

FOUNDRY TALKS

Foundry E-Magazine

For The Foundrymen By The Foundrymen



Innovation Article By



MESSAGE FROM CHAIRPERSON

Digitalization - A New Era to Change

Dear Fellow Foundrymen,

Digitalization is the use of digital technologies to change business model and provide new avenues and value producing opportunities. Digitalization moves beyond Digitalization. Industry 4.0 was developed by German government. It refers to the integration of multiple technologies throughout their industrial production and the value chain.

I think there is no master plan for all companies on how to undergo a digital transformation however, some overall steps are necessary for everyone to take before digitalization.

1. Build own strategy
2. Select technologies suitable to organization.
3. Develop human resources to adopt digitalization.

Digital transformation is not an option but an inevitable and necessary solution. The corona virus has shown the power of technology and digitalization to prevent global economics from collapsing.

So it's time to get started and move ahead.

MESSAGE FROM THE EDITOR

Dear Readers,

Foundry being process industry, it is vulnerable to defects arising from deviation in process parameters. There are so many parameters like Time, Temperature, Moisture, Humidity, Permeability, LOI, Compatibility, WTS, Hardness, Under cooling.....related to metal, mould and environment.

After much iteration, combinations and collective wisdom, foundries attain their equilibrium and hence wish to retain this status forever.

For scientific control over any process, it becomes necessary to identify and measure each parameter, which may affect the process conditions. This is sensing or "Digitization". When intelligence is applied on a set of parameters for finding most suitable operating range for flawless outcome, this becomes "Digitalization".

Friends, this issue of "Foundry Talks" is dedicated to "Digitalization" and this has already become need of time. Many organized and progressive foundries have adopted digitalization or i4.0 as an effective means of process monitoring and control. Digitalization helps in minimizing any probable down time or loss as the parameters are handy across the universe and instructions / commands can be given directly on-line. As one may think, it is not necessary to go for heavy investment, but one can start gradually, step by step, and earn your own path of progress.

With best wishes for new Samvat,

LETTER TO EDITOR

Dear Editor,

Thank you very much for sending FoundryTalks IIF-WR.

It is very good and highly beneficial to Foundry Industry and Foundrymen Congratulations.

The layout is superb and my special appreciation to you and everyone at IIF WR.

Best wishes to Chairperson/ IIF WR for the wonderful initiative.

From

Mr. N. Gopal

National Council Member, IIF

Dear Editor,

Foundry Talk Magazine was excellent.

The infos given by Foseco on degassing, Ask the Experts, Foundry tips by Mr. Anant Bam and about cylinder head problem Mr. Subramaniam were excellent.

Thanks,

Regards,

Mr. M. Thirugnanam

Chennai



Anuja Sharma

Chairperson, IIF-Western Region
Dir.-Mrkt.-Shamlax MetaChem Pvt. Ltd.



Anant Bam

Editor Foundry Talk
Foundry Consultant
& Energy Auditor

We truly welcome your feedback or suggestions for WR E-magazine. Please feel free to write to us at wr@indianfoundry.org with subject "Letter to Editor".

FOUNDRY TIPS



Digitalisation - Foundrymen’s Perspective

By Mr. V. Srinivasa Reddy, Executive Director, Synergy Green Industries Ltd.

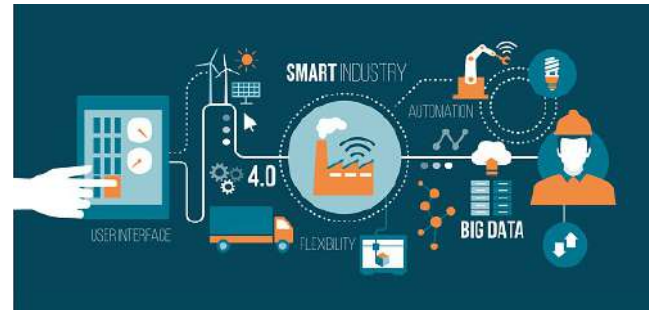
Introduction: Indian foundries are producing around 11 Mn MT of castings annually with a revenue of Rs 1,50,000 Crores. Common problem with majority of foundries is the financial leakages estimated as per given table.

Parameters	App. value	Impact on Profits
Rejections	5 to 10%	3%
Productivity Issue	10 to 20%	4%
Cost Issues	5 to 10%	3%
Total		10%

These leakages are much higher than actual foundry profits. One of the major reasons for this is due to large variabilities in the foundry.

Typical medium size foundry consists of 100’s of products, 300 people, 150 raw materials, 100’s of machines, 50 measurements and 50 processes results in billions of variables. In the absence of controlling these variables, it will be highly challenging to produce consistent results.

Digitalisation: Digitalisation is the best way to handle the variable and achieve consistent results. This will reduce the burden on skilled manpower requirement to operate a foundry.



Aviation is the best industry to benchmark with foundries. This industry also has got similar challenges but able to produce consistently good results with excellent competitiveness supported by digitalisation. For example all the airline failures are analysed in depth and documented with digital accessibility to entire industry. If we adopt similar approach in solving our foundry problems and make it accessible for entire team through digitisation can greatly reduce the repetition of problems.



Key digital technologies: We can use Industry 4.0 tools for digitising the foundries. Implementation consists of two stages, first one is to understand the functionality and second one is to implement the same through digitally.

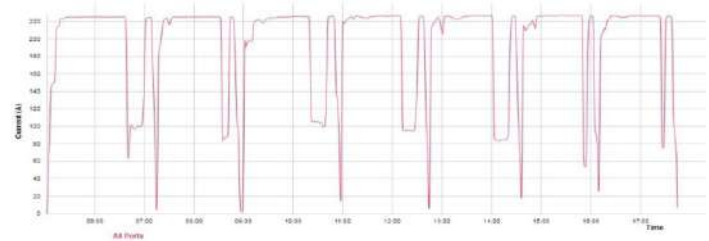
Younger generation is very well conversant with these concepts and abundant information is also available online. We need to blend the experienced people with younger generation for successful implementation.

Case study at Synergy Green Industries Ltd (SGIL): SGIL is a 30,000 TPA foundry producing large size casting to wind industry in the weight range of 3 Mt to 20 MT. Company is equipped with India’s largest semi-automated fast loop moulding line and largest shakeout equipment to produce the castings up to 6m X 5m sizes. Below are the Digitalization implementation that we did at SGIL.

a) Data Digitalisation: Generally foundry data flows through messages, emails logbooks, reports and excel sheets. One of the biggest challenge with this type of data is accessibility in right of format and will take away lots of time in analysing the problems. Quality of solution will greatly dependent on input data. At SGIL all these data inputs are digitised as per above matrix to analyse the same in desired format.

Variable	Pattern	Molding	Melting	Inpection
Material				
Equipment				
Process				
People				
Measurement				

b) Energy Optimisation: At SGIL all high intensive power consumption equipment's(28 node's) are connected with energy meters and data being captured on real-time basis. This information will greatly help in identifying the abnormal situations and control the same. Power consumption has been reduced from 1250 Units/MT to 1100 Units/MT through energy optimisation methods. Through this digital tracking, it is being aimed to reduce the same below 1000 Units/MT.



Above is a typical melting power input data from a furnace. Generally melting has got four stages like charging/melting/sampling/tapping. We can measure power consumed at each stage for large number of heats and benchmark the same with average consumption. Any heat is having much below/above average will help us in identifying the efficient/problematic heats along with their occurrence frequency. This will be a great information in finding optimal solution and also monitor the impact.

c) Robotic Fettleing: One of the biggest challenge today in foundry operations is fettleing. Going forward it may be even more difficult to get laborers for carrying out this task. At SGIL an attempt is being made to covert the major girding tasks through robotics implementation for all the casting but some sort of automation will be must in fettleing sooner or later to compensate for the skilled labours.



d) Other Implementation Ideas:

- i) **RFID** tag will be one of the simplest and greatest tool in tracking the key resource movement for optimisation through real-time data capturing and analysing.
- ii) **Smart Camera** which in addition to image capture is capable of extracting application specific information & making decisions should be another powerful tool in getting the various key resource deployment data for optimisation.
- iii) **Digital Display:** Availability of key information to shop floor on real-time basis should greatly enhance the productivity
- iv) **Machine Learning:** Collecting some simple data like temperature, vibration from key machine should help us in optimising the equipment's.



