Forest&Wood Products Australia
Knowledge for a sustainable Australia

R&D works.

R&D WORKS - JUNE 2013

Printer Friendly Version

Welcome to this June edition of the FWPA R&D Works newsletter.

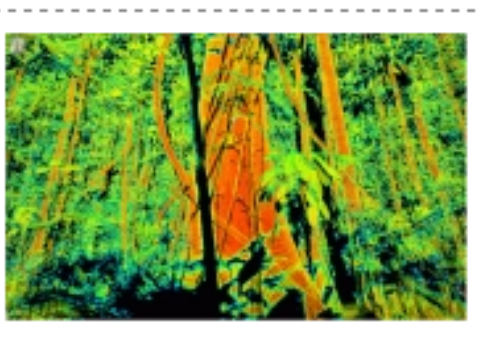
Our research stories this month include using medical scanners to map water distribution inside wood; assessing wood-based biodiesel for functionality in engine, emissions and fuel consumption in car fleets; reviewing how VicForests pre-harvest fauna survey has contributed to conserving a range of threatened species across eastern Victoria; and Forest and Wood Products Australia (FWPA) funded research showing Near infrared (NIR) spectroscopy can assess the amounts of preservative in H2 treated pine timber cheaply, quickly and accurately.

I hope you enjoy reading these articles and others in this newsletter.

Ric Sinclair
Managing Director, FWPA

FOREST GROWING

How we see the forest for the trees: the supersite



In a 3 year CSIRO study, researchers have measured, mapped and identified thousands of trees in 10 'supersites' around Australia. These sites form TERN's (Terrestrial Ecosystem Research Network) Australian Supersite Network, with each site carefully selected for its ability to improve our understanding of how Australia's ecosystems respond to change.

On one supersite, a 25 ha plot of rainforest at Robson Creek, near Cairns, researchers conducted a census of every single tree that had a stem greater than 10 cm in diameter. They found a total of 23,400 stems, representing 212 different species. This comprehensive survey mapped the forest's structure and composition and the characteristics of the forest ecosystem.

The research conducted at Robson Creek will act as a baseline. The data collected will help us answer questions about the health and distribution of the rainforest's biodiversity into the future, the forest's potential for carbon storage and exchange, and any impacts on the ecosystem that might occur as a result of climate change.

Click here for source

Photo credit: CSIRO

GPS and drones can improve tree planting

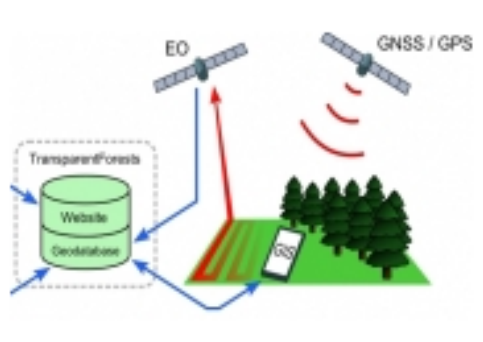
Progress in technology and machinery has increased the efficiency of felling operations, but replanting is still a manual, time-consuming process, but not for much longer according to a new project.

The use of modern digital technology and drones for aerial photography can lead to major gains, says Hans Thunander. He has developed a new tree-planting concept that envisions a 50% increase in efficiency within ten years. "I've spent my whole life in silviculture and these ideas have been germinating for a decade," he says. "But now I feel the technology is far enough advanced that it can be used to make replanting more efficient."

Click here for source

Image Credit: ElmiaWood

Satellite remote sensing to strengthen quality transparency



Over the last three years the Forestry Stewardship Council (FSC) has participated in a series of trials, financed by the European Space Agency, to assess the potential value and utility of satellite remote sensing to strengthen and increase the quality and transparency of the forest certification process.

Having satisfied itself that this technology would be of significant value, FSC has now initiated TransparentForests, a study to assess the viability of a web-based Forest Certification Information System (FCIS) in delivering an independent source of geo-spatial data to support better forest certification. The FCIS will integrate Earth Observation satellite mapping systems, global positioning systems and global navigation satellite systems in a web-based geographic information system, specifically customised for the needs of FSC and its stakeholders.

The feasibility phase of the study was initiated in January 2013. A review of the status and suitability of the core technologies has been completed.

