

INTISARI

Gempa bumi merupakan bencana alam tak terduga yang relatif sering terjadi di Indonesia. Gempa bumi mengakibatkan dampak yang cukup signifikan seperti adanya korban jiwa dan kerusakan bangunan. Kerusakan bangunan yang runtuh akibat gempa juga dapat menambah jumlah korban jiwa serta kerugian fisik dan materiil yang cukup besar. Maka dari itu, diperlukan suatu langkah mitigasi atau pencegahan berupa evaluasi pada gedung agar selanjutnya dapat diketahui apakah gedung masih layak dan sudah memenuhi persyaratan ketahanan terhadap gempa dengan level kinerja yang ditargetkan atau belum.

Evaluasi dilakukan pada struktur gedung perkuliahan 8 lantai yang terletak di Bantul dengan gempa kala ulang 72, 475, dan 2475 tahun yang mengacu pada standar ASCE 41-17. Struktur gedung dimodelkan dengan perangkat lunak ETABS yang kemudian gedung dievaluasi melalui 2 tahap prosedur, yaitu *Tier 1 (screening)* yang terdiri dari *Quick Checks* dan *Checklist* dan *Tier 2 (deficiency-based evaluation)* dengan level kinerja *operational* untuk gempa kala ulang 72 tahun, level kinerja *immediate occupancy* untuk gempa kala ulang 475 tahun, level kinerja *life safety* untuk gempa kala ulang 2475 tahun.

Pada hasil evaluasi *Tier 1*, diketahui beberapa kriteria, yakni pengecekan *slope-failure*, *column shear and axial stress check*, *column-bar splices*, *beam-bar splices*, *column tie spacing*, dan *strirrup spacing* tidak memenuhi persyaratan *Quick Checks* dan *Checklist* sehingga evaluasi perlu untuk dilanjutkan ke *Tier 2*. Evaluasi *Tier 2* dilakukan pada komponen struktural, yaitu balok dan kolom. Pada beberapa komponen kolom dan balok tidak memenuhi persyaratan untuk level kinerja *operational*, *immediate occupancy*, dan *life safety structural performance* dan berpotensi mengalami defisiensi. Dari hasil pemeriksaan dapat disimpulkan bahwa struktur gedung perkuliahan 8 lantai tidak memenuhi ketiga target level kinerja *operational* dengan gempa yang kemungkinan terlampaui selama umur struktur bangunan 50 tahun adalah sebesar 50%, *immediate occupancy* dengan beban gempa yang kemungkinan terlampaui selama umur struktur bangunan 50 tahun adalah sebesar 10%, dan *life safety* dengan beban gempa yang kemungkinan terlampaui selama umur struktur bangunan 50 tahun adalah sebesar 2%.

Kata kunci : Evaluasi, Gempa, Gedung, Struktural, ASCE 41-17

ABSTRACT

Earthquakes are unpredictable natural disasters that occur relatively frequently in Indonesia. Earthquakes cause significant impacts such as casualties and building damage. Damage to buildings that collapse due to earthquakes can also increase the number of casualties as well as considerable physical and material losses. Therefore, a mitigation or prevention step is needed in the form of an evaluation of the building so that it can be known whether the building is still feasible and has met the requirements for earthquake resistance with the targeted performance level or not.

The evaluation is conducted on an 8-storey lecture building structure located in Bantul with 72, 475, and 2475 year-return earthquakes based on ASCE 41-17 standard. The building structure is modeled with ETABS software and then the building is evaluated through 2 stages of procedures, namely Tier 1 (screening) consisting of Quick Checks and Checklists and Tier 2 (deficiency-based evaluation) with operational performance level for the 72-year return period earthquake, immediate occupancy performance level for the 475-year return period earthquake, life safety performance level for the 2475-year return period earthquake.

In the Tier 1 evaluation results, it is found that several criteria, namely slope-failure check, column shear and axial stress check, column-bar splices, beam-bar splices, column tie spacing, and stirrup spacing did not meet the Quick Checks and Checklist requirements so that the evaluation needed to proceed to Tier 2. Tier 2 evaluation was carried out on structural components, namely beams and columns. Some column and beam components do not meet the requirements for operational, immediate occupancy, and life safety structural performance levels and have the potential to experience deficiencies. From the inspection results, it can be concluded that the structure of the 8-storey lecture building does not meet the three operational performance level targets with an earthquake that is likely to be exceeded during the 50-year life of the building structure by 50%, immediate occupancy with an earthquake load that is likely to be exceeded during the 50-year life of the building structure by 10%, and life safety with an earthquake load that is likely to be exceeded during the 50-year life of the building structure by 2%.

Keywords : *Evaluation, Earthquake, Building, Structural, ASCE 41-17*