Public Awareness On Earthquake And Tsunami Survey In Penang

By: Lau Tze Liang, Assoc. Prof. Dr Taksiah A. Majid, Dr Choong Kok Keong and Shaharudin Shah Zaini
School of Civil Engineering, Universiti Sains Malaysia

INTRODUCTION

We, Malaysian, have the perception that we are staying in the region well away from earthquakes and that the effect of earthquake forces is negligible/ minimal. Malaysia is actually located in the 'ring of fire' which marks the areas affected or likely to be affected by earthquakes (Muhd. Yunus, 1982). The world's major and very active thrust fault (Java Trough) to the west of Sumatra is very close to Malaysia. There are also two thrust faults in Peninsular Malaysia, one is located in Pulau Langkawi while the other is near Ipoh (Muhd. Yunus, 1982).

Muhd. Yunus (1982) states that some study has predicted that Malaysia will experience severe earthquake arising from the Sumatra and Andaman strike slip fault which runs the length of Sumatra and the Andaman Sea to the north of the Straits of Malacca in the future. This prediction came true on December 26, 2004 when a magnitude 9.0 megathrust earthquake occurred just off the coast of Sumatra, Indonesia. This earthquake has caused devastating tsunami, which swept across the Indian Ocean and killed at least 280,000 people. After three months of that occurrence, another major earthquake struck off the west coast of Sumatra, at Nias on March 29, 2005 killing hundreds of Indonesian in a massive 8.7 magnitude earthquake.

Even though Malaysia was outside the seismic zone, Malaysians especially those occupants of high rise building in major cities of Peninsular Malaysia, have experienced a few earth tremors in the past which have resulted in some minor panics among them. Cracks on buildings and several large sinkholes appeared in various parts of Malaysia were reported.

A survey for public awareness on earthquake and tsunami in Penang State has been carried out on 28 April 2005 (Thursday) during a Public Talk on "Tsunamis, Its Effects, Relief and Defense Works" by Professor Nobuo Shuto, an International Authority in Tsunamis and Coastal Engineering, in Kompleks Masyarakat Penyayang Pulau Pinang, organised by The Institution of Engineers, Malaysia (Penang Branch). This survey has been successfully conducted in association with IEM Penang Branch.

