



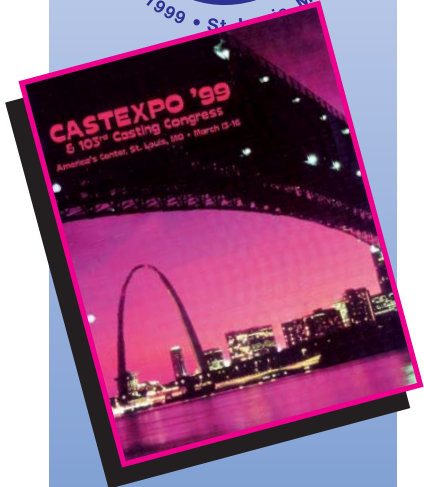
PERIODICO D'INFORMAZIONE IMPIANTI E MACCHINE PER FONDERIA

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SPOKANE MANAGEMENT GROUP



Checking the new IMF equipment with their project drawing during their visit at IMF. A detailed article will be in the next issue of IMF news-letter.



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NO-BAKE EVOLUTION

As one of the world's leading foundry machinery manufacturers we at I.M.F. have come to realise it is evolution, not revolution, which guides the foundry industry forward. Our equipment evolves to maximize its effectiveness and to minimize the foundries' own challenges in coping with the variables associated with metalcasting. Our concepts and designs evolve to enable better use of our machinery. Occasionally the focus on evolution throws up a mutation, a completely new idea or application, one that is worth waiting for, but such events do not constitute the reliable progress achieved through evolving and improving continuously. 1998 was one of the best years for I.M.F. on record, one in which our activities in the USA and Canada continued at high levels. We now have 25 plants or systems in place in North America, from the world's largest No-Bake moulding to date, at NORCAST, a major project completed at Bathgate Steel and the continuing supply of a range of equipment to long term customer ROBERT MITCHELL aluminium foundry in Mont-Joli.

North America has been so successful for us our agent there, Otto Blendin was recently awarded our prize for an outstanding contribution to our business. From Europe and in North America pioneers have looked traditionally westwards. As a global manufacturer I.M.F. has also continued to develop major markets in the East. In Japan where we have become the only major foreign supplier of No-Bake moulding process plant, with an average of more than one large project each year, to our newest exciting joint venture in China where we will manufacture more economically low value added items to I.M.F.'s exacting specifications. I.M.F.'s largest and latest project in Japan, at OCHI foundry breaks new ground in both scale and concepts for automation. Our involvement has led to the moulding process equivalent of concurrent engineering in component manufacture, involving the simultaneous preparation of all functions from pattern retrieval in store to synchronising core preparation with demands of the moulding operation. Computer technology and applying

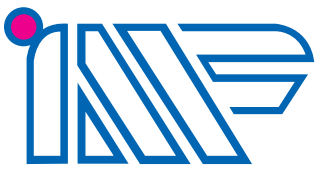
the right information are crucial here, alongside equipment of which the utmost reliability is demanded. The project at OCHI shows what is possible when the foundry customer aspires to match the highest level of greensand automation concepts with the more challenging and fragmented No-Bake manufacturing operation. But it also confirms our belief that markets, cultures and there what is demanded of equipment, differs markedly around the world. What is absolutely necessary in Japan is not necessarily needed in the USA, Germany, France or Brazil. This knowledge and belief has a singular effect. As an organisation we are and must be, totally receptive to our customers' ideas. We may mutually agree to modify the final approach as new ideas evolve but one thing for sure is that we shall never stop listening.

✓ Gabriele Galante

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A step either way and we might have missed Janelle Harris whose yellow sweater perfectly matches the color of IMF's rollover unit. Here she is though, appropriately framed during a visit to IMF with husband Charles who works for Hazleton pumps.



HOT AIR CURES NO-BAKE MATCHPLATE PROBLEMS

Hot air and a shuttle system for mold halves has removed the constraints in using double-sided matchplate patterns with No-Bake sand. A long time favorite for small castings in greensand, using jolt squeeze machines, the relatively long curing time of No-Bake precluded efficient use of double-sided matchplate patterns. Now IMF Srl has developed its "Duetto" machine to produce up to 15 or more complete molds per hour while running only two matchplate patterns and accommodating a range of sizes from 400-300 mm up to 1000 x 1000 mm. Two plates running together can each

