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See page 12

Case Study:
Schmolz + Bickenbach Casting Group discuss high performance measurement technology



# Castings and Forgings News

December 2009

CONTENTS



## Ladle Furnace Commissioning

Mechel commissions an integrated steel processing facility (ladle furnace) # 3 that is the second technological part of the continuous casting machine No.4 complex project at the oxygen-converter shop of its Chelyabinsk Metallurgical Plant (CMP) OAO subsidiary. The ladle furnace #3 is planned to process about 1.2 million tonnes of steel per year that would enable improved continuous caster efficiency at the continuous casting machine No.4 in the oxygen-converter shop up to 120 thousand tonnes per year. Investments for construction and commissioning of the ladle furnace #3 amounted to 1.05 billion roubles.

## Extrusion Tooling Subsidiary

Schmidt + Clemens GmbH has established its new subsidiary S+C Extrusion Tooling Solutions GmbH (ETS). "We deliberately chose the English company name," says Dr. Henning Kreisel, "ETS is operating internationally and we therefore favoured a widely-used language". ETS belongs to the Schmidt + Clemens Group and is headquartered in Kaiserau – Lindlar, Germany. In addition to the German headquarters, S+C also has production plants in Brazil, the United Kingdom, Malaysia, Spain, and the Czech Republic. S+C Sales Offices can be found in the USA, India, and the United Arab Emirates. The Schmidt+ Clemens Group employs approx. 1,000 people worldwide (Germany approx. 600).

## NADCAP certification

Aerocast Inc. announced that its wholly owned subsidiary, Aerocast International Inc., received NADCAP certification for optical emission spectroscopy (OES), a reference technique for direct analysis of solid metallic samples. Aerocast uses OES to test metal samples prior to pouring castings. NADCAP — the National Aerospace and Defense Contractors Accreditation Program — is a global cooperative that sets quality and performances standards for aerospace engineering, defense, and related industries.

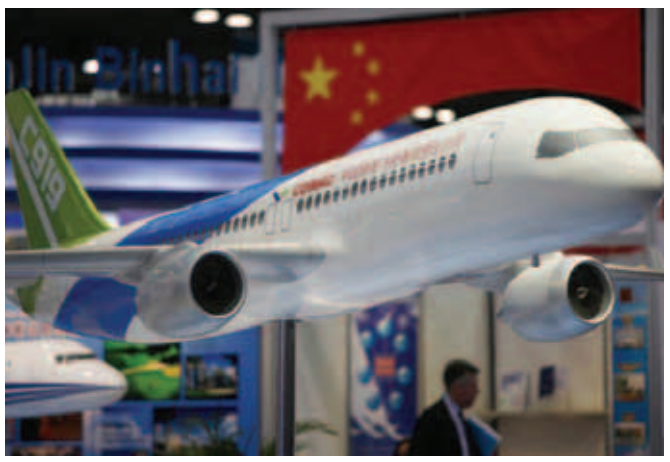
## Continuous casting and rolling plant

Shandong Jinsheng has placed an order with SMS Meer, Germany, for the supply of a complete continuous casting and rolling plant. The type Contirod® plant is the second of its kind supplied to Shandong Jinsheng. The plant is to be built in Shandong Jinsheng's new facility in the Shandong Linyi Economic Development Area. The Contirod® line is designed for an output of 48t/h and will thus be the largest of its kind in China. The plant comprises the SMS Meer-designed gas control system for the shaft furnace for melting copper cathodes. The modular designed Hazelett twin-belt caster will offer the largest casting section of 123mm by 70mm in China. The plant also comprises the highly flexible 14-stand rolling mill with frequency-controlled AC drives and integrated coil compacting and foil packing equipment. Commissioning of the plant is scheduled for the end of 2010.

# Technology cooperation for the C919 passenger jet

Alcoa and Commercial Aircraft Corporation of China Ltd. (COMAC) announced they are jointly exploring leading technology solutions for the design and development of China's new, large passenger jet, the C919. Through a technology cooperation agreement, the two companies are examining advanced aluminium structural concepts, designs and alloys to create the 190-seat aircraft.

"We are working closely with COMAC to develop a tailored solution that will meet COMAC's goal of creating a globally competitive, high-performance, economical commercial airliner," said Helmut Wieser, Alcoa Executive Vice-President and Group President Global Rolled Products and Asia. The aircraft will be assembled in Shanghai, but will source parts and components globally.

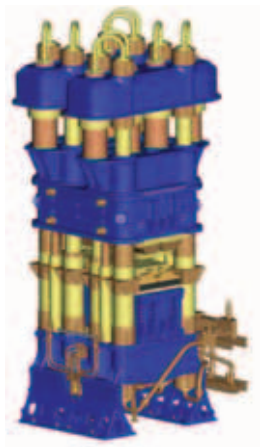


*courtesy of Mike Clarke/AFP/Getty Images*

"The C919 will be the largest passenger jet to be produced in China. Our goal is to design an efficient, high-performance structure that will compete in the global aerospace market. Therefore, it is imperative that we look at design alternatives and collaborate with innovative materials technology leaders like Alcoa," said Wu Guanghui, chief designer of the C919 program and vice president of COMAC.

A prototype of the C919 was displayed at the Asian Aerospace International Expo and Congress in Hong Kong last month. There is strong market interest for this aircraft based on China's expected long term growth in global passenger traffic demand. The C919 is expected to take its first flight in 2014 and enter service in 2016.

# World's largest closed-die forges modernized



*Computer simulation of the press with a height of 30 m (98 ft).*

Alcoa Forging & Extrusions has commissioned Siempelkamp to engineer and produce cast parts for one of the world's largest closed-die forging presses. The rebuild and modernisation of the 50,000-tonne (450 MN) press located in Cleveland, Ohio, USA, will make it the most advanced, productive forging press in the world. The Ohio forging press produces structural parts made of aluminium for the aircraft industry. Because of its large press force and its central meaning for the American aircraft industry, the giant press has become a "National Historic Mechanical Engineering Landmark" in the United States of America.

As part of the order, Siempelkamp will supply 14 large cast parts for the upper, moving and lower beams as well as the foundation stools. Ten of the castings weigh between 200 and 250 tonnes each (220 and 270 US tons). Siempelkamp cast the first foundation stool on August 20, 2009 at the company-owned Krefeld foundry. The beams and stools are to be machined on large-scale equipment, capable of processing components with a clamping length of 22 metres (72 ft).

## Aerospace & Defence Zone

Hero Group in India plans to develop a 300-acre Special Economic Zone for the aerospace and defence industry, with a further 100 acres expansion possible, the location has yet to be disclosed. Hero Motors will make a direct investment of Rs 500 crore for various activities in the aviation sector, which include manufacturing of light sports aircraft (LSA), aircraft and aerospace applications, besides setting up aviation training institutes and colleges, as told to Economic Times at a press conference.

## L&T Casting Mfg Unit

Larson & Toubro (L&T) inaugurated a state of the art Casting Manufacturing Unit (CUM) at its Coimbatore (Tamil Nadu, India) complex. The CMU will manufacture large size castings for critical applications such as wind power and energy sectors. The foundry will have a top capacity of 30,000 tonnes per annum and is capable of continuous production of castings in the weighing between 10 and 25 MT each. Covering 22,000 square metres on 15 acres of land, the foundry has a unique Vibratory feeder charging system with 15 MT dual crucible, dual track furnace. It hosts 11 heavy duty EOT cranes, state of the art pollution control, fire control, environmental conservation measures for sustainable growth.

## In the spotlight: PTC Industries

PTC Industries has now broken the weight barrier in ceramic shell castings. It utilizes an innovative and unique technology, enabling production of parts weighing up to 2500 kg, which offers all the benefits of investment castings and vacuum pouring, moreover reducing total costs up to 50%.

turn to page 3

Issue 4 - December 2009

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Subscriptions will be renewed in accordance with Dutch legislation.

Subscriptions will be automatically renewed for one year and are valid until recall. Notices of cancellations have to be filed three month prior to expiration.

Castings and Forgings News is published four times per year.
ISSN 1877-6809





# Global News

## Rotary-furnace order for Railcar components

Can-Eng Furnaces, manufacturer of a broad range of industrial heat-treating equipment, based in Ontario, Canada, has an order from Russian railcar manufacturer TVSZ for two 10-metric tons/hour rotary-hearth furnaces for normalizing steel castings, reported Foundry Management & Technology. TVSZ will install the equipment at its plant in Tikhvin, Russia, to quench and temper components for railroad truck assemblies, side frames, and bolsters. The project's scope of supply covers the entire thermal processing needs for a 73,000 metric tons/year combined normalizing and quench-and-temper operation. Can-Eng's multi-million dollar order is part of a $1-billion investment by TVSZ to establish a complete casting and machining operation, and railcar assembly plant. The Tikhvin plant, 150 miles east of St. Petersburg, will start up in January 2011 and product up to 12,000 railcars per year. Can-Eng indicates the normalizing furnaces will be supplied with a Level 2 Automation system; automated material handling functions; two batch tempers; an 80,000-liter quench tank with elevator; and loading and unloading roller hearth conveyors with forced cooling on the post normalize side. Castings will be conveyed on cast alloy grids that measure approximately 10 x 10 ft.

## JV plant construction begins


Alstom and Bharat Forge begin construction of manufacturing plant in Mundra, Gujarat, India.

Bharat Forge, manufacturer of forged and machined components, and Alstom, a power and rail systems manufacturer and service provider, broke ground for their new joint venture facility in Gujarat, India. This follows their November 2008 agreement to set up two joint venture companies - one for the manufacturing of steam turbines and generators and the other for the manufacturing of all the auxiliaries. To begin with, the plant will manufacture 300-800 MW subcritical and supercritical equipments with an annual capacity of 5000 MW. In the future, the JV will also explore possibilities of manufacturing turbines and generators for gas-based plants and nuclear applications.

## Ultra-wide steel hot plate mill

Indian public sector specialty steelmaker Mishra Dhatu Nigam Ltd (MIDHANI) will invest US$ 86.5 million to set up a hot plate mill. The proposed 6000tn/yr manufacturing facility will produce ultra-strong wide steel plates. These plates are used extensively in automobiles, nuclear reactors and motor castings for satellites and rockets. The project has received the necessary approvals from the Indian government. The Defence Research and Development Organization is expected to invest about US$ 43.3 million in the project, while the remainder will be financed from internal accruals and debts from financial institutions. Presently, the ultra-strong steel used in nuclear and aerospace applications is produced by the state-owned Steel Authority of India Ltd (SAIL) at the company's Rourkela steel plant. The manufacturing facility, which will also include a vacuum arc furnace, a forging press and an electro slag-refining furnace, is expected to begin operations by 2012.

