

S116-22

Original Proposal

IBC: CHAPTER 1, SECTION 108, [A] 108.1, CHAPTER 2, SECTION 202, SECTION 202 (New), CHAPTER 16, SECTION 1608, 1608.1, SECTION 1609, 1609.1.1, SECTION 1612, 1612.2, SECTION 1613, 1613.1, SECTION 1614, 1614.1, SECTION 1615, 1615.1, CHAPTER 31, SECTION 3103, 3103.1, 3103.1.1 (New), 3103.1.1, 3103.1.2, 3103.5 (New), 3103.5.1 (New), TABLE 3103.5.1 (New), 3103.5.1.1 (New), 3103.5.1.2 (New), 3103.5.1.3 (New), 3103.5.1.4 (New), 3103.5.1.5 (New), 3103.5.1.6 (New), 3103.5.1.7 (New), 3103.5.1.8 (New), 3103.5.2 (New), TABLE 3103.5.2 (New), 3103.5.3 (New), 3103.5.4 (New), 3103.5.5 (New), 3103.6 (New), 3103.7 (New), 3103.7.1 (New), 3103.7.2 (New), 3103.7.3 (New), CHAPTER 35, ANSI Chapter 35 (New)

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2021 International Building Code

CHAPTER 1 SCOPE AND ADMINISTRATION

SECTION 108 TEMPORARY STRUCTURES AND USES

Revise as follows:

[A] 108.1 General. The *building official* is authorized to issue a *permit* for temporary structures and temporary uses. Such *permits* shall be limited as to time of service, but shall not be permitted for more than 180 days. The *building official* is authorized to grant extensions for demonstrated cause. Structures designed to comply with Section 3103.5 shall not be in service for a period of more than 1-year unless an extension of time is granted.

CHAPTER 2 DEFINITIONS

SECTION 202 DEFINITIONS

Add new definition as follows:

PUBLIC-OCCUPANCY TEMPORARY STRUCTURE. Any building or structure erected for a period of one year or less that support public or private assemblies, or that provide human shelter, protection, or safety. Public-occupancy temporary structures within the confines of another existing structure (such as convention booths) are exempted from Section 3103.5.

SERVICE LIFE. The period of time that a structure serves its intended purpose. For temporary structures, this shall be the cumulative time of service for sequential temporary events which may occur in multiple locations. For public-occupancy temporary structures this is assumed to be a minimum of 10 years.

TEMPORARY EVENT.

A single use during the service life of a public-occupancy temporary structure at a given location which includes its installation, inspection, use and occupancy, and dismantling.

TEMPORARY STRUCTURE. Any building or structure erected for a period of 180 days or less to support temporary events. Temporary structures include a range of structure types (public-occupancy temporary structures, temporary special event structures, tents, umbrella and other membrane structures, relocatable buildings, temporary bleachers, etc.) for a range of purposes (storage, equipment protection,

CHAPTER 16 STRUCTURAL DESIGN

SECTION 1608 SNOW LOADS

Revise as follows:

1608.1 General. Design snow *loads* shall be determined in accordance with Chapter 7 of ASCE 7, but the design roofload shall be not less than that determined by Section 1607.

Exception: Temporary structures complying with Section 3103.5.1.3.

SECTION 1609 WIND LOADS

Revise as follows:

1609.1.1 Determination of wind loads. Wind *loads* on every building or structure shall be determined in accordance with Chapters 26 to 30 of ASCE 7. The type of opening protection required, the basic design *wind speed*, V , and the exposure category for a site is permitted to be determined in accordance with Section 1609 or ASCE 7. Wind shall be assumed to come from any horizontal direction and wind pressures shall be assumed to act normal to the surface considered.

Exceptions:

1. Subject to the limitations of Section 1609.1.1.1, the provisions of ICC 600 shall be permitted for applicable Group R-2 and R-3 buildings.
2. Subject to the limitations of Section 1609.1.1.1, residential structures using the provisions of AWC WFCM.
3. Subject to the limitations of Section 1609.1.1.1, residential structures using the provisions of AISI S230.
4. Designs using NAAMM FP 1001.
5. Designs using TIA-222 for antenna-supporting structures and antennas, provided that the horizontal extent of Topographic Category 2 escarpments in Section 2.6.6.2 of TIA-222 shall be 16 times the height of the escarpment.
6. Wind tunnel tests in accordance with ASCE 49 and Sections 31.4 and 31.5 of ASCE 7.
7. Temporary structures complying with Section 3103.5.1.4.

The wind speeds in Figures 1609.3(1) through 1609.3(12) are basic design wind speeds, V , and shall be converted in accordance with Section 1609.3.1 to allowable stress design wind speeds, V_{asd} , when the provisions of the standards referenced in Exceptions 4 and 5 are used.

SECTION 1612 FLOOD LOADS

Revise as follows:

1612.2 Design and construction. The design and construction of buildings and structures located in *flood hazard areas*, including *coastal high hazard areas* and *coastal A zones*, shall be in accordance with Chapter 5 of ASCE 7 and ASCE 24.

Exception: Temporary structures complying with Section 3103.5.1.5.

SECTION 1613

EARTHQUAKE LOADS

Revise as follows:

1613.1 Scope. Every structure, and portion thereof, including nonstructural components that are permanently attached to structures and their supports and attachments, shall be designed and constructed to resist the effects of earthquake motions in accordance with Chapters 11, 12, 13, 15, 17 and 18 of ASCE 7, as applicable. The *seismic design category* for a structure is permitted to be determined in accordance with Section 1613 or ASCE 7.

Exceptions:

1. Detached one- and two-family dwellings, assigned to *Seismic Design Category* A, B or C, or located where the mapped short-period spectral response acceleration, S_s , is less than 0.4 g.
2. The *seismic force-resisting system* of wood-frame buildings that conform to the provisions of Section 2308 are not required to be analyzed as specified in this section.
3. Agricultural storage structures intended only for incidental human occupancy.
4. Structures that require special consideration of their response characteristics and environment that are not addressed by this code or ASCE 7 and for which other regulations provide seismic criteria, such as vehicular bridges, electrical transmission towers, hydraulic structures, buried utility lines and their appurtenances and nuclear reactors.
5. References within ASCE 7 to Chapter 14 shall not apply, except as specifically required herein.
6. Temporary structures complying with Section 3103.5.1.6.

SECTION 1614 ATMOSPHERIC ICE LOADS

Revise as follows:

1614.1 General. *Ice-sensitive structures* shall be designed for atmospheric ice loads in accordance with Chapter 10 of ASCE 7. Public-occupancy temporary structures shall comply with Section 3103.7.3.

Exception: Temporary structures complying with Section 3103.5.1.7.

SECTION 1615 TSUNAMI LOADS

Revise as follows:

1615.1 General. The design and construction of *Risk Category* III and IV buildings and structures located in the *Tsunami Design Zones* defined in the *Tsunami Design Geodatabase* shall be in accordance with Chapter 6 of ASCE 7, except as modified by this code.

Exception: Temporary structures complying with Section 3103.5.1.8.

CHAPTER 31 SPECIAL CONSTRUCTION

SECTION 3103 TEMPORARY STRUCTURES

Revise as follows:

3103.1 General. The provisions of Sections 3103.1 through ~~3103.4~~ 3103.7 shall apply to structures erected for a period of less than 180 days. Temporary special event structures, tents, umbrella structures and other membrane structures erected for a period of less than 180

days shall also comply with the *International Fire Code*. These Temporary structures erected for a longer period of time and public-occupancy temporary structures shall comply with applicable sections of this code.

Exception: Public-occupancy temporary structures complying with Section 3103.1.1 shall be permitted to remain in service for 180 days or more but not more than 1 year when approved by the *Building Official*.

Add new text as follows:

3103.1.1 Extended period of service time. Public-occupancy temporary structures shall be permitted to remain in service for 180 days or more without complying with requirements in this code for new buildings or structures when extensions for up to 1 year are granted by the *Building Official* in accordance with Section 108.1 and when the following conditions are satisfied:

1. Additional inspections as determined by the *Building Official* shall be performed to verify that site conditions and the approved installation comply with the conditions of approval at the time of final inspection.
2. The *Building Official* shall perform follow up inspections after initial occupancy at intervals not exceeding 180 days to verify the site conditions and the installation conform to the approved site conditions and installation requirements.
3. An examination shall be performed by a registered design professional to determine the adequacy of the temporary structure to resist the structural loads required in Section 3103.5.
4. Relocation of the temporary structures shall require a new approval by the *Building Official*.
5. The use or occupancy approved at the time of final inspection shall remain unchanged.

Revise as follows:

~~3103.1.4~~ **3103.1.2 Conformance.** Temporary structures and uses shall conform to the structural strength, fire safety, *means of egress*, accessibility, light, *ventilation* and sanitary requirements of this code as necessary to ensure public health, safety and general welfare.

~~3103.1.2~~ **3103.1.3 Permit required.** Temporary structures that cover an area greater than 120 square feet (11.16 m²), including connecting areas or spaces with a common *means of egress* or entrance that are used or intended to be used for the gathering together of 10 or more persons, shall not be erected, operated or maintained for any purpose without obtaining a *permit* from the *building official*.

Add new text as follows:

3103.5 Structural requirements. Temporary structures shall comply with Chapter 16 of this code. Public-occupancy temporary structures shall be designed and erected to comply with requirements of this Section.

3103.5.1 Structural loads. Public-occupancy temporary structures shall be classified, based on the risk to human life, health, and welfare associated with damage or failure by nature of their occupancy or use, according to Table 1604.5 for the purposes of applying flood, wind, snow, earthquake, and ice provisions. Additionally, public assembly facilities that require more than 15 min to evacuate to a safe location and any structure whose failure or collapse would endanger the public assembled near the structure, such as speaker stands or other temporary structures for public gatherings shall be classified as Risk Category III.

TABLE 3103.5.1 REDUCTION FACTORS FOR GROUND SNOW LOADS FOR PUBLIC-OCCUPANCY TEMPORARY STRUCTURES

Risk Category	Service Life	
	≤ 10 yr	> 10 yr
II	0.7	1.0
III	0.8	1.0
IV	1.0	1.0

3103.5.1.1 Dead. Dead loads on public-occupancy temporary structures shall be determined in accordance with Section 1606.

3103.5.1.2 Live. Live loads on public-occupancy temporary structures shall be determined in accordance with Section 1607.

Exception: Where approved, live loads less than those prescribed by Table 1607.1 *Minimum Uniformly Distributed Live Loads, L_o , and Minimum Concentrated Live Loads* shall be permitted where shown by the registered design professional that a rational approach has been used and that such reductions are warranted.

