

---

Contents lists available at Sjournals

Scientific Journal of  
**Pure and Applied Sciences**

Journal homepage: [www.Sjournals.com](http://www.Sjournals.com)



---

**Original article**

## **A comparative study on housing renovation policies in earthquake-prone countries**

**S. Heidarzadeh<sup>a</sup>, H. Mesgarian<sup>b,\*</sup>, M. Fadaii Ghotbi<sup>c</sup>**

<sup>a</sup>*Master of Urban Planning, Islamic Azad University, Science and Research, Kerman, IRAN.*

<sup>b</sup>*Department of Geography, Islamic Azad University, Semnan Branch, Semnan, Iran, Member of Young Researchers and Elites Club, mesgarian.*

<sup>c</sup>*PhD in Urban Planning, Department of Urban Planning, Islamic Azad University, Kerman branch, IRAN.*

\*Corresponding author; Department of Geography, Islamic Azad University, Semnan Branch, Semnan, Iran, Member of Young Researchers and Elites Club, Mesgarian.

---

**ARTICLE INFO**

---

**ABSTRACT**

---

*Article history,*

Received 20 June 2014

Accepted 17 July 2014

Available online 25 July 2014

---

*Keywords,*

Crisis

Housing

Renovation

Renovation policies

---

Given substantial contribution of housing in human life and geographical position of Iran in Alpine-Himalayan collision belt, it seems urgent to deal with that in case of absence of reasonable and correct management approaches for post-earthquake housing renovation, wide varieties of socioeconomic issues and catastrophes will emerged. hence, in respect to some drawbacks while houses renovating in earthquake-stricken areas of Iran, the present research aims at comparative analysis of housing renovation policies of some earthquake-prone countries in order to promote renovation policies in Iran. To satisfy this end, a comparative study was conducted on housing renovation policies among Iran, china, Japan, India and Indonesia using descriptive-analytical approach. The results showed Iran's weakness in some areas such as zoning hazard-prone area while renovation, compliance to seismic strength criteria, and superiority in programs such as materials availability and government investment on affairs in which people are not involved. Eventually to compensate such shortcomings, some guidelines for promote renovation plan in Iran are suggested.

---

## 1. Introduction

As a social being, human needs suitable housing to family formation and protect his household frameworks. Since lack of appropriate dwellings as a deterrent factor in social, economic and psychological development causes many social abnormal issues (Gharkhloo 1:2008), in turn leads to psychological and personal disorders as well as severe problems (Dargahi 2013). So today, in every society, an affordable (Dargahi, 2003), physically safe and appropriately designed housing for most people is in priority in terms of social needs (Conversancy with the principles of housing planning, 3:2013), but the occurrence of unexpected catastrophes such as the earthquake causes the disruption of life order and favorable conditions and destruction of many homes, in turn while incurring substantial human casualties and financial losses, the authorities of a country will encounter to many problems for reconstructing damaged houses. So the first action they take to renovation is resort that country's housing renovation policies and plans. Therefore, some questions are risen in this context. Considering Iran position nestled in earthquake belt and some shortcomings in post-earthquake housing renovation, does renovation plans in Iran meets building renovation standards in earthquake -stricken areas? If no, what approaches may be put forwarded to cope with such shortcomings? To answer above questions, some countries including china, Japan, turkey, India and Indonesia were considered as sample subjects because: 1- they are comparable to Iran in development standpoints, 2- experienced destructive earthquakes and post-earthquake renovation. Then, logical inference is used for comparative analysis of aforementioned countries renovation policies in Iran; the goal is to suggest practical approaches forward to fill some gaps in housing renovation plans.

## 2. Theoretical fundamentals

Low accurate prediction of earthquake occurrence time (Faraji and Gherkhlo 1:2010) and its aftermath damages and causalities, have made earthquake -stricken building renovation most controversial issues in the world. This helps practitioners to ratify comprehensive plans and policies in order to compensate aforementioned damages. Hence before addressing renovation plans and policies, given to objectives of the present research, it is necessary to study some keywords here.

**Crisis:** a critical event occurred in naturally or anthropogenic manner suddenly, imposing causalities and damages to human society so that there is urgent actions to cope with them (Nategh Elahi 4:2008).

