

FEASIBILITY STUDY

FOR

ROWFER LIMITED

MINERAL PROCESSING PROJECT

PREPARED BY

ROWFER LIMITED

Dar es Salaam

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1.0 INTRODUCTION

1.1 Foreword

The Tanzania Government is emphasizing p on its long – term industrial plan of strengthening the metal and engineering sub- sector in the country.

The private sector has also been paying a vital role in the development of this basic industry, mainly by establishing service- oriented engineering workshops which provide maintenance and repair services.

The National demand was established to be more than 400,000 tons per annum .Indications that the demand is increasing fast and is now closed to 700,000 tons per annum

One of the basic necessities for the establishment of this basic industry is the availability of an adequate local market for its output. It is rational for local Governments, therefore , to encourage and promote the growth of the local engineering sub- sector which will ultimately consume the local based copper & iron and steel industry's output. A recently established local firm, **ROWFER LIMITED** has realized the potential this country has in terms of different minerals products markets. It is now contemplating putting up a complex that will refine minerals to produce various types of goods.

1.2 Objective of Study

The purpose of this feasibility study is to work out the technical and commercial details and financial viability for the establishment of Melting / refinery facilities for different minerals for various and users such as civil work construction and engineering works.

1.3 Project Promoters

The proposed mill is being promoted by a locally registered company namely **ROWFER LIMITED** of P.O Box 68, Chunya, Mbeya

Name of Director	Percentage Share	Nationality
AHMED GAAFAR YAHIA OSMAN	31.6	BRITISH
ALI ABDELRAHMAN YAHIA OSMAN	31.6	SUDANESE
MAKI AHMED OSMAN ABDELSLAM	10.5	TANZANIAN
HAMZA MOHAMED AHMED ELGABRI	26.3	SUDANESE

2.0 EXECUTIVE SUMMARY

2.1 Introduction

This study examines the possibility for the establishing a Vat leaching plant Mineral Processing Various metal products by using induction furnace and hot rolling technologies and locally available metal products and imported minerals from near countries. . A techno- economic evaluation has been carried out to determine the viability of the project idea.

2.2 Market and Marketing Aspect

The market survey carried out reveals that he demand for minerals products raising rapidly.

The survey concludes that the proposed production of about 4,800 tons of products per annum will not face any market problems.

2.3 Process and Technology

There are various methods for Vat leaching plant Mineral Processing. The most widely used method is the basic process. The method for iron smelting is of two type's .This includes the converted and the heath methods. The electric methods fall under the heath method and employ electricity as the energy for melting the inputs.

Two methods are used, namely the arc furnace and induction furnace. The former uses electrodes for current circulation while the latter used

frequency. The proposed project will employ the induction method, a method which is more economical for high quality steel.

The process involved sorting out the crucible of the furnace, heating and melting it and finally pouring the liquid steel into moulds where they solidify. Thereafter the ingots are reheated to even internal temperatures and then hot- rolled .The requisite machinery for the production include a 4 tone charge induction furnace, a reheating furnace and steel re- rolling induction accessories such as pouring and moulding equipment.

2.4 Production Inputs

The most critical inputs in to the plant are minerals, electric power in the magnitude of 2000 KVA will be required and this amount will be required and this amount will be supplied by Tanzania Electric Supply Company Limited

A considerable amount of water will be required for cooling .However, it will be recycles. Other production inputs include fuel oil, alloying elements, graphite powder and limestone.

2.5 Location

The plant will be located at Chunya District, Mbeya Region Tanzania.

2.6 Manpower Requirements

The plant Management will comprise 3 people out of a total workforce of 142 people. There will be 81 operators, 4 expatriates and the rest in direct workforce. The plant will operate on a3- shift per day basis. The plant will be organized into three departments, namely production, , finance and Administration and technical services(repair , maintenance and quality control).

2.7 Implementation

The Major activities include registration and approval by the Tanzania Investment Centre and mobilization of funds from sponsors and banking instutions. Civil works design, tendering and construction will be carried

out immediately after project is approved and would take about six months.

Machinery will be ordered after funds are committed. These will be fabricated shipped for activities related to machinery up to their receipt at site .

Training machinery installation and commissioning will be undertaken within another two months.

Activities related to civil works and machinery will take place simultaneously.

