

THE INDUSTRIAL ATHLETE AND NEXT-LEVELING SAFETY IN THE WORKPLACE



THE FOURTH INDUSTRIAL REVOLUTION – WHERE DISTINCTIONS BETWEEN THE PHYSICAL, DIGITAL, AND BIOLOGICAL WORLDS ARE BLURRED – IS NOW

WHAT DOES THAT MEAN FOR EMPLOYERS AND THEIR HUMAN CAPITAL?

Companies must recognize and adapt to this new environment if they're to differentiate in today's fast-changing and highly competitive economy. Every one of the assets of the successful employer-of-the-future is maximally productive and fully deployed, and that includes engaged and healthy human capital. Companies who understand this and have employees in physically-demanding, skilled jobs don't rest in their search for means of reducing injuries and illness in the workplace. Unfortunately, these same companies tend to find they achieve diminishing marginal returns from traditional means of loss control. Despite safety training, on-site safety management, environment changes and other tried-and-tested approaches, there remain certain types of injuries which repeatedly occur despite best efforts with these traditional approaches. How can companies "next level" in protecting valuable employees' health and improving productivity and profitability?

ENTER WEARABLE DEVICES AND THE "INDUSTRIAL ATHLETE"

There has been considerable buzz in the workers' compensation space around the use of "wearable devices". Their implementation promises exciting potential for driving down injury rates, leading to increased safety and productivity. Involving employees in the devices' best use and making them an active part of the derived learnings allows for collaboration and engagement in injury reduction. Many believe this technology represents the workforce of the future: stretching beyond our mental and physical limits by tapping into digital intelligence.

StrongArm Technologies is the creator of a proven suite of wearable products focused on reducing workplace injuries. Their main product, the FUSE Platform, includes a wearable IoT Sensor that measures the movements and environments of Industrial Athletes throughout their workday. StrongArm collects and analyzes the data with machine learning algorithms and transforms these learnings into actionable insights. In real-time, the FUSE can also alert the worker through haptic feedback of improper movement, prompting them to correct their movements. For risk prediction, a Safety Score is calculated based on the Industrial Athlete's movements, developed off research from Ohio State University's Dr. William S. Marras' Ergonomic Risk Model. The safer the Industrial Athlete's movements are, the higher the computed Safety Score. Based off this model and machine learning, injury risk can be measured in real-time, while live haptic feedback can provide corrections to high-risk movements to prevent injuries. More information on their market-leading technology may be found here: <https://www.strongarmtech.com/>

StrongArm's technology is already deployed and making a measurable difference in injury rates in employers with physically demanding job types. StrongArm firmly believes that employee engagement in their own safety is key to the success of any loss control initiative; thus, they've coined the term "Industrial Athlete," which connotes the individual health ownership aspect of StrongArm's model.

PROVING RESULTS

Oliver Wyman has been engaged to work with StrongArm to study the impact of these wearable devices (“WD”) and to derive metrics which determine if the impact results in measurable savings in insurance-related costs. Based on this analysis, **significant data already exists showing both potential for impact, and actual impact achieved from StrongArm devices.** Together, this analysis supports the following claims: 1) There is correlation between FUSE data outputs and observed frequency of lower-back injury (LBI), 2) When deployed, the FUSE can drive a measurable reduction in injury risk among workers, and 3) The FUSE has reduced incidence rate across injury categories when deployed at scale.

POTENTIAL FOR IMPACT

To evaluate the potential impact of StrongArm’s technology on injury risk prediction, the FUSE Sensor data was collected across over 60 job functions and 5000 industrial athletes in the Transportation, Wholesale Trade, and Manufacturing industries. The FUSE system-generated Safety Scores were based on over 300,000 hours of worker motion and environmental data collected over 2.5 years. This data was paired with over 500,000 workers’ comp claims spanning across 10 years of historical data, categorized by NCCI job code. As expected, **the Safety Score is correlated to the frequency of Lower Back Injuries (LBI’s).** The normalized data produced a correlation between LBI Frequency and Safety Score of 0.5211. Further, in a regression analysis when controlled for the impact of industry, Safety Score proved to be a significant variable, carrying a p-value under 5%. This result indicates the potential of using the FUSE Safety Score for evaluating specific injury risks in a population.

