

## **SECTION 3408 - OUTLINE**

### **3408.1 GENERAL REQUIREMENTS**

**Basic requirement: work in accordance with code requirements for new construction, except loads per 3408, and except as otherwise provided.**

### **3408.2 DEFINITIONS**

### **3408.3 CLASSIFICATION OF EXISTING BUILDINGS**

**Post 1975**

**Pre 1975**

### **3408.4 CLASSIFICATION OF WORK ON EXISTING BUILDINGS**

**Level 1 Minor alterations (i.e., not Level 2 work)**

**Level 2 Substantial architectural and MEP alterations for Pre 1975 buildings, change of use > 35%, substantial structural alterations**

**Level 3 Substantial alterations with substantial changes to shear walls and vertical frames**

**Level 4 Additions, >10% to 100% of total framed floor and roof area or effective mass**

**Level 5 Major demolition or reconstruction - > 35% of total floor and roof area; Additions > 100%**

### **3408.5 USE AND OCCUPANCY**

**Restricted (hazardous) uses**

### **3408.6 STRUCTURAL INVESTIGATION**

**Minimal requirements for Level 1**

**Reduced requirements for Level 2**

### **3408.7 LATERAL LOAD REQUIREMENTS**

**For each level of work: requirements increase with increase in level.**

### **3408.8 OTHER LOAD REQUIREMENTS**

### **3408.9 STRUCTURAL DESIGN AND CONSTRUCTION**

### **3408.10 SUPPLEMENTARY SEISMIC PROVISIONS FOR EXISTING CONSTRUCTION**

# COMPARISON BETWEEN SECTION 3408 OF THE 6<sup>TH</sup> ED SBC AND SECTION 3408 OF THE PROPOSED 7<sup>TH</sup> ED SBC

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## 1. Levels of Work & Lateral Load Resistance

Both editions require a degree of lateral load resistance that is related to the amount of alteration, repair, addition, or change of use. In the 7<sup>th</sup> Edition, levels of work are formally defined by qualitative triggers for each level; and the required lateral load resistance is specified for each level.

In the 6<sup>th</sup> Edition, seismic requirements for change of use or alterations depend on a *Seismic Hazard Category*, which is a function of the change of use, increase in the number of occupants, and cost of alterations in relation to assessed value. See Section 2 on restricted uses, below, for further information. There are three categories, Seismic Hazard Categories 1, 2, and 3; Seismic Hazard Categories 1 and 2 do not require seismic lateral load resistance (other than what already exists). Other lateral load criteria in the 6<sup>th</sup> Edition are not categorized.

The following table gives a comparison between the lateral load requirements of the 6<sup>th</sup> and 7<sup>th</sup> Editions, arranged according to the 7<sup>th</sup> Edition's levels of work, with a general description of the work of each level for each edition:

Level of Work	Section 3408 - 7 <sup>th</sup> Edition	Section 3408 - 6 <sup>th</sup> Edition
Level 1	<ul style="list-style-type: none"> <li>• Minor work defined as not triggering Level 2 work and above.</li> <li>• No lateral load resistance requirement.</li> </ul>	<ul style="list-style-type: none"> <li>• Minor work, determined subjectively by the building official (§3408.5.3).</li> <li>• No lateral load resistance requirement.</li> </ul>
Level 2	<ul style="list-style-type: none"> <li>• Substantial alterations or repairs with minimal demolition or relocation of shear walls and vertical frames.</li> <li>• Change of use for more than 35% of the floor area.</li> <li>• Permits 10% lifetime<sup>1</sup> increase of framed floor or roof area and 10% lifetime increase in effective seismic weight.</li> <li>• Minimum lateral load resistance: greater of 2/3 Code<sup>2</sup> wind load,</li> </ul>	<ul style="list-style-type: none"> <li>• Substantial alterations, repairs, or change of use (Seismic Hazard Categories 1 and 2).</li> <li>• Permits 10% increase in floor area and 10% increase in mass, and for wind load, 10% increase in forces on lateral load resisting system.</li> <li>• Minimum lateral load resistance: greater of Exposure A Code<sup>2</sup> wind load, or basic code<sup>3</sup> capacity.</li> </ul>

**Level of Work**

**Section 3408 - 7<sup>th</sup> Edition**

**Section 3408 - 6<sup>th</sup> Edition**

lateral load of 1%(DL + 0.5 Snow), or basic code<sup>3</sup> capacity.

