

**THE RATTAN
PROCESSING
AND TRANSFORMATION
INDUSTRY IN MALAYSIA**

THE RATTAN PROCESSING AND TRANSFORMATION INDUSTRY IN MALAYSIA

**Razak Wahab
Othman Sulaiman
Hashim W. Samsi**

UNIVERSITI MALAYSIA SABAH

Kota Kinabalu • Sabah • 2010

<http://www.ums.edu.my/penerbit>

A Member of Malaysia Scholarly Publishing Council (MAPIM)

All rights reserved. No part of this publication may be reproduced, distributed, stored in a database or retrieval system, or transmitted, in any form or by any means, electronics, mechanical, graphic, recording or otherwise, without the prior written permission of Penerbit Universiti Malaysia Sabah, except as permitted by Act 332, Malaysian Copyright Act of 1987. Permission of rights is subjected to royalty or honorarium payment.

Perpustakaan Negara Malaysia

Cataloguing-in-Publication Data

Razak Wahab

Rattan processing and transformation industry in Malaysia / Razak Wahab, Othman Sulaiman, Hashim W. Samsi.

Includes index

Bibliography: p. 139

ISBN 978-967-5224-32-4

1. Rattan--Malaysia. 2. Rattan furniture--Malaysia. 3. Rattan work--Malaysia. I. Othman Sulaiman. II. Hashim Wan Samsi. III. Title. 684.10609595

Cover designer: Albert Frederick

Layout designer: Rosalind Ganis

Typeface for text: Verdana

Text type and leading size: 10/12 points

Printed by: Capital Associates Printing Press (S) Sdn. Bhd.

CONTENTS

	Page
List of Figures	vi
List of Tables	x
Acknowledgement	xi
Summary	xii
Chapter 1 Introduction	1
Chapter 2 General Morphology	9
Chapter 3 Properties of Rattans	27
Chapter 4 Harvesting	35
Chapter 5 Primary Processing	41
Chapter 6 Description of Manufacturing Process for Cores and Skins	63
Chapter 7 Furniture Industry	75
Chapter 8 Finishing of Rattan Furniture	93
Chapter 9 Durability of Rattan	109
Chapter 10 Cost Structure and Economic Aspect in Setting Up a Rattan-based Industry	115
Appendix	127
References	141
Index	145

LIST OF FIGURES

Figure	Page
1.1	Naturally grown rattan found in the jungles 6
1.2	Rattan intercropping between rubber trees 6
1.3	Rattan intercropping between palm oil trees 7
1.4	<i>Calamus manan</i> grow solitary and can reach the length of 150 m from base to top 7
1.5	Close-up view on a rattan culm showing the sharp spines on the epidermis layer of the tree that act as hooks to aid climbing over other plants, and to deter herbivores 8
2.1	<i>Calamus manan</i> 24
2.2	<i>Korthalsia grandis</i> 25
3.1	Cross-sections of a reddish and a whitish rattans 28
3.2	Cross-section of immature rattan 29
3.3	Cross-section of mature rattan 29
3.4	Cross-sections of rattans showing different types of cells 29
4.1	Debarking of rattan skin is done immediately after harvesting to remove the inner epidermis of the leaf sheaths adhering to the stem 36
4.2	Rattan <i>Calamus manan</i> after having their skin removed 37
4.3	Raw rattan ready to be transported to processing mills 37
4.4	In areas where the road system is very poor, transportation of rattan is done by rivers 38
4.5	Harvested rattan are sold to generate side income for some rural people 38
4.6	Bundled rattan of small and big diameters ready for oil-curing process 39
5.1	A typical rattan oil-curing mill or shed 44
5.2	Raw rattans are sorted out according to species and sizes before they are oil-cured 45
5.3	Raw rattan being delivered to the oil-curing mill 45
5.4	Oil-curing process of rattans to improve their durability 46
5.5	Wood wastes are used to heat up the diesel in the oil-curing tank 46
5.6	Drums welded together can be used as an oil-curing vessel 47

