

Improving the Behavior Reinforced Concrete Frames Made of UHPC

Using the Metallic Vertical Shear Link

Chung Nguyen Van¹, Ali Ghamari^{2,*}

¹ Faculty of Civil Engineering, Ho Chi Minh City University of Technology and Education, VietNam.

² Department of Civil Engineering, Ilam Branch, Islamic Azad University, Ilam, Iran.

*Corresponding author: aghamari@alumni.iust.ac.ir

Abstract. This paper investigates the behaviour reinforced concrete frames of the Ultra High Performance Concrete (UHPC) using the metallic vertical shear link. The behavior of the UHPC is analyzed such as the case of ultimate strength, its stiffness and dissipating energy. A metallic vertical eccentrically braced frame (VEBF) shear link with a shear mechanism is explored in the UHPC. Accordingly, improving the behavior of the RC frame with double VEBF is investigated. The proposed system is not easy fabrication and good seismic performance. But it can be easily replaced after a severe earthquake. Since the VEBF does not carry the gravity loads, its replacement does not affect the severability of the building during the repair. The finite element models are applied to investigate the behavior of moment resisting frame made of UHPC and conventional concrete strengthened with metal vertical shear link. The accuracy of the proposed results is compared with the reported experimental test. The numerical results indicated that adding the VEBF to the RC frame improved the behavior of the RC frame in elastic and inelastic zones. It enhanced the ultimate strength, stiffness, and energy absorption of the RC moment-resisting frame. Also, it prevents hinge formation over the main column.

Keywords: UHPC; Frame; Ultimate strength; Stiffness.