

## *Time to get in shape and innovate*

The recession has struck all continents and is challenging us to reflect on what we are doing, the way we are doing it and what the future will bring. In this respect, we should regard such an economic slowdown as a moment, or rather an opportunity to think ahead, get in shape and develop new solutions for current and future practise. Now is the time to be inventive [or re-inventive], the time that we must innovate and exert entrepreneurial skills and talents to comply with the requirements of tomorrow. This is the time to confer with partners, speak to customers, and seek new [or the next] opportunities in which to invest time and [human] resources.

It is also of great importance to preserve human resources [human capital], and acquired knowledge and accumulated expertise that already exists within our organisations. That is why, and rightly so, governments worldwide reach out and support companies to prevent, or at least limit, the taking of drastic actions. Within specialist sectors like our own cast metal industry the demand for qualified workers and engineers continues. In order to keep developing the industry it is of major importance to attract talented staff. This is only possible if the conditions set by these people are satisfied.

The casting process is being challenged by the new economy and an ever-increasing awareness on its influence to the surroundings. Trends are heading towards a carbon dioxide neutral industry, with zero impact on the environment and cradle-to-cradle lifecycles. The impact of these new demands on processes in the cast metal-industry presents a major opportunity for everybody involved. Foundries have to become part of a so-called "Green Economy". Better use [or re-use] of energy, reduction of waste sand and odour-free production are some examples.

Think development of new products for an ever changing world, whether it be lightweight magnesium parts or high-grade steel. Think added value in machining and enhance the use of re-melting chips. Make up [or re-make] your product chain together with loyal partners and research institutes geared to be greener, faster and more efficient for your customer. Do even better at what you already do best so become world class in your niche, which is what we strongly believe in.

While we map our strategies for the future, it is important to seize the opportunities and persistently invest without any doubt or restraint in our future!

**Ir. Bas van Gemert**

General Manager

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- Innova Capital / ACE

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# PROEZA, Mexico relies on Knight Wendling for successful optimization of NovoCast foundry operations

*Proeza is a Mexican Industry portfolio group with businesses in the automotive, agro-industrial and service industries. The group is also owner of the NovoCast foundry in Monterrey. NovoCast is the name now given to what was originally a ProezaGrede joint venture. The name was changed in 2007 when ownership was transferred to 100% in favour of Proeza. With a good OEM and Tier-1 Customer basis NovoCast produces high volume ductile iron castings used as power-train, engine and suspension components for Mexican and US automotive markets.*



Newly equipped in 2001, the foundry has a moulding line with a flask size of 1020x820x250/350mm, a capacity to produce 240 moulds per hour and a cooling time of more than 115 minutes in mould when running at full speed. With this moulding line and an equally well equipped core shop the foundry is designed to produce big heavy castings like turbocharger housings, differential cases, hubs, control arms, steering knuckles and other core intensive truck castings. Comparing moulding speed as a function of flask size NovoCast is one of the –if not the – most competitive horizontal foundry for heavy duty ductile iron castings in the NAFTA Market. The foundry in Monterrey is currently able to produce approximately 60.000 metric t/a good castings, but can, with a small investment in more melting capacity, be rescaled to 80.000 metric t/a.

**Proeza** assigned Knight Wendling to carry out an Operational Improvement Project for their NovoCast foundry with the target to optimize Process and Box yield whilst at the same time minimizing scrap rates. The project kicked off with an Audit to determine the actual situation (SWOT Analysis), after which, Knight Wendling and NovoCast set-up an implementation project to achieve a pre-set six month target.

## **Scrap reduction / Process yield**

Important measurements were taken in order to reduce the scrap rate. By reducing pouring time, changing patterns during production stops, improving process controls at the pouring device and some slight modifications on pattern runner and feeding systems the mis-run defect was eliminated. Slag inclusions were avoided by cleaning up the charge area and by implementation of improved de-slagging procedures at the pouring device.

As an interim solution to overcome the shrinkage defects, chilling paint and chromite core sand were used.

In the meantime a second available pattern was modified and even with a reduced ingate- and feeder-system the casting was granted approval as shrinkage free by the customer.

Besides other, some organizational changes like introduction of a daily shop floor scrap melting and hourly visu-

alization of scrap levels proved helpful as well as an improved scrap prediction system to reduce the scrap.

