

CAVITY EYE PRESSURE MEASURING AND IOT SYSTEM IN INDUSTRIAL ENVIRONMENT

IN A YEAR THE COMPLAINTS DECREASED TO A QUARTER

Cavity Eye published many studies in the field of mould pressure measuring, although there was no publication that introduced the possibilities of our system from our customer's point of view. We will now make up for it. The questions asked by András Szűcs PhD, the chief technology officer of Cavity Eye Hungary Kft., and answered by János Györgyi, technical director of APTIV Services Hungary Kft, one of the main customers of the company.



The APTIV Group successfully applies the Cavity Eye technology in several of their factory: in Epernon France, Grosspetersdorf Austria, Pampona Spain and in our country in Tatabánya. But their plant in Morocco is also interested in our system.

How happened the introduction of the Cavity Eye system in Tatabánya, what kind of difficulties have you met?

The introduction of Cavity Eye happened through a pilot project. We chose a product which had been causing a lot of trouble for a long time. We had no good production technology, there was a lot of faulty product randomly between the supposedly good parts. Only continuously 100% sorted parts could be delivered to our customers, which depleted our capacity and reaction time. Furthermore the icing on the cake was when outsiders lectured us about how our internal problems should be solved. This kind of help is not needed.

In my experience the hardships do not occur during the introduction of the system, or they are technical problems for which we can find solutions very quickly and simply. For example, connecting the instruments or installing the sensor. The hard part comes when the system starts dropping parts in the scrap at Saturday night and somebody has to go there and understand what is happening. So, in other words to reach that level when it is known that Cavity Eye system does not cause scrap but helps to notice the inadequate quality. Furthermore, setting the permissions right, so it is not easy to push some buttons on the machine and run away after producing a couple good parts. The biggest challenge to

make people understand that this is the information which helps to find real reason behind the problem.

Might the reason be machine error, worn out screw, wrong settings, or instable material. The principle is to see where the problem is. If our colleagues switch off the measuring system instead of troubleshooting, then the project cannot be successful. I was lucky, my colleagues understood the point and helped to make everybody in the factory understand it. It was not an easy, nor a fast.

For what kind of problems offers the system solutions, for what does it not?

In the first two years we used the system to separate the parts produced in instable circumstances, so to separate the good parts from the supposedly bad parts. Here we were able to get results incredibly fast. Today installing the sensor on the mould is a one- or two-days task, but in the beginning it took a week. But after the installation and a few hours of production the references were finalised, and the products could be extracted from the selection circle. In a year, the complaints of injection moulding defects dropped to a quarter. In rest of the cases, we were able to deal with the problems, which we viewed before as "accepted standard", or as part of the technology. During 2018-19 we felt we have enough experience in operating the systems, so started to set the pressure switchover based on the CE-signal, so we could not only separate the scrap but to produce with a lower scrap percentage. In addition, the Cavity Eye network software was completed in 2019, which supports data collection and retrieval. By connecting it to the smartwatch, the technologist/machine setters can be



JÁNOS GYÖRGYI

I have been working in the field of injection moulding since 1996, and I have spent the last 7 years at APTIV with minor changes but essentially in the same area of responsibilities. Under my supervision belongs the production, engineering, maintenance, and tooling of the injection moulding area.

The APTIV (formerly DELPHI) is an US-based multinational automotive corporation. It has 12 sites in Europe, and more than 100 production plants worldwide. In two cities of Hungary, Tatabánya and Szombathely, the automotive parts are manufactured primarily for vehicle electronics. Our products consist of from the simplest connectors, complete electronic distribution centers, to chargers of the increasingly popular hybrid and electric vehicles.



ANDRÁS SZŰCS PhD

From 2004 I have worked for 10 years at the department Plastic Technology of GAMF Faculty of Kecskemét College. My research was done under the guidance of prof. Károly Belina in the field of plastic processing and polymer rheology. To introduce in the industry the phenomenon recognized and tools developed during my research, we founded Cavity Eye Hungary Kft., of which I am still chief of technology.

Cavity Eye Hungary Kft. deals with the development, production and sale of the products with its own brand name. In the beginning it offered for the customers only the quality control system based on cavity pressure measurement. Today it implements full production control with its hardware and software solutions on several continent. They use the technology to increase efficiency and productivity, which are complemented with courses, trainings and continuous product support from the professionals of Cavity Eye.

immediately warned when a problem occurs, which can reduce the reaction time. From the fraction of the money previously used for part selection and handling complaints we were able to achieve that 100% of our fleet of nearly 50 machines run with Cavity Eye systems. All our moulds, which in our history according to internal or external feedback manufactured short shot product during mass production, were equipped with sensors. Furthermore, the globally valid mould specification contains that the new mould cannot be manufactured without pocket for the pressure sensors, after this the installation became only a few hour long task.

With help of the CE system, we can see the filling process, the effective holding pressure, cavity balance problem or the occasional hot runner fluctuation. The transfer between the machines is simpler, since after some basic settings the point is to reproduce the reference curve of the cavity pressure. So, the product quality is really independent of the machine.

For what the Cavity Eye system is not good is a more interesting question. Obviously, it will not help to solve the constructional problems of the mould, but it can highlight the problems. It will not solve the problems with the product design, but it can highlight the insufficiencies. It will not make it possible to produce in ideal conditions on a worn out, not maintained machine, but at least it will be a higher chance that the products packed in the box will be adequate quality. And at last, it will not solve the human errors but it will give information to be able to make the right decision with a higher chance.

To whom and why do you recommend using this technology?

Primarily to those, for whom the quality challenges mean a significant burden in the everyday life. To those who because of a complaint are often forced to answer their customer that they will educate their employee, so the mistake does not happen again. To those who are often

meet the phrase, "I don't know what happened, everything is the same as yesterday, yet it is not good". To those who feel that the statements made in a professional conversation are based more on personal opinions, than facts and measured data. To those who are curious of what happens in the mould during injection moulding.



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