

2012/13 Undergraduate Research Grant Scheme – Executive Summary

Project title:

Evaluation of the shear constant of timber glulam composite using the torsional test method

University:

Edinburgh Napier University

Supervisor:

Hexin (Johnson) Zhang

Contact details:

School of Engineering and the Built Environment, Edinburgh Napier University, 10 Colinton Road, Edinburgh EH10 5DT

Telephone: 01314 552482

Email: j.zhang@napier.ac.uk

Students:

Mark Brain and Shicheng Zhu

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Project summary:

A research program was undertaken to evaluate the shear constant of the timber glulam beams using torsional test method with traditional angular displacement sensors and the cutting edge photogrammetric technology. Previous research has indicated a weak correlation between the shear constant and the modulus parallel to the grain but less attention has been paid to the correlation between the shear constant and the modulus perpendicular to the grain.

In this project, a methodology was created to investigate these two relationships of the glulam beams. Torsion, bending and multi-point compression test was employed to evaluate the shear constant, modulus parallel and perpendicular to the grain respectively. Dynamic acoustic test was also employed to validate the test results.

Statistical analysis demonstrated that results from torsional and multi-point compression test (perpendicular to the grain) exhibited strong linear correlation and that an improved correlation can be observed after considering initial testing data sets and implementation of numerical adjustment for moisture content.