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XXIII IUFRO World Congress, 23-28 August 2010, Seoul, Republic of Korea
ABSTRACTS

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EDITORS: JOHN A. PARROTTA and MARY A. CARR

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Contact

The Editor, International Forestry Review,
The Crib, Dinchope, Shropshire SY7 9JJ, UK
Telephone: +44 (0)1588 672868
Email: cfa@cfa-international.org, Web: www.cfa-international.org

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Abstracts

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JOHN A. PARROTTA and MARY A. CARR

E-06 Properties and utilization of plantation timbers

Organizers: KeeSeng Gan, *Forest Research Institute Malaysia, Malaysia, ganks@frim.gov.my;* Pekka Saranpää, *Finnish Forest Research Institute, Finland, pekka.saranpaa@metla.fi.*

Recent developments in resource characterisation in plantation radiata pine in New Zealand. Cown, D. (*Scion/New Zealand Forest Research Institute, New Zealand; dave.cown@scionresearch.com*).

The performance and value of plantation softwoods is increasingly important as such material continues to become a larger proportion of the global wood supply. Recent research in New Zealand has focused on improving the understanding of factors affecting wood quality in radiata pine and developing tools for more accurate resource description and material segregation. Characteristics of importance include the appearance of clear wood from pruned stands and the stiffness and stability of wood which is predominantly juvenile in nature. The costs involved in managing for clearwood in particular mean that blemishes such as resin defects and intra-ring checks must be detected at the earliest possible opportunity, and material segregated to avoid further unnecessary processing costs. For stiffness and stability, a range of approaches have been examined to determine whether material will meet industrial requirements. Focus here has been on wood density, acoustic properties, compression wood, knots and spiral grain. There is now much more interest in predicting wood quality as well as growth in plantation forests.

Effect of wood species and layer structure on physical and mechanical properties of strand board. Febrianto, F. (*Bogor Agricultural University, Indonesia; febrianto76@yahoo.com*), Heri Iswanto, A. (*University of Sumatera Utara, Indonesia; apriheri@yahoo.com*), Hidayat, H. (*University of Lampung, Indonesia; away_rie@yahoo.com*), Jin, H.K., Nam, H.K. (*Kangwon National University, Republic of Korea; kwon@kangwon.ac.kr; kimnh@kangwon.ac.kr*).

The objectives of this research were to evaluate the effect of wood species and layer structure on the physical and mechanical properties of strand board made from *Paraserianthes falcataria*, *Maesopsis emini*, and *Acacia mangium* woods collected from planted forest in Bogor district, West Java, Indonesia. The densities of *P. falcataria*, *M. eminii*, and *A. mangium* woods were 0.36, 0.41, and 0.46 g.cm^{-3} respectively. Three (3) types of layer structure—perpendicular, parallel, and random orientation—were applied. Methylene diisocyanate (MDI) resin with 7% resin amount (w/w) was used. The physical and mechanical properties of strand board were evaluated based on CSA 0437.0 standard. Results indicated that strand board manufactured from wood with lower density (*P. falcataria*) had higher mechanical properties (modulus of rupture, modulus of elasticity, and internal bond) and lower dimensional stability (water absorption and thickness swelling) compared to strand board manufactured from higher density (*A. mangium*). Strand orientation strongly affected the physical and mechanical properties of boards, with perpendicular orientation showing superior performance compared to parallel and random orientation. Physical and mechanical properties of OSB made from fast-growing tree species met the requirement of CSA 0437.0 standard for grade O-1 OSB panels.

Opportunities for improving the utilisation of the UK's plantation resource. Moore, J. (*Edinburgh Napier University, UK; jmoore@napier.ac.uk*), Gardiner, B. (*Forest Research, UK; barry.gardiner@forestry.gsi.gov.uk*), Ridley Ellis, D. (Edinburgh *Napier University, UK; d.ridleyellis@napier.ac.uk*), Macdonald, E. (*Forest Research, UK; elsepth.macdonald@forestry.gsi.gov.uk*).

The annual harvest from the United Kingdom's forests is approximately 8.5 million tonnes. Approximately 65% of this goes to domestic sawmills which collectively produce ~2.9 million m^3 of timber each year, enough to meet ~30% of the UK's annual demand for sawn wood. Most sawn timber produced in the UK is Sitka spruce (*Picea sitchensis*), while a substantial amount is Scots pine (*Pinus sylvestris*). However, of the material sold as construction timber, very little is used for producing the prefabricated timber frames and trussed rafters used in mainstream house construction. To improve the value of the UK's forest resource, it is important to get more locally produced timber into this higher value component of the construction market. This paper summarises a number of studies that have been conducted to characterise the wood properties of Sitka spruce and Scots pine and to understand the influence of environment, silviculture, and genetics on these properties. The increased pressure on the UK's wood resource, coupled with higher product performance requirements from the timber construction sector, means that the UK must continually work to improve timber quality if locally produced timber is to maintain, and ideally grow, its share of the construction market.

Increasing the processing yield of plantation hardwoods through innovative processing method. Ratnasingam, J. (*Universiti Putra Malaysia, Malaysia; jegaratnasingam@yahoo.com*), Pew Ma, T. (*Wood Saw Sdn. Bhd., Malaysia; tpma@woodsaw.com.my*).

The presence of juvenile wood and tension wood in plantation hardwoods is a common phenomenon, affecting processing yield. A regional study was undertaken in Malaysia, Indonesia, and Thailand to evaluate the influence of these wood abnormalities on the processing yield of rubberwood (*Hevea brasiliensis*). Further, the rotating saw-dry-rip (SDR) technique was implemented to assess its effectiveness in minimizing the effects of these wood abnormalities on the resultant yield. Detailed volumetric production data were collected from 150 saw mills for 6 months. The study found that the average saw milling yield ranged between 29% to 40%. Upon implementing the SDR technique, saw milling yield was significantly improved by almost 5%. It was apparent that by rotating saw logs 180 degrees between cuts, the stresses in the juvenile wood that often lead to warp-causing imbalances were reduced. The subsequent drying of the wood reduces growth stresses by balancing with drying stresses, and, when dried at high temperature (over 85 °C), the fibre arrangement in the wood was altered by lignin plasticization, which markedly reduced the incidence of fuzzy grain on the machined surfaces of wood with such abnormalities. This technique offers great potential to increase the processing yield of plantation hardwoods.

Mechanical stress grading of Chinese fir dimension lumber for light frame wooden houses. Ren, H.Q. (*Chinese Academy of Forestry, China; guowei2000@126.com*), Guo, W., Fei, B.H. (*Beijing Forestry Machinery Research Institute of State Forestry Administration, China; guowei2000@126.com; fbh@caf.ac.cn*), Wang, Z.H., Luo, X.Q. (*Chinese Academy of Forestry, China; zhwang@caf.ac.cn; lxq@caf.ac.cn*).

As one of the main planted forest tree species and a common natural structural material, Chinese fir (*Cunninghamia lanceolata* (Lamb.) Hook) was quite widely used in Chinese traditional wooden houses. Recently, as light frame house imports increased and