

30. PROFILE ON PRODUCTION OF ABRASIVE PAPER

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I. SUMMARY

This profile envisages the establishment of a plant for the production of abrasive paper with a capacity of 75 tonnes per annum.

The present demand for the proposed product is estimated at 55 tonnes per annum. The demand is expected to reach at 101.1 tonnes by the year 2016.

The plant will create employment opportunities for 25 persons.

The total investment requirement is estimated at Birr 4.38 million, out of which Birr 2.34 million is required for plant and machinery.

The project is financially viable with an internal rate of return (IRR) of 28.39 % and a net present value (NPV) of Birr 3.62 million, discounted at 8.5%.

II. PRODUCT DESCRIPTION AND APPLICATION

Sand papers and emery clothes, some times referred as flexible abrasive, are articles used for manual or machine smoothing, polishing, cleaning and finishing of wooden, metallic or glass articles. They consist of a flexible backing material on which a single layer of glued abrasive grit is sprayed. The backing material is either aluminum oxide or silicon carbide. The glue or adhesive used to bend the abrasive to the backing could be all resin, which is waterproof, glue or a combination of the two.

The quality and cutting action of a flexible abrasive is determined by the type of abrasive used, the grit size, the density or spacing of the grit, the strength of the adhesive and the flexibility of the backing material.

Flexible abrasives are traditionally produced and sold in the form of sheets cut to standard size. Production in the form of abrasive belts and rolls is also possible whenever the need arises.

III. MARKET STUDY AND PLANT CAPACITY

A. MARKET STUDY

1. Past Supply and Present Demand

Since abrasive paper /sand paper are not locally produced the demand is entirely met through import. The historical import data of abrasive paper/sand paper is shown in Table 3.1.

Table 3.1
IMPORT OF NATURAL OR ARTIFICIAL ABRASIVE ON
PAPER OR PAPER BOARD (1997-2006)

Year	Quantity (Tonnes)
1997	53.2
1998	93.7
1999	15.8
2000	15.2
2001	97.0
2002	56.0
2003	20.6
2004	44.8
2005	42.1
2006	77.0

Source:- Compiled From Customs Authority.

A glance at Table 3.1. reveals that import of abrasive paper fluctuates from year to year without any trend. During 1997 and 1998, the import figure was about 53 tonnes and 94 tonnes, respectively.

In the two consecutive years (1999 and 2000), the annual import figures dropped to about 15.5 tonnes. A sharp increase has been observed during the years 2001 and 2002. In 2001 and 2002 the amount imported amounts to 97 tonnes and 56 tonnes, respectively. Again, import has plummeted to 20.6 by the year 2003 which is the lowest in the ten years period. Imported quantity during the period 2004-2006 was in the medium range i.e. between 42 tones and 77 tonnes.

In the absence of a trend in the imported data, it is considered as reasonable to assume that the average of the recent three years to reflect the present demand. Thus, the present effective demand for the product is estimated at 55 tonnes.

2. Projected Demand

Abrasive paper is used for smoothing, polishing, cleaning and finishing of mainly wooden and metallic articles. Hence, the major users of the product are the metal and wood working manufacturing industries as well as the building construction sector. The construction sector is currently growing at faster rate and as a result the demand for metal and wood work articles is very high.

Assuming that the construction sector and the metal and wood working manufacturing sector to grow slightly less than the national economic growth rate of 10% in the recent past, future demand for abrasive paper is projected to grow by 7% annually. The demand projection worked on this assumption is given in Table 3.2.

Table 3.2
PROJECTED DEMAND FOR ABRASIVE PAPER (TONNES)

Year	Quantity
2008	58.9
2009	63.0
2010	67.4
2011	72.1
2012	77.1
2013	82.5
2014	88.3
2015	94.5
2016	101.1

3. Pricing and Distribution

Price of abrasive paper varies according to thickness, size and country of origin. For this purpose the average imported price in the recent two years is considered and is estimated at Birr 48 per kg or 48,000 per tonne.

The product can be distributed through the existing building materials distributing enterprises.

B. PLANT CAPACITY AND PRODUCTION PROGRAMME

1. Plant Capacity

The envisaged plant will have a capacity to produce 250 kg of flexible abrasive per day and around 75 tonnes per year working 300 working days and in 1 shift (8 hours) per day. The remaining days are provided for annual maintenance and unexpected down times.

