

Commentary

1. The weight w_{px} includes the weight of the diaphragm plus the tributary weight of elements normal to the diaphragm that are one-half story height below and above the diaphragm level. Walls parallel to the direction of the seismic forces are usually not considered in the determination of the tributary roof weight because these walls do not obtain support, in the direction of the force, from the roof diaphragm.
2. The single-story building version of Equation 12.10-1 is derived as follows.

$$F_{px} = \frac{\sum_{i=x}^m F_i}{\sum_{i=x}^n w_i} w_{px} \quad (\text{Eq 12.10-1})$$

$$F_x = C_{vx} V = \frac{w_x h_x^k}{\sum_{i=1}^n w_i h_i^k} V \quad (\text{Eq 12.8-11})$$

$$\text{where } C_{vx} = \frac{w_x h_x^k}{\sum_{i=1}^n w_i h_i^k} \text{ for short period of } < 0.5 \text{ sec } (k = 1.0). \quad (\text{Eq 12.8-12})$$

For a single-story building,

$$i = 1, x = 1, \text{ and } n = 1$$

$$\sum_{i=1}^1 w_i = W$$

and Equation 12.8-11 gives

$$F_1 = \frac{w_1 h_1}{w_1 h_1} V = V$$

where

$$V = C_s W = \frac{S_{DS} I}{R} W \quad (\text{Eq 12.8-1 and 12.8-2})$$

Finally, for the single-story building, Equation 12.10-1 is

$$F_{p1} = \frac{F_1}{W} w_{p1} = \frac{V}{W} w_{p1} = \frac{S_{DS} I}{R} w_{p1}$$