**2007 LARUCP 16-06.** Section 1614, 1614.1 and 1614.1.3 are added to Chapter 16 of the 2007 California Building Code to read as follows:

***SECTION 1614***
***MODIFICATION TO ASCE 7.***

***1614.1 General.*** *The text of ASCE 7 shall be modified as indicated in this Section.*

***1614.1.3 ASCE 7, Section 12.8.1.1.*** *Modify ASCE 7 Section 12.8.1.1 by amending Equation 12.8-5 as follows:*

$C_s$ = ~~0.01~~ *0.044 $S_{DS}$ I ≥ 0.01* (Eq. 12.8-5)

**REASONS FOR AMENDMENT/INTERPRETATION/CLARIFICATION:**
Results from the 75% Draft of ATC-63, Quantification of Building System Performance and Response Parameters, indicate that tall buildings may fail at an unacceptably too low of a seismic level unless the minimum base shear level is increased to the value used in ASCE 7-02. Thus it is recommended that the adoption of the minimum base shear is appropriate due to the recent research in PEER and the ATC 63 project. The conclusion suggested that the reduction of the base shear in the previous code led to a trend in which tall buildings had decreasing safety with increasing height. To minimize the potential increased fire-life safety associated with such a seismic failure of tall buildings, this proposed modification increases the minimum base shear level to be consistent with previous edition of the building codes. The propose amendment to the current ASCE 7 is very well supported by the engineering community. Both SEAOSC and other structural engineer organizations from the state level are in support of adopting the revised minimum base shear.

**FINDINGS:**
Local Geological Conditions – The greater Los Angeles/Long Beach region is a densely populated area having buildings constructed over and near a vast array of fault systems capable of producing major earthquakes, including but not limited to the recent 1994 Northridge Earthquake. Due to the large numbers of tall buildings in this region as well as the increased fire-life safety associated with such a seismic failure, the proposed modification to have a higher minimum base shear consistent with previous edition of the building codes need to be incorporated into the code to assure that new buildings and additions to existing buildings are designed and constructed in accordance with the scope and objectives of the International Building Code.

**2007 LARUCP 16-10.** Section 1614, 1614.1 and 1614.1.7 is added to Chapter 16 of the 2007 California Building Code to read as follows:

***SECTION 1614***
***MODIFICATION TO ASCE 7.***

***1614.1 General.*** *The text of ASCE 7 shall be modified as indicated in this Section.*

***1614.1.7 ASCE 7, Section 12.12.3.*** *Replace ASCE 7 Section 12.12.3 as follows:*

***12.12.3 Minimum Building Separation.*** *All structures shall be separated from adjoining structures. Separations shall allow for the maximum inelastic response displacement ($\Delta_M$). $\Delta_M$ shall be determined at critical locations with consideration for both translational and torsional displacements of the structure as follows:*

$$\Delta_M = C_d \delta_{max} \qquad \text{(Equation 16-45)}$$

*where $\delta_{max}$ is the calculated maximum displacement at Level x as define in ASCE 7 Section 12.8.4.3.*

*Adjacent buildings on the same property shall be separated by at least a distance $\Delta_{MT}$, where*

$$\Delta_{MT} = \sqrt{(\Delta_{M1})^2 + (\Delta_{M2})^2} \qquad \text{(Equation 16-46)}$$

*and $\Delta_{M1}$ and $\Delta_{M2}$ are the maximum inelastic response displacements of the adjacent buildings.*

*Where a structure adjoins a property line not common to a public way, the structure shall also be set back from the property line by at least the displacement, $\Delta_M$, of that structure.*

*Exception: Smaller separations or property line setbacks shall be permitted when justified by rational analyses.*

**REASONS FOR AMENDMENT/INTERPRETATION/CLARIFICATION:**
Section 12.12.3 of ASCE 7-05 including Supplement No. 1 does not provide requirements for separation distances between adjacent buildings. Requirements for separation distances between adjacent buildings, not structurally connected, were included in previous editions of the IBC and UBC. However, when ASCE 7-05 was adopted by reference for IBC 2006, these requirements were omitted. In addition, ASCE 7-05 defines ($\delta_x$) in Section 12.8.6 to refer to the deflection of Level x at the center of mass. The actual displacement that needs to be used for building separation is the displacement at critical locations with consideration of both the translational and torsional displacements. These values can be significantly different.

This code change fills the gap of this inadvertent oversight in establishing minimum separation distance between adjoining buildings which are not structurally connected. The purpose of seismic separation is to permit adjoining buildings, or parts thereof, to respond to earthquake ground motion independently and thus preclude possible structural and non-structural damage caused by pounding between buildings or other structures.

