

## ABSTRAK

Gempa bumi merupakan fenomena alam yang terjadi setiap periode tertentu dan sering terjadi di Pulau Jawa. Hal itu disebabkan karena Pulau Jawa terletak pada kawasan Cincin Api Pasifik. Salah satu peristiwa gempa bumi yang memberikan dampak besar adalah gempa bumi di Yogyakarta berkekuatan 5,6 skala *Richter* pada tanggal 26 Mei 2006. Gempa tersebut menyebabkan robohnya salah satu bangunan di kompleks keraton yaitu Bangsal Trajumas.

Penelitian ini bertujuan untuk memberikan contoh pemodelan struktur kayu yang detail pada komponen elemen dan sambungan. Penelitian ini juga bertujuan untuk menganalisis perilaku struktur salah satu bangunan di Keraton Yogyakarta yaitu Bangsal Kemagangan berdasarkan SNI 7973:2013 tentang Spesifikasi Desain untuk Konstruksi Kayu dan mengevaluasi bangunan Bangsal Kemagangan dengan peraturan FEMA 310 dan FEMA 356. Evaluasi dilakukan pada level kinerja *Operational*, *Immediate Occupancy*, dan *Life Safety*.

Berdasarkan hasil evaluasi bangunan Bangsal Kemagangan menggunakan peraturan FEMA 310 dan FEMA 356, pada pemeriksaan kriteria penerimaan komponen bangunan diperoleh beberapa komponen struktur yang memiliki nilai *acceptance*  $> 1$ , hal tersebut menunjukkan bahwa komponen tidak aman (kritis) seperti pada bagian sambungan (purus) baik pada level kinerja *Operational*, *Immediate Occupancy*, dan *Life Safety*. Selain itu, pada pemeriksaan kriteria penerimaan prosedur linier diperoleh beberapa komponen struktur yang memiliki nilai *Demand Capacity Ratio (DCR)*  $> 2$ , hal tersebut menunjukkan bahwa komponen tidak memenuhi untuk analisis linier sehingga harus dianalisis lebih lanjut menggunakan analisis non-linier pada tier 3 FEMA 310.

**Kata Kunci :** *Bangsals, evaluasi, level kinerja, analisis linier*

## ABSTRACT

An earthquake is a natural phenomenon which occurs in certain times frequently, especially in Java Island. The main reason of this occurrence is because Java Island is located in the Ring of Fire. One of the most impactful earthquakes which bring severe damages is 5,6 richter scale earthquake that happened in Yogyakarta on May 26<sup>th</sup> 2006. It caused one of the buildings in Kraton Complex which called Bangsal Trajumas collapsed.

The purpose of this study is to build a detailed structural timber model on element component and joint. Moreover, this study is conducted to analyze the structure behavior on one of the buildings in Kraton Yogyakarta which called Bangsal Kemagangan based on SNI 7973:2013 which states Design Specification for Timber Structure. In order to evaluate the Bangsal Kemagangan building, this study is involving FEMA 310 Regulations and FEMA 356 Regulations. The whole evaluation is carried out underperformances level such as operational, immediate occupancy and life safety.

The evaluation results on Bangsal Kemagangan building which uses FEMA 310 Regulations and FEMA 356 Regulations show that according to acceptance criteria check on building component, it found that some of the component structures have acceptance value under 1 which means those components are critical and unsafe especially in the joint part in term of performances level such as operational, immediate occupancy and life safety. In additional, Demand Capacity Ratio (DCR) under 2 on several components is obtained based on linear procedure according to acceptance criteria which shows those component didn't fulfill the linear analysis therefore further study are needed. The research needs to be conducted under non-linear analysis on tier 3 FEMA 310.

**Keywords :** *Bangsas, evaluation, performance level, linear analysis*