

ELEMENT



Your Guide to Foundries in Pakistan
www.pfa.org.pk

Special Edition 2012

Industrializing Pakistan

دنیا ہماری منڈی



INDUSTRIALIZED
PAKISTAN
WORLD IN FOCUS

4th IFCE

Dec. 05-06, 2012 دنیا ہماری منڈی
P.C. Hotel Lahore.



میتل ٹیکنالوجیز لمیٹڈ



Excel Engineering (Pvt) Ltd.



FOSECO



RAVI AUTOS (PVT.) LTD.
bringing technologies together



CHENAB ENGINEERING WORKS
& FOUNDRIES (Pvt) Ltd.



QADRI Group



PAK THERM

The Fastest Heating Solution

Mr. Misbah-Ud-Din



PAK THERM is pioneer
**MANUFACTURER OF
INDUCTION MELTING FURNACES**
in the Muslim world.

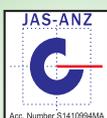


FURNACES CORE FEATURES:

- Lowest power consumption, 50-60KWH/Ton steel electricity saving.
- Highest productions 10-15% more than others.
- Prompt after sale services
- Upgradation option in future
- Lowest maintenance cost and down time.

OUR PRODUCTS

- Induction furnace
- Induction hardening
- Induction Heating
- Transformer
- DC Motor Controls
- Industrial Stabilizer
- Electrolyzer
- Rectifier



11KM Sharakpur Road Sagian Motifouji Road Near Al-Mugni Trust Nain Sukh Lahore.

Tel : +92 42 37934233, Fax : +92 42 37934236 Mob : +92 321 4473308

Email : Paktherm@gmail.com Website: www.paktherm.com.pk

President Message

It is my great pleasure to acknowledge that Pakistan Foundry Association has successfully organized 4th International Foundry Congress and Exhibition held on Dec 05-06 2012, at hotel Pearl Continental Lahore, Pakistan.

It is a matter of satisfaction to thank all foreign and local delegates and exhibitors who traveled especially to participate in this mega event. This year we had international participation from Italy, UK, Germany, Netherlands, Turkey, China, India and Japan in larger number in addition to the local participants. I acknowledge their encouraging response and would like to see them again in the 5th IFCE. I regret the inconvenience to all who could not attend due to visa problem.

The participation of eminent academicians and technologists from abroad who have discussed advances and technical opportunities available in the world. The technical papers presented by the speakers from Italy, Germany, India, UK, Turkey and Pakistan have provided knowledge to our foundry men, academia and students of engineering universities.

It is encouraging for me to note that many of our guests have fruitful visits to local foundry and engineering industries during their stay. I invite foundry men in the world to visit our engineering industry.

The foundry industry looks forward to expanding its manufacturing capacities in technology and coverage to the local and global market, particularly the Auto and Agricultural Tractors markets. We are competitively priced and are conscious of international standards requirements.

I am delighted to mention that Foundry Service Center has been completed for its operations and shortly the training courses on different technologies will begin. I especially thank UET and SMEDA for the support extended to build FSC. I also acknowledge the services of TEVTA in the development of Foundry Training School where workers and students have been trained and the first batch of 25 students is working in the relevant foundry industries now. I hope both training institutes will help in producing skilled workers for better quality production to meet international standards.

I thank once again the executive committee and Mr. Abdul Rashid secretary of Pakistan Foundry Association for their hard work to gain the attention of foundry industry in the world.



Sikandar Mustafa Khan
President PFA

Contents

Event Report of 4th IFCE.....	02
46th Census of World Casting Production (A report of Modern Casting Staff USA).....	20
Practical Application of Process Control in Foundries (Mr. Staf Henderieckx - CBI).....	26
Poor Machinability of Gray Cast Iron (Mr. Allah Ditta).....	31

Chief Editor

Mr. Fahad Iqbal
Joint Secretary - PFA

Technical Advisor

Mr. Abdul Waheed
G.M. Foundry
M/s, Ravi Spherocast
2.5 km, Defense Road of Bhotatain Chowk,
Raiwind Road Lahore. Ph: +92-42-37970474
Mob#: 0321-4989797
Email: abdul.waheed56@hotmail.com



Editor / Publisher

Mr. Abdul Rashid
Secretary - PFA
93-B, Hali Road, Gulberg-II, Lahore Pakistan.
Ph: +92 42 35023525, 35753619
Fax: +92 42 35755743
Cell: +92 322 8487873
Email: info@pfa.org.pk,
pakistanfoundryassociation@gmail.com
URL: www.pfa.org.pk

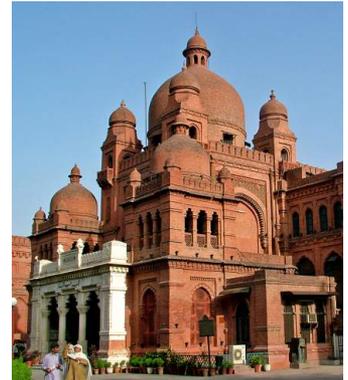


Event Report of 4th International Foundry Congress and Exhibition Lahore Organized by Pakistan Foundry Association

Welcome Dinner to Foreign Delegates



Lahore is the traditional capital of Punjab for a thousand years it had been the cultural center of northern India extending from Peshawar to New Delhi. Lahore is the city of poets, artists and the center of film industry. It has the largest number of educational institutions in the country. Apart from being the cultural and academic center of the country Lahore is showcase for Mughal architecture in Pakistan. Lahore was a thriving cultural center of the great Mughal Empire. They beautified the Lahore with palaces, gardens and mosques. Its faded elegances, busy streets and bazaar and wide variety of Islamic and British architecture make it a city full of atmosphere, contrast and surprise.



The warm and receptive people of Lahore are known for their traditional hospitality. Lahore can be best described as a city that is just so wonderful, very fabulous that every nook and corner of the city speaks certain vibrance, zeal and spirit of life which cannot be found anywhere in the world.



Lahore cuisine refers to the food and cuisine of the city of Lahore in Punjab, Pakistan. Lahore is a city with an extremely rich food culture. People from Lahore are famous all over the country for their love for food. The city offers a vast variety of options when it comes to gastronomy. In recent times, the style of food has achieved popularity in a number of different countries, because of its palatable and milder taste, mainly through the Pakistani culture.



PFA keeping up the hospitality traditions of Lahore hosted a sumptuous dinner to welcome the foreign delegates and members of executive committee at Avari Hotel. Mr. Sikandar Mustafa Khan President Pakistan Foundry Association in his welcome address he thanked all the guests who travelled all the way from their home town to participate in 4th IFCE. He said it is a great pleasure for me to see you in this evening and your interaction with local foundry men. I am very much encouraged to see you with us and sure we will learn from your experience to

improve our technology and skills. I hope you will find some time to go around and visit some of the historical buildings and perhaps you will enjoy the cuisine which was shown in the video. Prior to Mr. S.M. Khan speech a very beautiful documentary video was displayed on historic city of Lahore, its culture, cuisine, architecture of the great Mughal Empire in Pakistan. Well I wish you a wonderful stay in Pakistan.



In the next step Mr. Masood Akhtar Vice-President of Pakistan Foundry Association also welcomed the foreign delegates and participants. He talked about the history of PFA and its objectives for the up gradation in technology and skills development. To improve the quality of foundry products to meet international standards simulation software has been installed in the Foundry Service Center at University of Engineering and Technology Lahore. He asked local foundry men to get the benefit from this software which is easy to access.

He added that Pakistan Foundry Association is publishing ELEMENT a quarterly magazine having rich material about foundry and castings. it is widely distributed to all foundry men locally and internationally, to academia, students of engineering, metallurgy, materials and all relevant government offices. He suggested those who have not seen it yet please go through it positively. It is also available on our website www.pfa.org.pk.

Pakistan Foundry Association website where you can find substantial material and information related to local and international foundries. There are all international foundry magazines whose links are uploaded on our website and you can get latest updates about the technology and what is latest in the world.





DELEGATES AWARDS

4th International Foundry Congress & Exhibition (IFCE) was a hallmark in the history of Pakistan Foundry Association. We had more than sixty delegates from abroad and to give a feeling of ownership PFA presented momentous to all of them. I am sure 4th IFCE was an event to remember long and this momentous will remind them time and again.





4th International Foundry Congress and Exhibition

Pakistan Foundry Association has successfully organized 4th International Foundry Congress & Exhibition on Dec 05-06 2012 at hotel Pearl Continental Lahore, Pakistan.

Pakistan Foundry Association is a registered organization, member of the World Foundry Organization (WFO) and engaged for the development of foundry sector in Pakistan for technological up-gradation and skills development. The foundry industry is the base for the growth of engineering and allied industries worldwide. For the economical development of Pakistan, the importance of the foundry/ engineering industry cannot be over emphasized.

The 4th IFCE – 2012 provided an opportunity to Investors, machinery manufacturers, foundry supply companies and service providers to showcase their products and services to their counterparts and potential customers and make alliances. The forum also provided a platform to eminent academicians and technologist from worldwide to come together and to discuss advances and technical opportunities.

It is a matter of satisfaction this year we have ever higher number of participation from Pakistan, Italy, UK, Germany, Netherland, Turkey, China, India and Japan etc. Pakistan Foundry Association thanks all foreign and local speakers, technologist, delegates and exhibitors who traveled especially to participate in this mega event and have discussed advances and technical opportunities available in the world.

The objective of Pakistan Foundry Association is to provide a platform for the growth of foundry industry and 4th IFCE was organized to correlate the foundry industries of Pakistan with the latest international manufacturing practices.

Pakistan is set to grow as a producer and exporter of castings expected high growth in auto sector, tractor industry and agriculture machinery, truck and bus sector. Pakistan is still an economical market and our prices are comparable with good quality beside energy crises in the industry.

INAUGURATION OF 4th IFCE



It is my privilege to welcome Mr. Abdul Razaq Dawood, distinguished foreign delegates, commercial consular's, guests, ladies and gentlemen in 4th IFCE. I am pleased to have Mr. Razaq Dawood with us despite all his engagements and the busy schedule. He is an entrepreneur and the chairman of largest business houses in Pakistan and globally recognized businessman, ex-minister for commerce, industry & trade. He spared his valuable time to be with us. He is a source of encouragement for the engineering industry because of his long association.

He said PFA is a very young organization and was established in 2003, and registered in 2004. It is undoubtedly in uphill task with the efforts of executive committee of PFA. It is time to keep this organization moving, expanding and developing interest in our foreign participants to visit Pakistan. I thank them on this special occasion. The last year was very important for PFA because it took couple of initiatives which will push forward, skill development one of our main objectives. We have been able to establish the Foundry Service Center at the University of Engineering & Technology with the help of SMEDA and I will be failing in my duty if I did not mention Mr. Akram Sheikh who was at that time the chairmen of planning commission who provided funds to the government. The institution is now well established within UET and Inshallah we hope to start the classes early next year. Another step in this direction was collaboration with the TEVTA, where we have specifically designed a course for foundry technology and we have already got a class of 25 students being trained for the various foundries, who had sponsored them.



