ABSTRACT

In general, the failure of retaining wall construction is influenced by the geometry of the construction of retaining wall, physical and mechanical properties of the soil embankment and/or subgrade and static and/or dynamic load. In a dynamic analysis of the stability of retaining wall, landslide surface behind the retaining wall are calculated based on assumptions. It is required to develop a method that is appropriate in site planning construction of retaining wall due to the dynamic loads by considering the form of sliding soil behind retaining wall. The results of this study are expected to determine the role of these parameters to the movement of the material behind the wall due to the sinusoidal dynamic load. This research used the movement of materials with equivalent static analysis to analyze the stability of the retaining wall.

This study was conducted to the small-scale test of a retaining wall model in the laboratory. This models used gravity of retaining wall, which was made of concrete and was placed on dry sand with a trapezoid-shaped a height of 20 centimeters, width of peak 2 centimeters and width of below 10 centimeters and cantilever with a height of 18.3 centimeters, width of 9.3 centimeters that is placed on dry sand that can pass through sieve No. 4 and retained on sieve No.100. Variations in the relative density of the sand used for testing is a relative density (*DR*) of sand of 30%, *DR* of 60% and *DR* of 75% to model gravity and *DR* of 30%, *DR* of 55% and *DR* of 70% for the cantilever model. The model placed in the glass box of a length of 2 meters, width of 0.4 meters and height of 1 meter. The model vibrated using a shaking table that is moved horizontally with variation of the vibration frequency (*f*) and the amplitude of vibration (*A*). Sinusoidal dynamic acceleration response is recorded using an accelerometer. Granular soil displacement at some point also be monitored during the test.

The results showed that the shape of the field of material movement behind the retaining wall is influenced by *DR* of sand, type of retaining wall and the sinusoidal dynamic acceleration (a_{maks}). The *DR* of sand effect on the area and shape of material movement field by certain a_{maks}. The lower of affect *DR* then the wider and deeper the field of material movement. The relationship of a_{maks} against the width of material movement and a_{maks} against the height of material movement is linear. The parameter of *f* is more dominant influence on the a_{maks} compared with *A*. The percentage of increase in a_{maks} be two-fold when the *f* be improved. If the *A* is increased then the increase of a_{maks} be proportional to the increase in *A*. The parameter of *f* has a dominant effect on the height of the material movement field. The greater of *f* then the greater of height of material movement field. The parameter of *A* has a dominant influence on the width of the material movement field. The larger of *A* getting wider the field of material movement that occurred. By delivering three variations a_{maks} of 0,221g, 0,245g and 0,27g the safety factor of overturning ($SF_{overturning}$) for both models showed a decrease due to increased of the material movement bandwidth, as a result of the increase in the a_{maks}. By increasing the *DR*, then the $SF_{overturning}$ decreases follow the trend of their respective functions. the $SF_{sliding}$ for two types of models show a decline, along with the increase of vast of material movement field. The safety factor of sliding ($SF_{sliding}$) increases follow the trend of their respective functions if the *DR* increased.

Keywords: the type of retaining wall, dynamic acceleration, material movement field shapes, relative density of sand, vibration frequency, vibration amplitude.