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RAUTOMEAD CONTINUOUS CASTING EQUIPMENT AT GIFA 2011



Rautomead exhibition stand, Messe Dusseldorf, Germany

Rautomead Limited will be exhibiting its full range of continuous casting equipment for the processing of non-ferrous metals on Stand 10 G 38 at GIFA 2011.

Rautomead will be introducing a new Division within the Group 'RAUTOMEAD – ADVANCING METALS TECHNOLOGY', whose strategic aim is to advance the exploration and development of more efficient non-ferrous metals production, including their processes and end-user applications.

This will be the fifth occasion that the Dundee-based company has attended this four-yearly event and prospective customers will be able to discover first-hand the advantages of using Rautomead's innovative technology, and Advancing Metals Technology offering.

Providing continuous casting solutions for the production of high quality non-ferrous alloys, upwards vertical casting technology for copper and copper alloy wires, horizontal casting for bars and billets and both vertical and horizontal casting technology for the production of hollows, Rautomead equipment is used in the manufacture of a wide variety of finished products.

These range from bearings for pumps and motors to overhead catenary cables for high-speed trains, and from superfine wires for data communications, to jewellery and Olympic medals.

Rautomead Limited currently has over 300 customer installations worldwide.

CASTING THE NET. RAUTOMEAD LOOKS BEYOND THE OBVIOUS TO MAXIMIZE MARKET OPPORTUNITIES

Continuous casting technology specialist Rautomead of Dundee has a proud history of innovation going back to 1978 when the company began building horizontal casting machines for non ferrous metals to its own proprietary design.

The foundation of the company's ongoing growth and success has been the design and development of its unique casting process which is based upon the use of a graphite holding crucible, to contain the liquid metal, surrounded by electric resistance heating elements to provide the power for melting. The totally enclosed nature of the process, with molten metal in contact with pure carbon surfaces, is designed to eliminate any oxygen present and produce high-quality metal (alloys) free from contamination or impurities.

ONWARDS AND UPWARDS

In 1994, Rautomead adapted the graphite furnace technology and applied it to upwards vertical casting to facilitate production of the highest quality oxygen-free copper rod. The technology has been developed further to facilitate the manufacture of special conductor alloys and also for high quality brass wire rods. End use applications for materials produced through the continuous casting technology include contact wires for high speed trains, data communication cables, enamelled wires, EDM cutting wire,

bronze bearings, machined and forged brass components, jewellery items, gold and silver coins as well as dental alloys. There are currently more than 350 customer installations, in no less than 45 different countries worldwide.

A CONTINUOUS PROCESS OF INNOVATION

Rautomead maintains an R&D casting facility at its Headquarters in Dundee UK which is available for the production of customer samples and also for developing and testing of new machine, tooling and control designs all of which are consistent with the Company's strategy of continuous development and improvement.

Rautomead Managing Director Brian Frame explains: "A notable recent example of the company's programme of continuous

improvement is the revolutionary new 'SQ' continuous casting technology which caused quite a stir when it was recently showcased at the 'Wire' Dusseldorf show. By harnessing a new, advanced casting die/cooler design and a sophisticated new precision casting control system, SQ technology produces oxygen-free copper wire rod with a notably superior surface quality that minimizes the characteristic pulse mark effect.

"And, in general terms, our focus is on a more economical use of materials, improved performance, better energy consumption levels, process elimination, environmental improvement and the elimination of hazards.

"Collaborations with Universities, other research bodies, customers,



Mr Brian Frame, Managing Director

upstream and downstream technology providers are also very important elements in helping us to keep abreast of the very latest research findings and technological innovations as well as the ever-evolving needs of our customers.”

BRINGING HOME THE PRECIOUS METAL

It's a tough business environment out there these days whatever line of business you're in. But being a provider of continuous casting technologies comes with its own unique set of challenges.

