CHAPTER 16A
STRUCTURAL DESIGN

Adopt and/or codify chapter as amended below:

<table>
<thead>
<tr>
<th>PROPOSED ADOPTION</th>
<th>DSA-SS</th>
<th>DSA-SS/CC</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Adopt entire chapter without amendments</td>
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<tr>
<td>Adopt entire chapter as amended</td>
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<td>X</td>
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</tr>
<tr>
<td>Adopt only those sections listed below</td>
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</tr>
</tbody>
</table>

(All existing California amendments that are not revised below shall continue without change)

DRAFT INITIAL EXPRESS TERMS

SECTION 1601A
GENERAL

1601A.1 Scope. The provisions of this chapter shall govern the structural design of buildings, structures and portions thereof regulated by this code.

1601A.1.1 Application. The scope of application of Chapter 16A is as follows:

1. Applications listed in Section 1.9.2.1, regulated by the Division of the State Architect-Structural Safety (DSASS). These applications include public elementary and secondary schools, community colleges and state-owned or state-leased essential services buildings.

2. [Reserved for OSHPD]

Exception: [Reserved for OSHPD]
1601A.1.2 Amendments in this chapter. DSA-SS adopt this chapter and all amendments.

**Exception:** Amendments adopted by only one agency appear in this chapter preceded with the appropriate acronym of the adopting agency, as follows:

1. *Division of the State Architect-Structural Safety: [DSA-SS]* – For applications listed in Section 1.9.2.1.

2. *(Reserved for OSHPD)*

1601A.2 Enforcement Agency Approval. In addition to requirements of the California Administrative Code and the California Building Code, any aspect of project design, construction, quality assurance, or quality control programs for which this code requires approval by the Registered Design Professional (RDP), are also subject to approval by the enforcement agency.

SECTION 1602A
DEFINITIONS AND NOTATIONS

1602A.1 Definitions. The following terms are defined in Chapter 2 except those defined below which shall, for the purposes of this section, have the meanings shown herein.

... 

**HOSPITAL BUILDING.** Any building defined in Section 129725, Health and Safety Code.

... 

SECTION 1603A
CONSTRUCTION DOCUMENTS
1603A.1 General. Construction documents shall show the size, section and relative locations of structural members with floor levels, column centers and offsets dimensioned. The design loads and other information pertinent to the structural design required by Sections 1603A.1.1 through 1603A.1.8 shall be indicated on the construction documents.

[DSA-SS] Additional requirements are included in Section 4-210 and 4-317 of the California Administrative Code (Part 1, Title 24, C.C.R).

[Reserved for OSHPD]

1603A.1.5 Earthquake design data. The following information related to seismic loads shall be shown, regardless of whether seismic loads govern the design of the lateral-force-resisting system of the building:

1. Risk Category
2. Seismic importance factor, $I_e$.
4. Site class.
5. Design spectral response acceleration parameters, $S_{DS}$ and $S_{D1}$.
6. Seismic design category.
7. Basic seismic-force-resisting system(s).
8. Design base shear.
9. Seismic response coefficient(s), $C_S$.
10. Response modification factor(s), $R$.
11. Analysis procedure used.
14. Location of base as defined in Section 1613A.2.
**1603A.1.5.1 Connections.** Connections that resist design seismic forces shall be designed and detailed on the design drawings.

... 

**1603A.1.9 1603A.1.10 Construction Procedures.** Where unusual erection or construction procedures are considered essential by the Registered Design Professional (RDP) in order to accomplish the intent of the design or influence the construction design, such procedure shall be indicated on the construction documents.

**1603A.2 Site Data Reports.** Geotechnical and Geohazard reports for review by the enforcement agency shall be accompanied by a description of the project prepared by the Registered Design Professional (RDP) in responsible charge, which shall include the following:

1. Type of service such as General Acute Care Facility, Skilled Nursing Facility, Intermediate Care Facility, Acute Psychiatric Facility, Central Utility Plants, K-12 school, community college, essential service, etc.
2. Construction materials used for the project such as Steel, Concrete, Masonry, Wood, etc.
3. Type of construction project such as new, addition, alteration, repair, etc.
4. For existing buildings, extent of construction such as incidental, minor, major, and/or voluntary seismic improvements as defined in Section 318, Part 10, Title 24, C.C.R 3418 [DSA-SS] Sections 202 and 3402A [OSHPD 1 & 4].
5. Seismic Force Resisting System used for each structure in the project.
6. Foundation system that will be used for each structure in the project such as spread footing, drilled piers, etc.
7. Analysis procedure used and basis of design such as ASCE 7 Equivalent Lateral Force Procedure, ASCE 41 Nonlinear Dynamic Procedure, etc.
8. Building characteristics such as number of stories above and below grade, foot print area at grade, grade slope on site, etc.
9. Special features such as requirement for shoring, underpinning, retaining walls, etc.
1603A.3 Structural Calculations. The application for the approval of construction documents that involves structural elements or components shall be accompanied by complete and accurate structural design computations, which shall comply with requirements prescribed by the enforcement agency:

1. The computations shall be preceded by a detailed index.
2. The computations including each major subsection shall be prefaced by a statement clearly and concisely outlining the basis for the structural design and indicating the manner in which the structure will resist the vertical loads and lateral forces.
3. The computations shall be sufficiently complete to the extent that calculations for the individual structural members and connections can be readily interpreted.

SECTION 1604A
GENERAL DESIGN REQUIREMENTS

1604A.3 Serviceability. Structural systems and members thereof shall be designed to have adequate stiffness to limit deflections and lateral drift. See Section 12.12.1 of ASCE 7 for drift limits applicable to earthquake loading.

1604A.3.1 Deflections. The deflections of structural members shall not exceed the more restrictive of the limitations of Sections 1604A.3.2 through 1604A.3.6 or that permitted by Table 1604A.3.

TABLE 1604A.3 - DEFLECTION LIMITS\textsuperscript{a, b, c, h, i}

<table>
<thead>
<tr>
<th>CONSTRUCTION</th>
<th>\textit{L or \textit{L}_c}</th>
<th>\textit{S or \textit{W}^f}</th>
<th>(\textit{D + (L or \textit{L}_c)}^{d,g})</th>
</tr>
</thead>
<tbody>
<tr>
<td>...</td>
<td>...</td>
<td>...</td>
<td>...</td>
</tr>
</tbody>
</table>

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Veneered walls, anchored veneers and adhered veneers over 1 inch (25 mm) thick, including the mortar backing

<p>| | | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>1/600</td>
<td></td>
</tr>
<tr>
<td>Farm buildings</td>
<td>—</td>
<td>—</td>
<td>1/180</td>
</tr>
<tr>
<td>Greenhouses</td>
<td>—</td>
<td>—</td>
<td>1/120</td>
</tr>
</tbody>
</table>

**1604A.3.7 Horizontal diaphragms.** The maximum span-width depth ratio for any roof or floor diaphragm consisting of steel and composite steel slab decking shall not exceed those given in Table 4.2.4 of AF & PA SDPWS for wood or maximum span-depth ratio given in Table 1604A.4 for steel and composite steel-slab decking, unless test data and design calculations acceptable to the enforcement agency are submitted and approved for the use of other span-width or span-depth ratios. Concrete diaphragms shall not exceed the span-depth ratios for the equivalent composite steel-slab diaphragm in Table 1604A.4.

