Crystal Group Uses RFID Tags to Track Garment Production

The Hong Kong knitwear company has installed RFID interrogators at 8,000 sewing stations in three of its plants, so that it can record the number of garments made by each worker.

By Claire Swedberg

Dec. 7, 2007—Hong Kong knitwear company Crystal Group is employing passive 13.56 MHz RFID tags to track garments as they are manufactured. The company maintains 15 manufacturing sites in Sri Lanka, Vietnam, China, Hong Kong, Macao and Malaysia that produce more than 90 million garments each year. Crystal Group's clients include GAP, Old Navy, Wal-Mart, JC Penney, Marks and Spencer and Ann Taylor. Three of the manufacturer's sites currently use RFID technology to track the number of products workers manufacture during their shifts.

Because of the large volume of products it makes, Crystal Group emphasizes speed and quality in the production process. To accomplish this goal, the company closely monitors work-in-progress from sewing newly cut fabric to shipping completed garments, as well as the planning of workloads and payroll for the company's many sewers.

Until now, the company has relied solely on a bar-code-based system to track its plants' production process. At the start of a shift, employees use a bar-code scanner installed at their sewing station to read the bar-code number printed on their ID card. They then scan the bar code printed on a paper form accompanying each bundle of items they sew. The company utilizes this data to assist in calculating work hours, and to track the productivity of a specific point on the manufacturing line. The bar-coding system, however, has several shortcomings: The bar-coded forms are often difficult to read, can become crumpled in the garment and frequently do not scan properly.

The company wanted a faster and more accurate scanning process, as well as a system that could be integrated into its own back-end management system. Therefore, over the past three years, Crystal Group has been gradually implementing an RFID solution provided by Malaysian IT solutions and technologies company GPRO Technologies. The firm is now using GPRO's Shopfloor Data Tracking (SDT) system with RFID interrogators installed at every sewing station in some of its facilities. GPRO custom-built and provided all the hardware, including RFID-enabled ID cards and garment labels, label printer-encoders and interrogators, which comply with the ISO 15693 RFID standard.

In mid 2004, the clothing manufacturer first tested the system at one factory in China. Since that time, it has begun rolling out the system at several of its largest facilities—two in the Dongguan region of China and one in Hanoi, Vietnam. Crystal Group has installed RFID interrogators at about 8,000 sewing stations in the three plants. Within the next few months, says Quek Kar Loon, GPRO's CEO and cofounder, the company plans to add readers to another 4,500 stations at other manufacturing sites.

With the new system, employees begin their shift by using their station's RFID interrogator to read the unique

number of the passive 13.56 MHz RFID tag embedded in their ID card. Each employee's card number is linked to that person's name and place of employment in Crystal Group's back-end system.

Every garment or bundle of garments is also identified by the passive 13.56 MHz RFID tag embedded in a plastic label attached to each item or bundle. Some garments arrive individually, hanging from hooks attached to a conveyor system; others are part of a bundle of items; and some travel on rollers that move the product down the assembly line. During the sewing process, workers use their station's RFID interrogator to read each tagged item or bundle and record the pieces they sew.

Data from the readers is sent via a wide-area network (WAN) connection to Crystal's back-end enterprise resource planning (ERP) and payroll system. The information is also transmitted to a password-protected Internet server hosted by GPRO.

Employees can check their progress on their RFID terminals by pressing a "Sending Messages" button to receive a summary of their total production quantity, efficiency and earnings for a particular shift.

The garment RFID labels and employee ID cards are printed with a serial number on the front and encoded in the factory's cutting section, where fabric is cut and prepared for sewing. Old tags can be recycled—that is, re-encoded and reused, attached to a bundle or individual garment hook, then sent back into production.

RELATED_ARTICLES The SDT system also provides customized reports containing production data. Factory managers can use these reports to identify and resolve problems occurring on the floor, and to oversee quantities flowing from one production operation to another, with an eye toward minimizing pileups. The SDT presents the data in a dashboard-style format displayed on a computer screen.

The factories recouped the cost of their RFID investment within a year of deployment, Loon says, due to improvements in workflow. The cost of a system such as this is based on the number of RFID stations, he adds, though he declines to provide a specific price. According to Loon, Crystal Group intends to fully roll out RFID at all of its factories by 2008.