WindEEE Research Institute
Lecture Series

Presenter: Yared Shiferraw Bayleyegn, PhD, PE

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- BIO: Yared Shifferaw obtained his undergrad from Addis Ababa University and MSc/PhD from the Johns Hopkins University. His research interests lie in computational and experimental methods to advance sustainable and resilient solutions of structural systems, with particular emphasis on cold-formed steel systems.

Date: Thursday, May 22, 2014
Time: 12:00 to 1:00 p.m.
Location: The Boundary-Layer Wind Tunnel Laboratory

Section capacity of cold-formed steel members by the Direct Strength Method

Advances in cold-formed steel (CFS) section capacity design by the Direct Strength Method via computational analyses and experimental methods are presented. The strain capacity sustained in inelastic local and distortional buckling is investigated through existing experiments coupled with non-linear finite element analysis. Reserve inelastic bending capacity in CFS members potentially subject to local, distortional, and/or lateral-torsional buckling modes and the resulting slenderness-strength relationships adopted in the cold-formed steel AISI Specification are discussed. Direct analysis of the stability under combined actions in CFS beam-columns can yield fundamentally different (and more economical) solutions than the current approach of assuming linear interactions always govern. The stability and strength of CFS lipped C-section columns tested for failure in compression with different sheathing configurations is highlighted. Composite action between the stud and sheathing, and isolating direct loading of the sheathing, are shown to be significant in determining the strength and controlling limit state of the stud. These advances lead to efficient design by the Direct Strength Method and coupled with computational tools augment the potential to develop sustainable housing solutions through optimized shapes, enabling hazard-mitigation & resiliency examination of thin-walled structural systems.

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