ISSN 0379-5446

VOL 70 • ISSUE 2 • FEBRUARY 2024 • ₹ 250

INDIAN FOUNDRY JOURNAL

OFFICIAL JOURNAL OF THE INSTITUTE OF INDIAN FOUNDRYMEN

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INDIAN FOUNDRY JOURNAL • VOL 70 • ISSUE 2 • FEBRUARY 2024

President's Message

72nd IFC & IFEX 2024 brought together a vibrant community of the foundry industry, exceeding expectations on all fronts. Over 1500 delegates, including 51 lady delegates & about 612 students, actively participated alongside distinguished guests and 49 insightful speakers. The expansive exhibition space of 25,000 square meters buzzed with activity, hosting over 340 exhibitors, and attracting a staggering 20,000+ visitors across the three-day event.

Foundry Fraternity, Namaste!

The prestigious 72nd edition of the Indian Foundry Congress, a flagship event organised by The Institute of Indian Foundrymen, unfolded in Bengaluru, India's Silicon Valley, on February 2nd, 2024. Held at the vibrant Bangalore International Exhibition Centre, the event drew a multitude of attendees from the foundry and associated industries across India. Kicking off with pre-event activities like the MSME Conclave and industry visits, the Congress promised a monumental experience.

Coinciding with the Congress, IFEX 2024, the country's largest-ever International Exhibition of Foundry and Allied Industries Products, commenced at the same location. This exciting three-day event, held from February 2nd to 4th, 2024, was packed with an array of engaging programmes, ensuring a truly immersive experience for all participants.

Key Takeaways from 72nd IFC & IFEX 2024

Keynote speaker Mr. Girish DM, Vice President of Volvo Group Purchasing in India, highlighted Volvo's long-standing support for the Indian foundry industry through sourcing of cast components. He emphasised the growing foreign interest in Indian castings due to recent geopolitical developments. Additionally, he noted the trend towards lighter auto components using more aluminium alloys, urging Indian foundries to capitalise on this opportunity while prioritising sustainability.

Dr N Muthukumar, President & COO of Meritor & AAL India, celebrated the upcoming 75th anniversary of The Institute of Indian Foundrymen (IIF) and acknowledged the countless individuals who contributed to its success, mirroring India's own journey towards becoming the second-largest economy by 2047. He paid respects to national leaders and commended India's steady progress in initiatives like Digital India, Clean India, and Green India. Highlighting the Aatmanirbhar India ("Self-reliant India") initiative's success in achieving 50% domestic procurement of defence supplies, Dr Muthukumar projected immense export opportunities for the Indian foundry industry, urging 20% export growth. He concluded by emphasising the crucial role of digitalisation, renewable energy, and talent acquisition in the industry's future.

Chief Guest, Mr. Sriram Satish, Global Category Director at Flowserve Corporation, highlighted two key challenges facing the foundry industry at the valedictory function. Firstly, he emphasized the difficulty in attracting young engineers to the field. He attributed this to several factors. Secondly, Mr Satish stressed the need to incorporate Artificial Intelligence (AI) into foundry operations. He believes, this technology holds immense potential to improve efficiency, quality, and overall competitiveness.

President's Message

Setting New Benchmarks

72nd IFC & IFEX 2024 shattered benchmarks across various aspects. Record-breaking delegate registrations, the highest number of exhibitors ever, the largest exhibition area witnessed, and an unmatched visitor turnout stand as testaments to the event's success. Innovative initiatives like live Lost Foam Casting demos coupled with technical sessions on LFC, and dedicated student programmes at IFC as well as demo at IFEX received overwhelming response, further enriching the experience. Seamless online registration for all participants ensured a smooth and efficient experience.

Teamwork: The Cornerstone of Success

The incredible achievement of 72nd IFC & IFEX 2024 is a direct result of the dedicated teamwork of the 72nd IFC & IFEX 2024 Organising Committee of IIF-Southern Region. The blend of experience and youthful enthusiasm, led by veterans Past Presidents Mr SRV Ramanan and Mr Sanjay Shroff, proved invaluable. The passionate involvement of members from Shimoga, Chennai, Coimbatore, Bangalore, and Belgaum Chapters played a crucial role in the event's smooth execution. Sri S Rudregowda, Chairman of the Organising Committee, provided invaluable guidance and support throughout the process.

A Meticulous Journey

The success of 72nd IFC & IFEX 2024 wasn't a stroke of luck, but rather the culmination of meticulous planning and execution over 14 months. The Organising Committee meticulously followed the PDCA (Plan-Do-Check-Act) cycle, holding numerous physical and virtual meetings to focus on even the minutest details. This commitment to thorough planning translated into flawless execution, making 72nd IFC & IFEX 2024 a benchmark event.

Continuous Improvement

Recognising that even the most successful events present opportunities for learning and growth, the organisers are committed to capturing valuable takeaways and learnings from 72nd IFC & IFEX 2024. These insights will be meticulously implemented in future events, ensuring continuous improvement and even greater success in the years to come.

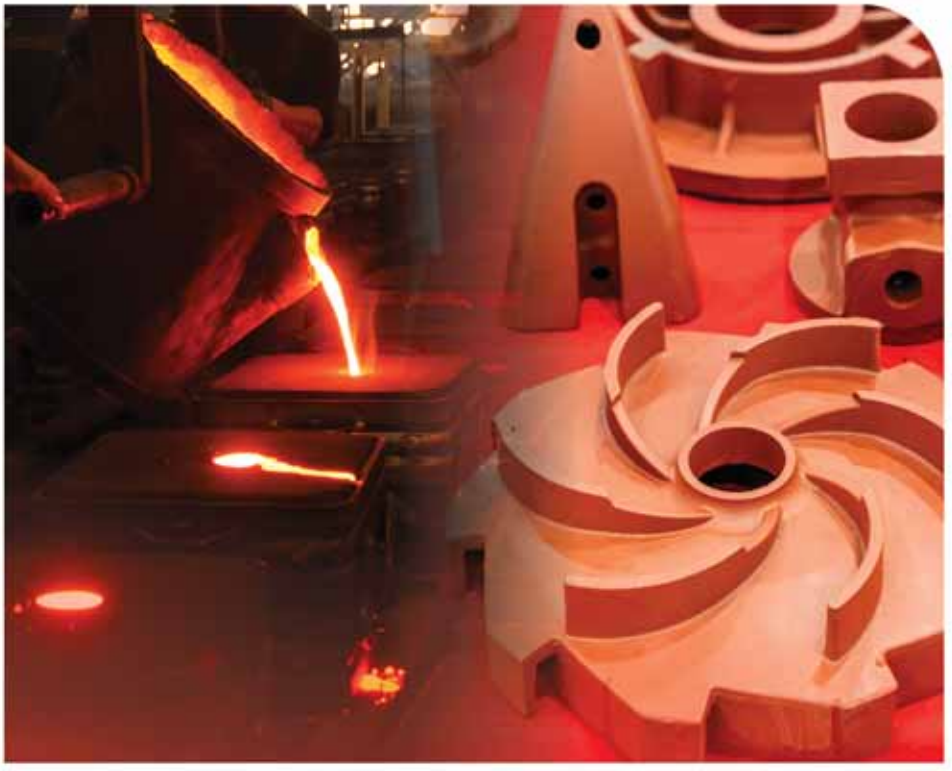
A Dream Realised

For the Organising Committee members, witnessing the culmination of 72nd IFC & IFEX 2024 felt like the realisation of a cherished dream. The immense effort and dedication poured into the event resulted in a resounding success, leaving a lasting impact on the foundry industry.

Gratitude and Looking Forward

A heartfelt thank you goes out to all who contributed to 72nd IFC & IFEX 2024's success – the speakers, exhibitors, visitors, volunteers, IIF staff, and especially the passionate members of the Southern Region/Chapters. As we bid farewell to this remarkable event, the excitement for future collaborations and continued progress within the foundry industry burns bright.

Jai Hind and Happy Reading!
Best wishes
D S Chandrashekar
President IIF, 2023-24



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Dear Foundrymen & Women,

The Institute of Indian Foundrymen has witnessed maximum participation of exhibitors and a large footfall with visitors from all over India and abroad in IFEX (International Foundry Exhibition) held on 2-4 February in Bangalore. A resounding success was achieved in IFC (Indian Foundry Congress) in organising MSME Meet on Day Zero and various plenary and technical sessions, Student programme, B2B Meet, Tech Mart Symposium, Kaizen Competition, Casting Quiz along with spectacular Award Ceremony and Cultural Programmes. The March Past involving all Chapters was a spectacular display of Unity in Diversity.

While the overwhelming success of the exhibition and Congress revealed the optimism of Foundry Sector, economy also looked good as Goldman Sachs predicted that India is likely to grow at more than 6% between FY23-28. India's manufacturing industry improved substantially at the beginning of 2024 with factory activity expanding at its fastest pace in four months in January on robust demand and an upbeat year-ahead outlook. Trade gap reduced to 9-month low in January, although Red Sea crisis continues to be the pain area of exporters. Also, India became the third largest digitalised country in the world, behind the United States of America and China. Economists see India's core inflation to be below 4% in the near term.

When we were preparing for our flagship initiative, the interim Budget was presented. Honourable Finance Minister presented an economist's budget devoid of political freebies, even as general election approaches. However, the 11% hike in CAPEX outlay is poised to take the economy in a higher growth trajectory. Mrs Sitharaman's announcement of Digital Infrastructure Investment will not only propel India to achieve a sustainable future, her proposal of tax benefits for start-ups will encourage more women to don the entrepreneurial hat. With the impetus to infra, railways, solar the foundry industries stand to benefit significantly.

Department for Promotion of Industry and Internal Trade (DPIIT), Ministry of Commerce and Industry has implemented Quality Control Orders (QCOs) for **Cast Iron Products** from 24 February 2024. It includes standards pertaining to various cast iron products such as Manhole covers, Cast iron pipe, Malleable iron fittings, and Grey iron castings. Hence manufacturing, storing and sale of non-Bureau of Indian Standards (BIS) certified products will be prohibited as per the BIS Act, 2016 and will attract penalty. It is aimed to enhance quality of the domestically manufactured products, curb the imports of sub-standard products into India, prevention of unfair trade practices, protection of health and safety of the environment. Though relaxations have been granted to small/micro industries in terms of timelines, CIM Shri Piyush Goyal is of the opinion that Medium & Large units are capable enough to get the BIS certification. IIF is taking active role in assisting foundries to get **BIS certification** through **FIC-BIS help desk** by organising sessions with BIS all over India.

NCTS (National Centre for Technical Services) is handholding foundries for reducing casting rejections and thus saving costs by using **Solidification Simulation Software** "Autocast XI" with FLOW. **Centre for Education & Training (CET)** along with **IIT Tirupati** is offering **Certificate course on Digital Manufacturing and Introduction to AI.**

Fellow Foundrymen are invited to take advantage of IIF services and be a part of India's ambitious journey of being the number one Foundry manufacturer elevating from the second position by continuous technical upgradation with an eye on sustainability.

Dr Abhishikta Roychowdhury (Acharyya)
Editor

72nd Indian Foundry Congress

Unleasing the Opportunities
Inaugural Ceremony

The 72nd edition of Indian Foundry Congress (IFC) was organised by The Institute of Indian Foundrymen (IIF) at Bangalore International Exhibition Centre (BIEC), Bengaluru during 2-4 February 2024. Southern Region of IIF was the Host Region whereas Shimoga Chapter of the Institute was the Host Chapter.

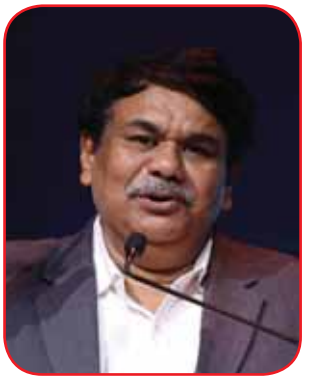
In a series of events, prominent personalities of the Foundry and its allied industries discussed about a number of techno-commercial, management, marketing, environmental issues pertaining to the metal casting industry.

Academicians and technocrats threw light on various aspects of metal casting technology.

The three-day flagship event of the Indian Foundry fraternity became a confluence of the foundrymen from India and abroad. All roads led to BIEC, Bengaluru during

INDIAN FOUNDRY INDUSTRY

World production rank	: 2nd
No. of foundries	: 4500
Annual castings production	: 14.16 million tonnes
Total turnover	: USD 20 billion
Total employment directly	: 0.5 million
Total employment indirectly	: 1.5 million
Exports	: USD 3.94 billion









three days when people of all spheres of foundry and its supporting industries from all over the country participated in the Congress. A large number of engineering students from half a dozen of technical institutions attended the 72nd IFC.

PROGRAMME HIGHLIGHTS

- 72nd IFC & IFEX 2024 Inauguration
- Plenary Sessions
- Panel Discussions
- Lost Foam Tech Sessions
- Non-Ferrous Sessions
- Tech Mart Symposium
- B2B Meetings (Castings Buyer-Seller Meet)
- Casting Clinics
- Students Programme
- National Kaizen Competition
- National Level Quiz Competition
- Awards Distribution and Fellowship conferring ceremony
- Cultural Programmes
- Valedictory Function
- Works visits
- Ladies programme

The 72nd IFC provided several platforms for sharing knowledge, information and experience by eminent speakers, technocrats, industry leaders, scientists, government representatives, academicians and others.

IFEX 2024 – the largest-ever foundry exhibition of international standard was held concurrently with the 72nd IFC at BIEC during February 2-4, 2024.

In presence of a large number of delegates at Jacaranda Hall of the Conference Centre in BIEC, 72nd IFC and IFEX 2024 were inaugurated on Feb 2, 2024 morning. The grand inauguration began with devotional song followed by lighting the holy lamp by the Chief Guest and the dignitaries on the dais. IFC song was also played in the background.

Mr S Rudre Gowda, Chairman, 72nd IFC Organising Committee while delivering welcome address paid gratitude to the visionaries who established an organisation like IIF about 75 years ago. The small plant is now a huge tree spreading its numerous branches all over India. Mr Rudre Gowda appreciated Organising Committee members' great efforts to make the mega event a success.

Mr Sanjay Shroff, Co-Chairman, 72nd IFC Organising Committee in his address said that IFC and IFEX are very useful platforms. Delegates have tremendous takeaways from various events and the exhibition. Referring to India's economic and industrial progress, Mr Shroff said that the century and not the decade is for India. He also mentioned about the country's well-balanced population with majority of youngsters. According to him, 72nd IFC Organising Team composed of young and senior members made the Congress successful in all respects. He said, 72nd IFC had set a new benchmark that, in his opinion, has to be maintained.

Mr D S Chandrashekar, President, IIF while addressing a large gathering stated that IIF had been branding Indian foundries in the global market. He also mentioned, India's Silicon Valley, Bangalore is the right choice as the venue of 72nd IFC & IFEX 2024 and the Theme "Unleashing the Opportunities" is also very relevant to the present industrial situation. He further said, India is now going through a state of transformation industrially/ economically, socially and politically. India with the fifth largest economy in the world is advantageous for having majority of young people in its population. In fact, with well-balanced human resources comprising young and seniors, India's per capita mobile data use is surpassing that of China. With the maximum number of startups and transportation of people from villages to the cities, India is on the brink of becoming the global destination of manufacturing. Thus, tremendous opportunities are unfolding before the country especially to the Foundry Industry. He advised the country's metal casting industry with the capacity of producing castings of a variety of categories, to rise to the occasion to reap huge advantages of the situation. According to the President, Indian Foundries should concentrate more on producing quality castings at minimum cost and explore new international markets to supply castings. Mr Chandrashekar further urged that the country's mother industry needs to adopt updated technologies to produce quality castings at a large scale in response to the rising demand for castings by the country's core sectors resulting from the Government's recent policy of 'Atmanirbhar Bharat' – to become economically/industrially self-reliant.

Chief Guest Dr N Muthukumar, President & COO, Meritor & AAL India in his address stated that a band of visionaries established IIF about seven and a half decades ago and a number of

people's contribution has made the Institute such a widespread pan India industry association. According to him, IIF and its activities are unique. Likewise, many people's tireless endeavour has made India progress to become world's fifth largest economy which will become worth of five-trillion in near future.

Dr Muthukumar paid Homage to the country's leaders who led the nation to the right direction and made the country worth living for millions of Indians. He then referred to the Government's policy of 'Aatmanirbharta' throwing open the doors for sourcing from indigenous manufacturers for the important sectors like Defence, Railways, etc. At the same time, the Chief Guest advised Indian casting suppliers to focus on exporting castings of international standards to international markets that are opening now due to several geo-political reasons. Dr Muthukumar's suggestion for Indian foundries is also to target exporting twenty per cent of their products and to do whatever is required to achieve the same. In his opinion, the country's human resource needs to be taken care of adequately so that per capita GDP can increase, which the industry leader considers as need of the hour. He also advised the country's metalcasting industry to do the needful for attracting talents to the foundry profession and retain people. Referring to the necessity of taking care of environment, the Chief Guest urged the industry use renewable energy and adopt green production technologies.

Keynote speaker, Mr Girish DM, Vice President and Head of Volvo Group Purchasing, India in his presentation briefed on the Volvo Group's profile. He said that Volvo, the leading vehicle manufacturer is a major castings consumer. Thus, the company is providing support to the foundry industry. He then referred to present trend of shifting in global supply chain. Mr Girish also said

that Indian Foundry Industry is now poised to get huge orders from the OEMs in international markets. He urged Indian casting suppliers to avail the opportunity and grow.

Mr Girish opined that automobile manufacturers are now asking for light-weight metal parts and the same is also true for electric vehicles. He informed that Indian economy would be of seven trillion by 2030. Referring to the Government's support to the Foundry Industry, Mr Girish mentioned about various schemes like PLI schemes offered by the Government. In his opinion, 72nd IFC's Theme "Unleashing the Opportunities" was rightly chosen. He further opined that innovation, quality consistency and people's skill development are essential for sustenance of the metalcasting industry in present situation. Digitalisation, automation and process efficiency are also the thrust areas that are needed to be taken care of in foundries for their development and growth.

IFEX 2024, the exhibition of castings, foundry raw materials,

foundry equipment, software and supporting services held concurrently with 72nd IFC at BIEC was also inaugurated on Feb 2, 2024 at Jacaranda Hall. The exhibition was thrown open digitally for visitors.

Mr Yogesh Kumar, Chairman, IFEX 2024 Committee while addressing the inaugural session said that castings are associated with every sphere of human society. In every stage of human life, casting is needed. He defined Foundry industry as a conglomerate of several disciplines like manufacturing, IT etc.

Mr Yogesh Kumar informed that application of IT in organising IFEX 2024 was remarkable. Most of the processes like registration, advertisement booking, inauguration, checking of the number & categories of visitors etc were done digitally.

Mr Sudip Sarkar of IEML in his address mentioned that India is the second largest producer of castings in the world. He also said that presently Indian foundries are getting orders on a large scale which in his opinion should be accepted by them seriously and do the needful. He informed that IFEX 2024 showcased the cutting-edge metal casting technologies. Mr Sarkar commented that innovation, for which there is ample scope in Foundry industry, has cascading effect on other industries, as Foundry industry is mother of all industries.

The Chief Guest and other dignitaries on the dais released the 72nd IFC Souvenir containing technical articles and valuable information pertaining to metalcasting technology.

73rd Indian Foundry Congress is scheduled to be held in Kolkata during Feb 7-9, 2025. IIF-Eastern Region will organise the 73rd IFC.

IIF-ER team comprising Mr Ravi Sehgal, Past President, IIF and Chairman, IFEX; Mr Navneet Agarwal, Vice President (2023-24); Mr Vijay S Beriwal, Past President, IIF and Chairman, 73rd IFC Organising Committee and Mr Goutam Dutta, Chairman, IIF-Eastern Region invited all to participate in 73rd IFC.

Mr Vignesh Ramanan, **Secretary, 72nd IFC Organising Committee** delivered vote of thanks.

IFEX 2024

Country's Largest Foundry Exhibition

India's largest exhibition of foundry products, foundry equipment, raw materials, simulation software etc took place concurrently with 72nd IFC during 2-4 Feb 2024 at Bangalore International Exhibition Centre (BIEC), Bengaluru. The 20th edition of IFEX, the largest ever edition of the exhibition, set a number of benchmarks. IFEX 2024

accommodating the stalls in two colossal halls was truly of international standard. Features of IFEX 2024 are as follows:

- Largest ever IFEX in IIF history
- Largest ever foundry event and gathering across the country
- Highest number of exhibitors – **341 Nos**
- Largest net area occupied – **13,598 square metres**
- Largest gross area occupied – **23,128 square metres**
- Highest number of visitors – **12,501**
- First ever IFEX having a Live Demo

LFC Live Demo at IFEX 2024

Lost Foam Casting, the unique production process of cast components was demonstrated live at IFEX 2024, held during 2-4 Feb 2024 in Bengaluru.

Overall it was an excellent show at the live demo stall. On day 1 engineering students from four colleges and on day 2 students from eight colleges visited the demo enthuciastically. Day 3 had random students' visit.

A total of 12-14 melts were taken. Two-part resin moulding, one trial with green sand process, two Gravity Die Casting dies of same part with different gating systems were shown. Students witnessed the demo with great interest. Lots of dignitaries also visited the stall. A few casting buyers were first time seeing the molten metal and castings being taken out of a mould. Several material suppliers visiting the stall also commented that it was their experience

of observing molten aluminium for the first time. A few entrepreneurs who had entered foundry recently got their numerous queries clarified at the demo stall.

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Region / Chapter	LM	AM	IND M-1	IND M-2	IND M-3	IND M-4	IND M-5	IND M-6	M	SM	FEL	Total
Eastern Region												
Kolkata	18	–	11	6	10	7	3	14	58	31	8	166
Durgapur	–	–	–	1	–	–	–	1	16	4	–	22
Howrah	2	–	7	7	5	3	2	6	20	2	–	54
Jamshedpur	8	1	5	4	1	1	–	3	47	1	1	72
Total	**28**	**1**	**23**	**18**	**16**	**11**	**5**	**24**	**141**	**38**	**9**	**314**
Foreign												
Foreign	–	1	–	–	–	–	–	2	2	–	–	5
Total	**–**	**1**	**–**	**–**	**–**	**–**	**–**	**2**	**2**	**–**	**–**	**5**
Northern Region												
Batala	–	–	3	2	–	1	–	–	31	–	–	37
Chandigarh	3	–	12	8	4	2	2	2	59	–	1	93
Delhi	8	1	32	13	10	12	3	8	68	–	4	159
Jaipur	1	–	6	6	1	2	–	5	18	–	–	39
Total	**12**	**1**	**53**	**29**	**15**	**17**	**5**	**15**	**176**	0	**5**	**328**
Southern Region												
Andhra	1	–	6	9	3	5	–	2	20	60	–	106
Bangalore	18	–	4	10	9	–	3	10	38	46	4	142
Belgaum	–	–	8	3	2	1	3	6	135	–	1	159
Chennai	14	2	20	17	4	7	4	17	102	1	8	196
Coimbatore	101	1	44	40	31	29	5	23	124	528	3	929
Hyderabad	4	1	3	10	–	4	–	2	29	1	–	54
Kerala	1	–	1	–	–	–	–	1	26	–	1	30
Shimoga	4	–	39	13	3	5	2	6	72	74	1	219
Total	**143**	**4**	**125**	**102**	**52**	**51**	**17**	**67**	**546**	**710**	**18**	**1835**
Western Region												
Ahmedabad	27	1	13	7	5	3	2	9	44	2	4	117
Greater Mumbai	15	2	20	19	5	15	4	6	59	1	4	150
Indore	8	–	11	4	1	2	1	2	48	–	–	77
Kolhapur	5	–	15	12	5	3	2	6	135	–	2	185
Nagpur	19	–	8	3	3	2	3	6	10	–	–	54
Pune	16	1	8	13	9	6	2	9	53	1	2	120
Rajkot	40	1	39	8	7	4	1	–	18	1	–	119
Vadodara	69	–	10	10	3	5	3	2	16	45	–	163
Total	**199**	**5**	**124**	**76**	**38**	**40**	**18**	**40**	**383**	**50**	**12**	**985**
Grand Total	**382**	**12**	**325**	**225**	**121**	**119**	**45**	**148**	**1248**	**798**	**44**	**3467**

M= Member FEL = Fellow Member IND.M-1= Industry Member (Turnover below: 1 crore) IND.M-2: Industry Member (Turnover: 1-5 crores) IND. M-3= Industry Member (Turnover: 5-10 crores) IND. M-4: Industry Member (Turnover: 10-25 crores) IND. M-5: Industry Member (Turnover: 25-50 crores) IND. M-6: Industry Member (Turnover: above 50 crores) SM=Student Member LM = Life Member; AM = Associate Member

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APPEAL

All Chairmen, Secretaries and Office Bearers of IIF Chapters and Regions are requested to give a special drive and increase their efforts to improve the strength of membership.

S Muthukumar
Hon Secretary, IIF

Aluminium Alloys for Electric Vehicle (EV) Applications

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Abstract

Electric vehicles have (EV) been developed to utilise green (electrical) energy to reduce emissions from vehicles with internal combustion (IC) engines like (a) petrol or (b) diesel. The disadvantages of EV are (a) insufficient milage per charge (MPC) and (b) high charging time. The larger size battery can increase the travelling distance, but it increases the empty weight of the vehicle also, so, reduce MPC.

EVs are made of lighter aluminium (Al) alloys (instead of steel) to (a) reduce weight of the vehicle and (b) improve its MPC. Al-alloys are widely used in aviation industries for their improved permanence on (a) formability, (b) machinability, (c) corrosion resistance and (d) crash-worthiness. This review article elaborates the advantages of using Al-alloys in EV, their strength structures, their suitability for manufacturing.

Keywords: Aluminium alloys, automotive, electric vehicles, fuel efficiency

Introduction

There is a direct relationship between vehicle curb weight and the energy requirement in wh/kg for electric vehicle (EV) driving range. This provides a compelling case for vehicle weight reduction to make EV [1,2] both more affordable and compatible with range requirements as less energy means a lower investment in the expensive battery pack. Industrial aluminium (Al) casting alloys, which are used for the manufacture of electric car bodies, must be strong. Al-die cast parts used in EV include the following:

- Plug-in hybrid electric vehicles (PHEV) battery enclosure assemblies
- Battery electric vehicle (BEV) battery enclosure assemblies
- Tops of battery enclosures
- Electric vehicle battery cases/ structures
- Electric vehicle motor housings

Advantages of Al-castings are (a) produced quickly and reliably, (b) chemical composition and (c) microstructure provide them with the necessary structural characteristics[3-5]. Components made of steel usually require heat treatment to improve (a) strength, (b) hardness, (c) ductility and (d) corrosion resistance. So, it involves additional (a) capital expenditures, (b) lengthens the production process and (c) reduces productivity. However, Al-casting alloys should provide high (a) yeild strength (YS) and (b) ductility without additional heat treatment. Typical YS of at least 130 Mpa and bending angle not less 20 degrees at cross-section thickness 3 mm in as-cast state and without additional processing is required in Al-alloy. Normally, A356 Al-alloy is best suitable for this purpose, its details are given below (Table-1):

Table-1: Composition of A 356 Al-alloy

Cu	Mg	Mn	Si	Fe	Zn	Ti	Others	Bal
0.2 max	0.25-0.45	0.1 max	6.5 - 7.5	0.2 max	0.1 max	0.2 max	0.15 max	Al

Table-2: Physical and mechanical properties of A356 Al-alloy

	A356.0-T51	A356.0-T6	A356.0-T71
Yield Tensile Strength	120 MPa	200 MPa	140 MPa
Ultimate Tensile Strength	180 MPa	270 MPa	210 MPa
Shear Modulus	26 GPa	26 GPa	26 GPa
Fatigue Strength	53 MPa	90 MPa	50 MPa
Elongation at Break	3.0%	6.0%	3.0%
Elastic Modulus	70 GPa	70 GPa	70 GPa
Density	2.6 g/cm3	2.6 g/cm3	2.6 g/cm3
Melting Completion	610 ℃	610 ℃	610 ℃
Melting Onset	570 ℃	570 ℃	570 ℃
Thermal Conductivity	150 W/m-K	150 W/m-K	150 W/m-K
Thermal Expansion	21 µm/m-K	21 µm/m-K	21 µm/m-K

The properties of A356.0 aluminium including 5 variations (tempers), they are A356.0-F, A356.0-T6, A356.0-T51, A356.0-T61, and A356.0-T71. T6 heat treatment of A356 aluminium castings offers improved hardness and other mechanical properties. Here we create a chart (Table-2) that shows some properties of A356.0 aluminium in the T51, T6, and T71 temper.