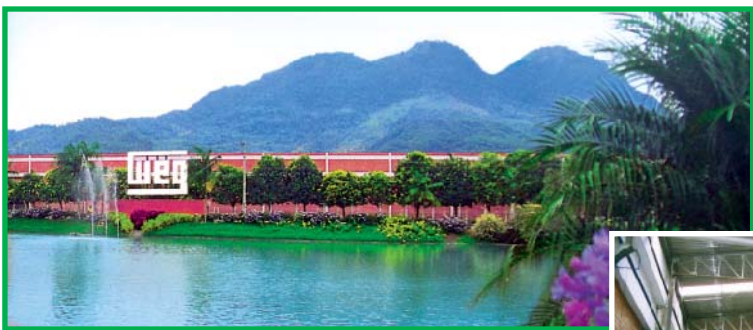
be different sizes. The Duetto includes a two-way shuttle system for handling the pattern clamps, frames and matchplate, allowing one half mold to harden while the other is positioned under the mixer head and filled. Crucial to achieving realistic production rates is the accelerated hardening of mold halves within the machine cycle time. IMF has engineered a hot air hardening method suitable for all heat sensitive No-Bake processes. In the Duetto there are two stations blowing hot air into the half mold to speed up hardening and minimize pattern strip time. An additional benefit is a reduction in the amount of

catalyst required. Elements of the Duetto include a high speed T 36 continuous mixer with PLC control and sand blending capabilities; a filling station with rollover system and vibrating compaction; heating and hot air blowing system with two-way shuttle; and a belt conveyor with hydraulic lifting device to transfer the stripped half molds. Designed for automated PLC control the system is flexible enabling the operator to intervene manually where necessary. The first Duetto machine has been operating for over a year at the Robert Mitchell aluminium foundry in Montreal, Canada.

✓ E. Rastelli



Operator's position of the Duetto machine.



WEG, the fortunate combination of the initials of the three founders has been the first step of a long and successful journey, has been founded in 1961 with a labor force of 20, WEG grew to become the largest producer of electric motors in South America and among the world's five largest. Now employing 8500 workers, WEG produces everything from small motors for household appliances to large ones up to 8000 kW.

To make its electric motors,

WEG uses three foundries with a total output of 6,000 tons per month. Two of these use green sand and mainly produce covers, fans, terminal boards, and others; the third one, based on chemical molding, makes all the castings. Four years ago WEG started studying the possibility of converting its manual core and mold lines into fully automated ones. The project was subdivided into three



stages and assigned to IMF because of its long experience in the chemical molding field.

The first phase involved the installation of a Disco 3200



core blower and four stations. This allowed to produce all the central cores up to 132 mm in diameter for the motors at the same time.

The second, which was the most important, covered the installation of a complete core and mold casting system for larger castings. Based on the JUST-IN-TIME concept, this system comprises a FAST LOOP molding plant producing the side mold flasks and a Practicor HV 50 core blower making the central cores. Both

the Fast Loop molding system and this blower have been designed to make four models of electric motors at the same time.. A computer supervises and controls all the processing phases including the molding system and the distribution of the molds and cores to the mold assembly lines.

The project of the third phase will complete the automatic molding process for smaller motors and the total regeneration of the sand.

Once this overhaul is completed, WEG will be one of the most important foundries in South America and among the most advanced in the world.

✓ A. Poggi



SAND REGENERATION WARMS UP

The IMF answer to market needs

Thermal regeneration is the final element which completes the total recovery cycle for sand. We are talking about that small percentage of impurities not removed by mechanical attrition, impurities which in current practice are diluted by adding new sand, for example as cores, as facing sand or simply new sand additions to bring the loss on ignition values to a constant figure.

The heat recovery process must produce a final product which is technologically acceptable and which is also cost competitive. IMF has acquired effective experience in this field, having supplied no fewer than 18 thermal regener-

ation plants over the last six years, to eight different countries.

IMF first produced plants using the innovative and effective short wave infra-red heating (eight plants installed), and passed through a parallel experience with small installations using oxygen, specifically requested by customers. Currently, the production is mainly direct combustion plants using fluid beds and gas, with capacities ranging from 500 to 5,000 kg/h. This type of machine is based on reliable proven technology and has the IMF stamp of innovative design, based on almost a quarter of a century's experience in treating foundry sand from the "No-Bake" process. These plants meet the requirements of a large market sector in which customers wish to use gas, either for economic reasons, or because the availability of electri-

cal power is strictly limited. Currently there are three gas based plants operating in Spain (each 1,500 kg/h.) and there is a three tonnes/h. plant working round the clock in a French foundry. Four new installations one for 3 tonnes/h. and three for 500kg/h., have also been commissioned recently.

The table below gives practical data from the French 3 tonnes/h. plant. This plant regenerates sand which has been bonded with phenolic urethane resin used for casting aluminium for the car industry. It has a heat recovery plant in which the exhaust flue gases pre-heat the fluidising air. This gives significant energy savings amounting to about 50,000 kCal, at equal heat output.