Consider this. Many of Rautomead's very first machines are still in daily use today more than 25 years after they were installed. As Brian points out: "It's fair to say that 'built in obsolescence' is a concept that's completely alien to the Company. But, of course, a product that's robust, safe and reliable is a great thing for our customers. The implication for a technology provider such as Rautomead is limited repeat business, a greater dependence on market expansion and a constant pressure for the development of new technologies for new market opportunities. Many of the new developments and improvements in the equipment designs are retrofittable to older existing machine installations where the core technology remains, essentially, the same.

CASTING FAR AND WIDE

To meet these challenges head on, Rautomead has developed a proactive strategy that makes great play of its strength, its heritage, its global profile, its technological

know-how, its people and their skills to cast its net wider than ever in search of growth to ensure that 'a good year last year leads to a good year this and next'.

This strategy falls into three distinct parts that the company has called: 'Using the now', 'Extending the now' and 'Creating a new now'.

'USING THE NOW'

The first stage in the process involves the here and now: wringing the maximum benefit from existing customers, markets, opportunities, suppliers and technologies to generate 'current era' sales.

'EXTENDING THE NOW'

The second phase, 'Extending the now', concerns applying established processes and technologies to new applications, materials and markets to forge new opportunities in existing markets and open up new market sectors.

'CREATING A NEW NOW'

Finally, 'Creating a new now' means developing new continuous casting technologies and processes and 'looking at the same thing from a different viewpoint', with a focus on applying the company's continuous casting expertise to provide its customers with a keener, sharper competitive edge. This will involve collaboration with existing and potential customers, industry peers, suppliers and third parties to create new 'baseground' markets which can themselves be used as a launchpad for a similar three-pronged approach.

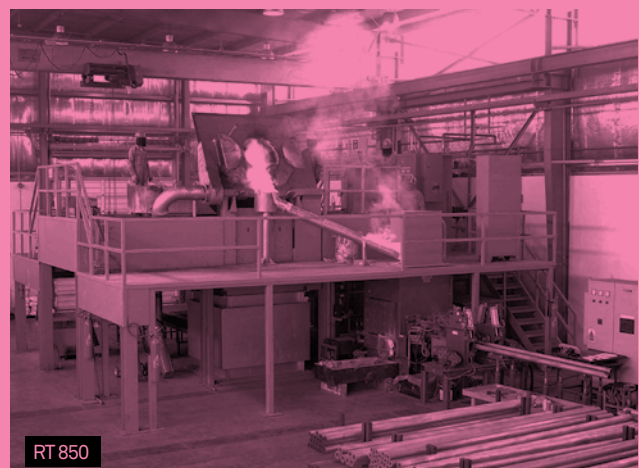
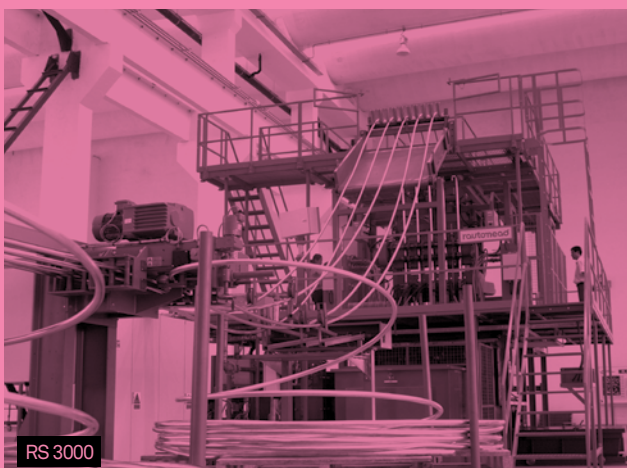
NOT SOMETIME OR ONE DAY BUT NOW

It's important to note that the company's three-pronged strategy for developing the business is no mere theoretical tract for internal consumption, however.

'Using the now' is being actively driven – right now- by the company's existing sales team, to maximize the benefit from sales support systems and networks, customer base, relevant industry exhibitions, agents' networks, market analysis and other tools. In 'Extending the now', Rautomead is actively developing the capability to process new alloys, improve alloy tolerances and variations, improve and/or extend product specification and implement new applications of commercial agreements between the company and its customers.

