

## **Work Group on Disaster Preparedness, Mitigation and Management**

### **Scope of Work**

- 1) *Preparedness and Alertness to Disasters*
- 2) *When Disaster occurred what is to be done and the readiness to meet this*
- 3) *Recovery process and clean up –Reconstruction and Rebuilt*
- 4) *Sharing of information of disaster incidences and reporting on effect and remedial work*
- 5) *Sharing of Country's Experiences*
- 6) *Consequences of climate change*
- 7) *Committee would deal with natural disaster and not man made disasters*

*Earthquakes*

*Storms and storm surges*

*Floods*

*Droughts*

*Coastal erosion and sea intrusion*

*Land subsidence*

*Sea level changes*

*Landslides, rockslides*

*Wild fires and haze*

*Tsunamis*

*Volcanoes*

### **Important Issues and Proposed for Action**

The following proposals were made at the meeting in Palawan and maintained for actions to be taken by each member country to do a short power presentation

1. *To identify the Expert/company/organizations groups available in each country who are currently involved in the natural disaster mitigation for each type of disaster that is being faced by the respective country*
2. *For each disaster that occur to get clippings etc of the event so that the work group can be educated on the disaster, the magnitude of the disaster and the rescue effort or whatever information that could be useful to the working group.*
3. *Setting up the ASEAN volunteer engineering group for building inspection after the earthquake. Setting up the inspection process and format. Workshop among the countries prone to earthquake disaster. Similar tasks may be done for other types of disaster.*
4. *Seek assistance from YEAFEO for volunteers to help out with the Immediate Disaster Response Group*

*Each country may have to look at setting up a list of experts for restoration*

## Representative on Environmental Engineering Working Group

### APPENDIX DP 1

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Ref: 2019/9/1

18 September 2019

### **APPENDIX DP 2**

H.E. Dato Lim Jock Hoi  
The ASEAN Secretary General  
The ASEAN Secretariat  
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Jakarta 121110  
Indonesia.

*His Excellency,*

#### **AFEO ACTION PLAN – CAFEO 37**

##### **i) EMERGENCY PREPAREDNESS AND HAZARD MAP**

##### **ii) DAM SAFETY**

We wish to inform His Excellency that ASEAN Federation of Engineering Organisation (AFEO), is a non-governmental body. Its members are the engineering institutions and organisations of ASEAN countries with the following main objectives:

- To promote goodwill and mutual understanding
- To establish and develop an ASEAN baseline standard for the engineering profession with the objective of facilitating the mobility of the engineers within the ASEAN countries.

AFEO became associated as an entity with the ASEAN Secretariat since 1985 and is recognised as an Accredited Civil Society Organisation in The ASEAN Charter.

To promote the objectives of AFEO, various Working Committees were set up and one of these Working Groups is the Disaster Preparedness, Mitigation and Preparedness Working Group chaired by Ir Assoc Prof Dr Suttisak Sorulump of Engineering Institute of Thailand under the King's Patronage. This Working Group had been looking into issues of Disasters that occurred in the ASEAN countries and provide assistance where possible.

For the purpose of this letter, we would like put forth two recommendations for His Excellency to consider. In order for His Excellency to understand the scenario, we wish to append the two set of papers on the issues.



AFEO

*Continuation sheet 2*

The first issue AFEO would like to propose for consideration would be to look into addressing the populated settlements at hazard prone areas. The Working Committee of AFEO had studied the matter and noted that due to unawareness of the danger, many ignorant communities and planners tend to set up homes along fault lines or in landslide risk areas. Although warning systems had been set up in all countries to provide early warning, it was noted to be a less effective way to communicate warnings. A proposal enclosed with this letter seeks attention of ASEAN Secretariat to consider looking into plotting out fault lines in ASEAN region. Such hazard maps should be made available to the engineers who will be developing the construction plan so that the hazard prone areas can be avoided when proposing for the building of housing and settlements. Our first paper entitled “HAZARD MAPS FOR ASEAN COUNTRIES” is enclosed herewith.