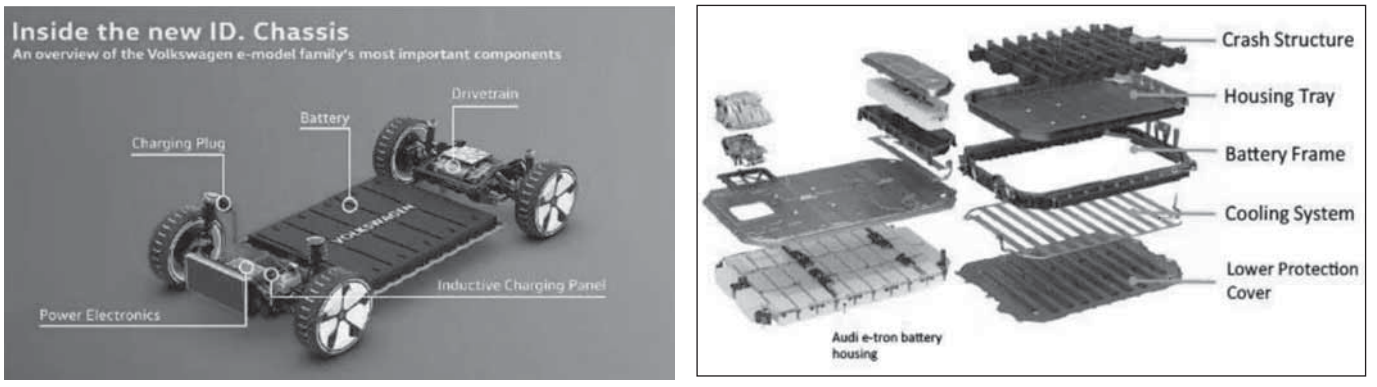
In EV, the (a) rotor and (b) inverter components should have high (a) electrical conductivity (EC) and (b) YS. The EC of A356 alloy is only 40 % International Annealed Copper standard (IACS) compared to 48% IACS for pure Al. However, the YS of pure Al is only 50 MPa. Tesla has developed a new Al-alloy having YS: 90-150 MPa and EC: 40-60% IACS. Casting was made by semisolid manufacturing (SSM) process where the metal in pasty state is pushed into metallic die with high pressure. The pasty alloy has the proper fluidity to ensure proper filling of the mould cavity. The casting, so formed, resists hot-tearing and retains the desired yield strength and conductivity on solidification.

Electric vehicles

The electric vehicle (EV) is that the vehicle's motion is thrusted by an electric motor instead of a gasoline or diesel internal combustion engine. An essential EV framework comprises a fuel source, a power converter, an electric motor and a mechanical transmission. The extensive use of electric vehicles is likely to increase due to the scarcity of fossil fuels and the environmental pollution caused by their widespread utilisation. At the moment, there are three types of electric vehicles on market. These are (a) all EVs, (b) fuel cell EV and (c) hybrid EV. All and fuel cell EVs do not have an additional internal combustion engine but hybrid ones have one [6,7]. EVs have significant energy efficiency compared to conventional internal combustion engine vehicles. In addition to this, EVs can effectively brake by transforming kinetic energy into electrical energy. With this recurrent braking, the range can be extended by up to 15%. EVs enable energy variation. In addition to thermal energy obtained by using oil and coal, it can also be produced in energies such as wind, nuclear, wave and hydropower. Currently, electricity generation with the onboard fuel cell has been getting feasible and widespread. EVs provide load balancing of the power system. By charging EVs at night, energy production systems can be used effectively. Thanks to this, energy costs are reduced and power costs are balanced. The minimum consumption value is 32375 MWh at 6:00 hrs and maximum consumption is 41887 MWh at 14:00 hrs in one hour. In addition, EVs increase air quality by preventing environmental pollution. Carbon dioxide, carbon monoxide and nitrogen oxide can be reduced by using electric vehicles. While gasoline/ diesel vehicles generate vibration and noise, electric vehicles operate quietly and without any vibration. As a result of this, EVs are welcomed by drivers and citizens. The less engine connection parts reduce vibration as well as lighten the vehicle. Short-range, requiring long charging times is one of the main disadvantages of electric vehicles. As these disadvantages are related to battery capacity, electric vehicles become popular as battery technology improves.

Battery enclosure design

For battery enclosures, material selection is decided when the vehicle is at the initial design stage, as it impacts the vehicle chassis and allows for the number of cells to be calculated, thus determining the vehicle range[8]. Presently, aluminium alloys are more commonly being selected for battery enclosures rather than steel or carbon fibre reinforced plastic (CFRP). The composite industry is not currently mature enough to support high volume vehicles, still comes at a very high premium, and has an extremely high carbon intensity with no real recycling capability especially at end-of-life. Almost all demand from the large volume Original Equipment Manufacturers (OEM) is for aluminium battery enclosures. Most established OEMs are (a) BMW, (b) Audi, (c) Porsche, (d) Daimler, (e) Volvo. The new group of electric vehicle, start-ups are approaching the design of battery enclosures based on Tesla's aluminium extrusion intensive skateboard approach (Fig 2). The main



(a) (b)

Fig 1: Components of EV car (a) Chasis and (b) Battery assembly

demand for aluminium extrusion supply is coming from the German OEMs, like BMW for their i20 EVs, Audi for their e-tron electric vehicles, and Daimler for their EQ range of electric vehicles. Audi is developing a modular approach by changing their battery enclosure from an aluminium die-cast intensive design to aluminium extrusion intensive. Daimler uses the same enclosure construction techniques for both its BEVs and PHEVs.

Aluminium

General physical properties of aluminium :

- Good corrosion resistance and durability due to the Al_2O_3 protective oxide layer
- Good electrical and thermal conductivity
- Light in weight (density of aluminium is only about one-third of iron or copper)
- It is also non-magnetic and does not burn when exposed to air under normal conditions
- Low melting point (660°C) that can facilitate the melting process
- Large shrinkage (up to 6%)

Aluminium alloys [9]

1. **AA 2XXX series alloys:** Alloys such as AA 2024 are utilised in EV applications where high strength is required, particularly in suspension and chassis components. AA 2024 aluminium alloy's composition includes 4.3–4.5% copper, 0.5–0.6% manganese, 1.3–1.5% magnesium and less than half a per cent of silicon, zinc, nickel, chromium, lead and bismuth. Type 2024 aluminium gains its optimal strength qualities not just from composition alone, but from the procedure by which it is heat-treated. There are many different procedures, or "tempers" of aluminium (given the designator -Tx, where x is a one-to-five digit long number), which all have their unique properties despite being the same alloy. The first digit following the "T" indicates the basic heat treatment method and optional second-to-fifth digits indicate specific manufacturing qualities. For example, in the 2024-T42 temper, the "4" indicates that the alloy is strengthened with solution heat-treating and natural ageing, but the "2" indicates that the buyer must heat-treat the metal themselves. 2024 heat treated aluminium alloy has a yield tensile strength of 324 MPa and an ultimate tensile strength of 469 MPa.
2. **AA 5XXX series alloys:** Alloys like AA 5052 and AA 5754 are extensively used for EV body panels and enclosures. They offer good formability, corrosion resistance, and moderate strength. These alloys primarily contain aluminium and magnesium. Type 5052 aluminium contains 97.25% Al, 2.5%Mg, and 0.25% Cr. Type 5754 aluminium contains Aluminium, Al, 95.6 %, Chromium, Cr, <= 0.30 %, Copper, Cu, <= 0.10 %; Cr + Mn, 0.10 - 0.60 %. AA 5754 heat treated aluminium alloy has a yield tensile strength of 90 MPa and an ultimate tensile strength of 250 MPa. AA 5052 heat treated aluminium alloy has a yield tensile strength of 120 MPa and an ultimate tensile strength of 260 MPa
3. **AA 6XXX series alloys:** These alloys, such as AA 6061 and AA 6082, are commonly used in EVs for structural components due to their excellent strength-to-weight ratio. They typically consist of aluminium, magnesium, and silicon, along with other trace elements. The main difference between 6082 and 6061 aluminium is in their composition. 6082 aluminium contains 97.6% aluminium, 2% magnesium, and 0.4% silicon, while 6061 aluminium contains 96.9% aluminium, 1% magnesium, 0.6% silicon, and 0.35% copper. 6061 heat-treated aluminium alloy has a yield tensile

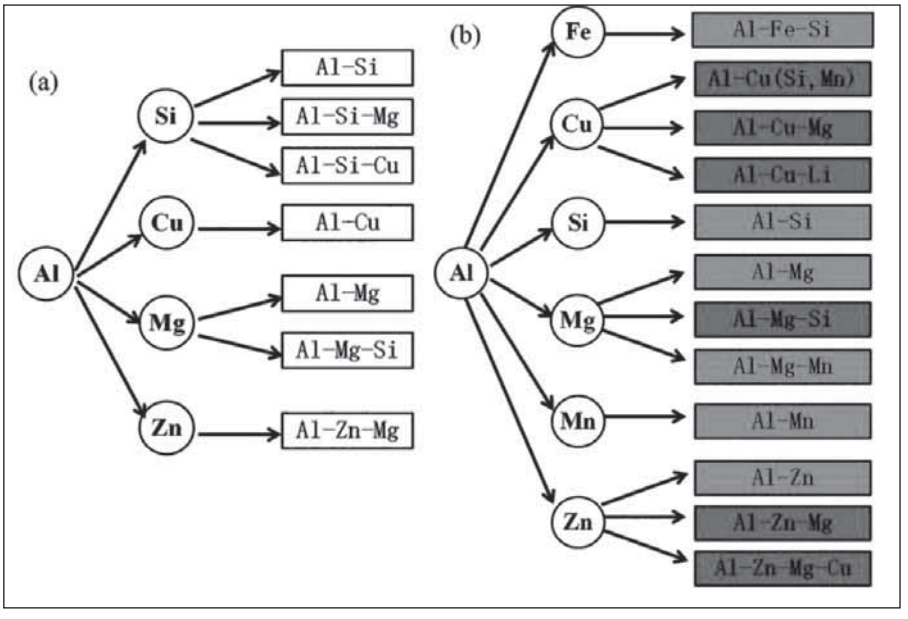


Fig 2: (a) Cast aluminium alloys. (b) Wrought aluminium alloys

strength of 276 MPa and an ultimate tensile strength of 310 MPa. 6082 heat treated aluminium alloy has a yield tensile strength of 250 MPa and an ultimate tensile strength of 295 MPa.

In Fig 2, non-heat treatable and heat treatable aluminium alloys are represented

Conclusion

The future requirements for aluminium due to the increasing production of electric vehicles are now much higher than before and also there is a much higher relative demand for aluminium extrusions, which conventionally sits at 10-11% of the automotive body sheet volume. It is clear that a large number of new extrusion processes will have to be installed worldwide to meet this rising demand, particularly if it is largely based on the supply of the strongest AA6xxx alloys to optimise light weighting. An added challenge is that, in addition to further extrusion capacity, the required heat treatment and finishing capabilities will need to be installed in order to provide automotive aluminium extrusions with an equivalent quality and performance to that of automotive aluminium sheet. By 2040, the aluminium extrusion tonnage required for electric vehicles would exceed 3 million tonnes, if the requirement for the Chinese market is included. For the UK alone, based on a forecast of 2.2 million vehicles by 2035 of which 50% are battery electric vehicles (BEVs) and 50% plug-in hybrid electric vehicles (PHEVs), this will require 88,000 tonnes of extrusions with an associated battery enclosure market estimated to be on the order of £870 million. Since there is no capacity in the UK that can supply this level of tonnage, the extruded profiles will have to be imported either from the EU or China. The combined requirement for aluminium automotive body sheet and extrusions for electric vehicles has also recently been estimated by CRU. They are predicting that the total world demand will be almost 10 million tonnes by 2030. The ratio of this demand between sheet and extrusions is likely to be 80/20, which is an extrusion demand of 2 million tonnes. Predictions of this scale of demand are relatively new and have not been realised from assessments based on the analysis of the present vehicle populations.

References

1. M Boukhnifer, A Raisemche, Fault Tolerant Control for Induction Motor in Electrical Vehicle, Proceedings of the 2012 IEEE International Conference on Control Applications, Dubrovnik, Croatia, 3–5 October 2012, p 136–141.
2. L. Yuxian, H. Anita, F. Yintian, L. Sufeng, S. Wutian , H. Henry, Nie Xueyuan, Al Alloys and Casting Processes for Induction Motor Applications in Battery-Powered Electric Vehicles: A Review, Metals (2022) 12(2), p 216.
3. J.R. Davis, ASM Specialty Handbook: Aluminum and Aluminum Alloys, ASM International: Materials Park, OH, USA, 2002.
4. L. Fang, Development of As-Cast High Strength Aluminum Alloys with Ni and Sr Addition. Ph.D. Dissertation, University of Windsor, Windsor, ON, Canada, 2018.
5. L.F. Mondolfo, Metallography of Aluminum Alloys, 2007, Available online: https://www.amazon.com/Metallography- Aluminum-Alloys-Lucio-Mondolfo/dp/1406736724
6. E.B. Iversen, J.M. Morales, H. Madsen, Optimal charging of an electric vehicle using a Markov Decision Process. Applied Energy 123 (2014), p 1-12.
7. Chi-Sheng Tsai, Ching-Hua Ting, Evaluation of a Multi-Power System for an Electric Vehicle, International Conference on Control, Automation and Systems, Korea, 2010, p 1308-1311.
8. Z. Xiaoyu, Z. Boming , Z. Shuren, Lightweight Design of Battery Box For Electric Vehicle, 21st International Conference on Composite Materials, China 20-25th August, 2017.
9. Information on https://www.xometry.com/resources/materials/what-is-aluminum-alloy.

Extending Die Life by Surface Treatment

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Abstract

This paper reports on a five-year plant trial where an entire die casting die was covered with a Physical Vapour Deposited (PVD) AlCrN coating. The results of the plant trial have shown that coating the entire die allowed a significant reduction in the amount of lubricant to be applied to the die. This has resulted in a number of documented benefits, including a reduction in soldering and erosion problems, an improvement in cycle time as less time is required to spray the die, a reduction in manufacturing costs as lower amounts of conventional lubricants are required and expensive die repairs can be postponed, and most importantly, a significant extension of die life was attained, as the PVD coating makes it possible to apply lower amounts of conventional lubricants, reducing thermal fatigue, and heat checking.

Introduction

Maximizing die life is one of the goals of most die casters, and so any technology that can significantly extend die life is of great interest. The application of Physical Vapour Deposited (PVD) coatings to die casting dies is one such technology, and it is known to significantly reduce both soldering and erosion[1]. However, excessive heat checking is typically the leading reason to retire a die and fabricate a replacement, but the impact of PVD coatings on heat checking is less clear.

This paper will report on the results of a plant trial that focused on using PVD coatings to minimise the amount of lubricant applied each shot to a die casting die, which has resulted in a significant reduction of the amount of heat checking observed with the die, thereby appreciably extending die life[2-6].

Background

Before going on to discuss the results of the plant trial, it is worthwhile to briefly discuss the mechanisms that cause die-casting die components to be replaced, with the three main ones being heat checking, soldering and erosion[1]. These three die failure mechanisms are briefly described below.

- **Heat checking** – Heat checking occurs due to the thermal fatigue arising from heating and cooling of the surface of the die during the production of each casting. As the liquid metal is injected to the die cavity, the surface of the die cavity immediately heats to a temperature close to that of the liquid metal, and then starts to cool as heat is transferred from the surface into the bulk of the die. This heating places the surface of the die into a state of compressive stress. However, once the casting is ejected and the die surface sprayed with lubricant, the die surface becomes cooler than its interior, placing the die surface into a state of tensile stress. This cyclical heating and cooling, producing cyclical compressive and tensile stresses, fatigues the surface of the die, producing the heat checking familiar to all die casters.
- **Soldering** – Soldering normally occurs when the surface of the die becomes excessively hot, and the solidifying metal sticks, or solders, to the die steel, making ejection difficult. Several authors have suggested mechanism for soldering in aluminium die casting. In 2000, Shankar and Apelian[7] suggested that soldering in aluminium die casting occurs via a six-stage process, which initially involves the molten aluminium

causing erosion on the surface of the die steel, followed by a reaction between the molten aluminium and the die steel producing Al-Fe based intermetallics that cause the cast aluminium to solder to the die steel. Two years later, Viswanathan and Han[8] agreed that soldering involves the generation of Al-Fe intermetallic phases, but predicted that soldering will not occur unless a specific high temperature is reached in the die surface (around 500oC for aluminium alloy A380 soldering to H13 steel). Recently however, Monroe and Sanders[9] have questioned the role that the Al-Fe intermetallics play in soldering, and so the mechanism causing soldering for aluminium die casting is still in question.

- **Erosion** - Erosion is the gradual removal of the die steel resulting from the direct impingement of the liquid metal (normally liquid aluminium) during cavity filling. Erosion is affected by a number of processing parameters, including alloy composition, gate velocity, metal pressure, gating design, and die temperature[1].

Benefits of using PVD coatings

Controlled laboratory studies performed at Case Western Reserve University in the USA, and summarised in Reference 10, have shown that the use of PVD coatings can significantly reduce the harmful effects of both soldering and erosion. However, the effect of PVD coatings on reducing heat checking is not so clear from their work, and so it is worthwhile to summarize the results from a plant trial that has been performed over the past five years[2-6].

Results from PVD Coating plant trial in 2016

A series of papers[2-6] has documented a plant trial showing how the use of PVD coatings can significantly extend die life. The plant trial was started in 2016, and was based on research results obtained at the Colorado School of Mines[2-4]. The objective of that research project was to determine whether permanent PVD coatings applied to the surfaces of die casting dies could totally eliminate the need for conventional die lubricants. These studies showed that an AlCrN PVD coating eliminated the adhesion (soldering) of solidifying aluminum A380 to H13 steel during laboratory testing, and therefore this AlCrN coating was chosen for the plant trial.

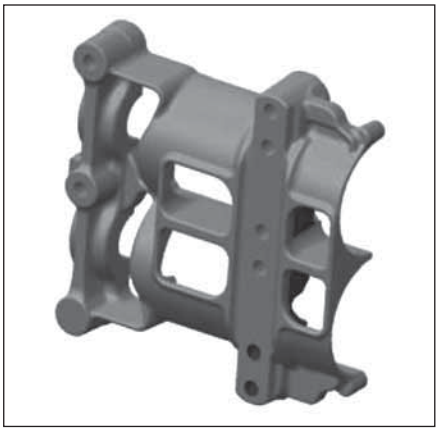


Fig 1: Model of the balance shaft housing[2,3]

The casting selected for the plant trial was the balance shaft housing shown in Fig 1. This casting is used in an outboard motor for marine applications, and is about 150 mm by 150 mm, weights around 0.8 kg, and is produced in a single cavity die. For the plant trial, all the surface of the die that are contacted by liquid aluminium were covered with the AlCrN coating, namely the runners, cavity, overflows, vents and vent block, for both the fixed and moving sides of the die (Fig 2). The caster had previous experience running an un-coated version of this die, and found that for the un-coated die it was necessary to spray the die with conventional organic lubricant for 12 seconds.

Initially a 2-day plant trial was performed with the PVD-coated die, which is summarised below:

- On the first day of the casting trial using the PVD-coated die,

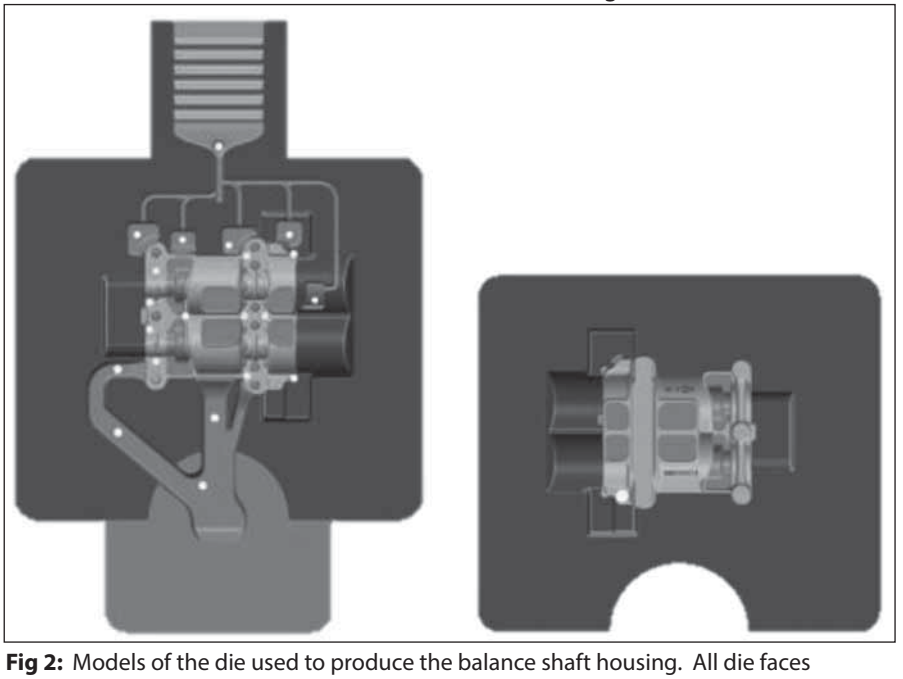


Fig 2: Models of the die used to produce the balance shaft housing. All die faces contacted by the liquid aluminium were coated[2,3]

the lubricant spray was initially reduced to 2 seconds, and 70 castings were successfully produced without sticking or soldering. This represents an 83% reduction in spray from the 12 seconds used previously with the un-coated version of this die.

- Following this success, the spray time was further reduced to one second, a 92% reduction in spray time over the 12 seconds used previously with the un-coated die, and an additional 30 castings were produced without sticking and soldering.
- The lubricant sprayer was then turned off, and an attempt was made to produce castings without conventional lubricant. The first casting stuck, and bent core pins during ejection. The die had to be removed and several core pins were replaced with spare-coated pins. The die was then replaced on the machine.
- Next day, an additional 96 castings were produced using the one second spray, with no evidence of sticking or soldering.

So although it was not possible to produce castings in the lube-free condition, it was possible to significantly reduce the amount of lubricant spray by 92% over that used for a previous un-coated die. The reduction in spray did lead to another benefit – as less time was required to spray the die, the median cycle rate was improved by 12% (Fig 3). More interesting, an even bigger improvement (18%) was observed for the third quartile cycle rate, most likely as less time was required to periodically stop and remove solder from the PVD-coated die.

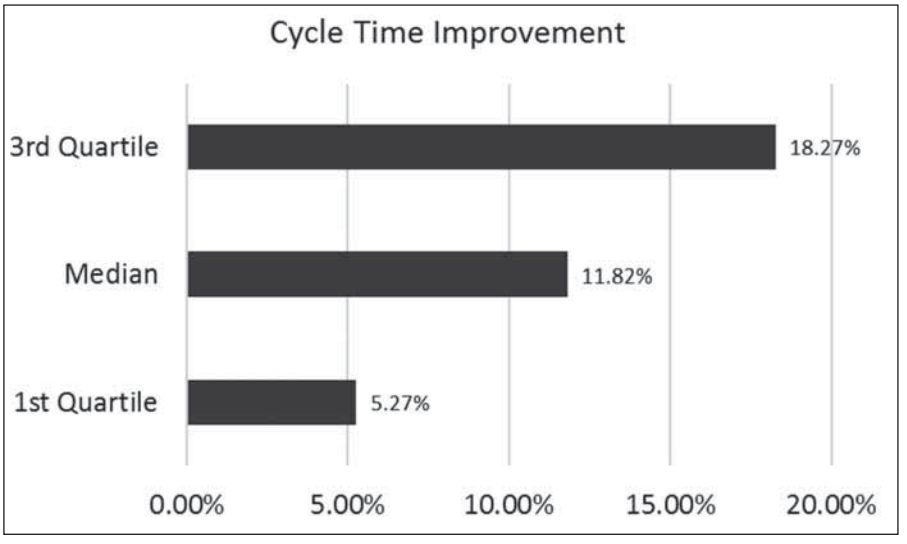


Fig 3: Data on cycle time improvement [3]

Results from PVD Coating Plant Trial in 2019 & 2020

Since the initial trial was performed in 2016, the die caster has continued to produce castings in the PVD-coated balance shaft housing die using a significantly reduced level of spray. As the caster only produces around 20,000 balance shaft housings per year, the plant trial is still ongoing. Two papers updating the status of the trial have been published, one in 2019 after more than 70,000 castings had been produced in the PVD-coated die[5], and one more recently in 2020 after more than 100,000 castings had been produced in the PVD-coated die[6]. As a reference, the older un-coated die had to be retired after the production of about 97,000 shots, due to excessive damage (heat checking, and other damage).

Figure 4 shows a photograph of both the fixed and ejector side of the die after more than 100,000 castings had been produced, and both halves of the die appear to be in excellent condition. However, closer inspection (see regions highlighted in Fig 5) shows that minor heat checking has occurred between the shaft-regions on the fixed side of the die, and on the shafts and at ejector pin holes on the ejector side of the die. However, considering that the older un-coated version of the die had to be retired at around 97,000 shots, the PVD-coated version of the die shown in Figures 4 and 5 appears to be in excellent condition after the production of more than 100,000 shots. So five years after the start of the plant trial in 2016, the PVD-coated die is still running, and clearly will exceed the shot count of the un-coated die by a considerable margin.

Figure 6 shows castings produced in the die after 100,000 shots had been produced, and considering the excellent condition of the die (Figs 4 and 5), the castings also exhibit very little evidence of heat checking, even after the production of such a large number of castings.

