

Shortcut Evacuation Road Concept as a Solution for Disaster Mitigation to Reduce Impacts of Earthquake and Tsunami at Gunung Kidul Coast, Yogyakarta, Indonesia

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Abstract: *The occurrence of natural hazards and disasters in general cannot be avoided. Especially for some areas such as coastal areas that have higher risk of vulnerability for earthquake and tsunami. Coastal area of Gunung kidul, Yogyakarta become interesting for the research subject because it is located at south of java island which have two system of plat motion: indian ocean plate at the south and the south china sea plate at the north. On its movement this plate produce subduction zone that have a possibility for a dip slip faults at the shallow area would happen. With the possibility for natural disaster to happen in this area, there is a paradigm to effort for the mitigation where the shortcut evacuation road concept will be applied as one of the effective way to reduce the risk when the natural disaster occur. This strategy is chosen because coastal area of Gunung kidul is a disaster-prone area especially for Earthquake and Tsunami. It can be indicated from the road pattern that have been made is resemble with the coast pattern without any roads that perpendicular with the coast where it is not relevant to disaster mitigation concept. The data that being used in for this study consist of primary and secondary data which is derived by the analysis from geographical information system(GIS), field surveys and literature. The result of this research show that there is effectiveness in evacuation rescue when natural disaster happen as part of disaster mitigation efforts. The mitigation effort to the vulnerability of this area has been endeavored by the government of Gunung kidul through a scheme of integrated policy in Regional Board for Disaster Mitigation (BPBD), however, the existing policies remain necessary revision and correction by integrating disaster risk reduction paradigm.*

Keywords: *mitigation concept, shortcut road evacuation, Gunung kidul coast, geographical information system (GIS)*

1. Introduction

1.1. Background

According to the Head of Disaster Management (BNPB) Regulation No. 4 of 2008, disaster is an event or series of events that threaten and disrupt the lives and livelihoods caused, by natural factors and/or non-natural factors and also human factors that result in human fatalities, environmental damage, loss property, and psychological impact. Meanwhile, Verstappen (1983) divides the natural disasters on the basic of the causes, namely: a) natural disasters caused by exogenous processes, among others: floods, erosion, and soil or rock mass movement; b) natural disasters caused by endogenous processes, among others: volcanic activity and earthquakes; c) natural disasters caused by anthropogenic processes, for example land subsidence due to excessive groundwater abstraction.

In the academic world, the earthquake and tsunami has produced empirical findings are very useful for the scientific world. Similarly, the relationship between energy and the intensity of the earthquake and tsunami could be calculated based on empirical experience this hole time.

Tsunamis are ocean waves, underwater avalanches, volcanic eruptions under the sea, or a meteor fall in the sea. The signs of a tsunami, which are:

1. There was an earthquake in the sea,

2. The sea water receded suddenly and unexpectedly,
3. Embossed smell of salt and a cold wind on the beach. This shows that the sea was going off the turbulence of sea water,
4. The presence of abnormal rumbling sound. This is due to the resonant sound of the water rolls seabed experiencing silting.