Conclusion: Digitalisation of foundry is no longer optional but it is a must thing for long-term sustain ability. Every day technology is improving and becoming cheaper as well. We should not be hesitant in implementation because of failures or searching for perfect solution as there are no ready made things available in the market. We should start implementation with key functions which offers significant contributions will result in great learning and transform the foundry.

Around 10% profit drain out in foundry is curable through digitization. It should be a reasonable expectation to aim for 5% cost optimisation through implementation of simple things.



Mahesh Date

Raw Material Price Index

Movement In Foundry Raw Material Prices

As per IIF data, there are nearly 7,000 foundries across India. The Indian foundry industry is ranked second globally with a production of 10 million tons per annum. It is catering to the automotive, tractor, power train, railways, energy and engineering sectors in domestic as well as overseas markets - Directly and indirectly.

There was sudden spike observed in April 2022 and continued due to various reasons. Prices got declined-stabilized thereafter but these fluctuations led us to establish the common reference point where we can study the actual raw material prices variations.

Now prices ruling in Kolhapur during second week of October 2022 are given in column 14 in the Table below. Also, given in table are the prices since November 2021. These prices are collected from Kolhapur market. These are approximate, ruling during the month and week as indicated in the table.

In the prices indicated below, transportation cost is included in most items. Only applicable GST is to be added. Prices of many materials are on the basis of "Immediate Payment"

Movement Of Prices of Raw Materials over a Period of 12 Months

(A) Major Ferrous Metallic Raw Materials, Low Ash Metallurgical Coke, and Electro-Graphite Fines {Rs/ Tonne}														
	Nov'21	Dec'21	Mar'22	May'22	Jun'22	July'22	July'22	July'22	Aug.22	Aug.22	Sept.22	Sept.22	Oct.22	Oct.22
	4 th Week	5 th Week	4 th Week	3 rd Week	3 rd Week	2 nd Week	3 rd Week	4 th Week	1 st Week	2 nd Week	2 nd Week	4 th Week	1 st Week	2 nd Week
Foundry Grade PigIron	49000	47000	63000	64000	61000	60000	59850	58850	57850	57850	57350	56850	56850	55850
MS Scrap (good quality)	43000	41000	52000	53000	49000	53000	52000	53000	53000	53000	51000	50500	50500	50500
Low Mn Steel Scrap	46000	44000	56000	56500	52000	56000	56000	56000	55000	55000	55000	55000	53000	53000
Si Steel Stamping Scrap	46000	44000	56000	56500	52000	56000	56000	56000	55000	55000	52800	52300	52000	52000
Low Ash Met. Coke	52500	47500	63500	62500	62500	610000	61000	60000	60000	60000	58500	57500	57000	56500
Electro-Graphite Fines	105000	100000	100000	110000	110000	110000	110000	110000	105000	105000	102000	102000	102000	102000

(B) Major Ferro-Alloys {Rs./Kg}														
Fe-Si (70-75% Si)	200	190	215	153	152	152	152	151	149	149	152	152	150	150
Fe-Si-Mg (5-7%< Mg)	280	250	250	230	230	230	220	210	195	195	230	230	230	230
Fe-Si-Mg (5-7%< Mg)	280±5	250±5	250±5	230±5	230±5	230±5	230±5	230±5	230±5	230±5	±5	±5	±5	±5
Fe-Si-Mg (8-10% Mg)	286±5	256±5	265±5	240±5	240±5	240±5	240±5	215±5	215±5	215±5	240±5	240±5	240±5	240±5
High C Fe-Cr (60% Cr)	140	130	130	130	130	130	130	120	120	120	130	130	126	120
High C Fe-Mn (60% Mn)	130	120	125	110	99	99	97	90	84	84	99	99	95	95
Ferro-Moly (60% Mo)	2150	2050	2150	2160	2160	2160	2160	2150	2150	2150	2160	2200	24000	25500

1. Above Prices are Excluding Taxes, GST Extra as Applicable
 2. Phenol Price: Rs. 130/Kg during 2nd week of October 2022
- (Info collected during October 2022, Reader are requested to check the market prices)

Disclaimer: Rates represented here are as per the data collected from the reliable sources based in Kolhapur and it may vary based on the supplier, location, payment terms & other conditions.

Innovation Article

By M/s. VEZAPP

Innovation Article is sponsored article to promote the innovation done by the company. To showcase your company product / innovation, please write to wr@indianfoundry.org.

Digitalizing Foundry using Smart Mobile Apps - VEZAPP

India is one of the world's largest casting producers, with foundries relying heavily on laborers. Despite the availability of Industry 4.0 technologies and IoT devices, Indian foundries have largely yet not adopted them. One of the major challenges is, to replace intensive labor operations with automation, robots, sensors, etc., which requires huge investments, skill, and infrastructure. But to become more competitive, reduce rejection, and deliver quality castings, Indian labor-intensive foundries need an indigenous alternative solution to IoT devices.

This has inspired us at Vezapp Solutions LLP to take on the task of developing indigenous solutions for India's labor-intensive foundries. With 439 million smart phone users, India has the world's second-largest smart phone population. Smart phones are widely used in India, from the shop floor operator to the highest management. These smart mobile devices can

revolutionize labor-intensive foundry processes, eliminate large junk of papers, and real-time data collection from the shop floor without any IoT device. Remember that a smart phone with internet access is a free IoT device in the hands of your employees.



Difference between Digitization, Digitalization and Digital Transformation?

Let us first understand the difference, to ensure you know exactly which stage you are, and when you implement you may be able to make the difference among them.

Digitisation	Digitisation	Digital Transformation
<p>The process of converting physical and analog data in to digital, which can be accessible</p> <p>e.g. Foundry logbook/paper based report can be scanned, or avail in the form of excel or google forms</p>	<p>Automate the process using digital data available</p> <p>Replace paper-based logbooks with software or mobile applications (e.g. Vezapp) such that if any input from user/human observed values are out of specification it can intimate the HOD's or concerned person for corrective / preventive actions</p>	<p>Integrate various automated process, digital data, or customed developed digitalized applications to minimize human interventions</p> <p>Instead of collecting data from human, get data from machine IoT directly, and in case of any abnormality observed either machine corrects on its own or intimate via notification, burger.</p>

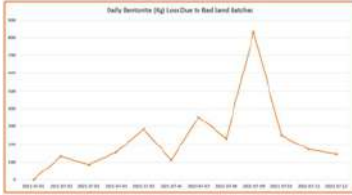
Challenges in Foundry Digitalization and possible way to overcome it:

Foundry Challenges in Digitalization	Vezapp – Smart Mobile apps to overcome the challenges
SME's have limited resources to invest in digitalization infrastructure.	Vezapp is an advanced smart mobile & web app available as SaaS (Software as a Service) that does not require upfront investment, software installation, licence oran in-house server&it uses a cloud server. This relieves from the burden of having a server, IT person, database setups, security software etc.
The majority of the sand testing is done in the laboratory. It is difficult to link sand test data with mould batch or date for Root cause.	Vezapp uses advanced mobile apps to replace paper-based reporting. It will send an automatic mobile notification/email if a property falls outside of specification. It will trace the date of the moulding & display sand test data in the dashboard during root cause analysis (Refer image below).

