

## INTISARI

Desain struktur dengan ketidakberaturan tinggi memiliki beberapa konsekuensi khusus yang perlu diperhatikan di dalam proses perancangannya. Dalam SNI 1726:2019, terdapat 2 prosedur perancangan yang direkomendasikan untuk analisis linear dinamik yaitu respons ragam dan respons riwayat waktu (*linear time history analysis*). Prosedur desain yang paling umum digunakan di Indonesia adalah prosedur analisis dinamik respons ragam/respons spektra. Berdasarkan penelitian terdahulu dijumpai bahwa ada beberapa kondisi di mana simpangan dan gaya geser dasar dengan metode *linear time history analysis* (LTHA) didapatkan hasil yang lebih kritis.

Dalam skripsi ini dilakukan analisis struktur gedung beton bertulang berupa auditorium 3 lantai dengan ketidakberaturan tinggi, Analisis bangunan gedung menggunakan prosedur LTHA dan respons ragam dengan pemodelan struktur berupa rangka tiga dimensi (3D) pada perangkat lunak CSI ETABS. Prosedur LTHA dilakukan dengan memilih tiga data rekam gerak tanah. Ketiga data rekam gerak tanah tersebut kemudian dicocokkan terhadap respons spektra gempa target pada situs struktur yaitu Kabupaten Sleman, Provinsi Daerah Istimewa Yogyakarta. Hasil analisis struktur kemudian diolah untuk identifikasi ketidakberaturan hingga dilakukan desain mengacu pada SNI 1726:2019 dan SNI 2847:2019.

Hasil analisis menunjukkan bahwa struktur gedung memiliki ketidakberaturan horizontal 1a, 1b, dan 3. Pada peninjauan gaya geser dasar struktur (*unscaled*) diperoleh bahwa nilai terbesar untuk arah X dijumpai pada LTHA Superstition Hills dengan beda 11,29% terhadap respons ragam, sementara nilai terbesar arah Y dijumpai pada LTHA Maule dengan beda 3,21% terhadap respons ragam. Kemudian pada peninjauan perpindahan puncak maksimum (*scaled*) untuk arah X diperoleh nilai terbesar pada analisis respons ragam, sementara untuk arah Y diperoleh nilai terbesar pada LTHA Superstition Hills.

**Kata kunci:** Struktur beton bertulang, Gedung auditorium, Struktur ketidakberaturan tinggi, Analisis respons ragam, *Linear time history analysis*

## ***ABSTRACT***

The design of structures with high irregularities have several special consequences that need to be taken into account in the design process. In SNI 1726:2019, there are 2 design procedures recommended for dynamic linear analysis, namely response spectrum and linear time history analysis. The most commonly used design procedure in Indonesia is the dynamic response spectrum procedure. Based on previous research, it was found that there are several conditions where the story drift and base shear force using the linear time history analysis (LTHA) method obtained more critical results.

In this thesis, a structural analysis of 3-story reinforced concrete auditorium building with high irregularities is carried out. The structural analysis uses the LTHA and response spectrum procedure by modeling the structure as a three-dimensional (3D) frame in the CSI ETABS software. The LTHA procedure was carried out by selecting three ground motion data records. The three ground motion data were then matched to the target response spectrum at the construction site, Sleman, D.I. Yogyakarta. The results of the analysis are then processed to identify irregularities until a design is carried out referring to SNI 1726:2019 and SNI 2847:2019.

The results of the analysis show that the building structure has horizontal irregularities 1a, 1b, and 3. When examining the base shear force of the structure (unscaled), it was found that the largest value for the X direction was found in LTHA Superstition Hills with a difference of 11,29% to the respons spectrum, meanwhile for the Y direction was found in LTHA Maule with a difference of 3,21% to the respons spectrum. The maximum peak displacement (scaled) for the X direction was obtained in the respons spectrum analysis while the Y direction was obtained at the LTHA Superstition Hills.

**Keywords:** Reinforced concrete structure, Auditorium, High iredularity structure, Response spectrum analysis, Linear time history analysis