3103.5.1.3 Snow. Snow loads on public-occupancy temporary structures shall be determined in accordance with Section 1608 and Chapter 7 of ASCE 7. The ground snow loads, p_g , in Section 1608 shall be modified according to Table 3103.5.1.

If the public-occupancy temporary structure is not subject to snow loads or not constructed and occupied during winter months when snow is to be expected, snow loads need not be considered, provided that the design is reviewed and modified, as appropriate, to account for snow loads if the period of time when the public-occupancy temporary structure is in service shifts to include winter months.

Exception: Risk Category II public-occupancy temporary structures that employ controlled occupancy measures per Section 3103.7.2 shall be permitted to use a ground snow load reduction factor of 0.65 instead of the ground snow load reduction factors in Table 3105.1.

3103.5.1.4 Wind. Wind loads on public-occupancy temporary structures shall be determined in accordance with Section 1609 and Chapters 26 to 30 of ASCE 7. The design wind load shall be modified according to Table 3103.5.2.

Exceptions

1. Public-occupancy temporary structures that employ controlled occupancy measures per Section 3103.7.1 shall be permitted to use a load reduction factor of 0.65 instead of the load reduction factors in Table 3103.5.2.
2. Public-occupancy temporary structures erected in a hurricane-prone region outside of hurricane season, the design wind speed shall be set at the following 3-second gust basic wind speeds depending on Risk Category:
 - 2.1. For Risk Category II use 115 mph.
 - 2.2. For Risk Category III use 120 mph, and
 - 2.3. For Risk Category IV use 125 mph.

3103.5.1.5 Flood. An Emergency Action Plan, in accordance with 3103.5.4, shall be submitted for public-occupancy temporary structures in a Flood Hazard Area when requested by the Building or Fire Official. Public-occupancy temporary structures need not be designed for flood loads specified in Section 1615 except when specifically designed as a dry floodproofed structure or designated to be occupied during a storm event per the approved Emergency Action Plan.

3103.5.1.6 Seismic. Seismic loads on public-occupancy temporary structures assigned to Seismic Design Categories C through F shall be determined in accordance with Section 1613. The resulting seismic loads are permitted to be taken as 75% of those determined by Section 1613. Public-occupancy temporary structures assigned to Seismic Design Categories A and B need not be designed for seismic loads.

3103.5.1.7 Ice. Ice loads on public-occupancy temporary structures shall be determined in accordance with Section 1614, Chapter 10 of ASCE 7, with the largest maximum nominal thickness being 0.5 in, for all Risk Categories. When ice is expected during the occupancy of public-occupancy temporary structures, ice loads shall be determined for surfaces on which ice could accumulate in accordance with ASCE 7. If the public-occupancy temporary structure is not subject to ice loads or not constructed and occupied during winter months when ice is to be expected, ice loads need not be considered, provided that the design is reviewed and modified, as appropriate, to account for ice loads if the period of time when the temporary structure is in service shifts to include winter months.

3103.5.1.8 Tsunami. An Emergency Action Plan, in accordance with 3103.5.4, shall be submitted for public-occupancy temporary structures in a Tsunami Design Zone when requested by the Building or Fire Official. The public-occupancy temporary structure need not be designed for tsunami loads specified in Section 1615.

3103.5.2 Foundations. Public-occupancy temporary structures may be supported on the ground with temporary foundations when approved by the Building Official. Consideration shall be given for the impacts of differential settlement when foundations do not extend below the ground or foundations supported on compressible materials. The presumptive load-bearing value for public-occupancy temporary structures supported on a pavement, slab on grade or on other Collapsible or Controlled Low Strength substrates soils such as beach sand or grass shall be assumed not to exceed 1,000 psf unless determined through testing and evaluation by a registered design professional. The presumptive load-bearing values listed in Table 1806.2 shall be permitted to be used for other supporting soil conditions.

TABLE 3103.5.2 REDUCTION FACTORS FOR WIND LOADS FOR PUBLIC-OCCUPANCY TEMPORARY STRUCTURES

Risk Category	Service Life	
	≤ 10 yr	>10 yr
II	0.8	1.0
III	0.9	1.0
IV	1.0	1.0

3103.5.3 Installation and maintenance inspections. A qualified person shall inspect public-occupancy temporary structures that are assembled using transportable and reusable materials; components shall be inspected when purchased or acquired and at least once per year. The inspection shall evaluate individual components, and the fully assembled structure, to determine suitability for use based on the requirements in ESTA ANSI E1.21. Inspection records shall be kept and shall be made available for verification by the Building Official. Additionally, public-occupancy temporary structures shall be inspected at regular intervals when in service.

3103.5.4 Emergency Action plans. When required by the Building Official, Emergency Action Plans shall be submitted and approved. Emergency Action Plans shall include procedures to be implemented due to flood, wind, or snow hazards, or within the tsunami design zone. The action plans shall include provisions for evacuating, securing, or dismantling public-occupancy temporary structures, in whole or in part, and removal to prevent damage to surrounding buildings or structures.

3103.5.5 Durability and maintenance. Reusable components used in the erection and the installation of public-occupancy temporary structures shall be manufactured of durable materials necessary to withstand environmental conditions at the service location. Components damaged during transportation or installation and due to the effects of weathering shall be replaced or repaired. A qualified person shall inspect public-occupancy temporary structures, including components, when purchased or acquired and at least once per year, based on the requirements in ANSI E1.21. Inspection records shall be kept and shall be made available for verification by the building official. Additionally, public-occupancy temporary structures shall be inspected at regular intervals when in service to ensure that the structure continues to perform as designed and initially erected.

3103.6 Serviceability. The effects of structural loads or conditions shall not adversely affect the serviceability or performance of the public-occupancy temporary structure.

3103.7 Controlled occupancy. Public-occupancy temporary structures that comply with Section 3103.5 for structural requirements do not require monitoring for controlled occupancy. Public-occupancy temporary structures that employ exceptions for reduced environmental loads shall employ controlled occupancy procedures as specified in this section and in accordance with ANSI ES1.7. An operations management plan conforming to ANSI E1.21 with an occupant evacuation plan shall be submitted to the Building Official for approval as a part of the permit documents.

3103.7.1 Wind. Wind speeds associated with the design wind loads shall be monitored before and during occupancy of the public-occupancy temporary structure. The public-occupancy temporary structure shall be vacated in the event that the design wind speed is expected to be exceeded during its occupancy.

3103.7.2 Snow. Surfaces on which snow accumulates shall be monitored before and during occupancy of the public-occupancy temporary structure and any loads in excess of the design snow load shall be removed prior to its occupancy, or the public-occupancy temporary structure shall be vacated in the event that the design snow load is exceeded during its occupancy.

3103.7.3 Ice. Surfaces on which ice accumulates shall be monitored before and during occupancy of the public-occupancy temporary structure and any loads in excess of the design ice load shall be removed prior to its occupancy, or the public-occupancy temporary structure shall be vacated in the event that the design ice load is exceeded during its occupancy.

CHAPTER 35 REFERENCED STANDARDS

Add new standard(s) as follows:

ANSI

American National Standards Institute
25 West 43rd Street, Fourth Floor
New York, NY 10036

E1.21-2013 Entertainment Technology: Temporary Structures Used for Technical Production of Outdoor Entertainment Event

ES1.7-2021 Event Safety Requirements - Weather Preparedness

Reason: There is a need for code provisions for minimum structural loads for temporary structures. In past code cycles, inappropriate references were attempted to be introduced to the International Building Code but failed due to lack of consensus within the industry. Following that failed attempt, committee members from the adopted structural loading standard ASCE/SEI 7 *Minimum Design Loads and Associated Criteria for Buildings and Other Structures* committed to work with building officials and industry stakeholders to develop provisions that align with the design basis for Chapter 16 and ASCE/SEI 7, as well as provide the appropriate level of risk and structural reliability to the public.

To meet the need for minimum loading provisions and deliver on their commitment, this code change proposal was developed by a diverse group of experts that have experience with the development of the ASCE/SEI 7 Standard, building officials from many jurisdictions from across the country that have experience with large events and temporary structures, and industry representatives from the US entertainment industry.

This proposal was developed by an ad hoc committee that met every month since mid-2020 and the included the following members:

- Don Scott; PCS Structural Solutions - ASCE 7 Wind Load Subcommittee
- Jennifer Goupil; ASCE/SEI Codes & Standards - ASCE 7 Main Committee
- Therese McAllister, PhD; NIST - ASCE 7 Load Combinations Subcommittee
- John Hooper; MKA - ASCE 7 Seismic Subcommittee
- John Duntemann; WJE - ASCE 7 Snow Subcommittee
- Andrew Stam; WJE - ASCE 7 Dead & Live Load Subcommittee
- Bryan Lanier; American Tower Corporation - ASCE 7 Ice Load Subcommittee
- Chris Cerino; STV - ASCE 7 Flood Load Subcommittee
- James (Greg) Soules, PhD; CBI - ASCE 7 Main Committee
- Ali Fattah; City of San Diego
- Constadino (Gus) Sirakis; City of New York

This proposal was developed in collaboration with industry stakeholders, many of whom reviewed the proposal and provided comments to the ad hoc committee; the following stakeholders were invited to collaborate, and many provided comments and input for this proposal:

- Richard Nix; Entertainment Services and Technology Assoc. (ESTA)
- Mike Nugent; ICC BCAC Chair
- Steve Kerr; National Council of Structural Engineers Associations (NCSEA)
- Kai Ki Mow; Seattle Department of Construction and Inspection
- Julius Carreon; City of Bellevue Washington

- Paul Armstrong; PCA Code Services
- Daniel Clark; Clark Reder Engineers
- William Gorlin; McLaren Engineers
- David Renn; City of Denver
- Jon Siu; Jon Siu Consulting
- Gary Ehrlich; National Association of Home Builders and ICC/PTF
- Edgar Surla; Southern Nevada Chapter of ICC

Due to the staggered nature of the ICC and ASCE 7 Standard code development processes, this IBC proposal is the first of two efforts to address the need for provisions for loads on temporary structures. The second effort includes development of a new Appendix to ASCE 7 to address temporary structures.

Following is the description and rationale for content of this code change proposal:

The International Codes regulate the construction of new buildings and temporary structures through the International Building Code (IBC) and regulate existing buildings through the International Existing Building Code (IEBC). A temporary structure is not an existing building because it is not permanent and is therefore regulated through Chapter 31 of the IBC.

Temporary Special Event Structures are regulated by the International Fire Code. However, they are a type of temporary structure and thus need to also meet the requirements of this proposed section.