The second issue of concern is the recent dam collapse disaster as in the incident in Laos PDR. Large dams which play vital roles in the economic development of a country can cause serious detrimental environmental and social consequences. Dam failure is rare and not a frequent disaster, but the populated floodplains downstream of dams must be protected from dam break possibilities. Recent dam collapse in Laos reignited urgent debate about preventing similar tragedies in future. In the event of potential danger or the imminent collapse of a dam that can cause death and missing people, the key component of disaster risk reduction is the availability and the effectiveness of early warning system. The Emergency Preparedness Plan (EPP) for the people living in the downstream area is important. This is to ensure that there is sufficient time to evacuate in time of danger and will not contravene the violation of human right in the event of the dam breaking and the loss of life. There is a clear need to strengthen systems of dissemination and communication, in particular to those living at the downstream places. Our second paper therefore provided a proposal on how to overcome such issues on EPP.

AFEO as a responsible body representing ASEAN grass-roots engineering stakeholders linked to and associated with engineering, technology and innovation would be able to provide its engineering support and input to ASEAN Secretariat from time to time in providing proposals and solutions in addressing these disaster management matters.

We hope our papers could contribute some thoughts for possible implementation for the good of society as a whole in ASEAN region.

With Best Regards,

Sincerely Yours,

**ASEAN FEDERATION OF ENGINEERING ORGANISATIONS (AFEO)**

*signed*

Ir Prof Dr Jeffrey Chiang Choong Luin  
AFEO Secretary General

# **PROPOSAL PAPER 1**

## **FORMULATION AND IMPLEMENTATION OF HAZARD MAP.**

### **Introduction**

Unmanaged expansion of settlement in hazard prone areas is one of the major causes responsible for more people being vulnerable to natural hazards. Many countries still lack clear guidelines on how to deal with hazards. Early warning systems are set up in different countries as a part of disaster risk reduction. But, warnings are still not effectively communicated, and not sufficiently acted upon.

Primarily, hazard exposure arises from people's occupancy of geographical areas where they could be affected by specific types of events that threaten their lives or property. But to minimize the impact the best option is to prevent settlement in Hazard prone areas.

We can look at the recent example of Earthquake in Palu, which resulted in more than 5000 deaths and more than 80,000 were displaced. Palu, one of the cities often hit by an earthquake, is caused by an active Palu Koro Fault. Asia pacific is one of the world's most natural disaster-prone areas and is at risk to multiple hazards, including earthquakes, landslides, flood, tsunami and volcano. Majority of people in South East Asia, are living in the areas that have high potential for the occurrence of natural disasters such as houses are built in fault line or liquefaction area.

The area of Petobo, Indonesia for instance, was classified as having high-risk potential. People in the devastated village of Petobo, had no idea that they were in an area already identified by the government as a high-risk zone for the devastating geological phenomenon that causes soft ground to liquefy during earthquakes. However, the central government did produce a map in 2012 identifying large swaths of Palu, a city of 380,000 people, where liquefaction could occur. The report also recommended that housing and industrial areas should best be built in areas with low liquefaction risk.

Natural Hazard events are inevitable but disasters can be avoided. Government policies on disaster management, through regulation and various risk-reduction programs, should help people become aware of disaster risks.

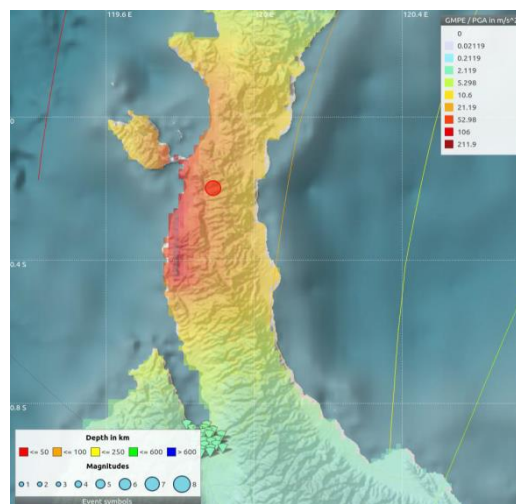
The provision and implementation of hazard map is essential for the proper planning of disaster risk management. Respective government should take a firm position to prevent settlements in disaster-prone areas. Nevertheless, trans-boundary risk assessment proved to be particularly challenging with insufficient data collection network, weak transmission systems, and a protective attitude from States and their specialized agencies towards data sharing, including with regional organizations. This is particularly true in the South East Asian region where for instance micro level seismic and hydrological data, when available, are invariably not shared which makes it extremely difficult to conduct detailed trans-boundary risk assessments of flood, earthquakes and landslides.

