Continued Innovation Helping to Keep the Workplace Safe

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So often discussions of technologies that can assist processing operations turn to ways of automating plant operations to stretch limited labor resources and increase production efficiency. Yet the poultry industry, despite its extensive use of automation, still depends on large workforces to get its products out. Even with emerging technologies, such as robotics and computer vision, which eventually will help to reduce some of this dependence, plants will continue to rely on line labor well into the future.

Designing operations to accommodate both high-speed automation and on-line workers is a challenge that the industry has focused considerable attention on over the past two decades. Its innovative MET (Medical Ergonomics Training) program, introduced in 1986, laid a solid foundation for early adaptation of OSHA’s meatpacking ergonomic guidelines, released in 1993. Succeeding years saw poultry plants aggressively pursue the redesign of in-plant workstations along with the training of managers and employees on ergonomic principles and the introduction of ergonomic review teams. The results have been impressive. OSHA recordables for poultry processing, in the area of musculoskeletal disorders, have dropped steadily in recent years to new industry lows.

Much of this success can be traced to the many industry efforts to reconfigure on-line workstations to reduce reach and stress. For example, the addition of an adjustable step, which enables shorter workers to position themselves at a more comfortable work height, helped to reduce awkward shoulder and arm posture and its potential to contribute to fatigue and injury. Likewise, the addition of lift and roller assist devices helped to reduce over-exertion from twisting and bending motions, reducing potential back and shoulder strains. The list goes on and on, much of which is documented in the 2004 OSHA Ergonomic Guidelines for Poultry Processing.

Today, the industry’s efforts in this area are taking some interesting new twists and turning to new technologies for answers. Take for instance the growing interface between line-workers and the many computer support databases needed to manage operations. With HACCP and Statistical Process Control techniques now integral to most operations, timely capture of performance data and feedback of performance findings is crucial to effective operations management. Entering data on-line and providing on-line feedback to workers can present ergonomic challenges as well.

Manually recording data on clipboards is gradually giving way to on-line computer monitors designed to speed the entry of data into the database. But it also can be less stressful on the hand. New wireless interfaces on data capture devices, such as digital thermometers, are further streamlining this process by allowing data to be entered with the push of a button on the device’s handle. And high background noise-canceling voice-entry technology and computer vision systems are poised to further streamline and eventually automate the capture of performance data.
Delivering electronic performance feedback to line workers is an area only now beginning to emerge in many plants. Some have begun putting waterproof monitors on the line to give workers feedback on performance or to provide them with additional information to help them perform their jobs more effectively. However, one of the challenges faced in positioning monitors on-line is to minimize the amount of head and eye movement needed to look back and forth between the monitor and the processing line. Excessive movement of the head can lead to neck and shoulder strain. Here, research may have another answer.

A system developed by Georgia Tech places information directly onto the product, via a laser projection system, as it passes by the workstation. This form of communication is more direct and seamless for the worker than having to look back and forth between a monitor and the line and mimics gesturing, that is common on many processing lines. Will it catch on? Only time will tell. Field trials are underway to test the system as part of a cook quality monitoring system.

Looking to the future, research is also underway to better understand and hopefully control motions and exertions that influence injury risk. Georgia Tech and Liberty Mutual researchers have developed an innovative monitoring and analysis system that is worn by a worker to track motions (wrist, elbow, and shoulder angles), handgrip force, and arm and shoulder muscle exertion rates while the worker performs cutting tasks on a processing line. It is being used in a study that is investigating the differences in upper body motion and exertion patterns between experienced and inexperienced line workers. The system employs a number of innovative and relatively new technologies that include fiber optic motion-tracking technology, developed for the computer animation and gaming industry, and WiFi wireless communication technology that frees the wearer physically from being tethered to the computer analysis system that is collecting real-time data. These studies are scheduled to continue over the next several months at five different plant locations, and have already begun to reveal subtle differences in body motions between experienced and novice cutters performing similar cuts, differences that start to disappear with the onset of fatigue.

At Ohio State, researchers have developed an exoskeletal measurement device that is placed on a worker’s back to track spine movements while the worker is performing lifting tasks. They have used this system to study lifting activities in a range of manufacturing and warehousing settings. In collaboration with Virginia Tech, these findings are being used to help generate biomechanical models that can further pinpoint mechanisms contributing to injury risk. One finding that has already emerged is the potential role of certain muscle groups in supporting back stability and the impact of fatigue in these muscle groups on back instability and injury risk. While this research also is continuing, it has already begun to shed new light on some of the intricacies of back dynamics.

How will such efforts and the technologies they are developing help plants in the future? One hope is that the knowledge they are generating about risky motions and their potential to lead to injury can be incorporated in future training programs to instill employee awareness on their avoidance. Another hope is that they may lead to additional assist devices that either help a worker recognize when high risk conditions are occurring or provide added support to alleviate the risk when it occurs. Regardless of what transpires, one thing remains certain, the future of workplace safety in the poultry industry remains bright.

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