



## EARTHQUAKE DISASTER PLANNING IN NURSERY SCHOOLS

Y.O. Izadkhah<sup>1</sup> and M. Hosseini<sup>2</sup>

### ABSTRACT

Disaster management planning of all educational institutes in high earthquake prone-areas is a necessity. In this paper, the development of an earthquake management system for nursery schools is highlighted. The unavoidable nature of the disasters, the impossibility to predict them and the need for considering the safety of the very young generation who are the future assets of communities emphasises this priority. Furthermore, small children are indeed one of the most vulnerable groups of the society, therefore, their protection is considered as highly important. This paper aims to develop an appropriate earthquake disaster management system for Iranian nursery schools with the hope that other developing countries can also benefit from the proposed programme. The plan can be expanded and implemented in schools, high schools and universities subject to specific requirements.

### Introduction

Iran is located in the Alpine-Himalayan seismic belt, as one of the most active tectonic regions of the world. In the last few decades, the country has experienced several major earthquakes which have claimed hundreds of thousands lives and tremendous property damage (Izadkhah 1998).

After the International Decade for Natural Disaster Reduction (IDNDR) and with the initiation of International Strategy for Disaster Reduction (ISDR) in 2001, a strong shift has been placed from post-disaster activities to pre-disaster mitigation and preparedness policy especially in countries such as Iran which are in the continuous exposure to risks. Also the level of preparedness activities is more focused in younger groups of the society. Therefore protecting the young children which are the future assets is of great importance.

The focus in this paper is on protecting young children as one of the most vulnerable groups in the society. If the children are at nursery school in the time of a disaster, there should

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<sup>1</sup> Research Associate, Resilience Centre, Defence Academy, Cranfield University, Shrivenham, Swindon, SN6 8LA, UK, email: [Y.O.Izadkhah@cranfield.ac.uk](mailto:Y.O.Izadkhah@cranfield.ac.uk)

<sup>2</sup> Associate Professor at the Structural Engineering Research Centre, Vice President of Planning and Development, and Head of Lifeline Engineering Dept., International Institute of Earthquake Engineering and Seismology (IIEES), P.O. Box 19395/3913, Tehran, Iran, email: [hosseini@iiees.ac.ir](mailto:hosseini@iiees.ac.ir)

be a lot of support provided to them, because in most cases they can not help in relief activities and they might be frightened very easily if they don't know about the earthquake and its consequences.

In addition, many questions arise such as:

- Are the children aware of what to do?
- Should they be kept indoors or they should be let out?
- What is the responsibility of the school personnel?
- How should the parents be notified in case of a disaster?
- What are the main things everyone should do in an emergency?
- Is there a system that can manage the consequences of the disaster?
- Have the roles and responsibilities of the children, tutors and administrators been identified and scheduled in advance?

This paper intends to deal with some possible suggestions to these questions.

### **Nursery Schools in Iran**

In Iran, children's age in nursery schools ranges from two to six years. The five year old children are in the preschool stage and during their sixth year are prepared to progress to primary schools. There are around 4,700 private nursery schools in Iran. In the capital city of Tehran, there are around 720 nursery schools including independent, private (non-governmental) and governmental nursery schools. According to the Data Information, in the year 2000 around 251,552 children were attending preschool level or as is called in Preparedness level (Welfare Organisation 2003). The nursery school education is teacher-based and does not follow a uniform or standardised guideline. Each teacher uses her/his own creative ways of teaching based on experience. Sometimes, teachers employ their own teaching methods based on consultations with the children's parents.

Besides, safety measures in other sectors are taught to children at preschool level. Issues such as "how to cross a street"; "how to avoid eating contaminated food"; "how to brush teeth"; and "how to use the dangerous utensils such as knives" is been taught by the teachers using their discretion as to what is appropriate for the children. However, in recent years, the scope of teaching earthquake issues has gained a higher priority and is more controlled than the above instructions concerning everyday threats. This is continuously supported by institutes such as the International Institute of Earthquake Engineering and Seismology (IIEES) due to the frequent occurrence of earthquake in the country.

