

# **The Role of Physical-Mechanical Characteristics of Weathered Volcanic Rocks to the Potential Mass Movement at the Southern Part of Garut, West Java, Indonesia**

**Dewi Gentana, Eza Nurfadli, Ildrem Syafri, Yunita Rosa Indah Putri and Murni Sulastri (Indonesia)**

**Key words:** Access to land; Land distribution; Risk management; physical-mechanical characteristics, weathered volcanic rocks, mass movement

## **SUMMARY**

The southern part of Garut area composed by Quaternary age volcanic products. Rocks that have not been consolidated with a perfect result are susceptible to various deformations, whether caused by tectonic or climate. In this region, the potential for mass movement is relatively high. On the other hand, alteration and mineralization is also found in some rocks. This is proven by the development of gold mining by local communities. In fact, a mining company has started operating in the region. The existence of ongoing development, certainly raised concerns about the safety factor for communities this region. The role of physical-mechanical characteristics of weathered rock needs to be known in detail in order to reduce the risk of disaster is feared will happen. The study of literature, data extraction in the studio, and field surveys conducted to obtain data. The physical properties and soil mechanics include water content, density, plasticity, and grain size. Some of the variables used for the verification such as the intensity and distribution of mass movement, rainfall, and land use. Analysis of data using a probabilistic approach, covering the comparative test and correlation test. Geospatial analysis was also conducted for data analysis related to spatial distribution. Based on USCS, soil from the weathering of volcanic rocks consists of high plasticity clay silt (MH), high plasticity silty clay (CH), silty sand (SM), and poorly graded sand (SP). The physical characteristics of each soil type is varied, covering the water content ranged from 1.46% to 70.2%, and the specific gravity the soil from 2.408 to 2.868. There is an inverse relationship between the specific gravity and water content with a correlation coefficient of 0.83. Clay soils have high plasticity index, from 35.14 until 46.81. Similarly, partly types of silt have relatively high plasticity index are 27.89 to 34.10. The altered rock condition affects soil plasticity. In general, hydrothermal altered volcanic rocks in the southern part of Garut. The grain size of the volcanic soil varies from clay to coarse sand. Correlation between water content and grain size of silt is directly proportional to the coefficient of 0.67. Similarly, the correlation between the sand and the water content was also strong, but inversely. While the grain size of fine sand and coarse sand

---

The Role of Physical-Mechanical Characteristics of Weathered Volcanic Rocks to the Potential Mass Movement at the Southern Part of Garut, West Java, Indonesia (8286)

Dewi Gentana, Eza Nurfadli, Ildrem Syafri, Yunita Rosa Indah Putri and Murni Sulastri (Indonesia)

FIG Working Week 2016

Recovery from Disaster

Christchurch, New Zealand, May 2–6, 2016

correlations tend to be very low to low. Physical characteristics of the soil to verify the results of the analysis that the soil types of silt and sand were have a significant contribution to the increase in the water content so it has implications for the potential of mass movement is relatively high.

---

The Role of Physical-Mechanical Characteristics of Weathered Volcanic Rocks to the Potential Mass Movement at the Southern Part of Garut, West Java, Indonesia (8286)  
Dewi Gentana, Eza Nurfadli, Ildrem Syafri, Yunita Rosa Indah Putri and Murni Sulastri (Indonesia)

FIG Working Week 2016  
Recovery from Disaster  
Christchurch, New Zealand, May 2–6, 2016