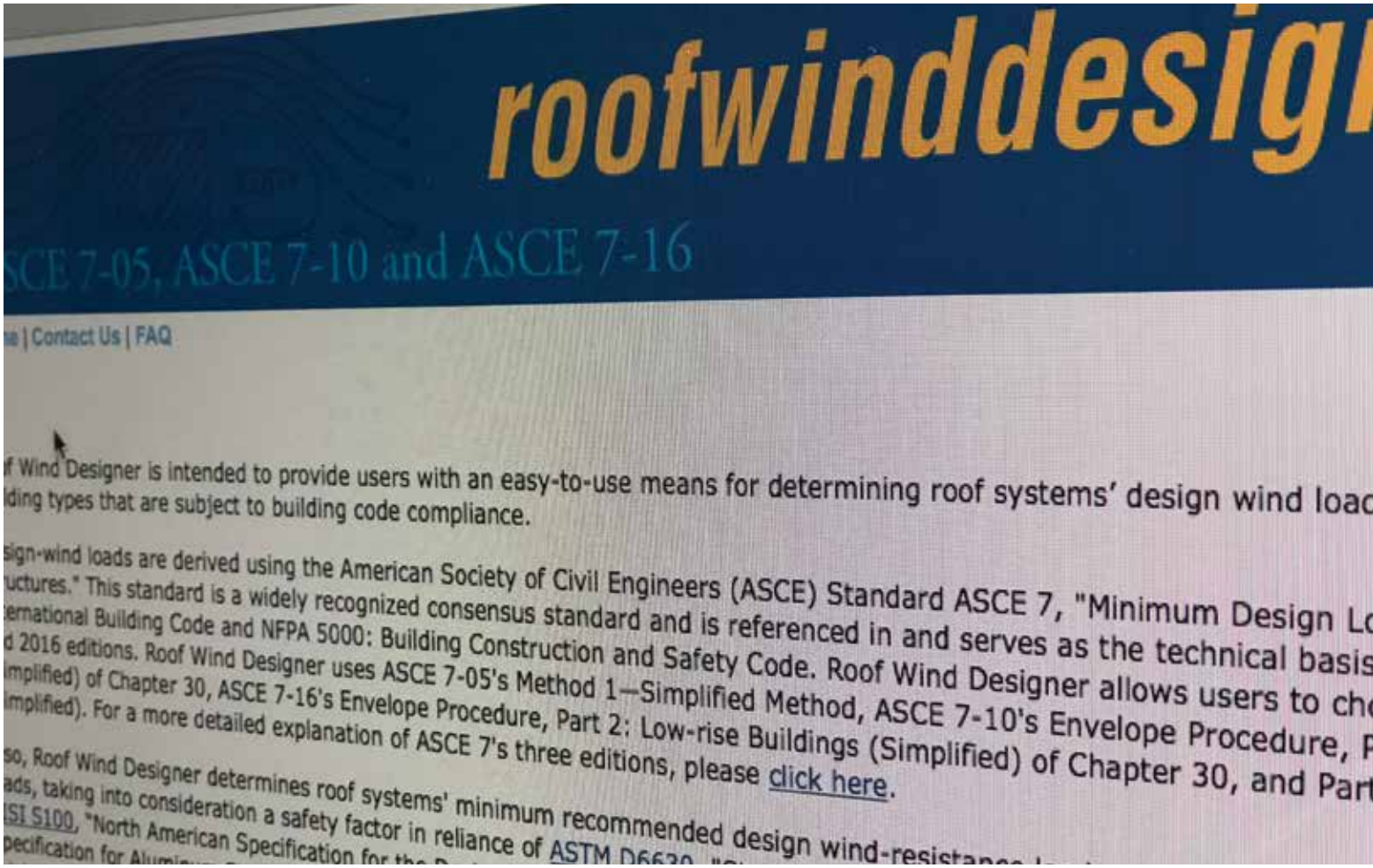


ASCE 7-16

Increased design wind-uplift loads may present challenges

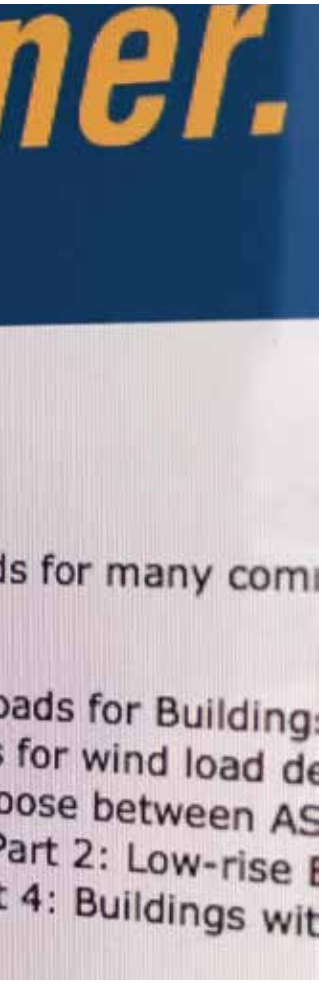
by Mark S. Graham

In June 2017, the American Society of Civil Engineers (ASCE) published an updated edition of ASCE 7, "Minimum Design Loads and Associated Criteria for Buildings and Other Structures," (ASCE 7-16). Because ASCE 7-16 is referenced in the *International Building Code,® 2018 Edition* (IBC 2018) as the basis for design wind-uplift load determination for all roof assembly types except asphalt shingles and tile, you should be aware of the changes.

ASCE 7-16

ASCE 7-16's design wind-uplift load procedures are described and the basic design wind speed maps are provided in Chapter 26-Wind Loads: General Requirements. Design wind-uplift loads for roof assemblies typically are determined using ASCE 7-16's Chapter 30-Wind Loads: Components and Cladding.

Chapter 30 provides seven methods—referred to as "Parts"—for wind load determination. Part 1 applies to low-rise, enclosed or partially enclosed buildings. Part 2 is a simplified approach applicable to low-rise, enclosed buildings. Part 3 applies to enclosed or partially



enclosed buildings higher than 60 feet. Part 4 is a simplified approach applicable to enclosed buildings higher than 60 feet but less than 160 feet in height. Part 5 applies to open buildings of all heights. Part 6 applies to building appurtenances, such as roof overhangs, parapets and rooftop equipment. And Part 7 applies to nonbuilding structures, including rooftop solar panels.

Part 2 and Part 4 apply to most buildings and likely will be used by most roof system designers. These simplified approaches include tables in Chapter 26 and Chapter 30 instead of analytical calculations.

Significant changes

Comparing ASCE 7-16's wind-uplift design procedures with those of the previous version, ASCE 7-10, reveals several notable changes.