**Crisis management:** is defined as an applied science dealing and cope with some events leading to killing large number of human, destruction of properties and disrupted social life order through systematic monitoring and analyzing crisis as well as advanced technology (Shakib 35:2004).

**Crisis management cycle:** crisis management cycle involves pre-crisis (prevention or impact alleviation), crisis (preparation), during crisis (cope with) and post-crisis (rehabilitation and responsibility) phases (Urban and Rural Service research center 8:2006), which become continuous when catastrophe occurred and then phases are emerged, however each phase pursue a given purpose, forming skeletons for following phase (Urban and Rural Service research center 8:2006).

**Rehabilitation:** to recover a damaged area affected by crisis taking sustainable development and all safety terms into account (Shakib 52:2004).

## 3. Materials and methods

3- Housing renovation policies and plans in earthquake-stricken areas in area Iran is one of the most seismically active countries in the world where almost every ten years an earthquake with a magnitude up to 5.6 on the Richter scale occurs., unfortunately, in this country, due to constructing non-earthquake resistant systems, the consequent casualties are high that the average mortality rate in the twentieth century is reported to be more than three thousand people a year. However the earthquake engineering and seismology breakthroughs in global scale have alleviated fatalities and

property damages caused in developed countries. Nonetheless, large parts of the buildings in the world and Iran in particular do not meet global safety standards and withstanding them against earthquake is not possible absolutely (Taghvaii and Darabi 4:2008).

Therefore, in countries like Iran post-earthquake management practices and contingency should be strongly taken into account to shed lights on demands of survivors properly and be met in timely manner. In Iran, such demands are satisfied through implementing comprehensive renovation plans and policies to:

- Renovate and rehabilitate damaged buildings in no time according to public and national potential frameworks
- Revitalize damaged rural and urban areas
- Bring victims to their living place

These were ratified in Housing Foundation of Islamic Revolution in 1999 which are following discussed.

**3.1. public investment**

- Public investment in technical services is related to housing for those victims who cannot afford it.

**3.2. public credit facilities**

- Providing banking credit facilities with low interest rate in part of the government

**3.3. the government and the people participation and corporation:**

To encourage people to help floods and earthquakes victims

**3.4. participation of injured families in the renovation plans**

- Involving government in affairs in which family alone cannot manage them.
- 3-6improvementthe physical quality of the residential units compared to pre-earthquake condition:
- To enhance the physical quality of residential units compared to pre-earthquake condition using public facilities and private assistance.

**3.5. The materials availability**

- to set up manufacturing industry to materials production for damaged areas
- Strengthening the materials production and distribution units in the affected areas and improving production capacity,

**3.6. To considers racial, social, economic and cultural factors**

the system valued people's beliefs and life style and respects it. (Housing Foundation of Islamic Revolution 1999: 114)

**Table 1**

Iranplans Frequency.

<b>Plan frequencies</b>	<b>Iran's strategies</b>
1	Public investments
1	Public credit facilities
1	the government and the people participation and corporation
1	participation of injured families in the renovation plans
2	improvement the physical quality of the residential units compared to pre-earthquake condition
3	The materials availability
1	to consider racial, social, economic and cultural factors

#### **4. Results and discussion**

To review above policy reflects the Iran's attention to considerable contribution and corporation of neighbor provinces to earthquake-stricken areas to obviate likely drawbacks and speed up renovation process while taking public investments, public credit facilities, the government and the people participation and corporation, participation of injured families in the renovation plans, improvement the physical quality of the residential units compared to pre-earthquake condition, The materials availability and to consider racial, social, economic and cultural factors into account compared to pre-earthquake conditions.

#### **5. Housing renovation policies and plans for earthquake-stricken areas in china**

China serves as an earthquake-prone country due to locating in the area with most susceptible earthquake collision belt in the world (Huang Huan & Min Lei 2010: 1) along with dense inhabited areas as well as increasing trend of urbanization extended to urban margins (IRP, 2008:2). Hence, in order to apply management principles to reduce the cities vulnerability and setting up priorities necessary to renovate earthquake-stricken areas, some policies and plans designed to rehabilitation following the occurrence of an earthquake, according to the priorities for the renovation efforts.

##### **5.1. Participation of earthquake-stricken families in housing renovation**

- People's demands are respected so that they involved in assistance, support and socioeconomic facilities and resources in renovation process.

##### **5.2. Government and people participation**

- To embark in construction in partnership with governments, enterprises and other social organization in clear and sound manner.