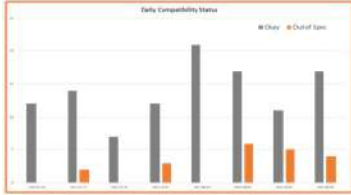
Foundry Challenges in Digitalization	Vezapp – Smart Mobile apps to overcome the challenges
<p>With human-based core & mould operation with manual & semiautomatic machines, it is difficult to determine machine-operator performance.</p> <p>Loss of production due to breakdown caused by not executing planned maintenance</p> <p>Determining the proper execution of a checklist for tool setup, chill, and filter SOP during actual production.</p> <p>Additional efforts to collect manual data and prepare the dashboard for analytics.</p>	<p>Users can enter their core, mould production, and rejections in Vezapp, or there are options to retrieve data straight from the machine through API.</p> <p>The maintenance plan vs. maintenance reporting feature in Vezapp enables you to escalate and issue reminders for the maintenance to reduce breakdowns in the event that the maintenance isn't reported within the allotted period.</p> <p>Users can carry out checklist-based SOPs during live production and upload photos of chill/filter installations done on the shop floor as evidence.</p> <p>Automatic dashboards are accessible based on real production, operator performance, OEE, Non-Reported duration, and operator-wise rejections; no manual effort or duplication of data is required.</p>
<p>Tool management: It is challenging to manually follow tool life calculations, comprehensive tool histories, and all modifications made to core boxes or tool patterns.</p>	<p>Based on core, mould production, & casting production, Vezapp determines tool life on its own by setting up a tool inspection life reminder inside the tool master to receive automatic notifications for tool inspections and, in the event of a failure in reporting, to assure tool availability as required.</p>
<p>Melting is the most crucial and challenging step to control manually with paper-based reporting. Replacement of melter - knowledge centre is challenging.</p> <p>Numerous redundant pieces of data are collected in 2-3 logbooks. The melt process contains crucial data & parameters gets difficult to access when needed for root cause</p> <p>Different charge mix recipe, difficult to remember and follow consistently. Lining life calculation has human limitation</p> <p>ERP might only record BOM and consumables, without recording all technical parameters. It is challenging to obtain heat-related data digitally or real-time notifications if any parameters deviate from specifications.</p> <p>Spectrometer reading separately available digitally</p> <p>Additional time & effort to generate dashboard, audit, & management reports that are relevant to the production, and QA team</p>	<p>Vezapp assists in replacing melter-based melting knowledge with system-based melting knowledge, overcoming the dependencies between melting knowledge and your own best practises based on the historical facts & data of your melting process.</p> <p>To capture data from charge-mix, ladle treatment, inoculation/ladle treatment, Spectrometer, and pouring without duplicating data, replace 2-3 logbooks with 2-3 apps. Heat code using only a system to prevent human error for traceability, which is linked with the mould number and batch.</p> <p>Library of charge mix grade wise, part wise, customer wise based on experience. Irrespective of melter in charge, consistency can be achieved. System calculates lining life automatically, sends reminder for check</p> <p>All weights, operators, power usage, temperature, and timings are recorded using apps, which can also calculate KWH/Ton at the end of the melting cycle and notify you if any attributes are out of specification. alerts in the event of a charge mix variation or excessive power used during any heat.</p> <p>Possible to upload heatwise data in sync with heatcode or interface with Spectrometer to monitor and root cause findings</p> <p>Auto dashboards populated of Daily no of heat, power consumption, excess power consumption with reasons & COPQ, Plan V/S Actual material consumption, Melt loss, Piggig weight, Pouring report, Abnormality.</p>
<p>Fettling, Shot blasting, Heat treatment, Machining and rework makes life difficult to monitor WIP inventory</p>	<p>Mobile apps can be used to report straight from the shop floor (by outside vendors too) for daily production & rejection reports with batch-by-batch traceability. Dashboards for WIP inventory at various stages, stage wise production, rejection, rework costs, vendor performance, etc. are prepared.</p>
<p>Physical, Chemical, NDT, Microstructure, Visual & Final Inspection quality reports are in various log books & are challenging to compile in one source for TC or root cause analysis.</p>	<p>Vezapp offers different apps for quality report. Possible to configure traceability heat-codewise, Day code wise or even single piece casting wise. This enables speedy decision-making & action planning by making it very simple to print TC with just one click, even during root cause analysis.</p>

Below are some examples of alerts and auto dashboards prepared by Vezapp.

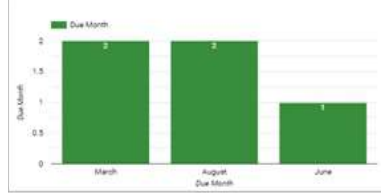
Daily Bentonite (kg) Loss Due to Bad Sand Batches



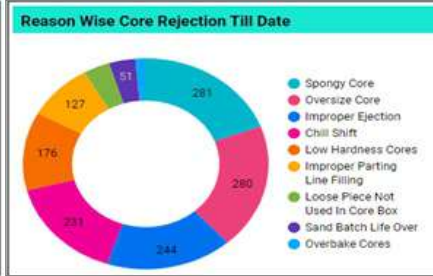
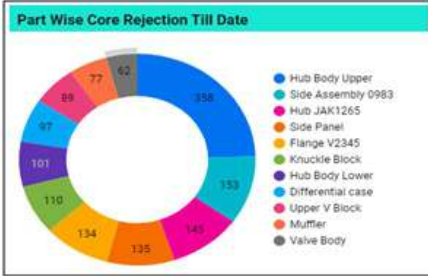
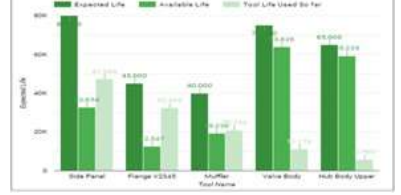
Daily Compatibility Status



Mould - No of Inspection Due in Month



MOULD TOOL DATA ANALYSIS



Excess power consumption, occurrence, Reason, and INR loss.

Mould Heat-code: 21K945 (1) - Part Code: P2-447 21K945 Oct 9, 2021 B2 Actual Melt Date: Oct 9, 2021 (1) - Final Melt Heat Code: [dropdown]

CLAY TESTING PROPERTIES							SAND TESTING PROPERTIES						
Total Clay	Active clay	Dead Clay	AFS	LOI	VM	pH	Compactibility	GSS	GCS	Prepared Sand Moisture	Return Sand Moisture	Permeability	Wet Tensile Strength
12.44	9.18	3.26	51.24	0	0	8.6	36	0.37	1.83	3.46	1.8	138	0
Okay	Okay	Out of Spec	Okay	Okay	Okay	Okay	Okay	Okay	Okay	Okay	Okay	Okay	Out of Spec

CHARGE MIX										MELT DETAILS								
CRCA Scrap	Silicon Scrap	HR Scrap	Boring	Pearlitic RR	Cu	Graphite	-	-	-	Furnace No	1st Sampling Meter reading	Melt Time (Till 1st Sample)	1st Bath Spectro Time	1st Bath Spectro Temp.	Actual Melt Start Time	Melt End Time	Melt Duration (in Min)	Unit Consumed
150	150	300	100	850	6.5	26	0	0	0	F1	70	14	15.44	1540	15:33	19:50	17	99

SPECTROMETER READING												
Spectro Type	Furnace Number	C	Si	Mn	P	S	Cu	Cr	Mo	Mg	Ni	
1	F4	-	-	-	-	-	-	-	-	-	-	-
2	Bath Spectro 1	F1	3.494	2.6715	0.41957	0.02604	0.01216	0.27459	0.03291	0	0.04264	0

LATE ADDITION ALLOYING												
Bath No.	Bath Spectro Time	M1	Q1	M2	Q2	M3	Q3	M4	Q4	M5	Q5	
1	-	Silicon Scrap	10	-	0	-	0	-	0	-	0	
2	Bath 2	15:55	Pearlitic RR	12	Silicon Scrap	1.2	M.S Scrap	4	Graphite	2	Fe2	0.8

POURING DETAILS					
Mould Heat-code	Final Melt Heat Code	1.Planned mould box to pour	Total Metal Poured	First Box Temperature	Last Box Temperature
21K945	B2	50	1000	1549	1544

OBSERVED HARDNESS		MICRO RESULT	LUG REPORT					
Minimum Hardness	Maximum Hardness	Observed Micro Status	Mould Heat-code	Carbide Actual	Pearlite Actual	Nodularity Actual	Nodule Count (in Numbers)	Result
406	928	Not OK	21K945	0	35	90.67	425	Not OK

FOUNDRY 4.0



Highlights of WESCON 2022

By: Prayut Bhamawat, Hon. Secretary, IIF Western Region

Digitalization... New Era of Change, with this theme, IIF Western Regional Conference – WESCON 2022 was organized by the Host Chapter - IIF Kolhapur on 15-16th October at Hotel Sayaji, Kolhapur.

Digitalization, Industry 4.0, IoT (Internet of Things) are common buzz words- in the manufacturing industry- because of rapidly changing technology due to increased interconnectivity and smart automation. However, in the foundry industry concept of digitalization or Foundry 4.0 has not gained enough popularity and probably one of the reasons for the same is lack of awareness about its implementation & benefits.

