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DETERMINATION OF SLIP SURFACE AREA USING GEOELECTRIC, MASW, AND SOIL MECHANICS DATA IN CIMUNCANG VILLAGE, WEST JAVA, INDONESIA Abstract - The research of soil movement has been conducted using resistivity method, MASW, and soil mechanical data in Cimuncang, Malausma, Majalengka. The research has done in order to know resistivity distribution value and shear wave velocity VS30, to determine a nd analyzing rock layers pattern, slip area depth through 2D and 3D modelling result, and analyzing slope Safety Factor (SF) based on soil mechanical laboratory testing. The estimation of resistivity value is done by applying resistivity modelling, the value is varying from 6- 2Owicth epofs ra -7 m.

The estimation of shear wave velocity value is done by applying MASW modelling, the value is varying from 40- used as slip area based oneisity moeg isnctwela<2m)nd (25 - o MS mdlightosdrdslprasewe sf si lyrV <8 ms adtf si lyrV 183- Safety Factor (SF) is valued 1,26 in southeast that means the slope is relatively stable and in northwest is valued 0,98 that means the slope is unstable area. Introduction Indonesia's geodynamic process makes volcanic eruptions, land movements, earthquakes, and other geological hazards occur from time to time. Recent years, it is increasingly that the frequency of ground motion events (Wirakusumah, 2012).

Land movement is a mass movement of soil or rock, or mixing both, down or out of the slopes due to disturbance of soil stability or rock compilers of the slope. Impaired soil stability caused by the disruption of forces acting on the slopes caused by a process that raises t he driving force or reduces the retaining force on the slope (Herlin, 2012). Factors that control the occurrence of ground motion are geological, morphological, water and land use conditions. Trigger factors are generally such a rainfall and an earthquake vibration, other triggers can be caused by human activities.

In the event of rain, rain water will seep and penetrate the soil to the waterproof layer. This layer will act as a plane, causing ground motion or landslides. In the investigation of the land movement the existence of this slip surface area becomes one of the interesting factors to be studied. To know the subsurface condition, especially the slip surface, can be used geophysical survey. The geophysical method used in finding the existence of the slip surface is using the geoelectric method with Wenner-Schlumberger configuration, MASW (Multichannel Analysis of Surface Wave), and the soil mechanics data.

The methods used in this study can produce overview of subsurface structure especially slip surface on 2D and 3D form based on the resistance value and shear wave velocity propagation (V S). Research Area Based on the coordinates of the UTM WGS84 projection system of 49S zone , the research location is located in 199737-199882 UTM X and 9219893- 9220507 UTM Y located in Dusun Cigintung Cimuncang Village Malausma Sub -district Majalengka Regency or geographical location of the research area located in the southern region of Majalengka Regency.

Geological condition Van Bemmelen (1949) has divided western Java into several physiographic and structural pathways in which Majalengka district is included in the geological pathway of the eastern Zone of Bogor that has been strongly folded to produce anticlinorium with a west -east trending axis. In the northern part of this zone, the geologic state of the northern trending structure is due to pressure from the south. According to Budhitrisna et al, 1986 in the geological map of Tasikmalaya s heets (Figure 1), it is known that the Majalengka Regency, especially Cimuncang Village, Malausma Subdistrict and its surroundings are in Qa Formation (Alluvium), Qvts Formation (Old Gap Sawal) and Qvtb Formation the old volcanic sediment of G. Cakrabuana) , Tpkw (Kaliwangu) Formation, Tpc Formation (Cijulang), Tmph Formation (Halang) And are in the Tpa Formation.

Based on the map of land movement vulnerability zones (PVMBG, 2014), the study area is located in the vulnerability zone of medium and high soil movements as in Figure 2. Where the area is susceptible to the movement of medium soil, in this zone can occur land movement, especially in adjacent areas with river valleys, escarpments, road cliffs or if the slopes are disturbed by a slope of 5 -15% to > 70%. While the area has a high degree of soil movement vulnerability, in this zone there is often a movement of the ground (old and new soil movements can still actively move due to high rainfall and strong erosion) with a slope of 30 -50% to > 70% dependin g on the condition of the physical properties and mechanical rocks.

