

## A SHORT ANALYSIS OF STAAD RESULTS.

\*\*\*\*\*

Some body using STADPRO can inform where I went wrong in the R.C.C SHEAR WALL BUILDING. While analyzing the frame I observed the following:

The building is 36x21m and is symmetrical in x and Z direction and its total height from the footing is 74m.

The building is in Zone III and the time period as per IS 1893-2002(Part I) for infill is taken.

After analysis through STAADPRO the following difference between manual and the software results are observed.

I need expert to explain why it is so?

### A. TIME PERIOD:

As per IS CODE 1893-2002(Part I)  $T = 0.09h/\sqrt{d}$  where d is the direction along the EQ forces.

$T_x = 0.09 \times 74 / \sqrt{36} = 0.74 \text{ Sec.}$

$T_z = 0.09h/\sqrt{21} = 1.453 \text{ Sec.}$

\*\*\*\*\*

\*

\*

\* TIME PERIOD FOR X 1893 LOADING = 3.00000 SEC

\* SA/G PER 1893= 0.227, LOAD FACTOR= 1.000

\* FACTOR V PER 1893= 0.0036 X 168083.81

\*\*\*\*\*

\* TIME PERIOD FOR Z 1893 LOADING = 1.45333 SEC

\* SA/G PER 1893= 0.468, LOAD FACTOR= 1.000

\* FACTOR V PER 1893= 0.0075 X 168083.81

\*\*\*\*\*

Check the figures by STAAD-  $T_x = 3.0 \text{ Sec.}$ ,

$T_z = 1.45333 \text{ Sec.}$

B. The Dead load as per Staad for 19 floors slab including self weight of columns, beams and shear wall as per dimensions input and shown in the sketch = 193956 Kn .

The total Live Load as per Staad for 18 floors (No II for roof) for EQ = 43092 Kn.

Therefore W the EQ load =  $193956 + 0.25 \times 43092 = 202574.4 \text{ Kn.}$

Staad calculates and it gives 168083.82 Kn as shown above against manual calculation of 202574 Kn which is  $34490/202574 \times 100 = 17\%$ .

Note: No extra load in Dead Load is added for the Furniture, staircases and water tank etc.

Why so much difference?

.....  
c. The base shear  $V_b = A_h W$  as given by code for ESM.

$A_h = Z I S_a / (2 R^* g)$ —for the value of  $T_x$  and  $T_z$  for medium soil the value of  $S_a/g$  for  $T_x$  from code  $= 1.36/T = 1.36/0.74 = 1.8378$ .

-do- for  $T_z = 1.36/1.453 = 0.93599$ .

But as per Staad  $S_a/g$  for x direction  $= 0.227$  while for Z direction is  $= 0.468$

Need to know why?

.....  
d. The value of  $A_{hx} = 0.16 \times 1.0 \times 1.8378 / (2 \times 5) = 0.0294$  against Staad  $0.0036$  &

$A_{hz} = 0.16 \times 1 \times 0.93599 / (2 \times 5) = 0.014975$

Why so much difference?

.....  
e. The value of  $V_{bx}$  as calculated manually  $= 0.0294 \times 202574 = 3956 \text{ Kn}$

$V_{bz}$  -do-  $= 0.01497534 \times 202574 = 3034$

Kn.

While the STaad calculates as  $V_{bx} = 0.0036 \times 168083.81 = 605 \text{ Kn}$ .

-do- for  $V_{bz} = 0.0075 \times 168083.81 = 1261.0 \text{ Kn}$

There is a huge variation in both the direction as calculated below

$V_{bx} = (3956 - 605) \times 100 / 3956 = 84.52\%$ .

$V_{bz} = (3034 - 1261) \times 100 / 3034 = 58.44\%$

Can we accpt thiese variations.

.....  
T.Rangarajan. Structural engineer.