UPDATING PROGRESS OF THE NATIONAL SEISMIC HAZARD MAP-INDONESIA : CRUSTAL DEFORMATION PERSPECTIVE

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Abstract: The Indonesian archipelago is located in a tectonically active zone of Eurasian Plate, Indo-Australian Plate, Pacific and Philippine Sea plates. To its west, the Indian oceanic crust is sliding underneath the Sunda Plate, forming a trench system spreading from western Java to northern Sumatra. To its east, subduction gives way to a collision between the Sunda-Banda arc and the submarine Australian continental shelf, leading to upper-plate deformation. Source model for the National Seismic Hazard (NSH) maps is constructed using three types of data: seismicity data, paleoseismic-geologic observations on past earthquake, and GPS constraints on fault slip rates and strain accumulation rates. The model is constructed as a combination of block rotation and strain accumulation in elastic half-space that assumes each fault segment slips beneath a locking depth or in combination with creeping in a shallower part. In this preliminary model, we divided Indonesia into six tectonic blocks and 88 faults.

Keywords: Deformation Model, Indonesia, Seismic Hazard

ENHANCING CLIMATE-RELATED DISASTER RESILIENCE THROUGH EFFECTIVE RISK COMMUNICATION IN BANDUNG, INDONESIA

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Abstract: Recent publications on climate change risk indices, such as the World Risk Index from Buendnis Entwicklung Hilft and UNU-EHS or the Global Climate Risk Index from Germanwatch, that Indonesia is at the top end of the most vulnerable country to climate change and natural hazards. This condition will exacerbate Indonesian urban areas. The 2004 Indian Ocean Tsunami is the turning point for Indonesia in rearranging its institutional framework on disaster risk reduction and climate change adaptation, focusing on institutionalizing local initiatives. The study addresses the linkage of climate disaster resilience and risk communication approaches at the local level. The adoption of Climate Disaster Resilience Index at the micro-city level (sub-district level) of Bandung City, Indonesia, demonstrates an approach to disclose the resilience of physical, social, economic, institutional, and natural dimensions of different areas within the city. The focus on resilience aims to foster actions enhancing the capacity of the city to future climate-related disasters through adequate planning decisions. Enabling this, communication envisages as the last mile of this comprehensive climate-related disaster resilience assessment on how the risk and resilience information collected at and conveyed to the public. Community-Based Society

Organizations of Bandung has the potential in conveying that information to wider communities, which would trigger them to take actions. A set of indicators in Social Institutional and Economic Resilience Activities approach is developed to characterize the delivering process of risk information by community organizations through their activities at sub-districts and wards. Results indicate that communities' organization activities in Bandung implement a certain degree of risk communication, which is embedded in their activities by involving the local government, agencies, private sector and media in the process. As the output, the study offers a model of comprehensive risk communication approach; integrating climate-related disaster assessment and risk communication processes driven by local novel initiatives in city.

Keywords: disaster risk reduction, climate change adaptation, resilience, risk communication, local initiatives

