

4th International Conference on

ADVANCED STEEL STRUCTURES

November 09-10, 2017 Singapore



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Non-linear behavior of back-to-back built-up cold-formed steel columns under compression: Finite element modeling and parametric study

This paper presents a numerical investigation on the behavior and design of back-to-back built-up cold-formed steel channel columns subjected to axial compression. Numerical models were developed using general purpose finite element (FE) package ABAQUS and have been verified using experimental data reported by the authors recently (ting, et. al (2017). Developed finite element models included material nonlinearities as well as initial geometric imperfections. Axial strength of columns, failure modes, deformed shapes at failure, load-displacements were predicted from the finite element analyses and obtained comparisons with test results showed considerable match. A comprehensive parametric study has been carried out covering a wide range of slenderness for the considered back-to-back built-up columns. Axial capacities obtained from the numerical study were used to assess the performance of the current North American standards(NAS) and Australian and New Zealand Standards when applied for cold-formed back-to-back built up columns; obtained comparisons showed that NAS and the Australian and New Zealand Standards are un-conservative for stub and short columns sections which were failed by local buckling whereas standards were over-conservative for the strength of columns which were failed mainly by overall member buckling.

Biography

Hieng Ho Lau is currently the Dean of Faculty of Engineering and Science, Curtin University Malaysia. He is a Member of Curtin University Malaysia Campus Community where he has accumulated over 14 years of teaching experience in the field of civil engineering. He is a Professional Engineer with Practicing Certificate registered with Board of Engineers Malaysia (BEM) and also Chartered Professional Engineer with Engineers Australia.

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