### **Disaster Education in Nursery Schools**

It is evident that preparedness in early preschool level will be increased through education and awareness of children and training the nursery school personnel including administrative staff, teachers, and administrators in safety measures. In addition to teaching about what to do before, during and after a disastrous event in the nursery schools, proposing a comprehensive disaster management programme for hazard mitigation and public awareness seems crucial as well. In fact, educational places such as nursery schools are among the most

important buildings exposed to serious damage and loss of life from earthquakes. Additionally, educating the children, as the future of any community at risk, can be considered as an effective strategy to communicate safety messages to the entire community. In other words, educating the children serves to disseminate vital information to most of the population via the knowledge, skills and enthusiastic motivation of children.

Children can be actively involved in disaster activities. Methods that have to be implemented in teaching disasters to children should be very selective, as teaching about earthquakes to this group of young children is not an easy job. It is assumed that practice, through the use of “drills” and “earthquake simulation exercises” can provide a sense of control and confidence in the earthquake educated group of children. This supports the contention that earthquake related education programmes do appear to help in equipping preschoolers with a higher degree of confidence and less fear in confronting an earthquake or presumably other hazards. In respect of psychological preparedness, it has been proved that children who receive earthquake education are able to display normal levels of anxiety with respect to earthquake education (Rezaiepanah and Parsizadeh 1997, Ronan et al 2001). Moreover, the earthquake educated preschoolers are more likely to report having discussed earthquake issues with parents which involves parents in their activities as well. In addition they can possibly act appropriately in the time of disasters in helping their friends (Izadkhah 2004).

Most of the times, fear manifests itself amongst older children, who may fully understand the consequences of an earthquake. “Safety” and “earthquake” are separate perceptions. In Iran, the “safety” has not been integrated into the adult culture and the latter, “earthquake”, usually invokes a reaction of fear and denial in adults. This “safety” does not seem to be a significant issue for a child. The child sometimes learns about fear from experience. They learn vicariously, by imagining things graphically if this is clearly explained to them. Reasoned fear appears in older age groups of children. This supports the view that learning to confront and overcome the fear of earthquakes, or any other hazard can be best achieved with children from early ages or even before school level.

One of other issues that needs consideration is that most of the teachers are not trained to teach the earthquake education materials. Consequently, the individual teacher’s method really depends on their personal interest and creativity to motivate the children. Having enthusiastic teachers to explain about earthquakes is very important in maintaining this as a vibrant and stimulating subject within nursery schools. The role of the teacher in presenting materials to different children with various backgrounds, interests and needs is crucial. While a disparity in teaching methods might be suggested before an assessment can be undertaken, means of establishing and benchmarking the most effective teaching methods should be defined. Evidence has shown that the manner in which teachers interact with children affects the extent to which they raise the children’s awareness of disaster issues. Subsequently, the first requirement should be to provide ‘Awareness Training’ courses for the teachers. Teachers should be inducted into training programmes conducted or organised by the appropriated authoritative institutions. These institutions can provide information about past disasters and the natural hazards within the country. Authoritative institutions should cooperate and coordinate in the provision of a special programme to provide educational training and resources in respect of emergencies. It is believed that a communication system needs to be gradually implemented through nursery schools and

this process of communication and sharing of information should be more developed and structured.

There is a need for teachers to continue regular meetings with the parents. This two-way communication offers an excellent opportunity to gain information about children and their reactions at home regarding earthquake education. Teachers should create the incentive for the children to practice drills at home. This helps in fostering the important transfer of information from children to their families. Additionally, teacher training should be uniform nationwide which demands the imminent attention of the policy-makers.

One of the best teaching methods for preschool children can be the use of games and other amusement activities such as singing the earthquake song (Izadkhah and Hosseini 2005). Children are more interested in playing in groups and teams in preschool levels, therefore responsible teams can also be allocated for helping to get prepared before, during, and after disasters as will be discussed later in this paper. Selective earthquake education activities can also be recommended by teachers and be supported by the parents. Children can choose to do these from various activities once a week along or besides doing their homework. Teachers should view the whole educational process as an optimum in joint communication between them and the class.

### **Disaster Management Planning**

Disasters do often require both the preparedness and response teams which is best planned and prepared before a disaster strikes (Dynes 1970, Quarantelli 1985). It is obvious that the necessity of giving services to important places such as nursery schools in the time of disasters requires preparedness. This necessity can be due to various factors such as:

- a) The occupancy of nursery schools by children as one of the most precious resources and the most vulnerable groups of the society, and
- b) The possibility of using nursery schools as temporary shelters after major disasters or before disasters where there is a warning period.