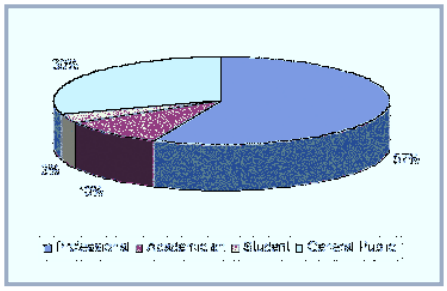

Figure 1: Nature of Career for Respondents

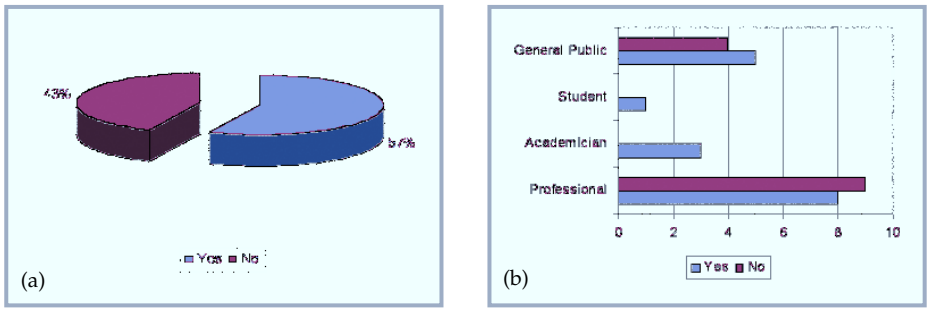

Figure 2: Earth Tremors Experience in Malaysia Resulted from Earthquake

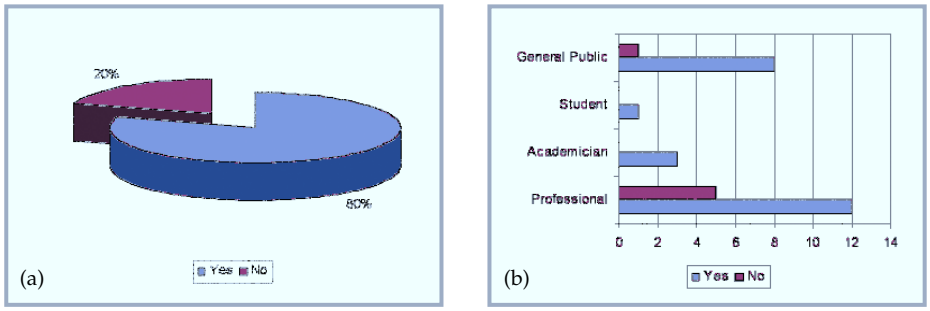

Figure 3: Earthquake Hazard Awareness in Malaysia

RESULTS

The information from the survey was analysed and the results are discussed in the following sections.

NATURE OF CAREER

We received 30 replies out of 50 participants of the talk. Out of these responses, 57% are the professional, followed by general public (30%), academician (10%) and a student as shown in Figure 1.

EARTH TREMORS EXPERIENCE

From these respondents, 17 (57%) of them have experienced the earth tremors in Malaysia resulted from earthquake in the past as shown in Figure 2(a). Figure 2(b) illustrates the details of the statistics based on the nature of career.

EARTHQUAKE HAZARD AWARENESS AND KNOWLEDGE ON EARTHQUAKE AND TSUNAMI

Generally, 80% of the respondents are aware of the earthquake hazard in Malaysia (Figure 3). In terms of knowledge, 70% of the respondents stated that they have the knowledge on earthquake and tsunami from our survey, respectively as presented in Figure 4.

PUBLIC AWARENESS, DISSEMINATION OF INFORMATION AND PREPAREDNESS, EARTHQUAKE MONITORING AND RESPONSE AND INFORMATION AND RESOURCES ON SOCIETAL IMPACTS

However, 94% of the respondents agree that public awareness on earthquake in Malaysia is low as depicted Figure 5. 84% of the respondents (Figure 6) gave the opinion that the dissemination of earthquake and tsunami information and preparedness for Malaysian is not sufficient at the moment. All the respondents except a general public as described in Figure 7 thought that the earthquake monitoring and response from the relevant agencies has not reached the satisfactory level.

Apart from that, 87% as given in Figure 8 stated that the information and resources to help in responding to the societal impacts of an earthquake are not comprehensive in Malaysia.

MAPS OF PROBABLE HAZARDS AND EARTHQUAKE PREPAREDNESS INFORMATION

Because of the above-mentioned inadequacies, most of the respondents (Figure 9) except two general public agreed that there is the necessity to have maps of probable hazards from future earthquake. 83% of the respondents also agreed that the information about how to prepare for an earthquake is essential for Malaysian (as shown in Figure 10).

