NRCA's wind-load calculator

by Mark S. Graham

This month, NRCA is debuting its online wind-load calculator, www.roofwinddesigner.com. This Web-based application is intended to provide roofing professionals with an easy way to accurately determine roof systems' design wind loads for many commonly encountered building types subject to building code compliance.

ASCE 7-05

ASCE 7, "Minimum Design Loads for Buildings and Other Structures," is a widely recognized consensus standard method for determining design wind loads on buildings and other structures. The 2005 edition of the standard, designated as ASCE 7-05, is referenced in and serves as the technical basis for wind-load determination in the *International Building Code, 2006 Edition*, and 2006 edition of *NFPA 5000: Building Construction and Safety Code*.

ASCE 7-05, Chapter 6—Wind Loads specifically addresses the determination of wind loads on buildings and other structures. Within the chapter, three methods of wind-load determination are provided and referred to as Methods 1, 2 and 3.

Method 1—Simplified Method uses a series of relatively easy-to-use tables to determine design wind loads and is limited to many common building types. This simplified method generally is intended for users who do not have extensive engineering-based knowledge of wind-load determination.

Method 2—Analytical Procedure is a calculation-based wind-load determination method generally used by design professionals who have wind-load determination experience.

Method 3—Wind Tunnel Procedure provides guidelines for determining wind loads for buildings and other structures by wind-tunnel testing. This complex procedure is intended to be used when Methods 1 or 2 may not be applicable, such as with unusually shaped buildings and some high-rise structures.

Wind-load calculator

NRCA's wind-load calculator is an automated application based on ASCE 7-05, Method 1, that performs the required table look-ups and analysis for determining roof systems' design wind loads.

After completing an initial user registration and accepting the license agreement, a user inputs information describing the specific building and roof area being evaluated, including the building's location and configuration, roof area dimensions, mean roof height and roof slope. Next, the user inputs exposure and occupancy information for the building; a descriptive explanation is given to help users provide this information. Then, the application determines and displays for verification the basic wind speed for the specific geographic region where the building is located.

The results of the analysis are presented in a report that describes the design wind loads for the roof area's field, perimeter and corner zones. It also provides minimum recommended design wind-resistance loads, which are derived from the design wind loads, taking into consideration a safety factor based on ASTM D6630, "Standard Guide for Low Slope Insulated Roof Membrane Assembly Performance."

Using these minimum recommended design wind-resistance loads, a user is able to select appropriate wind-resistant roof systems by using Underwriters Laboratories Inc.'s online certification directory or FM Approvals' RoofNav.

The report can be viewed and saved from within the application. It also can be printed and e-mailed as a PDF file.

A new tool

NRCA's www.roofwinddesigner.com provides roofing professionals with an easy-to-use means of accurately determining roof systems' design wind-resistance loads and minimum recommended wind-resistance loads for many building types. Using this information, users can select appropriately classified wind-resistant roof systems.

NRCA encourages roof system designers to determine roof systems' design wind loads and minimum design wind-resistance loads on a project-specific basis instead of arbitrarily specifying wind-resistance classifications or ratings; www.roofwinddesigner.com helps users reach this determination. (For additional information, see "Do you overspecify?" December 2005 issue, page 18.)

The wind-load calculator was developed in cooperation with the Midwest Roofing Contractors Association and North/East Roofing Contractors Association and is available to users at no cost. It can be accessed at www.roofwinddesigner.com.

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