At this point, it is not clear whether it is the use of the PVD coatings, or the reduced amount of lubricant spray, that is causing the dramatic extension of die life. PVD coatings used in die casting applications are normally very thin (typically 2-8 µm in thickness), and although they are extremely hard (hardness values of between 20-35 GPa), in author's opinion it is

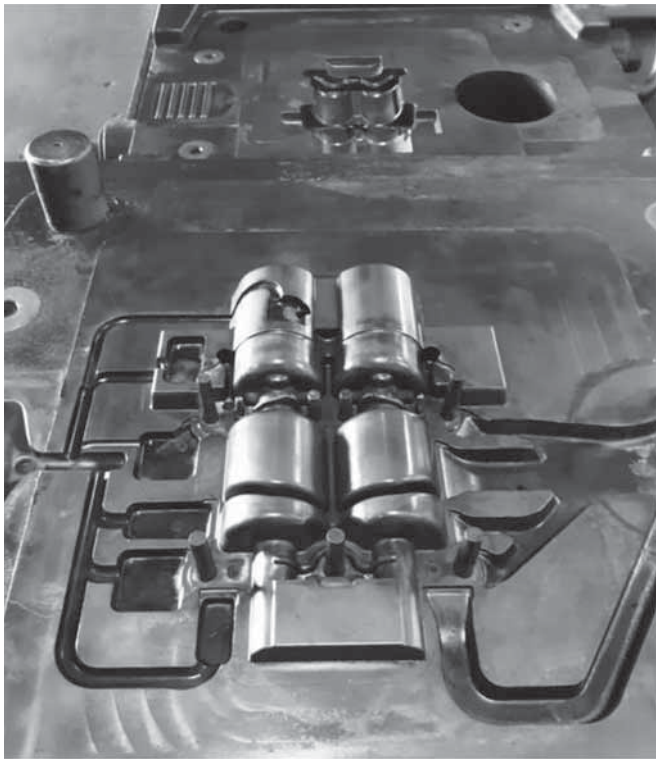
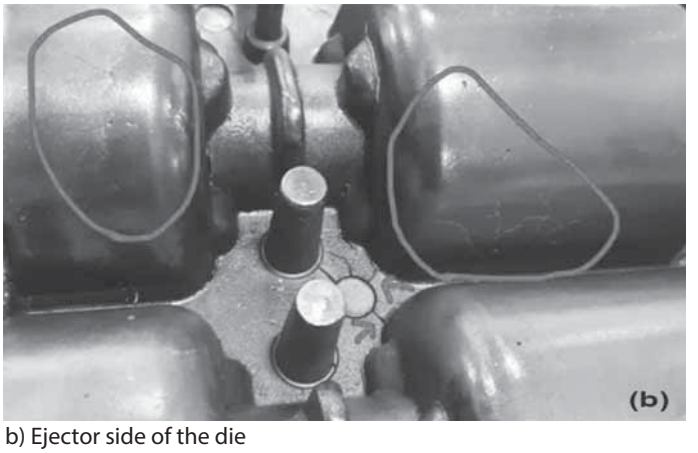


Fig 4: Both the fixed and moving side of the AlCrN PVD coated balance shaft housing die after 100,000 shots[6]

unlikely that these types of thin coatings would have such a significant effect on extending die life. However, it is well-known that reducing lubricant spray can have a significant effect on reducing heat checking. For example, the data in Fig 7 shows laboratory data generated at Case Western Reserve University using their accelerated "dunk tester"[10]. Figure 7 shows the effect of spray time on heat checking, measured after 5,000, 10,000 and 15,000 dunks. The data shows that considerable heat checking was

a) Fixed side of the die



b) Ejector side of the die

Fig 5: Minor heat checking present in the PVD coated die after 100,000 shots [6]

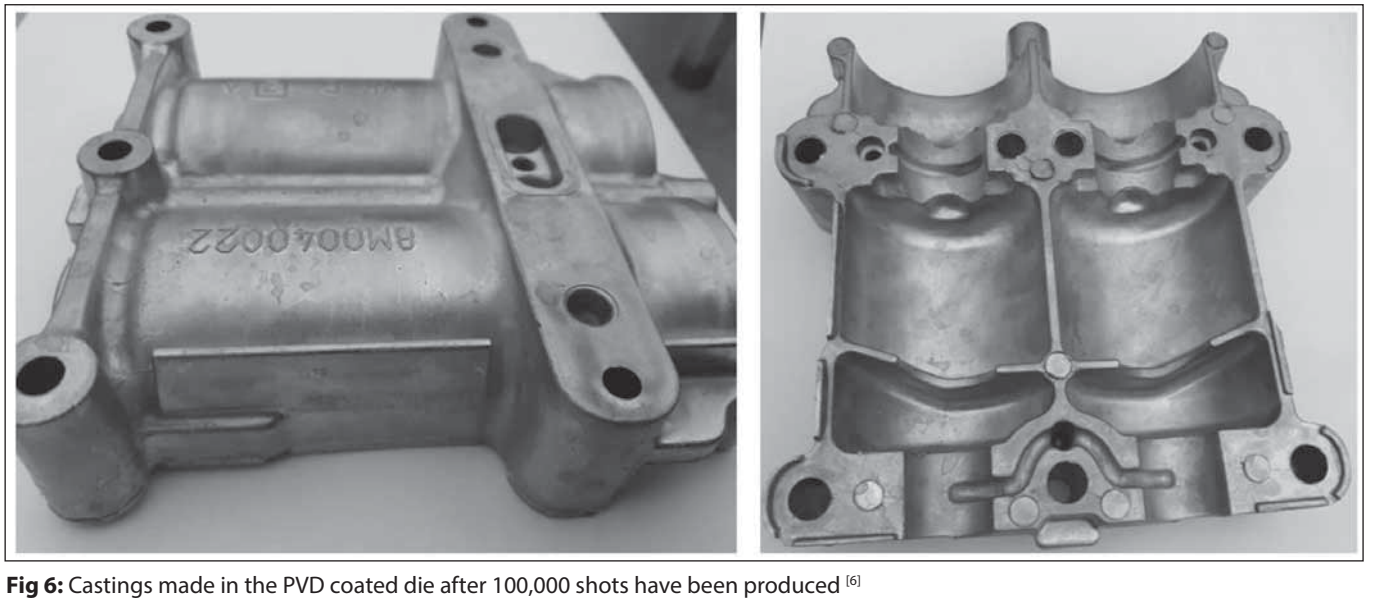


Fig 6: Castings made in the PVD coated die after 100,000 shots have been produced [6]

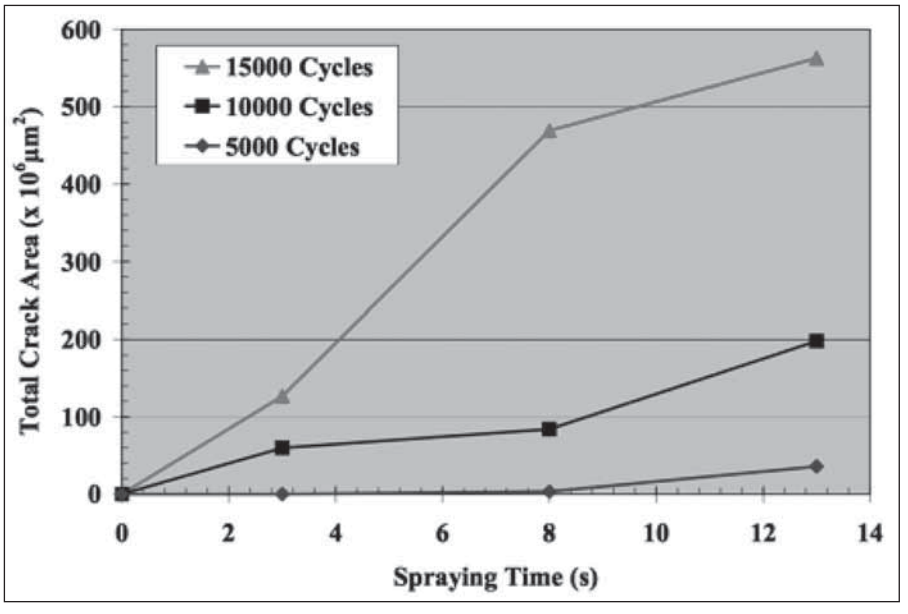


Fig 7: Impact of spray time on heat checking using the Case Western Reserve University dunk tester[10]

observed when spraying the dunk test sample for 13 seconds, but the amount of heat checking was reduced significantly when the spray time was reduced to three seconds. When no spray was applied to the dunk test sample (zero spray time), no heat checking was observed in their test.

Based on the data in Fig 7, it is likely that it was the reduction in spray that led to the life extension of the PVD-coated balance shaft housing die. However, without applying the PVD coating to the entire die, it would not have been possible to reduce the lubricant spray, so the use of the PVD coating led indirectly to the die life extension described above.

To better evaluate the benefits of the PVD coating, the die caster producing the balance shaft housing castings performed a cost comparison, comparing manufacturing costs associated with the older un-coated die, and this new die that was covered with the AlCrN PVD coating. The cost comparison was performed in 2019 after around 70,000 shots had been produced in the PVD-coated die[5]. Details of the cost comparison are listed below, and the results are summarised in Table-1

- By the time the old un-coated die had reached 70,000 shots, it had been repaired (removing solder and re-welding small piece in critical areas) on three separate occasions, with the first repair occurring after the production of only 37,000 shots. At the 70,000 shot mark the PVD-coated die had not yet required repair, with its first significant repair occurring at around the 75,000 shot mark. The die caster has estimated that the cost saving associated with avoiding repairs was about 10% of the original cost of the tool.
- Obviously reducing the spray time for the PVD coated die means that less lubricant will need to be purchased. The die caster has estimated that this saving corresponds to about 5% of the original tool cost.
- As noted above, the median cycle rate has been increased by about 12%, due to less time being required to spray the die. Thus more castings can be produced each hour, reducing the magnitude of fixed costs assigned to each casting. The caster has estimated that this cost saving corresponds to 5% of the original cost of the die.
- The biggest cost savings comes from the extension of die life, which is especially important for captive die casters. It is still not clear what the eventual extension of die life will be for the PVD-coated die, but in 2019 it was estimated as a 25% cost savings with respect to the original cost of the tool.
- Finally, the cost of coatings the entire tool must be subtracted from these costs savings. The cost of PVD coating the entire die corresponded to 20% of the cost of the tool.

By totaling the cost savings together

Table-1: Estimated cost savings for producing castings in a die-coated with AlCrN[5]

Item	Saving over 70,000 shots (as a percentage of original tool cost)
Reduced die repair	10%
Reduced die lubricant	5%
Faster cycle	5%
Extended Die Life	25%
Cost of Coating	(20%)
TOTAL SAVINGS	**+25%**

with the additional cost of PVD coating the entire tool, the die caster has estimated that the overall cost savings corresponded to 25% of the original cost of the tool (see Table-1), a considerable cost savings. Note that these calculations were performed in 2019 when the PVD-coated die had produced only 70,000 castings, and presumably the cost savings would have been even larger if the calculations had been performed this year when more than 100,000 shots have been produced.

Summary

So, in summary, there are many benefits of applying PVD coatings to die-casting dies. These include:

- A reduction in soldering and erosion problems.
- Cycle time can be improved, as less time is required to spray the die.
- Costs can be reduced, as it is necessary to purchase smaller amounts of lubricants, and expensive die repairs can be postponed to higher shot counts.
- Probably most importantly, a significant extension of die life can be attained, as the PVD coating makes it possible to apply lower amounts of conventional lubricants, reducing thermal fatigue, and reducing heat checking.

References

1. David Schwam & Stephen P. Midson, Extending Die Life for Aluminum Die Casting: 2nd Edition, Pub, North American Die Casting Association, 2019.
2. B. Wang, G.R. Bourne, A.L. Korenyi-Both, S.P. Midson and M.J. Kaufman, An investigation of the use of PVD die coatings to minimize or eliminate lubrication during high pressure die casting, Trans. 2016 NADCA Congress, paper No. T16-061.
3. B. Wang, J. Song, A. Monroe, A.L. Korenyi-Both, S.P. Midson and M.J. Kaufman, Results from a Series of Plant Trials to Evaluate the Impact of PVD Processed AlCrN Thin-Film Die Coatings to Minimize Die Lubrication, Trans. 2017 NADCA Congress, paper No. T17-083.
4. Bo Wang, Gerald R. Bourne, Andras L. Korenyi-Both, Alex K. Monroe, Stephen P. Midson, Michael J. Kaufman, Method to evaluate the adhesion behavior of aluminum-based alloys on various materials and coatings for lube-free die casting, Journal of Materials Processing Technology, 237, 2016, p 386-393.
5. David Bell, Viktor Khominich, Steve Midson, Steve Knickel, Eric Kessenich & Alex Monroe, Minimizing Soldering Using High Quality PVD Coatings - Part 2: Performance of PVD Coatings in Casting Plants, Die Casting Engineer, September 2019, p 12.
6. Eric Kessenich, Steve Knickel, Alex Monroe, Steve Midson, David Bell & Viktor Khominich, Update on Performance of PVD Coated Dies at Mercury Castings, Die Casting Engineer, Nov, 2020, p 24.
7. Sumanth Shankar & Diran Apelian, Soldering Tendencies of Alternate Non-Ferrous Die Materials, Trans. 2000 NADCA Congress, paper No. T00-045.
8. Srinath Viswanathan & Qingyou Han, Mechanism of Die Soldering During Aluminum Die Casting", Trans. 2002 NADCA Congress paper No. T02-034.
9. A. Monroe & P. Sanders, The Need for a New Approach to Soldering in High Pressure Die Casting, Trans. 2020 NADCA Congress, paper no. T20-081.
10. Y. Zhu, D. Schwam, X. Zhu & J.F. Wallace, Factors that Affect the Die Casting Die Life, Trans. 2007 NADCA Congress, paper No. T07-053.

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Science Fundamentals in Metal Casting

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[Prof Dr K Gnanamurthy, presently providing foundry consultancy service, wrote a number of Technical Notes on Metal Casting Technology during the pandemic period of May – Aug 2020 and circulated them in WhatsApp groups. The notes were written in easy conversation style emphasising on Foundry fundamentals and far from thumb rules. The notes have been published in the "Southern Stream" Newsletter of IIF- Southern Region. Some selected Technical Notes are being published in the IFJ starting from May 2023 issue.]

21 August 2020

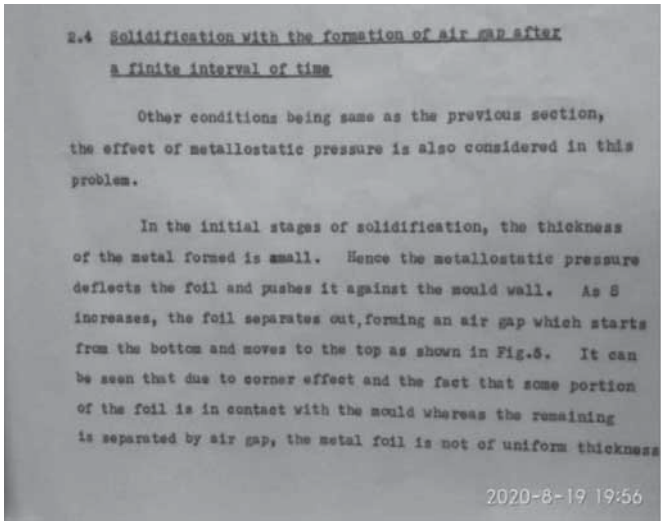
To conclude discussions on air gap formation, I had overlooked to mention that my analytical work was for metallic mould, and air gap was very significant there. The analysis showed that air gap formation is delayed on increasing the mould temperature and/or decreasing mould wall thickness. This was part of work on simulation of casting solidification by applying Biot's variational calculus techniques.

However even with the advent of Finite element/difference methods used in present day simulation packages, you are asked, if at all, to state the air gap size and assume it is uniform. There is nowhere-withal in the packages to calculate and predict air gap at various places and at various times, or even at one spot at one time. Of course, they refer us to various mathematical work that has been done since 1969 in a very detailed way. But you have to do the work and take responsibility for its accuracy.

This is not to belittle the monumental efforts that go behind writing the code for simulation, but only to emphasise, that physical occurrences in Foundry or for that matter in nature are so complex, all we understand are a few complex differential equations, often nonlinear like Navier stokes, or Fourier equations, not to mention the limited mathematical techniques we have to solve them or put them in finite form either. Talking about Foundry please see below Campbell's observation. Werner Heisenberg, the celebrated physicist is known to have said in his death bed, 'if I encounter God, I am going to ask Him two questions, why relativity and why turbulence'. Perhaps, he will have answer for the first one. And we deal with such least understood problems in foundry daily. Air gap and other convection problems are but a few of them. We shall talk about convection from mould to atmosphere and how simulation packages handle them next.

23rd August 2020

Heat transfer outside mould wall, with or without flask is another area of concern where the foundryman is left to his wits in spite of having fashionable simulation packages. It is very important to reckon that finally the entire heat of liquid metal is lost to atmosphere, through mould of course and the variables are too many to handle through simulation. The heat transfer is by convection. Convection Heat transferred is a product of temperature difference between mould outside surface and atmosphere and a very important entity called heat transfer coefficient per unit area and time. Lot simpler it appears than conduction transfer in metal or mould. How do you estimate the heat transfer coefficient, which depends on temperature, humidity to mention a few variables, both being very transient as the time passes, since as heat is transferred, temperature of atmosphere increases, and it is not uniform at all distances away from mould wall? While prediction of shrinkage defects itself may not be distorted much by mould wall cooling, it seriously affects shakeout time and hence capacity of foundry. I have known foundries, where serious errors have been made by not taking into account cooling time of moulds, especially in heavy castings.



2.4 Solidification with the formation of air gap after a finite interval of time

Other conditions being same as the previous section, the effect of metallostatic pressure is also considered in this problem.

In the initial stages of solidification, the thickness of the metal formed is small. Hence the metallostatic pressure deflects the foil and pushes it against the mould wall. As S increases, the foil separates out, forming an air gap which starts from the bottom and moves to the top as shown in Fig.5. It can be seen that due to corner effect and the fact that some portion of the foil is in contact with the mould whereas the remaining is separated by air gap, the metal foil is not of uniform thickness

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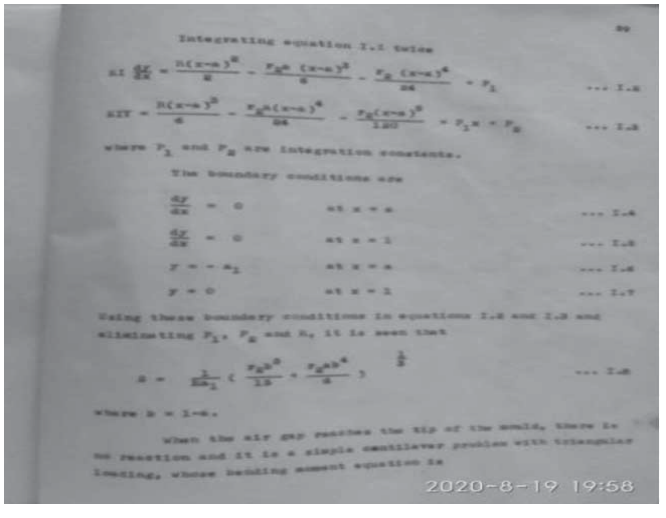

Integrating equation I.1 twice

$$EI\frac{dy}{dx} = \frac{R(x-a)^2}{2} - \frac{P_R(x-a)^3}{6} - \frac{P_R(x-a)^4}{24} + P_1 \quad \ldots I.4$$

$$EIY = \frac{R(x-a)^3}{6} - \frac{P_R(x-a)^4}{24} - \frac{P_R(x-a)^5}{120} + P_1 x + P_2 \quad \ldots I.5$$

where P_1 and P_2 are integration constants.

The boundary conditions are

$$\frac{dy}{dx} = 0 \quad \text{at } x = a \quad \ldots I.6$$

$$\frac{dy}{dx} = 0 \quad \text{at } x = l \quad \ldots I.7$$

$$y = -a_1 \quad \text{at } x = a \quad \ldots I.8$$

$$y = 0 \quad \text{at } x = l \quad \ldots I.9$$

Using these boundary conditions in equations I.5 and I.6 and eliminating P_1, P_2 and R, it is seen that

$$a = \frac{1}{EI a_1}\left(\frac{P_R b^5}{15} + \frac{P_R b^4}{8}\right)^{\frac{1}{3}} \quad \ldots I.10$$

where $b = l-a$.

When the air gap reaches the tip of the mould, there is no reaction and it is a simple cantilever problem with triangular loading, whose bending moment equation is

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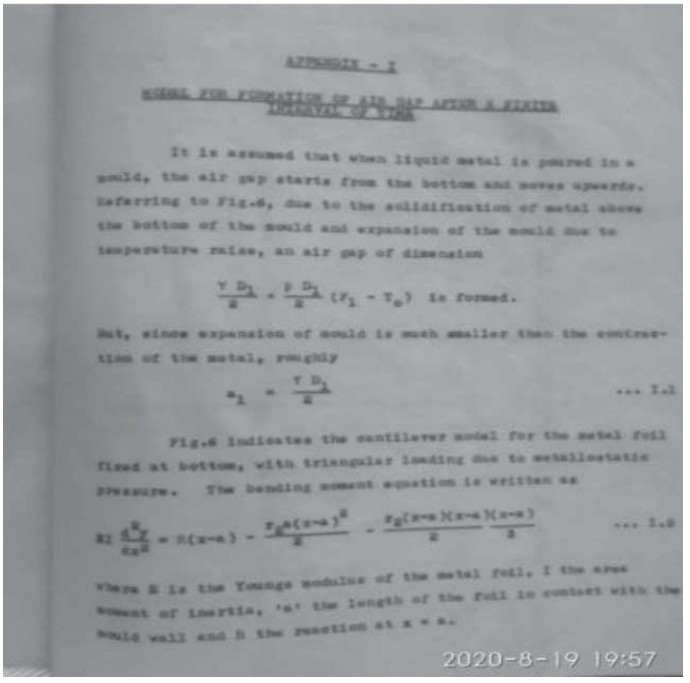

APPENDIX - I

MODEL FOR FORMATION OF AIR GAP AFTER A FINITE INTERVAL OF TIME

It is assumed that when liquid metal is poured in a mould, the air gap starts from the bottom and moves upwards. Referring to Fig.6, due to the solidification of metal above the bottom of the mould and expansion of the mould due to temperature raise, an air gap of dimension

$$\frac{\gamma D_1}{E_1} + \frac{P D_1}{E_1}(T_1 - T_0) \text{ is formed.}$$

But, since expansion of mould is much smaller than the contraction of the metal, roughly

$$a_1 = \frac{\gamma D_1}{E_1} \quad \ldots I.1$$

Fig.6 indicates the cantilever model for the metal foil fixed at bottom, with triangular loading due to metallostatic pressure. The bending moment equation is written as

$$EI\frac{d^2y}{dx^2} = R(x-a) - \frac{P_R a(x-a)^2}{2} - \frac{P_R(x-a)(x-a)(x-a)}{6} \quad \ldots I.2$$

where E is the Youngs modulus of the metal foil, I the area moment of inertia, 'a' the length of the foil in contact with the mould wall and R the reaction at x = a.

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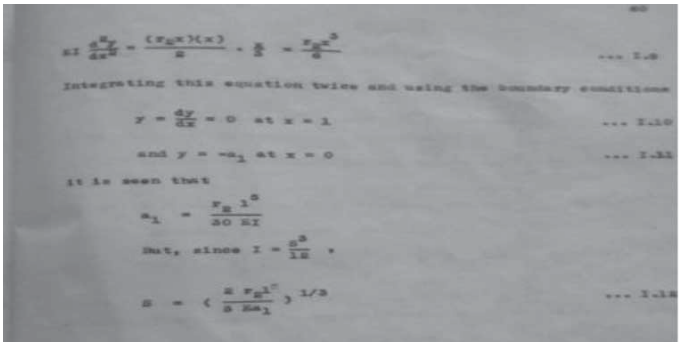

$$EI\frac{d^2y}{dx^2} = \frac{(P_R x)(x)}{2} \cdot \frac{x}{3} = \frac{P_R x^3}{6} \quad \ldots I.3$$

Integrating this equation twice and using the boundary conditions

$$y = \frac{dy}{dx} = 0 \quad \text{at } x = l \quad \ldots I.10$$

$$\text{and } y = -a_1 \text{ at } x = 0 \quad \ldots I.11$$

it is seen that

$$a_1 = \frac{P_R l^5}{30 EI}$$

But, since $I = \frac{b^3}{12}$,

$$R = \left(\frac{2 P_R l^2}{5 E a_1}\right)^{1/3} \quad \ldots I.12$$

While generally about 1.5 mts square of covered area per tonne per month seems to be the recommendation from many project consultants, especially when space is costly, in reality we require much more for heavier castings. I have seen even as much as 5 sq. mts per tonne per month in some East European foundries and as low as 0.9 in some Japanese foundries. It is important you include the fettling areas in the calculation even if it is sub-contacted outside.Since many a time, foundries do not reach the original planned capacity, they are not seriously affected in under-planning of shop-floor area. I also know in one instance, a foundry had to actually put rails and carriages to transfer poured castings (after a while) to another shed which was not planned originally.

Fettling – Automation Needs and Present Challenges+

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Fettling – a difficult shop to safely manoeuvre inside a foundry shop, customer usually not taken there, a place where safety concerns are an inherent fear and with maximum manpower present, heavily injury prone area.

Fettling managers usually understand where a failed wheel of a grinder flies, how do people grind their fingers off in pedestal grinders, layout is usually designed to avoid these dangers. Sadly, as capacity picks up, layout safety norms could be flouted to accommodate more fettling volumes.

Migrant labour-oriented area, huge inventory of semi-finished casting stuck here and always a bottleneck in a modern foundry where all other departments have been updated.

Why is a fettling shop not a one stop solution centre? Most of the solutions are centred for high volume castings, and one tool will not handle the whole grinding process.

Production goal is to pour and produce. Maintenance keeps the equipment running well, backing production. Development has less time to innovate, busy in offering safe proven solutions to make good casting fast. Less space for change for improving casting methoding to automate.

Fettling shop needs to be separated into various sub-activities and hence focused for automation after understanding of these areas :

1. Cleaning casting of sand sticking onto it – Shot blasted
2. De-gating castings – Done within limitations. Can be overcome
3. Chipping casting flashes – totally automate
4. Grinding with swing arm and pedestal grinders - totally automate
5. Needle grinder deburring, internal chipping and finishing internal areas foundry's choice – automate
6. Return of broken bar and risers back to the melt shop – implement runner bar cutters up to 60 mm size.

Intent is to automate accident prone areas and major bottleneck point which are time consuming.

So, action plan is to approach situation as follows.

Degating castings usually can be done with Degating Pneumatic hammer or commonly done through Spreader wedges too.

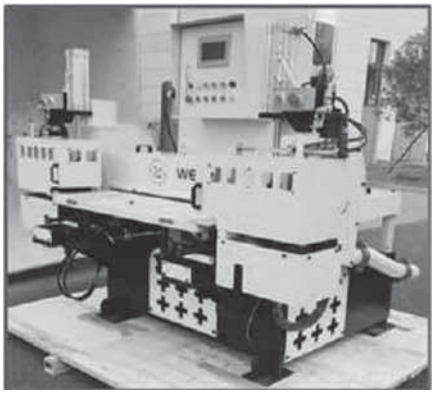
Operation 3 and 4 and if required operation 5 can be majorly automated, through use of automatic grinders.

Operation 5 can also be done through automatic grinders but must be approached with a balanced view on automation benefits and cost savings or pure completion of grinding operation in one machine. This must be educated to a customer as non-core areas, unskilled manpower could be use safely.

Our range of five-axis CNC grinders can handle castings from 50 grams to 300 kg through use of our several models of machines.

We use diamond tipped grinding heads which last easily for a year as proved in a customer's site in India, but wear parts life cannot be assured always.

+ Reprinted from Foundry Talks Newsletter Nov 2023 Issue published by IIF-Western Region



2-Axis grinding machine

Our Two-axis PLC programmable grinding machine with two grinding stations is designed to fettle the ingates, parting line and flashes on the outer diameter of round castings. Two-axis grinding machine simultaneously grinds two same parts or two different parts max ingate 300 sqmm and 600 sqmm – two models. Repeatable grinding accuracy is controlled by 4 position sensors and Control System: PLC + 11 sensors.

Diamond wheel life more than a year time. Our first users to change the original wheels yet.

5-Axis grinding machine

Five-axis CNC single or double pallet grinders suitable for casting from 300 gm to 165 kg preferable to choose for maximum 5 fixture changes per day of 3 shifts. Long life diamond wheel. The users have changed the first wheel after a year of round the clock 22 hours per day running. 14 Machines and six more under execution.

Easy hand programming, just place fixtures.

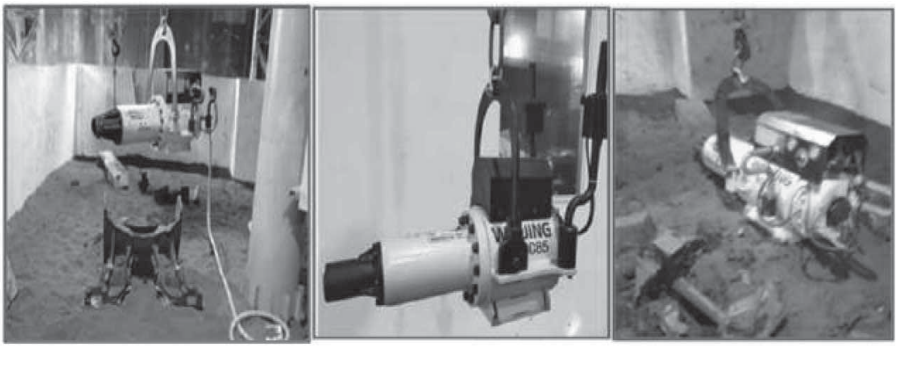
Degating spreader & runner bar cutters

Minimum insertion of spreaders 10 mm to 24 mm, has no central wedge coming out, makes it possible to degate parts. 30 cycles per min breaking speed can meet highly efficient degating. Waist height or floor operated models. Long life blades, double sealing design for long life. In problematic cases where material elongation is high from 12 per cent to 25 per cent it can touch up to 225 sq mm to 3600 sq mm breaking area size with 9-tonne to 35-tonne spreader degating tools.

Runner cutter is designed to shear the runner into small pieces easily before putting them into the furnace. Help the foundries to reduce power consumption in furnace with more density of load. Compared normal runner breaker, the cutter is more flexible, more ergonomic, easier to operate and mainly can cut up to 60 mm SG iron alloy.

Degating hammer

Degating hammer of nine sizes from 35 mm neck to 350 mm neck size riser is pneumatically operated.