## New continuous slab caster for Gerdau Açominas

Siemens VAI Metals Technologies has announced that it has brought a new continuous slab caster into operation. It was ordered by Gerdau Açominas, a Brazil-based steelmaking company which is a member of the Gerdau Group. The plant has already cast slabs of various sizes and steel grades since production started at the Ouro Branco Works in Brazil. With this new plant, Gerdau Açominas can now produce 1.5 million tonnes of high quality steels for the flat steel market. The acceptance certificate was issued in the middle of October 2009. During the same time the continuous slab caster for Gerdau Açominas was constructed, Siemens also supplied an RH vacuum degassing plant together with the associated electrical and automation equipment. Both plants have been designed so that another degassing vessel and a second casting line can be installed in a later expansion stage. These two projects, which have now been completed, had a total volume of some USD 100 million. They are part of an expansion program for the Ouro Branco Steel Works, which is located in the state of Minas Gerais. The project's objectives were to increase steel production in the works by 50% from 3 to 4.5 million tonnes per year.

## Schmolz + Bickenbach close casting site

The management of Schmolz + Bickenbach Guss GROUP announced plans to close its production site in Monheim, Germany at the end of the year, as reported by Gus News. Approximately, 60 employees will be affected by the closing. This facility, which mainly focuses on centrifugal and gravity cast products, had already taken measures and cut back employee hours earlier in the year.

Since centrifugal castings are heavily used in biofuel refineries, it turns out that protests over biofuel became a critical influencer in the closing of the facility. Matthias Pampus-Meder, Chairman of the Management of Schmolz + Bickenbach Guss GROUP, remembers a time when it was believed that the use of regular gasoline and ethanol would become increasingly mixed. So, the foundry invested 1.8 million euros in the Monheim operation. There have since been significant protests against biofuel. Mr Pampus-Meder was quoted explaining how produce was seen as taking away fuel from food supply and how it increasingly became "ethically questionable." He said, "Currently, there is an oversupply in the market for bio-gasoline. Even in the longer term, the situation does not look like it will improve . . . We deeply regret [the closing] - especially in light of the Monheim long-standing commitment to our employees. Because of the economic situation, it is, unfortunately, not possible to provide adequate jobs for employees within the group."

Schmolz + Bickenbach Guss Group says this closing will have no effect on customers. All customers previously supplied by the Monheim facility will continue to receive their orders in a timely manner. The company's three other casting facilities in Krefeld, Ennepetal and Kohlscheid will not be affected.

## China – Austria stainless steel project

Xingtai Iron & Steel Corp. Ltd officially started its CNY 1.2 billion stainless steel project in November. The first phase of the project was funded CNY 600 million, containing an advanced 700,000 tonnes alloy melting furnace, a CNY 9 million continuous casting machine made by voestalpine AG, a 600,000 tonne AOD furnace and Ladle Refining Furnace and a sharpening machine. The project is slated to be put into service in October 2010, and will be capable of yielding 350,000 tonnes of continuous casting billet slab a year, including stainless steels 200, 300 and 400 series, tire cord steel, ESR and more.

## Multiple investments in production lines

Mechel OAO, a Russian mining and metals companies, announces completion of several investment projects at Mechel Campia Turzii plant, Romania, a part of Mechel OAO's East-European Steel Division.

Three new production lines were launched at the plant including: a metal fiber production and packing line, a reinforcing wire coils extension, an enlargement line and steel wire production shop. Total investments in the projects amounted to approximately € 7 million.

## Forged JV for Brakes

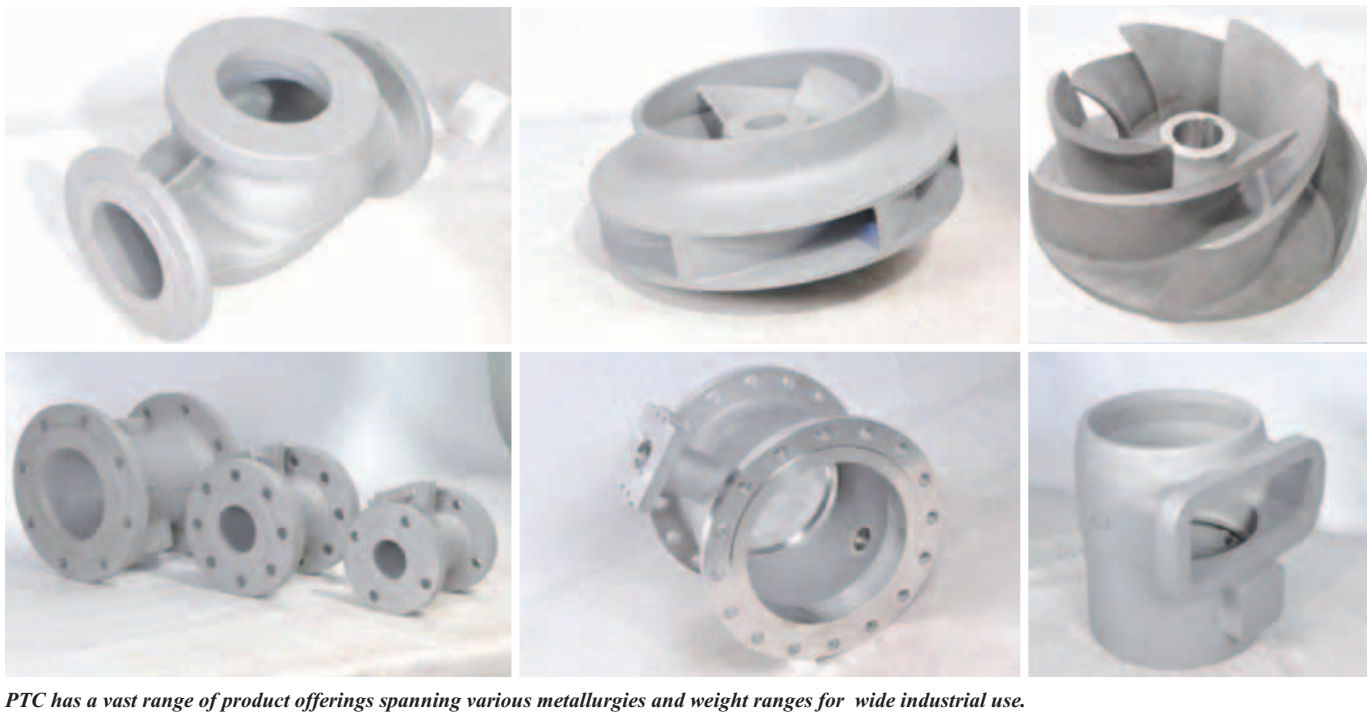
Hero Motors Ltd., India, signed a joint venture agreement with Kiriu Corporation, Japan. The JV company, named Munjal Kiriu Industries Pvt. Ltd., will manufacture brake disc, drums and knuckles for automotive original equipment manufacturers at Manesar, Haryana, India. The total project cost for the JV, with Sumitomo Corporation Japan, Sumitomo Corp. in India and Kiriu Corp (a Sumitomo Group company), is Rs 240 crore.

## Georgia foundry to resume

Intermet Corp's ductile iron foundry in Columbus, Georgia, USA, reportedly has been bought by a Carlyle Group holding, Diversified Machine Inc. According to the Columbus Ledger-Enquirer the sale closed, at an undisclosed price.

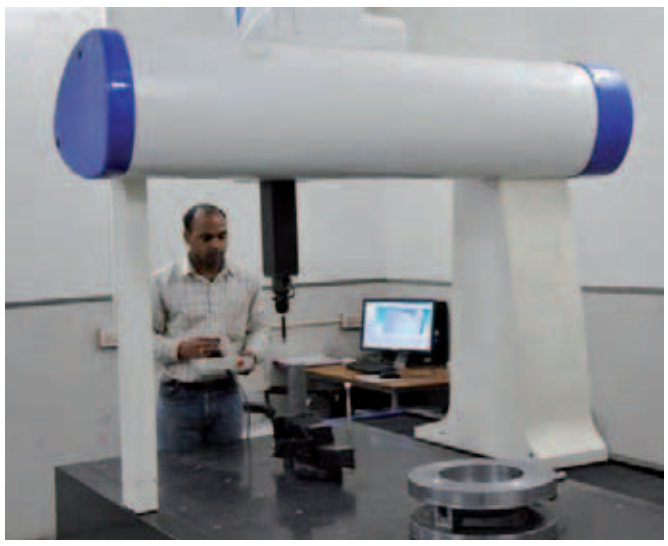
# 2500 Kg affordable Investment Casting

**PTC Industries has now broken the weight barrier in Ceramic Shell castings. It utilizes an innovative and unique technology, which enables it to produce parts weighing up to 2500 kg, which offer all the benefits of Investment Castings and Vacuum Pouring, moreover reducing the Total Cost up to 50%.**



*PTC has a vast range of product offerings spanning various metallurgies and weight ranges for wide industrial use.*

PTC Industries commenced operations over 40 years ago and has been exporting castings to US and Europe for over 25 years. PTC has **3 foundries and 2 CNC machine shops in India**, manufacturing castings using **Replicast®, RapidCast®, Investment Casting** (Lost Wax) and **Centrifugal Casting** processes in either as cast or finish machined condition. PTC has a wide range of materials that it can offer, including ***Alloy Steel, Stainless Steel, Duplex and Super Duplex Stainless Steel, Creep Resistant Steel, Heat Resistant Steel, Nickel Based Alloys, Cobalt Based Alloys, Austenitic Ductile Iron, Nickel Aluminium Bronze*** etc.



