UQ Fire Project #2020.01

FIRE PERFORMANCE ASSESSMENT OF NATIVE AUSTRALIAN WOOD SPECIES

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Background and motivation

Wood burns. Everyone knows that, but are all woods equally susceptible? Fire performance is becoming increasingly important for timber use in bushfire prone areas of Australia. With around 500 timber species growing in Australia, a wide range of species is available to use for construction, but the number of species for which flammability data exists is limited. Testing every species is not feasible; however, there may be other ways to use timber characteristics such as density and extractives content to develop estimate models of fire performance. The aim of this project will be to examine timber characteristics in relation to fire behaviour of selected timber species from far North Queensland.

Research objectives

1) Identification of native Australian wood species with potential for market development.
2) Characterisation of wood characteristics and material properties such as cellular structure, thermal conductivity, density, specific heat capacity, resin content, char yield, or thermal decomposition.
3) Determination of flammability for selected wood species using bench-scale fire testing.
4) Analysis of correlations between wood species and fire performance indicators (ignition, heart release rate (HRR), charring rate and self-extinction).

Methodology

This project is primarily experimental and will use equipment and facilities available in the UQ Fire Safety Engineering, and UQ Civil Engineering Structures laboratories. This equipment will be used to characterise the wood species selected and to undertake the required fire testing. The testing consists of using the Mass Loss Calorimeter to identify the ignition, loss of cross-section due to smouldering and charring, HRR, and self-extinction under a specified regimen of heat exposures.

Recommended literature

[1] Forest and Wood Products Australia. 2017. Building with Timber in Bushfire-prone Areas BCA Compliant Design and Construction Guide
[2] Standards Australia. 2014. Australian Standard AS 1530.4:2014 Methods for Fire Tests on Building Materials, Components and Structures. Standards Australia, Melbourne
[3] Standards Australia 2009. AS 3959—2009 Construction of buildings in bushfire prone areas. Standards Australia, Melbourne