Reference:
1. IBC 2000 Section 1620.3.6, Building Separations; IBC 2003 Section 1620.4.5, Building Separations;
2. "Recommended Lateral Force Requirements and Commentary, – Section C108.2.11, Building Separations," Structural Engineers Association of California, Sacramento, CA, 1999 Edition;
3. CBC 2002 (UBC 1997) Section 1630.9.2, Determination of $\Delta_M$; Section 1630.10.1, General; and Section 1633.2.11, Building Separations.

**FINDINGS:**

Local Geological Conditions – The greater Los Angeles/Long Beach region is a densely populated area having buildings constructed over and near a vast array of fault systems capable of producing major earthquakes, including but not limited to the recent 1994 Northridge Earthquake. The seismic separation is necessary to permit adjoining buildings, or parts thereof, to respond to earthquake ground motion independently and preclude possible structural damage due to pounding between buildings and other structures. The need to incorporate this modification into the code will help to assure that new buildings and additions to existing buildings are designed and constructed in accordance with the scope and objectives of the International Building Code.

**2007 LARUCP 19-01.** Section 1908.1 is amended to read as shown below and Section 1908.1.17 is added to Chapter 19 of the 2007 California Building Code to read as follows:

**1908.1 General.** The text of ACI 318 shall be modified as indicated in Sections 1908.1.1 through ~~1908.1.16~~ *1908.1.17*.

***1908.1.17 ACI 318, Section 14.8.*** *Modify ACI 318 Section 14.8.3 and 14.8.4 replacing equation (14-7), (14-8) and (14-9).*

***1.*** *Modify equation (14-7) of ACI 318 Section 14.8.3 as follows:*

*$I_{cr}$ shall be calculated by Equation (14-7), and $M_a$ shall be obtained by iteration of deflections.*

$$I_{cr} = \frac{E_s}{E_c}\left(A_s + \frac{P_u}{f_y}\frac{h}{2d}\right)(d-c)^2 + \frac{l_w c^3}{3} \qquad \textit{(14-7)}$$

*and the value $E_s/E_c$ shall not be taken less than 6.*

***2.*** *Modify ACI 318 Sec, 14.8.4 as follows:*

***14.8.4*** *– Maximum out-of-plane deflection, $\Delta_s$, due to service loads, including P$\Delta$ effects, shall not exceed $l_c/150$.*

*If $M_a$, maximum moment at mid-height of wall due to service lateral and eccentric loads, including P$\Delta$ effects, exceed ($^2/_3$) $M_{cr}$, $\Delta_s$ shall be calculated by Equation (14-8):*

$$\Delta_s = \frac{2}{3}\Delta_{cr} + \frac{M_a - \frac{2}{3}M_{cr}}{M_n - \frac{2}{3}M_{cr}}\left(\Delta_n - \frac{2}{3}\Delta_{cr}\right) \qquad \textit{(14-8)}$$

*If $M_a$ does not exceed ($^2/_3$) $M_{cr}$, $\Delta_s$ shall be calculated by Equation (14-9):*

$$\Delta_s = \left(\frac{M_a}{M_{cr}}\right)\Delta_{cr} \qquad \textit{(14-9)}$$

*where:*

$$\Delta_{cr} = \frac{5 M_{cr} l_c^2}{48 E_c I_g}$$

$$\Delta_n = \frac{5 M_n l_c^2}{48 E_c I_{cr}}$$

**REASONS FOR AMENDMENT/INTERPRETATION/CLARIFICATION:**

Section 14.8 was introduced in ACI 318-99 based on requirements of the Uniform Building Code and experimental research and on the basis that design of slender wall must satisfy both strength and serviceability requirements. ACI 318-05 provision was found to grossly under-estimate service load deflection. This update reduces the differences in serviceability provisions. The revision will essentially replace equations (14-8) and (14-9) with two new equations to reflect the UBC procedure for service load out-of-pane deflection. The proposed revision will be included in ACI 318-08.

**FINDINGS:**

Local Geological Conditions – The greater Los Angeles/Long Beach region is a densely populated area having buildings constructed over and near a vast array of fault systems capable of producing major earthquakes, including but not limited to the recent 1994 Northridge Earthquake. The proposed modification to ensure that the design of slender wall must satisfy both strength and serviceability requirements need to be incorporated into the code to assure that new buildings and additions to existing buildings are designed and constructed in accordance with the scope and objectives of the International Building Code.