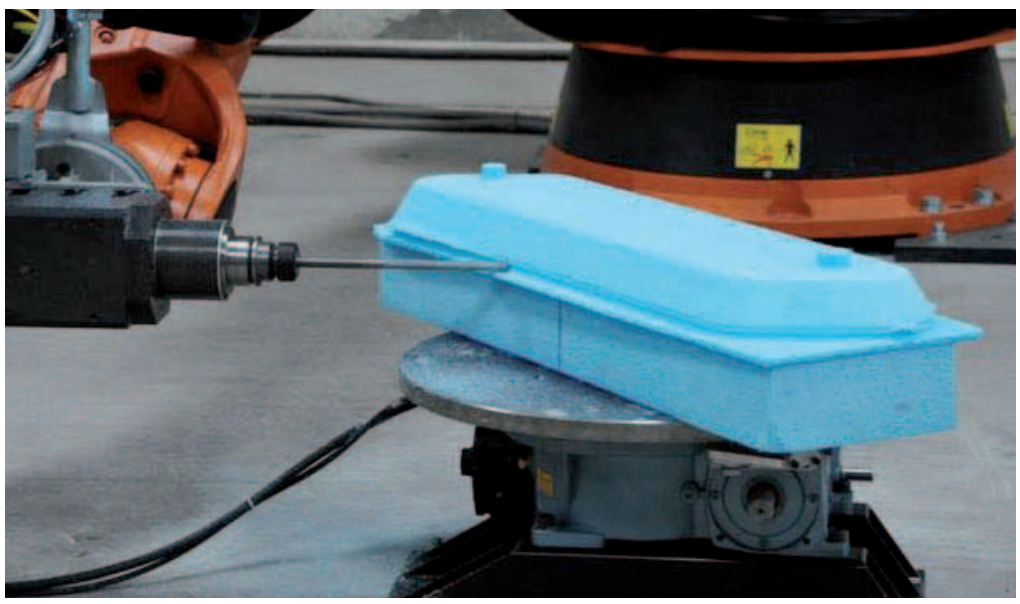
*Latest equipment & technologies ensure stringent quality.*

Investment Castings (Lost Wax) have found many applications in recent times by converting conventional sand moulded castings into precision castings, thus reducing total cost and adding substantial value to the product. The advantages of Investment Casting are well known viz. superior quality, reduced weights, lesser machining costs, and far better surface finish and aesthetics. However, Investment Castings are limited by the maximum weight and size they can be used to cast, generally well below 100 Kg. Thus, all larger and heavier castings continue to be produced predominantly by Sand Moulding process. Every casting buyer who has dealt with Sand Moulded castings has always gone through the pain of quality troubles and delays. Most of the quality related issues generated in Sand Moulded castings arise from sand, binders (in sand), gas & moisture in the mould, and sand core. These elements in the sand mould and core create problems like sand inclusions & reactions, gas holes & porosities, "hot tear" & cracks and "core shift" & dimensional variation. Since these elements and their related parameters are extremely difficult to control, Sand Moulded casting quality becomes highly vulnerable to any variation and thus is unreliable and inconsistent.

PTC utilizes a process called ***Replicast®*** which was developed by Castings Technology International (U.K). As in the Investment Casting process, a Die/Tooling is required to make patterns; however instead of a heavy and fragile wax pattern used in the Investment Casting process, Replicast® uses light weight and dimensionally stable polystyrene patterns. In Replicast®, the mould takes form of a thin **Ceramic Shell**, while the liquid metal is poured in that shell under **Vacuum**. Thus, by using this process, PTC is able to replace sand and binders by a ceramic shell. The presence of moisture in the air is removed by applying vacuum to the shell which eliminates the major sources of defects in the casting.

The Replicast® process requires an Aluminium Die/Tooling in order to produce patterns for parts having repetitive and series production requirements. However, for low and medium volume require-ments, PTC offers a unique technology named **RapidCast®**. RapidCast® uses the same manufacturing process as Replicast®, but instead of making the polystyrene pattern from a Die/Tooling, the pattern is machined from a solid block of polystyrene on a large **7-Axis Machining Centre**. RapidCast® uses the concept of "**Virtual Tooling**" whereby the initial cost and lead time related to Die/Tooling is eliminated. The short development cycle and reduced production lead times makes RapidCast® very attractive for customized solutions, projects, spares, etc.

*The recently commissioned Robot assisted Shell Coating System for Replicast®*



*The 7 – Axis Machining Centre for RapidCast®*

The main advantages of castings offered by PTC utilizing this unique process are:

- Weight Reduction up to 40%
- Machining Time Reduction up to 30%
- Exceptional Surface Finish
- No Sand Inclusion or Reaction
- Reduced Gas Holes and Porosity
- "Green Process" – solid waste 1/30th of sand moulding
- Flexible production lots; from 1 piece to several hundreds
- Short 'Time to Market' using RapidCast®

The main industries being serviced by PTC are Power Plants and Turbine Equipments (including blades), Oil & Gas, Valves and Pumps for Petrochemical Industry and Refineries, Paper Industry and Defence Equipment. PTC has supplied many castings for valves to its customers which have been used in very critical applications for large Oil companies like Saudi Aramco etc.

PTC Industries has been awarded the National R&D Award from the Government of India in 2006. It carries an **ISO 9001:2000** BV certification, **PED/97/23** – BV, **AD 2000 Merkblatt WO** – TuV Nord while the **ISO 14000 & 18000** accreditations are under implementation. The company has been approved by the Nuclear Power Corporation of India, while BV and Lloyds have approved the company for **Marine Classification**. Approval of manufacture of **Nuclear Pressure-Retaining Castings** in accordance with ASME Section III is currently under process and shall be completed soon.

Not one to rest on its laurels, PTC Industries is constantly making investments for the future. PTC has recently commissioned a fully automated, **Robot assisted Shell Coating system** for Replicast®. This has led to a remarkable consistency in quality, increase in efficiency, shorter lead times and less wastage. Company has further added a new Induction furnace for melting metal up to 5000 Kg. PTC has its own in-house capability for all testing equipments including **Radiography up to 200mm** thickness. The two CNC machine shops are equipped with state of the art **CNC Turning Centres, Vertical Machining Centres** and Horizontal Machining Centres from Japan and Germany. Additionally, a new Replicast® and RapidCast® **'Green' Foundry** is being set up, this plant will have the capability to produce individual parts weighing up to 5000 kg.

PTC has always believed that its greatest success lies in being a part of their customer's competitive edge. As their Chairman, Mr. Sateesh Agarwal states, "....for only on our customer's triumph depends our success" hence, the company has constantly strived to advance their ideals of ***Quality, Value & Speed***.

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# Wind Power continues growth trend

Siemens has confirmed its objective to become one of the world's top providers of wind turbines. Siemens entered the wind power market five years ago with its acquisition of Denmark's Bonus Energy. Since then, wind power operations at Siemens have undergone rapid development. The workforce has grown sevenfold, while revenue has actually increased tenfold. "This is a success story whose narrative we wish to continue," says Andreas Nauen, CEO of the Wind Power Business Unit. "The overall global wind power market is growing at 12% annually. We intend to significantly outpace the market growth to become one of the top three providers by 2012."

A recent press release from Siemens Wind Power stated it currently has a record order backlog of €6 billion. Revenue from the

Siemens' Environmental Portfolio totaled about €23 billion in fiscal year 2009, making Siemens the world's largest supplier of ecofriendly technologies. In the same period, these products and solutions enabled customers to reduce CO2 emissions by 210 million tonnes.

Part of Siemens' strategy increase its market status is to strengthen its position in offshore wind farms and to ensure it remains a leader in innovation. Innovation with products such as the Hywind floating turbine project, a joint effort with StatoilHydro, and the recently completed prototype of its newly developed gearless wind turbine, which assures even higher availability than standard wind turbines with about half the number of parts, seem to secure a place at the top for Siemens.

# Jindal orders caster from Siemens

Siemens VAI Metals Technologies has received an order from Jindal Steel & Power Ltd for the supply of a new single-strand slab caster, which will be built at Angul in the Indian state of Orissa. The slab caster will be part of a greenfield integrated production facility currently under construction at the Angul site where an annual steel output of approximately 6 million tonnes is planned. The nominal capacity of the caster will be approximately 1.5 million tonnes per year with steel grades ranging from ultra low to high carbon steels as well as micro and low alloyed grades. Initially, production will concentrate on slabs for pipeline and plate applications, which will be rolled in a new Siemens VAI 5m wide plate mill which is currently under construction. The caster is equipped with a straight mold and the casting radius is 10m. Slabs will be cast at thicknesses of 200mm, 260mm and 300mm and in widths from 1000mm to 2300mm. Cut slab lengths will range from 4.5m to 12m. Siemens VAI's responsibilities for this project include plant engineering, equipment design and supply, advisory services for erection, installation, start-up and commissioning in addition to personnel training. All of the major process equipment will be provided such as the main casting-floor equipment, mold, strand-guiding system and discharge facilities in addition to the torch-cutting machine, deburrer, marker, roll-gap checker and pusher/piler. Electrics, hardware and software for Level 1 automation and Level 2 process optimization as well as hydraulic, lubrication and cooling systems are also included. Start up is scheduled for September 2011.

# Forgemasters play a crucial role in Britain's Nuclear industry

Sheffield Forgemasters International (SFIL) will further develop its key role in the development of Britain's nuclear manufacturing industry after becoming a founding member of the new Nuclear Advanced Manufacturing Research Centre (NAMRC).

SFIL will provide a functional and supportive role to the NAMRC, which will be based at the Advanced Manufacturing Park in Rotherham, UK.

SFIL will play a crucial and enthusiastic part in the design, strategy and function of the facility and the projects chosen and undertaken by the centre.

The centre will provide a focal point for the bulk of the UK civil nuclear manufacturing industry supply chain, ensuring that manufacturers in the UK have the capability and capacity required to compete for nuclear new build in the UK and globally, from skills training to research and development. The centre will be led by the University of Sheffield in partnership with the University of Manchester and with Rolls-Royce as the lead industrial partner. Other founding partners include Areva, Westinghouse and The National Metals Technology Centre (NAMTEC).

## Brasil exports will grow

Flavio Azevedo, president of Brazil's Steel Institute Aco Brasil, told reporters on Dec. 2 that crude steel production capacity in Brazil will rise 3.6 percent next year to 43.5 million metric tonnes, about double demand levels which are still recovering from the crisis. He went on to say that in the medium-term, new mill projects, including those announced by Vale SA, will further boost capacity, particularly for the export market. According Aco Brasil, steel demand will climb 22 percent to 22.9 million tons from 18.8 million this year as orders grow from industrial segments including carmaking. "There's going to be steel to spare," Azevedo said. "Brazil's going to continue with high export levels." According to the institute's forecast, steel exports from Brazil increased by 3.3% in 2009 and will grow an additional 16% to 11 million tonnes in 2010.

