DOWNLOAD PDF FOUNDRY INDUSTRY SAKURA KOJIMA

Chapter 1 : KOJIMA IRON WORKS CO.,LTD.-Company History-

Abstract. Many scholars hold that Japan's machine industries became the world's strongest competitors, because they are built on small- and medium-sized (hereinafter small and medium) suppliers and semifinished-goods subcontractors with high technological capability, especially in production control know-how.

Pouring[edit] Bronze poured from a crucible into a mold, using the lost-wax casting process In a foundry, molten metal is poured into molds. Pouring can be accomplished with gravity, or it may be assisted with a vacuum or pressurized gas. Many modern foundries use robots or automatic pouring machines to pour molten metal. Traditionally, molds were poured by hand using ladles. Shakeout[edit] The solidified metal component is then removed from its mold. Where the mold is sand based, this can be done by shaking or tumbling. This frees the casting from the sand, which is still attached to the metal runners and gates â€" which are the channels through which the molten metal traveled to reach the component itself. Degating[edit] Degating is the removal of the heads, runners, gates, and risers from the casting. Runners, gates, and risers may be removed using cutting torches , bandsaws , or ceramic cutoff blades. For some metal types, and with some gating system designs, the sprue, runners, and gates can be removed by breaking them away from the casting with a sledge hammer or specially designed knockout machinery. Risers must usually be removed using a cutting method see above but some newer methods of riser removal use knockoff machinery with special designs incorporated into the riser neck geometry that allow the riser to break off at the right place. Since this metal must be remelted as salvage, the yield of a particular gating configuration becomes an important economic consideration when designing various gating schemes, to minimize the cost of excess sprue, and thus overall melting costs. Heat treating[edit] Heat treating is a group of industrial and metalworking processes used to alter the physical, and sometimes chemical, properties of a material. The most common application is metallurgical. Heat treatments are also used in the manufacture of many other materials, such as glass. Heat treatment involves the use of heating or chilling, normally to extreme temperatures, to achieve a desired result such as hardening or softening of a material. Heat treatment techniques include annealing, case hardening, precipitation strengthening, tempering, and quenching. It is noteworthy that while the term "heat treatment" applies only to processes where the heating and cooling are done for the specific purpose of altering properties intentionally, heating and cooling often occur incidentally during other manufacturing processes such as hot forming or welding. Surface cleaning[edit] After degating and heat treating, sand or other molding media may remain adhered to the casting. To remove any mold remnants, the surface is cleaned using a blasting process. This means a granular media will be propelled against the surface of the casting to mechanically knock away the adhering sand. The media may be blown with compressed air, or may be hurled using a shot wheel. The cleaning media strikes the casting surface at high velocity to dislodge the mold remnants for example, sand, slag from the casting surface. Numerous materials may be used to clean cast surfaces, including steel, iron, other metal alloys, aluminium oxides, glass beads, walnut shells, baking powder, and many others. The blasting media is selected to develop the color and reflectance of the cast surface. Terms used to describe this process include cleaning, bead blasting, and sand blasting. Shot peening may be used to further work-harden and finish the surface. Finishing[edit] Modern foundry circa The final step in the process of casting usually involves grinding, sanding, or machining the component in order to achieve the desired dimensional accuracies, physical shape, and surface finish. Removing the remaining gate material, called a gate stub, is usually done using a grinder or sander. These processes are used because their material removal rates are slow enough to control the amount of material being removed. These steps are done prior to any final machining. After grinding, any surfaces that require tight dimensional control are machined. Many castings are machined in CNC milling centers. The reason for this is that these processes have better dimensional capability and repeatability than many casting processes. However, it is not uncommon today for castings to be used without machining. A few foundries provide other services before shipping cast products to their customers. It is common to paint castings to prevent corrosion and improve visual appeal. Some foundries assemble castings into complete machines or sub-assemblies.

Other foundries weld multiple castings or wrought metals together to form a finished product. Machines can reduce risk of injury to workers and lower costs for consumables â€" while also increasing productivity. They also limit the potential for human error and increase repeatability in the quality of grinding.

Chapter 2 : Foundry industry | Vetter Krantechnik

CHAPTER THREE Foundry Industry By SAKURA KOJIMA Bunka Women's University, Tokyo INTRODUCTION Historical background Many scholars hold that Japan's machine industries became the world's.