During a disaster, the initial outcome of an earthquake is convergence. The dangerous situation generates by the unorganised and frightened children as they rush out from the exit doors to an open area. They may create problems for the nursery school personnel including teachers, assistants and the administrators. Having a coordinated, comprehensive and appropriate disaster management system is therefore necessary in nursery schools. This system should consider three phases of before, during, and after an earthquake. In this regard, there are some necessary activities that should be planned beforehand such as:

- Vulnerability identification of nursery schools (Structural problems);
- Conducting and implementing public education of “Preparedness against earthquakes in nursery schools”;
- Having periodical meetings with parents;
- Having periodical meetings with disaster management experts;
- Allocating necessary commissions for planning and allocating the responsibilities to a

- group of selected personnel;
- Establishment of an executive earthquake management council in nursery schools under the auspices of Welfare Organisation;
  - Conducting a list of the name of the children in nursery school;
  - Organising a system of information dissemination with placing the head of the nursery school on the top;
  - Prepare cards to record each child's identity including name, age, the blood group, home telephone number, and the telephone number of one of the kin (this card should be kept with the child when attending nursery school);
  - Identification of the necessary activities for various operational groups.

A preparedness framework for disasters is introduced by the United Nations Development Programme (UNDP Manual 1990) which emphasises on planning as one of the base requirements of the programme. Preventive measures should be considered before the earthquake. As noted earlier, planning can be scheduled by the administrators, teachers, other staff and the representative groups of parents.

Part of the necessary activities and the strategy that can be planned before an earthquake are proposed and shown in Table 1.

**Table 1:** Part of the necessary provisions in nursery schools before an earthquake

| <b>Provisions</b>  |
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| Psychological preparation of the staff and children for a probable earthquake                                |
| Asking the structural experts to visit nursery schools for their resistance                                  |
| Increasing the safety of nursery school building   |
| Planning for earthquake educational initiatives in nursery schools   |
| Preparing guidelines for the time of a disaster for children and nursery school authorities                  |
| Preparing a map of the nursery school and the necessary equipment  |
| Identifying the physical blockage in the route ways and lack of communication service with the outside world |
| Selecting a number of children's parents for relief and rescue teams   |

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| Training selected tutors for first aid activity and earthquake drills  |
| Identifying the roles of the selected groups   |
| Allocating the responsibilities to the selected teams  |
| Ensure the proper performance of the facilities that may cause problems in the time of earthquakes, like electricity, gas piping, underground channels and so on |
| Having special drills in nursery schools for preparedness on a regular base  |

It is also proposed that practicing drills which is believed to be one of the most favourite activities among the children (FEMA 1990, Izadkhah 2004) should be planned and scheduled by the nursery school's administrators and to be performed in specific times in the nursery schools by trained tutors. The objective of these practical and simulated drills can be summarised as:

- Familiarising with different preparedness procedures;
- Evacuation (Kaji 1992);
- Emergency response activities;
- Simulating an unreal earthquake (Izadkhah and Hosseini 2003);
- Exercise coping mechanisms in a variety of situations and conditions; and
- Simulating drop, cover, and hold.

Few other provisions can be planned in advance to meet the needs of the personnel and children such as:

1. Preparing the school area for evacuating children;
2. Identifying the most safe and dangerous places in nursery schools;
3. Making the area suitable for Search and Rescue (SAR) activities without any serious disturbance;
4. Training school authorities as well as representatives of parents for first aid assistance;
5. Making sure that all the involved groups know their responsibilities.

### **Disaster Management System**

A well-coordinated response can save many lives and reduce the damage in a disaster. Therefore, there is need to expand a comprehensive system that each group of the society and the organisations can rely on their own sources and ingenuity for a while before a gradual return to normality. This requires an efficient organisation of resources, staff and prioritisations of actions with time and an understanding of the possible consequences of the disaster (Coburn and Spence 2002).

In this regard and what was noted earlier in this paper, the authors propose a chart for disaster management action planning in nursery schools presented in Fig 1. Various operational teams should be assigned to work in coordination with each other in different phases of before, during and after a disaster with assigned roles and responsibilities. Some teams can be more functional before the earthquake happens, whereas others can coordinate in all three phases.