## **Box yield**

The box yield was improved by optimizing pouring accuracy (line adjustment and maintenance) and at the same time reducing the pouring cup and downsprue dimensions. Starting with the patterns for the high volume pieces the feeding- and gating-system of all patterns have been reduced. As a result the average box yield was improved by 15 to 20%, depending on the type of casting.

Additional operational cost efficiency was obtained by improvements in re-lining of the furnaces, improving the magnesium treatment of the melt, improving the pouring ladle preparation after refill, additives adjustment and coating of cores.

Adjustments made in moulding line maintenance immediately increased the moulding line uptime by 20% while the maintenance department could be reduced by 15 people.

## **Results**

Optimization of finishing procedures with associated improvement of casting quality raised the productivity in this area by over 20%. The internal scrap rate was brought down from 9% to 5.2%. External rejects were reduced from 1.38% to 0.50% and, in the same time, box yield increased to 59.7% by the end of the 6 month period. Knight Wendling has calculated that based on the actual annual tonnage, savings of approximately 3.1 Million US Dollars were achieved.



## Innova Capital involves Knight Wendling foundry consulting services when establishing an international foundry group.

Innova Capital, one of Central Europe's leading private equity firms with headquarter in Warszawa, Poland had asked Knight Wendling for technological foundry consulting support while forming an European foundry group focussing on automotive brake component castings. Knight Wendling served Innova Capital with several technical due diligence assignments during the past 4 years.

The first engagement was in 2004 executing an assessment of the market position of EBCC (European Brakes and Chassis Components Poland S.A.), an aluminium casting and machining company specialized in automotive brake components located in Wroclaw, Poland. Innova Capital acquired EBCC in February 2005.

As in late 2005 Innova Capital was checking an engagement at Fuchosa, an iron foundry located in Spain specialized in nodular iron brake components for passenger cars, Knight Wendling was mandated to execute a market potential review covering commercial and technical aspects. Innova Capital acquired Fuchosa in February 2006.

In 2006 Innova Capital combined the brake component business of aluminium cast components (callipers) manufactured by EBCC and nodular iron cast components (anchors) manufactured by Fuchosa in the ACE Group (Automotive Components Europe) forming one of Europe's leading suppliers of brake parts. Meanwhile ACE had entered the Warsaw Stock Exchange.

In January 2007 the ACE Group asked Knight Wendling to execute a technical due diligence analysis on the Odlewnia Motoryzacyjna (Automotive Foundry Ltd.), an iron foundry located in Lublin, Poland. The intention to acquire this company was finally turned down. In November 2007 ACE again mandated Knight Wendling with a technical due diligence analysis now aiming for Feramo Metallum International, an iron foundry located in Brno, Czech Republic. After finalizing the due diligence process ACE decided to acquire Feramo Metallum early 2008. Currently Knight Wendling is executing an operational audit and implementation project to support EBCC in maintaining a top performance position in manufacturing practices.



## Nederlandse Vereniging van Gieterij Technici (NVvGT) (Dutch association for Foundry Technologists)

NVvGt's primary aim is to broaden and exchange know-how in foundry technology and the cast product. Especially the last few years the association has shift its focus from foundry technology to "transfer of knowledge" in regard to the functional characteristics of the cast product.

**NVvGT** is a regular and welcome guest at Gemco's premises in Eindhoven. It is with pleasure that we host and participate in their regional meetings. On the last meeting presentations were held by: **Wolfgang Baumgart, Managing Director OCC**. Theme: "Mechanische Eigenschappen als Funktion der Graphitausprägung".

**Lothar Spang, Consultant Knight Wendling**; Theme: "Grundlagen zum Verständnis des Eisen-Kohlenstoff-Diagramms".



*From left to right: Wolfgang Baumgart, Vitor Anjos and Lothar Spang*



*Attentive audience during presentations*



*Lothar Spang during his presentation*

# Georg Fischer completes successful 1<sup>st</sup> melt in new foundry in China



3D-view new GF plant China



Groundbreaking Ceremony



Gemco offices and facilities on site



GEORG FISCHER Automotive AG, a world leading automotive casting supplier and the largest automotive casting supplier for safety parts in Europe, has realized a Greenfield foundry in China.