**TABLE 1604A.4 – MAXIMUM HORIZONTAL DIAPHRAGM SPAN AND SPAN-DEPTH RATIOS**

<table>
<thead>
<tr>
<th>FLEXIBILITY FACTOR (F)²</th>
<th>MAXIMUM DIAPHRAGM SPAN FOR</th>
<th>DIAPHRAGM SPAN-DEPTH LIMITATION</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Rotation (torsion) Not Considered in Diaphragm</td>
<td>Rotation (torsion) Considered in Diaphragm</td>
</tr>
<tr>
<td>MASONRY OR CONCRETE WALLS (feet)</td>
<td>Masonry or Concrete Walls</td>
<td>Flexible Walls</td>
</tr>
<tr>
<td>----------------------------------</td>
<td>---------------------------</td>
<td>---------------</td>
</tr>
<tr>
<td>More than 150</td>
<td>Not to be used</td>
<td>2:1</td>
</tr>
<tr>
<td>70-150</td>
<td>200</td>
<td>2:1 or as required for deflection</td>
</tr>
<tr>
<td>10-70</td>
<td>400</td>
<td>2-1/2:1 or as required for deflection</td>
</tr>
<tr>
<td>1-10</td>
<td>No limitation</td>
<td>3:1 or as required for deflection</td>
</tr>
<tr>
<td>Less than 1</td>
<td>No limitation</td>
<td>As required for deflection</td>
</tr>
</tbody>
</table>

For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm, 1 plf = 14.6 N/m, 1 psi = 6894 Pa

1 Diaphragms shall satisfy span-depth limitations based on flexibility.
2 Flexibility Factor (F) is the average deflection in micro inches ($10^{-6}$) or μm of the diaphragm web per foot (m) of span stressed with a shear of 1 pound per foot (N/m).
3 The total deflection $\Delta$ of the diaphragm may be computed from the equation: $\Delta = \Delta_f + \Delta_w$.

Where:

$\Delta_f$ = Flexural deflection of the diaphragm determined in the same manner as the deflection of beams. The flexural stiffness of the web of diaphragms consisting of bare steel decking shall be neglected.

$\Delta_w$ = Web deflection of the diaphragm may be determined solving the following equation:
\[ F = \frac{\Delta \omega \times 10^6}{q_{ave} L} \]

Where:

\( L \) = Distance in feet (m) between the vertical resisting element (such as a shear wall) and the point to which the deflection is to be determined.

\( q_{ave} \) = Average shear in the diaphragm in pounds per foot (N/m) over length \( L \).

When applying these limitations to cantilevered diaphragms, the allowable span-depth ratio will be half of that shown.

1604A.3.8 Deflections. Deflection criteria for materials not specified shall be developed by the project architect or structural engineer in a manner consistent with the provisions of this section and approved by the enforcement agency.

1604A.4 Analysis. Load effects on structural members and their connections shall be determined by methods of structural analysis that take into account equilibrium, general stability, geometric compatibility and both short- and long-term material properties.

Members that tend to accumulate residual deformations under repeated service loads shall have included in their analysis the added eccentricities expected to occur during their service life.

Any system or method of construction to be used shall be based on a rational analysis in accordance with well-established principles of mechanics. Such analysis shall result in a system that provides a complete load path capable of transferring loads from their point of origin to the load-resisting elements.

The total lateral force shall be distributed to the various vertical elements of the lateral force-resisting system in proportion to their rigidities, considering the rigidity of the horizontal
bracing system or diaphragm. Rigid elements assumed not to be a part of the lateral force-resisting system are permitted to be incorporated into buildings provided their effect on the action of the system is considered and provided for in the design. A diaphragm is rigid for the purpose of distribution of story shear and torsional moment when the lateral deformation of the diaphragm is less than or equal to two times the average story drift. Where required by ASCE 7, provisions shall be made for the increased forces induced on resisting elements of the structural system resulting from torsion due to eccentricity between the center of application of the lateral forces and the center of rigidity of the lateral force resisting system.

Every structure shall be designed to resist the overturning effects caused by the lateral forces specified in this chapter. See Section 1609 for wind loads, Section 1610 for lateral soil loads and Section 1613 for earthquake loads.

...  

1604A.5 Risk category. Each building and structure shall be assigned a risk category in accordance with Table 1604A.5. Where a referenced standard specifies an occupancy category, the risk category shall not be taken as lower than the occupancy category specified therein. Where a referenced standard specifies that the assignment of a risk category be in accordance with ASCE 7, Table 1.5-1, Table 1604.5 shall be used in lieu of ASCE 7, Table 1.5-1.

...  

TABLE 1604A.5 - RISK CATEGORY OF BUILDINGS AND OTHER STRUCTURES

<table>
<thead>
<tr>
<th>RISK CATEGORY</th>
<th>NATURE OF OCCUPANCY</th>
</tr>
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<tbody>
<tr>
<td>...</td>
<td>...</td>
</tr>
</tbody>
</table>
Buildings and other structures that represent a substantial hazard to human life in the event of failure, including but not limited to:

- Group I-2 occupancies with an occupant load of 50 or more resident care recipients, but not having surgery or emergency treatment facilities.

Buildings and other structures designated as essential facilities, including but not limited to:

- Group I-2 occupancies having surgery or emergency treatment facilities.

- Designated emergency preparedness, communications and operations centers and other facilities required for emergency response. [DSA-SS] as defined in the California Administrative Code (Title 24, Part 1, CCR), Section 4-207 and all structures required for their continuous operation or access/egress.

1604A.8.2 Structural walls. Walls that provide vertical load-bearing resistance or lateral shear resistance for a portion of the structure shall be anchored to the roof and to all floors and members that provide lateral support for the wall or that are supported by the wall. The connections shall be capable of resisting the horizontal forces specified in Section 1.4.4 of ASCE 7 for walls of structures assigned to Seismic Design Category A.
and to Section 12.11 of ASCE 7 for walls of structures assigned to all other seismic design categories. For anchorage of concrete or masonry walls to roof and floor diaphragms, the out-of-plane strength design force shall not be less than 280 lb/linear ft (4.09 kN/m) of wall. Required anchors in masonry walls of hollow units or cavity walls shall be embedded in a reinforced grouted structural element of the wall. See Sections 1609A for wind design requirements and 1613A for earthquake design requirements.

... 

SECTION 1605A
LOAD COMBINATIONS

1605A.1 General. Buildings and other structures and portions thereof shall be designed to resist:

...

1605A.1.1 Stability. Regardless of which load combinations are used to design for strength, where overall structure stability (such as stability against overturning, sliding, or buoyancy) is being verified, use of the load combinations specified in Section 1605A.2 or 1605A.3 shall be permitted. Where the load combinations specified in Section 1605A.2 are used, strength reduction factors applicable to soil resistance shall be provided by a registered design professional. The stability of retaining walls shall be verified in accordance with Section 1807A.2.3. When using allowable stress design, factor of safety for soil bearing values shall not be less than the overstrength factor of the structures supported.

...

SECTION 1606A
DEAD LOADS

...
1606A.3 Roof Dead Loads. The design dead load shall provide for the weight of at least one additional roof covering in addition to other applicable loadings if the new roof covering is permitted to be applied over the original roofing without its removal, in accordance with Section 1511.1540.

... 

SECTION 1607A 
LIVE LOADS

... 

1607A.1 General. Live loads are those loads defined in Chapter 2 of this code.

1607A.2 Loads not specified. For occupancies or uses not designated in Table 1607A.1, the live load shall be determined in accordance with a method approved by the building official.

1607A.3 Uniform live loads. The live loads used in the design of buildings and other structures shall be the maximum loads expected by the intended use or occupancy but shall in no case be less than the minimum uniformly distributed unit loads required by Table 1607A.1.

... 

