

Effect of post weld treatment on cracking behaviors of beam-column connections in steel bridge piers

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Abstract. A great number of moment-resisting steel structures collapsed due to ductile crack initiation at welded beam-column connections, followed by explosive brittle fracture in the Kobe (Hyogoken-Nanbu) earthquake in 1995. A series of experimental and numerical studies on cracking behaviors of beam-column connections in steel bridge piers were carried out by the authors' team. This paper aims to study the effect of post weld treatment on cracking behaviors of the connections during a huge earthquake event. Experiments of three specimens with different weld finishes, i.e. as-welded, R-finish, and burr grinding, were conducted. The experimental results indicate that the instants of ductile crack initiation are greatly delayed for the specimens with R-finish and burr grinding finishes compared with the as-welded one. The strain concentration effect in the connection is also greatly reduced in the specimens with post weld treatment compared with the as-welded one, which was also verified in the tests.

Keywords: ductile fracture; post weld treatment; burr grinding; R-finish; beam-column connection; steel bridge pier.

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