Peter Withagen  
Projectmanager

At the GIFA 2007 we were proud to officially announce that GEORG FISCHER Automotive AG chose GEMCO as their engineering and project management partner for the realization of their new foundry facility in Kunshan, 50 km west of Shanghai, the industrial heart of China. By strengthening its strong market position in metal casting with its own iron foundry, GF is making the most of its worldwide technological leadership. The foundry is going to supply its global customers, active in China, with quality castings.

Gemco together with GEORG FISCHER has been responsible for the engineering and project management of the project. The construction of the new project evolved according plan; on the 8<sup>th</sup> of January 2008 the groundbreaking ceremony took place; in February the piling was completed and in March the project team moved into the temporary site office building. During the summer, the 22.000 m<sup>2</sup> building was completed and from September onwards the equipment arrived on site for installation. The plan as presented at GIFA 2007 was met by the first melt on December 19<sup>th</sup>, 2008. It is the result of the commitment and expertise from GF and Gemco to realize projects on time. The Gemco team now works in close cooperation with a dedicated team of future operational managers of the new foundry. It is anticipated that series-production starts in May 2009.

For more information contact: [eng@gemco.nl](mailto:eng@gemco.nl)

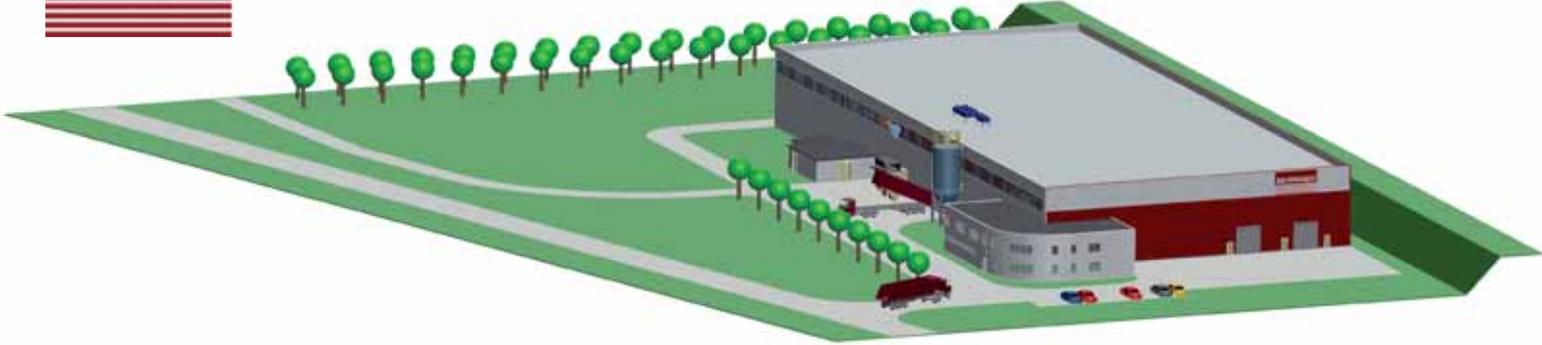


First Melt Ceremony



First Pour at GF China

# “Behringer Maschinenfabrik und Eisengießerei GmbH” builds Greenfield Foundry for Iron Castings up to 4 tons



“Construction ongoing” From left to right: Mr. Rolf Behringer, Mr. Maurits Brandt (Gemco), Mr. Cees Noortman (Gemco), Mr. Christian Behringer, Mr. Dieter Karasek (Behringer)

“Behringer Maschinenfabrik und Eisengießerei GmbH” is recognized as one of the world's leading saw manufacturers and has a reputation for outstanding engineering quality. Behringer GmbH exports to more than 70 countries worldwide and has subsidiaries in the USA and France as well as representations around the world that ensure excellent customer support service.

In 2008, Behringer decided to build a new state of the art foundry to replace their existing facility and selected Gemco to analyse the production requirements and subsequently design the new foundry. After having completed this aspect of the project successfully, Behringer has now moved into the realization phase with Gemco as general contractor for all equipment and supplies. Behringer decided to make one contract to avoid interfacing conflicts and which also provides guarantees for the realization time, budget and performance of the new facility. The scope of supply encompasses a full functioning foundry including all process equipment, laboratory and cranes.



