Hotels contingency assessment in Padang city against coastal hazard

Giani Ananda¹*, Taufika Ophiyandri¹, Abdul Hakam¹
¹ Civil Of Engineering Department, Andalas University

Abstract. Padang city has a variety of regions including coastal. The city of Padang is very vulnerable to coastal disaster (Coastal Hazard). In response to these statements, it is necessary to optimize the Multi-Hazard Early Warning System (MHEWS) for contingencies against coastal hazard referring to the four major components of MHEWS according to UNISDR. Hotels are kind of many public buildings that may be used as shelters. The purpose of this study is to assess the hotel contingencies in Padang city against coastal hazard. To achieve the goal, some near the beach hotels have been selected as the object of research. The selected hotels are five of four-star hotels, one of one-star hotel, and three for two-star hotels. The research results are processed by qualitative and quantitative analytic methods. The assessment then concludes that contingency afford is effected by the level hotel star. The important things that need to be planned for the hotel contingency against the coastal hazard are the evacuation route map and the signs of evacuation direction in the easy place to find.

1 Introduction

Padang city has a complex condition of the geographical and morphological condition. Geographically area of Padang is located near to the Indo-Australia and the Eurasian subduction plates. The total length of the coastline in Padang reach 84 km and the total area of the whole city of Padang is 694.96 km² [1]. It was judged that Padang city is very vulnerable to the disasters from the coast (Coastal Hazard).

According to the document for disaster management plan of Padang city 2014-2018, the coastal hazards threatening the city of Padang are flood, earthquake, tsunami, and abrasion. Based on the statement, Padang city needs for prevention efforts both development such as shelter as well as development of the regulations for the Multi-hazard Early Warning System.

Multi-hazard Early Warning System can be defined as the ability needed to inform the public so that they are able to take action to reduce disaster losses. Multi-Hazard Early Warning System has four main components according to UNISDR which are the main reference used in this study to assess the level of contingencies.

2 The material and method

2.1 Disaster

A disaster is a phenomenon that causes distress, harm or suffering to the affected people. Natural disaster means a disaster caused by nature [2]. The disaster also described as an event or series of events that threaten and disrupt the lives and livelihoods of society caused, either by natural factors and or non-natural factors and human factors resulting in the onset of human casualties, damage to the environment, loss of property, and the psychological impact. Where disaster is the confluence of three elements, are the threat of disaster, vulnerability, and abilities that are triggered by an event [3].

2.2 Coastal hazard

Coastal hazard means was a disaster that occurred in the area of the coast. The Padang city has an area that is 1,414.96 km² with territorial waters covering an area of 720 km². In the administration, the city of Padang has limits as follows:

- North: Padang Pariaman Regency
- South: Pesisir Selatan Regency
- West: Hindia Ocean
- East: Solok Regency

Generally, Padang city can be divided into the coastal areas which all the beach are facing to Hindia Ocean, the lowland region that most of the already developed (including the downtown area), and the highland region. The Topography of the city of Padang has a very varied characteristic result in Padang city prone to danger [1].

The coastal disaster occurred in the city of Padang, according to BPBD city of Padang [4] are shown in Table 1.
2.3 Flood

Flood is the event or circumstance where his submerged an area or land due to increased volume of water. In the DRR Document by BPBD of Padang city, mentioned that the flood risk index was 0.67 of Padang city. This indicates high-risk levels for flood disaster in Padang city on the area [3].

2.4 Tsunami

A tsunami refers to a long period ocean waves caused by impulsive disturbance of the seafloor. The impulsive disruption can be a tectonic earthquake, volcanic eruption, and landslide happen. The history of tsunami in Indonesia recorded by BNPB, indicate that approximately 172 of the tsunami that occurred in the period between the years 1600-2012. Source of generator note told that 90% of the tsunami caused by the earthquake tectonic activity, 9%, due to volcanic activity, and 1% by the landslides happened. Tectonic earthquake is a potential occurrence of tsunami [2].

The tsunami risk index in the Padang city is 0.67. It means the city of Padang has a high risk of tsunami [4].

2.5 Earthquake

The Earthquakes is the tremor or the vibration from the earth then spread in all directions. The earthquake is divided into 2 based on cause, i.e. a volcanic earthquake and tectonic earthquake [5].

The earthquake risk index in the Padang city is 0.62, which indicates medium earthquake risk of Padang [4].

2.6 Abrasion

Abrasion is a process annihilation of the beach by the energy of the ocean waves and the ocean currents of a destructive nature. Abrasion typically is called also the erosion of the beach. Damage to the coastline due to abrasion is caused by two main factors, i.e. the human factor and the nature factor. This research focuses on the abrasion of the disaster came from natural factors [6].

The risk of abrasion index of Padang city is 0.72. This shows a high level of abrasion risk in Padang city.

2.7 Multi-hazard early warning system

Early warning system is the provision of timely information and effective, allowing people exposed to danger to take action to avoid or reduce their risk and prepare for effective response [7].