Basic of Heat Treatment Process

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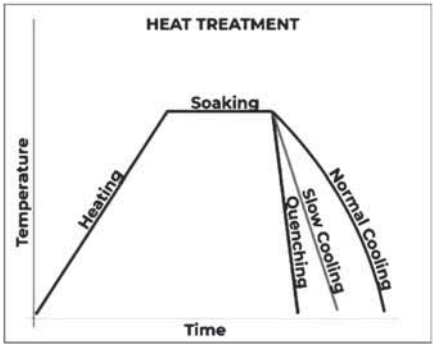
The metal part based on its application, life etc. utilizes number of tools to control the physical and Mechanical properties. An alloys chemistry is only an initial part of the process, the final properties can only be achieved through heat treatment.

Heat treatment is a broad term describing a range of thermal processes used to control an alloy's properties. These processes ensure a fnished product carries the mechanical and physical properties demanded by its application. Encompassing both heating and cooling, heat treatment incorporates a few distinct and equally important phases:

1. **Ramp-up:** heating the metal;
2. **Soak:** maintaining the metal at a desired temperature for a specifed amount of time;
3. **Cooling:** cooling to a specifed temperature at a controlled rate and in a controlled environment.

You can have a chemistry with all the right elements, but if you don't heat and cool the alloy properly, you'll end up with undesirable material



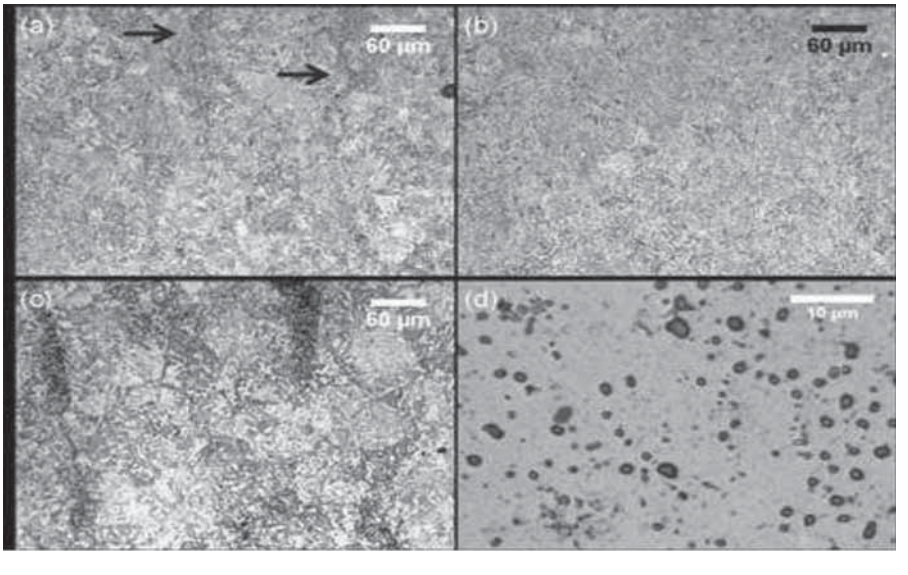
properties. Through heat treatment, foundries create products carrying the desired combination of properties. For many materials, strength (yield and ultimate tensile strength) ductility, hardness, toughness, corrosion resistance and wear resistance are all strongly infuenced by heat treatment.

Different grades require specific targets for mechanical properties, and only heat treatment can produce the desired outcomes. A successful product is one that meets a customer's specifications in terms of both shape and material properties.

All steels are alloys, meaning they are metals created by melting and combining multiple elements. When melted, metals come together in different ways. The result of each elemental combination is a unique microstructure.

Steel only has three phases: ferrite, cementite, austenite and it has many microstructures.

Heat treating is how we achieve the desired microstructures appropriate for a given part. Therefore, the ultimate goal of heat-treating parts in a metal casting foundry is to alter their as -cast microstructures to improve performance.



Essential Heat Treatment Processes for Foundries

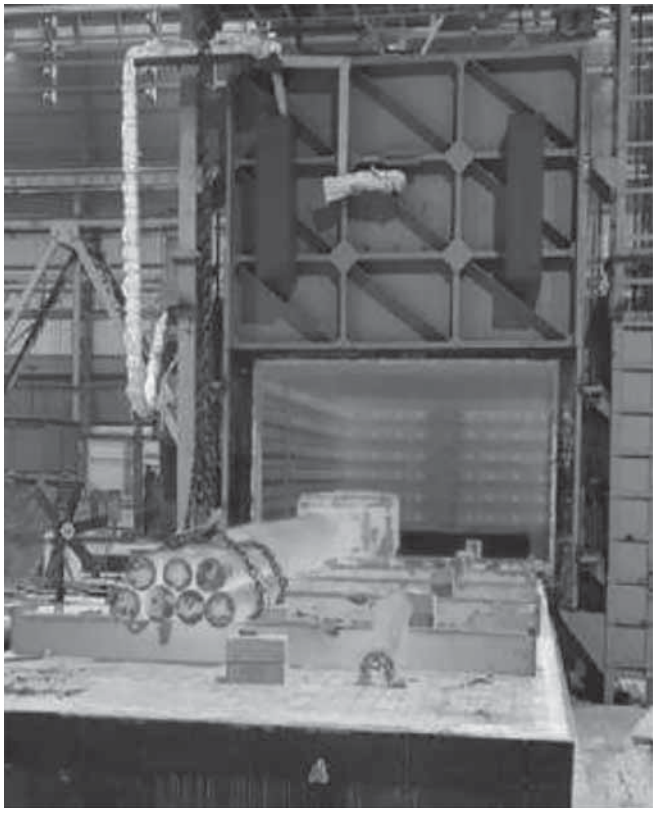
Austenisation

Austenisation is the process of heating steel to a temperature high enough to produce austenite, which is the phase structure produced when you heat iron above its austenization temperature. Correctly manipulating cooling rates from above the upper transition temperature can produce steel products with superior properties.

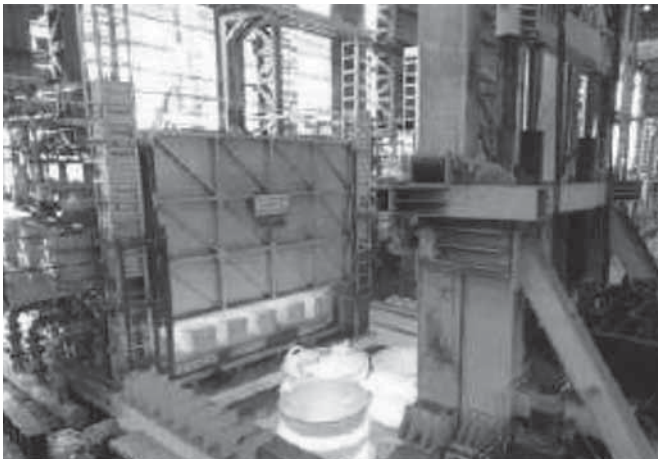
Normalising annealing

Normalising and annealing enhance a steel's mechanical properties by refining the grains that make up its microstructure.

The thermal process of normalising a steel is an essential tool for foundries: these are typically the first heat treatment completed for cast carbon steel products. The reason for the name 'normalising' is because this heat treatment results in a much more uniform microstructure across a workpiece.



Similar to normalizing, annealing is used to make a part more workable by increasing its ductility and, by correlation, reducing its hardness. The main differences between normalizing and annealing are the cooling rates involved.



Quenching

Quenching is defined by ASTM International as rapid cooling (of steel, in our case) at a rate sufficient to preserve or produce desired material characteristics. Steel will be cooled much faster in a liquid than in air. Quenching is one of the methods to manipulate the cooling rate to tailor the microstructure and resulting properties.

Quenching can be conducted with many different quenching mediums; water, brine, polymers, oils and gases are all popular quenchants that produce different cooling rates and outcomes.

Hardening

Quenching is also an essential step in hardening many grades of steel. Quenching is often performed after austenization in a process

known as phase transformation hardening - a very common method to strengthen and harden carbon steel.

Hardening steel such as quench hardening, case hardening, or precipitation hardening – all these methods target the same goal: to harden and strengthen a steel in different ways.

Tempering

A drawback of hardening is that it also causes steel to become very brittle and prone to breaking. As such, hardened steel usually must be tempered for any practical applications.

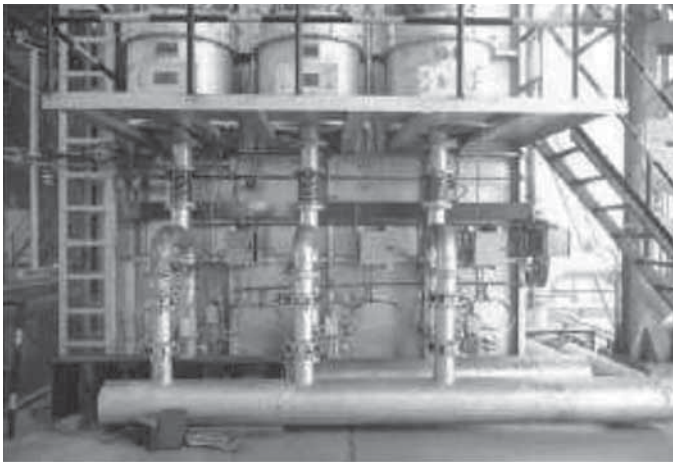
Tempering is a form of stress relief that targets an alloy's ductility. Tempering reduces hardness, brittleness and increases ductility, but it still maintains a hardness sufficient enough that a piece can be used in many applications requiring high-strength steel.

Classification of Heat-Treating Furnaces

Criteri	Feature	Remarks
Method of Heating	Combustion of Fuel Electrical	Natural Gas, LPG, CBG, Diesel Electrical Resistance
Method of Handling	Batch	Jobs remain stationary
	Continuous	Jobs move Continuously or Intermittently
Internal Atmosphere	Air inert carburising	Depending upon surface properties
Exposure of Charge to atmosphere	Open Closed	Normal HT Furnaces ADI, Carburising etc.
Type of Hearth	Stationary Mobile	Fixed Hearth Bogie, Pusher, Roller
Heated Job Transfer	Overhead crane Manipilator	Manual Automatic Rapid Quench
Quenching	Air	Normalising
	Water	Hardening
	Polymer	Hardening
	Oil	Hardening
	Brine	Hardening

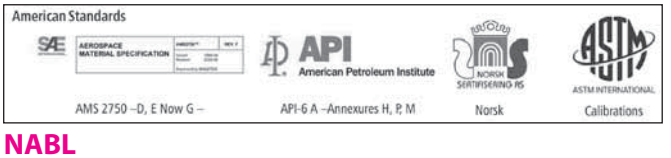
Stress relieving

Stress relieving describes the general heat-treating practice of removing a workpiece's internal stresses from Cast or Fabricated Materials.



Uniformity and Standards

Heat treatment is a single or multi process treatment on Ferrous or Non-Ferrous materials of different weights, sizes, Compositions. The Physical and Mechanical properties obtained need to be uniform in a batch or continuous heat-treating process and it depends on the Uniform Parameters controlled. Over the centuries, decades these parameters have been standardised across the world as standards for Heat Treating and are in practice and gets revised from time to time as per the stringiest quality norms.



NABL

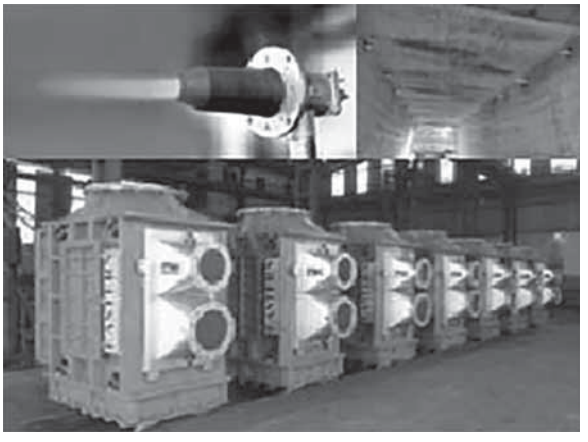
These standards have set a procedure to obtain uniformity in any of this process so that products get standardised in terms of Physical and Mechanical properties.

All casting manufacturers follow these standards based on the need of accuracy. Indian casting manufacturers have rapidly adopted these and improved the quality of their products.

The Furnaces and Foundry Casting Manufacturers should update themselves to these standards.

Instrumentation

The measuring instruments, sensors, field instruments required to be calibrated by NABL Laboratories to the highest accuracies. The Pyrometry is the most important part of Heat Treatment.



And the results are best achieved. Documentation of calibrations, day to day process is also very important part of the system.

NABL tested instruments and sensor and field testing

Refractory lining systems

Good quality Refractory Bricks, Ceramic Fibre Products like Pyroblocs are available for making effective lining of Furnaces that leads to optimising the heat losses through walls. The suppliers provide the Simulations for assessing the proper insulation and such services are also available.

Heating source

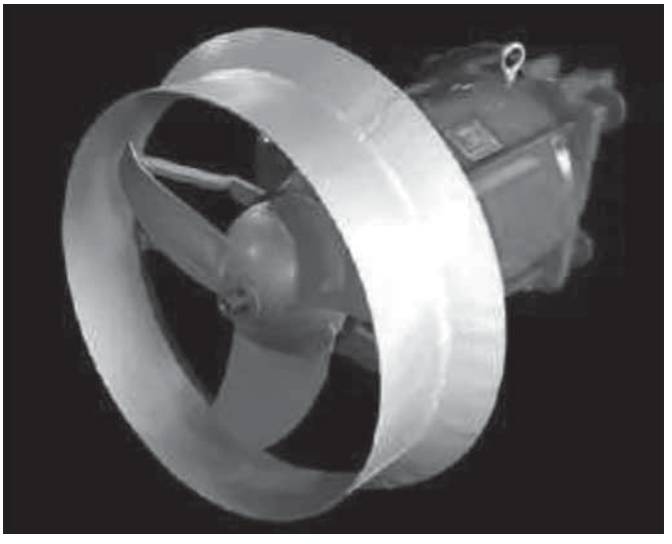
The Combustion Engineering is vital part of Furnace selection. The latest technologies provide the uniform heating with best efficiencies and are most safe in Fuel Burning. The Fuel Fired Furnaces with such Burners are best competitors of Electrically heated Furnaces. The best part of Gas Fired Furnace being the wide temperature range with required uniformity. The Self Recuperative and Regenerative Burners offer least fuel consumption. The new technologies in Recuperators also provide best heat recovery from the flue gases.

Electrical Resistance Heating systems are well updated and provide good efficiencies in its own range. These are practically less maintenance Furnaces and good quality heaters and control system provide the best results.

Other accessories like Auto Door Latching, Heat Resistant Door, Bogie Frames, Sand Seals do provide the better efficiencies. Its installation on Furnaces is always beneficial.

Automation

Auto control system using the PLC, SCADA, Human Machine Interface provides the accurate control over the process and yields repeatability of best results. It also provides data logging facility and can be connected to IoT for Data



Collection and availability for analysis. Furnaces can be remotely operated.

Manipulator

For fast quenching and consistent results Manipulators are used to maintain quench delay periods less than 40 sec.

Agitators

The Uniformity during quenching and very fast heat extraction is very important in Quenching Process. The standard demands quenchant velocities of minimum 0.8 M/sec across the jobs periphery. Specially designed Agitators offer these high velocities.

+The article was originally published in Deccember 2023 issue of "Foundry Talks", Newsletter.

The Growth Imperative – Grow or Die![+]

MUKUND PANT
Managing Director
Metal Power Analytical Pvt Ltd
E-mail: mukund.pant@metalpower.net

Let's face the harsh truth – most businesses fail. Most of us know this, but few promoters look beyond the headlines and fewer still delve further into answering the question, "What does this mean for me and how should I avoid this fate?" Before delving into specifics, let's see the main statistics:

- Only ~25% of businesses make it past the 15-year mark
- Only ~12% of family-run businesses enter the third generation
- The most common reason for failures is cash-flow problems – even for businesses that are profitable
- The second most common reason for failure is being overtaken by competition

Taken in isolation, each of these is something promoters tend to ignore as things that could affect them or their businesses, as long as they're not in distress; collectively though, these highlight the very clear imperative – a business absolutely must keep growing (and staying relevant) if it is to have any chance of surviving in the long term. Let's address the whys for this postulation – as well as the business imperatives an acceptance of this entails.

Ignore incentives; focus on upsides

A common theme across several MSMEs is to focus on the benefits of remaining an MSME in terms of concessional tax rates, special tender terms, EMD exemptions, stringency of regulations etc. Indeed, several promoters actively look for ways in which to remain MSMEs and not expand beyond it. This is the single most important reason for the Indian MSME sector's struggle to match global standards – but beyond that, it is the factor that is most likely to cause the business to experience financial distress and failure in the longer term.

Firstly, there is a reason why businesses crave "economies of scale". The larger the scale of operations, the larger the base on which you spread your fixed overheads as these are easily managed to a level where they grow far slower than volumes. Therefore, a larger business simply has a lower "unit cost of operations" than a smaller one even for the same procurement costs, and is therefore far better placed to ride out market cycles and fluctuations.

Secondly, the larger a business, the lower the cost of debt. Any investor – whether a lender or an equity investor – relies on financial statements to assess the risk associated with extending credit to (or investing in) a business. A larger business that's also growing quickly simply presents a far lower risk investment – and therefore gets far more favourable credit terms and/or valuations.

Thirdly, and this follows from the first two, since a larger business has lower costs and more money available, it is far more capable of investing in innovation and research and therefore staying at the cutting-edge, or at least of evolving and adapting to changing trends, thereby staying relevant and responsive to the ever-changing demands of customers. This enables the business to stay alive and not shrink and die as the industry evolves – whether slowly, or through a step-change in technology, regulations or consumer preferences.

Finally, a growing and large business will also attract better quality talent across levels – and will be better placed to retain the best talent as

* Reprinted from Foundry Talks Newsletter, Nov 2023 Issue published by IIF-Western Region

well. This is simply not true for smaller businesses.

In summary, regulatory benefits offered to MSMEs should be seen as tools enabling a business to scale up quickly, rather than as incentives to remain small.

Set targets to ensure you don't get cut adrift

Economies, industries and companies grow – that's inevitable through inflation alone. It's important therefore, to differentiate "nominal" growth from "real" growth. To put it simply, "real" revenue growth should outpace the inflationary growth specific to the business. A growth target that falls short of this is one that will see the firm "shrink" in real terms. This is a double whammy since inflation on raw materials and wages is unavoidable – causing a shrinkage in margins. Therefore, the growth target for a firm should be set considering multiple factors:

- What is the expected growth of the relevant industry / sector itself (the one that the company belongs to)? This is typically something that's freely available in economic/industry research and forecasting papers or is something that can easily be estimated by assessing the current and expected situations of customer and supplier markets.
- What wage inflation – including headcount changes as well as increments, bonuses etc – does the company expect in the coming period and how will this impact the overall cost base? This should be defined in the annual operating plan.
- What is the raw material cost forecast – and resultingly – the COGS expected? This too should be part of the annual operating plan, based on vendor discussions and market analysis.

In combination, these factors should help the company define the bare minimum growth required to meet profitability targets and also to outpace overall industry growth. A firm that doesn't outpace industry growth will find itself in trouble soon, as it means that competitors are outpacing it and generating more cash to fund innovation, marketing, and growth initiatives, as well as creating opportunities for cost savings vide process improvements, automation, volume-based RM discounts, lower interest rates and / or to grow via acquisitions.

Target and monitor the right metrics

The key factor for most bankruptcies is not a failure to be profitable, but that businesses simply run out of cash. Managing the cash cycle is therefore as critical for businesses as managing profitability. A good financial plan therefore is one that contains all 3 statements – the P&L, the Balance Sheet and the Cash Flow Statement. Within these too, however, some metrics are more critical than others. The top metrics that promoters and business owners should focus on are:

DSCR: The DSCR is a crucial metric that determines how a debt Financier will evaluate any proposal and has a direct bearing on the rates and terms that will get offered.

EBITDA: Quite simply, if a business has a healthy EBITDA, the rest of the heads can be turned around far more easily. EBITDA is the simplest and most powerful comparable metric that informs promoters and stakeholders of the true health and competitiveness of the business.

Net-free cash flow: The net-free cash flow of the company informs the leadership about how much money is available for either extraction, distribution or for financing growth or acquisitions, making it critical to long-term strategic plans.

These metrics are – not coincidentally – also the ones assessed by lenders and investors, alongside revenue growth. Setting and achieving targets for these therefore ensures sound business health, while also offering very good prospects for minimising the cost of finance.

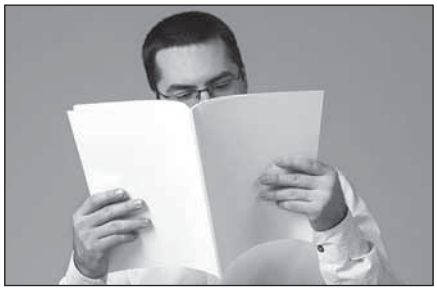
Set the business up to succeed

To succeed over time, a business needs resilience – and resilience comes far more from an institutional structure than from individual contributions. Indeed, a company with a "visionary leader" as its central driving force across areas is far less resilient than one that has a large number of capable leaders heading specific business functions in a synergistic manner, simply because it has a single point of failure.

Here, family-run businesses in particular should take heed. There are very few – if any – examples of any large, successful family-run enterprise remaining both family-run and alive after 3 generations – and this includes not just businesses, but even political parties and entire nations. While there are examples of family-owned businesses thriving in the long-term, these are almost ubiquitously the ones where the family retains ownership while professionalising operations. Doing so ensures a number of upsides:

- Eliminates dependency on succession within a small group of people who may not individually, or even collectively, have the required skills.
- Performance assessment and appraisal of the operational leadership can be completely objective and ruthless.
- Eliminates the likelihood of splits and splinters being created on account of familial disputes or rivalries.
- Frees the promoters to focus on growth in the business, and their own interests outside it.
- Enables the business to always attract the right talent – while also presenting a completely professional face to the industry, and being seen as far lower-risk by investors and lenders.

Comments & Suggestions



Comments and suggestions for improvement of Indian Foundry Journal (IFJ) are invited from the readers, which will be published in the IFJ. Such suggestions will be considered by the Editorial Committee of the Journal for implementation.

Readers may send their views and comments on issues related to the contents of the Journal at **journal@indianfoundry.org** with a copy to : **ed@indianfoundry.org**

Jasdanwalla Library at IIF Center

A Treasure Trove for Foundrymen

FAA Jasdanwalla Library at IIF Center, Kolkata has recently been re-opend for IIF members. The library has books, collections of technical papers, AFS Transactions, Congress/Conference proceedings etc.

The reference books contain valuable information on metalcasting technology. Bound volumes of Journals of British Foundrymen, American Foundry Society etc. AFS Transactions contain a variety of technical articles covering various aspects of metalcasting technology.

International journals available at the Jasdanwalla Library include

- Modern Casting – Published by American Foundry Society, USA
- Foundry Trade Journal – Published by ICME, UK
- Casting Plant and Technology International – Published by German Foundry Association
- INCAST – Published by Investment Casting Institute, USA

IIF members may visit the library where they can consult books, journals and other publications.

Plenary Sessions and Panel Discussion

Review of Technology and Industry Trends

Foundry Industry in India is poised for growth in the coming years capitalising on the opportunities ahead strategising on the aspects of Technology, Automation, Cost Optimisation etc. Indian foundry industry has turnover of approx US$ 20 billion with exports of nearly US$ 3.94 billion. Grey iron castings have the major share of nearly 68 per cent of total castings production.

In the recently held 72nd Indian Foundry Congress (IFC) along with IFEX 2024 at Bangalore International Exhibition Centre (BIEC), Bengaluru during Feb 2-4, 2024, thought-provoking Plenary Sessions and Panel Discussions took place as part of the Mega Event. Plenary sessions were one of the main attractions of the 72nd Indian Foundry Congress.

Both Indian and foreign stalwarts from the industry deliberated on several topics in line with the main Theme of the Mega Event – *Unleashing the Opportunities*. A galaxy of prominent personalities from the industry, Government departments and others shared their thoughts as well as experiences on various aspects of metal casting technology, management, marketing of castings, zero defect production of castings, process optimisation etc.

The detailed programme categorised by the Themes, Topics and the Speakers of the Plenary Sessions as well as Panel Discussions for the 3-Day Mega Event are as follows:

Day 1: Feb 2, 2024

Theme: Growth - New Markets

Panel Discussion :

Topic: Expanding Horizons & Unleashing the Opportunities

Moderator

Mr Prasad Chavare

MD & CEO, Foseco India Ltd

Speakers

Mr Paul Heiss

CMD of IBCC, Inc, USA

Mr Mohan Kadam

GM-Materials, DANA Holding Corporation

Mr P Deepak Reddy

Managing Director, Nelcast Ltd

Mr Navneet Agarwal

Managing Director, RBA Exports Pvt Ltd

Plenary Session :

Theme: Make in India - Atma Nirbhar: Defence, Railways & Energy

Speakers

Mr Sunil Kharad

Executive Director, Head - Corporate Materials, BEML Ltd

Mr Manas Kumar Poddar

Principal Chief Mechanical Engineer, Rail Wheel Factory, Bangalore

Mr Renganayagan Ramanujam

Strategic Material Sourcing, ZF Windpower Coimbatore Pvt Ltd

Day 2: Feb 3, 2024

Theme: Global Competitiveness

Plenary Session :

Topic: Driving Quality Excellence & Innovation Culture

Speakers

Mr Mustafa Ata

Senior Expert - Casting, Continental Automotive Technologies GmbH

Mr N Ramanathan

Chairman - Examination Committee & Vice President, International Academy for Quality (IAQ)

Panel Discussion :

Topic: Effective Cost Management – A Key Facet to be competitive

Moderator

Mr Vikas Garg

Managing Director, Forace Polymers Pvt Ltd

Speakers

Mr V Srinivasa Reddy

Executive Director, Synergy Green Industries Ltd

Mr Baskar Radhakrishnan

Managing Director, BAETTR, India

Mr Jayant Humbarwadi

Joint Managing Director, Ashok Iron Group

Mr Rahul Patil

Head Operations, Menon and Menon Ltd

Plenary Session :

Topic: Combating Challenges with Path-breaking Technology

Speakers

Mr Ganesh Jagadeesan

Managing Director, Indoshell Cast Pvt Ltd

Mr R V Gumaste

Managing Director, Kirloskar Ferrous Industries Ltd

Panel Discussion :

Topic: Roadmap for Scaling – Skill & Talent Development

Moderator

Mr J Arun

Head of Organisational Development & Learning, Ashok Leyland Ltd

Speakers

Mr A S Shivakumaran

Vice Chairman, Quality Circle Forum of India, Coimbatore

Dr Nithyanandan Devaraaj

CEO, Flow Link Systems (a Voith Group Company)

Mr Raja Radhakrishnan

President & CHRO, Ashok Leyland Ltd

Dr Sivapriya Chellappa

Co-Founder Gnana Vikas Jagrati

Day 3: Feb 4, 2024

Plenary Sessions :

Theme: Gearing up for the Future

Plenary Session

Topic: Lead Time Reduction in New Product Development

Speakers

Mr K E Shanavaz

CEO & Joint Managing Director, Peekay Steel Castings (P) Ltd

Mr Nageshwar Rao Cheekala

New Product Introduction, Ashok Leyland Ltd

Plenary Session :

Topic: Foundry Automation - A Practical Approach

Mr Yogesh Kumar

Director & Chief Operations Officer, DiFacto Robotics and Automation

Mr C Sathyamurthy

Vice President – Foundry, Aquasub Engineering (Aqua Group) ?

Panel Discussion :

Topic : Tech Process for Tomorrow

' What does the future unveil?'

Moderator

Mr Franz Friedrich Butz, *President, Huttenes Albertus Chemische Werke GmbH, Germany*

Speakers

Dr Ashish Kumar

Director, Department for Promotion of Industry and International Trade (DPIIT), Ministry of Commerce, GoI

Dr Phani Kumar

Professor, Department of Metallurgical and Materials Engineering, IIT Madras

Mr Sanjay Arora

Business Head, Ferrous Foundry Division, Revent Metalcast Ltd

Mr R Hari Shankar

Global Head, Bradken

Panel Discussion :

Topic: Green Foundry – A Myth or a Mission?

