INTISARI

Indonesia merupakan negara yang rawan terjadi gempa bumi, sehingga diperlukan perancangan struktur tahan gempa. Gedung pada penelitian ini memiliki ketinggian 35,8 meter yang terdiri dari 8 lantai fungsional, 1 lantai semi *basement* dan 1 lantai *rooftop*. Dilakukan perancangan ulang karena gedung tidak memenuhi persyaratan bangunan tahan gempa berupa periode dan simpangan maksimum. Tujuan penelitian ini mengkaji pemodelan gedung menggunakan ETABS v.20 sesuai peraturan yang berlaku, menentukan konfigurasi dinding geser agar gedung memenuhi persyaratan SNI 1726:2019, dan merancang elemen dinding geser sesuai SNI 2847:2019. Selain itu, penelitian ini membandingkan perilaku dan kinerja struktur gedung antara kondisi eksisting (Model 1) dan struktur dengan penambahan dinding geser (Model 2), termasuk perbandingan D/C (*demand capacity ratio*) pada elemen strukturalnya.

Penelitian ini meliputi analisis dan pemodelan menggunakan ETABS v.20 sesuai kondisi eksisting yang kemudian dilakukan modifikasi struktur dengan penambahan dinding geser. Dilakukan analisis konfigurasi letak dinding geser dan perancangan elemen dinding geser sesuai peraturan yang berlaku. Kemudian dilakukan perbandingan kinerja struktur dan *demand capacity ratio* pada elemen struktural sebelum dan sesudah penambahan dinding geser.

Hasil analisis menunjukkan bahwa Model 2 memiliki kinerja struktur yang lebih baik dibandingkan Model 1. Model 2 memenuhi persyaratan *mode shape*, periode alami struktur, partisipasi massa, dan batas maksimum simpangan antar lantai. Kekakuan struktur Model 2 meningkat signifikan, terlihat dari waktu getar alami yang lebih kecil (0,986 detik) dibandingkan Model 1 (1,829 detik). Selain itu, gaya geser dasar Model 2 juga lebih besar dibandingkan Model 1. Penambahan dinding geser mengurangi gaya lateral dan simpangan horizontal. Berat struktur Model 2 meningkat sebesar 26,51% dibandingkan Model 1. Dapat disimpulkan bahwa penambahan dinding geser dengan pemilihan konfigurasi dan dimensi yang tepat dapat meningkatkan kinerja struktur gedung, mereduksi gaya lateral, dan meningkatkan kekakuan bangunan. Penambahan dinding geser berperan mereduksi gaya yang diterima struktur rangka, sehingga D/C elemen rangka pada Model 2 lebih kecil dibandingkan Model 1.

Kata kunci: Perancangan struktur, dinding geser, SNI 1726:2019, kinerja struktur, kekakuan bangunan

ABSTRACT

Indonesia is a country prone to earthquakes, necessitating the design of earthquake-resistant structures. The building in this study is 35.8 meters tall, consisting of 8 functional floors, 1 semi-basement floor, and 1 rooftop floor. A redesign was undertaken because the building did not meet earthquake-resistant building requirements, specifically regarding maximum period and displacement. The objective of this study is to analyze the building model using ETABS v.20 in accordance with applicable regulations, determine the shear wall configuration to ensure the building meets SNI 1726:2019 standards, and design shear wall elements according to SNI 2847:2019. Additionally, this study compares the structural behavior and performance of the building between the existing condition (Model 1) and the structure with added shear walls (Model 2), including a comparison of demand capacity ratio (D/C) of the structural elements.

This study includes analysis and modeling using ETABS v.20 based on the existing condition, followed by structural modification with the addition of shear walls. The placement configuration of the shear walls and the design of the shear wall elements were analyzed according to applicable regulations. Subsequently, a comparison of the structural performance and demand capacity ratio of the structural elements was conducted before and after the addition of the shear walls.

The analysis results show that Model 2 has better structural performance compared to Model 1. Model 2 meets the requirements for mode shape, natural period of the structure, mass participation, and maximum inter-story drift limits. The stiffness of Model 2 significantly increased, as indicated by a smaller natural period (0.986 seconds) compared to Model 1 (1.829 seconds). Additionally, the base shear of Model 2 is larger than that of Model 1. The addition of shear walls reduces lateral forces and horizontal displacement. The weight of Model 2 increased by 26.51% compared to Model 1. It can be concluded that the addition of shear walls with the appropriate configuration and dimensions can enhance the structural performance of the building, reduce lateral forces, and increase the building's stiffness. The addition of shear walls also helps reduce the forces experienced by the frame structure, resulting in a lower D/C ratio for the frame elements in Model 2 compared to Model 1.

Keywords: *Structural design, shear wall, SNI 1726:2019, structural performance, building stiffness*