## Official opening of the NovaCast subsidiary CAMITO foundry in Sweden

CAMITO, fully owned subsidiary of the NovaCast Technologies group, stands for a casting method that significantly shortens production lead times of (die) tools, allowing for a much faster introduction of new models.

As an engineering and overall project management partner for the realization of this foundry, Gemco wishes NovaCast continuity and much productivity with the CAMITO generation of tools.



April 2008, On the occasion of the official opening of the CAMITO dedicated facility Bas van Gemert, presents a commemorative plate to Hans Svensson, CEO Novacast Technologies. Also present were: Jan van Wijk (Gemco), Bengt Karsten, CEO Camito Technology Center and Eric Manni (Gemco)

# Simulation

*Five years ago, Gemco started with logistical simulation in foundry design and engineering. Today, simulation supports the engineering in many projects to create the optimum foundry capacity with minimum investment. Gemco's simulation engineers create 3D models that run the actual or future client's production program, giving insight in the process flow, utilization rates, potential bottle necks and 'what happens if ...' scenario's.*

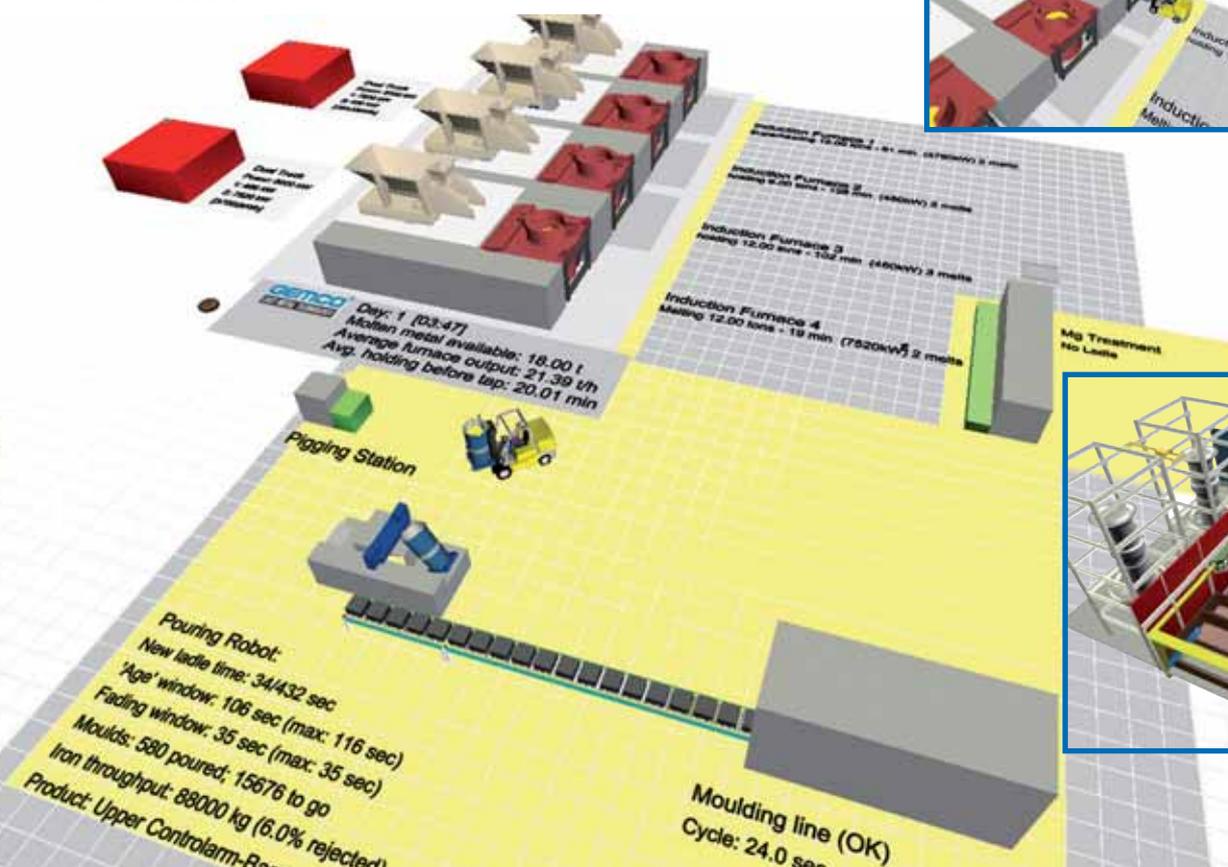
A foundry is a complex system of people and equipment that exchange energy and material with each other. Specification of equipment, energy demands, production program, transport capacity and their interruptions all influence the output of the foundry. A fluctuating metal demand in the production program should not lead to metal shortage at the molding line. Is it helpful to enlarge the melting furnace content, should a holding furnace be applied or is it better to enlarge the power of the melting furnaces? What effect does this have on the energy consumption and costs? What if the production program is changed or a furnace fails? These are typical questions that are now easily answered with a running model.

