Minimum Design Loads and Associated Criteria for Buildings and Other Structures

ASCE/SEI 7-16

Errata 1

Effective: July 9, 2018

This document contains errata to the above title, which is posted in the ASCE Library at
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THIS TYPE AND SIZE FONT INDICATES DIRECTIVE TEXT THAT IS NOT PART OF THE TITLE. CHANGES ARE INDICATED USING STRIKE-OUT AND UNDERLINE TEXT.

Acknowledgments

"SEISMIC TASK SUBCOMMITTEE ON NONLINEAR GENERAL PROVISIONS" AND "SEISMIC TASK COMMITTEE ON SEISMIC ISOLATION" SHOULD ACKNOWLEDGE:

"Reid ~~F.~~ B. Zimmerman, P.E., S.E., M.ASCE"

Chapter 4

IN TABLE 4.3-1, CORRECT THE L_o VALUES AS FOLLOWS:

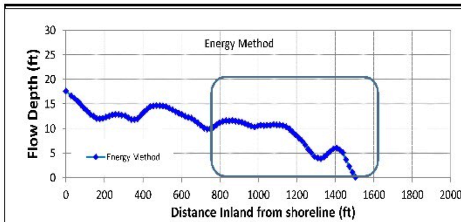
Roofs

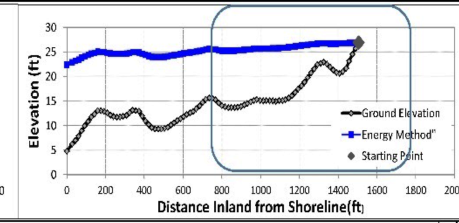
Roof areas used for assembly purposes 100 (~~4.70~~ 4.79)

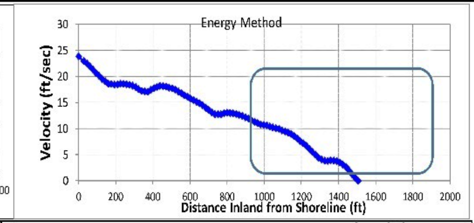
Vegetative and landscaped roofs

Roof areas used for assembly purposes 100 (~~4.70~~ 4.79)

THE PUBLISHED VERSION OF FIG. C6.6-2 IS ILLEGIBLE. REPLACE WITH:







EXAMPLE

Input -------> ------->

Coordinates x_R and z_R of Runup Point

At this location

NAVD-88 4.78 = MHW

Calculate from Runup Point along the transect towards the ocean

Transect points, i, toward ocean starting at the Runup Point	Enter Transect Profile x_i (ft)	z_i (ft)	Δx_i (ft)	Δz_i (ft)	Ground slope φi	Manning n_i	x/x_R	Froude number F_{ri} (see note 2)	Friction Slope s_i	Solution for Energy Head, Depth, Velocity: E_{gi} Energy Head (ft)	h_i inundation depth (see note 1) (ft)	u_i (ft/sec)	u_{min} for hydrodynamic forces §6.6.1 (ft/sec)	Inundation Elevation h+z (ft)
0	1505.5	26.87				0.030	1.000	0.000	0.000000	0.0	0.10	0.0		26.87
1	1489.1	25.73	16.4	1.14	0.0694	0.030	0.989	0.104	0.000305	1.15	1.14	0.6	10.0	26.87
2	1472.7	24.53	16.4	1.20	0.0731	0.030	0.978	0.148	0.000273	2.35	2.32	1.3	10.0	26.85
3	1456.2	23.11	16.4	1.42	0.0865	0.030	0.967	0.181	0.000323	3.77	3.71	2.0	10.0	26.82
4	1439.8	21.69	16.4	1.42	0.0865	0.030	0.956	0.209	0.000369	5.20	5.09	2.7	10.0	26.78
5	1423.4	21.03	16.4	0.66	0.0402	0.030	0.945	0.234	0.000416	5.87	5.71	3.2	10.0	26.74
6	1407.0	20.66	16.4	0.37	0.0225	0.030	0.935	0.256	0.000481	6.25	6.05	3.6	10.0	26.71
7	1390.6	20.79	16.4	-0.13	-0.0079	0.030	0.924	0.276	0.000550	6.12	5.90	3.8	10.0	26.69
8	1374.1	21.29	16.4	-0.50	-0.0305	0.030	0.913	0.295	0.000634	5.64	5.40	3.9	10.0	26.69
9	1357.7	21.92	16.4	-0.63	-0.0383	0.030	0.902	0.313	0.000735	5.02	4.78	3.9	10.0	26.70
10	1341.3	22.55	16.4	-0.63	-0.0384	0.030	0.891	0.330	0.000850	4.40	4.17	3.8	10.0	26.72
11	1324.9	22.89	16.4	-0.34	-0.0207	0.030	0.880	0.346	0.000977	4.08	3.85	3.9	10.0	26.74
12	1308.5	22.67	16.4	0.22	0.0134	0.030	0.869	0.362	0.001095	4.32	4.05	4.1	10.0	26.72
13	1292.0	22.42	16.4	0.25	0.0152	0.030	0.858	0.377	0.001167	4.58	4.28	4.4	10.0	26.70
14	1275.6	21.55	16.4	0.87	0.0530	0.030	0.847	0.391	0.001234	5.47	5.09	5.0	10.0	26.64
15	1259.2	20.76	16.4	0.79	0.0481	0.030	0.836	0.404	0.001249	6.29	5.81	5.5	10.0	26.57
16	1242.8	19.76	16.4	1.00	0.0609	0.030	0.825	0.418	0.001275	7.31	6.72	6.1	10.0	26.48
17	1226.4	18.87	16.4	0.89	0.0542	0.030	0.815	0.431	0.001291	8.22	7.52	6.7	10.0	26.39
18	1209.9	18.13	16.4	0.74	0.0451	0.030	0.804	0.443	0.001317	8.98	8.18	7.2	10.0	26.31
19	1193.5	17.47	16.4	0.66	0.0402	0.030	0.793	0.455	0.001352	9.66	8.75	7.6	10.0	26.22
20	1177.1	16.76	16.4	0.71	0.0432	0.030	0.782	0.467	0.001392	10.39	9.37	8.1	10.0	26.13
21	1160.7	16.06	16.4	0.70	0.0426	0.030	0.771	0.479	0.001429	11.12	9.97	8.6	10.0	26.03
22	1144.2	15.56	16.4	0.50	0.0305	0.030	0.760	0.490	0.001466	11.64	10.39	9.0	10.0	25.95
23	1127.8	15.27	16.4	0.29	0.0177	0.030	0.749	0.501	0.001512	11.96	10.62	9.3	10.0	25.89
24	1111.4	15.11	16.4	0.16	0.0097	0.030	0.738	0.512	0.001567	12.14	10.74	9.5	10.0	25.85
25	1095.0	15.07	16.4	0.04	0.0024	0.030	0.727	0.522	0.001626	12.21	10.74	9.7	10.0	25.81
26	1078.6	14.93	16.4	0.14	0.0085	0.030	0.716	0.533	0.001691	12.38	10.84	9.9	10.0	25.77
27	1062.1	15.04	16.4	-0.11	-0.0067	0.030	0.706	0.543	0.001751	12.30	10.72	10.1	10.1	25.76
28	1045.7	15.05	16.4	-0.01	-0.0006	0.030	0.695	0.553	0.001823	12.32	10.68	10.3	10.3	25.73
29	1029.3	15.09	16.4	-0.04	-0.0024	0.030	0.684	0.562	0.001890	12.31	10.63	10.4	10.4	25.72
30	1012.9	15.01	16.4	0.08	0.0049	0.030	0.673	0.572	0.001958	12.42	10.67	10.6	10.6	25.68
31	996.5	15.12	16.4	-0.11	-0.0067	0.030	0.662	0.581	0.002021	12.34	10.56	10.7	10.7	25.68
32	980.0	15.30	16.4	-0.18	-0.0110	0.030	0.651	0.591	0.002093	12.20	10.38	10.8	10.8	25.68
33	963.6	15.11	16.4	0.19	0.0116	0.030	0.640	0.600	0.002171	12.42	10.53	11.0	11.0	25.64
34	947.2	14.81	16.4	0.30	0.0183	0.030	0.629	0.609	0.002226	12.76	10.76	11.3	11.3	25.57
35	930.8	14.49	16.4	0.32	0.0195	0.030	0.618	0.618	0.002275	13.12	11.01	11.6	11.6	25.50
36	914.4	14.16	16.4	0.33	0.0201	0.030	0.607	0.627	0.002322	13.48	11.27	11.9	11.9	25.43
37	897.9	13.91	16.4	0.25	0.0152	0.030	0.596	0.635	0.002369	13.77	11.46	12.2	12.2	25.37
38	881.5	13.76	16.4	0.15	0.0091	0.030	0.586	0.644	0.002419	13.96	11.57	12.4	12.4	25.33
39	865.1	13.65	16.4	0.11	0.0067	0.030	0.575	0.652	0.002476	14.11	11.64	12.6	12.6	25.29
40	848.7	13.67	16.4	-0.02	-0.0012	0.030	0.564	0.661	0.002534	14.13	11.60	12.8	12.8	25.27
41	832.3	13.64	16.4	0.03	0.0018	0.030	0.553	0.669	0.002600	14.21	11.61	12.9	12.9	25.25
42	815.8	13.79	16.4	-0.15	-0.0091	0.030	0.542	0.677	0.002662	14.10	11.47	13.0	13.0	25.26
43	799.4	14.06	16.4	-0.27	-0.0164	0.030	0.531	0.685	0.002737	13.88	11.24	13.0	13.0	25.30

Notes:

1. Structures located entirely within inundation depths of 3 ft or less need not be designed for tsunamis

2. Scour depth is permitted to be reduced per Section 6.12.2.4.1, where the calculated Froude number is less than 0.5

ASCE 7

Chapter 7

IN COMMENTARY TABLE C7.2-1, CORRECT THE NEW HAMPSHIRE LOCATION AS FOLLOWS:

New Hampshire

All cities

Chapter 12

REVISE SECTION 12.11.2.1 TO REFERENCE SECTION 12.11.1, AS FOLLOWS:

Where the anchorage is not located at the roof and all diaphragms are not flexible, the value from Eq. (12.11-1) is permitted to be multiplied by the factor $(1 + 2z/h)/3$, where z is the height of the anchor above the base of the structure and h is the height of the roof above the base; however, F_p shall not be less than required by Section ~~12.11.2~~ 12.11.1 with a minimum anchorage force of $F_p = 0.2W_p$.

Chapter 13

REVISE SECTION 13.1.4 ITEMS 5 AND 6 AS FOLLOWS:

5. Mechanical and electrical components in Seismic Design Category C provided that either
   a. The component Importance Factor, I_p, is equal to 1.0 and the component is positively attached to the structure; or
   b. The component weighs 20 lb (89 N) or less ~~or, in the case of a distributed system, 5 lb/ft (73 N/m) or less~~.
6. Discrete mechanical and electrical components in Seismic Design Categories D, E, or F that are positively attached to the structure, provided that either
   a. The component weighs 400 lb (1,779 N) or less, the center of mass is located 4 ft (1.22 m) or less above the adjacent floor level, flexible connections are provided between the component and associated ductwork, piping, and conduit, and the component Importance Factor, I_p, is equal to 1.0; or
   b. The component weighs 20 lb (89 N) or less ~~or, in the case of a distributed system, 5 lb/ft (73 N/m) or less; and~~.

