

Appeal by the Japan Association for Earthquake Engineering

PREFACE

The Japan Association for Earthquake Engineering (JAEE) is an institution that aims to develop the science and technology related with earthquake engineering and disaster mitigation. It is characterized by its wide scope, ranging from the traditional engineering to societal issues. After the giant earthquake on March 11, 2011, JAEE members have been devoted intensely to damage investigation and developing reconstruction strategies together with proposing preparedness of the community for future giant earthquakes. Upon one year after the March 11 event, JAEE makes a public appeal towards the engineers, people, and the nation as well as the world. What follows is a brief English summary of this appeal.

INTRODUCTION

Recovery and reconstruction of the earthquake-hit society is a difficult and complicated job. Preparedness for future big earthquakes is not easy either. There are and will be many arguments and conflicts between different opinions about the directions to go. To avoid unnecessary delay and unfortunate consequences, it is essential for all the stakeholders to agree what follows;

- the bases of the prosperity of the nation and the happiness of the people have to be respected,
- those bases have to be conserved and transferred to the future generations, and
- in pursue of the above two long-term themes, the nation should not be affected by short-term conflicts that may occur between decisions made by policy makers and the feeling of the people.

The characteristics of natural disasters depend on the types of our civilization and community. As the civilization and community change with time, the types of disasters change. Therefore, we always encounter with unexpected new types of disasters upon every big earthquake. For example, problems of lifelines and telecommunication facilities started only a few decades ago. Upon the March-11 event, tsunami and nuclear problems as well as soil liquefaction in personal properties emerged. Although it is not easy to foresee new kinds of problem prior to the occurrence of disasters, we need to continue watching our changing community and try to detect possibility of new types of problems during future events.

SIGNIFICANCE OF THE MARCH-11 EARTHQUAKE DISASTER

The disasters caused by the M=9 earthquake were characterized by the vastness of the damaged area and the significant interaction among individual damages. Because transportation networks stopped operation at many places, supply of emergency goods and fuels stopped as well, emergency activities became very difficult, industrial activities slowed down, and jobs for affected people decreased significantly. Until the time of this gigantic earthquake, the significance of the vastness and interaction of damages had not been understood precisely.

The compound damage mechanism have to be understood properly. This mechanism means that two or more causative mechanisms of damage occur together and worsen the situation. For example, it is likely that foundation of some structures in coastal areas was first affected by subsoil liquefaction and then tsunami washed them away totally, although verification being impossible after the tsunami attack. Electricity supply to the Fukushima 1 Power Plant was destroyed by the earthquake shaking first and then the big tsunami. More detailed study is needed on the compound mechanism and appropriate mitigation measures have to be developed.

Another important feature of the earthquake was the substantial damage in personal properties, such as houses and lands. Because financial capacity of people that is available for damage mitigation is limited, those properties have not been well reinforced against earthquake actions. This is in a clear contrast with public and industrial facilities for which financial support is relatively bigger. It is one of the future directions for the earthquake engineering to supply support to those individuals that wish to protect their properties from natural disasters.

WHAT EARTHQUAKE ENGINEERS SHOULD DO

Engineers have to foresee possibilities of new problems. To do this, engineers have to have a good imagination. At the same time, they have to discriminate absurd things from meaningful imaginations. This is a very difficult task and can be achieved only by freeing imaginations of traditions. Moreover, it is certainly important for the sake of the future generations to document and archive real damages caused by the giant earthquake.

As stated in the preface, the bases of the nation and the community have to be respected. A short-term scope is often affected by emotions and may lead to destruction of the community's basic structure. Engineers need to maintain a long-term scope.

Because the damage mechanism is complicated and related with each other, it is difficult to achieve relevant preparedness against future giant earthquakes. The idea of "Business Continuity Plan (BCP)" that are now getting popular in industries should be applied to the entire community and the nation. BCP intends to minimize the negative effects of natural disasters and help resume the regular operation as soon as possible after disasters. BCP for the entire community or the nation is extremely more difficult than that for an individual factory and a company. One of the long-term targets of BCP study is a development of a computer technology for national risk analysis in which every component of a nation is accurately computed and analyzed.

MESSAGE TO PEOPLE

The impact of a giant earthquake is beyond human imagination. It is impossible to prevent all kinds of its negative effects. This is the reason why this appeal stresses that the bases of the prosperity and happiness of the people and the nation have to be given the first priority during the reconstruction period. Therefore, something else may not be well respected and people may have to accept inconvenience after the giant earthquake.

In spite of this negative remark, earthquake engineering still wishes to support those people who wish to solve problems for themselves and protect their own life. Detailed information on risk and safety measures should be supplied to people in a convenient way. If desired, safety measures and

tools should be supplied to people at a reasonable cost. The development of IT technologies is helpful in this regard.

SPECIAL REMARK ON FUTURE OF NUCLEAR POWER PLANTS

The accident of Fukushima 1 Power Plant was unfortunate and very bad. It should not be repeated again in future. JAEE shares this kind of idea with people. Because JAEE is a neutral institution, however, it attempts to call people's attention to the following issues that are important for the prosperity of happiness of the community and people, but have not been stated very much in a public environment.

1. Nuclear power generation can supply energies to industries in a mass scale at relatively low cost. Then industries can supply jobs to people. This situation is very important and has to be respected.
2. Although the earthquake impact was significant in the power plant, its extent was not yet fatal. The fatal impact was caused by the unfortunate underestimation of the tsunami effect in the Fukushima No.1 Plant. It deserves more attention that other nuclear power plants were able to avoid fatal consequences. Currently, efforts are going on intensely to learn lessons from the induced damage and reinforce existing nuclear power plants. Attempts to totally demolish nuclear power plants in spite of those efforts will destroy the bases of the prosperity and happiness, including people's employment. Those attempts should show to the nation alternative future scopes on the prosperity and happiness.