

DEVELOPMENTS IN COCONUT UTILISATION

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ABSTRACT

Coconut stem utilisation is recognised as a necessary adjunct to the replacement of over-mature plantations for both economic and phytosanitary reasons. Research into methods of utilising the stem has been carried out since 1975 in several countries but the greatest effort has been at the project supported by the Philippine Coconut Authority, the Food and Agriculture Organization, and the New Zealand Government, at Zamboanga, Southern Philippines.

This research centre is equipped with four circular sawmills (of varying sizes), a drying kiln, a preservation plant, a fully equipped sawdoctor shop and machine shop, a truss-making factory, and a charcoal kiln.

Coconut wood has been used in houses built at the centre, for virtually all building components, including foundations, framing, flooring, wall panels, exterior sheathing, joinery and roofing. The houses serve as performance tests for these commodities and there are supplementary exposure tests for various preservative systems and surface coatings.

Currently, the best uses for coconut wood were seen as decorative panels, flooring, roof shingles and furniture of the highest grades, general building, particularly low-cost housing, for intermediate grades, and energy for lowest grades.

INTRODUCTION

The coconut-growing countries of the Asian and Pacific Region share a common problem of declining palm productivity resulting from the increasing senescence of a substantial proportion of the coconut palms. Consequently, with the recent development of early bearing, high yielding hybrid material, there is now a region-wide desire to improve the productivity of the coconut stands by replacing the senile palms.

In the Philippines, coconut stem utilisation has gained considerable attention on account of:

- (1) About 84 million senile, unproductive coconut palms that need to be replanted which will eventually become ideal breeding sites for the destructive rhinoceros beetles

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- (2) The need for construction materials for the low-cost housing project of the government
- (3) The need for utility poles to bring electricity to the rural areas.

In the early part of 1976, the Philippine Coconut Authority with the support of the Food and Agriculture Organisation, and the New Zealand Government, established the Timber Utilisation Project at Zamboanga, Southern Philippines, to conduct research on coconut stem utilisation.

RESEARCH PROGRESS

Research on coconut stem utilisation covers such diverse fields of specialisation as logging, sawmilling, seasoning, machining, preservation, field and service testing, and charcoal making. Sawmilling has proved to be the most difficult aspect because normal circular and bandsaws become hopelessly dull almost immediately.

The use of tungsten carbide teeth has overcome this problem but it requires expensive precision equipment and highly skilled sawdoctors for maintenance. However, saw maintenance can be made simpler with the use of inlaid stellite or tungsweld inserted teeth that can be removed and sharpened with simpler equipment and less degree of skill.

Developments in coconut stem utilisation have been presented in scientific gatherings in Tonga (1976) and in the Philippines (1979). For almost six years of research in the Philippines, technological advances in such an endeavour are still far from complete. However, at this point in time, it can be said that the Philippine Coconut Authority has the basic technology and the tools for coconut stem utilisation, from palm felling to the end-products generally acknowledged by coconut producing countries in Asia and the Pacific.

COCONUT STEM UTILISATION IN THE PHILIPPINES

Sawmilling

To date, the research centre in Zamboanga has three portable and one stationary circular sawmills of various sizes. Two of the portable sawmills are being tested for commercial operations in the different parts of the country to provide village people with low-cost housing construction materials.

The circular saw of each mill is fitted with either tungsten carbide or stellite-tipped teeth that can withstand the intense heat generated during cutting. Unfortunately, the use of tungsten carbide teeth requires expensive precision equipment and highly skilled sawdoctors. However, it would be entirely satisfactory in permanent and well established mills. For mobile mills in remote areas it is more suitable to use inlaid stellite or tungsweld inserted teeth which require simple equipment and less skill for resharping. The teeth can be easily removed and replaced when needed.

Experience to date suggests that circular saws with reduced number of teeth provide a more effective bite and, with appropriate saw and feed speeds, can result in efficient sawing. Another factor to consider is that milling should be done as soon as possible after felling the palms to prevent fungus infection which will rapidly discolour and decay the wood. Also, lumber for decorative purposes should be dipped immediately after sawing in an anti-sap stain solution or dried to prevent development of visually offensive stains.

Seasoning and Machining

Drying of coconut wood appears to be remarkably problem-free provided the wood is segregated into different classes and properly stacked under cover to enable air drying to proceed without interference. The air drying time for 25 mm board is approximately two months under conditions at Zamboanga where equilibrium moisture content of wood is about 17%. Hot-air kiln drying is successfully carried out to hasten drying, particularly when used in making furniture and utility items.

Conventional wood-working machinery is used in machining coconut wood into the desired shape and finish. Some raised grain problems occur when planing soft material but these can be overcome by sanding.

Preservation

Various preservative chemicals and preservation methods have been applied on coconut timber, particularly those in ground contact and exposed to weather conditions. Excellent preservation is possible both in hard and soft wood using a vacuum-pressure treating machine. A locally made hot and cold bath treatment tank is also used to reduce preservation cost to be within the reach of the rural people. Perhaps the most simple is

by brush coating the wood, but the preservative ability of the chemical against wood pests and decay is very limited. Several new treatments involving diffusion are currently under test at Zamboanga.

Structures

Experience has shown that coconut wood can be successfully laminated either to obtain the desired size, particularly in the construction of large buildings, or for decorative purposes. Trusses, roof shingles, and other building components of various designs are prefabricated in the construction of low-cost houses, school rooms, and some advanced type of buildings. Machined boards in parquet made from medium density wood are used in floors, steps and internal linings of the walls of houses. Indeed, almost the entire range of coconut wood can be utilised as construction materials.

Charcoal-making

Because of density limitations, the upper portion of the coconut stem is converted into charcoal. The stem is cut into short sections, split into billets, and stack-piled near the kiln for drying. Splitting can be done either by axe or with a cone-shaped stump splitter attached to the power take-off of a tractor. A manually operated steel kiln designed by the Tropical Products Institute is used for carbonisation. Low density wood makes low density charcoal but this can be overcome by brignetting.