

Effective Use of Wearable Technology for Manual Material Handling

What's the Risk?

Manual material handling is a well-documented risk for musculoskeletal disorders (MSDs). Overexertion, often resulting from manual material handling, ranks as the top cause of the most serious workplace injuries (those causing an employee to miss more than five days of work), many of which are MSDs. These injuries also cost U.S. employers nearly \$12.5 billion annually in direct costs of medical and lost-wage payments.

Employees at Life Line Emergency Vehicles often complete work through a manual process that includes manual material handling, such as pushing, pulling, and carrying, as well as using a variety of hand tools such as sanders, drills, or other devices that can create repetitive movement and gripping-related risks. Many of the tasks required of employees involve risk of MSDs and subsequent soft-tissue injuries.

Implementation of Wearable Sensor Technology

Life Line Emergency Vehicles recognized that due to the risks their employees faced from manual material handling to complete their jobs, MSD prevention was paramount to keeping their workers safe. To address such risks, Life Line Emergency Vehicles sought a data-driven approach to assess risks and make plans for mitigation. After being introduced to wearable sensors by their workers' compensation insurance company as a means to lessen MSD risk, Life Line Emergency Vehicles decided to engage in a pilot of the technology with MākuSafe. At the onset of implementation in January 2021, MākuSafe held meetings with employees who would be donning the wearable sensors. During these meetings, the technology and its capabilities were explained, and employees were reassured that the sensors were in no way monitoring their work performance or productivity. However, some employees still had concerns over the purpose of the technology and use of the data.

To circumvent concerns, Life Line Emergency Vehicles educated employees and were transparent with the sensor-collected data and its uses to implement positive safety changes (e.g., identify hazards, eliminate/modify risky job tasks). The MākuSafe wearable sensors collected real time motion data showing indicators of high force, acceleration, pushing and pulling, and repetitive motions, and ranked the overall physicality compared to peers in the same work role. Employees had access to their data upon request, which aided in gaining employees' trust about the technology. MākuSafe was also available for additional meetings throughout the implementation process if questions arose.

The implementation at Life Line Emergency Vehicles started with 40 wearables in January 2021, went to 120 in 2022, and now has 160 wearables being utilized across the entire company as of January 2023. These wearable sensors are utilized by employees within production including those involved in finishing, electrical, cabinetry, fabrication, paint assembly, welding, and engineering as well as office staff.

Impacts

Life Line Emergency Vehicles captures frontline worker reported "good catches" which are hazards that need to be corrected. After implementation of the wearable sensors, Life Line Emergency Vehicles recorded 335 good catches and was able to mitigate 82% of those in a year. Prior to the implementation of the sensors, only a few hazards that needed correcting were brought up annually, and tracking hazards and fixes was not consistently completed. This reporting of good catches was greatly improved by using the voice message functionality of the wearable sensors that allowed frontline workers to immediately notify safety and health personnel when a hazard was present.

Additionally, Life Line Emergency Vehicles has seen a reduction in workers' compensation costs, fewer hours of lost time, fewer trip hazards and more efficient work areas. Employees at Life Line Emergency Vehicles are now working in a more ergonomic environment since the implementation of ergonomic tools such as work tables and lift carts. These new solutions were determined based on data from the wearable sensors showing that employees were often bending, working in awkward postures or handling tools that were difficult to hold. Employees are also generally more aware of their body mechanics as it relates to ergonomics and consider their posture and static positions more than before the implementation of the wearable sensors.

Overall, employees are now more conscious of how they are working and if they are working safely. Through the implementation of the MākuSafe technology, the organization increased their knowledge regarding ergonomic fixes and learned how to spot hazards more effectively.

Return on Investment

Workers' compensation costs were reduced by 60% from 2021-2023. Life Line Emergency Vehicles has also had fewer recordables, from 16 recordable injuries to just 8, and an increase in good catches that are tracked on the MākuSafe provided dashboard. Tracking of these indicators on the dashboard helps to ensure that mitigation happens in a timely and effective manner.

Lessons Learned

The Life Line Emergency Vehicles team learned a lot through the implementation of the wearable sensors. Here are a few of the notable lessons learned:

- As is with a lot of technology, sometimes data are generated but actionable steps on what to do with those data can be hard to decipher. **Don't get overwhelmed by all the data. Instead, make plans to better understand how to interpret the data.** Life Line Emergency Vehicles began conducting daily data reviews, monthly tech provider meetings and quarterly insurer reviews to get a better understanding of the data being collected.
- **Be open with employees about data being collected and share the data with them.** It can be effective to use these data to encourage a participatory approach to solution development in which employees are able to use their own data to brainstorm possible solutions.
- It can feel daunting to try to fix all hazards or issues at one time. **Start with certain areas of the organization or departments to figure out solutions and then move to the next area.** Breaking down and prioritizing the action items needed can help to make change more possible and efficient.
- **Partner with and rely on the solutions provider for support.** Life Line Emergency Vehicles allowed MākuSafe to participate in orientation with their workers and collaborate on insights from data gathered which accelerated taking action and results.



At Life Line Emergency Vehicles, we aren't just building emergency vehicles, we're building a legacy. For over 35 years we've built a reputation around remarkable customer service, outstanding quality and exceptional craftsmanship, all to help our customers provide better patient care.



THE LEADER IN WORKFORCE WEARABLES

MākuSafe is a leading connected worker wearable and safety data analytics platform designed to reduce workplace incidents, enhance safety and improve productivity. The solution combines innovative wearable sensor technology with powerful data analytics to monitor and mitigate risks in real time. The Ally™, a compact armband device, captures a range of environmental and physical data via sensors such as motion, heat, air quality, noise levels and ergonomic strain providing safety leaders with actionable insights to proactively address hazards.

The MākuSmart™ platform enables organizations to identify trends, track near-misses and visualize risks across facilities helping to improve safety management strategies. MākuSafe also supports worker health by offering personalized exposure data enabling timely interventions to prevent injuries like heat stress, musculoskeletal disorders and noise-induced issues.

MākuSafe's approach collects no PII to ensure worker privacy while fostering collaboration between safety teams and frontline employees through accessible, real-time data and MyVoice™ push-to-talk communication capabilities.