MODIFY SECTION 13.3.2.1 TO DEFINE THE TERMS USED IN EQS. (13.3-7) AND (13.3-8), AS FOLLOWS:

13.3.2.1 Displacements within Structures. For two connection points on the same structure A or the same structural system, one at a height h_x and the other at a height h_y, D_p shall be determined as

$$D_p = \cancel{\Delta}\delta_{xA} - \cancel{\Delta}\delta_{yA} \qquad (13.3\text{-}7)$$

where

D_p = relative seismic displacement that the component must be designed to accommodate;

δ_{xA} = deflection at building level x of structure A, determined in accordance with Eq. (12.8-15);

δ_{yA} = deflection at building level y of structure A, determined in accordance with Eq. (12.8-15).

Alternatively, D_p is permitted to be determined using modal procedures described in Section 12.9, using the difference in story deflections calculated for each mode and then combined using appropriate modal combination procedures. D_p is not required to be taken as greater than

$$D_p = \frac{(h_x - h_y)\Delta_{aA}}{h_{sx}} \tag{13.3-8}$$

where

Δ_{aA} = allowable story drift for structure A as defined in Table 12.12-1;

h_{sx} = story height used in the definition of the allowable drift Δ_a in Table 12.12-1.

MODIFY SECTION 13.5.9.1 AS FOLLOWS:

13.5.9.1 General. Glass in glazed curtain walls, glazed storefronts, and glazed partitions shall meet the relative displacement requirement of Eq. (13.5-2):

$$\Delta_{\text{fallout}} \geq 1.25 D_{pI} \tag{13.5-2}$$

or 0.5 in. (13 mm), whichever is greater, where:

Δ_{fallout} = the relative seismic displacement (drift) at which glass fallout from the curtain wall, storefront wall, or partition occurs (Section 13.5.9.2);

D_{pI} = the relative seismic displacement that the component must be designed to accommodate (Section 13.3.2) (D_{pI} shall be applied over the height of the glass component under consideration)~~; and~~

~~I_e = the Importance Factor determined in accordance with Section 11.5.1.~~

MODIFY TABLE 13.6-1 AS FOLLOWS:

- Under “Mechanical and Electrical Components,” insert a row for “Manufacturing or process conveyors (nonpersonnel)” with $a_p{}^a = 2\ ½$, $R_p{}^b = 3$, and $\Omega_0{}^c = 2$.
- Under “Distribution Systems,” change all three instances of “ductwork” to “duct systems”.
- Under “Distribution Systems,” change “Electrical conduit and cable trays” to “Electrical conduit, cable trays, and raceways”

MODIFY SECTION 13.6.6 AS FOLLOWS:

13.6.6 Distribution Systems: Duct Systems. HVACR and other duct systems shall be designed for seismic forces and seismic relative displacements as required in Section 13.3.

EXCEPTIONS: The following exceptions pertain to duct~~work~~ not designed to carry toxic, highly toxic, or flammable gases or not used for smoke control:

1. Design for the seismic forces and relative displacements of Section 13.3 shall not be required for duct systems with I_p = 1.0 where flexible connections or other assemblies are provided to accommodate the relative displacement be-tween the duct system and associated components, the duct system is positively attached to the structure, and where one of the following apply:
    a. Trapeze assemblies with 3/8-in. (10-mm) diameter rod hangers not exceeding 12 in. (305 mm) in length from the duct support point to the connection at the supporting structure are used to support duct, and the total weight supported by any single trapeze is ~~less than~~ 100 lb (445 N) ~~10 lb/ft (146 N/m)~~ or less, or
    b. Trapeze assemblies with 1/2-in. (13-mm) diameter rod hangers not exceeding 12 in. (305 mm) in length from the duct support point to the connection at the supporting structure are used to support the duct, and the total weight supported by any single trapeze is 200 lb (890 N) or less, or
    c. Trapeze assemblies with 1/2-in. (13-mm) diameter rod hangers not exceeding 24 in. (610 mm) in length from the duct support point to the connection at the supporting structure are used to support the duct, and the total weight supported by any single trapeze is 100 lb (445 N) or less, or
    d. The duct is supported by individual rod hangers 3/8in. (10 mm) or 1/2in. (13 mm) in diameter, and each hanger in the duct run is 12 in. (305 mm) or less in length from the duct support point to the connection at the supporting structure, and the total weight supported by any single rod is 50 lb (220 N) or less.
2. Design for the seismic forces and relative displacements of Section 13.3 shall not be required where provisions are made to avoid impact with other ducts or mechanical components or to protect the ducts in the event of such impact, the distribution system is positively attached to the structure~~;~~, and HVACR ducts have a cross-sectional area of less than 6ft^2 (0.557 m^2) and weigh 20 lb/ft (292 N/m) or less.

Components that are installed in line with the duct system and have an operating weight greater than 75 lb (334 N), such as fans, terminal units, heat exchangers, and humidifiers, shall be supported and laterally braced independent of the duct system, and such braces shall meet the force requirements of Section 13.3.1. Components that are installed in line with the duct system, have an operating weight of 75 lb (334 N) or less, such as small terminal units, dampers, louvers, and diffusers, and are otherwise not independently braced shall be positively attached with mechanical fasteners to the rigid duct on both sides. Piping and conduit attached to in-line equipment shall be provided with adequate flexibility to accommodate the seismic relative displacements of Section 13.3.2.