TABLE 1607A.1 - MINIMUM UNIFORMLY DISTRIBUTED LIVE LOADS AND MINIMUM CONCENTRATED LIVE LOADS

<table>
<thead>
<tr>
<th>OCCUPANCY OR USE</th>
<th>UNIFORM (psf)</th>
<th>CONCENTRATED (lbs.)</th>
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<tr>
<td>...</td>
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<td>...</td>
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<tr>
<td>4. Assembly areas&lt;sup&gt;0,q&lt;/sup&gt;</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fixed seats (fastened to floor)</td>
<td>60&lt;sup&gt;m&lt;/sup&gt;</td>
<td></td>
</tr>
<tr>
<td>Follow spot, projections and control rooms</td>
<td>50&lt;sup&gt;m&lt;/sup&gt;</td>
<td></td>
</tr>
<tr>
<td>Lobbies</td>
<td>100&lt;sup&gt;m&lt;/sup&gt;</td>
<td></td>
</tr>
<tr>
<td>Movable seats</td>
<td>150&lt;sup&gt;m&lt;/sup&gt;</td>
<td></td>
</tr>
<tr>
<td>Stage floors</td>
<td>100&lt;sup&gt;m&lt;/sup&gt;</td>
<td></td>
</tr>
<tr>
<td>Platforms (assembly)</td>
<td>100&lt;sup&gt;m&lt;/sup&gt;</td>
<td></td>
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<tr>
<td>Other assembly areas</td>
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<table>
<thead>
<tr>
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<tr>
<td>Corridors above first floor</td>
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<td>Corridors above first floor</td>
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<tr>
<td>Reading rooms</td>
<td>File and computer rooms</td>
<td>File and computer rooms</td>
</tr>
<tr>
<td>Stack rooms</td>
<td>shall be designed for</td>
<td>shall be designed for</td>
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<tr>
<td></td>
<td>heavier loads based on</td>
<td>heavier loads based on</td>
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<tr>
<td></td>
<td>anticipated occupancy</td>
<td>anticipated occupancy</td>
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<tr>
<td></td>
<td>Lobbies and first-floor</td>
<td>Lobbies and first-floor</td>
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<tr>
<td></td>
<td>corridors</td>
<td>corridors</td>
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<tr>
<td></td>
<td>Offices</td>
<td>Offices</td>
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<tr>
<td>80</td>
<td>2,000</td>
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<tr>
<td>60</td>
<td>—</td>
<td>—</td>
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<tr>
<td>150 b,m</td>
<td>1,000</td>
<td>100</td>
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<td>1,000</td>
<td>2,000</td>
<td></td>
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<tr>
<td>1,000</td>
<td>2,000</td>
<td></td>
</tr>
<tr>
<td>24. Reviewing stands,</td>
<td>24. Reviewing stands,</td>
<td>24. Reviewing stands,</td>
</tr>
<tr>
<td>grandstands and bleachers</td>
<td>grandstands and bleachers</td>
<td>grandstands and bleachers</td>
</tr>
<tr>
<td>100c,m</td>
<td>100c,m</td>
<td>100c,m</td>
</tr>
<tr>
<td>27. Schools</td>
<td>27. Schools</td>
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<tr>
<td>Classrooms</td>
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<tr>
<td>Corridors above first floor</td>
<td>Corridors above first floor</td>
<td>Corridors above first floor</td>
</tr>
<tr>
<td>First-floor corridors</td>
<td>First-floor corridors</td>
<td>First-floor corridors</td>
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<tr>
<td>40 e</td>
<td>80</td>
<td>100</td>
</tr>
<tr>
<td>1,000</td>
<td>1,000</td>
<td>1,000</td>
</tr>
<tr>
<td>35. Yards and terraces,</td>
<td>35. Yards and terraces,</td>
<td>35. Yards and terraces,</td>
</tr>
<tr>
<td>pedestrians</td>
<td>pedestrians</td>
<td>pedestrians</td>
</tr>
<tr>
<td>100m</td>
<td>100m</td>
<td>100m</td>
</tr>
<tr>
<td>36. Storage racks and wall-</td>
<td>Total Loads</td>
<td>2015 Triennial Code Adoption Cycle</td>
</tr>
<tr>
<td>hung cabinets.</td>
<td>Total Loads</td>
<td>Title 24, Part 2, Volumes 1 &amp; 2 - Structural</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Draft Express Terms</td>
</tr>
</tbody>
</table>

n. The minimum vertical design live load shall be as follows:

**Paper media:**
- 12-inch-deep (305 mm) shelf: 33 pounds per lineal foot (482 N/m),
- 15-inch-deep (381 mm) shelf: 41 pounds per lineal foot (598 N/m), or
- 33 pounds per cubic foot (5183 N/m³) per total volume of the rack or cabinet, whichever is less.

**Film media:**
- 18-inch-deep (457 mm) shelf: 100 pounds per lineal foot (1459 N/m), or
- 50 pounds per cubic foot (7853 N/m³) per total volume of the rack or cabinet, whichever is less.

**Other media:**
20 pounds per cubic foot (311 N/m³) or 20 pounds per square foot (958 Pa), whichever is less, but not less than actual loads.

o. [DSA-SS] The following minimum loads for stage accessories apply:

1. Gridirons and fly galleries: 75 pounds per square foot uniform live load.

2. Loft block wells: 250 pounds per lineal foot vertical load and lateral load.

3. Head block wells and sheave beams: 250 pounds per lineal foot vertical load and lateral load. Head block wells and sheave beams shall be designed for all tributary loft block well loads. Sheave blocks shall be designed with a safety factor of five.

4. Scenery beams where there is no gridiron: 300 pounds per lineal foot vertical load and lateral load.

5. Ceiling framing over stages shall be designed for a uniform live load of 20 pounds per square foot. For members supporting a tributary area of 200 square feet or more, this additional load may be reduced to 15 pounds per square foot.

p. [DSA-SS] The minimum uniform live load for classroom occupancies is 50 psf. Live load reduction is not permitted for classrooms classified as Group A occupancies unless specific exception of Section 1607A.10 apply.

q. [DSA-SS] The minimum uniform live load for a press box floor or accessible roof with railing is 100 psf.

r. [DSA-SS] Item 35 applies to pedestrian bridges and walkways that are not subjected to uncontrolled vehicle access.

...
SECTION 1608A
SNOW LOADS

1608A.2 Ground snow loads. The ground snow loads to be used in determining the design snow loads for roofs shall be determined in accordance with ASCE 7 or Figure 1608A.2 for the contiguous United States and Table 1608.2 for Alaska. Site-specific case studies shall be made in areas designated "CS" in Figure 1608A.2. Ground snow loads for sites at elevations above the limits indicated in Figure 1608A.2 and for all sites within the CS areas shall be approved. Ground snow load determination for such sites shall be based on an extreme value statistical analysis of data available in the vicinity of the site using a value with a 2-percent annual probability of being exceeded (50-year mean recurrence interval). Snow loads are zero for Hawaii, except in mountainous regions as approved by the building official.

