FM Global makes some changes

A new FM 1-28 introduces wind design complications for FM-insured buildings

by Mark S. Graham

On Feb. 26, FM Global updated its Property Loss Prevention Data Sheet 1-28, "Wind Design," to reflect changes in its wind load determination methodology. FM 1-28 is intended to provide designers with general guidance for highly protected, FM Global-insured buildings. Following is an overview of the roofing-specific changes.

FM 1-28's changes

FM 1-28 is a 100-page document divided into five primary sections: scope, loss prevention recommendations, support for recommendations, references and appendixes. Wind speed maps for the U.S., including detailed maps for Hawaii, are provided in Appendix C. Changes from FM 1-28's previous edition, released in October 2015, are denoted in red. Also, Section 1.1-Changes summarizes significant changes.

The most notable change is the uplift design pressure tables that appeared in the previous edition have been removed. Now, use of the Ratings Calculator provided in FM Approvals' RoofNav application (www.roofnav.com) is recommended. The pressure equations and various pressure coefficients used in the Ratings Calculator are described in FM 1-28's Section 3.

FM 1-28 now uses pressure coefficients and zone dimensions based on ASCE 7-16, "Minimum Design Loads and Associated Criteria for Buildings and Other Structures." However, FM 1-28 does not use ASCE 7-16's wind maps and basic wind speeds. Instead, FM 1-28 uses wind maps and basic wind speeds based on ASCE 7-05.

Also, FM 1-28 and RoofNav's Ratings Calculator base their calculations on allowable stress design; ASCE 7-05 also is based on allowable stress design. ASCE 7-10 and ASCE 7-16 are based on ultimate strength design.

New guidance has been added for rooftop-mounted equipment. FM 1-28 recommends a professional structural engineer design attachment and resistance to overturning moment for large rooftop-mounted equipment. Separate equations based on ASCE 7-10 and ASCE 7-16 are provided for determining horizontal and vertical wind forces. For new installations of rooftop piping or conduit, an engineer also should verify adequate securement to the roof deck or structure. Appurtenances (intake and exhaust hoods, cowlings) should be secured according to guidelines in FEMA 549, "Attachment of Rooftop Equipment in High-Wind Regions."

Comparing results

To analyze the significance and magnitude of the changes to FM 1-28, NRCA has performed a series of calculations comparing the results from the 2015 version with the new version and RoofNav's Ratings Calculator. The results of example design wind load determinations for hypothetical 60- and 150-foot buildings located in Chicago are shown in the figure.

For the 60-foot-tall building, the new procedures result in significant increases in design wind loads compared with FM 1-28's 2015 version. For this example, a Class 90 uplift rating now is recommended when previously only a Class 60 uplift rating would have been necessary.

For the 150-foot-tall building, there are no differences in the design wind loads. This is because there are minimal changes in FM 1-28 applicable to most high-rise buildings.

Comparing the results using FM's new procedures with ASCE 7-16, which is referenced in the *International Building Code,® 2018 Edition*, FM Global's new procedures typically result in higher design wind loads than those of ASCE 7-16. Converting ASCE 7-16's ultimate design wind loads to allowable stress design allows for direct comparison of FM's new procedure with IBC 2018's requirements. For both the 60- and 150-foot-tall building examples, FM Global's new procedures resulted in higher design wind loads than are required by IBC 2018.

NRCA's recommendations

If you are working on roofing projects at FM Global-insured buildings, I encourage you to be aware of FM 1-28, its changes and the effects these changes may have on roof assembly designs.

IBC 2018 (and its previous editions) requires design wind loads be provided in projects' construction documents. For FM Global-insured buildings, if FM 1-28 results in design wind loads higher than those required by the applicable code, the designer should clearly delineate these in the project's construction documents.

FM Global has indicated it intends the new version of FM 1-28 to be effective immediately upon publication. If you have previously bid on or are under contract for roofing projects on FM Global-insured buildings, you should contact your building owner, who can coordinate with his or her assigned FM Global field engineer, to determine whether any changes to the project's roof assembly design are necessary. You also can contact NRCA's Technical Services Department for further guidance.

FM 1-28 and other Loss Prevention Data Sheets are available from www.fmglobaldatasheets.com.

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Mean roof height (feet)	Method	Basic wind speed (mph)	Design wind pressure (psf)			
			Zone 1 (center)	Zone 1 (field)	Zone 2 (perimeter)	Zone 3 (corners)
60	FM 1-28 (previous)	90	—	27	46	69
	FM 1-28/RoofNav (current)	90	24	43	57	77
150	FM 1-28 (previous)	90	—	44	69	94
	FM 1-28/RoofNav (current)	90	—	44	69	94

Comparison of design wind-uplift values using FM 1-28's previous version and current version (RoofNav). The hypothetical buildings were enclosed structures in Risk Category II and Exposure Category C.