2. Production Programme

The plant shall start by utilizing 75%, 85% and 100% of its capacity during the first, second and third year of operation, respectively. Full capacity utilization is assumed to be achieved at the third year due to time needed for machine tuning and workers acquaintance with machinery and production techniques.

IV. MATERIALS AND INPUTS

A. RAW MATERIALS

The major raw materials required for the manufacture of flexible abrasive are abrasive, glues, high tear withstanding special quality paper and emery (for cloth backing). The type of paper required shall have weight and thickness ranging between 80 and 220 gms/m² and 100 and 290 microns, respectively. Cloth (emery) is the other major raw material (in the case of cloth back sandpapers) and is expected to have high strength. The two most known abrasives namely, silicon carbide and aluminum oxide, are the second major inputs. The adhesives used to bond the abrasive onto the paper are either water-soluble, water proof or a combination of the two. All the raw materials are to be imported from abroad.

The estimated quantity and cost of materials required at full capacity operation are listed below in Table 4.1.

Table 4.1
ANNUAL RAW MATERIALS REQUIREMENT AND COST

Sr. No	Description	Qty (Tonnes)	F.C (Birr)	L.C (Birr)	Total (Birr)
1	Special craft paper	16	245,988	86,096	332,084
2	Treated cloth	5	227,065	68,120	295,185
3	Abrasive	21	296,477	103,767	400,244
4	Glue and Chemicals	21	441,517	154,531	596,048
5	Packaging material	-	-	18,854	18,854
	Total		1,211,047	431,368	1,642,415

B. UTILITIES

The total electrical energy required per annum is around 72,000 kWh and the estimated annual cost will be Birr 34,626. The annual consumption of water which is used both for production papooses, drinking and sanitation is about 1,823 m³ and the estimated annual cost will be Birr 10,027.

V. TECHNOLOGY AND ENGINEERING

A. TECHNOLOGY

1. Production Process

The manufacturing process of abrasive paper in all plants is almost similar. Two of the basic differences are gluing of abrasive to the backing material (i.e. electrostatically or by gravity) and final drying process (namely by steam or electrical resistance).

The major production processes are primary glue coating, electrostatic abrasive coating, secondary glue coating, electrical drying, slitting, cutting and packaging and storage.

- **Primary Glue Coating**

In the coating machine, the substrate which is continuously fed is covered with a layer of glue using a rigid knife method.

- **Electrostatic Abrasive Coating**

In the electrostatic spreader, the rice-shaped abrasive grits are deposited in regular upright form across the whole surface of the coated base material.

- **Secondary Glue Coating**

The substrate is glued again to hold the grits in place before drying.

- **Electrical Drying**

The properly coated substrate (with grits) is then further conveyed for drying and curing before the coated side can be touched again. A flat electric dryer shall be used for drying because it is easily controllable and does not affect the strength and stability of the coated substrate.

- **Cutting and Slitting**

The cured and dried up substrate is then slitted horizontally in to strips by a set of vertical knives in the slitter and are further cut to pieces by a reciprocating blade at right angles to the direction of flow.

2. Source of Technology

The technical data are compiled from the Addis Ababa pilot industrial estate feasibility study conducted by IPS for the former HASIDA.

B. ENGINEERING

1. Machinery and Equipment

Coated abrasive manufacturing plants are normally big with high outputs. The continuous process of glue and abrasive application make their investments consideration high.

The estimated cost of the machinery and equipment for the envisaged plant is about Birr 2,340,750 out of which Birr 1,989,638 is in foreign currency and Birr 351,112 is in local currency.

The list of machinery and equipment is presented in Table 5.1.

Table 5.1
MACHINERY AND EQUIPMENT REQUIREMENT AND COST

Sr. No	Description	Qty (No)	Cost
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1	Mark printer	1	
2	Glue coater	1	
3	Electrostatic coating equipment	1	
4	Abrasive application	1	
5	Electricity heated flat dryer	1	
6	glue mixer	2	
7	Rewinding machine	1	
8	Slitting machine	1	
9	Cutting machine	1	
10	Flat press	1	
11	Fork lift	1	
Total Estimated Cost			Birr 2,340,750

2. Building and Civil Work

The total building space requirement of the plant is estimated at 400m². The cost of building and civil work is estimated about Birr 1,000,000. The total area of the land including provision for open space is about 700m² and its annual rent cost will be Birr 350.

3. Proposed Location

The envisaged plant shall be located in Body town in Damot Galle Woreda of Wolayita Zone.