Click here for source

Photo credit: FSC

NEW PRODUCT INNOVATIONS

Harvesting electricity directly from plants

The sun provides the most abundant source of energy on the planet. However, only a tiny fraction of the solar radiation on Earth is converted into useful energy. To help solve this problem, researchers at the University of Georgia looked to nature for inspiration, and they are now developing a new technology that makes it possible to use plants to generate electricity.

"Clean energy is the need of the century," said Ramaraja Ramasamy, assistant professor in the UGA College of Engineering and the corresponding author of a paper describing the process in the Journal of Energy and Environmental Science. "This approach may one day transform our ability to generate cleaner power from sunlight using plant-based systems."

Click here for source

Image Credit: UGA Today

Wood-based biodiesel in fleet tests of automobiles

UPM, VTT Technical Research Centre of Finland and VW-Auto Group have started fleet tests of renewable domestic diesel in Helsinki, Finland. The tests, which will take several months, will focus on investigating UPM renewable diesel in terms of fuel functionality in engine, emissions and fuel consumption.

The fleet tests are a part of a larger project coordinated by VTT. The goal of this project is to encourage companies to commercialise renewable energy solutions in traffic. "The (EU) Commission will most likely restrict the use of biofuel made from food crops, meaning that the value of the forest industry residues will increase," says research professor Nils-Olof Nylund at VTT.

Click here for source

Image Credit: VTT

TIMBER CONSTRUCTION AND DESIGN

Report shows worldwide cost-effective green building benefits

A new comprehensive report released from the World Green Building Council (WorldGBC), highlights that there are a large number of compelling benefits from green buildings received by different stakeholders throughout the life cycle of a building.

The report, "The Business Case for Green Building: A Review of the Costs and Benefits for Developers, Investors and Occupants," examines whether or not it's possible to attach a financial value to the cost and benefits of green buildings.

"This report synthesizes credible evidence from around the world on green buildings into one collective resource, and the evidence presented highlights that sustainable buildings provide tangible benefits and make clear business sense," said Jane Henley, CEO of WorldGBC. "From risk mitigation across a building portfolio and city-wide economic benefits, to the improved health and well-being of individual building occupants, the business case for green building will continue to evolve as markets mature. Indeed we have already seen this momentum grow globally where in more and more places, green is now becoming the status quo."

Click here for source

Image Credit: World Green Building Council

WOOD HARVESTING, TRANSPORT AND LOGISTICS

Victoria's state forests: threatened fauna management framework

Biodiversity conservation is a vital part of ecologically sustainable forest management. It is undeniable that the diversity (of genes, species and ecosystems) is fundamental to ecosystem function and therefore forest health.

VicForests, which is responsible for native timber harvesting within Victoria's state forests, has developed a threatened species management framework that is complimentary to the existing legislative requirements governing threatened species management across the state.

This paper is a review of VicForests pre-harvest fauna survey process and targeted monitoring projects, outlining the results and survey effort undertaken over the past year, and how this process has contributed to the conservation of a range of threatened species across eastern Victoria. This review also considers potential improvements to the framework that may drive further development in the future.

Click here for source

The impact of extended working hours on logging workers

Trying to increase machine utilisation to reduce costs can have a negative influence on logging workers.

In a study partially funded by the Wood Supply Research Institute, 22 logging business owners who had implemented shift work were interviewed. Of the 22, most businesses operated two shifts per day. The average shift length was 10.5 hours for the day shift and 9.5 hours for the night shift.

The research showed many challenges associated with extended working hours, such as increased worker turnover (especially during the implementation phase), fatigue, mental burnout, physical illness due to a lack of exercise and social problems. A range of measures were identified to help reduce the negative aspects of extended working hours.

Click here for source

Image Credit: Forest Resources Association

For additional research on this topic, a previous FWPA funded postgraduate project was undertaken by Andrew Nicholls at the University of Melbourne. This project was titled "Harvester Productivity and Operator Fatigue: Working Extended Hours". Click here to read this report.

WOOD PROCESSING AND MANUFACTURING

Wood gets medical attention

Using medical scanners, scientists at Rotorua-based Crown Research Institute Scion have been able to peer inside blocks of wood. MRI and CT scanners at Lakes Radiology in Rotorua were used to map the water distribution inside wood from which moisture had been extracted.

