

FAQs on ASCE Standards

What You Always Wanted to Ask

By Laura Champion, P.E., F.SEI, F.ASCE, and Jennifer Goupil, P.E., F.SEI, M.ASCE

Thank you for all your comments in response to the launch of this new quarterly column in the January 2022 issue. These articles address some of the questions received about structural standards developed by the Structural Engineering Institute (SEI) of the American Society of Civil Engineers (ASCE), including the recently released ASCE 7-22. In addition, questions received from engineers, building officials, and other design professionals are often considered to develop future editions. Following are some questions received by SEI and responses to clarify the provisions.

ASCE/SEI 7: Minimum Design Loads and Associated Criteria for Buildings and Other Structures

When Can You Use the 0.7 Multiplier in Seismic Category A?

Q: Is the resultant value in Equation 1.4-1, referenced in ASCE/SEI 7-16 Section 1.4.2, an allowable stress or strength level force?

A: The force defined by Equation 1.4-1, $F_x = 0.01 W_x$, (where F_x is the design lateral force applied at story x) and W_x is the portion of the total dead load of the structures, D , located or assigned to level x is a strength level force. Because Equation 1.4-1 is required to be used in the lateral force design of structures assigned to Seismic Design Category A, it is permitted to be multiplied by 0.7 when used with allowable stress design (ASD) load combinations of Section 2.4. Because many nonbuilding structures designed under Chapter 15 are designed using ASD procedures, it would be common to see these nonbuilding structures use the force from Equation 1.4-1 multiplied by 0.7 as the minimum base shear. While this question was specific to SDC A, this applies to all Seismic Design Categories. The 0.01 factor found in Equation 1.4-1 is the same value as the 0.01 minimum limit for the C_s value determined from Equation 12.8-5. For nonbuilding structures falling in Seismic Design Categories B through F, additional minimum base shear values are specified in Section 15.4.1 and may exceed the 0.01 value.

What are the Requirements for Adhesives in the Seismic Design of Access Floors?

Q: What is the intent in Section 13.5.7 of ASCE/SEI 7-16 with $R_p = 1.5$ for access floors and the fact that adhesive is explicitly ruled out

for special access floors where $R_p = 2.5$? Does Section 13.5.7.1 allow the use of a qualified adhesive, whereas 13.5.7.2 prohibits it because a larger response modification factor is allowed? Therefore, can access floor base plates be attached with a qualified adhesive when using an $R_p = 1.5$ per Section 13.5.7.1?

A: ASCE/SEI 7-16 Section 13.5.7.1 states that adhesives (bonding or gluing of the pedestal to the supporting structure) can be used for the attachment of ordinary access floors ($R_p = 1.5$) to the supporting structure. Per ASCE/SEI 7-16 Section 13.5.7.2 Item 2, adhesives are prohibited for special access floors ($R_p = 2.5$). However, per Section 13.5.7.2 Item 1, adhesive anchors that comply with Chapter 17 of ACI 318 are permitted for special access floors. Note that there is a difference between adhesives and adhesive anchors.

What is the Definition of a Rooftop Structure when Determining Wind Loads on Buildings?

Q: Are penthouse structures that are habitable spaces included in the definition of rooftop structures as defined in ASCE/SEI 7-16 Section 29.5? Is an elevated platform supporting an air handling unit (AHU) included in the definition of rooftop structures?

A: Section 29.5 is used to determine the wind pressures on parapets. The provisions of Section 29.4 should be used to determine the pressures on rooftop structures (penthouses) and rooftop mechanical units.

What Building Height Should be Used for Determining Wind Loads when Designing a Roof Canopy?

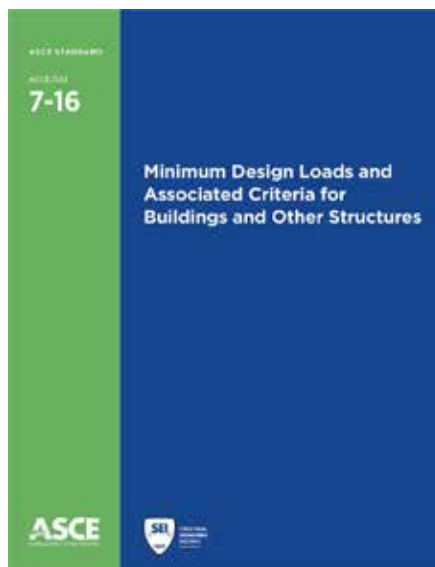
Q: In equation 30.11-1, is q_b defined at the top of the canopy or the roof structure?

A: Per Section 30.11, the velocity pressure q_b is determined from Section 26.10 and is evaluated at the mean height of the roof or the eave height for a flat roof structure. This does not change when determining the design pressures on a canopy.

Where is Vehicle Barrier Loading Applied?

Q: What is the application area regarding vehicle barrier loads referenced in ASCE/SEI 7-16 Section 4.5.3? Where is the 6000-pound impact load applied?