MODIFY SECTION 13.6.7.3 AS FOLLOWS:

13.6.7.3 Exceptions. Design for the seismic forces of Section 13.3 shall not be required for piping systems where flexible connections, expansion loops, or other assemblies are provided to accommodate the relative displacement between component and piping, where the piping system is positively attached to the structure, and where one of the following apply:

~~1. Trapeze assemblies are used to support piping whereby no single pipe exceeds the limits set forth in 5a, 5b, or 5c below and the total weight of the piping supported by the trapeze assemblies is less than 10 lb/ft (146 N/m).~~

~~2.~~1. Trapeze assemblies are supported by 3/8-in. (10-mm) diameter rod hangers not exceeding 12 in. (305 mm) in length from the pipe support point to the connection at the supporting structure, do not support piping with I_p greater than 1.0, ~~and~~ no single pipe exceeds the limits set forth in items ~~4~~5a, ~~4~~5b, or ~~4~~5c below, and the total weight supported by any single trapeze is 100 lb (445 N) or less, or

~~3.~~2. Trapeze assemblies are supported by 1/2-in. (13-mm) diameter rod hangers not exceeding 12 in. (305 mm) in length from the pipe support point to the connection at the supporting structure, do not support piping with I_p greater than 1.0, ~~and~~ no single pipe exceeds the diameter limits set forth in items 4~~5~~a, 4~~5~~b, or 4~~5~~c below, and the total weight supported by any single trapeze is 200 lb (890 N) or less, or

~~4.~~3. Trapeze assemblies are supported by 1/2-in. (13-mm) diameter rod hangers not exceeding 24 in. (610 mm) in length from the pipe support point to the connection at the supporting structure, do not support piping with I_p greater than 1.0, ~~and~~ no single pipe exceeds the diameter limits set forth in items 4~~5~~a, 4~~5~~b, or 4~~5~~c below, and the total weight supported by any single trapeze is 100 lb (445 N) or less, or

~~5.~~4. Piping that has an R_p in Table 13.6-1 of 4.5 or greater is either supported by rod hangers and provisions are made to avoid impact with other structural or nonstructural components or to protect the piping in the event of such impact, or pipes with I_p = 1.0 are supported by individual rod hangers 3/8 in. (10 mm) or 1/2 in. (13 mm) in diameter; where each hanger in the pipe run is 12 in. (305 mm) or less in length from the pipe support point to the connection at the supporting structure; and the total weight supported by any single hanger is 50 lb (220 N) or less. In addition, the following limitations on the size of piping shall be observed:

   a. In structures assigned to Seismic Design Category C where I_p is greater than 1.0, the nominal pipe size shall be 2 in. (50 mm) or less.

   b. In structures assigned to Seismic Design Categories D, E, or F where I_p is greater than 1.0, the nominal pipe size shall be 1 in. (25 mm) or less.

   c. In structures assigned to Seismic Design Categories D, E, or F where I_p = 1.0, the nominal pipe size shall be 3 in. (80 mm) or less.

~~6.~~5. Pneumatic tube systems supported with trapeze assemblies using 3/8-in. (10-mm) diameter rod hangers not exceeding 12 in. (305 mm) in length from the tube support point to the connection at the supporting structure and the total weight supported by any single trapeze is 100 lb (445 N) or less.

~~7.~~6. Pneumatic tube systems supported by individual rod hangers 3/8 in. (10 mm) or ½ in. (13 mm) in diameter, and each hanger in the run is 12 in. (305 mm) or less in length from the tube support point to the connection at the supporting structure, and the total weight supported by any single rod is 50 lb (220 N) or less.

MODIFY SECTION 13.6.8 TO REFERENCE SECTIONS 13.6.5 THROUGH 13.6.8, AS FOLLOWS:

13.6.8 Distribution Systems: Trapezes with a Combination of Systems. Trapezes that support a combination of distribution systems (electrical conduit, raceway, duct, piping, etc.) shall be designed using the most restrictive requirements for the supported distribution systems from Sections 13.6.5 through 13.6.8~~7~~ for the aggregate weight of the supported system. If any distribution system on the trapeze is not exempted, the trapeze shall be braced.

MODIFY THE FIFTH PARAGRAPH OF COMMENTARY SECTION C13.3.1 TO REFERENCE SECTIONS 13.3.1.4.1 AND 13.3.1.4.2, AS FOLLOWS:

Dynamic amplification occurs where the period of a nonstructural component closely matches that of any mode of the supporting structure, although this effect may not be significant depending on the ground motion. For most buildings, the primary mode of vibration in each direction has the most influence on the dynamic amplification for nonstructural components. For long-period structures (such as tall buildings), where the period of vibration of the fundamental mode is greater than 3.5 times T_s, higher modes of vibration may have periods that more closely match the period of nonstructural components. For this case, it is recommended that amplification be considered using such higher mode periods in lieu of the higher fundamental period. This approach may be generalized by computing floor response spectra for various levels that reflect the dynamic characteristics of the supporting structure to determine how amplification varies as a function of component period. Calculation of floor response spectra is described in Section 13.3.1.4.1. This procedure can be complex, but a simplified procedure is presented in Section 13.3.1.4.2. Consideration of nonlinear behavior greatly complicates the analysis.

Chapter 26

MODIFY THE INSET BOX TO FIG. 26.5-1D AS FOLLOWS:

Location	**V (mph)**	**V (m/s)**
Guam	~~180~~ 220	~~(80)~~ (98)
Virgin Islands	~~150~~ 180	~~(67)~~ (80)
American Samoa	~~150~~ 180	~~(67)~~ (80)
Hawaii	See Figure 26.5-2D	

EQ. (26.11-6) SHOULD READ AS FOLLOWS:

$$G = 0.925\left(\frac{1 + 1.7 g_Q I_{\bar{z}} Q}{1 + 1.7 g_v I_{\bar{z}}}\right)$$

IN TABLE 26.11-1, MODIFY THE VALUE FOR $\hat{\alpha}$ FOR EXPOSURE B AS FOLLOWS:

~~1/70~~ 1/7.0

MODIFY THE CAPTION TO COMMENTARY FIG. C26.7-7 AS FOLLOWS:

FIGURE C26.7-7 Exposure D: A Building at the Shoreline ~~(Excluding Shorelines in Hurricane-Prone Regions)~~ with wind Flowing over Open Water for a Distance of at Least One Mile. Shorelines in Exposure D Include Inland Waterways, the Great Lakes, and Coastal Areas of California, Oregon, Washington, and Alaska

Errata 2

Effective: February 13, 2019

This document contains errata to the title, *Minimum Design Loads and Associated Criteria for Buildings and Other Structures*, ASCE/SEI 7-16, which is posted in the ASCE Library at https://doi.org/10.1061/9780784414248

THIS TYPE AND SIZE FONT INDICATES DIRECTIVE TEXT THAT IS NOT PART OF THE TITLE. CHANGES ARE INDICATED USING STRIKE-OUT AND HIGHLIGHTED TEXT.