While, for Rautomead, 'Creating a new now' involves the development of totally new processes, the extension of existing processes and technology for entirely new applications and the creation of a focused and innovative R&D environment within the organization, all designed to sit beneath the 'umbrella' of 'continuous casting technology'.

"All of these measures are designed to help improve the long term stability and value of the Rautomead business," adds Brian, "by focussing on broadening the appeal of our products and technologies to provide innovative solutions which will improve the competitive edge of a wide range of businesses in diverse market sectors."



ADVICE ON MAXIMISING FOUNDRY BUSINESS OPPORTUNITIES IN CURRENT ECONOMIC CLIMATE

As the impact of the global financial crisis spreads further down into the retail, service and manufacturing industries, continuous casting technology specialists, Rautomead Limited, have investigated how organisations across the global metals processing sector may better position themselves to take advantage of renewed growth when the green shoots of recovery begin to appear.

The technology provided by Rautomead Limited is designed to present non-ferrous metals processing companies with the expertise, equipment and know-how to produce their own semi-finished "near net shape" bars and hollow sections in-house. Committed to

assisting organisations of all sizes in acquiring the continuous casting equipment essential for success, Rautomead has also recently introduced a range of market initiatives, including a technology funding programme that could significantly benefit organisations looking to invest in new machinery. (photo 1: hollow bronze billet production).

ROBUST STRATEGY

"A robust survival strategy is essential for the ongoing well-being of any foundry business at the moment," comments Rautomead Sales Manager, Guy Henderson. "Such a strategy," he adds, "may be achieved by ensuring a measured reduction in processing cost, upgrading or

modernising existing manufacturing equipment and continuing to invest in new technologies. At the same time, it is important to fully consider the benefits of in-house production, move away from low margin - higher volume products, and seek out opportunities to develop new product alloys and section shapes."

MORE EFFICIENT, MORE CONTROLLED MANUFACTURING

In the foundry sector, the continuous casting operation can often replace existing processes to provide a much more efficient, economic and controlled manufacturing sequence. Examples include:

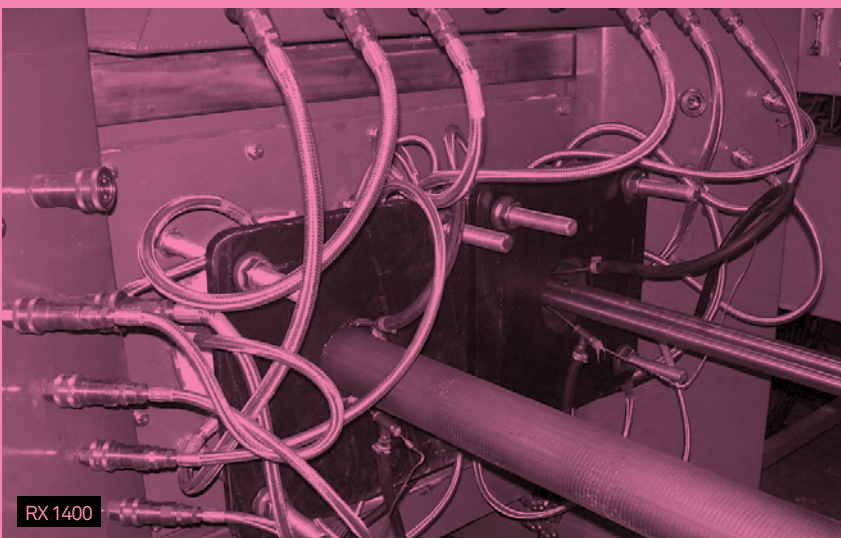
Continuous casting of lengths of hollow bronze bearing alloys as opposed to static casting of individual hollow pieces.

Continuous casting of small diameter alloy wires in place of billet casting and extrusion or bar casting and rolling.

Continuous casting of copper wire rod for continuous rotary extrusion to strip in place of billet casting and conventional extrusion.

EVOLVING TECHNOLOGY

Rautomead Limited has been supplying continuous casting equipment to the non-ferrous metals industry for more than thirty years. The technology has continuously evolved and been modified, adapted



and improved to meet the ever-more-demanding requirements of the industry.

