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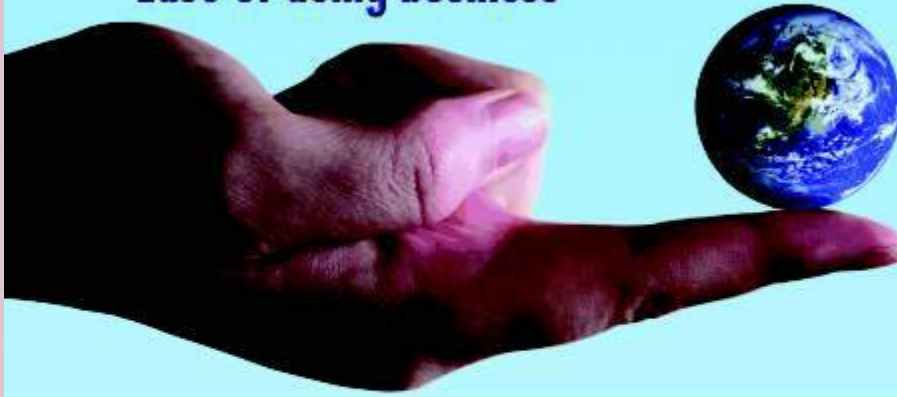
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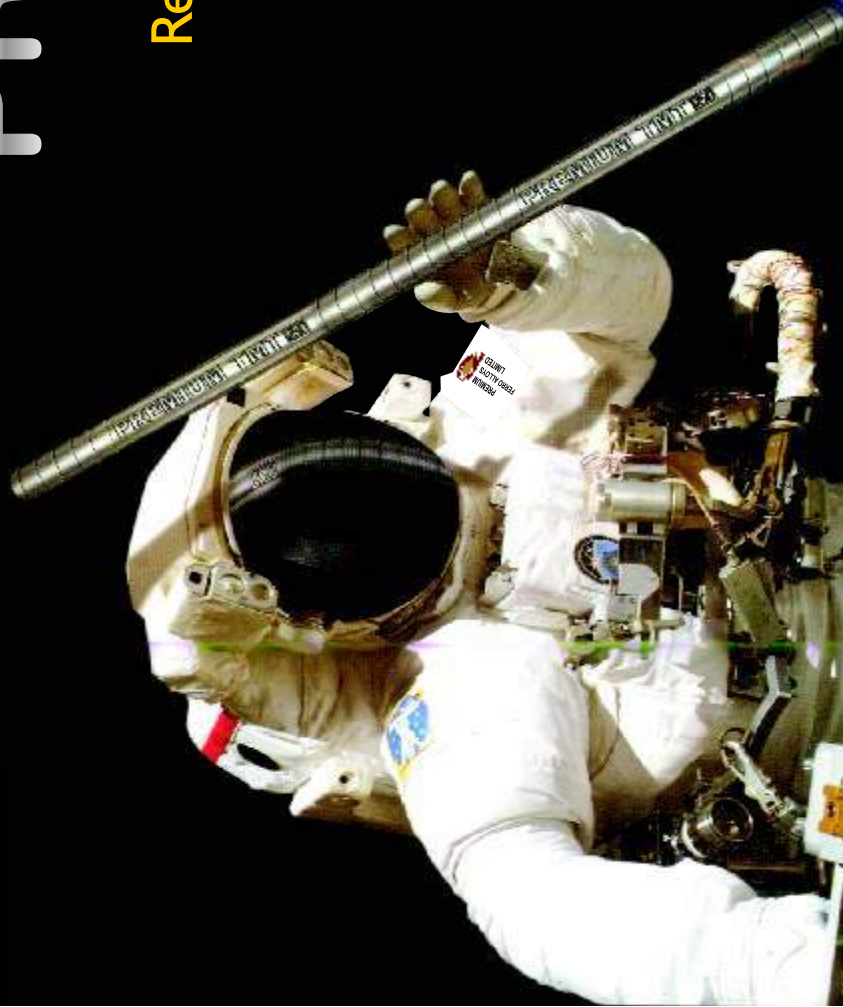
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HANDBOOK ON INDIAN STEEL INDUSTRIES

(a directory of units producing steel through electrical route)

2018-19



Compiled by:



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Strategies for Operational Excellence by Family Owned Indian Mini Steel Plants in Global Competitive Market

P. Mishra
Sr. Executive Director, AIIFA, Delhi

→ **Introduction:** Steel is the most essential and recycled material in the world for nation's growth and a backbone in the engineering and manufacturing industries. It is produced both by large scale industries in integrated ways as well as by mini steel industries in the capacity of MSMEs. Mini steel plants in India are mostly functioning as family business within the category of micro, small and medium enterprises (MSMEs) and many of them have proved to be leaders in the areas of quality, efficiency and productivity in induction furnace steel making and processing. The production of steel through electric induction furnace is inherently energy intensive. The affordability and reliability of key energy resources, including electricity, melting scrap/ scrap substitute, various other additives are essential to the industry's competitiveness.