2.8 Assessment contingencies of hotel against coastal hazard

The contingency planning as a management process analyze potential the latest events or a particular society or could threaten the environment and the process of setting the initial settings, in order to be able to respond to these threats in a timely, effective, and appropriate [11]. It is known that the disaster contingency assessment is an assessment of preparedness in the face of the threat of disaster.

A hotel in this study is one type of accommodation providing rooms, foods and beverages, and other services for the general public, which is managed commercially as well as meeting [12]. The hotels can be divided into several types [13]:

- The 1-star Hotel (one)
- The 2-star Hotel (two)
- The 3-star Hotel (three)
- The 4-star Hotel (four)
- The 5-star Hotel (five)

| No | Types of dangers | Level of risk | Priority |
|----|------------------|---------------|----------|
| 1  | Flood            | High          | Priority 1 |
| 2  | Tsunami          | High          | Priority 2 |
| 3  | Earthquake       | Medium        | Priority 2 |
| 4  | Extreme wave and abrasion | High | Priority 3 |
As the hotel is open to the public, therefore the hotel expected to have contingencies for non-structural both in terms of policy or action, as well as the structural contingency i.e. can be a place of evacuation. The evacuation is divided into 2 types, i.e. horizontal and vertical. The horizontal evacuation is the evacuation by road to get to a safe place in the event of a disaster. While the vertical evacuation towards building public evacuation or we refer to a shelter. The public building that already to use can be used as a shelter. In this case, the hotel is the place of the vertical evacuation.

The objects of this research are the hotels located close to the coastal area. Nine hotels are selected as samples. The research work plan can be described in the following flowchart:

![Research Flowchart](image)

Fig. 1. Research Flowchart

The data are collected based on interviews and field observations. First, the selected respondent is interviewed and the field observation is done. The question and observation list are made base on the four components multi-hazard early warning systems according to UNISDR.

The data analysis methods used in this research are analysis in qualitative and quantitative techniques. Following observation and interviews, the next activity is encoding by the authors adjusted according to the results of the research. After that, the data will be presented in the form of descriptive writing.

### 3 Result and discussion

#### 3.1 Assessment of the contingencies of hotels in the city of padang against coastal hazard

Multi-Hazard Early Warning System (MHEWS) According to UNISDR based on the following four components, i.e.

1. Risk Analysis
   a. Knowledge of the type and impact of coastal hazard
   b. Existing Infrastructure
   c. Evacuation point and line
   d. Signs
      - Evacuation directions
      - Assembly Point
   e. Evacuation shelters and public buildings.
2. Monitoring and forecasting of Disasters
   a. Cooperation with BPBD Padang city
3. Dissemination of information
   a. Early warning system tool
   b. Dissemination
4. Ability to respond
   a. The creation of a standard Operational Procedures
   b. Training and simulation

Eleven components are used to assess contingency hotels against the coastal hazards. The plan that is necessary for the hotel in the face of coastal hazard will be discussed. The results of the assessment contingencies of hotels in Padang City against coastal hazard are shown in table 2:

| No. | Component                                                                 | 1 | 2 | 3 | 4 | 5 |
|-----|---------------------------------------------------------------------------|---|---|---|---|---|
| 1   | Risk Analysis                                                             |   |   |   |   |   |
|     | a. Knowledge of the type and impact of coastal hazard                     | ✓ | ✓ | ✓ | ✓ | ✓ |
|     | b. Existing Infrastructure                                                | ✓ | ✓ | ✓ | ✓ | ✓ |
|     | c. Evacuation point and line                                              | ✓ | ✓ | ✓ | ✓ | ✓ |
|     | d. Evacuation directions                                                  | ✓ | ✓ | ✓ | ✓ | ✓ |
|     | e. Assembly Point                                                         | ✓ | ✓ | ✓ | ✓ | ✓ |
|     | f. Evacuation shelters and public buildings                               | ✓ | ✓ | ✓ | ✓ | ✓ |
| 2   | Monitoring and forecasting of Disaster                                    |   |   |   |   | ✓ |
|     | a. Cooperation with BPBD Padang city                                     |   |   |   |   | ✓ |
| 3   | Dissemination                                                            |   |   |   |   |   |
|     | a. Early warning system Tool                                              | ✓ | ✓ | ✓ | ✓ | ✓ |
|     | b. Dissemination                                                          | ✓ | ✓ | ✓ | ✓ | ✓ |
| 4   | Ability to respond                                                        |   |   |   |   |   |
|     | a. The creation of a standard Operational Procedures                      | ✓ | ✓ | ✓ | ✓ | ✓ |
|     | b. Training and simulation                                                |   | ✓ | ✓ | ✓ | ✓ |

| Percentage Of Hotel Contingency Against Coastal Hazard | 82% | 91% | 91% | 91% | 100% |