2.8 Project Economics

2.8.1 Capital Investment Requirements

DESCRIPTION	TOTAL
Land and Building	100,000
Plant & Machinery	400,000
Furniture & Fitting	90,000
Vehicle	100,000
Pre- Operational Expenses	40,000
Working Capital	100,000
TOTAL INVESTMENT	830,000

2.8.2 Financing Scheme

i) Fixed Assets and Pre- Operational Costs

US\$

Equity 830,000

Total 830,000

2.9 Recommendations

The study shows that steel & copper production is both technically and financially feasible. Furthermore, it will cut down on imports of this important product. In view of the findings the project is recommended for implementation

3.0 MARKET AND MARKETING

3.1 Demand

Demand for the proposed product has been derived on the basis of the end use method. The products are used in various ways from buildings and other civil work constructions, in manufacturing of security grills and fences and as raw materials for manufacture of industrial products and machinery parts to industries.

Eg. Copper, is one of the basic chemical elements. In its nearly pure state, copper is a reddish- orange metal known for its high thermal and electrical conductivity. It is commonly used to produce a wide variety of products, including electrical wire, cooking pots and pans, pipes and tubes, automobile radiators and many others .Copper is also as a pigment and preservative for paper, paints, textiles and wood. It is combined with zinc to produce brass and with tin to produce bronze.

There is high demand for copper products as Raw materials for manufacture of Industrial products and machinery parts. The demand for these products as raw material for the manufacture of industrial products and machinery parts, analysis has revealed there is an increase which is caused by shortage of raw materials, old machineries and import of manufactured goods.

Given the current improvements in the national economy, it is expected that the average capacity utilization of the past 5 years to at least 70%. It is also expected that the average growth rate of usage of steel bars as raw materials will equal to the growth rate of GDP for the industrial sector, currently at 3.4 %.

3.2 Supply

The quantity has been declining over the years. The declining trend is as a result of increasing number of minerals companies being opened in the country.

Distribution Channels

Minerals products are heavy and bulky products. Hence they can be easily distributed to find consumers either directly (one level channel) to final consumers or by using only one intermediary who will resale to final consumers (two level channel)

3.3 Promotion

Experience of selling this product prescribes that they can be easily sold through personal selling (personal solicitations of orders) to potential big customers and advertisement with emphasis on product availability quality and persuasion.

4.0 PRODUCTION PROCESS AND TECHNOLOGY

4.1 Production Processes

On the basis of refining minerals making processes fall into two chemical divisions namely:

- Acidic process
- Basic process

The terms acid and basic refer to the furnace linings and the nature of the slag formed.

5.0 Plant Location and Civil Works

The plant will be located in Tanzania. Production Building Required which is an open shed roofed with GCI sheets, and constructed from reinforces concrete slab in site is ideal for both the furnace and rolling mill facilities. The scrap and finished products would both be stored in the open

6.0 Utility Services

a) Water

The site has already been supplied with water. A 3 inch diameter pipeline connects the plot to the main pipeline. The plant water requirement is basically for cooling purposes and water will be recycled. About 10,000 litres of water will be required per day. Therefore a water reservoir of capacity 30,000 litres is recommended to be constructed.

b) Electricity

The site will tap its power from substation nearby. A number of machines will be premedical operated. There will therefore be a need to have a central compressor station which will generate the compressed air requirements. A central compressor station will be provided to provide compressed air for some of the production units.

As said elsewhere in this report, the source of energy for meeting the scrap will be electric power. Power is consumed in very large quantities and it is among the biggest cost element in this type of steel production. The demand for this plan is estimated at around 2000Kva

c) Material Handling Equipment

The plant will require the services of an overhead crane which will be employed for lifting the scrap containers for feeding the furnace as well as move the ladles with liquid steel into the casting area.

d) Weighing Scales

A road vehicle weigh bridge and a portable dial platform scale will be required at the plant site for weighing incoming trucks with scrap and weighing the production inputs during production

e) Oxygen and Acetylene Gas Cutting Equipment

Several gases cutting equipment of the type mentioned above and their corresponding cutting torches will also be required for the steel mill.

f) Workshop Facility

In order to enable the company to handle small repairs to its aassets we recommend the acquisition of a minimum number of metal working machines such as one lathe, a milling/drilling machine power hacksaw and tool kits.

7.0 MANPOWER AND ORGANISATION

The proposed complex will have three Independent departments, namely administration and finance production and technical staff.

Organisation

The top people in the day- to day running of the company will be General Manager .Under the General Manager's office will e three department, namely finance/ administration production and technical services. Each department will be under a Manager and will comprise a number of sections each headed by section head such as Finance/ Personnel Department Production Department.