Three new definitions are added for public-occupancy temporary structures, service life, and temporary event. Public-occupancy temporary structures are new buildings or structures that are used by the general public, or that support public events, where the public expects similar levels of reliability and safety as offered by permanent construction. Public-occupancy temporary structures are often assembled with re-useable components and designed for a particular purpose and defined period of time, which is defined as a temporary event when the period of time is less than one year. Public-occupancy temporary structures in service for a period that exceeds 1-year are required to comply with the IBC for new buildings. Temporary structures should not pose more risk to occupants than permanent structures, but because the code's design-level environmental loads are far less likely during a temporary event, this proposal makes adjustments to reduce the requirements for a consistent level of risk. The code change addresses the hazards in the built environment in IBC chapter 16 for public-occupancy temporary structures. The code change includes the ability to mitigate some hazards through Emergency Action Plans. Portions of temporary structures may be removed to reduce wind loads, for example.

The concept of controlled occupancy is also introduced to address cases where an environmental loading hazard cannot be reasonably mitigated and allows for actions based on a preapproved action plan that the Building Official may use to allow installations that cannot resist code prescribed loads. For example, hazard areas such as flood hazard areas and tsunami inundation zones are clearly mapped, and evacuation plans are adopted and include tsunami alert warning systems and temporary structures subject to high wind loads may be evacuated and have sections removed to reduce the wind load. The code change proposal recognizes that it may be desirable for a temporary structure to remain in service for more than 180 days, whether continuously occupied or not, and provides a process that the Building Official can follow to facilitate such an extended service period. However, after 1-year has passed, the structure is required to comply with requirements for new buildings or is removed from service by being disassembled.

DESIGN PHILOSOPHY:

Temporary structures that are occupied by the general public or that could cause injuries or loss of life by their failure require a design basis that is consistent with the risk and reliability criteria in ASCE 7. The basis of design for temporary structures needs to consider voluntary vs involuntary risk, service life, and reliability as well as the ability to reduce risk for the general public for severe weather events, as elaborated below. Therefore, temporary structures occupied by the general public are expected to have the same level of reliability (or failure rate) and performance as permanent structures.

While temporary structures are developed for use up to 180 days, many of these structures are used repeatedly at different locations. Thus, their actual service life may be on the order of 5 to 10 years. Such structures are consequently subjected to repeated assembly and

dismantling with associated wear and tear. Therefore, service life for temporary structures is defined to provide a consistent basis of reliability relative to that of new buildings, and a service life of 10 years is assumed for determining structural load requirements in Section 3103.5.

Risk:

In a general sense, risk represents the potential consequences of exposure to a natural or man-made hazard in the presence of uncertainty. There are three components to risk – hazard, consequences and context – and risk-informed decisions should involve all three. The focus in structural engineering has been on the hazard (and its probability of exceedance) and structural performance in terms of failure given a hazard intensity over a structure's service life. Consequences and context are reflected indirectly through Risk Categories (or Importance Factors).

The concept of voluntary and involuntary risk assumed by the general public should be considered in the design of structures. Voluntary risk assumption occurs when people choose to undertake an activity with a known level of hazard and consequences, such as driving or flying to a destination. Involuntary risks occur when people are exposed to a hazard without understanding the potential consequences. The willingness of people to incur risk depends on whether the risk is incurred voluntarily or involuntarily (Slovic, 2000). Because people require shelter, building occupancy is an involuntary risk. The general public assumes that all structures, permanent and temporary, have been designed and constructed to provide the same level of structural safety and reliability. If a structure is designed to a lower level of safety or reliability, the general public has no means to identify or assess the difference in risk. This includes temporary structures that may not be accessible to the general public but could cause injuries or loss of life in the event of failure (e.g., special event structures such as towers, platforms, and stages). Analogies can be made to various modes of transportation, and their inherent risks; the general public is aware of differences in assumed risk and can choose a mode of transportation accordingly. In contrast, ASCE 37 was developed for temporary structures used in construction. The risk associated with these structures is generally limited to construction workers, who voluntarily accept a higher-risk environment and have training and skills for operating in a construction environment. Therefore, temporary structures that are used by or in close proximity to the general public need to have a level of reliability consistent with the other structures designed for involuntary risk.

Reliability:

Structural reliability requires the combined analysis of the probability of occurrence of the hazard and the probability that the loads caused by the hazard equal or exceed the structural resistance. Temporary structures that are used, occupied, or placed in close proximity to the general public should meet reliability targets that are consistent with those for permanent structures in ASCE, allowing for differences in service lives and other conditions of use.

ASCE 7 Table 1.3-1 presents the target reliabilities by Risk Category (RC) and failure mode (e.g., ductile vs brittle failures) for hazards other than earthquake, tsunami, or extraordinary events. The target reliabilities are presented in two formats: the mean annual failure rate and the probability of failure for a 50-yr service life, expressed in terms of reliability index, β . For example, a RC II structure with ductile, local failure modes has a target mean annual failure rate $P_F = 3.0 \times 10^{-5}$ and a 50-yr target reliability index of $\beta = 3.0$ (or $P_F = 1.43 \times 10^{-3}$ over 50 years).

WIND:

ASCE 7-16 wind hazard maps were updated to confirm the risk-based mean recurrence interval (MRI) for RC I to III and to establish a risk-based MRI for RC IV (McAllister, Wang, and Ellingwood 2018). The updated wind maps are based on a fully coupled reliability analysis that considered the hazard and structural resistance. The results for the recommended MRI for the target reliabilities are shown in Figure 3105.5.2.

Two exceptions are allowed for wind:

- An exception is allowed where controlled occupancy actions in Section 3103.7 are adopted, given that on-site management and weather forecasting capabilities allow sufficient time to reduce the risk to occupants by canceling events or reducing the wind loads through removal of wind surface area or dismantling sections of the temporary structure.
- An exception is allowed when public-occupancy temporary structures are erected in a hurricane-prone region outside of hurricane

season. The wind load reduction is based on hurricane and non-hurricane wind speeds. ASCE 7 publishes wind speed maps that include both hurricane and non-hurricane winds for permanent structures. Pintar et al (2015) published maps of non-hurricane non-tornadoic wind speeds for the contiguous United States.

A study by Dasgupta and Ghosh (2019) evaluated a wind speed factor of 0.78 used by the Unified Facilities Criteria for temporary structures for 5-yr and 25-yr service lives. This study selected the 50-yr target reliabilities and associated 50-yr wind speed exceedance probabilities to evaluate the wind speed load factor for occupied temporary structures based on ASCE 7-16 wind speed maps. The ASCE 7-16 wind maps for RC I, II, III and IV structures were developed for 15%, 7%, 3% and 1.6% probabilities of wind speed exceedance. To evaluate the 0.78 wind speed factor, wind speeds at 342 locations across the country were identified for specified mean recurrence intervals (MRI). The specified MRI were determined by computing the MRI that would provide the same probability of wind speed exceedance in 5 years and 25 years as that specified for a 50-yr service life in ASCE 7, as shown in Table C3105.1.1. However, the mean recurrence rates of wind speeds, and therefore the structural reliability, are quite different from the ASCE 7 target reliabilities, as shown in Example 1. Assuming that the structural resistance is similar, a comparison of the RC II mean annual frequency for wind speeds for a 50-yr service life (1.43×10^{-3}) to that of a 5-yr service life (1.43×10^{-2}) and a 10-yr service life (7.14×10^{-2}) show service life reliability ratios of 10 and 5, respectively, which do not meet the ASCE 7 target reliability criteria.

Until further analyses can be conducted, a 10-yr service life and a wind speed factor of 0.9 is deemed to provide a reasonable level of reliability, given the ability to evacuate or modify temporary structures for strong wind events.

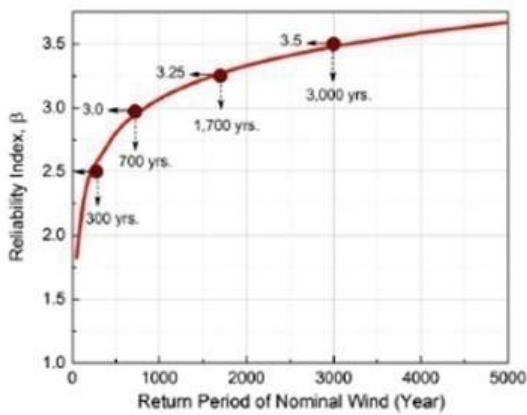


Fig. 3. Recommended mean return periods for wind maps in ASCE 7-16 ($K_{dn} = 0.85$; $\mu_{Kd} = 0.71$)

Figure C3105.5.1. ASCE 7 wind MRI versus reliability index (McAllister, Wang, and Ellingwood 2018).

Table C3105.5.1. Proposed wind speed factor for 5-yr and 25-yr service life for temporary structures by Dasgupta and Ghosh (2019) based on 50-yr service reliability criteria.

ASCE 7 MRI Wind speed factor 5 yr MRI 25 yr MRI I 3000.7830150 II 7000.7870350 III 1,7000.78170850 IV 3,0000.783001,500

Example 1: Probability of exceedance over T yr service life for W

This example provides a comparison of probability of wind speed exceedance for service lives (T) from 5 to 25 years and Risk Category. The probability of wind exceedance is set to remain constant for each risk category; however, the mean annual frequency (P_a) can vary significantly between different values of T.

$$P(W > w \text{ for } T) = 1 - (1 - P_a)^T = X\%$$

- W - random wind speed (3-sec gust)
- w - wind speed (3-sec gust) for Mean Recurrence Interval (MRI)
- T is the service life (yr)
- $P_a = 1/T$ is the mean annual frequency for this wind speed (1/yr)
- X is the probability of the wind speed exceedance for T

For a 50 yr service life (ASCE 7):

$$\text{RC I } P(W > 300 \text{ MRI in 50 yrs}) = 1 - (1 - 0.0033^5)^0 = 0.15 = 15\% \quad P_a = 3.3 \times 10^{-3}$$

$$\text{RC II } P(W > 700 \text{ MRI in 50 yrs}) = 1 - (1 - 0.00143^5)^0 = 0.069 = 7\% \quad P_a = 1.4 \times 10^{-3}$$

$$\text{RC III } P(W > 1700 \text{ MRI in 50 yrs}) = 1 - (1 - 0.00059^5)^0 = 0.029 = 3\% \quad P_a = 5.9 \times 10^{-4}$$

$$\text{RC IV } P(W > 3000 \text{ MRI in 50 yrs}) = 1 - (1 - 0.00033^5)^0 = 0.017 = 1.7\% \quad P_a = 3.3 \times 10^{-4}$$

