SEISMIC ANALYSIS OF MULTISTORY PREFABRICATED FRAMED STRUCTURES

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SYNOPSIS

The paper presents the seismic analysis of a prefabricated framed structure of ground floor plus five levels;the influence of floor slab deformations for shear force distribution in the various vertical resistant elements is taken into account.The theoretic investigations are compared with the experimental ones,carried out by mean of a 140 tf seismic table (scale model 1:3).The seismic response of the structure during the quasielastic and limit inelastic stages has been obtained by mean of the Fourier response spectrum theory,using the accelerogrames recorded during the experiments.

INTERPRETATION OF RESULTS

From the experimental investigations,it yields during the elastic stage of structural behaviour,the first story floor presents high elastic deflections.If $|\Delta|$ represents the difference between the extreme values of measured displacements of transversal frames at the same level,in the elastic stage $|\Delta|$ are greater than those corresponding to the stage of development of fissures.The study of deformed shapes of first story floor has pointed that besides instantaneous symetric deflected shapes there are also nonsymmetrical ones.This fact will lead to a horizontal forces distribution to the transversal frames,completely different from the theoretical one,due to the rigid floor assumption.The difference of horizontal force $\Delta f=|F^{theor}{-}F^{exp}|$ overtaken by each the transversal frames;at the first story,by the contribution of different displacements of frames,at this level represents up to 5-6% of total seismic force F,(which was calculated in the quasielastic stage as well as in the nonlinear one).The marginal frame and also the central one can overtake in this situation,at first level horizontal forces of 1,5-2 times greater than those obtained theoretically.

CONCLUSIONS

The method of response spectra was used to obtain the seismic force distribution to axes of transversal frames.The experimental horizontal displacements were used to correct the rigid floor assumption,this correction will be different according to the structural behaviour (quasielastic or inelastic stage).For the studied model the transport of loads has led to double or halving of seismic forces on transversal frames at first story floor,that which does not surpass 6% of the total seismic forces.

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