

Value Added Products from Coconut Timber

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The increased demand for timber has caused indiscriminate felling of trees from the natural forests, seriously affecting the ecology as well as the living conditions on earth. Growing population and higher per capita consumption of timber products due to elevated living conditions have put tremendous pressure on the natural forest resources. Illegal felling has caused serious environment problems in many regions of the world, which are considered to be the green areas required for maintenance of the ecological balance. The development of plantations for lumber has been a parallel activity and the results in terms of yield from such plantations are not yet appreciable in comparison to the increased requirement of the timber. Many heavily wooded areas in the developing countries have become importers of timber to meet their requirements of wood and wood products. India with a very large requirement of timber and a highly depleted forest resource depends largely on imported timber to meet the various requirements of wood products. Since the effect of plantation timber is not appreciable yet, it is absolutely necessary to explore the possibility of processing plantation residue timber as well as monocots from plantation or fast growing species like Bamboo.

Coconut tree has been planted in many tropical regions and it is one of the oldest plantations in organized sector or informal sectors and thus the over matured coconut trees offer a good raw material base for production of lumber and products for various end-uses.

Salient features of coconut wood processing

The proposal for production of value added products from coconut wood should seriously consider the structure and density variation of coconut wood

stem. The variation in density necessitates a programme to manufacture various end-use products based on this particular feature. The coconut trunk stem analysis is shown in Fig-1.

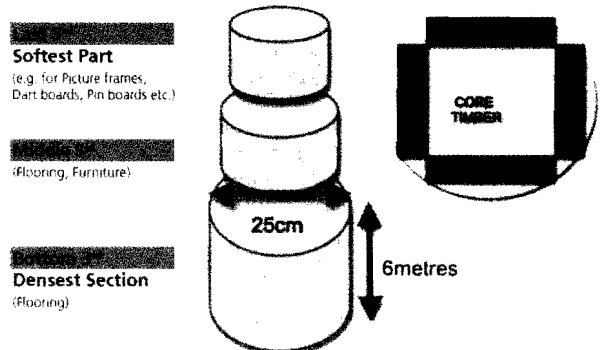


Figure 1

The durability of the hardwood segment is increased by coating the wood surface (at the bottom) with a suitable low toxicity chemical preservative. The coconut wood does not have any diametric growth, wood rays, branches or annual rings, and hence the swelling and shrinkage properties hardly differ in the tangential or radial direction. Compared to other species of corresponding densities the volume of shrinkages and expansion is negligible. The outer segment which is air-dried for normalization provides a stable parquet slat input.

The table-1 shows the density segment of a coconut stem recommended for different uses as coconut lumber product for building construction.

As a rule, it is suggested that coconut wood with density below 400 kg/m³ should not be used as load bearing structural components but only in the internal parts of a building such as ceilings and wall linings in the form of boards and wall paneling.

| Segment | Density | Uses |
|-------------|-------------|--|
| Lower Stem | Hard | Flooring, Trusses, Floor Joists, Staircase Components, Door Panels, Rafters, Window Jambes and Sidings |
| Middle Stem | Medium Hard | Exterior Wall Panels, Ceiling, Studs, Purlins and Roof Shingles. |
| Top Stem | Soft | Panels and Interior Partition Walls. |

The other end-use products from coconut wood could be listed as follows.

| Segment | Density | Uses |
|-------------|-------------|---|
| Lower Stem | Hard | Cigar boxes, Jewelry boxes and Chest, Rods and Sticks, Handles, Lampshade stand, Show cases, Moulding, Plates, Bowls, Paper weight, Ash tray, Flower vases, Parquet flooring, balusters, Street sign posts, Road guard railings, Table tops, Stool tops and furniture components. |
| Middle Stem | Medium Hard | Packing boxes, Glass shutter frames, Name plate, Shelves, Cabinet dividers, balusters, Headboards, Drafting boards and furniture components. |
| Top Stem | Soft | Shelves, Radio and television cabinets and Cloth hangers. |

Production of charcoal

Coconut wood is comparable to other woods as a fuel. Medium to good quality charcoal could be produced from coconut wood using any of the conventional methods of making charcoal.

The high density segments of the trunk yield higher charcoal recovery and better quality, compared to that from the low density segments. Experience has also shown that good quality charcoal can be obtained from logging and sawmilling residues like coconut trunk slabs and timber off-cuts and from the butt part of the trunk. The upper portion of the trunk, consisting of low density wood, gives charcoal of inferior quality.

Torrifaction

Coconut wood chips could be utilized to generate high quality fuel by the process of torrifaction. The fuel produced by torrifaction burns with very less smoke and generates lesser ash. However, this process is still under trials and commercial exploitation has not started.

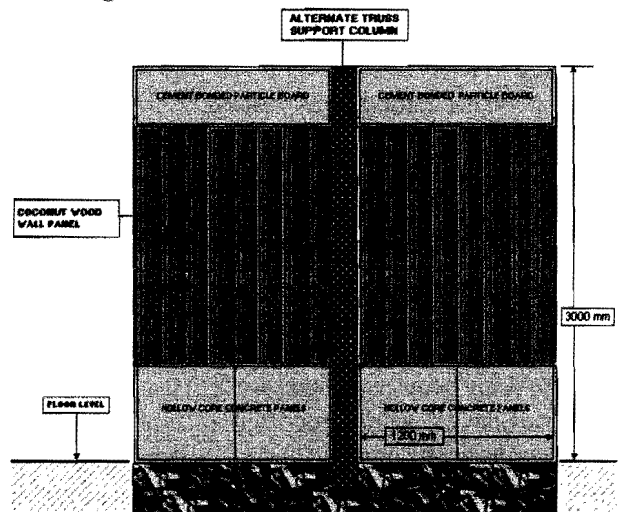
Coconut Fiber-cement Board (CFB)

The coconut fiber-cement board (CFB) is a relatively new product that makes use of coconut

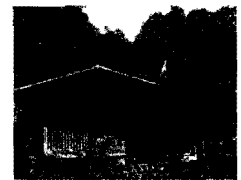
wastes and can be combined with coconut wood. It is manufactured from fibrous materials like coconut coir, fronds, mid-ribs, coconut top logs, or even shredded wood from small diameter fast-growing trees growing along the borders of coconut plantations. Manufacturing CFBs can be a good investment segment in developing countries facing huge demand for housing. CFB is a good replacement for tiles, brick, plywood, asbestos and cement hollow blocks.