# Special steel & ultra heavy forging JV

Larsen & Toubro (L&T) announced the formation of a joint venture with the Nuclear Power Corporation (NPCIL) to set up a company in Gujarat for the production of special steel and ultra-heavy forgings. The facility will come up for an investment of Rs 1,725 crore in Hazira, Surat, and will manufacture critical components for the power industry. "India has been making most products required for nuclear power generation, but heavy forgings were not on the Indian product list. The JV is aimed at to ease this constraint," NPCIL chairman & managing director SK Jain said.

The facility will have a dedicated steel melt shop producing ingots weighing up to 600 MT each and a heavy forge shop equipped with a forging press. "The JV will supply finished forgings for nuclear reactors, pressurisers and steam generators, in addition to heavy forgings for critical equipment in the hydrocarbon sector, as well as for thermal power plants. Direct access to a water front at Hazira will facilitate multimodal transportation and exports," L&T chairman and managing director AM Naik said.

"The plant will start production from April 2011. It will meet domestic demand across nuclear and thermal power and hydrocarbon sectors in the short-term. However, there are plans to start exporting from 2013," he added. "L&T will have 74 per cent stake in the venture, while NPCIL will hold the remaining 26 per cent stake. The company will have one-lakh tonne per annum steel and 40,000 tonne per annum forgings making capacity," Naik said.

# Forgitron long-term growth plan

Forgitron Technologies has completed a new equipment installation at its Camden, South Carolina, plant, and indicated that the second phase of its long-term growth program is on track for completion this year. Forgitron is a rotary forging operation that produces commercial truck wheels according to a proprietary technology for OEMs, contract manufacturers and the aftermarket. It also has on-site heat-treating. The first phase of the expansion involved the plant start up in 2006. Longer term, Todd Latouf, Forgitron Technologies president, said Phase Three calls for more production lines at Camden, to increase forged wheel capacity in anticipation of an economic recovery.


# Volunteers make positive global impact

On International Volunteer Day, Alcoa President and CEO Klaus Kleinfeld congratulated a record 23,000 Alcoa employees who took part in the company's 2009 Worldwide Month of Service - volunteering in 800 community events to support those in need and invest in the sustainability of our planet. The annual Worldwide Month of Service program brings together Alcoa's global workforce to make a positive difference in the communities where they live and work – this year partnering with nearly 1,900 not-for-profit community organisations across 23 countries. Through Alcoa employees' efforts during the month of service over 14,000 meals were served to those in need, 4,000 charitable campaigns held to collect and distribute food and clothing, and 11,000 trees planted.

## Long Christmas shutdowns

Many Italian steel mills will implement 3 to 6-week holiday breaks. Many plant closings will start on December 19th and end on January 11th. As reported by SBB, Tubemaker Tenaris Dalmine's Italian operation will close from three to five weeks, while long products maker Stefana stopped production at the beginning of December and will not resume until 18 January.

## Outstanding payable settled through issuance of shares

Timminco Limited, the 46% owned affiliate of AMG Advanced Metallurgical Group, announced that it has agreed to issue approximately 900,000 common shares, representing approximately 0.6% of Timminco's current issued and outstanding shares, as full and final settlement of approximately $1.2 million in outstanding payments due to a supplier of services for the silicon metal operations of its wholly-owned subsidiary, Becancour Silicon Inc. The issuance of these common shares is subject to receipt of all necessary regulatory approvals, including approval of the Toronto Stock Exchange.

The issuance of these shares will decrease AMG's ownership in Timminco to approximately 45.7%.

## COLUMN

# Visiting some forge masters….wow!

*Barrie's no-nonsense columns in sister publication Valve World are always very well read.*

I have had the privilege in 2009 to visit several forge masters either as an auditor or just as a visitor. It has indeed been most interesting to see both established and new factories in practice. From an end-user viewpoint I would like to raise the following question?

***Are there any technical gaps between Chinese and western forge masters?***

Chinese have many forge masters which are similar to those found in Italy in the 1980's but they also are investing in many advanced plants that are equal or better. Irrespective of the 2009's recession such investment continues at a rapid pace. (see photo)

Commodity products numbers for flanges, fittings, valves, balls etc are numerous and are found via western distributors or in OEM finished products. Issues have risen in the past with certification, chemical & mechanical properties and with dimensions.

Every now and then a "scare email" circulates.

The main lesson learnt here in TO KNOW AND TRUST YOUR FULL SUPPLY CHAIN. Too often purchases are made without this knowledge, especially on projects where lump sum contracts dictate. You have to look beyond the "paper" and "be convinced by your supply chain's QA/QC management of sub-suppliers" or "become involved yourself." One key question to ask is: "May I see the original material certificate please?"

I believe things are improving in this area….*I have now run out of space in this article so I'll continue in the next issue. Meanwhile if you have any comments or information addressing the above question please email direct.*

Best wishes for the holiday season and a prosperous 2010!

**Barrie Kirkman**
***BSc.CEng.MIMechE***
**barriekirkman@ntlworld.com**

Note: Barrie also writes a regular article for the Valve World Magazine.

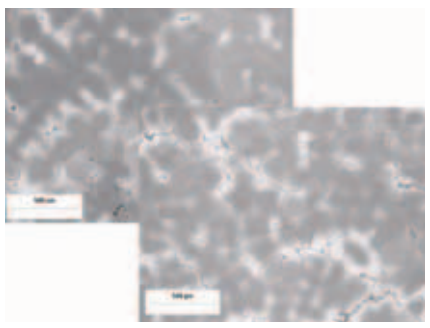
*"A modern forge master in China"*

# Grain refiner for special steels

Elkem in collaboration with NTNU and SINTEF has developed a grain refiner for steel. While grain refiners have been used in aluminum for many years (TiB2), a dedicated grain refiner has not been available for steels until recently. The grain refiner is accessible both in lumpy and in cored wire, and is added just prior to casting. The cored wire is supplied by Affival.

For low alloyed steel that undergo massive thermo mechanical treatment, reduction in grain size can be obtained through heat and mechanical treatments. This is due to phase transformation and recrystallization after plastic deformation. In Elkem Grain Refiner (EGR) cerium, which is the active element, will form particles (non metallic inclusions) in the melt. The formed Ce-particles, which have low mismatch with the solidifying steel, give numerous nucleation points (so called nucleus) in the melt in front of the solidifying front. This will lead to reduction of the columnar zone and smaller equiaxed grains, resulting in improved mechanical properties, improvement in forgeability and higher signal to noise ratio during ultrasonic testing. Examples of steel types that will benefit from grain refinement during solidification are near net shape cast components that undergo no phase transformation, large near net shape cast components where the solidification structure give coarse grain structure, and high alloyed steel where the coarse solidification structure leads to problems during forging.

## Case study:
## austenitic manganese steels



0.7 % EGR was added to an austenitic manganese steel with 1.4% carbon and 19% manganese. This is a steel that is cast to near net shape as crushing plates and cones, and undergoes no phase transformation during subsequent cooling. It solidifies austenitic and is only given a homogenization treatment to dissolve carbides formed during solidification and obtain a fully austenitic structure. In this case grain refinement during solidification is the only option to achieve a finer grain structure. EGR additions led to a fine distribution of CeO2 particles which gave finer grain size. The result was a reduction in grain size from approximately 800 µm down to 250 µm.

# 3DQ - Three-Dimensional Hot Bending and Quench technology

Sumitomo Metal Industries Ltd and Sumitomo Pipe & Tube Corp. have developed the world's first Three-Dimensional Hot Bending and Quench mass processing technology (3DQ), which enables the formation of automotive parts with a tensile strength of 1470MPa or more. This technology enables steel components with a hollow tubular structure to acquire ultra high-tensile strength.

Application of this technology reduces weight of automotive parts by 30-50% and improves crash safety, compared to conventional methods. It is also expected to lead to technologies for space frame body structures in the future. The new technology enables such components with complex shapes to be manufactured in one process. For example, some selected steel tube parts are heated and quenched with cooling water while a bending moment is simultaneously applied to the steel pipe with a movable roller-dice so that the pipe bends.

This 3DQ technology is a consecutive forming method that allows three-dimensional complex hot bending and quenching at the same time. It has produced effects that are hard to achieve with conventional hydroforming and other cold forming methods. 3DQ technology combines both the effect of improving tensile strength by quenching after hot stamping and the advantage of hydroform processing for hollow tubular structures. 3DQ technology can significantly reduce the number of dies required.

# New CONDAT die lubricants for Al and Mg

Condat has developed a complete range of lubricants designed to meet the needs of all casting techniques at all stages of foundry processes. The range includes: vanishing lubricants, plunger lubricants, slide-rail lubricants, fire resistant fluids, heat transfer fluids, pastes and greases, release agent, and ladle coating. Condat can offer equipment for application and control of its lubricants range such as spray guns, die lubricant mixing units, refractometer or colorimeter, and dispensers for beads.

Condat now offers a brand new range of soluble die lubricants for high-pressure die casting of aluminium and magnesium alloys. These new die lubricants, named Condafond, use the latest generation of soluble oils and required several months of Research & Development within the Condat R&D laboratories. They mark an important evolution in terms of chemistry as they do not contain silicone and are in compliance with the most recent French legislation.

## Tell the world about your technology

**CFN is keen to hear about your own research and development activities. Contributions are welcome from all sides of the industry: foundries, forges, equipment suppliers, universities, research institutes, end users, etc. Selected items will be placed free-of-charge. Suggested length 200-500 words. To submit, please send to press.cfn@kci-world.com**



# New casting simulation program

CD-adapco, a developer of CAE programs for simulating fluid flow, heat transfer and stress, has teamed up with a German-based research institute to introduce a new technique they claim will "revolutionize" industrial casting process simulation. Their joint development, STAR-Cast, offers "unrivaled ease-of-use and automation to the simulation of casting processes, and introduces a new level of multi-disciplinary sophistication to simulation results". The co-developer is Access, an independent R&D centre affiliated with the Technical University of Aachen that concentrates on scientific and industrial issues in metallurgy and materials science, particularly casting processes.