Each section will be manned by a number of personnel with varying education levels and work experiences. The management team will comprise the General Manager, Chief Accountant and the four expatriates who will head the different production and service department.

He will also be responsible for repair and maintenance for company assets and research and development activities.

The technical department will comprise three sections, namely:

- a) The repair and maintenance section which would be responsible for all repair works. An expatriate will be employed to train the local technician in the machinery repair works.
- b) Laboratory section which will be responsible for quality control of both the raw materials and finished goods.

c) Research and development section.

7.1 Production Department

The production department will comprise two sections, namely steel mill and rolling mill.

Finance and Administration Department

An Administration and Finance Manager will head the department. He will be responsible for the administration of the company as well as overseeing the financial aspect of the company

7.2 Manpower Requirement

The manpower requirement for running the proposed mill is 142 people. The administration staff will work on one shift per Day. The production and technical departments will work on 3 shifts per Day basis.

8.0 INVESTMENT AND FINANCING

8.1 Assumptions

The financial projections to determine the viability of the minerals is based on the following key assumptions:

- The project will operate at 50% capacity in year 1 , 60% in year 2, 70% in year 4 and thereafter
- Plant will operate on three shifts per day for 250 days per year.
- The whole project output will be sold locally

8.2 Summary of Capital Costs

The total initial investment required for undertaking the project is estimated at US\$ 830,000. Spread over a year as shown. The breakdown of the capital investments is presented in table below:

DESCRIPTION	Total
Land and Building	100,000
Plant & Machinery	400,000
Furniture & Fitting	90,000
Vehicle	100,000
Pre- Operational Expenses	40,000
Working Capital	100,000
TOTAL INVESTMENT	830,000

8.3 Building and Civil Works Costs

The premises will be renovated e for constructions for plant installation only. These are Estimated and given under cost of machinery

8.4 Plant Machinery and Equipment Costs

The main machinery for the envisaged project will be electric furnace, steaming ladles and moulds reheating various tools, accessories etc.

8.5 Furniture and Fittings

The items to be purchased will comprise office furniture and computers for office and factory.

8.6 Vehicles

A 15 toner truck and a 5 toner truck that will be used for transportation of raw Materials and finished products and other office activities are recommended. A Bus of 45 seats will be provided for workers' transport and two saloon cars for the top management

8.7 Pre- Production Capital Expenditures

These include project development cost for feasibility study and start-expenses

Including interest on loan taken for capital investment in the pre-production Period

8.8 Initial Working Capital

Initial Working capital requirements for the proposed project works Out at about US\$0.83 Million

8.9 COST OF OPERATION

The anticipated costs for operating the project are detailed in the following Sections the capacity utilization has been assumed to grow at a rate of 50% in year 1, 60% in year 2, 70% in year 3 while stabilized production is envisaged From the fourth year at 80% of rated capacity. 80% will be the sustainable Production level.

8.10 Repair and Maintenance

Annual repairs and maintenance of the machinery and equipment have been Worked out to cover all costs including spare parts.

8.11 Vehicle Running Expenses

Vehicle running expenses include fuel, lubricants, tear and wear, road licence Insurance etc, This cost item has been estimated at 35% of the original cost of the vehicle annually

8.12 Salaries and Wages

The total wage package is estimated at US\$ 0,070 million for the first two years

8.13 Administrative Overheads.

The main item in the administrative cost is insurance of fixed assets. The administrative costs are estimated at US\$0,010 million/ annum

Dividends for the first 5 years during which are company will have to meet other

Commitments like loan repayment, costs for technology training etc.

9.0 FINANCIAL ANALYSIS

9.1 Income and Expenditure

9.1.1 Income

The proposed project expects to earn its income through the sale of reinforcement copper and steel products mainly at sustainable level of production, the total sales are expected to stand at US\$ 1,632 million from the Fourth year of production onwards by selling a total of 4800t of final products.

9.1.2 Cash Flow Statement

The project's cash flow is impressive as the need for external assistance arises Only in the initial stages of the project investment.

10.0 Economic Benefits

The successful operation of this processing plant will contribute significant Economic benefit to asaid region people and Tanzania as whole . In summary the benefits which will be realized are as follows:

- The execution of this project will bring about employment opportunities
- Provision of income to other services providers, thus contributing to the reduction of poverty. The income to be earned will help in improving standard of living of the workers and other people residing in the region
- The direct income for the workers combined with help in overall efforts of alleviation of poverty in the Region
- This project will facilitate opportunities to increase foreign exchange earnings through export of some of its value products
- Project will create Government Revenue through Taxation

11.0 Conclusion

The investment and development of these products processing undertaking is in Line with the Government objective of encouraging proper development of Industries in the country. It will have a positive

impact on the development of the region as, it would Generate a number of benefits and more positive impact on the economy of the region
This document has provided a full analysis on the financial , Techno-economic viability and have established that the proposed project is technically sound financially viable , and economically/ socially beneficial.

