Passive Structural Control (HW1)

Due: 3/21

Please find the first six frequencies, mode shapes of the following bench mark structure and describe dynamic response with attached time histories. (The selected pictures of structure model and analytic result should be printed and showed.)

Note:

(1) See the structural information in page 2.

(2) Superimposed dead load:

2FL: **500**kg/m2

3FL: **500**kg/m2

RFL: **375**kg/m2

(3) Time histories file:

(a) Input ground acceleration history: *EL50AXBS.TXT*

unit: **g**

time interval: **0.0125** sec

(b) Measured roof acceleration history: *EL50RFA.TXT*

unit: **g**

time interval: **0.0125** sec

(c) Measured roof displacement history: *EL50RFD.TXT*

unit: **mm**

time interval: **0.0125** sec

(d) Predict the roof acceleration and displacement by histories:

(longitudinal and transverse direction)

NCERB.TXT, TzuChi.TXT

unit: **gal & mm**

time interval: **0.005** sec

- You should modify the numerical model by comparing the analytic result with measured histories from (a)(b)(c).
- *EL50RFA.TXT* – absolute acceleration
- *EL50RFD.TXT* – relative displacement

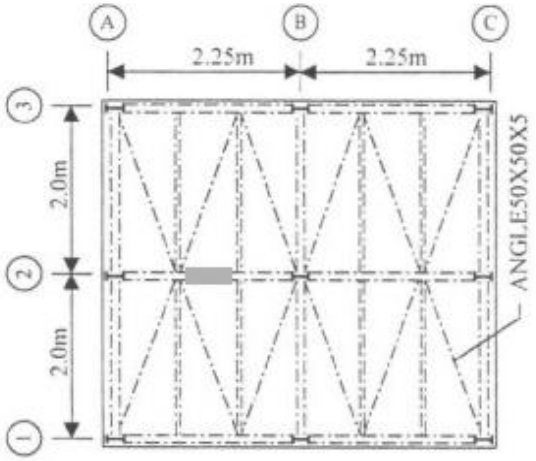
(4) Please ignore the gray-hatching zone in this homework.

(5) You can assume the thickness of floor by yourself.

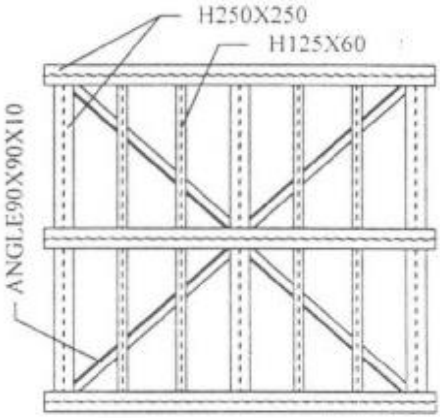
(6) You are required to write down the modeling procedure and discussion.

Longitudinal Direction

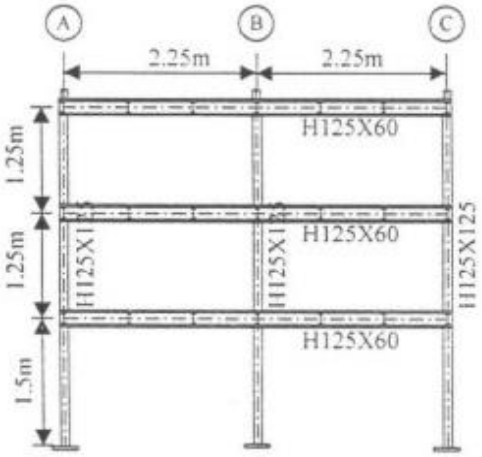
Transverse Direction



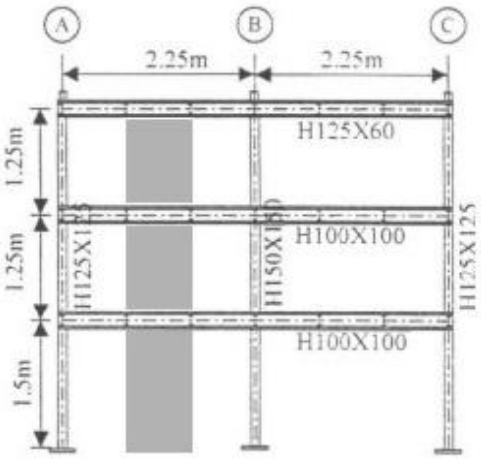
Typical Floor Plan



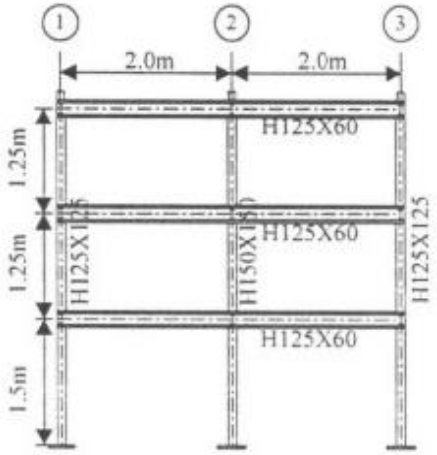
Base Plane



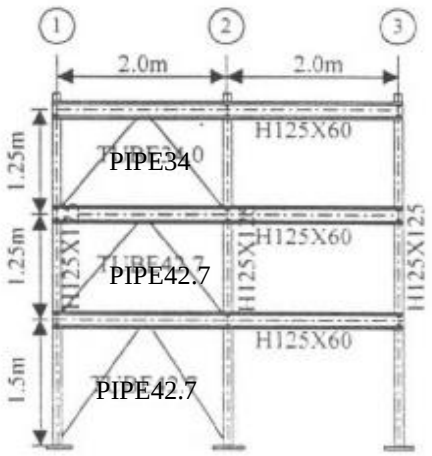
Elevation Frame 1, 3



Elevation Frame 2



Elevation Frame B



Elevation Frame A, C

Column、Girder and Beam								
Section	H×B (mm)	t_w (mm)	t_f (mm)	Area (cm^2)	I_x (cm^4)	I_y (cm^4)	R_x (cm)	R_y (cm)
H250×250	250×250	**9**	**14**	**92.18**	**10833**	**3648**	**10.84**	**6.29**
H150×150	150×150	**7**	**10**	**40.14**	**1641**	**563**	**6.39**	**3.75**
H125×125	125×125	**6.5**	**9**	**29.46**	**847**	**293**	**5.29**	**3.11**
H100×100	100×100	**6**	**8**	**21.90**	**383**	**134**	**4.18**	**2.47**
H125× 60	125×60	**6**	**8**	**16.84**	**413**	**29**	**4.95**	**1.31**

Brace				
Section	Thick (mm)	Area (cm^2)	I (cm^4)	R (cm)
PIPE34	**2.3**	**2.291**	**2.892**	**1.124**
PIPE42.7	**2.3**	**2.919**	**5.975**	**1.431**

Floor Brace							
Section	H×B (mm)	t_w (mm)	Area (cm^2)	I_{max} (cm^4)	I_{min} (cm^4)	R_{max} (cm)	R_{min} (cm)
ANGLE 50×50×5	50×50	**5**	**4.8**	**17.5**	**4.58**	**1.91**	**0.98**
ANGLE90×90×10	90×90	**10**	**17**	**199**	**51.7**	**3.42**	**1.74**

Material Property: A36