

# STUDI KINERJA STRUKTUR BETON BERTULANG MENGUNAKAN METODE DDBD, ATC-40 DAN FEMA 440

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## ABSTRAK

Berkurangnya lahan pembangunan yang tersedia di Indonesia menyebabkan meningkatnya jumlah pembangunan gedung bertingkat. Semakin tinggi suatu struktur, semakin rawan struktur terhadap gaya gempa bumi. Perencanaan bangunan tahan gempa perlu dilakukan untuk meminimalisir pengaruh gaya gempa bumi. Untuk itu, pemodelan dan analisis gedung tahan gempa menjadi penting. Konsep analisis gedung dalam penelitian ini berdasarkan *performance based design* yang sebagai studi kasus diambil gedung *Swarnabumi Residence*. Penelitian ini bertujuan untuk mengetahui level kinerja struktur gedung *Swarnabumi Residence* dengan metode DDBD (*direct displacement based design*), ATC-40 (*Applied Technology Council*) serta FEMA 440 (*Federal Emergency Management Agency*). Berdasarkan hasil analisis struktur menggunakan program ETABS V.9.7.2, menurut metode DDBD menunjukkan perpindahan pada *rooftop* sebesar 0.351 m pada arah X, 0.338 m pada arah Y, dan nilai maksimum *drift* 0.0045. Sementara menurut metode ATC-40 menunjukkan perpindahan sebesar 0.381 m pada arah X, 0.253 m pada arah Y, dan nilai maksimum *drift* 0.005. Kemudian menurut metode FEMA 440 menunjukkan perpindahan sebesar 0.246 m pada arah X, 0.219 m pada arah Y, dan nilai maksimum *drift* 0.003. Dengan demikian level kinerja struktur gedung *Swarnabumi Residence* berdasarkan ketiga metode tersebut termasuk level *immediate occupancy*, dengan nilai maksimum *drift* sebesar 0.005.

Kata kunci: Gempa, DDBD, ATC-40, FEMA 440, Level Kinerja.

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2) Dosen Penanggung Jawab Kedua

## **THE PERFORMANCE LEVEL OF CONCRETE STRUCTURE USING DDBD, ATC-40 AND FEMA 440**

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### **ABSTRACT**

*The reduced development land available in Indonesia has led to increase number of high-rise buildings. The higher a structure, the more vulnerable structure to earthquake forces. Planning for earthquake resistant buildings needs to be done to minimize the influence of earthquake forces. Therefore, modeling and analysis of earthquake resistant buildings become important. The concept of building analysis in this study was based on performance based design which as case study was taken from Swarnabumi Residence building. This study aims to determine the level of performance of the Swarnabumi Residence building structure with direct displacement based design (DDBD) method, ATC-40 (Applied Technology Council) and FEMA 440 (Federal Emergency Management Agency). Based on the results of structural analysis using ETABS V.9.7.2 program, according to DDBD method shows the displacement on the rooftop is 0.351 m in the direction of X, 0.338 m in the direction of Y, and maximum drift value is 0.0045. While according to ATC-40 method shows the displacement is 0.381 m in the direction of X, 0.253 m in the direction of Y, and maximum drift value is 0.005. Then according to FEMA 440 method shows the displacement is 0.246 m in the direction of X, 0.219 m in the direction of Y, and maximum drift value is 0.003. Thus the performance level of the Swarnabumi Residence building structure based on these three methods could be classified in immediate occupancy, with maximum drift value is 0.005.*

*Keywords : Earthquake, DDBD, ATC-40, FEMA 440, performance level.*

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