Moderator

Mr Sachin Goel

Head-Foundry Business, Ashok Leyland Ltd

Speakers

Mr C Arun Prasad

Director, EY

Dr CA Rashmi Ainapur

Principal Consultant, BhumiMithr Sustainability Solutions Pvt Ltd

Mr S Sundaresan

Senior Vice President - Operations & Technical, Brakes India Foundry Division

Plenary Session :

Topic: Foundry & Auto Industry

"Navigating an Ever-Changing Landscape"

Talk on Electric Vehicle and the Future of Mobility

Speakers

Dr Kanakasabapathi Subramanian

Senior Vice President - Product Development, Ashok Leyland Ltd

Mr E Nand Gopal

Director, Grant Thornton Bharat LLP

Lost Foam Tech Sessions – A Flagship Event of 72nd IFC

Lost Foam Casting (LFC) process is one of the Evaporative Casting Processes (EPCs) where foam is used for the pattern. It is an innovative way for producing the most complex cost-effective as well as efficient components. This process is becoming popular in India as well as other countries.

During recently held 72nd Indian Foundry Congress (IFC) at Bangalore International Exhibition Centre (BIEC), Bengaluru, Lost Foam Tech Sessions were the flagship event of the Mega Event on Feb 2-4, 2024. Eminent speakers like Mr Gopal Padki; Mr Praveen Sinha; Mr Tapan Patel; Mr C Ravi Chandramouli; Mr Marshall Miller; Mr Srinivasa Rao T; Mr Ramanathan deliberated on the said subject.

For the LFC expo the icing on the cake was the interactive Roundtable discussions and the video conference with LFC China subcommittee and CASTCHEM China STAMMA manufacturers! The main topic was how to shift from traditional manufacturing to LFC? The experts' panel consisted of Mr Devendra Jain, MD, Porwal Auto Components Ltd; Mr TS Rao, COO, Madras Engineering; Mr Ankit S Divekar; Mr Hemant

Manjunath; Mr Ramnath; Mr Gopal Padki and Mr Praveen Sinha. The entire team had almost one and half hour interactive session with simultaneous exchange of technical and process

challenges, advantages for LFC in India with the audience and overseas experts Mr Lu Guo Hua, Founder of Castchem and LFC Industry associates and engineers with due assistance of English – Chinese language interpretation from Mr Joey Wu!

A Foundrymen Handbook for LFC best practice, first edition from Castchem –SN Greentek was launched during the Expo. It was well received and appreciated by several delegates.

Details of the presentations are as follows:

Topic: Lost Foam Tech and Its Pathway for India

Speaker: Mr Gopal Padki, *Founder, S N Greentek, Castchem India Distributor*

Topic: Deep Dive - Ferrous Lost Foam Castings

Speaker: Mr Praveen Sinha, *President - Operations, Porwal Auto Components Ltd*

Topic: GMC and Its Journey in Lost Foam Casting

Speaker: Mr Tapan Patel, *MD, Gujarat Metal Cast Industries Pvt Ltd*

Topic: LFC Coatings & Refractories

Speaker :

Mr C Ravi Chandramouli, *Managing Director, Quality Technologies Pvt Ltd*

Topic: Global Trends in Lost Foam Technology, Alternate Materials for Lost Foam Tools

Mr Marshall Miller, *3D Systems, USA*

Topic: Lost Foam Technology and its Benefits

Speaker: Srinivasa Rao T, *COO, Madras Engineering Industries*

Topic: Quality and Defects in Lost Foam Castings

Speaker: Mr T N Ramnath, *Consultant*

Non Ferrous Sessions

Application of non-ferrous materials, mainly aluminium alloys is increasing at a rapid rate. Vehicle manufacturers are eager to source aluminium alloy components for the purpose of making vehicles light-weight. Light vehicles with lighter parts are speedier and less polluting. Electric vehicles also require light-weight components. Aluminium-magnesium alloy components are also needed by aerospace industry. In defence, consumption of light-weight castings is on the increase. Aluminium is the future material for casting.

Considering the growing importance of non-ferrous metals, 72nd Indian Foundry Congress Organising Committee held several sessions on non-ferrous metals during Feb 2-3, 2024 at BIEC, Bengaluru. Technocrats with vast knowledge and long experience made in-depth presentations on various aspects of non-ferrous metal casting technology. The experts also referred to the present trends of the non-ferrous foundry industry. Domain experts discussed about the ins and outs of non-ferrous metal casting industry. In a number of case studies, critical issues related to non-ferrous castings production were presented and possible solutions for such problems were also suggested by the experts.

Following presentations were made in non-ferrous sessions:

Day 1 : Feb 2, 2024

Theme: Energy

Topic: Predictable Energy Consumption Leading to Conservation and Increased Profits

Speaker: Mr Shashank Agarwal, Manager- Sales & Applications, Oritech Solutions

Theme: Electric Vehicles

Topic: Essential Lightweighting in Electric Vehicles with Added Structural Strength

Mr Mariskumar Marimuthu, DGM – Casting & Machining – Manufacturing, Engineering, Ather Energy

Day 2: Feb 3, 2024

Theme: Automation

Topic: Essential Automation for Increased Productivity and Reduced Downtime

Speaker: Mr Dhananjay Sahani, Sales & Marketing Manager, DiFACTO Robotics & Automation

Theme: Diecasting Management

Topic: Planned Management of Diecasting for Continuous Growth

Speaker: G Prabu Ram, Managing Director, Alubee

Theme: Quality Cost Analysis

Topic: Understanding QCA for Profitability

Speaker: Dr M Arasu, HOD, Foundry Technology, PSG Polytechnic College

Tech Mart Symposium

DAY 1

Special Invitee Mr Vineet Thakar, Director - Sales, Marketing & Technology, FOSECO Foundry Division of Vesuvius inaugurated the Symposium.

Following presentations were made at Tech-Mart Symposium.

Topic : Melting Practice Evolution in the Modern Time
Speaker : Mr P Ravikumar
Senior Manager - Sales, Inductotherm Group India

Topic : Modern Ultra High Strength Ductile Irons – 700/10
Speaker : Mr Swapan Kumar Biswas
Technical Manager, Elkem South Asia Pvt Ltd

Topic: Clean Steel Castings at Ultralow Pouring Temperatures for High Performance Applications Using the Innovative Rotoclene Process
Speaker : Mr David Hrabina
International Project Manager, FOSECO Vesuvius Moravia sro

Topic : Veining Defects, the Solution (A Series of Case Studies)
Speaker : Mr Andrew Tagg
Technical Manager, John Winter & Co Ltd, UK
Moderator : Dr M Arasu
HOD, Foundry Technology, PSG Polytechnic College, Coimbatore

DAY 2

Opening Remarks by Special Invitee Mr Vikas Garg, *MD, Forace Polymers (p) Ltd*

Topic : Evolution of Magnesium Alloy Treatment
Speaker : Mr S Nadimuthu
Mentor & Technical Advisor, Snam Alloys (P) Ltd

Topic: Evolution of Organic No-Bake for Cores
Speaker : Mr D Ghosh
Director (Technical), Forace Polymers Pvt Ltd

Topic : Sand Package Process
Speaker : Mr Jorge Mateo
Business Unit Director, Loramendi S Coop

Topic: Alternative to Zircon & Chromite for Foundries
Speakers : Dr Pawan Pal
Senior Scientist (R&D), Ashapura Group
&
Mr Kameshwara Rao
Scientist (R&D), Ashapura Group
Moderator : Mr K Varatharajan
Vice President, Operations, Nelcast Ltd

DAY 3

Opening Remarks by Special Invitee Mr Parag Bhandare, *Joint Managing Director, AKP Ferrocast*

Topic : Challenges of 3D Printing for Foundry Applications
Speaker : Mr Holger Barth
Product Manager, Huttenes Albertus, Germany

Topic: Automation in Fettling - Selection Criteria
Speaker : Mr R Vijay Balaji
Founder, Fettling Automation

Topic: Industrial Robotics and Automation in Foundries
Speaker : Mr Yogesh Kumar,
Director and Chief Operations Officer, Difacto Robotics & Automation
Moderator : Mr P Venkatesan
Plant Head, Gudur, Nelcast Ltd

Casting Clinic Received Overwhelming Response

It was the unique opportunity to the foundries to participate in Casting Clinic in 72nd IFC during 2-4 Feb 2024 at BIEC, Bengaluru. Led by Dr V S Saravanan, Indo Shell Cast Pvt Ltd, the team of Mr Sandeep Kulkarni, Aditi Industries; Mr C Ravi Chandramouli, Quality Technologies Pvt Ltd; Mr Peranandhanathan M, Viperan – MRCT Institute; Mr Arunachalam S P, Freelance Foundry Consultant; Mr Sivakumar S, Pitti Castings Pvt Ltd; Mr Shreedhar Bapat, Consultant, had serious discussion and analysis on a number of technical problems brought in by metal casters and provided potential solutions. CFT approach was highlighted in the whole conversation.

During IFEX Exhibition, few more foundries and customers came up with casting problems and got their queries clarified by the team.

More than 20 foundries presented their technical problems related to casting defects in Cast iron, Grey iron, SG iron, Carbon Steel, Alloy Steel and Aluminium Alloys etc. Experts having 250+ years of combined experience provided possible solutions for the problems. By seeing the overwhelming responses from the foundry industry, IIF is thinking of continuing the Casting Clinic as a permanent forum to provide service for the Foundry Industry.

Students Programme – Attended by Enthusiastic Future Foundrymen

A specialised programme for engineering students with insights on the latest advancements in the foundry industry, highlighting the advantages and benefits thereof, by esteemed panel of experts was organised as part of 72nd IFC.

The unique programme meant for attracting students to build career in foundry profession was held on the 2nd day (Feb 3, 2024) of 72nd IFC at Gulmohar Hall of BIEC which was jam-packed with 400 plus engineering students from eleven colleges in and around Bangaluru who came with their coordinators to listen to the experts speaking on the latest technologies applicable in the foundry industry and also success stories of young entrepreneurs.

The speakers were Mr V P Premkumar from Nelcast; Mr David Schmidt from Finite Solutions Inc; Mr Anil Kumar Satpathy from

DiFacto Robotics & Automation; Mr Ankit Divekar from Pearlite Liners and Mr Vignesh Ramanan from Sriram Enterprises.

The programme was chaired by Mr N Gopal who also offered vote of thanks.

B2B Meetings
Casting Buyers Meet Sellers

B2B Meeting is a very useful platform for castings suppliers to meet leading buyers of castings for getting orders expansion of their business. It is the opportunity for meeting of Buyers and Sellers face-to-face for their mutual benefits. On the occasion of 72nd Indian Foundry Congress (IFC) and International Foundry Exhibition (IFEX) 2024 held during Feb 2-4, 2024 at Bangalore International Exhibition Centre (BIEC), Bangaluru, B2B meetings were organised on the first two days of the 3-Day mega event.

Following Casting Buyers participated in the B2B meetings:

- American Axle
- Armstrong
- Atlas Copco
- Automotive Axle
- BML Ltd
- Bradken Resources
- Cummins India
- Daimler India Commercial Vehicles
- IBCC Industries India Ltd

- LCB Sourcing
- SKF India
- Tata Motors Ltd
- TAFE
- TMTL Ltd (Eicher Tractors)
- ZF Rane Automotive India Ltd
- ZF Windpower Ltd

More than 80 suppliers of castings had B2B meetings with their potential buyers.

IIF Fellowship

IIF Fellowship, the highest honour of IIF, is conferred on some selected members of IIF every year during the Mega Event, Indian Foundry Congress. The Fellowship Jury Panel adjudges the eligibility of the candidates for selection for IIF Fellows.

This year, Mr S V S Tyagi, Member of IIF-Jamshedpur Chapter; Mr R C Kothari, Life member of IIF-Vadodara Chapter and Mr N Visvanathan, Life Member of IIF-Coimbatore Chapter were selected for IIF Fellowship. In absence of Mr S V S Tyagi, Mr Munish Kumar, Hon Jt Secretary, IIF-Jamshedpur Chapter receive the memento and certificate on behalf of Mr S V S Tyagi.

Brief bio-data of the Fellows are as follows:

Mr S V S Tyagi, an M Tech in Foundry Engineering from IIT Kharagpur, retired as DGM from Tata Motors in 1997, worked as Technical Advisor to MD of Tata Metaliks, Consultant to Rallis India, Ooty, is now working as CEO of Arush Metal Casting Ltd, Jamshedpur from 2004. Other assignments undertaken are: setting up of an iron foundry for Amtek Auto, Delhi; Selection of equipment and process for KISWOK Foundry in Kolkata for producing iron and SG Iron foundry; giving solution to power generation problem of Ashok Leyland Ltd, Chennai etc.

As Past Chairman of IIF-Jamshedpur Chapter, he is actively involved in IIF activities. His areas of interest are Change Management, Skill Development, Quality Circles, Kaizen, TPM, Emplyee empowerment, Continuous Improvement, Self Directed Teams. He visited several foreign countries and was a member of Italian delegation in 1999. He has authored many papers on foundry technology published in Indian Journals.

Mr S V S Tyagi

Mr Munish Kumar, Hon Joint Secretary of Jamshedpur Chapter, receiving the memento and Certificate on behalf of Mr S V S Tyagi for IIF Fellowship

Mr S V S Tyagi, CEO, Arush Metal Casting Ltd

Mr R C Kothari, an M Tech, a professional foundryman and a thoroughbred technocrat, started his career in Bhartia Electric Steel Co Ltd, Kolkata. He became the member of core team for development of Center Buffer Couplers introduced for the first time in 1960 by Indian Railways, under the control of American specialists; he got the opportunity of setting up of Hindustan Motors engine production plant.

After a few years of service, in 1983, he started project consulting and engineering as well as providing services to the foundry industry to optimise and modernise their foundries; slowly became 1st generation entrepreneur and ventured in full-fledged manufacturing in 1991 and started Rhino Machines. He travelled to all western world countries and Afro Asian countries. He has enormous contribution to IIF-Vadodara Chapter, awarded with lifetime Special

Mr R C Kothari receiving the memento and Certificate for IIF Fellowship

Achievement Award in 2018, special recognition from Dynamic Foundry Group, WESCON 2014.

Mr N Visvanathan, an Electrical Engineer from PSG College of Technology, Coimbatore is presently the Managing Partner and CEO of Ammarun Foundries, Coimbatore. He has total experience of 50 years in foundry field. With his significant contribution, Ammarun Foundries has been awarded with a number of certificates like IATF 1969, ISO 14001, ISO 45001 is in progress. He has worked a lot for technology upgradation, pollution control measures, HR initiatives etc.

He is the Life Member of IIF from 1983.

Mr N Visvanathan receiving the memento and Certificate for IIF Fellowship

Ammarun Foundries is Company Member of IIF from 1994. He held varous positions in IIF-Chapter level and in IIF National Committees. He invented a washing technology to reclaim used CO_2 and cold box cores in 2003, commissioned Ammarun Enviroguard Industries (P) Ltd in 2015. He is the recipient of many awards.

Lifetime Achievement Award

Mr Shyam Cousik, Director - Sales & Projects, VAP Induction Pvt Ltd receiving the memento and Certificate on behalf of Mr D G Sastry

Mr D G Sastry, MD, VAP Induction Pvt Ltd, recipient of "Lifetime Achievement Award"

71st IFC Chairman Mr. Pradip Mittal being felicitated during the award function of 72nd IFC on February 2, 2024 at BIEC, Bengaluru

Mr Pradip Mittal, Chairman, 71st IFC receiving the memento and Certificate

Foundry Galleria

Evolution of Foundry Industry: From Tradition to Innovation

Foundry Galleria at IFEX 2024

Foundry Galleria at IFEX 2024 showcased the journey of metal casting industry through the evolution of cast components, material, production process and equipment used in foundries. The galleria providing a retrospective look presented the industry's origin featuring ancient machinery highlighting the progress till today.

In a phased manner, the galleria presented: Melal melting & treatment process, Mould making & core making, Finishing in automatic system.

For senior foundrymen, Foundry Galleria was nostalgic whereas for youngsters the industry evolution was educative and encouraging.

Gargi HA Stall at IFEX – A Foundrymen's Meeting Point

During Feb 2 – 4, 2024, GARGI HA Stand (Stand No. B2, Hall 4 at IFEX-2024) was a meeting point for foundrymen from all parts of India and abroad. The stand showcased various case studies from several key customers as well as new/upcoming products in Gargi HA product portfolio.

Mr Gaurav Kapur, Mr Varun Kapur and Gargi HA team were making special efforts to welcome foundrymen worldwide to develop deep understanding and strong business relations among the Foundrymen.

Mr Franz Butz – President; Mr Amine Serghini – Vice President (Global Sales & Marketing); Mr Bernhard Mueller - Regional Vice President Asia & Pacific; Mr Klaus Oosterhof, Business Development Manager; Mr Markus Schabrucker – Director (Product Management & Application Management); Mr Holger Barth – Product Manager (3D Binders); Mr Lars Zumbusch - Managing Director (Chemex Foundry Solutions GmbH) and Mr Georg Grassl - Global Product Manager (Chemex Foundry Solutions GmbH) of M/s. Huttenes Albertus Chemische Werke GmbH (Member of HA Group), Germany, interacted with the foundrymen and shared their experience on Resins & Coatings. Mr Mark Fenyes Chairman & Mr Andy Pickering, Sales Director of Omega Foundry Machinery Ltd, UK along with Mr Nitin Sane, Managing Director of Omega Sane Foundry Machinery Ltd, Pune were also present.

National KAIZEN Competition

National KAIZEN Competition was part of 72nd Indian Foundry Congress. A total of ten companies contested in the competition. The participating teams were -

Eastern Region

1. Tata Motors
2. Tata Metaliks

Northern Region

3. JMP Auto

Western Region

4. Metso India
5. Mahindra and Mahindra (Mumbai)
6. Synergy Green Industries Ltd

Southern Region

7. Kirloskar Ferrous Industries Ltd (Koppal)
8. Die Tech (Chennai)
9. CRI Pumps (Coimbatore)
10. Aquasub Engineering (Coimbatore)

Kirloskar Ferrous Industries Ltd, Koppal became the Champion. Synergy Green Industries Ltd was in the Second Position. Metso India was in the Third Position.

National Level Quiz Competition

As part of the 72nd IFC, a National Level Quiz Competition was organised on the second day of the mega event at BIEC, Bengaluru.

Eight teams from all over India participated in National Foundry Quiz Competition:

Results of the Quiz Competition:

1st position

Team: Mr S Balamurugan and Mr G Venkateswaran, Brakes India Ltd, Chennai

2nd Position

Team: Ms Gadige Sushma and Mr R Revanna, Snam Alloys, Chennai

3rd Position

Team: Mr Viney Luthra and Mr Anurag Singh Bhadauriya

Participants of Quiz Competition

Sl. No.	Team	Company	Location
1.	S Vasanthi and A Makesh	Aquasub Engineering	Coimbatore
2.	Ms Gadige Sushma and Mr R Revanna	Snam Alloys	Chennai
3.	Mr S Balamurugan and Mr G Venkateswaran	Brakes India team 2	Chennai
4.	Mr P Ponraj and Mr K Tamilarasan	Brakes India team 1	Chennai
5.	Mr Dilip Raniwal and Mr Narendra Malakar	Indore Team	
6.	Mr Devasish and Mr Viraj Vyas	Vadodara Team	
7.	Mr Viney Luthra and Mr Anurag Singh Bhadauriya	North Team	
8.	Mr Munish Kumar and Mr Avijit Singha	Tata Motors	Jamshedpur

Valedictory Function

The concluding session of the three-day mega event, the 72nd Indian Foundry Congress, was the Valedictory Function on Feb 4, 2024 at Jacaranda Hall, BIEC, Bengaluru.

Mr Sanjay Shroff, Co-Chairman, 72nd IFC Organising Committee while addressing the valedictory session said that a number of issues pertaining to foundry industry had been focused on during the three-day conference. A clear roadmap for the future days of the industry had been prepared and now the time is for implementation.

Addressing the Valedictory Session, IIF President Mr D S Chandrashekar said that the closing of the curtains on the 72nd IFC marks the end of an era, yet the memories forged during this journey will forever leave an indelible







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mark on everybody's heart and mind.

IFC & IFEX had consistently aimed to explore new horizons for the industry providing members with opportunities to delve into cutting-edge technologies, engage in R&D work and showcase their remarkable capabilities.

He further said that the intense discussions and presentations held during various sessions of the IFC had enriched the delegates with knowledge, identified weaknesses, strengthened them resolve and paved the way for a brighter future for the industry.

He extended gratitude to the Past Presidents for their unwavering support and invaluable advice and acknowledged support of other NOBs, council members, Executive Director, Directors and other staff members of IIF for their collaborative spirit and collective support. He also extended special thanks to all distinguished guests, exhibitors, sponsors and others who had graced the IFC and IFEX with their presence or offered support in various forms.

Mr S R V Ramanan, Mentor, 72nd IFC Organising Committee in his address stated that 72nd IFC had focused on such issues as are urgently needed to be addressed for the foundry industry. Discussion during the Congress were in line with the Government's policy of Make in India and Aatmanirbharta. While mentioning about the success of the IFC and great effort put in by Organising Committee members, he commented that small Chapters of IIF are learning a lot by participating in organising big events like IFC jointly with large Chapters.

Mr Yogesh Kumar, Chairman, IFEX 2024 Organising Committee said that IFEX 2024 was truly an international exhibition. He informed that about 12501 people visited IFEX 2024. Mr Kumar also underlined that all the events of 72nd IFC were very unique and useful for the delegates.

Chief Guest **Mr Sriram Satish**, Global Category Director, Flowserve Corporation said that IFC and IFEX 2024 are very close to his heart. The mega events facilitate exchange of very useful information and wide networking. According to Mr Satish, to attract young engineers to Foundry industry is now a big challenge. He stressed the need for having Graduateship Course on Foundry engineering in more and more Institutions supported by the Government. The Chief Guest further stated that Artificial Intelligence (AI) is urgently required to be applied in metal casting units to make them smart foundries. In his opinion, logistics is also a challenge faced by the industry. He advised foundrymen to embrace challenges positively to win the war half in the beginning. In this way, their vision would be clear.

Mr Ankit Divekar, Secretary, 72nd IFC Organising Committee offered vote of thanks.

Sponsors of 72nd IFC were recognised and felicitated by presenting mementos.

IIF National Office Bearers were honoured by presenting mementos.

IIF-Southern Region team handed over the IFC Flag to IIF-Eastern Region team. The 73rd IFC is scheduled to be held during Feb 7-9, 2025 by IIF-Eastern Region in Kolkata.

Industry Visit

On the occasion of 72nd Indian Foundry Congress (IFC) and IFEX 2024 held during Feb 2-4, 2024 in Bangalore International Exhibition Centre, Bengaluru, twelve industrial visits were organised on 1st February 2024 covering Foundries, Equipment Manufacturers, Casting Buyers, Research and Development facilities of the companies etc.

IFC delegates visited the following companies:

- Grotek Enterprises Pvt Ltd, Malur, Karnataka - Iron Foundry
- DiFACTO Robotics & Automation Pvt Ltd, Peenya, Bengaluru, Karnataka - Robotic Automation
- ACE Designers – Foundry Division, Dabaspet, Bengaluru, Karnataka – Iron Foundry
- DISA India Ltd, Tumkur, Karnataka – High Pressure Moulding Line Manufacturer
- Amsteel Castings Pvt Ltd, Hosur, Tamil Nadu –Steel Foundry
- SNAM Alloys Pvt Ltd – R&D Centre, Hosur, Tamil Nadu – Foundry & R&D Centre
- HAL-Foundry Division, Bengaluru, Karnataka – Aluminium Magnesium Foundry & Lab Visit
- Rapsri Engineering Products Company Ltd, Kanakpura, Karnataka – Copper Base Alloys Foundry
- Federal-Mogul Goetze (India) Ltd, Bengaluru, Karnataka – Piston, Piston Rings & Sintered Parts Manufacturer
- Peekay Steel Castings Pvt Ltd, Engineering Centre, Bengaluru, Karnataka - 3D Sand Printing & Prototyping

MSME CONCLAVE

A Pre-Event to 72nd Indian Foundry Congress

Foundry Industry is mother of all manufacturing industries. About 85 per cent of Indian metal casting units belong to MSME sector and their accumulated contribution to the country's economy is remarkable. So, MSME sector needs to be taken care of for its development and growth.

On the eve of 72nd IFC, MSME Conclave was held on Feb 1, 2024 at Sheraton Grand, Brigade Gateway, Bengaluru. MSME Conclave focused on MSME sector, especially Foundry Industry highlighting various challenges faced by the sector and their possible solutions. Industry leaders, management experts, Government representatives and others shared their views at the conclave.

Mr Parag Bhandare, Chairman, MSME Conclave Committee while delivering welcome address said that MSME sector of the country plays a significant role in the growth of the country's economy and employment generation. He also said that the Government is keen to develop infrastructure and other facilities for MSME sector. Mr Bhandare stressed the need for technological innovation in MSMEs in collaboration with academia and R&D centres. He then said, for survival of MSMEs, use of green technology is urgently required.

Mr D S Chandrashekar, President, IIF stated that 72nd IFC was through several forums to address the burning issues of MSMES. He mentioned a few challenges that are faced by the MSME sector like dearth of skilled workers, low investment, limited marketing scope etc. Mr Chandrashekar informed that a number

of IIF Industry members are from MSME sector.

Keynote Speaker **Mr V P Premkumar** in his speech mentioned that there is ample scope for exporting MSME products. He underlined that orders for castings are now being diverted from China to India.

An interactive session was held with Government bodies, Foundry clusters and MSME foundries around the country, to discuss about strategies for MSMEs to excel.

Chief Guest Dr K Socrates, Joint Director, MSME DFO, Bengaluru along with other dignitaries inaugurated the conclave.

Dr K Socrates in his address referred to the Hon'ble Prime Minister's call for making a strong foundation for the MSME sector. He also highlighted the importance of MSME sector's remarkable contribution to the economic growth of the country and employing huge people in the sector. The Chief Guest further said that the Government is keenly interested in providing support to MSME sector for funding, marketing their products, workmen's skill upgrading etc. He then underlined the importance of Foundry Industry and said that Foundry is the basic of all manufacturing industries. He further focused on the important contribution of the Foundry Industry. The Chief Guest also mentioned about several Govt schemes available for the benefit of the MSME foundries.

Mr V P Prem Kumar, Director Nelcast Ltd delivered the Keynote Address on the topic "Export opportunities for MSMEs".

Mr Suresh Ramanujam, Managing Director, METIS spoke on Grooming the Next Generation Family - Owned Business (MSMEs).

Session 1 : Privileges for SMEs

Session Chairman: Mr Parag Bhandare
Executive Director AKP Ferrocast (P) Ltd

Presentations :

- **Mr Himanshu,** Senior Manager, Business Development, NSE spoke on "SME Exchange IPO".
- **Mr H V Singh,** Head Strategic Sourcing Forbes Marshall & Mr Ankur Malik, Assistant Director, NABET Quality Council of India spoke on "MSME

Competitive (LEAN) Scheme"

- **Mr Virjin Jawahar,** AGM Consultancy Services Cell, State Bank of India spoke on "Financial Supports from Banks for MSMEs"

Session 2: Strategies for Growth for MSMEs

Session Chairman: Mr Sanjay Shroff
Managing Director, Vishwashanti Merchandise; Past President IIF & Co-Chair 72nd IFC.