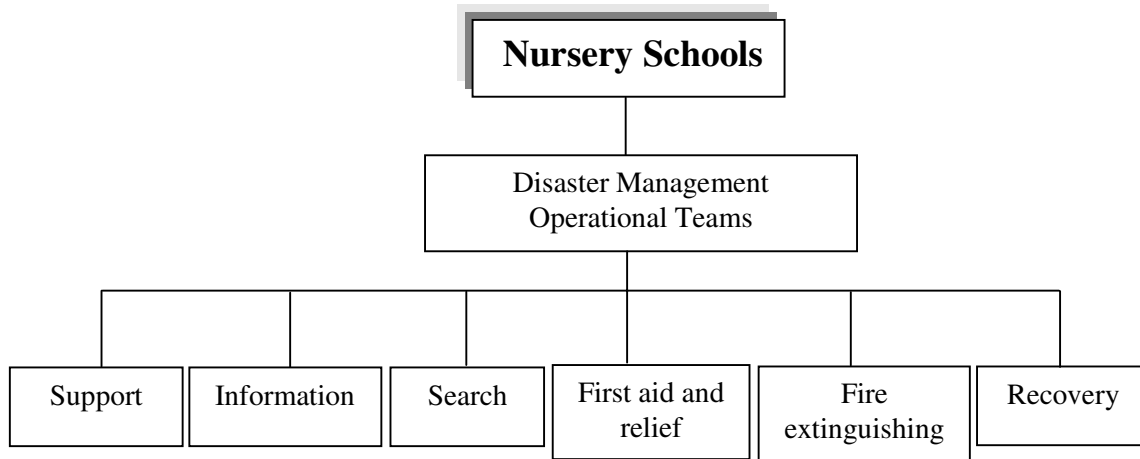


Figure 1: Proposed chart of different operational groups in nursery schools.

### **Support Team**

This team should identify the earthquake hazards in nursery schools and to solve these problems with the help of parents and the authoritative experts. Part of this teams' responsibility includes:

- Preparing the necessary requirements and locating them in a safe place to be used for at least 24 hours after the earthquake;
- Conducting a map of the nursery school location;
- Identifying the dangerous and safe places;
- Preparing necessary kits after the earthquake including water, food and necessary medicines;
- Consideration of the water supply, electricity and gas in the nursery schools;
- Observation of the emergency exit doors.

### **Information Team**

Part of this group's activities also relates to post disaster which can be:

- The development of an appropriate earthquake plan;
- Awareness of the existing conditions;
- Check the situation of the children's absence before and after the disaster;
- Offering information and guidance to children and their parents;
- Information control and notifying it to the search, relief, fire extinguishing and support teams;
- Awareness of the emergency exit doors and connection ways;
- Preparing a list of the emergency telephone numbers of children's relatives;
- Announcing a report of the disaster consequences.

### **Search Team**

This group addresses search and rescue after disasters, of which, the main activities are:

- Inspecting the building;
- Observing the damaged area in the nursery school;
- Evacuating and transferring the injured children and school personnel to safe places outside the damaged area.

### **First Aid Team**

The first aid team consists part of the relief teams who are trained beforehand. Some of their activities include:

- Offering first aid to the injured;
- Preparing a list of the physical conditions of children and the nursery school personnel;
- Assisting those children who need emotional and mental consulting;
- Providing assistance to even less injured, and calming them by giving advice to them.

### **Fire Extinguishing Team**

The probability of a fire after an earthquake is very high. The fire group operates in:

- Inspecting the building;
- Preparing fire capsules for extinguishing fire after the earthquake;
- Inviting children to relax in the time of a fire;
- Preparing guidelines for fire safety;
- Evacuating the nursery school area when there is no chance to extinguish fire.

### **Recovery Team**

Part of the team activities includes:

- Long-term recovery;
- Normalising the situation in the nursery school;
- Re-offering the emergency services at the nursery school;
- Providing physical and psychological assistance to more sensitive children.

