Iran is one of the most seismic countries in the world, a lot of earthquakes occur in Iran every year. Some actions and researches have been done about Earthquake Disaster Risk Management field since 1990 after large earthquake of Manjil-Rudbar in Iran. One of the main subjects of Earthquake Disaster Risk Management is Community base Disaster risk Management (CBDRM). This paper presents the idea of Earthquake Disaster Management Multipurpose Complex (EDMMC) with self-help neighborhood approach that has been proposed for making CBDRM feasible in each neighborhood of a large city like Tehran, The case study is Youssef Abad-region6-Tehran. Furthermore, in structural Design, the seismic behavior of Earthquake Disaster Management Multipurpose Complex (EDMMC) was evaluated using dynamic nonlinear analysis. In total, three different structures (the building of a training complex with a typical foundation (M_1), the steel building of the training complex with a LRB base-isolator (M_2), and the steel building of the training complex with rocking structural systems (M_3)) were studied applying three earthquakes of Northridge, Kobe, and Chi-Chi. Several seismic parameters were also evaluated including time history of displacement (displacement-time), time history of base shear (force-time), and the hysteresis diagram (force-displacement). The results indicate the appropriate function of the selected M_2 and M_3 model in controlling and decreasing the seismic responses of the structure.

billions of dollars and often constitute a large percentage of the gross national product of the country affected. Additionally, the damage caused by earthquakes is almost entirely associated with manmade structures. As in the cases of landslides, earthquakes also cause death by the damage they induce in structures such as buildings, dams, bridges and other works of man. Unfortunately many of earthquakes give very little or no warning before occurring and this is one of the reasons why earthquake engineering is complex [1,2].

Also buildings, which are tall in comparison to their plan area, will generate high overturning moments while buildings with large plan

the complexity of the active control needed. However, it couples vibration modes (natural frequencies) which have been calculated for an un-damped system [2-4].

Subramani et al. presented an overview of the present state of base isolation techniques with special emphasis and a brief on other techniques developed world over for mitigating earthquake forces on the structures. The effects of base isolation on structures located on soft soils and near active faults are given in brief. Simple case study

Workshops, Workshops about Earthquake, Gymnasium, Conference Hall, Court Yard, Storage.

- After earthquake: Temporary Accommodation, Emergency

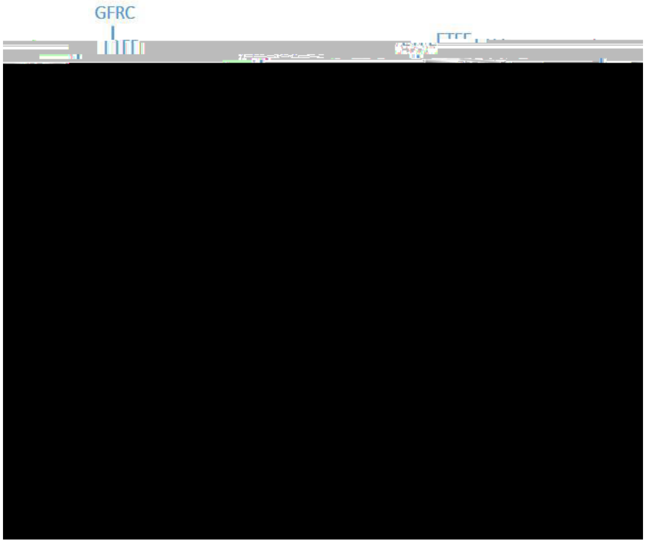
Drawing

Drawings include some plans (before and after earthquake), dimension plans, elevations and sections plans (Figures 16 and 17).

Building materials

This section discusses ETFE, PTFE and CRFC that are considered as finishing materials for this project (Figure 18).

GFRC as finishing: Glass Fiber Reinforced Concrete (GFRC) is one of the most innovative construction materials available and



Building Materials.

GRFC wall Section [12].

following earthquakes:

1- Kobe earthquake (1996)

2- Northridge earthquake (1995)

3- Chi Chi earthquake (1999).

The temporal step and the total time of the record of each accelerations have been shown in Table 1.