Today, we have participation from China, India, UK, Japan, Italy, Turkey, Germany, Netherland. I am very pleased and thankful to our friends specially from India despite their various difficulties have been able to come across and joined us on this occasion. Today we are also going to provide the opportunities to all our members to interact with foreign delegates and local participants in developing ideas of interaction in the foundry technology, in globalizing our products and to be able to introduce to our foreign friends the local industry and local market potential. We have as you know a large automobile industry about 500,000 vehicles, 80,000 tractors and products from other sectors sugar mills, cement, chemical, fertilizer industries and other heavy engineering products required in the country. We produce almost 400 thousand tons cast iron and different forms of mould metal but there is still a bigger potential of developing parts which are imported in Pakistan.

I think Pakistan is today at the beginning of an era which will I am sure improve the foundry technology industry in Pakistan and we will be able to be one of the global player as we are inspiring to do with all our efforts. I thank you Mr. Razaq Dawood for being with us today, and I thank all the participants and delegates, who have taken time out to be here.

Updates of PFA Activities



Mr. Masud Akhtar - vice president said, PFA is indeed a young organization which was formed in 2003 and became operational in 2004, when the leading foundries realized that technology growth issues cannot produce enormous results unless they are taken up on common platform. Responding to this idea some of the Leading foundries teamed up for creating the structure of this great idea. The mandate was clear for this very important segment of our society, need to be updated and to make competitive locally and globally. PFA conducted number of activities including foundry congress and exhibitions, specific initiatives regarding training and providing a platform to our industries whereby they really to takeoff.

Our objectives are very clear to provide a voice and a strong channel of communication to represent the foundry industry and raised issues at the concerned quarters. He said training is one of our main objectives as most of our foundries are in SME sector. We felt that it is very important to train them effectively & introduce them to the best practices of latest technology available in the market. Helping our members for the import and export activities is another objective and we are doing it effectively and the results are clear demonstration of our plan. Another important area was bridging the gap between academia and industry. It has been talked a lot but our objective was very really to develop an effective linkage with academia and industry to get support from their strength.

He said there are almost 1800 foundries operating in Pakistan, mostly in the SME sector and we have about 350 - 400 thousand tons of casting production with 50% remaining capacity, and we cast ferrous and non ferrous material. In addition to the black material of grey iron all foundries have the capacity and competence to really cast special material steel and duplex style steel. These kinds of steels are very rare and very few foundries in the world have the capacity and capability to do it. Our foundries are primly engaged in manufacturing, casting for auto sector, tractors and to support effectively in the cement sector, chemical, paper, sugar, fertilizer industries by manufacturing consumer parts for them. The agriculture implements are also one of the important areas where our foundries are playing very effective role. So we cover the entire spectrum of the industry and support them very effectively by providing products, parts as OEM.



PFA is indeed a young organization, some of the milestones, we held three IFCEs before and we are in 4th IFCE today, we organized it every alternate year Mahsallah very professionally. This gives an opportunity to our foundries to interact with the international foundry men, suppliers, customers and stake holders to improve technology and increase the business.

We have also provided state of the art foundry simulation software at Foundry Service Center in UET Lahore, to train the students on latest technology as well as offer the service to our foundries so that they can simulate their castings and to identify and diagnose their problems.

Training is certainly an important area for us and we have great strength in it. Our Foundry Service Center has been setup at UET and the first batch will be inducted very shortly. This is really state of the art facility that has been created and I am sure the problem of industry facing shortage of trained man power will be addressed by this initiative. Technical training and seminars we are conducting regularly to update our foundry people about latest technology and techniques in our area.

We also offer internship programs to the students of engineering universities in Pakistan. The students get explore and being trained on the floor about the foundry technology and the industry getting advantage from young students working for them during summer vocations and this has started bringing fruits.

PFA publishes quarterly ELEMENT magazine it has rich contents related to foundry technologies and circulated widely locally and internationally. If you have not seen it I strongly recommend to have a look on it.

PFA has also provided a facility of international foundry magazines and their links are on the website www.pfa.org.pk. That is another facility available to update the knowledge. PFA has a professional website and I recommend to please do visit it for global interaction.

We provide growth potential and are exporting 60 to 70 million dollars castings to almost all parts of the world and this includes high quality of different materials. It is a great achievement of PFA and its members. We are gaining and expanding the market share by increasing our figures every year. It is primarily an offering to the world because we have low labor cost and have a huge domestic market. These two areas give us a very strong advantage to be an important player globally. We also have facility of infrastructure and we can provide comparative infrastructure in very short period of time as well. The environment, skills standard and requirements are not very stringent in our market as globally. So we can offer certain advantages related to this area. Once again I would like to thank all of you to be here and the expression we have that is a clear proof of our progress and commitment of sector in our offering.



It was a matter of great pleasure that Mr. Abdul Razzaq Dawood the Chairman, Pakistan Business Council and Managing Director of Descon Engineering Limited inaugurated the 4th International Foundry Congress & Exhibition. In his inaugural address he said I stand here more as a mechanical engineer than I do as a chief guest being involved in the engineering industry for the last 30 years and going through the various challenges that we all face as engineers in Pakistan. First of all I would like to congratulate the PFA for organizing 4th IFCE and the achievements what they had in such a short time.

I do remember the situation when the association was formed and it is very pleasing to see its members are increasing but more pleasing to see that the association is now slowly and gradually developing into an institution. The association is trying to absorb and bringing new technologies, improving their working methods and quality. It is a matter of pleasure this association is unlike to many others they don't rush to Islamabad to seek protection and favor on any issue rather they look inward into themselves as a collective body to improve themselves and through their own efforts bringing better technology from world resources. I acknowledge that the association is spending a lot of time on skill development in manpower and the availability of skilled labor which will remove the major hurdle and the industries will go running smoothly.

I have heard from Mr. Masud Akhtar - vice president that the foundry industry is getting into the export market and have achieved 60 to 70 million US dollar in the year 2011. Excellent I think it is a good beginning of a small industry and I repute you internally, Please set this self standard, a target that you will achieve a \$ 100 million so you can all work for and achieve it. The real challenge is that you have a big domestic market but while looking at the domestic market do not overlook the great challenge that we have and opportunities in the international market. I do know that some of the member of the PFA have gone overseas and have gone even as far as Central America and are doing a very good job in various industries over there.

I thank foreign delegates very much for coming and visiting us. I want to just say that why Pakistan, why should you look to Pakistan and its engineering industries over all and the foundry business in particular have to offer. Unfortunately we have not a very good perception but my request is go beyond the perception. We are not the people who just read in the headlines we request you people to go into the details and look at our engineering industry. You would see, a group of people who are very eager to learn, willing to look at new technology and have the desire and ability to absorb the new ways of working.

We all are struggling hard to meet the international quality standard, schedule standard and comparable prices. We all work hard and know that we can be and in some cases we are internationally competitive. I asked the members of association please do not forget to go out in the world and reach out your customers. My own personal experience going out to overseas countries for the last 25 years and I can say that in all our endeavors we can be competitive and we all can be good seller of corporate Pakistan. Finally I would like to congratulate all that you are slowly but surely moving forward the foundry industry which is very important industry for people like us. We also love to depend more and more on the effort of this association and from looking at so the cost structure and Inshallah we will be and we can be internationally competitive and meet the standards.

I very heartily congratulate the Pakistan Foundry Association and inshallah you will reach the greater heights. Thank you very much once again.

VOTE OF THANKS

Mr. Shahid Hakeem CEO Bolan Casting (PVT) LTD thanked the chief guest for his presence to grace this event. He specially thanked all foreign guests travelled specially from their home towns to participate in 4th IFCE and hope it is a fruitful trip. He said this time we are having greater number of participant from abroad e.g. India, Italy, Germany, Turkey, Japan, China, UK and Netherland including local participants. He invited all the guests to do come in the next event.

SUPPORTERS/ACKNOWLEDGEMENT

4th International Foundry Congress & Exhibition was organized with the financial support of M/S FOSECO and leading foundry men and members of Pakistan Foundry Association. They were the major contributors and their participation has been acknowledged by presenting them momentous by the chief guest Mr. Abdul Razaq Dawood. They are:

- Mr. Bulent Tutanco Regional Manager, m/s FOSECO Turkey
- Mr. Irfan Aqeel CEO, m/s Millat Tractors (Pvt) Ltd
- Mr. Shahid Ahmen Hakim CEO, m/s Bolan Castings (Pvt) Ltd
- Mr. Ahmed Hassan CEO, m/s Chenab Engineering Works & Foundries (Pvt) Ltd
- Mr. Adil J. Mansoor Chief Executive, m/s Excel Engineering (Pvt) Ltd
- Mr. Masud Akhtar Managing Director, m/s KSB Pumps (Pvt) Ltd
- Mr. Irfan Qadri Director m/s Qadri Group (Pvt) Ltd
- Mr. Pervez Mahmood General Manager m/s Ravi Autos (Pvt) Ltd





Pakistan Foundry Association organized three consecutive programs during this event including scientific sessions, Exhibition of foundry products and sourcing pavilion. Exhibition provided an opportunity to investors, machinery manufacturers, foundry supply companies, service providers and potential customers to make alliances.

The objective of PFA is to correlate the foundry industry of Pakistan with the latest international manufacturing technology and practices to promote the trade and commerce of foundry products in local and international markets.



Mr. Abdul Razaq Dawood opened the exhibition and visited almost all stalls with greater interest. He spent good time at each stalls and appreciated the products developed locally and asked questions about the new technology they have adopted. He greeted and welcomed foreign exhibitors like IMF, RUD, OMEGA, Inductotherm, Magatherm, Electrotherm, Garji, Ajay Sysicon..... present in this mega event.





CERTIFICATE DISTRIBUTION

Mr. Sikandar Mustafa Khan, President PFA personally visited each stall and distributed the certificates of participation to the exhibitors. He thanked them for their endeavors to make 4th IFCE a great success. He welcomed the foreign exhibitors once again and asked them to join us in the next event too.





Scientific Session - 4th IFCE

4th International Foundry Congress and Exhibition organized two events concurrently, exhibition to showcase the foundry products by machinery makers, investors, software companies and foundry suppliers and two days scientific sessions where technical papers were presented.

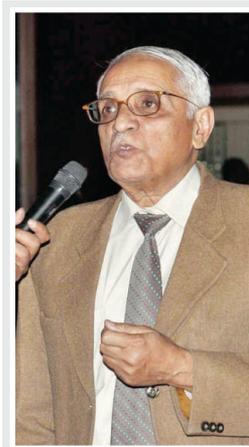
Next to inauguration session six scientific sessions were held in Koh-E-Noor hall, hotel Pearl Continental Lahore. 4th IFCE was efficiently organized and regarded the best event compared to previous three events. It was for the first time that speakers from India, UK, Turkey, Italy, Germany, CBI, and Netherland have presented technical papers of greater interest of the audience including academia, technical managers from various walks of industries including sugar, cement, fertilizer, chemical and engineering industries.

There were about 20 papers presented during six sessions in two days. The objective of scientific session was upgrading knowledge among the foundry men and benefit from the knowledge and expertise in knowledge about latest technologies in the respective field. There were 36 technical paper received from local and international speakers and selected 20 papers after scrutiny by the scientific committee comprised on Dr. Faiz-ul-Hassan Vice Chancellor, Mr. Muneer Ahmad, Mr. Siraju-ud-Din and Mr. Abdul Rashid.