For developing countries and countries with economies in transition like India, the main challenge of globalization at the start of the twenty-first century for mini steel plant is to determine and decide how to take adequate advantage of the positive effects of liberalization and how to strengthen competitive advantages in order to improve the process, product quality and services in accordance with international standards, facilitate access to the international market, increase exports and have a significant impact on the sustained growth and competitiveness of the plant.

Steel's versatility, innovation, development of its producers and users have helped to establish steel as the material of choice particularly in energy, transportation, construction and engineering industries. The steel industry continues to lead in revolutionary developments in producing new steel grades for the automotive market; iron and steel making technologies that will significantly reduce energy and greenhouse gas emissions; advances in steel building construction; and energy transmission and development — to name a few. Since 1990, the industry has reduced its energy intensity and greenhouse gas (GHG) emissions intensity at appreciable rate all over the world.

Also, the need for a turnaround strategy arises because of the changes in the external environment viz. change in the government policies, saturated demand for the product and competitive pressure, a threat from the substitute products, changes in the tastes and preferences of the customers, etc. Most organizations continuously strive to achieve operational excellence, but they spend less effort understanding customer needs and only few of them really consider these two sources of customer value effectively. While focus is on lowering costs, improving quality but providing consistent reliable service maintaining good contact will continue to be important for entrepreneurs. It may be seen in the coming decade that most of the producers will try to maintain rapport for customer intimacy tailoring solutions for individual customers based on a deep understanding of their needs combining operational excellence at their end.

The gross output of family run businesses accounts for 90% of India's industrial output, 79% of organized private sector employment, and 27% of overall employment superseded only by the government and public sector undertakings (Ref: CII reports). Family ownership is often associated with a double role for the family as that of owners and managers of the plant where a higher share of owner's wealth is invested in the plant creating a long-term commitment for survival of the company even with high sensitivity to uncertainty and risk.

In 21st century, members in the family owned mini steel plants are successfully coming out from leading management institute where they are well exposed vividly on the subjects like Finance, Marketing, Cost,

Production etc. Their first approach is to create the structure of the mini steel plant matching exactly the company's strengths, removing weaknesses for sound positioning formulating the strategy building defenses against the competitive forces fighting for cost and quality or as finding positions in the industry where the forces are weakest. Family members responsible in running the mini steel plants involve themselves in the areas like Negotiation with Customers and Suppliers, Global Supply Chain, Traders & Dealers related to steel business in domestic as well as international level, Finance, Entrepreneurship formalities, Statutory bodies, Govt. Officials, Operations management, logistics etc.

However, management in family business need to highlight among team members about plant's capabilities and the causes of the competitive forces in the areas where the plant has to confront competition and where to avoid it which, hopefully, will determine the profitability and stability of the plants for keeping it in comfortable position. Even, plant with a strong position in an industry unthreatened by potential entrants will earn low returns if it faces a superior or a lower-cost substitute product as the leading manufacturers of quality steel products.

Manufacturing is one of the key sectors of the Indian economy and steel being the major part related to it, contributing almost 18% of the gross value added and providing employment to about 12% of the Indian workforce. Under the National Manufacturing Policy, the government had set an ambitious target of increasing the contribution of manufacturing from the current level of 15% to 25% of gross domestic product (GDP) by 2022. In recent years, however, growth of the manufacturing sector in India has been subdued with its contribution to total GDP.

It may be noted that family-controlled industries dominate the corporate landscape around the world (Ref: La Porta, Lopez ´ de Silanes, and Shleifer, 1999; Claessens, Djankov, and Lang, 2000; Faccio and Lang, 2002). Theories of family control can be classified into two broad explanations referred to as "competitive advantage" and "private benefits of control." The key difference between the two is the group of shareholders for whom value is maximized. Under the competitive advantage hypothesis, value is maximized for both family and nonfamily shareholders (Ref: Bertrand and Schoar, 2006). Under the private benefits of control hypothesis, value is maximized only for the family, who expropriates nonfamily investors (Ref: Burkart, Panunzi, and Shleifer, 2003).

Govt. of India has set a target for steel production as 300 million tonne by 2030-31 when foreign companies can immensely benefit by setting up manufacturing units in India. In view of the proposed additional capacity in the next 10-12 years, it is expected to invest about \$128 billion for creation of new capacity where India will have to import large number of critical plants, equipment and machineries valued almost \$25 billion to meet needs of steel industry by 2030-31 and for that spares worth over \$500 million will have to be imported every year to meet the needs of India's steel industry by 2030-31.

Foreign companies can, also, set up manufacturing facilities in India of their own or through joint venture/collaboration with Indian capital goods manufacturers in a win-win situation bringing new technologies to produce equipment and spares of world class quality at a global competitive rate. There has been rise in the rate of steel consumption by 7 per cent in last four years and 7.9 per cent in last 2 years in the country. The steel production at the same time is also increasing at the rate of 6.7 per cent at per capita consumption, present rate being 68.3kg from 58kg four years ago.

Govt. of India has taken initiative to domestically meet the demand of capital goods for steel sector to develop India into a Global Manufacturing Hub for steel plant equipment and machinery by setting up of the needed facilities not only to reduce imports but will have force multiplier impact in long term sustainability of steel industry in India helping growth of mini steel. It has been decided that foreign manufacturers will enter into a JV with Indian firms who can get advantage of purchase preference even getting benefit from foreign investment and technology to fulfill the eligibility condition of experience. (Ref: Steel Ministry's Report).