Drawing the acceleration diagram- time of acceleration

According to 2800 standard criteria, after selecting the related earthquakes, all of acceleration values in certain temporal steps are obtained by introducing the earthquake's acceleration pair to the software and are drawn by the software. In this way, the maximum acceleration of the acceleration pair (PGA) is obtained. It is worth mentioning that scaling acceleration pair via SEISMOSIGNAL software is used for reading and drawing the acceleration of the selected earthquakes.

Scaling acceleration to the maximum value

The first stage involves scaling the obtained acceleration from the software to the maximum value which equals *g* acceleration. To this aim, we should find a number so that the obtained PGA at the first stage multiplied by that number equals *g* acceleration. We can show it by the following relation:

$$\alpha = g/PGA \qquad (1)$$

In this relation, α equals the scale factor that scales the accelerations to its maximum value (Table 2).

As shown in Figure 23, the value of acceleration is scaled to its maximum value, i.e. g (Figure 24).

Nonlinear dynamic analysis (time history)

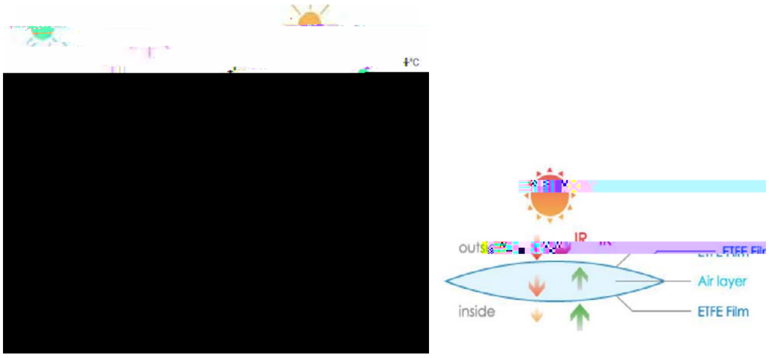
Steel structure with typical foundation (M_1): In nonlinear time

Temporal step	0.005	0.01	0.02
Total time	90	24	48

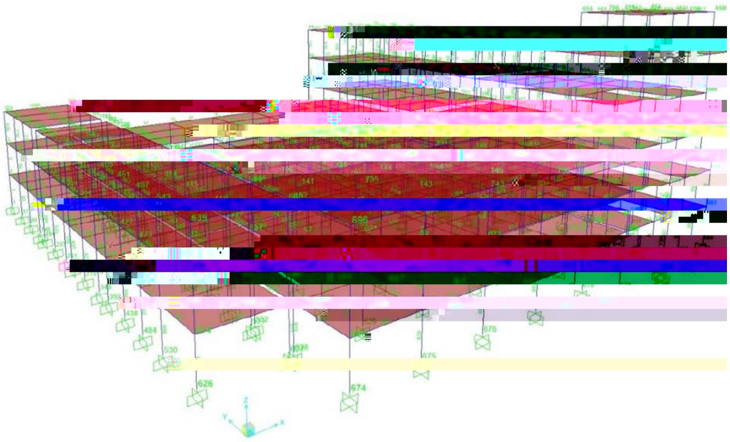
The temporal step and the total time of accelerations.

		α Coefficient
Kobe	0.599 g	1.669
Northridge	0.879 g	1.138
Chi Chi	0.474 g	2.109

Lists PGA and α coefficient for each accelerogram.



ETFE Section [13].



(a) Steel building with typical foundation (M_1)

(b) Steel building with a LRB base-isolator (M_2)