Day-1 (Wednesday-5th December 2012)

Session Chairman: Mr. Javaid Ashraf - CEO Karachi Tools, Dies and Moulds Center			
TECHNICAL SESSION-1	Time	Topic	
	9:30 AM TO 11:00 AM	Keys To Success in the Metal Casting Business Mr. Imtiaz Ali Rastgar - CEO Rastgar Engineering Company	
		Practical application of Process Control in Foundries Mr. Staf Henderieckx CBI External consultant	
		Industrialized Pakistan (World Focus) Maj Gen Muhammad Ovais Mustafa (Retd)-Director General MVRDE – Ministry of Defense Production	



Session Chairman: Mr. Allah Dita - GM Foundry - Excel Engg.

TECHNICAL SESSION-2	Time	Topic	
	12:30 PM TO 13:45 PM	Alphaset Resin presentation	Mr. S. I. D Zion – GM Gargi Huttenes Albertus
		Use of Coal in Molding Sand	Mr. Munir Ahmed- Consultant SMEDA
		Energy Efficient Foundries	Dr Khalid Mahmood Ghauri – Prof of Materials UET Lahore.



It was worth appreciating and great encouragement for us that we had participation for the first time from foreign countries. We are thankful to all those who traveled all the way to participate in 4th IFCE specially Mr. A.V Gupta, Mr. Sushil Sharma, Mr. Dipak Ghosh, Mr. S. I. D Zion, Mr. Subodh Panchel (Kastwel Foundries), Ajaysyscon (Pvt. Ltd.), India, Mr. Staf Henderieckx, Mr. Chris Goldworthy-C.B.I, Mr. Alberto Maracci-IMF, Mr. Reinhard Smetz & Mrs. Renate Knoblauch RUD-Germany, Mr. Benan Betik-OMEGA, Mr. Basar Oztopcular, Mr. Ahmet and Mis Gozdeuliudag-Marmetal Metal-Turkey attended and presented technical papers.

Session Chairman: Pervaiz Mehmood - GM Ravi Autos

TECHNICAL SESSION-3	Time	Topic	
	15:00 PM TO 16:30 PM	Energy Efficiency in Foundry Compressed Air Systems	Mr. Chris Goldworthy – From ComAir Germnay
		The best practical optimization of Co2-Silicate Core Process	Mr. Siraj-u-din Khan- GM Works – Bolan Castings (Pvt) Ltd
		CAST IRON MELTING PRACTICES IN SOUTH ASIAN FOUNDRIES	Dr. V.P. Gupta, Consultant Neo Metallurgicals, Chandigarh, India.



Major General Rehan Abdul baqi Director General of Military Vehicles Research and Development Establishment (MVRDE) introduced himself as an engineer and a soldier also. He said I am bridging between the military, Academia and Industry. No doubt it is a difficult job to deal with the soldiers and academia both simultaneously. I have profound and deep appreciation from the armed forces specially at the highest level for the industry to indigenise military products. It is successful experience in Pakistan and we have all appreciations for the contribution of industries.

He said I would like to share my experience when I was a young officer and technology manager after ten years of my training courses and experience again I was on the road and found the same old building, same manpower, same old machinery, same old processes and no quality control etc. But there were exceptions of development and their children studied abroad, and joined the industry. They brought a meaningful change in their setup. Some of the industries have made relevant foreign collaboration and moving ahead. Today after two decades we are in 4th IFCE at PC Hotel discussing about the latest technology, sharing our experiences, trying to learn and improve. Therefore once again I have all appreciations for PFA who have successfully organized this event.

He heartedly offered that my organization would remain one call away from you and Inshallah you will find us very willing partner in this endeavor. I specially thank our foreign colleagues who are with us today in this event.

Mr. Asim Qadri thanked Major General Rehan Abdul baqi to be here with us and it is a great acknowledgment. It was a great support of you to be here for chairing the scientific session followed by exhibition visit.



Day-2 (Thursday-6th December 2012)

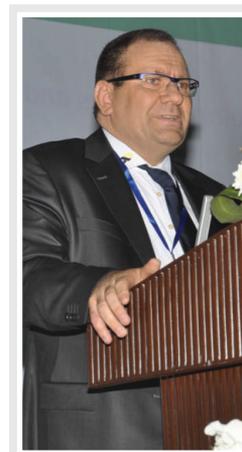
Session Chairman: Maj General Rehan Abdul Baqi - Director General MVRD- Ministry of Defense Production

TECHNICAL SESSION-1	Time	TOPIC	
	9:00 AM TO 11:00 AM	OVERVIEW OF PROCESSING AND CHARACTERIZATION OF ADVANCED SHAPE MEMORY ALLOYS	
		Dr. Fazal Ahmed Khalid - Prorector GIKI	
		Poor Machinability of Grade 17 Cast Iron Casting of Automotive and Tractor Parts	
		Mr. Shoaib Raza---- Allah Ditta---- Excel Engg.	
		Frontiers of Nano Composite Coatings and their Engineering Applications	
Engr. Muhammad Irfan – Head PITMAEM, PCSIR COMPLEX			



Session Chairman: Dr. Faiz-ul-Hassan – Vice Chancellor University of Education

TECHNICAL SESSION-2	Time	Topic	
	11:30 PM TO 13:00 PM	Automation in no bake foundries	
		Mr. Alberto Maracci	
		THE NEWER TRENDS TOWARDS GATING OF CASTINGS USING METAL CASTING SIMULATIONS	
		Muhammad Saqib Qayyum	
		ADVANTAGES OF CHEMICALLY BONDED CORES/MOULDS	
		Mr. Benan Betik	
Colour Changing Refractory Coatings As Quality Control Tool For Various Foundry Sand Systems & Its Economics			
Mr. Sushil Sharma			



Session Chairman: Dr. V.P. Gupta - Consultant Neo Metallurgicals - Chandigarh, India.

TECHNICAL SESSION-3	Time	Topic	
	14:00 PM TO 15:30 PM	Direct reduced iron (DRI) & its uses	Mr. Ali Akhtar-Advisor Business Development-Tuwairqi Steel Mills
		CKE's CASTING CHEMICALS PRESENTATION APPLICATION	Mr. Basar Oztopcular
		Development of Compacted Graphite Cast Iron (CGI) in Ravi Autos	Mr. Pervaiz Mehmood (Ijaz Ai - Manager Ravi Autos)



Mr. Muneer Ahmad-Chairman scientific committee closing the congress remarked I am grateful to all speakers, academicians and foundry consultants who spared their precious time for chairing the scientific sessions and presented the informative technical papers.

Chairmen: Mr. Javaid Ashraf, Mr. Allah Ditta, Mr. Pervaiz Mehmood, Maj General Rehan Abdul Baqi and Dr. Faizul-Hassan chaired the scientific sessions during 4th IFCE.

Speakers: Mr. Imtiaz Ali Rastgar, Maj Gen Muhammad Ovais Mustafa (Retd), Mr. Munir Ahmed, Dr Khalid Mahmood Ghauri, Mr. Siraj-u-din Khan, Dr. Fazal Ahmed Khalid, Mr. Shoaib Raza, Mr. Muhammad Irfan, Mr. Muhammad Saqib Qayyum, Mr. Ali Akhtar and Mr. Pervaiz Mehmood presented the technical papers.

Mr. Asim Qadri, General Secretary- PFA, said I am highly obliged and thankful to all local and international speakers for their technical papers presentations during scientific sessions and regret to those who cannot participate due to visa or other issues.

He said before closing 4th IFCE I would like to thank and pay rich complements to Mr. Abdul Rashid Secretary-PFA, one and only who did his best to successfully organize this event. He did his job so efficiently that everything was smooth and normal. We all are proud of him and to thank he deserves a big hand. He called him on the stage and asked the audience for a big applause.

Mr. Abdul Rashid thanked Mr. Asim Qadri and Mr. S.M Khan for their support and recognition of his efforts and services for a great success and assured even better results in 5th IFCE by the grace of Allah.



Gala Dinner and Musical Evening

Pakistan Foundry Association arranged a gala dinner in which Mr. Sikandar Mustafa Khan was the chief guest and presented momentous and suvinears to foreign delegates who could not participate in welcome dinner. PFA served their guests with the traditional food Lahore fish, mutton karahi, chicken boti, chicken kabab, palak puneer, karri pakora, vegetable rice and assorted salad and deserts. It was really delicious combination of food and enjoyed by foreigners and our own peoples.

To entertain and relax our guests a musical evening was followed up by the dinner. Miss. Sara Raza Khan a popular folk and ghazals singer, famous even in India entertained the audience with beautiful songs. She was given a big applause.





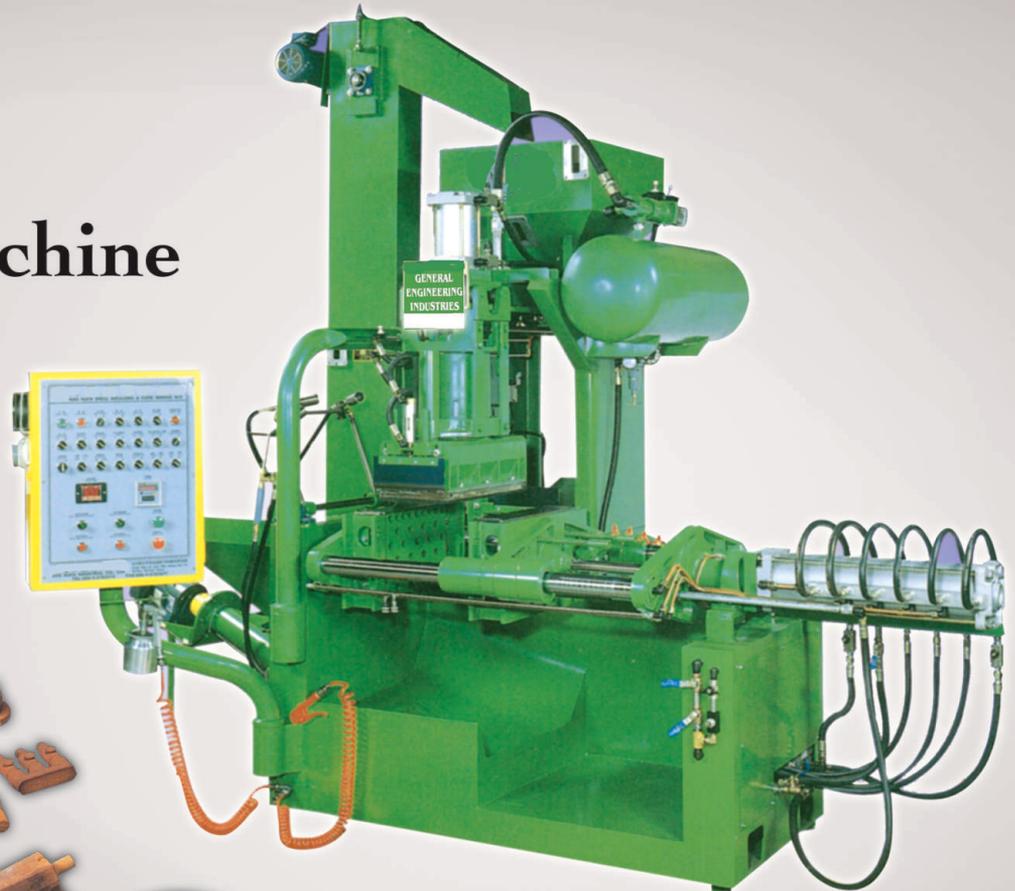
GENERAL ENGINEERING INDUSTRIES

General Engineering Industries has manufactured " PLC base 8" HMI Color Touch Screen, Fully Automatic Shell Core and Mold Making Machine first time in Pakistan. Solid and "Hollow" cores and possible in order to save Resin Coated Sand. The machine is also equipped with auto sand loading into the hopper with recycle sand.

