

University of Technology Sydney

PFE / Master 2019

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

First name: Carole

Name: Nadot-Martin

Service/Laboratory: Department of Physics and Mechanics of Materials, Pprime Institute.

First name: Sardar

Name: Malekmohammadi

Service/Laboratory: University of Technology Sydney.

DURATION 6 mois

DATES April to September 2019

MISCELLANEOUS INFORMATION

Financial allowance: UTS (2000 AUD) for 6 months.

NATURE OF THE PROJECT

R&D numerical modelling

TITLE OF THE PROJECT

Micromechanical modelling of damage initiation in Laminated Veneer Lumber (LVL).

SUBJECT

The proposed research constitutes a part of a program performed in the context of a collaboration between Pprime (contact Prof. C. Nadot-Martin) and UTS (Dr S. Malekmohammadi). This program involves analytical and numerical modelling works using commercial software packages such as ABAQUS, Mathematica, MatLab, etc., to help with the multi-scale modelling of different types of composites.

The objective is here to develop analytical and numerical models to predict the initiation of damage in Laminated Veneer Lumber (LVL), a novel wood composite product. Defects (voids) within the glue lines (resin) as well as resin penetration into the wood cellular microstructure are considered for this purpose. A “Morphological Approach”, initially designed at Pprime for solid propellants, will be employed in the analytical part of this work. Additionally, a recently developed multi-scale model (in ABAQUS) at UTS will be extended to provide numerical reference solutions. Results will be compared with available experimental data to validate both models. The final objective is to progress in the analysis and prediction of the long-term behaviour of composite materials and structures.

The potential candidates will have the opportunity to interact with experts in the field of composites and engage with academics and engineers 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.

The candidate is expected to be a good communicator and be able to document his/her research findings on a regular basis in the form of reports and presentation slides.

SKILLS PROVIDED BY THE PROJECT

This project will provide important skills and expertise in the following fields:

- Finite Element analysis with Abaqus software,
- Multiscale modelling and corresponding coding with Mathematica, MatLab, Python,
- Composite materials.

For more details, please contact Carole Nadot-Martin (carole.nadot@ensma.fr).

For application, please send your letter and CV to Carole Nadot-Martin (carole.nadot@ensma.fr).