

Analisis Kinerja Bangunan Modular untuk Rumah Tinggal dengan Metode Riwayat Waktu Nonlinier = Performance Analysis of Modular Building for Residential Houses Using the Nonlinear Time History Method

Simarmata, Nathaniel Januardo, author

Deskripsi Lengkap: <https://lib.ui.ac.id/detail?id=9999920571587&lokasi=lokal>

Abstrak

Konstruksi modular menjadi solusi inovatif dalam penyediaan hunian karena keunggulannya dalam efisiensi waktu, pengurangan limbah, dan fleksibilitas desain. Namun, ketahanan strukturnya terhadap beban gempa masih perlu dievaluasi, terutama di wilayah rawan gempa seperti Indonesia. Penelitian ini menganalisis kinerja bangunan modular rumah tinggal menggunakan metode riwayat waktu nonlinier (NLTH) melalui pemodelan di ETABS dan pengujian eksperimental dinamik. Evaluasi dilakukan pada model satu lantai dan model bertingkat dengan variasi mutu pasangan bata sebagai elemen dinding. Hasil analisis menunjukkan bahwa respons struktur sangat dipengaruhi oleh kualitas material dinding serta konfigurasi elemen struktural. Metode NLTH berhasil menggambarkan deformasi, gaya dalam, dan pembentukan sendi plastis secara rinci di bawah eksitasi gempa bidirectional. Penelitian ini memberikan pemahaman mendalam mengenai perilaku dinamis bangunan modular dan dapat menjadi acuan dalam pengembangan desain struktur modular yang lebih tahan gempa.

.....Modular construction offers an innovative solution for housing development due to its advantages in time efficiency, waste reduction, and design flexibility. However, its structural resistance to seismic loads still needs to be evaluated, especially in earthquake-prone regions such as Indonesia. This study analyzes the performance of modular residential buildings using the Nonlinear Time History (NLTH) method through ETABS modeling and dynamic experimental testing. The evaluation was conducted on both single-story and multi-story models with varying quality of masonry walls as structural elements. The analysis results indicate that the structural response is significantly influenced by the wall material quality and the configuration of structural components. The NLTH method effectively captures deformation, internal forces, and the formation of plastic hinges in detail under bidirectional seismic excitation. This research provides a deeper understanding of the dynamic behavior of modular buildings and can serve as a reference in developing more earthquake-resistant modular structural designs.