

INTISARI

Komplek Situs Istana Ratu Boko memiliki geometri lereng yang terjal. Situs ini berada di Daerah Istimewa Yogyakarta dengan potensi gempa sedang dan curah hujan yang cukup tinggi. Adanya rencana pembangunan infrastruktur menimbulkan perubahan pembebanan lereng. Perubahan kadar air dan penambahan beban merupakan faktor pendorong terjadinya gerakan tanah. Pada penelitian ini dilakukan analisis stabilitas lereng pada lokasi pembangunan *cottage*.

Penelitian ini didahului dengan pengujian terhadap geometri serta profil lapisan penyusun lereng. Pengujian pendahuluan terdiri dari pengujian Geolistrik, *Measured Stratigraphic* dan pengambilan sampel tanah dengan alat *hand auger*. Tahap analisis dimulai dari pemodelan dengan *GeoStudio 2004 Slope/W Analysis* untuk mengetahui bidang gelincir kritis dan faktor aman lereng. Pemodelan dilakukan pada berbagai kondisi yaitu kondisi asli, dengan penambahan beban *cottage*, penambahan beban dinamis, dan perubahan kadar air tanah. Analisis dilanjutkan hitungan manual terhadap faktor aman lereng dengan metode kesetimbangan batas.

Stabilitas lereng pada kondisi asli atau musim kemarau memenuhi persyaratan faktor aman terhadap gerakan tanah yaitu sebesar 1,381. Diperoleh hasil penambahan beban *cottage* tidak berpengaruh terhadap stabilitas lereng dengan faktor aman sebesar 1,381. Faktor aman turun menjadi 1,02 dengan kondisi adanya koefisien percepatan gempa (kg) sebesar 0,355g. Pada kondisi akibat perubahan kadar air tanah, faktor aman mengalami penurunan menjadi 1,168. Hasil pemodelan numeris menunjukkan lereng kompleks Situs Istana Ratu Boko berpotensi mengalami longsor pada musim penghujan dan pada kondisi adanya gempa. Rekomendasi perbaikan dengan metode *soil removal works* merubah faktor aman lereng naik dari 1,168 menjadi 1,46. Menurut Bowles hasil tersebut dapat dikatakan relatif aman terhadap longsor.

Kata kunci : stabilitas, bidang gelincir, faktor aman, *GeoStudio 2004 Slope/W Analysis*

ABSTRACT

Ratu Boko Palace site has a steep slope geometry. This site is located in Yogyakarta with medium earthquake potential and high rainfall intensity. The existence of infrastructure development plan led to changes the loading of slope. Increase of soil moisture content and the addition of loading are some of driving factors behind the slope movement. In this research, slope stability on the cottages construction site will be analyzed.

This study was preceded by geometry and slope profile constituent layers test. This preliminary test consists of Geoelectricity, Measured Stratigraphic and soil sampling using hand auger. The analysis starts from modeling with GeoStudio 2004 Slope/W Analysis to determine the critical sliding plane and slope safety factor. Modeling is done in a variety of conditions: existing condition, with the additional of cottages load, dynamic load, and changes of soil water content. The analysis continued by manual count of the slope safety factor using limit equilibrium method.

Slope stability in native conditions full fill the requirements of safety factor against the ground motion that is equal to 1,381. The results indicate that addition load did not affect the slope stability with safety factor equal to 1,381. Safety factor decrease down to 1,02 in the conditions with existence of seismic acceleration coefficient (kg) about 0,355g. In conditions due to changes in soil water content, safety factor decreased becoming 1,168. Based on the numerical results obtained, the slope of Ratu Boko Palace has ground motion potential during the rainy season and the condition of the earthquake. Recommendations for improvement by soil removal works increase the safety factor of slope stability from 1,168 up to 1,46. These results are relatively safe from landslides according to Bowles.

Keywords: stability, sliding plane, safety factors, GeoStudio 2004 Slope/W Analysis