Global Steel Scenario: Forecast made by Country group as – steel demand in mature economies will show zero to slightly negative growth rates over the period 2018 & 2019 and in emerging economies will be in the range 2.5% to 4%, less robust than experienced by developing countries in the past whereas demand forecast in India - to grow at around 5.6% per annum. On the other hand, demand in China is expected to decline at 1.1% per annum (Presented: OECD Paris). As per World Steel, steel growth will remain robust, as

the economy is recovering after the twin shocks of demonetization and the roll-out of the goods and services tax. It said that demand will be supported by improving investment and infrastructure, construction.

It might be seen that the globalization of competition would diminish the importance of home demand. In practice, however, this is simply not the case. In fact, the composition and character of the home market usually has a disproportionate effect on how companies perceive, interpret, and respond to buyer needs. Nations gain competitive advantage in industries where the home demand gives their companies a clearer or earlier picture of emerging buyer needs, and where demanding buyers pressure companies to innovate faster and achieve more sophisticated competitive advantages than their foreign rivals. The size of home demand proves far less significant than the character of home demand.





Home-demand conditions help build competitive advantage when a particular industry segment is larger or more visible in the domestic market than in foreign markets. The larger market segments in a nation receive the most attention from the nation's companies; companies accord smaller or less desirable segments a lower priority. More important than the mix of segments per se is the nature of domestic buyers. A nation's companies gain competitive advantage if domestic buyers are the world's most sophisticated and demanding buyers for the product or

The globalization of the world economy has had a profound effect on the steel industry which will continue to do so because of competition on product quality and cost. Despite, or perhaps because of, market stagnation in several consuming sectors as well as competition at their end on cost and quality, the steel producing industry is undergoing intensive structural changes characterized by the development of new concepts in steel making and processing by reducing process cost e.g. induction furnace steel making and refining, liquid steel casting techniques i.e. bottom pouring as ingot or continuous casting of liquid steel as bloom/ billet or slab. Highly competitive market conditions may accelerate this structural change encouraging consolidation in the steel industry. This is evident at places from the growing number of alliances, co-operative ventures and takeovers by the entrepreneurs.

The Asean Iron and Steel Council (AISC) particularly countries like Indonesia, Malaysia, Philippines and Thailand is urging the region's governments to ban the entry of substandard and low quality steel products produced by China which are not only unsafe to use for construction, but also destructive to the environment. However as per CISA report, 140 million tones production has been suspended from closure of induction furnace melting route. Indian IF units should avail this opportunity supplying good quality products to those countries.

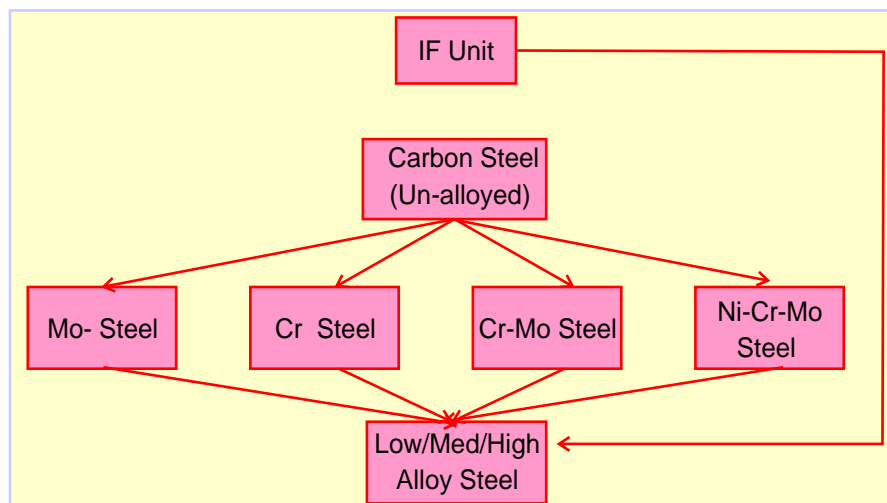
Integrated large steelmakers are fighting to compete with mini steel plants which use electric induction furnace steel making process where, typically, non-union, activities have a labor cost advantage and management control over different activities which include more variable compensation and almost non-existent retiree obligations as well as performance monitoring mechanism. Flexible cost structure, better ways of quality control system for smallness of unit, shorted lead time, faster inter-actions with customers are huge factors in the increased share of production in mini steel plants over large scale integrated producers. However, electric-based steel making process like EAF & IF dominate in India at 57% level which is second highest after US 67% compared to oxygen-based process at 43% level in India.