WESCON 2022 has not only identified this gap rightfully but also has impeccably delivered what it had set out to- through excellent content & keeping MSMEs in mind. All credit goes to the team of the IIF Kolhapur Chapter who meticulously planned the work visits where delegates witnessed the application of digitalization, they literally hand-picked the speakers who gave due justification to the topic selected and the team extended their warm hospitality through-out the stay of delegates. WESCON was inaugurated in presence of industry leaders like Mr. Basavaraj Kalyani (Chief Guest) - Executive Director, Bharat Forge, Pune; Mr. V Narsimhan (Guest of Honour) – Former Executive Director, Brakes India Ltd, Chennai; Mr. J Ganesh Kumar (Keynote Speaker) – Managing Director, Indoshell Pvt Ltd, Coimbatore, who all have achieved a commendable accomplishment in Modernization & Digitalization of their own organization. Thereafter a series of technical sessions were delivered by the experienced speakers who enlightened the delegates by sharing their knowledge in this field. It was one of the rarest conferences with 300+ Delegates who left with a good impact and with a great experience.

There were many learning opportunities during the technical sessions and through this article, I have tried to summarize presentations given by various speakers. Though each presentation had elaborate value and by itself could be a full-fledged article but due to limitation of space I have tried to cover key take-aways from presentations focussed on digitalization. Please note, though I have tried to maintain utmost accuracy, this report includes my understanding and interpretation of the presentations and it may deviate from someone else's perspective.

Using Digitalization to meet the goal of the organization: By Mr. Vijay Menon, Managing Director, Menon & Menon Ltd.

Mr. Menon focussed his presentation on achieving the goal of an organization through digitalization. He mentioned that main goal of any organization is to stay ahead of competition always - which can be achieved by looking for a competitive advantage and aim to get better than the competition. Here, digitalization should be used to aim towards making our organization better than the competition. He also explained the evolution from the Analog era (Data entry on PC from paper reports) to Digital era (getting all the data digitally right from the source). Advantage of moving to digital era was quite visible with his explanation on how decision-making capability differs between human and artificial intelligence (AI). Human mind can reach to a limitation while handling the large number of variables whereas AI uses algorithm which are based on the past data collection with n number of variables and hence can provide better suggestions/results on compilation of the present data/variables. Through his presentation, he encouraged all foundrymen to use Automation / AI / Digitalization tools to deliver better than competitors but at the same time cautioned to not get lost in technology but to use technology to attain the goal of the organization. Mr. Menon referred to growth story of M/s Asian Paints from being smallest to the 10th largest company & 2nd Most Valuable Company using the same strategy – Staying ahead of competition.

A Strategic roadmap to Digitalization: By Mr. Milind Kank, Managing Director, Yeshshree Group of Companies

Mr. Milind Kank from Yeshshree group gave a presentation on his journey from facing challenges to overcoming them through Digitalization of his plant. Yeshshree group which was founded in 1987 & started with a single plant now has a group of 7 plants. They have expertise in processing of press components and welded assemblies and are supplying to automobile and engineering companies. Mr. Kank also faced similar challenges on the manufacturing operations and administration front like low productivity, low quality, high costs, reporting error etc after which he decided to digitalize operations in his company to overcome these challenges. He explained that they went into digital transformation in a phased manner. In Phase I they automated their manufacturing & administrative process, while digitalizing only administrative processes. Then in Phase – II they implemented IoT - connecting automation and digitalization. It was interesting to note that after implementation of phase-I they were able to increase their OEE up by 13%, reduce manpower count by 35% and reduce skilled labour count by 95%. Similarly with digitalization in the administrative process, they were able to reduce error in documentation to ZERO – that too with reduced manpower. In phase II- with implementation of IoT, the company's complex multi-mode of communication was converted to simpler single way communication for all the processes. It gave them a clear and real time picture which helped them to make effective changes in the process and were able to reduce energy consumption by 18%, possibility of defect generation by 95%, reduce manufacturing cost and ensured 100% timely delivery. He highlighted that his implementation journey was long but with strategic implementation of digitalization in phase-wise manner and with focus on results- they are able to achieve their target and get continuous benefits.

Digitalization for Operational Excellence: By Mr. Mukund Kulkarni, Owner Director, Expert Global Solutions

Mr. Kulkarni focussed his presentation on “From where to Start” & strategies for implementation of digitalization/IoT for any industry. Mr. Kulkarni has been very generous by providing us with his presentation in the form of an article for our magazine. His article is published on Page no. 15 & 16 of this magazine under ‘Special Insights’ section. Readers are requested to gain insights into the topic directly from the speaker/author himself through his article.

Pain to Peace – Machining as a substitute for fettling: By Mr. Prakash Rathod, Chairman & Managing Director, Caspro Group of Companies

Mr. Prakash Rathod presented a very innovative solution for reducing the PAIN of fettling and to get PEACE by substituting it with machining. He started with the well-known pain area of the fettling department that it is prone to accidents, disturbs the appearance of castings, is a low technology process, occupies lots of floor space, is dusty, unhygienic and requires skilled labour which are difficult to get these days. Facing these challenges just after the lock-down period, Mr. Rathod & his team changed the process of fettling & substituted it with machining. Through videos he showcased that using the right tools and right processes of machining, we can overcome the problem of vibration, cutting tool breakage issues etc which we normally face on machining of raw castings (without fettling). He explained how he took one product at a time based on priority (high volume requirement) and executed the same. He also shared the figures of cost savings on each item with this substitution. Other advantages were an improvised look of casting, getting waste back in the form of scrap, reduced labour dependency, increased space saving and better sustainability. Mr. Rathod shared his future goals to collaborate with Machine manufactures to make low-cost automation/SPM and convert 50% of his castings from fettling process to “Fet-machining” process. The presentation was the classic example of thinking out of the box and how simple innovation can bring in the big changes.

Competitive Advantage through People in Digital Era: By Dr. Santosh Bhawe, Director HR, Bharat Forge

Dr. Bhawe highlighted the importance of having the right people for digital transformation in an organization and why digital transformation is important for business in today's time. He specified that digital transformation can be done only with having people with the right mindset, proper communication, sufficient empowerment to take decisions, right skill set and right tool set. He gave the example of the implementation process at Bharat Forge. He requested organizations to develop a collaborative work environment by encouraging communication, building trust, minimal manual intervention & establishing common goals. All of this can be easily done with digitalization. He further discussed about the impact of digital technology on jobs. He mentioned that through digitalization the number of jobs will reduce but not work, the major difference would be the nature of work i.e. smart jobs for smart people and innovative jobs for intelligent people. The result will be – heightened efficiency, reduced cost and a way to attract & retain talented employees. He concluded his presentation emphasizing the importance of technology - it is the necessity of time as it brings speed & accuracy in decision making process but it can be made a success only by nurturing talents – developing the right people.

Digitalization: Foundrymen's Perspective: By Mr. V Srinivasa Reddy, Executive Director, Synergy Green Industries Ltd.

Mr. Reddy presented the final talk of the technical session of WESCON, and his presentation also summarized the entire conference. Mr. Reddy shared his approach and journey of digitalization in his foundry and how they succeeded in reducing rejection, improving productivity, reducing cost by implementing IoT for various processes at different stages. We are privileged to have his article on this topic on Page no. 3 & 4 of this magazine under the 'Foundry Tips' section. We request readers to refer to it to get first-hand knowledge as shared by the speaker/author himself through his article.