Although simulation was introduced as a tool to support the engineers, customers mostly appreciate the clear insight they get in their future foundry. For almost a decade, Gemco has used 3D modelling tools to create a virtual insight into the design. With simulation, this 3D insight is not only static: it shows the running foundry that produces the customer's products according their production schedule.

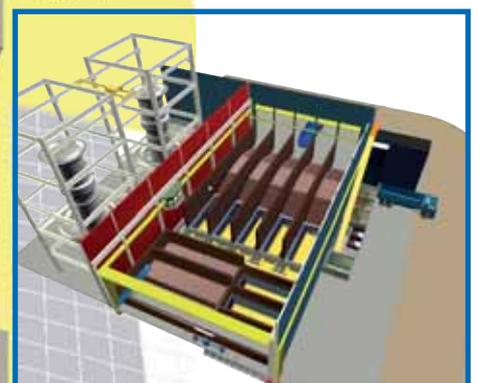
Recent simulations focused on a wide variety of engineering challenges, including the design of a 100t/h scrap yard, logistical optimization in the production of 7 meter long rail road crossings and the molten metal supply in a foundry with 10 continuous casting lines.

For the engineers, it is always tempting to include as much as possible into the simulation model or to simulate the customer's entire foundry. It is however important to describe a clear purpose for each simulation. Creating an accurate simulation model requires intensive communication with the customer and many hours of modelling and testing. Simulation should only be used if the behavior of the system is too dynamic or complex for the conventional calculation methods. With the simulation experience of the past three years, Gemco has built up a library of the most common foundry equipment. This shortens the time required for new simulations, making it now feasible for many of Gemco's projects.

Simulation has proven to be a highly appreciated tool by customers and a great support for the design and engineering process at Gemco. With this tool, Gemco distinguishes itself from its competitors in realizing the most efficient and reliable solutions for its customers.



*Dirk Wijnker  
Project engineer*



# Energy Efficiency

**Summary of the presentation on energy aspects for foundries as presented during the 21st Foundry Colloquium at the Clausthal University in Germany, on October 10, 2008.**

By Jan van Wijk, Gemco Engineers BV.

“Energy-efficient” is a primary qualification for any undertaking. Foundries are operations with a high requirement for energy. When splitting up the cost of a casting, energy would represent between 10 and 20 percent of the production costs, depending on the type of foundry and the type of casting concerned. (See fig.1)

In apportionment of the overall energy consumption in the plant, the melting of the metal and maintaining its liquidity until pouring is attributed with the largest requirement.

Research and field-experience show that in newly designed foundries that are optimally equipped to produce specific groups of castings, the E-consumption ratio would be about 75% for melting [high voltage systems] and 25% for the rest of the plant [all low voltage systems]. In older plants however, you often find ratios of 60% for melting and 40% for other departments. (See fig. 2) The statement at the Colloquium was that these figures represent a scenario that is actually worse than they may at first appear.

Every foundryman is aware of the high-energy demand for melting. Since we expect every foundryman to melt efficiently, we may therefore presume that every foundry consumes more or less the same amount of energy for melting. However, the figures show that in newly designed foundries this amount of energy represents 75% of the total energy, whereas in older foundries this value tends more towards 60% of the total power used in producing a casting. This means that existing foundries tend to consume double the amount of energy for their low voltage systems compared to newly designed foundries. (See fig.3) and suggests that there are almost certainly possibilities for improvement.

