

## ABSTRACT

### **“EARTHQUAKE FORCE ANALYSIS AND STRUCTURAL PERFORMANCE EVALUATION OF A 25-STORY APARTMENT IN SURABAYA THROUGH COMPARISON OF FEMA 365 AND ASCE 41-17 WITH NON-LINEAR STATIC PUSHOVER METHOD”**

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Indonesia is located in the Ring of Fire region which makes it very vulnerable to seismic activity. Surabaya City is included in earthquake risk area due to the presence of two active faults, namely Surabaya Fault and Waru Fault. Therefore, the planning of high-rise buildings in this region must take into account the potential earthquake hazard with the Performance Based Design (PBD) approach, which not only considers earthquake forces, but also deformation and potential structural damage. One of the methods used in this approach is non-linear static pushover analysis. This research aims to evaluate the seismic performance of a 25-story apartment building in Surabaya City using the pushover method with reference to SNI 1726:2019 and FEMA 365 and ASCE 41-17 evaluation standards. This building has experienced vibrations due to the 2024 Bawean earthquake, so further analysis is needed to determine the structure's resistance to lateral loads. The analysis results show that the maximum base shear value in the X direction is 13,705.5172 kN with a lateral displacement of 1.491 mm, while in the Y direction it is 14,017.4469 Kn with a displacement of 1.701 mm. This indicates that the Y direction is the strong axis of the building. Evaluation of the structural performance level based on FEMA 365 shows that the maximum total drift value is still below the Immediate Occupancy (IO) limit. Meanwhile, based on ASCE 41-17, the maximum value of inelastic drift is also within safe limits. Thus, the structure is declared feasible and can be immediately functioned again after the earthquake without experiencing significant damage.

**Keywords:** Pushover Analysis, Structure Performance, FEMA 365, & ASCE 41-17