



PRAYAS



Dear Customers,

The financial year 2016-17 has witnessed several events that ended up impacting economies all over the world. Shock and surprise continued over the period which was started with the exit of Britain from the European Union (Brexit) and continued through to the election of Donald Trump as U.S. President.

Amidst economic turmoil across the globe, India has posed as a beacon of hope with ambitious growth targets supported by a slew of strategic missions like “Make in India”, “Digital India”, “Demonetization” to facilitate foreign investment, foster innovation and digitally empower India in the field of technology, and to curb black money to turn the economy around. Recent initiatives of the Government to promote healthy environment for growth of the manufacturing sector in the country such as reduction of income tax rate to 25 per cent for MSME companies, carry forward of MAT credit extended by 5 years etc. demonstrate a progressive ambition to build India as an attractive hub for foreign investment in the manufacturing sector.

Goods and Services Tax (GST), one of the most significant reforms introduced in the history of the Indian fiscal evolution, is likely to come into effect in July 2017. Globally, GST is acknowledged as a progressive tax regime, with inbuilt efficiencies to broaden the tax base, decrease cascading effect and reduce revenue leakages. GST is expected to provide the much needed stimulant for economic growth in India by transforming the existing basis of indirect taxation towards free flow of goods and services within the economy.

Implementation of GST will be a drastic change from the existing tax structure which will affect the entire supply chain & distribution management. Hence it is important that the industry is well prepared to adapt to the changes envisaged under GST which will bring **“acche din”** for all the stakeholders and drive the economy towards a positive direction.

Best wishes,

Subhra Sengupta
Chief Financial Officer



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EDITORIAL

Dear Readers,

As per Indian Foundry Industry Statistics, there are 5,000 + running foundries in India and 95% of total units fall under the category of **small-scale industry**. India is responsible for nearly 10% of the world's total casting production.

Technological improvements have taken place in advanced countries in foundry processes like manufacturing of pattern, mould and core making, melting and pouring techniques, terms of reliability, guaranteed high quality service and increase in life of components. Such improvements have strengthened foundries to meet increasing demands.

In this issue of Prayas, we shall explore current practices followed in the small-scale industry foundries and how they affect quality. India's casting production is more or less at par with the U.S. and to surpass them, we need to increase productivity of foundries by implementing technology in various processes which are explained in detail.

We hope that this issue of Prayas will provide information regarding productivity improvement and awareness about implementation of technology in foundries. For any further services, please get in touch with our Customer Service Centre.

Regards,

M. Sambasiva Rao

and

Sukhendu Mukherjee

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PRODUCTIVITY IMPROVEMENT IN FOUNDRY PROCESSES:

Casting played a major role in the industrial revolution and remains the basis of manufacturing of equipment and goods. Casting is one of the oldest manufacturing processes from which simple and complicated shapes can be made from any metal that can be melted. Castings produced may be a small part of useful devices or may constitute the entire device.

Foundry is a casting factory which is equipped for making moulds, melting of metal and handling molten metal, performing the casting process, cleaning and finishing the castings.

Productivity of foundry is the rate of overall production. Foundry is a chain of processes. So to improve the productivity of a foundry, each and every process of production has to be improved.

Foundry processes are

1. Pattern and core box making
2. Sand preparation
3. Mould preparation
4. Core making
5. Melting
6. Pouring
7. Fettling (knockout, shot blasting & grinding)

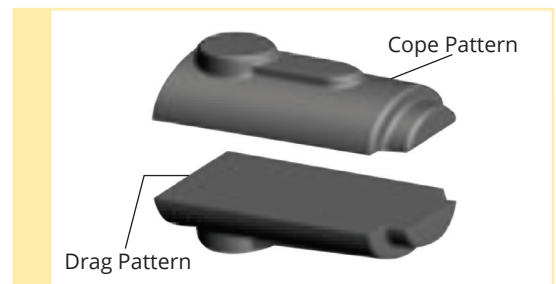
PATTERN AND CORE BOX MAKING PROCESS:

General Present Practices:

- > Loose piece patterns
- > Wooden patterns
- > No proper maintenance
- > No periodic dimensional checking
- > No proper matching (use of dowel pins)

