Code compliance for green roof systems

by Mark S. Graham

After years of acceptance and use in some European countries, green roof systems are gaining popularity in the U.S. However, advocates and manufacturers of green roof systems provide little information to designers and installers about whether the roof systems comply with U.S. building codes.

Following is a review of some code requirements that apply to green roof systems in the U.S. and suggestions for properly complying with these requirements.

IBC 2006

The *International Building Code, 2006 Edition* (IBC 2006) provides minimal guidance specific to green roof systems.

IBC 2006's Chapter 16—Structural Design, Section 1607.11.2.2—Special-purpose Roofs, indicates: "Roofs used for promenade purposes, roof gardens, assembly purposes or other special purposes shall be designed for a minimum live load as required by Table 1607.1."

Table 1607.1—Minimum Uniformly Distributed Live Loads and Minimum Concentrated Live Loads states a 100-pound-per-square-foot (psf) live load is required for "roofs used for roof gardens or assembly purposes." Other special-purpose roofs shall " … be designed for appropriate loads as approved by the building official."

Conventional roof systems typically are required to be designed for a minimum 20-psf uniform live load.

Section 1607.11.2.3—Landscape Roofs states: "Where roofs are to be landscaped, the uniform design live load in the landscape area shall be 20 psf (0.958 kN/m^2). The weight of the landscaping materials shall be considered as dead load and shall be computed on the basis of saturation of the soil."

IBC 2006's Chapter 15—Roof Assembly and Rooftop Structures contains no specific reference to green roof systems; however, it can be interpreted that this chapter's requirements also apply.

The scope of Chapter 15 indicates: "The provisions of this chapter shall govern the design, materials, construction and quality of roof assemblies and rooftop structures."

Because vegetative green roof systems serve the function of buildings' roof assemblies according to the code's definition, a logical interpretation of IBC 2006 is that Chapter 15's requirements also apply to green roof systems.

Chapter 15 includes specific requirements for roof assemblies to resist external fire exposure and be tested or designed to resist wind loads. At this point, it appears green roof systems may not be able to meet these code requirements because advocates for and manufacturers of green roof systems have not done the necessary testing to comply with this portion of the code.

The International Code Council (ICC) publishes IBC 2006, and during its 2006-07 code-development cycle, NRCA submitted a code change proposal intended to clarify whether Chapter 15 applies to green roof systems. ICC's code-development committee unanimously approved and its membership overwhelmingly accepted this clarification for publication in the code's 2009 edition, pending any additional changes during ICC's 2007-08 code-development cycle.

Complying

Although green roof systems' popularity and use are increasing in the U.S., their compliance with building code requirements is a concern, particularly regarding resistance to exterior fire exposure and wind uplift.

Until additional code compliance information is made available, it appears the most appropriate means of providing code-compliant green roof systems is to use the code's alternative materials, design and methods provisions.

For example, IBC 2006's Chapter 1—Administration, Section 104.11—Alternative Materials, Designs and Methods of Construction and Equipment, allows building officials to accept alternative materials and design methods, such as a green roof system, provided the system complies with the code's intent. Typically, building code officials will require research reports, commonly referred to as Evaluation Reports, to substantiate code compliance. Evaluation Reports typically are prepared for and available from manufacturers.

Also, I caution you against implying green roof systems comply with U.S. building code requirements. One such way roofing contractors often unknowingly make such implications is by signing and submitting building permit applications, which typically include certifications of code compliance.

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