Hope or Hype?

The concept of Industry 4.0 is electrifying the mining industry, but what is really behind it? And can you also benefit from it? Read on and find out.
First came flint, followed by bronze, iron, gold, coal and during the last decades it was oil. The title of “most important” resource has been held by many different materials over the course of our history. And now, at the beginning of the 21st century, there is another contender. A player, that in reality is not even a substance at all: data.

You may now think of companies like Facebook, which has become one of the most valuable enterprises in the world and just within the span of a decade. However, social media is not the only beneficiary from the new gold and industrial companies believe they can benefit from this evolution or revolution, that some call Industry 4.0, others Digitalization, Big Data or Internet of Things (See the box on the next page for a short explanation of these terms).

The manufacturing industry for example has already embraced Industry 4.0. Digitalization of the workplace has already begun in this sector and now the process industries are getting more and more interested and mining is no exception.

“A lot of our customers ask us about this trend and what it actually means. And it’s no wonder, if you keep in mind that the whole mining industry is facing huge challenges because of declining ore grades and volatile commodity prices”, explains Jenish Gheewala, Industry Manager for mining at Endress+Hauser. “We take great pride in being one of the most innovative company in the market, so of course we had this topic on our radar for quite a while now, to be ready when our customers would ask us about it.”

Integration as a first step  But how can Big Data help mining companies to master these challenges? If you think about it, data is already produced in abundance within a mining operation: process information from the field, inventory values, plant status and market prices to name just a few. The problem: a lot of this data is stored and visible in different systems and platforms. So the first step towards Industry 4.0 has to be the integration of this data to open up its real potential. Integration has to be aligned along three axes: horizontally along the value creation chain, vertically from the field to the control level and from planning to maintenance to ensure consistent engineering. With the help of Endress+Hauser, you can boldly take this first step today.

Let’s look at the first axis. An exact forecast of consumption based on current inventory values and planned material movements is the key to reducing warehouse stocks and, at the same time, improving the delivery service. Reliable measurement technology is the basis for this.
Endress+Hauser can provide you with a complete range of measurement technology. For data communication, Endress+Hauser can plug most available fieldbus technologies directly into their smart measurement sensor; in addition the local data transmission unit, Fieldgate, with integrated inventory management. With the integrated e-mail function, you can request supplies quickly and easily, for example. With the analysis module, you can also calculate and evaluate Key Performance Indicators (KPIs).

Full control of your basic processes
When it comes to vertical integration, intelligent networking between sub-systems of the mine process, from the ERP system to operating and control level and on to field level, is essential for optimized functionality and best efficiency of the digital mine. The reality today is often less than streamlined or smooth operation. It is characterized by closed system silos, missing interfaces and many manual data transfers and thus potential error sources. These decoupled system silos can be connected to form an elegant overall system with a continuous data flow thanks to Endress+Hauser’s BPI concept (Business Process Integration). BPI acts as middleware beneath the sub-systems and thus forms a shared platform for data exchange between these systems. This is not just limited to the IT world however: by using Industrial Ethernet at field and control level, automation components can also be integrated in the overall system. Digital communication, for example, enables advanced measurement sensor diagnostics which can form the basis of effective process condition monitoring and preventative maintenance measures or calibration requests which can be triggered in the ERP system.

Many of Endress+Hauser’s smart measurement sensors can be used to monitor process condition and verify measurement integrity. Simply look for the HEARTBEAT Technology logo.

Several examples of HEARTBEAT Technology’s benefits are already used in the concentration processes in many copper and gold mines, for example in froth flotation tanks: a Promass 100 curiolis flow meter will schedule a flocculant batch remix by measuring changes in the medium chemistry. The aim is to produce process optimization and stability using a combination of smart sensors which monitor their own performance, indicate process anomalies and tell maintenance when things need cleaning or recalibrating.