For a 25 yr service life:

$$\text{RC I } P(W > 150 \text{ MRI in 25 yrs}) = 1 - (1 - 0.0067^2)^5 = 0.15 = 15\% \quad P_a = 6.7 \times 10^{-3}$$

$$\text{RC II } P(W > 350 \text{ MRI in 25 yrs}) = 1 - (1 - 0.0029^2)^5 = 0.069 = 7\% \quad P_a = 2.9 \times 10^{-3}$$

$$\text{RC III } P(W > 850 \text{ MRI in 25 yrs}) = 1 - (1 - 0.0012^2)^5 = 0.029 = 3\% \quad P_a = 1.2 \times 10^{-3}$$

$$\text{RC IV } P(W > 1500 \text{ MRI in 25 yrs}) = 1 - (1 - 0.0007)^{25} = 0.017 = 1.7\% \quad P_a = 6.7 \times 10^{-4}$$

For a 10 yr service life:

$$\text{RC I } P(W > 60 \text{ MRI in 10 yrs}) = 1 - (1 - 0.017^1)^0 = 0.16 = 16\% \quad P_a = 1.7 \times 10^{-2}$$

$$\text{RC II } P(W > 140 \text{ MRI in 10 yrs}) = 1 - (1 - 0.0714^1)^0 = 0.069 = 7\% \quad P_a = 7.1 \times 10^{-3}$$

$$\text{RC III } P(W > 340 \text{ MRI in 10 yrs}) = 1 - (1 - 0.00294^1)^0 = 0.029 = 3\% \quad P_a = 2.9 \times 10^{-3}$$

$$\text{RC IV } P(W > 600 \text{ MRI in 10 yrs}) = 1 - (1 - 0.00167^1)^0 = 0.017 = 1.7\% \quad P_a = 1.7 \times 10^{-3}$$

For a 5 yr service life:

$$\text{RC I } P(W > 30 \text{ MRI in 5 yrs}) = 1 - (1 - 0.0333^5) = 0.16 = 16\% \quad P_a = 3.3 \times 10^{-2}$$

$$\text{RC II } P(W > 70 \text{ MRI in 5 yrs}) = 1 - (1 - 0.0143^5) = 0.069 = 7\% \quad P_a = 1.4 \times 10^{-2}$$

$$\text{RC III } P(W > 170 \text{ MRI in 5 yrs}) = 1 - (1 - 0.0059^5) = 0.029 = 3\% \quad P_a = 5.9 \times 10^{-3}$$

$$\text{RC IV } P(W > 300 \text{ MRI in 5 yrs}) = 1 - (1 - 0.0033^5) = 0.017 = 1.7\% \quad P_a = 3.3 \times 10^{-3}$$

References

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SEISMIC:

The requirement that the seismic loads on temporary structures assigned to Seismic Design Categories C through F are permitted to be taken as 75% of those required by Section 1613, while resulting in reduced seismic performance relative to permanent structures, is consistent with the reduction generally accepted for the evaluation/upgrade of existing buildings and would result in a similar seismic risk to the occupants. Due to the unique lack of warning associated with earthquakes, taking further reductions, even for temporary structures, results in unacceptable, involuntary risk to the occupants. Even for short time frames, the risk to the occupants should be similar, whether it's a temporary or permanent structure. Given the low seismic risk associated with Seismic Design Categories A and B locations, which results in low seismic demands, temporary structures are exempted from designing for seismic loads.

TSUNAMI:

Given that most tsunami-affected areas will have time to respond to a possible inundation, designing temporary structures for tsunami loads was deemed unnecessarily. Rather, temporary structures located in a Tsunami Design Zone will require an Emergency Action Plan that will provide details for evacuating the structure in the event of a tsunami warning.

SNOW:

When snowfall is expected during the service life of a temporary structure, snow loads are determined for surfaces on which snow can accumulate in accordance with Section 1608 and Chapter 7 of ASCE 7. In recognition of the relatively short service life of temporary structures, the ground snow load can be reduced to reflect the relatively low probability that the ASCE 7 ground snow loads will occur during the shorter service life of a temporary structure. The reduction factors of 0.7 and 0.8 in Table 3103.5.1 approximately correspond to 10-year and 20-year MRI for ground snow loads, respectively. If the service life of the temporary structure will not occur during winter months when snow is to be expected, snow loads need not be considered. Similar to wind, an exception is allowed where controlled occupancy actions in Section 3103.7 are adopted, given that on-site management and weather forecasting capabilities allow sufficient time to reduce the risk to occupants by canceling events or reducing the snow loads.

FLOOD:

Temporary structures within riverine and coastal flood zones should be evacuated at the time of loading, therefore the intent of this section is to have a defined plan to secure the structure and minimize the potential for the temporary structure to become floating debris for the surrounding environment. While local flash flooding can occur without advanced warning, the potential hazard area is much more widespread and not easily quantified for an enforceable Code provision as part of this cycle. For this reason, there are no requirements for temporary structures outside of a mapped flood zone.

ICE:

When ice can accumulate on a temporary structure during the service life of a temporary structure, ice loads are determined for surfaces on which ice can accumulate in accordance with Section 1614 and Chapter 10 of ASCE 7.

The 0.5-inch nominal ice thickness is based on consideration of the 10-yr and 25-yr mean recurrence interval values. Based on this, the use of a single nominal ice thickness for all locations with a Risk Category II nominal thickness greater than 0.5 inch is recommended. The gust wind speeds in Figure 10.5-1 are concurrent values, rather than extremes, so they should be used in determining wind-ice-loads for temporary ice-sensitive structures.

LOAD FACTORS/RELIABILITY:

The proposed code change is necessary to harmonize the IBC with the IFC since the latter addresses Temporary Special Event Structures

and tents that are in service for up to 180 days. The recent pandemic has shown that temporary structures can be in service for more than 180 days and includes structures not regulated within the scope of the IFC.

Given the need to propose load and design criteria for publicly occupied temporary structures based on existing information and standards, the approach presented uses the load and Risk Category criteria in ASCE 7-22. Further analyses may be able to refine these criteria for the next edition of ASCE 7.

EMERGENCY ACTION PLANS:

The code change addresses all the natural hazards and associated environmental loads addressed in IBC chapter 16 and ASCE 7. However, some hazards are more frequent with a likelihood of occurrence during the in-service period or occupancy while others have a remote possibility of occurrence. Emergency Action plans are currently accepted by authorities having jurisdiction for wind loads to reduce the risk to public safety, given the reduced level of reliability relative to new buildings. Flood hazards may be seasonal for example during hurricane seasons or flash flooding is forecast in advance to allow for removal or tying down of installations. They provide the Building Official with the ability to permit a more cost effective alternative than full compliance.

DURABILITY AND MAINTENCE:

Temporary structures are designed to be assembled and disassembled and transported to many locations as components or as modules. Additionally, they may be in service during varying weather conditions. The components may be damaged during transportation or installation. Components may have been manufactured more than a decade prior to the latest use. As a consequence, and unlike a new structure that is typically constructed with new building materials and components that were not previously used, components for temporary structures need to be inspected regularly and suitability for re-use needs to be assessed. This is typically done by the installation crews, and this is similar to bleachers regulated by ICC 300 (Section 501.2). The qualified person is identified by the owner and approved by the Building Official.

Temporary structures are typically assembled utilizing transportable and reusable components that can get damaged in use or during transportation and in use and need to be verified prior to reuse. The most qualified personnel to address whether superficial corrosion is acceptable or whether bent members can be used will be the specifying engineer or the rigging supervisors or owner's management team who tend to be most familiar with the components and the temporary structure's system.

Cost Impact: The code change proposal will decrease the cost of construction

The proposed code change will reduce the cost of construction since it proposes reduction to the adopted loads in IBC Ch 16 and ASCE 7. The codes and standards that are in effect under the 2021 edition of the I Codes, with the exception of the International Fire Code regulations for Temporary Special Event Structures, do not provide structural loading criteria adjusted to lower loads for temporary structures that typically have a service life of a few days or weeks not to exceed 1 year.

Public Hearing Results

Committee Action

As Modified

Committee Modification:

3103.5.1.3 Snow. Snow loads on *public-occupancy temporary structures* shall be determined in accordance with Section 1608 and Chapter 7 of ASCE 7. The ground snow loads, p_g , in Section 1608 shall be modified according to Table 3103.5.1.

If the *public-occupancy temporary structure* is not subject to snow loads or not constructed and occupied during winter months when snow is to be expected, snow loads need not be considered, provided that the design is reviewed and modified, as appropriate, to account for snow loads if the period of time when the *public-occupancy temporary structure* is in service shifts to include winter months.

Exception: Risk Category II *public-occupancy temporary structures* that employ controlled occupancy measures per Section 3103.7.2 shall be permitted to use a ground snow load reduction factor of 0.65 instead of the ground snow load reduction factors in Table 3105.1.

3103.5.1.4 Wind. Wind loads on *public-occupancy temporary structures* shall be determined in accordance with Section 1609 and Chapters 26 to 30 of ASCE 7. The design wind load shall be modified according to Table 3103.5.2.

Exceptions

1. *Public-occupancy temporary structures* that employ controlled occupancy measures per Section 3103.7.1 shall be permitted to use a load reduction factor of 0.65 instead of the load reduction factors in Table 3103.5.2.
2. *Public-occupancy temporary structures* erected in a hurricane-prone region outside of hurricane season, the design wind speed shall be set at the following 3-second gust basic *wind speeds* depending on *Risk Category*:
 - 2.1. For *Risk Category II* use 115 mph,
 - 2.2. For *Risk Category III* use 120 mph, and
 - 2.3. For *Risk Category IV* use 125 mph.

3103.5.1.5 Flood. An Emergency Action Plan, in accordance with 3103.5.4, shall be ~~required submitted~~ for *public-occupancy temporary structures* in a Flood Hazard Area ~~when requested by the Building or Fire Official. Where an Emergency Action Plan is approved by the building and fire official, public~~ *Public-occupancy temporary structures* need not be designed for flood loads specified in Section 1612. 4645 ~~except when specifically designed as a dry floodproofed structure or designated to be occupied during a storm event per the approved Emergency Action Plan.~~

3103.5.1.6 Seismic. Seismic ~~design of loads on~~ *public-occupancy temporary structures* assigned to Seismic Design Categories C through F shall be determined in accordance with Section 1613. The resulting seismic loads are permitted to be taken as 75% of those determined by Section 1613. *Public-occupancy temporary structures* assigned to Seismic Design Categories A and B need not be designed for seismic loads.

