

REPORT OF THE TRAINING PROGRAM ON EARTHQUAKE RESISTANT BUILDING IN CITY OF BENGKULU

1.0 INTRODUCTION

On June 4, 2000, at approximately 23.30 local time, the City of Bengkulu was shaken by a 7.9 scale earthquake with its epicenter located in the Indonesian Ocean, 100 km from Bengkulu City in the south-east direction, near the Enggano Island. The earthquake has caused losses in Bengkulu Province and in particular in Bengkulu City, due to damages to buildings, public facilities and infrastructures. It has also caused injuries and loss of life of many people.

In order to prevent or to reduce the impact of this kind of disaster in the event of future strong earthquake, there is a need to implement mitigation activities. One of the mitigation suggested measures is strengthening or retrofitting of non earthquake-resistant buildings. The repair and restoration of earthquake damaged buildings (dwellings and public facilities) in Bengkulu provide the best opportunity to implement mitigation measures through the retrofit and strengthening of the inadequate buildings to fulfil the earthquake resistant building criteria.

As part of its replication program, using the window of opportunity provided by the event of earthquake in Bengkulu Province, the IUDMP proposes a training program on earthquake resistant building for policy makers, engineers and technicians in Bengkulu City. The training program is implemented under the Phase 3 of the IUDMP, which started its program on the 1st September, 2000.

The implementation of the training program is coordinated and combined with a similar project sponsored by the United Nations Center for Regional Development (UNCRD), which is promoting the school earthquake safety project in the Asia-Pacific. The UNCRD project is currently promoting the active role of the local community in constructing school buildings that are safe from earthquake hazards.

2.0 THE PROGRAM

The training program was implemented in Bengkulu City from 11 to 16 September 2000. It combined the Indonesia Urban Disaster Mitigation Project – IUDMP building training program (funded from AUDMP-ADPC) and the School Earthquake Safety Project (funded by UNCRD) community based school safety program , as follow:

1. Understanding the Seismic Risks of Bengkulu area and Appropriate Earthquake Resistant Buildings Practices for Bengkulu

The aim of this activity is twofold, i.e. to raise the seismic risks awareness of various parties and organizations, involved in and responsible for the development process of

Bengkulu City, and to introduce the principle of good earthquake resistant building practices to mitigate the risks.

The activity is implemented under the framework of the Indonesian Urban Disaster Mitigation Project (IUDMP) in collaboration with the Municipality of Bengkulu City and the University of Bengkulu, using the fund from the IUDMP Replication Phase. It consists of a workshop for policy makers and a training program for local engineers, contractors and technicians.

2. Training Program for Community Based Repair and Retrofit of School Buildings Damaged by 4th June Earthquake in Bengkulu City

The purpose of this program is to train the people of Bengkulu for implementing the repair and retrofit program of school buildings damaged by the earthquake using the locally available material and technology, and which includes the participation of the related local community groups.

The program is implemented by IUDMP in collaboration with the Municipality of Bengkulu and the University of Bengkulu, under the framework of School Earthquake Safety Project, sponsored by the United Nation Center for Regional Development (UNCRD), Kobe, Japan. It consists of a series of workshops and training for various local community groups on local earthquake resistant building practices.

3.0 PROGRAM IMPLEMENTATION

3.1 Two-day Workshop on “Seismic Risk and Earthquake Resistant Building in Bengkulu”, September 11 – 12, 2000

Workshop Objective

- ❑ To provide more accurate information on seismicity of Bengkulu Area and to introduce the concept of earthquake disaster management to various stakeholders in Bengkulu City.
- ❑ To introduce the principle of good earthquake resistant building practices to the participant.

Organization, Venue and Resources

The Workshop was organized jointly by the Institute for Research, ITB (represented by IUDMP), the University of Bengkulu and the City of Bengkulu, and it took place in the Auditorium of University of Bengkulu, from 11 to 12 September 2000. Funding comes from IUDMP Phase 3 and local contributions from University of Bengkulu and the City of Bengkulu.

Workshop Participants

The Workshop, inaugurated officially by Prof. Dr. Zulkifli Herman, Rector of the University of Bengkulu, , was attended by 45 representatives from various organizations, such as local Public Works Department, National Education Department, local BAPPEDA, regional office of Mining and Energy, city council member, local contractor and consultant and mass media (local newspaper and TV). Mr. Philip B. Tjakranata from USAID Jakarta also participated in this seminar.