Crude Steel Production by Global Leaders (million tones)

Rank in 2018	Country	2018	2017	2016	2015	2014
1	 P. R. China	928.3	831.7	786.9	803.8	822.7
2	 India	106.5	101.4	95.5	89.6	87.3
3	 Japan	104.3	104.7	104.8	105.2	110.7
4	 United States	86.7	81.6	78.5	78.9	88.2

World Steel Association has commented that India's steel demand is set to develop in the short and medium term due to favorable macro-economic conditions and ambitious reform agenda. (Ref: Adam Szewczyk, Head - Economic and Statistical Analysis of the

➔ **Mini Steel Plants:** Production of steel & alloy steels in India are, mostly, done through induction furnace route by mini steel plants at the capacity of about 75% level where the individual units having installed capacities, on an average, ranging from 12,000 to 50,000 tonnes. Few units have more than one furnace and equipped with secondary refining facilities like LRF, VD, AOD to produce critical steel grades including stainless steel. Assessing the steel demand in domestic market and expecting export orders, units are trying to optimize cost and quality of products considering sales assurance from demand. IF units produce carbon as well as low, med & high alloyed steels. (shown in the flow diagram below).



Most of the units are trying to expand capacity either up-grading or modernizing or revamping units with minimal expenditure. Region-wise Status of Capacity & Production of IF Units and top performers of regions in 2017-18 shown below ('000 tonnes). Eastern Region in the country has become leader both in number and volume of steel production in the country mainly by Jharkand state (40% of Eastern Region) and Odisha (39 % of Eastern Region) and share both together is 79% in Eastern Region. (source:AIIFA).

Among all states , Rank wise Production from IF in 2017-18 are: Jharkand-1, Odisha-2, Chattisgarh-3, Karnatak-4, Gujrat -5, Andhra Pradesh -6, Punjab -7, UP- 8.

Regions	Tot Units	Tot Cap.	Total Prod	% Ach	Prod. of Leading States in Regions			
Eastern	319	59103	43009	73	Jharkand	17113	Odisha	16968
Western	246	40696	30518	75	Chattisgarh	13033	Gujrat	8620
Southern	241	29526	23187	75	Karnataka	12766	A.P.	6156
Northern	261	8650	6417	75	Punjab	1779	UP	1001
Total	1067	137975	103131	75	1.Jhark, 2.Odisha,3.Chattis,4.Karnataka			

Management of Indian mini steel plants believe that it would be easier for them to manage and run smaller units in efficient ways and as such they, mostly, use IFs as batch melting of scrap, sponge iron normally in range of 5-10T capacity and refining by fundamental working system differing from traditional working ways. Ingots produced are rolled or forged and heat treated to meet property requirements. Few units have installed concast facilities even adopting sequence casting for better yield, optimizing cost for rerolling and some units have casting facilities in foundry shop for casting different shaped quality products. Everywhere, the entrepreneurs run their own steel making and processing units changing employees' fixed mindset towards growth mindset by adaptability links on issues like cost, quality, productivity, skill and knowledge.

Mini steel units use steel scrap or scrap substitute as raw materials for melting in induction furnaces in economic way which require significantly lower utilities and resources helping to reduce the cost and requirement for land, construction, water, power and workforce. Both carbon steel as well as alloy steels are produced for different sectors like automobile, construction, railways, defense, power plants, fertilizers, chemical & petro-chemical, ship building and various construction and fabrication activities. Because of demand in the market, the consuming sectors around the world are exploring market to find out sources for low cost better quality products, even consuming sectors in the country have been forced to resort to importing cheaper quality steel in order to meet the growing demands.

Indian mini steel plants should try to specialize their production line to innovate, develop and dispatch quality products in faster ways improving profitability strengthening market position. Many units engage professional experts as consultant time to time for managing complexity seamlessly working together in concert in the

specific fields who can process situations and data in a holistic way spotting risks and opportunities in critical areas. The role of working personnel are getting better getting suggestions for running production processes proving that the human touch and proper guidance are still critical for success in bringing result.

Operating age of the units in most of the cases at the level of 10, 15, and 20 years or even more are constantly facing the same question when dealing with their legacy equipment to be upgraded or modernized. In developing countries and economies in transition like India, industrial micro, small and medium enterprises (MSMEs) often lack managerial capacities and have insufficient knowledge of business processes as well as of operational and production cycles in running mini steel plants where performance is often hindered by poor technologies utilized and limited access to finance needed to expand production capacities. Individual mini steel plants also find it very difficult to deal with policy and regulatory challenges that impact on their sector or on the business sector in general resulting in creating obstacles and barriers to MSMEs to compete on domestic and international markets.

Tackling these challenges in a holistic way will, hopefully, assure MSMEs to produce innovative, cost effective, safe, reliable quality products in sufficient volumes by Upgrading and Modernizing the plant aiming to contribute towards economic growth by increasing the capacities of production units for value added generation, economic diversification, exports, customer satisfaction and employment creation. UNIDO advocates that competitiveness and innovation are the key dynamics to take advantage of liberalization and to drive economic development and growth for every industry.

The scale of investment in the unit greatly differ between modernization and up-gradation. Any equipment in the process chain as its part or whole identified functioning as outdated technology or not working in optimal condition for aging should be replaced or modified as up-gradation by smaller investment for quick turnaround. For modernization of the entire production process, management has to think twice or thrice to adopt and implement contemporary technology to solve obsolete equipment and processes at much higher cost and time consuming to ensure productivity and quality improvement at lower cost.

Many times, project groups in mini steel plants running small projects attempt to perform all of the project operations activities themselves. This can include creating new work plans, calculating progress metrics, scheduling status meetings, and performing a host of supporting activities for the project. While it may be a source of great pride to agencies working for equipment modification or installation to perform improvement activities, they represent an opportunity cost for the organization. Employing support resources even on small modification can save valuable time and costs.