##### **5.3. Improvement physical residential units compared to pre-earthquake conditions**

- To achieve better housing quality, try to improve construction quality

##### **5.4. Meeting seismic strength standards**

- Upgrade building quality in compliance with seismic strength standard

##### **5.5. prohibiting construction in earthquake-prone areas**

- To select appropriate sites for construct urban and rural residential buildings or renovation projects entails for much more attention and potential and risky zones should be avoided.

##### **5.6. to consider racial, social, economic and cultural factors**

- To implement design in different phases and in comprehensive manner, and renovation should be in line with areas real position.
- While construction, racial, social, economic and cultural factors should be taken into account.

Housing process should accommodate characteristics, native architectural landmarks in compliance with people's customs.

##### **5.7. Public credits**

Public credits should be dedicated based on different terms of rural and urban buildings and renovations plans must be added to these policies (unisd2008:1-13).

**Table 2**  
plan frequencies in China.

<b>Plans frequencies</b>	<b>strategies</b>
1	participation of earthquake-stricken families in housing renovation
1	Government and people participation
1	Improvement physical residential units compared to pre-earthquake conditions
1	meeting seismic strength standards
1	prohibiting construction in earthquake-prone areas
3	to consider racial, social, economic and cultural factors
1	Public credits

**5.8. Results and discussion**

1. Reviewing china's housing renovation plans implies to various positive points such as:
2. Paying more attention to physical quality of residential area and accommodating racial, social and economic factors
3. Large number of housing renovation plans in china compared to Iran
4. To repair and retrofit damaged houses warranting individual's security.
5. meeting seismic strength standards

**Table 3**  
Comparison of housing renovation policies in Iran and China.

<b>China</b>	<b>Iran</b>	<b>strategy</b>
		Government investment
		Taking Public credit(budget)
		Government and people participation
		Improvement physical residential units compared to pre-earthquake conditions
		Material availability
		to consider racial, social, economic and cultural factors
		meeting seismic strength standards
		prohibiting construction in earthquake-prone areas
		participation of earthquake-stricken families in housing renovation

**5.9. Comparison of housing renovation policies in Iran and China**

An analogy on renovation plans in both countries shows that they are common in Government and people participation; Improvement physical residential units compared to pre-earthquake conditions, to consider racial, social, economic and cultural factors, participation of earthquake-stricken families in housing renovation and public credit. Although Iran emphasizes much more on buildings material availability, china outperform Iran through making a series of systematic plans.

**6. Housing renovation policies and plans for earthquake-stricken areas in japan**

earthquake struck Japan in Kobe region incurred damage worth an estimated £ 100billion was caused to roads, houses, factories and infrastructure, led to attaining importance achievements in crisis management

area(UNISDR,2011:3).the most primary is post-earthquake renovation plans designed in terms of following objectives:

- planning to reconstruction damaged areas
- immediate servicing after earthquake based on predetermined objectives
- warrant residential areas safety
- to make basic changes in city

Such plans are organized as follow:

**6.1. Construction prohibition in earthquake-prone areas**

- Improving buildings safety through transferring to safe part of city
- Banning new building construction next to present houses in earthquake-prone areas

**6.2. Victim's family participation in housing renovation**

- Full support on renovation, through cooperation with related organizations
- To extend ubiquitous renovation efforts through collaboration to citizens

**6.3. Increased awareness on earthquake**

- To encourage and motivate citizens to get awareness on prevention
- To update new courses on crisis presentation in schools
- To promote local measures against crisis

**6.4. Private sector investment**

- More support from private sector

**6.5. Building Materials availability**

- To develop new industries on earthquake using seismic zone special system(unisdr2007:27)

**Table 4**  
plan frequencies in Japan.

<b>Plans frequencies</b>	<b>strategies</b>
2	Construction prohibition in earthquake-prone areas
2	victims family participation in housing renovation
3	increased awareness on earthquake
1	private sector investment
1	Building Materials availability

**6.6. Result of discussion**

These results imply to specific endeavor by Japan on prevention or in other words increased awareness for cope with earthquake along with utilize private sector.

**6.7. Comparison housing renovation polices in Iran, china and Japan**

Above table indicates ignoring meeting seismic strength standards and prohibiting construction in earthquake-prone areas by Iran, while such factors are in priority of China and Japan plans.