Housing and shelters



Coconut lumber and CFB could be utilized for building residences and commercial blocks, utilizing a well engineered prefabricated housing technology. The coconut lumber houses are built in various parts of the world. Efforts are made in India also to establish alternate products for building houses and coconut wood and



boards could be a reliable source.



The model houses built in Philippines indicate considerable scope for utilizing coconut lumber and coconut wood based panels.

Wood Polymer Composite (WPC)

Efforts have been made to produce coconut fiber / chips and polymer composites for various end-uses.

The trials have been successful and WPC based on coconut fiber could be produced on a commercial basis. However, the cost of production seems to be high. Hence the production is commercially viable for few selected applications only.

Commercially Viable Value Added Products From Coconut Wood

Investment opportunities

Currently, in India, there is no organized investment programme in the sector of secondary processing of coconut wood. Some of the items which could be commercially manufactured with viable economics are listed below.

Parquet Flooring

The wooden parquet flooring market in India has registered very high growth rate in the last few years. The discerning customers prefer wooden flooring in selected areas in their residences or apartments. Recently wooden parquet flooring has made inroads to commercial buildings, office spaces, super markets and clinics also. The high price of timber and the resultant increase in the prices of wood parquet encouraged use of coconut wood parquet for various end-uses. The technological development improves the durability and wear and tear of the coconut wood parquet and renders it as a cost effective eco-friendly natural product.

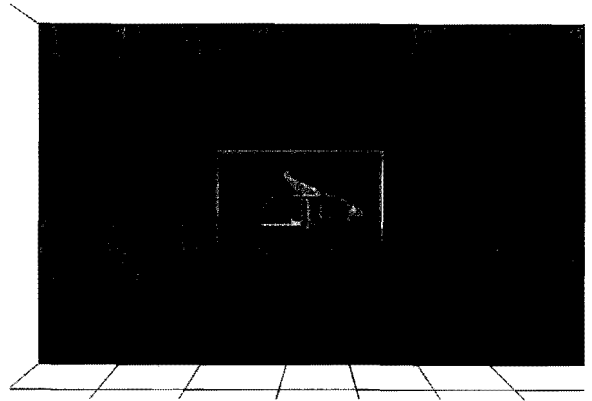


Wall Paneling

The demand for solid wood wall paneling for interiors in residences, commercial spaces and restaurants has been increasing at a rapid pace. The preference for eco-friendly natural product is strong and coconut wood wall paneling is one of the alternate sources, which is cost effective. An investment in coconut wood parquet flooring could produce wall paneling also.

Door and Window Frames

Matrix impregnated door and window frames from processed coconut wood could be a product which will meet the large demand for door and window frames in India. The recovery could be increased by



laminating smaller thickness scantlings. Such a product will be more stable and cost effective.

Coconut Wood Veneers

There is demand for coconut wood face veneer from certain panel manufacturing units in India and abroad. Slicing of coconut wood could cause problems of fiber separation. This problem will be acute during the veneer drying process. One solution is to upgrade the input coconut wood slab for slicing by impregnating a matrix which will provide lateral binding of fibers. Also the thickness of the veneer has to be designed to minimize such a problem. The timber slicing units in India could be interested in developing coconut wood face veneers also.

Furniture and Components for Interiors

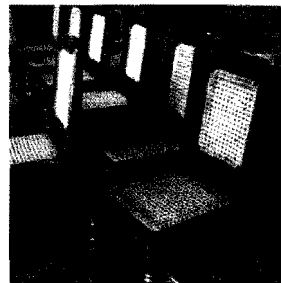
Processed coconut wood offers a refreshing change in the segment of solid wood furniture. Considerable headway has taken place in developing coconut wood furniture for various applications and end-uses.

Pre-engineered and pre-finished components could be produced from coconut wood for application in interiors as well as exteriors. The range includes hollow beams, columns, pickets, poles, cabinets and other utility products.

Coconut wood hollow beams of different cross sections could be produced in lengths up to 4 Mtrs. The product may find application in interiors as well as exterior pergolas. The design and cross section of the product



The item could be mass produced as long hollow beams and the same could be cut to the required length for the production of various smaller components. The product may find application as an element in house construction also.



Novelty and crafted Products

A well processed and upgraded coconut wood lumber could be utilized for production of various crafted items and utility products.

Handicrafts could be produced from coconut shell also. Such items which are combined with the craftsman skills could find export markets in Europe and other developed countries. Coconut wood provides a suitable input for development of skills and production.

Conclusion

Large scale replantation of the senile coconut trees opens opportunity for investment in coconut wood lumber processing, secondary processing of lumber as well as power generation. A coordinated and a well planned effort will be of tremendous social benefits. The rejuvenation and replantation scheme initiated by Coconut Development Board will act as a prime mover for the development of primary and secondary processing of senile coconut palms, generating considerable economic benefits to the society.

could be varied according to the applications. This component could be employed as columns also. In combination with metal sections, the hollow beam could be used as a load bearing component.



The web of the beam could be engineered either as a finger jointed and laminated timber or solid planks with glued lap joints.

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