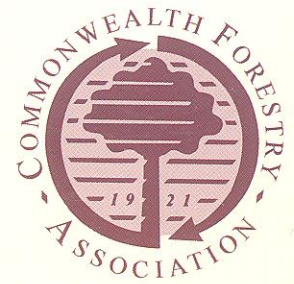


# *The International Forestry Review*



*Forests for the Future: Sustaining Society and the Environment*  
XXIII IUFRO World Congress, 23-28 August 2010, Seoul, Republic of Korea  
ABSTRACTS



ISSN 1465 5489

PUBLISHED BY THE  
COMMONWEALTH FORESTRY ASSOCIATION  
[www.cfa-international.org](http://www.cfa-international.org)

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# The International Forestry Review

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**Abstracts**

**EDITORS**

**JOHN A. PARROTTA and MARY A. CARR**

**Physical and mechanical properties of flakeboard made from mixed fast-growing tree species.** Febrianto, F., Panca Nur Alam, S. (Bogor Agricultural University, Indonesia; febrianto76@yahoo.com), Hidayat, W. (University of Lampung, Indonesia; away\_rie@yahoo.com), Jin, H.K., Nam, H.K. (Kangwon National University, Republic of Korea; kwon@kangwon.ac.kr; kinnh@kangwon.ac.kr).

The objectives of this study were to determine physical and mechanical properties of particleboard made from mixed flakes of *Paraserianthes falcataria*, *Maesopsis eminii*, and *Acacia mangium* woods with and without pre-treatment in cold water immersion. The densities of *P. falcataria*, *M. emini*, and *A. mangium* woods were 0.36, 0.41, and 0.46 g.cm<sup>-3</sup> respectively. Sixteen (16) mixed combinations of homogeneous flakeboards were produced. Methylene diisocyanate (MDI) was used as a binder with 8% resin content. Physical and mechanical properties of flakeboard were evaluated based on JIS A 5908:2003. The results indicated that mixing higher flake density with lower flake density improved the dimensional stabilisation (water absorption and thickness swelling) of flakeboard, and vice versa. Immersing flakes in cold water prior to being manufactured also improved the dimensional stability of flakeboard. Mixing lower flake density with higher flake density improved modulus of elasticity (MOE) and modulus of rupture (MOR) values of flakeboard. On the other hand, immersing flake in cold water tend to resulted in lower MOE and MOR values. Almost all physical and mechanical parameters except MOE met the JIS A 5908: 2003 standard. Flakeboard made from whole *A. mangium* wood pretreated with cold water immersion yielded superior properties.

**Chipping energy of woody biomass: effect of species and dimension.** Fujimoto, K., Ikami, Y., Yoshida, T., Takano, T. (Forestry and Forest Products Research Institute, Japan; kiyopi@ffpri.affrc.go.jp; ikami@ffpri.affrc.go.jp; tyoshid@ffpri.affrc.go.jp; ttakano@ffpri.affrc.go.jp).

To clarify the chipping energy of woody biomass, we investigated the effect of species and dimensions of specimens on power consumption during chipping using a disk chipper. As specimens we used: the lumber of sugi (*Cryptomeria japonica*), hinoki (*Chamaecyparis obtusa*), karamastu (*Larix kaempferi*), and kunugi (*Quercus acutissima*); culm of moso bamboo (*Phyllostachys heterocycla*); and trunk of oil palm (*Elaeis guineensis*) trunk. In addition, we also measured chipping time and particle size distribution of chips. Power consumption was increased with the width and thickness of the specimen, while the integrated power consumption per dry weight (Wh/kg) was decreased with the width and thickness of the specimen. The integrated power consumption per dry weight of hinoki and kunugi of 30 mm in thickness and 120 mm in width were 6.7 and 6.0 Wh/kg, respectively. The average value of the integrated power consumption per dry weight of oil palm and moso bamboo were 6.1 and 6.6 Wh/kg, respectively. Chipping efficiency was 1.0 t/h for moso bamboo; 2.0 t/h for hinoki, sugi and oil palm; and 3.5 t/h for kunugi.

**Preliminary research on tension properties of metal-plate connected larch dimension lumber joints.** Guo, W. (Chinese Academy of Forestry, China; guowei2000@126.com), Fei, B.H. (Beijing Forestry Machinery Research Institute of State Forestry Administration, China; fbh@caf.ac.cn) Zhao, R.J. (Chinese Academy of Forestry, China; rongjun@caf.ac.cn).

This study was conducted to obtain load-deformation curves, evaluate the effects of metal-plate connector (MPC) MPC length and MPC area on the ultimate tensile load, and investigate the effect of MPC size on tension strength and failure modes. The results indicated that the shapes of load-deformation curves were similar to former studies, and consisted of linear section and nonlinear part. The MPC size was a key factor to both the tension mechanical properties and the failure mode of MPC joint. There was a good positive linear relationship between ultimate load and MPC area, with a high coefficient of determination of 0.7725. Large enough MPC size and reasonable layout method (the single tooth of MPC parallel or vertical to the wood fiber direction) were effective methods to enhance the tension property of MPC joints. Finally, three main failure modes of metal-plate connected larch dimension lumber were found. This preliminary research on tension properties of MPC connected domestic planted larch dimension lumber not only laid the foundation for further research in this subject, but also had great significance to develop domestic tree species for structural timber.

**Initial results of clonal selection for teak (*Tectona grandis*) in Côte d'Ivoire.** Kadio, A. (SODEFOR, Côte D; kadio.aime@gmail.com).

The program of clonal breeding of teak (*Tectona grandis* Linn. f.) improved by SODEFOR has achieved important results in vegetative propagation, initial growing, and qualitative traits for stem conformation and branches fixing. The best conditions for root initiation have been drawn up by characterizing the substratum and plant material to be used for rooting and also by determining the right time in the year to carry out these activities. The rooting rates stand between 89 and 95 percent. At age six, the best clones measure 19.5 m for total height 57 cm for mean dbh at average, corresponding to a gain of 35 percent compared to a progeny from open fertilization in a clonal seed orchard set up in 1982 in Côte d'Ivoire. The heritabilities of these traits are medium for the total height ( $h^2 = 0.44 \pm 0.07$ ) and high for the circumference ( $h^2 = 0.72 \pm 0.09$ ). For the stem and branches, the variables studied are strongly correlated ( $0.74 < r < 0.90$ ) and present also high heritability ( $h^2 = 0.94$  to  $0.96$ ). These clones are at present using as "multiclonal variety" for afforestation and provide higher productivity than any other plant material used in Côte d'Ivoire.

**Promoting sustainable utilization of low-medium density tropical wood species as structural materials.** Karlinasari, L., Surjokusumo, S. (Bogor Agricultural University, Indonesia; l\_karlinasari@yahoo.com; dhht@ipb.ac.id).

Nowadays, consumers in the tropics must shift their way of thinking with regard to the use of timber for daily structural uses. The new paradigm is to utilize tree species having low-medium strength grade, i.e., low-medium density instead of well-known tree species with high strength (high density). This paper reports a comparative study on wood properties of some tree species growing in plantation forests and outside forests including community forests. Small specimens were used to evaluate the mechanical properties of wood in accordance with ASTM D 143 standards. Four commonly available tree species—mangium (*Acacia mangium*), African wood (*Maesopsis eminii*), nangka (*Artocarpus heterophyllus*), and Durian (*Durio zibethinus*)—were examined for wood property tests. The results showed that the densities of the wood species studied were about 0.4–0.6 g/cm<sup>3</sup>. The mechanical properties, bending strength, MOE and MOR, tension strength, and shear strength obtained were comparable with