Productivity Improvement Practices:

- > Use of match plates
- > Aluminium patterns
- > Periodic dimensional checking
- > Use of dowel pins to avoid mismatching



SAND PREPARATION PROCESS:

General Present Practices:

- > No use of binders and additives
- > No mixing or mulling
- > No sand testing

Productivity Improvement Practices:

- > Use of binders and additives to maintain GCS, permeability etc. according to casting requirement
- > Use of mixer or muller to mix properly so that uniform properties prevail
- > Testing of sand parameters at fixed intervals of time



MOULD PREPARATION PROCESS:

General Present Practices:

- > Green sand moulding
- > Sand ramming with hands and no use of proper tools
- > No mould hardness measurement and maintenance
- > No uniform gating system
- > Lot of reinforcement to mould box for holding sand
- > Coal consumption to dry the moisture in moulds leads to increased carbon production
- > High carbon footprint of foundry and air pollution
- > Very low productivity (moulds/hour)
- > Highly labour intensive
- > Quality depends on skill factor of labour

Productivity Improvement Practices:

- > Use of proper sand ramming tools
- > Use of pin lifting machines
- > Use of quick release aluminium moulding box and C. I. Jackets
- > Use of match plates with gating system
- > Very high productivity (moulds/hour) simultaneous jolt squeeze machines
- > Mechanization to transfer mould boxes from moulding to pouring lines
- > Moulding quality should be by design and not by default



Bench Sand Rammer



Floor Sand Rammer



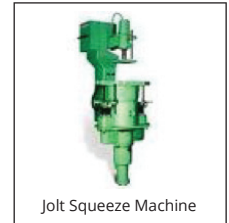
Pin Lifting by Pneumatic



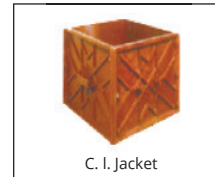
Pin Lifting by Manual



Simultaneous Jolt Squeeze Machine



Jolt Squeeze Machine



C. I. Jacket



Quick Release Aluminium Mould Boxes

CORE MAKING PROCESS:

General Present Practices:

- > Dry cores i.e. green sand cores by baking in coal fired heat chamber
- > High levels of air pollution and carbon footprint by foundry
- > Very low productivity (cores/hour)
- > Highly labour intensive
- > Impossible to meet urgent requirement
- > Heavy reinforcement of cores to support sand
- > Difficult to make complicated cores
- > Surface finish not upto mark

Productivity Improvement Practices:

- > CO₂ process development
- > No bake process

Advantages of CO₂ and No Bake Core Making:

- > No heating involved, therefore no pollution
- > Easy process
- > No ramming is required
- > Very high productivity (cores/hour)
- > Not labour intensive
- > Higher dimensional accuracy
- > Easy to make complicated cores
- > Improved surface finish

MELTING PROCESS:

General Present Practices:

- > Conventional cupola (single blast)
- > Clay lining for ladles
- > Running of pollution equipment for namesake
- > No upgradation and no periodic cleaning, checking & repairing of pollution equipment
- > More dependent on cupola mistry than technology

Productivity Improvement Practices:

- > Divided blast cupola to get maximum heat recovery and improved melting rate
- > Bed coke and charge calculation according to coke quality and raw materials quality
- > Use of skip charging to avoid manpower dependence
- > Use of CO₂ and branded linings in ladles
- > Upgradation and periodic cleaning, checking & repairing of pollution equipment

POURING PROCESS:

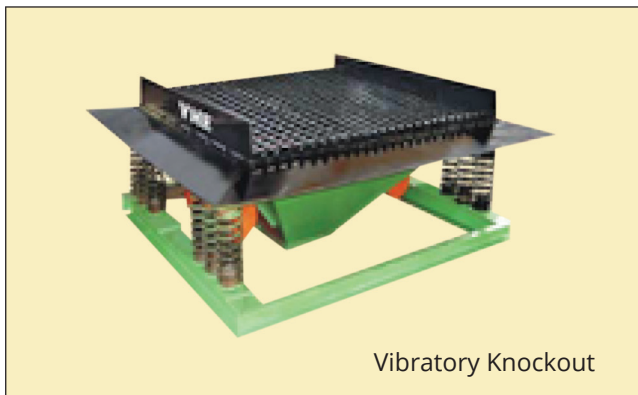
General Present Practices:

- > Manual pouring by using hand ladle
- > No inoculation practice
- > No slag removal practice
- > No usage of personal safety equipment in handling liquid metal
- > No temperature measurement
- > No CE apparatus to measure CE, Carbon and Silicon
- > No Wedge Sample Analysis to check chilling effect on section thickness
- > No test bar pouring to know UTS and hardness



Productivity Improvement Practices:

- > Use of hand shank ladles
- > Inoculation practice
- > Slag removal by adding slag coagulant
- > Usage of personal safety equipment in handling liquid metal to avoid casualty and improve work environment
- > Temperature measurement
- > CE apparatus to measure CE, Carbon and Silicon
- > Wedge Sample Analysis to check chilling effect
- > Test bar pouring to know UTS and hardness



Vibratory Knockout

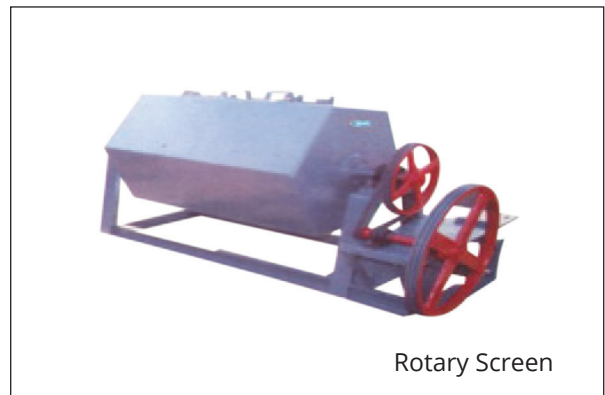
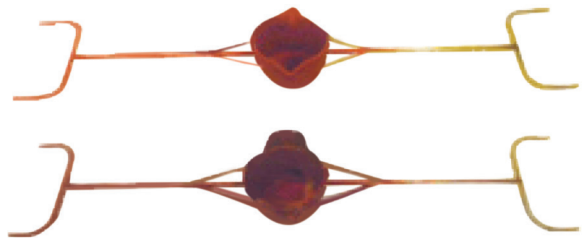
FETTLING (KNOCKOUT, SHOT BLASTING & GRINDING) PROCESS:

General Present Practices:

- > Manual knockout
- > No notch in gating system for easy breaking of gatings
- > Cleaning with wire hand brush
- > No proper stacking
- > No designated fettling area
- > More SPM in foundry area due to fettling

Productivity Improvement Practices:

- > Use of vibratory screen for speedy knockout
- > Notch provision for easy breaking
- > Use of finishing drum or shot blasting for cleaning
- > Maintain housekeeping through proper stacking
- > Designated area with proper dust collectors to reduce SPM in foundry and use of magnetic separator in sand system to avoid fines mixing in system sand



Rotary Screen

After Changing to Productivity Improvement Practices in Various Foundry Processes, the Advantages would be:

1. Increased production from a given floor area and high productivity
2. Accurate castings, better surface finish and closer tolerances
3. Labour saving due to mechanized equipment
4. Better working environment
5. Reduced cost due to less labour



Hanger-Type Shot Blasting Machine



Table-Type Shot Blasting Machine



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CUSTOMER VOICE:

First, let me convey my gratitude to TATA METALIKS for launching 'PRAYAS' as the communication medium with us. We, as one of the proud customers of TATA METALIKS are very happy to share our views about their services. We are lucky enough to get them as our esteemed vendor. Their services are outstanding in all departments.

In various types of technical matters, we get complete support and help from Mr. Sambasiva Rao for reducing our costing from the Customer Service Centre, Howrah. In the areas of sales we are aided by Mr. Devraj Choudhury regarding timely delivery of materials and other support services from the registered office.

They are available 24x7 to assist us. Hope we will always remain a member of this enriched family and the co-operation which we get from them will become better and our partnership grow stronger.

