

PRAYAS

2020

VOLUME 1
ISSUE 16
MARCH 2020

Dear Customer,

Season's Greetings.

At the outset of ending of FY20, I along with team TML thank all of our customers for their continued support and patronage.

With starting FY21, we will be entering a new decade of possibilities and challenges. This New Decade will come with its own excitement and expectations. The blistering pace of technological changes are making us dizzy and predicting the future has become useless. All prediction of new innovations have surpassed their target dates by miles and I am sure that in 2030 on the same day, we would wonder and may be laugh on the life we are living today. Autonomous Cars would be the new norm. Human Organs would be synthesized in Labs and used to replace defective ones. The Man would reach Mars and it is predicted that by 2029 the Computing powers of our Machines would surpass the human brain power. We as a result cannot probably predict what we would be on the same day in 2030.

The future holds the key & as foundry fraternity, need to hour is to move on the path of Digitisation & Automation bringing the power of analytics, mobility and smart machines to the industry and make it more efficient, environmental friendly, agile and responsive to face the ever changing business dynamics.

We have recently seen foundries becoming more proactive towards changing needs of Customers. Implementation of various other systems like MES and Robotics in the production systems is not a talk of future. I said, future holds the key, but actually the key is held in our hands, we have made ourselves proud in the last decade by surviving one of the toughest decades and we only can make this industry proud in the coming decade. For that we need to participate in the developments happening in the industry with both our minds and our hearts, with an objective of creating a Green & Sustainable Ecosystem.

A comprehensive and complete implementation of all the initiatives taken by us only will provide us the platform to launch foundry industry into a new and better trajectory. We must involve ourselves, talk about the initiatives, give our opinions and even criticise our efforts but in a constructive way. Only a cohesive, participative and involved workforce would make this company write another accolade in its annals for the coming decade

At the end, I must state that environment must be our first priority, we must take care of our environment as our families, create a safe and green workplace, take care of our workforce & keep them healthy and safe. With this I wish you a very happy & prosperous financial year ahead.



Sharad Kumar Sharma
Executive Vice President
(Marketing and Sales)

CONTENTS

1.	Editorial	02
2.	Customer visit at Tata Metaliks Kharagpur Plant	03
3.	CSR Initiative at Foundries of Our Customers	03
4.	Technical Content	04
5.	TML Contribution to "APPROACH TO GREEN FOUNDRY"	05
6.	Initiatives Toward Green	05
7.	Cupola Furnace	06
8.	Induction Furnace	07
9.	Designing of Tata eFee	07
10.	Features of Tata eFee	07
11.	Benefits for Foundries	07
12.	Tata eFee Customer Conclave	08

Dear Readers,
Greetings from Kolkata,

TML team is back with 16th issue of Prayas. FY20 remained a year of new innovative initiatives for TML, where team TML has implemented and matured a number initiatives poised to increase productivity and outlook change management for foundries such as health camps at foundries for labours, safety awareness campaign for foundry owners & On- site production demo run for establishing effective benefits of Tata eFee to name a few. Getting regular feedback from customers, helps any organisation to synchronize its efforts to cater changing need of our customers. To have a first-hand inputs from our preferred customers from Howrah foundry belt, we have conducted an interaction in between customers & TML team meet on 18th Feb at Kolkata.

To understand the challenges being faced by the Howrah foundry industry, we have conducted a real time survey during 16-18th Feb. Outcome of survey was well in line with the inputs that we get during our focused group discussions.

In this issue of Prayas, we will be sharing the outcomes of survey & how TML contribution to make foundry fraternity more self-reliant in facing them. Along with this, we will also be sharing a technical article on the topic approach to Green Foundries.

We hope that this knowledge piece will help foundries to have a bigger picture and getting exposure to change management.

For further consultation & availing our services, we request you to kindly remain in touch with our Customer Service Centre, Howrah WB.

Regards
Shivam Pandey
& Swati Pal

CUSTOMER VISIT at TATA METALIKS KHARAGPUR PLANT



Under Safety awareness campaign in Q-4 FY21, 12 consumers from Howrah foundry cluster have visited TML Plant, taking a cumulative number of consumers attending the campaign to 28. Started with an objective to sensitize the foundry owners about importance of safety, along with establishing a direct line of communication with foundries and develops an understanding of their requirement. Over last two years, such interactions have also helped us in getting first hand inputs regarding Tata eFee usage & support required.



