Body Stressing Injury Risk Assessment Using Wearable Technology and Data Analysis

The Food Manufacturing and Processing Industry has the fifth highest rate of avoidable body stressing injuries, with 10% of the total number of body stressing injuries that occurred in the U.S. in 2019. The industry also has the highest rate of slip, trip and fall injuries, with 14% of total slip, trip and fall injuries in the U.S. in 2019. The median recovery time for injured Food Manufacturing workers is 9 weeks, having a significant impact on productivity and increasing costs.

In 2019, a trial program was conducted to assess how the wearable technology, smartphone app and data analytics platform could assist in assessing and reducing avoidable body stressing injury risks.

Background

Decades of research have indicated that the most effective injury prevention methods are found in elite sport. These methods involve the measurement of an athlete's movements using wearable technology and analysis of the data collected to identify injury risk and guide action to reduce risk. This technology (validated by leading universities) is now available to companies through the Bardavon platform.

Key Outcomes

53 — Reports recorded across 12 different workers and 3 locations

48% — Potential risk reduction for high load tasks

4x — Difference between high-risk workers and the group average

Trial Overview

The employer faced the following challenges in reducing the risk of body stressing injuries:

- Workers are required to perform physical work tasks which are unavoidable

- Previous injury risk assessments have not used data analysis to identify opportunities to reduce risks for specific tasks and individual workers

- Decreasing physical capacity of an aging workforce

- High cost of injury prevention programs with variable outcome and difficulty demonstrating ROI

Trial Objectives

Use wearable technology and data analysis to understand the physical demands on various workers, and identify opportunities to reduce injury risks.

Method

Measure the movements of a selected group over a three month period using Work Task Assessments and Movement Coaching.

Task Assessments

A safety professional places the sensors on a worker and records data and video through the smartphone app as the worker is performing the work tasks. This enables;

- The direct comparison between different methods of performing the task to identify the safest way

- An accurate assessment of a worker's ability for pre-employment screening or return to work following injury

Movement Coach

The worker wears the sensors to measure their movements throughout a shift. The smartphone app provides alerts when the worker moves in a way that increases their injury risk. This enables;

- Workers to modify the way they perform tasks to reduce risk

- Employers to understand which workers are moving safely, which have a high injury risk and which may be fatiguing faster than others

Safety Team and Worker Engagement

The most important components of a workplace injury prevention program are the safety team and worker engagement. The safety team onboarding process involved a 30 minute online training session, whilst the worker engagement process involved sports themed posters around the worksite and a short instructional video.

Task Injury Risk Reduction

One component of the project was to measure the effectiveness of using a manual handling aid (vacuum lifter) to move 20kg bags. When data and video is collected from workers performing the task, it enables an accurate assessment of the load on the body. This highlights any opportunity to reduce the injury risk through task modification or changes in operating procedures.
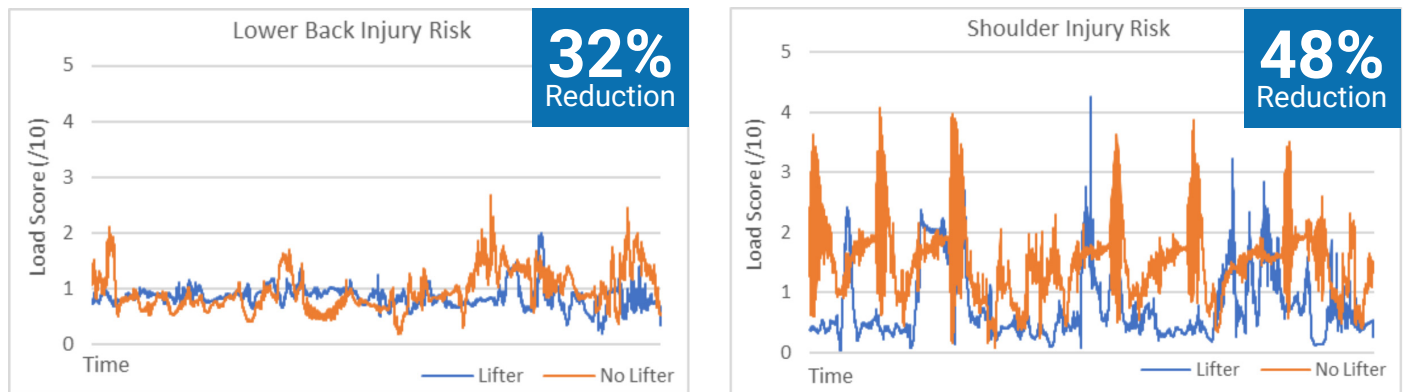

The above charts demonstrate the correct use of the vacuum lifter reduced the load on the worker's back by 32% and shoulder by 48%.

Worker Risk Reduction

Each point on the adjacent scatter chart represents a Movement Coach report from an individual worker, with the arm load score on the Y-axis (representing the physical demands on the worker's shoulder and arms) and back load score on the X-axis (representing the physical demands on the worker's back).

The chart indicates a 3 to 4 times greater increase in injury risk between the 5 highest risk workers (red points) and group average (green point). This chart enables the high risk workers to be identified, enabling the employer to take action by providing further training and assessment for these workers to decrease their injury risk.
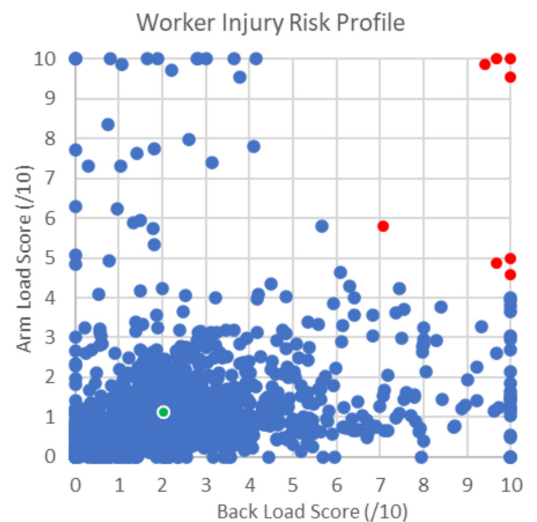
"I have been impressed with the work of Bardavon and the ability to give our employees and managers real data about what is occurring to their bodies during time of manual handling and physical activity. As a health and safety practitioner, asking people to stretch, warm up and consider trolleys and aids etc. is often a hard message to 'sell'. However, when people have an understanding ofthe impact of these tasks on them personally, then it highlights the burning platform and makes a compelling case for change."

–Danielle O., Head of Health, Safety and Wellbeing

Overall Results

Key Outcome	Opportunity
The load on the worker's body is different when they perform tasks with different equipment and techniques.	Identify the equipment and techniques that reduce the load on the worker's body and take action to train the workers to reduce their injury risks.
Some of the physical demands of the work tasks are unavoidable.	Educate and coach the workers on the health benefits of physical work when it's performed in the safest way with low load.
Different tasks, locations and individual workers may have different load.	Develop a risk profile across tasks, locations and individual workers and take action to reduce the load. Use AI to automatically provide workers with high load individualized training content.

To learn more, contact the Bardavon team at businessdevelopment@bardavon.com