
Bamboo engineered wood-based tiles

a. Introduction

Engineered bamboo is designed to be a replacement for wood or engineered wood. Engineered bamboo comes in several different forms, including bamboo scrimber and laminated bamboo, which has three times the structural capacity as normal timber and is defined and regulated by the ASTM International Standards.

Engineered bamboo has been used as panelling, vehicle beds, floor and wall tiles, furniture etc. In comparison to the woods that have been traditionally used, a number of benefits have been identified. Lower cost of bamboo tiles, especially when replacing wood is a key advantage. Further benefits include greater hardness and shape retention, especially in high temperatures.

b. Market Demand

Bamboo flooring is a flooring in which bamboo engineered wood-based tiles are used for floor instead of Vinyl and traditional wood. Bamboo flooring is now preferred because of the low cost of bamboo in comparison to other hard wood, easy to clean floorings, and are more stylish than traditional wooden floorings. In addition, bamboo flooring is termite resistant and is inhospitable to dust and dirt making a fine alternative for dust allergic people. Bamboo tiles with low-moisture content, dense surface, their natural appearance and environment friendly material are major selling points.

c. Production Target

Bamboo engineered wood-based tiles manufacturing involves higher investment as well as certain experience and technical expertise. A bamboo engineered wood-based tiles unit may be established on a larger scale as a Bamboo farmers' cooperative or government enterprise. Especially peoples, who are involved/experienced in Bamboo pre-processing, Bamboo stick manufacturing, manufacturing Bamboo mat board are prefeed to establish a Bamboo engineered wood-based tiles manufacturing unit.

d. Assumptions, if any

The essential requirements for a successful unit are:

- Regular supply of mature bamboo culms (appropriate diameter)
- Unskilled and skilled labour
- Sufficient start-up capital; and
- Market access.

e. Production Process

The manufactured bamboo-based tiles commonly follow the following steps;

- Cross cutting (slicing mature bamboo poles or culms desired length)
- Splitting (sliced into strips depending on the width desired)
- 4-side planning (outer skin and nodes are removed)
- Treatment (boiling either for 45min to 3 hours in a tank (200 litres of water & 1 litre of H₂O₂) for bleaching OR Mix 1% Borax i.e., 8 Kg of Borax Oxide & 2 Kgs of Boric Acid in 1000 litres of water at 0.3 MPa steam pressure for 40-120 minutes OR

- Carbonising (Heating strips leading to change of colour, drying for 32 hours (8 hours @ 80 degree C; 8 h @ 60 C; 8 h @ 80 C and 8 h @ 60 C) to get moisture level at 6%)
- Assembling (Same coloured sheets outside for floor tiles)
- Gluing (150 g/sq. m per surface of the middle sheet) in a 3-layered floor tiles
- Hot Pressing (200 Tonnes Press in one direction and 100 Tonnes press the sides at 100-140 degree C with steam for 10-15 minutes OR Pressing time depends on temp, board thickness, thermal conductivity and initial moisture content.)
- Sanding (80 & then 240 grits)
- Painting (multi coats on the top side)

f. List of machinery required along with quantity with Unit Price.

Bamboo engineered wood-based tiles manufacturing requires the industrial work shed/ factory setup and the list of machineries required are;

Sl. no	Tools & Equipment	Nos.	Unit Price in INR)
1	Cross cutter	2	55,000
2	Radial bamboo splitter	2	1,80,000
3	Elementary strip planning (4 side planning)	2	6,84,400
4	Further fine strip planning	2	5,01,500
5	Treatment Plant (pressure)	1	4,50,000
6	Industrial dry kiln / Carbonizer	1	10,34,000
7	Industrial both side sander	1	8,20,500
8	Edge cutting	1	1,65,000
9	Hot-Press	1	12,50,000

Note: how ever production line can be standardised depending upon the production shift and capacity.

ONE PAGER SUMMARY OF BAMBOO ENGINEERED WOOD-BASED TILES

Sl. No.	Particulars	Description				
A. Project Description						
1	Proposed Project	Bamboo engineered wood-based tiles				
2	Capacity of the machine (at 100% capacity utilization)					
3	Year wise capacity utilization	Year- 1	Year- 2	Year- 3	Year- 4	Year- 5
		70%	80%	90%	100%	100%
4	Raw Materials Required	Bamboo, Boric Borax, Industrial Glue, Hydrogen Peroxide, Miscellaneous items				
5	Final Product	Bamboo engineered wood-based tiles				
6	Infrastructure Required	Shed (10000 sq ft)				
7	Plant and machinery	Cross cutter Radial bamboo splitter Elementary strip planing (4 side planing) Further fine strip planing Treatment Plant (pressure) Industrial dry kiln / Carbonizer Industrial both side sander Edge cutting Hot Press				
8	Employment Generation	35 Hired labour – 25 semiskilled, 10 skilled. Additionally, 2 Managers cum supervisors shall be on permanent roll				
B. Project Cost						(Figures in Rs. Lakhs)
1	Land (own)					0.00
2	Civil works and Buildings (500 sqft @200/sqft)					40.00
3	Machinery					77.42
4	Others					13.00
5	Sub-total (A)					130.42
6	Working Capital Margin @40% of Total WC Requirement					56.28
7	Total Project Cost					271.13
8	Total Working Capital Req (B)					140.71
C. Means of Finance						(Figures in Rs. Lakhs)
9	Total Funds Required(A+B)					271.13
10	TERM LOAN (75% of A)					97.82
11	WORKING CAPITAL (60% of B)					84.42
12	Total					182.24
13	Equity					88.89
14	Total					271.13

D. Financial Benchmarks		(Figures in Rs. Lakhs)			
		Year- 1	Year- 2	Year- 3	Year- 4
1	Target Revenue (Lakh)	1386	1584	1782	1980
2	Break Even Point	55.41%	50.15%	45.86%	42.71%
3	DSCR including Principal repayment	3.82	3.62	4.76	6.22
E. Basic Assumptions					
1	Production of Bamboo engineered wood-based tiles	<p>Bamboo engineered wood-based tiles manufacturing involves higher investment as well as certain experience and technical expertise. A bamboo engineered wood-based tiles unit may be established on a larger scale as a Bamboo farmers' cooperative or government enterprise. Especially people, who are involved/experienced in Bamboo pre-processing, Bamboo stick manufacturing, manufacturing Bamboo mat board are preferred to establish a Bamboo engineered wood-based tiles manufacturing unit.</p> <p>Loading and unloading time for each press is 30 minutes. In a single press using the hot press, 6.5ft x 4ft ply can be pressed with 6 layers. Machine will run for 12 hours a day, functioning 300 days a year.</p> <p>Selling price is assumed at Rs 180 per sq ft.</p>			
2	Machinery	This is a profile of an industrial enterprise with 35 hired labour.			
3	Interest rate assumed	11%			
4	Repayment period	5 Years with 6 months moratorium			
F. Others					
1	Training Institutes	CBTC Meghalaya, BCDI Agartala, IIE Guwahati, Existing Units like ESES Bio-wealth and Mutha Industries			
2	Whether the service is in the Negative list under NEIDS and MSME?	No			