3103.5.1.7 Ice. Ice loads on *public-occupancy temporary structures* shall be determined in accordance with Section 1614, ~~Chapter 10 of ASCE 7,~~ with the largest maximum nominal thickness being 0.5 in, for all Risk Categories. ~~When ice is expected during the occupancy of public-occupancy temporary structures, ice loads shall be determined for surfaces on which ice could accumulate in accordance with ASCE 7.~~ If the *public-occupancy temporary structure* is not subject to ice loads or not constructed and occupied during winter months when ice is to be expected, ice loads need not be considered, provided that the design is reviewed and modified, as appropriate, to account for ice loads if the period of time when the temporary structure is in service shifts to include winter months.

3103.5.4 Emergency Action plans. ~~When required by the Building Official,~~ Emergency Action Plans shall be submitted and approved. Emergency Action Plans shall include procedures to be implemented due to flood, wind, or snow hazards, or within the tsunami design zone. The action plans shall include provisions for evacuating ~~and anchoring or removal of , securing, or dismantling~~ *public-occupancy temporary structures, in whole or in part, and removal* to prevent damage to surrounding buildings or structures.

Committee Reason: Approved as modified as the proposal appropriately brings guidance for temporary structures into the IBC. The modification provides clarification, removes redundant language adds a needed language to address the Emergency Action Plan. (Vote: 13-1)

Public Comments

Public Comment 1

Proponents: Jonathan Siu, Jon Siu Consulting, LLC, Self (jonsiuconsulting@gmail.com); Jennifer Goupil, Structural Engineering Institute of ASCE, Structural Engineering Institute of ASCE (jgoupil@asce.org) requests As Modified by Public Comment

Further modify as follows:

2021 International Building Code

3103.5 Structural requirements. *Temporary structures* shall comply with Chapter 16 of this code. *Public-occupancy temporary structures* shall be designed and erected to comply with requirements of this Section.

Temporary non-building structures ancillary to public assemblies or special events structures whose structural failure or collapse would endanger assembled public shall be assigned a risk category corresponding to the risk category of the public assembly. For the purposes of establishing an occupant load for the assembled public endangered by structural failure or collapse, the applicable occupant load determination in Section 1004.5 or 1004.6 shall be applied over the assembly area within a radius equal to 1.5 times the height of the temporary non-building structure.

3103.5.1 Structural loads. *Public-occupancy temporary structures* shall be designed in accordance with Sections 3103.5.1.1 through 3103.5.1.9, classified, based on the risk to human life, health, and welfare associated with damage or failure by nature of their occupancy or use, according to Table 1604.5 for the purposes of applying flood, wind, snow, earthquake, and ice provisions. Additionally, public assembly facilities that require more than 15 min to evacuate to a safe location, and any structure whose failure or collapse would endanger the public assembled near the structure, such as speaker stands or other temporary structures for public gatherings shall be classified as Risk Category III.

Commenter's Reason: This public comment is being submitted to clarify the original proposal. It address non-building structures such as lighting or audio equipment stands or camera stands that are associated with public-occupancy temporary structures and special event structures, and can pose a danger to the public if they fail. The intent of this public comment is to say that they should be designed with the appropriate risk category in mind.

The current code is not clear as to how these structures should be classified. IBC Table 1604.5 only says "certain" temporary structures get assigned to Risk Category I. There is no definition of which temporary structures qualify as "certain." The importance factors associated with Risk Category I reduce the required loads these structures are designed to withstand. While Risk Category I may be appropriate for temporary structures that will not affect the public, it is inappropriate where their failure would likely injure or kill people. These types of structures are classified as non-building structures in ASCE 7, and do not fall directly under the definitions of public-occupancy temporary structures or special event structures, since they generally aren't occupied. However, they can still pose a significant danger to people who are assembled nearby, if they should fail.

The original proposal contained a requirement that these all of these ancillary structures should be assigned to Risk Category III. However, this could be viewed as being more restrictive than is required for new construction of, for example, a small theater. In addition, the original proposal did not give guidance as to how to apply the code provisions, since many times the structures are associated with outdoor assembly events whereas the current code generally envisions addressing assemblies within a building.

This public comment requires these non-building structures to be assigned a risk category that is consistent with the risk category associated with the nearby public assembly. If the nearby assembled public would be classified under Risk Category III, any stands that can fall on them should also be Risk Category III. Stands associated with smaller assemblies may get classified as Risk Category II.

In this case, "nearby" is quantified as being an area within 1.5 times the height of the non-building structure. This is consistent with recommendations from the California Building Officials association (CALBO) for the "fall zone" around buildings damaged in earthquakes when conducting ATC-20 building safety evaluations. Those recommendations suggest that building safety evaluators cordon off or barricade for a distance of 1.5 times the height of a damaged building in danger of collapsing to protect the public from building materials that can also shatter and bounce. (Ref. FEMA P-2055, *Post-disaster Building Safety Evaluation Guidance*, November 2019.) The intent of this public comment is to view the assembled public exposed to this falling hazard as being within an area where a radius equal to 1.5 times the height of the non-building structure overlaps the public assembly area. The occupant load used to determine the risk category is determined by counting fixed seats within that overlapping area (Section 1004.6) or applying the appropriate occupant load factors in Table 1004.5 to that area (Section 1004.5).

This public comment is being proposed as an addition to the three WABO TCD/SEI public comments. If all four public comments are approved, the change in Section 3103.5 in this public comment would appear as a second paragraph below the new exception, and the change in Section 3103.5.1 would not override the change in the other public comment. The final result if all four are approved would appear as follows:

3103.5 Structural requirements. Temporary structures shall comply with the structural requirements of this code. Public-occupancy temporary structures shall be designed and erected to comply with the structural requirements of this code and Sections 3103.5.1 through 3103.5.7.

Exception: Where approved, live loads less than those prescribed by Table 1607.1 shall be permitted provided a registered design professional demonstrates that a rational approach has been used and that such reductions are warranted.

Temporary non-building structures ancillary to public assemblies or special events structures whose structural failure or collapse would endanger assembled public shall be assigned a risk category corresponding to the risk category of the public assembly. For the purposes of establishing an occupant load for the assembled public endangered by structural failure or collapse, the applicable occupant load determination in Section 1004.5 or 1004.6 shall be applied over the assembly area within a radius equal to 1.5 times the height of the temporary non-building structure.

3103.5.1 Structural loads. *Public-occupancy temporary structures* shall be designed in accordance with Chapter 16, except as modified by Sections 3103.5.1.1 through 3103.5.1.6.

Cost Impact: The net effect of the Public Comment and code change proposal will decrease the cost of construction. The original cost impact statement says this proposal will decrease the cost of construction. However, a timed egress analysis for each of these public-occupancy temporary structures will add cost. The change to eliminate that in this public comment will reduce the cost of the original proposal. The change regarding ancillary structures allows some of them to remain under Risk Category II, as opposed to being pushed to Risk Category III, and will therefore reduce costs compared to the original proposal.

Public Comment 2

Proponents: Jonathan Siu, Jon Siu Consulting, LLC, Washington Association of Building Officials Technical Code Development Committee (jonsiuconsulting@gmail.com); Jennifer Goupil, Structural Engineering Institute of ASCE, Structural Engineering Institute of ASCE (jgoupil@asce.org); Micah Chappell, Seattle Department of Construction and Inspections, Washington Association of Building Officials Technical Code Development Committee (micah.chappell@seattle.gov) requests As Modified by Public Comment

Further modify as follows:

2021 International Building Code

3103.1.1 Extended period of service time. *Public-occupancy temporary structures* shall be permitted to remain in service for 180 days or more without complying with requirements in this code for new buildings or structures when extensions for up to 1 year are granted by the *Building Official* in accordance with Section 108.1 and when the following conditions are satisfied:

1. Additional inspections as determined by the *Building Official* shall be performed by a qualified person to verify that site conditions and the approved installation comply with the conditions of approval at the time of final inspection.
2. ~~The *Building Official*~~ A qualified person shall perform follow up inspections after initial occupancy at intervals not exceeding 180 days to verify the site conditions and the installation conform to the approved site conditions and installation requirements. Inspection records shall be kept and shall be made available for verification by the Building Official.
3. An examination shall be performed by a registered design professional to determine the adequacy of the *temporary structure* to resist the structural loads required in Section 3103.5.
4. Relocation of the ~~*public-occupancy temporary structure*~~ structure shall require a new ~~approval by the *Building Official*~~ permit application.
5. The use or occupancy approved at the time of final inspection shall remain unchanged.
6. A request for an extension is submitted to the building official. The request shall include records of the inspections and examination in Items 1 and 3 above.

Commenter's Reason: This public comment is intended to improve the enforceability of this proposal. As written, the proposal requires the building official to track and conduct ongoing inspections of these structures after the Certificate of Occupancy is issued. Unless there is work being done that requires a permit, what happens after the CofO is issued is not normally regulated by the building official. For many jurisdictions, this would require setting up a system similar to Temporary CofOs to keep track of these and trigger the required inspections.

For those jurisdiction who have an electronic permit tracking system, this is less onerous than for those who are still working in a paper system, but even with electronic permitting, setting up the system may not be a negligible effort.

The biggest changes proposed by this public comment are in Items 1 and 2. Instead of requiring the building official to track these, this public comment puts the onus on the owner and their "qualified person" to provide the additional inspections in Item 1, and the ongoing inspections in Item 2. For the ongoing inspections, the qualified person is required to keep the records, should the building official or their delegatee wants to review them. These changes make the process very similar to the process for special inspections in Chapter 17, where the building official relies on a special inspector or agency for many of the details of construction.

The change to Item 4 clarifies this applies to public-occupancy temporary structures (not all temporary structures), and that the owner will need to apply for a new permit and go through the full permit process for relocated public-occupancy temporary structures, as opposed to getting an undefined "new approval" from the building official.

Regarding the new Item 6, the apparent intent of the original proposal is that the extension is granted without requiring the owner to go through the normal permit application process. This public comment clarifies the request has to be submitted to the building official, and that reports resulting from the inspections by the qualified person and the registered design professional's "examination" must be submitted along with the request. The jurisdiction's process will determine what form the request takes (written or electronic). This public comment is one of a series of three being submitted by WABO TCD and ASCE to improve this proposal. This public comment is not intended to override the editorial change being made to Section 3103.1.1 by one of the other comments (changing "when" to "where" in two places). For reference, we have developed a clean version of the proposal that incorporates all three public comments (see link below), showing how the final code language for the entire change should appear, should all three public comments be approved.