# Wrought & cast welding electrodes

Arcos Industries LLC has released Arcos 309/309L, its new bare wire and covered stainless steel electrodes, designed for welding similar alloys in wrought and cast form. The Arcos 309/309L bare wire (ER309/309L) and covered (E309/309L) electrodes can be utilized for welding Type 304 and similar base metals, where severe corrosion conditions exist. In addition, these electrodes are used for joining 304 to carbon steel or the clad side of 304 clad steels. Arcos 309/309L also joins Types 304, 347, 321 and 316 and duplex stainless steels to mild and low alloy steels and can provide a buffer layer prior to surfacing 308L for corrosion resistant overlays. Typical welding applications for 309/309L bare wire and covered electrodes include general fabrication, automotive exhaust systems, pipelines and equipment in chemical processing plants and nuclear power facilities. The bare wire electrodes are available in diameters from .035in- 3/16in, the covered electrodes are offered in three different coatings, -15, -16, and -17 and in standard diameters from 3/32in - 3/16in, as well as non-standard diameters up to .250in.

## Technology round-up

**This page presents information about recent technological developments. Due to space constraints we have restricted ourselves to providing abstracted information only. Web links are given for readers interested in more details.**

# Reliable castings

Looking at university research activities, CFN came across some very interesting pages on the University of Birmingham website. There we learnt that one of the key underlying themes of recent work has been to study the detrimental effects of filling moulds with molten metal under conditions that lead to surface turbulence. According to the website it has been shown that "molten metal flow becomes unstable once its velocity exceeds a critical value of ~0.5 m/s. This results in bubble formation and subsequent damage and also the incorporation of double oxide film defects into castings. Both significantly reduce the reliability of castings and so it is essential that such defects are at least minimised and preferably eliminated by improving the filling of moulds. This is being achieved by radical changes to the design of running systems and by using alternatives to gravity pouring, such as tilt pouring."

Info:
www.irc.bham.ac.uk/casting/production.htm

# TT6080 insert grade

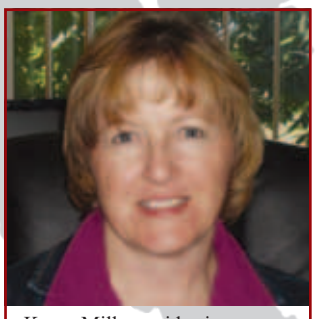
Taegutec has introduced the TT6080 insert grade for milling cast irons. The TT6080 milling insert encompasses the application range of both the TT6030 and TT6060 grades. TaeguTec's TT6080 insert grade for milling cast irons increases tool life when milling plain and nodular cast irons. Taegutec's grades for machining cast iron come in two different types: the TT6290 for grey cast iron machining at high speeds and the TT6080 grade for machining both plain cast iron and nodular cast iron. The TT6080 grade is capable of operating at low to medium speeds and is suitable for manufacturers that are machining a diverse range of cast irons. It utilises an upgraded A1TiN coating on a TiN layer that has a coating affinity with K20H that increases coherence.

## Precoated Steel assets acquired

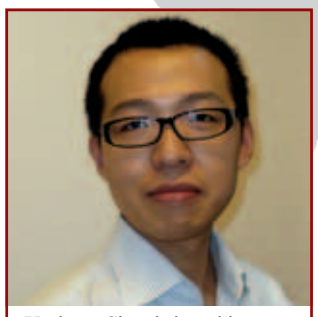
Essar Steel, a fully integrated flat carbon steel manufacturer, has completed the acquisition of steel assets of Shree Precoated Steels Limited. The assets that have been acquired include the plant comprising colour coating line, cold rolling mill, galvanizing line and pickling line. This is only plant in India that uses NIR (near infrared) technology for colour coating which extends the life of the product. The colour coated products from this plant are well accepted in the domestic and export market with exports accounting for 80% of its production. Commenting on the acquisition, Mr. Malay Mukherjee, CEO, Essar Steel said, "going forward, it is important for the steel companies to widen the product base. This acquisition is aimed at achieving that objective. We will be able to capitalize on the synergies offered by this plant through technical expertise of Essar Steel". The total value of the fixed and current assets acquired is approx. Rs. 1200 crores. This is funded through a mix of debt and equity.

# CFN's Global Correspondents

James Chater's office is in Nevers, France.



Karen Miller resides in Kentucky, USA.



Yuzhong Shen is based in Shanghai, China.

### Aluminium R&D

*James says:*

An interesting report crossed my desk recently about aluminium alloy castings. It seems that the CTIF (Foundry Industry Engineering Centre) has carried out an R&D project on defect control in aluminium alloy castings in collaboration with ACTRA (Association of Technical Centres of the Rhone Alpes Region) and in partnership with the École Nationale des Mines de Saint-Etienne.
The project had three aims: to set up innovative methods of producing samples with controlled internal defects; to characterize the impact of the defects on mechanical behaviour; and finally, to correlate characterizations with simulations and FEM calculations.
The project should improve knowledge of the real impact of internal defects on mechanical characteristics of foundry parts and better define the maximum acceptable level of these defects (to avoid current penalizing safety coefficients).

☞ www.ctif.com

### Enhanced forge

*Karen writes:*

There's positive news this month from Alcoa. The company has announced that funding has been approved for the complete repair and refurbishment of its 50,000-ton forging press at the company's Cleveland Works. As I understand it, the project will make Cleveland Works a premier producer of large aluminium and titanium forgings for the defence, aerospace and industrial markets. In a press statement, William F. Christopher, Alcoa executive vice president and president of Alcoa Engineered Products and Solutions, said, "This could not have happened without the support of our employees, community leaders and leadership of United Auto Workers Local 1050. When this project is completed Cleveland Works will be the home of the most advanced, productive large forging presses in the world." The press project should be completed by the end of 2011. It will involve the complete disassembly and renovation of the 50,000 tonne press. This 92-foot structure began production in 1955.

☞ www.alcoa.com

### Boom in China

*Yuzhong reports:*

The positive vibe I've been noticing amongst local foundry managers has recently been backed up by official figures. These reveal that the Chinese foundry industry is experiencing a boom. According to the report, the overall output of Chinese castings in 2008 was 33.5 million tonnes, which equals the total output of the U.S.A, Russia, India and Japan and accounted for 1/3 of the world's total output. Since the last quarter in 2008, the Chinese government has dramatically increased infrastructure investments. In particular, the State Council passed the Adjustment and Development Plan of Ten Top Industries, including iron and steel, automobile, equipment manufacturing industry and so on. Now, all those industries are closely related to the foundry industry, thus providing a broad space for development. So it is predicted that after the adjustment in 2009, despite improvements in casting precision, the output of Chinese castings will exceed 35 million tonnes in 2010.

☞ www.castings-forgings-news.com

## Rico Auto plans new plants

Rico Auto has announced that it would set up two new plants outside Haryana after a protracted labour strike at its four plants in the state crippled production for over two months. A top Rico official said the move was in line with a demand raised by key customers, who were affected by the 45-day strike at its Gurgaon factory. The four plants located in Haryana's Gurgaon and Dharuhera automotive belts, were virtually shutdown by a labour strike during September and October, choking the lines of Maruti, Hero Honda and Tata Motors, besides global clients such as General Motors, Jaguar, Ford Motors and Nissan. Rico Auto refused to confirm any tentative locations for the plant or that any greenfield expansion will take place in Haryana. Its major production comes from Haryana, while it also has some new facilities in Uttarakhand and Sanand – the location for Tata Motors' Nano car project.

# Automatic visual inspection techniques for modern foundries

**By Dipl.-Ing. Dirk vom Stein, inspectomation GmbH, Mannheim/D**

*Mould inspection by colour multiplexed shadow modulation.*

Currently, quality control in foundries is often assessed by manual visual inspection, which is sometimes undertaken by staff only implicitly and alongside their proper activities in the production process, for instance during manual deburring or palletizing/packing. This manual inspection has its well-known drawbacks:

• Inspection quality is not uniform, i.e. test results may be affected by the condition, time of day and inspector. Thus certain tests are forgotten; each inspector has his own (subjective) criteria, and inaccurate measurements may happen, e.g. due to incorrect use or reading of measuring equipment. Therefore, reproducible (objective) results cannot be expected.

• Test results are often documented only partially or not at all.

These sources of error can be avoided by automatic quality inspection to supply objective, reproducible and documented results. During the past years, inspectomation GmbH has developed many different inspection systems for various inspection locations and tasks. These systems have proven their dependability during long-term operation in many foundries throughout the world.

**Cores, moulds and patterns**

For cores, moulds and associated patterns, the shadow-modulation principle offers a low-cost qualitative inspection solution [1]. Using several directed light sources from different directions enables the acquisition of an image series where the same object regions show different shadow patterns. These shadows contain valuable implicit 3-D information about the shape of the object under investigation, so this image series carries much more information than a single image acquired with diffuse lighting, thus increasing the performance and robustness of the system. This technique may be used to monitor core shooting systems and assembly of core packages as well as horizontal and even vertical moulding lines [2].

*Gearbox housing presented by robot to light-section sensor.*

**Complex castings**

Triangulation-based acquisition of range images enables an almost all-over quantitative surface inspection of complex castings [3]. Different faces are presented sequentially to the vision system by a robot. The acquisition unit contains a light-section sensor moving on a highly dynamic and precise linear actuator. Several lasers are used on opposite sides of the camera to minimise blind areas. Different triangulation angles allow trade-offs between resolution and measuring range. Typically, each scan takes up about 1 s and provides approximately 5 million 3-D points. The fault detection and analysis is completed after an additional second, thus allowing the in-line inspection of 100 percent of the production. The attainable height resolution clearly depends on diverse design parameters of the setup. A typical system achieves a vertical resolution of 0.1 mm on a lateral sampling grid of 0.2 mm _ 0.2 mm. By the use of a robot, this system is extremely flexible: Different products can be examined by the same system, if necessary using different grippers. Beyond that, the test strategy can be chosen very flexibly, selected sides can be scanned several times in different situations using different lasers and triangulation angles. If the cycle time is exhausted, several inspections can be alternated in a user-defined order. The check routines are configured by means of a concise graphical user interface. All inspection results are stored in a database that can be queried from any networked computer. In particular, the workman at the reworking station only has to scan the data matrix code (or another one-to-one tag) and immediately gets images of the defective faces with the exact locations of the flaws indicated.