Panel Discussion: Mod. – Mr. Sanjay Karkhanis

(Panel Members - Mr. Bipin Jirage, Mr. Anand Deshpande, Mr. V Srinivasa Reddy & Mr. Prakash Rathod)

It was a good discussion, with appropriate questions asked and very well answered by the panel members. Below are few highlights on some major topics: -

- Panel members highlighted that for **implementing the Digitalization** in the foundry the first step would be communication- spreading the message & convincing team members. Thereafter the team can start with simple projects with some machines, see the results of implementation- which can further build the case and convince other members to go for the next step.
- Regarding the **budget for digitalization** panel members mentioned that it is difficult to put a fix number a on the cost but one can start with low-cost automation and can enhance further as and when required. Further, one should start with the latest technology so that upgradation can be easier. And it is important to have a roadmap on how to incentivise the investment which can eventually lead to zero cost of digitalization.
- One concern was raised on **managing the chaos** that would result when digitalization would give actual data unlike modified data provided manually. To this, panel members responded that sportsman spirit must be created in the team beforehand, it should be about eagerness to solve the issues by using the right data in a right way to overcome the challenges like rejections, wastages, lower efficiency etc. Having proper data can help in establishing the correct root-cause analysis which eventually will reduce the chaos.
- On **inhibition** among foundry-men **on implementing digitalization**, panel members mentioned that currently the right data is not available and hence the real picture is not clear. Through digitalization everything gets transparent & people need to accept the data. Once difference & improvement is seen people will get encouraged to adapt and use it further.
- Also, addressing **failure in implementation of digitalization**, members highlighted that implementation of the same requires combination of right hardware, software and team with proper knowledge. Without proper infrastructure one cannot start with Industry 4.0. It is a journey and it must start with the simplest process and then expand. With this approach- it becomes non-threatening, non-demanding & results can be seen with less investment.
- Discussion ended with the common **conclusion** that foundrymen should identify one of their pain areas in the foundry, identify the root cause of it, establish the counter action parameters for it and then digitalize it. Use the technology in a right way, it is easy to get lost but with proper focus and road-map one can achieve the results which can make huge difference in their organization

Apart from above, there were some non-digitalization topics too – which were also very essential for establishing symbiotic relations in the foundry. These were based on the **importance of delegation** of work for the growth of the company. This was presented with a video showing how the right people for the right work are important for the organization and having back-up of the same is also important for delegation under crisis. There was a presentation on getting **financial support for MSMEs** through various government schemes which was supported with the data on organizations that have already taken benefits from these schemes. Mr. Raju Ketkale, Exe. VP, Toyota Kirloskar Motors gave the presentation of how Toyota is achieving the goal of carbon neutral mobility using the electrified technologies, developing hybrid vehicles and what are future steps/research on it. Ms. Tejashree Joshi from Godrej Boyce Mfg. C.L., gave a talk on establishing **sustainability in foundries** and how one should aim at and can achieve net-zero in the foundry industry as well. She emphasized on the severity of environmental deterioration which has already taken place due to industrialization and hence industries need to innovate their processes targeting carbon neutrality. There was also a very meaningful session on **managing a healthy mind and body** through various modes, identifying the symptoms of long term and short-term stress & ways to deal with it along with the significance of energy chakras in our body. Overall, it was a very fruitful conference with many thoughts and ideas shared and many learnings, lessons, and tips to take from experts. It is now on all of us foundrymen to use this knowledge and implement it in our respective organizations.

Innovation Article

By Mr. Deepak Chowdhary - Founder - MPM Group

Founder & Inventor of Globally Patented Software - Sandman



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SANDMAN – A True Industry 4.0 Solution for Green Sand Management by Predictive & Prescriptive Analytics

What does it mean to lose 1% castings to rejections? On back-of-the-envelope calculation, the cost of a 1% Green Sand Rejection in an entry-level 24,000 Ton/Annum foundry is approximately US \$ 220,000 per annum. Now, what would a 10% reduction in additive consumption means to a foundry? Chart here provides a ball-park figure from the actual data collected for the period November 2016 to August 2017.

SANDMAN organizes, stores, validates, analyses, and leverages the foundry's molding-sand data legacy for molding process optimization, using prescriptive and predictive data analytics. This enables the user foundry to move from reactive to proactive green sand control and management, and by corollary, reduce sand related repetitive casting rejections. It provides an opportunity to reclaim your lost profits by:

- Using your own historical and developing data legacy
- Without changing Man, Material or Machine source or specification
- Institutionalize to your foundry and retrieve on-call, the experiential process and data legacy, in a unified, co-related and validated format.

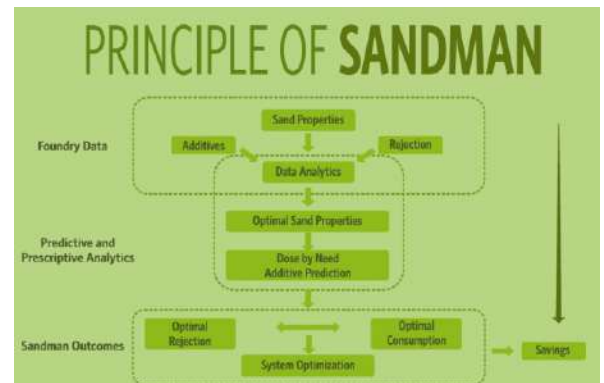
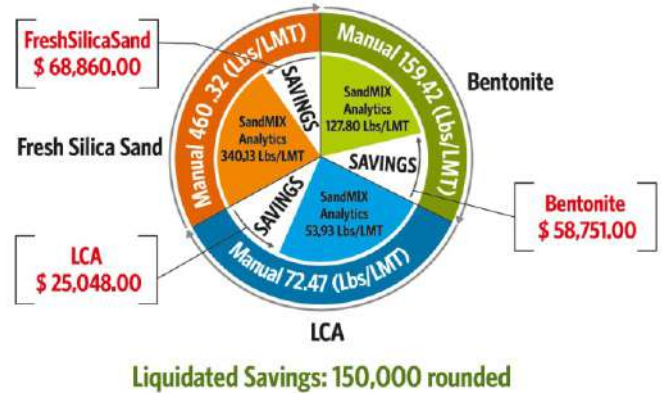
Challenges in Molding Sand Control

- As sand managers age, change, and move on, the **legacy of experience** and skill of foundry sand control is **often lost** or available only in limited sports to succeeding controllers.
- Varying core sand influx, casting types, and increasing data points, result in a **huge process-variable scenario** that can confound experienced sand managers.
- The data on foundry sand, related casting rejection, and sand additive consumption, are often recorded in proprietary, non-standard formats, making **data correlation capabilities difficult**.
- Multiple data generation points (laboratory, shop floor and management) create a **disconnect between correlation of data for meaningful analytics**.
- Also, more often than not, the available data is questionable for **accuracy and veracity**.

The Solution: Developed by MPM INFOSOFT, SANDMAN is world's first, patented*, Data analytics driven decision support. SaaS delivered.

SANDMAN harnesses the power of proprietary mathematical modelling and algorithms to provide predictive and prescriptive analytics. It leverages the foundry's own historical and experiential sand data legacy. It takes reactive decision-making in modling sand management to a proactive, predictive and forward-looking level with powerful speed and accuracy. Positive environmental impact due to reduction in toxic waste generated by reduced additives and casting rejections is a significant collateral.

*USPTO NUMBER: 9,731,344



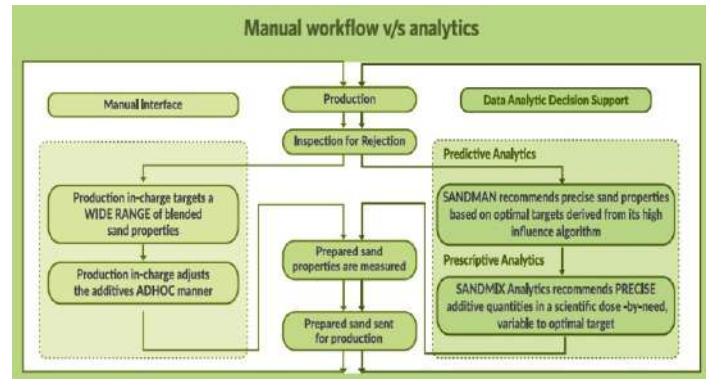
Salient Features

- Powerful data validation features ensure that data is segregated into 'clean' and aberrant data
- Data is also validated by correlation of intuitive parameters. Example Active Clay:GSC:WTS
- The power of multi-variate analytics provides predictive optimal targets for the most influencing molding sand parameters vis-à-vis the various rejection incidences.
- A first design of its kind, the algorithms can micro drill down to analyze and suggest optimal sand parameters by incidence of rejection by type as well as by component.
- SANDMIX Algorithms further translate the optimal target sand properties by variable additive prescription, making the entire user experience of SANDMAN simple and easy.
- Measurability of the performance metrics of the analytics by powerful SPC tools enable validation of the decision making.
- Unique annotation feature enables the foundry to record experiential and historical data, thereby allowing:
- Institutionalizing the experiential data of the foundry to its own archives, moving away from the points of disconnect of individual-specific experience in the lifetime of the foundry.



