ABSTRACT

Diaphragm design is important to be studied and calculated, because the diaphragm serves to tie each vertical elements together to resist the forces. Generally, engineers tend to assume that diaphragm of building structure is rigid, but the architect frequently plans a slender building that causes rigid diaphragm analysis is not proper to be used. Rigid and semi rigid diaphragm behave differently. It may cause harm if the assumption for design is not suitable. Diaphragm has to be able to resist inertia force and transfer forces from different vertical elements as required in SNI 1726-2012. Large transfer forces should be anticipated at diaphragms having discontinuities or offsets, particularly at podium area. In this research, analysis results of designing rigid building structure and semi rigid building structure are compared. Finite element method application in this analysis is useful to determine the distribution of forces and stresses in the diaphragm, with the margin of error is 0.132 % from the exact calculation. The analysis result of semi rigid structure may increase period, modal participating mass and earthquake scale factor. It may cause a higher design force compared to the analysis result of rigid structure. Semi rigid structure analysis shows that concentrated stressess occur in some area such as chord, collector and diaphragm shear force.

Keyword: diaphragm design, high rise building, chord, collector, diaphragm shear force and finite element method..