



Injection Moulding

Case study: RobotWare Plastics, AD Plast, Sweden

RobotWare Plastics-Mould is a software product from ABB to simplify and speed up the process of programming ABB robots used in plastics injection moulding applications. It minimizes the learning time, setup time, error recovery time and improves error diagnostic accuracy. Robotization and this new piece of software keep a small southern Swedish company out in front in the injection moulding business.

DRIVING HARD

Michael Jonsson, owner of AD-plast in southern Sweden, has driving ambitions, both on and off the track. For him, cars are a passion. He loves driving competitively in go-karts at the nearby Anderstorp race track, which used to be a Formula 1 venue, and encourages the employees in his injection-moulding company to join in the fun. And it's clear by the sheer volume of trophies and medals festooning the kitchen area of the company canteen that they do.

Back home, in Jonsson's garage, is another symbol of his automotive passion – an AC Cobra that is nearing completion after a year-long rebuild. When asked if he will be racing this car, he protests: "No, no, no ... it's far too precious."

Jonsson's driving ambitions carry over to his work as well. AD-plast was founded in 1963 as a tooling company, but later moved into injection moulding. When Jonsson bought the company in 1994, automotive components were a key product



segment for the factory's output. And it has grown in volume since then. AD-plast is a fourth-tier supplier to companies such as SAAB and Volvo, and a new type of three-part cooling system hose connector that AD-plast makes for ABA can be found in a wide range of vehicles, including Mercedes-Benz cars.

AD-plast counts among its direct customers auto-accessory manufacturers Hiab, Thule and Mont Blanc. In addition, AD-plast is working with such non-automotive customers as MODUL service, a subsidiary of IKEA. As an example, Jonsson demonstrates a highly efficient onion slicer, for which the company manufactures the plastic body halves.

Jonsson says he feels bullish about the future and points to a leap in sales from 48 million Swedish kronor at the end of 2000 to SEK 68 million in 2004, despite the fact that he's facing tough competition from Asia and, nearer home, from the Baltic States.

What does Jonsson have that they haven't? Very simply, state-of-the-art robots.

6-axis robots

From very early on in his tenure, Jonsson saw that AD-plast would not be able to compete as a business if it retained its old-fashioned, labor-intensive way of making injection mouldings. Everything that was made in a machine was subsequently

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handled by humans. Scrap sprue – the excess plastic on a moulding – was removed by hand, and all the checks and quality controls were done by hand as well. In short, the manufacturing was slow, time-consuming and subject to tea and coffee breaks. Today, the picture is very different: There are 14 ABB robots on site (a 15th was due to be delivered immediately after this interview) plus four robotized moulding machines.

Each robot sits at the center of a production cell complete with quality-control systems. Raw plastic materials for use in the molds is contained in a separate area of the factory, where it is first conditioned and then fed by vacuum hose directly to the respective automated moulding machine. In the case of the three-part cooling system hose connector, both male and female parts are manufactured then checked prior to assembly by a robot vision system. Using a series of cameras, measurements are taken of each part to check that the cast pieces are within accepted tolerances (if there is an error, the robot system will reject the part). They are then assembled with an O-ring and subjected to an automated pressure test. Once this has been passed, there is a final inspection by the vision system before the parts are packed and dispatched. Packing is the only part of the operation that is not yet automated, but this will change shortly. Using the robot manufacturing technique allows the company to run 24-hour production in three daily shifts.

Easy programming

AD-plast is collaborating with ABB in the development of RobotWare Plastics Mould software, a program specifically designed for easy programming and operation of ABB robots used for plastic injection-moulding applications. “The key advantage with this software,” says Anna Liberg, ABB’s project manager for the development, “is to make the whole process of programming these robots faster and easier.” And this means a smoother, faster startup for production. Operators don’t need to know any programming language; there is a graphical user interface that uses symbols, and a program wizard to guide the operator through the program configuration. “It’s definitely faster to program using the new system,” says Mikael Hensch, in charge of programming at AD-plast. “A new program can be installed and operational within 30 minutes.” It used to take Hensch and his team a day or more, if they were lucky. Nowadays, machines don’t stand still while they are being programmed. And it offers greater flexibility – molds can be quickly switched between machines.

The new program is being evaluated on a handle for a Volvo car. It’s a simple part, but the surface is very important. It must be cleanly cast, with no surface defects, because it will be printed later. It is molded and then picked out by a new IRB 1600 robot for subsequent packing (still by hand, but not for long). But the software is independent of the robot model, so it can be run on almost any standard ABB robot. “Uniformity



is vital for this part,” says Hensch, “and that’s true for plastic mouldings in general. Before automation, quality used to go up and down every time the operator had a cigarette break.”

“If we look at our long-term survival,” says Michael Jonsson, “robotization is vital to the company’s performance. And [referring to the packaging issue] we must use robots to do more than they do today.” More customers are asking about increased levels of service. “What else can we do for them? Do more. Boost quality. Keep prices down. This is a difficult race to be in, you know. But you are never going to win by standing at the side of the road, watching the competition flash past. You’ve got to get out there and fight.” And Jonsson intends to be firmly in the driving seat.

Facts about AD-Plast

AD-plast AB, founded in 1963, is located in Anderstorp, Småland, southern Sweden. Plastic injection moulding specialists with sales (2004): SEK 68 million and 28 employees.

Robotization of AD-plast has allowed the company to remain competitive in the face of strong competition from the Baltic states and Asia. In particular, the company can achieve consistent quality levels throughout its production cycle while maintaining competitive pricing.