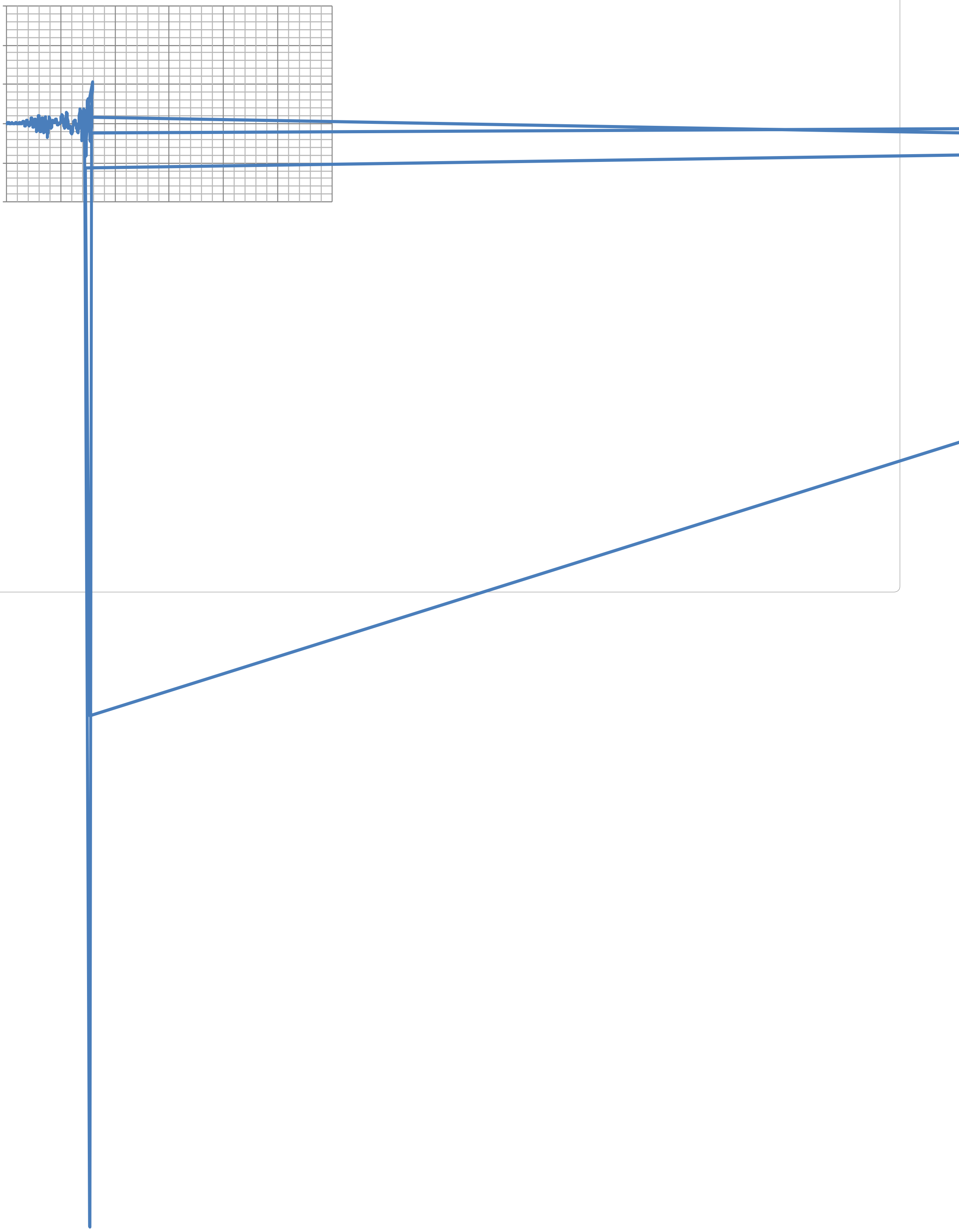
(c) Steel building with rocking structural systems (M_3)

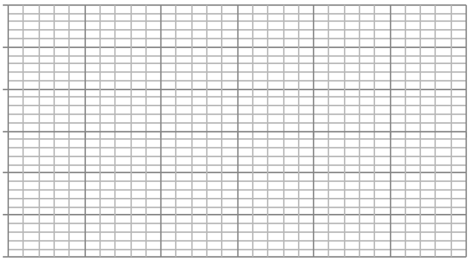
3D view of structures M_1, M_2 and M_3.