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"SEISMIC TASK SUBCOMMITTEE ON SEISMIC ISOLATION" AND "SEISMIC TASK COMMITTEE ON STEEL" SHOULD ACKNOWLEDGE:

"Su ~~F.~~ Hoa, Ph.D., C.Eng., Aff.M.ASCE"

Chapter 12

REVISE SECTION 12.13.5 AS FOLLOWS:

12.13.5 Strength Design for Foundation Geotechnical Capacity

Where basic combinations for strength design listed in ~~Chapter 2~~ Section 2.3 are used, combinations that include earthquake loads, E, are permitted to include reduction of foundation overturning effects defined in Section 12.13.4. The following sections shall apply for determination of the applicable nominal strengths and resistance factors at the soil–foundation interface.

REVISE SECTION 12.13.6 AS FOLLOWS:

12.13.6 Allowable Stress Design for Foundation Geotechnical Capacity

Where basic combinations for allowable stress design listed in Section ~~12.4~~ 2.4 are used for design, combinations that include earthquake loads, E, are permitted to include reduction of foundation overturning effects defined in Section 12.13.4. Allowable foundation load capacities,

Q_{as}, shall be determined using allowable stresses in geotechnical materials that have been determined by geotechnical investigations required by the Authority Having Jurisdiction (AHJ).

Chapter C12

REVISE SECTION C12.12 IN THE TENTH PARAGRAPH AS FOLLOWS:

The allowable story drifts, Δ_a, for structures a maximum of four stories above the base are relaxed somewhat, provided that the interior walls, partitions, ceilings, and exterior wall systems have been designed to accommodate story drifts. The type of structure envisioned by footnote ~~d~~ c in Table 12.12-1 would be similar to a prefabricated steel structure with metal skin.

Chapter 13

REVISE SECTION 13.1.4 ITEMS 6b AS FOLLOWS:

6. Discrete mechanical and electrical components in Seismic Design Categories D, E, or F that are positively attached to the structure, provided that either
   a. The component weighs 400 lb (1,779 N) or less, the center of mass is located 4 ft (1.22 m) or less above the adjacent floor level, flexible connections are provided between the component and associated ductwork, piping, and conduit, and the component Importance Factor, I_p, is equal to 1.0; or
   b. The component weighs 20 lb (89 N) or less.

Chapter 26

REVISE FIGURE 26.8-1 TOPOGRAPHIC FACTOR, K_{ZT}, CORRECT EQUATION FOR K3 AS FOLLOWS:

$$K_3 = e^{-\gamma z/L_h}$$

Chapter 27

REVISE FIGURE 27.3-3 MAIN WIND FORCE RESISTING SYSTEM AND COMPONENTS AND CLADDING, PART 1 (ALL HEIGHTS): EXTERNAL PRESSURE COEFFICIENTS, Cp, FOR ENCLOSED AND PARTIALLY ENCLOSED BUILDINGS AND STRUCTURES – ARCHED ROOF, CORRECT MISSING NEGATIVE SIGN (“-“) FOR ALL LEWARD QUARTER COEFFICIENTS AND ADD MISSING “D” IN NOTE 4, AS FOLLOWS:

External Pressure Coefficient, C_p

Conditions	Rise-to-Span Ratio, r	C_p Windward Quarter	C_p Center Half	C_p Leeward Quarter
Roof on elevated structure	$0 < r < 0.2$	-0.9	$-0.7 - r$	-0.5
	$0.2 \le r < 0.3$[a]	$1.5r - 0.3$	$-0.7 - r$	-0.5
	$0.3 \le r \le 0.6$	$2.75r - 0.7$	$-0.7 - r$	-0.5
Roof springing from ground level	$0 < r \le 0.6$	$1.4r$	$-0.7 - r$	-0.5

[a]When the rise-to-span ratio is $0.2 \le r \le 0.3$, alternate coefficients given by $6r - 2.1$ shall also be used for the windward quarter.

Notes

1. Values listed are for the determination of average loads on main wind-force resisting systems.
2. Plus and minus signs signify pressures acting toward and away from the surfaces, respectively.
3. For wind directed parallel to the axis of the arch, use pressure coefficients from Fig. 27.3-1 with wind directed parallel to ridge.
4. For components and cladding (1) at roof perimeter, use the external pressure coefficients in Fig. 30.3-2A, B, ~~and C~~ C, and D with θ based on springline slope and (2) for remaining roof areas, use external pressure coefficients of this table multiplied by 1.2.

Chapter C28

REVISE SECTION C28.3.2 LAST PARAGRAPH AS FOLLOWS:

The edge strip definition was modified following research (~~Elsharawy et al. 2014~~) (Alrawashdeh and Stathopoulos, 2015) showing that the definition of dimension “a” in ASCE 7-10 led to unduly large edge strips and end zones for very large buildings

REVISE REFERENCES AS FOLLOWS:

~~Elsharawy, M., Alrawashdeh, H., and Stathopoulos, T. (2014) “Wind loading zones for flat roofs,” *Proc., 4th Intl. Structural Specialty Conf.*, CSCE, Halifax, NS, May 28–31.~~

Alrawashdeh, H., and Stathopoulos, T. (2015). "Wind pressures on large roofs of low buildings and wind codes and standards" *J. Wind Eng. Indust. Aerodyn.* 147, December, 212−225.