SANDMAN Analytics Features

- SANDMIX Analytics addresses the un-meet need of a foundry to target variable, dose-by-need additions of additives in place of the fixed dose additions based on pattern changes. Foundrymen do change additive dosages based on pattern changes, but in the absence of accurate feedback on the return sand properties, these changes too are based on experiential approximations.
- SANDMIX Analytics complements the SANDMAN High Influence algorithms, translating the optimal sand properties target into suggesting near-precise quantity of additives to be mixed/manipulated to realize consistent and optimum molding sand control.



- At its core, it leverages information of underlying green sand plant dynamics and historical additive consumption trends to arrive at the additive prescriptions of each shift or day depending on the granularity of data made available.
- A model of the sand plant mixing operation is obtained to arrive at the additives mix that best achieves the target sand properties.
- The predictions are based on the relationship between the make-up additives and the corresponding current and past prepared sand properties, advised under the constraints imposed by the foundry infrastructure and operation.

Additives advisory based on current and target sand properties

Additive	Prediction	Additive Ratio(kg/t)	Prepared Sand	Recycled Sand (kg)	Additive Quantities (kg)	Additive Range(kg)
Bentonite	0.2231449		3100.00	24.00		22.00-26.00
Core sand	0.2289159		3100.00	281.00		NA
Fresh Silica Sand	0.2288832		3100.00	84.00	79.00-106.00	
LCA	0.0230493		3100.00	12.00	10.00-11.00	
Return sand	0.2626194		3100.00	2816.00		
Water	0.0142664		3100.00	46.00		NA
Prepared Sand Qty				3273.00		

Prediction of prepared sand properties when advisory is followed

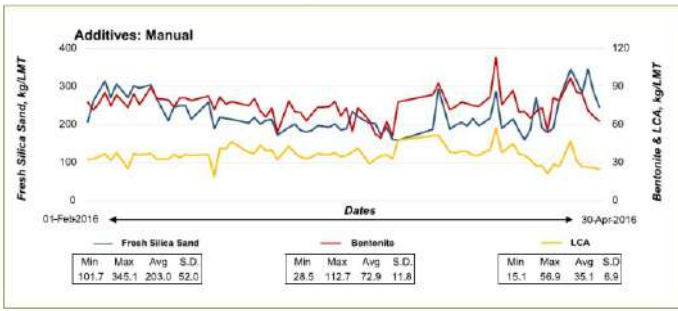
Prepared Sand	Current Value	Target Value	Predicted Value
Active Clay (%)	8	6.25	8.16
Compactivity (no)	40.44	40.58	40.45
GCS (g/cm ²)	1561.11	1546.24	1555.12
GFI/AFS (no)	58.47	54.59	55.52
Inert Fines (%)	3.82	3.88	3.89
LOI (%)	4.2	4.41	4.40
Moisture (%)	3.29	3.30	3.30
Permeability (no)	188	144.06	144.44
pH Value (no)	8.68	8.71	8.76
Shear Strength (kg/cm ²)	441.11	480.61	470.58
Volatile Matter (%)	3.2	3.28	3.36
Wet Tensile Strength (g/cm ²)	22.8	22.67	23.32

Case Study 1: Variable "Dose-By-Need" Addition Advantage of Prescriptive Analytics

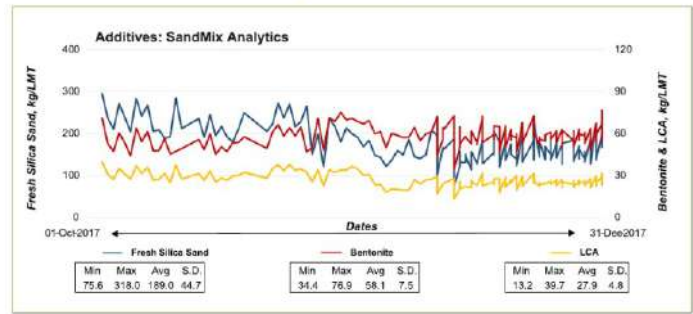
Reduction of additives consumption through systematically variable dosage of additives based on the requirement of sand and additives to achieve target properties, avoiding overdose.



Manual operation: Before



SandMix Analytics advised operation: After



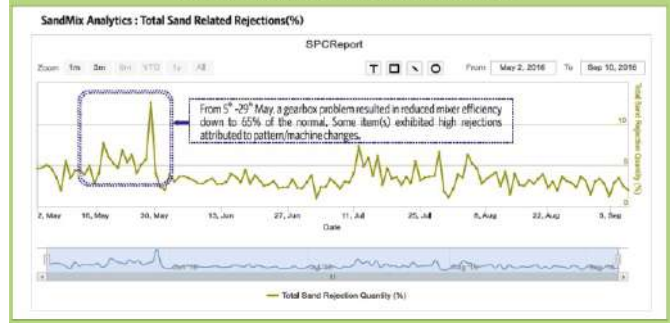
Case Study 2: Rejections When Operated with Optimal Sand Properties

By consistent achievement of optimal sand property values, the casting defects whose origin can be traced back to the sand system, are reduced by analytics advisory based operation.

Manual operation : Before



SandMix Analytics advised operation: After



Operating with the right set of sand property values that are consistent and precise, leads to reducing the overall rejection—the desired effect.

IoT for Foundry: Internet of Things is fast transforming the way the interlinking of data from various devices can add huge value by bringing near real time information to the analytics process, reducing human intervention and increasing precision of decision support and execution.

The first step to establishing IoT in Foundry Green Sand Process management by predictive analytics is now on Beta Test: Themolding line SCADA – this will enable collection and optimization from very granular data collected per sand mix.

Imagine the capability to able to co-related sand-mix to additive consumption, each casting component/part and predict probable causality of rejection with high accuracy. Imagine being able to co-relate ambient conditions at different times of the day and also the changing seasons, and its impact on molding sand properties like moisture and sand temperatures, and be able to predict causality of related rejections.

How does Sandman work towards rejection reduction? Sandman is about process optimization of the moding sand through predictive & prescriptive data driven analytics. The system sand process stability and consistency achieved by the predictive analytical engines of Sandman, helps in reducing rejections and optimizing consumption of additives.

What Sandman will do? If the sand parameters and rejection categories are captured faithfully and transparently, it will show the highest influencing parameters impacting rejections on any given date of the user’s choosing. It will prescribe the actions required in terms of those parameters to guide the foundry to bring the process to optimal consistency as modelled in the given data set determined by the foundry. As a consequence of such optimization of th green sand control, reduction in sand related rejections is achievable.

If variables to the moding process are introduced midst reamed, it enables the user to use the simple yet powerful SPC tool to instantly design a view of the ‘before & after’ consequence of the variable/variation and see what actions need immediate course correction if required.

What Sandman will not do? It does not presume nor claim or postion itself as a stand-alon casting rejection reduction software. Neither is SandMix Analytics a stand-alone additive consumption reduction model. Those sand parameters & rejection data that are not captured or those annotations which are not recorded will not be analyzed for interference in the analytics.

Sandman Analytics in simple terms, is a powerful data analytic software designed for the optimization of the moding sand in a foundry by its predictive and prescriptive analytics. By consequence of such optimization (and within the limits of recorded data) reduction in sand related rejections and optimization of additive consumption is achievable.



SPECIAL INSIGHTS



Strategic viewpoints for IOT platform selection and implementation

By: Mukund Kulkarni

Chairman, National Taskforce for Technology and Policy intervention,
CII MSME Council And Director Expert Global Solutions

In the process of conceiving, developing, and implementing IOT platforms, Technology and Project Leadership has learned various strategic and operational factors of IOT platform selection and implementation. These experiences are being deliberated on various domestic & international forums.

Following frequently spoken key learnings form a baseline to evolve & build strategy and action plan for organisation planning to implement IOT.

Action orientation through Real time data: In a technology driven competitive business environment, IOT implementation has significant importance due to availability of “Real time data”.