Besides, other provisions may be considered in the emergency planning for the nursery schools such as:

- Backing-up the disaster plans,
- Having a psychological plan,
- Considering security issues after the earthquake,
- Updating earthquake educational programmes,
- Involving children in activities related to earthquake preparedness,
- Involving parents in related disaster activities,
- Supporting the activities by teachers and parents together,
- Inserting more updated earthquake materials in the nursery school activities,
- Conducting regular assessment of the plans and to ensure their compliance with the safety policies,
- Monitoring of the operational groups activities regularly,
- Ensuring greater coordination of school safety plans,
- Increasing awareness among educational organisations in country.



## Conclusion

Pre-disaster mitigation and planning are necessary steps for achieving sustainable development and should aim at developing a culture in which the general public are aware of the hazards which will confront them and provides the knowledge with which people can protect themselves. It is proved that earthquake education from the early ages of preschool and elementary levels can be a suitable vehicle for increasing their knowledge to deal with earthquakes. The transfer of this knowledge to the family and to the wider community seems feasible and promising in the development and expansion of a future “safety culture” in the country.

Natural disasters such as earthquakes often result in extensive casualties and damage. The location of Iran and many other developing countries in active tectonic regions of the world emphasises the necessity to develop a comprehensive disaster management system that considers critical facilities including nursery schools and other educational institutes. The disaster management system proposed in this paper addresses different phases of the disaster by assigning responsibilities to various operational teams in order to mitigate the consequences of the disaster. Also there is a need to emphasise on a national-level contingency planning that includes developing and designing detailed plans for a proper response and training of relevant personnel. The assessment of the disaster management systems in nursery schools can increase their effectiveness. The evaluation should be undertaken on a regular basis toward the improvement of these initiatives. Key indicators should focus on:

- Programme implementation,
- Services, and
- Functioning of the system.

Another important issue suggested for special attention is the training of the nursery school personnel such as tutors, administrators and also parents to play their important roles in reducing the risks by implementing the new system. It is hoped that the development of a disaster management system for nursery schools can contribute to the reduction of the disastrous consequences of the future earthquakes for Iranian children and their families. In addition, other developing countries can benefit from a similar system based on the proposed model.

## References

- Coburn, A., and R. Spence, 2002. *Earthquake Protection*, (2<sup>nd</sup> ed.), John Wiley and Sons Inc. New York, USA.
- Dynes, R.R. 1970. *Organised Behaviour in Disaster*. New York.
- FEMA, 1990. Guidebook for Developing a School Earthquake Safety Programme. 88, Revised.
- Izadkhah, Y.O., 1998. “Earth, Science and Safety”. UNDP/UNESCO/IIIES, Brochure on Reducing the Impact of Disasters.
- Izadkhah, Y.O., and M. Hosseini, 2003. “Reducing Pre-school Children’s Stress in Earthquake Preparedness through Proper Education”, The VIII. European Conference on Traumatic Stress,

Berlin, Germany, 22-25 May.

Izadkhah, Y.O., 2004. "Bridging the Generations, A Critical Assessment of Disaster Education in the Development of a Seismic Safety Culture in Iran", *PhD Dissertation*, Cranfield University.

Izadkhah, Y.O., and M. Hosseini, 2005. "Towards Resilient Communities in Developing Countries through Education of Children for Disaster Preparedness", *International Journal of Emergency Management*, 2(3), 138-148.

Kaji, H., 1992. "School Education for Earthquake Disasters: Japanese Experiences", Training and Education for Improving Earthquake Disaster Management in Developing Countries. UNCRD Meeting Report Series, No 57, 115-120.

Quarantelli, E.L., 1985. "Organisational Behaviour in Disasters and Implications for Disaster Planning" (Report Series 18). Newark, DE: University of Delaware, The Disaster Research Center.

Rezaiepanah, N., and F. Parsizadeh, 1997. "Analysing Education Effects on Children and Young Adults, "Earthquake and Safety", IIEES Report, (In Persian).

Ronan, K., D.M. Johnston, M. Daly, and R. Fairley, 2001. "School Children's Risk Perceptions and Preparedness: A Hazards Education Survey". *The Australian Journal of Disaster and Trauma Studies*, Vol. 1.

UNDP Manual, 1990. "Disaster Management Planning".

Welfare Organisation, Iran. <http://www.behzistitehran.org.ir>, [accessed April 2003].