

## Industry 4.0 and what it means to the foundry industry

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The first thing to understand about Industry 4.0 is its not one technology but a combination of modern technologies combined to create a 'Smart Factory'. The 4.0 stands for the fourth industrial revolution which at first sounds extreme but when you start to look at the possibilities it's easy to see how these technologies can become real game changers.

Industry 4.0 is the brain child of the German government, and the train of thought is to create smarter more efficient manufacturing through the use of Smart Factories in the not too distant future. This will be achieved by various technologies communicating in a way that allow autonomous running of the factory and processes.

The big question is how can we utilise these new technologies within the foundry industry and what are the benefits?

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### 1. Introduction

In our everyday lives we are becoming more and more reliant on technology, with smarter cars keeping us safe through to smart phones keeping us connected. If you consider the things we take for granted in our everyday 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 a lot more control over various aspects of our lives. And this is where industry will start to see massive leaps forward within 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 4.0 is to take this one step further by connecting not just one machine but all the factory so it communicates as one entity.

To achieve this there's one more key element needed and that is the Industrial Internet of Things and this

boils down to creating smart devices/machines that communicate with each other and the outside world.

### 2. Foundry Applications

If we were to take all these technologies and look at how they can be utilised in a foundry for example one using silica sand monitored by a smart system. When the sand drops below the reorder level the Smart Factory automatically places an order on the sand supplier for the required quantity of sand. So far this is simple but its reactive not proactive so to take it to the next level if that same system was tied into the production control system within the foundry and using data from material consumptions could predict the sand, chemical, and consumable requirements for the coming week or month it could then have orders ready with suppliers for when its 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 you start to get an understanding of how far reaching Industry 4.0 can truly be.

### 3. Today's Foundry

We may be some years away from a truly automated foundry but the technology is already available to achieve a lot of the benefits we will see in the future.

As an example you can already monitor your machinery in your foundry remotely via cloud based control systems giving complete access to the data on the machine and if needed remote control of certain elements. Also using technologies like RIFD we are able to automate control of various machines for example on sand mixers its possible to deliver the exact sand recipe and quantity along with fully automatic filling sequence, this level of control can reduce wastage and improves overall casting quality. Because this process is automated it becomes easier to

record production information and material usage as it is automatically collated and stored.

Add the ability to then access this data remotely on PC, table or phone from anywhere in the world and we can see the future foundry is not so far away.

#### **4. Benefits and Future advantages**

With less time spent doing the mundane work and by removing the guess work from the equation it's easy to see the efficiency gains possible. In Germany they are talking about average productivity gains of 5-8% with some sectors seeing up to 20% and potential of Industry 4.0 adding over \$14 trillion to the global economy in the next 15 years.

Foundries of the future will need to be reactive to the changing market place and by investing in Industry 4.0 will give them competitive edge. Being more efficient and improving productivity but at the same time being able to be more reactive to their customer needs as these systems will give huge flexibility allowing more affordable short production runs.

#### **5. Pitfalls and Cybersecurity**

Obviously there are disadvantages to any system and Industry 4.0 doesn't come without its issues. 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 apparent when the whole plant is connected to the internet.

These issues are easily overcome with clear planning and preparation, the plant must be able to continue operating if connectivity is lost and the systems also need to have robust security and protection. When undertaking the task of installing a smart foundry it's important to understand all the limitations and minimize 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 are not on board or capable of working with Industry 4.0. There is nothing stopping businesses implementing Industry 4.0 in small sections of the foundry as this gives a clear and steady path to implementation, but again planning is the key element and choosing the correct partners to work with will be paramount.

#### **6. What's next**

It will be many years before smart foundries become

common place but that does not mean it's not important now to understand what the benefits are and what can be done to prepare for the future. It is possible to retro fit smart technology to old plant so we don't have to wait for new factories and equipment to take advantage of the Industrial Internet of Things. As devices and equipment in our factories get smarter so must we 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 the future of these foundries easier to upgrade to the Industry 4.0 ethos.

#### **7. Final Goal**

The final goal is a Foundry where the customer orders are placed via a centralised control system and using integrated MRP/ERP systems the foundry manages its supply chain and production needs automatically. Machines communicate to each other and the supply chain placing orders for raw materials and planning production needs to meet lead times. The equipment then works together in the most efficient manor to achieve the customers requirements.

This doesn't mean the end of human involvement but does necessitate a different skill sets, so it's important to have a work force able to understand and deal with this advance in technology.

As technology has changed our everyday lives away from work it is now time to see how it can improve our working environments too. We all need to get a better understanding of what can and cant be done with Industry 4.0 so we can make the transition as smooth as possible.