

Quality Assurance Right at the Workbench

The following is based on the article "Qualität am Handarbeitsplatz" (Quality on the Workbench) which appeared in Quality Engineering magazine, June 2011. It has been translated from German.

To err is human, yet one forgotten screw could have fatal consequences. Problem: It is neither technically nor economically feasible to automate many assembly steps. In particular, the continuous monitoring and documentation of whether, at the time of delivery, every screw really is in place.

An ideal solution is in great demand. At the beginning of 2011, ISRI started a pilot project with the new Sarissa Tool-Navigator.

The name ISRI stands for comfortable, innovative and safe commercial motor vehicle seating systems, providing comfort and security to millions of professional drivers. Customers include DAF, Daimler, Iveco, MAN, Renault, Scania and Volvo. 100% quality in every detail is a must, particularly with the assembly of safety-relevant screw connections. The practice of "just in time manufacturing" requires a flexible supply chain, which adds both technical and economic limits to automation. As a result, hundreds of individual seat parts are crafted and assembled by hand.

"The solution comes from Sarissa"

Precise torque tolerances and exacting documentation are today's standard. However, how can you guarantee that the mechanic tightens each screw properly, using the correct sequence? Assembly errors must be prevented, yet humans make mistakes! Complaints cost not only time and money – sometimes the company's reputation is on the line.

The solution comes from Sarissa GmbH, with its ultrasonic Local Positioning System (LPS). Managing director Volker Jauch: "Our LPS can very precisely and reliably detect the position of free moving objects in any work space."

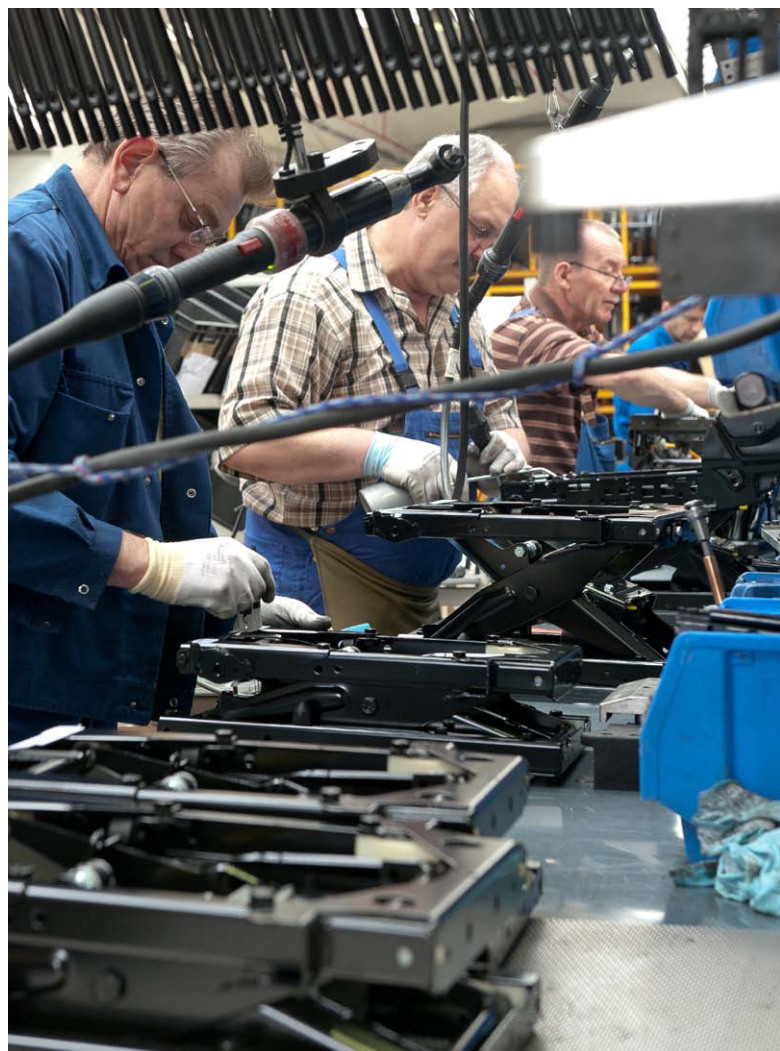
It's easy to install and easy to use. The main components of Sarissa's solution include compact ultrasonic transmitters, a receiver unit, and a

modern touchscreen PC. The transmitters are very small and weigh only a few grams. Using adapters, the transmitters can be attached to any tool with only a few modifications. The ultrasonic signals they produce are inaudible and harmless to humans.

