InvestigatIng the performance of grouted sleeve connectors under tensile load

Abstract

A sleeve combined with grout is a cylindrical connector used to join two discontinuous steel reinforcement bars without complying to the conventional lap length. It acts as the connection for joining steel reinforcement bars to safely transfer the tensile force from one reinforcement bar to the other to ensure the integrity of a structural frame system. The objective of this research was to investigate the behavior and the feasibility of fifteen new proposed grouted sleeve connectors for the connection of precast concrete components. The connectors were tested to failure under incremental tensile load. The configurations of the grouted sleeve connectors were varied and their tensile performances were evaluated in terms of the ultimate tensile resistance, stiffness, yield strength, ductility and failure modes. The results show that the grouted splice sleeve connectors could provide comparable ultimate tensile strength of the connected steel bars. It is seen that the bond between bar-and-grout, and also between grout-and-sleeve are essential to the success of the tensile load transfer between the steel bars. It is also seen that the confinement provided by the sleeve enhances the bar-and-grout bond dramatically by controlling the splitting cracks.