Pengaruh pemodelan perletakan dan diafragma lantai dasar terhadap respons seismik bangunan tinggi = Effects of supports modelling and type of ground slabs on seismic response of high rise building.

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Abstrak

Di dalam perancangan bangunan tinggi, pondasi biasanya dimodelkan sebagai perletakan jepit. Akibatnya, perbedaan jenis pelat lantai dasar yang digunakan tidak mempengaruhi respons struktur dan gaya geser dasar dianggap bekerja serentak. Padahal, terdapat dua jenis pelat lantai dasar (suspended slab dan slab-on-ground) yang dapat memberi kekakuan yang berbeda pada perletakan bangunan. Ditambah lagi, kekakuan perletakan berperan besar dalam memberi kekakuan pada bangunan tinggi. Dengan demikian, pengaruh pemodelan perletakan terhadap respons seismik struktur perlu diteliti. Penelitian ini bertujuan untuk menganalisis respons bangunan tinggi akibat beban gempa dan menganalisis pengaruh variabel-variabel yang ada (tinggi bangunan, Ly/Lx bangunan, asumsi diafragma lantai tingkat, jenis diafragma lantai dasar, dan pemodelan perletakan) terhadap karakteristik dinamik dan respons struktur dengan analisis spektrum respons menggunakan ETABS berlisensi Laboratorium Struktur UI. Hasilnya, suspended slab memperbesar gaya geser dasar dinding geser. Selain itu, perbedaan jenis diafragma lantai dasar menyebabkan perbedaan distribusi: gaya geser tingkat gedung dan dinding geser, drift antarlantai, gaya tarik cord, serta gaya tekan kolektor. Perbedaan gaya tarik cord tersebut membesar jika Ly/Lx bangunannya membesar. Kemudian, perletakan lentur memperbesar gaya geser dasar gedung, sedangkan perletakan kaku memperbesar gaya geser dasar dinding geser. Selain itu, perbedaan jenis perletakan, khususnya perbedaan kekakuan pegas, menyebabkan perbedaan distribusi: gaya geser tingkat gedung, dinding geser, dan portal, drift antarlantai, gaya tekan kolektor, serta gaya tarik cord.

.....In design of high-rise building, foundations are usually modeled as fixed supports. As a result, different type of ground slabs does not affect structure response and base shear is assumed to work together. In fact, there are two types of ground slabs (suspended slab and slab-on-ground) which can give different stiffness to the supports. In addition, supports' stiffness have a big role in giving stiffness to high-rise building. Therefore, effects of supports modelling to structure's seismic response need to be investigated. This research aims to analyze high-rise building's response due to seismic load and analyze effects of variables (building's height, Ly/Lx of building, assumption of story diaphragm, types of ground slabs, and supports modelling) on structure's dynamic characteristic and response using response spectrum analysis by ETABS with a license belonging to Universitas Indonesia Laboratory of Structure. The result is that suspended slabs increase shearwalls' base shear. Furthermore, different type of ground slabs cause differences of distribution of: building and shearwalls' story shear, story drift, cords' tension force, and collectors' compression force. The differences of distribution of cords' tension force will increase if Ly/Lx of building increase. Then, flexible supports increase building's base shear whreas rigid supports increase shearwalls' base shear. Furthermore, different type of supports, especially different stiffness of springs, cause differences of distribution of: building, shearwalls, and frames' story shear, story drift, cords' tension force, and collectors' compression force.