DEVELOPMENT OF EARTHQUAKE RISK ASSESSMENT MODEL FOR ROADS IN INDONESIA

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Abstract: Road network in Indonesia, which consists of 446,000 km of national, provincial and local roads as well as toll highways, are exposed to various natural hazards, such as earthquakes, floods, landslides, volcanic eruptions etc. Within the Indonesian archipelago, which consists of more than 13,000 islands, several global tectonic plates interact, such as the Indo-Australian , Pacific, Eurasian as well as the Philippines plates, resulting in a complex geological setting, characterized by the existence of seismically active faults and subduction zones and a chain of more than one hundred active volcanoes. Heavy monsoon rainfalls trigger floods, flash floods, debris and lahar flows and landslides, which often damage roads and bridges. Losses due to disasters caused by the damage of road infrastructures as well as socio-economic losses due to traffic disruption are compromising the development of the country. Risk reduction measures are essential to the sustainability of the road network, a vital infrastructure to the socio-economic activities of the country. As resources are limited, priorities need to be identified in implementing risk reduction measures to the road infrastructure.A research is conducted on the earthquake risk model for roads in the country. The objective of the research is to develop an earthquake disaster risk assessment model for road links, in terms of road segments. Assessing disaster risk is essential in order to provide adequate information for decision makers at the national and local level in prioritizing disaster mitigation works for road segments. The model is based on the development of a road disaster risk index model involving a series of risk indicators. Based on the earthquake risk index model, the risk level of each road segments within a road network can be assessed andthen plotted into the road network map based on the risk level category. It is expected that with the risk assessment model, road management programs will be able to better prioritize risk mitigation measures and hence improving the network level of service.The research compares various risk assessment models that have been developed in other countries, and identifiespotential indicators to be adapted in the road risk index model..The road earthquake risk index model is structured based on the definition of disaster risk factors and their components, and the indicators are selected to reflect the value of each risk factors. By aggregating those values, weighted in accordance to the importance of the factors, a risk index value for a specific road link can be established, as an indicator of its relative risk level to the other road links in the road network system.

Keywords : risk assessment, earthquake, model, road link

ON THE IMPORTANCE OF GPS SEA FLOOR DEFORMATION FOR DISASTER RISK REDUCTION IN JAVA, INDONESIA

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Abstract: Subduction zones are places where devastating megathrust earthquakes occurred, accompanied by large tsunamis, such as the 2004 M9.3 Sumatra-Andaman earthquake in Indonesia and the 2011 M9.0 Tohoku earthquake in Japan. Beneath Java Island, the most populated island in Indonesia, the Australia plate subducts beneath Sunda Block along the Java trench off Java Island. Despite its aseismic activity, in term that no megathrust earthquakes with M>8.0 occurred in the last 300 years, recent study using continuous GPS data indicate that the accumulated seismic moment in the subduction plate interface is capable to host a ~Mw 8.7 off southwest Java (Hanifa, et al., 2014). That study use only land GPS observation, which is 200 km from the trench, yet their model suggests a possibility of full coupling condition in the shallowest part of the trench. Occurrence of past tsunami earthquakes along the Java Trench imply capability of this subduction zone to allow rupture to the most shallow part of the trench, which may give a threat for either future tsunami earthquake or tsunamigenic earthquake. In order to evaluate a more accurate estimation of state of interplate coupling near the trench, seafloor geodetic data technology has proved it capability to estimate a more reliable state of interplate coupling (e.g. Iinuma et. al., 2015). In this paper, we show the importance to conduct a GPS seafloor deformation measurement in the shallow portion of the subduction near the Java Trench, for disaster risk reduction purpose. The methodology will employ a numerical simulation using checkerboard test to evaluate the reliability of the spatial resolution of the analysis. Geodetic data consist of combination of existing continuous GPS network in Western Java and proposed location to install geodetic seafloor.

Keywords: deformation model, interplate coupling, megathrust earthquakes, tsunami earthquakes

DEVELOPMENT OF COLLABORATIVE MODEL IN EARTHQUAKE DISASTER RISK ANALYSIS AT COMMUNITY LEVEL

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Abstract: Disaster risk assessment is conducted to assess the risk level in one area. It can be used for planning issue as well as for determining the disaster mitigation effort in such area. There are many researches that have developed the disaster risk analysis methods, both top-down and bottom-up approach. At certain level of planning, the top-down approach can be used, but at community level, it can produce different risk acceptance between what researcher has resulted and what community accept. Therefore, community involvement in the disaster risk assessment is important to produce consensus on risk level in the area. This research is aimed at identifying the participation form in disaster risk assessment at community level, developing collaborative model in disaster risk

analysis and the involvement of stakeholders, and identifying factor that influence the collaborative model in disaster risk analysis at community level. This research will contribute in supporting and enrich the collaborative planning theory, especially in disaster risk analysis and will also contribute to the new participatory approach in disaster risk analysis especially in the less disaster experienced area to produce the consensus in disaster risk at community level.

Keywords: disaster risk assessment method, disaster risk assessment