The Program

In the first session of the first day of the workshop, Mr. Teddy Boen introduced an overview of earthquake mechanism and its impact. Dr. Jodi Firmansjah., earthquake and structural engineer from ITB, presented the New Earthquake Hazard Map of Indonesia and the seismic risks of Bengkulu area.

In the second session, Mr. Engkon K. Kertapati, geologist from GRDC and member of IUDMP Working Group, gave an overview of the geological condition of Bengkulu area and its effect on earthquake intensity in Bengkulu city. Mr. Yalinus, an engineer from Local Public Works Department, explained the kinds of building in Bengkulu which are vulnerable to earthquake. Ir. H. Suparman from BAPPEDA of Bengkulu City gave an overview on cost for rehabilitation of the damages in Bengkulu City due to June 4, 2000 earthquake.

In the third session, Dr. Krishna S. Pribadi discussed the disaster management mechanism for earthquake hazard, followed by social issues related to the June 4, 2000 earthquake disaster, presented by Mr Hadiwinarto from the University of Bengkulu.. The final session of the day was closed by a general discussion forum for the topics of the first day.

On the second day of the workshop, September 12, 2000, Mr. Teddy Boen, started the first session with an overview of earthquake resistant non-engineered building design principles. A similar topic on engineered building was given by Dr.Jodi Firmansjah, followed by a presentation, again by Mr. Teddy Boen, giving an overview on the various types of damage due to earthquake in non-engineered building and the cause of the damages.

In the second session, Mr. Teddy Boen explained methods on repair, restoration and strengthening of non-engineered building, followed by similar presentation from Dr. Jodi Firmansjah on engineered building. The session was closed by presentation from Dr. Krishna S. Pribadi on principles of quality assurance for construction of earthquake-resistant building.

The second day workshop was closed by general discussion and then followed by conclusion of the workshop. The workshop was adjourned by the 2nd Vice Rector of University of Bengkulu, Mr. Ridwan Nurazie.

Discussion Results

During the discussion, it was concluded in general, that the City of Bengkulu needs an earthquake mitigation strategy, which should include the following measures:

- ❑ Socializing the seismic risk of Bengkulu, in particular the City of Bengkulu, to various organizations, institutions and individuals, in order to raise the awareness of the local community.
- ❑ Develop or review the local building regulation, in particular provisions related to seismic aspect, followed by monitoring and controlling of the implementation of the regulation by the authorized institutions.
- ❑ Development of standard operating procedure for disaster management and emergency plan, in particular for earthquake disaster, to help coordinate all related institutions and organizations in improving their preparedness for the future event.

General Comment

In general, the objective of the workshop was achieved. However, in term of participants, it could have been more successful if there were more workshop participants with more decision authority background.

3.2 “School Safety Workshop for School Community”, September 13, 2000

Workshop Objective

The workshop is aimed to give proper understanding regarding the role of the school community in promoting school safety, related to the school building, school children, teachers and other school personnel as well. It is also expected that the workshop will raise the community preparedness toward future earthquake.

Organization, Venue and Resources

School safety workshop is part of a series of training workshops of the Training Program for Community Based Repair and Retrofit of School Buildings Damaged by Earthquake, sponsored and funded by UNCRD, for the school community in Bengkulu City. The workshop was organized by IUDMP in collaboration with the Municipality of Bengkulu and the University of Bengkulu. It has taken place in the Auditorium of the Municipality of Bengkulu City.

Workshop Participants

About 46 attendees representing some school community elements, i.e. school principals, teachers, parents and officials from local education office participating in the one-day workshop. The media as well as the public relation staff of the municipality were also represented in the workshop.

The Program

The opening address was given by the Secretary of the Municipality, appreciating the timely workshop for the local community in need of more accurate information on earthquake disaster. The program sessions includes presentations from Mr. Teddy Boen on the earthquake phenomena and its impact to school buildings and Dr. Jody Firmansyah on the seismic risks of Bengkulu City. Dr. Krishna S. Pribadi discussed the measures to be taken to protect the school community from earthquake hazards and Dr. Harkunti P. Rahayu discussed preparedness activities for school communities. At the end of the workshop, the participants were divided into 3 (three) small groups for exercise and group discussion on conducting earthquake drills for self protection, emergency evacuation and rescue, and vulnerability assessment of school place (hazard hunt), facilitated by Dr. Harkunti P. Rahayu.

