PEAK GROUND ACCELERATION AT SURFACE FOR MATARAM CITY WITH A RETURN PERIOD OF 2500 YEARS USING PROBABILISTIC METHOD
Rian Mahendra Taruna, Vrieslend Haris Banyunegoro, Gatut Daniarsyad

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INTRODUCTION

- West Nusa Tenggara is an area that is prone to earthquakes because it is flanked by two earthquake sources, subduction zone and Back Arc Thrust zone.

- According to the Mataram Geophysics Station data, the 6.2 SR earthquake on June 6, 2016 has caused damage in Mataram and Central Lombok. Even in 2017 there have been 9 earthquakes felt with scale II-III MMI in Mataram City.

SEISMIC HAZARD ANALYSIS

Peak Ground Acceleration & Spectrum Acceleration
at surface
DATA

- Earthquake Data (1960-2017)
  - Engdahl
  - BMKG

- Source Parameter
  - Peta Sumber dan Bahaya Gempa 2017
  - USGS

- Vs30
  - Marjiyono (2016)
FLOWCHART

Start

Collecting earthquake data:
- Sources: catalogs of Engdahl and BMKG
- Start from 1960 to 2017

Declustering earthquake data

Uniforming magnitude to $M_w$

Compiling and calculating source parameter

Determining logic tree

Probabilistic Seismic Hazard Analysis

PGA and spectral acceleration at bedrock for $T=0.2$ s & $T=1.0$ s

PGA and spectral acceleration at surface for $T=0.2$ s & $T=1.0$ s

Design spectrum response

End

Collecting $V_s30$ data:
Sources: USGS and Marjiana (2016)

Site Classification
(SNI 1726:2012)

Amplification factors
## SOURCE PARAMETER

<table>
<thead>
<tr>
<th>No.</th>
<th>ID</th>
<th>Name-segment</th>
<th>Dip</th>
<th>Length</th>
<th>Slip rate (mm/yr)</th>
<th>Top</th>
<th>Bottom</th>
<th>Mmax</th>
<th>Width</th>
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<tbody>
<tr>
<td>1</td>
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<td>540</td>
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<td>Java Megathrust-Bali</td>
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- **b value**: The magnitude completeness ($M_c$) is determined as 4.8
- **b value**: Estimated as $b = 0.944 \pm 0.044$, $a = 7.13$, $a$ value (annual) = 5.38
- **Magnitude of Completeness**: $M_c = 4.8$
PGA & SPECTRAL ACCELERATION (BEDROCK)

Legend

PGA at bedrock (g)
- 0.171 - 0.175
- 0.175 - 0.179
- 0.179 - 0.183
- 0.183 - 0.187

T=0.2 s

PGA

T=1.0 s
SITE CLASSIFICATION

Legend
- BATAS_WILAYAH
- Site Classification
  - Kelas E
  - Kelas D
RESPONSE SPECTRUM

![Graph showing response spectrum for different site classes (D and E) with and without research data, comparing periods T (second).]
CONCLUSION

- **North area** of Mataram has **larger** PGA, Ss, and S1 value than southern Mataram which caused by dominance of **Back Arc Thrust** north of the city.

- **Ampenan Utara village** is area with **largest** PGAM, SMS, and SM1, which is mostly caused by how close it with **back arc thrust** and dominated with **E class soil**. While the **lowest** PGAM, SMS, and SM1 area is located at **Turida village** which relatively away from Back arc thrust and has **D class soil**.

- **Peak design respons spectrum** of Mataram for D class site is 0.42 g at 0.114-0.571 s, while for E class is 0.51 g at 0.15-0.75s. These values are really important in purpose to plan earthquake resistant building and risk category determination.
THANK YOU

RIAN MAHENDRA TARUNA

+62 81335556059

reemyan@gmail.com