TABLE 1608.2 - GROUND SNOW LOADS, pg , FOR ALASKAN LOCATIONS

<table>
<thead>
<tr>
<th>LOCATION</th>
<th>POUNDS PER SQUARE FOOT</th>
<th>LOCATION</th>
<th>POUNDS PER SQUARE FOOT</th>
<th>LOCATION</th>
<th>POUNDS PER SQUARE FOOT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Adak</td>
<td>30</td>
<td>Galena</td>
<td>60</td>
<td>Petersburg</td>
<td>150</td>
</tr>
<tr>
<td>Anchorage</td>
<td>50</td>
<td>Gulkana</td>
<td>70</td>
<td>St. Paul Islands</td>
<td>40</td>
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<tr>
<td>Angoon</td>
<td>70</td>
<td>Homer</td>
<td>40</td>
<td>Seward</td>
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<tr>
<td>Barrow</td>
<td>25</td>
<td>Juneau</td>
<td>60</td>
<td>Shemya</td>
<td>25</td>
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<td>Barter Island</td>
<td>35</td>
<td>Kenai</td>
<td>70</td>
<td>Sitka</td>
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<tr>
<td>Bethel</td>
<td>40</td>
<td>Kodiak</td>
<td>30</td>
<td>Talkeetna</td>
<td>120</td>
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<tr>
<td>Location</td>
<td>Wind Load</td>
<td>Location</td>
<td>Wind Load</td>
<td>Location</td>
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<tr>
<td>----------------</td>
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<td>-----------</td>
<td>----------------</td>
<td>-----------</td>
</tr>
<tr>
<td>Big-Delta</td>
<td>50</td>
<td>Kotzebue</td>
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<td>Unalakleet</td>
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<td>Cold Bay</td>
<td>25</td>
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<td>70</td>
<td>Valdez</td>
<td>160</td>
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<tr>
<td>Cordova</td>
<td>100</td>
<td>Nenana</td>
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<td>Whittier</td>
<td>300</td>
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<td>Cold Bay</td>
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<td>Nome</td>
<td>70</td>
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<td>60</td>
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<tr>
<td>Fort Yukon</td>
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<td>Palmer</td>
<td>60</td>
<td>Yakutat</td>
<td>150</td>
</tr>
</tbody>
</table>

For SI: 1 pound per square foot = 0.0479 kN/m².

**FIGURE 1608A.2 - Not shown for Clarity**

...  

1608A.4 Determination of snow loads. [DSA-SS] The ground snow load or the design snow load for roofs shall conform with the adopted ordinance of the city, county, or city and county in which the project site is located, and shall be approved by DSA.

**SECTION 1609A**

**WIND LOADS**

...  

1609A.1.3 Story Drift for Wind Loads. The calculated story drift due to wind pressures with ultimate design wind speed, \( V_{ulh} \), shall not exceed 0.008 times the story height for buildings less than 65 feet (19,812 mm) in height or 0.007 times the story height for buildings 65 feet (19,812 mm) or greater in height.

**Exception: [DSA-SS]** This story drift limit need not be applied for single-story open structures buildings in Risk Category I and II.

...
SECTION 1612A
FLOOD LOADS

1612A.3 Establishment of flood hazard areas. To establish flood hazard areas, the applicable governing authority shall adopt a flood hazard map and supporting data. The flood hazard map shall include, at a minimum, areas of special flood hazard as identified by the Federal Emergency Management Agency in an engineering report entitled “The Flood Insurance Study for [INSERT NAME OF JURISDICTION],” dated [INSERT DATE OF ISSUANCE], Agency’s Flood Insurance Study (FIS) adopted by the local authority having jurisdiction where the project is located, as amended or revised with the accompanying Flood Insurance Rate Map (FIRM) and Flood Boundary and Floodway Map (FBFM) and related supporting data along with any revisions thereto. The adopted flood hazard map and supporting data are hereby adopted by reference and declared to be part of this section.

...
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, SS, 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.

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.

1613A.2 Definitions. The following terms are defined in Chapter 2 except those defined below which shall, for the purposes of this section, have the meanings shown herein. Definition provided in ASCE 7 Section 11.2 and [OSHPD 1 & 4] Section 3402A.1 and ASCE 7–Section 11.2 shall apply when appropriate in addition to terms defined in this section.

ACTIVE EARTHQUAKE FAULT. A fault that has been the source of earthquakes or is recognized as a potential source of earthquakes, including those that have exhibited surface displacement within Holocene time (about 11,000 years) as determined by California Geological Survey (CGS) under the Alquist-Priolo Earthquake Fault Zoning Act, those included as type A or type B faults for the U.S. Geological Survey (USGS) National Seismic Hazard Maps, and faults considered to have been active in Holocene time by any authoritative source, Federal, State or Local Governmental Agency.

BASE. The level at which the horizontal seismic ground motions are considered to be imparted to the structure or the level at which the structure as a dynamic vibrator is supported. This level does not necessarily coincide with the ground level.
DISTANCE FROM AN ACTIVE EARTHQUAKE FAULT. Distance measured from the nearest point of the building to the closest edge of an Alquist-Priolo Earthquake fault zone for an active fault, if such a map exists, or to the closest mapped splay of the fault.

GENERAL ACUTE CARE HOSPITAL. See Section 1224.3.

HOSPITAL BUILDINGS. Hospital buildings and all other medical facilities as defined in Section 1250, Health and Safety Code.

IRREGULAR STRUCTURE. A structure designed as having one or more plan or vertical irregularities per ASCE 7 Section 12.3.

STRUCTURAL ELEMENTS. Floor or roof diaphragms, decking, joists, slabs, beams, or girders, columns, bearing walls, retaining walls, masonry or concrete nonbearing walls exceeding one story in height, foundations, shear walls or other lateral-force-resisting members, and any other elements necessary to the vertical and lateral strength or stability of either the building as a whole or any of its parts, including connection between such elements.

1613A.3 Seismic ground motion values. Seismic ground motion values shall be determined in accordance with this section.

1613A.3.1 Mapped acceleration parameters. The parameters $S_s$ and $S_1$ shall be determined from the 0.2 and 1-second spectral response accelerations shown on Figures 1613.3.1(1) through 1613.3.1(8). Where $S_1$ is less than or equal to 0.04 and $S_s$ is less
than or equal to 0.15, the structure is permitted to be assigned to Seismic Design Category A. ---

(Figures 1613.3.1(1) through 1613.3.1(8) were stricken in the CBC 2013 and will not be shown in Chapter 16A. These figures are shown in Chapter 16)

...

1613A.3.5 Determination of seismic design category. Structures classified as Risk Category I, II or III that are located where the mapped spectral response acceleration parameter at 1-second period, $S_1$, is greater than or equal to 0.75 shall be assigned to Seismic Design Category E. Structures classified as Risk Category IV that are located where the mapped spectral response acceleration parameter at 1-second period, $S_1$, is greater than or equal to 0.75 shall be assigned to Seismic Design Category F. All other structures shall be assigned to Seismic Design Category D. a seismic design category based on their occupancy category and the design spectral response acceleration coefficients, $S_{DS}$ and $S_{DL}$, determined in accordance with Section 1613.5.4 or the site-specific procedures of ASCE 7. Each building and structure shall be assigned to the more severe seismic design category in accordance with Table 1613.5.6(1) or 1613.5.6(2), irrespective of the fundamental period of vibration of the structure, $T$.

**TABLE 1613.3.5(1) - SEISMIC DESIGN CATEGORY BASED ON SHORT-PERIOD (0.2 second) RESPONSE ACCELERATIONS**

<table>
<thead>
<tr>
<th>VALUE OF $S_{DS}$</th>
<th>RISK CATEGORY</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>I or II</td>
</tr>
<tr>
<td>$S_{DS} &lt; 0.167g$</td>
<td>A</td>
</tr>
<tr>
<td>$0.167g \leq S_{DS} &lt; 0.33g$</td>
<td>B</td>
</tr>
<tr>
<td>$0.33g \leq S_{DS} &lt; 0.50g$</td>
<td>C</td>
</tr>
</tbody>
</table>
TABLE 1613.3.5(2) - SEISMIC DESIGN CATEGORY BASED ON 1-SECOND PERIOD RESPONSE ACCELERATION

<table>
<thead>
<tr>
<th>VALUE OF S(_D1)</th>
<th>RISK CATEGORY</th>
</tr>
</thead>
<tbody>
<tr>
<td>(0.50g \leq S_{DS})</td>
<td>D-</td>
</tr>
</tbody>
</table>

### 1613A.3.5.1 Alternative seismic design category determination.

*Not permitted by DSA-SS.* Where \(S_1\) is less than 0.75, the seismic design category is permitted to be determined from Table 1613.3.5(1) alone when all of the following apply:

1. In each of the two orthogonal directions, the approximate fundamental period of the structure, \(T_a\), in each of the two orthogonal directions determined in accordance with Section 12.8.2.1 of ASCE 7, is less than 0.8 \(T_s\) determined in accordance with Section 11.4.5 of ASCE 7.

