

STUDY OF PARAMETERS AFFECTING THE SEISMIC BEHAVIOR OF END PLATE MOMENT CONNECTIONS

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Keywords: End Plate Connection, Hysteresis Curve, Pretension Force, Panel Zone, Finite Element

From 1970 to 1994, welded flange-bolted web moment connections widely used in the United States of America. It was assumed that, these connections act in a manner that will provide adequate ductility but the Northridge earthquake in 1994; it was observed that the failure of flexural frames was because of brittle fracture in beam-to-column connection. Research and experiments have been performed on these connections. It was observed that, before obtaining adequate ductility, brittle fracture happened in penetration weld of beam flange.

Further research and testing, resulting in prequalified connections such as Reduced Beam Section Connection, Slotted Web Connection, Free Flange Connection, Reduced web connection, Flange welded beam cover plate, Side plate connection, Bolted bracket connection, Welded haunch connection and etc.

End plate moment connection is composed of a steel plate welded to the end of a beam section with attachment to an adjacent member using rows of fully tensioned high-strength bolts. No need for welding on site makes the process of installing the connection cheap and fast. The important point is the study of ductility, and the transferred moment from the beam to the column. In this study, ABAQUS software was used to evaluate the analytical framework. In order to verify the results, the results of laboratory specimens Sumner (2003) were compared with the results obtained from the software.

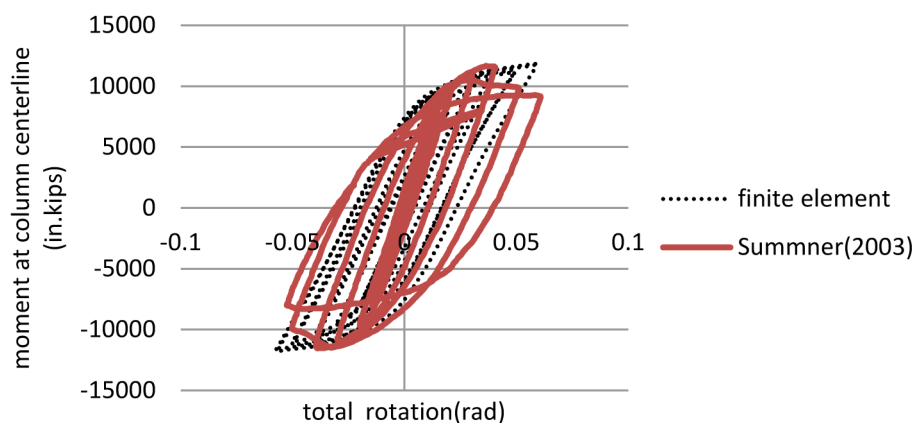


Figure 1. Experimental and analytical rotation-moment hysteresis curve

In this study four specimens have been modelled. Table 1 Show the specimens properties.

Table 1. Specimen's properties

Continuity plate and doubler plate	Pretension load(ton)	Bolt dimension	End plate dimension (cm)	Column section	Beam height(cm)	Beam section	Title
✓	45	(A490)8	85.7 ×25.4 ×3.8	W14×120	61	W24×64	Main Specimen
✓	45	(A490)8	85.7 ×25.4 ×2.54	W14×120	61	W24×64	Specimen 1
×	45	(A490)8	85.7 ×25.4 ×3.8	W14×120	61	W24×64	Specimen 2
✓	45	(A490)8	85.7 ×25.4 ×3.8	W14×120	58	W24×64	Specimen 3
✓	35	(A490)8	85.7 ×25.4 ×3.8	W14×120	61	W24×64	Specimen 4

Then, ductility and influenced parameters such as end plate thickness, beam height, effect of panel zone strengthening and effect of pre-tension force quantity is evaluated analytically.

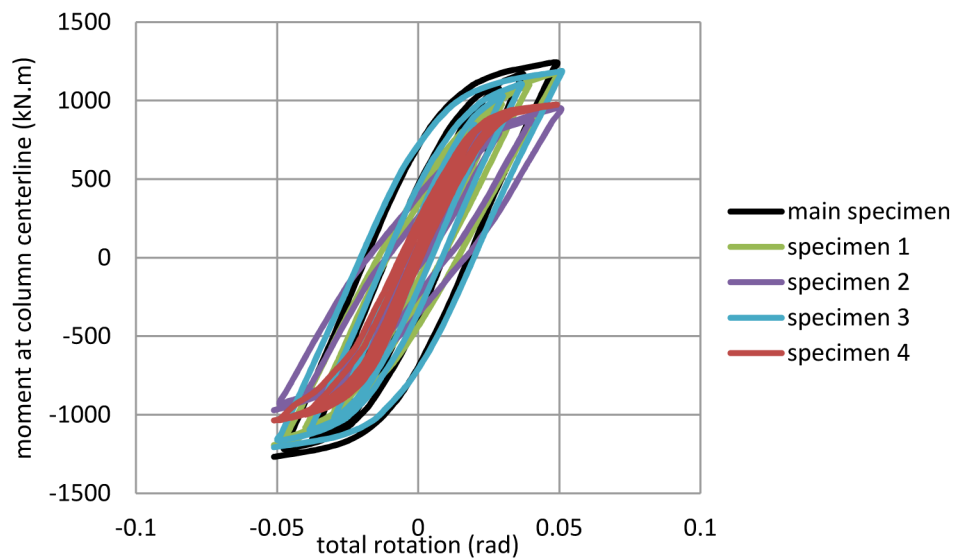


Figure 2. Rotation-moment hysteresis curve for all specimens

The results show that the low thickness of end plate, the low height of beam, weak panel zone and pretension force less than that given in current AISC specifications reduce ductility and transferred moment from the beam to the column.

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