47 Disaster Education: A Right To Generation's Safety

BACKGROUND

Iran, a country located in the Alpine-Himalayan seismic belt, is one of the most active tectonic regions of the world. The country has experienced many devastating earthquakes with a magnitude of 7.0 or more on the Richter scale throughout its history. After the Manjil-Roudbar Earthquake of June 1990 and during the IDNDR there has been considerable effort in Iran, nationally and internationally to develop effective public awareness and education for different levels of the society. A comprehensive earthquake risk reduction program in Iran was launched in 1991. In parallel with improvement of and new methods for design and construction of structures, earthquake education has developed and grown as another effective initiative

OBJECTIVES

In this respect, educating children, as the future of any community at risk, can be regarded as an effective strategy to communicate safety messages to the entire community. It is proposed that children can act as a key factor in the promotion of a safety culture, leading to disaster mitigation and risk reduction In many developing countries, over half the population are of school age. Children can communicate the messages they have learned about public safety to their parents, their relatives, their neighbours and to family friends Through this "trickle-down" process of dissemination, the wider society may be touched by an effective school safety curriculum Consequently, schools play a major role in the development of a more disaster-educated population. Therefore, if awareness raising educational programmes in schools are effective, then the message is communicated to a broad spectrum of citizens in many communities

ACTIVITIES

Education about disasters can be provided for children at various educational levels One of the key target groups is preschool children Education of preschool children has been undertaken in Iranian nursery schools since 1999 The effectiveness of this education has been positively highlighted in recent case studies. One of these recent studies demonstrates that earthquake education of children from an early age in preschool and elementary levels can be an effective vehicle for increasing their knowledge and ability to respond to earthquakes Furthermore, the transfer of this knowledge to the families and to the wider community seems both feasible and promising in the development of a future "culture of safety" nationally. In the case study (by this author), the process of behaviour assessment was undertaken by placing preschool children in various simulated earthquake situations The findings of the study also revealed that the group of children who have not been educated in respect of earthquakes, displayed more distress when confronted by a simulated earthquake event. It was also noted that practice, through the use of "drills" and earthquake simulation exercises , provides a sense of control and confidence in children who have received earthquake education. These results support the contention that earthquake related education programmes appear to enhance the confidence with which preschool children respond to an earthquake It is felt that this confidence may be applicable in responses to similar hazards.

In Iran, educating children and young people in disaster preparedness at nursery, elementary, secondary and high school levels has been implemented on a national scale covering both urban and rural areas since 1991 This has been achieved through including materials in the textbooks, use of films, conducting "safety drills", holding exhibitions and competitions, displaying paintings and posters in educational environments, and using songs and games (For more details, please see: http://www.iiees.ac.ir/English/Publicedu/eng_publicedu.html) These activities have been demonstrated to be of great interest to the children, their parents and the teachers. "Safety drills" are among the activities favored by children. The First Nursery schools' drill on the subject of *"Earthquake and Safety"* was held on October 2000 in one of the central parks in the capital city of Tehran. The children had previously received instruction about earthquakes and appropriate responses The aim

of the drill was the demonstration of the safety procedures taught to the preschool children. The drill has been subsequently performed in June 2002, June 2003, and May 2004, the latter in four parks in the capital city of Tehran.

ACHIEVEMENTS

Nation wide school "Safety drills" commenced in 1999 involving 15,499 high schools. The Second Drill on the subject of *"Earthquake and Safety"* was held in 2000 involving all of Iran's secondary and high schools – a total of 45,000 schools and 11 million students. Subsequently, the drill has been performed annually. In 2003, the drill was performed at a wider national level covering 18 million children in 110,000 educational institutes in primary, secondary and high schools across the country. The "Safety Drill" program has been developed by IIEES (Ministry of Science, Research and Technology) with the cooperation of Ministry of Education, the National Committee for Natural Disaster Reduction (*Ministry of Interior*), the Iranian Red Crescent Society, and Iran National Television and Radio. The purpose of these drills is to prepare students for the appropriate and timely responses during earthquake. Assessment and evaluation of the most recent drill in 2003, has provided recommendations to achieve more structured and systematic drills in future.