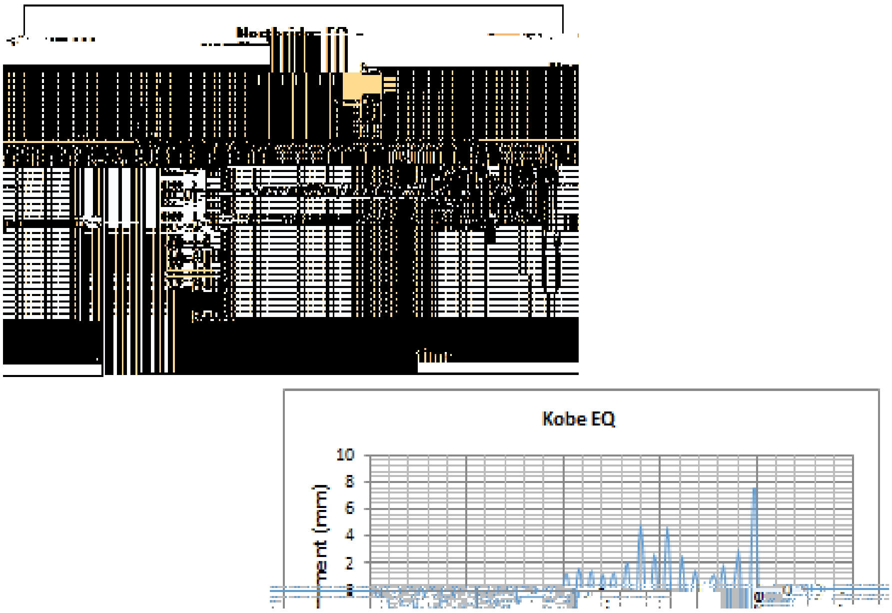
history analysis, the load was applied on the structure as acceleration in both directions of X and Y by Kobe, Northridge, and Chi-Chi earthquakes. The results obtained by modeling and analyzing are shown in Figures 25 and 26.

We first evaluate changes in displacement and force exerted on the structure both in X and Y directions considering changes in time (Figures 27, 28, Tables 3 and 4).

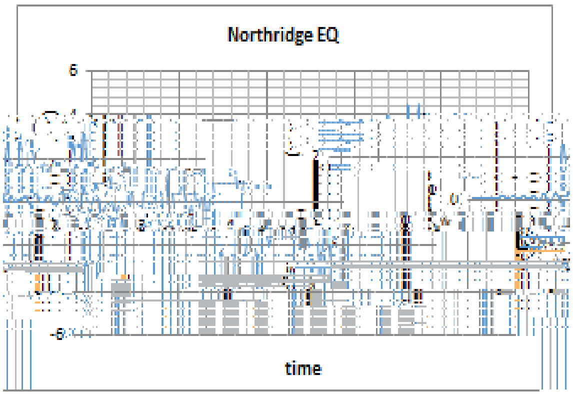
Tables 5 and 6 show the maximum force caused by the mentioned earthquakes.

