Example:
Seismic Loading

Example 1

Example 5

The floor plan of a single story commercial building located in Seismic Zone 3 is shown in Fig. 5-22. The 14-foot high masonry shear walls are load bearing and have a weight of 70 pounds per square foot. The weight of the roof is 50 pounds per square foot and all other weights may be neglected. Determine the seismic base shear.

Solution

The relevant dead loads are given by:

Roof = $W_R = 0.05 \times 40 \times 20 = 40$ kips

North wall = $W_3 = 0.07 \times 12 \times 14 = 11.76$ kips

South wall = $W_1 = 11.76$ kips

East wall = $W_2 = 0.07 \times 10 \times 14 = 9.80$ kips

West wall = $W_4 = 9.80$ kips

Total seismic dead load is then

$W = W_R + W_1 + W_2 + W_3 + W_4$

$= 83.12$ kips.

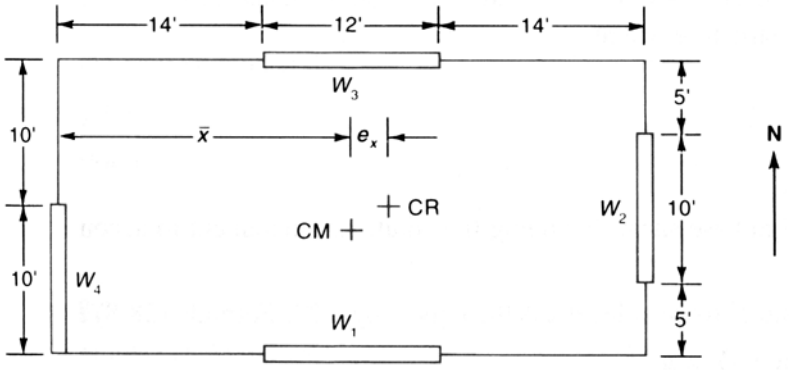

Fig. 5-22

The seismic base shear is given by Formula (28-1) as

$V = (ZIC/R_W)W$ where

$Z = 0.3$ for Zone 3 from Table 16-I

$I = 1.0$ for a standard occupancy structure as defined in Table 16-K

$C = 2.75$, the maximum value specified by UBC Section 1628.2.1

$R_W = 6$ from Table 16-N for a bearing wall system

$W = 83.12$ kips, as calculated

Then the seismic base shear is

$V = (0.3 \times 1 \times 2.75/6)W$

$= 0.1375\ W$

$= 11.43$ kips.