

INTISARI

Proyek Pembangunan Gedung Infrastruktur Bandung *Advanced Science and Creative Engineering Space* (BASICS) memiliki beberapa paket pekerjaan infrastruktur. Salah satunya adalah gedung *workshop* yaitu gedung perkantoran tiga lantai yang merupakan fasilitas penelitian. Pada struktur utama gedung ini terdapat komponen struktur yang unik dimana gedung ini memiliki dinding penahan tanah untuk menahan perbedaan elevasi tanah pada sisi bagian belakang gedung dan hanya terletak pada lantai dasar saja. Analisis struktur perencana yang didapatkan menunjukkan tidak adanya analisis lebih lanjut terkait adanya perbedaan elevasi tanah ini. Penelitian dilakukan dengan melakukan komparasi evaluasi kinerja struktur terhadap gempa dengan melihat pengaruh dinding penahan tanah dan massa tanah.

Struktur gedung dimodelkan secara numerik menggunakan aplikasi SAP 2000 dengan tiga variasi pemodelan yang berbeda. Tiga pemodelan yang dilakukan yaitu pemodelan secara *open frame* tanpa melibatkan dinding penahan tanah (Model 1), pemodelan secara *open frame* dengan melibatkan dinding penahan tanah dan massa tanah (Model 2), dan pemodelan secara keseluruhan dengan melibatkan dinding arsitektural, dinding penahan tanah, dan massa tanah. Pemodelan dilakukan untuk mengetahui gaya-gaya dalam pada tinjauan elemen struktur dan simpangan antar lantai pada struktur utama.

Berdasarkan hasil penelitian didapatkan bahwa evaluasi kinerja struktur dari tiga pemodelan menghasilkan analisis yang relatif berbeda. Pada pengecekan gaya geser dasar didapatkan nilai gaya geser yang mengalami penurunan setelah dimodelkan dinding penahan tanah dan massa tanah. Pada pengecekan simpangan antar lantai didapatkan penurunan nilai *displacement* akibat adanya kekakuan tambahan dari dinding penahan tanah. Sedangkan pada analisis *demand capacity ratio* didapatkan variasi hasil yang berbeda. Secara keseluruhan hasil analisis menunjukkan Model 3 memiliki tingkat ketelitian hasil analisis yang lebih tinggi sehingga pengaruh pemodelan dinding penahan tanah dan pengaplikasian beban tanah pada analisis struktur sangatlah besar.

Kata Kunci : Interaksi Struktur-Tanah, Dinding Penahan Tanah, Massa Tanah, *Open Frame*, Gempa

ABSTRACT

The Bandung Advanced Science and Creative Engineering Space (BASICS) Infrastructure Building Project has several infrastructure work packages. One of them is a workshop building, which is a three-story office building which is a research facility. In the main structure of this building there is a unique structural component where this building has a retaining wall to withstand differences in soil elevation on the rear side of the building and is only located on the ground floor. The structural design analysis obtained shows that there is no further analysis related to this difference in soil elevation. The study was conducted by comparing the performance evaluation of the structure against earthquakes by looking at the effect of retaining walls and soil mass.

The building structure is modeled numerically using the SAP 2000 application with three different modeling variations. The three modeling carried out are open frame modeling without involving retaining walls (Model 1), open frame modeling involving retaining walls and soil mass (Model 2), and overall modeling involving architectural walls, retaining walls, and soil mass. Modeling is carried out to determine the internal forces in the review of structural elements and the drift between floors in the main structure.

Based on the results of the study, it was found that the evaluation of the structural performance of the three models resulted in a relatively different analysis. In checking the basic shear force, the value of the shear force decreased after modeling the retaining wall and soil mass. In checking the deviation between floors, it was found that the displacement value decreased due to the additional stiffness of the retaining wall. While the analysis of demand capacity ratio obtained different variations of results. Overall, the results of the analysis show that Model 3 has a higher level of accuracy, so that the influence of retaining wall modeling and the application of soil loads on structural analysis is very large.

Kata kunci : *Soil-Structure Interaction, Retaining Wall, Soil Mass, Open Frame, Earthquake*