✓ M. Favini

Regeneration temperature	750°C.
Capacity	3,000kg./h.
Usage period	132 hours/week
Resin type	Phenolic urethane (L.O.I. 0.8 - 1.8%)
L.O.I. of the regenerated sand	0.01 - 0.04
AFS of the regenerated sand	53 - 55
Acid demand	0.1 - 2.5 ml. (per 50 g. of sand)
Gas consumption	22 nm ³ /tonne
Power consumption	12.5 kWh/tonne
Water consumption	0.173 m ³ /tonne
CO emission	0 - 1 ppm
NO emission	18 ppm
NOX emission	19 - 20 ppm



ELLWOOD MIXES ITS PORTFOLIO

A new 60 tons per hour (2200 lb/minute) IMF mobile mixer is helping to make Ellwood Engineered Castings a major player in the large jobbing casting market. Ellwood is a leading producer of ingot molds and heavy engineering castings for the North American and export markets. Valley Mold was a major producer of ingot molds using direct blast furnace metal, and now Ellwood produces more than 50% of the ingot mold requirements in North America using induction melted iron from its own separate electric melt shop. Ellwood can produce individual ingot mold castings up to 90 tons and regularly produces ingot mold castings in the 30 to 50 ton range. Ellwood has now diversified to make more use of its vast experience and large facilities. The foundry has extended the area previously used to cast into stools and has made a very mod-



Testing of the giant mobile mixer.

ern facility for large castings. The large engineering castings are made using conventional wood patterns or consumable styrofoam patterns. These latter patterns require special storage and assembly areas and dedicated handling and Ellwood has carefully provided for all these requirements. Ellwood has recently installed a 60 ton per hour

(2200 lb/minute) IMF mobile mixer running down the center of its heavy molding bay. Sand is continuously supplied to the mobile mixer by a pneumatic transport system with three outlet points along side the running tracks. At any of these points the mixer can be plugged in, and filling can take place while the mixer is working

in that area filling pit molds or large flasks. Because of the large quantity of resin and catalyst used by this big mixer, temperature controlled resin and catalyst tanks are mounted on a separate trolley towed behind the mobile mixer. This allows the resin and catalyst tanks to be refilled using the overhead crane in the next bay while the

mixer is working in the end position of its travel.

This new mobile mixer plus the extension of other facilities, makes Ellwood Engineered Castings a major player in the large jobbing casting market, as well as the major ingot mold producer.

✓ J.Frost

A division of Trittech Precision Inc. Norcast is a large iron and steel foundry located in Mont-Joli, Quebec, Canada. Norcast has two foundries in

Heavyweight production at Norcast



View of the Fast Loop

Mont-Joli, one producing grinding media and the other producing wearparts for the world market. Liner plates, lifter bars, grates etc. are produced up to an individual casting weight of 3000 kg. During 1997 it was decided to change the molding process from greensand to Furan No-Bake. This decision had a major effect on the wearparts foundry because it was decided

to put a complete IMF No-Bake molding and pouring system, including shakeout and sand reclamation, into the existing foundry building. The system selected uses a molding bolster plate 3400mm x 1800mm (134" x 71") and a pouring and cooling plate of the same size. This makes the Norcast system the largest system anywhere. The molding system, the pouring system and part of the mold cooling system was installed in



Large automatic closer.

late 1998, and commissioning of these sections took place just before Christmas 1998. The system is designed to run at 6-8 molds per hour of average size molds and can handle 6 molds per hour of sized molds (3150mm x 1650mm x 650/650 mm) or (124" x 65" x 25/25"). This means mold weights of up to 9000 kg of sand and when 5000 kg of poured metal is added, a total weight of 14 tonnes. With these very large poured weight molds, the mold cooling system at Norcast must be able to carry at least 15 tons per pouring plate. Because of the alloys produced and the

heavy section thickness of the castings, long cooling times are required for many of the molds. The combination of these requirements means Norcast has probably the largest fully automated mold cooling system in the world. It has 310 cooling positions on two levels, using nine double-deck cooling conveyors of very heavy construction. The total system is computer controlled and the computer operations are fully integrated into Norcast's main computer system using Ethernet. Once a mold is poured and sent to the cooling system, the required cooling time is observed and then the

mold is automatically sent to the shakeout. Norcast has accomplished a great deal in a short time while executing this project including major building extensions, a third induction melting furnace body, and five new heat treat furnaces to increase their production capacity. The new foundry systems give Norcast a production capacity of 30,000 tons per year of finished wearparts with improved dimensional accuracy and improved surface finish. This project puts Norcast in the forefront of major wearparts casting producers for the world market.