2. In each of the two orthogonal directions, the fundamental period of the structure used to calculate the story drift is less than \(T_s\).

3. Equation 12.8-2 of ASCE 7 is used to determine the seismic response coefficient, \(C_s\).

4. The diaphragms are rigid or are permitted to be idealized as rigid in accordance with Section 12.3.1 in ASCE 7 or for diaphragms permitted to be idealized as
flexible in accordance with Section 12.3.1 of ASCE 7, the distance between vertical elements of the seismic-force-resisting system does not exceed 40 feet (12 192 mm).

1613A.3.5.2 Simplified design procedure. Not permitted by DSA-SS. Where the alternate simplified design procedure of ASCE 7 is used, the seismic design category shall be determined in accordance with ASCE 7.

1613A.4.1 Additional seismic-force-resisting systems for seismically isolated structures. Add the following exception to the end of Section 17.5.4.2 of ASCE 7:

Exception: For isolated structures designed in accordance with this standard, the structural system limitations including the structural height limitations in Table 12.2-1 for ordinary steel concentrically braced frames (OCBFs) as defined in Chapter 11 and ordinary intermediate moment frames (OMFs) (IMFs) as defined in Chapter 11 are permitted to be taken as 160 feet (48 768 mm) for structures assigned to Seismic Design Category D, E or F, provided that the following conditions are satisfied:

1. The value of $R_i$ as defined in Chapter 17 is taken as 1.

2. For OMFs and OCBFs, design is in accordance with AISC 341.

3. For IMFs, design is in accordance with AISC 341. In addition, requirements of Section E3.6e of AISC 341 shall be satisfied.
1615A.1 General. High-rise buildings that are assigned to Risk Category III or IV shall comply with the requirements of this section. Frame structures shall comply with the requirements of Section 1615A.3. Bearing wall structures shall comply with the requirements of Section 1615A.4.

1615A.2 Definitions. The following words and terms are defined in Chapter 2 except those defined below shall, for the purposes of this section, have the meanings shown herein.

…

HIGH-RISE BUILDING. A building with an occupied floor located more than 75 feet (22 860 mm) above the base.

…

SECTION 1616A
MODIFICATIONS TO ASCE 7

1616A.1 General. The text of ASCE 7 shall be modified as indicated in Sections 1616A.1.1 through 1616A.1.42.

1616A.1.1 ASCE 7, Section 1.3. Modify ASCE 7 Section 1.3 by adding Section 1.3.6 as follows:

1.3.6 Structural Design Criteria. Where design is based on ASCE 7 Chapters 16, 17, or 18, and 31, the ground motion, wind tunnel design recommendations, analysis, and design methods, material assumptions, testing requirements, and acceptance criteria proposed by the engineer shall be submitted to the enforcement agency in the form of structural design criteria for approval.

[relocated from above] [DSA-SS] Structural design criteria including wind tunnel design recommendations are required where design is based on ASCE 7 Chapter 31.
Peer review requirements in Section 3414A of this code shall apply to design reviews required by ASCE 7 Chapters 17 and 18.

**1616A.1.2 ASCE 7, Section 11.1.3.** Replace last paragraph of ASCE 7 Section 11.1.3 by the following:

Buildings shall be designed and detailed in accordance with Chapter 12.

**1616A.1.3 ASCE 7, Section 11.4.7.** Modify ASCE 7 Section 11.4.7 by adding the following:

For buildings assigned to Seismic Design Category E or F, or when required by the building official, a ground motion hazard analysis shall be performed in accordance with ASCE 7 Chapter 21 as modified by Section 1803A.6 of this code.

**1616A.1.4 ASCE 7, Table 12.2 -1.** Modify ASCE 7 Table 12.2-1 as follows:

**A. BEARING WALL SYSTEMS**

5. *(Reserved for OSHPD)*

17. Light-framed walls with shear panels of all other materials – Not permitted by DSA-SS.

**B. BUILDING FRAME SYSTEMS**

3. *(Reserved for OSHPD)*

8. *(Reserved for OSHPD)*
24. Light-framed walls with shear panels of all other materials – Not permitted by DSA-SS.

26. [Reserved for OSHPD]

C. MOMENT RESISTING FRAME SYSTEMS

2. [Reserved for OSHPD].

3. [Reserved for OSHPD].

4. [Reserved for OSHPD].

5. Cold-formed steel – special bolted moment frame - Not permitted by DSA-SS.

Exception:

1) Systems listed in this section can be used as an alternative system when pre-approved by the enforcement agency.

2) Rooftop or other supported structures not exceeding two stories in height and 10 percent of the total structure weight can use the systems in this section when designed as components per ASCE 7 Chapter 13.

3) Systems listed in this section can be used for seismically isolated buildings when permitted by Section 1613A.4.1.

1616A.1.5 ASCE 7, Section 12.2.3.1. Replace ASCE 7 Section 12.2.3.1 Items # 1 and # 2 by the following:

The value of the response modification coefficient, R, used for design at any story shall not exceed the lowest value of R that is used in the same direction at any
story above that story. Likewise, the deflection amplification factor, \( C_d \), and the system over strength factor, \( \Omega_0 \), used for the design at any story shall not be less than the largest values of these factors that are used in the same direction at any story above that story.

1616A.1.6 ASCE 7, Section 12.2.3.2. Modify ASCE 7 Section 12.2.3.2 by adding the following additional requirement:

f. Where design of elements of the upper portion is governed by special seismic load combinations, the special loads shall be considered in the design of the lower portion.

1616A.1.7 ASCE 7, Section 12.2.5.6.1 [DSA-SS] The exception after the first paragraph is not permitted by DSA-SS.

1616A.1.8 ASCE 7, Section 12.2.5.7.1 [DSA-SS] The exception after the first paragraph is not permitted by DSA-SS.

1616A.1.9 ASCE 7, Section 12.2.5.7.2 [DSA-SS] The exception after the first paragraph is not permitted by DSA-SS.

1616A.1.10 ASCE 7, Section 12.3.3. Modify first sentence of ASCE 7 Section 12.3.3.1 as follows:

12.3.3.1 Prohibited Horizontal and Vertical Irregularities for Seismic Design Categories D through F. Structures assigned to Seismic Design Category D, E, or F having horizontal structural irregularity Type 1b of Table 12.3-1 or vertical structural irregularities Type 1b, 5a or 5b of Table 12.3-2 shall not be permitted.

1616A.1.11 ASCE 7, Section 12.7.2. Modify ASCE 7 Section 12.7.2 by adding item 6 to read as follows:
6. Where buildings provide lateral support for walls retaining earth, and the exterior
grades on opposite sides of the building differ by more than 6 feet (1829 mm), the
load combination of the seismic increment of earth pressure due to earthquake acting
on the higher side, as determined by a Geotechnical engineer qualified in soils
engineering plus the difference in earth pressures shall be added to the lateral forces
provided in this section.

1616A.1.12 ASCE 7, Section 12.8.1.3. Replace ASCE 7 Section 12.8.1.3 by the following:

12.8.1.3 Maximum $S_s$ Value in Determination of $C_s$. For regular structures five
stories or less above the base as defined in Section 11.2 and with a period, $T$, of 0.5
s or less, $C_s$ is permitted to be calculated using the larger of either $S_s = 1.5$ or 80% of
the value of $S_s$ determined per Sections 11.4.1 or 11.4.7.

