



DICAM  
DIPARTIMENTO DI INGEGNERIA CIVILE, CHIMICA, AMBIENTALE E DEI MATERIALI

## **THE RESPONSE OF PILED BUILDINGS TO TUNNELLING**

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**April 14<sup>th</sup> 2016, 5-6 pm, room 2.3 (viale Risorgimento)**

There is an increasing demand for underground space in urban areas for infrastructure development. This has resulted in tunnel construction and deep excavations taking place in close proximity to buried infrastructure and building foundations. Despite its practical importance, the global tunnel-ground-piled building interaction (TPSI) problem is still not well understood. During the presentation the outcomes of a series of centrifuge tests and numerical analyses are used to illustrate the response of buildings to tunnelling in term of displacements and distortions. In particular, the main effects of tunnel-pile interaction, tunnel volume loss, the superstructure stiffness and the pile-superstructure connections are illustrated. Overall, piled foundations alter the global tunnel-building interaction having a detrimental role in TPSI problems, whereas the stiffness of buildings can significantly reduce the resulting building distortions.

**Andrea Franza** is currently a third year PhD student at the University of Nottingham with Bachelor's and Master's degrees in civil engineering from the Marche Polytechnic University (Italy). His research work is concentrated on tunnelling and its effects on piled buildings. To investigate the global tunnel-soil-piled building interaction, he has been working on centrifuge modelling of tunnelling in greenfield conditions and beneath piled buildings; analytical methods and artificial neural networks to predict greenfield ground movements in sands; analysis of the response to tunnelling of piled-structures (beams and frames) with Winkler-based numerical models.