

PERBANDINGAN ANALISIS STATIC PUSHOVER DAN NONLINIEAR TIME HISTORY DALAM EVALUASI BANGUNAN

Studi Kasus: Apartement Gunawangsa Gresik Superblock Tower B

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ABSTRAK

Pembangunan gedung tahan gempa sangat penting di Indonesia, mengingat Wilayah Indonesia memiliki potensi rawan gempa bumi. lempengan bumi. Adanya peristiwa tersebut maka struktur bangunan harus didesain sebagai bangunan tahan gempa. Perencanaan gedung yang tahan terhadap gempa dan memerlukan evaluasi terhadap gedung yang sudah berdiri guna mengetahui kelemahan struktur gedung. Secara umum Analisis struktur terhadap gempa dibagi menjadi 2 (dua), yaitu analisis statik dan analisis dinamik (respon spektra, *pushover* dan *nonlinier time history*). Perencanaan bangunan tahan gempa yang direkomendasikan saat ini adalah konsep perencanaan berbasis kinerja dengan menggunakan metode analisis yaitu analisis statik *pushover* dan *nonlinear time history*.

Penelitian ini membandingkan kinerja struktur yang di tinjau dari simpangan dan gaya geser. Beban gempa yang digunakan yaitu gempa Kobe 1998, San Fernando 1997, dan Superstition Hills 1987. Berdasarkan hasil output program SAP2000 Ver 22.0. Hasil *output* didapatkan nilai *displacement* analisis *pushover* arah X sebesar 0,176 m dengan *base shear* sebesar 12445,84 kN, untuk arah Y dengan *displacement* sebesar 0,168 m dengan *base shear* sebesar 11281,58 kN sedangkan Analisis *nonlinier time history* didapatkan nilai *displacement* arah X sebesar 0,2576 m dengan *base shear* sebesar 25966,86 kN, untuk arah Y *displacement* sebesar 0,1996 m dengan *base shear* sebesar 20067,07 kN yang terjadi pada gempa Kobe 1998. Berdasarkan ATC-40 berada pada kategori IO (*Immediate Occupancy*) dimana struktur masih bisa dikatakan aman. Apabila terjadi gempa bumi gedung tidak mengalami kerusakan struktur dan non struktural sehingga bangunan tersebut tetap aman digunakan kembali.

Kata Kunci : Analisis *Pushover*, *Time History*, Evaluasi Kinerja, ATC-40

COMPARISON OF STATIC PUSHOVER ANALYSIS AND NONLINEAR TIME HISTORY IN BUILDING EVALUATION

Case Study: Gunawangsa Gresik Apartment Superblock Tower B

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ABSTRACT

The construction of earthquake-resistant buildings is very important in Indonesia considering that the territory of Indonesia has the potential to be prone to earthquakes. With so many earthquakes, the building structure must be designed as an earthquake-resistant building. The design of an earthquake-resistant building requires an evaluation of the existing building in order to find out the weaknesses of the building structure. In general, structural analysis of earthquakes is divided into 2 (two), namely static analysis and dynamic analysis (response spectra, pushover and nonlinear time history). The currently recommended earthquake-resistant building design is a performance-based planning concept using analytical methods, namely pushover static analysis and nonlinear time history.

This study compares the performance of the structure in terms of displacement and shear forces. The earthquake loads used were the 1998 Kobe earthquake, 1997 San Fernando, and 1987 Superstition Hills. Based on the results of the SAP2000 Ver 22.0 program output. The output results obtained that the displacement value for the X-direction analysis was 0.176 m with a base shear of 12445.84 kN, for the Y-direction with a displacement of 0.168 m with a base shear of 11281.58 kN, while the nonlinear time history analysis obtained the X-direction displacement value of 0, 2576 m with a base shear of 25966.86 kN, for the Y direction a displacement of 0.1996 m with a base shear of 20067.07 kN which occurred in the 1998 Kobe earthquake. Based on the results of the study, ATC-40 is in the IO (Immediate Occupancy) category where the structure can still be said to be safe. In the event of an earthquake, the building does not suffer structural and non-structural damage so that the building remains safe for reuse.

Keywords: *Pushover Analysis, Time History, Performance Evaluation, ATC-40*