*Vent inspection for brake discs.*

**High volume castings**

For high volume production castings with special geometries to which the aforementioned technology cannot be applied directly, specific and customized systems have been developed. For example the inspection of ventilation slots in brake discs [4], the verification of the clearance (i.e. inner diameter) of cast cylinder liners as well as the gauging of camshafts and crankshafts can be reliably conducted based on silhouette images from telecentric optical set-ups.

***References***

*[1] Beyerer, J.: A vision of quality. Cast Metal Times, No. 6, 2001, pp. 30–33.*

*[2] vom Stein, D.; Siebecker, G.; Larsen, K.: Automatic visual inspection in vertical moulding systems. Casting Plant & Technology, No. 4, 2006, pp. 18–23.*

*[3] vom Stein, D.: Automatic laser visual inspection of complex castings. Casting Plant & Technology, No. 1, 2008, pp 64–69.*

*[4] Klawitter, Th.: Automated inspection of ventila*tion slots in cast brake disks. Casting Plant & Technology, No. 2, 2006, pp. 48–51.

## YXLON gears itself for the future

YXLON International is gearing itself for the future through further process optimization. Feinfocus microfocus systems are going to be produced alongside YXLON X-ray inspection systems on an additional 2400 square meters of space in a new, state-of-the-art production hall at the Hamburg location. A relocation of all other activities at the Garbsen location in Hamburg will take place at the same time. Substantial opportunities for synergies are going to be brought to bear by consolidating the two sites in North Germany at one production venue. This step facilitates the development of innovative products that transcend platforms, thus safeguarding the leading position YXLON holds in the field of X-ray inspection systems for the non-destructive testing of materials in the future.

## Rapid Prototyping

The Special Focus page in the next issue (February) will address Rapid Prototyping. If your company is involved in this sector, then why not share your experiences? Ideas, news items, press releases etc are most welcome at: press.cfn@kci-world.com

## Quality and defect tracking

Quality was one of the hot topics discussed during the recent North American Die Casting Association (NADCA) annual Plant Management Conference. The event was held 23-25 September at the Hilton – Northbrook in Northbrook, Illinois, US. In addition to a reception and plant tours, the conference also included round table discussions, where attendees could voice their opinions and ask questions. Some of the hot topics discussed were productivity improvement, controlling processing cost and improving quality and defect tracking. The featured speakers were NADCA president Daniel L Twarog, who gave attendees an overview of where the die casting industry is at and the direction it is going, NADCA project engineer Alex Monroe, who discussed the pressing issues of Cap & Trade and Energy Efficiency and professor & director of the Metals Processing Institute at Worcester Polytechnic Institute Diran Apelian, who spoke on Semi-Solid Metal Processing.

## Modal Shop hires Sokolowski

The Modal Shop Inc. has announced the hiring of Frank Sokolowski as the NDT Field Sales Manager for North America. Mr Sokolowski was previously an Automotive Key Account Manager for GE Inspection Technologies with the responsibility for supporting GE's non-destructive test products at major automotive manufacturing companies like GM, Toyota, Ford, Nissan, Magna, Chrysler and Honda. The Modal Shop provides quality-testing systems for powder metal, cast, ductile iron and forged parts.

## About this page

**Starting this issue, CFN will include pages devoted to specific materials. We will present a selection of the very latest technical developments, updates on company and product information, reviews of relevant associations and also provide links for further reading. Please help us to make these pages as informative as possible by sending your own materials information to CFN editor Betty Hammond at: b.hammond@kci-world.com**

## Annual Mg Conference

The next instalment of the Annual World Magnesium Conference is scheduled for May 16-18, 2010 at the Kowloon Shangri-La Hotel in Hong Kong. The show is organised by the International Magnesium Association, who state it is a unique gathering which successfully blends association business, technical presentations, networking opportunities, social activities and more.

Info: www.intlmag.org/conference.html

# Squeezed between cost and innovation

*Rösler developed this highly efficient processing system for an automobile manufacturer to deburr and surface finish magnesium transmission housings.*

Automobile manufacturers are facing pressure from two development trends. Increasing costs due to global competition forces these companies to take comprehensive measures to adjust their cost structure. At the same time, this industry sector is trying to meet environmental protection targets. According to an automotive expert, Prof. Ferdinand Dudenhöfer, all manufacturers still significantly exceed the upper limits of values for carbon-dioxide ($CO_2$) emissions. An obstacle to drastically reducing $CO_2$ emissions is that cars are still very heavy, which is why innovations in the field of light vehicle construction that focus on new materials and improved production technologies are particularly critical.

**Increased production rate**

'Time to market' is the slogan which is currently driving activities in the automobile industry. In order to accelerate the time to market, many manufacturers resort to continuous streamlining of their manufacturing processes, thus reducing the time required to bring new products to the marketplace. Increasingly, outsourced divisions are being retransferred. A South German automobile manufacturer reintegrated shot blasting of transmission housings back into the company after the material they are constructed of was changed from aluminium to magnesium die castings. This automobile manufacturer asked Rösler Oberflächentechnik to develop a highly efficient processing system for deburring and surface finishing the castings and internal surfaces of transmission housings. Rösler developed a custom-built RROB 800/1200-6 Roboblaster which was designed with a special emphasis on cost-effectiveness and quality. To achieve the required cycle time of 26 seconds per component, the robot is equipped with a double gripper which can accommodate two components at the same time. The robot places the transmission housings in the blast chamber, and then rotates them. This rotation causes the patented interlocking seal on the gripper's collar to immediately and securely seal the blast chamber. In the shot blast chamber, the housings are shot blasted for 20 seconds by six high-performance blast wheels, of which, two are mounted on to the back wall of the chamber to guarantee that the inside area is shot blasted thoroughly. A system especially developed for the Roboblaster subsequently removes the shot blast media from the components.

# Multi-slide, hot-chamber innovation

A company which immediately springs to mind when discussing magnesium is Dynacast. The company website is quite clear about the advantages this metal has to offer: "Magnesium is the ideal material for applications where weight saving is a priority, having the lowest density of all structural metals. Almost as light in weight as plastic, magnesium has the advantage of greater strength and rigidity along with inherent EMI/RFI shielding, durability, heat-dissipation and full recyclability."

Dynacast is clearly at the forefront of innovation when it comes to casting magnesium. In fact, their website gives a good overview of their so-called "multi-slide, hot-chamber" casting process. They write, "Multi-slide tooling is designed to use 4 perpendicular slides in the tool to enable very complex and accurate castings to be produced. In some cases, up to 6 slides can be used, which may be at angles other than 90 degrees. The process is used principally for small zinc components but also Dynacast has developed a multi-slide machine for die casting magnesium parts."

***Tip:***
***On the home page, www.dynacast.com, select the "Mg - Magnesium" button. Then click "Manufacturing Processes", found on the right-hand side. Then just under it click "Multi-Slide Hot-Chamber".***

# Magnesium resources

The Pacific Northwest National Laboratory (PNNL) website offers visitors an extensive overview of technical papers about magnesium and other metals. PNNL is one of the U.S. Department of Energy's (DOE's) ten national laboratories, managed by DOE's Office of Science. PNNL also performs research for other DOE offices as well as government agencies, universities, and industry to deliver breakthrough science and technology.

The PNNL's extensive resource for magnesium papers is intended to inform readers about the "who and where" of the latest research and development on magnesium. Although the site does not include the actual papers themselves, the information provided should be sufficient to enable readers to readily access the articles of interest.

To say the information is extensive is an understatement. The "casting processes and properties" link alone brought up close on 200 articles on magnesium, covering the past ten years or so. These papers cover research efforts from quite literally around the globe. There are also sections on related topics, such as "alloy development", "corrosion" and "primary production". In short, the site provides links to a massive amount of data.

**www.pnl.gov**
**www.magnesium.pnl.gov**

# A mine of information

A resource that comes highly recommended is the International Magnesium Association (IMA) website. This provides access to information about IMA members, programs and events, databases, conference proceedings, publications and videos. In short, the site contains a wealth of resource information about magnesium, which the IMA rightly notes is "one of the earth's most versatile metals." Founded in 1943, the mission of the International Magnesium Association (IMA) is to promote the use of the metal magnesium in material selection and encourage innovative applications. IMA's members consist of primary producers, recyclers, foundries, fabricators, end-users and suppliers. IMA serves the industry and the membership through its Annual World Magnesium Conference, seminars, statistical programs, research and publications. Through IMA's efforts, manufacturers and consumers are increasingly aware of the numerous options and benefits the metal magnesium provides. The IMA website also includes some compelling applications for magnesium. For example, they state that thanks to its lightweight properties, magnesium alloys are being used increasingly in the automotive industry as a means of reducing weight, increasing fuel efficiency and reducing greenhouse gas emissions.

***Further reading:***
***www.intlmag.org***



# International Magnesium Award

CAST's Dr Mark Easton has been awarded the GKSS Magnesium Research Award at the 8th International Conference on Magnesium Alloys and applications. The GKSS Research Centre in Geesthacht initiated the award to honour innovative work by an individual researcher in the area of the science and technology of magnesium alloys.

Magnesium is a logical lightweight alternative to traditional materials, especially for automotive applications. Magnesium is 33% lighter than aluminium and 75% lighter than cast iron, has an excellent strength to weight ratio, high shock and dent resistance and will dampen noise and vibrations significantly more than either aluminium or steel.

Dr Easton was selected from a field of applicants from Asia, Australia, Europe and North America. According to GKSS, Dr Easton received the award because of his "important contributions to the understanding of the relationship between nuclei and grain refinement for magnesium alloys." GKSS further said, "Dr Easton was [also] involved in the development of new grain refiner for wrought alloys containing Zr in its most effective form. He has led teams in the development of several new alloys, predominantly for casting, and for a range of other applications. Dr Easton has provided considerable leadership in the Australian research community and globally."

According to Dr Easton, "My passion is for doing research that spans the gap between good science and the development of real technologies. Research is able to contribute to some of the important issues that face the world and humanity. One of the greatest issues is how we learn to live in a resource limited world. I like to think that my research goes some way to addressing these issues."

Mark Easton is a Research Program Manager with the CAST Cooperative Research Centre based at Monash University, Melbourne, Australia. Dr Eaton graduated from Monash University and obtained his PhD in Materials Engineering from the University of Queensland. In 1999, he worked at Comalco Research and Technical Services in Thomastown, Victoria, Australia. From 2000-2004, he was a Research Engineer at Monash University with the CRC for CAST Metals Manufacturing (CAST). Since 2005, Dr Easton has been a Research Program Manager with the CAST Cooperative Research Centre based at Monash University, Melbourne, Australia.