ALA-520, Shell Core / Molding Machine

Made In Pakistan

Resin Coated Sand for Cast Iron and Aluminum foundries is also available from 50 to 80 mesh.



For More
Information Please Contact

E mail: info@g-group.org
Web: www.g-group.org

AMTC™

Pressure Die Casting
Ali Machine Tool Company (Pvt.) Ltd.

POURING PASSION IN YOUR CASTINGS

For decades, AMTC (pvt.) ltd. has provided you with the finest of aluminum die casted components. This has been possible through our utmost commitment towards quality and a drive for new and noble ways of problem solving for our clients.

AMTC Pvt. Ltd realizes the need for constant improvement result of which, today AMTC Pvt. Ltd has one of the largest pressure die casting setups, in Pakistan. In addition to automated die casting machines, AMTC Pvt. Ltd houses a state of the art machining and CNC center. Furthermore, our finishing dept. provides polishing, blasting and liquid painting. A well established network of international suppliers enables us to be flexible and proactive in designing your solution.

We at AMTC produce safe, quality assured and time tested components for the future.

www.amtcdiecasting.com
info@amtcdiecasting.com

Head Office & Plant 1

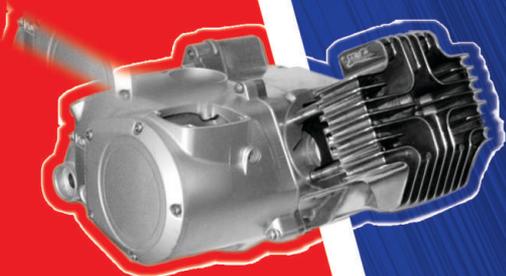
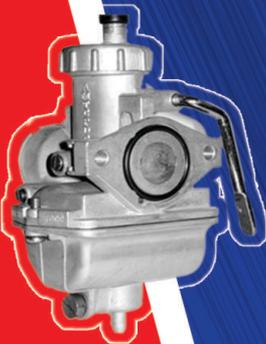
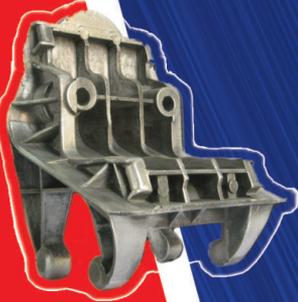
Plot No. B-20, Sindh Industrial & Trading Estate (S.I.T.E.),
Super Highway, Karachi, Pakistan.

Tel: +92 21 36881101, 36881103
Fax: +92 21 36881102

Plant 2

46-KM, Multan Road, Adda Nathey Khalsa,
Chunian Industrial Estate,
District Kasur, Pakistan.

Tel: +92 49 4540123, 4540601
Fax: +92 49 4540599



46th Census of World Casting Production

The 2011 census shows annual casting production's return to pre-2008 levels.

A Modern Casting Staff Report



PRODUCTION PER PLANT

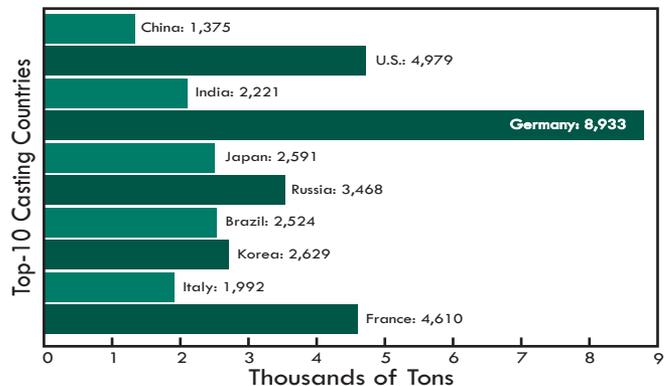
In 2011, world casting production returned to pre-2008 levels, at 98.6 million metric tons, marking a 7.5% increase vs. 2010, according to this year's MODERN CASTING Census of World Casting Production. Indeed, the figure has exceeded the 2007 peak of 94.9 million metric tons, indicating the global metalcasting industry has emerged from the economic downturn.

Twenty-eight of the 37 countries that provided census data reported growth in annual volumes for 2011. Five countries reported contraction. Belgium is down 53%, with 51,035 fewer metric tons produced vs. 2010.

Denmark, Pakistan, Slovenia and South Africa also reported contraction.

This is a greater number of contracting countries than in 2010, but it was offset by dramatic growth in countries including Bosnia and Herzegovina (169%, producing an additional 31,770 metric tons), the Czech Republic (34%, an additional 115,568 metric tons) and the U.S. (21.5%, an additional 1,769,767 metric tons). Growth in countries that showed the largest gains in 2010 has slowed but not stopped, with Brazil reporting a 3% casting production increase vs. 41% from 2009 to 2010, and Taiwan coming in at 11% vs. 42% from 2009 to 2010.

The U.S. narrowly overtook India on this year's top 10 list, regaining the 2nd spot, while the remaining cast metal producing country rankings are the same. China is number one, having produced 41.3 million metric tons in 2011. The U.S. produced 10 million metric tons, followed closely by India at 9.9 million metric tons. Japan closely surpassed Germany with 5.47 metric tons. Russia, Brazil, Korea, Italy and France occupy spots six through 10 on the list. The top 10 nations produced 88% of the total global castings, as in 2009 and 2010.



Eight of the top 10 nations reported growth in productivity per plant (calculated as total tonnage divided by number of plants) in 2011. Of the top 10, the U.S. showed the greatest increase at 24.5%, followed by Germany at 14.4%.

Production per plant is another area where gains in the U.S. are showing, at 24.5% vs. 2010 (4,979 metric tons per plant). Germany's productivity increased significantly, also, at 14.4%. Germany remains the most productive country at 8,933 metric tons per plant. Asia suffered a dip in productivity, with China down 9.7% and Japan dropping 12%.

Productivity is calculated as total tonnage divided by the number of plants reported.

Gray iron continues to comprise 48% of the world's ferrous metal castings vs. 25% ductile iron and 10% steel. Of the nonferrous metals, aluminum takes the lion's share at 13% of the global total. Nonferrous castings overall increased by more than 1 million tons.

The data reported in the 46th Census of World Casting Production is supplied by each nation's metalcasting association or similar representatives. Countries that did not participate this year were Croatia, Mexico, Mongolia and the Ukraine. These countries remain listed according to the last year they participated.

Slovakia has returned to the list, this year, producing 71,000 metric tons. Its metalcasting output has increased 56% since 2008, with the majority of its

tonnage in aluminum (46,000 metric tons). Its iron production trends to ductile at 18,200 metric tons vs. 2,700 metric tons gray iron.

Economic Rebound

Global casting production has returned to pre-2008 levels, but some countries continue to lag. Despite a devastating tsunami and nuclear disaster, Japan showed 15% growth in 2011, yet the country remains below its 2008 level. Among the other top 10

producers, U.S. casting volumes have not yet exceeded the 2008 figure. Russia remains significantly below its 2008 volume, while China, India and Korea have exceeded their prerecession levels.

Other countries reporting production above their 2008 volumes include Hungary, Poland, Portugal, Slovakia, South Africa and Turkey.

World Totals

Gray Iron	Ductile Iron	Malleable Iron	Steel	Copper Base	Aluminum	Magnesium	Zinc	Other Nonferrous	Total
45,870,050	24,782,540	1,381,461	10,342,738	1,799,294	13,197,181	181,931	505,614	532,313	98,593,122

The Americas

Country	Gray Iron	Ductile Iron	Malleable Iron	Steel	Copper Base	Aluminum	Magnesium	Zinc	Other Nonferrous	Total
Brazil	1,963,556	812,467	23,177	270,302	14,245	251,640	4,617	3,681	-	3,343,685
Canada	378,394	-	-	92,131	14,560	221,083	-	-	-	706,168
Mexico*	771,700	58,947	-	78,746	140,701	600,469	109	1,007	-	1,651,679
United States	2,962,000	3,841,000	102,000	977,000	263,000	1,523,000	99,000	181,000	60,000	10,008,000

* 2010 data

Europe

Country	Gray Iron	Ductile Iron	Malleable Iron	Steel	Copper Base	Aluminum	Magnesium	Zinc	Other Nonferrous	Total
Austria	40,600	101,600	-	18,600	-	129,438	5,937	13,717	-	309,892
Belgium	38,000	6,800	-	-	-	823 ^A	-	341	-	45,964
Bosnia and Herzegovina	9,661	2,667	-	5,316	-	7,550	-	-	25,394	50,588
Croatia*	22,107	17,375	-	1,313	459	11,652	-	230	661	53,797
Czech Republic	198,068	57,953	15,621	94,013	4,842	80,049 ^A	-	8,545	8,554	459,945
Denmark	31,800	47,400	-	-	1,273	3,172 ^A	-	-	290	83,935
Finland	28,126	46,359	-	17,008	3,575	4,032	-	222	-	99,322
France	734,500	831,600	-	108,900	19,964	326,777 ^A	-	22,628	2,457	2,046,826
Germany	2,541,011	1,698,235	35,139	217,548	78,109	843,745	14,890	37,939	80	5,466,696
Hungary	27,629	23,171	12	6,027	1,303	99,412	570	3,710	167	162,001
Italy	692,298	469,051	-	73,658	73,830	833,000	6,850	63,800	800	2,213,287
Norway	15,505	38,995	-	3,661	1,274	5,695	-	-	-	65,130
Poland	471,800	143,800	17,600	71,400	8,411	256,112 ^A	-	14,628	-	983,751
Portugal	41,274	77,882	-	8,475	8,470	15,490	-	476	-	152,067
Romania	36,812	2,054	927	23,091	6,168	43,499	8,000	83	19	120,653
Serbia	34,140	15,961	11,856	10,260	2,607	4,129	-	1,520	3,950	84,423
Slovakia	2,700	18,200	-	4,100	-	46,000	-	-	-	71,000
Slovenia	76,765	33,205	2,556	37,723	1,582	30,377	650	2,910	210	185,978
Spain	444,900	584,200	5,100	77,200	9,664	112,989 ^A	-	9,056	647	1,243,756
Sweden	176,500	52,800	-	22,800	10,600	40,800	2,200	3,600	-	309,300
Switzerland	20,400	40,500	-	1,900	2,127	20,826 ^A	-	1,436	-	87,189
Ukraine**	640,000	40,000	-	275,000	-	45,000 ^B	-	-	-	1,000,000
United Kingdom	146,000	216,000	3,800	76,000	11,000	114,500	-	8,600	1,000	576,900