Hence, last meeting of working group on disaster preparedness (AFE0) on 12th November 2018 came up with an agreement to formulate and implement the natural hazard map for all SEA countries and strictly prohibit the settlement in disaster prone areas.

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### **Palu Earthquake and Tsunami 7.4 $M_w$ (September 28<sup>th</sup> 2018), Indonesia**

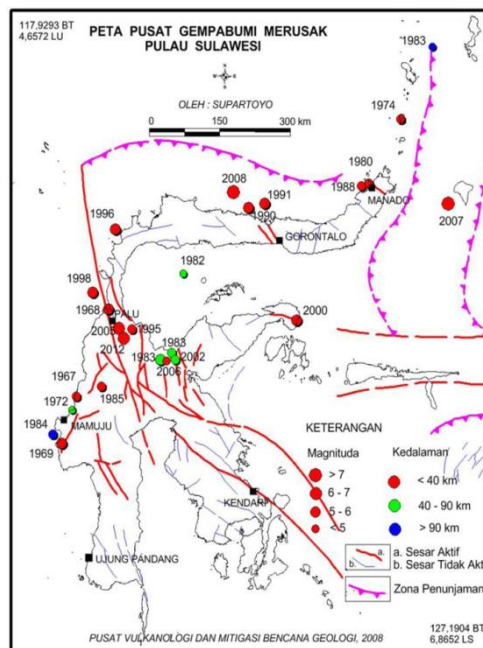
The Meteorological, Climatological, and Geophysics Agency (BMKG) of Indonesia has reported earthquake 26 km North of Donggala, Central Sulawesi, on Friday (09/28/2018) at 17:02:44 with local magnitude  $M_L$  7.7 and verified to be 7.4  $M_w$ . The location of epicenter is shown in figure below.



Map of earthquake epicenter Donggala Palu, Indonesia (Source: BMKG).

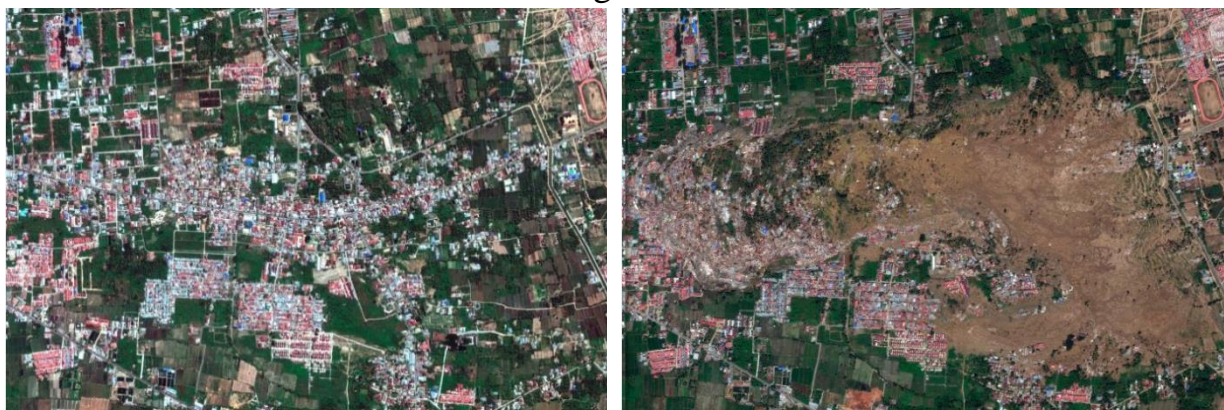
The region of Central Sulawesi is one of the area located in a region of high seismic hazard in Indonesia (Supartoyo and Surono, 2008), near to the earthquake sources (fault and subduction zones) on the land and sea. The great

shaking was felt in many locations. Based on the accelerograph record, the area with the highest level of shaking is located in Mapaga with that shaking value VI-VII MMI. The distribution of the damaging earthquake events are presented in figure below.



Historical significant earthquake map of Sulawesi Island (modified from Supartoyo and Surono, 2008).

