ABSTRAK

Nazwa Nurrahmi: *Evaluasi Kinerja Struktur Gedung Showroom Dan Kantor Medan Design Center Menggunakan ASCE 41-17*. Skripsi. Fakultas Teknik Universitas Negeri Medan. 2026

Indonesia berada pada wilayah dengan aktivitas seismik tinggi, sehingga evaluasi kinerja struktur terhadap beban gempa diperlukan untuk menjamin keselamatan penghuni, keberlanjutan fungsi, dan ketahanan bangunan. Evaluasi tidak hanya penting bagi bangunan lama, tetapi juga bangunan baru, karena dapat terjadi perbedaan antara asumsi perencanaan dan kondisi aktual, seperti mutu material, pelaksanaan konstruksi, dan detail struktur. Penelitian ini mengevaluasi kinerja seismik Gedung Showroom dan Kantor Medan Design Center berdasarkan ASCE 41-17.

Pemodelan 3D dilakukan menggunakan SAP2000 melalui analisis statik nonlinier pushover pada arah X dan Y untuk tingkat bahaya BSE-1E dan BSE-2E. Parameter yang ditinjau meliputi target perpindahan, persebaran sendi plastis, dan *Demand Capacity Ratio* (DCR) balok serta kolom terhadap *force controlled action*. Target perpindahan BSE-1E sebesar 0,0496 m pada arah X dan 0,0586 m pada arah Y, sedangkan BSE-2E sebesar 0,0678 m pada arah X dan 0,0896 m pada arah Y.

Hasil menunjukkan lebih dari 90% sendi plastis berada pada kondisi A–B, dengan respons inelastik dalam rentang *Immediate Occupancy* hingga *Life Safety*. Plastifikasi diawali pada balok dan berkembang menuju kolom yang menunjukkan mekanisme *strong column weak beam*. Nilai DCR<1 pada balok dan kolom, sehingga kapasitas elemen memenuhi tuntutan gaya. Struktur memenuhi target BPOE, yaitu *Life Safety* pada BSE-1E dan *Collapse Prevention* pada BSE-2E sesuai ASCE 41-17.

Kata kunci: Analisis Statik Nonlinier, Pushover, ASCE 41-17, Target Perpindahan, Sendi Plastis, Kinerja Struktur.

ABSTRACT

Nazwa Nurrahmi: *Structural Performance Evaluation of the Showroom and Office Building of Medan Design Center Using ASCE 41-17. Essay. Faculty of Engineering, Universitas Negeri Medan, 2026.*

Indonesia is located in a region of high seismic activity; therefore, structural performance evaluation under earthquake loading is necessary to ensure occupant safety, functional continuity, and building resilience. This evaluation is relevant to both existing and newly constructed buildings because differences may arise between design assumptions and actual conditions, including material quality, construction practices, and structural detailing. This study evaluates the seismic performance of the Showroom and Office Building of Medan Design Center based on ASCE 41-17.

A 3D SAP2000 model was analyzed using nonlinear static pushover analysis in the X and Y directions for the BSE-1E and BSE-2E seismic hazard levels. The evaluated parameters included target displacement, plastic hinge distribution, and the Demand Capacity Ratio (DCR) of beams and columns for force-controlled actions. The BSE-1E target displacements were 0.0496 m and 0.0586 m in the X and Y directions, respectively, while the BSE-2E target displacements were 0.0678 m and 0.0896 m.

More than 90% of plastic hinges remained in the A–B range, while inelastic responses were within the Immediate Occupancy to Life Safety range. Plastic hinges initiated in beams and subsequently developed in columns, indicating a strong-column–weak-beam mechanism. All evaluated beam and column DCR values were below 1.0, indicating sufficient capacity to resist force demands. The structure satisfied the Basic Performance Objective for Existing Buildings (BPOE), achieving Life Safety under BSE-1E and Collapse Prevention under BSE-2E in accordance with ASCE 41-17.

***Keywords**: Nonlinear Static Analysis, Pushover Analysis, ASCE 41-17, Target Displacement, Plastic Hinge, Structural Performance.*