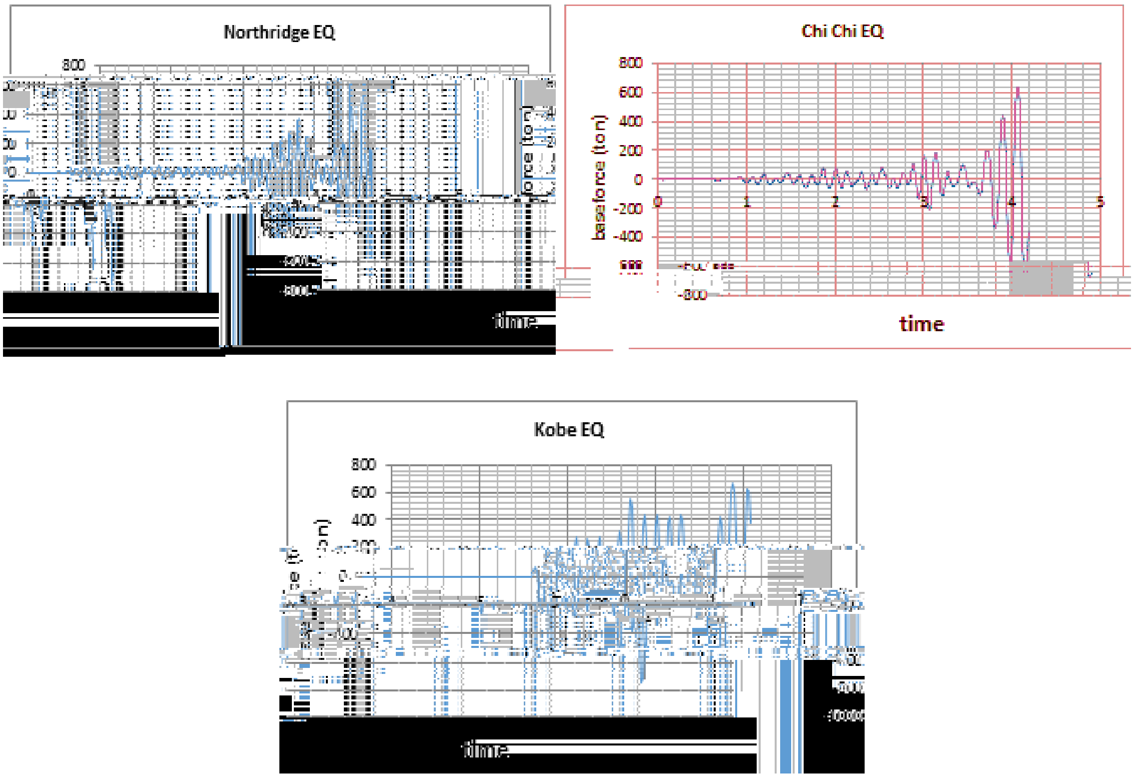




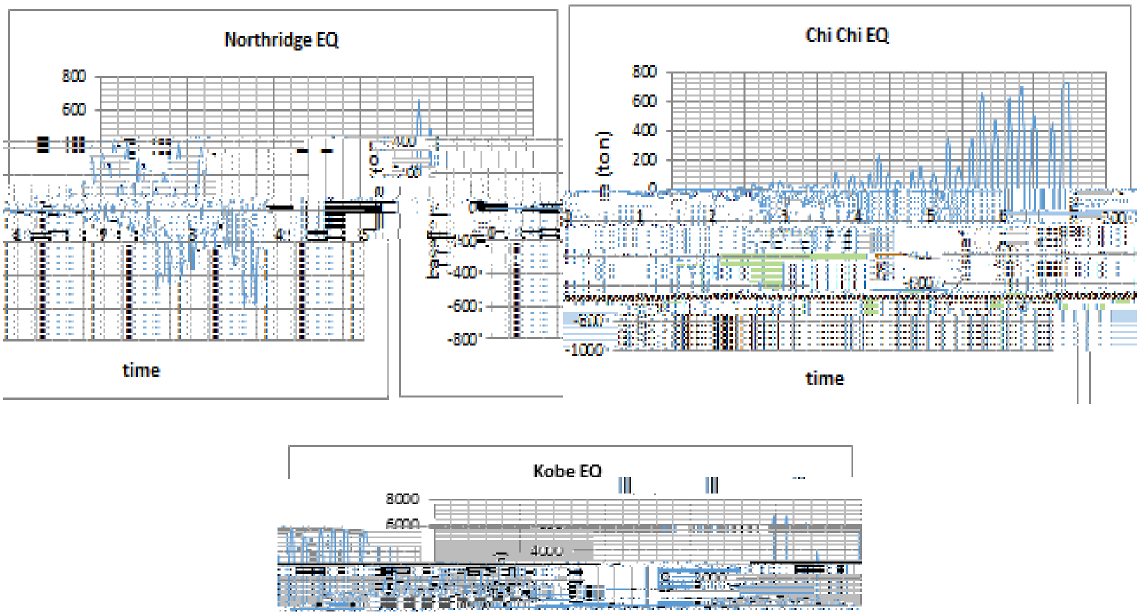


Time history displacement in X-direction for M$_2$ model.i03924Tm.9154 65531 1185799 746/Im3 D5Q83.118 90.141 4