Customer delegation & TML team during Plant visit

Based on these inputs TML has launched a number of customer centric initiatives, which we have shared in customer meet conducted on 18th Feb at Kolkata. We will be sharing a detailed coverage on this in following sections.

Based on these inputs TML has launched a number of customer centric initiatives, which we have shared in customer meet conducted on 18th Feb at Kolkata. We will be sharing a detailed coverage on this in following sections.



CSR INITIATIVE at FOUNDRIES of OUR CUSTOMERS

With continued support from foundry fraternity, TML has completed 2 years of its unique customer service initiative of conducting health camps for foundry workmen. In total 3500 foundry workmen from 24 different foundries in Eastern Region have got benefited from it.



Team TML at Usha Foundry, Howrah on 29th Feb 20

Started with general health & vital screening, we have added blood grouping, pulmonary function test & eye check-up services over the period. Going by the foundry sector demographical distribution as per our internal study, participation of younger worker is < 20%. We are confident that such health camps will add a lot more value to our consumers. We are also exploring the possibility to extend these services in other foundry cluster.

Approach to Green Foundry – Role of Tata eFee

Foundries have long looked at themselves recyclers. Since metals were first poured, it was recognized that recycling old castings was the easiest manner to remake another casting and reuse unwanted/used castings. With this concept, later the scrap (cast iron/steel) was introduced into our charge mixes as an additional feedstock. This recycling trend extended to most other cast metals like aluminum, copper and lead.

Foundries have earned a gritty image because of super-hot furnaces, molten metals, noxious fumes and dust. The foundry industry is a large consumer of energy and a producer of waste sand & emissions. Because of the above causes, the foundry industry is treated as pollution industry.

Pollution is defined as which causes any undesirable change in physical, chemical or biological characteristics of air, water and land which are the most essential ingredients for life in this earth. The ill health effects of pollution are headache and fatigue, Respiratory illness, Cardio vascular illness, Cancer risk etc. The above said health effects are because of Air, Water and Land pollution.

The foundry industry is causing all the above pollutions. The foundries can minimise above said pollutants drastically by adopting Green Technology.

Green Technology encompasses a large body of concepts whose definition may vary by group or industry. With respect to foundries are concerned, Green Technology means...

"Green technology can include energy and materials waste reductions in the manufacturing process, and the use of alternative manufacturing technologies with the least impact to human health, the earth, and its natural resources".

"To become greener, one must find ways to increase the efficient use of energy in the complete manufacturing process, and not merely shift energy use up or down the manufacturing stream".

"Sustainability and the application of green technology means finding smarter ways to use our finite natural resources, both in manufacturing materials and in the energy reserves used to manipulate them".

PILLARS OF GREEN TECHNOLOGY:



Energy Management



Production Management



Pollution Management



Waste Management



Resource Management



Safety and Health Management

TML Contribution to "APPROACH TO GREEN FOUNDRY "



1. Setting up of **CUSTOMER SERVICE CENTRE** in Howrah foundry cluster for providing technical services to address **GREEN FOUNDRY PILLARS**.
2. Conducting awareness programs & technical seminars on foundry processes by associating with **IIF HOWRAH & KOLKATA CHAPTERS** in Eastern region.



OUR LATEST INITIATIVES TOWARD GREEN FOUNDRY CONCEPT

Tata eFee, world's first branded pig iron.

Why is energy consumption, a big challenge for Indian foundries?

Deeper study of the energy consumption in furnaces revealed that 70% of the energy consumption takes place during the melting process in the furnaces. Hence, TML team decided that, if it could work on a new product that could significantly melt faster than the existing pig iron, it would be able to considerably bring down the energy consumption in the furnaces, thereby helping foundries resolve the energy consumption challenge to a great extent.

There are predominantly two types of furnaces in Indian Foundry Industry; cupola furnace and induction furnace, with majority of furnaces being cupola furnace. Induction furnaces are technologically more advanced than cupola furnace, more expensive. There is capacity limitation in induction furnaces.

The sources of energy vary from a cupola furnace to an induction furnace. While coke is the source of energy for melting in cupola furnace, electricity is used for the melting in induction furnace. Over last few years, the prices of both coking coal and electricity have risen, thereby leading to a sharp rise in the power bill of the foundries.

