

PC peripherals, First Engineering, Singapore Case study: Injection Moulding

At First Engineering, picking and placing precision plastic computer latches with a robot instead of manually has meant huge improvements in output and uptime, translating into big savings for the company.



First Engineering is a specialist in ultra-precision moulds and plastic parts used in everything from hard disk drives to PC peripherals to optical-related products. It bought a robotic system put together by plastic process automation specialist ConAir Pacific Equipment, using a robot made by ABB. The final version of the robot was up and running in August 2007. The robot works with plastic latches – small pieces of plastic with a metal insert – which are used in computer products and “need special attention when it comes to manufacturing them given their miniature size and tight tolerance requirements,” explains First Engineering’s operations manager Ben Lee.

Top-notch production

Clients’ names are confidential but First Engineering is a global leader, accounting for 25 percent of the world’s output of the high-precision computer components for big-name customers in the computing business arena, says its general manager, Tan Kek Chiang. So it is no surprise that demands from customers meant that the company needed to have top-notch production.

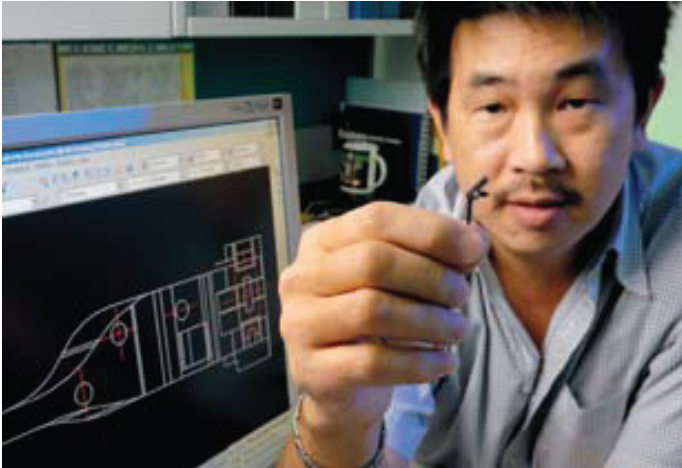
Conairs environment-controlled premises in Singapore are

a high-tech seven-storey factory. The 28-year-old company has a total of seven factories in five cities including Shanghai, Guangzhou and Suzhou in China, Johor Baru and Penang in Malaysia, with one more coming up in Chennai, India. The injection moulding specialist company has grown from having only four machines to having 450, turning out 2,000 moulds per year, with a professional management team headed by group CEO J.R. Ong.

Seamless automation

What makes the difference with the robotic arm is seamless automation for a pick-and-place procedure. First, the robotic arm of the IRB 1410 from ABB picks up four metal inserts from a bowl feeder. The arm swings to the left, toward two injection moulding machines. A program recognizes which machine is in place. The robot arm then moves into the machine; its gripper (a Conair Sprue Picker) picks up four plastic latches (from a previous cycle). Then the robot inserts the metal pieces into the mould for encasing. Finally, as the inserts are being encased, the robot moves to place the completed batch of plastic latches into collection bowls. There is no need for any manual input. “Previously, under the manual system, the job

PC peripherals, First Engineering, Singapore



was so mechanical, the operator may fall asleep. We had to make many shift rotations – creating the roster was a headache. Plus, the job is hot, and the operator has to wear gloves but that means less tactile sensation to pick up the parts,” says Lee.

Challenges

To be sure, getting to the finished product was not easy. Koh Leong Seng, operations manager of Conair, faced several challenges working on the project from December 2006 to July 2007. The biggest was the minute measurements. Says Koh, an electrical engineer by training, “The size of the metallic insert is 3.75mm and the mould insert clearance is 3.81mm, and both cannot be changed because they are pre-specified. So, the only thing I could change was the tooling or the robot’s fingers.”

What was needed, says Koh, was a tooling smaller than the mould so that the robot could place the insert in the mould without damaging it, while taking into account the intricacies of tolerances or stress levels. But the needed adjustment was made and the final tooling sent to First Engineering in August 2007. Since then, the robotic system has been working like clockwork.

Koh is nonchalant about the eureka moment: “You know the data and you know the problem. The solution lies in manipulating the data to fit what you need. There were no miracles, the light bulb is always on.”

To be sure, the automation comes at a pivotal time. Says Tan: “We must increase productivity and the quality of parts because customers are demanding higher volume and cheaper parts.”

FACTS

Benefits:

First Engineering has seen some remarkable improvements in production since installing the IRB 1410:

- Increase of 75 percent in output to some 300,000 pieces per month
- Labor savings of SGD 3,000 (USD 2,100) per month (down from three people per day to zero)
- More consistent quality

First Engineering Plastic Pte Ltd

- Company: Makes ultra precision moulds and plastics parts for use in high tech products including hard disk drives and PC peripherals
- Number of employees: 2,700
- Customers: Major players in data storage, business, machine, automotive and healthcare industries
- Revenue: USD 200 million in 2006
- Website: www.first-engr.com.sg

Conair Pacific Equipment Pte Ltd

- Company: Makes 450 products including materials handling systems, robots and palletizers
- Founded: 1956 in Pittsburgh, U.S.; Singapore office, a subsidiary, opened in 1987
- Number of employees: 18 in Singapore, Kuala Lumpur, Philippines, Ho Chi Minh City and Bangkok
- Customers: Plastics processors in electrical, consumer gadgets, packaging and automotive industries
- Revenue: USD 2.5 million (average annual)
- Website: www.conairnet.com

ABB Robotics

www.abb.com/robotics