Presentations :

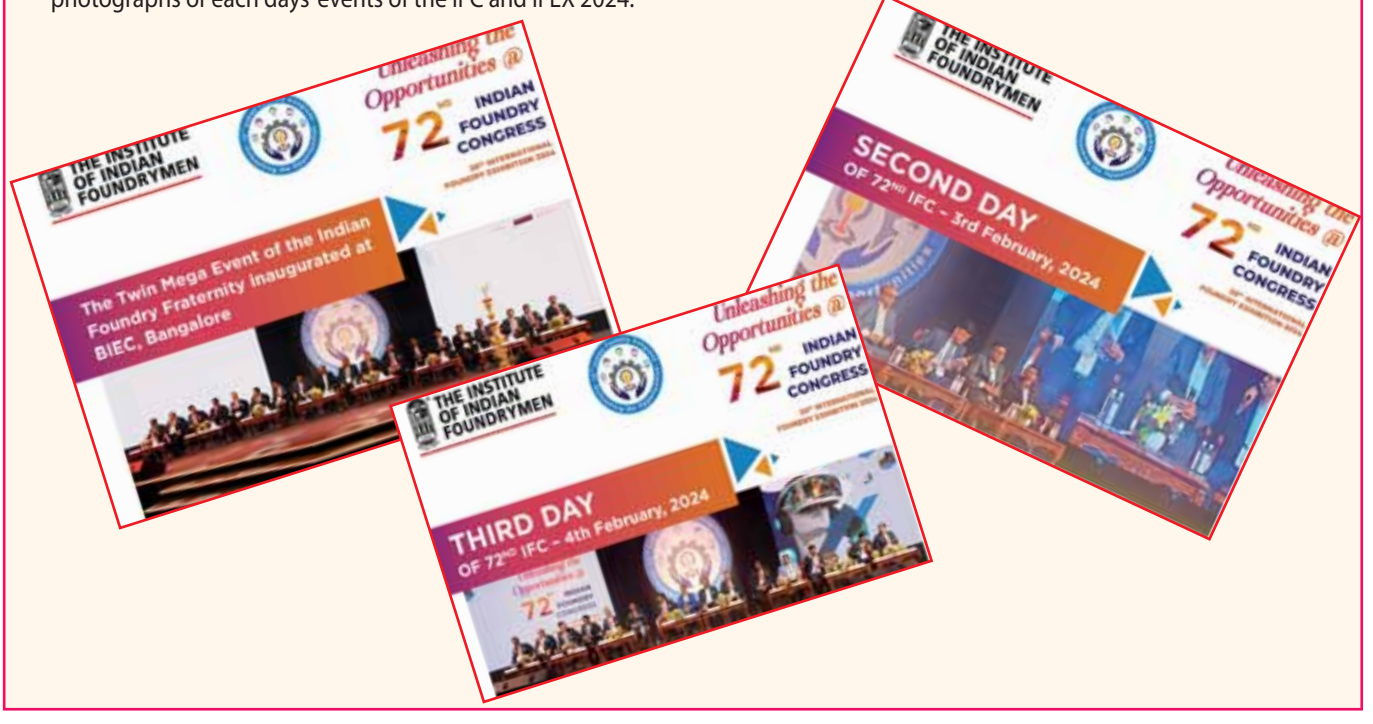
- **Dr R Jayaram,** *Professor of Practice, IFMR GSB, KREA University,* Costing Advisor Nelcast Ltd spoke on "Foundry Cost Accounting Practice & Procedure"
- **Mr J V Raja Gopal Rao,** *Joint Director EEPC INDIA* spoke on "Expanding Business – A Guide to Export"
- **Mr Sureshkumar *P,*** *Founder Agna Inc* spoke on "Achieving Competitive Advantage with Quality"

The sessions were informative and provided lots of takeaways for the MSMEs.

Mr Ankit Divekar, Secretary, 72nd IFC Organising Committee offered vote of thanks.

72nd IFC Newsletter

On three days of 72nd IFC - 2, 3 & 4 Feb, 2024 Newsletters were published. The newsletters contained information and photographs of each days' events of the IFC and IFEX 2024.



GLIMPSES OF 72ND IFC

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IIF comprises of Individual members, Foundries, Equipment manufacturers, Raw material suppliers and Institutions

To avail Membership Benefits, Join the Country's Premier Industry Association promoting Foundry and Supporting Industries

Some Reasons why you should join IIF

- Networking with Indian Foundries and Foundry Allied Industries
- Meeting Potential Customers at different forums
- Participation in Skill Development Trainings of IIF-CET
- Trouble-shooting Technical Services, In-Plant Training and Workshops provided by IIF-NCTS
- To avail Integrated Information System and Pricing Index through large Database of IIF-FIC
- Participation in Chapter, Regional, National and International Events and Trade-fairs
- Receive Complementary copy of monthly Official Journal of IIF - Indian Foundry Journal
- Free entry in Indian Foundry Directory
- Opportunity to Engage in Policy Advocacy and representation to GOI through Foundry Development Council
- Procuring IIF Publications at discounted prices
- Inter-Regional and Chapter Industry Visits on Technology Mission
- Industry-Academia Collaboration/Co-operation
- Participation in Knowledge sharing activities like Kaizen Competition and Quiz Contest
- Special rates for participation in IFC
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- After becoming Members in IIF, they can avail benefits of discounts in Membership Subscription and redemption of Loyalty Coupons for IIF Services for early Renewals as per norms from the subsequent years.

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Contact - Mr. Pradeep Kr. Madhogaria

EASCON

Eastern Regional Conference

IIF Eastern Region's flagship event EASCON - the Eastern Regional Conference, took place on January 13, 2024 at Hotel Park Prime, Kolkata. IIF-Eastern Region along with Kolkata, Howrah, Jamshedpur Chapters and Durgapur Activity Centre organised the conference on the Theme, *Recasting East - Transforming Foundries Through Technologies.*

In the Inaugural session, **Mr Gautam Dutta,** Chairman, IIF-Eastern Region made the opening remarks.

Mr Navneet Agarwal, Vice President, IIF while delivering welcome address highlighted the importance of the Foundry Industry as well as the industry's ongoing resurgence in the eastern part of India. He said that due to several reasons, orders for castings from overseas buyers are now being offered to Indian foundries and Indian foundries should utilise such opportunities. Mr Agarwal further said that Indian Foundry Industry, the second largest castings producer in the world comprises of mainly small and medium-size metal casting units. Speaking about IIF, the country's premier industry association, acts as a point of reference for the foundry industry of the country he said.

Established in 1950 IIF has gradually sprayed its branches all over India with 23 Chapters under 4 Regions. IIF Vice

President informed that 73rd Indian Foundry Congress is scheduled to be held on February 7, 8 & 9, 2025 in Kolkata. IIF-Eastern Region is the Host Region. IFEX 2025 will also be held in concurrence with 73rd IFC.

The Chief Guest, Guest of Honour along with other dignitaries on the dais lighted the holy lamp to inaugurate Eastern Regional Conference.

The Guest of Honour **Dr Naresh Chandra Murmu**, Director, CSIR – CMERI Durgapur in his address focused on the MSME foundries of the country, their importance and the challenges faced by them. He said, the $ 20 billion Indian Foundry Industry's 85% units belong to MSME sector; whose contribution to the country's economy is remarkable. He also said, this potential MSME foundry sector is facing a number of challenges as low investment, shortage of skilled

manpower, lack of adequate infrastructure, limited marketing scope, high prices of raw materials, high energy cost are some of them.

Dr Murmu also tried to find out solutions to the challenges. He further stressed the need for energy efficiency practice in the energy-intensive foundry industry.

Special Guest **Mr P Mahinder,** GM and ZM, Kolkata, Punjab National Bank (PNB) while addressing the gathering called foundry industry as mother of all manufacturing industries. He then informed that PNB, the country's second largest bank's motto is to provide its customers with more and more digital services. Mr Mahinder also said that MSME is the backbone of the country's economy. It is also a high growth industry. He further said that PNB is keenly interested to support the MSME sector by providing funds and grow with the sector hand in hand.

Dr Abhishikta Roychowdhury, Executive Director, IIF spoke about IIF and its activities. Mentioning about IIF's services to its members she said that IIF, the pan India apex body of the Indian Foundry Industry, with its 23 Chapters under 4 Regions, helps its industry members to promote their organisation, branding their products in the market, taking up various foundry related issues with the appropriate authorities, policy advocacy etc. The Institute also publishes its monthly publication Indian Foundry Journal and it has an informative website. IIF Center, the Headquarters of the Institute, in Kolkata houses the FAA Jasdanwalla Library, an excellent reservoir of books and journals.

Mr Ravi Sehgal, Past President of IIF in his address mentioned the three 'M's that are the most important factors for today's Indian Foundry Industry - money power, manpower, and materials. He also informed that Foundry industry in the Eastern India where it had started long ago, are transforming technologically with substantial investments. He thanked the organising committee of EASCON for holding the regional conference with preparation of a very short period.

IIF Past President **Mr Vijay S Beriwal** while speaking on the occasion informed that a number of modern foundries are coming up in the Eastern India especially in the Howrah area with the latest technologies to produce value-added castings. He appealed to the foundries to come out with better images to attract youngsters to build their professional career in Foundry.

Chief Guest, **Mr Arup Mukherjee**, Vice President, Tata Hitachi in his address presented the profile of his company. He stated that Tata Hitachi sources huge cast components mainly construction castings regularly. He informed, now India is considered as the alternative source of castings. So, this is a very good opportunity for Indian foundries. He also said that Foundry Park is a big








step of the state government in Bengal. He further said that foundries should find out new markets for their products. He confidently said that Indian castings are accepted in international markets.

Mr R Palanimurugan, Convenor, Delegate Mobilisation

Committee, 72nd IFC made a presentation on 72nd Indian Foundry Congress.

Mr Ranjan Guha, Hon Secretary, IIF-Eastern Region offered vote of thanks.

Technical Session

Chairman: Dr Shamim Haidar, Vice Chairman, IIF-Eastern Region

Following presentations were made in Technical Session.

Presentations:

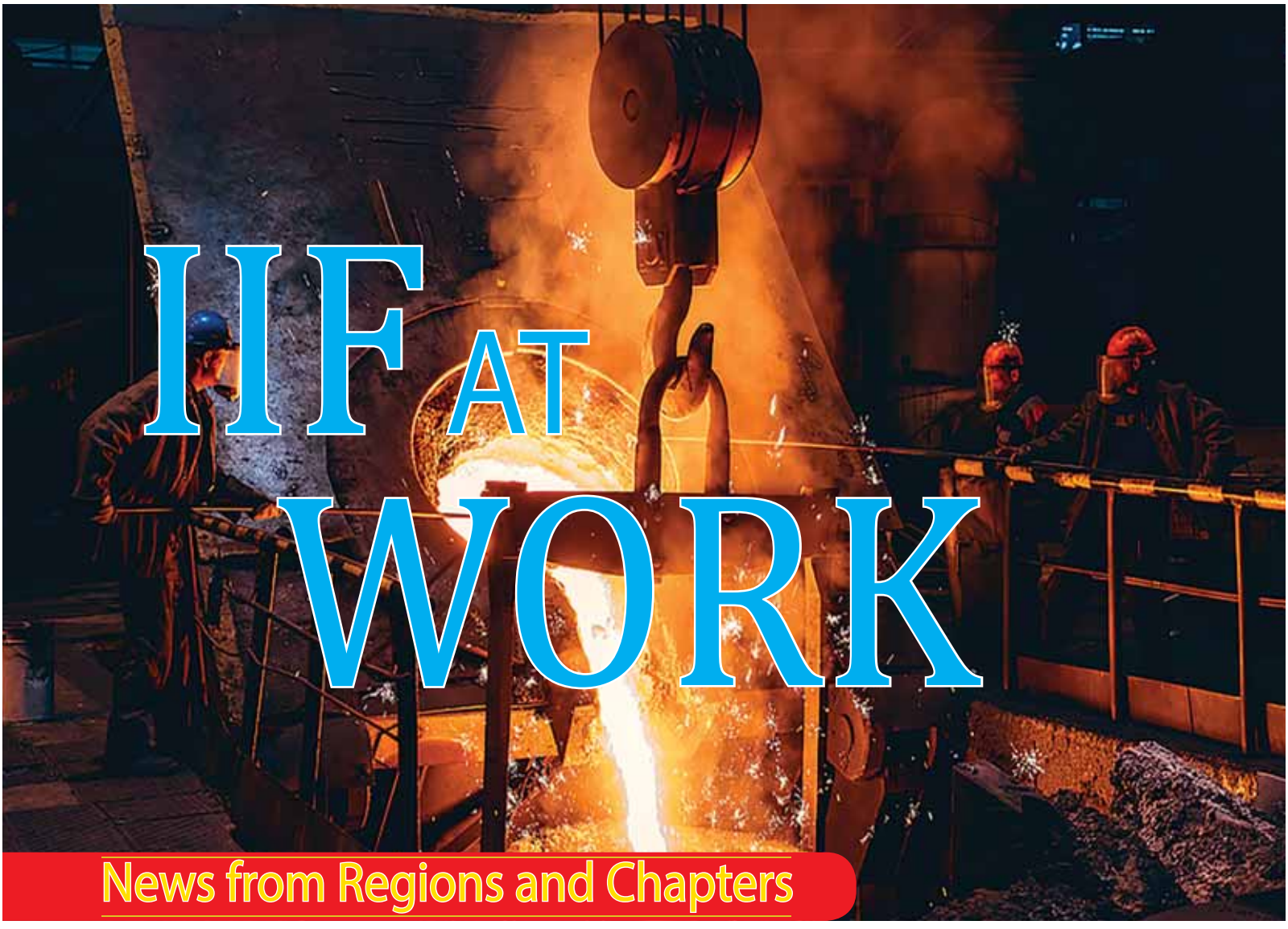
- Transformation of foundry through skill-linked modernisation
  - Mr Satadri Chanda, CEO cum Director, Megatherm
  - Mr V Varshneya, Director, Megatherm
- Enhancing productivity through IIOT
  - Dr Rajesh P Barnwal, Principal Scientist and Dr Aditya Kumar Lohar, Chief Scientist, CSR-CMERI
- Exports – Challenges & Future Growth
- Moderator: Mr R P Sehgal, Past President-IIF, Past Chairman-EEPC
  - Mr Navneet Agarwal, Vice President-IIF, MD, RBA Exports
  - Mr Ankit Kejriwal, MD, Welcast
- Advance Pouring Technology for HPML
  - Mr Michael Colditz, Pour-Tech, Sweden
- 3D Printing Prototyping
  - Mr Subrata Kr Nath, Associate Manager, Webel-Fujisoft Vara
- Smart Foundries – Leveraging Connected Devices for Real Time Process Monitoring
  - Mr Rohit Kumar, Sr Metallurgist, Computational Modelling, NowPurchase
  - Moderator : Mr Vijay S Beriwal, Past President, IIF
  - Mr Pradip Goswami, Manager (Credit), DIC, Howrah
- WBPCB – Ms Jayati Mitra, Asst Environment Engineer
- WBSEDCL- Ms Bhaswati Sinha, Divisional Engineer (Commercial)
- PNB – Mr Bijan Kr Mishra, AGM & MCC, Head, MCC-2, Kolkata

Mr Kenichi Tamura, Director, E-SQUARE Inc, Tokyo, Japan and Mr Nitish Saini, Deputy Manager, Technology and Market Validation, Development Alternatives, New Delhi met Dr Abhishikta Roychowdhury, Executive Director, IIF at IIF Center, Kolkata. A copy of IFJ being handed over to Mr Tamura.

IIF Southern Regional Conference

34TH SOURECON

Corrigendum: In January 2024 Issue of IFJ Page 51-54, with the Report of 34th Sourecon, wrong photographs were published. Photographs of 34th Sourecon are published here.



IIF AT WORK

News from Regions and Chapters

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HOWRAH CHAPTER

Symposium on "Developments in Metal Casting"

Date : Jan 23, 2024
Venue : Sett Iron Foundry Bagan Bari, Baluhati, Gayespur, Howrah
Organised by: IIF-Eastern Region, Kolkata & Howrah Chapters
Speaker: Prof (Dr) G L Datta

- Former Professor & Dean-IIT Kharagpur and Former Chancellor of K L University, Andhra Pradesh

Speaker deliberated on: Evolution of metal casting process starting from the primitive age up to the modern age.

Family Get-together : Members along with their spouse and children participated in the get-together. They also took part in games and sports.

Vote of thanks delivered by: Mr Ranjan Guha, Hon Secretary, IIF-Eastern Region.

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FIC CHAPTER

Webinar on "Mandatory Certification for CI castings and Aluminium Castings"

On Dec 7, 2023 IIF-Northern Region and Foundry Informatics Centre (FIC), New Delhi in association with Bureau of Indian Standards (BIS) organised a webinar on the said topic in which Mr Kunal Kumar, Scientist-D, Joint Director and Member Secretary, Foundry and Steel Casting, Sectional Committee, MTD 14, BIS, Government of India was the Key Speaker.

Dr Abhishikta Roychowdhury, Executive Director, IIF delivered welcome address. Mr Pradeep Mittal, Chairman, FIC during his address, appreciated the efforts of FIC & NR team and also for choice of a relevant topic for the webinar.

Mr D S Chadrashekar, President, IIF, while delivering his special address, stressed upon importance of QCO and licensing process for the Foundry industry and the manufacturing industry at large. He also said that sessions like this aims at benefitting IIF members and the industry.

During his presentation, the key speaker Mr Kumar elaborated on the roles and activities of BIS pertaining to Standardisation process in the country and detailed on the mandatory licensing in view of the recent quality control order (QCO) and its completion procedure. The licensing process has been made completely online and can be done by logging onto the BIS website.

Mr Sanjeev Kumar, Director-FIC and IIF-NR was the moderator of the session.

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CHANDIGARH CHAPTER

Awareness Programme on "Modern Casting Feeding Solution"

On Dec 22, 2023, IIF-Chandigarh Chapter organised an awareness programme on the above topic wherein Mr Arun Sood, Chairman, Kumar Autocast Ltd, Ludhiana was the Chief Guest. Mr Satendra Dattatrey, Product Manager (Feeding System), Gargi Huttenes Albertus Pvt Ltd, an expert in casting quality and cost control, was the Guest Speaker.

Mr Sanjeev Juneja, Hon Secretary, IIF-Chandigarh Chapter delivered welcome address and said that the foundry industry has increasingly been challenged over the recent years.

Mr Balram Kapoor, Chairman, IIF-Chandigarh Chapter in his address focused on the role of IIF in bridging the gap between industry and academia.

Mr Satendra Dattatrey detailed on making of defect-free castings with optimal utilisation of plant and machinery.

Mr Arun Sood appreciated the efforts of IIF in organising awareness programmes from time to time for the benefit of the industry.

Dr Sonia Chawla and Dr Rohit Mehra from NIT, Jalandhar said that there should be collaboration between industry and educational institutes to make the students corporate - ready.

Mr Vishal Choudhry, Assistant Branch Manager, SIDBI informed the delegates about the interest rates and other schemes of SIDBI and Government on purchase of machinery.

Mr Tejinder Bhasin, President, Udyog Nagar Manufacturers Association, Gudaipur offered vote of thanks.

Medical Camp for Health Checkup

A medical camp was organised recently by IIF-Chandigarh Chapter in association with CII Zonal Office, Jalandhar and Punjab Institute of Medical Sciences (PIMS) at JMP Industries, Jalandhar wherein health check-up of more than 200 employees of the company was done at free of cost and medicines were also distributed among them.

According to Mr Balram Kapoor, Managing Director, JMP Industries, health is a state of complete physical, mental and social well-being and it gives people strength for doing work.

Dr Amit Singh, Resident Director, PIMS, Jalandhar in his deliberation on the occasion said that PIMS is working for doing goodness for the society and so they gladly supported this joint initiative of CII and IIF for organising such a medical camp for the wellbeing of the workers of JMP Industries. A few Doctors and others from PIMS were also present there.

Mandatory BIS Certification for Foundry Industry

On Feb 12, 2024, IIF-Chandigarh Chapter in association with Jalandhar Auto parts Manufacturers Association (JAMA) held a meeting with the team of Bureau of Indian Standards (BIS) led by Mr Neeraj Mishra, Assistant Director, BIS, Jammu and Kashmir Branch.

Mr Neeraj Mishra informed that Government is going to make BIS certification mandatory for some cast iron products and for this a Gazette Notification was issued by Department for Promotion of Industry and Internal Trade (DPIIT) under the Ministry of Commerce & Industry, Government of India.

In his welcome address Mr Balram Kapoor, Chairman, IIF-Chandigarh Chapter said that Foundry Industry is apprehensive of Mandatory BIS Certification. He informed that many foundries supply to large companies like Tata, Mahindra, Eicher etc only complying with their standards, and thus, Mandatory BIS Certification may create confusion in this case.

According to Mr Sanjeev Juneja, President of JAMA and Hon Secretary of IIF-Chandigarh Chapter, foundry industry at present is not prepared for BIS Standards. As per Government notification, medium and large enterprises need to take this certification shortly, however, they should be allowed some time for getting prepared for the same. Awareness programmes should also be organised by BIS. Further, he recommended for exemption of micro and small units from mandatory BIS certification.

Mr Vishal Gautam, Executive Member, JAMA said that it would also add financial burden on the units as for different BIS category products, the unit should take certificate for each category of products with payment of licence fee and renewal fee every year. Mr Jasjeet Singh Bedi and Mr Dharminder Mehta, Executive Member, IIF-Chandigarh Chapter raised the issue of tedious and complex process of sample testing as Government labs are very few and private ones would take a havoc charge.

Mr Balram Kapoor, Mr Sanjeev Juneja, Mr Vishal Gautam, Mr Dharminder Mehta, Mr Jasjeet Singh Bedi, Mr Akshit Gupta, Mr Gokul Kapoor, Mr Gurnam Singh and others were present in the meeting.

THE INSTITUTE OF INDIAN FOUNDRYMEN
WESTERN REGION

THE INSTITUTE OF INDIAN FOUNDRYMEN WESTERN REGION
THE INSTITUTE OF INDIAN FOUNDRYMEN NAGPUR CHAPTER

Technical Seminar on "Best Operating Practices for Heat Treatment Furnaces"

Date: Jan 18-19, 2024

Venue: Pench, Nagpur, Maharashtra

Speaker: Mr Sarup Bhowmik, Sr Manager (PAAS), Murugappa Group

Welcome Address delivered by: Mr Prayut Bhamawat, Chairman, IIF-Western Region

Speaker introduced by: Mr Chandrashekar Mankar, Chairman, IIF-Nagpur Chapter

Speaker deliberated on: Different HT furnaces and their applications; tips on trade and precautions to be taken during application for best efficiency and productivity.

Vote of thanks delivered by: Mr Nikhil Sharma, Hon Jt Secretary, IIF-Nagpur Chapter

Works Visit at: Kapilansh Dhatu Udyog Pvt Ltd, Nagpur

THE INSTITUTE OF INDIAN FOUNDRYMEN
VADODARA CHAPTER

Works Visits by Students

On Dec 19, 2023, IIF-Vadodara Chapter organised Works Visits for the students.

A team from IIF-Vadodara Chapter members along with students visited Patel Furnace & Forging Pvt Ltd; Met-Heat Pvt Ltd; Nodule Cast, Makarpura, Vadodara.

At Patel Furnace, new designs and new concepts for Foundry, Forging, Shot Peening, Billet Cleaning, Strip Cleaning Equipment, Shot Blasting and Sand Blasting Machines were shown.

At Met-Heat Pvt Ltd, metal testing, heat treatment, quality control, calibration and quality assurance were observed. Queries of the participants were clarified by industry experts.

At Nodule Cast, the process of sand casting and its related equipment were witnessed. Students were satisfied with the practical exposure.

Mr Prayas Vyas, Vice Chairman, IIF-Vadodara Chapter offered vote of thanks.

THE INSTITUTE OF INDIAN FOUNDRYMEN
SOUTHERN REGION

THE INSTITUTE OF INDIAN FOUNDRYMEN
BELGAUM CHAPTER

Technical Meeting

On Dec 20, 2023, IIF-Belgaum Chapter organised a Technical Meeting in Belgaum Foundry Cluster wherein keynote speakers were Mr MHM Jambhunath, Manav Marketing Pvt Ltd and Mr Gaurav Laddha of Jagdeep Machines.

Mr Laddha gave presentation on heavy duty double column VTL/VTM machines.

Mr Gaurav Pandit, Hon Secretary, IIF-Belgaum Chapter offered vote of thanks.

THE INSTITUTE OF INDIAN FOUNDRYMEN
CHENNAI CHAPTER

Technical Meeting

On Dec 2, 2023 IIF-Chennai Chapter organised a technical meeting online on the topic "Importance of energy audit and benefits for foundries" wherein Dr R Sivakumar, Energy Consultant – Coimbatore, BEE Certified Energy Auditor was the speaker.

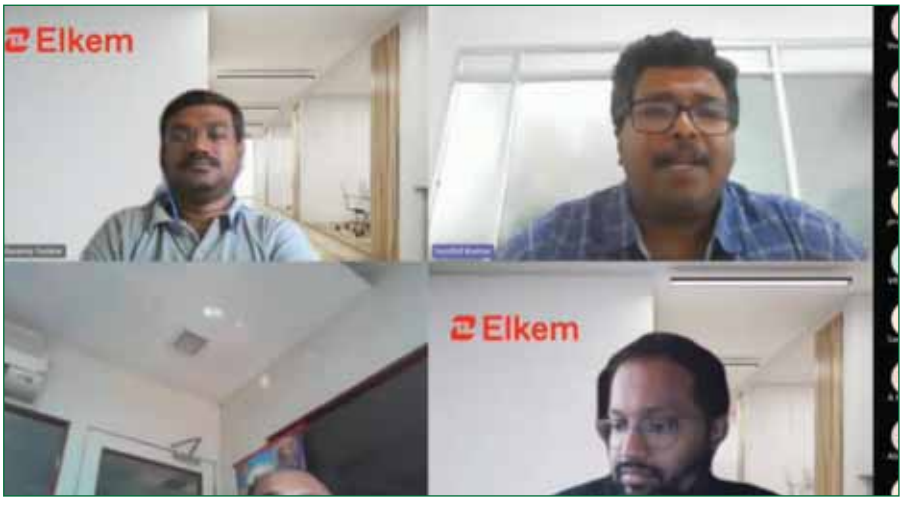
Mr V K Raman, Chairman, IIF-Chennai Chapter delivered welcome address while Mr P Senthil Kumar, Hon Secretary, IIF-Chennai Chapter introduced the speaker.

The speaker deliberated on Energy Audit in Air Compressors, IoT-Based Air Compressor Monitoring System, Energy Performance, and also presented a Case Study on ENCON proposal.

Mr K Hemaprasad, Council member, IIF-Chennai Chapter offered vote of thanks.

Technical Webinar

A technical webinar was organised by IIF-Chennai Chapter on the topic "Optimising MG treatment process in ductile iron – A cost-efficient approach" on Dec 9, 2023. Mr Balaguru Sendil, Deputy Manager – R&D, Elkem South Asia Pvt Ltd was the speaker.



Mr Sanchit Kittur, Chairman, IIF-Southern Region delivered welcome address whereas Mr V K Raman, Chairman, IIF-Chennai Chapter, introduced the speaker.

While deliberating on the aforesaid topic, the speaker said that the process of converting a flaky graphite to a correct nodule is quite complex, however, this could have been made simple by treatment processes (magnesium-based alloys etc). Selection of correct treatment process allows foundries to improve their practice with value-added service and proper guidance from Elkem by reducing treatment cost, eliminating rejections, improving casting machinability etc resulting in a significant cost savings.

Mr P Senthil Kumar, Hon Secretary, IIF-Chennai Chapter offered vote of thanks.

Technical Service to IIF Industry Member

On Dec 12, 2023, IIF-Chennai Chapter provided technical service to its Industry Member Madras Engineering Industries

Pvt Ltd. Sriperumbudur. A team of experts from Ashok Leyland Ltd visited Madras Engineering for this purpose.

Mr M Balamurugan, Manager, Lab, Madras Engineering Industries (MEI) welcomed the team of Ashok Leyland Ltd Foundry Division, on behalf of MEI Management. The team from Ashok Leyland Ltd viewed the production process areas of MEI Foundry Division and gave their valuable feedback/recommendations for betterment of production.

Representative of the Management of Ashok Leyland Ltd Foundry Division offered vote of thanks.

Industry Visit

IIF-Chennai Chapter organised a works visit to Aquasub Engineering Foundry Division, Unit 5, Coimbatore on Dec 15, 2023. The unit is one of the world-class foundries with deployment of automation.

Office Bearers of IIF-Chennai Chapter thanked Mr C Sathyamurthy, Vice President, Aquasub Engineering and other members of the team for their hospitality and also for allowing them to visit the factory.

Mr P Senthil Kumar, Hon Secretary, IIF-Chennai Chapter offered vote of thanks.

Industry Visit by IIF-Student Members

On Dec 20, 2023, an industry visit was organised by IIF-Chennai Chapter in which thirty students of CPAT – TVS along with their faculties visited Madras Engineering Industries Pvt Ltd (MEI), Foundry Division, Sriperumbudur and gained knowledge of shop-floor production process steps from core shop to fettling areas.

