



The Effect of Shape and Dimensions of Openers in Concrete Shear Wall with Nonlinear Static Analysis

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ABSTRACT

One of the ways of confronting lateral forces due to wind or earthquake is using RC shear walls. RC shear wall besides appropriate behavior against lateral forces it causes the plan to be cost-effective. Sometimes because of architectural reasons or implementing facility systems, there is a necessity to use shear wall with opener. In this article we study and investigate the effect of openers' location on the performance of shear wall through finite element method. For this, four walls without opener, wall with opener in the above, down and middle were modeled by ABAQUS software and the results are provided both in diagrams and figures. The results show that by comparing cracking contours in different walls, presence of opener increases the cracking tension in that part. But the tension under the walls is not very different and this could be due to the symmetry in different walls. Generally, it could be said that the best state for energy loss in the wall is seamless implementation and avoiding the creation of opener. Then, by movement of the opener to the wall base, energy loss and plasticity in the wall would be reduced. In other words, energy loss and plasticity in the wall with opener in the above is more than a wall with opener in the middle and wall with opener in the middle has better performance in energy loss with respect to wall with opener in the below. In a wall without opener the most tension and cracking is in the wall foot and this is due to the maximum shear and bending in this part. Also, with comparing pushover diagrams in different walls it is seen that for a special movement, the following walls have the most tolerance, respectively: wall without opener, walls with opener in the above, middle, and below.

Keywords:

Shear Wall, Opener, Finite Element, Cracking, Plasticity, Energy Loss, ABAQUS.