12.8.1.3 Maximum $S_{DS}$ Value in Determination of $C_s$ and $E_v$
The value of $C_s$ and $E_v$ are permitted to be calculated using a value of $S_{DS}$ equal to
1.0, but not less than 70% of $S_{DS}$ as defined in Section 11.4.4, provided that all of the
following criteria are met:

1. The structure does not have irregularities, as defined in Section 12.3.2;
2. The structure does not exceed five stories above the base as defined in
   Section 11.2;
3. The structure has a fundamental period, $T$, that does not exceed 0.5 seconds,
   as determined using Section 12.8.2;
4. The structure meets the requirements necessary for the redundancy factor, $\rho$,
   to be permitted to be taken as 1.0, in accordance with Section 12.3.4.2;
5. The site soil properties are not classified as Site Class E or F, as defined in
   Section 11.4.2; and
6. The structure is classified as Risk Category I or II, as defined in Section 1.5.1.
7. [Reserved for OSHPD]

1616A.1.13 ASCE 7, Section 12.9.4. Replace ASCE 7 Section 12.9.4 as follows:

12.9.4 Scaling Design Values of Combined Response. Modal base shears used to
determine forces and drifts shall not be less than the base shears calculated using
the equivalent lateral force procedure of section 12.8.
1616A.1.14 ASCE 7, Section 12.10.2.1. Replace ASCE 7 Exception 1. of Section 12.10.2.1 by the following:

EXCEPTIONS:

1. The forces calculated above need not exceed those calculated using the load combinations with overstrength factor of Section 12.4.3.2 with seismic forces determined by Equation 12.10-3 and transfer forces, where applicable.

1616A.1.15 ASCE 7, Section 12.12.3. [Reserved for OSHPD]

1616A.1.16 ASCE 7, Section 12.13.1. Modify ASCE 7 section 12.13.1 by adding Section 12.13.1.1 as follows:

12.13.1.1 Foundations and superstructure-to-foundation connections. The foundation shall be capable of transmitting the design base shear and the overturning forces from the structure into the supporting soil. Stability against overturning and sliding shall be in accordance with Section 1605A.1.1.

In addition, the foundation and the connection of the superstructure elements to the foundation shall have the strength to resist, in addition to gravity loads, the lesser of the following seismic loads:

1. The strength of the superstructure elements.

2. The maximum forces that would occur can be delivered to the foundation in the a fully yielded structural system.

3. Forces from the Load Combinations with overstrength factor in accordance with ASCE 7 Section 12.4.3.2.

Exceptions:
1. Where reference standards specify the use of higher design loads.

2. When it can be demonstrated that inelastic deformation of the foundation and superstructure-to-foundation connection will not result in a weak story or cause collapse of the structure.

3. Where basic structural system consists of light framed walls with shear panels, unless the reference standard specifies the use of higher design loads.

Where the computation of the seismic overturning moment is by the equivalent lateral-force method or the modal analysis method, reduction in overturning moment permitted by section 12.13.4 of ASCE 7 may be used.

Where moment resistance is assumed at the base of the superstructure elements, the rotation and flexural deformation of the foundation as well as deformation of the superstructure-to-foundation connection shall be considered in the drift and deformation compatibility analyses.

1616A.1.17 ASCE 7, Section 13.1.3. [Reserved for OSHPD]

1616A.1.18 ASCE 7, Section 13.1.4. Replace ASCE 7 Section 13.1.4 with the following:

13.1.4 Exemptions. The following nonstructural components are exempt from the requirements of this section:

1. Furniture (except storage cabinets as noted in Table 13.5-1).
2. Temporary or moveable (mobile) equipment.

Exceptions:
a) Equipment shall be anchored if it is permanently attached to the building utility services such as electricity, gas, or water. For the purposes of this requirement, “permanently attached” shall include all electrical connections except plugs for duplex receptacles.

b) The enforcement agency shall be permitted to require temporary attachments for movable equipment which is usually stationed in one place and heavier than 400 pounds or has a center of mass located 4 feet (1.22 m) or more above the adjacent floor or roof level that directly support the component, when they are not in use for a period longer than 8 hours at a time.

3. Architectural, mechanical and electrical components in Seismic Design Categories D, E, or F where all of the following apply:

a. The component is positively attached to the structure;

b. Flexible connections are provided at seismic separation joints and between the component and associated ductwork, piping, and conduit; and either:

i. The component weighs 400 pounds (1780 N) or less and has a center of mass located 4 feet (1.22 m) or less above the adjacent floor or roof level that directly support the component;

   Exception: Special Seismic Certification requirements of this code in accordance with Section 1705A.12.4 shall be applicable.

   or

ii. The component weighs 20 pounds (89 N) or less or, in the case of a distributed system, 5 lb/ft (73 N/m) or less.
Exception: The enforcement agency shall be permitted to require attachments for equipment with hazardous contents to be shown on construction documents irrespective of weight.

1616A.1.19 ASCE 7, Section 13.4. Replace ASCE 7 Section 13.4.2.3 with the following:

13.4.2.3 Prequalified P post-installed anchors and specialty inserts in Concrete and Masonry.

Post-installed anchors and specialty inserts in concrete that are used for component anchorage shall be pre-qualified for seismic applications in accordance with ACI 355.2, ACI 355.4, ICC-ES AC193, ICC-ES AC232, or ICC-ES AC308 or ICC-ES AC446 shall be permitted. Post-installed anchors in masonry used for component anchorage shall be pre-qualified for seismic applications in accordance with ICC-ES AC01, AC58, or AC106.

Use of screw anchors shall be limited to dry interior conditions and shall not be used in building enclosure walls. Re-use of screw anchors or screw anchor holes shall not be permitted.

Exception: [DSA-SS] Screw anchors are not prohibited for use in building enclosure walls.
Modify ASCE 7 Section 13.4.5 by adding Section 13.4.5.1 as follows:

(Relocated from Section 1908A.1.1) **13.4.5.1 Power Actuated Fasteners:** Power actuated fasteners qualified in accordance with ICC-ES AC 70 shall be deemed to satisfy the requirements of Section 13.4.5. This section.

Power actuated fasteners shall be permitted in seismic shear for components exempt from permit requirements by Section 1616A.1.18 of this code and for interior non-bearing non-shear wall partitions only. Power actuated fastener shall not be used to anchor seismic bracing, exterior cladding or curtain wall systems.

*Exception: Power actuated fasteners in steel to steel connections prequalified for seismic application by cyclic tests in accordance with ICC-ES AC 70 shall be permitted for seismic design.*

Replace ASCE 7, Section 13.5.6 with the following:

**13.5.6 Suspended Ceilings.** Suspended ceilings shall be in accordance with this section.

**13.5.6.1 Seismic Forces.** The weight of the ceiling, \( W_p \), shall include the ceiling grid; ceiling tiles or panels; light fixtures if attached to, clipped to, or laterally supported by the ceiling grid; and other components that are laterally supported by the ceiling. \( W_p \) shall be taken as not less than 4 psf (19 N/m²).

The seismic force, \( F_p \), shall be transmitted through the ceiling attachments to the building structural elements or the ceiling-structure boundary.
13.5.6.2 Seismic Design Requirements. Suspended acoustical tile or lay-in panel ceilings shall be designed in accordance with ASTM E 580 Section 5.2.8 and the requirements of Sections 13.5.6.2.1 and 13.5.6.2.2, or be designed in accordance with Section 13.2.1.1, or be seismically qualified in accordance with Sections 13.2.5 or 13.2.6.