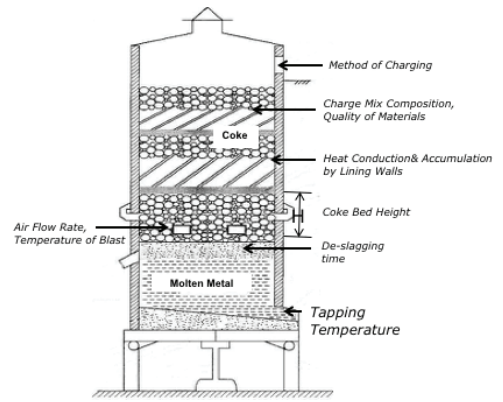
This cost is significant as energy costs are the second highest cost after raw material costs in foundry operations, accounting for 12%-15% of the total cost.

The melting processes in cupola and induction furnaces are completely different. While melting takes place due to convection in cupola furnace, radiation is used for the same in induction furnace. This makes any research very difficult as the need is to find a solution which will work in both these melting processes.

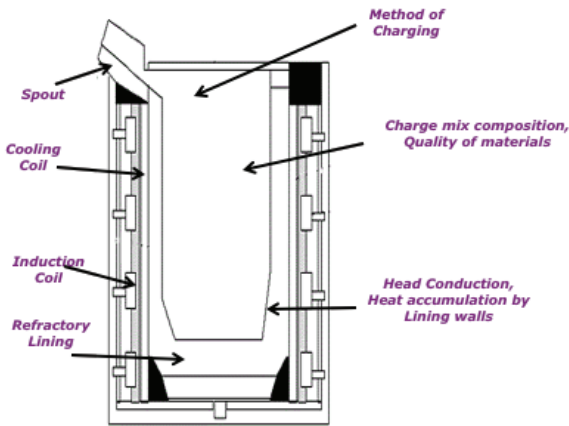
Being a raw material supplier to foundries, TML has its own limitations as there are many other variables apart from raw material that influence the energy consumption in furnaces as shown in figures in the next page, be it cupola or induction furnace. Some of these factors being charge mix, chemical composition of inputs and end product, quality of raw materials, sequencing of charging, etc.

Other factors:

1. End product
2. Level of Automation
3. Operational factors like
 - a. Mould making
 - b. Volume of 'Heel'
 - c. Pouring time in mould
 - d. Tapping time
 - e. Packing Density in furnace
4. Utilities like bulbs, compressor etc.



Energy Consumption in Cupola Furnace is a multi-variate problem



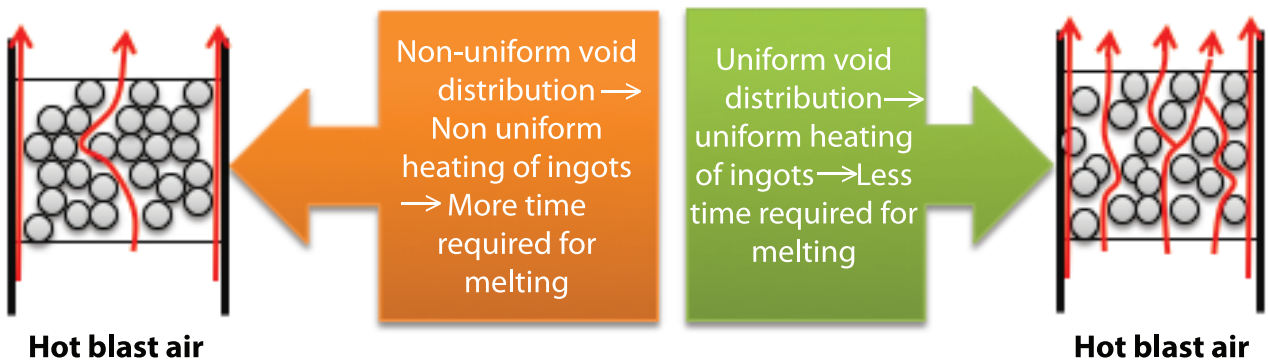
Energy Consumption in Induction Furnace is a multi-variate problem.

Other factors:

1. End product
2. Level of Automation
3. Operational factors like
 - a. Mould making
 - b. Pouring time
 - c. Tapping time
4. Void distribution in furnace
5. Utilities like bulbs, compressor etc.

How it works for CUPOLA FURNACE

- Flow of air blast in furnace is essential for faster melting
- Uniform void distribution leads to central air blast flow in furnace
- Voids between metal surfaces initiate early melting in such surfaces



- Uniformity in quality and size of ingot is a must for good cupola operation.
- Uniformity in void within metallic charges is an important parameter.
- If voids are uniform then ingots in cupola furnace will be heated up uniformly by hot blast.

How it works for Induction Furnace

Melt rate is directly proportional to packing density.