Chapter 29

REVISE FIGURE 29.4-5 DESIGN WIND LOADS (ALL HEIGHTS): ROOFTOP SOLAR PANELS FOR ENCLOSED AND PARTIALLY ENCLOSED BULDINGS, ROOF ANGLE ≤ 7 DEGREES, CORRECT MISSING SUBSCRIPT “n” FOR NORMALIZED WIND AREAS A_n, AS FOLLOWS:

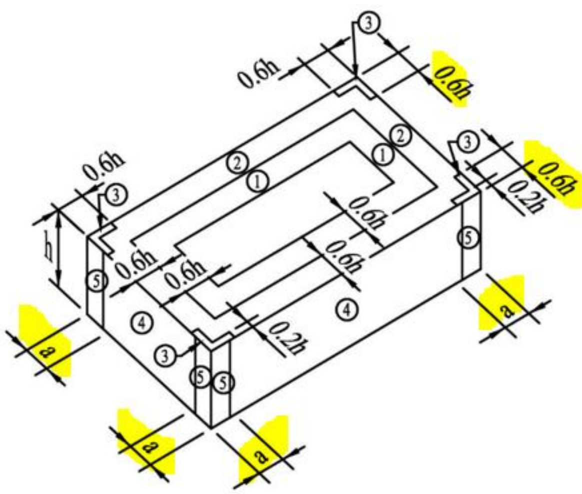
For Array Edge Factors graphs, the Normalized Wind Areas, A_n

Chapter 30

REVISE SECTION 30.4.1 CONDITIONS, CORRECT ITEM 5 TO INCLUDE HIP ROOF WITH 45 DEGREES AS FOLLOWS:

5. The building has either a flat roof, a gable roof with $\theta \leq 45°$, or a hip roof with $\theta \leq$ ~~27~~ 45°.

REVISE FIGURE 30.4-1 COMPONENTS AND CLADDING, CORRECT “a” AND “0.6h” FOR FLAT/HIP/GABLE AS FOLLOWS AND USE THIS UPDATED FIGURE:



Flat/Hip/Gable (0° ≤ Θ ≤ 7°)

REVISE FIGURE 30.4-1 COMPONENTS AND CLADDING, CORRECT COLUMN FOR NEGATIVE PRESSURES FOR BASIC WIND SPEED OF 150 MPH.

	Zone	Effective wind Area (ft²)	Basic					
			140		150		160	
Walls	4	10	35.3	-38.2	40.5	-43.9	46.1	-50.0
	4	20	33.7	-36.7	38.7	-42.1	44.0	-47.9
	4	50	31.6	-34.6	36.2	-39.7	41.2	-45.1
	4	100	30.0	-33.0	34.4	-37.8	39.2	-43.1
	5	10	35.3	-47.2	40.5	-54.2	46.1	-61.7
	5	20	33.7	-44.0	38.7	-50.5	44.0	-57.5
	5	50	31.6	-39.8	36.2	-45.7	41.2	-52.0
	5	100	30.0	-36.7	34.4	-42.1	39.2	-47.9
Flat/Hip/Gable Roof 0 to 7 Degrees	1	10	14.3	-56.2	16.5	-64.5	18.7	-73.4
	1	20	13.4	-52.5	15.4	-60.2	17.6	-68.5
	1	50	12.3	-47.6	14.1	-54.6	16.0	-62.1
	1	100	11.4	-43.9	13.0	-50.4	14.8	-57.3
	1'	10	14.3	-32.3	16.5	-37.0	18.7	-42.1
	1'	20	13.4	-32.3	15.4	-37.0	17.6	-42.1
	1'	50	12.3	-32.3	14.1	-37.0	16.0	-42.1
	1'	100	11.4	-32.3	13.0	-37.0	14.8	-42.1
	2	10	14.3	-74.1	16.5	-85.1	18.7	-96.8
	2	20	13.4	-69.3	15.4	-79.6	17.6	-90.6
	2	50	12.3	-63.0	14.1	-72.4	16.0	-82.3
	2	100	11.4	-58.3	13.0	-66.9	14.8	-76.1
	3	10	14.3	-101.0	16.5	-115.9	18.7	-131.9
	3	20	13.4	-91.5	15.4	-105.0	17.6	-119.5
	3	50	12.3	-78.9	14.1	-90.5	16.0	-103.0
	3	100	11.4	-69.3	13.0	-79.6	14.8	-90.6
Gable Roof > 7 to 20 Degrees	1	10	21.4	-65.1	24.5	-74.8	27.9	-85.1
	1	20	19.3	-65.1	22.1	-74.8	25.2	-85.1
	1	50	16.5	-39.6	18.9	-45.5	21.5	-51.8
	1	100	14.3	-20.3	16.5	-23.3	18.7	-26.5
	2e	10	21.4	-65.1	24.5	-74.8	27.9	-85.1
	2e	20	19.3	-65.1	22.1	-74.8	25.2	-85.1
	2e	50	16.5	-39.6	18.9	-45.5	21.5	-51.8
	2e	100	14.3	-20.3	16.5	-23.3	18.7	-26.5
	2n	10	21.4	-95.0	24.5	-109.1	27.9	-124.1
	2n	20	19.3	-82.1	22.1	-94.3	25.2	-107.3
	2n	50	16.5	-65.1	18.9	-74.8	21.5	-85.1
	2n	100	14.3	-52.3	16.5	-60.0	18.7	-68.3
	2r	10	21.4	-95.0	24.5	-109.1	27.9	-124.1
	2r	20	19.3	-82.1	22.1	-94.3	25.2	-107.3
	2r	50	16.5	-65.1	18.9	-74.8	21.5	-85.1
	2r	100	14.3	-52.3	16.5	-60.0	18.7	-68.3
	3e	10	21.4	-95.0	24.5	-109.1	27.9	-124.1
	3e	20	19.3	-82.1	22.1	-94.3	25.2	-107.3
	3e	50	16.5	-65.1	18.9	-74.8	21.5	-85.1
	3e	100	14.3	-52.3	16.5	-60.0	18.7	-68.3
	3r	10	21.4	-112.9	24.5	-129.7	27.9	-147.5
	3r	20	19.3	-96.8	22.1	-111.1	25.2	-126.4
	3r	50	16.5	-75.4	18.9	-86.5	21.5	-98.4
	3r	100	14.3	-59.2	16.5	-67.9	18.7	-77.3

