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# Investigation of Seismic T-Resisting Frame with Shear and Flexural Yield of Horizontal Plate Girders

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**Abstract :** There are some limitations in common structural systems, such as providing appropriate lateral stiffness, adequate ductility, and architectural openings at the same time. Consequently, the concept of T-Resisting Frame (TRF) has been introduced to overcome all these deficiencies. The configuration of TRF in this study is a Vertical Plate Girder (VPG) which is placed within the span and two Horizontal Plate Girders (HPGs) connect VPG to side columns at each story level by the use of rigid connections. System performance is improved by utilizing rigid connections in side columns base joint. Shear yield of HPGs causes energy dissipation in TRF; therefore, high plastic deformation in web of HPGs and VPG affects the ductility of system. Moreover, in order to prevent shear buckling in web of TRF’s members and appropriate criteria for placement of web stiffeners are applied. In this paper, an experimental study is conducted by applying cyclic loading and using finite element models and numerical studies such as push over method are assessed on shear and flexural yielding of HPGs. As a result, seismic parameters indicate adequate lateral stiffness, and high ductility factor of 6.73, and HPGs’ shear yielding achieved as a proof of TRF’s better performance.

**Keywords :** experimental study, finite element model, flexural and shear yielding, t-resisting frame
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