EVALUASI KINERJA STRUKTUR GEDUNG FASILITAS LAYANAN PERPUSTAKAAN KOTA BANJAR DENGAN ANALISIS STATIK NON-LINIER *PUSHOVER*

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ABSTRAK

Gedung Fasilitas Layanan Perpustakaan Kota Banjar terletak di Jalan RE. Kosasih, Kecamatan Banjar, Kota Banjar, Jawa Barat, dimana Jawa Barat merupakan kawasan seismik aktif dan kompleks. Gedung ini menggunakan peraturan gempa yang lama yaitu SNI 1726:2002, sehingga dievaluasi kinerja strukturnya menggunakan peraturan SNI 1726:2019. Evaluasi kinerja struktur menggunakan analisis *pushover* dengan metode ATC-40 dan FEMA 356 dengan 3 skenario gempa. 3 skenario gempa yang digunakan yaitu MCE (*Maximum Credible Earthquake*) dengan periode 50 tahun probabilitas 2%, DBE (*Design Basis Earthquake*) dengan periode 50 tahun probabilitas 10% SLE (*Serviceability Level Earthquake*) dengan periode 30 tahun probabilitas 50%. Pemodelan 3D menggunakan software SAP2000 V.22. Analisis *pushover* yang digunakan berdasarkan dengan ATC-40 dan FEMA 356 serta kriteria kinerja struktur SEAOC Vision 2000. Peraturan untuk menganalisis beban gempa menggunakan SNI 1726:2019 dengan peta sumber dan bahaya gempa Indonesia tahun 2017. Peraturan untuk pembebanan menggunakan SNI 1727:2020. Kurva kapasitas arah X berhenti pada step 12, nilai *displacement* 0,1571 m, dan nilai gaya geser maksimum 30988,277 kN. Kurva Kapasitas arah Y berhenti pada step 6, nilai *displacement* 0,0742 m dan nilai gaya geser maksimum 6912,185 kN. *Drift ratio* SLE ATC-40 arah X 0,147%, SLE ATC-40 arah Y 0,205%, DBE ATC-40 arah X 0,224%, DBE ATC-40 arah Y 0,301%, MCE ATC-40 arah X 0,333% dan MCE ATC-40 arah Y 0,462%. *Drift actual* SLE FEMA 356 arah X 0,320%, SLE FEMA 356 arah Y 0,472%, DBE FEMA 356 arah X 0,413%, DBE FEMA 356 arah Y 0,472%, MCE FEMA 356 arah X 0,514% dan MCE FEMA 356 arah Y 0,803%. Level kinerja struktur dengan metode ATC-40 dan FEMA 356 pada skenario gempa MCE, DBE dan SLE yaitu *Immediate Occupancy*. Kinerja struktur bangunan sudah optimal karena *drift* cenderung lebih kecil daripada kinerja yang disyaratkan SEAOC Vision 2000.

Kata Kunci : Analisis *pushover*, Skenario Gempa, FEMA 356, ATC-40, *Immediate Occupancy*

PERFORMANCE EVALUATION OF THE FACILITIES BUILDING STRUCTURE BANJAR CITY LIBRARY SERVICES WITH STATIC ANALYSIS OF NON-LINEAR PUSHOVER

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ABSTRACT

The Banjar City Library Service Facilities Building is located on Jalan RE. Kosasih, Banjar District, Banjar City, West Java, where West Java is an active and complex seismic area. This building uses the old earthquake regulations, namely SNI 1726:2002, so its structural performance is evaluated using the SNI 1726:2019 regulations. Evaluation of structural performance using pushover analysis with the ATC-40 and FEMA 356 methods with 3 earthquake scenarios. The 3 earthquake scenarios used are MCE (Maximum Credible Earthquake) with a 50 year period of 2% probability, DBE (Design Basis Earthquake) with a 50 year period of 10% probability SLE (Serviceability Level Earthquake) with a 30 year period of 50% probability. 3D modeling using SAP2000 V.22 software. The pushover analysis used is based on ATC-40 and FEMA 356 as well as the SEAOC Vision 2000 structural performance criteria. Regulations for analyzing earthquake loads use SNI 1726:2019 with a map of the source and hazard of the Indonesian earthquake in 2017. Regulations for loading use SNI 1727:2020. The capacity curve in the X direction stops at step 12, the displacement value is 0.1571 m, and the maximum shear force value is 30988.277 kN. The capacity curve in the Y direction stops at step 6, the displacement value is 0.0742 m and the maximum shear force value is 6912.185 kN. Drift ratio of SLE ATC-40 in X direction 0.147%, SLE ATC-40 in Y direction 0.205%, DBE ATC-40 in X direction 0.224%, DBE ATC-40 in Y direction 0.301%, MCE ATC-40 in X direction 0.333% and MCE ATC- 40 Y direction 0.462%. The actual drift of SLE FEMA 356 in the X direction is 0.320%, SLE FEMA 356 in the Y direction 0.472%, DBE FEMA 356 in the The level of structural performance using the ATC-40 and FEMA 356 methods in the MCE, DBE and SLE earthquake scenarios is Immediate Occupancy. The performance of the building structure is optimal because drift tends to be smaller than the performance required by SEAOC Vision 2000.

Keywords: Pushover analysis, Earthquake Scenario, FEMA 356, ATC-40, Immediate Occupancy