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Seismic Strengthening of Precast Beam Column Connection Using Stainless Steel Wire Mesh (SSWM)

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Abstract

In this study, Stainless Steel Wire Mesh (SSWM) is explored for a strengthening of precast beam column connection. Experiments are conducted to study the behaviour of SSWM strengthened precast beam column specimens under monotonic vertical loading applied at the end of the beam. Wet precast beam column connection is considered for the study. Connection is provided at the intersection of beam and column within column portion. U-shaped reinforcement bars projecting from the beam are inserted into column gap at the intersection and subsequently empty gap is filled with cast-in-place micro concrete. Total of two reduced (1/3rd) scale precast test specimen with and without SSWM strengthening are tested. Strengthening is carried out by wrapping SSWM around beam and column surfaces near the junction. Epoxy based adhesive SIKADUR 30 LP with resin to hardener ratio of 3:1 is used for bonding SSWM with concrete surface. The performance of test specimens is evaluated in terms of ultimate load carrying capacity, deflection behaviour of specimens, crack formation and failure propagation. Strain is measured at selected locations on reinforcement bars, on concrete surface as well as on SSWM. From the experimental results, it is evident that strengthening using SSWM is effectively enhances load carrying capacity and ductility of precast wet connection. Ultimate load carrying capacity and deflection corresponding to ultimate load of strengthened precast specimen is increased by 41.43% and 33.12%, respectively, as compared to control specimen. Failure pattern clearly indicates that SSWM effectively provide confinement to the concrete and reduces crushing of concrete.

Keywords: Precast wet connection, Strengthening of beam column junction, Stainless steel wire mesh