; G-90 provides greater corrosion protection. Aluminum zinc alloy protection should conform with ASTM A 792; an aluminum zinc alloy provides greater corrosion protection than a G-90 galvanized coating.

For steel roof deck in highly corrosive or chemical atmospheres, special care should be taken when specifying protective finishes, and individual deck manufacturers should be contacted for specific recommendations.

Q: *Why is the notation made in the* NRCA Construction Details *that the use of a recessed sump pan at a roof drain in steel roof deck is not recommended? Isn't a sump at a roof drain desirable to aid drainage?*

A: A conventional recessed sump pan, which typically is provided by the steel deck fabricator, measures 33 inches (825 mm) by 29 inches (725 mm). The resulting drain sump measures 24 inches (600 mm) by 20 inches (500 mm) by 1½ inches (38 mm) deep; the drain is intended to be placed in the approximate center of the sump pan.

NRCA's concern with these conventional-sized recessed sump pans is that the sump's depth and its relatively small size result in a complex, sloped geometry that makes proper termination of the roof membrane difficult. This is especially the case with adhered membrane systems. These systems are particularly difficult to conform to the sump geometry while keeping the membrane firmly bonded to the substrate. Also, conventional sump pans typically allow for the use of little or no thermal insulation, resulting in a risk of condensation forming around the drain.

The preferred drain installation method is placing a roof drain with an appropriate metal drain receiver directly in a metal deck panel opening using a suitable underdeck drain clamp. Metal drain receivers typically are available from the roof drain supplier as an optional drain component. They have a recessed opening to smoothly receive a roof drain's outside flange.

The drain receiver and roof drain are intended to be placed directly on steel deck or on top of the roof insulation, depending on the detail configuration. Then, any roof insulation around the drain can be tapered gradually to provide a drain sump.

Where additional structural support of the roof deck at the drain opening is required, the use of a flat sump plate (available as an accessory component from most steel deck fabricators) or suitable underdeck framing is recommended. PR

Each month in this column, one of NRCA's deputy directors of technology and research will answer readers' technical questions. If you have a specific question that you would like answered in this column, send it to Professional Roofing, *10255 W. Higgins Road, Suite 600, Rosemont, Ill. 60018-5607; or fax (708) 299-1183.*