5.7	The raw rattans are oil cured using diesel	47
5.8	Rattans immediately after the oil-curing process	48
5.9	Another picture showing rattan immediately after the oil-curing process. The excess oil on the rattan surfaces needs to be wiped clean in order to produce good quality rattan	48
5.10	Oil-cured rattan needs to be cleaned to remove dirt and to clear off wet diesel from its surfaces	49
5.11	High pressured water is sometimes preferred in cleaning the excess oil as this will reduce cleaning time	49
5.12	Rattan surfaces become shiny after the oil-curing and cleaning process	50
5.13	Drying of rattan by leaning against fences	51
5.14	Drying of smaller size rattans	52
5.15	Drying of big diameter rattans	52
5.16	Rattans are tied in bundles of between 30 to 50 poles before being stacked for fumigation	53
5.17	Stacking of big and smaller diameters rattan for fumigation	54
5.18	Rattans are soaked for bleaching in water containing bleaching agents	55
5.19	Grading of smaller rattan (19 mm or less in diameter) according to sizes and physical conditions	56
5.20	Grading of big rattan (20 mm or more in diameter) according to size and physical conditions	57
5.21	Rattan of grade 1/1, 1/3 and 4/5 (from left to right)	57
5.22	Horizontal stacking of rattans	58
5.23	Vertical stacking of rattans	59
5.24	High-grade rattans are bundled and tied firmly, ready to be sent to furniture manufacturers	60
5.25	Low-grade rattans are sent for further processing into rattan cores	60
5.26	Processing steps for big diameter rattans	61
5.27	Processing steps for small diameter rattans	62
6.1	Peeling is done on rattan of grade 4/5 in order to enhance their physical appearance and to increase selling price	65
6.2	Peeling machine used in peeling off the damaged part of outer-most layer of the epidermis in rattan	65
6.3	Small diameter rattans are processed to produce rattan skins used for binding joints	67
6.4	Rattan skins can also be produced manually, but this technique is time consuming and labour intensive	67

6.5	Selection of rattan skin for rattan skin production is done manually	68
6.6	Rattan skins of width 2 mm are used to produce rattan mats for chair seats	68
6.7	Processing steps for rattans semi-process products	69
6.8	Different sizes of cutting tools for making rattan skins and cores	70
6.9	Rattan cores of various sizes are produced by rattan splitting machines	71
6.10	Rattan cores and skins manufacturing process	72
6.11	Rattan cores in natural and bleached form are packed and ready for shipment	73
6.12	Rattan split and skins ready for marketing	73
7.1	Rattans with skin in one of the rattan furniture manufacturing mills in Malaysia	77
7.2	Rattan peeled in one of the rattan furniture manufacturing mills in Malaysia	78
7.3	Straightening of a rattan pole	79
7.4	An electrical steaming chest is used to soften the rattan tissues before it undergoes the bending process	80
7.5	Water is heated electrically to produce steam that is used to soften the rattan	81
7.6	Bending process being done with the assistance of a blowtorch	81
7.7	Blowtorch is used to soften the rattan cells prior to bending	82
7.8	After the rattan has been heated with a blowtorch, it is then bent manually	82
7.9	Drilling of the rattan piece to accommodate smaller pieces of rattan for furniture	83
7.10	A pneumatic drill is also used to fasten joint in rattan furniture before rattan binding is applied	84
7.11	Assembling of various components into a rattan chair	85
7.12	Binding is normally done to strengthen and enhance appearance of joinery	86
7.13	Weaving for furniture seats	86
7.14	Rattan skins are used for binding at joinery parts of furniture. They are also used for decorative purposes	87
7.15	Rattan cores are used for basket-making apart from furniture making	87
7.16	Type of joints normally used for rattan furniture	88

7.17	Different types of binding techniques that can be chosen	89
7.18	Binding at the furniture legs is complicated and needs expertise on the part of the workers	90
7.19	Simple binding is used at T-joint in furniture	90
7.20	Sanding and scraping are done prior to the finishing application	92
8.1	Sanding is an important process prior to finishing	
8.2	A rattan chair is sprayed with finishing material in front of a spraybooth	102
8.3	A rattan chair is sprayed with finishing material in front of an exhaust fan	102
8.4	Rattan furniture is ready for the finishing process	103
8.5	Rattan chairs are sometime stained finished in order to attract buyers	103
8.6	Rattan settees are air-dried after undergoing the finishing process	104
8.7	The framing of the wickers involves the application of large diameter rattan	104
8.8	Wickers make use of small size rattan cores	105
8.9	Rattan wickers are considered exclusive and are normally used by people in the higher income group	105
8.10	Wickers combined with wooden frame can improve design and quality of furniture	106
8.11	Mat-rattan-croco	106
8.12	Mat-peel-natural	107
8.13	Mat-wicker	107
9.1	Staining of joinery parts of the rattan chair affect the quality	111
9.2	Staining normally occurs in peeled rattan	112
9.3	Peeled rattans are likely to be attacked by borers as they are composed of low grade rattan. It is recommended they be treated with preservatives to deter insects and fungal attacks	112
9.4	The application of finishes does not prevent borers from attacking the rattan	113
9.5	Borers attack rattan from within to the outside	113
9.6	TERMIFOS 200 is a typical preservative used to deter insects and termites from attacking rattan	114

