ABSTRAK

Lingkungan di sekitar bangunan gedung FTSP UII tumbuh seiring pertumbuhan jumlah mahasiswa yang masuk setiap tahunnya. Pertumbuhan jumlah mahasiswa setiap tahunnya juga berbanding lurus dengan jumlah kendaraan yang berlalu-lalang di jalan kampus maupun jalan milik warga utamanya di utara gedung FTSP UII. Letak Indonesia yang berada di antara tiga lempeng utama dunia yaitu lempeng Australia, lempeng Eurasia dan lempeng Pasifik serta berada di posisi Ring of Fire menjadikan Indonesia kerap kali diterpa bencana gempa bumi dan letusan gunung berapi. Tentu gempa bumi ini merupakan salah satu aspek yang perlu diperhatikan dalam mengevaluasi keamanan dinding penahan tanah.

Penelitian ini dimulai dengan pengambilan sampel tanah dengan alat hand auger. Selanjutnya dilakukan uji laboratorium untuk mengetahui propertis material tanah. Analisis stabilitas dinding dilakukan dengan cara manual. Pada penelitian ini dinding penahan tanah dimodelkan dengan dua kondisi yakni kondisi tanpa beban gempa dan kondisi dengan tambahan beban gempa serta dengan data masukan pembebanan yang sama yaitu beban lalu-lintas. Perhitungan beban gempa dengan menggunakan metode Seed-Whitman.

Dari hasil perhitungan stabilitas dinding penahan tipe gravitasi pada potongan 1 dari as A0-B pada utara bangunan gedung FTSP UII untuk kondisi tanpa beban gempa didapatkan nilai angka keamanan terhadap guling 2,612, angka aman terhadap geser 1,682, dan angka aman terhadap daya dukung 3,362. Kondisi dengan tambahan beban gempa memberikan nilai angka keamanan terhadap guling 1,136, angka aman terhadap geser 1,0253, angka aman terhadap daya dukung 0,921. Untuk memenuhi persyaratan yang ditetapkan oleh AASHTO Design Method (1995), dilakukan desain ulang pada dinding penahan tanah eksisting. Hasil perhitungan stabilitas yang dilakukan pada desain baru dinding penahan tanah pada kondisi tanpa beban gempa, memberikan nilai angka keamanan terhadap guling 3,523, angka aman terhadap geser 2,109, angka aman terhadap daya dukung 3,090. Kondisi dengan tambahan beban gempa menunjukkan hasil angka aman terhadap guling 1,533, angka aman terhadap geser 1,286, angka aman terhadap daya dukung 1,061. Hasil keseluruhan nilai angka aman pada dinding penahan tanah desain baru mengalami peningkatan dan memenuhi persyaratan yang ditetapkan.

Kata kunci : *stabilitas, dinding penahan tanah, faktor aman*

ABSTRACT

The neighborhood around the building FTSP UII grow as the growth of the number of students admitted each year. Growth in the number of students each year is also directly proportional to the number of vehicles passing by on the street campus and its main street belonging to residents in the north building FTSP UII. Location of Indonesia who was among three world major plates, namely the Australian plate, the Eurasian plate and the Pacific plate and is in position to make Indonesia Ring of Fire is often buffeted by earthquakes and volcanic eruptions. Of course this earthquake is one of the aspects to be considered in evaluating the security of retaining wall.

This study begins with the soil sampling by means of hand auger. Further laboratory tests to determine the material properties of the soil. Analysis of the stability of the walls done by hand. In this study the retaining wall is modeled with two conditions: a condition without the burden of earthquake and seismic load conditions with the addition and with the same loading input data ie traffic load. Earthquake load calculation using the Seed-Whitman method.

From the calculation of the gravity type retaining wall stability in one of the pieces as A0-B on the north building FTSP UII for no seismic load condition value safety factor against overturning moment of 2,612, safety factor against sliding of 1,682, and safety factor against bearing capacity failure of 3,362. With additional seismic load conditions provides the numerical value of safety factor against overturning moment 1,136, safety factor against sliding of 1,0253 , safety factor against bearing capacity failure of 0,921. To meet the requirements established by AASHTO Design Method (1995), the redesign is done on the existing retaining wall. Results of stability calculations done on the design of a new retaining wall in no-load condition earthquake, providing safety factor against overturning moment of 3,523, safety factor against sliding of 2,109, safety factor against bearing capacity failure of 3,090. Additional seismic load conditions with figures showing the results safety factor against overturning moment of 1,533, safety factor against sliding of 1,286, safety factor against bearing capacity failure of 1,061. The overall results of the numerical value of retaining wall safe in the new design has increased and meet the requirements set.

Keywords: *stability, retaining walls, safety factor*