

PERBANDINGAN DESAIN SERTA PERILAKU GEDUNG HOTEL DAN CONDOTEL-ATTURE LLOYD'S DENGAN BEBAN GEMPA RESPON SPEKTRUM DAN RIWAYAT WAKTU

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ABSTRAK

Pembangunan Gedung Hotel dan Condotel-Attire Lloyd's Yogyakarta berfungsi sebagai gedung hotel dan gedung galeria dengan 10 lantai + (1 basement dan 1 groundfloor), dimana merupakan wilayah dengan resiko gempa kuat. Sehingga diperlukan perencanaan struktur yang mampu menerima beban gempa resiko tinggi. Pada Tugas Akhir ini Gedung Hotel dan Condotel-Attire Lloyd's Yogyakarta membandingkan desain serta perilaku gedung menggunakan beban gempa analisis respon spektrum dan analisis time history (riwayat waktu). Dari hasil analisis tersebut dapat diketahui simpangan antar tingkat, *drift ratio* serta perbandingan kebutuhan penulangan pada balok dan kolom SRPMK dengan metode analisis respon spektrum dan analisis time history. Tahapan analisis struktur adalah gedung didesain dengan analisis respon spektrum kemudian desain tersebut dievaluasi dengan analisis time history. Data gempa untuk time history menggunakan 3 (tiga) rekaman gempa yaitu gempa Imperial Valley (Niland Fire Station, 1979), Kobe (Jepang, 1995) dan Chichi (Taiwan, 1999). Dari ketiga data gempa tersebut diambil yang nilai terbesar. Hasil studi mendapatkan nilai simpangan antar lantai maksimum dari analisis respon spektrum arah x sebesar 127,001 mm dan arah y sebesar 64,536 mm. Analisis *time history* Imperial Valley (magnitudo rendah) arah x sebesar 26,842 mm dan arah y sebesar 7,579 mm. Analisis *time history* Kobe (magnitudo sedang) arah x sebesar 120,802 mm dan arah y sebesar 34,664 mm. Analisis *time history* Chichi (magnitudo tinggi) arah x sebesar 134,578 mm dan arah y sebesar 32,609 mm. Nilai *drift ratio* maksimum pada analisis respon spektrum arah x sebesar 1,759 % dan arah y sebesar 1,175 %. Analisis *time history* Imperial Valley (magnitudo rendah) arah x sebesar 0,261 % dan arah y sebesar 0,157 %. Analisis *time history* Kobe (magnitudo sedang) arah x sebesar 1,609 % dan arah y sebesar 0,633 %. Analisis *time history* Chichi (magnitudo tinggi) arah x sebesar 1,833 % dan arah y sebesar 0,640 %. Sehingga didapat gaya dalam dari nilai simpangan antar tingkat dan *drift ratio* dengan nilai terbesar analisis respon spektrum dan analisis *time history* Chichi. Kebutuhan penulangan balok dan kolom Gedung Hotel Dan Condotel-Attire Lloyd's memiliki jumlah yang sedikit lebih banyak menggunakan gempa Chichi dari pada dengan analisis respon spektrum. Hasil desain dituangkan dalam gambar.

Kata Kunci: Respon Spektrum, Time History, SRPMK, Beton Bertulang

COMPARISON OF LLOYD'S HOTEL AND CONDOTEL-ATTURE BUILDING DESIGN AND BEHAVIOR WITH EARTHQUAKE LOADING RESPONSE SPECTRUM AND TIME HISTORY

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ABSTRACT

Pembangunan Gedung Hotel dan Condotel-Attire Lloyd's Yogyakarta berfungsi sebagai The construction of the Hotel and Condotel-Attire Lloyd's Yogyakarta functions as a hotel building and galleria building with 10 + floors (1 basement and 1 groundfloor), which is an area with a strong earthquake risk. So it is necessary to design a structure that is able to accept high risk earthquake loads. In this final project, the Hotel and Condotel-Attire Lloyd's Yogyakarta Building compares the design and behavior of the building using earthquake loads, spectrum response analysis and time history analysis. From the results of the analysis, it can be seen that the deviation between levels, the drift ratio and the comparison of the need for reinforcement in the SRPMK beam and column using the response spectrum analysis method and time history analysis. The stage of structural analysis is that the building is designed with spectrum response analysis and then the design is evaluated by time history analysis. Earthquake data for time history used 3 (three) earthquake records, namely the Imperial Valley earthquake (Niland Fire Station, 1979), Kobe (Japan, 1995) and Chichi (Taiwan, 1999). From the three earthquake data, the largest value was taken. The results of the study obtained the maximum value of the deviation between floors from the analysis of the response spectrum in the x-direction of 127.001 mm and the y-direction of 64.536 mm. Time history analysis of Imperial Valley (low magnitude) in the x direction of 26,842 mm and the y direction of 7,579 mm. Time history analysis of Kobe (medium magnitude) x direction is 120,802 mm and y direction is 34.664 mm. Chichi time history analysis (high magnitude) x direction is 134.578 mm and y direction is 32.609 mm. The maximum drift ratio value in the spectrum response analysis in the x direction is 1.759% and the y direction is 1.175%. Time history analysis of Imperial Valley (low magnitude) x direction is 0.261 % and y direction is 0.157 %. Time history analysis of Kobe (medium magnitude) in the x direction is 1.609% and the y direction is 0.633 %. Chichi's time history analysis (high magnitude) in the x direction is 1.833% and the y direction is 0.640%. So that the internal force is obtained from the value of the deviation between levels and the drift ratio with the largest value of spectrum response analysis and Chichi time history analysis. The need for reinforcement of beams and columns of the Hotel and Condotel-Attire Lloyd's Building has slightly more numbers using the Chichi earthquake than with spectrum response analysis. The results of the design are outlined in the image.

Keywords: Response Spectrum, Time History, SRPMK, Reinforced Concrete