NON-LINEAR ANALYSIS OF A SYMMETRIC FLUSH END PLATE BOLTED BEAM-TO-COLUMN STEEL CONNECTION

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SYNOPSIS

Most connections that fasten beams to columns are deformable and exhibit a non-linear behaviour between conditions fully fixed and perfectly pinned. Connection flexibility affects both force distribution and deformation in beams and columns of the frame and must be accounted for in a structural analysis. This problem can be solved by conducting a non-linear analysis, which addresses both the geometric non-linearity and connection flexibility.

The linear elastic analysis assumes that the deformations are relatively small and the equilibrium equations can be formulated with respect to initial geometry.

To see the differences between the above approaches on moment capacity of the connection, a model of A Symmetric Flush End Plate Bolted Beam-to-Column connection model has been analysed using both approaches above. This model will be made similar to the model that had an experimental data for verification.

From non-linear computer analysis the moment capacity model is found to be 7.8 kNm compared to experimental data, 8.8 kNm.

The moment capacity resulted from linear analysis is found to be 19.5 kNm which is 2.5 time the non-linear analysis result or 2.216 above the experimental data.

The results of this study shows an agreement with previous researchers that the connection behaves in between pinned and fully rigid and possess some rotational stiffness.

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