The receiver unit, which is installed above the work station, localizes the ultrasonic waves and preprocesses the signals, which are then transferred

through a fast USB connection to the touchscreen PC where the information is evaluated. The accuracy of the reception is within +/- 2 mm. Volker Jauch: "Under laboratory conditions, 0.2 mm is also possible."

The transmitters currently have an operational range of 3 meters, however Mr. Jauch sees developmental potential in this area: "We know for certain that we will be able to increase



our range in the future. Also, the possible applications of the ToolNavigator extend far beyond those at ISRI."

"Every finished part is issued a virtual certificate of quality as it is being made."

Mr. Jauch: "Whether using adhesive or grease guns, welding tongs, punches, or torque wrenches, our ToolNavigator can realistically be used anywhere in a meaningful way – wherever position, dwell time, or any target deviation needs to be verified and documented."

The 12" touchscreen PC reliably guides the employee through clear textual, multimedia and acoustic instructions, even through very complex processing steps. This accelerates the training of new employees, and facilitates job rotation.

Employee approval

Sounds good, but how do the employees feel about the device looking over their shoulders? Volker Jauch: "The ToolNavigator only checks the employees' work for quality assurance. The system does not store any personal data, only product-related



data. This data can be archived, which, in the event of a liability claim, can be very useful. I know from discussions with our users that the ToolNavigator is regarded with relief, as it reduces personal responsibility. Every finished part is issued a virtual certificate of quality as it is being made. The main function of the ToolNavigator is to oversee the correct, predefined operational sequences, in the background."

"Sarissa fulfilled all of our requirements."

ISRI Process Planner Rainer Horneburg confirms: "The ToolNavigator has been in operation since the beginning of the year as a pilot project at an assembly line for seat structures during 2nd shift operations. The employees feel supported, not controlled. If the correct, predefined operational sequence isn't followed, the system doesn't scold – it simply displays the correct step which should have occurred. This makes the workplace more relaxed."

"Innovation, technology and superior quality are the basis of Isringhausen's company philosophy," Horneburg says. "Isringhausen relies on the uncompromising use of the newest technology in all areas."

The process planner also praises Sarissa for "the skillful and considerate commitment of the Sarissa programmers while connecting the touchscreen PC to the other components at our assembly line."



System Integration

For the Sarissa PC to interact with the screwing system and bit box, some special adjustments were necessary. "Sarissa fulfilled all of our requirements," says Horneburg.

The price for a ToolNavigator workstation is affordable. Assembling the system is uncomplicated and takes little time. For programming the system, making individual adjustments to the customer's software and connections to external periphery and CAQ systems, Sarissa obviously charges extra. However, according to Horneburg, "The costs are within normal market rates."

Programming the ToolNavigator yourself usually requires no more than a half day of briefings. Configuring the system requires only two steps: First, the workplace needs to be specified. This includes the work areas that need to be monitored. Next, the assembly sequence needs to be specified, and the preset screwing sequence must be defined, step by step.

"The ToolNavigator passed with flying colors. I foresee a great future for this system."

The software is sleekly programmed and to a large extent self-explanatory. The system configuration and data input is organized into clearly structured and user-friendly input windows. Incorporating designs and pictures into the sequential program is easy, as is the use of the Input/Output channels, as well as setting up data exchange with external devices, for example, scales or printers.

Once programs have been created they can be modified at any time, or they can be transferred to other assembly lines which have the same configuration. Access to these administrative functions is password protected, as they should be.

To get started, the employee simply activates the start button on the touchscreen, or, as specified by ISRI, scans a bar code. Everything else runs automatically.

Conclusion

Rainer Horneburg: "It is always exciting when new technologies prove themselves in real life. At ISRI, the ToolNavigator passed with flying colors. As a process planner I foresee a great future for this system. There are many different QA tasks, in which the motion control of tools within a defined space requires monitoring. As far as I know, Sarissa is currently the only provider that offers a realistic and affordable solution."



ISRI Isringhausen

ISRI Isringhausen, which belongs to the Aunde Group, is a family owned company in Lemgo, Germany, with 38 factories in 18 countries, and is the worldwide market leader in development and manufacturing of innovative vehicle seating systems for commercial motor vehicles. This year alone, approximately 2.4 million seats will be produced by 5,000 employees worldwide, providing comfort and security for trucks, delivery vans, buses, construction machines, motorhomes and forklifts.

Background

Sarissa, located in Weingarten, Germany, has been developing ultrasonic applications for quality assurance, coordinate specification within fixed areas, production traceability, motion studies, and ergonomics since the beginning of 2010.



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