Big Data made easy
Last but not least, in order to get close to this goal of maximum process efficiency at the lowest possible cost, intuitive and reliable process asset management is crucial. Endress+Hauser offer a so-called Big Data asset management software which is manufacturer-neutral: the cloud-based asset management toolbox, called WiM has proven beneficial to management, maintenance, process engineers and metallurgists in generating plant-wide process improvements and providing relevant and reliable data on process performance. A simple example is a ten percent proven increase in heap leach and stripping performance in a copper mine when they use WiM.

Powerful measurement performance capability to monitor variations in performance of critical measurement parameters such as acid usage, PLS output, organic to aqueous stripping parameters such as leach and stripping performance in a copper mine when they use W@M as software which is manufacturer-neutral. The cloud-based asset management toolbox, called WiM has proven beneficial to management. The aim is to produce process optimization and stability using a combination of smart sensors which monitor their own performance, indicate process anomalies and tell maintenance when things need cleaning or recalibrating.

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**“The path towards Industry 4.0 is an evolution not a revolution. And we are ready to accompany our customers on this path.”**

Jenish Gheewala, Industry Manager

Endress+Hauser take pride in being equipping them with sensors so that they are able to collect and exchange data with each other. The internet of Things was coined by Kevin Ashton, a British technology pioneer.

**Big Data:** Generally speaking, “Big Data” describes sets of data that companies produce and that are so huge that traditional methods of processing do not work on them. The term also often implies that these data sets are stored in a unstructured way and on separate systems.

**Internet of Things:** This term refers to the idea of connecting physical objects like buildings, vehicles etc. and equipping them with sensors so that they are able to collect and exchange data with each other. Typically, the internet of Things is in each one’s mantra these days. However, sometimes the term is used to refer to the internet of everything, where all devices and objects are connected and can talk to each other.

**Data:** describes sets of data that can be collected from multiple sources and analyzed to uncover patterns, trends, and insights. Big Data is a term used to describe the massive amounts of data that are generated by digital devices, social media, and other digital sources.

**Processing:** refers to the process of collecting, cleaning, and analyzing data to derive insights and make informed decisions. It involves various techniques such as data mining, predictive analytics, and machine learning.

**Software:** is a set of instructions that tell a computer what to do. It is used for tasks such as word processing, spreadsheets, and database management.

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Endress+Hauser is a global leader in the process industry, providing innovative solutions for measuring and controlling processes. Their technology helps companies improve their efficiency and sustainability. To learn more about their solutions and services, visit their website at www.endress.com.

**In a nutshell**

**Industry 4.0:** The term “Industry 4.0” was first used in 2011 during the Hannover Fair in Germany. It is part of a project within the high-tech strategy of the German government, which focuses on the computerization of manufacturing. The basic idea of the name is that the use of water and steam power mechanized production and was the first industrial revolution. The second industrial revolution introduced electricity and mass production. And finally, the digital revolution which improved the production process with electronics and IT.

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**Digitization:** Basically means the conversion of certain information into digital data. However, it has also been used to describe the process of converting analog signals into digital signals for processing. This can be done using a combination of smart sensors and other process tools – Operations apps for mobile smartphones and tablets.

**Wireless and wired connectivity** to smart sensors and other process equipment for diagnostics, verification and condition monitoring.

“A lot of our customers are sometimes surprised, that for the first implementation of Industry 4.0 they don’t have to completely rearrange their whole operation. But this so-called fourth industrial revolution is a gradual evolution than a big bang revolution,” explains Jenish Gheewala. “We at Endress+Hauser take pride in being an innovative company, and our R&D engineers take great pride in being ahead of the game in smart sensor development. And that means for our customers that their first step towards Industry 4.0 and the “digital mine” will be a small one.”

**More info** Do you want to find out how you can take the first step towards Industry 4.0? Then contact Jenish Gheewala: jenish.gheewala@consult.endress.com Phone: +41 61 715 7481

**Phone:** +41 61 715 7481

**Jenish Gheewala:**

**joins the Industry 4.0 club:**

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