

# Numerical Investigation of Cold Formed Z Purlins with Lap Bolted Connection

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**Abstract.** The main aim of this paper is to investigate the flexural rigidity of lapped cold-formed steel (CFS) purlin connections under monotonic loading, using a numerical model developed with finite element software ABAQUS. The purlins are made up of CFS Z-section, while high strength bolts of diameter 12 mm and grade 8.8 have been used. The test setup consists of simply supported two Z-section that are connected together using overlap connection, where load is being applied at mid span. Furthermore, a parametric study has been conducted to investigate various parameters including, length of lapped connections, thickness, and depth of CFS section and arrangement of bolts, to end up with a total of 15 case specimens. All case specimens were examined in detail in terms of load carrying capacity and deflection characteristics. The results showed that overlap connection is capable of transmitting moment and acts as semi-rigid connection. Moreover, results proved that increasing the ratio of overlap length to beam span resulted in an increase in connection moment capacity. Additionally, decreasing the ratio of lap length to section thickness increases the flexural capacity. Finally, the specimens with bolts in both flange and web at the position of overlap connection were found to have the highest moment capacity.

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