LIST OF TABLES

Table		Page
3.1	Means value for basic densities of age-group 7, 11, 18 and 24 cultivated <i>Calamus manan</i>	32
3.2	Mean value for modulus of rupture for compression, modulus of rupture (MOR) and modulus of elasticity (MOE) for static bending tests at 12% moisture content	34
6.1	The types of machines used for rattan cores and skin industry are listed	70
7.1	Grades of rattan poles by surface quality	76
7.2	Classification of rattan poles by diametrical sizes	76
8.1	Finishing materials and their advantages and disadvantages	95
8.2	Common problems encountered in finishing, their causes and remedies	96
8.3	The bleaching of rattan	98
10.1	Cost incurred in setting up a rattan oil curing mill on a medium scale	115
10.2	Cost incurred in setting up a rattan core and skin industry	118
10.3	Work force distribution in the model factory	121
10.4	Major raw material requirements for the model factory	122
10.5	Tools and machines for rattan furniture manufacturing	123
10.6	Fixed Assets as the Initial Investment Cost	124
10.7	Operational costs per month	124

ACKNOWLEDGEMENTS

The idea to produce a complete book on the Rattan Processing and Transformation Industry in Malaysia came to me in 2001 when I was doing a study for the International Network for Bamboo and Rattan in the Rattan Oil Curing, Bleaching and Preservation for the Transfer of Technology Model series. At that time I was still working as a senior research officer for the Forest Research Institute of Malaysia (FRIM). Now, I am working as a lecturer with Universiti Malaysia Sabah (UMS).

It took me about eight years to study, prepare drafts and complete this book. Quite a number of people have assisted me along the way. I would like to thank Mohd. Tamizi Mustapa, Wan Termeze Wan Ariffin, Hamdan Husein, Rahim Ahmad, Latif Mohmod, for their contributions. Also of course, my co-authors, Othman Sulaiman and Hashim W. Samsi, for their dedication and contribution.

Last but not least, I would like to thank my family, especially my lovely wife Norhayati bte Senin; my sons Muhammed Husyaini, Mohammed Haziq and Mohammed Hakimi; and my daughter Miza Haniza, for giving me inspiration and motivation to complete this book.

Razak Wahab

Universiti Malaysia Sabah
Kota Kinabalu, Sabah, Malaysia
2010

Source(s) of Technology

The rattan processing and transformation industry can be considered as skill-dependent. The rattan processing and transformation industry can be learned from Southeast Asian countries such as Malaysia, Indonesia, Thailand and the Philippines.

Main Development Attributes

The rattan processing and transformation industry mentioned in this book is readily applicable to Malaysia, other ASEAN countries as well as other tropical climate countries such as India and Pakistan, which have their own supply of raw materials.

The financial aspects required to operate rattan processing and transformation industry might be different from country to country. For countries like Indonesia, Thailand and Philippines, the labour costs may be far less than that of Malaysia. The cost of purchasing equipment, machinery and chemicals may also vary depending on the rate of import taxation imposed by the respective governments.

Rattan processing and transformation industry can best be run as a small and medium industry (sole proprietorship). It is also suitable as community cooperative business since the villagers can be the workforce. In Malaysia, rattan processing and transformation industry has been taught to the aborigines as a way to upgrade their standard of living.

To succeed such businesses need substantial amounts of funding, consistent supply of raw materials and secured skilled workforces.

The rattan processing and transformation industry still needs a lot of research and development efforts in order to maintain its relevancy to other industries. While the world has seen a growing concern about the environment, the rattan processing and transformation industry should strive harder in adapting and developing better and systematic methods to select and use rattan materials to minimise wastage and to ensure highest quality output, both in terms of the appearance and the in-service output. Better techniques should be developed to lessen damage to raw materials during the processes. Mechanisation of certain processes would help in reducing dependency on skilled labour. Inevitably, new designs of rattan furniture would be required to suit the changing lifestyles.