Chapter C30

REVISE TABLE C30.3-4 GABLE ROOF 20 DEGREES<Θ≤ 27 DEGREES, CORRECT “3e” AND “3r” AS FOLLOWS:

Table C30.3-4. Gable Roofs, $20° < \theta \le 27°$ **(Figure 30.3-2C)**

Negative without overhang		
Zones 2n, 2r, and ~~3r~~ 3e	$(GC_p) = -2.5$	for $A \le 10$ ft^2
	$(GC_p) = -3.6054 + 1.1054 \log A$	for $10 \le A \le 150$ ft^2
	$(GC_p) = -1.2$	for $A \ge 150$ ft^2
Zones ~~3e~~ 3r	$(GC_p) = -3.6$	for $A \le 4$ ft^2
	$(GC_p) = -4.5880 + 1.6410 \log A$	for $4 \le A \le 50$ ft^2
	$(GC_p) = -1.8$	for $A \ge 50$ ft^2
Negative with overhang		
Zone ~~3r~~ 3e	$(GC_p) = -3.6$	for $A \le 10$ ft^2
	$(GC_p) = -5.2155 + 1.6155 \log A$	for $10 \le A \le 150$ ft^2
	$(GC_p) = -1.7$	for $A \ge 150$ ft^2
Zone ~~3e~~ 3r	$(GC_p) = -4.7$	for $A \le 4$ ft^2
	$(GC_p) = -6.0173 + 2.1880 \log A$	for $4 \le A \le 50$ ft^2
	$(GC_p) = -2.3$	for $A \ge 50$ ft^2

REVISE SECTION C30.11 TO INCLUDE MISSING COMMENTARY, AS FOLLOWS:

C30.11 ATTACHED CANOPIES ON BUILDINGS WITH h < 60 ft (18.3 m)

The proposed provisions result from wind tunnel test results on pressures applied on horizontal canopies described in Zisis and Stathopoulos (2010), Zisis et al. (2011) and Candelario et al. (2014). Restrictions to buildings under 60 ft high and to canopies that are essentially flat (maximum slope: 2%) are based upon a lack of test data. Canopies are different from roof overhangs, which are simply extensions of the roof surfaces at the same slope with the roof.

In a canopy with two physical surfaces both Figures 30.11-1A and 30.11-1B would be needed.

Figure 30.11-1A, which provides the coefficients on separate surfaces, would be used to design the fasteners of the top and soffit elements. Figure 30.11-1B would be used to design the structure of the canopy (e.g., joists, posts, building fasteners). In a canopy with one physical surface, only Figure 30.11-1B is needed.

References (to be added on page 790)

Zisis, I., and Stathopoulos, T. (2010). "Wind-induced pressures on patio covers." *Struct. Eng*. 136(9) 1172−1181.

Zisis, I., Stathopoulos, T., and Candelario, J. D. (2011). "Codification of wind loads on a patio cover based on a parametric wind tunnel study." *Proc., 13th Int. Conf. on Wind Engineering*, July 10−15, Amsterdam, The Netherlands. Amsterdam: Multi-Science Publishing Co.

Candelario, J. D., Stathopoulos, T., and Zisis, I. (2014). "Wind loading on attached canopies: Codification study." *Struct. Eng.* 140(5) May, CID: 04014007.

Errata 3

Effective: January 16, 2020

This document contains errata to the title, *Minimum Design Loads and Associated Criteria for Buildings and Other Structures*, ASCE/SEI 7-16, which is posted in the ASCE Library at https://doi.org/10.1061/9780784414248

THIS TYPE AND SIZE FONT INDICATES DIRECTIVE TEXT THAT IS NOT PART OF THE TITLE. CHANGES ARE INDICATED USING STRIKE-OUT AND HIGHLIGHTED TEXT.

Chapter 12

IN EQUATION 12.8-9, THE METRIC COEFFICIENT FOR C_q SHOULD BE 0.0058 AS FOLLOWS:

where C_q = 0.0019 ft (~~0.00058 m~~ 0.0058 m)

IN SECTION 12.3.3.4, DELETE THE COMMAS IN EXCEPTION AS FOLLOWS:

1. Connections of diaphragms to vertical elements and to collectors and
2. Collectors and their connections, including connections to vertical elements, of the seismic force-resisting system.

EXCEPTION: Forces calculated using the seismic load effects~~,~~ including overstrength of Section 12.4.3~~,~~ need not be increased.
^ ^

IN SECTION 12.3.3.4, "WHERE" IS MEANT TO INTRODUCE THE FOLLOWING PARAMETERS THAT ARE TO BE USED IN EQUATIONS 12.14-10 AND 12.14-11. "WHERE" SHOULD BE LOCATED BELOW THE LINE DESCRIBING THAT "KA NEED NOT BE TAKEN AS LARGER THAN 2.0".

K_a need not be taken as larger than 2.0 ~~where~~
where
Fp = ….