Continuous casting technology currently exists for:

Horizontal continuous casting of solid or hollow billets.

Upward vertical continuous casting of small diameter hollow bars and shapes.

Upward vertical continuous casting of alloy wires.

Horizontal casting with QDC (Quick Die Change) technology for batch production.

Horizontal and vertical (downwards) casting for small batches of high purity materials used in the electronics and jewellery industries.

ECONOMIES ON A SMALL SCALE

The fact that continuous casting can be economic on a relatively small scale (50 - 500 tonnes per month) has led to opportunities for producers to install this technology at locations where metal-making activity was previously not possible and where process scrap arisings and off cuts required to be sold to others for recycling.

ABILITY TO REACT AND RESPOND

As a result, new users have been able to become independent from large metals producers and take complete control of their product quality and cost. Ownership of their own metal manufacturing equipment has enabled these organisations to develop techniques for the production of new alloys and sections shapes; equipping themselves with the flexibility to react and respond to changes in market demand, to expand their product range and to diversify into offering products to a wider range of industry sectors.

UPGRADES AND RETRO-FITS

As an organisation, Rautomead Limited invests significantly in new product development and provides extensive retrofit and upgrade



opportunities. Recent innovations in casting die tooling, withdrawal pulling systems, operation and data recording software are developed primarily for use in conjunction with new Rautomead furnace technology. However, opportunities exist to retrofit the latest designs onto existing Rautomead machines and also adapt the technology to enhance the operation of furnaces originally manufactured by different suppliers.

RESEARCH AND DEVELOPMENT

In today's economic climate, organisations may be advised to consider all opportunities, even where this involves researching the ability to produce new materials and products. Where there is a requirement to develop new die/cooler designs or to adapt the continuous casting technology to attempt to process new alloys or section shape combinations, the Rautomead R&D facility and engineering team may be commissioned to undertake such evaluation.

RECENT PROJECTS UNDERTAKEN BY RAUTOMEAD INCLUDE:

ECO Brass casting – to develop the tooling design and identify the horizontal continuous casting parameters capable of producing high quality, near net shape bars and hollows in ECO brass alloy whilst

achieving an economic casting die life.

Superior Quality (SQ) copper rod production – to develop techniques and tooling designs for the upwards vertical continuous casting of SQ oxygen-free copper wire rod; the objective of the exercise being to minimise, or eliminate, the “micro cracks” that occur at the pulse mark of conventional continuous cast wire rods. Development of specialist casting die tooling designed to overcome the problems associated with Zinc bar processing.

Development of Quick Die Change (QDC) technology – to enable casting dies to be changed without requiring the casting furnace to be cooled down. Granted a European Patent in 2008, this technology is specifically designed for use with continuous casting systems that use graphite crucibles for containment of the liquid metal and can reduce casting die change time from 30 hours to one hour.

QDC is available on various new Rautomead horizontal casting models, as well as being a retrofit opportunity on several machines already in service.

COMPETITION OUTSTRIPPED

A firm order for an RVS III machine from Sino-Platinum Metals Co. Ltd. of Kunming, Yunnan Province, China has been secured for the production of rods in fine gold and gold alloys.

The machine has the capability to cast strips of up to 75mm wide and rods of up to 20mm in diameter, but the ability to process small batch quantities and the potential to cast small diameter wire rods was the attraction for the RVS III machine. The equipment will be installed at the Rautomead factory in Dundee for the customer to participate in pre-shipment casting trials and to receive thorough training in the operation of the machine.

The order in question is particularly satisfying for Rautomead in representing repeat business from an important customer in the rapidly expanding Chinese market. This will be Sino-Platinum's second Rautomead machine, the first having been a model RMT 100 installed in 2006.

RAUTOMEAD ON ITS METTLE IN IRAQ

UK-based continuous casting technology specialist Rautomead Limited of Dundee has announced the appointment of a new agent in the Middle East.

