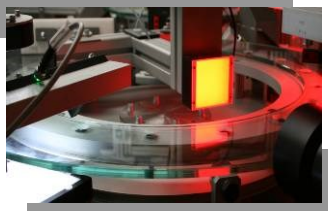
Welcome to the April issue of the RNA newsletter

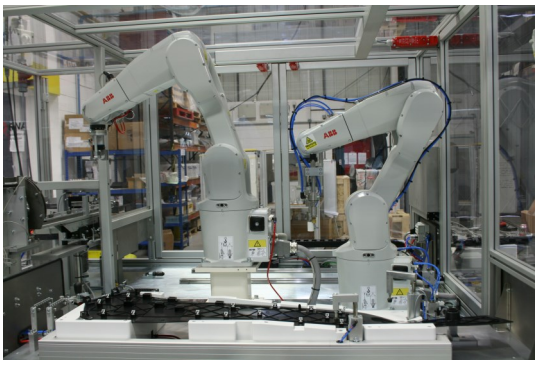
news

ADVANCED AUTOMATION

In this issue



Six Axis Robot Clipping & Welding System



A leading global supplier of automotive components approached RNA to design and develop an automatic system for the assembly and **Poka-Yoke** of console side panels (left hand & right hand).

For this particular project the system were required to fit 15 clips per side panel and weld one reinforcement panel per hand per cycle. RNA have developed a robot clip & welding system incorporating a clip insertion robot, a welding robot with ultra-sonic welding head, a bowl feeder system and a control system.

The challenge

In designing the system a number of challenges were highlighted:

⇒ The project was required to have a complete cycle time of less than 120 seconds including load and unload time.

⇒ Component parts with shape variation

⇒ The project needed to ensure precise positional accuracy for the clip placement and the reinforcement panel welding.

Two work as a team

Working in close cooperation with our customer, engineers at RNA selected two six axis robots to carry out all the requisite processes.

To start the process, the console side panel and the reinforcement panel are manually loaded and clamped onto a sliding table by the operator and pushed into position. Robot 1 picks and accurately loads 15 clips onto the side panel, while robot 2 ultrasonically welds and joins the reinforcement panel to the side panel. The cycle time was optimized by having both robots work simultaneously to complete the clip placement and ultrasonic welding. To complete the process, robot 1 dot marks the 'good' side panel, adding poka-yoke (error proofing) and assuring traceability.

Upstream of the robots, clips are fed and orientated via a vibratory bowl and linear feed system to a precession shuttle mechanism so that the clip is always in a known repeatable and accurate positional location for the robot to pick up.

Once the robots have conducted their tasks the operator pulls the sliding table out and the cycle completes.

The system has independent right and left hand sliding tables, each including a mirrored assembly fixture for a LH or RH side panel. While the operator is unloading and reloading one side, the other side is being processed by the robots. The mirrored feature allows for increased productivity due to fast lead time and the inherent repeatability and efficiency of the robotic process.

Key benefits

The system:-

- Traceability Poka-Yoke (an error proofing mechanism used in a lean manufacturing process)
- The quality of welding is significantly higher than with manual welding
- Easy to operate and meets the requirements of safety
- Provide speed, accuracy and repeatability
- Increase productivity and consistency and reduce rework

All of these benefits deliver a short pay back period and impressive return on investment

Breaking down stereotypes in a man's world

For Kirsty Van Rensburg, the biggest worry about a career in mechanical engineering was not the lack of female company - but that she might get bored. Fortunately she couldn't have chosen a more challenging and fast paced career. With over 20 years experience in design engineering and project management, she is now design office manager for RNA Automation, designing and building automation machines for manufacturers all over the world.

Continues ▶

Meet New People

We would like to extend a warm welcome to **Jack Kirby**, who has joined our design office as a Design Engineer. Jack brings with him industry experience and has quickly fitted in to life of RNA.

We also welcome our two new toolroom technicians **James Healy** and **Alexander Guy**. James and Alex join to expend our automation capacity and support the growth in our manufacturing activities.

(Continued)

"Every day is a different challenge," she says. "I like starting with a blank piece of paper and having to design a machine that can automate getting a product into a specific location, often at a specific rate per minute and using automation technology such as pick and place pneumatics, robots, bowl and linear feeders and could include inspection with cameras.

