



# Cutting

## Case study: Waterjet Cutting, Lear, Sweden

### Applications in Plastics

- Cutting/Finishing
- Glueing/Sealing/Dispensing
- Flaming/Painting
- Assembly
- Packing/Palletizing
- Inspection/Quality control
- Machine Tending

In the tough automobile industry, automotive suppliers such as Lear Corporation have to fight hard to maintain business with the car companies. An innovative waterjet cutting robot solution helps the company stay ahead.

### Cutting edge cutting

The small but pretty municipality of Tidaholm in Västra Götaland County, south western Sweden, boasts a few churches from the 1100s; there was an ironworks that was replaced in 1868 by a match factory; the River Tidan meanders through the center of town, and it has a hotel that does a rather good buffet lunch. But apart from that, reckon the outsiders, not much goes on there.

They'd be wrong, at least in terms of automotive component production. Tidaholm is one of five manufacturing centers in Sweden run by Lear Corporation, and is responsible for the assembly and production yearly of around 250,000 instrument panel/fascias, headliners and glove compartments for Saab and Volvo cars. Lear is one of the town's largest employers and in its quest for success in assembling these units, the company has called on some cutting edge technology from ABB and KMT Cutting Systems.

Lear Interiors at Tidaholm has long been an ABB robot customer, and today has some 60 units deployed throughout the five manufacturing halls on site. One entire line is given over to the production of Volvo S80 instrument and dashboard fascia units, producing some 50,000 pieces



annually. "It is like a jigsaw puzzle put together by robots," says Othmar Fiala, production engineer for Lear.

There are three elements used in the construction of the S80 unit: the outer skin of the fascia – the surface that you can see when you sit in the car – the carrier, or the box frame to which it is attached, and the foam, which provides the padding between the carrier and the skin. The entire process is automated, with only inspection and some belt loading work done by hand.

### Cutting and routing

The foaming process is undertaken by an IRB 6600 robot with a foaming tool. "Automation here is important for a number of reasons," says Fiala, who has seen more than a few changes in over forty years with the company. "Once, this was a process done by workers, and this put quality at the mercy of human variation," he remembers. "Using robots for the process ensures uniform quality every time,



and better quality.” There’s another difference he recalls: Foaming by hand was a dirty and tedious business. Once foaming is complete, the now familiar-looking fascia needs the surplus areas removing. This is done with waterjet cutting and routing – more automated processes that combine a blend of IRB 2400 robots and KMT Cutting Systems waterjet technology and routing cutting systems. The choice of waterjet cutting was originally made in preference to routing tools, since the latter need frequent tool replacements and create more dust. In the end, a mix of both technologies was chosen for this particular line, which opened in January 2005.

### Fast and accurate

“KMT’s waterjet solution is a fast and accurate way of removing material,” says Fiala. “The 6-axis robot can manipulate the nozzle in any required direction while ensuring the right cutting direction.” The waterjet nozzle can be moved along linear or spherically curved paths at high speed and with good repeatability. KMT Cutting Systems’ WaterJetWare with process parameters is based on ABB’s dynamic model software for easy and precise path planning. The high frequency routing tool is guided by the robot along the contour of the workpiece and is used to drill holes and cut out unwanted surfaces. “Routing is a dirty business, though,” says Fiala, drawing attention to the dust and debris that it produces. “That’s why the process has to be conducted in a well-sealed room.” This form of routing, he also points out, requires the workpiece to be secured and held firmly something that isn’t necessary with waterjet cutting.

### Being competitive

After cutting and washing, there are only a few short steps to final assembly – where the fascia air ducts are added – and packaging for dispatch to the vehicle assembly line. About 21 fascia units are produced for the S80 line every hour. Being competitive is everything in the automotive supply business, and it is Lear’s use of automation and its subsequent ability to deliver competitive products that is ensuring its own survival in a tough business environment. “There’s a lot going on here,” says Fiala. “We can’t survive by being a sleepy backwater.”

*Note: At the time of publication, Lear Interiors is scheduled to become part of International Automotive Components in October 2006.*

### Lear Corporation

- One of the world’s largest suppliers of automotive interior systems and components
- Headquarters in Southfield, Michigan
- 115,000 employees in 34 countries in 286 locations (five in Sweden)
- Annual net sales of USD 17.1 billion
- Founded in 1917 in Detroit as American Metal Products

### KMT Cutting Systems

#### Injection Technology Corporation

- Specialists in the design and production of robotized waterjet cutting, routing and cleaning systems
- Based in Ronneby, Sweden. Founded in 1991
- Approx. 75 employees in Sweden, Germany, U.K., France, U.S. and China
- Annual net sales of SEK 165 million (USD 21 million)
- Part of the KMT Group, formed in 1991 as the Karolin Machine Tool company
- Website: [www.cuttingbox.com](http://www.cuttingbox.com)

### ABB and the Plastics Industry

ABB’s wide range of plastics robots can handle most of the tasks involved in and around injection mould machines, regardless of required cycle time or size of the machine. Together with our partners, we provide automation solutions for most manufacturing processes in the plastics industry.