Timber engineering technician, Slobodan Bradic from Scion, says that carbon dioxide was used to remove moisture from wood - a process called dewatering. Carbon dioxide has proved to be most effective, and the wood is then open to further modifications such as adding colours and hardening agents. However, a crucial research question remained unanswered - how much water remains inside the wood after dewatering and where is it hiding?

Both the MRI and CT scanners were used to view how water was distributed inside the wood. The results are an impressive series of three dimensional images of moisture patterns inside wood.

Click here for source

Image Credit: Scion

New lightweight board showcased at Ligna

A versatile and sturdy lightweight board was launched by BASF, a world leading chemical company, and Swiss Krono Group, a major European wood-based material manufacturer, at Ligna 2013.

The jointly developed lightweight solution is up to 30% lighter than conventional particle board. Available from a thickness of 28 mm, it is ideal for a range of applications in furniture and interior design. Visitors to Ligna saw the new material for themselves as part of a special presentation devoted to lightweight construction.

The material owes its lightness to BASF's Kaurit Light technology. Under a top layer of fine wood chips is a lightweight middle layer consisting of larger wood chips and a binder made of a foamed polymer. This construction makes the material up to 30% lighter than conventional particle board.

Click here for source

Image Credit: Forestry Expo

Shining a light on treated pine timber

The Australian building industry relies on pine timbers for house framing and construction, and for regions where termites or borers might be active timbers treated with a preservative to H2 level (i.e. above ground, inside use) are required.

A research team from CSIRO, with funding from Forest and Wood Products Australia (FWPA), has demonstrated that Near infrared (NIR) spectroscopy can assess the amounts of preservative in H2 treated timber cheaply, quickly and accurately.

The researchers measured the NIR response pattern from timber samples with known but different concentrations of preservative to create a calibration chart. They then compared their models with samples from operating mills to see how accurate both the NIR method and the mill assessments actually were.

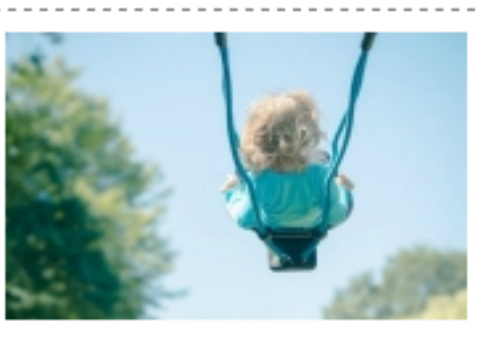
The research took over a year, but the results show NIR can deliver accurate and timely results. Using NIR it takes about 30 seconds for a worker to know the concentrations of preservative at a given depth inside the wood.

Having a quick, cheap and accurate assessment method means, in the future, manufacturers will be able to readily adjust their production processes to make them as economically efficient as possible.

FWPA Project Ref: PNB204-1011
Quality Control of H2F Treated Timber via NIR Spectroscopy
Click here for report

OTHER INFORMATION

Forests are more than just logs and leaves



New global report finds that time spent in forests and parks has decreased over the past five years.

As more people move into cities around the world, the time we spend in forests and parks is decreasing. According to the Global Green Space Report, conducted by Husqvarna Group, one in three are dissatisfied with the amount of time they spend in green spaces, and 50% think that schools should take responsibility for this by scheduling green time for children. Improved health and wellbeing are among the reasons given for why we should address the increasing imbalance between grey and green in our lives.

Over 4,500 people from Sweden, China, Russia, USA, Germany, Canada, Australia, Poland and France participated in the study.

Click here for source

Photo credit: Husqvarna Group

Fostering collaborations towards integrative research development

The complex problems associated with global change processes calls for close collaboration between science disciplines to create new, integrated knowledge. In the wake of global change processes, forests and other natural environments have been rapidly changing, highlighting the need for collaboration and integrative research development.

Few tools are available to explore the potential for collaborations in research ventures that are just starting up. This study presents a useful approach for exploring and fostering collaborations between academics working in research teams and organisations comprising multiple science disciplines. The research aim was to reveal potential barriers, common ground, and research strengths between academics working in a new centre focused on forest and climate change research.

Click here for source

Image Credit: NASA Earth Observatory

Forest & Wood Products Australia Limited | www.fwpa.com.au

Subscribe Unsubscribe

Print