

Respon seismik dua bangunan tinggi yang dihubungkan oleh jembatan pada lantai tertentu dengan perletakan fleksibel nonlinier = Seismic response of two high buildings connected by a bridge at certain floor with nonlinear flexible support

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Abstrak

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Bangunan tinggi harus memiliki sistem keamanan terhadap resiko kebakaran, salah satunya dengan menggunakan refuge floor. Perkembangan selanjutnya, untuk evakuasi dibutuhkan jembatan yang menghubungkan bangunan tersebut dengan bangunan lain yang berdekatan. Pada penelitian ini akan dianalisis pengaruh letak jembatan pada dua bangunan tinggi yang dihubungkan dengan perletakan fleksibel dimana kedua bangunan 30 lantai dengan variasi jembatan di lantai 10, 20 atau 30. Analisis dilakukan secara respon spektrum, time history linier dan nonlinier dengan metode FNA (Fast Non-linear Analysis) akan dievaluasi dengan program Etabs. Sumber gempa menggunakan gempa Chichi yang diskalakan ke kota Jakarta dengan tanah lunak menggunakan program Seismo Match. Gempa Chichi sebelum diskalakan memiliki puncak percepatan 0,361 g, lalu setelah diskalakan memiliki puncak percepatan 0,323 g. Pada analisis time history nonlinier, isolator pada jembatan dimodelkan nonlinier sedangkan bangunan tetap linier namun dengan pembesaran gempa. Hasil penelitian menunjukkan bahwa secara umum respon bangunan ganda dapat diwakili bangunan tunggal, namun perlu diperhatikan pada elemen lokal dekat jembatan. Semakin tinggi letak jembatan atau semakin tinggi kekakuan perletakannya maka semakin besar efeknya pada elemen lokal tersebut. Sifat nonlinier dari isolator hanya berpengaruh pada elemen jembatan tidak pada elemen lokal bangunan. Analisis riwayat waktu nonlinier lebih konservatif dalam analisis elemen jembatan.;

ABSTRACT

High rise building should have an evacuate system for an emergency situation such as fire. Refuge floor is one of that system. Further development, to evacuate the occupant, we need a bridge that connects to nearby building. Thus, this thesis will analyzed the seismic response of two high buildings connected by a bridge at certain floor with nonlinear flexible support. Two buildings with 30 floors will be connected by a bridge at certain level of 10th, 20th or 30th. This research will be analyzed by spectrum response, linear time history and nonlinear time history using Fast Nonlinear Analysis (FNA) method and will be evaluated with Etabs program. The earthquake source is Chichi earthquake that is scaled to Jakarta soft clay using Seismo Match program. Before being scaled, the peak acceleration is 0,361 g and after being scaled is 0,323 g. In time history nonlinear analysis, base isolation is modeled as nonlinear link, but the structure is assumed to be linear with scale-up earthquake. The result shows that the global response of two buildings that connected by a bridge can be represented with a single building but for the local elements near the bridge must be concerned. The higher location of the bridge or the higher stiffness of isolator gives the larger effect on local elements. Nonlinear properties of isolator only effects element of bridge, but not for local element of the building. Analysis of nonlinear time history is more conservative on elements of bridge., High rise building should have an evacuate system for an emergency situation such as fire. Refuge floor is one of that system.

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