

Effectiveness of Damping Devices on Coupling Beams of 15-story Building Based on Nonlinear Analysis Procedures

Authors : Galih Permana, Yuskar Lase

Abstract : In recent years, damping device has been experimentally studied to replace diagonally reinforced coupling beams, to mitigate rebar congestion problem. This study focuses on evaluating the effectiveness of various damping devices in a high-rise building. The type of damping devices evaluated is Viscoelastic Damper (VCD) and Rotational Friction Damper (RFD), with study case of a 15-story reinforced concrete apartment building with a dual system (column-beam and shear walls). The analysis used is a nonlinear time history analysis with 11 pairs of ground motions matched to the Indonesian response spectrum based on ASCE 41-17 and ASCE 7-16. In this analysis, each damper will be varied with a different position, namely the first model, the damper will be installed on the entire floor and in the second model, the damper will be installed on the 5th floor to the 9th floor, which is the floor with the largest drift. The results show that the model using both dampers increases the level of structural performance both globally and locally in the building, which will reduce the level of damage to the structural elements. But between the two dampers, the coupling beam that uses RFD is more effective than using VCD in improving building performance. The damper on the coupling beam has a good role in dissipating earthquakes and also in terms of ease of installation.

Keywords : building, coupling beam, damper, nonlinear time history analysis

Conference Title : ICCECS 2021 : International Conference on Civil Engineering, Construction and Structural Design

Conference Location : Dubai, United Arab Emirates

Conference Dates : December 20-21, 2021