If you want to achieve energy efficiency, the foundry layout, capacity and suitability of the equipment should match the castings that you produce. Only after optimization of these items, the reduction in energy consumption of the individual processes can be actively pursued.

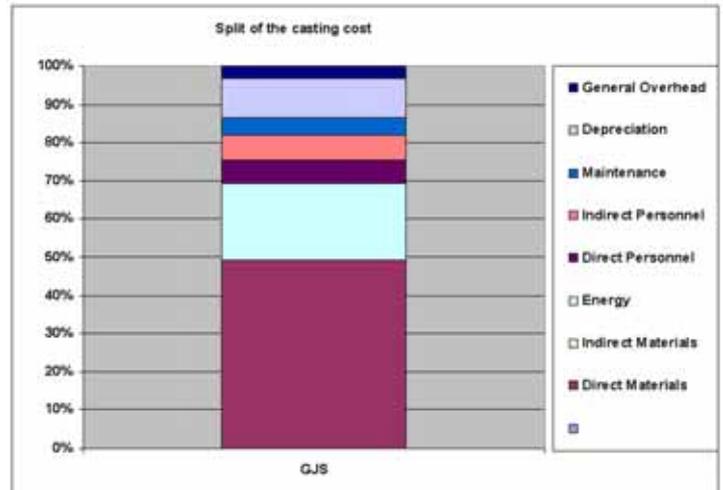


Figure 1.

	Newly designed plant	Good figures	Possibility for improvement
High voltage (Melting)	75%	70%	60%
Low voltage (Other Departments)	25%	30%	40%

Figure 2.

Energy in MWh/a	Newly designed plant	Good figures	Possibility for improvement
High voltage (Melting)	22.991 (75%)	22.991 (70%)	22.991 (60%)
Low voltage (Other Departments)	7.664 (25%)	9.853 (30%)	15.327 (40%)
Total energy consumption	30.655 (100%)	32.844 (100%)	38.318 (100%)

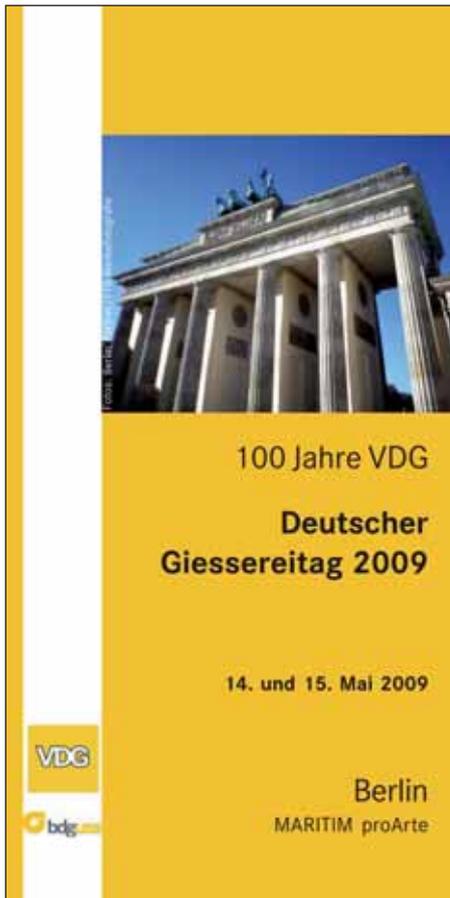
Figure 3.



Jan van Wijk  
Senior Accountmanager

## Where to find us

In 2009 Gemco will, among other, also be present at following events:



We look forward to seeing you there!

*Our stand-details were not yet known prior to print of this newsletter. If you wish to receive details or wish to make an appointment for a meeting during the Moscow fair please contact us at: [eng@gemco.nl](mailto:eng@gemco.nl)*

On the occasion of the “Deutscher Giessereitag 2009“, the VDG will once again host a diverse and broad selection of speakers/lecturers. Gemco’s contribution will be dedicated to: **“Realisierung von zukunftsfähigen Gießereien: Worldclass in Energie, Umwelt und Effizienz”**

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Optimierung	Durchführbarkeit	Leistung

2009  
Zukunftsfähig!  
Effizienz  
Energie  
Umwelt

Do not hesitate to contact us or meet with us. Find out what we can do for your future.