BARDAVON®
PREVENTION + RECOVERY

Body Stressing Injury Risk Assessment Using Wearable Technology and Data Analysis

The construction industry has the fourth highest rate of body stressing injuries, with 11% of the total number of body stressing injuries that occurred in the U.S. in 2019*. The industry also has the fifth highest rate of slip, trip and fall injuries, with 7% of total slip, trip and fall injuries in 2019. The median recovery time for injured construction workers is 13 weeks, having a significant impact on productivity and increasing costs.

Bardavon conducted a trial program 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

109 Reports recorded across 17 different workers and 3 locations

34% Potential risk reduction for high load tasks

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

* 2020 data available. 2020 data skewed due to Covid.

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
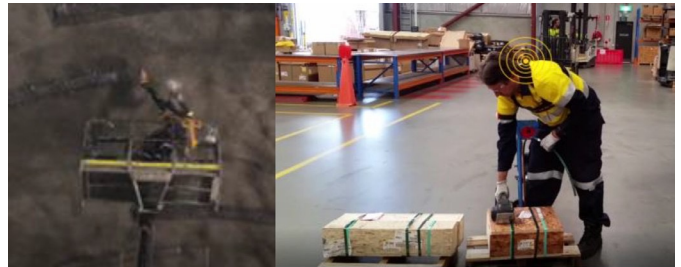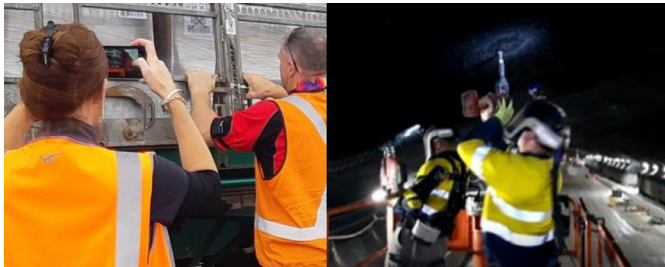

Trial Objectives

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.

Work 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

When data and video is collected from workers performing a 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.
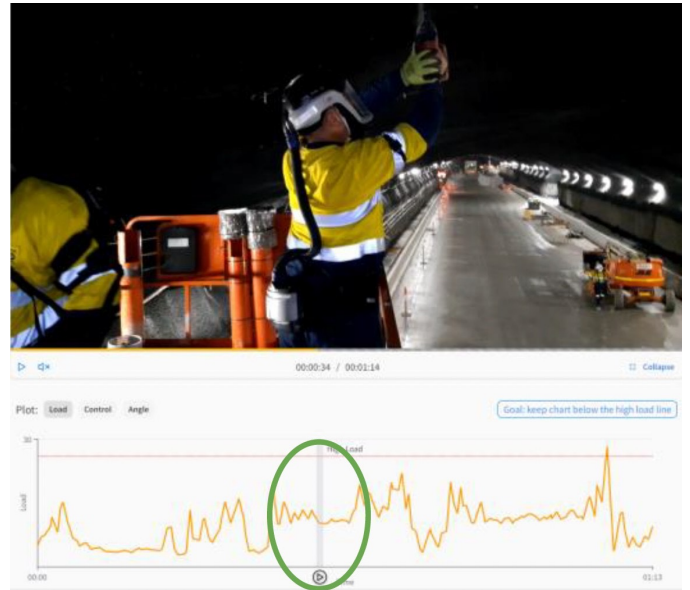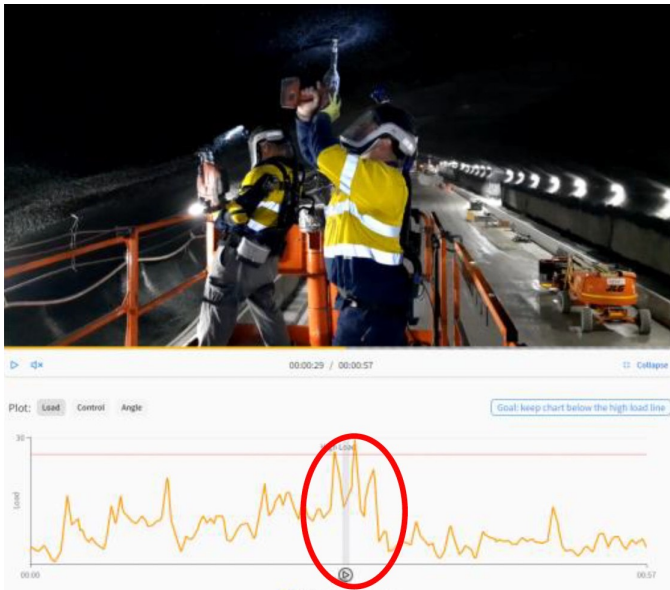

The above charts demonstrate the difference between the load on the arm when overhead drilling with two different types of drills. The first drill (red circle) increased the load on the arm by 34% compared to the second drill (circled in green).

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 12 highest risk reports (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.

Worker Injury Risk Profile
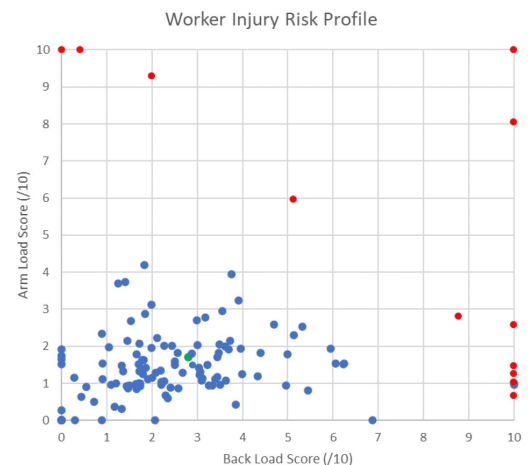
"I was using the shovel and jamming into the concrete and the data made me realize how many times I was doing that. Using the sensor made me switch to my other arm to avoid doing that too much to reduce the high load alerts."

−Darren P., construction worker

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.