INFORMATION AND EDUCATION CAMPAIGN FOR PUBLIC AND SCHOOL STUDENTS

Figures 11 and 12 give the importance

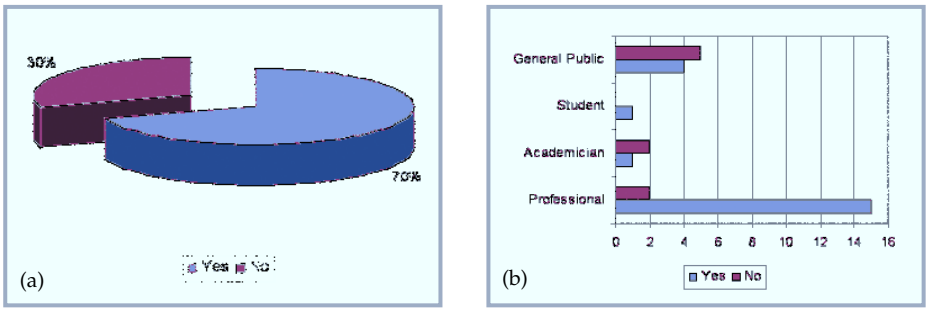

Figure 4: Knowledge on Earthquake and Tsunami

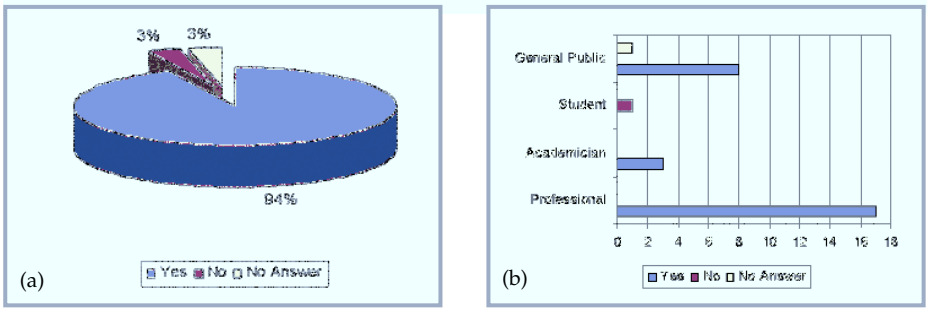

Figure 5: Poor Public Awareness on Earthquake in Malaysia

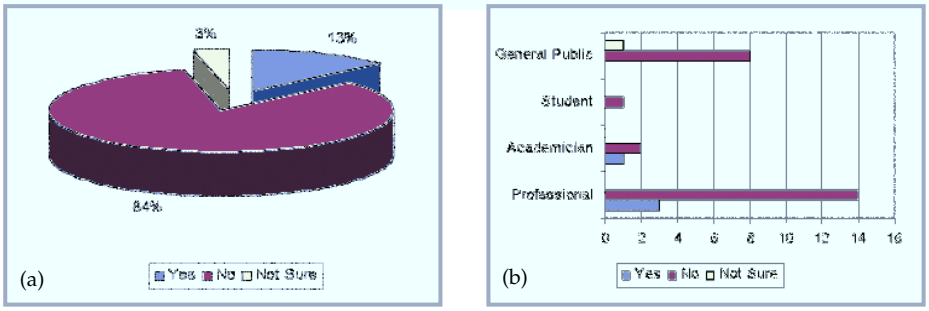

Figure 6: Sufficient in Dissemination of Earthquake and Tsunami Information and Preparedness for Malaysian

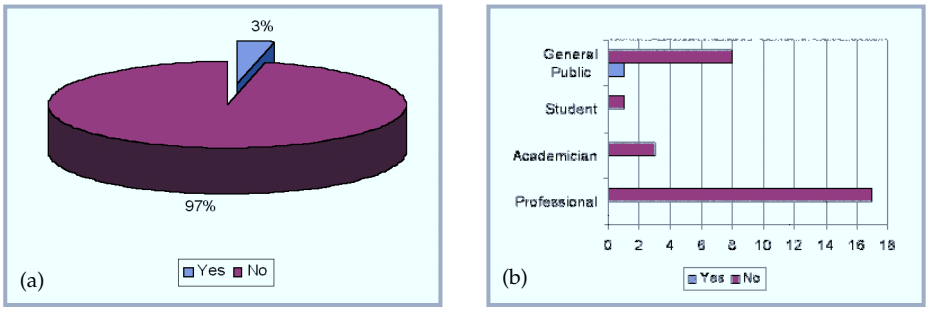

Figure 7: Satisfactory of Earthquake Monitoring and Response from the Relevant Agencies

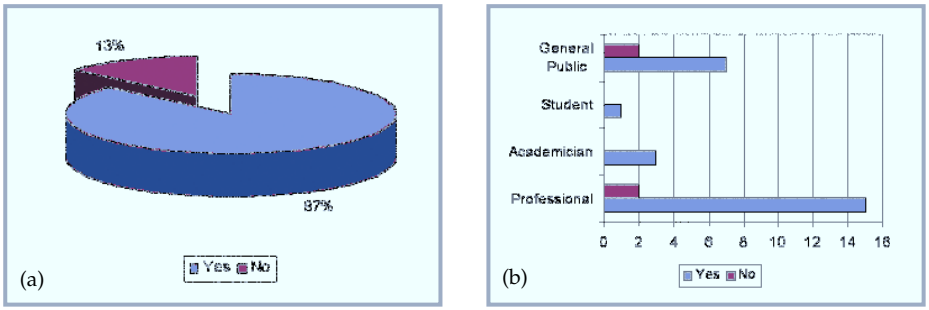

Figure 8: Incomprehensiveness of Information and Resources in Responding to the Societal Impacts of Earthquake