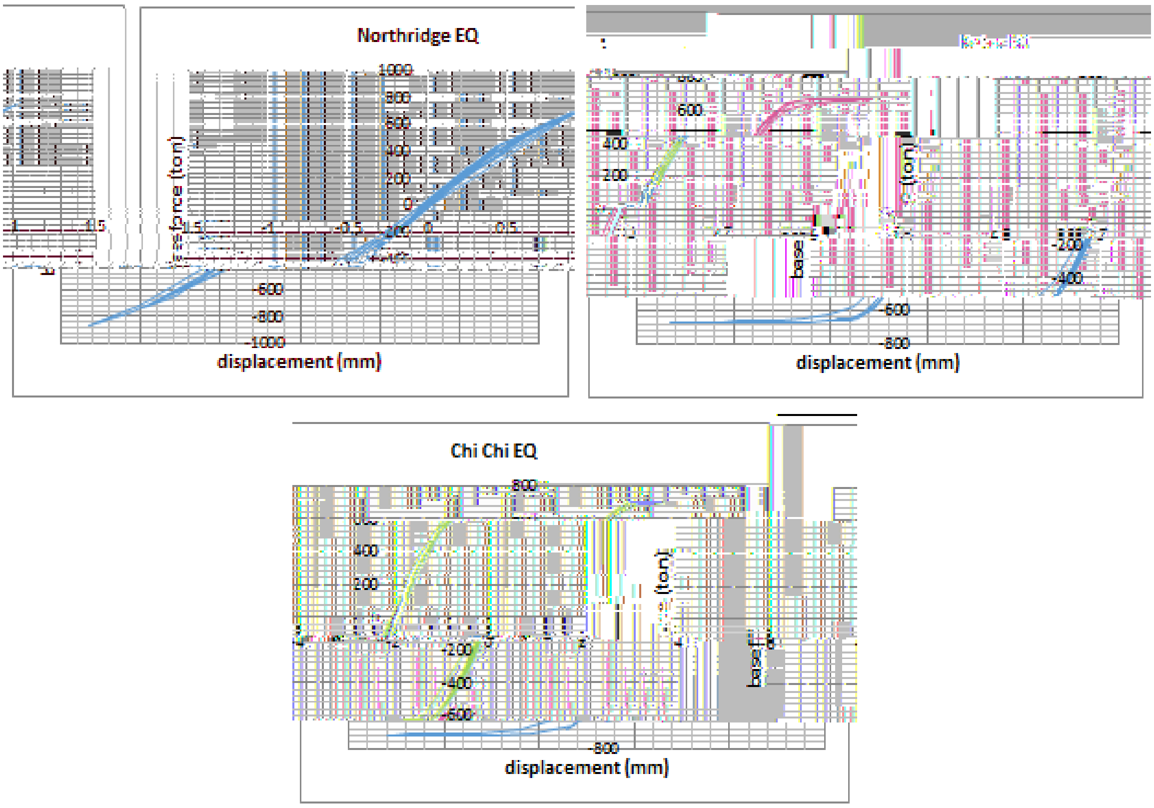
Time history base force in X-direction for M_2 Model.



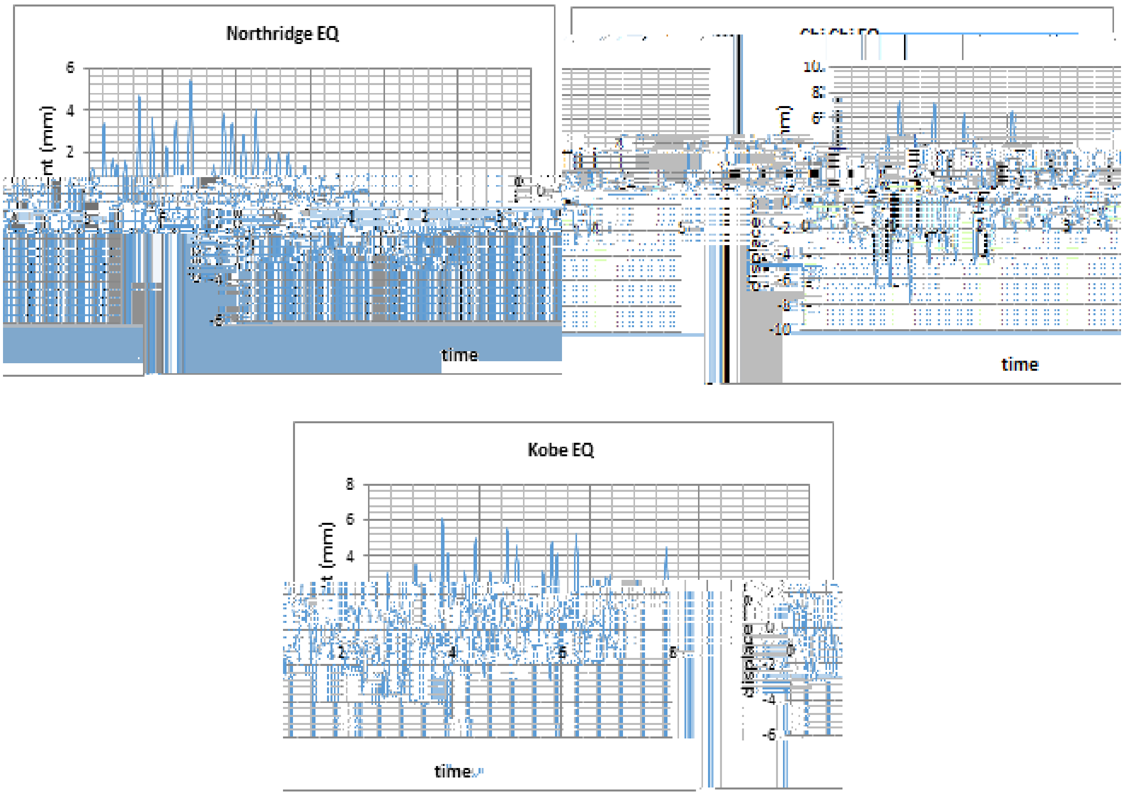
Time history base force in Y-direction for M_2 Model.