“Making use of this real time data through apt visualisation for taking actions to improve is a key driving factor”.

In the words of a very successful CEO, “Unmeasured invariably deteriorates. This does not mean; measurement alone brings improvement. Actions on measured departures is a must and which is most difficult”.

Focus on Value addition: Needless to say, every effort and investment shall result into Value addition. Hence, while defining strategy, it is important to define primary focus, such as:

- a. Customer centric value addition e.g. Delivery on time, Time to repair, Monitoring product performance at customer premises, Field failure monitoring, etc
- b. Operations centric value addition e.g. Uptime, Down time, Productivity, Rejection, Safety, Inventory, Process parameters, etc

Everything is important. However, everything cannot be addressed at a time. Hence focused beginning is important.

Change management is a game changer: Strategist and project champions, who have seen successes & failures, are of the opinion that, technology management contributes to 40% and change management contributes to 60% in success of IOT implementation.

System reduces dependency on people and structured data brings transparency. In a way, this is encouraging. However, people are worried about their identity and transparency too. These root causes of resistance should not be ignored while managing the change. Developing shared vision and communicate it frequently to working team helps to address the worries / resistance.

The key factors to be considered for effective change management are:

- a. Start small – start focused. Small wins build belief.
- b. Start with proactive, positive, and capable team.
- c. Top Management to provide visible support to Project and Operations team.

It is all about ability of leadership to integrate ‘People – Process – Technology’.

Technology and Solution selection: Mega multinational organisations to Start-ups are in the marketplace with their solutions, USP, advantages, limitations, costs, etc. Hence, selection of technology and partner is an acid test for the customer. Of course, the key parameters would be maturity of technology stack, market population, and so on. Along with this, following parameters must be seriously assessed before making decision:

- a. Maturity of organisation to manage technology and adapt with solution.
- b. Maturity of organisation in its manufacturing technology and process.
- c. Long term plan of the organisation and scalability.
- d. Complexity of processes vs need to monitor and measure such complexities.
- e. One of the vital factors is 'Who's thought process will influence the decision maker'? Is it "Decision makers or Solution developer or Front-line executives"?

If day to day user (Front-line executive) find the solution user-friendly, the probability of successful implementation is higher. Experienced leaders expressed that, feature rich products generally tend towards complexities.

Milestones for implementation: This is one of the toughest strategic decisions. During the process of platform evaluation, the core team and decision makers develop great deal of understanding of solution, dos and don'ts. With their views and evolved understanding, launching project with speed and larger scope looks feasible.

However, business world has seen introduction many technologies & tools, 'be it ERP, PLM, Lean, TPM' ... in which, though Solution providers cumulate their experiences, but implementing organisations are doing it for the first time. Hence, following classical approach comes handy.

- a. Test the water through POC and learn.
- b. Define and implement a light house process and improvise.
- c. Go deeper in one area of work and formulate organisational plan.
- d. Implement across a plant and stabilise to go in auto pilot mode.
- e. Implement in other plants of multi-plant organisation in phases.

Be it new product development, technology implementation or process improvement, phased approach has no option, and this is irrespective of resourcefulness of implementing organisation.

The starting point: For Multi-plant organisations, 'which plant first is a dilemma'. When we think of a plant, which 'Line / Shop / Cell / Process first and then 'which machine / equipment / device first' are the decision-making points.

Assessment and short listing using following criteria will ease out process of selecting the starting point to 'test the water':

- a. Bottleneck, where the improvement will directly add to productivity.
- b. High value operation, where the improvement will derive significant cost/quality benefit.
- c. Ease of capturing data, where machine is smart and lessor no retrofit is needed.
- d. The activity where team members are proactive and positive about change.
- e. Simplicity of monitoring, where the platform needs less / no customisation to start with.
- f. Customisation is a trap. It starts with enthusiasm and mostly lands into complications. Confidence of 'we can manage it' is to be admired.

However, this confidence should be kept reserved when implementation enters in to 'Go deeper in one area of work' milestone.

Nothing succeeds like success hence start simple to improves probability of success.

Innovation Article

By M/s. ACI Automation Private Ltd

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Foundry Process Digitalisation – The Way Forward

Introduction: We all know, foundry is rightly called **The Mother of all Industries** and is assumed to be the nerve center of manufacturing value chain. It is a pretty Old industry but still the challenges are enormous.

As one renowned foundryman pointed out in his presentation at the recent Wescon 2022 Seminar, a typical foundry has got innumerable variables and the only way to gain control on the process is by Digitalization. He has also pointed out that by addressing Quality, Productivity, Cost and Efficiency issues, Indian Foundries can save about 10% on their cost of production.

While Metal casting operations are comprised of many processes, Metal melting is one of the key steps in the production process. In this article we focus only on the scope for Digitalisation in Melting and related areas of the foundry process.

Metal melting is an extremely Energy intensive process. Next to Raw material, Energy expenditure plays a major role in the manufacturing cost. Improving energy efficiency is widely discussed in the Foundry forums but the improvement that can be achieved by way of measuring Raw material and molten metal, is not given enough importance. Infact measuring Raw material and molten metal could indirectly lead to a big improvement in Energy efficiency also. These process control initiatives shall help in controlling some of the Key variables, leading to consistency in results.

Garbage IN , Garbage OUT :

Almost all foundries manually generate a Furnace Log sheet for their Melting Process. Handwritten Data is compiled and entered into an ERP or Excel sheets for generating reports and further Processing. The same data is used for Decision making and for the purpose of Traceability. This process has got a number of pitfalls.

1. Charge Mix ratio not communicated to the Operator in a proper way, leading to erroneous addition into furnace.
2. Charge mix weightment accuracy is fully dependent on Operator and highly prone to Human error.
3. Error due to Wrong Material addition because of similar looking materials.
4. Wrong entry into Log book by mistake.
5. Sample result from Spectro not communicated to Operator in a proper way leading to erroneous addition.
6. Manual calculation of Correction material based on Spectro result is bound to have mistakes.
7. Mistakes during Data entry from Log book to ERP/Excel Sheet.

Data is the New Oil of Digital Economy. But it can create value only when it is collected completely and accurately.

STOP , START , CONTINUE – Model :

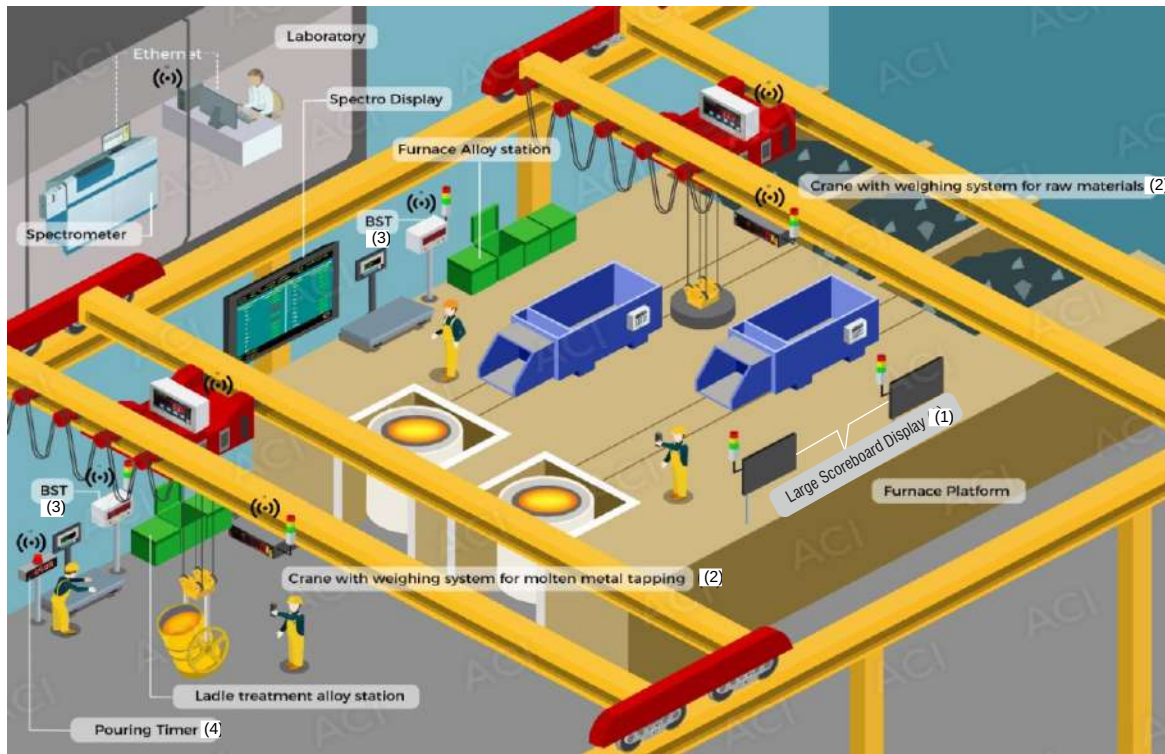
Let us apply the famous Stop, Start, Continue – Management model in the above process.

