World Academy of Science, Engineering and Technology
International Journal of Structural and Construction Engineering
Vol:10, No:11, 2016

The Capacity of Bolted and Screw Connections in Cold-Formed Steel Truss Structure through Analytical and Experimental Method

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Abstract : Designing of cold-formed steel capacity connections often based on the formula used for hot rolled steel. It makes the result of the actual capacity connection doesn't accurate anymore. When the hot rolled steel receives the axial load pull, it will have different characteristics. As the result, there will be failure result when designing Truss structure made of hot rolled steel. This research aims to determine the capacity of actual cold-formed steel connections section which is loaded by the axial tensile force. It will test the appeal of the connection using bolt grafting tool and screw grafting tool. The variations of the test will be on the type of connection (single and double slap), the number of the connection tools and connection configuration. Bold and screw connections failure mode observed in this research are different each other. Failure mode of bolted connections includes sliding pivot plate, tearing at the plate and cutting of the bolt head. While the failure mode of screw connections includes tilting, hole-bearing, pull over and cutting the screw body out. This research was conducted using a laboratory test of HW2-600S Universal Testing Machine model with ASTM E8. It has done in the materials testing laboratory of Mechanical Engineering Department, Faculty of Engineering UNNES. The results obtained through the laboratory diversification towards theoretical calculations using the standards specified in ISO 7971-2013 Cold-Rolled Steel Structures. Based on the research, it can be concluded that the effective connection in receiving force strength is bolted connections neither single nor double plate. The method used is by applying 4 bolts through 2 parallel lines configuration. Furthermore, this connection deals with the consequences of holding the highest Pmaks, lowest failure risk and getting a little kind of mode of failure.

Keywords : axial load, cold-formed steel, capacity connections, bolted connections, screw connections
Conference Title : ICSECM 2016 : International Conference on Structural Engineering, Construction and Management
Conference Location : Singapore, Singapore
Conference Dates : November 21-22, 2016