Packing density is estimated using theoretical research, further validated by experimental research, **Void Distribution = 1 – Packing Density**.

Ingots should be packed as closely as possible so more magnetic flux breakage to generate more eddy current leads to furnace run with full power results in faster melting and lower power consumption.

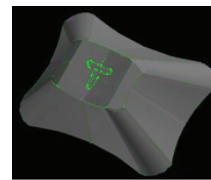
Designing of Tata eFee

Surface area to mass ratio for Pig Iron should be high to absorb heat through convection and radiation. Hence the key is to arrive at an optimum design which would optimize both uniform void distribution in cupola furnace and packing density in induction furnace with highest surface area to mass ratio.

After various design simulations like conical, spherical,

an optimum ingot design was arrived, which would offer optimum void distribution in cupola furnace and optimum packing density in induction furnace with highest surface area to mass ratio.

Pig iron with this design is given brand name of “Tata eFee” where “Fe” is the chemical symbol of Iron and “e”s at the beginning and the end of “eFee” denote energy efficiency and environment friendliness.



Extensive R&D



Tata eFee

Features of Tata eFee

- Melts faster than existing pig iron.
- Energy efficient operations for foundries.
- Highest surface area to mass ratio existing in market today.
- Uniform void distribution in cupola & packing density in induction furnace.
- Available in foundry grade and SG grades in all chemical compositions.

Benefits for FOUNDRIES

- Reduced energy in the form of electricity consumption in induction furnaces and coke consumption in cupolas.
- Become cost competitive and environment friendly which should lead to sustainable growth.
- Approaching towards Green by reducing emission, carbon foot print.

Tata eFee

Customer Conclave,
Kolkata (18th February, 2020)



The Tata eFee Customer Conclave held in Kolkata, focused on the enriching journey that we have made in the last couple of years to strengthen our relationship with our esteemed customers in Howrah while also touching upon how Tata Metaliks has played a role to address the above mentioned challenges. 43 nos. of our exclusive 100% SOB customers participated in the Conclave.

We, Tata Metaliks Marketing & Sales Team, conducted a quick survey in the Howrah foundry industry recently, to understand the key challenges faced by the industry presently. An overwhelming 82% of the responses acknowledged (a) Availability of labours (55%), (b) lack of automation (18%) and (c) Raw material price fluctuation (14%) as the top three challenges faced by the industry.



Tata eFee Conclave 2020 held at Kolkata

We were thankful to have with us our guest customer speakers Shri Chandrashekhar J Mankar and Shri Dilip R Pawar from Deepshikha Castings Pvt. Ltd. Nagpur, address the gathering on how semi automation improvements in their foundry helped them to save cost, reduce labour & achieve better process efficiencies with only modest investments – all these simple but effective automations have a payback period as low as 4 months to around 2 years!

We have been conceptualizing such a session for our fellow Howrah foundrymen since sometime now based on requests received from them to organize some knowledge sharing on this subject. This also helps us to address the challenge of availability of labour effectively. Further, we also shared how our health camp initiative for the foundry workers also aided in addressing such concern of labour availability and helped in retaining the workforce in the foundries where we held such camps. This was acknowledged by almost all customers where we had held such camps.

How Tata eFee pig iron has been creating value for our fellow foundrymen by ensuring slag free pig iron, reduced burning losses, cost optimization, saving in coke consumption, improving productivity and reducing rejections was touched upon in the Conclave. Similarly, how Tata Metaliks has been adding value by stable pricing, ensuring round the clock availability, catering to customized grades, fair & transparent channel operations & providing technical support was also acknowledged by the customers. Also, we shared how we endeavor to be a responsible corporate citizen particularly for our fellow foundrymen by conducting health camps, safety awareness sessions, Tata Metaliks plant visits, promote environmental awareness and organizing technical seminars for knowledge up-gradation.

We are extremely grateful to our customers who acknowledged our modest contributions as mentioned above and how it helped them to strengthen their business performances. As a token of our appreciation, we also facilitated below mentioned customers for their long, enriching and cherished association with us.

- Kharagpur Metal Reforming Industries
- Shree Hanuman Iron Works
- Vinayak Founders
- Kapoor Castings Corporation
- Parucco Foundry Pvt. Ltd.



**Shri Chandrashekhar J Mankar from
Deepshikha Castings Pvt. Ltd. Nagpur**

We are extremely thankful to all our customers who wholehearted participated in the Conclave to make it a very memorable occasion!