Table 2. Assessment the Contingencies of 4-Star of Hotel in the city of Padang towards Coastal Hazard
Table 3. Assessment the Contingencies of 3 and 2-Star of Hotel in the city of Padang towards Coastal Hazard

| No. | Component                              | 3 Star Hotel | 2 Star Hotel |
|-----|----------------------------------------|--------------|--------------|
| 1   | Knowledge of the type and impact of coastal hazard | ✓ ✓ ✓ ✓ | ✓ ✓ ✓ ✓ |
| 2   | Monitoring and forecasting of Disaster   | ✓ ✓ ✓ ✓ | ✓ ✓ ✓ ✓ |
| 3   | Dissemination                          | ✓ ✓ ✓ ✓ | ✓ ✓ ✓ ✓ |
| 4   | Ability to respond                     | ✓ ✓ ✓ ✓ | ✓ ✓ ✓ ✓ |
| 5   | The creation of a standard Operation Procedures | ✓ ✓ ✓ ✓ | ✓ ✓ ✓ ✓ |
| 6   | The creation of a standard Operation Procedures | ✓ ✓ ✓ ✓ | ✓ ✓ ✓ ✓ |
| 7   | Training and simulation                 | ✓ ✓ ✓ ✓ | ✓ ✓ ✓ ✓ |
| 8   | Percentage Of Hotel Contingency         | 73% 45% 55% 27% |

From the assessments of table 2 and 3 then plotted in Figure 2.

Fig. 2. Chart Percentage the Contingencies Of Hotel Against Coastal Hazard

Based on the literature review, as it is known that the higher level of star in the hotel influences the service levels and facilities. It can be seen from the results of the assessments, the percentage range of the 4 star hotel is 82%-100%, and the next 3 stars hotel is 73% and the 2 star hotel is in the range of 27%-55%. The highest contingency level of the hotel in Padang is the 4 star hotel no. 5 with the percentage value of 100%, and the lowest i.e. hotel no 9 with the value of 27%. Thus, it can be concluded that the hotel's star rating influences the level of contingencies against the coastal hazards.

3.2 The contingencies plan of hotel against coastal hazard

The hotel is one of the alternatives, which is helpful for upgrading Government contingencies against coastal hazards. Risk analysis in the coastal hazard, in terms of the type of knowledge and the impact of the threat of coastal hazard, is better to be understood by hotel workers. In addition, the workers also required to understand the action to anticipate the threats.

Disaster action plan can be seen in terms of infrastructure, namely the emergency stairs. In terms of the access and the gathering point of evacuation, the hotel needs to put maps of evacuation in part of the hotel that is often to be used such as corridors and restaurant.

The map only is not located in the guest rooms, since the hotel guests not only visitors who rent a room, but they also enjoy other hotel facilities. In terms of direction signs and evacuation gathering points, the hotel needs to put a sign in easily visible. It is necessary to separate the direction of the evacuation and the gathering point of the tsunami and earthquake.

For the mechanism of reduction of the impact can be seen in terms of the durability of the building that can be used as shelters and public buildings. Any hotel may be used as a shelter must be tested its feasibility against the hazard before it was declared to be a shelter. The BPBD is expected to do the testing the feasibility of the hotel as a shelter.

Monitoring and forecasting of disasters can be done in collaboration with BPBD of Padang city. BPBD of Padang city has not an agreement with the hotel regarding cooperation for contingency against coastal hazards and the use of the building as an evacuation of the building to the public. BPBD Padang city should speed up the actions that are needed in the implementation of cooperation, such as the feasibility testing of building and the agreement the public evacuation building.

For the dissemination, hazard information can be done by using early warning systems namely siren/alarm. BPBD of Padang has not been optimal in the distribution of siren/alarm to the hotels. BPBD also is supposed to check any siren/alarm and to replace or to repair the tools. If the hotel does not accept the siren/alarm from BPBD Padang city, the hotel is expected to provide the own tools. All respondent hotels stated strongly the importance of the availability of early warning systems.

Dissemination of information can also be done with socialization. It is necessary to improve the socialization of hotel guests at the meeting time as well as at the check-in time. The hotel that did not do so, due to the worry of making scared guests, it can do it through dissemination brochures or visually reflects the profile of
the hotel and the dependencies with the disaster on television.

Enhancement of the risk management needs the SOP and the implementation. The training and simulating can be executed internally, even the BPBD of Padang have not yet conducted training and simulating at regular time in collaboration with the hotels.

4 Conclusions

Based on the results and the discussion above, the conclusion can be drawn as follows:

1. From the results of the assessment can be concluded, the star rating of the hotel is influencing the level of hotel contingencies for facing the coastal hazard.
2. The actions that need to be planned for contingencies against coastal hazard are:
   1. For hotels that can be used as shelters and public building needs a structural test.
   2. Dissemination of information in the form of siren/alarm needs to be installed and regularly checked.
   3. Training and simulation on a regular basis can optimize ability to respond.

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