

**ANALYSIS OF  
CALCUTTA BAMBOO FOR  
STRUCTURAL COMPOSITE MATERIALS**

by

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**ABSTRACT**

Land use issues have dramatically changed the timber supply outlook for our nation's forest products industry. Since demand for wood products shows no sign of abating, alternative products must be developed. Bamboo is a very promising alternative raw material for the manufacture of structural composite products. It is fast growing, economical, renewable and abundant throughout the world. Bamboo has physical and mechanical properties that are comparable to many commercial timber species, and thus, may easily be processed using existing technology from the wood-based composites industry. Bamboo can be cultivated in the U.S., and thus has the potential to relieve some of the harvesting pressure from our nation's forestlands. However, the use of specific bamboo species for structural composite products will require a thorough investigation of the material as well as its interaction with other components. Thus, the primary objective of this dissertation is to determine the properties of Calcutta bamboo and its interaction with adhesives. The properties investigated were relative density, dimensional stability, equilibrium moisture content, bending strength and stiffness, tensile strength, pH, buffer capacity, wettability and the adhesive penetration. In addition to this, a prototype bamboo

parallel strip lumber (BPSL) was manufactured and tested for its physical and mechanical properties. The relationships among the properties of Calcutta bamboo and the prototype bamboo composite were also investigated. As the result of these investigations, it is concluded that Calcutta bamboo is technically a suitable raw material for structural composite products. This result may also be applicable for the utilization of other bamboo species, thus aiding companies in decisions regarding investment in bamboo plantations and manufacturing facilities in the U.S, Malaysia and other parts of the world. The primary benefits from this research may be the development of new products to serve growing markets, and thereby relieving some of the pressure to harvest forestlands

## ACKNOWLEDGEMENTS

I would like to honor and convey my deepest appreciation to all parties that were involved directly and indirectly in carrying out my dissertation. Firstly, I want to express my gratitude to my advisor and committee chair, Dr. Frederick A. Kamke. He has guided me to the right path and I could not have asked for a better teacher and mentor. I'm deeply thankful to him and I'm confident that our friendship will last forever.

I also wish to convey my appreciation to the members of my committee: Dr. Fred.M.Lamb, Dr. J.Daniel Dolan, Dr. Audrey G.Zink and Dr. Michael P. Deisenroth. They have served as my teachers and guided me through my study at Virginia Tech.

A million thanks go to the staff, students and faculty at the Department of Wood Science and Forest Products at the Thomas M.Brooks Forest Products Center, as well as at Cheatham Hall. I personally like to thank Dr. Geza Ifju, the Head of the Department of Wood Science and Forest Products, and to Carlile, Butch, Bob Carner, Bob Wright, Angie and Sharon.

I wish to also express my appreciation to Balazs Zombori, Elena Kutikova, Mike Malmberg, Jong-Bum Ra, Chris Lenth, Milan Sernek, and many others in the department. They have spent enormous time in helping and motivating me in carrying out my dissertation.

I like to express my gratitude and show my appreciation to Universiti Teknologi Mara for their support and motivation. They have given confidence and guidance to me throughout my study at Virginia Tech.

To my late mother, Rahmah Abd. Hamid, my father Ahmad Awang and to my brother and sister, back home in Malaysia, Salehah, Roshdi, Aishah, Saadah,

Kamaruddin, Mustafa and to my mother in law, Sharifah Abdullah, my late father in law, Asmawi Basri, and my step mother, Sarimah, thank you for their support and encouragement. It often been difficult to be separated from them, but I want them to know that they were always in my thoughts.

Last, but by no means least, I would like to thank my wife, Rusidah Asmawi. She is very supportive and her encouragement has helped me tremendously. She is my love, my confidante, my best friend and so much more. I am very grateful to her. My children, Ahmad Luqman, Ahmad Imran and Adlin Liyana, they have kept me cheerful all the time by their playfulness, smile and laughter. I love them dearly and I hope they will be successful in their life. Lastly, I would like to say that may my success be everybody success too and let this success lead to greater success in the future.