Discussion Results

The direct experience toward the latest earthquake has markedly influenced their opinion about the needs of earthquake preparedness program for their schools and its mechanism to conduct the program effectively. The main lesson taken from the discussion was the evident need in the future for implementing earthquake preparedness program at school communities, including earthquake drills, in the Province of Bengkulu.

3.3 Training Program on “Repair, Retrofitting and Strengthening of the Earthquake Damaged Building”, September 14 to 15, 2000

Training Objective

- To introduce the techniques for constructing earthquake resistant buildings and repair, retrofitting, and strengthening of earthquake damaged building to technical personnel involved directly in reconstruction and rehabilitation phase of earthquake damage in Bengkulu.

Organization, Venue and Resources

The Training was organized by the Institute for Research, ITB (represented by IUDMP) in collaboration with the Municipality of Bengkulu City and the University of Bengkulu, and took place in the Auditorium of University of Bengkulu, from 14 to 15 September 2000. Funding comes from IUDMP Phase 3 and local contribution from City Government of Bengkulu and University of Bengkulu.

Workshop Participants

The Workshop, inaugurated officially by the 1st Vice Rector of the University of Bengkulu, Dr. Zainal Mukhtar, was attended by 40 participants representing various organizations such as Public Works Department, City Planning Department, BAPPEDA, local contractor and consultant, and some students from Civil Engineering Department of the University of Hazairin.

The Program

In the first day of the training, Mr. Teddy Boen introduced an overview of the principle and criteria of earthquake resistant building for non-engineered building. This overview then continued by explanation on the typical damage of non-engineered and engineered building and how to repair, retrofit and strengthen the damaged non-engineered building. Dr. Jodi Firmansjah presented an overview of design criteria for earthquake resistant building, especially for engineered building.

in the afternoon, Dr. Masyhur Irsyam, geotechnical expert gave an overview of geotechnical soil condition and its effect on seismic risks and typical earthquake damage on soil structure (foundations and infrastructures). Dr. Jodi Firmansjah proceeded with explanation on construction detailing needing special attention in earthquake resistant building. Dr. Harkunti P. Rahayu presented techniques on field supervision and inspection of construction materials.

In the last session, the training participants were divided into 2 (two) groups. Each group was given the task to read and review a given design drawing of a typical school building and an engineered building, i.e. the Basic Science Building of the University of Bengkulu. Discussion was held between participants and resource persons on the deficiency of each building design drawing, related to earthquake safety.

In the second day of the training, participants were taken to visit the damaged buildings on site. The first group visited the damaged Basic Science Building in the University of Bengkulu and the second group visited an elementary school building, the SDN 2, which

was also damaged. Discussion on the damage of the buildings and how to repair and strengthen them was conducted on the site visit, followed by further discussion in the classroom on the suggestions for actions required to correct the deficiency.

The workshop was adjourned by Mr. Ridwan Nurazie, 2nd Vice Rector of University of Bengkulu, late in the afternoon.

General Comments

In term of programming and content, the training seems to be a good model for these kind of training needed by a local community in the reconstruction phase after an earthquake disaster. In term of participants, the training could have been more effective if more technical personnel (local city engineers, contractors and consultants) were involved. The participants in this particular training were composed of 50% technical/non-technical personnel and 50 % students from the Civil Engineering Department from the University Hazairin in Bengkulu City (The University of Bengkulu does not have Faculty of Engineering). This is also considered as positive, since it gave an early introduction into earthquake safety practices for future engineers of the city.

ANNEX PHOTOS OF ACTIVITIES

Two-day Workshop on “Seismic Risk and Earthquake Resistant Building in Bengkulu”, September 11 – 12, 2000



Figure 1 Participants of workshop



Figure 2 Discussion among the workshop participants



Figure 3 The Presenter at the Workshop

(From left: **Ir. Teddy Boen** – IUDMP Advisory, **Ir. Jodi Firmansjah, MSE., Ph.D.** – Seismic and Building Structure Expert, Moderator)

“School Safety Workshop for School Community”, September 13, 2000



Figure 1 Opening Session of the Workshop



Figure 2 Workshop participants



Figure 3 Discussion session among the participants
(Facilitated by Dr. Harkunti P. Rahayu)

Training Program on “Repair, Retrofitting and Strengthening of the Earthquake Damaged Building”, September 14 to 15, 2000



Figure 1 Opening session of the Training Program



Figure 2 Discussion between the training participants and the resource persons



Figure 3 The participants of the two-days training program