EAGE-HAGI 1st Asia Pacific meeting on Near Surface Geoscience & Engineering 11-12 April 2018, Yogyakarta, Indonesia Figure 1 Geological map of Malausma and surrounding areas (Budhitrisna et al., 1986) Figure 2 Vulnerability map zone of land movement in research area (PVMBG,2014). EAGE-HAGI 1st Asia Pacific meeting on Near Surface Geoscience & Engineering 11-12 April 2018, Yogyakarta, Indonesia Slip surface analysis Based on the 2D and 3D geoelectric modeling results, shows the distribution value around 6- 200 Om which has three subsurface layers, namely the first layer with a resistance value of <25 Om is thought to be a clay layer, a second layer with a resi stance value of 25-7Oisueedt e tfler and a third layer with a resistance value of > 75 Om is thought to be an unconsolidated breccia layer.

From the result of modeling of line 1 there is a slip area located at a depth of 5 m, line 2 and line 3 there is a slip surface area located at a depth of 5 and 10 m, and at line 4 there is a slip surface area located at a depth of 7 m which is indicated by black shading line. The layer that becomes the slip surface in geoelectric modeling is betwee f layer (25- 7 Research using MASW method is done as much as two line that is on line 2 and line 3 with each line length 45 m. From line 2 and line 3 modeling the shear wave velocity distribution value (V S) is about 40-500 m/s having three subsurface layers; first layer with V S 40-183 m/s is soft soil layer which has depth about 0-5 m, the second layer with V S value of 183-366 m/s is a rigid soil layer which has a depth of about 5-30 m, and the third layer with value V S 366-500 m/s is a layer of solid soil and soft rock having depth of about 30-57 m.

Of the two models, the coating to which the slip contacts are between the soft soil layers (V S 40-183 m/s) and the rigid soil layer (V S 183-366 m/s) with the depth of contact of the slip layer about 5 m marked by the line red shading. Soil mechanics analysis is done by sampling the soil at some point on the surface at the slope to be tested. From the test results of soil samples 1 and 4, we get the weight values coesinc) an itn sh anlf) Tese vues are used for making slope safety model. Safety factor modeling (SF) of slope uses the equilibrium circular analysis of the Morgenstern -Price method, resulting in circular or circular collapse.

From the results of the two models it shows that for each model there are two layers with a S afety Factor (SF) slope of about 1.26 on line 1 which means a relatively stable slope and a value of about 0.98 on line 4 which means unstable slopes. Conclusions The conclusions of this study, as follows: 1. Based on 2D and 3D geoelectric values modeling obtained the distribution 6- suspected to have three layers of the layer wit estimated is a clay layer, the resistance value of 25 -7 O s estimated a layer of tuff, and the resistance value > 75 Om is thought to be an unconsolidated breccia layer. 2.

Based on MASW 2D and 3D modeling the V S distribution values around 40-500 m/s, with V S 40-183 m/s are supposed to be soft soil layers, V S values of 183-366 m/s are thought to be layers rigid soil, and V S 366-500 m/s values are thought to be solid soil layers and soft rocks. 3. The slip surface layer based on geoelectric modeling is the contact between the clay layer and the tuff with a depth of about 5-7 m, whereas based on the MASW modeling between soft soil layers and rigid stiff layer with a depth of about 5 m. 4.

Slope stability modeling shows the S afety Factor (SF) value slope of 1.26 in the southeast which means the slope is relatively stable and in the northwest of 0.98 which means the slope is unstable. References Budhitrisna, T., J.B. Supandjono., H. Panggabean., dan Marino. [1986] Peta Geologi Lembar Tasikmalaya, Jawa Barat skala 1:100.000. Pusat Penelitian dan Pengembangan Geologi. Bandung. EAGE-HAGI 1st Asia Pacific meeting on Near Surface Geoscience & Engineering 11-12 April 2018, Yogyakarta, Indonesia Herlin, H.S. dan A. Budiman.

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