* 2010 data ** 2009 data A) Includes magnesium B) All nonferrous

Asia

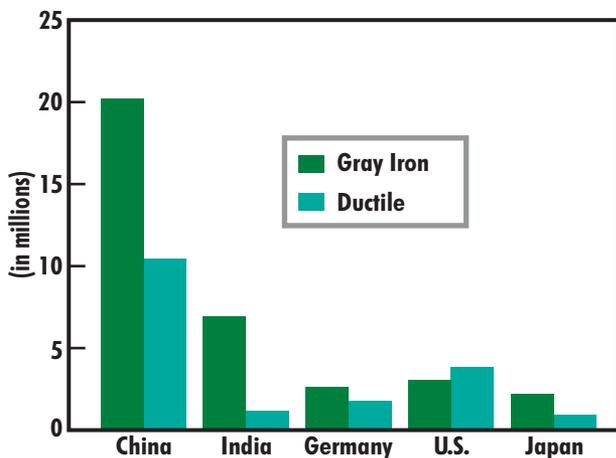
Country	Gray Iron	Ductile Iron	Malleable Iron	Steel	Copper Base	Aluminum	Magnesium	Zinc	Other Nonferrous	Total
China	19,680,000	10,375,000	415,000	5,395,000	830,000	4,150,000	-	-	415,000	41,260,000
India	6,798,000	1,090,000	66,000	1,140,000	-	900,000 ^B	-	-	-	9,994,000
Japan	2,190,245	1,635,500	39,513	218,181	83,140	1,272,528	-	28,487	6,414	5,474,008
Korea	1,054,500	652,000	22,100	160,600	25,500	413,400	-	-	12,100	2,340,200
Mongolia*	2,000	220	-	12,000	60	180	-	-	240	14,700
Pakistan	224,000	24,000	-	50,000	16,000	8,000	-	-	-	322,000
Russia	1,857,600	897,840	340,560	731,000	56,760	373,670	33,110	9,460	-	4,300,000
Taiwan	744,459	232,258	-	71,085	35,070	283,144	5,698	73,838	2,030	1,447,582
Turkey	625,000	480,000	5,500	152,700	13,000	145,000	-	12,500	-	1,433,700

* 2010 data B) All nonferrous

Africa

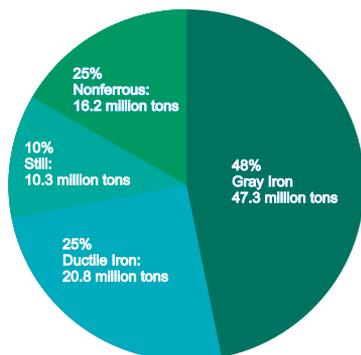
Country	Gray Iron	Ductile Iron	Malleable Iron	Steel	Copper Base	Aluminum	Magnesium	Zinc	Other Nonferrous	Total
South Africa	148,000	117,500	-	115,000	17,000	25,000	300	2,200	-	425,000

GRAY IRON VS. DUCTILE IRON



Top 5 Producers of Iron Castings

Globally, 47% of iron castings produced are in gray iron, compared to 24% produced in ductile iron. But this type of disparity is not present in every country. Denmark, Finland, France, Norway, Portugal, Slovakia, the U.K. and the U.S. produce more ductile iron than gray iron.



Gray iron (the calculation includes malleable iron) continues to be the largest contributing material to global production, at 47.3 million of the 98.6 million-ton total. Ductile iron remained close to 2010 levels and steel showed a slight decrease in tonnage, while nonferrous materials increased by more than 1 million metric tons.

Metalcasting Plants by Nation

Country	Iron	Steel	Nonferrous	Total
Austria	27	4	39	70
Belgium	19	7	7	33
Bosnia and Herzegovina	4	6	3	13
Brazil	545	201	579	1,325
Canada*	38	27	110	175
China	-	-	-	30,000
Croatia*	15	3	24	42
Czech Republic	86	33	59	178
Denmark	9	-	11	20
Finland	14	6	16	36
France	96	37	311	444
Germany	215	53	344	612
Hungary	24	7	36	67
India	-	-	-	4,500
Italy	154	43	914	1,111
Japan	808	78	1,227	2,113
Korea	515	145	230	890
Mexico*	175	167	339	681
Mongolia**	24	15	3	42
Norway	7	3	8	18
Pakistan	1,700	50	150	1,900
Portugal	35	7	39	81
Romania	51	43	55	149
Russia*	-	-	-	1,240
Serbia	16	15	17	48
Slovakia	12	7	32	51
Slovenia	12	3	50	65
South Africa	43	53	84	180
Sweden	32	13	72	117
Switzerland	18	4	50	72
Turkey	597	68	395	665
United Kingdom	226 ^s	-	210	436
United States	643	362	1,005	2,010
TOTALS	6,130	1,459	6,371	49,391

*2010 data ** 2009 data s = includes steel

TOP-10 CASTING PRODUCERS

1. China



41,260,000 metric tons

Gray iron: 2,009,500 tons
 Ductile iron: 10,375,000 tons
 Steel: 5,395,000 tons
 Nonferrous: 5,395,000 tons

6. Russia



4,300,000 metric tons

Gray iron: 2,198,160 tons
 Ductile iron: 897,840 tons
 Steel: 731,000 tons
 Nonferrous: 473,000 tons

2. u.S.



10,008,000 metric tons

Gray iron: 3,064,000 tons
 Ductile iron: 3,841,000 tons
 Steel: 977,000 tons
 Nonferrous: 2,126,000 tons

7. Brazil



3,343,685 metric tons

Gray iron: 1,986,733 tons
 Ductile iron: 812,467 tons
 Steel: 270,302 tons
 Nonferrous: 274,183 tons

3. India



9,994,000 metric tons

Gray iron: 6,864,000 tons
 Ductile iron: 1,090,000 tons
 Steel: 1,140,000 tons
 Nonferrous: 900,000 tons

8. Korea



2,340,200 metric tons

Gray iron: 1,076,600 tons
 Ductile iron: 652,000 tons
 Steel: 160,600 tons
 Nonferrous: 451,000 tons

4. Japan



5,474,008 metric tons

Gray iron: 2,229,758 tons
 Ductile iron: 1,635,500 tons
 Steel: 218,181 tons
 Nonferrous: 1,390,569 tons

9. Italy



2,213,287 metric tons

Gray iron: 692,298 tons
 Ductile iron: 469,051 tons
 Steel: 73,658 tons
 Nonferrous: 978,280 tons

5. Germany



5,466,696 metric tons

Gray iron: 2,576,150 tons
 Ductile iron: 1,698,235 tons
 Steel: 217,548 tons
 Nonferrous: 974,763 tons

10. France



2,046,826 metric tons

Gray iron: 734,500 tons
 Ductile iron: 831,600 tons
 Steel: 108,900 tons
 Nonferrous: 371,826 tons



Europe's total production is 10% below 2008 levels, and North America's production is down 7% vs. 2008. Russia remains nearly 45% below the production level reported in 2008, with China (23%) and India (47%) showing the most impressive gains.



Collaboration of

GOLDEN & SAER®

Bringing Advance Pumping Technology in Pakistan

CUTTING EDGE PUMPING SOLUTIONS

SAER is one of the world's largest companies which covers a wide range of water pump technologies and has more than 50 years of experience, enabled GOLDEN to share its advance usage procedures and upgrade pumping technology in Agricultural, Industrial, Domestic and Public Sectors.

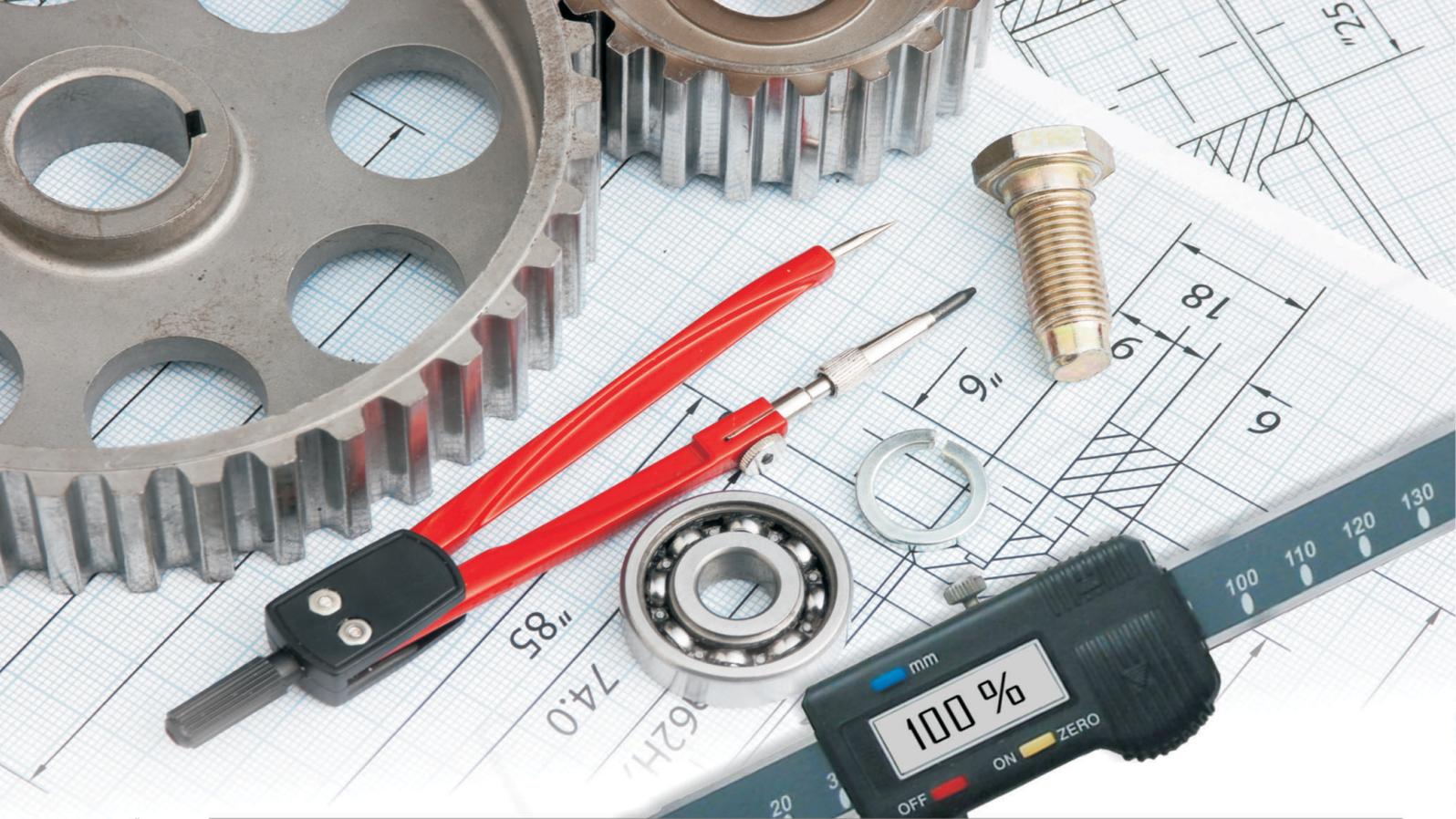
For Life



GOLDEN PUMPS (PVT) LTD.

Ph: 055-3842756, 4243280 www.goldenpumps.com





EXCELLENCE WITH COMMITMENT

Bajwa Agro Industries was founded in 1947 and rejuvenated in 1975; casting in Ferrous and non-Ferrous material as well as specialized in ductile Iron. Our latest technology helps us to maintain higher standards of excellence of OEM's parts with the number of quality according to



BAJWA AGRO INDUSTRIES (PVT) LTD.