LESSONS

Regular assessment of the effectiveness of all awareness programs is a necessity. This can be achieved through systematic planning by the implementing organizations and related ministries for each of the various disaster awareness programs. When appropriately in practice, the results of the assessments lead to improved implementation of new and updated initiatives. In parallel with the education and awareness programs, retrofitting of school buildings for improved earthquake safety has been recently started in Iran.

FUTURE

In respect of the post-disaster phase, planning of initiatives for "emergency response" and "recovery" has yet to be designed and implemented. However, research has been started with the objective of proposing a comprehensive "Disaster Management Planning" initiative in schools.

48 Bam Earthquake Of 05:26:26 Of 26 December 2003, Ms 6.5

BACKGROUND

The Magnitude Ms=6.5 earthquake of 26th December 2003 occurred at early morning (05:26 26 local time) along Bam fault with no recorded of any major earthquake, at least, approximately in past 2500 years; and while many residents of the Bam historical city were still sleeping. The traditional mud-brick and clay homes put up little resistance to the violent shaking, and as walls and roofs crumbled and collapsed, more than 100,000 of victims were trapped beneath the rubble and from them around 26,500 lost their lives Close to 11,000 of the city's students perished, along with one to five of Bam's 5,400 teachers. Tens of thousands were left homeless and up to 6,000 children were orphaned. Arg-e-Bam (Bam Citadel), the largest mud-brick complex in the world and other historical buildings were almost totally destroyed. Bam earthquake not only shook the heart and mind of the Iranian, but the world and created on the biggest human solidarity This earthquake have created a new initiative in Iran's risk reduction program and consequently provides a unique window of opportunity to raise international awareness of the importance of the effective implementation of a comprehensive earthquake risk reduction program in hazard-prone countries

OBJECTIVES

TThe objectives of the case study is to present some preliminary results of investigations on geotechnical and structural aspects, and to understand the damages caused by the event.

ACTIVITIES

The activities described here are the results of the investigation on geotehnical, and structural engineering aspect and damages on lifelines and special structures The intensity levels are estimated to be VIII in Baravat, VII in New-Arg (Arg-e Jadid) and the airport area. The intensity level was estimated to be around IV-V in Kerman and Mahan

■**Geotechnical Aspects:** There were not any major geotechnical failures observed in the Bam. However, many land subsidence due to collapse of Qanats (underground irrigation tunnels), local toppling and block slides along riverbanks or man-made channels were observed For the purpose of geotechnical microzonation of Bam, seismic hazard analysis geological studies accompanied by geophysical surveys and aftershock and microtremor measurements were carried out to provide preliminary site classification and PGA distribution maps for two return periods of 475 and 2475 years Reasonable agreements exist between the site classification and 2475 years PGA distribution maps of the city and the damage distribution map of the recent earthquake. Almost all damages of the low rise buildings occurred in sites with stiff shallow and medium depth soils, which possess a considerable amplification potential in the high frequency range The maximum value of the peak ground acceleration was evaluated in the south-east part of the city, where the highest value of damage percent (80-100) was experienced. The minimum value of the peak ground acceleration was evaluated in the north-west part of the city, where the least value of damage percent (20-50) was experienced. In addition, the 475 years PGA microzonation map could be used as a preliminary useful hint in reconstruction and urban planning of the city

■**Structural Engineering Aspects:** Existed buildings in Bam composed of Adobe and Masonry housing units (90%), Steel (8%) and Reinforced Concrete (2%). Based on the statistical evaluation of 550 buildings (74% 1-story, 22% :2-story and 4% .3 story or more) of the partially damaged, it was concluded that 62% could not be used for occupation, 34 8% could be retrofitted and 3 2% were safe

The main reason for the failure of the adobe and masonry buildings were the heavy roofs and walls as well as the lack of structural integrity, specially in the newly build ones The good performance of the arch roof of the old adobe buildings was good example of the importance of structural integrity.