VI. MANPOWER AND TRAINING REQUIREMENT

A. MANPOWER REQUIREMENT

The envisaged plant will employ 25 persons of whom 7 are administrative workers and 18 are production workers. A detail of manpower requirement is presented in Table 6.1.

Table 6.1
TOTAL MANPOWER REQUIREMENT AND COST

Sr. No	Description	Req. No.	Monthly Salary (Birr)	Annual Salary (Birr)
1	Plant Manager	1	3,000	36,000
2	Technical Head	1	2,000	24,000
3	Secretary	1	700	8,400
4	Finance	1	1,500	18,000
5	Sales	1	1,500	18,000
6	Production foreman	1	1,000	12,000
7	Messengers and cleaner	2	400	4,800
8	Maintenance	3	2,400	28,800
9	Machine Operators	14	5,600	67,200
10	Workers benefit (15%)			32,580
	Total	25	18,100	249,780

B. TRAINING REQUIREMENT

Training technical manager and maintenance personnel is required. The total cost of training is estimated at Birr 25,000.

For the supervision of erection and start-up of the plant, two expatriates one engineer and one supervisor, are needed. The expatriates would be posted for a period of one month. Total cost of expatriates for the period is estimated at Birr 81,000.

VII. FINANCIAL ANALYSIS

The financial analysis of the abrasive paper project is based on the data presented in the previous chapters and the following assumptions:-

Construction period

1 year

	30-12
Source of finance	30 % equity
	70 % loan
Tax holidays	3 years
Bank interest	8%
Discount cash flow	8.5%
Accounts receivable	30 days
Raw material local	30days
Raw material, import	90days
Work in progress	5 days
Finished products	30 days
Cash in hand	5 days
Accounts payable	30 days

A. TOTAL INITIAL INVESTMENT COST

The total investment cost of the project including working capital is estimated at Birr 4.38 million, of which 13 per cent will be required in foreign currency.

The major breakdown of the total initial investment cost is shown in Table 7.1.

Table 7.1
INITIAL INVESTMENT COST

Sr. No.	Cost Items	Total Cost (‘000 Birr)
1	Land lease value	21.0
2	Building and Civil Work	1,000.0
3	Plant Machinery and Equipment	2,340.8
4	Office Furniture and Equipment	75.0
5	Vehicle	200.0
6	Pre-production Expenditure*	432.9
7	Working Capital	308.8
	Total Investment cost	4,378.4
	Foreign Share	13

* *N.B Pre-production expenditure includes interest during construction (Birr 232.85 thousand) training (Birr thousand 106) and Birr 94 thousand costs of registration, licensing and formation of the company including legal fees, commissioning expenses, etc.*

B. PRODUCTION COST

The annual production cost at full operation capacity is estimated at Birr 2.67 million (see Table 7.2). The material and utility cost accounts for 61.74 per cent, while repair and maintenance take 4.37 per cent of the production cost.

Table 7.2
ANNUAL PRODUCTION COST AT FULL CAPACITY ('000 BIRR)

Items	Cost	%
Raw Material and Inputs	1,642.42	61.36
Utilities	10.03	0.37
Maintenance and repair	117.04	4.37
Labour direct	149.87	5.60
Factory overheads	49.96	1.87
Administration Costs	149.87	5.60
Total Operating Costs	2,119.19	79.18
Depreciation	371.58	13.88
Cost of Finance	185.77	6.94
Total Production Cost	2,676.54	100

C. FINANCIAL EVALUATION

1. Profitability

According to the projected income statement, the project will start generating profit in the first year of operation. Important ratios such as profit to total sales, net profit to equity (Return on equity) and net profit plus interest on total investment (return on total investment) show an increasing trend during the life-time of the project.

The income statement and the other indicators of profitability show that the project is viable.

2. Break-even Analysis

The break-even point of the project including cost of finance when it starts to operate at full capacity (year 3) is estimated by using income statement projection.

$$BE = \frac{\text{Fixed Cost}}{\text{Sales} - \text{Variable Cost}} = 18 \%$$

3. Pay Back Period

The investment cost and income statement projection are used to project the pay-back period. The project's initial investment will be fully recovered within 4 years.

4. Internal Rate of Return and Net Present Value

Based on the cash flow statement, the calculated IRR of the project is 28.39% and the net present value at 8.5% discount rate is Birr 3.62 million.

D. ECONOMIC BENEFITS

The project can create employment for 25 persons. In addition to supply of the domestic needs, the project will generate Birr 2.25 million in terms of tax revenue. The establishment of such factory will have a foreign exchange saving effect to the country by substituting the current imports.