

## Interaction of Local, Flexural-Torsional, and Flexural Buckling in Cold-Formed Steel Lipped-Angle Compression Members

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**Abstract :** The possible failure modes of cold-formed steel (CFS) lipped angle (LA) compression members are yielding, local, flexural-torsional, or flexural buckling, and any possible interaction between these buckling modes. In general, the strength estimated by current design guidelines is conservative for these members when flexural-torsional buckling (FTB) is the first global buckling mode, as the post-buckling strength of this mode is not accounted for in the global buckling strength equations. The initial part of this paper reports the results of an experimental and numerical study of CFS-LA members undergoing independent FTB. The modifications are suggested to global buckling strength equations based on these results. Subsequently, the reduction in the ultimate strength from strength corresponding to independent buckling modes for LA members undergoing interaction between buckling modes such as local-flexural torsional, flexural-flexural torsional, local-flexural, and local-flexural torsional-flexural are studied systematically using finite element analysis results. A simple and more accurate interaction equation that accounts for the above interactions between buckling modes in CFS-LA compression members is proposed.

**Keywords :** buckling interactions, cold-formed steel, flexural-torsional buckling, lipped angle

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