**Table 5**  
comparison housing renovation polices in Iran, china and Japan.

Japan	China	Iran	strategy
			Government investment
			Taking Public credit(budget)
			Government and people participation
			Improvement physical residential units compared to pre-earthquake conditions
			Materials availability
			to consider racial, social, economic and cultural factors
			meeting seismic strength standards
			prohibiting construction in earthquake-prone areas
			participation of earthquake-stricken families in housing renovation
			Increased awareness on earthquake
			Private sector investment

Reference: Author.

### 7. Housing renovations policies and plans for earthquake-stricken areas in Turkey

Catastrophic earthquake events along with nestling cities in faults margins, dense population and unsuitable infrastructures (Mustafa Erdik2008:1), have led to many casualties in Turkey's cities. Such destructions delays socioeconomic developments in transition from undeveloped to developed countries and capsule (Fulin Bolen, 2004:1). For this reason, there are urgent needs to a comprehensive plan to expedite the earthquake-stricken area and recover it to normal situation. Hence, some plans and policies designed to detect those hazard-prone buildings and their renovation may be found as an effective and promising stem to realize country renovation goals.

#### 7.1. Government and people participation

- To minimize earthquake hazards, the experts and practitioners should be aware on common developments and technical rules and do their best on supervene strong buildings and constructions against earthquake.

#### 7.2. Improvement physical residential units compared to pre-earthquake conditions

- Damages prevention measures are incorporated in some parts new buildings

#### 7.3. prohibiting construction in earthquake-prone areas

- The top priority sites for design and construct strong buildings against seismic should be specified

#### 7.4. meeting seismic strength standards

- The Buildings retrofitting methods should be extended
- During all processes to improve buildings efficiency against earthquake( renovation), construct feasibility should be checked according to international rules and practical designs(unisdr2006:12)

**Table 6**  
Housing renovation policies and plans in Turkey.

Plan Frequency	Strategy
1	Government and people participation
1	Improvement physical residential units compared to pre-earthquake conditions
1	prohibiting construction in earthquake-prone areas
3	meeting seismic strength standards

**8. Results of discussion**

The housing renovation and rehabilitation plans in turkey are outcomes of previous policies and programs in the country so that there are some useful plans including constriction supervising (surveillance), Improvement physical residential units compared to pre-earthquake conditions and etc. among many others.

**Table 7**  
Comparison housing renovation polices in Iran, china, Japan and turkey.

turkey	Japan	china	Iran	strategy
				Government investment
				Taking Public credit (budget)
				Government and people participation
				Improvement physical residential units compared to pre-earthquake conditions
				buildings Materials availability
				Public service accessibility
				Providing development opportunity
				meeting seismic strength standards
				prohibiting construction in earthquake-prone areas
				Houses renovation
				increased awareness on earthquake
				Private sector investment

Reference: Author.

**8.1. Comparison housing renovation polices in Iran, china , Japan and turkey**

The table denotes on similarity between china and turkey in taking some policies specially those related to alleviate forthcoming earthquake hazards.

**7- Housing renovations policies and plans for earthquake-stricken areas in Indonesia**

Indonesia is an earthquake-prone country due to geological position, plenty faults within and margins parts of cities together with various anthropogenic factors including increased urban population, large number of unsafe buildings and unwise urbanization (Ophiyandri, T2005:1). So one of the determinant factor on damages and casualties resulted from catastrophic events is presence of an efficient crisis management system to planning for prevention, cope with, preparation, damage compensation and recovery along with cost-effective methods (Yan Chang, 2010:1) based on following goals:

- Housing Improvement
- Enhance victims safety and health

Following these plans is discussed.

**8.2. Participation of earthquake-stricken families in housing renovation**

-one day after the event, the earthquake-stricken families according to government guidelines in renovation plans, involve in building renovation through adopting suggested methods.

-the publics and families should play substantial rule in detecting renovation methods after earthquake and have great deal of contribution in rehabilitation process.

