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Influence of Bearing Plate on Stiffened Cleat Angle J-Bolt Precast Beam Column Connections Under Cyclic Loading

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Abstract

Generally dry connections are adopted in precast beam column connections because it can easily be demounted. Precast beam column dry connections uses either corbel or steel components like billet, cleat angle, stiffeners. Previous study on dry connections with corbel indicates that the load carrying capacity is not same in both the positive and negative directions because of heavy damage to the concrete corbel. Hence an attempt has been made to study the influence of steel bearing plate on stiffened cleat angle J-Bolt precast beam column connection. This study describes the experimental investigation of precast beam to column J-Bolt connections with beam stiffened at the top using cleat angle with single and double stiffeners and at the bottom with steel bearing plate under reverse cyclic loading. Two beams to column precast specimens and a monolithic specimen of one-third scale were tested under displacement controlled cyclic loading. The first precast connection consists of a J-Bolt with cleat angle stiffened with a single stiffener and bearing plate (JC-SSB) whereas and the second connection consists of J-bolt with cleat angle stiffened with double stiffeners and bearing plate (JC-DSB). The parameters studied were load carrying capacity of the connection, load displacement hysteresis, ductility and energy dissipation. The monolithic specimen performed better when compared to the precast specimen (PC-SSB) in terms of strength and energy dissipation. The precast specimen (JC-DSB) exhibited comparable behaviour in terms of strength and better performance in terms of ductility and energy dissipation when compared to the monolithic specimen (ML).

Keywords: Cyclic loading, Precast concrete, Beam-column, Dry connection