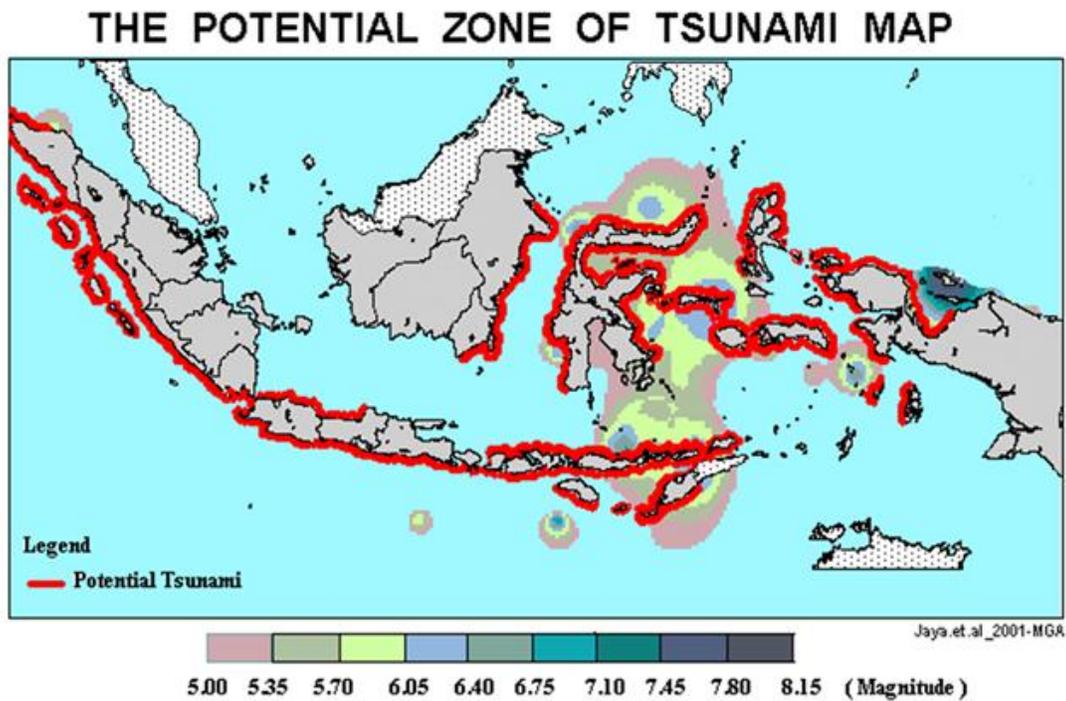


Fig. 1.1 The potential zone of tsunami map.

Earthquakes are vibrations or shocks that occur in the Earth's surface due to the release of energy from a sudden that creates seismic waves. Earthquakes typically caused by the movement of the Earth's crust (earth plate). The frequency of a given region, referring to the type and size of earthquakes were experienced over a period of time.

