Earthquake Retrofitting of Concrete Structures Using Steel Bracing with the Results of Linear and Nonlinear Static Analysis

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Abstract : The use of steel braces in concrete structures has been considered by researchers in recent decades due to its easy implementation, economics and the ability to create skylights in braced openings compared to shear wall openings as well as strengthening weak concrete structures to earthquakes. The purpose of this article is to improve and strengthen concrete structures with steel bracing. In addition, cases such as different numbers of steel braces in different openings of concrete structures and interaction between concrete frames and metal braces have been studied. In this paper, by performing static nonlinear analysis and examining ductility, the relative displacement of floors, examining the performance of samples, and determining the coefficient of behavior of composite frames (concrete frames with metal bracing), the behavior of reinforced concrete frames is compared with frame without bracing. The results of analyzes and studies show that the addition of metal bracing increases the strength and stiffness of the frame and reduces the ductility and lateral displacement of the structure. In general, the behavior of the structure against earthquakes will be improved.