<https://www.cdpassess.com/public-comment/3147/27095/files/download/3599/S116-22%20Temp%20Structures%20-%20Combined%20SIU%205-6-12%20PCs%20%28clean%29.pdf>

Cost Impact: The net effect of the Public Comment and code change proposal will decrease the cost of construction

The original proposal states the cost of construction will decrease. This public comment does not change the proposal's effect on the initial cost of construction, since it applies to ongoing maintenance and inspections after the initial Certificate of Occupancy is issued. However, the public comment will increase the costs to the owner relative the original proposal, since the owner will be required to hire/retain the "qualified person" to conduct the ongoing inspections. Because the original proposal is unclear on the qualifications of the "qualified person," and because of the variability in the size and complexity of the temporary structures being regulated, it is not possible to put an accurate dollar value on the additional cost. But supposing the "qualified person" is an engineer who charges \$300/hour for their services, and it takes 3 hours to conduct the required inspections, the cost for each inspection would be less than \$1000. On the other hand, this public comment will decrease the costs for the building official's jurisdiction relative to the original proposal, since the jurisdiction won't be required to incorporate ongoing inspections and tracking into their processes and workload. The building official will only incur costs if they choose to follow up on these structures.

Public Comment 3

Proponents: Jonathan Siu, Jon Siu Consulting, LLC, Washington Association of Building Officials Technical Code Development Committee (jonsiuconsulting@gmail.com); Jennifer Goupil, Structural Engineering Institute of ASCE, Structural Engineering Institute of ASCE (jgoupil@asce.org); Micah Chappell, Seattle Department of Construction and Inspections, Washington Association of Building Officials Technical Code Development Committee (micah.chappell@seattle.gov) requests As Modified by Public Comment

Further modify as follows:

2021 International Building Code

3103.5.1.3 Snow. Snow loads on *public-occupancy temporary structures* shall be determined in accordance with Section 1608. The ground snow loads, p_g , in Section 1608 shall be modified according to Table 3103.5.1.3.

~~If the *public-occupancy temporary structure* is not subject to snow loads or not constructed and occupied during winter months when snow is to be expected, snow loads need not be considered, provided that the design is reviewed and modified, as appropriate, to account for snow loads if the period of time when the *public-occupancy temporary structure* is in service shifts to include winter months.~~

Exception: Risk Category II *public-occupancy temporary structures* that employ controlled occupancy measures procedures per Section ~~3103.7.2~~ **3103.7** shall be permitted to use a ground snow load reduction factor of 0.65 instead of the ground snow load reduction factors in Table 3105.1.3.

Where the public-occupancy temporary structure is not subject to snow loads or not constructed and occupied during times when snow is to be expected, snow loads need not be considered, provided that where the period of time when the public-occupancy temporary structure is in service shifts to include times when snow is to be expected, either of the following conditions is met:

1. The design is reviewed and modified, as appropriate, to account for snow loads; or
2. Controlled occupancy procedures in accordance with Section 3103.7 are implemented.

3103.5.1.4 Wind. Wind loads on *public-occupancy temporary structures* shall be determined in accordance with Section 1609. The design wind load shall be modified according to Table 3103.5.1.4.

Exceptions

1. *Public-occupancy temporary structures* that ~~employ~~ implement controlled occupancy ~~measures~~ procedures per Section ~~3103.7.1~~ 3103.7 shall be permitted to use a load reduction factor of 0.65 instead of the load reduction factors in Table 3103.5.1.4.
2. *Public-occupancy temporary structures* erected in a hurricane-prone region outside of hurricane season, the design wind speed shall be set at the following 3-second gust basic *wind speeds* depending on *Risk Category*:
 - 2.1. For *Risk Category II* use 115 mph,
 - 2.2. For *Risk Category III* use 120 mph, and
 - 2.3. For *Risk Category IV* use 125 mph.

3103.5.1.5 Flood. ~~An Emergency Action Plan, in accordance with Section 3103.5.4, shall be required for public-occupancy temporary structures in a Flood Hazard Area. Where an Emergency Action Plan is approved by the building and fire official, public~~ *Public-occupancy temporary structures* need not be designed for flood loads specified in Section 1612. Controlled occupancy procedures in accordance with Section 3103.7 shall be implemented.

3103.5.1.7 Ice. Ice loads on *public-occupancy temporary structures* shall be determined in accordance with Section 1614 with the largest maximum nominal thickness being 0.5 in, for all *Risk Categories*. ~~#~~ Where the public-occupancy temporary structure is not subject to ice loads or not constructed and occupied during winter months ~~times~~ when ice is to be expected, ice loads need not be considered, provided that where the period of time when the temporary structure is in service shifts to include times when ice is to be expected, either of the following conditions is met:

1. The design is reviewed and modified, as appropriate, to account for ice loads ~~if the period of time when the temporary structure is in service shifts to include winter months; or~~
2. Controlled occupancy procedures in accordance with Section 3103.7 are implemented.

3103.5.1.8 Tsunami. ~~An Emergency Action Plan, in accordance with Section 3103.5.4, shall be submitted for public-occupancy temporary structures in a Tsunami Design Zone when requested by the Building or Fire Official. The public~~ *Public-occupancy temporary structure structures* in a tsunami design zone need not be designed for tsunami loads specified in Section 1615. Controlled occupancy procedures in accordance with Section 3103.7, shall be implemented.

3103.5.4 Emergency Action plans. ~~Emergency Action Plans shall be submitted and approved. Emergency Action Plans shall include procedures to be implemented due to flood, wind, or snow hazards, or within the tsunami design zone. The action plans shall include provisions for evacuating and anchoring or removal of public-occupancy temporary structures, to prevent damage to surrounding buildings or structures.~~

~~3103.5.5~~ **3103.5.4 Durability and maintenance.** [Text unchanged]

3103.7 Controlled occupancy procedures. ~~Public-occupancy temporary structures that comply with Section 3103.5 for structural requirements do not require monitoring for controlled occupancy. Where controlled occupancy procedures are required to be implemented for public-occupancy temporary structures that employ exceptions for reduced environmental loads shall employ controlled occupancy procedures as specified in Section 3103.5.1, the procedures shall comply with this section and in accordance with ANSI ES1.7. An operations management plan conforming to in accordance with ANSI E1.21 with an occupant evacuation plan shall be submitted to the~~

Building Official for approval as a part of the permit documents. In addition, the operations management plan shall include an emergency action plan that documents the following information, where applicable:

1. Surfaces on which snow or ice accumulates shall be monitored before and during occupancy of the public-occupancy temporary structure. Any loads in excess of the design snow or ice load shall be removed prior to its occupancy, or the public-occupancy temporary structure shall be vacated in the event that either the design snow or ice load is exceeded during its occupancy.
2. Wind speeds associated with the design wind loads shall be monitored before and during occupancy of the public-occupancy temporary structure. The public-occupancy temporary structure shall be vacated in the event that the design wind speed is expected to be exceeded during its occupancy.
3. Criteria for initiating occupant evacuation procedures for flood and tsunami events.
4. Occupant evacuation procedures shall be specified for each environmental hazard where the occupant management plan specifies the public-occupancy temporary structure is to be evacuated.
5. Procedures for anchoring or removal of the public-occupancy temporary structure, or other additional measures or procedures to be implemented to mitigate hazards in snow, wind, flood, ice, or tsunami events.

~~**3103.7.1 Wind.** Wind speeds associated with the design wind loads shall be monitored before and during occupancy of the public-occupancy temporary structure. The public-occupancy temporary structure shall be vacated in the event that the design wind speed is expected to be exceeded during its occupancy.~~

~~**3103.7.2 Snow.** Surfaces on which snow accumulates shall be monitored before and during occupancy of the public-occupancy temporary structure and any loads in excess of the design snow load shall be removed prior to its occupancy, or the public-occupancy temporary structure shall be vacated in the event that the design snow load is exceeded during its occupancy.~~

~~**3103.7.3 Ice.** Surfaces on which ice accumulates shall be monitored before and during occupancy of the public-occupancy temporary structure and any loads in excess of the design ice load shall be removed prior to its occupancy, or the public-occupancy temporary structure shall be vacated in the event that the design ice load is exceeded during its occupancy.~~

Commenter's Reason: This public comment is intended to coordinate, clarify, and simplify the requirements surrounding the proposed emergency action and operations management plans. As written, the proposal is confusing as to whether the emergency action plan is a separate document from the operations management plan, yet it seems that the (minimal) elements outlined in the section on emergency action plans are, or should be, included in the operations management plan. This public comment places requirements for an emergency action plan within the requirements for controlled occupancy procedures, revises the section on controlled occupancy, and makes other editorial changes to coordinate the applicable sections. Specifically:

- "Controlled occupancy measures" is replaced in the snow and wind sections (exceptions in 3103.5.1.3 and 3103.5.1.4) with "controlled occupancy procedures" to be consistent with Section 3103.7. This is intended to eliminate confusion as to whether "measures" are different from "procedures."
- Requirements for an "emergency action plan" for floods and tsunamis (3103.5.1.5 and 3103.5.1.8) is replaced with a requirement to employ controlled occupancy procedures. This is intended to make the language consistent among the sections, and coordinates with changes to 3103.7. The order of the sentences in both sections has been revised to lead off with the load (non-) requirement, since 3103.5.1 is generally about environmental loads.
- Provisions allowing controlled occupancy procedures for snow have been modified to allow for regional differences in expected snow events. The original proposal referred to "winter months," but there are areas that can expect snow events year-round.
- An allowance to implement controlled occupancy procedures is added to ice loads (3103.5.1.7) as an option to redesigning the structure if the occupancy extends into times when ice is to be expected. This makes the ice provisions parallel with snow, and coordinates this section with 3103.7.3 in the original proposal (3103.7, Item 2 in this public comment).
- Section 3103.5.4 (Emergency action plans) is deleted, since there is a requirement for an operations management plan in 3103.7, which includes an emergency action plan. In addition, the sentence regarding protection of surrounding structures not only should be part of the controlled occupancy procedures, but also fails to recognize that people should be protected from the hazards created by these structures.
- With the deletion of 3103.5.4, the section that follows (durability and maintenance) has been renumbered.

- Besides retitling the section to refer to controlled occupancy procedures, Section 3103.7 has been substantially rewritten and reformatted.
 - The first sentence stating controlled occupancy monitoring (procedures? measures?) are not required is unnecessary and in the cases of flood and tsunami, conflicts with the requirement for an emergency action plan (now part of the operations management plan). The sentence has been deleted without replacement.
 - The first modification to the next sentence simplifies and clarifies the trigger language for controlled occupancy procedures. As written, the requirement that appeared to say controlled occupancy procedures were required where any environmental load is reduced in 3103.5 conflicted with the actual provisions--only certain reductions require the procedures. This has been clarified by referring back to triggers in 3103.5.1.
 - ANSI E1.21 contains requirements for monitoring the weather and forecast for high winds, tornadoes, thunderstorms, lightning, and other "severe conditions," as well as a requirement for mitigating actions for ice and snow to be specified in the operations management plan. These appear to overlap with the originally-proposed emergency action plan. This public comment now requires an emergency action plan be included in the operations management plan, and that some additional information needs to be provided.
 - The originally-proposed wind, snow, and ice subsections of 3103.7 provide some additional guidance on mitigating activities that should be included in the operations management plan. Subsections 3103.7.1 through 3103.7.3 in the original proposal have been reformatted as numbered items in Section 3103.7, for clarity and to make the charging language simpler.
 - Subsections 3103.7.2 and 3103.7.3 have been combined in the new Item 1 since the language in each of the subsections was identical except for the hazard.
 - Subsection 3103.7.1 is now Item 2. The change in order of presentation is so the items will appear in the same order as they appear in Section 3103.5.1 (snow before wind).
 - The new Item 3 clarifies the operations management plan needs to specify what triggers evacuation for flood and tsunami events.
 - The new Item 4 requires the operations management plan to specify the procedures for evacuation, once those procedures are triggered.
 - The new Item 5 is a catch-all for any other necessary procedures, and incorporates requirements from the deleted section on emergency action plans.

