

Builder's Competency Improvement About Simple Earthquake Resistant Houses in Blang Pulo Village, Lhokseumawe City

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ABSTRACT

The Indonesian region has a very high seismic intensity. Its geographic location is on three active tectonic plates, namely Indo Australia, Eurasia and the Pacific and is part of the circum Pacific belt, a series of volcanoes (ring of fire) that reaches 40,000 km in length, causing Indonesia to be frequently hit by tectonic earthquakes and volcanic eruptions. Incident after incident seemed to alternately hit various regions in Indonesia. An earthquake with a magnitude of 9.1 on the Richter scale followed by a tsunami wave devastated the Aceh region in 2004. Another major earthquake occurred in Jokjakarta in 2006, which was followed by dozens of earthquakes in various regions in Indonesia. The most recent event was an earthquake with a magnitude of 6, 6 on the Richter scale in Banten on January 14 2022 which is reported to have damaged more than 3000 buildings. Simple houses are the group of buildings that most often experience collapse, heavy damage and minor damage.

This community service activity will try to improve the ability of builders in five villages around the Malikussaleh University campus on simple earthquake-resistant housing technology. Efforts to increase these competencies will be carried out through theoretical explanations using examples and drawings, which will then be followed up with direct practice of making key components that have a major influence on the ability of buildings to withstand earthquake loads.

Keywords: Earthquake, Earthquake Resistant Simple House; reinforcement details; builder competence; Reduce the effects of earthquakes.

Introduction

The Center for Volcanology and Geological Hazard Mitigation (PVG) has identified as many as 27 earthquake-prone areas in Indonesia. Earthquake disaster is one of the geological dynamics that cannot be prevented from happening. Earthquake events show a tendency to recur in an area if the area has previously been hit by an earthquake. Until now, it is not possible to predict when and how strong an earthquake will occur. However, with science and technology, earthquake-prone areas can be identified.

Due to the active regional tectonic patterns, the Aceh region is a disaster-prone area. The tectonics of the Aceh region are strongly influenced by the existence of subduction areas between the Indian-Australian oceanic plate (Indian-Australian Plate) and the European-Asian continental plate (Eurasian Plate). The tectonic pattern greatly influences the geological conditions in the waters of the study area. Geological structures that develop on land continue offshore. From the shallow reflection seismic data, the presence of geological structures in the waters will be traced. The penetration of the seismic records obtained is very limited, namely not more than about 250 meters below the seabed surface. Therefore, for geological structures that are far below the surface of the seabed, they are not visible, but for active geological structures up to the surface, they can be seen from their seismic characteristics. From the morphology of the seabed surface from the coast to the offshore, a division of geological hazard level zones was made. The purpose of conducting this training activity is to introduce basic knowledge about earthquakes, provide a simulation of how to save yourself from an earthquake disaster, and explain regarding earthquake disaster mitigation as an effort to minimize the risk of earthquake disasters.

Partner Problems

Based on an analysis of the circumstances and conditions that often occur in the community, in general the problem for the community is that many people still do not know about earthquake disaster mitigation. These problems can be described more specifically into: How to increase knowledge about earthquake disaster mitigation in schools, Islamic boarding schools and the community as one of the efforts to reduce the impact of earthquake disasters.

TARGETS AND OUTCOMES

Based on the problems faced by partners and the efforts that have been planned to overcome partner problems, the targets and outputs of the plan are as follows:

Table 1 Targets and Outcomes

No	Target	external
1.	Dissemination of the importance of Earthquake Disaster Mitigation for people's lives	1. There is public awareness of the importance of Earthquake Disaster Mitigation for people's lives.
2.	Making a simple prototype regarding evacuation routes for disaster mitigation when an earthquake occurs	1. Producing a simple prototype of earthquake disaster mitigation. 2. Increasing the creativity of village communities for earthquake disaster mitigation.
3	Scientific Publications at International Seminars	Publish
4	Publication of Activities in Mass Media	Publish

IMPLEMENTATION METHOD

The main activity carried out in the context of solving the problem is conducting training on "Earthquake Disaster Mitigation" as an effort to minimize disaster risk. Therefore, the method that is considered appropriate in carrying out these community service activities is training including lectures accompanied by discussions and simulations. In detail, the implementation of training activities is as follows:

1. Gather training participants, then provide an explanation of the objectives of the training;
2. Convey Theory in a manner theory on Earthquake Disaster Mitigation;
3. Develop guidelines in the form of earthquake safety measures; and
4. Evaluation of activities refers to the goals that have been set.

Mitigation is defined as efforts aimed at reducing the impact of natural disasters, man-made disasters or a combination of both within a country or society (Permendagri No.33 of 2006). Disaster mitigation which is part of disaster management, is one of the tasks of the Central Government and Regional Governments in the framework of providing a sense of security and protection from the threat of disasters that may occur (Permendagri No. 33 of 2006).

There are four important things in disaster mitigation, namely:

1. available information and maps of disaster-prone areas for each type of disaster;
2. socialization to increase public understanding and awareness in dealing with disasters, due to living in

- disaster-prone areas;
- 3. know what to do and avoid, and know how to save yourself if a disaster occurs, and
- 4. regulation and arrangement of disaster-prone areas to reduce the threat of disasters (Permendagri No. 33 Thm 2006).