**www.gkss.de**
**www.cast.org.au**
**www.eng.monash.edu.au**

# Magnesium Technology symposium 2010

A very interesting event to be held early in 2010 (February 14-18, Seattle, USA) is the yearly Magnesium Technology symposium, said to be one of the largest gatherings of magnesium specialists in the world. Papers are presented on all aspects of magnesium, from primary production to applications and recycling. In 2010, the symposium will cover the following topics: primary production, recycling, casting, casting and wrought alloys and properties, wrought products and processing (rolling, extrusion, forging), forming, corrosion and surface finishing, joining, structural applications (automotive, aerospace, etc.), emerging applications (biomedical, battery, H-storage, etc.). In short, this could be a most informative show for people interested in castings and forgings made from magnesium.

***To see abstracts of the dozens of approved presentations, please go to: www.tms.org***

***Tip:***
***enter "magnesium 2010" in the search field. The abstracts are listed under the "programmaster" section of the website.***

## Next Issue: *Zinc*

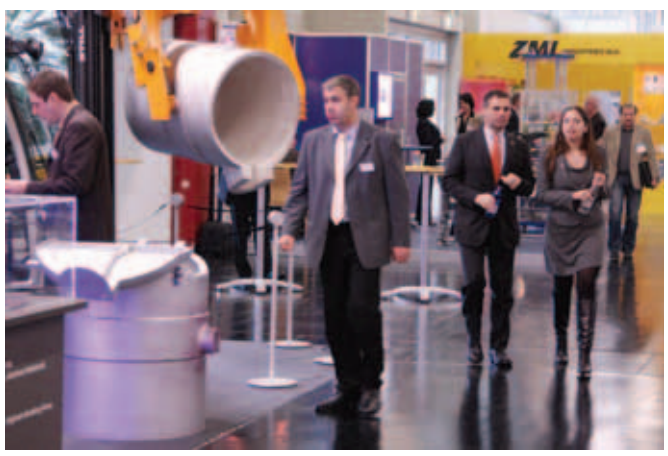
Are you involved in producing zinc castings or forgings? Do you have some research work to share? Or, perhaps you are a user of zinc components? Betty would be delighted to hear your experiences and can be reached at: b.hammond@kci-world.com

# Euroguss 2010:

Euroguss 2010, 10th International Trade Fair for Die Casting: Technology, Processes, Products, will be held January 19-21, 2010 at the Exhibition Centre Nuremberg. EUROGUSS is the central forum for experts from the pressure die casting foundries and the associated industries. As a leading international trade fair for pressure die casting, this highly specialized event offers the setting for the international exchange of knowledge, know-how and dedicated information. The exhibition will host some 300 exhibitors. Running parallel to the exhibitions the 10th International Die Casting Congress will offer an extensive program of lectures with 22 presentation on "tools and machinery" and "aluminium, magnesium and zinc die casting" for the expected 6,000 trade attendees. NurembergMesse has organized the event in cooperation with the German Association of Pressure Die Casting Foundries (VDD)

and with the Federation of German Foundry Specialists (VDG).

For optimal preparation prior to visiting the fair, www.ask-euroguss.de has been made available. Here, all exhibitors are represented with comprehensive information about their companies, products and contacts.



# METEF & Foundeq 2010

Metef – 8th International Aluminium Exhibition and Foundeq Europe - Foundry Equipment Exhibition for Ferrous and non-Ferrous metals will be held in conjunction April 14-17, 2010 at the Garda Exhibition Centre in Montichiari, Brescia, Italy. Distinguishing itself as the opportunity par excellence to have a close-up view of industry developments in machinery, plant, equipment, products and aluminium applications, Metef is a meeting point for large and small scale enterprises in the industry providing qualified experts in the field of die casting, extrusion, foundry, rolling, surface treatments and complementary technologies, with innovative and technologically advanced solutions to cope with the most demanding production requirements. One can not talk of Metef without mentioning **Foundeq**, now in its 5th edition, Italy's one and only exhibition of foundry machines, equipment and products.

## Valve World's first time in Dusseldorf

The leading international trade fair for valves and valve accessories, Voalve World Expo, will be held for the first time in 2010 at its new location in Dusseldorf. A total of 400 exhibitors from 35 countries and approximately 7,000 visitors come together to focus on technical innovations in faucets, valves components, related fittings and pipeline products. Coinciding with the exhibition is the KCI-organized Valve World Conference.

# METAV 2010

The next METAV: International Fair for Manufacturing Technology and Automation will take place February 23-27, 2010 at the Düsseldorf Trade Fair Centre. Thus METAV is the first international metalworking fair in the new year and the ideal platform for exhibitors to gather information on the latest developments and solutions for production right at the start of 2010. The exhibition will cover a wide scope of state-of-the-art manufacturing technologies for the metalworking industry – from machine tools, precision tools, automation technology to complete systems made to customers' specification. Trade visitors are offered ideal opportunities for gaining an overview of the goods and services available and can make their investment decisions at the beginning of the year on a sure and well-informed footing.

☞ For more information please visit www.metav.de.

# Calendar & Appointments

## Calendar

January 7 - 9, 2010
**7th Everything About Water Expo Chennai (India)**

January 11 - 15, 2010
**AOV / MOV Joint Conference San Antonio (USA)**

January 19 - 20, 2010
**1st Middle East North Africa Water Resource Dubai (United Arab Emirates)**

January 19 - 21, 2010
**Euroguss 2010 Nuremberg (Germany)**

February 5 - 7, 2010
**IFEX 2010 Ahmedabad (India)**

February 10 - 12, 2010
**Metallurgy India 2010 Mumbai (India)**

February 23 - 27, 2009
**METAV 2010 Düsseldorf (Germany)**

February 25 - 27, 2010
**Aluminium India 2010 Mumbai (India)**

March 10 - 20, 2010
**Dongguan Int Expo on Foundry & Die Casting 2010 Dongguan (China)**

March 20 - 23, 2010
**CastExpo 2010 Orlando (USA)**

April 12 - 16, 2010
**wire & tube 2010 Düsseldorf (Germany)**

April 14 - 17, 2010
**Metef 2010 Brescia (Italy)**

May 11, 2010
**Asia Foundry Forum 2010 Beijing (China)**

May 11 - 13, 2010
**International Casting Sourcing Fair 2010 Beijing (China)**

May 11 - 14, 2010
**Casting China International 2010**
The 10th International Foundry, Metalforming & Industrial Furnaces Exhibition
The 12th China International Metallurgical Industry Expo
**Beijing (China)**

June 2 - 4, 2010
**5th International ROSMOULD Exhibition Moscow (Russia)**

June 10 - 11, 2010
**Deutscher Gießereitag 2010 Dresden (Germany)**

## DE BELDER COLUMN

# Getting up close and personal

### It's not just what you know, it's also who you know

***About Philip de Belder***

Philip de Belder is Managing Director of de Belder Associates Ltd, a globally based search and selection organisation that specialises in the foundry, castings and metals industries. Philip writes regular columns for CFN, with advice on successful recruitment.

**www.debelder.co.uk**

Most employers only tend to get involved in the recruitment process when they are looking for new personnel. Likewise, most people only begin studying the jobs market when they are looking for a new position. So it is probably quite fair to state that such employers or candidates are by no means experts in this complex and often complicated field. Therefore, whether you are looking to source new personnel or whether you want to find that 'dream job', a specialist recruitment company can really make the difference between success and failure.

A piece of advice we always give to companies or candidates is to get to know the other people involved personally. Don't make decisions on hearsay or for that matter on information you glean from the Internet.

**Get facts AND feeling**

Here is a real-life and very timely example. For a recent commission, we were asked to find an experienced industry specialist by a company that is quite literally located on the other side of the world. An excellent candidate was found and a meeting arranged with the client company, who were planning to visit Europe to conduct interviews.

In the meantime, however, the candidate decided to do some research of his own on the Internet. From what he saw he decided he didn't want to proceed with his application.

That was a big mistake! Whilst he got facts from the Internet, he didn't get any feeling. He could not assess the personality of the company and its people. We, however, thanks to our own personal experience, were able to reassure him of their quality and reputation both as a company and as employers. Not only that, we were also able to inform him that they were sending two senior executives over to meet him – one a national of the country where the company is based and the other being someone who had previously done exactly the journey they were asking our candidate to consider.

After listening to the advice our candidate has changed his mind and has agreed to the meeting, to which incidentally his wife is also invited to attend. After all, everyone realises that the spouse should be part of any decision-making of this magnitude. Now all parties will be able to discuss the job, the company and the career prospects; but, they can also talk about the country, its lifestyle and all the other considerations of going to live on the other side of the world.

**You can't beat face-to-face**

We would always advise employers and candidates to meet face-to-face before they make any decisions. It is often said that body language tells you as much as the spoken word. And in our opinion, that is certainly true.

The best piece of advice? Do not underestimate the recruitment process. Find a specialist recruitment company that works within your own market sectors for a close and personal viewpoint on the best way forward.

# Aluminium India 2010

Aluminium India 2010, India's largest professional conference and exhibition on aluminium, in its 2nd edition, is set to be held February 25-27, 2010 at the Bombay Exhibition Centre, Mumbai, India. Aluminium India 2010 offers the aluminium industry an international B2B platform that will showcase and foster the exchange of ideas on the latest technology, products and new business opportunities to visitors from a wide spectrum of decision makers, manufactures, producers, users, policy makers, government officials, academics, and technology developers. Alcastek 2010 conference, held concurrently, will continue its present role by providing a high standard technical forum on new developments addressed by invited world class experts.

# International Casting Sourcing Fair 2010

China Foundry Association will host the International Casting Sourcing Fair 2010, May 11-13, 2010 at the New China International Centre in Beijing, China. With 1, 869 members whose casting output accounts for 72% of the total output of castings in China, this fair offers a unique opportunity for overseas purchasers to find business partners and see the latest industry development in China.

