

عنوان مقاله:

NUMERICAL STUDY OF THE DIAPHRAGM BEHAVIOR OF THE COMPOSITE FLOOR SYSTEMS SUBJECTED TO LATERAL LOAD

محل انتشار:

سومین کنفرانس بین المللی بتن و توسعه (سال: 1388)

تعداد صفحات اصل مقاله: 15

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خلاصه مقاله:

The influence of the in-plane flexibility of composite floor systems on the seismic response of the structures may become significant, particularly when considerable floor slab cracking and yielding are expected. As in recent years the use of composite floor systems is increasing, in this study the lateral in-plane behavior of composite floor diaphragms in steel structures is investigated through numerical simulations. The structures considered in the study were two models of the prototype buildings, where the elastic and inelastic response of the diaphragms under lateral load is analyzed using 3-D finite element models and FEM linear and nonlinear structural analysis. It was found that under the seismic load specified in the code, the criterion of diaphragm rigidity is too small, so the composite floor systems can be assumed as rigid body, however under lateral loads with higher amplitudes, by developing the cracks in the concrete slabs, nonlinear behavior and stiffness degradation of the diaphragms might occur. The results showed that for both single story structures the ultimate strength of the diaphragms was very high about 20 to 33 times of the seismic load specified in Iran's seismic code, however the ultimate strength of the second diaphragm was considerable showing an increment about 50~60 percent compared to the ultimate strength of the first diaphragm. The comparisons between the numerical and previously obtained experimental results showed that FEM overestimates the diaphragm response in terms of stiffness and deformability; however conservatively estimates the diaphragms strength.

کلمات کلیدی:

composite floor system, numerical simulation, finite element method, nonlinear analysis, diaphragm, seismic load, crack pattern, ultimate strength, inplane stiffness

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