Welding dedication

A lean and specialized spot-welding robot

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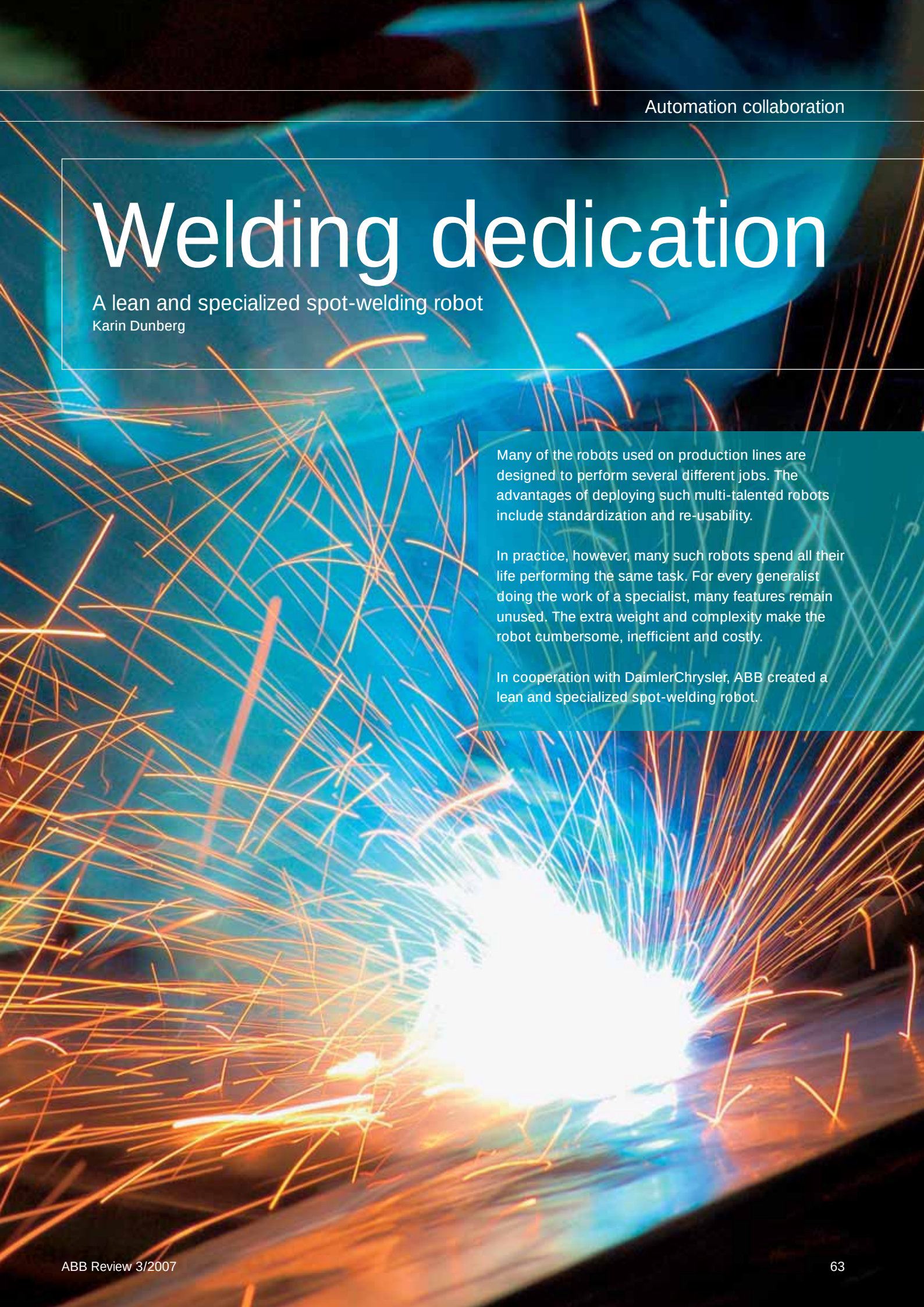

Many of the robots used on production lines are designed to perform several different jobs. The advantages of deploying such multi-talented robots include standardization and re-usability.

In practice, however, many such robots spend all their life performing the same task. For every generalist doing the work of a specialist, many features remain unused. The extra weight and complexity make the robot cumbersome, inefficient and costly.

In cooperation with DaimlerChrysler, ABB created a lean and specialized spot-welding robot.

Automation collaboration

It all began when DaimlerChrysler contacted ABB in 2003: The company was searching for a new dedicated spot-welding robot.

They were seeking to jointly develop a lean standard robot. This robot should handle a payload of 150 kg to be able to master the majority of the company's spot welding applications. The six-axis robot should also be able to perform a series of spot welding tasks utilizing a single servo-controlled weld gun.

The so-called semi-shelf layout permits a second level of robots to be added to the line, with the robots on the upper level being able to weld upside down.

"We needed a workhorse for our main spot welding applications," said Anton Hirzle, Senior Manager at DaimlerChrysler. "Today we use standard robots for most of our applications. The same robots can weld, glue, handle parts, do whatever you want them to, but we had to pay for a lot of features that we never used in spot-welding applications. We wanted a dedicated robot for spot welding; cost-savings were the most important driver for the project."

DaimlerChrysler is a robot-intensive company with around 9,000 robots in its Mercedes plants and about 5,000 in its Chrysler plant in the United States.

Factbox The DaimlerChrysler Group

The DaimlerChrysler Group, which generated more than € 150 bn in revenues in 2006, can look back on a tradition stretching over more than a hundred years and marked by pioneering achievements. Today, the company is a leading supplier of up-market passenger cars, SUVs, sports and touring cars, minivans and pickups, as is also the world's largest manufacturer of commercial vehicles.

Anton Hirzle, Senior Manager at DaimlerChrysler: "We wanted a dedicated robot for spot welding"

The company consulted several robot suppliers, presenting their ideas on how to this goal could be achieved.

As a result of this, DaimlerChrysler and ABB embarked on a common R&D project in 2004. Instead of adding features, this project focused on removing features that were not needed for spot welding. The goal was to optimize through simplicity.

Almost three years later, the two companies had created a lightweight robot with a wide working range – the IRB 6620. No less than 800 kg of weight has been removed from the original robot! This not only lead to savings in the steelwork, but created a robot that is more agile and easier to handle.

This robot has a payload of 150 kg and a robust wrist-design capable of handling typical integrated-transformer spot-weld guns. The tool-mounting flange conforms to ISO standards for 200 kg and the robot comes with a dress package especially designed for spot welding.

The IRB 6620 is easier to install, has a lower investment cost and a wide working range. Especially the increase in the working range in the area below the robot's base presents an interesting approach for a redesign of spot-welding cells. The so-called semi-shelf layout permits a second level of robots to be added to the line, with the robots on the upper level being able to weld upside down. This approach saves space and provides more efficient integration of the robots in the working cell and hence greater productivity.

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In the long run, ABB wishes to replace most of the multipurpose robots that are used for spot welding today with the lean and dedicated spot welder IRB 6620.

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Additional reading

Negre, B., Legeleux, F., FlexLean – Robots challenge low cost labor, *ABB Review* 4/2006, pp. 6–10, and especially the factbox on p. 8 of that article.