Chapter 13

IN SECTION 13.6.12, EXCEPTION NUMBER 2, THE METRIC CONVERSION FOR THE CUSTOMARY UNIT EQUATION AND THE ADDED SI UNIT EQUATION ARE AS FOLLOWS:

, but is not taken as less than 2 ft (~~1.2 m~~ 0.6 m)

$$\delta_{mpv} = 1.5 I_e (S_{DS} - 0.4)^2 \text{ [m]} \qquad (13.6\text{-}1.si)$$

Chapter 14

THE INCORRECT ACI 318 REFERENCE SECTION WAS LISTED IN SECTION 14.2.3:

14.2.3 Additional Detailing Requirements for Concrete Piles. In addition to the foundation requirements set forth in Sections 12.1.5 and 12.13 of this standard and in Section ~~14.2.3~~18.13 of ACI 318, design, detailing, and construction of concrete piles shall conform to the requirements of this section.

SECTIONS 14.2.4.3.1, 14.2.4.3.2, 14.2.4.3.3 HAS INCORRECT POINTER, IT SHOULD READ 14.2.4.4.7 AND NOT 14.2.4.6.7:

14.2.4.3.1 Low Deformability Element (LDE). Connectors or joint reinforcement used in precast concrete diaphragms with tension deformation capacity, as determined in Section 14.2.4.4.7 ~~14.2.4.6.7~~, less than 0.3 in. (7.5 mm) are classified as low deformability elements.
14.2.4.3.2 Moderate Deformability Element (MDE). Connectors or joint reinforcement used in precast concrete diaphragms with tension deformation capacity, as determined in Section 14.2.4.4.7 ~~14.2.4.6.7~~, greater than or equal to 0.3 in. (7.5 mm) but less than 0.6 in. (15 mm) are classified as moderate deformability elements.14.2.4.3.3 High Deformability Element (HDE). Connectors or joint reinforcement used in precast concrete diaphragms with tension deformation capacity, as determined in Section 14.2.4.4.7 ~~14.2.4.6.7~~, greater than or equal to 0.6 in. (15 mm) are classified as high deformability elements.

Chapter 18

IN SECTION 18.2.2.1, THE TITLE SHOULD BE MCE_R (AND NOT MCR_R):

18.2.2.1 Design Earthquake and MCE_R ~~MCR_R~~ Response Spectra.

Chapter 23

IN SECTION 23.1, CONSENSUS STANDARDS ARE CORRECTLY CITED AS FOLLOWS:

23.1 CONSENSUS STANDARDS AND OTHER REFERENCE DOCUMENTS

ACI 318, *Building Code Requirements for Structural Concrete and Commentary*, American Concrete Institute, 2014.

Cited in: Sections 11.2, 12.12.5, 12.13.8, 12.13.9.2.1.1, 12.13.9.2.1.2, 12.13.9.3.3, 12.13.9.3.4, 13.4.2.1, 13.4.4, 13.5.7.2, 14.2.1, 14.2.2, 14.2.2.1, 14.2.2.2, 14.2.2.3, 14.2.2.4, 14.2.2.5, 14.2.2.6, 14.2.2.7, 14.2.3, 14.2.3.1.1, 14.2.3.2.1, 14.2.3.2.2, 14.2.3.2.3, 14.2.3.2.5, 14.2.3.2.6, 14.2.4,

~~14.2.4.5.5~~14.2.4.3.5, 14.3.1, 14.3.2, 14.4.4.1.2, 14.4.5.2, 15.4.9.1, 15.4.9.4, 15.6.2.2, 15.7.5, 15.7.11.7. Table 12.2-1, Table 12.10-1, Table 15.4-1, Table 15.4-2

ASTM A615, *Standard Specification for Deformed and Plain Carbon-Steel Bars for Concrete Reinforcement*, 2016.

Cited in: Section ~~14.2.4.5.5~~14.2.4.3.5

ASTM A706/A706M, *Standard Specification for Low-Alloy Steel Deformed and Plain Bars for Concrete Reinforcement*, ASTM International, 2004.

Cited in: Section ~~14.2.4.5.5~~14.2.4.3.5

ASTM C39, *Standard Test Method for Comprehensive Strength of Cylindrical Concrete Specimens*

Cited in: Section ~~14.2.4.6.8~~14.2.4.4.8

Chapter 26

DELETE THE WORD “NOMINAL” IN NOTE 1 ON ***ALL*** WIND SPEED MAPS IN CHAPTER 26 (FIGURES 26.5-1A TO 26.5-1D AND 26.5-2A TO 26.5-2D) AS FOLLOWS:

1. Values are ~~nominal~~ design 3-s gust wind speeds in mi/h (m/s) at 33 ft (10 m) above ground for Exposure Category C.

Chapter 30

IN TABLE 30.4-1, CHANGES SHOULD BE MADE AS FOLLOWS:

Table 30.4-1 **Net Design Wind Pressure Tables (**pages 356, 357, and 361), “h/D” should be “h/B” and add B in Notation:

B = Horizontal dimension of building measured normal to wind direction, in ft (m).

IN TABLE 30.6-2, CHANGES SHOULD BE MADE AS FOLLOWS:

Table 30.6-2 in **Reduction Factors for Pressures Show in C&C Wall and Roof Pressures Table** (page 367), for Roof Form “Flat/gable/hip/mansard” the Sign Pressure “Plus and Minus” labels are switched; Minus should be on top for Zone 1 D and Plus should be on second line for Zone 1 NA as follows:

Reduction Factors for Pressures Shown in C&C Wall and Roof Pressures Tables

Roof Form	Sign Pressure	Zone 1	Zone 2	Zone 3	Zone 4	Zone 5
Flat/gable/hip/mansard	MINUS	D	D	D	C	E
($\theta < 7$ deg.)	PLUS	NA	NA	NA	D	D
Monoslope	Plus	A	B	D	C	E
	Minus	C	C	C	D	D
Overhang	All	A	A	B	NA	NA

Appendix CC

DELETE THE WORD "NOMINAL" IN APPENDIX CC, FIGURES CC.2-1 TO CC.2-4:

Pages 802 to 808

Notes:

1. Values are ~~nominal~~ design 3-s gust wind speeds in mi/h (m/s) at 33 ft (10 m) above ground for Exposure Category C.