A Reference Point for OEMs

6-Jehangir Road, Bhogiwala, BaghbanPura, Lahore-54920 Pakistan
 Tel: +92 42 6822327 / 6824541 / 6833007 Fax: +92 42 6813977
 info@bajwagroup.com www.bajwa.com.pk

All the trademarks are the property of their respective owners

PRACTICAL APPLICATION OF PROCESS CONTROL IN FOUNDRIES

Mr. Staf Henderieckx- CBI

Each company, which means also foundries, must optimize its profit in order to enable a long lasting beneficial life time. This is very clear in times as are nowadays: world crisis.

All over the world, a lot of literature about Six Sigma, Theory of Constraints, 5M, 5S, Lean manufacturing... are available. And foundries, maybe except highly automated serial foundries, do think that these techniques are not suited for them. Is this right?

Every foundry works with material and processes that follow the "law of nature", which is equal for everyone all over the world. So, using basic common sense, will be required. Techniques are depending on the nature of the foundry, the product, the condition of the foundry, the know how available... Common sense will be required in all companies, also in foundries. But do we use it properly?

Process control consist of two parts: process and controlling.

Process

The process should be identified properly in a way that each activity is known. These activities are more than pattern making, moulding, core making, melting and pouring, heat treatment and fettling! Each of them consists of many partial activities. Just take melting as an example: raw material charging, slag removing, temperature testing... And what about internal transport of patterns, moulds, metal, poured moulds, shake out castings, fettled castings... And what about inspection by quality control employees?

The activity inventory is classified in three groups: value adding, non-value adding and problem related. The customer does only pay for the value adding activities, not for the other ones (non-value adding are transport, storing between operations and repair)! It is fact to evaluate the necessity of the non-value adding activities as well as problem related ones. Are they really required and or can they be decreased in cost?

Just make the example of the real time spent (not required) for all the activities and compare the time for the value adding activities to the total time spent. This can vary from 15 to 35 %, and is seldom more if process control is not used. This indicates that your lead time is much too long and that the WIP (Work In Progress) is too high. WIP is sleeping capital and consuming interest (bank cost) and decreasing the money available for new investments.

Concerning lead time, there is an example of cooling in the mould. How long is required? Example is grey iron, which is mostly pearlitic. Does a pearlitic structure have problems if shaken out at 600 °C or even at 800 °C? Does an austenitic stainless steel have problems if shaken out at 800 °C? If not, how many time can be saved in your foundry? Is it better for the quality of the re-used mould sand if the casting is shaken out earlier?

What about the in process inspections? They are mostly started after a problem (rejection or rework) happened. The problem is solved but the inspection remains. Example is a core shooter. Due to a leaking seal, the core strength was too low. The seal is repaired and cores are checked every hour to assure proper castings. But why not done by the operator and why not at a much lower frequency or why not removed totally?

Why are the process inspections done by quality department people? It is sure that the operators (or at least the department leader) do know much more about the process and they know when a process operation result is tricky. Let them check when it is required and they can do it without extra time / cost and no defect will escape. Or do we not trust them because we have not trained them or not provided them with the proper measuring tools?

Do you coat cores in cold box with water based coatings (and dry them) to assure a proper surface condition? Is this required? If the coating is not properly applied or dried, the casting surface will be anyhow not correct. Do you know about a no-coat additive? This addition is much better controllable and less vulnerable to miss-use.

Why do we leave poured castings in the mould until they are below 200 °C?

We know that pearlitic irons do not have any problem with hot shake out, on the contrary, it will benefit the pearlite formation. And ferritic structure iron? The ferrite is formed above 600 °C, so below this temperature they can be shaken out.

Why do the moulds stay at the pouring area for hours? We can calculate when the metal is solidified and after solidification, they can be transported without any problem. What happens in automatic pouring lines (DISA...), they move immediately.

Leaving them at the spot is occupying a lot of space and increase the value of WIP.

Control

When the process, which is the sum of all activities, is set to the “best” extend, the castings will be according to the required quality, deliverable in (a short) time and have the lowest possible cost. This process must be frozen and controlled. This control is the second part of Process Control.

If, during the production, rejection or rework appears, what is happening? The rejections are appearing due to two reasons.

Firstly, there are a high number of influences affecting the activities and we will have to control them. But to control them, we have to know / inventorize them and these influences are different from foundry to foundry. These influences have to be controlled by setting limits.

Secondly the process is not followed as it was for the good castings. If we had done the same, the result had been the same because the law of nature is equal now and before and it does not cheat you. So, it is fact to find the difference.

The influences can be categorized according to the 5M-method: Method, Machines, Material, Man and Management. These types of causes leads to the “root” cause of the problem and will solve it for all future castings.

Methods (or instructions) are mostly not incorrect because if this is the case, the rejection rate would be very high, if not 100 %. But they are mostly “incomplete”. As an example, the pouring temperature of 1520 °C. No-one can continuously pour at this temperature, there is a need for a temperature range: 1510 – 1520 °C.

Does the method have a chapter “What if?” or “Problems”? No, why does every equipment manual have it and we do not provide it for our operators? Are they so clever that they will solve it themselves and everyone will solve it in an identical way?

Machines (or equipment and tooling) are subject to wear and decreasing quality. They must be monitored and controlled regularly. Not only measuring tools and patterns but also production equipment and templates.

Material (or everything that is purchased and subcontracted) must be assured by certificates. But are these certificates reliable? Do we have the good purchasing specifications (especially technically) to get the correct material?

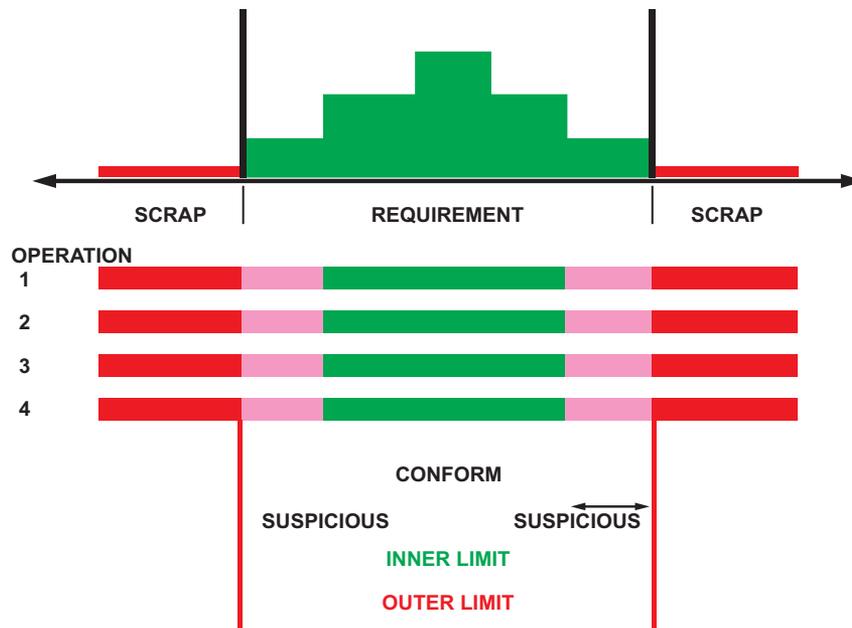
Men (or human activity) is the most difficult influence because it is unpredictable in frequency and severity. It depends not on the incomplete methods..., but just human mistakes, which we all make.

Management is a more difficult influence because they can decide anything but... Do they take orders for which the company does not have or not sufficiently have the knowledge and experience and or proper equipment? If yes, the operators, engineers... cannot be blamed for problems. And anyhow, a company has to progress (with new orders, new type of castings...) but in a controlled way.

Every process influence will lead to particular type of defects. Did we inventory these defects? We only have to do it once and then it can be used as a checklist in case problems are appearing.

And are we setting up the FMEA-file of our castings because the customer is requiring that? We have to do it for ourselves because it can indicate “critical” area for defects and when we know it, we can pay attention to it. The critical items can be provided with proper limits in order to prevent defects. These limits will be double limits:

action limits and scrapping limits. Results located inside the action limits are perfect and the operator can proceed without any problem. Results located between the action and scrap limits are more serious (suspicious) and require the operation leader (together with the operator) to take action and follow-up the result of the action. This has a huge learning effect for the ones that act / produce.



Conclusion

Process Control is using the common sense of all employees and controlling all activities properly. There is no direct need for sophisticated techniques although they can help.

A foundry using Process Control in the proper way can:

1. reduce the rejection level to less than 2 % for serial production and less than 4 % for batch type production
2. decrease the delivery times by 25 (serial production) to 50 % (batch production)
3. decrease the WIP (Work In Progress) volume and value by more than 30 %
4. decrease the cost significantly (different from foundry to foundry).

This all by just using your (everyone in the company) common sense and start applying it with the tools and possibilities that are available for them.

CBI, government organization of the Netherlands, has a program for assisting SME companies in Pakistan to export to the EU-countries. Companies, participating the program will be assisted from the Netherlands (external consultants) and from Pakistan (local consultant).

CBI has already organized and think again on re-organizing training for applying of Process Control.

All information can be found on www.cbi.eu.

Staf Henderieckx

Product Consultant CBI (Castings, forgings and subcontracting)

Familiar with Asia and Europe concerning foundries and metal working industry

Foundry specialist since 1970 (www.gietech.be)

ELEMENT

Your Guide to Foundries in Pakistan

To enhance the corporate image
of your company
And to grow your business

Advertise in

Rate for Local Companies:

Rs. 20,000/- (A4 Size)

Rate for Foreign Companies:

\$ 400/- (A4 Size)

Contact: Abdul Rashid Secretary – PFA
93 –B, Hali Road, Gulberg II, Lahore – Pakistan.

Ph#: +92-42-35753619 / 042-35023525,

Cell#: +92-322-8487873

Email: info@pfa.org.pk /

pakistanfoundryassociation@gmail.com,

URL: www.pfa.org.pk



RASTGAR

www.rastgar.com

Air Compressors

©hydrovane

The ©hydrovane series rotary sliding vane compressors are reliable, versatile, powerful, and cost effective.



HV75RS

10 year
Advance™ warranty

Vane
Technology

Direct Drive

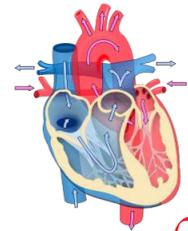
Regulated
Speed

Low Noise

Saves you
Money!

Energy Saving
Model

We Help You Keep
Pumping



Compressed Air



HV45



HV15

 **CompAir**

RASTGAR & CO
111 - 727 - 777

RASTGAR & COMPANY (PVT.) LIMITED

Darul Uloom Plot # 9, Shahrah-e-Darul Uloom, Sector 28, Korangi Industrial Area, Karachi-75180, Pakistan

Fax: +92 21 35123112

Email: ko@rastgar.com

Web: www.rastgar.com

KARACHI

LAHORE

ISLAMABAD

• SALES • SERVICES • SPARES • SOLUTIONS



QADRI GROUP COMPANIES

experience of a 100 years



Manufacturers & Exporters of Heavy Plant & Equipment
for Industrial Sectors including Sugar, Cement, Steel, Chemical, Power



- Qadri Brothers (Pvt.) Ltd.
- Qadcast (Pvt.) Ltd.
- Qadri Foundry (Pvt.) Ltd.
- Qadbros Engineering (Pvt.) Ltd.
- Qadri Engineering (Pvt.) Ltd.
- Qadri Forge (Pvt.) Ltd.
- Qadri Sons (Pvt.) Ltd.
- Kashif Trading (Pvt.) Ltd.