A: Section 4.5.3 of ASCE/SEI 7-16 does not specify the required height of the vehicle barrier system itself. However, this section specifies a range of heights for which the horizontal load must be applied. In addition, a maximum area is specified over which the load can be applied. A smaller area can be used. For whichever size area is assumed, up to the maximum area of 12 by 12 inches, it would be



rational to center the load area at both the minimum and maximum height to determine the maximum load effects. Note, be sure to confirm if your project needs to meet additional minimum vehicle barrier heights as required in the *International Building Code*.

ASCE/SEI 24: Flood Resistant Design and Construction

Is ASCE/SEI 24-14 Applicable for Non-Building Structures?

Q: What is the intent of Section 1.5.5 regarding wood-constructed boardwalk ramp connections? Does this section only allow bolted connections and preclude the use of screw connections and/or mechanical connections, such as pre-engineered manufacturer connections?

A: ASCE/SEI 24-14 standard requirements are intended principally for buildings and not for docks, piers, boardwalks, etc. These other structures may still be subject to floodplain management or local jurisdiction requirements (since the structures are considered “development” under floodplain regulations). Section 1.5.5 was written with buildings in mind, specifically, the attachment of the elevated portion of the building to the foundation with bolted connections. Other attachment methods should be acceptable for nonbuilding construction if the design objectives are satisfied to resist all loads. This includes, but is not limited to, lateral and vertical load and requirements from the authority having jurisdiction for flood plan regulations to prevent flotation, collapse, and displacement.

Is Parking Allowed Below Grade Where Flood-Resistant Design and Construction are Required?

Q: Does Chapter 9 Section 9.4.1 of ASCE/SEI 24-14 allow below-grade parking? Is ASCE 24’s definition of below-grade parking in conflict with the National Flood Insurance Program (NFIP) regulations?

A: ASCE/SEI 24-14 provisions related to below-grade areas are patterned after NFIP regulations in 44CFR 60.3 for Flood Plain management. This has been the case since the first (1998) edition of ASCE 24. Below-grade parking requirements in ASCE/SEI 24-14 are referenced in several additional chapters. Chapter 1 applies to all flood hazard zones, Chapters 2 and 4 provide the basic requirements, depending on the flood hazard zone, and Chapters 5-9 provide additional requirements.

Section 9.4.1 states, “Attached garages and accessory storage structures are permitted below the elevations specified in Table 2-1, provided the walls meet the requirements of Section 2.7” and, “Attached garages, carports, and accessory storage structures are permitted below the elevation specified in Table 4-1, provided the walls comply with the requirements of Section 4.6.” The elevations referenced are for the Design Flood Elevation (DFE), and the intent is to allow construction between the DFE and grade. Sections 2.7 and 4.6 define flood openings in walls or breakaway walls between the DFE and grade, respectively. An exception to the flood opening requirement of Section 2.7 is mentioned in Section 2.3.

Section 9.4 states, “The floors of garages, carports, and accessory storage structures shall be at or above grade on at least one side.” However, a “basement” is defined as “the portion of a structure having its lowest floor below ground level on all sides.” And, basements are not permitted in residential structures (explained in Section C.2.3 and C.9.4.1) or in any structure (residential or non-residential) in a Coastal High Hazard Area, Coastal A Zone, or other high-risk flood hazard area. Basements are permitted below non-residential structures (and non-residential portions of mixed-use structures), but the enclosed area must be dry-floodproofed to the DFE. Flood insurance credit for floodproofing may require dry-floodproofing at a higher elevation. ■



If you have a question you want to be considered in a future issue, send it to sei@asce.org with FAQ in the subject line. Visit asce.org/sei to learn more about ASCE/SEI Standards.

This article’s information is provided for general informational purposes only and is not intended in any fashion to be a substitute for professional consultation. Information provided does not constitute a formal interpretation of the standard. Under no circumstances does ASCE/SEI, its affiliates, officers, directors, employees, or volunteers warrant the completeness, accuracy, or relevancy of any information or advice provided herein or its usefulness for any particular purpose. ASCE/SEI, its affiliates, officers, directors, employees, and volunteers expressly disclaim any and all responsibility for any liability, loss, or damage that you may cause or incur in reliance on any information or advice provided herein.

Laura Champion is a Managing Director of the Structural Engineering Institute and Global Partnerships at the American Society of Civil Engineers.

Jennifer Goupil is Senior Manager of Codes and Standards and Technical Activities at the Structural Engineering Institute of the American Society of Civil Engineers.

BUILD YOUR CAREER AT KL&A

We are currently looking for:

- Structural Engineers
- Civil Engineers
- BIM Technicians
- Construction Managers
- Steel Detailer

Please visit klaa.com/open-careers for more information and to apply.



GOLDEN | LOVELAND | CARBONDALE | BUFFALO

ADVERTISEMENT—For Advertiser Information, visit STRUCTUREmag.com