## **ACKNOWLEDGEMENTS (In Malaysian Language)**

### **KATA ALUAN**

Shukur kepada Ilahi di atas limpah kurnia dan izinnya menimba ilmu alam semester ini. Jadikanlah kejayaan aku ini sebagai bekal keinsafan dan dalam menuju ke jalan yang lurus. Saya ingin menyatakan ribuan penghargaan dan terima kasih kepada ramai individu. Pertamanya, ribuan terima kasih kepada penasihat utama, Dr. Frederick A. Kamke yang banyak membantu serta memberi tunjuk ajar sewajarnya untuk menamatkan disertasi ini. Saya yakin di masa hadapan kita akan terus berkerja-sama dan menjalinkan hubungan persahabatan yang berkekalan.

Saya juga ingin mengucapkan terima kasih kepada penasihat yang lain, iaitu Dr. Fred M. Lamb, Dr. J. Daniel Dolan, Dr. Audrey G. Zink dan Dr. Micheal P. Deisenroth. Mereka juga telah banyak memberikan bantuan dan tunjuk ajar.

Terima kasih juga diucapkan di atas bantuan yang di berikan oleh kakitangan, pelajar dan ahli fakulti di Jabatan Sains Perakayuan dan Hasil Hutan di pusat 'Thomas M. Brook Forest Product' dan di 'Cheatham Hall'. Saya ingin mengucapkan ribuan terima kasih kepada Ketua Jabatan Sains Perakayuan dan Hasil Hutan, Dr. Geza Ifju, dan kepada Carlile, Butch, Bob Carner, Bob Wright, Angie dan Sharon.

Saya juga ingin mengucapkan penghargaan saya kepada Balazs Zombori, Elena Kutikova, Mike Malmberg, Jong-Bum Ra, Chris Length, Milan Sernek, dan ramai lagi di jabatan ini. Mereka banyak membantu dan memberikan dorongan yang padu.

Saya mengucapkan ribuan terima kasih kepada Universiti Teknologi MARA kerana membiayai pengajian saya di Virginia Tech. Peluang dan keyakinan yang

diberikan menjadi pendorong. Insyallah akan dicurahkan ilmu dan berbakti kepada UiTM khasnya dan negara amnya.

Saya juga ingin melahirkan penghargaan dan kasih sayang kepada arwah ibunda, Rahmah Abd.Hamid, ayahnda Ahmad Awang dan kepada keluarga di Malaysia, Roshdi, Salehah, Saadah, Aishah, Mustafa dan Kamaruddin, serta ibu mertua, Sharifah Abdullah, arwah bapa mertua, Asmawi Basri dan ibu, Sarimah. Juga kepada semua ahli keluarga serta sahabat handai di Malaysia. Terima kasih yang tidak terhingga kerana sokongan dan dorongan yang di berikan. Berada jauh dari pangkuan keluarga tercinta memang menjadi dugaan besar buat kami, namun mereka sentiasa dalam ingatan selama kami berada di perantauan.

Terutamanya kepada isteri nan tercinta, Rusidah Asmawi. Dorongan dan sokongan darinya menjadi pengerak nadi. Dia banyak membantu dan memberi keyakinan yang tinggi dalam segala hal. Dialah menyinar hidup ini. Kepada anaknda Ahmad Luqman, Ahmad Imran dan Adlin Liyana, merekalah pelita hati, cahaya dalam hidup, kenakalan dan gurau senda dari mereka menjadi kegembiraan dan ketawa. Kasih sayang untuk mereka, dan tinggi harapan agar mereka berjaya dalam hidup bila dewasa nanti. Akhir kata, kejayann ini bukan milik mutlak diri tetapi milik tuhan semata mata. Kejayaan ini juga kejayaan semua. Semuga kejayaan ini mendorong lebih kejayaan di masa yang akan datang.

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