CORPORATE OFFICE

Sharif Centre, 72-A Izmir Town, P.E.C.H.S, Canal Bank, via Thokar Niaz Baig, Lahore-53800, Pakistan
Tel: + 92-42-3 596 1761~65 Fax : + 92 42 3 596 17 66 Email: info@qadbros.com

www.qadrigroup.pk

POOR MACHINABILITY OF GRAY CAST IRON

(Tractor & Auto Parts)

Mr. Allah Ditta

Often Foundries receive complaints from Machine shop about poor machinability . Although hardness is within specified range but still problems arise during machining. In local language of machining operators, the material is “CHEERHA”.

In this article we have tried to explain the reasons of poor machinability which are:

- A. Metal Composition.
- B. Poor Graphitization potential of molten metal.
- C. Pouring Temperature.
- D. Under cooling Temperature of molten metal.
- E. Poor Inoculation.

A. Composition

Gray cast Iron is an alloy of Iron, Carbon, Silicon and Manganese with sulphur and Phosphorus as impurities. For Tractor and auto parts, Foundries are producing mostly Grade 17 cast Iron. It has tensile strength as 260 N/mm^2 . The composition of metal depends on average wall thickness of casting and therefore Foundries are asked to control Tensile Strength and microstructure. In general, range of carbon, silicon and manganese is as follows;

● Carbon	3.0%	to	3.2%
● Silicon	1.6%	to	1.9%
● Manganese	0.6%	to	0.8%
● Phosphorous	0.1%	max.	
● Sulpher	0.1%	max.	

According to average wall thickness of casting the percentage of carbon, Silicon and Manganese will be adjusted to achieve required Tensile Strength.

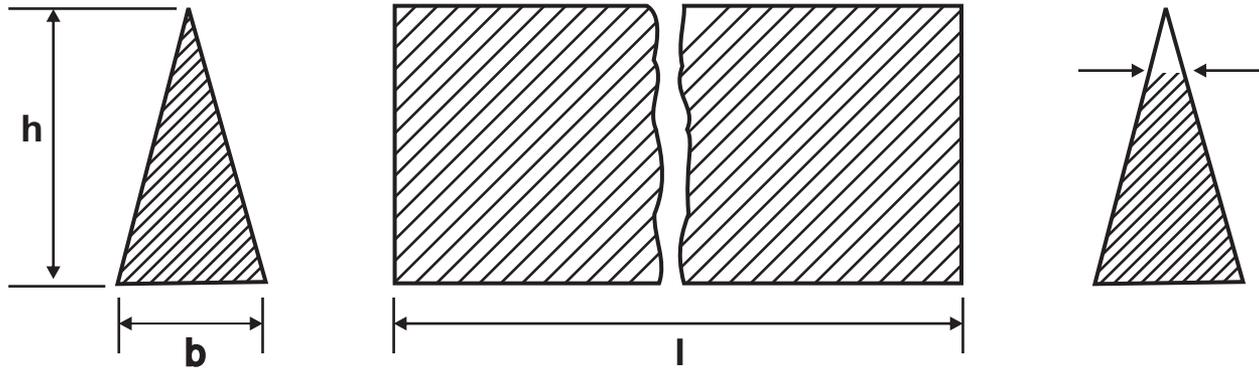
Molten metal should be prepared strictly according to specification. Presence of tramp elements like Molybdenum, Chromium, Vanadium, Tungsten etc should be controlled to lesser than 0.01%. The Source of tramp elements is scrap purchased from the market or Pig Iron produced with steel Scrap.

B. Poor Graphitization Potential of Molten Metal

Primary melting methods influence the graphitization potential of molten metal.

Metal melted in Cupola has more graphitization potential as compared to metal prepared in Electric furnace. In Electric furnace long holding time and high degree of super heating decreases graphitization potential of molten metal.

To check graphitization potential of cast Iron, a simple method is wedge chill test on the Foundry floor. Wedge chill test should be frequently used to check graphiting potential of metal as a routine, even if full laboratory facilities are available. The dimensions of wedge chill sample are shown.



Base (b)		Height (h)		Length (l)	
mm	in	mm	in	mm	in
6	¼	11	7/16	57	2¼
13	½	22	7/8	100	4
19	¾	38	1½	127	5
25	1	57	2¼	127	5

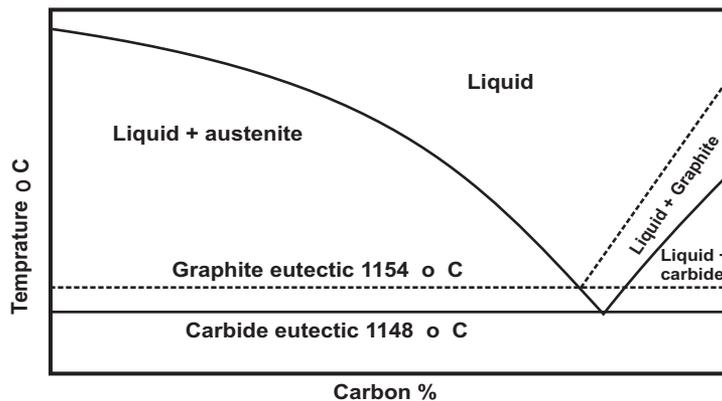
C. Pouring Temperature

The best pouring temperature for grade 17 Cast Iron is between 1390°C to 1420°C. When thick sections are poured at temperature higher than 1420°C, Shrinkage or sink defects will appear in casting. When pouring temperature is lesser than 1390°C in thin walled casting, the edges and corners of casting will solidify as white which is difficult to machine. A further decrease in pouring temperature to lesser than 1370°C, will cause blow hole in casting, which reveal after machining.

Therefore selection of proper pouring temperature is very important to improve machinability.

D. Undercooling in Gray Cast Iron

The concept of undercooling has to be understood by Foundry men. In Cast Iron portion of Iron Carbon diagram, if the molten solidifies at the temperature of the carbide range. It will solidify as white. If the solidification takes place at the temperature in the graphite range it will solidify as grey.



In simple words at lower solidification temperature, most of the carbon remains in combined form as Fe₃C. There is little time for graphite to solidify as free. Hence, the casting will be difficult to machine.

Equilibrium Solidification does not take place in most Foundry Conditions due to following reasons:

- Variation in metal chemistry.
- Less pouring temperature.
- Solidification rate.
- Section thickness etc.

As a result metal will cool below eutectic temperature before start of solidification. The process of solidification of metal below eutectic temperature is called undercooling (ΔT). If the undercooling (ΔT) is slight, randomly oriented graphite flakes form uniformly in the matrix. These are known as “A” type Graphite flakes. As the undercooling (ΔT) increases, the Graphite will branch forming abnormal patterns.

This is called B type flakes. A further increase in the undercooling (ΔT), will suppress the formation of Graphite and result in hard iron structure of D & E type Graphite flakes with ferrite matrix.

The metal is non-uniform and weak in strength. It will be difficult to machine. If at all it is machined, it will fail in service.

The undercooling (ΔT) in Gray cast Iron molten metal can be controlled by use of proper Inoculation. With controlled addition of inoculating material in molten metal, at the time of pouring, a large number of nuclei are formed which are starting point of solidification. As the solidification from nuclei starts, latent heat is dissipated. This latent heat controls the undercooling (ΔT) and overall solidification temperature of molten metal, in the mould, remains in graphite range.

In the Carbon Equivalent Equipment used for checking CEL, Carbon and Silicon, Programmes are available which indicate undercooling temperature (ΔT). The best undercooling temperature for grade 17 casting is between 6°C to 12°C .

E. Poor Inoculation

Inoculation is a process which controls the microstructure and properties of cast Iron, minimizes undercooling and increases the number of nucleation events during solidification.

Traditionally inoculants are based on Graphite, Ferro Silicon and Calcium Silicide.

The most popular Inoculant is Ferro Silicon, containing small quantities of elements; Al, Ba, Ca, St, Ti and Zr etc. Unfortunately most of the Inoculant materials available in Pakistan are simply crushed Ferro Silicon.

Therefore these do not work as effective Inoculants.

Inoculation changes the structure of Cast Iron by altering the solidification process.

The role of Inoculant is to produce nuclei in the liquid Iron melt, which enhances the Graphite nucleation at very small undercooling temperature. As a result, the formation of type “A” graphite microstructure in Gray Iron casting and very high number of Graphite nodules in Ductile Cast Iron will be promoted.

The benefit obtained by Inoculation Process is to achieve desired microstructure and mechanical properties in Gray Iron. The process of Inoculation is important and mandatory in Gray Cast Iron.

Inoculation in cast Iron facilitates:

- Graphitization.
- Formation of A type graphite flakes with minimum D & E type flakes.
- Refining the flake size.
- Promotion of pearlitic matrix.
- Elimination of formation of iron carbide in thin sections, corners and edges of castings.
- Reduction in section sensitivity.
- Increase in nodule count in S.G Iron.
- Improvement in strength.

Pre-requisites for Successful Inoculation

A certain degree of undercooling is required during solidification. This is achieved by addition of calculated amount of Inoculant in the melt just before pouring.

The Inoculating material e.g, Al, Ba, Ca, Sr, Ti, and Zr etc. are added through Ferro Silicon which is carrier of Inoculant material. The carrier should have following properties;

- Provide fast and homogenous distribution of nucleant in the melt.
- Have composition, which is comparable with the analysis of the melt.

- Form an alloy between nucleant and carrier.
- Should have melting temperature lesser than pouring temperature of cast Iron.
- Be Cost efficient.

Addition Techniques and size of Inoculants

To obtain full benefits of Inoculating process, following points are to be taken care of:

- Inoculant should not be put at the bottom of ladle followed by pouring. Inoculant becomes oxidized and its effectiveness will hamper.
- Inoculant should not be added on top of the ladle after it is full. The slag on top of the ladle will not allow Inoculant to be in contact with molten metal. It can be added at slag free surface of molten metal and manually mixed with iron rod.
- Quantity of Inoculant to be added should be weighed according to the quantity of metal in the ladle.
- The size of Inoculating Material is very important. The size can be 4 mm to 10 mm for ladle addition. For metal stream Inoculation size of 1-3 mm is good. Fines in Inoculants should be separated before addition of Inoculant in the metal.

Following are some method for addition of Inoculant in molten metal:

i: Ladle Addition

It is good technique to add Inoculant to metal stream, while transferring molten metal from furnace to ladle or ladle to ladle. The approximate addition time is 70% of ladle filling e.g, if metal is being transferred from Furnace to ladle in 60 Seconds, then time spent on addition of Inoculant should be between 40 to 45 Seconds. It is better to add inoculant, when one third metal is filled in the ladle. In ladle addition Inoculant Quantity is from 0.2% to 0.5% of metal in the ladle.

ii. Metal Stream Inoculation

In this method, the Inoculating material is fed along with the metal stream into the mould. This is most effective practice used in modern Foundries. Normally the feeding of metal and Inoculant addition should start immediately. The obvious advantages are no fading effect, less use of Inoculant as compared to ladle addition. Inoculant will be added according to the pouring weight of casting. It is in the range 0.15% to 0.2%.

iii. Inmold Inoculation

This method is putting Inoculant on sprue bottom under the strainer core. Another method is to put Inoculant in the reaction chamber. The size of Inoculating material is from 0.3 to 1 mm for Inmold Inoculation and percentage is from 0.1% to 0.15% of pouring weight of casting. One more method of In-mold Inoculation is to put pre-cast tablets of 5 to 10 grams in the runners. There are some limitations of this process:

- a. Putting of Inoculants in sprue bottom or reaction chamber
- b. Entry of semi-dissolved Inoculant lump into casting cavity along with the metal stream and its entrapment in runner, which blocks the metal entry into the mould, causing misrun.
- c. There is one more possibility that very first metal entering the mold is not inoculated, because Inoculant may take few seconds to start dissolving. As a result chilling may take place in initially fed area.

iv. Mixed Inoculation:

This method is combination of above methods. e.g,

Ladle inoculation and Mold stream Inoculation or Mold stream Inoculation and Inmold Inoculation.

