4.1.8. Earthquake Load and Effects

4.1.8.1. Analysis

(1) The deflections and specified loading due to earthquake motions shall be determined according to the requirements in this Subsection, except that the requirements in this Subsection need not be considered in design if S(0.2), as defined in Sentence 4.1.8.4.(7), is less than or equal to 0.12.

4.1.8.2. Notation (See Appendix A.)

(1) In this Subsection,

A_r = response amplification factor to account for type of attachment of mechanical/electrical equipment, as defined in Sentence 4.1.8.18.(1),

A_x = amplification factor at level x to account for variation of response of mechanical/electrical equipment with elevation within the *building*, as defined in Sentence 4.1.8.18.(1),

B_x = ratio at level x used to determine torsional sensitivity, as defined in Sentence 4.1.8.11.(9),

B = maximum value of B_x, as defined in Sentence 4.1.8.11.(9),

C_p = seismic coefficient for mechanical/electrical equipment, as defined in Sentence 4.1.8.18.(1),

D_{nx} = plan dimension of the *building* at level x perpendicular to the direction of seismic loading being considered,

e_x = distance measured perpendicular to the direction of earthquake loading between centre of mass and centre of rigidity at the level being considered,

F_a = acceleration-based site coefficient, as defined in Sentence 4.1.8.4.(4),

F_t = portion of V to be concentrated at the top of the structure, as defined in Sentence 4.1.8.11.(6),

F_v = velocity-based site coefficient, as defined in Sentence 4.1.8.4.(4),

F_x = lateral force applied to level x, as defined in Sentence 4.1.8.11.(6),

h_i, h_n, h_x = the height above the base (i = 0) to level i, n, or x respectively, where the base of the structure is the level at which horizontal earthquake motions are considered to be imparted to the structure,

h_s = interstorey height (h_i - h_{i-1}),

I_E = earthquake importance factor of the structure, as described in Sentence 4.1.8.5.(1),

J = numerical reduction coefficient for base overturning moment, as defined in Sentence 4.1.8.11.(5),

J_X = numerical reduction coefficient for overturning moment at level x, as defined in Sentence 4.1.8.11.(7),

Level i = any level in the *building*, i =1 for first level above the base,

Level n = level that is uppermost in the main portion of the structure,

Level x = level that is under design consideration,

M_v = factor to account for higher mode effect on base shear, as defined in Sentence 4.1.8.11.(5),

M_x = overturning moment at level x, as defined in Sentence 4.1.8.11.(7),

N = total number of *storeys* above exterior *grade* to level n,

$\overline{N}_{60}$ = Average Standard Penetration Resistance for the top 30 m, corrected to a rod energy efficiency of 60% of the theoretical maximum,

PGA = Peak Ground Acceleration expressed as a ratio to gravitational acceleration, as defined in Sentence 4.1.8.4.(1),