Mr G Velu, Production Engineer, MEI clarified the queries of the students in the question answer session.

Faculty of CPAT Polytechnic College offered vote of thanks.

Workshop on "Balancing the Six Wheels of Success"

Date: Dec 23, 2023

Venue: T S Srinivasan Centre for Polytechnic College and Advanced Training (CPAT-TVS), Vanagaram, Chennai

Speaker: Mr M Harihara Mahadevan, Corporate Trainer & HR Faculty; Facilitator

Organised by : IIF-Chennai Chapter

Welcome address delivered by: Mr P Senthil Kumar, Hon Secretary, IIF-Chennai Chapter

Speaker introduced by: Mr K Hemaprasad, Faculty of CPAT Polytechnic

Speaker deliberated on :

- Necessity of doing exercise for healthy body and sound mind for performing day-to-day activities
- Harmonious relationship in Family - Between couples, parents & children, between in-laws.
- Criteria of success in career, success through service, tips for success in profession
- Holding a grip over the six wheels of success
- Work life balance, achieving bliss and peace in life
- Practical application of training in daily life etc.

Session appraised by: Mr R Palanimurugan, Hon Secretary, IIF-Southern Region for active participation of students and their interaction with the facilitator.

Vote of thanks offered by: Mr P Senthil Kumar, Hon Secretary, IIF-Chennai Chapter

Technical Webinar

Date: Dec 30, 2023

Topic: Zero Fettling – A Myth or Reality

Speaker: Mr R S Kumar, Plant Director, Sri Venkatachalapathy Alloys Pvt Ltd, Tamil Nadu

Organised by: IIF-Chennai Chapter

Welcome address delivered by: Mr V K Raman, Chairman, IIF-Chennai Chapter

Speaker introduced by: Mr P Senthil Kumar, Hon Secretary, IIF-Chennai Chapter

Speaker deliberated on:

- Zero Fettling – a Myth or Reality - Highly man-dependent, non-value-added activity Involves rework, spends time, for shaping of the final product as per customer requirement
- **Objective should be :**
  - Reduction of non-value-added activities; Aesthetic improvements; Productivity improvements; Achieving zero defects; First time right/first piece right approach; Lean – to become competitive in market; Wastage; Inventory reductions; Making environment less pollutant; Reducing manual intervention; Reducing machining cost / time; Taking care of safety and cleanliness of environment etc.

Vote of thanks offered by: Mr K Hemaprasad, Council member, IIF-Chennai Chapter

Technical Seminar

Date: Dec 30, 2023

Venue: IIF-Chennai Office

Organised by: IIF-Chennai Chapter

Topic: Importance of Corporate Governance and Compliance in Organisations

Speaker: CA Mr Krishnamurthy, Business Consultant

Welcome address delivered by: Mr V K Raman, Chairman, IIF-Chennai Chapter

Speaker introduced by: Mr K Hemaprasad, Council member, IIF-Chennai Chapter

Speaker deliberated on:

- 400-year old 17th Century concept, initiation of Corporate Governance, starting of current Governance, 2008 as tipping point – sub-crime crisis, collapse of economy.
- Artificial Intelligence, Robotics, Driverless cars, reduced job opportunities, accuracy in work, environment social awareness, audit report etc.

Vote of thanks offered by: Mr Vignesh Ramanan, Vice Chairman, IIF-Chennai Chapter

Webiner on "Long Lasting Diecoating for Gravity and Low Pressure Die Casting"

Date: Jan 6, 2024

Speaker: Mr Andrew Tagg, Technical Manager, John Winter, UK (JV of Forace Polymers Pvt Ltd)

Organised by: IIF-Chennai Chapter

Welcome address delivered by: Mr V K Raman, Chairman, IIF-Chennai Chapter

Speaker introduced by: Mr K Hemaprasad, Council member, IIF-Chennai Chapter

Speaker deliberated on:

- Significant role of Diecoating in Diecasting
- Suitability of Dytek range of coatings
- JW formulated coating for specific customer requirement
- Spraying of coatings onto the die, coatings - non-hazardous, with no VOCs
- Utilities of a variety of diecoat applications

Question-Answer session: The speaker clarified the queries raised by the participants

Vote of thanks offered by: Mr Rajmohan Mathiazhagan, Council member, IIF-Chennai Chapter

Industry Visit by Students of T S Srinivasan Polytechnic College

Date: Jan 11, 2024

Venue: Ashley Alteams India Pvt Ltd, Cheyyar

Organised by : IIF-Chennai Chapter

Number of participants: 29 students, 2 faculty

Visit details: Ashley Alteams India Management Team explained the various operations of production process, and students gained practical knowledge with updated information for their projects. They also observed the industrial safety, health responsibility, environment-friendliness maintained in the factory of Ashley Alteams.

Vote of thanks offered by: Faculty of CPAT TVS

Webinar on ESG Guidelines

Date: Jan 20, 2024

Speaker: Mr S Venkatraman, Lead – Environment Corporate EHS, Ashok Leyland Ltd

Welcome address delivered by: Mr V K Raman, Chairman, IIF-Chennai Chapter

Speaker introduced by: Mr K Hemaprasad, Council member, IIF-Chennai Chapter

Speaker deliberated on:

- Environmental, Social Governance Guidelines, as every bit of warming matters, every year matters, every choice matters etc.
- Global warming, every year changes climate catastrophic, cloud burst in hilly region, cloud burst everywhere.
- Extremity of temperature now-a-days, choice of taking right decision from the factory to individual which really matters.
- Global warming of 1.5 °C to 2 °C, less extreme weather where people live, including extreme heat and rainfall.
- Extreme of global warming, water scarcity and food production, health and wellbeing, cities and settlements, infrastructure, ecosystem structure, species range shifts and changes in timing.
- **Suggestions:** Avoidance of excess water usage; Reuse of water-based quality; Efficient water recycling; Usage of rain water with proper treatment; Enhancing rain water storage capacity.
- Reduction in nonhazardous waste intensity by 2030; Strategy to approach extract energy from waste; Compliance of EPR guidelines; elimination of wood waste; Ensure 100% recycling etc.

Vote of thanks offered by: Mr Rajmohan Mathiazhagan, Hon Jt Secretary, IIF-Chennai Chapter

Technical Seminar on "Japanese Technologies and Practices: Environment-friendly Casting Production"

Date: Jan 24, 2024

Venue: Fairfield by Marriott, Mahindra City, Chennai

Speaker: Mr Shinji Kasuya, Director, Sinto Bharat Manufacturing Pvt Ltd

Organised by: IIF-Chennai Chapter along with Institute for Global Environmental Strategies (IGES), Japan & The Energy and Resources Institute (TERI)

Welcome address delivered by: Dr Satoshi Kojima, Programme Director, IGES and Mr R Palanimurugan, Hon Secretary, IIF-Southern Region

Presentations:

- Presentation on IGES-TERI's efforts to promote Japanese LCTs in India through JITMAP initiative
  - Mr Prosanto Pal, Senior Fellow, TERI
- Efficient Moulding Technologies from Sinto for foundries
  - Mr Shinji Kasuya, Director, Sinto Bharat Manufacturing Pvt Ltd

Mr Kasuya deliberated on:

- How Sinto Moulding Machines help to improve the environment by utilising the less power & pneumatics.

Question-Answer session: Queries of the participants were clarified by the speaker.

Vote of thanks offered by: Mr P Senthil Kumar, Hon Secretary, IIF-Chennai Chapter

Industry Visit

Date: Jan 24, 2024

Venue: Sinto Bharat Manufacturing Pvt Ltd - Manufacturing facility at Kanchipuram District, Near Chengalpattu

Organised by: IIF-Chennai Chapter along with Institute for Global Environmental Strategies (IGES), Japan & The Energy and Resources Institute (TERI)

Visit Details: Mr C Kathiravan, Director, Operation of Sinto Bharat Manufacturing Pvt Ltd has invited all the members and briefed their manufacturing setup and product ranges, process details etc. Moulding machines were seen by the visitors and they appreciated the quality systems and project management process of the company.

Question-Answer session: Queries of the participants were clarified by the speaker.

Vote of thanks offered by: Mr P Senthil Kumar, Hon Secretary, IIF-Chennai Chapter

THE INSTITUTE OF INDIAN FOUNDRYMEN CHENNAI CHAPTER

THE INSTITUTE OF INDIAN FOUNDRYMEN SOUTHERN REGION

Webinar on "Financials for Foundrymen"

Date: Jan 27, 2024

Speaker: Mr V Srinivasa Reddy, Executive Director, Synergy Green Industries Ltd

Organised by: IIF-Chennai Chapter and IIF-Southern Region

Welcome address delivered by: Mr Sanchit Kittur, Chairman, IIF-Southern Region

Speaker introduced by: Mr R Palanimurugan, Hon Secretary, IIF-Southern Region

Speaker deliberated on:

- The basic finances for industries, how to manage business through typical foundry challenges.
- Important factors for industries - the high input cost and availability, higher quality costs, shortages of skilled manpower, work environment and statutory compliances etc.
- Marketing, Operations, Finance - minimum knowledge of each other
- Income statement, in PBDIT, Profit before Depreciation, Interest and Tax, Net Sales – Direct Expenses etc.
- Rejection controls, Maintenance of good control over the variables etc.

Question-Answer session: Queries of the participants were clarified by the speaker.

Vote of thanks offered by: Mr Rajmohan Mathiazhagan, Hon Jt Secretary, IIF-Chennai Chapter

Data Privacy Act 2023, What It Says & What It Doesn't

Date: Jan 27, 2024

Venue : IIF-Chennai Office

Organised by: IIF-Chennai Chapter with Madras Management Association

Speaker: Mr V Rajendran, Advocate, Chairman, Digital Security Association of India

Speaker deliberated on:

- DPDP act 2023 (Digital person Data Protection act), Cyber Law, usage of WhatsApp, Facebook
- Internet banking, QR code payments
- Data protection authority of laws and data protection aids etc.

Vote of thanks offered by: Mr P Senthil Kumar, Hon Secretary, IIF-Chennai Chapter

THE INSTITUTE OF INDIAN FOUNDRYMEN
COIMBATORE CHAPTER

8th Foundry Quiz Contest for Students

Date: Jan 3, 2024

Organised by: IIF-Coimbatore Chapter

No. of Participants: 210 teams

Welcome address delivered by: Mr C Sathyamurthy, Chairman, IIF-Coimbatore Chapter

Chief Guest: Mr S Muthukumar, Hon Secretary, IIF

Sponsor: Velumani Engineering Industry (Texvel Trophy)

Quiz Master: Dr V S Saravanan

Winners:

Prize	College
First	PSG College of Technology Ms Sarika Laxmi R, Ms Dhivyasrie S
Second	Sri Krishna College of Engineering & Technology Ms Hamlin Benshika, Ms Abirami
Third	PSG College of Technology Mr M Naveen Pandi, Mr Arjun M

Prize Distributed by: Mr S Muthukumar, Hon Secretary, IIF

Vote of thanks offered by: Mr Hari Viswanathan, Hon Secretary, IIF-Coimbatore Chapter

37th Foundry Quiz Contest

Date: Jan 6, 2024

Organised by: IIF-Coimbatore Chapter

No. of Participants: 42 teams

Welcome address delivered by: Mr C Sathyamurthy, Chairman, IIF-Coimbatore Chapter

Chief Guest: Mr S Muthukumar, Hon Secretary, IIF

Sponsor: Velumani Engineering Industry (Texvel Trophy)

Quiz Master: Dr V S Saravanan

Winners:

	Company Name
First	Lakshmi Machine Works Ltd Mr Anand
Second	Aquasub Engineering Mr Ramesh
Third	PSG College of Technology Ms Sarika Laxmi R Ms Dhivyasrie S

Prize Distributed by: Mr S Muthukumar, Hon Secretary, IIF

Vote of thanks offered by: Dr M Arasu, Technical Committee, IIF-Coimbatore Chapter

Technical Webinar

Date: Jan 12, 2024

Topic: Development of Nitrogen Based Stainless Steel Castings

Keynote Speaker: Mr S Sudhakar, Founder, Annamalaiyar Casting Exports

Welcome Address delivered by: Mr D G Benakappa, Vice-Chairman, IIF Southern Region

Speaker introduced by: Dr M Arasu, Technical Committee, IIF Coimbatore Chapter

Speaker deliberated on: Nitrogen substituting Nickel in austenitic stainless steels improving mechanical properties and corrosion resistance, two measures for increasing nitrogen content in austenitic steel powders, atomisation of steel melts etc.

Vote of thanks delivered by: Mr S Sivakumar, Technical Committee, IIF-Coimbatore Chapter

Technical Seminar on "Future of Making"

Date: Jan 18, 2024

Venue: The Grand Regent Hotel, Coimbatore

Organised by : IIF-Coimbatore Chapter

Keynote Speakers: Mr Simhadri Murthy B L, Business Manager – Sales, Capricot Technologies Pvt Ltd

Mr Manthesh M, *Sr Solution Specialist, Capricot Technologies Pvt Ltd*

Mr Shanmugapraveen P, *Solution Specialist, Capricot Technologies Pvt Ltd*

Welcome address delivered by: Mr D Prabhu, Hon Treasurer, IIF Coimbatore Chapter

Speakers introduced by: Dr M Arasu, Technical Committee, IIF Coimbatore Chapter

Speaker deliberated on: Optimisation of process parameters, Design of experiments, Thermal analysis etc.

Vote of thanks delivered by: Dr M Arasu, Technical Committee, IIF-Coimbatore Chapter

Industry Visit

Date: Jan 19, 2024

Venue: Swelect HHV Solar Photovoltaics Pvt Ltd, Coimbatore

Welcome address delivered by: Mr R Chellappan, Managing Director, Swelect HHV Solar Photovoltaics Pvt Ltd, Coimbatore

Chief Guest: Mr S Muthukumar, Hon Secretary, IIF

Visit Details: Mr Narayanan, Director, Swelect HHV Solar Photovoltaics Pvt Ltd, Coimbatore explained all the processes in the industry and briefed some of the new technologies that could be used in all solar power plants for manufacturing.

Mr S Muthukumar presented a memento to Mr R Chellappan and honoured him with a shawl.

Vote of thanks offered by: Mr D Prabhu, Hon Treasurer, IIF Coimbatore Chapter

8th Badminton Event for IIF Trophy

Date: Jan 26, 2024

Venue: My Life Sports, Periyanaikkanpalayam, Coimbatore

No. of Participants: 32 teams

Welcome address delivered by: Mr C Sathyamurthy, Chairman, IIF-Coimbatore Chapter

THE INSTITUTE OF INDIAN FOUNDRYMEN
SHIMOGA
CHAPTER

Industry Visits

On Dec 15, 2023, IIF-Shimoga Chapter organised Works Visits to Aquasub Engineering, Sri Sakthi Equipments Co. Pvt Ltd and Sitas NDT, Coimbatore.

A team of members from IIF-Shimoga Chapter participated in the Works Visits.

Technical Meeting

On Jan 11, 2024, IIF-Shimoga Chapter organised a Technical Meeting on the topic "Future of Making" in Country Club, Shimoga. Mr Manthesh M, Sr Solutions Specialist deliberated on the subject.

Mr T N Paramashekar, Chairman, IIF-Shimoga Chapter delivered welcome address, while Mr Raghavendra M V, Hon Secretary, IIF-Shimoga Chapter offered vote of thanks.

Chief Guest: Mr S Muthukumar, Hon Secretary, IIF

Winners:

First Prize	Second Prize	Third Prize
Aquasub Engineering	Shree Kumaran Alloys	Aquasub Engineering
Mr K Balamurugan Mr R S Kavinraj	Mr R Sathishkumar Mr V Rajesh	Mr A Rajadurai Mr S Ravikumar

Vote of thanks offered by: Mr Hari Viswanathan, Hon Secretary, IIF-Coimbatore Chapter

Yogyata Vikas Skill Development Programme

As part of the Yogyata Vikas Skill Development Programme, a pan India foundry workmen's skill development initiative by IIF, an in-plant workshop was organised by IIF-CET in collaboration with IIF-Kolkata Chapter at RBA Exports Pvt Ltd, Kolkata on Jan 21, 2024. Mr Gautam Banerjee, Foundry Consultant and Dr Shamim Haidar, Associate Professor & Head, Department of Mechanical Engineering, Alia University conducted the workshop on "Casting defects in grey iron & SG iron and their remedies". The workshop was conducted in English, Hindi and Bengali languages.

Participants raised a number of queries that were clarified by the speakers.

The trainees were very happy to interact with the trainers on various practical issues pertaining to casting defects and possible solutions thereof.

Management of RBA Exports Pvt Ltd thanked the trainers for their conducting the training session elegantly.

भारतीय प्रौद्योगिकी संस्थान तिरुपति
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Certificate Course on

Digital Manufacturing and Introduction to AI and Machine Learning.

Course commence on 11th March 2024

Certificate Issue by IIT (T) & IIF - CET

- Technology in manufacturing is evolving at a rapid pace and has provided opportunity to increase the productivity in the Foundry Industry.
- Artificial Intelligence and Machine Learning provides greater information on the manufacturing process and supports in reducing the wastage in production.

Eligibility

(i) IIF company members are only eligible to participate in the programme.
(ii) Participants must be a manager aspiring to grow to senior level.

Course Duration — Duration of the course is 15 working days

Course Fee — Rs. 50,000 + 18 % GST per participant.

Course Content

Dr. Ajay Kumar
IIT Tirupati

Module : 1

- Materials 4.0 and Digital Twin

Dr. Govind Narayan Sahu
IIT Tirupati

Module : 2 - 4

- Industrial Automation and Safety
- Smart sensor, Actuator & Controller
- Signal Monitoring and Data Acquisition

Dr. R Thiyagarajan
IIT Tirupati

Module : 5

- Mechatronics System,
- Robotics in Smart Foundry

Course Content

Prof. Sunil Jha
IIT Delhi

Module : 6 to 9

- Industrial IoT and Cyber Physical Systems
- Real Time Dashboards
- Digital Twin Implementation
- Signal Monitoring and Data Acquisition

Module : 10 to 13

- Rapid Prototyping and Tooling
- Augmented Reality
- Remote Maintenance
- Manufacturing Execution System

Dr. Srivallabha Deevi
IIT Tirupati

Module : 14 to 15

- Machine Learning for Foundry
- Big Data and Data Analytics

Address By Industry Experts

Mr J Balasubramanian
Head Analytics & ET
Ashok Leyland

- Adopting AI in Foundries

Mr Yogesh Kumar
Chief Operating Officer
Difacto Robotics and Automation

- Robotics in Foundry Automation

Mr P Senthilkumar
Director Marketing
ACI Automation

- Automation & Economies of Operation in Melting

Additional Information

(i) This is a residential program at IIT – Tirupati.

(ii) The course fee includes boarding & lodging.

(iii) Professors from IIT will conduct the classes.

(iv) Submission of assignments & periodical evaluation through tests is must.

(v) At the end of the course the certificate will be issued jointly by IIT-Tirupati and IIF – CET.

(vi) No. of participants are limited to maximum of 30

Contact: Mr. K. Dhayalan Ph: 89397 33314, Mr. M. Sivasankar Ph: 9042459899

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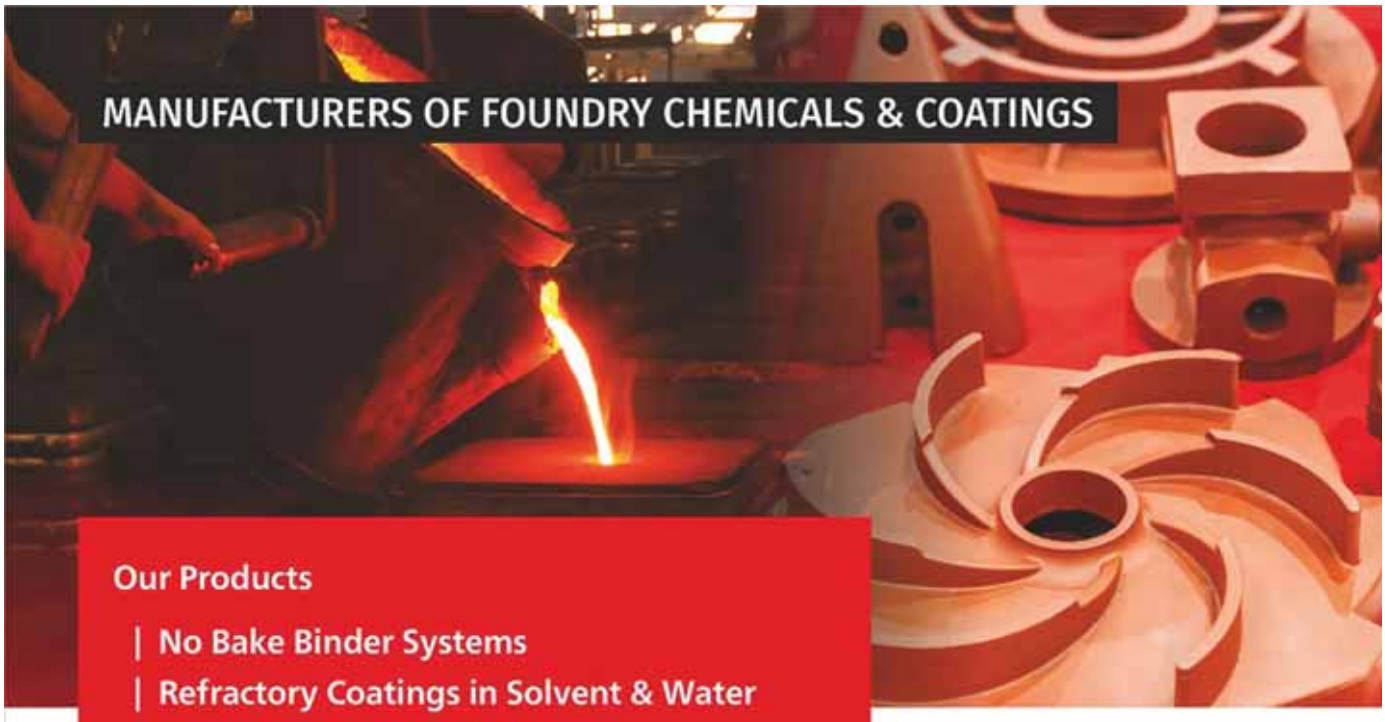

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- Auxiliaries

PRESIDENT

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Qualification	B. Tech. with minimum 20 years relevant experience

MANAGER (TECHNICAL SERVICE)

No of Vacancy:	1
Area	Northen Region
Qualification	B.sc/Diploma in Engg.
Min. Experience	3 years in Similar Field

MANAGER (TECHNICAL SERVICE)

No of Vacancy:	2
Area	Western Region
Qualification	B.sc/Diploma in Engg.
Min. Experience	3 years in Similar Field

LAB TECHNICIAN (CHEMIST)

No of Vacancy:	3
Qualification	B.sc
Min. Experience	3 years in Similar Field

MAINTANANCE HEAD

No of Vacancy:	1
Area	Rajkot
Qualification	Diploma in Mechnical / Electrical
Min. Experience	3 years in Similar Field

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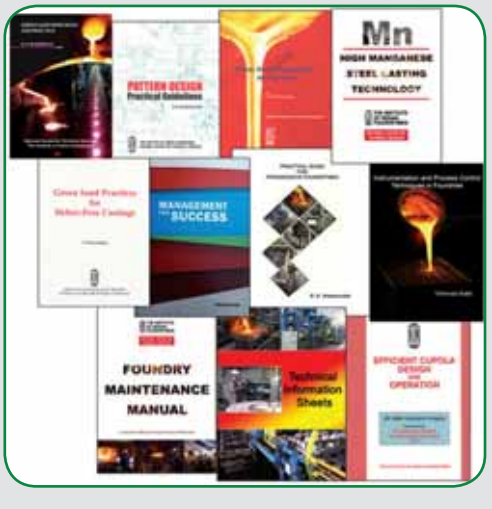

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NELCAST LIMITED

Company Profile

A Grey Iron & Ductile Iron Company

Nelcast Ltd is one of the Largest Jobbing Foundries in India for the manufacturing of Ductile & Grey Iron Castings. Nelcast's products cater to the Global Automotive, Tractor, Construction, Mining, Railways and General Engineering sectors and they are proud to have as their customers, the leading companies in these sectors worldwide.

Deepak Reddy
Managing Director, *Nelcast Limited*

IFJ: Please provide a brief about your company- brief history, present products and production, technologies and future expansion plans.

Deepak Reddy: Nelcast Limited was incorporated in 1982 and started commercial production in 1985. The company manufactures a wide range of castings for the Commercial Vehicle, Tractor, Mining & Construction Machinery, Passenger Vehicles and Railways sectors. The company uses the latest state-of-art technologies in the manufacturing of Ductile & Grey Iron castings with fully automatic High Pressure Green Sand Moulding Lines for castings from 0.5 kg to 450 kg.

The company has grown in the global market with an export

revenue of almost $50 million from just $0.5 million in the last 8 years. I strongly believe that India has the opportunity to be the hub for global castings and it is the ambition of Nelcast to be the pioneer in this transition.

IFJ: What are the biggest challenges that your company is facing today and how do you plan to overcome them? Are there any future challenges anticipated?

DR: The biggest challenge that our company faces is the availability of skilled manpower for the industry. The skill level required has increased especially for maintenance of the highly automated and complicated machinery. The number of people who have the requisite skills are limited as automation in the industry has suddenly grown multi-fold and it takes extremely long for a new employee to become skilled.

To counter this, we are in the process of setting up a training institute that will provide the necessary classroom, practical and on-job training to cater to not just our needs but also to the overall industry.

IFJ: How do you see the Indian economy today and for future growth - what suggestions would you give the Government? Do you wish to seek any changes in any of the Policy matters?

DR: The Indian economy is a bright spot for the world and I believe that it would continue to do well for the next 20-25 years due to favourable demographics. If we miss this opportunity window of the next 25 years, we may lose the opportunity permanently. The major contribution of the Government is to continue to invest in infrastructure at a rapid pace and to unleash the true power of Indian entrepreneurship by making it easier and faster to do business with less red tape.

IFJ: What is your Company's Core strength area and what advice/guidance would you have for the upcoming young entrepreneurs? Any past challenge that you overcame and how - share your experience if any.

DR: The company's core strength is in the mass manufacturing of complex products. We have built our facilities to meet the requirements of the top global OEMs and win business in products that are a class apart. The advice I would give to young entrepreneurs is, don't be scared to take some risks and push boundaries. We have even in the recent past taken on many new complex products that we were not sure that we had the ability to execute but, a combination of confidence and determination ensured that we put everything we had into making it possible and the efforts paid off.

IFJ: What is your "mantra" for sustaining growth and success in the domestic/ global markets?

DR: The Mantra is to be the Customers first choice by offering Quality, Cost & Delivery performance at benchmark levels. By being the first choice, we get involved with the customer early in the product development cycle and can provide the inputs to ensure a better design for manufacturing which adds more value to the customer.

IFJ: What are your suggestions to IIF in assisting members and in expanding its reach to Industry, Academia and other industries/ businesses that are related to the Foundry Industry?

DR: IIF does a great job in connecting foundrymen together and presenting a great forum for knowledge sharing. As the industry is going to change rapidly over the next decade with implementation of Industry 4.0 and a much greater focus on the environment, it would be a great opportunity for IIF to build a greater connection with academia to spearhead breakthrough projects to ensure the Indian Foundry Industry is truly a world leader in all aspects.

