

Analysis of Economic Value in The Manufacture Of OpefbFiberboard as A Substitute for Ceramics

Bonaraja Purba¹, Batumahadi S², Marlan³, Agus Noviar P⁴

{bonarajapurba@gmail.com¹, batumahadi@gmail.com² mrlan.mr.n@gmail.com³,
agusnoviar.p.an@gmail.com⁴}

Medan State University, Faculty of Engineering, Mechanical Engineering¹²³⁴

Abstract. Amount of palm oil waste that has not been utilized optimally, such as Oil Palm Empty Bunches (OPEFB). OPEFB waste can be used as a raw material for partition boards to replace ceramics by processing OPEFB into fiber and adding resin adhesive to the partition board molding process. Making partition boards requires an economic analysis calculated from the cost of using raw materials, tools, labor, operational costs, and margins to get the value and selling price in the community. Ceramic partiCeramicd with a size of 40 cm x 40 cm with a thickness of 5 mm and this size is adjusted to the ceramics used by the community. Economic analysis is calculated from the capital for 1 month or 24 working days with the cost of raw materials Rp. 68,811,200, labor wages Rp. 7,200,000, Overhead Rp. 3,893,000, and the use of tools is Rp. 48,900,000, the total cost of tools in 1 month of work is Rp. 815,000, whose use is calculated for 5fiveyears of use, while the results are 6,912 pcs/month. From the capital price issued, the price of the partition board is Rp. 84,000/box which in 1 box contains 6 pcs. The ceramic partition boards obtained are 84,000/box, which is still in sale with the selling price of ceramics in the community Rp. 55,000 – Rp. 120,000.

Keywords: Analysis, Tecno-Ekonomi, OPEFB, Fiberboard.

1 Introduction

The palm oil industry developed rapidly in 2010, with CPO production estimated to increase between 5%-6%, while for the 2010-2020 period, it is estimated at around 2%-4% [1]. However, the increase in oil palm yields still causes problems in the results of solid and liquid waste in the form of Empty Palm Oil Bunches (OPEFB), stems, branches, shells, and liquid waste [2][3]. Waste products are currently not fully utilized, one of which is solid OPEFB waste which is still used as fuel and fertilizer, but this use has not been resolved to spend OPEFB waste[4]. At the same time, OPEFB waste causes a foul odor and can cause fungi that can damage the surrounding plants where OPEFB waste contains elements of cellulose (44.14%), Lignin (16.19%), and Hemicellulose (19.28%) [5]. OPEFB solid waste product is waste that can be utilized with high economic value, such as making fiberboard, charcoal, gas production, liquid smoke oil production, and handicrafts [6][7].

The use of OPEFB waste as the primary raw material has been widely developed by researchers and the community, one of which is the manufacture of partition boards with a mixture of resin[8]. A Partition board is a product in the form of sheets with the process of compaction and printing by adding adhesive. Partition board products can be used in the room as dashboards, walls, ceramics, and soundproofing [9]. The process of making partition boards needs a techno-economic analysis to get the price value of the product that will later be marketed to the public, where the techno-economic analysis is seen from production costs such as material costs, labor costs, overheating costs, tool costs, and margin costs [10][11][12]. The results of the explanation of the background above, the researchers are interested in analyzing the financial technology of processing partition board products from OPEFB fiber as a substitute for ceramics.

2 . Methodology

Empty Palm Oil Bunches (OPEFB) are used as raw material for making ceramic replacement partition boards with the addition of resin adhesives, where the raw material for OPEFB will be made of fiber. This research method uses experimental data and literature, where the implementation of the experiment is seen from the test data for the manufacture of partition boards, starting from the fiber manufacturing process to printing, for the computing system, the data analysis process is carried out in finding costs. Put out in production. And determine the selling price. The pricing of partition board products needs to be done through a techno-economic analysis of the cost of raw materials, labor, break-even point, tools, and margin settings.