ASCE 7-16's basic design wind speed maps differ from ASCE 7-10's maps. Although the wind speeds along the U.S. Atlantic and Gulf of Mexico hurricane coastline are similar, ASCE 7-16's wind speeds in the central U.S. are slightly lower and in the West are notably lower than ASCE 7-10's wind speeds. Also, ASCE 7-16's maps include midpoint indicators between the maps' wind speed contours. Interpolation between the wind speed contours is permitted.

ASCE 7-16's external pressure coefficients are generally higher than those of ASCE 7-10. ASCE 7-16's Zones 1, 2 and 3 external pressure coefficients have increased about 70 percent, 28 percent and 14 percent, respectively, from ASCE 7-10. These external pressure coefficient increases generally will result in higher design wind-uplift loads in ASCE 7-16's Zones 1, 2 and 3 than ASCE 7-10's zones. ASCE 7-16 also includes a new Zone 1' pressure coefficient that is about a 10 percent reduction from ASCE 7-10's Zone 1.

> "ASCE 7-16 will result in increased wind-uplift loads and more complex perimeter and corner zones for most roof system designs"

ASCE 7-16's zone diagrams, which define the rooftop configurations to which the external pressure coefficients apply, generally differ from and are somewhat more complex than those in ASCE 7-10 and other previous editions. For example, for flat, hip and gable roofs with slopes less than 7 degrees (about 1.5-in-12 slope), ASCE 7-16 has a zone diagram that applies to buildings 60 feet and less in height and another diagram that applies to buildings taller than 60 feet. ASCE 7-16's zone diagram for buildings 60 feet and less has a Zone 1' in the center of the roof area's field and is surrounded by Zone 1. Zone 2 is at the roof area's perimeter and generally is wider than ASCE 7-10's Zone 2. ASCE 7-16's Zone 3 is an L-shaped corner that occurs inside the width of Zone 2 and is somewhat smaller than that in ASCE 7-10.

For buildings with flat roof assemblies greater than 60 feet in height, ASCE 7-16's zone diagram is similar to ASCE 7-10; however, the external pressure coefficients are greater.

The changes in the configurations of the zone diagrams and the magnitude of the associated external pressure coefficients are important considerations because these define the regions and extent where additional perimeter and corner attachment enhancement generally are necessary.