Energy is an important cost factor in Induction Fce steel making in India. Energy efficiency improvement is an important way to reduce these costs and to increase predictable earnings, especially in times of high energy price volatility. There are a variety of opportunities available at individual plants in the steel industry to reduce energy consumption in a cost-effective manner. This Energy Guide discusses energy efficiency practices and energy-efficient technologies that can be implemented at the component, process, facility, and organizational levels. A wide variety of energy efficiency measures lead to expected savings in energy and energy-related costs like scrap quality , refractory lining, minimization delays in furnace running, no held up of furnace at melting stage, use of scrap heating etc.

➔ **Favorable Situations of Family owned Mini Steel Plants:-** Family businesses in running mini steel plants contribute to the growth of business as the financial performance of the plant has been superior to that of non-family-owned peers as they have consistently outperformed peers in terms of share price return. According to a Credit Suisse report, India stands third highest in the world in terms of public-listed family businesses, after China and US. According to the report, Indian family businesses are more mature with 60 per cent of them even continuing in their third generation compared to just 30 per cent of Chinese family businesses unto third generation. But the trend may not remain the same as growing number of Next-Gen entrepreneurs are dropping the option of joining their family business and are following their own pathway. The next generation of entrepreneurs are well-educated, tech-savvy, highly ambitious and have their own dreams to follow getting their activities shifted from steel industry. This generation believes in doing something that is different as well as exciting for them.

Joining a family owned steel business anyway brings some inherent challenges for the next generation. Apart from the generation gap, which creates difference of opinion in several aspects of business, a larger

gap is found in terms of communication between the two generations. Besides this, they have to prove their credibility to the family members before taking any major decision in the family business, because the older generation has its own doubts and lacks faith in the abilities of the new generation, at least at the initial stage. All this can be very frustrating for the new generation and, in many cases, leads the new generation to start their own venture, where they have complete control over their business and no intervention of family members.

The family businesses will have to address the needs and desires of the next generation, if they want a smooth succession. A recent report by PwC expressed that the four key things that the new generation likes to implement in their traditional business are – 1. Bring experienced non-family managers to help modernise/ professionalise the business, 2. Take the business into new geographic markets, 3. diversify into new products, and/or services and establish a new entrepreneurial venture to run alongside. The situation requires each generation to carefully consider the interest of the other generation. While the older generation will have to be thoughtful to the ideas of next generation and be ready for incremental changes, the new generation will have to understand the genuine concern of older generation, which is to maintain organizational stability and sustainability in the long run. (Ref: Dr. Lalit Sharma, Entrepreneurship Development Institute of India-EDII).

➔ **Adverse Situation & Common Problem faced by Family owned Mini Steel Plants:** Many steel units understand their product, process without studying real demand in domestic and export market, activities of competitors in line and also how accidental, uncontrollable, unscheduled innovation actually works. Fund raising or managing in right time for right cause with right valuation is vital to the entrepreneurs of mini steel plants. Self-delusional and greedy believing for revolutionizing running industry may, sometime, do harm to the entrepreneurs.

Mini steel plant, often, faced problematic situation e.g. 1. Drop in net income i.e. a decrease in the amount of money left over after subtracting expenses from revenues for one specific period compared to another. 2. Cash Flow Shortage i.e. when the incoming cash flow is insufficient to meet the outgoing cash flow needs for running business. 3. Transparent Accounts, A strong indicator of future growth is how the steel business invests its money. When an investor cannot find information stating where a company invests, the investor is less likely to invest in the business. 4. Poor Management i.e. Substandard supervision on cost-effective production balancing performance of results w.r.t. revenue, actual against budget etc.

The chances of surviving serious financial trouble by mini steel plant will depend on where they are placed on the “restructuring spectrum” by making turnaround strategy and priority-wise implementation of action points. Underperforming units need performance improvement solutions like cost control and cost reduction in the operational process where skill improvement and awareness is essential even external technical assistance in specific areas. According to prevailing thinking, cost of production inclusive of labor costs, interest rates, exchange rates, and economies of scale are the most potent determinants of competitiveness. The words of the day are merger, alliance, strategic partnerships, collaboration, and supranational globalization.

