



ABSTRACT

The dissertation depicts, an sectoral review of the Refractory industries in Orissa. The emphasis that has laid down in finding out the competitive advantages, of the large Indian refractory companies that have created overtime along with their adaptation to the changing environment, keeping in view the marketing potential and prospects of the refractory industries in Orissa.

The study focuses on the major companies in the Refractory sector located in Orissa, namely Tata Krosaki Refractories Ltd formerly known as Tata Refractories Ltd (Belpahar), IFGL Refractories Ltd(Kalunga), Manishri Refractories and Ceramics Pvt. Ltd(Cuttack) , Sarvesh Refractories Pvt Ltd(Kaurmunda) and OCL Ltd(Rajganpur).

For the purpose of investigation, both primary as well as secondary source of information were collected to get the results. Many books on the related topic like books on steel marketing, competitive advantage, business research methods etc. were also consulted along with a number of visits to the libraries for research purpose. Related quotes and texts from different entrepreneurs have been mentioned in the literature review section of the report. Mostly questionnaires and interview surveys were conducted among the officials 64 nos. from personnel category , 32 nos. from customers category and 32 nos. from agents of major Refractory Companies located in Orissa to know their responses towards the research questions.

Infact the research work through the collection of questionnaires and surveys, helped me to know the various marketing aspects of refractory industries in India, mainly about the various strategies that the companies have adopted to gain competitive advantage not only domestic but also globally.



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CHAPTER-1

1-INTRODUCTION

1.1 BACKGROUND OF THE STUDY

Three main sectors which contribute to the Indian economy are agriculture, industrial and service, we cannot ignore as in 2005-06 GDP growth was 8.1 % with Industrial sector to 9.4 %, agriculture growth 2.3%¹. So Industrial sector has lot more contribution to the India's Economic, as Industrial goods are defined as companies which buy products and services to help them produce other goods and services². Industrial goods deals with³: accessory equipments (ex. hand tools, lift trucks), business service(ex. banking and maintenance), installations (ex. furnaces, refractory) ,parts ,raw materials, semi manufactured goods and supplies(maintenance, repair and operating supplies). when installations were furnaces are built up of both metallic and non metallic parts with the application of heat resisting non metallic materials used in it are called "Refractories"⁴ ,.As such steel plants, cement rotary kilns or a glass melting furnaces could never produce finished goods without the application of Refractory products. The below table 1 indicates Refractory products in India directly assist in the current production of about 24 mt of steel, 70 mt of cement clinker, over 9 lakhs tonnes of glass and about 8 lakhs tonnes of non-ferrous metals in the country.⁵

Contribution of Refractory Products in different Industries are as follows:⁶

	Steel	Cement	Glass	Ceramics	Non Ferrous	Others
International	70%	12%	3-4%	6%	2-3%	4%
Domestic	74%	7%	4%	3%	3%	6%



Source: IRMA, Aug 2005

Even though, the contribution of Refractory industry in India is 4% of the Global Market⁷, but for the last four to five years Refractory industries have been in good progress for exporting its products ex. export has increased from Rs. 314 Crores in 2006-2007 to about Rs. 452 Crores in 2007-2008^{8(IRMA)}. Even though the export competitiveness and market of refractory in India are small in size compared to its counterparts elsewhere. The total 120 refractory industries which are spread over many states mainly Tamil Nadu, West Bengal, Bihar, Orissa, Madhya Pradesh, Maharashtra, Gujarat and Rajasthan⁹. But if we take a look on the share of Refractory Industries of different regions in the world market were Asia/Pacific 40% ,Eastern Europe 23% ,Latin America 4% NAFTA (USA,Canada and Mexico) 14% ,Western Europe 15% and Others (Africa and the middle East) 4%¹⁰.

Moreover the aggregate production capacity of India is 1,500,000 metric tonnes per year-actual production however is between 700,000 and 1,000,000 metric tones¹¹ per annum and in worldwide refractory market estimated to be 22 to 25 million tonnes - as opposed to a production capacity of approximately 40 million tonnes.¹²

As in domestic market due to the new upcoming of four Greenfield and one expansion project of Tata Steel, Essar, Posco, Arcelor Mittal and SAIL set to take off in **Orissa** in the next three to four years, **refractory** manufacturers in the state are in a mixed mood. So the future scenarios of these **refractory** manufacturers, mostly dependent on steel plant projects, which would keen in meeting the demand points and stand more viable logistically too. **Orissa** is one of the state has quite a few reputed **refractory** manufacturers capable of making quality **refractory** products to stand themselves to



compete not only domestically but also globally with their specialty products . Tata **Ref Ltd(No. 1 Refractory Manufacturer in India)**, OCL Ltd, IFGL Ref Ltd(No.1 Refractory Exporter), Sarvesh Refractories Pvt. Ltd, and Manishri Refractories and Ceramics Ltd are the major players who are operating in the state for a long time.