Closing thoughts

The changes incorporated into ASCE 7-16 will result in increased design wind-uplift loads and more complex perimeter and corner zones for most roof system designs. It remains to be seen how implementation of ASCE 7-16 will affect specific roof system designs. In many instances, additional perimeter and corner attachment may be necessary to satisfy ASCE 7-16's higher loads.

I encourage roof system manufacturers and designers to provide applicators with specific and straightforward guidance for any enhancements that are necessary where ASCE 7-16 applies.

NRCA has updated its Roof Wind Designer online application (www.roofwinddesigner.com) to include design wind-uplift load calculations based on ASCE 7-16's simplified approaches in Parts 2 and 4.

ASCE 7-16 can be purchased by accessing the publications tab of ASCE's website, www.asce.org.

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For an article related to this topic, see "How do I load thee?" October 2017 issue.

ICC welcomes new vice president

The International Code Council (ICC) has named Neil Burning vice president of government relations technical resources. Burning is a certified building official with more than 30 years' technical expertise in codes and standards.


Burning

In his new position, Burning will develop and direct programs and resources that support the adoption of the International Codes (I-Codes), the most widely used set of building safety codes in the U.S.

"We are excited to welcome Neil to the team," says Dominic Sims, ICC's CEO. "The code council and our membership will greatly benefit from Neil's extensive knowledge of the I-Codes and the industry as we advocate for the adoption of modern, regularly updated and cost-efficient codes and standards in jurisdictions across the U.S."

Burning previously served as vice president of construction, codes and standards for the National Association of Home Builders, where he oversaw the development of the association's advocacy efforts dealing with residential construction codes and standards development, implementation and enforcement.

ASTM International standard helps classify waste materials

ASTM International's Committee E60 on Sustainability has developed a new standard to help manufacturers classify discarded materials from their factories and facilities. ASTM E2979-18, "Standard Classification for Discarded Materials from Manufacturing Facilities and Associated Support Facilities," also helps manufacturers maintain corporate responsibility and protect the environment.

"This standard provides a system based on classification, location, disposition and treatment," says ASTM International member Amy Costello, a sustainability manager at Armstrong Flooring, Lancaster, Pa. "It will provide manufacturers a common way to classify waste materials generated at their facilities."

According to Costello, many manufacturers—especially global companies and companies with multiple facilities—struggle to determine how much waste their facilities generate because of different waste-related requirements in different locations. ASTM E2979-18 provides a general classification for sustainability accounting purposes and key performance indicators related to discarded materials.

Solar installer targets low-income households

Rooftop solar company PosiGen LLC, Jefferson, La., is targeting the low-income neighborhoods other solar system installers typically avoid, according to Bloomberg BNA.

Larger solar installers use no money down solar leasing to make rooftop solar more popular but typically focus on consumers with high credit scores and relatively high income.

PosiGen CEO Thomas Neyhart says his company chooses to target people with lower incomes to expand the use of solar power within communities.

"We want the people on disability, the people living paycheck to paycheck," he explains. "They're the ones who can benefit the most from $50 off their monthly utility bill."

PosiGen's strategy does come with a disadvantage. The company sometimes struggles to raise financing because some banks are wary of PosiGen's revenue, which depends on monthly payments from low-income customers. Neyhart says only 47 of his 13,000 homes have defaulted, which is less than 0.4 percent and comparable with companies targeting the higher-income market.

Neyhart now is seeking funding from private equity, family offices and other investors with an interest in solar energy and/or community development.

Despite facing challenges, PosiGen has expanded since it first won 80 percent of Louisiana's rooftop solar market and helped rebuild parts of New Orleans after Hurricane Katrina. The company expanded to Connecticut three years ago and now is expanding in Minnesota and New Jersey. Neyhart says he expects PosiGen to add as many as 3,000 homes during 2018.

Because PosiGen doesn't check credit scores, its target market is left wide open.

The company helps control costs by offering a standardized 6.2-kilowatt installation, flat universal fee of $79.99 per month and simple contract that is easy for customers to understand.

To identify potential customers, PosiGen meets with church groups and neighborhood organizations. A few months after completing an installation, the company helps organize a "Power Party" so customers can discuss their rooftop systems and cost savings with their neighbors. As a result, 40 percent of PosiGen's sales come from its referral program.

After completing PosiGen's expansions in Minnesota and New Jersey, Neyhart hopes to expand the company into two additional states.