This public comment is one of a series of three being submitted by WABO TCD and ASCE to improve this proposal. This public comment is intended to be melded together with the changes proposed by the other two public comments. Because this public comment is proposing very substantive changes to the original proposal, it is being submitted for separate consideration at the Public Comment Hearings. Thus, in some cases, if this public comment is approved, it will override the other public comments, and in others (particularly for editorial changes), the other public comments are intended to govern. For reference, we have developed a clean version of the proposal that incorporates all three public comments (see link below), showing how the final code language for the entire change should appear, should all three public comments be approved.

<https://www.cdpassess.com/public-comment/3147/27095/files/download/3599/S116-22%20Temp%20Structures%20-%20Combined%20SIU%205-6-12%20PCs%20%28clean%29.pdf>

Cost Impact: The net effect of the Public Comment and code change proposal will decrease the cost of construction. The original cost impact statement says this proposal will decrease the cost of construction. This public comment clarifies and reformats the proposal, and therefore, will have no effect on the original cost impact statement.

Public Comment 4

Proponents: Jonathan Siu, Jon Siu Consulting, LLC, Washington Association of Building Officials Technical Code Development Committee (jonsiuconsulting@gmail.com); Jennifer Goupil, Structural Engineering Institute of ASCE, Structural Engineering Institute of ASCE (jgoupil@asce.org); Micah Chappell, Seattle Department of Construction and Inspections, Washington Association of Building Officials Technical Code Development Committee (micah.chappell@seattle.gov) requests As Modified by Public Comment

Further modify as follows:

2021 International Building Code

CHAPTER 2 DEFINITIONS

SECTION 202 DEFINITIONS

PUBLIC-OCCUPANCY TEMPORARY STRUCTURE. Any building or structure erected for a period of one year or less that serves an assembly occupancy or other public use, support public or private assemblies, or that provide human shelter, protection, or safety. ~~Public occupancy temporary structures within the confines of another existing structure (such as convention booths) are exempted from Section 3103.5.~~

CHAPTER 31 SPECIAL CONSTRUCTION

SECTION 3103 TEMPORARY STRUCTURES

3103.1 General. The provisions of Sections 3103.1 through 3103.7 shall apply to structures erected for a period of less than 180 days. Temporary *special event structures*, tents, umbrella structures and other membrane structures erected for a period of less than 180 days shall also comply with the *International Fire Code*. *Temporary structures* erected for a longer period of time and *public-occupancy temporary structures* shall comply with applicable sections of this code.

ExceptionExceptions:

1. *Public-occupancy temporary structures* complying with Section 3103.1.1 shall be permitted to remain in service for 180 days or more but not more than 1 year ~~when~~ where approved by the *Building Official*.
2. *Public-occupancy temporary structures* erected within the confines of an existing structure are not required to comply with Section 3103.5.

3103.1.1 Extended period of service time. *Public-occupancy temporary structures* shall be permitted to remain in service for 180 days or more without complying with requirements in this code for new buildings or structures ~~when~~ where extensions for up to 1 year are granted by the *Building Official* in accordance with Section 108.1 and ~~when~~ where the following conditions are satisfied:

[No change to conditions]

3103.5 Structural requirements. *Temporary structures* shall comply with ~~Chapter 16~~ the structural requirements of this code. *Public-occupancy temporary structures* shall be designed and erected to comply with the structural requirements of this Section code and Sections 3103.5.1 through 3103.5.7.

Exception: Where approved, live loads less than those prescribed by Table 1607.1 shall be permitted, provided a registered design professional demonstrates that a rational approach has been used and that such reductions are warranted.

3103.5.1 Structural loads. *Public-occupancy temporary structures* shall be designed in accordance with Chapter 16, except as modified by Sections 3103.5.1.1 through 3103.5.1.6. ~~classified, based on the risk to human life, health, and welfare associated with damage or failure by nature of their occupancy or use, according to Table 1604.5 for the purposes of applying flood, wind, snow, earthquake, and ice provisions.~~ Additionally, public assembly facilities that require more than 15 min to evacuate to a safe location and any structure whose failure or collapse would endanger the public assembled near the structure, such as speaker stands or other temporary structures for public gatherings shall be classified as Risk Category III.

3103.5.1.1 Dead. Dead loads on *public-occupancy temporary structures* shall be determined in accordance with Section 1606.

3103.5.1.2 Live. Live loads on *public-occupancy temporary structures* shall be determined in accordance with Section 1607.

Exception: Where approved, live loads less than those prescribed by Table 1607.1 *Minimum Uniformly Distributed Live Loads, L_o*, and *Minimum Concentrated Live Loads* shall be permitted where shown by the registered design professional that a rational approach has been used and that such reductions are warranted.

~~3103.5.1.3~~ **3103.5.1.1 Snow loads.** Snow loads on *public-occupancy temporary structures* shall be determined in accordance with Section 1608. The ground snow loads, p_g , in Section 1608 shall be ~~permitted to be modified according to~~ permitted to be modified in accordance with the ground snow load reduction factors in Table 3103.5.1.3.

If the *public-occupancy temporary structure* is not subject to snow loads or not constructed and occupied during ~~winter months~~ times when snow is to be expected, snow loads need not be considered, provided that the design is reviewed and modified, as appropriate, to account for snow loads if the period of time when the *public-occupancy temporary structure* is in service shifts to include ~~winter months~~ times when snow is to be expected.

Exception: Ground snow loads, p_g , for Risk Category II *public-occupancy temporary structures* that employ controlled occupancy measures per Section 3103.7.2 shall be permitted to use be modified using a ground snow load reduction factor of 0.65 instead of the ground snow load reduction factors in Table 3105.1.3 3103.5.1.

~~3103.5.1.4~~ **3103.5.1.2 Wind loads.** ~~Wind loads on *public-occupancy temporary structures* shall be determined in accordance with Section 1609. The design wind load on *public-occupancy temporary structures* shall be permitted to be modified according to~~ in accordance with the wind load reduction factors in Table 3103.5.1.4 3103.5.2.

Exceptions

1. Design wind loads on *public-occupancy temporary structures* that employ controlled occupancy measures per Section 3103.7.1 shall be permitted to use be modified using a wind load reduction factor of 0.65 instead of the load reduction factors in Table 3103.5.1.4 3103.5.2.
2. For *public-occupancy temporary structures* erected in a hurricane-prone region outside of hurricane season, the design basic wind speed, V , shall be permitted to be set at the following 3-second gust basic wind speeds as follows, depending on Risk Category.
 - 2.1. For Risk Category II use 115 mph,
 - 2.2. For Risk Category III use 120 mph, and
 - 2.3. For Risk Category IV use 125 mph.

~~3103.5.1.5~~ **3103.5.1.3 Flood loads.** An Emergency Action Plan, in accordance with Section 3103.5.4, shall be required for *public-occupancy temporary structures* in a Flood Hazard Area. Where an Emergency Action Plan is approved by the building and fire official, *public occupancy temporary structures* need not be designed for flood loads specified in Section 1612.

~~3103.5.1.6~~ **3103.5.1.4 Seismic loads.** ~~Seismic design of *public-occupancy temporary structures* assigned to Seismic Design Categories C through F shall be determined in accordance with Section 1613. The resulting seismic~~ Seismic loads on *public-occupancy temporary structures* assigned to Seismic Design Categories C through F shall be ~~are~~ permitted to be taken as 75% of those determined by Section 1613. *Public-occupancy temporary structures* assigned to Seismic Design Categories A and B need not be designed for seismic loads.

~~3103.5.1.7~~ **3103.5.1.5 Ice loads.** Ice loads on *public-occupancy temporary structures* shall be ~~permitted to be determined in accordance with Section 1614 with the largest maximum nominal thickness being 0.5 in~~ permitted to be determined in accordance with Section 1614 with the largest maximum nominal thickness being 0.5 in (13 mm), for all Risk Categories. If ~~Where~~ the *public-occupancy temporary structure* is not subject to ice loads or not constructed and occupied during ~~winter months~~ times when ice is to be expected, ice loads need not be considered, provided that the design is reviewed and modified, as appropriate, to account for ice loads if the period of time when the temporary structure is in service shifts to include ~~winter months~~ times when ice is to be expected.

~~3103.5.1.8~~ **3103.5.1.6 Tsunami loads.** An Emergency Action Plan, in accordance with Section 3103.5.4, shall be submitted for *public-occupancy temporary structures* in a Tsunami Design Zone ~~when requested by the Building or Fire Official~~. The *public-occupancy temporary structure* need not be designed for tsunami loads specified in Section 1615.

3103.5.2 Foundations. *Public-occupancy temporary structures* may shall be permitted to be supported on the ground with temporary foundations ~~when~~ where approved by the Building Official. Consideration shall be given for the impacts of differential settlement ~~when~~ where foundations do not extend below the ground or foundations supported on compressible materials. The presumptive load-bearing value for *public-occupancy temporary structures* supported on a pavement, slab on grade or on other *Collapsible or Controlled Low Strength* substrates soils such as beach sand or grass shall be assumed not to exceed 1,000 psf unless determined through testing and evaluation by a registered design professional. The presumptive load-bearing values listed in Table 1806.2 shall be permitted to be used for

other supporting soil conditions.

3103.5.3 Installation and maintenance inspections. A qualified person shall inspect *public-occupancy temporary structures* that are assembled using transportable and reusable materials; components shall be inspected when purchased or acquired and at least once per year. The inspection shall evaluate individual components, and the fully assembled structure, to determine suitability for use based on the requirements in ESTA ANSI E1.21. Inspection records shall be kept and shall be made available for verification by the *Building Official*. Additionally, *public-occupancy temporary structures* shall be inspected at regular intervals when in service to ensure that the structure continues to perform as designed and initially erected.

