Test 1 - Transamerica Pyramid (505 Sansome Street)

Constructed in 1980
Structural System : Steel Ordinary Moment Frame

CODE: UBC 1979

$h := 261$

$T := 0.05 \cdot \frac{h}{\sqrt{150}} = 1.07$

$C := \frac{1}{15 \cdot \sqrt{T}}$

$S := 1.5$

$CS := C \cdot S = 0.1$

$CS := min(0.14, CS) = 0.1$

$Z := 1$

$I := 1$

$K := 0.67$

$C_{s.1979} := Z \cdot I \cdot K \cdot CS = 0.06$

CODE: ASCE 7-16

$h := 261$

$S_{DS} := 1.2$

$R := 3.5$

$I := 1$

$C_s := \frac{S_{DS}}{\left(\frac{R}{I}\right)} = 0.34$

$T := 0.028 \cdot h^{0.8} = 2.4$

$C_{s.max} := \frac{1}{T \cdot \left(\frac{R}{I}\right)} = 0.12$

$C_{s.2016} := \frac{min(C_s, C_{s.max})}{1.4} = 0.08$

$\frac{C_{s.2016} - C_{s.1979}}{C_{s.1979}} = 30.93\%$

Test 2 - 121 Spear Street

Constructed in 1990
Structural System : Ordinary Reinforced Concrete Shear Walls

CODE : UBC 1988

$h := 280$

$C_t := 0.020$

$T := C_t \cdot h^{0.75} = 1.37$

$Z := 0.4$

$I := 1$

$S := 1.5$

$$C := min\left(1.25 \cdot \frac{S}{T^{\frac{2}{3}}}, 2.75\right) = 1.52$$

$R := 8$

$$C_{s.1988} := \frac{Z \cdot I \cdot C}{R} = 0.08$$

CODE: ASCE 7-16

$h := 280$

$S_{DS} := 1.2$

$R := 5$

$I := 1$

$T := 0.02 \cdot h^{0.75} = 1.37$

$$C_s := \frac{S_{DS}}{\left(\frac{R}{I}\right)} = 0.24$$

$$C_{s.max} := \frac{1}{T \cdot \left(\frac{R}{I}\right)} = 0.15$$

$$C_{s.2016} := \frac{min\left(C_s, C_{s.max}\right)}{1.4} = 0.1$$

$$\frac{C_{s.2016} - C_{s.1988}}{C_{s.1988}} = 37.23\%$$