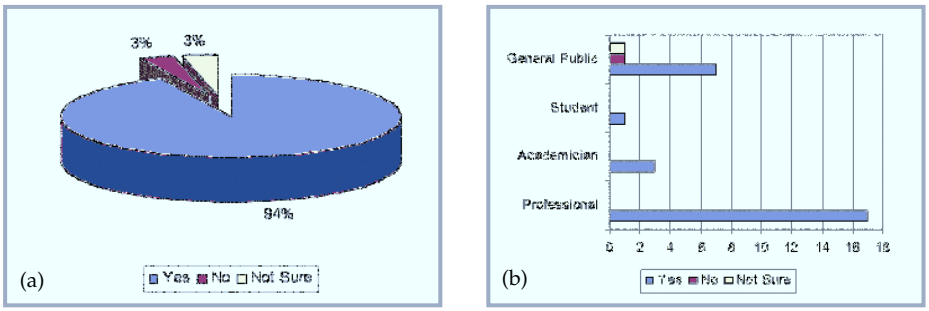

Figure 9: Necessity of Maps Probable Hazards from Future Earthquake

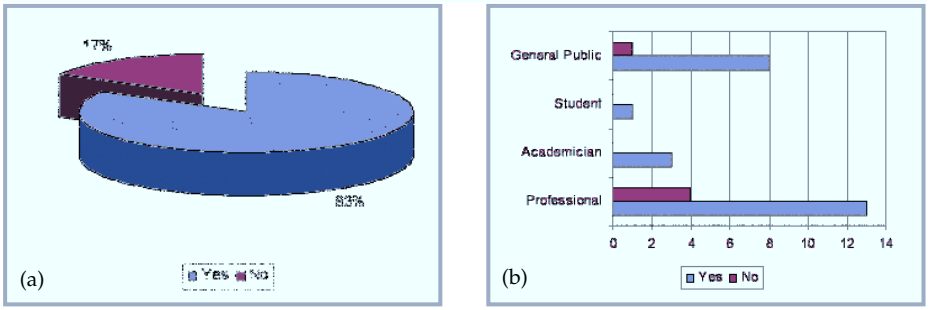

Figure 10: Importance of Information on Earthquake Preparedness for Malaysian

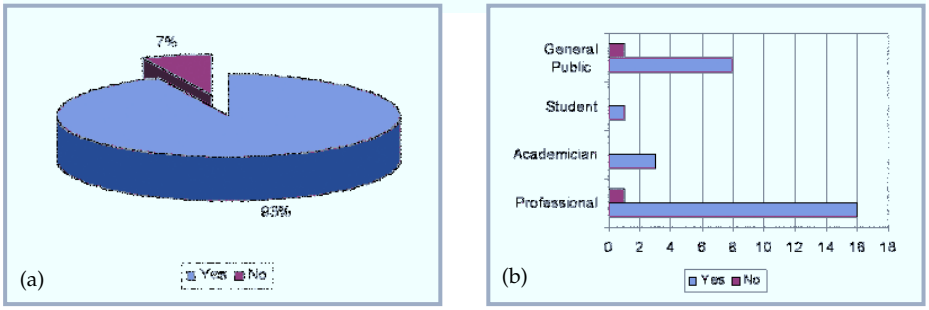

Figure 11: Implementation of Information and Education Campaign for Public Awareness toward Earthquake Hazard

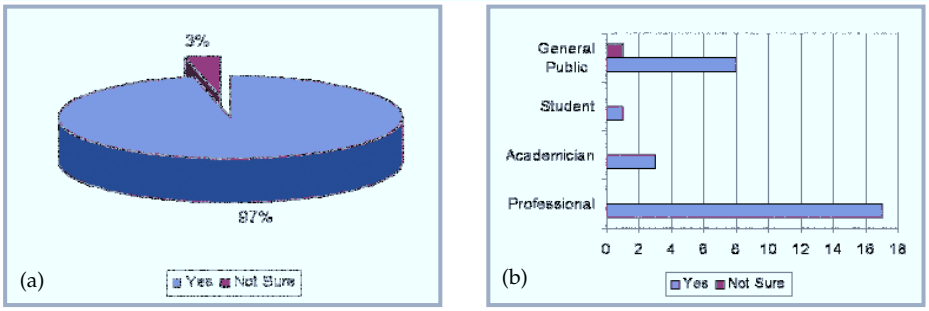

Figure 12: Information and Education Campaign for School Student will help in Relief of the Earthquake Hazard