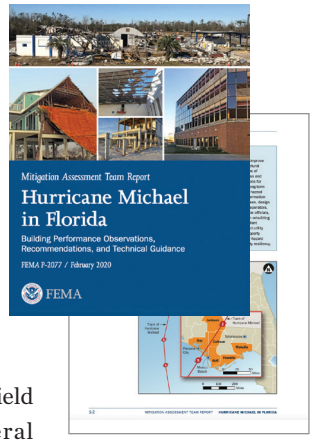
SPRI revises wind design standard

SPRI has revised ANSI/SPRI WD-1, "Wind Design Standard Practice for Roofing Assemblies," and announced the standard has been reaffirmed by the American National Standards Institute.

SPRI developed ANSI/SPRI WD-1 as a reference for the design, specification and installation of nonballasted single-ply roof systems. ANSI/SPRI WD-1 provides methodology for selecting an appropriate roof system to meet the wind-uplift pressures calculated in accordance with ASCE 7-16, "Minimum Design Loads and Associated Criteria for Buildings and Other Structures." The standard previously was revised and reaffirmed in 2014.

ANSI/SPRI WD-1 can be downloaded at www.spri.org.

FEMA releases hurricane mitigation assessment report



The Federal Emergency Management Agency has released a mitigation assessment team report about Hurricane Michael, a Category 5 hurricane that struck the Florida panhandle in October 2018.

At the request of FEMA's joint field office in Florida, FEMA's Federal Insurance and Mitigation Administration's building science branch deployed a mitigation assessment team to affected areas in Florida in October 2018 and January 2019. The mitigation assessment team included national, regional, state and private sector experts specializing in structural, coastal and civil engineering; architecture; building construction; and emergency management code development and enforcement.

The mitigation assessment team assessed the performance of hundreds of coastal and inland residential properties, critical facilities such as hospitals and police stations, municipal and public buildings, and seawalls, as well as hurricane evacuation shelters. Based on its findings, the mitigation assessment team developed 69 recommendations for federal, state and local governments; design and construction industries; and building code and standards organizations. When implemented, the recommended actions will help reduce injuries and mitigate building damage caused by future natural hazard events in Florida and elsewhere.

The report is available at www.fema.gov/es/media-library/assets/documents/186057.

Smartphones and headphones pose job-site hazards

Some construction companies are developing policies to combat workers' growing use of smartphones and headphones on job sites, according to www.constructiondive.com.

Frank Trujillo, vice president of Miller & Long Concrete Construction, Bethesda, Md., says the company's managers tell employees earbuds and headphones are not acceptable on job sites. However, workers don't always realize they are still wearing earbuds when entering a site because they are so used to wearing them all the time.

There is no specific federal regulation prohibiting the use of headphones on a construction site, but the Occupational Safety and Health Administration issued a letter of interpretation in September 2019 providing clarification. In the letter, OSHA said headphone entertainment on a construction site is permissible at managerial discretion "unless such use creates or augments other hazards apart from noise," such as when music masks environmental sounds that need to be heard, "especially on active construction sites where attention to moving equipment, heavy machinery, vehicle traffic and safety warning signals may be compromised."

Associated Builders and Contractors Vice President of Workforce Development Safety Health and Environmental Greg Sizemore says no smartphone use should be allowed on active construction sites and urges his members to train employees regarding the appropriate use of technology on job sites. Workers may argue they use music to drown out loud construction noises, but an OSHA spokesperson says the goal for job-site ear protection is to minimize sound—not eliminate it. Employers must protect workers' ears with ear protective devices when certain sound levels are reached on job sites, and headphones and earbuds do not fulfill that requirement.

Trujillo also experiences problems with employees using smartphones to take photos on-site; his company has clients such as the U.S. Navy that prohibit photos on job sites. Additionally, smartphones have been used to document sensitive incidents or accidents by potential whistleblowers or disgruntled employees. Miller & Long Concrete Construction safety leaders are developing a formal policy regarding smartphone and headphone use on job sites; in the meantime, managers tell employees if they must check their phones or answer calls, they must exit the job site and clock out to do so.

"If you're in construction you need to pay attention to what you're doing," Trujillo says.

To learn more about the importance of having a job-site cell phone policy, go to www.professionalroofing.net.