Most of the steel building were damaged due to lack of code implementation, poor workmanship, poor connections (specially Khorjinie or satchel connection), weld rupture, buckling (overall, out of plane and lateral-torsional) of the weak columns specially in the batten columns, rupture and plastic shear of the

battens, local buckling and rupture of X bracing and lack of frame in one direction of the buildings. The buildings that had followed the minimum code requirements were not damaged

Performance of the concrete buildings were poor for the residential cases and good for the essential ones.

Up to 95% of the buildings and walls within the 2500-years-old-ancient-Arg-e-Bam (Bam Citadel), the largest adobe construction in the world, were collapsed The failure were mainly due to improper and lack of seismic safety consideration in the restoration program.

■**Lifeline and Special Structures:** The Lifeline systems of Bam were shut down due to various type of equipment failure, However most of the lifeline systems were restored within the first week after the earthquake. The performance of the bridges, roads, railways were good and slight damages did not cause interruption of their services. The failure of the Bam airport tower caused delay in using the airport facilities. However its rapid restoration of the airport played very important role in the rescue and relief operation. Without the airport the human casualty were become much more. Water distribution systems for both drinking water and agricultural water which were done through the traditional irrigation system (Qanats) were seriously damage. Water tower and underground water storage tank and deep well sustained some damage and in general had acceptable performance Nonstructural damage in the PTT buildings caused the communication interruption. The cell phones started to work within a few hours. There were little damage to high voltage transmission lines and towers and moderate damage to electrical equipment in the Bam substation. Most factories and other industrial facilities were either not damaged or stayed intact. However, they remain dysfunctional due to loss of workers.

LESSONS

The Bam earthquake disaster, despite its high casualties and losses, provides a unique window of opportunity to raise international awareness of the importance of the effective implementation of a comprehensive earthquake risk reduction program in Iran as well as in hazard-prone developing countries. It gives a challenge to the governments to make the highest use of the existing know-how on earthquakes and its integration into development programs. It also compels the scientific and engineering community to provide more socio-economic-cultural compatible solutions to national needs. Moreover, the public at large should become more concerned about the hazard and increase its own preparedness level. The UN Strategy document, Bam Declaration and Recommendation for Bam citadel, Bam reconstruction paper and formation of the UNESCO-UNDP-UN/ISDR-IIEES Alliance for earthquake risk reduction in developing countries are sample of the initiatives for the better future.

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49 Activities To Create The New Trend Of The Disaster Mitigation Education

BACKGROUND

Kobe and the surrounding cities, towns were struck by a strong earthquake in the early morning on 17 January 1995 The disaster imposed a lot of lessons to tackle on the national and local governments, the fire and rescue sections, the Japan Self Defense Force, the specialists at universities and even the ordinary citizens The necessity and importance of the education was pointed out and the new trend of the disaster mitigation education started in Hyogo Prefecture. In April 2002 Maiko High School started a special course where the students major in the disaster mitigation, utilizing the lessons of the Great Hanshin-Awaji Disaster and aiming at becoming the citizens who can contribute to the society

OBJECTIVES

The disaster mitigation education in Japan so far only focused on how to escape from the disaster just after the disaster takes place. Evacuation drill at school is an good example Now the focus of the disaster mitigation, however, is sifting from "emergency management' to "preparation." The focus of the education also needs to shift in this direction of preparedness. The simple but ultimate goal of the course is to raise the citizens with the capacity to cope with the disasters not only during the disaster but also after and before the disaster The important factors we believe are the fundamental knowledge, the fundamental skills and the strong will To make the students acquire the three factors we set the objectives as following.

■The education of disaster mitigation is based on the lessons of the Great Hanshin-Awaji Disaster. It makes the students think of the importance of life, cultivates the students' power against disasters, and brings up the human beings who can contribute to our society.

