



**IUSS**

Scuola Universitaria Superiore Pavia

**UME**

understanding and managing extremes

## **SHORT SEMINAR**

# **Controlled Rocking Steel Braced Frames: Connecting Research and Practice**

**By Dr. Lydell Wiebe,**

**Assistant Professor at Mc Master University (Ontario, Canada)**

Because of their potential to avoid structural damage during design-level earthquakes, controlled rocking steel braced frames (CRSBFs) are attracting interest from researchers and practicing engineers alike. In a CRSBF, selected columns are permitted to uplift from the foundation, limiting the peak seismic forces while also avoiding structural damage and residual deformations. Post-tensioning and/or energy dissipation technologies are used to control the response. This seminar will use examples from both research and practice to examine three key issues for CRSBFs:

1. A designer has a wide range of options for selecting post-tensioning and energy dissipation. These options will be demonstrated using examples from buildings that have been constructed recently, and recent numerical results will also be presented to show how to target a desired level of performance.
2. The capacity design of the frame must account for the forces that develop due to the higher modes. Shake table test results will be used to illustrate how these forces develop and can be mitigated, and methods for predicting these forces will be assessed based on nonlinear time history analysis.
3. The connections between the CRSBF and the floor diaphragms are critical to the overall behaviour of the structure. Several alternative connection methods will be discussed, using illustrations from practice.

### ***About Dr. Lydell Wiebe***

Lydell Wiebe began his Master at the ROSE School in September 2006. After leaving Pavia, he completed his PhD in Civil Engineering at the University of Toronto, led the writing of the New Zealand Design Guide for Controlled Rocking Steel Braced Frames, and joined the faculty at McMaster University in 2013. His research seeks to develop simple, inexpensive ways to mitigate damage due to earthquakes, particularly for steel structures, based on results from advanced nonlinear analysis and large-scale physical testing.

**Wednesday, April 6<sup>th</sup> 2016, 17:00**

**Sala del Camino - Palazzo del Broletto**

**Piazza della Vittoria 15 – Pavia**