Kobe	Chi-Chi	Northridge
7.6	7.9	5.8
MAX Displacement=7.9 mm		

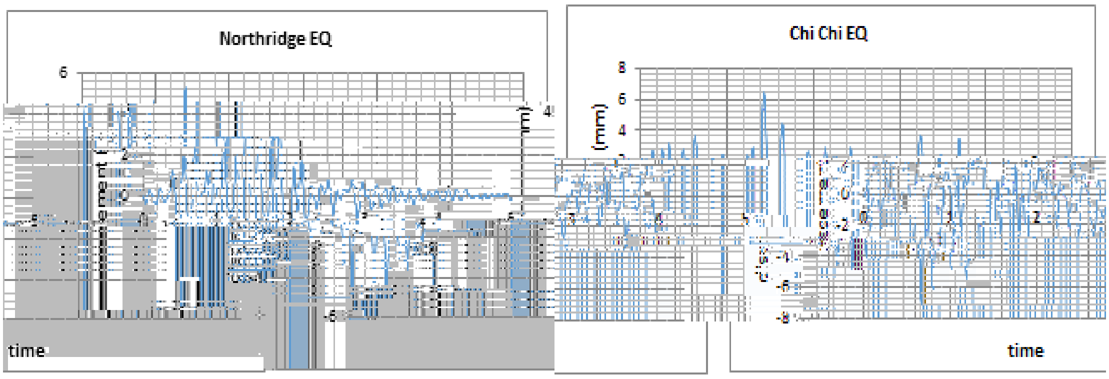
Maximum displacement in Y-direction for M_2 Model.



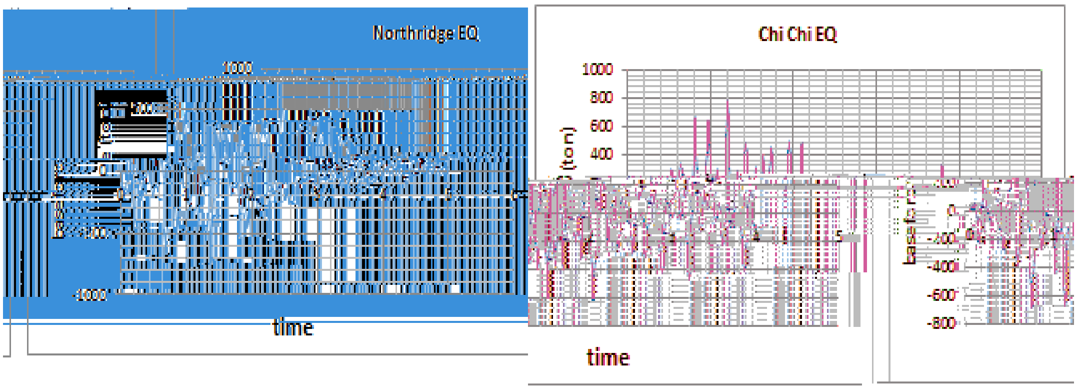
Hysteresis diagram of M_2 in Y-direction.