✓ J. Frost



Sustained investment has created an extremely flexible automated production facility at Schmolz & Bickenbach's carbon and stainless steel foundry in Krefeld, Germany. A trend towards larger and heavier castings, however, put a strain on hand molding capacity and peripheral equipment which a

new design of mixer from IMF has resolved. At 400 tonnes per month of high quality steel castings weighing up to 18 tonnes. Schmolz & Bickenbach's hand molding section relied upon two articulated mixers with an hourly capacity of 18 tons and a range of 4.5 m, supplying additive free silica backing sand. Facing

Detail shows swiveling mixer trough attached under the robust mixer arm which can be raised or lowered to suit molding box height



sand, usually chromite, was prepared in separate pan mills and transferred in containers to the molding flasks. The operation employed five people on each pan mixer with above standard output encouraged through bonus payments. With molding capacity squeezed, a shortage of space and excessive waiting time for overhead cranes,

WORK FLOWS FASTER WITH NEW MIXERS



Parallelogram frame and hydraulic rams raise or lower the pivoting arm of this new IMF sand mixer enabling the mixer trough and delivery head to put sand into flasks up to 3,600 mm. high



Under construction in IMF's Luino plant, a new design of elevating sand mixer which overcomes the problem of filling molding flasks of differing heights.

Schmolz & Bickenbach examined possible solutions.

A study of the work organization confirmed the excessive demands on the crane over a seven hour shift. Sand transport accounted for 30%, other tasks 50%, dwell times 15% and congestion 5%. Waiting times amounted to 105 minutes per shift and work group. On average each pan mill runs for 1.2 hours per day- 17% of shift time-equivalent to 21 tons. Sand to metal ratio, is typically 4:1.

Consultation with leading Italian machinery specialist IMF has overcome the foundry's problem. A new design of mixer from IMF features a height adjustable pivoting arm, where the hydraulically actuated parallelogram design enables the mixer trough to be raised to accommodate differing heights of molding flask.

Now there is no need to process facing sand in a separate pan mill and transport it using containers and crane.

Container dumping of sand into the upper flasks is also no longer required. Significantly, the shop crane is released for other tasks with no waiting time. Benefits in casting quality are also anticipated with the facility to introduce selected additives to the silica sand. Schmolz & Bickenbach estimates initial savings due to improved productivity of some DM 70,000 per pan mill.

✓ W. Gries / M. Ingegnoli

IMF STRENGTHENS CHINA PRESENCE WITH JOINT-VENTURE

When Impianti Macchine Fonderia started doing business in China it was pretty much a lone player in its field. Its new joint venture with Qiqihar Railway Rolling Stock is the reward of a decade of patience and determination. Sales to China have been a crucial part of IMF's export business which accounts for 85% of annual turnover. Already over the last 10 years the Luino based company has exported 44 moulding plants to the Republic of China including the country's largest No-Bake moulding system at

Qiqihar, making railway bogies. The new company inaugurated on 12 November 1998 is called Qiqihar EEE Foundry Equipment Co Ltd and is situated in the northern province of Heilongjiang. IMF retains 51% of the social capital, the rest is held by the Qiqihar Railway Rolling Stock, part of the Industrial Locomotive Rolling Industry Corporation, controlled by the Ministry of Railways. "Some parts we make cannot be transported all the way to China and we immediately understood it was much more economical

producing low added-value parts locally" says Mr. Galante. "That is why we and our partner decided to start this joint venture. We are to supply the expertise, design and quality control on the product; they will support us with their local structures, logistics and of course their labor forces. The Qiqihar factory will build part of the foundry systems we design for extensive distribution in the huge Chinese market" he adds.

"When we landed in China many years ago alone and much earlier than our nearest German French and American rivals. Now, at last we have been able to create a production unit that will rely on an indisputable technical leadership and from where the foundry systems we design here in Luino will be assembled and shipped to even the most distant foundry in that huge country. Galante believes IMF

can only benefit from this joint venture: "Once production becomes normalised," he states "the new company will make about 30% of the whole IMF production for China and at costs that nobody can dream of realising here in Italy. This is not, however, a first step to transfer IMF production to China a "whole-sale". "We were born in Luino and here we shall remain forever" Galante pledges. With linked activities employing as many local people as his own workforce Galante's commitment to remain in the town is as welcome as his foresight in continuing to drive IMF forward as a world class foundry equipment manufacturer.



● The international ceremony of the new jv facilities.

● The management Group of the joint venture.



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