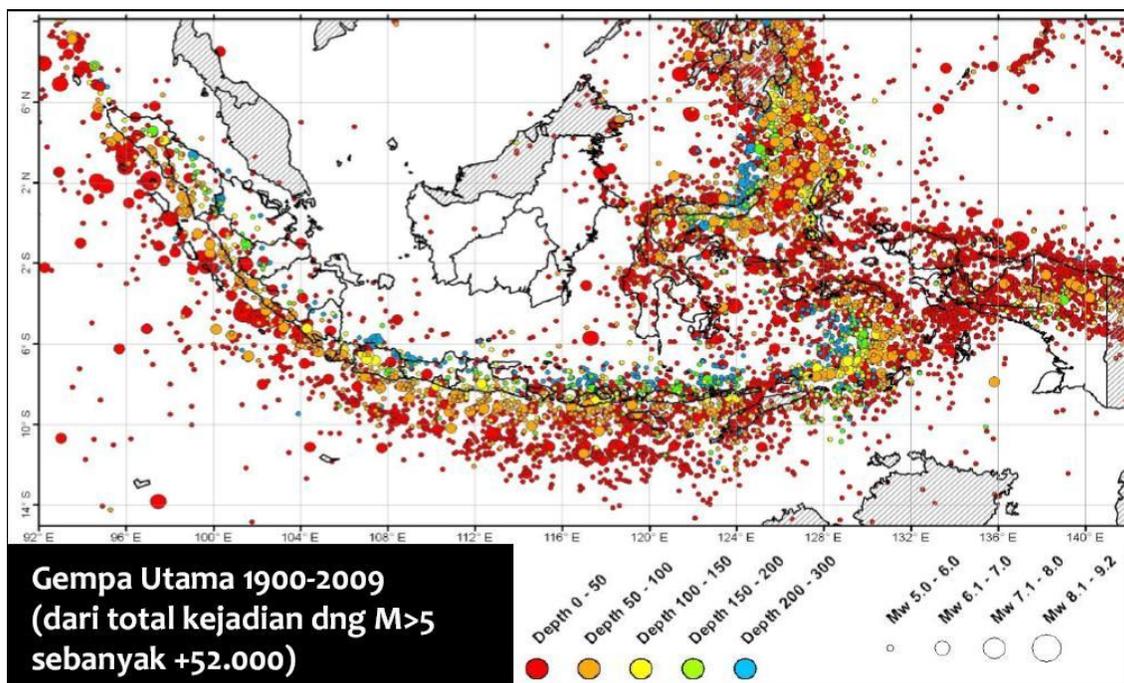


Fig. 1.2 The potential zone of earthquake in Indonesia

The dark history of the earthquake and tsunami (2004), Nias (2005), West Java (2006), Bengkulu (2007) it could happen again another Indonesian coastal region. Why not, it turns behind so many of the natural resources in our oceans, Indonesia is located in one area located at the junction of three tectonic plates (triple junction plate conferegence). All three plates - the Eurasian, Pacific Ocean, and indo / Australia - moving relative to the west and to the north eurasian.

Gunung Kidul Regency is one of regencies in Yogyakarta, Indonesia. Government center in District Wonosari. Area of about one-third of the area of its parent, the district had a relatively low density of population than other districts. The district borders the district of Klaten and Sukoharjo regency in the north, Wonogiri regency in the east, the southern Indian Ocean, and the districts of Bantul and Sleman districts in the west. Gunung Kidul Regency has 18 districts

Most of the district of hills and mountains of limestone, which is part of Sewu Mountains. Gunung known as arid regions and droughts in the dry season, but kept the unique historical peculiarities, besides the potential of tourism, culture, and culinary.

The coastal area of Gunung Kidul, Yogyakarta is located in the southern island of Java where a region that is vulnerable to be hit by the earthquake and tsunami, and through the application of GIS can be seen that the evacuation route in Gunung kidul areas still not optimal.

1.2. Problem Formulation

Mitigate or reduce the impact of a disaster action could be a powerful tool in the face of the earthquake and tsunami, through a strategy that people can be protected from the fierce earthquake and tsunami.

Issues that will be resolved by this method is closely related to the mitigation of the earthquake and tsunami in the right lane which will be useful evacuation to reduce the risk of the impact of the earthquake and tsunami, the following are the issues that will be resolved:

- How to optimize the evacuation path that is in the Gunung kidul coast?

1.3. Aims

This research aims to optimize the evacuation route in the coastal areas Gunung kidul using the Shortcut evacuation road concept as a solution for disaster mitigation to reduce impacts of earthquake and tsunami at Gunung Kidul coast, Yogyakarta, Indonesia, the results of this study are expected to be may be applied in order to reduce the impact of the earthquake and tsunami as well as the development of disaster mitigation study materials. Disaster mitigation to reduce impacts of earthquake and tsunami at Gunung kidul coast, Yogyakarta, Indonesia.

1.4. Limitation of Study

Shortcut method of evacuation road concept as a solution for disaster mitigation to reduce impacts of earthquake and tsunami coast at Gunung Kidul, Yogyakarta, Indonesia is expected to assist in disaster mitigation activities will involve many factors in its application. To the authors give a limit research to achieve the objectives of the research. Here is a limitation of research:

- The area that will be targeted in the application of this method is the coastal areas of Gunung Kidul,
- The test results, a pattern more optimal evacuation paths in Gunung Kidul,
- Testing is done with litelature study and observation of Gunung Kidul coast.

1.5. Methodology

Methodology conducted through field observations on the basis of the literature and by conducting interviews with professors or professionals for information and correction.