**8.3. To consider racial, social, economic and cultural factors**

- Considering demands and potentials of different families, construction methods adopted after earthquake, should be similar to those utilized in routine manner as much as possible.
- Building construction rules and renovation standards should reflect local culture and climate conditions.
- 7-4 Taking Public credit (budget)
- Monetary assistances and technical supports should be given to people (unisdr2009:7)



**8.4. Considering multiple renovation methods**

- To accommodate different needs in all social classes, basically more than one renovation method should be considered

**8.5. Results and discussion**

**Table 8**  
Frequency of housing renovation plans in Indonesia.

<b>Plan frequency</b>	<b>strategy</b>
2	participation of earthquake-stricken families in housing renovation
2	to consider racial, social, economic and cultural factors
1	Taking Public credit(budget)
1	considering multiple renovation methods

In spite of experiencing huge earthquake such as Haiti earthquake and enormous damages and abandoned houses, Indonesia do not emphasize on developing housing renovation plans and just offered a few plans with no important components like meeting seismic strength standards or prohibiting construction in earthquake-prone areas.

**Table 9**  
Comparison housing renovation polices in Iran, china, Japan, turkey and Indonesia.

<b>Indonesia</b>	<b>Turkey</b>	<b>Japan</b>	<b>china</b>	<b>Iran</b>	<b>Strategy</b>
					Government investment
					Taking Public credit(budget)
					Government and people participation
					Improvement physical residential units compared to pre-earthquake conditions
					Materials availability
					to consider racial, social, economic and cultural factors
					meeting seismic strength standards
					prohibiting construction in earthquake-prone areas
					participation of earthquake-stricken families in housing renovation
					increased awareness on earthquake
					Private sector investment
					Considering multiple renovation methods

Reference: Author.

**8.6. Comparison housing renovation polices in iran, china, japan, turkey and indonesia**

Table 9 indicates that even by accommodating such a few plans is most similar to Japan and is differed from others in offering flexible renovation methods.

**9. Housing renovations policies and plans for earthquake-stricken areas in indonesia**

Unwise constructions, people encroachment into earthquake-prone areas and ignoring natural thresholds in urban regions (2008:1Jennifer Duyne) have resulted in catastrophic crisis and economic losses. For this, given locating India on active faults and enormous earthquake, there are urgent needs plans for damaged areas

renovation in this country to satisfy earthquake-stricken demands. Hence regulatory agencies and policy makers have taken actions to develop required plans. Following some of them are discussed:

**9.1. Meeting seismic strength standards**

- Once hazards of earthquake, landslide and earthquake and etc. detected, appropriate manipulations should be exerted

**9.2. Prohibiting construction in earthquake-prone areas**

- As unsuitable zones may exacerbate susceptibility and vulnerability, it is essential to protect such zones against unfavorable mechanisms

**9.3. Houses renovation**

- Ensure on new buildings health and safety and their renovation

**9.4. Participation of earthquake-stricken families in housing renovation**

- Buildings renovation design should be implemented in participatory process involving government, society, victims, stakeholders, non-profit organizations and contractors(unisdr2005:3)

**Table 10**

Frequency of housing renovation plans in India

Plan frequency	Strategy
1	prohibiting construction in earthquake-prone areas
1	Housing Renovation
1	participation of earthquake-stricken families in housing renovation
1	meeting seismic strength standards

Reference: author.

**9.5. Results and discussion**

Small number of renovation policies and putting one plan in practice for each policy indicates government indifference to develop housing renovation plans.

**10. Analysis**

A comparative study of the abovementioned countries plan is provided in the following table. In addition to specifying the major renovation plans (common among at least three countries) and the strength or weakness of Iranian the plan development represent results presented in the following table.

the most important renovation plans included: taking public credit, Government and people participation, participation of earthquake-stricken families in housing renovation, Improvement physical residential units compared to pre-earthquake conditions, to consider racial, social, economic and cultural factors and meeting seismic strength standards.

**10.1. Results obtained from table**

- Whereas Iran focuses on cost-effective bidding materials and assistance from neighbor provinces to earthquake-stricken areas, through developing some plans to minimize earthquake hazards, china outperform the Iran
- Similarity of Turkey to China in adopting policies
- Similarity of India to China in terms of adopting plans

- Disagreement between all countries on common plan
- Emphasizing five countries on common plans of earthquake-stricken families in renovation and four countries on prohibiting construction in earthquake-prone areas, indicating high importance of these two plans.
- China strength and Indonesian government's weaknesses in developing renovation plans
- Ignoring plans to prohibit construction in hazard-prone areas, meeting seismic strength standards, by Iran given their contribution on surviving human against forthcoming crisis.