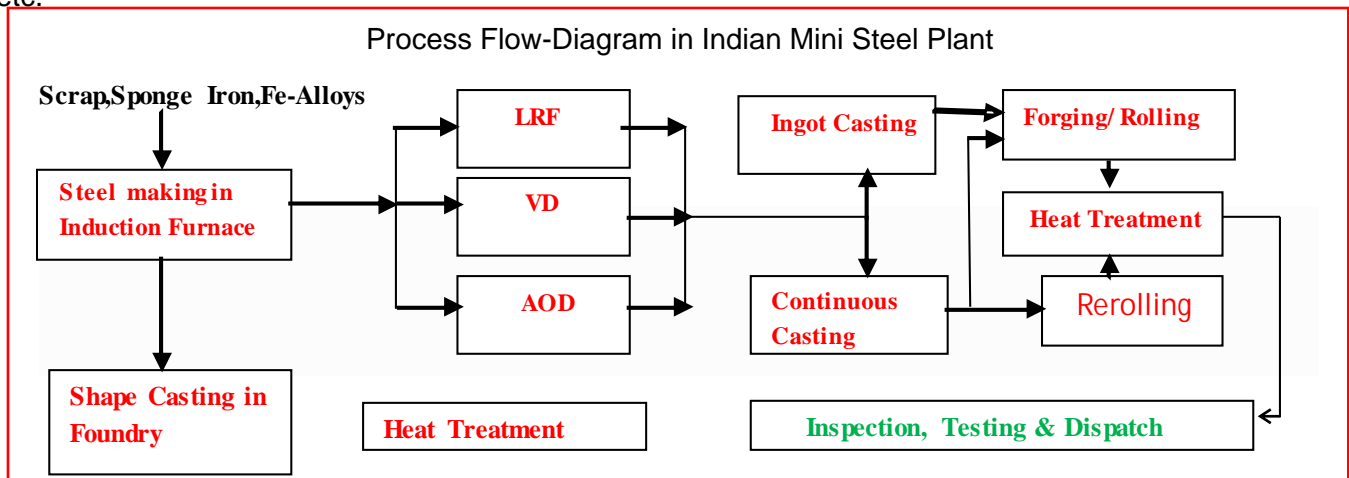
However, Family owned mini steel plants still continue to work even facing problems e.g. Lack of clarity in terms assets, business control, and ways of management functioning, differences in remuneration structure among de-motivated key family members leading to insecurity and eventually may break up family business. Many times, absence of proper or formal communication channel to report the business activities lead to a lot of confusion. Often, entrepreneurs fail because of hanging out with the wrong people in the plant.

Family owned steel plants are majorly characterized by features such as owner-manager control in functioning. According to a study by Perez-Gonzalez found that family businesses in the start-up stage were characterized by informal organizational structures, owner-manager and more incline to appoint family members as MD/ Director or CEOs responsible for the overall performance, competitiveness and innovative development in businesses. Leenders and Waarts further characterized the family business into two dimensions the family-oriented family business and the business oriented family business. Lenders and Waarts explained that a family-oriented family business is a business firm that is considered as a family business when its ownership and/ or management are concentrated within a family while Lenders and

Waarts went further to explain the second dimension which is the business orientation as related to the value creation of the plant. Few smaller size family owned steel plants do not prefer to engage professionals in running the plant rather want to keep all control and monitoring activities by them only.

Insecurity generated over the period breaks up of family business in terms of assets, finance or in terms of business control. Different remuneration structure and also facilities demotivate family members involved directly or indirectly in operating the plant. Proper and timely communication system among the family members responsible in specific activity areas even for good or bad will help the plant to take action for improvement. (Ref: Sandeep Nerlekar, CEO and MD, Terentia Consultants)

➔ **Steel Making in IF:** Steel scrap is the most important raw material for electric induction steelmaking, contributing between 60% - 80% of total production costs. In addition, the degree of which the induction furnace process may be controlled and optimized is limited by fluctuations in scrap quality and its cleanliness. Therefore quick estimations of properties of different steel scrap grades and classification are very important for improving the control and optimization of steel making in induction furnace. Steel scrap is usually graded by individual plant in terms of size distribution, chemistry, density, origin, and processing method as 1. Physicochemical properties e.g. chemical composition, density, specific surface area, size distribution, melting temperature, specific heat capacity, metallic/ organic/oxidic content which are only dependent on the particular scrap grade and are best determined by controlled experiments in laboratories. 2. Process related properties e.g. metallization, yield coefficients, alloy recovery from ferro-alloys, specific energy consumption etc.



From the available information as well as statistical analysis by experts on comparison of functioning of family and non-family owned mini steel plants in different countries it has been observed that there has been much more willingness for innovation of products and processes and better control by family owned mini steel plants all over the world. Also, they are more efficient in their process innovation, innovative output measured by quality, cost reduction, or revenues generated with innovative ideas. Many of them are very cautious about investments, aiming to avoid any waste and use their powerful shareholder positions to ensure that activities should always move in the positive direction and people engage only in prudent investments.

Steel Making & Refining



Sponge Iron Plant



Electric Arc Furnace



Electric Ind. Furnace



Ladle Refining Furnace



Vacuum Degassing Unit



A O D Unit



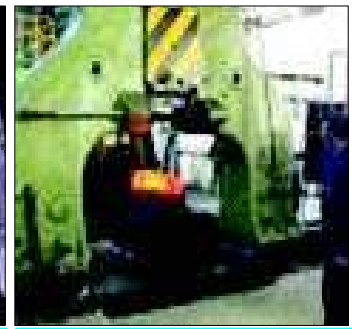
4-Strand Concast Machine



Bottom Pour Ingot



Re-Rolling of CC Billet as Re-bar



Open Die Forging in Forge Shop

Rolling & Re-Rolling Units: Re-rolling mills came up in the limelight to Entrepreneurs of mini steel plants and first re-rolling mill was established in the year 1928 at Kanpur, since then about 1800 re-rolling mills working in India serving the purpose as Secondary Steel Sector and as a complement to the main steel lines. Such re-rolling industries are producing merchant bars, sections as well as high strength deformed bars (TMT) due to the ever-growing demand from the construction industry. Most of the units are running at low energy efficiency and poor productivity due to the continued use of backdated and incompetent technologies and processes though most of the units are trying to become energy efficient reducing emissions of greenhouse gases getting Govt. assistance. Reduction of high power tariff and tax burden affecting the performance of re-rolling units of mini steel plants need to be looked into by Govt.