Mr Majeed A. Al-Rawi of the EI-Tech Energies and Technologies Company will be representing Rautomead's interests Iraq and Jordan, servicing Rautomead's existing customers in the region and identifying new potential customers in the wire and cable and metal processing industries.

REDUCING O₂ IN THE CONTINUOUS CASTING ARENA

Rautomead's unique graphite crucible reducing technology naturally reduces the oxygen in the process enabling compact and easily integrated melting and casting solutions for the production of the very highest quality oxygen-free copper wire and cable, copper alloys and precious metals.

ADVANCED TECHNOLOGIES

Rautomead has continued with new order success having received an order for an RMJ/H005 machine for the casting of gold from Materion Advanced Technologies of Singapore, the former Williams Advanced Materials Far East. In March 2011, Brush Engineered Materials Inc., changed its name to Materion and unified all of its business, including Williams Advanced Materials.

The order represents the latest fruits of a longstanding and mutually advantageous relationship. This will be the eighth machine in all supplied to the recently named Materion Group by Rautomead with the first machine having been delivered to Williams Gold, USA, way back in 1985.

The new machine will expand the Group's manufacturing capability in the Far East with the objective of replicating the production parameters and process routes used on existing Rautomead equipment in US Group facilities.



A WIDE RANGE

Mr. Al-Rawi will be promoting Rautomead's entire product range which encompasses fully automated machines for the production of quantities of up to 30,000 tonnes per year. For smaller scale wire rod production, a new range is capable of producing between 1000 and 3600 tonnes. While specialist precious metals' models facilitate the production of the highest quality gold and silver alloy shapes and sections.

CASTING FAR AFIELD

Rautomead Sales and Marketing Manager Guy Henderson remarked: 'The appointment of Mr. Al-Rawi is another example of the company's commitment to emerging markets following on from the launch of our Russian and Chinese language websites.'

SMOOTH TRAIN OF EVENTS HELPS BREAK RECORD FOR CHINESE RAILWAYS

The recent record-breaking test run for China's new high speed rail link between Beijing and the country's financial centre of Shanghai would not have been possible without the contribution of continuous casting technology specialist, Rautomead Limited, of Dundee, Scotland. By supplying the copper magnesium casting machines to nkt cables GmbH, of Cologne, Germany for installation in the nkt cables factories in China, to begin production of copper magnesium wire rod in China for use in the high speed rail contact wire, Rautomead was significantly involved in setting in motion the train of events that led to the 'Harmony' train, more prosaically known as CRH 380A, achieving a record speed for an unmodified passenger train of 486.1 km/hr or 303 mph.

ALL CHANGE IN CHINA'S FAST MOVING NEW WORLD

China's drive to become the leading global player in the high speed rail business is no mere publicity stunt however. The Beijing-Shanghai high-speed rail link will be part of a nationwide network of high speed trains that will ease the pressure on China's airports and deliver a 'green dividend' in the form of an environmentally-friendly alternative to short haul internal flights between cities.

The Beijing-Shanghai link in itself has cost £21 billion and is expected to double the capacity of the current service to a staggering 80 million passengers a year and halve time of travel to a mere five hours. And the world's fastest-growing economy has no intention of stopping there. By 2013, China will have the world's most comprehensive high-speed railway network with 800 sleek, grey-nosed bullet trains. China's 4706 miles of high-speed track, which already outstrips any other nation on earth, is expected to double to 10,000 miles by 2020. While its ambitions for the project even transcend

its own national borders with plans already afoot for a service that will carry passengers all the way from London to Beijing in just two days.

A RELATIONSHIP BUILT ON HARMONY

Rautomead has established a long and harmonious relationship of trust with nkt cables, through its European operations at HFB Hettstedter Fahrleitungs- und Bronzedraht-GmbH, with the nkt cables group harnessing Rautomead technology for the production of copper-magnesium wire rod for over fifteen years, largely for use as the contact wire in high-speed rail systems for the European market.

China's reliance on nkt cable's expertise in the field is testament to recognition on the part of the Chinese railway authorities of the advanced technology available from Europe.