On the other side, influx of Chinese refractory is a major concern for these refractory manufacturers in India. But with current import trends from China, these refractory manufacturers looking worried as around 20 percent of the refractory produced in India are imported and most of the imported refractories are sourced from China, according to a spokesperson from the Indian Refractory Manufacturer's Association (IRMA). Around 0.3 million tons of refractory was imported in 2006-07 on an annualized basis, these is a big concern for the small players operating in the domestic markets.

In the below Table 2. Depicts the Steel **industry** is the highest consumer of **refractory** which consumes around 12 kg of **refractory** per ton of steel produced. After steel, aluminum consumes 4 to 5 kg of **refractory** per ton of aluminum produced. Cement consumes around 0.8 to 0.9 kg of **refractory** per ton. Other than steel, aluminum and cement, consumption of **refractory** in other **industry** is insignificant.

Industry	Refractory Consumptions per ton
Steel	12 kg
Aluminum	4-5 kg
Cement	1.7 kg



Glass	55 kg
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(Sources: Steel Insights)

This study has been conducted because of the recent changes in the refractory industry, which has given a competitive look in the domestic as well as international market. As such there has been lot of technical papers published but not on the marketing aspect which is going to be the key factor for survival in the long run of the business. During the past two decades the refractory industry has been changing at a rapid pace with new materials, production and application techniques. It is directly reciprocal to the changes in the refractory industries, the changes in the manufacturing sectors also need to be followed. So Indian Refractory makers have started to think globally not only in respect to product wise but also in market wise too. In comparison to other industries the refractory industry is small and very specialized one but it's contribution cannot be ignored to the Indian economy which is very sad to say that it has never received its due recognition because of its insignificant size compared to its key user industries like steel, cement and aluminum.. This study would offer information of the Indian refractory makers in Orissa trying to market their products in the international arena along with the important features which would reflect how competitive refractory industries in Orissa against the world trends.

REASONS FOR THE STUDY AND ITS IMPORTANCE

The purpose of this study is to show the varieties of equipment and processes in the refractories industry, their individual functions, and their importance to the overall metal and nonmetal consumer and producer industries. The refractories industry plays an



important role in making materials usable. Refractory is needed to cause desired changes in the metallurgical structure and hence the properties of metal parts. Properties of most metals and alloys can be affected by heat treatment. Ferro-alloys, particularly steels, undergo the most dramatic changes in properties. Generally, the most stable steel structures are produced when steel is heated to a high temperature and then slowly cooled. This is called annealing or normalizing. The process of heat treatment performs multiple functions as are needed for individual cases. In some cases, it releases stress, strain, and fatigue so that the material will work normally. In other cases, it alters the structure so that the material's properties will improve. As an example, parts made from glass and some ceramic cannot be used without proper annealing. They will simply shatter under residual stress. All of these functions are carried out in heat treating furnaces of various kinds, shapes, and sizes.

There are two components of the refractory industry. One component of the industry involves the manufacture of the heat treating furnaces and the other the utilization of the furnaces for heat treating purposes. A number of furnace manufacturers also offer custom heat treating operations. Since the total heat treating industry is very large and broad (a total of 750 to 850 large, medium, and small companies), with a total turnover of about \$15 billion, this report will deal only with heat treating furnace manufacturers who make the furnaces and sometimes offer customized heat treating services.

1.2 RESEARCH OBJECTIVES

- I. To have a conceptual study of refractory market in the world, India as well as Orissa.:



- II. To explore the Indian Refractory producers with respect to share of export and revenue earned.
- III. To highlight the problems faced by the Small Scale refractory producers in catering to the domestic as well as export demand.
- IV. To compare the position of refractory market in Orissa with that of India.
- V. To know the type of customers, domestic as well as international purchasing the finished goods from the refractory Industries located in Orissa.
- VI. To study the different products and marketing strategies adopted by the refractory industries of Orissa.:
- VII. To suggest majors for the growth and development of refractory industries in India in general and Refractory Industries situated in Orissa in particular.

Refractory companies in Orissa emerging even stronger with the opening up of the economy and now command a competitive position not only in the Indian refractory industries but also competing globally with better competitive advantages. This study intends to find out the competitive advantages which few of the largest Indian refractory companies has created over time and how have they adapted to the changing environment. A thorough analysis of the leading companies particularly in Orissa among the 5 refractories industries we have identified IFGL Ref Ltd and Tata Ref Ltd has been conducted in order to identify the future potential of these companies and to understand the way in which it could sustain its competitive advantage not only domestically as well as globally.



The Indian **refractory** manufacturers are also dependent on China for the supply of important raw materials such as brown bauxite, fused alumina and other items. Without Chinese material, the domestic players either have to import similar materials at more prices from other countries or have to develop inferior grade domestic source at costs which is not recoverable from the customers, which indirectly have effect on the quality of the product that has an impact on the performance. As performance is directly related to the cost realization for the refractory industries.