**Level 3**

- Substantial alterations or repairs with substantial demolition or relocation of shear walls and vertical frames.
- Lateral load resistance required to be greater of Code wind load, 35% of Code seismic load,<sup>4,5</sup> or basic code capacity.<sup>3</sup>

- Included with Level 2

**Level 4**

- Structurally attached additions with 10% to 100% lifetime<sup>1</sup> increase of framed floor or roof area or 10% to 100% of lifetime increase in effective seismic weight.
- Lateral load resistance of building as a whole required to be greater of Code wind load; 50% to 100% of Code seismic load<sup>5</sup> for 10% to 60% increase in framed floor and roof area or effective seismic weight; or for buildings built after 1-1-75, Code seismic load.

- Structurally attached additions with 10% to 100% increase in floor area or 10% to 100% increase in mass.
- Lateral load resistance of building as a whole required to be greater of Code wind load; or 40% to 100% of Code seismic load<sup>5</sup> for 10% to 70% increase in floor area or mass.

**Level 5**

- Removal or reconstruction of more than 35% of total framed floor and roof area.
- Structurally attached additions with greater than 100% lifetime increase of framed floor or roof area or greater than 100% of lifetime increase in effective seismic weight.
- Lateral load resistance of building equal to Code wind and Code seismic loads.

- Substantial alterations or repairs and change of use for Seismic Hazard Category 3 buildings.
- Lateral load resistance of building for alterations, repairs, or change of use equal to greater of Exp. A Code wind or 75% of Code seismic load
- Structurally attached additions with greater than 100% increase of floor area or greater than 100% of increase in mass.
- Lateral load resistance of building with additions equal to Code wind and Code seismic loads.

<b>Level of Work</b>	<b>Section 3408 - 7<sup>th</sup> Edition</b>	<b>Section 3408 - 6<sup>th</sup> Edition</b>
Historic-Totally Preserved	<ul style="list-style-type: none"> <li>• No lateral load requirements.</li> </ul>	<ul style="list-style-type: none"> <li>• No lateral load requirements.</li> </ul>
Historic-Partially Preserved	<ul style="list-style-type: none"> <li>• Meet all lateral load requirements specified above.</li> </ul>	<ul style="list-style-type: none"> <li>• Meet wind load or basic code<sup>3</sup> requirements as specified above.</li> </ul>

**Table Notes:**

1. *Lifetime* means starting 2-28-97 (promulgation of the 6<sup>th</sup> Ed of the SBC) or from the date of the building permit if after 2-28-97.
2. Where the term *Code* is used as an adjective with a required load, the meaning is the particular load as required for new construction in the Code.
3. The basic code is the building code under which the building was built.
4. The low level of seismic resistance for Level 3 is required so that the arrangement, strength, and stiffness of new, relocated, or strengthened lateral load resisting elements will result in good behavior of the building during an earthquake. Since structural changes are substantial, requiring this low level of seismic resistance is not a significant penalty.
5. Both editions provide seismic criteria for existing lateral load resisting elements that do not conform to those permitted for new construction in the Code. Not applicable to Level 5.

**2. Restricted Uses**

The two editions approach restricted uses in a different manner. In the 7<sup>th</sup> Edition, restricted uses are defined as Assembly Group A for more than 300 people (some of this is subject to change), Hazardous Group H, Institutional Group I-3, and Buildings in Seismic Use Group III. For these restricted uses, only Level 1 and Level 2 work is permitted. All other structural work must comply with the requirements for new construction of the Code, with the exception that unreinforced masonry (URM) walls may be reused under certain restrictions.

No change of use from an unrestricted use to a restricted use is permitted unless the structural system complies with the requirements for new construction of the Code. URM walls are however permitted under certain restrictions.