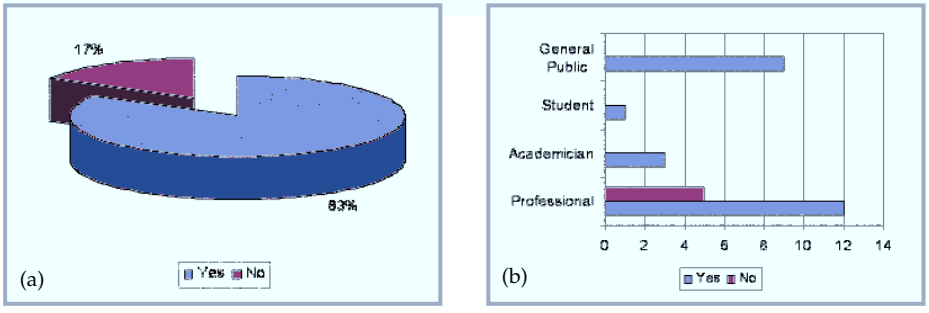

Figure 13: Development of the Earthquake Guidance for Building Design and Construction

of information and education campaign to reduce earthquake hazard. More than 90% of the respondents agreed that the information and education campaign toward earthquake hazard for public should be carried out and these activities for school students will help in the relief of earthquake hazard.

DEVELOPMENT OF EARTHQUAKE GUIDANCE FOR BUILDING DESIGN AND CONSTRUCTION

The idea to develop the earthquake guidance for building design and construction has been brought out by the government after the shaking of numerous high rise buildings in Malaysia from recent earthquake occurrences originating from Sumatra. This suggestion has received different point of views from various levels of Malaysian communities. From the statistics of this survey, we found that 17% (Figure 13(a)) did not agree with the movement to develop such guidance. Out of this figure, they are all professionals (Figure 13(b)). The need for IEM to arrange courses corresponding to this guidance for practising engineers or young engineers was proposed by one of the respondents from professionals.

SEMINAR OR TALK ON EARTHQUAKE AND TSUNAMI

Figure 14 shows that 97% of the respondents thought that the seminar or talk on earthquake and tsunami should be carried on for professional key persons and general public.

OTHER COMMENTS

Other comments related to earthquake and tsunami were raised by the respondents. These comments include the construction of quake-safe structure from policy, design and legislative aspects such as compulsory earthquake safety precaution, mandatory earthquake proof structure, regulatory preventive measures, policy and design for earthquake resistance buildings. The concern on environmental aspect such as preservation and increase in mangrove forest areas, prohibition of mangrove forest destruction and minimization of coastal habitation

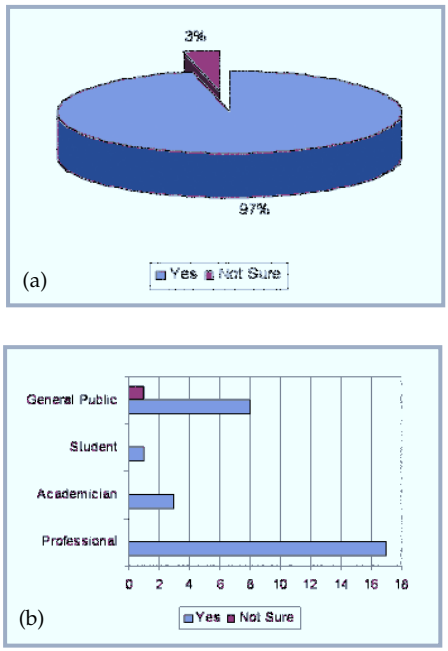

Figure 14: Seminar/Talk on Earthquake and Tsunami should be Carried On for Professional Key Persons and General Public

should be taken into consideration during any development. Besides that, regular public talks on related topics or issues should be organised.

CONCLUSION

This survey has given initial an indicator for researchers and professionals on the degree of awareness about earthquake and tsunami. Further effort should be made to create awareness and enhance the knowledge and preparedness for Malaysians so that we all are well prepared for future earthquake incidences. Certain measures should also be taken to ensure that all our buildings are safe from tremors and earthquake. ■

REFERENCES

Muhd. Yunus, M. Y., (1982), "Keynote Address – Building High", Proceedings of the Asian Regional Conference on Tall Buildings and Urban Habitat, Kuala Lumpur, August 17-20, The Institution of Engineers, Malaysia, pp. K-1 – K-8.