So to reduce the cost of production by the steel **industries** are not encouraged to develop one **refractory** source for strategic alliance as the specific cost of **refractory** in the blast furnace, coke-oven and converter route is only Rs 350 per ton of liquid steel produced, which is only 1.9 percent of the cost of producing steel. (Sources: Steel Insights)

Michael Porter, (1985) opines that competitive advantage means creating unique capabilities and strengths, which can be defended against imitations from rival firms (Porter, 1985). It is learning lesson for the Refractory Industries to follow the path of competitive advantage to survive in the long run of competition.

Wharton (1997) on the other hand suggests that a company in various ways can obtain competitive advantage but it is very important for us to define the scope. Research examines the competitive advantage created by IFGL Ref Ltd and Tata Ref Ltd vis a vis the other industry players (Indian Refractory Makers Association). Public sector policies can create and help to sustain competitive advantage for firms, or can undermine and even destroy advantages (Wharton, 1997), thus it is necessary to understand the policy issues governing the industry.



AUDIENCE FOR REPORT

The report is meant for a variety of people who are interested in the heat treating of metals like iron, steel, and nonferrous metals, and of other materials like glass and ceramic parts. Refractory manufacturers who makes furnaces of various types will have detailed information about their industries. The refractories industry has a major impact on ancillary industries such as those involving the manufacture of gas and oil heating systems, electrical resistance and induction heaters, and controls and switches for heating, furnace atmosphere, and the total process. Manufacturers of salt bath, ovens, and lehrs, etc. will also be interested in the report. Other people who are inclined to look at the potential of this industry will also benefit from this report. Investment-oriented people will be able to evaluate the potential of refractory or the furnace manufacturing component of the user industries.

SCOPE AND CONTENT OF REPORT

The scope of the report will be limited to heat treating furnaces for ferrous and nonferrous metals, and annealing furnaces for glass and ceramics. The report will provide a comprehensive report about the different types of furnaces with regard to their sizes, shapes, capacities, and price ranges. The report will include information on the heat insulating refractories for different types of furnaces. It will also discuss the different types of heating systems available along with the modern control systems.

The report includes information regarding the manufacturers-the leading companies, their locations, products, capabilities, asset values, and some of their officers. It also identifies



the different types of furnaces and ovens that each individual company makes. The report presents the current market of the refractory industries and indicates the future potential for the next 5 years. The report also discusses the domestic as well as world market for the refractory industries and indicates current conditions and future prospects.

METHODOLOGY AND INFORMATION SOURCES

The report is presented in a systematic way by identifying the refractory manufacturers and their customers along with their current and future market potential. The information for the report has been derived from a variety of sources. The theoretical aspects of the heat treatment processes have been provided from books on fundamental principles on heat treatment. A major amount of information has been provided from the Indian Refractory Makers Association (IRMA) and Technology Information, Forecasting and Assessment Council (TIFAC). Actual information has been gathered mostly from dialogue with furnace manufacturers and users as well as makers of heating systems and controls. Other information has been provided by discussion with Dr. A.K Chattopadhyay of IRMA and the author's personal experiences in using heat treating furnaces and processes. Information in the section on International Refractory markets and financial aspects has been obtained from different websites like American Ceramic Society and South East Asian Iron and Steel Institute.

1.3 What are Refractories?

"Refractory" items according to any standard English dictionary are materials which are hard to work with, and are especially resistant to heat and pressure. In practical terms,



refractories are products used for high temperature insulation and erosion/corrosion and are made mainly from non-metallic minerals. They are so processed that they become resistant to the corrosive and erosive action of hot gases, liquids and solids at high temperatures, in various types of kilns and furnaces. Basalt is a naturally occurring siliceous refractory product. It was formed many, many years ago - and is still being formed in lava flows from volcanic eruptions - under the natural geological forces of heat and pressure. Modern refractory production is largely a replication of this process of forming naturally-occurring (or synthetic) non-metallic mineral oxides (and some non-oxides like carbides or nitrides) under the bonding conditions of high heat and pressure. Of course with technological progress, alternative bonding techniques, such as with chemicals, cements, resins, etc. have also developed. Because refractory products are so resistant to heat, erosion and corrosion, they are typically used in any process involving heat and corrosion such as in kilns and furnaces. According to the main chemical component, i.e. fire clay, or magnesia, or zirconia, etc. they are commonly known as alumino-silicate or acid refractories, basic refractories, and neutral refractory products. In physical characteristics, refractories typically have relatively high bulk density, high softening point and high crushing strength. They are produced as standard bricks, or as shapes (including hollow-ware) or as granular or unshaped or monolithic products. The principal applications of refractories are in iron and steel industries, cement, glass, non-ferrous metals, petro-chemicals and fertilizer industry, chemicals, ceramics and even thermal power stations and incinerators. The development and application of refractories for various industries, testing procedures

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