

Welcome to the December edition of the FWPA R&D Works newsletter, the last for 2012.

This month's stories include research into wood-plastic composites, a new foam insulation product made from tree bark tannin and a landmark report highlighting the potential role of production forests in reducing Australia's greenhouse gas emissions.

I hope you find the articles of real interest, and also inspiring for what our important industry is capable of achieving.

Ric Sinclair
Managing Director, FWPA

MAIN NEWS

Latest Australian forest & wood products statistics

The Australian Bureau of Agricultural and Resource Economics and Sciences (ABARES) has released the latest bi-annual Australian forest and wood products statistics, providing insights into the economic and trade environment for the wood products manufacturing industry.



The report contains trade data for the March and June 2012 quarters as well as updated production data, financial information (such as price indexes, wages, sales and service income) and industry value added data. Employment statistics for 2011-12 are also covered.

For the first time, this issue of the Australian forest and wood products statistics also includes a range of other socio-economic indicators, including: employment, contribution of industry to the community, workers' wellbeing and work force diversity.

One key highlight this year shows a modest recovery within the forest sector employment over the 2011-12 year period, with total forestry sector employment increasing from 66,000 to 67,000.

[Click here for report](#)

Image credit: ABARES

Landmark NSW carbon report published

A landmark NSW report published in an international forest journal has, for the first time, highlighted the potential role of production forests in reducing Australia's greenhouse gas (GHG) emissions. The report, 'Harvested forests provide the greatest ongoing greenhouse gas benefits', examined key aspects of GHG outcomes for managed multiple use production forests and conservation forests in NSW.



Department of Primary Industries (DPI) Research Leader for Climate in Primary Industries, Dr Georgina Kelly, said Australian scientists are leading the world in this area and are contributing to the global debate on the role of forests in addressing climate change.

'In an Australian first, the report compared the full GHG potential of NSW production forests against conservation forests,' Dr Kelly said. 'The report authors found that production forests have a significantly higher greenhouse benefit than conservation forests when considering the full lifecycle of timber products as well as standing carbon in trees.'

[Click here for press release](#)

Image credit: NSW Department of Primary Industries

FOREST GROWING

Attack of the drones to fight tree disease

Drones, more commonly associated with the war on terror, are to patrol the skies over Scotland in a bid to eradicate diseases that threaten to wipe out swathes of forest. The unmanned planes are smaller than conventional drones and armed with high resolution cameras to capture images that will help woodland managers spot any key signs of fatal fungal infections in trees.



A trial carried out by the Forestry Commission Scotland at Carradale on the Kintyre peninsula used drones to map the spread of *Phytophthora ramorum*, a fungus which has recently spread from rhododendrons to larch—forcing estates to fell thousands of trees in a bid to contain the outbreak.

Ian Thomas, who monitored the Carradale trial in August, said the cameras on board drones can spot the early signs of disease in trees better than most other methods of detection, including foot patrols.

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Image credit: Scotsman.com

Wood properties for high-value Australian hardwood products

Wood quality and properties of plantation grown trees differ from those from mature, natural grown trees and this has implications for processing, manufacturing and product performance. The younger age and faster growth rates of genetically improved and silviculturally managed plantation trees affect the properties of their wood.

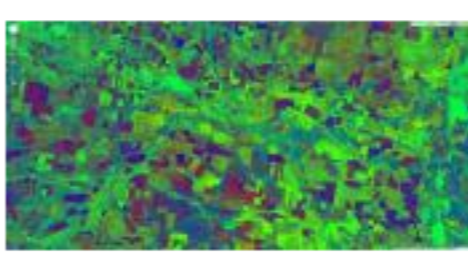


This report summarises the key wood properties of species that are the primary candidates for plantation forestry in the subtropical to tropical region of eastern Australia. The planned end uses for these trees vary from short-rotation pulp to high-value products such as poles, sawn timber for appearance products and engineered wood products including structural plywood and laminated veneer lumber.

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Treetops to laptops

Detailed satellite imagery about Australian landscapes will soon be only a button push away for land managers in community and non-profit sectors thanks to a partnership between Australian scientists and Google. According to CSIRO Principal Research Scientist Dr Alex Held, Director of the Terrestrial Ecosystem Research Network's (TERN) AusCover facility, the partnership aims to provide greater access to and international reach of Australian science.



'CSIRO and TERN researchers will be able to use Google's enormous cloud computing power to contribute their expertise and environmental data to deliver easy to use maps and tools for millions of users worldwide,' he said. One of the tools to be made available in Google's Earth Engine will be a vegetation monitoring tool. It will enable land managers to see if vegetation is in a healthy condition or being impacted by things like pests, diseases, fire or feral animals.

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Image credit: Peter Scarth, TERN

NEW PRODUCT INNOVATIONS

Wood plastic composites based on modified wood

This KTH Royal Institute of Technology (Sweden) study, by Kristoffer Segerholm, demonstrates the feasibility of using a modified wood component in the new building material known as wood-plastic composites (WPCs). WPCs are a combination of a thermoplastic matrix and a wood component, the former is usually recycled polyethylene or polypropylene, and the latter a wood processing residual, e.g. sawdust and wood shavings.



Results showed that the use of a modified wood component in WPCs decreases moisture movements in the material. Accelerated weathering or the use of a hygroscopic matrix material will increase the rate of moisture sorption into the composite, however final moisture levels are unchanged. WPCs with an acetylated wood component showed greatly reduced crack formation caused by moisture induced movements when compared to WPCs with an unmodified wood component.

