عنوان مقاله:

SEISMIC OPTIMIZATION OF STEEL SHEAR WALL USING SHAPE MEMORY ALLOY

محل انتشار:

مجله بهینه سازی در مهندسی عمران, دوره 9, شماره 4 (سال: 1398)

تعداد صفحات اصل مقاله: 17

نویسندگان:

R. Kamgar

Y. Askari Dolatabad

M. R. Babadaei Samani

خلاصه مقاله:

Nowadays, steel shear walls are used as efficient lateral-load-resistant systems due to their high lateral stiffness and carrying capacity. In this paper, the effect of substituting a shape memory alloy (SMA) material is investigated instead of using conventional steel in the shear wall. A numerical study is conducted using finite element method (FEM) by OpenSees software. For this purpose, at first, to verify the numerical simulation, the results of the experimental data are compared with those obtained from the numerical phase. Finally, the behavior of a one-bay three-story steel frame equipped with shear walls made of conventional steel, shape memory alloy and a combination of these two materials are studied when the structure is subjected to cyclic and seismic loadings. Results indicate that the use of shape memory alloy increases the maximum deformation, the yield displacement, and also the loading capacity of the structure. Also, it decreases the residual deformation of the structure and its initial stiffness. In general, using composite materials of conventional steel and shape memory alloy can reduce the maximum value of compression axial load of the column and, as a result, increase maximum rotation at the connections. In addition, the minimum and maximum values of base shear occurred in the model with ۵۰% and ۲۵% of Ni-Ti SMA material, respectively.

کلمات کلیدی:

shear wall, shape memory alloy, cyclic loading, seismic loading, strip method