EVALUASI KINERJA STRUKTUR TERHADAP GAYA GEMPA GEDUNG PASAR PRAWIROTAMA KOTA YOGYAKARTA MENGGUNAKAN PUSHOVER ANALYSIS

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ABSTRAK

Hampir setiap hari Indonesia diguncang Gempa baik yang ringan maupun yang terhitung besar, ini dikarenakan Indonesia merupakan negara yang berada di wilayah jalur Gempa pasifik (Circum Pacific Earthquake Belt) dan jalur Gempa asia (Trans Asiatic Earthquake Belt) sehingga sangat berpotensi terjadinya Gempa bumi. Untuk itu pada Perencanaan bangunan yang tahan Gempa pada proyek pasar prawirotaman ini penulis menggunakan analisa statis non-linear (pushover analysis) untuk mengetahui perilaku struktur terhadap Gempa besar. yaitu dengan memberi pola beban dalam arah lateral pada pusat masa tiap lantai dari bangunan. Penambahan beban akan terus ditingkatkan secara bertahap sampai tercapai keruntuhan sruktur karena terdapat sendi plastis pada elemen balok maupun kolom atau mencapai target perpindahan (Displacement) tertentu. Penelitian tugas akhir ini dilakukan untuk menentukan titik kinerja berdasarkan ATC-40, dan menentukan tingkat kinerja berdasarkan FEMA 356. Metode penelitian menggunakan spektrum respon dengan SAP2000 v22 program. Hasil point performance pada Gedung dengan nilai Sa = 0,729, dan Sd = 0,026 untuk push X, sedangkan nilai push Y Sa = 0,715, dan Sd = 0,024. Perhitungan ATC-40 pada gedung menunjukkan nilai drift ratio arah X 0,0283 dan drift ratio arah Y 0,0274 pada tingkat performance Immediate Occupancy (IO). Hasil perhitungan FEMA 356 pada Gedung menunjukkan nilai target perpindahan lateral struktur arah X = 0,00126 (0,0126 %), dan nilai target perpindahan lateral struktur arah Y = 0,00122 (0,0122 %) dan pada tingkat kinerja Immediate Occupancy (IO). Maka dapat disimpulkan bahwa Gedung Pasar Prawirotaman berada pada level performance Immediate Occupancy (IO), artinya bangunan masih aman dan dapat digunakan kembali pasca gempa dan tidak terjadi kerusakan yang parah.

Kata kunci ; Pushover Analisis, ATC 40, FEMA 356, Immediate Ocupancy

EVALUATION OF STRUCTURE PERFORMANCE ON THE EARTHQUAKE FORCE OF PRAWIROTAMAN MARKET BUILDING YOGYAKARTA USING PUSHOVER ANALYSIS

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ABSTRACT

Almost every day, Indonesia is shaken by earthquakes, both mild and relatively large, this is because Indonesia is a country located in the Pacific Earthquake Belt (Circum Pacific Earthquake Belt) and Asian Earthquake Route (Trans Asiatic Earthquake Belt), so it has great potential for earthquakes to occur. For this reason, in the planning of earthquake-resistant buildings in the Pasar Prawirotaman project, the authors used non-linear static analysis (pushover analysis) to determine the behavior of structures against large earthquakes by giving a load pattern in the lateral direction at the center of mass of each floor of the building. The added load will continue to be gradually increased until structural collapse is achieved due to plastic hinges in the beam and column elements or a certain displacement target is reached. This final project research was conducted to determine performance points based on ATC-40, and determine performance levels based on FEMA 356. The research method used was response spectrum with the SAP2000 v22 program. The results of the point performance on the building with a value of Sa = 0.729, and Sd = 0.026 for push X, while the value of push Y Sa = 0.715, and Sd = 0.024. ATC-40 calculations for buildings show a drift ratio in the X direction of 0.0283 and a drift ratio in the Y direction of 0.0274 at the Immediate Occupancy (IO) performance level. The results of the calculation of FEMA 356 on the building show the target value of the lateral displacement of the structure in the X direction = 0.00126 (0.0126 %), and the target value of the lateral displacement of the structure in the Y direction = 0.00122 (0.0122 %) and at the Immediate Occupancy performance level (I.O.). So it can be concluded that the Prawirotaman Market Building is at the Immediate Occupancy (IO) performance level, meaning that the building is still safe and can be reused after the earthquake and no serious damage occurred.

Keywords *; ATC 40, FEMA 356, Immediate Occupancy, Pushover Analysis*