"When people think of design they think of someone designing a door handle, a car exhaust or a kettle. They can spend a lot of time designing that one thing and I was worried I would find that process repetitive and tiresome. What drew me to this type of work was ok, maybe our machines aren't as pretty as a curvy kettle, but for me the challenge is constantly moving, every job is different."

At RNA Automation, Kirsty is now designing an automated feeding and orienting machine for fender brackets.

"I have always been interested in how things work," she says. "My father was an engineer; maths and physics were my strong suit at school – so it was a natural progression for me. When I go to a funfair I am not thinking how terrifying the rides look, but how they work, whereas a sales person would be looking at the same ride and thinking how much money is that making in an hour!"

It was a one-day event for Women in Science and Engineering while still at school, that cemented the direction Kirsty would take. Although being a woman in a predominantly male environment brought its challenges early in her career. "I remember being in a meeting with a client and they directed all the questions to the sale engineer who was a man, but when they realised I was the person answering the technical questions, their attention was refocused. All I can say to other women thinking about a career in engineering is to have a go, it is a very challenging and rewarding career.

"You need to be willing to listen to others – especially when you are first entering the industry and learn from other people's experiences. You have to have imagination to come up with different ways of doing things and you've got to be driven. This industry is constantly moving and projects are very fast paced when it comes to designing a machine or mechanism. You have to have that drive to get things done."

What are Collaborative Robots and How are they used?

If recent research is anything to go by, collaborative robots (cobots) are the workforce of the future.

Robots have been widely used in the manufacturing industry for many years to replace a human labour, however collaborative robots or '**cobots**' are an entirely different ball game.

The definition of collaboration is the action of working with someone to produce something and cobots are designed with that in mind, working alongside other employees and not as a replacement to them.

Some operations and activities simply cannot be fully automated, however the process speed suffers if parts are being ferried backwards and forwards between workers on the assembly line from robots locked in cages.

Cobots could transform the way we work and manufacturers like Ford have already jumped on the cobot bandwagon. This German factory is successfully using collaborative robots to install shock absorbers on their vehicles with precision and accuracy right on the production line, saving valuable time and money, not to mention boosting their productivity.

Here we look at the four main types of cobot currently available.

Safety Monitored Stop
This collaborative feature is used when a cobot is required to work primarily on its own, but may on occasion need an operator to assist. An example of this would be if a worker needs to step in and perform an operation on a part that is being held by a cobot in an automation assembly process.

The cobot will sense the presence of a human in its workspace and will cease all motion until the worker has left the predetermined safety zone. The cobot will not resume its actions until it has received a signal from its operators.

Speed and Separation Monitoring
This function is fairly similar to the Safety Monitored Stop in that the cobot operates within a predetermined safety zone, however the Speed and Separation Monitoring cobot reacts differently to human presence. Rather than simply stopping because someone has entered the safety zone, this cobot will slow down whilst using a vision detection system to continually monitor the location of the person or object that entered the area.

If the person or object does become too close to the cobot, it will stop and wait for the person's proximity to increase once again before continuing. This cobot is used in areas where there are many workers present as it will require far fewer human interventions in order to keep functioning.

Hand Guiding
A Hand Guiding cobot is unique in that it acts like a regular industrial robot, but benefits from an additional end of arm device that is pressure sensitive.

This device allows the operator to teach the cobot how hard to hold an object or how fast to move it, in order for it to be securely operated on and/or moved without incurring damage. Hand Guide control robots are useful in production lines where delicate components are being carefully assembled.

Power and Force Limiting
Perhaps the most worker-friendly machine, this cobot can sense abnormal forces in its path, such as a human or object, in its joints. The cobot is programmed to stop all movement or even reverse the movement should obstructions be detected or contact be made.

This is not your regular run of the mill robot, as it is programmed to know how much power and force a human can withstand. The Power and Force Limiting cobot can operate without any additional safety devices thanks to the state of the art robotic technology on board, and is designed for regular, direct collaboration with a human workforce.

RNA AUTOMATION LTD Hayward Industrial Park, Tameside Drive, Castle Bromwich, Birmingham B35 7BT United Kingdom
T: +44 (0)121 749 2566 F: +44 (0)121 749 6217 E: rna@rnaautomation.com W: www.rnaautomation.com