Forging Units: The shaping of metal using localized compressive forces by delivering blows with hammer or press is done by mostly family-owned forging units as major worldwide industry. For better working and good impact, many forging units have converted their pneumatic hammer to hydra-pneumatic hammer. Since the Industrial Revolution, forged parts are widely used in mechanisms and machines wherever a component requires high strength usually require further processing (such as machining) to achieve a finished part. Today, forging is a major worldwide industry. The Indian forging industry is mostly, concentrated around its end user customer locations. Therefore, the major forging clusters are found to be in the states of Maharashtra, Punjab, Gujarat, Tamil Nadu, Haryana, Delhi, Karnataka, Jharkhand, West Bengal and Andhra Pradesh. Most of the forging companies in the MSME segment need to upgrade their technologies seeking government support in terms of further interest subvention and technology up-gradation fund.

Innovative ideas for Improvement: In the present competitive market, many new plants are coming up with latest technology, the top position in the industry is no longer a reserve of a few. To retain or establish company's cutting edge, mini steel plants should compete strategically by having a dynamic business to make strategic and innovative moves and thus cut above the rest. With markets all over the world becoming more interlinked, greater opportunities are emerging in these new markets and with that, new needs and challenges are being faced. For instance, China and India are estimated to be the leading markets, and Africa is predicted to be the next "hot spot". Therefore, mini steel plants should try to capture this market share implementing innovative ideas to enable them to capitalize on the opportunities opening up.

Mini steel plants are demanding more government support in particular areas like reduction of energy rate and easy availability of imported melting scrap etc. for induction furnace which are beyond control of management. The necessity of importing scrap has become important because of the enforcement of quality control order passed by the steel ministry restricting production and sale of steel whose quality does not meet a certain standard of metallurgical composition and mechanical properties like Tensile, Yield Strength, Elongation etc.

Mini steel plants need to think adoption of installation of new concept of shaft furnace for scrap preheating by using waste heat from off gases. With the single shaft furnace at least 50 % of the scrap can be preheated [Smith, 1992] whereas the new finger shaft furnace allows the preheating of the total scrap amount [Voss-Spilker, 1996]. The steel making time can appreciably be reduced to a great extent also saving power consumption at the level of 40-60KWH/T.

Still, many units are trying to achieve competitive advantage through acts of innovation in its broadest sense, including both new technologies and new ways of doing things. For cleaner steel, installation of secondary refining of liquid steel should be considered examining the process in totality. Further, better means should be examined by the management for competing in market with quality and developed products by improved production process, a new marketing approach, improving skill and knowledge of working personnel even with small investment in such areas.

The current consuming sectors of alloy steel products have many reputed global sources of quality products and services available to them and are well informed of their choices than before. Mini steel plants must therefore keep them abreast forging improved ways of satisfying the customer. Of course, in the present tough competition, most of the many mini steel plants have started implementing ideas to improve process and product maintaining equipment health in good condition for producing better quality products reducing cost from existing level using a step-wise improvement plan thinking and implementing innovative actualizing ideas adapting need-based changes leading to successful result which add up additional values. However, improvement should be aimed towards - Product Quality/Development of New Product, Modified Process / Revamping of Processing Equipments, Finding out New sources of better quality raw material, Exploring Market.

However, management of mini steel plants are always ready to bear risks and uncertainties involved in running steel plants. The formulation of an effective business plan and sound execution help them to maximize the chances of success. According to J. A. Schumpeter, a German economist, management has the power to change the ways of functioning for improvement combining production factors to make the production process efficient. According to him, management is a foresighted person having a risk taking and innovation capability.

Some innovations create competitive advantage by perceiving an entirely new market opportunity or by serving a market segment that others have ignored. When competitors are slow to respond, such innovation yields competitive advantage. For instance, in industries such as autos and home electronics, Japanese companies gained their initial advantage by emphasizing smaller, more compact, lower capacity models that foreign competitors disdained as less profitable, less important, and less attractive. In international markets, innovations that yield competitive advantage anticipate both domestic and foreign needs.

Information plays a large role in the process of innovation and improvement—information that either is not available to competitors or that they do not seek. Sometimes it comes from simple investment in research and development or market research; more often, it comes from effort and from openness and from looking in the right place unencumbered by blinding assumptions or conventional wisdom. Mini steel plants have made many modification by way of implementing ideas in steel melting, refractory lining, ingot casting, hot top, bottom pouring & anti-piping compound, grade-wise heating/ soaking standard of stock for rolling or forging and heat-treatment of products etc. Mini steel plants, in the coming days, should go for promoting digitalization in the plant steel industry on the basis of selected projects. Maximizing plant performance combined with minimized maintenance and low capital lock-up.