STOP : Stop all manual data entries which is the route cause for above problems.

START : Start using Weighing systems with automatic data capturing facility and implement Poka Yoke function to avoid mistakes in weightment and communication.

CONTINUE : Continue to use most of your existing Instruments with necessary up gradation, along with new equipments with above features.

Solution from ACI Automation: ACI has a number of products which can help in Digitalisation and also avoid the pitfalls explained in the earlier section. ACI also provided the necessary software for integrating these products through a Data communication network.



Large Scoreboard display (1), Integral type Crane weigher (2) , Pokayoke Weighing scale (3) and Pouring Timers (4) are some of the products with features customised for foundry operation.

Large Scoreboard display is used for prominently displaying the current Charge mix ratio on the furnace platform. Data is updated in this display directly from the PC, where the Grade is already scheduled. It also displays the current material addition status based on weight data received from the Crane weigher. This helps the operator to go through the material addition process easily without any mistakes. The same display is used for communicating Dilution material details to Operator, after sample checking in Spectro.

Upgrading an existing Crane by installing Integral type Crane weigher shall help in capturing the weight of Raw material added using magnets. The material is either identified automatically using sensors defining storage bays or by manual acknowledgment by Operator. The weight data interface to Central PC is through wireless RF communication.

A similar Crane weigher installed in the Tapping crane with a Target/Actual display, shall help in tapping the right quantity of molten metal from the furnace. The actual quantity of molten metal shall also be recorded in the PC and used in Yield calculation.

The Pokayoke weighing scale shall be used for batching the minor materials in a scheduled batch. The material name and required quantity are displayed to the Operator. Colour lamps and audio messages, guide the Operator for accurate batching and the actual weight is captured and stored in the Central PC. The system also has provision for controlling storage bins and reading Barcode labels, to ensure that the right material is added. The same unit is used for communicating Correction material details to Operator, after sample checking in Spectro.

In SG Iron process, a similar weighing scale shall be used for batching Ladle addition materials.

The Pouring timers are preset to alert the Operator in stages, on the time exhausted from the time of Tapping, till completion of Pouring. Provision is available for automatically starting the Timer, based on Tapping status input from Crane weigher.

A separate TV is also provided as an option, for displaying the Spectro result in shop floor, immediately after a sample is tested.

Furnace / Ladle addition management software

The Centralized Software from ACI, has the facility to create Charge Mix for various Grades and to schedule them for production. It also allows the User to create the Chemistry Master for every Grade.

This software displays the Charge mix data and also updates the Weight data from Crane weigher onto the Large display. Whenever the software receives data from Spectrometer, it calculates the correction/dilution material based on the Master information and communicates to the appropriate display.

This software also stores the following data in a database table, for generating daily Log sheet report.

Heat number, Furnace Number, Grade, Metallics Weights (like Pig Iron, CRC, Borings, RR,et), Alloying Element weights (like FeSi, FeCr, Copper, Tin, Moly, Carbon,etc), the Final Chemistry Results, Ladle addition material weights and Tapping quantity.

The same data shall be shared to ERP in a suitable format, for further processing.

The Key mantra for foundries has always been **Do it Right at the First Time & Every Time**

By ensuring that the Right material is added at the Right time in Right quantity, the probability of Correction and Rejection are greatly reduced.

This system when implemented, could save a minimum of 2- 5% on Raw Material consumption.

Energy efficiency would be greatly improved as the process could be completed with less iterations and rejections are avoided. Less scrap and rework results in lower operating cost.

There are also other benefits like reduced ladle lining costs because of reduced heating time, fine tuning of process parameters based on accurate real time data, monitoring Raw material stock / Yield and reduced dependency on skilled manpower.

Digitalisation shall lead to consistent production and help in building a business which is easier to manage.



References :

The above concept / systems are already implemented in some of the leading Foundries in India and they have started reaping the benefits of the systems. You may see below video link to understand the systems better and you may fix up our online/off line meeting with our team to get even more better clarity.



Scan QR Code to watch Video on:
Furnace / Ladle Ferro Alloy Addition System



Scan QR Code to watch Video on:
Melting Platform Automation



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Ask The Expert

Q: What infrastructure is required for Digitalization? And where to begin digitalization in a foundry?

A: If you want to use locally installed software or program, you will need a local server, a database, IT person, server expertise & security management etc. For large foundries with an internal IT team that can be manageable. For small/mid-sized foundry, they can choose to install cloud-based software or applications. Many cloud service providers, are audited by the Government of India e.g. Google, Amazon, etc. to make sure that data backups and server security are in place. Most Internet of Things (IoT) devices have the ability to connect over the cloud, making interaction easier.

To begin with digitalization in a foundry, there is no definitive answer because it depends on the kind, size, technique, and application of the foundry. However, one can identify the process or area that causes the most amount of rejection, breakdowns, or quality issues and has to be fixed as soon as possible. If it is a human-based, try to acquire data in real time (through digitalization/IoT) & any abnormalities are detected, it should be alerted in real time so that corrective action can be taken immediately. Once the identified area issue is resolved/controlled, same-way can adopt the digitalization for next process as per the priority and severity in your foundry.

Answered By Mr. Bhushan Bhatt

Q: What is IoT? And why it is required or How is it helpful?

A: Internet of Things (IoT) describes the network of physical objects that are embedded with sensors, software & other technologies and gives real time data/information from machines, equipment and systems directly. Real Time Data is basically any data / information coming from directly machine or equipment without any man intervention. This helps in eliminating man dependency & get accuracy in the information available. Some examples are Cycle Time, production quantity, machine up-time/down-time, energy consumption, pre-intimation/alarm before machine goes under for natural/forced deterioration.

These data help to understand different losses accurately related to machine and equipment. We can do correct analysis, can take corrective action accordingly and take proactive actions before the loss happens. It eventually results into better productivity, reduction in cost & improve equipment safety.

Extracted from the WESCON presentation by Mr. Milind Kank

To ask your question or get the suggestions, please write your problem with detailed description to wr@indianfoundry.org with subject "Ask the Experts". Identity of the Questioner will be kept confidential.

Message from IIF Indore Chapter Chairman



Mr. Sangram Patil
Chairman
IIF, Indore Chapter
Jash Engineering Ltd.

Dear Foundrymen & Members,

Thanks to giving a chance to express me on this digital platform. This Year our theme is "Innovate to Elevate" is indicating, growing your own business or changing your mindset to hidden potential, is a combination of creative thinking & positive problem solving.

Now a days profit margin in foundry business is very less. Raw material price rising is a global issue. To survive, we have to think differently on small innovations, productivity improvement projects, working on energy efficiency, process lean management & small cost saving projects to be required. Periodic activity based costing has to be done in foundry. Definitely Vehicle Scrap Policy will help to boost our foundry industry. With the changing of global political scenario most of OEM's are shifting their casting sourcing base from China. So we Indian foundries have to catch this opportunity by producing export quality castings. Their is a bright future to foundrymen, so be ready to groom.

My best wishes to all IIF members & our foundry industry to become a United India, United Foundrymen. Also I willing to wish western region Chairperson Mrs. Anuja Sharma & her team for success of exciting projects ahead in there tenures.

Western Regional Conference - WESCON 2022



Work Visit



Inauguration



71st IFC & IFEX Promotion



Technical Session



Technical Session



Technical Session



Panel Discussion



Valedictory



WESCON Team