Hence, in light of results from comparative analysis and acquainting to Iran's renovation plans, following approaches are recommended for promote these plans:

**Table 7**  
Summary of renovation policies in earthquake-stricken countries

India	Indonesia	Turkey	Japan	China	Iran	strategy
						Government investment
						Taking Public credit(budget)
						Government and people participation
						participation of earthquake-stricken families in housing renovation
						Improvement physical residential units compared to pre-earthquake conditions
						Building materials availability
						to consider racial, social, economic and cultural factors
						meeting seismic strength standards
						prohibiting construction in earthquake-prone areas
						increased awareness on earthquake
						Private sector investment
						Considering multiple renovation method

Reference: Author.

## 11. Solutions

- Given lack of incorporating architectural and urban planning rules in urban construction processes, architectural and urbanization rules should developed aiming at minimize houses vulnerabilities against natural events while specifying regulations and duties of each of the responsible agencies in city and clearly defining enforcement such rules.
- Prohibit and prevent the unsafe and unprofessional building constructions resistant to earthquake and mandate insurance and apply all relevant implementation standards and regulations.
- Admittedly, training courses and plans under normal condition, is great deal of importance in alleviating damages and casualties incurred by natural disasters. The educational programs through the mass media, newsletters, brochures, safety messages in billboards, etc. could be effective in raising public awareness unnatural disasters and subsequent losses before, during and after the occurrence of the disaster. In this regards, municipalities through disseminating safety messages and training texts in the billboards or brochures or IRIB broadcasting educational programs may play an important role in this area.
- To educate and extend building construction techniques to executive groups and local masons while renovation process
- To use modern technology in producing building materials
- To apply exact monitoring on building materials producers

- To develop renovation plans and designs considering peoples culture, customs and religious

## 12. Concluding Remarks

Since earthquake is known to be one of integral parts of crisis management, to neglect exact implementing renovation plans may impose much heavy cost than others. For this, any effort to prepare, prevent, renovate and retrofit buildings should be set to alleviate casualties and damages against disaster and warranted based on accurate predetermined designs in compliance to government and people executive and financial potentials to get effective and useful results. So since the comparative analysis presented in the previous section suggests Iran focuses on availability of building materials and offering various building designs along with some weakness like neglect prohibiting construction in earthquake-prone areas, meeting seismic strength standards, increased safety and housing renovation

.To compensate for these shortcomings and avoid confusion involving issues and crises, Iran's housing renovation programs and policies should set so that besides appropriate theoretical support, provide wide varieties of stakeholders with profits and survive people against disasters while government supports through expressing terms and conditions. To this end, while considering financial potential for execute them and lack of negative responses in part of people, governments incorporate important points and plans considered in other countries having been calibrated. In this manner, they can assist people and country economy as well as human protection through retrofitting houses.

## References

- Dargahi, H., 2013. does housing finance supply system can be organized. *Macroeconomics 2013. Introduct. Hous. Plan.*, Iranian Student News Agency.
- Faraji, A., Gherkhloo, M., 2006. Urban crisis management with emphasis on the post-crisis phase. *J. geography. Landscape.*, 6.
- Farokhloo, M., Abedini, A., 2008. Informal settlement and unconventional residential strategies with emphasis on the housing sectoring Iran. *Geogr. Plann.*, N.25.
- Institute for Urban and Rural Services Studies in rural and urban., 2006. Urban crisis Management. *Inst. Humanit. Soc. Sci.*
- Institute for Urban and Rural Services Studies., 2006. Introduction to Crisis Management with emphasis on rural area. *Inst. Humanit. Soc. Sci.*
- Nateghi Elahi, F., 1999. Earthquake crisis management in Iran( structure, research, education and executive requirements). *Int. Inst. Earthq. Eng. Seismol.*,(IIEES).
- Reconstruction plan for flood and earthquake-stricken areas., 1989. Housing Foundation of Islamic Revolution, December 1989.
- Shakib, H., 2004. preparation against earthquake, Tehran City Council.
- Taghvai, M., Darabi, M., 2008. Urban Crisis Management with emphasis on the post-crisis. *J. geography. Landscape.*, 6.
- Vatani Oskuii, A., 2008. Crisis management and the assessment trend of earthquake stricken buildings. *J.Educat. Technol.*, V 3, N1.