The 6<sup>th</sup> Edition utilizes a Hazard Index, given in a non-structural section of Chapter 34 (Table 3403). This hazard index varies from 1 to 8 for the various Use Groups, with the higher number indicating a higher hazard. In Table 3408.1, a trigger for hazardous change of use is defined as a change of use from one with a hazard index of less than 4 to one of 4 or more, or a change of use to one under Seismic Use Group III. This trigger is used in Table 3408.1 and requires either Seismic Hazard Category 3 work (Level 5) or Seismic Hazard Category 2 work (Level 2), depending on the increase in occupants and the cost of alterations in relation to assessed value. All other changes of use or no change in use requires either Seismic Hazard Category 2 work (Level 2) or Seismic Hazard Category 1 work (Level 2) depending on the increase in occupants and the cost of alterations in relation to assessed value.

### **3. Level 2 Triggers (7<sup>th</sup> Ed)**

Besides a number of structural triggers and a trigger for change of use, there is a non-structural trigger for Level 2 that is applicable to buildings built before the inception of the State Building Code on January 1, 1975. Level 2 (substantial alterations) is triggered when rehabilitation or remodeling of 20,000 sf of floor area or 50% of the total floor area of a building, whichever is less, is accumulated from the inception of the 7<sup>th</sup> Edition (say 1-1-07). For buildings constructed after January 1, 1975, this trigger is unnecessary since these buildings were designed for substantial wind and seismic resistance. Thus a substantial amount of remodeling of buildings built after January 1, 1975, without significant structural changes, may be classified as Level 1 Work.

### **4. Structurally Separate Additions**

Both editions require that structurally separate additions comply fully with the requirements for new construction of the Code.

In the 6<sup>th</sup> Edition (§3408.4.2.1), the existing building is required to resist Exposure A Code wind load even if this building is not being altered. This requirement has been eliminated in the 7<sup>th</sup> Edition

### **5. Live Load**

Same for both editions. Full Code live load is required, except that existing floors may be posted for the live load of the previous use if the use is controlled in a manner acceptable to the building official.

### **6. Snow Load**

The 6<sup>th</sup> Edition requires that where the geometry of an addition causes drifting or sliding of snow onto a lower existing roof, said lower roof shall be reinforced to comply with snow drifting load requirements for new buildings of the Code. There are no other snow

load requirements in the 6<sup>th</sup> Edition

In the 7<sup>th</sup> Edition, Level 1 work and totally preserved historic buildings are exempt from snow load requirements.

For other levels of work in the 7<sup>th</sup> Edition, drift load is required on all roofs (existing or new) in accordance with the Code requirements for new construction, and uniform snow load is required on existing roofs at 85% or 90% of that required for new construction. The 85% factor is for ground snow loads of 55 and 65 psf; the 90% factor is for ground snow loads of 35 and 45 psf.

## **7. Structural Investigation of Existing Buildings**

In the 6<sup>th</sup> Edition a structural investigation of the existing building is required for all levels of work, which includes review of available plans and other documents; a field investigation; structural analysis; borings as necessary; and determination of the condition and capacity of the foundations.

In the 7<sup>th</sup> Edition, a structural investigation similar to that of the 6<sup>th</sup> Edition is required, but the extent is different.

- Level 1 work: field investigation is limited to the areas where structural work will take place, and for buildings more than 20 years old, a general visual condition survey of the building is required. If there is no structural work, the condition survey can be performed by the architect.
- Level 2 work: field investigation similar to that of 6<sup>th</sup> Edition, plus a general visual condition survey. If the work does not involve an addition, new shear walls or vertical frames, and there is no indication of settlement or lateral movement of basement walls, no foundation or geotechnical exploration is required.
- Levels 3, 4, and 5 work: field investigation similar to that of 6<sup>th</sup> Edition, plus a general visual condition survey.
- For Levels 2 to 5 work, a determination is required as to whether the cladding is hazardous or deteriorated. The SER or another engineer who will be responsible for the cladding can do this evaluation.