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Creating usable foam from tree bark

Germany is known for its cutting-edge policies on green issues and its drive towards a clean economy. One of its latest eco-breakthroughs comes from the University of Freiburg's Biofoambark project. Researchers there are trying to green up the insulation foam used in construction by replacing petroleum-based ingredients with a naturally-occurring compound that ordinarily goes to waste in the timber industry.



The saw material for the biofoam is tannin, a compound found in tree bark. Properly processed, it can be used to produce hard foams that are not only good for insulation for buildings and molded auto parts, but that also have flame-resistant properties. It's also possible that the foams could come to replace the toxic, uber-un-green polystyrene (more commonly known as Styrofoam).

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Image credit: Gizmag

TIMBER CONSTRUCTION AND DESIGN

Australian house designs: Quantifying greenhouse benefits of wood

As the average wood products usage per unit of floor area in Australia has decreased significantly over time, there is potential for increased greenhouse gas (GHG) mitigation benefits through an increased use of wood products in buildings. This study determined the GHG outcomes of the extraction, manufacture, transport, use in construction, maintenance and disposal of wood products and other building materials for two popular house designs in Sydney, Australia.



Significant GHG emission savings were achieved by optimising the use of wood products for two common house designs in Sydney. The switch of the sub-floor and floor covering components to a wood option accounted for most of the GHG savings. Inclusion of end of life parameters significantly impacted on the outcomes of the study.

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World-first wooden wind turbine

Getting a wind turbine to a decent height to allow it to reach stronger winds than those found closer to the ground generally means sitting them atop a tower. Despite the eco-credentials of wind turbines, these towers are usually constructed from steel, which is not only expensive, but requires large amounts of energy to process.



In an effort to make wind turbines even greener, German company TimberTower has erected a prototype wooden 1.5 MW wind turbine for testing in Hannover, Germany. The TimberTower starts as a linked system of glued laminated timber panels and surface components that are manufactured off-site and transported for on-site assembly into a hollow octagonal tower. The finished prototype tower measures 100m high and generates 1,500 kW of electricity.

With ground broken on the Hannover site in January, the prototype is currently undergoing testing and should be connected to the power grid by the end of the year.

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Image credit: Gizmag

WOOD HARVESTING, TRANSPORT AND LOGISTICS

Forecasting algorithm for natural drying of energy wood

Increasing procurement volumes of forest biomass for energy require improved information systems to control and manage transportation. Moisture content of the biomass is the most important quality parameter to follow.



Transportation of water in solid biofuels increases both costs and CO₂ emissions. Procurement operations need to be directed to storages which have low enough moisture content. Storing the fuel too long increases capital costs of procurement as well as heating value losses. This complex decision making situation requires moisture content changes of storages as a part of the procurement control of energy wood.

This study introduces one approach to create a forecasting algorithm based on daily moisture change and drying periods. The algorithm is simple and easy to program and can be a part of enterprise resource planning applications.

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New innovative semi-trailers weigh 40% less than steel

FPInnovations have developed a new semi-trailer with posts and crossbeams made from composite materials. These composite materials are as strong and durable as steel, but much lighter, which has resulted in a large reduction of overall trailer weight. This naturally results in more payload and less fuel burned when travelling empty. The composites are 40% lighter than the equivalent steel, resulting in a saving of 450kg when carrying 2.4m logs.



The composite material used is non-corrosive, impact resistant (even at low temperatures), the posts retain their shape after being struck by loader grapples, and the posts are more flexible than steel.

FPInnovations indicate that in order to obtain the correct composite properties for log transport applications, the right blend and quantities of ingredients are very important. It has taken seven years of research to arrive at the correct properties.

[Click here for source](#)

Image credit: FPInnovations

Australian house chipping: Optimising transport

This paper examines the optimisation of the transport scheduling of woodchips for in-field chipping operations whose efficiency depends on a range of factors. It illustrates the advantages of optimising trucking efficiency and cost in the context of the Australian forest industry.



The study was enabled using an adapted version of Simulated Annealing and a forestry domain model. The model simulator, called Fast Truck, was implemented for experimental use, with the results being discussed in the context of the Australian industry.

Factors worth noting are truck payload and chipper utilisation, which, by optimisation, account for 52% and 29% of the total cost savings obtained, respectively. These savings arise when better transport control and management occur in chipping operations. Further work will consider ways to implement these optimisations, primarily by adapting Fast Truck as an optimiser of daily dispatch schedules.

[Click here for source](#)

Forwarding technologies to collect harvesting residues

The CRC for Forestry has carried out research into the collection and processing of logging residues from pine and eucalypt felling operations. This report briefly summarises the technical and economic information for the use of forwarders for the collection and extraction of logging residues.



The load carrying area of the forwarder needs to be modified due to some of the material being of smaller dimensions than the usual logs, and the low bulk density of logging residue requires a larger volume bin to achieve acceptable payloads. Three different types of modified forwarders are described, being the Dutch Dragon press, the ABAB carrier, and the Ponsse BTS. Information on the abilities, load capacity, payload and the total weight of the collector is included for each forwarder.

The report highlights that, where high volumes of residue remain on a site, modified forwarders could have the potential to collect the residue.

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