Conclusion: The challenges faced by Indian mini steel plants having induction furnace steel making units in the age of globalization are complex in nature due to competitive pressure from domestic and global competitors for quality and cost. The secret of operational excellence by way of cost control & cost reduction at all the stages of steel making and processing or even making sustainable turnaround for sickness lies on the strategies developed by the plants to combat all the challenges for operational excellences anticipating future constraints and marketing threats.

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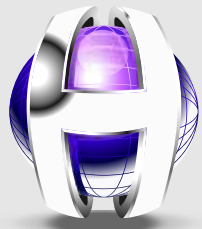


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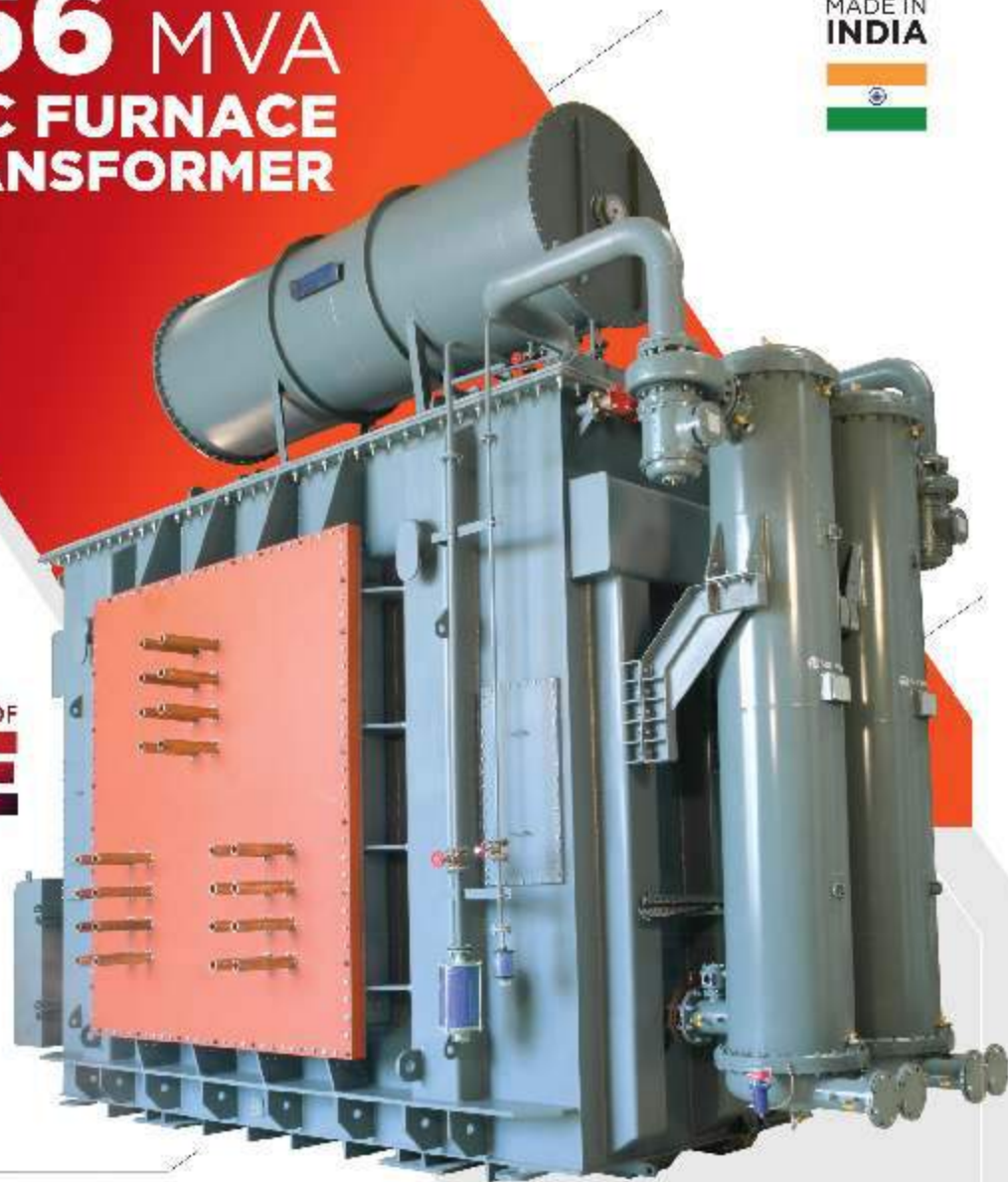


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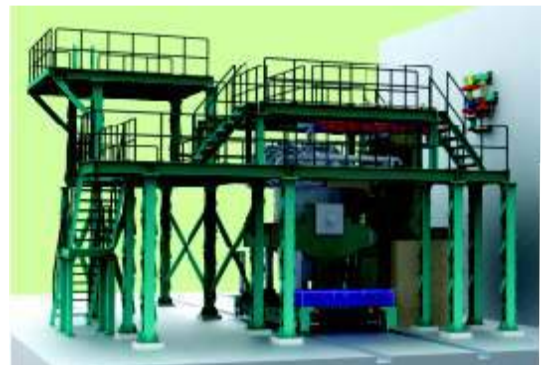
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