13.5.6.2.1. Industry Standard Construction for Acoustical Tile or Lay-In Panel Ceilings. Acoustical tile or lay-in panel ceilings in Seismic Design Categories D, E, and F shall be designed and installed in accordance with ASTM C635, ASTM C636, and ASTM E 580, Section 5 - Seismic Design Categories D, E, and F as modified by Section 13.5.6.2.2.

Exception to Section 13.5.8.1 shall not be used in accordance with ASTM E 580 Section 5.5.

13.5.6.2.2 Modification to ASTM E 580. Modify ASTM E 580 by the following:

1. Exitways. Lay-in ceiling assemblies in exitways of hospitals and essential services buildings shall be installed with a main runner or cross runner surrounding all sides of each piece of tile, board or panel and each light fixture or grille. A cross runner that supports another cross runner shall be considered as a main runner for the purpose of structural classification. Splices or intersections of such runners shall be attached with through connectors such as pop rivets, screws, pins, plates with end tabs or other approved connectors. Lateral force diagonal bracing may be omitted in the short or transverse direction of exitways, not exceeding 8 feet wide, when perimeter support in accordance with ASTM E 580 Sections 5.2.2 and 5.2.3 is provided and the perimeter wall laterally supporting the ceiling in the short or transverse direction is designed to carry the ceiling lateral forces. The connections between the ceiling grid, wall angle and the wall shall be designed to resist the ceiling lateral forces.
2. **Corridors and Lobbies.** Expansion joints shall be provided in the ceiling at intersections of corridors and at junctions of corridors and lobbies or other similar areas.

3. **Lay-in panels.** Metal panels and panels weighing more than 1/2 pounds per square foot (24 N/m²) other than acoustical tiles shall be positively attached to the ceiling suspension runners.

4. **Lateral force bracing.** Lateral force bracing is required for all ceiling areas except that they shall be permitted to be omitted in rooms with floor areas up to 144 square feet when perimeter support in accordance with ASTM E 580 Sections 5.2.2 and 5.2.3 are provided and perimeter walls are designed to carry the ceiling lateral forces. The connections between the ceiling grid, wall angle and the wall shall be designed to resist the ceiling lateral forces. Horizontal restraint point spacing shall be justified by analysis or test and shall not exceed a spacing of 12 feet by 12 feet. Restraint Bracing wires shall be secured with four tight twists in 1 1/2 inches, or an approved alternate connection.

5. Ceiling support and bracing wires shall be spaced a minimum of 6” from all pipes, ducts, conduits and equipment that are not braced for horizontal forces, unless approved otherwise by the building official.

5. **Ceiling fixtures.** Fixtures installed in acoustical tile or lay-in panel ceilings shall be mounted in a manner that will not compromise ceiling performance. All recessed or drop-in light fixtures and grilles shall be supported directly from the fixture housing to the structure above with a minimum of two 12 gage wires located at diagonally opposite corners. Leveling and positioning of fixtures may be provided by the ceiling grid. Fixture support wires may be slightly loose to allow the fixture to seat in the grid system. Fixtures shall not be supported from main runners or cross runners if the weight of the fixtures causes the total dead load to exceed the deflection capability of the ceiling suspension system.
Fixtures shall not be installed so that the main runners or cross runners will be eccentrically loaded.

Surface-mounted fixtures shall be attached to the main runner with at least two positive clamping devices made of material with a minimum of 14 gage. Rotational spring catches do not comply. A 12 gage suspension wire shall be attached to each clamping device and to the structure above.

6. **Partitions.** Where the suspended ceiling system is required to provide lateral support for the permanent or relocatable partitions, the connection of the partition to the ceiling system, the ceiling system members and their connections, and the lateral force bracing shall be designed to support the reaction force of the partition from prescribed loads applied perpendicular to the face of the partition. Partition connectors, the suspended ceiling system and the lateral-force bracing shall all be engineered to suit the individual partition application and shall be shown or defined in the drawings or specifications.

1616A.1.22 1616A.1.21. [Reserved for OSHPD]

1616A.1.23 1616A.1.22 ASCE 7 Tables 13.5-1 and 13.6-1, Modify ASCE 7, Tables 13.5-1 & 13.6-1 by the following:

For components with $R_s$ greater than 1.5, overstrength factor ($\Omega_o$) for design of anchorage to concrete and vibration isolators along with associated snubbers/connections shall be 2.0.

1616A.1.24 1616A.1.23 ASCE 7, Section 13.6.5. Modify ASCE 7, Section 13.6.5.6

Exceptions 1 and 2 as follows:

**Exceptions:**
1. Design for the seismic forces of Section 13.3 shall not be required for raceways where either:

   a. Trapeze assemblies are used to support raceways and the total weight of the raceway supported by trapeze assemblies is less than 10 lb/ft (146 N/m), or

   b. The raceway is supported by hangers and each hanger in the raceway run is 12 in. (305 mm) or less in length from the raceway support point to the supporting structure. Where rod hangers are used with a diameter greater than 3/8 inch, they shall be equipped with swivels to prevent inelastic bending in the rod.

2. Design for the seismic forces of Section 13.3 shall not be required for conduit, regardless of the value of $I_p$, where the conduit is less than 2.5 in. (64 mm) trade size.

1616A.1.25 1616A.1.24 ASCE 7, Section 13.6.7. Replace ASCE 7, Section 13.6.7 Exceptions 1 and 2 with the following:

Exceptions:

The following exceptions pertain to ductwork not designed to carry toxic, highly toxic, or flammable gases or used for smoke control:

1. Design for the seismic forces of Section 13.3 shall not be required for ductwork where either:

   a. Trapeze assemblies are used to support ductwork and the total weight of the ductwork supported by trapeze assemblies is less than 10 lb/ft (146 N/m); or

   b. The ductwork is supported by hangers and each hanger in the duct run is 12 in. (305 mm) or less in length from the duct support point to the supporting structure. Where rod hangers are used with a diameter greater than 3/8 inch, they shall be equipped with swivels to prevent inelastic bending in the rod.
2. Design for the seismic forces of Section 13.3 shall not be required where provisions are made to avoid impact with larger ducts or mechanical components or to protect the ducts in the event of such impact; and HVAC ducts have a cross-sectional area of 6 ft² (0.557 m²) or less, or weigh 10 lb/ft (146 N/m) or less.

1616A.1.25 ASCE 7, Section 13.6.8.2. Modify ASCE 7, Section 13.6.8.2 by adding Exception as follows:

Exception: Anchor capacities shall be determined in accordance with material chapters of this code in lieu of using those in NFPA 13 and demand shall be based on ASCE 7.

1616A.1.26 ASCE 7, Section 13.6.8.3. Replace ASCE 7, Section 13.6.8.3 with the following:

13.6.8.3 Exceptions. Design of piping systems and attachments for the seismic forces of Section 13.3 shall not be required where one of the following conditions apply:

1. Trapeze assemblies are used to support piping whereby no single pipe exceeds the limits set forth in 3a. or b. below and the total weight of the piping supported by the trapeze assemblies is less than 10 lb/ft (146 N/m).

2. The piping is supported by hangers and each hanger in the piping run is 12 in. (305 mm) or less in length from the top of the pipe to the supporting structure. Where pipes are supported on a trapeze, the trapeze shall be supported by hangers having a length of 12 in. (305 mm) or less. Where rod hangers are used with a diameter greater than 3/8 inch, they shall be equipped with swivels to prevent inelastic bending in the rod.

3. Piping having an Rₚ in Table 13.6-1 of 4.5 or greater is used and provisions are made to avoid impact with other structural or nonstructural components or to
protect the piping in the event of such impact and where the following size requirements are satisfied:

a. For Seismic Design Categories D, E, or F and values of I_p greater than one, the nominal pipe size shall be 1 inch (25 mm) or less.

b. For Seismic Design Categories D, E, or F, where I_p = 1.0 the nominal pipe size shall be 3 inches (80 mm) or less.