2.1. Raw Material Cost

Determination of the cost of raw materials seen from the results of 1 pcs partition board. The use of raw materials for OPEFB fiber is as much as 400 Grams and 200 Grams of resin adhesive.

2.2. Labor Cost

Labour is an essential part of the production process, while wages are based on where the work is carried out. In determining workers' wages calculated for 1 month of work (24 days). The process of making partition boards has 6 workers: partition board printing, fiber making, drying, leveling/polishing, and packaging.

2.3. Machine Cost

Necessary to calculate the cost of the machine, which will later be needed for repairs or new purchases. The cost of the machine is also calculated for 1 working month (24) to find a similarity in the calculation of costs, while the use of the machine is estimated to last up to 5 years of work.

2.4. Overhead Cost

Overhead costs are additional costs in addition to the primary raw materials, divided into electricity costs, rabbinic costs, sanding paper costs, packaging costs, operational costs, and purchasing boxes for packaging [13].

2.5. Cost Margin

Margin is the profit that each company increases to reduce the cost of losses incurred, while the marginal cost in producing partition boards is 20%.

The partition board product has a square shape with a size of 400 mm x 400 mm and a thickness of 5 mm, where the results of the partition board product will later be used as a substitute for ceramics, while the shape of the partition board and mold is shown in Figure 1.

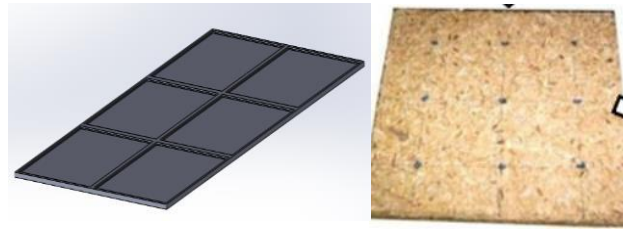


Fig.1. partition board mold and partition board result

Implementation of research on the manufacture of partition boards needs to be carried out in stages, as shown in Figure 2.

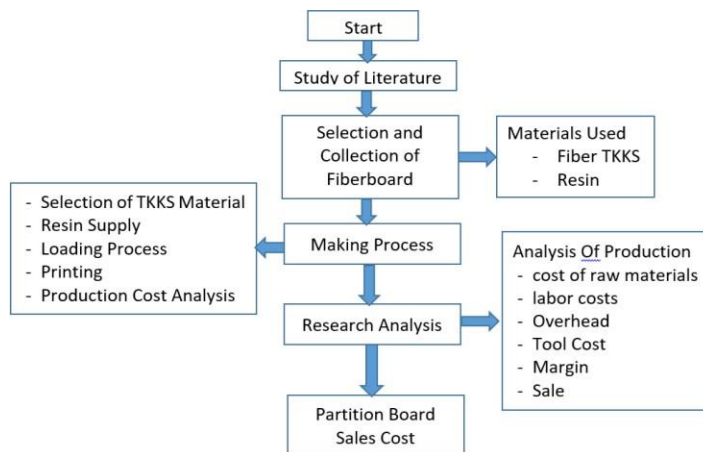


Fig. 2. Research Steps

process printing in 1 working month (24 working days) produces 6,912 pcs/month partition boards, where each printing process produces 6 pcs with a printing time of 10 minutes, while the working time in 1 day is 8 hours. Looking for the selling value of the partition board 1 Pcs and 1 box.

3. Result And Discussion

3.1. Main Raw Material

3.1.1. Oil Palm Empty Fruit Bunches (OPEFB)

OPEFB raw materials are obtained from Adolina plantations with transportation costs of Rp. 1,000,000 who get OPEFB weigh 4 tons. The OPEFB raw material is then used as fiber for the partition board printing process, while the weight of OPEFB fiber in 1 Pcs is 400 grams. The costs incurred for OPEFB raw materials can be obtained in this case.

$$\begin{aligned}
 EFB \text{ Price} &= \frac{EFB \text{ Pick Up Price}}{\text{Weight Results Obtained}} & (1) \\
 &= \frac{Rp. 1.000.000}{4 \text{ Tons}} \\
 &= \frac{Rp. 1.000.000}{4.000.000 \text{ grams}}
 \end{aligned}$$

$$OPEFB \text{ Price /Pcs} = Rp. 0,25/\text{grams}$$

Obtained the price of OPEFB/grams of Rp. 0.25/grams, we get the cost usage in 1 pcs partition board.

