# Concerns with ASCE 7-10

## How will implementing ASCE 7-10 affect the roofing industry?

by Mark S. Graham

The 2010 edition of ASCE 7, "Minimum Design Loads for Buildings and Other Structures," has been published and incorporated into the *International Building Code, 2012 Edition*. ASCE 7-10 contains significant revisions to the standard's previous edition, ASCE 7-05. Several of these changes significantly will affect the wind design of buildings' exterior envelopes, including roof systems. Therefore, you should be familiar with ASCE 7-10 and its changes.

### Comparing standards

In ASCE 7-10, wind-load requirements are provided in Chapters 26-31. In ASCE 7-05, wind-load requirements were provided in Chapter 6.

ASCE 7-10 provides six primary design approaches applicable to roof systems, as well as a wind tunnel testing method, compared with three design methods contained in ASCE 7-05. ASCE 7-10 provides simplified design approaches for roof heights of 160 feet or less; ASCE 7-05 applied the simplified approach to roof heights of only 60 feet or less.

ASCE 7-10 contains three basic wind speed maps based on a 300-year, 700-year and 1,700-year mean recurrence interval, respectively. Specific building occupancy dictates map selection.

ASCE 7-05 (and ASCE 7-02 and ASCE 7-98) used one basic wind speed map based on 50- and 100-year return peak gust wind speeds. ASCE 7-05's calculation methods also included an importance factor and load factor not included in ASCE 7-10.

Comparing ASCE 7-10's basic wind speed maps to ASCE 7-05's map shows the wind speeds of the ASCE 7-10 maps are higher.

Wind-uplift calculation results

| Region | Building height | Calculated wind loads (uplift load, Zone 1 [field of roof]) | |
|---|---|---|---|
| | | ASCE 7-05 | ASCE 7-10 |
| Kansas City, Kan.[1] | 30 feet | 20.4 pounds per square foot (psf) (field) | 33.3 psf (field) |
| | 60 feet | 23.6 psf (field) | 38.6 psf (field) |
| | 150 feet | 38.3 psf (field) | 62.7 psf (field) |
| St. Petersburg, Fla.[2] | 30 feet | 42.6 psf (field) | 56.7 psf (field) |
| | 60 feet | 49.3 psf (field) | 65.6 psf (field) |
| | 150 feet | 79.9 psf (field) | 106.6 psf (field) |

[1] For the ASCE 7-05 example for Kansas City, Kan., a basic wind speed of 90 mph, Exposure Category II and an importance factor of 1.0 were used. For the corresponding ASCE 7-10 example, a basic wind speed of 115 mph and Risk Category II were used.

[2] For the ASCE 7-05 example for St. Petersburg, Fla., a basic wind speed of 130 mph, Exposure Category II and an importance factor of 1.0 were used. For the corresponding ASCE 7-10 example, a basic wind speed of 150 mph and Risk Category II were used.

Wind-uplift calculation results for sample buildings comparing ASCE 7-05 with ASCE 7-10

The American Society for Civil Engineers (ASCE) claims these higher values are somewhat offset by changes in ASCE 7-10's wind-load calculation procedures.

The figure shows a comparison of calculated wind-uplift loads for identical sample buildings located in Kansas City, Kan., and St. Petersburg, Fla. From this example, ASCE 7-10's wind-uplift loads appear to be 33 percent to 64 percent higher than ASCE 7-05's wind-uplift loads.

In addition to changes in wind-uplift loads using ASCE 7-10, the changes in the basic wind speed maps also affect asphalt shingles, which typically are designed based on wind speeds. For example, in Kansas City, asphalt shingles with a Class D (90-mph) rating would be appropriate using ASCE 7-05's basic wind speed map. Using ASCE 7-10's maps, Class F (110 mph) or Class G (120 mph) would be necessary depending on the specific building occupancy.

### Become more aware

Because ASCE 7-10 provides different—sometimes significantly different—design wind-uplift loads for buildings' roof systems, roof system designers should become familiar with the standard.

ASCE 7-10 is available from ASCE in print, CD and downloadable electronic file formats at www.asce.org.

To help designers use ASCE 7-10, NRCA is updating its online Roof Wind Designer application, which is accessible at www.roofwinddesigner.com. NRCA's updated application will be available later this year.

**MARK S. GRAHAM** is NRCA's associate executive director of technical services.