Jrad Wassim, J Steel Struct Constr 2018, Volume 4
DOI: 10.4172/2472-0437-C1-007

Analytical and Finite element analyses of Thin-Walled Beams vibration

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We investigate the vibration of thin-walled beams with arbitrary open cross section shape. Based on beam element model accounting for warping and flexural torsional coupling, analytical solutions are derived for higher free vibration modes in bending, torsion and flexural-torsional coupled modes. In the model, the effects of rotational inertial kinematic terms are included. The finite element approach of the model is also investigated. For this aim, 3D beams with 7 seven degree of freedom per node are adopted. The model is validated by comparison to benchmark solutions found in literature where numerical and recent experimental results are considered. Compared to classical models where rotational terms are neglected, more accurate results are obtained with the present model.

Biography

Jrad Wassim, second year PhD student from Lorraine University. He is a member in researsh team MMSV-Laboratoire LEM3-Technopole-Metz, a premier research laboratory. He has a Master's degree in conservation and consolidation of historical structures and Master degree in civil engineering. He has experience in consultancy and design of many projects: residential buildings, schools, and warehouses.

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