On the cover

Photo credit: Heath Moffatt

Production technician Marilyn Macaisa demonstrates the new cleaning process for radiation sensors at Redlen Technologies. The team used a 3-D printer to create a fixture that would remove the strain risk from this daily work task.

Prevention by design

By Sarah Ripplinger

When a rise in demand for its products was increasing the risk of musculoskeletal injury, a B.C. manufacturer took swift action.

Redlen Technologies faced a significant challenge: business was growing rapidly, and the designer and manufacturer's equipment and processes needed to be scaled up quickly to handle a sudden influx of product orders. But, while business was on the rise, so too were injuries. The company knew it had to act fast to keep workers safe, while still meeting production demands.

Founded in 1999 and based in Saanichton, B.C., Redlen is one of the only producers of Cadmium Zinc Telluride photon counting sensors. The company's technology is used for such things as medical imaging scanners, airport security scanners, and screening equipment to detect contaminants in consumer goods.

Meeting demand

In 2019, the employer of around 150 workers, including 50–60 production staff, needed to quickly expand to meet demand.

Redlen purchased more of the equipment production workers had previously used. However, this equipment and the processes in place weren't "designed to accommodate the growth in volume," says Mark Wiegele, quality assurance and safety manager with Redlen.

Process technicians' routines had shifted from a variety of tasks to mostly performing one task throughout the day — causing strains and muscle fatigue.

"In 2019, it all came to a head," says Wiegele.

During this time, repetitive strain injuries increased significantly — injuries that required time off, modified work, and assignment to other duties went from 1-to-2 per year prior to 2019, to 18 by the end of 2019.

Production efficiency dropped by 30–50 percent as injured and replacement workers were trained to perform different tasks temporarily, notes Redlen lap and polish supervisor Nathan Guido.

"We drew down inventory [to accommodate for the drop in production], which put deliveries at risk," adds Guido. "Should this have continued, and we didn't address it, we may have had to reduce production and shipments."

Identifying the problem

Redlen enlisted its team and ergonomists at WorkSafeBC to identify some of the causes of the injuries workers were reporting, and devise new approaches and tools to keep workers safe.

"We were seeing issues with the upper extremities, from the fingers to the shoulders and neck," notes Diane Cronk, supervisor of EH&S and training with Redlen.

Many of the injuries were caused by contact stress. For example, to clean tiles used in the assembly of sensors, workers would rub them between their fingers. The task was not an issue when only a small number of tiles were done per day but scaling up meant repetitive strains.

Musculoskeletal injuries (MSIs) such as these are the most common type of injury in the manufacturing industry, according to 2014–2018 WorkSafeBC claims statistics. MSIs affect the soft tissues of the body, such as muscles, tendons, joints, and nerves. Around one third of MSIs are caused by repetitive motions and forceful exertion.

Hidden costs

Preventing these injuries requires taking a close look at work tasks and equipment, and making the necessary workplace changes, says Heather Kahle, an ergonomist with WorkSafeBC who visited Redlen's manufacturing facility to survey worker tasks and make recommendations.

At Redlen, those changes included redesigning workstations to be more ergonomic — a process that involves "making physical workplace changes to reduce risk factors and prevent injuries," says Kahle.

"There is a real business case for up-front expenditures to minimize repetition or awkward postures," she asserts. "If someone gets hurt, now you have a claim and you still have to make the changes, which can take longer and cost more to retrofit."

When workers are happy and healthy, Kahle adds, employers also minimize absenteeism and turnover — hidden costs that can have a big impact on a company's bottom line.

"In this case, we were taking a reactive approach with our injured workers," says Wiegele, but that's already changing. "Since 2020 began, we've been more proactive."

Photo credit: Heath Moffatt

Redlen's Mark Wiegele and Diane Cronk meet with WorkSafeBC's Michael Brown outside the company's facility in Saanichton, B.C.

"We created a goal specifically for ergonomics within the business — on top of our standard health and safety goals — because this is our number one injury claim for 2019. We want to ensure that, going forward, we reduce the number of new injuries."

Informed ergonomics

Redlen launched an ergonomics assessment process to flag ergonomic concerns. Supervisors connected with their teams to identify work activities that were causing undue strain or pain.

Once flagged, the work activities were reviewed, videotaped, further assessed using an ergonomics checklist, and presented to workers and supervisors for consultation.

The ergonomics checklist uses a score sheet to rank the risk of MSI in each work task, and factors in length of exposure, what areas of the body are at risk, object weight, and overall posture. Recommendations are then made to mitigate or eliminate the risk.

For example, the cleaning task that once involved rubbing tiles between technicians' fingertips scored high when assessed through the company's ergonomics assessment process.

This risk has now been almost eliminated with the use of a re-engineered process that requires minimal manual cleaning, notes Behzad Mohazzab, senior process engineering manager with Redlen. The employer is also looking into designing and installing automated cleaning systems to eliminate all hand-based cleaning of tiles.

Workers were involved in redesigning processes, providing feedback during the prototyping of new jigs and fixtures to alleviate wrist strain from holding objects that could weigh around 15 pounds, adds Cronk. "They knew what was changing and had a voice in the process."

"There is a lot of education going on, and we are finding that people are more aware of their postures and ergonomic risks in general."

Recovery at work

Redlen reviews the progress of its ergonomic improvements at monthly company-wide town hall meetings. Led by Jim Balcom, chief operating officer, the meetings cover information about safety, quality, on-time delivery, and various customer and corporate updates.

"The executives are clearly taking responsibility and accountability for the welfare of the employees and the organization," says Wiegele.

The employer also implemented a recover-at-work program in 2019 to help workers who were already injured recover on the job, which can support better physical and mental health, as well as better recovery outcomes.

Injured employees meet with their supervisor and a health and safety representative on a monthly basis to ensure that their work is safe and they are receiving the treatment they need. These meetings also give employees an opportunity to voice any concerns.

"Workers were concerned about how long it was taking them to recover, or that they were letting their teams down," says Cronk.

"We wanted them to know that they have support here and that we will do our best to find something else for them to do if it isn't safe for them to do their existing work."

Long-term benefits

The ergonomic changes Redlen spearheaded to reduce worker injuries came with a price tag in the tens of thousands of dollars in terms of staff time, designs, and materials.

However, Mohazzab notes that the newly implemented processes, tools, and products are more efficient and effective, and have eliminated the use of some products, such as costly chemicals, all of which saves the company time and money.

"Because these designs accommodate other improvements, and a reduction of the cycle time, it pays back very quickly," says Mohazzab.

He estimates that the company will recoup costs associated with ergonomic upgrades within half a year and will continue to save money over the long term.

"This has definitely given us some lessons learned here," says Wiegele. "As we develop new processes and products within the business, we will take into account these lessons and ensure that we prevent ergonomic injuries from the get-go."

For more information

Visit worksafebc.com and search for "ergonomics."

Did you know?

The most common types of injury claims are strains. Search "sprains and strains" on worksafebc.com to find out how to reduce the risk.

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