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EVALUATION OF SEISMIC BEHAVIOR OF STEEL FRAMES EQUIPPED WITH OFF CENTER BRACING AND EBF BRACING UNDER THE NEAR AND FAR FIELD EARTHQUAKES

Hadi ABOUTALEBI
M.Sc. in Earthquake Engineering, Department of Civil Engineering, Islamic Azad University, Hamedan, Iran
h.aboutalebi@iauh.ac.ir
Reza ALGHASI
Ph.D. Student, Department of Civil Engineering, Islamic Azad University, Kermanshah, Iran
rezaalghasi72@gmail.com
Bita BEIGZADEH
M.Sc. of Structural Engineering, Department of Civil Engineering, Islamic Azad University, Hamedan, Iran
Bitabeigzadeh@ymail.com

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In order to solve the problem of low stiffness in the framing system, as well as the problem of low formability in a frame with a coaxial bracing, Popov proposed a non-axial brace. By choosing the right amount of exit from the center, the system is sufficiently hard and through supplying the shear of the interface beam, the system's ductility is supplied. This system has a good ductility, but in order to ensure its plasticity, the interface beam, which is one of the main elements of the structure, surrenders, causing serious damage to the ceiling and difficult to repair after the earthquake. Due to fixing problems, the gateway system has been developed.

In this study, an evaluation of seismic behavior of steel frames equipped with OFF Center Bracing and EBF bracing under the near and far field earthquakes has been investigated. For this purpose, the analysis of nonlinear time histories has been performed under seven seismic records of the near and far field in ABAQUS software on 4, 8 and 12st frames equipped with off center and EBF bracing, shown in Figure 1.

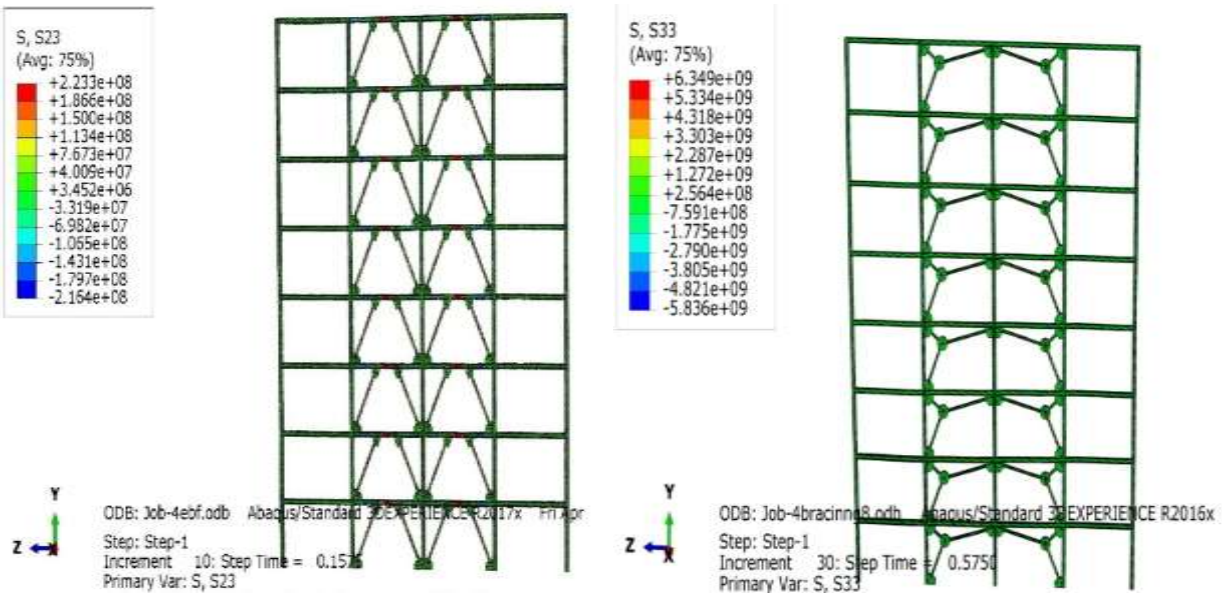

Figure 1. Bracing modeling in ABAQUS.

The Far field seismic records are based on the 2800 regulations and the near field seismic records according to the ASCE 4113 instruction and after applying fault angle based on 1.5AB spectrum. The results of nonlinear analysis in ABAQUS software indicate a significant reduction in the location and tension in frames equipped with OFF Center Braces compared to frames with EBF braces. Besides, the results of drift and displacements in the 4th and 12th floor frames indicate this Near-earthquakes about the extent of damage are more than 20% higher than the far field seismic records in OFF Center braces, which is heavy vertical component domain in near field earthquakes. Besides, the amount of drift of frames equipped OBF braces is less than the frames equipped with EBF bracing. In Figure 2, the maximum relative displacement of the 12-story frame is shown under the near-field records in the frame with a y-shape brace.

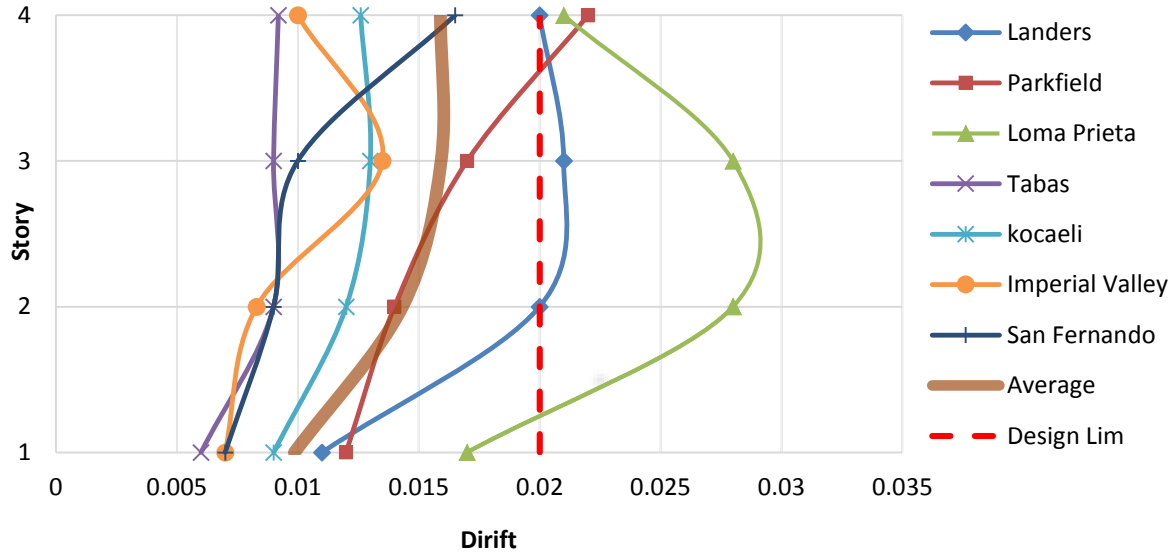

Figure 2. The results of the relative displacement of floors in the 12-story frame under the near-field records with y-shape brace.

In this study, the maximum displacement of the roof, respectively, is subject to near-field disturbances in the frame of the frame with an EBF bracelet and an OFF Center brace. Comparing earthquakes in the far and near field, it is concluded that the displacement values of roofing under earthquakes in the near field are far greater than the distant domain.

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