

Introducing the vision of the Digital Cell.

How die casting will evolve.

Jonathan Abbis, Managing Director Bühler Die Casting, argues that bringing technological advances together with Industry 4.0 and IoT capability has the power to create a step-change in our industry. And that change has already begun.

Is this the next big technological step-change?

When we look back at the modern history of die casting, there are a number of technological advances that proved to be the catalyst for a positive, sustainable step-change in productivity, efficiency and cost-effectiveness.

The first big change was the introduction of the PLC (Programmable Logic Controller) which led to the first real-time controlled shot in 1989. This enabled a more stable and reproducible production quality, driving efficiency and quality in our industry.

The next big change came with the technological breakthrough of the two-platen die-casting machine in 2007. This new approach enabled die-casters to produce lighter-weight structural parts in aluminum, opening up an important new market area, particularly in the automotive business.

Now Bühler is working on the vision of the Digital Cell, bringing all of the individual die-casting components together under one smart digital brain. Bühler believes that this will be the next big step-change.

Imagine

Today, when something goes wrong, your operator has to walk around the cell working out where a problem might be, before trying to fix it. They then need to reset every component.

Imagine having a screen on any smart device that tells you where and what the problem is as well as a home button that resets every component simultaneously, once it's fixed.

Introducing Bühlers vision of the Digital Cell – a new way to monitor, control and manage the die-casting process

“To achieve a step-change in die casting, it's not enough to focus on single components. To significantly boost productivity, we have to tackle the system as a whole.”

- Jonathan Abbis, Managing Director, Bühler Die Casting

Up until now, digital technology has been used to improve processes within the machine and to collect and analyze data. Companies like Bühler have even integrated some proprietary peripherals such as sprayers, ladlers and robots.

The vision of the Digital Cell looks at monitoring, controlling and managing the complete cell. This approach could transform die casting, delivering key benefits in foundries around the world:

0% scrap

By analyzing data points of all key processes in real-time, the Digital Cell will ultimately recognize quality issues and immediately optimize itself to correct the problem. Zero scrap would be a game-changer for the economics and sustainability of our industry – that is what Bühler is working on with the vision of the Digital Cell.

40% reduction in cycle time

At the moment, about a third of average cycle time may be taken up with the thermal management processes. Harmonizing micro-spraying, conformal cooling and infrared cameras within the Digital Cell will significantly reduce cycle time – potentially by as much as 40%.

24/7 uptime

Today, when there is a problem in a process, the cell may detect it, but it cannot proactively do much more than halt the process until it is fixed. The plan for the Digital Cell is for it to use machine learning, artificial intelligence algorithms and other technologies to make smart decisions, without the need for intervention. Imagine the cost and productivity advantages for 24/7 uninterrupted production.

A solution for the 3D problem

Finding skilled operators prepared to work in a loud and noisy foundry environment is one of the biggest challenges facing our industry today. The 3D phenomenon – Dangerous, Dirty and Demanding – is a barrier to recruitment around the world. Finding skilled people prepared to work through the night in this environment to support 24/7 production is a particularly difficult.

The vision of the Digital Cell could help solve this problem.

It will give operators and managers the best possible information when there is a problem that needs an intervention. This will include a clear explanation of what to do and how to do it, minimizing the skill level and training people will need.

In fact, future die-casting cells could be so easy to use they wouldn't even need special training. Intuitive prompts will enable people to operate, reset and repair, quickly and easily.

Not that intervention will be required very often. Machine learning and artificial intelligence will potentially correct issues before they become a problem.

Alarms, alerts and data will of course be available on any device (who knows what devices we may have), enabling decision-makers to remain fully informed, 24/7, wherever they may be.

Imagine

It's hard to find, train and keep good people to manage machines on the foundry floor.

Imagine a world where your production experts sit in a quiet, clean, control room, responding to occasional prompts. They will get clear information on what needs doing and can often manage interventions remotely.

Communicating with your Smart Factory

One of the biggest benefits Bühler is working on with the vision of the Digital Cell, is the integration into an Industry 4.0 infrastructure, ready to communicate with wider Smart Factory solutions.

As part of a Smart Factory, future die-casting cells will be connected to the whole production system, receiving information from other areas and sending instructions to improve efficiency.

The exchange of information with other production areas can optimize die-casting production on a machine, across a site, or at a global scale.

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