MS. ROWFER LIMITED INVESTMENT COST

DESCRIPTION	TOTAL
Land and Building	100,000
Plant & Machinery	400,000
Furniture & Fitting	90,000
Vehicle	100,000
Pre- Operational Expenses	40,000
Working Capital	100,000
TOTAL INVESTMENT	830,000

MS. ROWFER LIMITED

PROJECT FINANCING

US\$

DESCRIPTION	FOREIGN	TOTAL
Equity	830,000	830,000
TOTAL INVESTMENT	830,000	830,000

ROWFER LIMITED
DEPRECIATION SCHEDULE

		Rate		1	2	3	4	5	6	7	8	10-Sep
Land & Building		4%	900,000	36,000	36,000	36,000	36,000	36,000	36,000	36,000	36,000	36,000
Plant & Machinery		12.50%	1,200,000	150,000	150,000	150,000	150,000	150,000	150,000	150,000	150,000	150,000
Furniture & Fitting		12.50%	90,000	11,250	11,250	11,250	11,250	11,250	11,250	11,250	11,250	11,250
Vehicles		25%	800,000	200,000	200,000	200,000	200,000	200,000	200,000	200,000	200,000	200,000
Pre Operational Expenses		20%	40,000	8,000	8,000	8,000	8,000	8,000	8,000	-		
TOTAL				405,250	405,250	405,250	405,250	405,250	405,250	397,250	397,250	397,250

ROWFER LIMITED
PROFIT & LOSS FORECAST

	1	2	3	4	5	6	7	8	9	
	60%	80%	90%							
PNOVER	979000	1,305,600	1632000	1632000	1632000	1632000	1632000	1632000	1632000	1632000
Sale of Steel & Copper Products										
	979000	1,305,600	1632000	1632000	1632000	1632000	1632000	1632000	1632000	1632000
RECT COSTS	242000	322000	403000	403000	403000	403000	403000	403000	403000	403000
Total Direct Cost	242000	322000	363000	403000	403000	403000	403000	403000	403000	403000
LOSS PROFIT	737000	939600	1229000	1229000	1229000	1229000	1229000	1229000	1229000	1229000
OTHER COSTS	200750	200750	200750	200750	200750	200750	196750	196750	196750	200750
Depreciation										
Profit before tax	536250	738850	1,028,250	1,028,250	1,028,250	1,028,250	1,032,250	1,032,250	1,032,250	1,032,250
ERATING PROFIT	536250	738850	1,028,250	1,028,250	1,028,250	1,028,250	1,032,250	1,032,250	1,032,250	1,032,250
Taxation 30%	160875	221655	308475	308475	308475	308475	309675	309675	309675	309675
GROSS PROFIT	375375	517195	719775	719775	719775	719775	722575	722575	722575	722575
MULATIVE	375375	892570	1,612,345	2,332,120	3,051,895	3,771,670	4,494,245	5,939,395	5,939,395	6,661,970

ROWFER LIMITED
PROJECTED CASH FLOW

		0	1	2	3	4	5	6	7	8	
Source											
Profit before			737000	939600	1229000	1229000	1229000	1229000	1229000	1229000	1229000
interest and											
Depreciation											
Equity		830,000									
Total Sources		830,000	737000	939600	1229000	1229000	1229000	1229000	1229000	1229000	1229000
Duplications		830,000									
Capital Expenditure		830,000									
Tax		830,000	536250	738850	1,028,250	1,028,250	1,028,250	1,028,250	1,032,250	1,032,250	1,032,250
Sub Total		830,000	536250	738850	1,028,250	1,028,250	1,028,250	1,028,250	1,032,250	1,032,250	1,032,250
Capita Duplications		830,000	536250	738850	1,028,250	1,028,250	1,028,250	1,028,250	1,032,250	1,032,250	1,032,250
Net working capital			200750	200750	200,750	200,750	200,750	200,750	196,750	196,750	196,750
Acumulated Cash			200758	401500	602,250	803,000	1,003,750	1,204,500	1,401,250	1,598,000	1,794,750