**Contact:**

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# Tube & Wire 2010 Dusseldorf

April 12-16, 2010, Dusseldorf Messe will host Wire 2010, international wire and cable trade fair in conjunction with Tube 2010, international wire and pipe trade fair,. Wire 2010 & Tube 2010 will bring exhibitors and visitors together to highlight the wire, pipe and cable industries. At Tube 2010, plastic pipes, profiles, profile technology and OCTG technology will be the hub of activities. Wire 2010 will focus on the latest technologies in wire, cable, and fibre optic equipment, as well as spring production and metal forming. Wire 2010 can be found in halls 9 to 12 and halls 15 to 17, while exhibitions for Tube 2010 can be found in Halls 1 to 7.

# IFEX 2010 - India's Foundry Industry trade fair

IFEX 2010, the 6th International Exhibition on Foundry Technology, Equipment and Supplies, will be held February 5-7, 2010, at the Gujarat University Exhibition Hall, Ahmedabad, India. The fair runs concurrent to Cast India Expo and will be an excellent platform for Indian as well as overseas companies to showcase their state-of-the-art technologies and services being offered to this vibrant industry and for exposure to new business opportunities. The event is a cooperative effort of the Koelnmesse and the Institute of Indian Foundrymen.

## Appointments

**Vice President – Public and Government Affairs**
Daniel Cruise will join Alcoa as Vice President for Public and Government Affairs. He will oversee all global, national, state and local governmental and regulatory affairs and other public matters for the company. Mr Cruise comes to Alcoa from the Albright Stonebridge Group where, as a Managing Director, he ran the firm's New York office. At Albright Stonebridge, Mr. Cruise advised global businesses as they entered new markets and adjusted to local government and regulatory frameworks. Mr. Cruise also served in President Clinton's White House as Director for Public Affairs for the National Security Council.

**Chief People & Communications Officer**
Novelis Inc. announced that Eric Drummond has been named Chief People and Communications Officer. He will be a member of both the Executive Committee and the Executive Human Resources Committee and will be responsible for the Corporate Communications. Mr Drummond was previously Vice President, Global Human Resources for the National Basketball Association. Drummond started his career at Ingersoll-Rand taking on progressively more senior roles in human resources within the manufacturing arena. He later worked in various Human Resources roles at PepsiCo, Coors Brewing, RJ Reynolds/Japan Tobacco and Linde Gases. Drummond holds a B.S. degree in Employment and International Relations as well as a Masters degree in Labor and Industrial Relations, both earned at Michigan State University.

## Appointments, Anniversaries, Celebrations!

**CFN is interested in your companies or organisation's appointments and celebrations. Tell us about the people making it all happen. Contributions are welcome from all sides of the industry: foundries, forges, equipment suppliers, universities, research institutions, end users, etc. Selected items will be placed as space allows and, of course, free of charge. Please send items to press.cfn@kci-world.com**

## Active institute for foundries in India

Set up in 1950 and registered as a society in West Bengal under the Societies Registration Act XXI of 1860, the Institute of Indian Foundrymen (IIF) had modest beginnings. Today it has an enviable national spread of four regional branches and twenty seven chapters. Its current membership numbers over 3,200 inclusive of Fellows, Members, Life Members and Company Members.

From providing education, research and training pertaining to metal casting, to publishing the monthly Indian Foundry Journal, in addition to hosting the annual Indian Foundry Congress and being the nodal point of information, plus being the one point reference for the Government and participating in the preparation of standards for foundry materials and products . . . IIF is multi-dimensional in its sphere of activities.

Headquartered in Calcutta, in a four storey building, it is equipped with a library aimed at keeping the foundrymen technically abreast of global developments.

The IIF is affiliated with the Confederation of Indian Industry (CII), New Delhi and the World Foundrymen Organisation (WFO), U.K.

☞ **Info:**
**www.indianfoundry.com**

# Specialist foundries slowly emerging

**By David Sear**

*In recent years Mr Natarajan (MD of Sanmar Metals Corporation) has seen many noteworthy developments including the acquisition of Matrix Metals foundries in North America, expansion at the Trichy foundry and the winning of several top-notch customers.*

Think India and you may form a picture of a foundry sector still dominated by smaller-sized companies turning out commodity castings. Whilst such companies are without doubt still in the majority other, more organized enterprises are slowly emerging, according to Mr Natarajan, the Managing Director of Sanmar Metals Corporation. "Like in any other country, in India there are also foundries which specialize in specific end-user industries. For example, some of the foundries focus on automotive parts, some in valves and some in construction and mining type castings. Many buyers are surprised that Indian foundries are often able to do complex parts with demanding specifications. While sourcing from India, my advice would be to seek supplies of machined castings since that would reduce the potential quality issues."

Sanmar is one of the more developed foundries in India and, indeed, at its Trichy facility boasts one of the world's largest single locations for steel castings with a capacity of 25,000 tonnes per annum. The same location also has an investment foundry and well-equipped CNC machine shop. Mr Natarajan states, "The Sanmar Metals business consists of two distinct and independent sectors, namely the iron and steel foundries. In both these businesses we have operations in India as well as overseas. The iron business is largely focused on the automotive segment particularly for the turbo charger applications. Our Eisenwerke Erla foundry in Germany specializes in Ni-Resist (D5S) alloys for highly cored complex parts used in turbo charger applications. We have recently started a Greenfield Iron Foundry in Chennai (India) to complement the Germany foundry. The steel foundry business, on the other hand, is very different. Here the applications are largely in flow products like valves, for the construction and mining segment and rail / transit applications. Our foundries are located in US, Mexico and India, but we service customers on a worldwide basis. Another difference is that in steel we make a wide range of castings from very small to large size and in a wide range of metallurgies from carbon steel to super high alloys."

*View of the Sanmar Foundry Steel Foundry complex consisting of a sand foundry with a capacity of 25,000 MT per annum, an investment foundry with a capacity of 1200 MT per annum and a well equipped CNC machine shop.*

Asked about Sanmar's strengths, Mr Natarajan comments that the company's technical capability is highly rated. "The client base for both the businesses includes industry leaders and these tend to be the most demanding in terms of quality and service levels. We pride ourselves for our highly professional approach to the business and are setting high standards in terms of health, safety and environmental issues. Thanks to our experienced team and sharing of practices across the locations, we can offer a wide range of casting solutions and today are also in a position to offer large capacity from a low cost country like India," he says.

**"Prices for steel castings in India are generally lower due to the high labour content. The price differential for iron castings is not as significant."**

### Expansion plan

**Pioneer Alloy Castings has chalked out an INR 400 crore plan to augment capacity. The company, which has two foundries at Gummidipundi in Tamil Nadu and Renigunta in Andhra Pradesh, India, has an existing casting capacity of 40,000tn. Pioneer is expected to begin work on Phase I expansion in January 2010 that involves importing a high pressure casting line. When commissioned, it is likely to triple casting capacity to 120,000tns/month.**

# A global destination for castings and forgings

India is seen by many procurement managers as the emerging global destination for forgings and castings. They claim that Indian companies can offer significant advantages such as cost-effective skilled labour, engineering skills, low cost input material of select grades and also proven abilities in handling complex engineering products.

A company that is helping to shape India's future is Bay Forge Limited based in Chennai. Since 1996, Bay-Forge has been a leader in the area of open die forgings and large seamless rings. According to Mr Ravishankar, VP Sales & Marketing, Bay-Forge is a well recognized name in India and abroad for the supply of large forgings like shafts and components for steam and gas turbine rotors, seal housing and barrel casings for compressors and pumps, dished ends, shells, tube sheets and covers for pressure vessels, pinions, gears and shafts for gear boxes, wind turbine shafts and flanges. With this product range it serves critical sectors of the economy such as, power generation, nuclear, wind, oil and gas, cement machinery, steel plants and general engineering sectors. Bay Forge plays an exclusive role in the aerospace sector supplying aluminium and titanium rings as well as steel components for the satellite launch vehicles, to Indian Space Research Organization (ISRO).

Bay-Forge boasts extensive facilities covering 65 acres. The plant is equipped with a 2000-tonne press with integrated manipulator dedicated to open die forgings and a 3500-tonne press (soon to be fitted with an integrated manipulator) used for larger forgings and rings. The ring rolling mill can roll out rings of 5.5 meters in diameter and 20 tonnes in weight – one of the most powerful in the world.

The plant is currently equipped with twelve gas and oil fired furnaces (20 to 100 tonne capacity) along with four electric furnaces for aluminium, titanium and special alloys and a state-of-the art machine shop. In 2009 alone, new investments at Bay Forge included the installation of six new furnaces, plus additional quench tank and machining facilities, delivering additional capacity and capabilities.

Of course, manufacturers are more than just the sum of their facilities. Bay Forge's key strengths are quality and innovation. Virtues which have been recognised by the Indian Space Research Organization, which singled out Bay Forge for their requirements of seamless rings and critical forgings in special grade of aluminium, titanium and exotic steel. Mr Ravishankar concluded, "As a subsidiary of the Italian FOMAS Group, Bay-Forge has access to world-class technology and process details. Bay-Forge is therefore on a technological par with FOMAS. Moreover, Bay-Forge is one of the few companies with experience in handling such a wide range of ferrous and non-ferrous materials with exotic chemistry for a diverse range of sectors of the economy. This has helped Bay Forge to emerge as a one-stop-shop for any buyer looking for wide variety of forgings and rings."

A "leading light" in India, Bay Forge is setting standards for others to follow. Bay Forge is an ISO 9001: 2008 certified company. Bay Forge has also been recommended to receive ISO 14001-2004 Environmental certification in December 2009 by European DNV.

# Steel foundry commissioned

*Karmen Castmetals has commissioned a state-of-the-art steel and alloy steel foundry in Chennai.*

Karmen Castmetals (a division of Karmen International Pvt. Ltd.) is pleased to announce the commissioning of its state–of–the–art steel and alloy steel foundry in Chennai, India. The plant is equipped with fully automatic Fast Loop No-Bake moulding line supplied by IMF, Italy with mould size of 1800 x 1400. The plant can handle single piece weight of 550 kgs and has a total capacity of 500 tonnes/month. The new foundry has been certified to ISO 9001 and PED by TUV Nord. Karmen Castmetals has full NDT capability with ASNT Level III certified personnel.

With a full range of carbon steel, alloy steel, low temperature steels, stainless steels including duplex grades, Karmen Castmetals intends to focus on the valve and pump industry and can supply fully machined castings and precision components through its Engineering Division which is equipped with latest CNC horizontal and vertical machining centers.