3.1.2. Resin

The use of resin raw materials in 1 pcs as much as 200 grams, which is currently the resin price of Rp. 50,000 with a weight of 1 kg (1,000 grams). It is necessary to search for resin prices in grams.

$$\begin{aligned}
 Resin \text{ Price} &= \frac{\text{Total Purchase Price}}{\text{Total Resin Weight}} & (2) \\
 &= \frac{RRp. 50.000}{1.000 \text{ Grams}} \\
 &= \mathbf{Rp. 50}
 \end{aligned}$$

Table 1. Cost of using raw materials

No	Raw Material	Material Use	Quantity (Print)	Clock (Print)	Working (Days)	Month (Day)	Total (Pcs)	Total Price	Total Price
1	OPEFB	400 gr	6	6	8	24	6912	Rp. 0,25	Rp. 691.200
2	Resin	200 gr						Rp. 50	Rp. 69.811.200
Total Cost									Rp. 69.811.200

The use of OPEFB and Resin Raw Material Costs for 1 working month (24 days) is Rp. 69,811,200 with a result of 6,912 pcs OPEFB partition boards.

3.2. Labor Wages

Labor costs include salaries and wages paid to employees. Labor costs are issued after the work is completed within 1 month, with the amount of salary given by the partition board company Rp. 1,200,000, while the labor section is listed in table 2.

Table 2. Classification of Labor and Wages

No	Worker Description	Quantity	Wages	Total Wages
1	Printer Process	1	Rp. 1.200.000	Rp. 1.200.000
2	OPEFB Fiber Grader/Grinder	1	Rp. 1.200.000	Rp. 1.200.000
3	Drying	1	Rp. 1.200.000	Rp. 1.200.000
4	Shine/Rabin	1	Rp. 1.200.000	Rp. 1.200.000
5	Transport/Pack	1	Rp. 1.200.000	Rp. 1.200.000
6	OPEFB Fiber manufacture	1	Rp. 1.200.000	Rp. 1.200.000

The total wages of workers in 1 month of work for making OPEFB partition boards are Rp. 7,200,000 with 6 employees.

3.3. Overhead Cost

Overhead costs are elements of production costs other than raw materials and direct labor, which consist of various costs which cannot be traced directly to other asset products. The details of overhead costs in 1 month of work can be seen in table 3.

Table 3. Overhead Cost

No	Worker Description	Quantity	Wages	Total Wages
1	Electricity Cost	1 Month	Rp. 700.000	Rp. 700.000
2	Rabin Fee	4 Bottle	Rp. 45.000	Rp. 180.000
3	Sandpaper Fee	5 roll	Rp. 12.000	Rp. 60.000
4	Unforeseen Expenses	1 month	Rp. 1.800.000	Rp. 1.800.000
5	Box	1152 box	Rp. 800	Rp. 1.152.000
Total Cost				Rp. 3.892.000

As for the overhead costs incurred for electricity costs, the purchase of a rabbi, sandpaper, additional costs, and boxes of Rp. 3,892,000, where this fee is for the processing for 1 month.

3.4. Machine

The manufacture of partition boards requires several machines to support the production process, where the cost of procuring machines will be calculated for 1 month. In contrast, the capital costs for the procurement of machines are shown in table 4.

