

ANALISIS PERBANDINGAN RESPON STRUKTUR GEDUNG MENGGUNAKAN GEMPA STATIK EKIVALEN DINAMIK RESPON SPEKTRUM DAN *TIME HISTORY*

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ABSTRAK

Indonesia merupakan wilayah yang rawan terjadi gempa bumi, kondisi geografis di Indonesia terletak pada pertemuan empat lempeng mengakibatkan keruntuhan gedung. Gempa yang sampai pada permukaan tanah dapat menghancurkan bangunan yang ada di atasnya, sehingga perlu adanya antisipasi agar bangunan tersebut aman. Untuk mengamankan bangunan tersebut, bangunan harus didesain sebagai bangunan tahan gempa sesuai dengan syarat dan aturan gempa yang ada di Indonesia. Penelitian ini akan dilakukan suatu perbandingan desain dan respon struktur gedung menggunakan analisis statik ekuivalen, *dinamik respon spektrum* dan *time history*. Sehingga didapat perbandingan respon struktur berupa nilai simpangan, *drift ratio*, gaya dalam pada balok dan kolom. Pada penelitian ini metode penelitian mengacu pada SNI 1726:2019 tentang tata cara perencanaan ketahanan gempa untuk struktur bangunan gedung dan non gedung. Serta perencanaan struktur bangunan menggunakan SNI 2847:2019 Nilai simpangan antar lantai maksimum pada statik ekuivalen arah X 101,816 mm, arah Y 179,728, dinamik respon spektrum arah X 86,724 mm, arah Y 147,007 mm, San Fernando arah X 108,366 mm, arah Y 181,038 mm. Duzce, Turkey arah X 402,79 mm, arah Y 593,622 mm. Tabas, Iran arah X sebesar 157,503 mm, arah Y sebesar 256,376 mm, Nilai *Drift Ratio* maksimum statik ekuivalen pada arah X 0,317 %, Arah Y 0,490 %. *Respon Spektrum* arah X 0,298 %, arah Y 0,471 %. Hasil dari analisis *Time History* gempa yang diambil dari berbagai Negara didapatkan nilai San Fernando arah X 0,349 %, arah Y 0,298%. Duzce Turkey arah X 1,256 % Arah Y 2,249%, Tabas, Iran arah X 0,527%, arah Y 0,897 %.

Kata kunci : Respon Spektrum, Statik Ekuivalen, *Time History*.

COMPARISONAL ANALYSIS OF BUILDING STRUCTURE RESPONSE USING STATIC EARTHQUAKE EQUIVALENT DYNAMIC RESPONSE SPECTRUM AND TIME HISTORY

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ABSTRACT

Indonesia is an area that is prone to earthquakes, geographical conditions in Indonesia are located at the confluence of four plates resulting in the collapse of buildings. An earthquake that reaches the ground can destroy the buildings above it, so it is necessary to anticipate that the building is safe. To secure the building, the building must be designed as an earthquake-resistant building in accordance with the terms and regulations for earthquakes in Indonesia. This research will conduct a comparison of the design and response of the building structure using equivalent static analysis, dynamic response spectrum and time history. So that we get a comparison of structural responses in the form of deviation values, drift ratios, internal forces on beams and columns. In this study, the research method refers to SNI 1726:2019 regarding procedures for planning earthquake resistance for building and non-building structures. As well as planning the structure of the building using SNI 2847:2019 The maximum value of the deviation between floors in the static equivalent direction X 101.816 mm, Y direction 179.728, dynamic response spectrum X direction 86,724 mm, Y direction 147,007 mm, San Fernando X direction 108,366 mm, Y direction 181,038 mm . Duzce, Turkey X direction 402.79 mm, Y direction 593.622 mm. Tabas, Iran in the X direction of 157.503 mm, the Y direction of 256,376 mm, the maximum static Drift Ratio value is equivalent to the X direction of 0.317 %, the Y direction of 0.490 %. Response Spectrum direction X 0.298 %, direction Y 0.471 %. The results of the Time History analysis of earthquakes taken from various countries obtained the value of San Fernando in the X direction of 0.349%, the Y direction of 0.298%. Duzce Turkey X direction 1.256 % Y direction 2.249%, Tabas, Iran X direction 0.527%, Y direction 0.897 %.

Keywords: Response Spectrum, Equivalent Statics, Time History