



At Volkswagen's Anchieta plant outside São Paulo, models such as Polo (above), Gol, Europa Fox, Saveiro and Kombi are made.

Pressed to perfection

Using a new robotic system, Volkswagen in Brazil increases its stamping production from 170 to an astounding 3,880 pieces per day.

> These are extraordinary times for car makers in Brazil. The industry produced a record 2.4 million vehicles during 2007 and production continues to rise this year. Low inflation, rising wages and cheaper credit are driving a consumption boom, and as more Brazilians move up from the lower to the middle income brackets, demand for cars looks set to keep rising.

Car makers have moved quickly to adapt. Volkswagen of Germany has been in the country since the middle of the 20th century, one of Brazil's four big traditional car makers (the others are Ford and General Motors of the US and Fiat of Italy) that were joined from the 1990s by others from Europe

and Asia in a wave of expansion and modernization. At its enormous Anchieta plant on the outskirts of São Paulo, aging production lines have been overhauled to introduce the most modern automated systems.

One of the plant's latest innovations, completed in December, is the introduction of IRB 6650s robots with a seventh axis from ABB in a line of six presses in vw's metalworking facilities. The presses were previously used to make panels for the front and roof of vw's ubiquitous Kombi multi-use van or minibus. vw builds about 100 Kombis a day and the presses, fed by hand, had little difficulty churning out 170 pieces a day – meaning they would lie idle for about half the week.

As production of other vehicles has been ramped up, that kind of productivity was no good any more. In April 2008, vw was getting ready to launch a new compact car known only as 23X NF. The Kombi line had to make way.

"We needed to automate the process," says Paulo Henrique Barbosa, the engineer and process analyst responsible for the project. The results speak for

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themselves. From 170 pieces a day, the same line of presses is now producing 3,880 pieces a day in eight different families of parts, with the same 30 employees that formerly worked one shift three or four times a week now manning the line round the clock in three shifts, seven days a week.

The line works as follows: Flat steel sheets are delivered on pallets to an area next to the first robot, which lifts them off one or two at a time (depending on the size of the piece to be made) and puts them onto a loading platform made up of narrow conveyor belts. If necessary, the sheets are fed through an oiling machine to facilitate complex pressing. Then a second robot collects them – but not before a vision system relays their exact position to the second robot, which makes minute adjustments before picking them up in just the right position for delivery to the first press. This vision system was built by Schleifstein of Germany and supplied by ABB.

The first, 1,800 ton press gives the piece its shape. Then comes the first complication. Because the force is applied from above, the piece emerges as a convex structure. Subsequent pressings, which punch holes and make other refinements, must be made from the other side. So the piece must be "flipped" between presses one and two.

Using one robot, this is a complex movement that involves several changes in direction including a full 180 degree arc on the vertical axis. In the early

days of automation this was quite acceptable. But as pressure on volume production has increased, such a maneuver is unacceptably time-consuming. ABB's solution was to use two robots in what is known as a turnover system – one machine hands the piece to the other in a movement that is kept low and fast.

"While the second robot is putting the piece into the second press, the first one is already back at the first press to collect the next piece," explains Henrique.

"It's all a question of saving cycle time," says Tania Duque, automotive segment manager at ABB Robotics in Brazil. The turnover system alone has saved three to four seconds per operation – not much to the layman, but a huge difference on a production line already producing more than two pieces per minute and aiming for a target of three.

Between the subsequent presses, just one robot is needed. But each has another innovation introduced at vw on this line: a "seventh axis," an extension attached to the end of each robot's main arm. Like the turnover system, this also speeds the movement from one press to the next and keeps the weight more evenly distributed, reducing troublesome vibration.

vw has two lines of presses at its São Paulo plant. Paulo Henrique hopes to automate the second one soon. Meanwhile, he hopes the impressive results already achieved will earn him one personal satisfaction: the automation process is up for an award under vw's internal recognition program. ☺



Pressing at the VW plant in Anchieta

>FACTS

ABB's new robot line

Project implemented: August to December 2007

- Productivity: increased from 170 pieces a day to 3,880 pieces a day
- Cycle time: maximum measured to date is 2.80 parts per minute, right hand panel of Saveiro – up from 1.5 per minute on an earlier robot line
- Parts produced: left and right side of Saveiro, left and right side of Polo Hatch, roof of Polo Sedan and Polo Hatch, engine support for Polo, Fox, 23X NF

Volkswagen Anchieta at a glance

Inaugurated in 1959 – the first VW factory outside Germany

- "Nova Anchieta" (New Anchieta) production lines installed from 2002 as the most modern in Brazil in a BRL 2 billion (USD 565 million) investment
- Total area: 1.96 million square meters
- Capacity: 1,600 vehicles per day
- Employees: 15,000 (10,000 Volkswagen, 5,000 third parties)
- Products: Gol, Fox Europa, Polo Hatch, Polo Sedan, Saveiro, Kombi