The Effect of Shelling Ratio on Oriented Strand Board (OSB) Made From Andong Bamboo (*Gigantochloa verticillata*)

Rima Vera Ningsih [1)] Sitti latifah [1)] Fauzi Febrianto [2)] and Lina Karlinasari [2)]

[1] Department of Forestry, Faculty of Agriculture, University of Mataram, Majapahit Street No.62, Gomong, Mataram City, West Nusa Tenggara, Indonesia

[2] Department Forest Product Technology, Faculty of Forestry and Environment, Bogor Agricultural University. IPB, Indonesia

Introduction

High productivity

Many usage for construction

1. Bamboo is abundant in Indonesia and a beneficial important material for the Indonesian rural community.

Oriented Strand Board (OSB)

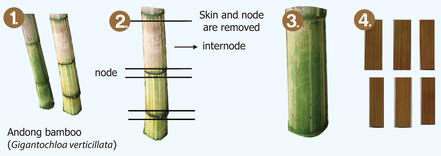
2. Bamboo is great to be use as a raw material for OSB

No Information about emission

3. Development of OSB from andong bamboo with different shelling ratios

Materials and Method

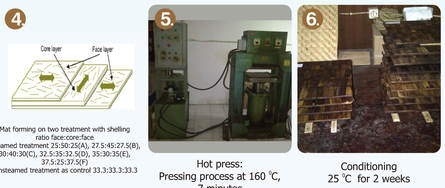
Strand Production



Andong bamboo (*Gigantochloa verticillata*)

Strand Fabrication

Strand | Mixing of strand and adhesive | Adding paraffin 1%

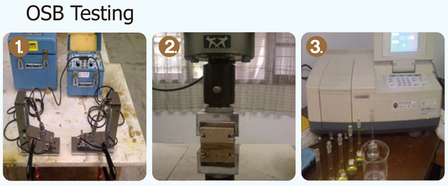


Mat forming on two treatment with shelling ratio face:core:face
¹Steamed treatment 25:50:25(A), 27.5:45:27.5(B), 30:40:30(C), 32.5:35:32.5(D), 35:30:35(E), 37.5:25:37.5(F)
²Unsteamed treatment as control 33.3:33.3:33.3

Hot press: Pressing process at 160 °C, 7 minutes

Conditioning 25 °C for 2 weeks

OSB Testing



Nondestructive Metriguard 293 A Model

Destructive Universal Testing Machine (UTM)

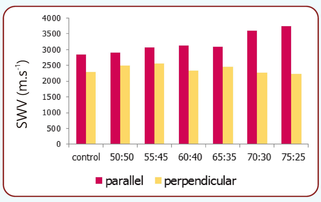
Formaldehyde emission Spectrophotometer

Objective

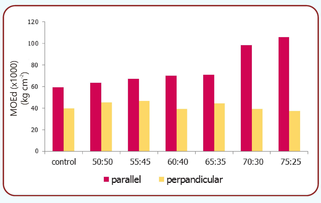
To determine strength of SB made from andong bamboo on different shelling ratios and to analyze formaldehyde emission content of OSB through steamed and unsteamed strand.

Result and Discussion

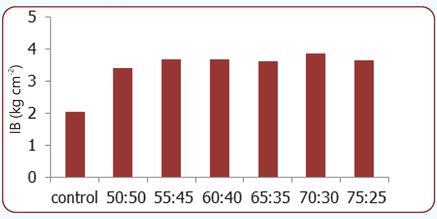
Stress Wave Velocity (SWV) in Parallel and Perpendicular Direction to the Grain



Dynamic of Modulus Elastic (MOEd) in Parallel and Perpendicular to the Grain



Internal Bond (IB)



Formaldehyde emission

Products	Formaldehyde emission m.L^{-1}	Grade
Unsteamed OSB(control)	0.72	F***
Steamed OSB (50:50)	0.45	F****
Steamed OSB (55:45)	0.45	F****
Steamed OSB (60:40)	0.30	F****
Steamed OSB (65:35)	0.37	F****
Steamed OSB (70:30)	0.36	F****
Steamed OSB (75:25)	0.37	F****

*Categorized by JIS A 5908 (2003)

Conclusion

SWV and MOEd values in parallel direction were higher than perpendicular ones and the bamboo strand through steam treatment with some shelling ratio were stronger than unsteam on strands. All OSB through steam treatment had better classification emission compared to unsteam OSB based on JIS standard.

References

Febrianto F, Purnamasari I, Arinana, Gumilang A, Kim NH. 2013. Steaming effect on natural durability of bamboo oriented strand board against termites and powder post beetle attacked. *JITKT* 11(2):162-170.

[JIS] Japanese Industrial Standard. 2003. *JIS A 5908: Particleboards*: Akasaka, Minato-ku, Tokyo (JP): Japanese Industrial Standard.

Karlinasari L, Hermawan D, Maddu A, Iksan MF, Firmanti A. 2011. Nondestructive bending strength testing of wood wool cement board from some fast growing species using stress wave velocity method. *JITKT* 11(2):162-170.

Pallerin RF, Ross RJ. 2002. *Nondestructive Evaluation of Wood*. New York (US): Forest Product Society.

Roffael E. 1993. *Formaldehyde Release from Particleboard and Other Wood Based Panels*. Kuala Lumpur (KL): Forest Research Institute Malaysia.

Ross RJ, Brashaw BK, Pellerin RF. 1998. Nondestruktif evaluation of wood. *J Forest Product* 48(1).

Rowell R, Lange S, McSweeny J, Davis M. 2002. Modification of wood fiber using steam. On: Rowell R, editor. *The 6th pacificrim Bio-Based Composites Symposium & Workshop On The Chemical Modification Of Cellulosics Oregon*, USA; 2002 Oktober 27; Oregon, USA. Madison (US) Wood Science and Engineering Department: 606-615.

[SBA] Structural Board Association. 2005. *OSB Performance by Design in Wood frame Construction*. Canada (CA): Technical Bulletin No. TM422.

Sumardi I, Suzuki S. 2014. Dimensional stability and mechanical properties of strandboard made from bamboo. Bioresources 9(1):1159-1167.