The exceptions above shall not apply to elevator piping.

1616A.1.27 ASCE 7, Section 13.6.10.1. Modify ASCE 7 Section 13.6.10.1 by adding Section 13.6.10.1.1 as follows:

13.6.10.1.1 Elevators guide rail support. The design of guide rail support-bracket fastenings and the supporting structural framing shall use the weight of the counterweight or maximum weight of the car plus not less than 40 percent of its rated load. The seismic forces shall be assumed to be distributed one third to the top guiding members and two thirds to the bottom guiding members of cars and counterweights, unless other substantiating data are provided. In addition to the requirements of ASCE 7 Section 13.6.10.1, the minimum seismic forces shall be 0.5g acting in any horizontal direction.

1616A.1.28 ASCE 7, Section 13.6.10.4. Replace ASCE 7, Section 13.6.10.4 as follows:

13.6.10.4 Retainer plates. Retainer plates are required at the top and bottom of the car and counterweight, except where safety devices acceptable to the enforcement agency are provided which meet all requirements of the retainer plates, including full engagement of the machined portion of the rail. The design of the car, cab stabilizers, counterweight guide rails and counterweight frames for seismic forces shall be based on the following requirements:

1. The seismic force shall be computed per the requirements of ASCE 7 13.6.10.1. The minimum horizontal acceleration shall be 0.5g for all buildings.
2. \( W_o \) shall equal the weight of the counterweight or the maximum weight of the car plus not less than 40 percent of its rated load.

3. With the car or counterweight located in the most adverse position, the stress in the rail shall not exceed the limitations specified in these regulations, nor shall the deflection of the rail relative to its supports exceed the deflection listed below:

<table>
<thead>
<tr>
<th>RAIL SIZE (weight per foot of length, pounds)</th>
<th>WIDTH OF MACHINED SURFACE (inches)</th>
<th>ALLOWABLE RAIL DEFLECTION (inches)</th>
</tr>
</thead>
<tbody>
<tr>
<td>8</td>
<td>1 ¼</td>
<td>0.20</td>
</tr>
<tr>
<td>11</td>
<td>1 ½</td>
<td>0.30</td>
</tr>
<tr>
<td>12</td>
<td>1 ¾</td>
<td>0.40</td>
</tr>
<tr>
<td>15</td>
<td>1 31/32</td>
<td>0.50</td>
</tr>
<tr>
<td>18 ½</td>
<td>1 31/32</td>
<td>0.50</td>
</tr>
<tr>
<td>22 ½</td>
<td>2</td>
<td>0.50</td>
</tr>
<tr>
<td>30</td>
<td>2 ¼</td>
<td>0.50</td>
</tr>
</tbody>
</table>

For SI: 1 inch = 25 mm, 1 foot = 305 mm.

NOTE: Deflection limitations are given to maintain a consistent factor of safety against disengagement of retainer plates from the guide rails during an earthquake.

4. Where guide rails are continuous over supports and rail joints are within 2 feet (610 mm) of their supporting brackets, a simple span may be assumed.

5. The use of spreader brackets is allowed.

6. Cab stabilizers and counterweight frames shall be designed to withstand computed lateral load with a minimum horizontal acceleration of 0.5g.
1616A.1.29 ASCE 7, Section 16.1.4. Remove ASCE 7 Sections 16.1.4.1 and 16.1.4.2 and modify Section 16.1.4 by the following:

Maximum scaled base shears used to determine forces and drifts shall not be less than the base shears calculated using the equivalent lateral force procedure of Section 12.8.

1616A.1.30 ASCE 7, Section 16.2.2. Modify ASCE 7 Section 16.2.2 by adding the following:

Requirements of this section shall be deemed to be satisfied for new buildings, using acceptance criteria in Section 16.2.4.2, by the nonlinear modeling parameters in ASCE 41.

1616A.1.31 ASCE 7, Section 16.2.3. Modify ASCE 7 Section 16.2.3 by adding the following:

Requirements of this section shall be deemed to be satisfied by using load combinations in Sections 12.4.2.3 and 12.4.3.2 with 25% of the required live loads.

1616A.1.32 ASCE 7, Section 16.2.4. Modify ASCE 7 Section 16.2.4 by the following:

a) Where site is located within 3.1 miles (5 km) of an active fault at least seven ground motions shall be analyzed and response parameters shall be based on larger of the average of the maximum response with ground motions applied as follows:

1. Each of the ground motions shall have their maximum component at the fundamental period aligned in one direction.

2. Each of the ground motion’s maximum component shall be rotated orthogonal to the previous analysis direction.
b) Where site is located more than 5 km from an active fault at least 10 ground motions shall be analyzed. The ground motions shall be applied such that one-half shall have their maximum component aligned in one direction and the other half aligned in the orthogonal direction. The average of the maximum response of all the analyses shall be used for design.

1616A.1.33 ASCE 7, Section 16.2.4.1. [Reserved for OSHPD]

1616A.1.34 ASCE 7, Section 16.2.4.2. [Reserved for OSHPD]

1616A.1.35 ASCE 7, Section 17.2.1. Modify ASCE 7, Section 17.2.1 by adding the following:

The importance factor, I_p, for parts and portions of a seismic isolated building shall be the same as that required for a fixed-base building of the same risk category.

1616A.1.35 1616A.1.36 ASCE 7 Section 17.2.4.7. Modify ASCE 7, Section 17.2.4.7 by adding the following:

The effects of uplift and/or rocking shall be explicitly accounted for in the analysis and in the testing of the isolator units.

1616A.1.37 ASCE 7, Section 17.2.5.2. Modify ASCE 7, Section 17.2.5.2 by adding the following:

The separation requirements for the building above the isolation system and adjacent buildings shall be the sum of the factored displacements for each building. The factors to be used in determining separations shall be:

1. For seismically isolated buildings, the deformation resulting from the analyses using the Risk-Targeted Maximum Considered Earthquake unmodified by R_m.
2. For fixed based buildings, $C_d$ times the elastic deformations resulting from an equivalent static analysis using the seismic base shear computed via ASCE 7, Section 12.8.

1616A.1.36 1616A.1.38 ASCE 7, Section 17.4. Modify ASCE 7, Section 17.4.2 by adding the following:

17.4.2.3 Linear Procedure. Linear procedures shall not be used in Seismic Design Category E & F structures. be limited to structures located at sites where mapped value of $S_1$ is less than 0.6g.

1616A.1.37 1616A.1.39 ASCE 7, Section 17.6 Modify ASCE 7, Section 17.6 by adding the following:

17.6.1.1 Minimum Seismic Force. For the response spectrum and linear response history procedures, $V_b$ and $V_s$, shall not be taken less than those calculated in accordance with Equations 17.5-7 and 17.5-8.

1616A.1.38 1616A.1.40 ASCE 7, Section 18.3.1. Modify ASCE 7, Section 18.3.1 by replacing the third paragraph with the following:

If the calculated force in an element of the seismic force resisting system does not exceed 1.5 times its nominal strength for the Risk-Targeted Maximum Considered Earthquake (MCE$_R$) nor its nominal strength for the Design Earthquake (DE), the element is permitted to be modeled as linear. For this section, the MCE$_R$ and DE response shall be based on largest response due to a single ground motion and not the average response of suite of ground motions.

1616A.1.39 1616A.1.41 [Reserved for OSHPD]

1616A.1.40 1616A.1.42 [Reserved for OSHPD]

(All existing amendments that are not revised above shall continue without any change)
NOTATION:

- **Authority**: Health and Safety Code Section 130005(g) & 130021
- **Reference**: Health and Safety Code Section 1275, 129790, 129850 & 130005(g)