2. Results and Discussion

2.1. Results

Application of this method focuses more physically earthquake mitigation process where by creating an alternative path as evacuation routes, with the condition of the flow path in a coastal area that follows the contours of the Gunung Kidul coast as seen in the picture below:

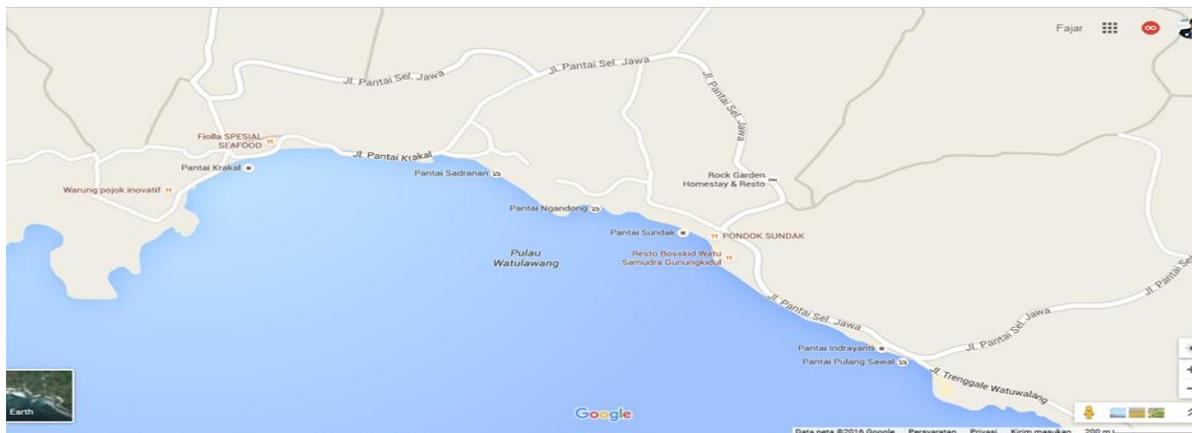


Fig. 2.1 track road in Gunung kidul coast area.

2.2. Discussion

In the application of the method Shortcut evacuation road concept as a solution for disaster mitigation to reduce impacts of earthquake and tsunami at Gunung Kidul coast, Yogyakarta, Indonesia will try to apply with the road, which is directed perpendicularly to the flow path on the coast, with the condition of the road in coastal areas that are still narrow and located close to the beach.

Street perpendicular earlier will function as a one-way street which serves to facilitate the evacuation of people in times of disaster, for example, taken the road Krakal in areas Krakal where roads were still classified as rural roads and the number of transport passing through that path, then the method shortcut evacuation road concept as a solution for disaster mitigation to reduce impacts of earthquake and tsunami at Gunung kidul, Yogyakarta, Indonesia, will look like the image below:



Fig. 2.2 estimate for the road with Shortcut method of evacuation road concept as a solution for disaster mitigation to reduce impacts of earthquake and tsunami at Gunung kidul coast, Yogyakarta, Indonesia, at about Krakal beach and Sadranan beach.

Can be seen the red line in the image above which is a plan of the road with the method Shortcut evacuation road concept as a solution for disaster mitigation to reduce impacts of earthquake and tsunami at Gunung Kidul coast, Yogyakarta, Indonesia that connects directly road Krakal with the south coast, in an effort optimizing access to evacuation at the time of the early warnings of earthquake and tsunami.

If you look at the whole area of the Gunung kidul coast then will get an estimate as shown below:



Fig. 2.3 estimate for the road with Shortcut method of evacuation road concept as a solution for disaster mitigation to reduce impacts of earthquake and tsunami coast at Mount Kidul, Yogyakarta, Indonesia,

3. Conclusion and Recommendation

3.1. Conclusion

Based on the results of the application and the discussion it can be concluded as follows:

- Evacuation route in Gunung kidul coast still less than optimal physical condition of the road with a view.
- With Shortcut method of evacuation road concept as a solution for disaster mitigation to reduce impacts of earthquake and tsunami at Gunung kidul coast, Yogyakarta, Indonesia, can further optimize the evacuation at the time of the early warnings of earthquake and tsunami.

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5. References

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