3103.5.5 Durability and maintenance. Reusable components used in the erection and the installation of *public-occupancy temporary structures* shall be manufactured of durable materials necessary to withstand environmental conditions at the service location. Components damaged during transportation or installation and due to the effects of weathering shall be replaced or repaired.

~~A qualified person shall inspect *public-occupancy temporary structures*, including components, when purchased or acquired and at least once per year, based on the requirements in ANSI E1.21. Inspection records shall be kept and shall be made available for verification by the *building official*. Additionally, *public-occupancy temporary structures* shall be inspected at regular intervals when in service to ensure that the structure continues to perform as designed and initially erected.~~

CHAPTER 16 STRUCTURAL DESIGN

1608.1 General. Design snow *loads* shall be determined in accordance with Chapter 7 of ASCE 7, but the design roofload shall be not less than that determined by Section 1607.

Exception: *Temporary structures* complying with Section ~~3103.5.1.3~~3103.5.1.1.

1609.1.1 Determination of wind loads. Wind *loads* on every building or structure shall be determined in accordance with Chapters 26 to 30 of ASCE 7. The type of opening protection required, the basic design *wind speed*, V , and the exposure category for a site is permitted to be determined in accordance with Section 1609 or ASCE 7. Wind shall be assumed to come from any horizontal direction and wind pressures shall be assumed to act normal to the surface considered.

Exceptions:

1. Subject to the limitations of Section 1609.1.1.1, the provisions of ICC 600 shall be permitted for applicable Group R-2 and R-3 buildings.
2. Subject to the limitations of Section 1609.1.1.1, residential structures using the provisions of AWC WFCM.
3. Subject to the limitations of Section 1609.1.1.1, residential structures using the provisions of AISI S230.
4. Designs using NAAMM FP 1001.
5. Designs using TIA-222 for antenna-supporting structures and antennas, provided that the horizontal extent of Topographic Category 2 escarpments in Section 2.6.6.2 of TIA-222 shall be 16 times the height of the escarpment.
6. Wind tunnel tests in accordance with ASCE 49 and Sections 31.4 and 31.5 of ASCE 7.
7. *Temporary structures* complying with Section ~~3103.5.1.4~~3103.5.1.2.

The wind speeds in Figures 1609.3(1) through 1609.3(12) are basic design wind speeds, V , and shall be converted in accordance with Section 1609.3.1 to allowable stress design wind speeds, V_{asd} , when the provisions of the standards referenced in Exceptions 4 and 5 are used.

1612.2 Design and construction. The design and construction of buildings and structures located in *flood hazard areas*, including *coastal high hazard areas* and *coastal A zones*, shall be in accordance with Chapter 5 of ASCE 7 and ASCE 24.

Exception: *Temporary structures* complying with Section ~~3103.5.1.5~~3103.5.1.3.

1613.1 Scope. Every structure, and portion thereof, including nonstructural components that are permanently attached to structures and their supports and attachments, shall be designed and constructed to resist the effects of earthquake motions in accordance with Chapters 11, 12, 13, 15, 17 and 18 of ASCE 7, as applicable. The *seismic design category* for a structure is permitted to be determined in accordance with Section 1613 or ASCE 7.

Exceptions:

1. Detached one- and two-family dwellings, assigned to *Seismic Design Category* A, B or C, or located where the mapped short-period spectral response acceleration, S_s , is less than 0.4 g.
2. The *seismic force-resisting system* of wood-frame buildings that conform to the provisions of Section 2308 are not required to be analyzed as specified in this section.
3. Agricultural storage structures intended only for incidental human occupancy.
4. Structures that require special consideration of their response characteristics and environment that are not addressed by this code or ASCE 7 and for which other regulations provide seismic criteria, such as vehicular bridges, electrical transmission towers, hydraulic structures, buried utility lines and their appurtenances and nuclear reactors.
5. References within ASCE 7 to Chapter 14 shall not apply, except as specifically required herein.
6. *Temporary structures* complying with Section ~~3103.5.1.6~~3103.5.1.4.

1614.1 General. *Ice-sensitive structures* shall be designed for atmospheric ice loads in accordance with Chapter 10 of ASCE 7. *Public-occupancy temporary structures* shall comply with Section 3103.7.3.

Exception: *Temporary structures* complying with Section ~~3103.5.1.7~~3103.5.1.5.

1615.1 General. The design and construction of *Risk Category* III and IV buildings and structures located in the *Tsunami Design Zones* defined in the *Tsunami Design Geodatabase* shall be in accordance with Chapter 6 of ASCE 7, except as modified by this code.

Exception: *Temporary structures* complying with Section ~~3103.5.1.8~~3103.5.1.6.

Commenter's Reason: This public comment is being submitted to clarify the original proposal by making editorial changes, some minor changes that are technically substantive, and several clearly substantive changes. We believe this will result in a more reasonable, understandable, and enforceable code.

The substantive changes:

- Modify the definition of "public-occupancy temporary structure."
 - As proposed, this definition is overly-broad. A building or structure that "provide[s] human shelter, protection, or safety" makes any building fall under this definition. Second, the use of "support" in the definition can cause confusion whether this is intended to mean structural support, or just be associated with the assemblies. Third, including "private assemblies" is confusing when the defined term is "public." Lastly, the second sentence in the definition is an exception to a code requirement that does not belong in a definition.
 - This public comment addresses the issues above by changing "supports" to "serves," changes "public and private assemblies" to "assembly occupancies," moves the second sentence to an exception to the scoping of Section 3103.1, and replaces the reference to shelter/protection/safety with "public use."
 - "Serves" still brings the ancillary structures associated with temporary assemblies into these regulations, but doesn't confuse the issue of whether the structure needs to provide actual structural support for a stage, for example, in order for these regulations to apply.
 - The term "public use" was chosen to give the building official the flexibility to interpret it as needed, but to convey the idea the "public" had to be using the structure. Thus, the intent is to include structures like temporary COVID vaccination and testing facilities, field hospitals, or emergency shelter for people experiencing homelessness (e.g., "tiny home" villages), but not include temporary structures, for example, that only provide shelter for materials like cement bags or highway salt/sand.
- Delete the requirements related to Risk Category (Section 3103.5.1).
 - The main reason for the deletion is that the original proposal made some substantive modifications to the Risk Category table (1604.5) that we do not think were appropriate. First, it would have required a computerized timed egress analysis to prove these structures could be evacuated in 15 seconds, or else it would get thrown into Risk Category III. Second, it would require those temporary structures serving any assembly occupancy (speaker stands, light standards, etc.) to be classified as Risk Category III, which could be a more stringent classification than if they were permanent.
 - Ultimately, we think Risk Category should just be determined by Section 1604.5, and not modified here.

- Delete the Risk Category II limitation for reducing the snow loads (Section 3103.5.1.1, Exception).
 - The deletion creates consistency with use of the reduction factors for the wind and ice loads where controlled occupancy procedures are being used.
 - In addition, if controlled occupancy procedures are implemented (for example, evacuating the public-occupancy temporary structure), there is no reason why the same reduction factors could not be applied to structures in a higher risk category.
- Change references to "winter months" in the snow and ice sections to be more generic (Sections 3103.5.1.1 and 3103.5.1.5)
 - As we were collaborating with others on this, it was pointed out that some areas of the country have snow and ice events at times other than the winter months--in some cases, year-round. This public comment changes those references to refer to times when snow or ice "is to be expected," to allow for those regional differences.
- Require an Emergency Action Plan whenever a public-occupancy temporary structure is located in a tsunami design zone (Section 3103.5.1.6).
 - The original proposal made this only a requirement when the building or fire official asked for one. We believe that you should have should have an evacuation plan, along with triggers for initiating the plan whenever these are located in areas subject to tsunami inundation, similar to the flood loads section. These should be included in the Emergency Action Plan.

The technically substantive changes:

- Modifies the exception to Section 3103.5 (moved from the deleted 3103.5.1.2 on live loads) to refer to "a" registered design professional, rather than "the" registered design profession. The latter implies a specific person, which gets into contractual arrangements that the building code should not be regulating.
- Make all the load reductions in Section 3103.5.1 optional ("shall be permitted to be"), instead of making them mandatory per the original proposal.
- Aligns the wind speed terminology in the renumbered Section 3103.5.1.2 (wind loads) with the terminology used in S9-22 (Approved as Submitted by the Structural Committee)

The editorial changes:

- Makes the new text in Section 3103.5.1 (structural loads) charging for the rest of the section, saying to comply with the structural loads in Chapter 16, unless the following subsections modify them. This allows deletion of the dead and live load subsections since they didn't modify Chapter 16, and allows deletion of any pointers to Chapter 16 sections in the remaining subsections.
- Align the language among the sections (use parallel construction),
- Use traditional code language ("where" instead of "if" or "when," and "shall be permitted" instead of "may")
- Modify references to the load reduction tables to reflect the correct table numbers.
- Deletes the unnecessary table title in the relocated exception to Section 3103.5, and rearranges the text of the exception so the registered design professional needs to "demonstrate" the lower loads are justified.
- Reorganize some of the provisions as follows:
 - The exception within the definition of "public-occupancy temporary structure" becomes a second exception to the scoping in Section 3103.1. (See the substantive change to the definition, above.)
 - With the deletion of the live loads section (see substantive change to 3103.5.1 above), the exception that used to be in the live loads section is moved to the general charging for structural requirements (Section 3103.5).
 - A redundant provision for maintenance inspections is deleted from Section 3103.5.5 (Durability) and the statement of purpose for the inspections that was in deleted language is now included to Section 3105.3 (installation and maintenance inspections).
- Modify the references in the Chapter 16 exceptions to reflect the new organization.

This public comment is one of a series of three being submitted by WABO TCD and ASCE to improve this proposal. This public comment is not intended to override any substantive or organizational changes being made by the other comments. For reference, we have developed a clean version of the proposal that incorporates all three public comments (see link below), showing how the final code language for the entire change should appear, should all three public comments be approved.

<https://www.cdpassess.com/public-comment/3147/27095/files/download/3599/S116-22%20Temp%20Structures%20-%20Combined%20SIU%205-6-12%20PCs%20%28clean%29.pdf>

Cost Impact: The net effect of the Public Comment and code change proposal will decrease the cost of construction. The original cost impact statement says the cost of construction will decrease. The editorial changes, minor substantive changes, and the

change to the definition are clarifications that will have no effect on the original cost impact statement. The elimination of a requirement for a timed-egress analysis to avoid Risk Category III will reduce the cost of construction as compared to the original proposal, but overall, will have no effect on the original cost impact statement.

Final Hearing Results

S116-22

AMPC1,2,3,4