OUTSTANDING PROPERTIES

With its superior balance of tensile strength, electrical conductivity, good wear and environmentally neutral properties, copper-magnesium is the preferred alloy in many countries for contact wire in high-speed rail systems enabling speeds in excess of 300 mph.

ACCURATE CONTROL OF MAGNESIUM

Magnesium is a light and volatile element, where even a very small variation in alloy content causes unacceptable changes in key physical properties of the product. It is, therefore, technically difficult to achieve the necessary consistency of quality in the manufacturing process. Rautomead's unique resistance-heated continuous casting furnace design enables the magnesium to be accurately controlled and uniformly distributed in the alloy.



TURNING WIRE IN DUSSELDORF INTO COPPER ROD IN VIETNAM



Continuous casting specialist Rautomead Limited of Dundee, Scotland, is currently reaping the rewards of its attendance at the Wire exhibition held in Dusseldorf in 2010.

Most notably, the visit to the Rautomead stand of Mr. Vo Tan Thinh, General Director of Dovina of Ho Chi Minh City, Vietnam, clinched a firm order from the company for Rautomead's model RS 3000 six-strand upwards-vertical continuous casting machine. The model in question has the capacity to produce oxygen-free copper rod of 8mm to 22 mm diameter.

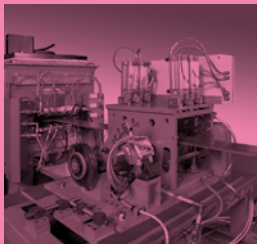
ESTABLISHING GOOD RELATIONS

Meeting Mr. Vo Tan Thinh on the stand at Wire was not Rautomead's first contact with the company however. No less than three visits to Vietnam had previously

been made in February, March and June 2010 in which a clear understanding of the company's needs, as well as excellent relationships, had been established. It's fair to say that this is an area in which Rautomead excels, developing meaningful relationships with customers which develop over time into fruitful long-term partnerships.

A VIETNAMESE POWERHOUSE

Dovina is the former Thinh Phat Manufacturing & Trading Company Ltd. and part of the Thinh Phat Group, one of the fastest-growing privately-owned organizations in Vietnam, specializing in the manufacture of medium and low voltage power cable. For Rautomead, the new relationship represents another significant foray into the dynamic Far East market.



RAUTOMEAD AWARDED MEDALS FOR US ARMY

Silver Towne Mint of Winchester, Indiana, USA has recently taken delivery of a new precious metals casting machine to cast silver strip from continuous casting technology specialist Rautomead Limited of Scotland.

The new machine is a model RMT 200 and the initial casting configuration will be to produce two strands of 2.25" x 0.25" silver strip simultaneously.

As a specialist manufacturer of silver and gold coins and medallions, Silver Towne has prestigious contracts with the US Army, Air Force, Navy, Marines, Coast Guard, Sheriffs, Police, Fire and Rescue Services.

The investment in Rautomead will represent a major upgrade and modernization of Silver Towne's silver production capabilities.

SILVER TOWNE MINT: RISING TO THE 'CHALLENGE'

Silver Towne has been producing high quality precious metal gifts since 1949. Born out of the US military tradition of the 'Challenge coin' dating back to World

War One, the practice of presenting coins as a form of identification in the US has rapidly spread to the police, fire and rescue services, churches and public servants. Many businesses have also now adopted the practice of presenting one-ounce silver and gold medallions to impress their clients and business associates with a valuable and lasting memento. The company's products include commemorative coins & medallions made from gold, 999 fine silver and non-precious metals such as bronze, nickel silver and copper.

In 1983, the company expanded and opened a new custom minting and silver manufacturing facility. By selecting Rautomead technology for the modernisation of silver production, Silver Towne Mint join many of the other leading Mints and precious metal coin manufacturing companies around the world using Rautomead technology for the casting of their gold and silver. These include: the Sunshine Mint, Royal Canadian Mint, Shanghai Mint, Perth Mint Australia, Royal Thai Mint and the Rand Refinery in South Africa amongst others.