

**University of Technology Sydney  
PFE / Master Internship 2019**

## **Vibrational analysis of composite floor systems comprising cold-formed steel and timber-based floorboards**

Composite floor systems comprising cold-formed steel beams and timber-based floorboards have been proposed recently as a viable sustainable and economical solution for hybrid buildings. The structural design of such systems is often governed by serviceability criteria such as deflection and vibration response. Indeed, both geometrical and material nonlinearities need to be taken into account accurately if the structural performance of these new hybrid buildings is to be enhanced. The goal of this project is to develop an advanced numerical model in order to study the influence of key governing parameters in the analysis of the dynamic behaviour of sustainable composite floors and to obtain their vibration response under specific vibration spectrum.

Currently, there is no clear floor vibration assessment guideline for composite floor systems and different countries follow different procedures and guides. Comparisons between the Euro code guidelines and Australian floor vibration assessment measures will be conducted through numerical case studies of various long-span steel/timber composite floors. The assessment measures would include the response factor, peak acceleration, and vibration level. For this purpose, a recently developed and validated model at UTS will be extended to better understand the role of fasteners and spacing between them on the floor vibration response. Results will be employed to design a robust composite floor system and examine its vibration response experimentally at UTS TechLab in the future.

The potential candidate will have the opportunity to interact with Australian experts in the field of structural engineering, and collaborate with PhD students. Additionally, the candidate will engage with civil and mechanical engineering academics and construction industry experts while working in an open-space, world-class, research facility (UTS TechLab) which has recently been opened in Sydney, Australia. Please visit <https://www.uts.edu.au/about/faculty-engineering-and-information-technology/tech-lab> for more details.

### **COMPANY or LABORATORY**

**University of Technology Sydney, 15 Broadway, Ultimo NSW 2007, Australia.**

*In collaboration with:*

*Department of Physics and Mechanics of Materials, Pprime Institute, 1 avenue Clément Ader, BP 40109, F86961 Futuroscope-Chasseneuil cedex, France.*

### **SCIENTIFIC SUPERVISORS**

**Dr. Sardar Malekmohammadi (sardar.malek@uts.edu.au)**

University of Technology Sydney (UTS)

**Dr. Mandana Arzaghi (mandana.arzaghi@ensma.fr)**

ISAE-ENSMA, PPRIME Institute

**DURATION** 5 to 6 months **DATES** April to September 2019

### **MISCELLANEOUS INFORMATION**

**Financial allowance: total of 2000 AUD for the duration of project.**