■The students are expected to understand deeply about the various environments (the natural environment and the social environment) by learning the mechanism of the natural phenomenon and the relationship between disasters and human society

■We cooperate with universities, research institutes and coherent organizations Students' understanding of the environment and disaster mitigation is deepened through the experience learning. To raise the students' attitude to "Think Globally, Act Locally" is one of the main goals to attain. We aim to bring up the individuals who can take actions independently.

ACTIVITIES

The disaster mitigation education at Maiko High School is not a temporary trial but expected to continue and spread to the local, national and international level as the model for the new challengers in this field. We have implemented many activities during the 2-3 years after the start of the course and we hope to produce more and more examples of the activities of the disaster mitigation education The education can be categorized into two fields; the social environment and the natural environment. The education of the natural environment is well done in Japan in such subjects as geology, geography and environment; the mechanism of the earthquake, the inside of the Earth, the volcanoes, and so on. On the other hand, the education of the social environment concerning the disasters can not be seen in most classrooms. That is why the activities concerning the social environment are mainly listed below. For further information please see the "Education on Disaster Mitigation by Maiko High School–Some Examples of the Educational Activities."

■The Memorial Event of the Great Hanshin-Awaji Disaster
■International Exchange Program with NSET-Nepal and the Students in Nepal (Kobe-Katmandu Exchange Program with the Help of UNCRD and NSET-Nepal)
■Speeches by those who Experienced the Great Hanshin-Awaji Disaster
■Learning at Disaster Museums
■Making of "Concept Map"
■Simulation to Cope with the Disaster
■Making of "Related Map of the Disaster"
■Making of "Safety Map" of the Area
■Disaster Imagination Game
■Simulation Using the Map
■Simulation by Role Playing

- Disaster Management of My House
- Disaster Management of a Fictitious Town
- Making of 'Wall Newspaper
- Making of "World Hazard Map"
- Town Walking in the Disaster Area
- Ten Ideas to Make Community Safer
- Field Work at Mt. Rokko
- Teaching the Pupils at an Elementary School
- Writing the Experiences of the Earthquake

The outcomes of the education are sometimes presented at the workshops and seminars held by the administrations, NGOs and NPOs. Presentation itself is a good stimulus both to improve and deepen their students' studies and to make people more aware of the disaster mitigation.

ACHIEVEMENTS

The goal and objectives of this course is to raise the students who have the capacity to cope with the disaster and the attitude to contribute to the society. We can safely say that this goal is well attained by the most of the students. Many of them are more interested in the disaster management and participate in the volunteer activities, the seminars and workshops of the disaster mitigation, and the evacuation drills done in the small communities.

To expand the disaster mitigation education is another goal and this goal is partly attained by being noticed by the disaster section of the local and national governments, the specialist of the disaster management, the fire fighters, the mass media, the NGOs and NPOs, and the ordinary citizens.

LESSONS

From our activities we learned that there are a lot of people who want to change the situation by teaching the children but they are not given the opportunities to do so. This made us realize that one of the teachers' important roles is to connect these people with the daily activities of school. Once they are given the chance, they are sure to tell meaningful stories and the stories changes the students a lot.

Another lesson is that experience takes a very important role in the education. We let the students learn by experiences; listening to the stories by the guest teachers, visiting the relevant places, making interviews in the streets, presenting their opinions to the public, making the wall newspapers, walking around the town to make the "Safety Map", and so on.

Most teachers still think that the disaster mitigation education is something special, something that bothers the teachers, and something that has nothing to do with the daily curriculum. We need to change these teachers and make them realize that the disaster mitigation education is deeply related with the daily life.

Maiko High School are now trying to make a dual network: a network of the teachers and schools to facilitate the disaster mitigation education, and a network of the local and national governments, specialists, the corporations, NGOs, NPOs to get more information and utilize the human resources.

FUTURE

To extend the disaster mitigation education, a strong and wide network needs to be made not only by the teachers but also by the students, regional citizens, specialists, administrators, NGOs and NPOs and so on. Schools must open the school gate to welcome these people to let them give lessons of the disasters. School is an epitome of the society. Many kinds of people must be involved in the school activities. To implement this activity the teachers should make a drastic change in their attitude.

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