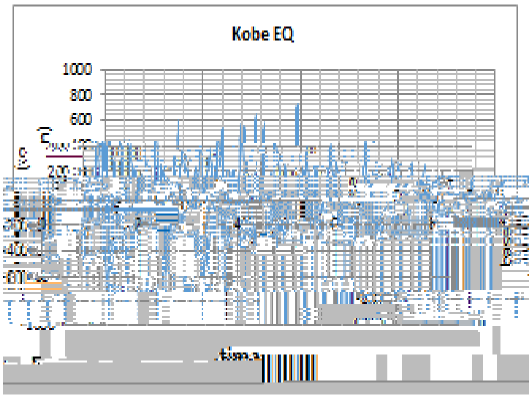


Time history displacement in X-direction for M_3 Model.



Time history displacement in Y-direction for M_3 Model.





Time history base force in X-direction for M_3

the structure both in X and Y directions considering changes in time (Figures 39 and 40). Tables 11 and 12 list the maximum displacements over time caused by the earthquakes.

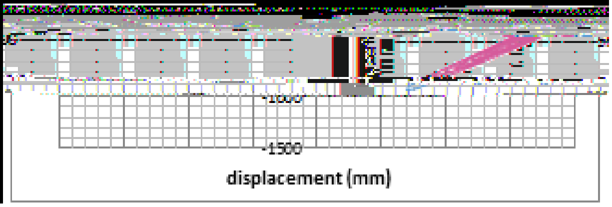
Tables 13 and 14 show the maximum force caused by the mentioned earthquakes.

The maximum force in X happened due to Kobe earthquake which is 885 tones. Northridge earthquake caused the maximum force in Y, with a value of 1090 tones.

After representing diagrams of changes in displacement and force exerted on the structure (displacement-time and force-time) both in X and Y directions considering changes in time and interpreting the results, we will evaluate hysteresis diagrams (Figures 41 and 42).

As shown in Figures 41 and 42, the structure did not enter the nonlinear state by the three earthquakes and the structure displacement remained in the elastic state. Given that the area under the hysteresis diagram represents the absorbed energy, Chi-Chi had the maximum energy loss along X and Y, respectively.

In general, the area under the hysteresis diagram represents the amount of energy absorbed by the structure under the load. On this basis and considering Figure 41, we can conclude that M_3 absorbed the maximum amount of energy and entered the nonlinear state under Chi-Chi earthquake while in X, the structure did not enter the


-1000
-1500
displacement (mm)

Tehran, The case study is Youssef Abad-region6-Tehran and then is designed one EDMMC with high performance of architectural and structural earthquake resistance design, that has different function before and after earthquake. Before earthquake EDMMC is a public school and after earthquake EDMMC allows neighborhood to help wounded people before coming of rescue and relief team and reduces the casualty of an earthquake disaster. But, in structural Design, the seismic behavior of Earthquake Disaster Management Multipurpose Complex (EDMMC) was evaluated using dynamic nonlinear analysis. In total, three different structures (the building of a training complex area under the hysteresis diagram represents the absorbed energy, Chi-Chi had the maximum energy loss along X and Y, respectively.

- M_3 absorbed the maximum amount of energy and entered the nonlinear state under Chi-Chi earthquake while in X, the structure did not enter the nonlinear state by the three earthquakes and showed far less plasticity than other available earthquakes in Y.

- In the hysteresis diagram of M_3 in Y, the only important point was the nonlinear behavior of the structure under Chi-Chi and earthquake that absorbed a considerable amount of energy compared to Northridge and Kobe earthquakes.

Comparing displacements in X and Y, we found that the maximum displacement in X (8.1 mm) was experienced by M_2 and caused by Chi-Chi earthquake. In addition, the maximum displacement in Y was 7.9 mm, experienced by M_2 (steel foundation with LRB base isolator) and caused by Chi-Chi earthquake. As discussed, the maximum displacement of M_2 in Y under Chi-Chi earthquake is about 2.5% more than the maximum displacement in X.

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2. Rodrigo MMD, Lavado J, Museros P (2010) Dynamic performance of existing high-speed railway bridges under resonant conditions retroftted with fuid viscous dampers. Engineering Structures. 32: 808-828.
3.