Table 4. Machine Usage Fee

No	Worker Description	Quantity	Wages	Total Wages
1	Machine Fiber OPEFB	1Units	Rp. 30.000.000	Rp. 30.000.000
2	Oven	1 Unit	Rp. 10.000.000	Rp. 10.000.000
3	Machine Rabin	2 Units	Rp. 450.000	Rp. 900.000
4	Grinder OPEFB	1 Unit	Rp. 8.000.000	Rp. 8.000.000
Total Cost				Rp. 48.900.000

The use of costs in the purchase of machines of Rp. 48,900,000, where the age of the machine in the process of making partition boards is estimated at 5 years (60 months), then the cost of using the machine for 1 month is obtained, namely:

$$\begin{aligned} \text{Machine Cost/Month} &= \frac{\text{Total Machine Cost}}{\text{Machine Life}} & (3) \\ &= \frac{\text{Rp.48.900.000}}{5 \text{ Years (60 Menit)}} \\ &= \text{Rp. 815.000 /month} \end{aligned}$$

The cost of using the machine for 1 month of work is Rp. 815,000/month.

3.5. Production Cost

Production costs are the sum of the initial capital to manufacture the product. These are the sum of the costs of purchasing materials, labor, overhead, and machines, where production costs are calculated in 1 month of work.

Raw Material Cost:	Rp. 69,811,200	
Labor Costs	: Rp. 7,200,000	
Overhead Cost	: Rp. 3,892,000	
Machine Cost	: Rp. 815,000	+
the amount costs		: Rp. 81.718.200

From the calculation of the use of costs for 1 month with the amount of Rp. 81.718.200, it is necessary to calculate the cost of sales for the marketing, where :

$$\begin{aligned} \text{Cost Of Selling} &= \frac{\text{Total Cost}}{\text{Number Of Partion Boards Generated}} \\ &= \frac{\text{Rp.81.718.200}}{6912 \text{ Pcs}} \\ &= \text{Rp. 11.823/Pcs} \end{aligned}$$

Obtained the selling price of the partition board is Rp. 11.823/pcs, where the selling price does not include the company's margin.

3.6. Margin

The cost of margin in a business needs to be done to reduce the cost of losses from the company. In contrast, the understanding of margin is a term used in the financial world to indicate a guarantee that must be placed in trading in an option to cover losses and seek profit in the company, as for the margin set in the process of making ceramics by 20%, as for this determination to avoid increasing demand for goods by consumers which requires additional labor and additional costs.

$$\begin{aligned}\text{Margin Cost} &= \text{Cost Of Goods Sold} \times \text{Margin} \\ &= \text{Rp. } 11.823 \times 20\% \\ &= \text{Rp. } 2.365 / \text{Pcs}\end{aligned}$$

The value of the product price of fixed costs in the manufacture of partition boards is Rp. 11,823 with an additional margin of Rp. 2.365, it can be determined that the production cost of Rp. 14,188, with a rounding of Rp. 14,000/pcs, the acquisition price of production, and the selling price of 1 box of 6 pcs partition boards is Rp. 84,000.

There needs to be a comparison of the price of the partition board produced with the price of ceramics on the market. Where the price of ceramics currently available in the community is Rp. 50,000 - Rp. 120,000, which is compared to the partition board price of Rp. 84,000 is still classified as standard to be marketed to the public.

4. Conclusion

This report analyzes the technology for making partition boards from empty oil palm fruit bunches (OPEFB) with a mixture of resin adhesives as a substitute for ceramics, where the analysis process is carried out to obtain production costs and selling prices in the community. A techno-economic analysis is seen from the cost of raw materials, labor costs, overhead costs, and tools, which are calculated in the process of 1 month of work in determining the selling price of the product plus a margin to avoid significant losses. For the results obtained for the selling price of the partition, the board is Rp. 14,000/pcs and Rp. 84,000/box. The price gain is still considered standard, judging from the current price of ceramics in the community starting from Rp. 50.000/box - Rp. 120,000/box, partition board products can be registered for Rp. 84,000/box has been able to compete in the market.

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