The first thing to understand about Industry 4. This will be achieved by various technologies communicating in a way that allows autonomous running of the facility and processes. The big question is how can we utilise these new technologies within the foundry industry and what are the benefits? If you consider the things we take for granted in our daily lives like streaming music or films, saving documents to the cloud, or remotely connecting to the office, these are all using state-of-the-art technology with one important link - the Internet. The high speed internet of today is allowing a lot more data to be transferred remotely and giving us much more control over various aspects of our lives, and this is where industry will start to see massive leaps forward in the workplace. Businesses are starting to utilise this connectivity in many ways, from automatic material ordering through to cloud-based software control. The premise behind Industry 4. The example we shall consider is one using silica sand monitored by a smart system. When the sand drops below the re-order level the SMART factory automatically places an order on the sand supplier for the required quantity of sand. So far this is simple, but it is reactive not proactive. Taking it to the next level, if that same system was tied into the production control system within the foundry and used data from material consumptions it could predict the sand, chemical, and consumable requirements for the coming week or month and could therefore have orders placed with suppliers for when they are needed. Of course whilst all this is happening the relevant person within the organisation is kept informed via notifications and can easily see what is happening via any device with a web browser and internet connection from anywhere in the world. This is a very simple example of what could easily be achieved and if the rest of the foundry was automated and connected we start to get an understanding of how far reaching Industry 4. As an example, machinery in a foundry can already be monitored remotely via cloud-based control systems giving complete access to the data on the machine and if needed remote control of certain elements is possible. Also using technologies like RFID radio frequency identification we are able to automate control of various machines. For example, on sand mixers it is possible to deliver the exact sand recipe and quantity along with fully automatic filling sequence - this level of control can reduce waste and improve overall casting quality. As this process is automated it becomes easier to record production information and material usage because it is automatically collated and stored. Add the ability to then access this data remotely on a PC, table or phone from anywhere in the world and we can see the future foundry is not so far away. In Germany industry is talking about average productivity gains of per cent with some sectors seeing up to 20 per cent and the potential of Industry 4. Foundries of the future will need to be reactive to the changing market place and by investing in Industry 4. Those adopting the concept will be more efficient and improve productivity but at the same time will be able to be more reactive to customer needs because these systems will give huge flexibility allowing more affordable short production runs. Firstly the systems are very dependent on connectivity and the Internet, if the factory were to lose its internet connection it would have no means of communicating with the outside world. Secondly, the risk of cybercrime and hacking become even more of a threat when the whole plant is connected to the Internet. However, these issues are easily overcome with clear planning and preparation. The plant must be able to continue operating if connectively is lost and the systems also need to have robust security and protection. When undertaking the task of installing a SMART foundry it is important to understand all the limitations and minimise their impact. Another point worth considering is the supply chain around the foundry - there is no point creating an automated process if the current supply chain is not on board or capable of working with Industry 4. There is nothing stopping foundries implementing Industry 4. As devices and equipment in our factories get smarter, we must also get smarter on how we use the connectivity made available to us. The possibilities are endless and by simply integrating smarter open technologies now it will make foundries easier to upgrade in the future to the Industry 4. Machines communicate with each other and the supply chain placing orders for raw materials and planning production needs to meet lead times. As technology has changed our everyday lives away from work it is now time to see how it can improve our working environments too.

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Foundry Industry, by Sakura Kojima, author: 4. A New Geography of Knowledge in the Electronics Industry? Asia's Role in Global Innovation Networks.

Whether it is about blackening, turning moulding boxes, handling workpieces or weights â€” VETTER offers customized and versatile solutions to enhance occupational safety and efficiency in foundries considerably. Heavy moulding boxes with a deadweight of up to 50 tons - it is hardly imaginable that such monsters can be rotated once around their own axis while hanging freely. These are equipped with a driving dog which engages with a trunnion on the moulding boxes, and thereby prevents the chains from slipping through. The device can lift up to 80 tons in its function as a lifting beam. For this purpose, different chains are used. In the production process of a foundry, casting moulds need to be weighted. These moulds with a height of up to 10 m stand in a pit for the casting operation. Covers are placed on the moulds for closing them. In order to ensure that they stay on the mould when casting, they are weighted with up to tons. In the past, this process was time consuming and hazardous because handling of the individual weights 21 and 42 tons is quite difficult. The new beam facilitates this process and makes it safer: An overhead crane with special beam is positioned above the weights to be lifted. The beam is provided with hooks which hang from a slide and are marked with different colours red for weights up to 21 tons, green for weights up to 42 tons. The pair of hooks which are currently not used are pulled in standby position by means of chains and secured. Now, the beam takes up the weight. In doing so, the two required hooks move together and are pulled into the recesses of the weight. Thanks to the adjustability of the hooks, diagonal pulling is avoided. In addition, a coloured lamp shows when the correct lifting position is reached. Then, the weight is safely lifted and positioned on the mould. Afterwards, the lifting beam is relieved and the hooks disengage from the recesses. This process is repeated until the required number of weights are positioned on the mould. Now, the preparations for successful casting are completed. Moreover, this lifting beam contributes significantly to work safety.

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Foundry explains all the factors that affect manufacturability and total manufacturing costs, so attendees can see how Waupaca's industry-leading design strategy makes a consistent, quality casting.

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Japan's casting and foundry sector has been integral to the developmental success of a range of machine-based industries. Although casting technology is mature, institutional and policy support was vital to the Japanese casting industry's rapid gains in quality and productivity.

Chapter 9 : Industry and what it means to the FOUNDRY INDUSTRY | Foundry Trade Journal

Mark Lewis of Omega Foundry Machinery Ltd gives Foundry Trade Journal an insight into the impact the fourth industrial revolution will have for the cast metals industry.