

Cyclic behaviour of an innovative extended end-plate connection with shape memory alloys

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ABSTRACT

Shape memory alloys (SMAs), with superelastic and shape memory effects, have attracted research interests in civil engineering in recent decades. Many research endeavours have been made to investigate the feasibility of SMAs applications in column-to-beam connections, aiming to minimise or even eliminate permanent post-earthquake deformations in main structural members. In this paper, an innovative extended end-plate (EEP) connection incorporating SMA bolts, high strength (HS) bolts and SMA Belleville washers is introduced which has been numerically investigated by the co-authors previously. This paper presents experimental data for the first time to prove the feasibility of the connection. One full-scale test is conducted under cyclic loading. Besides, the hysteretic performance including ductility, strength, self-centring performance, and energy dissipation is studied. The test results show that the innovative connection possesses excellent deformation capacity, self-centring ability, with moderate energy dissipation ability under seismic loading. More experimental and numerical works are currently in progress in order to further understand the structural performance of this type of hybrid connection.

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