Earthquake Mitigation

Disaster mitigation consists of before an earthquake occurs, during an earthquake and after an earthquake occurs (bpbk.jakarta.go.id)

Before the Earthquake occurred

- a) The main key is Recognizing what is called an earthquake, Ensure that the structure and location of your house can be protected from the dangers caused by earthquakes (landslides, liquefaction, etc.), Evaluate and renovate building structures to avoid earthquake hazards.
- b) Get to know the environment where you work, pay attention to the location of doors, elevators and emergency stairs, in the event of an earthquake, already know the safest place to take shelter, learn to do first aid, learn to use a fire extinguisher, record important telephone numbers that can be contacted in the event of an earthquake.
- c) Routine preparation at work and live. Furniture (cupboards, cabinets, etc.) is set against the wall (nailed, tied, etc.) to avoid falling, collapsing, shifting during an earthquake. Store flammable materials in an unbreakable place to avoid fire. Always turn off water, gas and electricity when not in use.
- d) The cause of the most accidents during an earthquake is due to falling material. Arrange heavy objects as low as possible. Check the stability of hanging objects that can fall when an earthquake occurs (eg lights etc.).
- e) A tool that should be in every place. First aid kit, Flashlight/battery light, Radio, Supplemental food and water.

1) When an Earthquake Occurs

- a) If you are in a building:
- b) Protect your body and head from falling debris by hiding under tables etc.; Find the safest place from rubble and shaking;
- c) Run outside if you can
- d) If outside the building or open area:
- e) Avoiding nearby buildings such as buildings, electric poles, trees, etc. Pay attention to the footing, avoid if there is a crack in the ground
- f) If you're driving a car
- g) Get out, get down and away from the car avoid in case of shifting or fire
- h) If living or on the beach : Stay away from the beach to avoid a tsunami hazard.
- i) If you live in a mountainous area
- j) In the event of an earthquake, avoid areas where avalanches may occur

2) After the Earthquake occurred

- a) If you are in a building
- b) Exit the building in an orderly manner; Do not use elevators or elevators, use regular stairs; Check for injuries, perform first aid; Call or ask for help in the event of a serious injury.
- c) Check the surroundings
- d) Check if there is a fire, Check if there is a gas leak, Check if there is an electric short circuit, Check the flow and water pipes, Check if there are things that are dangerous (turn off electricity, do not start a fire, etc.)
- e) Don't enter building which already caught earthquake because there may still be ruins
- f) Do not walk in the area around the earthquake. There is still a possibility of aftershocks
- g) Listening to information: listen to information about earthquakes from the radio (in case of aftershocks).
- h) Do not be easily provoked by issues or news whose sources are unclear.
- i) Fill in questionnaire which given by agency related for know how much damage was done
- j) Don't panic and don't forget to always pray to God Almighty for the safety and security of all of us.

RESULTS, IMPACT, AND OUTCOMES

Activity Results

The results of the community service regarding Building the Competence of Builders Regarding Earthquake Resistant Simple Houses in Blang Pulo Village, Lhokseumawe City are as follows: First, an initial description of the level of understanding of builders in Blang Pulo Village regarding the principles of earthquake resistant simple houses is obtained which consists of several indicators as follows; a) knowledge of the terms earthquake resistant buildings, b) basic concepts of earthquake resistant buildings, c) implementation of work to produce simple earthquake resistant houses and d) knowledge of the use of building materials to produce simple earthquake resistant houses. In general, it can be stated that the understanding of the craftsmen in Blang Pulo Village regarding simple earthquake-resistant houses is still very low.

Second, the results of the activities carried out are the presentation of training materials on simple earthquake resistant houses consisting of; a) seismic materials in the form of earthquake shaking characteristics, b) earthquake disaster mitigation materials and c) earthquake resistant simple house construction materials. Earthquake resistant simple house construction materials can be described in the form of the basic concept of earthquake resistant simple houses, procedures for implementing the construction of earthquake resistant houses and the use of appropriate building materials for earthquake resistant houses. The following is the documentation of the activityCommunity service on Builder Competency Improvement on Earthquake Resistant Simple Houses in Blang Pulo Village, Lhokseumawe City:



Figure 1.Material Exposure

Impact of Activities from Community Service

There are activitiesCommunity service on Building the Competence of Builders About Earthquake Resistant Simple Houses in Blang Pulo Village, Lhokseumawe City, it is hoped that the builders in Blang Pulo village can understand the basic concept of earthquake resistant houses in the form of using symmetrical plans, understanding the foundations of earthquake resistant houses, understanding the detailing system proper reinforcement, an understanding of the composition of the concrete mix, an understanding of the use of lightweight materials, an understanding of the earthquake load-bearing construction system and an understanding of the method of

implementing the construction of earthquake-resistant houses. With the understanding of the builders in Blang Pulo Village about the procedures for building simple earthquake-resistant houses, it is hoped that the houses to be built next in Blang Pulo Village in particular and around Lhokseumawe City in general will be simple house buildings that have met the earthquake resistant simple house standards. Furthermore, the impact of this activity is expected to be the construction of simple houses that already comply with earthquake-resistant standards by trained

builders, so that when an earthquake occurs, people's houses do not suffer severe and severe damage so that there are no more fatalities resulting from the earthquake. in very large quantities.

Outputs from Community Service Activities

This service activity produced several outputs, namely the existence of publications in the mass media, namely, at www.unimalnews.com, there are articles published in international proceedings, MICoMS 2022 and the availability of cooperation documents between the implementing team and the Village Head.

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