CAST QUIZ

1. **The foundry uses ---------- process to relieve stresses produced in castings.**
   (a) Reforming (b) Heat Treatment
   (c) Water Treatment (d) Cooling
2. **---------- tuyers increase the melting efficiency.**
   (a) Single (b) Double
   (c) Auxiliary (d) Blast
3. **Which of the following is a property of core material used in a foundry?**
   (a) Appropriate for long production (b) Low weight
   (c) Reusable (d) Core print
4. **The ---------- is responsible for cavity in castings in a foundry.**
   (a) Pattern (b) Sand
   (c) Core (d) Riser
5. **The number of cores to be used to form castings is ----------.**
   (a) One (b) Ten
   (c) Depends on the sand (d) Depends on the design
6. **Which of the following processes is not used to remove the cores from the finished castings?**
   (a) Blowing (b) Melting
   (c) Washing (d) Chemical Dipping
7. **Which of the following is not a component of the gating system?**
   (a) Pouring cups (b) Sprue
   (c) Pattern (d) Runners
8. **If the gating system is part of the pattern, it avoids cutting a runner and gates.**
   (a) True (b) False
9. **---------- is responsible for the prevention of erosion and washing away from the sand.**
   (a) Riser (b) Gates
   (c) Vents (d) Sprue Hole
10. **---------- is also called as the feeder head.**
    (a) Pouring basin (b) Chills
    (c) Risers (d) Gate
11. **A riser permits the escape of the air and mould gases.**
    (a) True (b) False
12. **Which is the most common defect caused by the risers?**
    (a) Blow holes (b) Shrinkage
    (c) Crush (d) Mould shift
13. **---------- is a defect caused by loose dowels.**
    (a) Mould shift (b) Scab
    (c) Drop (d) Blow holes
14. **Variation in wall thickness occurs due to --------- core boxes.**
    (a) Rigid (b) Flexible
    (c) Surface finished (d) Worn out
15. **---------- usually occurs at the parting line and results in excess of metal.**
    (a) Fins (b) Fash
    (c) Strain (d) All of the mentioned
16. **Patterns having insufficient taper result in ----------.**
    (a) Fins (b) Blow holes
    (c) Drop (d) Scab
17. **Defects by ---------- are discovered by mechanical testing.**
    (a) Heat Treatment (b) Moulding
    (c) Material (d) Pattern
18. **Surface defects are discovered by radiography.**
    (a) True (b) False
19. **---------- is the displacement of the mould while closing of mould.**
    (a) Drop (b) Blow holes
    (c) Crush (d) Mould shift
20. **Heat storage capacity of moulding sand can be increased by adding**
    (a) Chromite (b) Graphite
    (c) Magnesium powder (d) Any of the above
21. **Of the following metals, the pouring rate should be minimum for**
    (a) Aluminium (b) Brass
    (c) Cast iron (d) Steel
22. **High silicon irons are ----------.**
    (a) Brown in colour (b) Machinable
    (c) Malleable (d) Resistant to wear

(For answers, please see page 145)

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1 Clarification on Section 43(h)

Section 43B(h) was introduced in Finance Act, 2023. Section 43B(h) says: Any sum owed by an assessee to a micro or small enterprise that is outstanding beyond the time limit specified in section 15 of the MSMED Act, 2006, shall be allowed only in the previous year in which such sum is paid. The time limit prescribed in section 15 of MSMED Act is -1. When there is no agreement between the buyer and the seller; payment to be done within 15 days of purchase. 2. When there is an agreement; Payment to be done within the time-limit decided by buyer and seller which can be maximum 45 days.

Let's understand with examples

1. Purchases done from MSE seller on 01.03.2024. No agreement regarding credit period. Time allowed for payment will be 15 days. If amount is o/s as on 31.03.2024, purchases will be disallowed. If not paid within 15 days but paid before 31.03.2024, purchases will be allowed.
2. Purchases done from MSE seller on 01.03.2024. Seller and buyer agreed for a credit period of 40 days. The expense will be allowed even if payment is o/s as on 31.03.2024.
3. Purchases done from MSE seller on 01.02.2024. Seller and buyer agreed for a credit period of 90 days. As per MSMED Act, payment must be made within 45 days. If the amount is o/s as on 31.03.2024, expense will be disallowed.

Key clarifications

The provision is applicable from AY 2024-25. Purchases done in FY 2023-24 will be covered. Purchases from Medium Enterprises not covered. Applies only to purchases from manufacturers and service providers. (Traders under confusion still clarification required). Does not apply to purchases before 01.04.2023, no disallowance even if unpaid by 31.03.2024. Even if payment is made before ITR filing, it will be allowed only in the year of payment. In case of any dispute, the timeline starts post dispute resolution. Not applicable to the buyers opting for presumptive taxation. Applicable for all the buyers whether MSME or non-MSME.

Action Points for Buyers

1. Send a letter to verify your suppliers' MSE status. Ask for their Udyam Certificate. 2. Maintain a separate MSE supplier database, tracking due dates and payments. 3. No MSE creditors outstanding exceed 15/45 days as on 31.03.2024. 4. Pre-agree on payment terms for purchases. 5. Regularly monitor payments and outstanding to MSE suppliers.

Guidelines for Sellers

1. Display Udyam registration on invoices; inform buyers of your MSE status. 2. Specify a credit period (up to 45 days) on invoices.

2 Expenditure of ESOP allowable

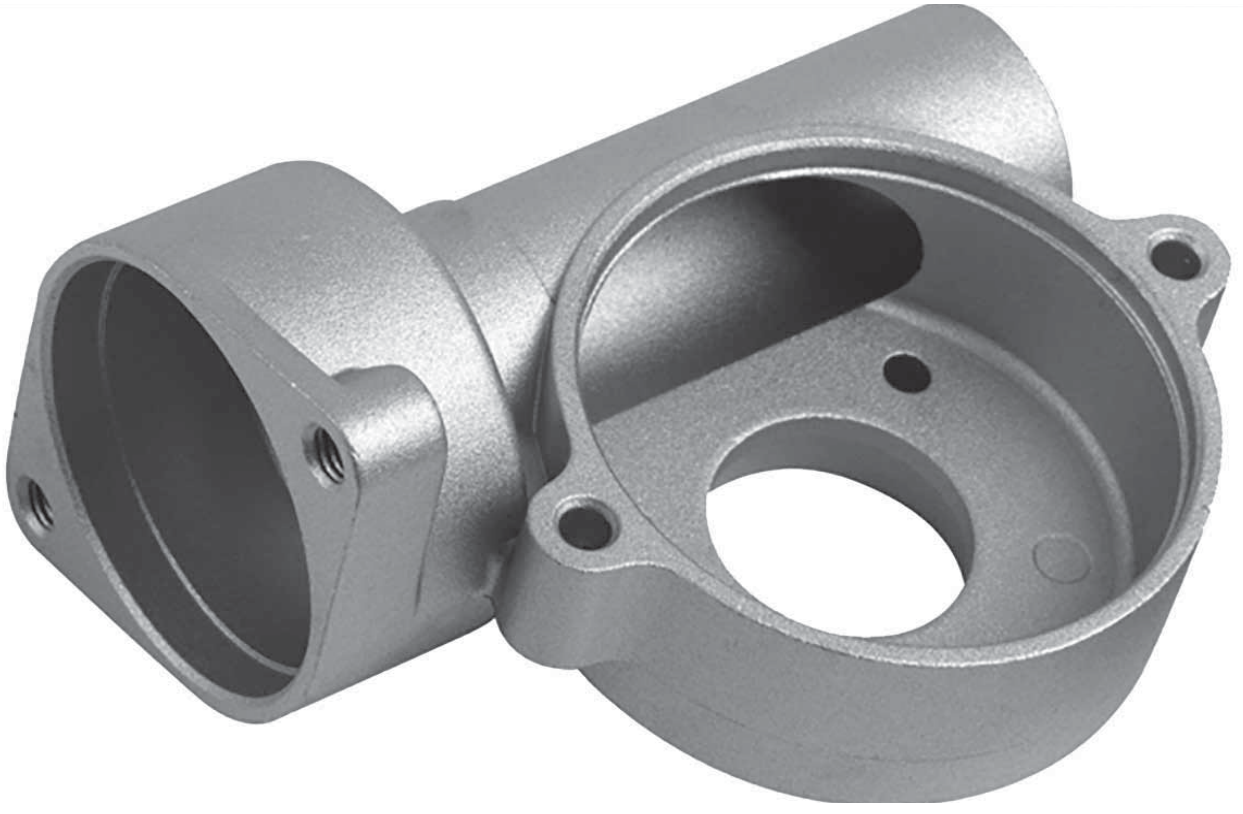
The expenditure on account of ESOP is a revenue expenditure and has to be allowed as deduction while computing income. The sole object of issuing shares to employees at a discounted premium is to compensate them for the continuity of their services to the company. By no stretch of imagination, can such discount be described as either a short capital receipt or a capital expenditure. It is nothing but the employees cost incurred by the company. The substance of the transaction is disbursing compensation to the employees for their services, for which the form of issuing shares at a discounted premium is adopted. Hence it was held that ESOP expenditure is an allowable claim under section 37(1) of the Income Tax Act by the Karnataka High Court in the case of CIT Vs. Biocon Ltd. The same was followed in the case of EDELWEISS ASSET MANAGEMENT LTD Vs ACIT, CIRCLE-3(1)(2) [2024- VIL-112-ITAT-MUM].

IIF Annual Awards 2023

The awards were distributed at 72nd Indian Foundry Congress on February 2, 2024 in Bangalore International Exhibition Centre (BIEC), Bengaluru.

List of the Recipients of distinguished awards are as follows:

Name of the Award	Recipient
Laxman Rao Kirloskar Award - For Foundry of the Year	Peekay Steel Castings (P) Ltd, Coimbatore
Gargi Huttenes Albertus Green Foundry of the Year Award	Ashok Leyland Foundry Division - Sriperumbudur Unit
K R Santhanam Memorial Award - For Foundryman of the Year	Madras Engineering, Foundry Division, Chennai
IIF Region of the Year Award	Southern Region
Viswamitra Kapur Memorial Award - For IIF Chapter of the Year	Coimbatore Chapter
Membership Growth Award for IIF Chapters	
Large Chapter Category	Shimoga Chapter
Small Chapter Category	Jamshedpur Chapter
Forace Polymers Young Foundryman of the Year Award	Mr Hassan Fainaze T M, *Peekay Steel Castings (P) Ltd, Kozhikode*
Casting of the Year Award	
Ferrous Category	Grotek Enterprises Pvt Ltd, Bangalore
Non-Ferrous Category	Hindustan Aeronautics Ltd (HAL) Foundry & Forge Division, Bangalore
Export Excellence Award	
Large Scale Foundry	Nelcast Ltd, Chennai
Medium Scale Foundry	RBA Exports Pvt Ltd, Chennai
Small Scale Foundry	Hastalloy India Ltd, Visakhapatnam
Jayaswal Neco Quality Award	Kirloskar Ferrous Industries Ltd, Solapur
Bhagwati SME Foundry of the Year Award	Big Casting Pvt Ltd, Belgaum
Chandran Menon Memorial Award for Applied Research & Innovative Technology	Indian Institute of Technology, Tirupati
Foundry Kaizen Award	Ashok Leyland Foundry Division - Ennore Unit
5S Excellence Award	
Large Scale Category	Menon & Menon Ltd, Kolhapur
Medium Scale Category	Koso India Pvt Ltd, Coimbatore
Best Technical Paper Award	
Ferrous Category: Review of Steel Making Process *Published in Indian Foundry Journal March 2023 Issue*	Late Barundeb Raha, *Metallurgical Consultant, Kolkata*
Non-Ferrous Category: In-Mould Semi-Solid Processing of Copper Alloys by Electric Current Treatment *Published in Indian Foundry Journal Jan 2023 Issue*	Anjan Prodhan, *Ex-CSIR, National Metallurgical Laboratory, Jamshedpur*
General Category: Implementation of System Engineering in A Medium Scale Foundry to Improve Castings *Published in Indian Foundry Journal Nov 2022 Issue*	Vijaykumar H K, *Research Scholar* & M S Uppin, *Professor & Head of the Dept of Industrial Production and Engineering, PDA College of Engineering, Kalaburagi, Karnataka*
Soli Commissariat Best Paper Award Sodium Alloy -1st of Its Kind Metal Conditioner for Iron & Steel	C Natarajan, *Managing Director, NC Innovations Pvt Ltd, Bengaluru*
Special Appreciation Award	Tata Motors Ltd



Strategic Costing – A Lifeline to the Foundry Industry

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We are talking about ABC, VBC, per kg rate etc in foundries but strategically fixing the price is very vital to the foundry for its existence in the business. While talking about strategic costing, the costing formula can be modified as given below for the buyer's market,

(Manufacturing cost+ Profit) + Competition Cost = Selling price ---------- (1)

Manufacturing cost = Process cost + Material + Labour + OH + Poor Quality cost + Quality cost ----- (2)

Competition cost is nothing but how much we are adjusting the price to retain the business with us from our competitor's push. Sometimes it is projected by our customer in such a way that it cannot be accommodated in the profit. For a monopoly's competition cost is less.

To maintain the balance in the equation when, the selling price is fixed and competition is more, then, we are in a position to reduce either profit or manufacturing cost. To adjust the values of the manufacturing cost, we should know the actual manufacturing cost. Many hidden costs are there in the manufacturing side. Without knowing those hidden costs and reducing the profit will result in the negative in the balance sheet.

For example, if you talk about poor quality cost, mostly it is known to all. But at the same time, you should know the quality cost. The definition of Quality cost is the amount of money that we are spending to achieve the required quality. There is no limit to quality, it is agreed. But what is the cost of that? Here the problem is, sometimes we are struggling

to achieve the basic quality requirement due to various factors. Technology, manpower consistency, skill level, material quality, etc are coming here if we go for root cause analysis. Due to these inadequacies and inconsistencies, we are spending more to achieve the quality and even more to ensure the quality sometimes. Whether these costs are captured really is a question here. On the other hand, sometimes we are giving quality more than the customer wants. It may be to retain the present business or to get more future businesses or to show our supremacy or unaware of the real quality requirement etc. But the necessity of giving more than the customer's expectation has to be decided by the company. But we should keep in mind how much we are spending more for that when the customer is not giving additional price for extra quality. The Right Price for the Right Quality is the need for the business to survive and not the Least Price for the Best Quality. So, we have to optimise the quality for the price. It is important to run the company profitably.

On the manufacturing side technology, consistency in Manpower, Material, Method, Monitoring and Measurements, are really paying us. Deterioration in all the said "M"s will increase the cost of manufacturing. Our costing method should capture these variations dynamically. Also, we should know which area is to be focused to bring down the manufacturing cost.

The company should really focus on NVAs (Non-Value Added) in material, manpower (direct or indirect/ blue or white), and in Method/ process. Everywhere if we go with a bird's eye,` we can find out lot of NVAs, which increases the cost of manufacturing significantly. For every Ms if we ask Why, it is? And what for it is? then the cost will come down automatically.

In the above equation, the selling price is fixed, the competition cost is more, profit cannot be lowered beyond the limit, then the remaining portion is the manufacturing cost. Manufacturing cost mainly comprises of Material, Manpower, and Processing costs. If we drill down further, with material we cannot play more, as it is a global market, and we are forced to buy the right material at the right price. It is explicit to customers also. But we can reduce the wastage of the materials, ie with effective utilisation of material. Similarly, we can use some of the strategies like dual sourcing and strategic buying of materials at the best price, using alternate materials without affecting the quality, keeping minimum inventory, etc which will help in reducing the material cost. Then, comes to manpower, here more options are there, either to go for automation and reduce the manpower or improve the process towards de-skilling or use skilled labour and increase the productivity, etc. Productivity in the sense it is not a mere number here but quality is also inbuilt. Retaining skilled labour is a challenge to the company and the company should take a call. Foundry operations are skill-dependent but availability of skill or retainment of skill is a challenging task now-a-days. So, the automation is the only solution for that. We need to take the initiative of going for automation from now onwards to mark our presence in the future.

Finally, to maintain the equation, the other way is to eliminate the competition cost! ie you should become a monopoly. It will come only with the innovation of process and product!

Foundry Raw Material Prices

for the Period 8th Jan - 4th Feb 2024

Sl No.	Particulars	Price during 08/01/2023-14/01/2024 Rs./Tonne	Price during 29/1/2024-4/2/2024 Rs./Tonne	Location	Price Increase / Decrease (+/-) Rs./Tonne	Price Increase / Decrease (%)
1	Copper Armature Scrap, Cu 99%	677200	676400	Delhi	-800	-0.12
2	Copper Primary CC Wire Rods (CCR), BME, 8 mm, Cu 99.99%	747800	761000	Mumbai	13200	1.77
3	Ferro Manganese, HC 70%, 25-150 mm	64900	66700	Durgapur	1800	2.77
4	Ferro Manganese, MC (Mn 70% min), 10-150 mm	87000	89250	Durgapur	2250	2.59
5	Ferro Manganese, HC 70%, 25-150 mm	64960	66600	Raipur	1640	2.52
6	Ferro Molybdenum (FeMo60%), Mo: 60%, 10-100 mm	2460000	2367000	Nagpur	-93000	-3.78
7	Ferro Silicon, FeSi 70%,25-150 mm	107750	108750	Guwahati	1000	0.93
8	GP 120 GSM, 0.6 mm	67900	67600	Mumbai	-300	-0.44
9	GP 120 GSM, 0.8 mm	66400	66100	Mumbai	-300	-0.45
10	HC Ferro Chrome (Low Silicon), HC 60%, Si - 2%,10-150 mm	119000	125100	Jajpur	6100	5.13
11	HC Ferro Chrome (Medium Silicon), Si-4%, HC 60%, 10-150 mm	112700	118600	Jajpur	5900	5.24
12	Melting Scrap, CR Busheling (Loose)	38367	37983	Ludhiana	-384	-1.00
13	Melting Scrap, HMS (80:20)	33133	32783	Mumbai	-350	-1.06
14	Nickel Cathode, BME, Ni 99.99%	1402600	1399600	Mumbai	-3000	-0.21
15	Pig Iron, Foundry Grade	43900	43300	Ludhiana	-600	-1.37
16	Pig Iron, Steel Grade	38392	38567	Durgapur	175	0.46
17	Tin Pure Ingot, BME, Sn 99.99%	2163800	2311000	Mumbai	147200	6.80

N.B.: Above Prices are Exclusive of GST

Source : SteelMint

It always pays to plan ahead

Forthcoming Events

India Pavilion at Middle East Energy 2024

April 16-18, 2024

Dubai, UAE

www.middleeastenergy.com

AFS Metalcasting Congress 2024

April 22-24, 2024

Milwaukee, Wisconsin, USA

www.afsinc.org

Hannover Messe 2024

April 22-26, 2024

Hannover, Germany

www.hannovermesse.de

Rapid Tech 3D 2024

International Hub for Additive Manufacturing

May 14-16, 2024

Erfurt, Germany

www.rapidtech-3d.com

Subcon Thailand 2024

May 15-18, 2024

BITEC, Bangkok, Thailand

www.subconthailand.com

India Pavilion at Middle East Energy 2024

April 16-18, 2024

Dubai, UAE

www.eepcindia.com

Pune Auto Expo 2024

April 18-21, 2024

Pune

www.puneautoexpo.in

Subcon 2024

June 5-6, 2024

The NEC, Birmingham, UK

www.subconshow.co.uk

Aluminium China 2024

July 3-5, 2024

Shanghai New International Expo Centre (SNIEC), Shanghai, China

www.aluminiumchina.com

Forthcoming IIF Events

73rd Indian Foundry Congress & IFEX 2025

February 07-09, 2025

Biswa Bangla Mela Prangan, Kolkata

Website : www.ifcindia.net / www.ifexindia.com

MMMM 2024

14th International Exhibition and Conference on Minerals, Metals, Metallurgy & Materials

August 29-31, 2024

Pragati Maidan, New Delhi

www.mmmm-expo.com

Ankiros/Turkcast 2024

September 19-21, 2024

Istanbul Expo Centre

Istanbul, Turkey

www.ankiros.com

LMPC 2024

Liquid Metal Processing and Casting Conference

September 22-25, 2024

Leoben, Austria

www.lmpc2024.org

International Fair of Technologies for Foundry Metal

September 24-26, 2024

Targi Kielce, Poland

www.targikielce.pl

GIFA Mexico 2024

October 16-18, 2024

Mexico

www.gifa.com

75th World Foundry Congress

October 25-30, 2024

Deyang, China

www.75wfc.com

METEC INDIA 2024

November 27-29, 2024

Mumbai

www.metec-india.com

Members' Accolade

Indian Foundry Journal invites write-ups from the members (both Industry and individual) informing their recent achievements.

Industry members may send brief write-ups on their recent achievements in technology implementation, management systems, green practices, receiving of awards, and so on, to **journal@indianfoundry.org**

These news will be published in the Indian Foundry Journal. A photograph related to the achievement can also be sent along with the write-up.

Individual members of IIF may also send information on their achievements like receiving of awards etc to the above-mentioned E-mail ID with a related photograph. Achievement by children of the members like academic excellence may also be sent for publishing in the journal.

Cast Quiz

Answers

1 (b)	2 (c)	3 (b)	4 (c)	5 (d)	6 (b)	7 (c)	8 (a)	9 (b)	10 (c)	11 (a)
12 (b)	13 (a)	14 (d)	15 (d)	16 (a)	17 (c)	18 (b)	19 (c)	20 (a)	21 (a)	22 (d)

READY TO SALE FOR INDUCTION FURNACE USED SPARES

1. **Transformer**
   Capacity: 865 Kva
   Make: Tesla Transformers Limited
   Primary Voltage: 22000 V
   Secondary Voltage: 575 V
   On Load
2. **ON LOAD TAPE CHANGER**
   Make: Alwaye
   Voltage In Kv: 22
   Rated Amps: 200
   Motor Voltage/Phase: 415v/3 Ø
   Controll Voltage/Hz: 110/50
   Tapping Range: % +10 To -10
3. **FURNACE CRUCIBLE**
   Dura Line With Box: 2 Nos.
   Crucible Full Set Up and Sanction Frame with Hyd-Cylinder
   Make: Inductotherm
   Capacity: 750 Kw, 1 Tonne

Interested parties, please contact:

E-mail : stores@indoshellcast.com
Mobile : 93448 46982,93440 03133

Reduction Sale of Indian Foundry Journal

Copies of various issues of Indian Foundry Journal (IFJ) of 2022 & 2023 are available at discounted price.

IFJ, 70-year old official Journal of The Institute of Indian Foundrymen (IIF), contains quality technical articles, reports on activities organised by IIF Regions, Chapters and Centres of excellence, Industry news, Foundry raw material prices, Event calendar and many more.

The old issues of IFJ can be had at discounted price from IIF Head Office, Kolkata.

Contact: journal@indianfoundry.org

FOR SALE

SHOT BLASTING MACHINE IN EXCELLENT RUNNING CONDITION

DISA Mono Rail Hanger Type Shot Blasting Machine VP – 14 with Dust Collector System

No. of Wheel Blast - 2 X 380
No. of Hangers - 4
Hanger Capacity – 500 kg
Max Diameter of Job on Hook – 1000 mm
Max Length of Job on Hook – 1250 mm
Year – 2010

Price - Rs.20 Lakh

DISA Mono Rail Hanger Type Shot Blasting Machine Vh- 10/12 with Dust Collector System

No. of Wheel Blast - 2 X 393
No. of Hangers - 4
Hanger Capacity – 1000 kg
Max Diameter of Job on Hook – 1000 mm
Max Length of Job on Hook – 1200 mm
Year – 2018

Price - Rs.25 Lakh

Please Contact:

GLOBAL CASTINGS PVT LTD, Mouzapur / Kamnara Dewandighi, Palitpur Road
Purba Bardhaman - 713102, West Bengal
Shivansh : ✆ Cell: +91 9874580806

Toyomet

TÜV INDIA ISO 9001-2015

Toyo Metallurgicals Ltd., a leading manufacturer since 1963 of Foundry Fluxes, Coatings & Additives, is looking for energetic, resourceful & dynamic personnel.

Sales Managers

Location : Pune, Kolhapur, Belgaum, Coimbatore, Chennai, Ahmedabad, Rajkot, Indore

Experience : At least 3-5 years experience in Foundry Technical and Operational Knowledge is a must. Candidate must have contacts in leading foundries & must possess good communication skills

Qualifications : Graduate / Diploma holders may apply

Salary : Negotiable

Toyo Metallurgicals is also looking for **Dealers** in the above mentioned locations.

Requirements : Minimum 3-5 years experience in foundry. Must have a good sales/ marketing set up. The organisation should have excellent contacts among the foundry industry.

Contact:

TOYO METALLURGICALS LIMITED

19 Annapurna Industrial Estate, Tilak Road, Ghatkopar (East),
Mumbai – 400077, INDIA

Tel No.: 022- 21027104, 022- 21027257 • **Email:** info@toyomet.com

Website: www.toyomet.com

EQUIPMENT FOR SALE

SL NO.	EQUIPMENT	NO.
1.	Induction Melting Furnace Power unit 450 KVV / 1000 Hz VIP Power Track-R-PI Power and Control System with Water Circulating System and one Hydraulic Power Supply Unit etc. Complete set – Inductotherm make	1
2.	1000 kg & 500 kg Duraline Furnace with Hydraulic tilting arrangement with water cooled leads and interconnecting arrangement	1
3.	Knockout Machine, Mixer, Transfer Trolley	1
4.	Belt Conveyor, Bucket Elevator, Feeder Belt Conveyor	1
5.	Twin Hopper, Transfer track line, Mould track line	1
6.	Sand Storage Hopper, Sand Plant structure	1
7.	Permanent Magnetic Pulley, Polygonal Siever, Bucket Elevator	1
8.	Fluidized Bed Type Sand Cooler, Intensive Mixer – Sree Sakthi make	1
9.	SWL 3MT EOT Crane	1
10.	450 SJS Moulding Machine – 1 Pair – Sree Sakthi make	1
11.	Surge Hoppers, Birail arrangement, Permanent Magnet type	1
12.	Mould Box, Mould Car, Match Plate, 40 LB Rails	1
13.	Sand Handling System	1
14.	Shot Blasting Machine – Sree Sakthi make	1
15.	Spectromax Spectrometer machine	1
16.	Brinell Hardness Tester, Digital Display, UTM Machine etc.	1
17.	600 KVA (11/575) Volts Furnace Duty Transformer – ESENNAR make	1
18.	600 KVA (11/433) Volts Distribution Transformer – ESENNAR make	1
19.	Core Sand Mixer, Ladle Tea Spout, Pedestrial Grinder etc	1
20.	Electric Power Screw C ompressor and Air Receiver – ELGI make	1
21.	62.5 KVA DG set Model: ALGP4DT G3 – Ashok Leyland make	1
22.	Electrical Chain Hoist etc.	1
23.	PCC Panel, MCC Panel	1
24.	Copper Bus Duct, Copper Flexible	1
25.	Sand Rammer VR, Base Block VRB, etc.	1
26.	300 KVA UPS with Battery and Transformer Kit	1
27.	Cooling Tower	1
28.	Carbon Silicon Analyser Cable, Temperature Indicates	1
29.	Electrical Material Cables, MCB, Copper Bus Duct, etc.	1
30.	Heat Exchanger M6-MFM, Kirloskar Monoblock Pump Sets. Piller wise Drum m/w Centre etc	1
31.	Vernier Height Gauge, Vernier, Surface Plate, Angle Plate etc	1
32.	Anneling Furnace	1
33.	500 Ltrs/hr. capacity RO Water Purification System	1
34.	Fettling Grinding Machine	1
35.	Pollution Equipments (Scrubber, Dust Collector, Blowers etc)	1
36.	Welding Machine and Cable	1
37.	Digital Electronic Platform Weighing Scale, Table Weighing Scale	1
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Interested parties may contact :

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by Dr N P Sinha

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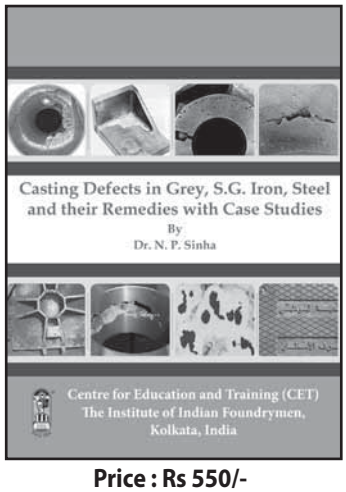

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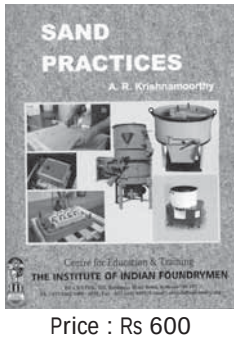

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Printer and publisher Dr. Abhishikta Roychowdhury (Acharyya), published from The Institute of Indian Foundrymen, "IIF Center", 335, Rajdanga Main Road, East Kolkata Township P O, Kolkata - 700 107 and Printed at CDC Printers Private Limited, Plot No. 5, 6, 16, 17, Tangra Industrial Estate-II (Bengal Pottery) 45, Radhanath Chowdhury Road, Kolkata - 700 015. Editor : Dr. Abhishikta Roychowdhury (Acharyya).