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An experimental study on resistant mechanism of embedded connection for steel square tube filled with filler: Effect of characteristics of filler

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Recently, a fitting type joint is adopted to the connection of steel framed structures which requires the disassembling properties and the shortening of a construction period. However, this joint has the difficulties to adjust the fixed degree of joints. In this study, a new type of connection technique for steel square tube is suggested. This connection consists as follows; steel square tube is just embedded to steel connector, and filler is filled to clearance each member, and a pin is inserted as a fail-safe mechanism against the uplift. This connection has advantage as follows: it needs not to use the bolting or welding, so the workability is improved. And the filler using any materials or the size of connector can control the fixed degree of joint. This study investigates the effect of the filler by experimental studies as parameters with filling method and its materials. From the cyclic loading test results, it is confirmed that the bending rigidity and strength are enhanced by adhesive characteristics of filler. And the slip behavior becomes small under inelastic cyclic behavior by the effect of filler. Furthermore, the finite element method (FEM) analysis is conducted to analyze the load resistant mechanism in detail. From these results, the resistant mechanism is effected by contact behavior on metal touch surface, pin. From the observations, the analysis model subjected to bending on this connection is proposed, and it can predict the restoring force characteristics of test results.

Biography

Yuta Nakaie has completed his Bachelor of Engineering degree in 2017. And, he has been a Master's course student of Tokyo University of Science and investigated about Steel Structural Engineering. In research activities, he submitted some papers to academic journals of Architectural Institute of Japan.

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