This powerful disaster collapsed the building and public facilities to the affected area. More than that, some areas were dramatically buried by liquefaction such as in Petobo and Balaroa as shown in figure below.



Petobo on August 17 (before)

Petobo on October 1 (after)





Balaroa neighbourhood on August 17  
(before)



Balaroa neighbourhood on October 1  
(after)



Palu Jetty on August 17 (before)



Palu jetty on October 1 (after)

Satellite images showing extent damage by 2018 Palu earthquake, Indonesia

We can look at the recent example of Earthquake in Palu, which resulted in more than 5000 deaths and more than 80,000 were displaced. Palu, one of the cities often hit by an earthquake, is caused by an active Palu Koro Fault.

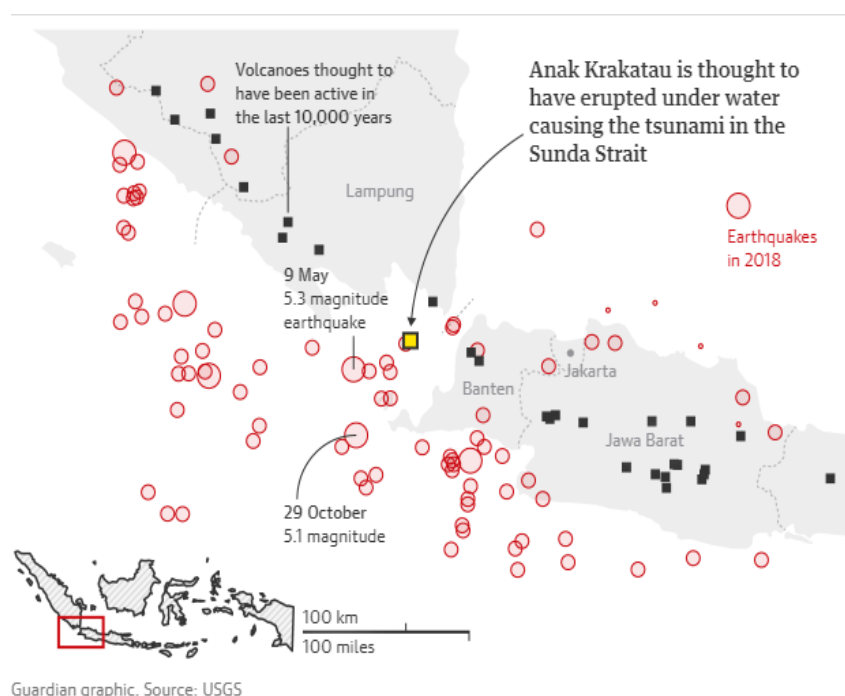
Buildings were seriously damaged because of the quality of the building which was not sufficient to resist the seismic load from the earthquake and do not comply with the standard of seismic design building code. In addition, it was also affected by the location of the residence which was mostly above loose sandy layers influenced by the sedimentation process and near to valley and hill. Moreover, the earthquake source had a shallow depth and epicenter close to the residence site with many strong foreshocks and aftershocks worsening the effect of collapsing building and infrastructures. All these factors incorporate one another and finally resulted a deadly earthquake. More than 550 people died and 1,500 people were injured from this devastating earthquake.



