Step 1: Calculate Mass at Every Floor

**Rooflevel:**

4th and 3rd Floor:

1st and 2nd Floor:

Step 2: Calculate the Total Mass of the Building

Step 3:Calculate Base Shear

Step 4: Vertical Distribution of Seismic Forces

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Levels | Story Hgt. | | hx(m) | Wx(Kn) | Wxhx |  | Fx | |
| Roof | 3 | | 12.5 | 5168.1 | 64601.25 | 0.378 | 1269.55 | |
| 4th | 3 | | 9.5 |  | 51437.75 | 0.301 | 1010.86 | |
| 3rd | 3 | | 6.5 |  | 35576.45 | 0.209 | 699.15 | |
| 2nd | 3.5 | | 3.5 |  | 19156.55 | 0.112 | 376.47 | |
|  | |  | | 21529.2 | 170772 | 1 | | 3356.03 |

Therefore:

1. Material Properties

* Concrete f’c=28Mpa
* Concrete Unit Wgt.=24Kn/m
* Concrete CHB Wgt. 150mm thick solid grouted = 3.83Kn/m2

1. Member Sizes

Column

* C1/2C1=300x400
* C2/2C2=300x450
* C3/2C3=300x500
* 3C1/4C1=250x350
* 3C2/4C2=300x400
* 3C3/4C3=300x450

Beam

* 2B1=300x450
* 2B2=300x550
* 3B1/4B1=300x400
* 3B2/4B2=300x500

1. Other Superimposed Dead Load

* Concrete Topping at Roofing = 0.075m
* Concrete Topping at Typical Floor = 0.05m
* Interior Partition at Typical Floor = 1.00Kn/m2
* Assumed 1.5m high parapet wall along the perimeter of the roof
* Assumed 50% of the perimeter of the typical floor is covered with 150mm CHB solid grouted.

1. Seismic Parameters

* Occupancy Categories

Seismic Importance Factors, I=1.00

* Site Seismic Hazard Categories

Seismic Zone Factor, Z=0.40(zone 4)

* Site Geology and Zone Characteristics

Soil Profile Type = SD

* Seismic Source Type = A