The combination method ensures consistency in quality and cost effectiveness. Because in this case total quantity used is lesser than the ladle addition. By mixed Inoculation methods, the chilling tendency is totally eliminated.

Demerits Regarding Inoculation

- Excessive Inoculation should be avoided. It will result in excessive nuclei. There will be high pressure of molten metal on mold walls. In case of less ramming, mold dilation will take place, which needs extra metal to feed. If surrounding area is not able to feed molten metal, then casting will be rejected due to shrinkage or porosity.
- In case of less Inoculation, the volume expansion of graphite will be lesser to counter contraction volume of molten metal. In this case shrinkage may also take place.
- Presence of Aluminum in metal beyond acceptable level causes formation of pin holes in the casting.
- Similarly Inoculant with high Aluminum content and moisture can cause pinhole porosity in the casting.
- Inoculants with contaminations (slag, dust and non-metallic inclusions) and specifically Ca-Si Inoculant result in Slag formation. The slag is so thin that it can go into the mold with metal stream causing defects in the casting.
- It is very important to determine graphitization potential of molten metal. Especially metal prepared in Induction Furnace will have less graphitization potential due to superheating, holding metal in the bath, agitation and addition of additives. Therefore, it is required to monitor graphitization potential of molten metal before Inoculation.

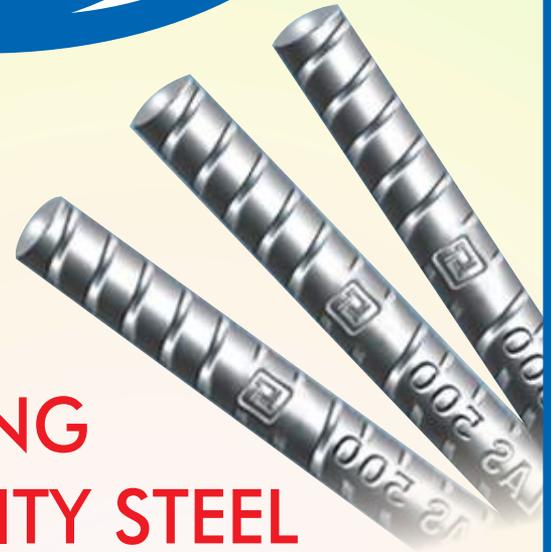
References

- Cast Iron Technology by Roy Elliot
- Factors Influencing Inoculation Of Cast Iron by Dawson I.V. B.C.I.R.A. Journal 9.
- The Importance and Practice of Inoculation in Iron Casting Production by Hughes I.C.H
- Elkem Literature on Inoculation
- Foseco Foundryman's Handbook edited by John R. Brown
- A practical Approach of Inoculation Process by D.S. Pandan, Indian Foundry Journal NO. 6, vol. 58

RASTGAR

www.rastgar.com

The Compressed Air People



STRONG QUALITY STEEL

With



CompAir

Air Compressors



Best Performance
Reduced Cost

Fixed and
Regulated Speed

Premium
Efficiency

Extended
Warranty

Reduced Energy
Consumption

Installation
Efficiency

Reduced Cost of
Ownership

RASTGAR & CO

111 - 727 - 777

RASTGAR & COMPANY (PVT.) LIMITED

Darul Uloom Plot # 9, Shahrah-e-Darul Uloom, Sector 28, Korangi Industrial Area, Karachi-75180, Pakistan

Fax: +92 21 35123112

Email: ko@rastgar.com

Web: www.rastgar.com

KARACHI

LAHORE

ISLAMABAD

● SALES ● SERVICES ● SPARES ● SOLUTIONS

ELECTRO HEAT

For total melting solutions

Manufacturers of Medium Frequency Induction Melting Furnaces
Custom made foundry solutions
Flexible design to match your foundry requirements
Motor Generator upgrade solutions to Solid State Furnace



Made In Pakistan
Based on latest technology

Melting Capacity

Steel Frame Crucible: 10MT to 50MT
Yokeless Aluminum Crucible: 50kg to 10MT

Power Pack

Series Inverter: 50 kW to 900 kW
Parallel Inverter: 50 kW to 14000 kW

Address:

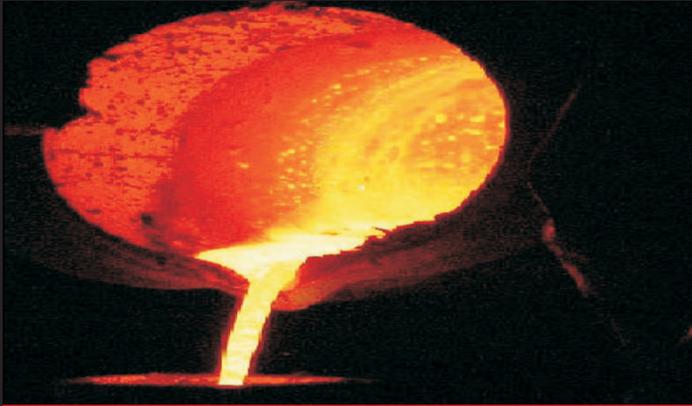
10km, Gujranwala-Lahore G.T Road, Attawa, Gujranwala Pakistan
Mobile: +92 300 8442057
Phone: +92 55 34000505
Fax: +92 55 3264490
Email: electroheat@gmail.com | m nubeg@gmail.com
Website: www.electroheat.com.pk

Among our prestigious customers:

Bolan Castings Ltd, Karachi
Chenab Engineering Works and Foundries (Pvt) Ltd, Faisalabad
Friends Foundry (Pvt) Ltd, Islamabad
Qadri Brother (Pvt) Ltd, Lahore

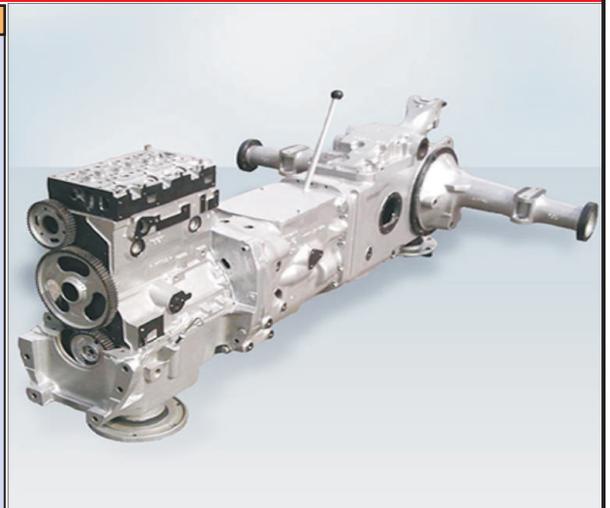


We Pour Quality Into Castings



PRODUCT RANGE

TRACTOR INDUSTRY	AUTOMOBILE INDUSTRY	ENGINEERING INDUSTRY
<p>a. MF Tractors</p> <ol style="list-style-type: none"> 1. Cylinder block 2. Cylinder head 3. Transmission case 4. Centre housing 5. Timing gears 6. Bearing caps 7. Planetary carrier 8. Differential cases 9. Hydraulic lift cover 10. Box hydraulic 11. Oil sump 240 12. Link rocker 13. Sleeve 14. Fork clutch release 15. Axle housing 240 16. Axle housing 385 17. Oil sump 385 <p>b. Fiat Tractors</p> <ol style="list-style-type: none"> 1. Axle casing 2. Differential case 3. Trumpet 640 4. Front axle support 5. Bearing covers 6. Trumpet cover 640 7. Trumpet 480 8. Hubs 9. Master clutch housing 10. Oil sump 480 	<p>a. Isuzu Trucks/Buses</p> <ol style="list-style-type: none"> 1. Brake drums & Hubs 2. Exhaust manifold 3. Spring pads & Brackets 4. Generator Brackets 5. Fly Wheel <p>b. Dong Feng Trucks/Buses</p> <ol style="list-style-type: none"> 1. Brake drums & Hubs 2. Brackets 3. Shackles <p>c. Nissan Trucks/Buses</p> <ol style="list-style-type: none"> 1. Brake drums & Hubs 2. Fan pulley 3. Shackles 4. Spring stoppers & Brackets 5. Pads <p>d. Hino Trucks/Buses</p> <ol style="list-style-type: none"> 1. Brake drums 2. Spring stoppers & Brackets 3. Bracket injection pump 4. Pulleys <p>e. Bedford Trucks</p> <ol style="list-style-type: none"> 1. Brake drums 2. Differential Carrier <p>f. Honda/Coure</p> <ol style="list-style-type: none"> 1. Pulleys <p>g. Master Trucks</p> <ol style="list-style-type: none"> 1. Brake drums <p>h. Adam Car</p> <ol style="list-style-type: none"> 1. Brake drums 2. Brake discs 	<p>a. Pumps</p> <ol style="list-style-type: none"> 1. Pumps heads 2. Pump bases 3. Bases plates 4. Adopter flanges 5. Pump housings 6. Suction chambers 7. Seal covers <p>b. Wheel Rims</p> <ol style="list-style-type: none"> 1. Blank holder dies 2. Forming punch dies 3. Roller dies <p>c. Defence</p> <ol style="list-style-type: none"> 1. Bomb shell <p>d. Textile</p> <ol style="list-style-type: none"> 1. Labyrinth seals



Bolan Castings Limited

Head Office

F-1, Hub River Road. S.I.T.E. Karachi. Phone : 0092-21-32566714, 0092-21-32579819.

Fax :0092-21-32573558, E-mail: bclho@bclpk.com Web Site www.bolancastings.com

Factory & Registered Office

Main RCD Highway, Hub Chowki, District Lasbella , Baluchistan.

Phone : 0092-0853-363293, 0092-0853-363294 Fax : 0092-0853-363292 E-mail :bclhub@bclpk.com



OMEGA
FOUNDRY MACHINERY LTD

Equipment For Chemically Bonded Sand Foundries



TINKER OMEGA
OHIO, U.S.A.

WES OMEGA
FOUNDRY MACHINERY PTY LTD
VICTORIA, AUSTRALIA

OMEGA SANE
FOUNDRY MACHINERY PVT LTD
PUNE, INDIA
WWW.OFML.NET



- | Continuous Mixers 3 - 100TPH
- | Compaction Tables
- | Manual or Mechanised Moulding Plants
- | Manipulators from 350kg to 15 tonnes
- | Flood Coaters
- | Mechanical Sand Reclamation 1-30TPH
- | Core shooters 2.5L to 130L

Omega Foundry Machinery Ltd - United Kingdom
E: sales @ofml.net W: www.ofml.net

AGENT: Mosh International - Karachi - Pakistan
T: +92 (21) 3531 1014 - +92 (21) 3531 1015
E: s.ali@moshpakistan.com