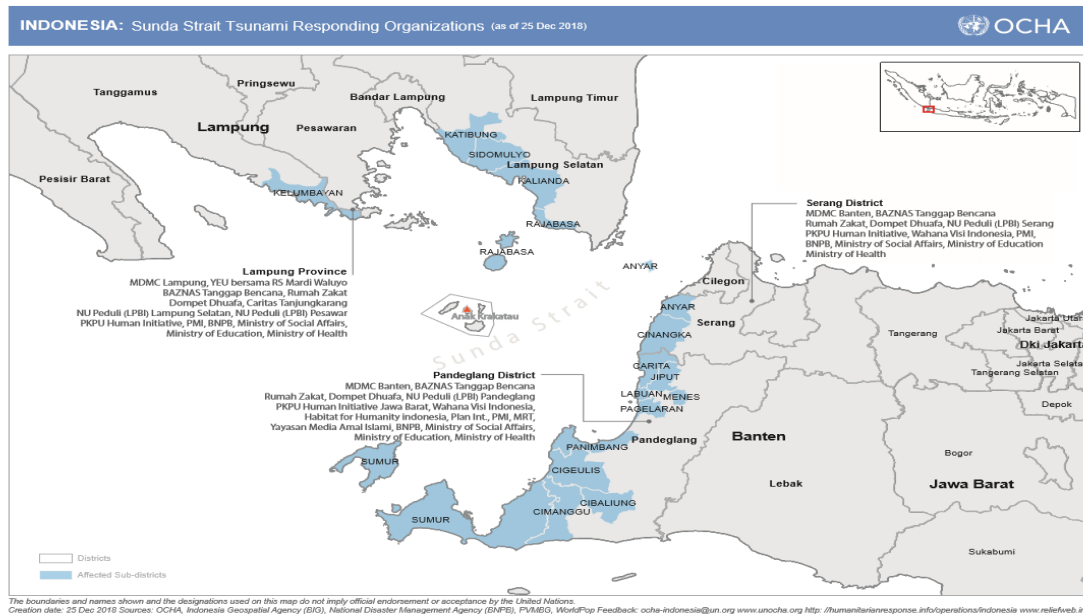
Despite of being situated in one of the world's most natural disaster-prone areas, majority of Indonesians, including people of Palu, are living in the areas that have high potential for the occurrence of natural disasters and houses are built in fault line and liquefaction area.

### **Volcanic Eruption and Tsunami (December 22<sup>th</sup> 2018)**

The deadly tsunami in Indonesia was triggered by a chunk of the Anak Krakatau volcano slipping into the ocean. 426 people were killed, more than thousands of people were missing and many buildings were heavily damaged after the tsunami struck, almost without warning. A month before the occurrence, Anak Krakatau had been spewing ash and lava and 64 hectare section of its south-west side collapsed. Therefore, BMKG (Meteorological, Climatological, and Geophysical Agency of Indonesia) revealed that the underwater landslide caused the tsunami. Indonesia's tsunami buoy network has not been in operation since 2012 due to the limited budget and technical damage (BNPB). The Indonesian Disaster Agency (BNPB) said the country had no early warning system for underwater landslide or volcanic eruption. Therefore, Indonesia must build an early warning system for tsunamis that are generated by underwater landslides and volcanic eruption.



Activity and seismicity around the Anak Karakatau volcano before eruption  
(Source USGS)



Affected area of Tsunami after the Anak Krakatau eruption (Source: OCHA)

## **Proposal /Recommendation**

Therefore the Working Group on Disaster Preparedness would like to propose that ASEAN Secretariat write or present to the respective governmental agencies in the respective ministries highlighting this high risk of natural disasters and the need for a strict **implementation of Natural Hazard maps to prevent settlements being set up in disaster prone areas in SEA countries.** In order to make a significant difference, these hazard map should be made available to the engineers who will be developing the construction plan so that the hazard prone areas would not be proposed for the housing and settlements.

## **PROPOSAL PAPER 2**

### **DAM SAFETY**

#### **Dam collapse and flash flood, Laos**

Laos has been severely affected by devastating floods between July and September 2018. On July 18-19, Tropical storm Son-Tinh caused heavy rains and flooding in 55 districts and 13 provinces across the country. On 23<sup>rd</sup> - 24<sup>th</sup> July, Xe Pien – Xe Nam Noy hydropower saddle dam breached and caused a flash flood in Attapeu Province. Based on the post-disaster needs assessment (PDNA), the overall effects of the floods on the economy was estimated to be around 3,166.99 billion Lao kip or approx. US\$ 371.5 million.

The portion of the dam collapsed was reported to be a saddle dam (Saddle dam D) which is the auxiliary structure used to hold the water in the main dam with width 8 m, length 770 m, and height 16 m. The company responsible for this disaster stated that it was fractured and the water leaked downstream to the Xe-Pien River which is about 5 km from the dam. Figure below shows the direction of the flood and the location of flooded area.

## Laos dam collapse



Direction of the flood and inundated area.

### **Proposal /Recommendation**

Therefore the Working Group on Disaster Preparedness would like to propose that ASEAN Secretariat write or present to the respective governmental agencies in the respective ministries **proposing that all large dams in SEA countries need to have Early warning system and Emergency Preparedness Plan (EPP) for the people living in downstream**