Slightly more subtle, but compelling, is the fact that Safety Scores can vary widely within an industry/job cohort. For instance, among “Mezzanine” employees in the transportation sector, there is wide variation in Safety Scores, i.e. employers with the same hazard level can achieve low or high Safety Scores. This signals that job functions with the greatest need for improvement, having both low Safety and high rates of injury, have the potential to increase their Safety Score by influencing the behaviors of the least-safe workers.

Exhibit 1: Safety Score Correlation to LBI Frequency

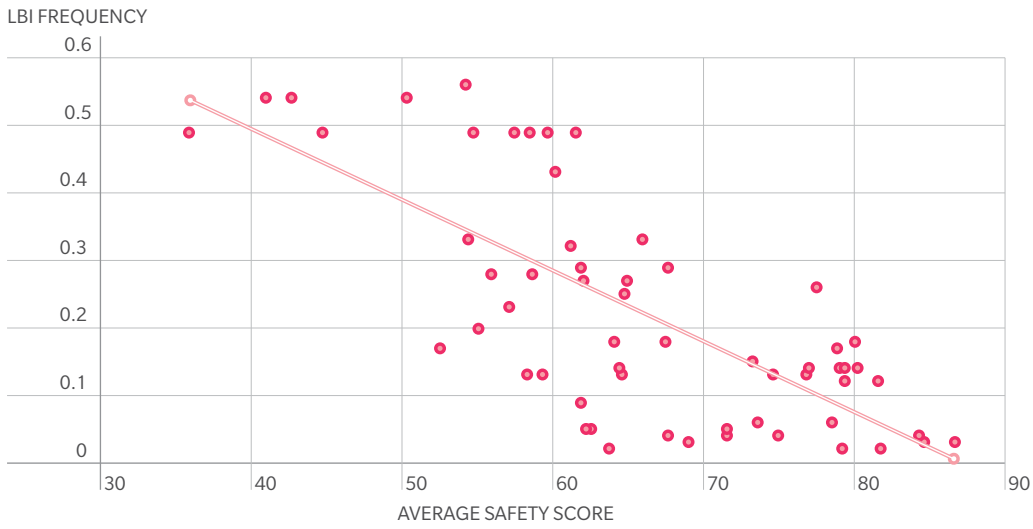


Exhibit 2: Safety Score by Job Type

INDUSTRY	JOB TYPE	30 TH %ILE SCORE	70 TH %ILE SCORE	SCORE SPREAD	LBI FREQUENCY
Transportation	Facer	56	69	13	0.29
Transportation	Mezzanine	58	78	20	0.29
Transportation	Unloader	54	65	11	0.28
Wholesale	Loader	45	57	12	0.33
Wholesale	Order filler	41	53	12	0.49
Wholesale	Shelf Picker	46	59	13	0.17
Manufacturing	Logistics	78	81	3	0.02
Manufacturing	Quality	85	89	4	0.03



THE RESULTS ARE IN

StrongArm Technologies has amassed millions of hours of experience from the active use of their WDs by Industrial Athletes in physically-demanding job types, including the delivery of haptic feedback to reduce injury risk. The results, though early-stage, are irrefutable.

The effectiveness of the FUSE haptic feedback was evaluated using a controlled split-test design, with two separate case studies conducted. In each study, after a baseline period without the feedback, one cohort of Industrial Athletes began receiving haptic feedback, while the second cohort did not receive the feedback. In the first study, after controlling for differences in seasonality and changes in risk management, **deploying FUSE haptic feedback resulted in a statistically significant increase in Safety Score, correlating to a reduction in injury risk of over 25%.** The results were examined for job types with the highest variability in Safety Scores and were measured for their impact on average Safety Score with and without the haptic feedback of the FUSE. Though a true A/B test was not performed on the second case study, from Exhibit 3, we can clearly see the increase in Safety Score with haptic feedback. This data highlights how the delivery of real-time alerting from the FUSE Sensor can impact worker behaviors to reduce injury risk.

The third section of analysis focuses on actual injury claim reduction across three major deployments of the FUSE technology. The tables presented here display results from employees in both Package Handling and Loading & Unloading types of work from a major U.S. logistics firm, who started using StrongArm devices with feedback mechanisms in place in late 2017. The results display rates of different types of injury in the first 10 months of 2017 without FUSE devices deployed, compared to the first 10 months of 2018 after the wearable devices had been in use for a few months. No other significant changes to the facility took place during this time. **Injury rate reductions range from 21% to 52%, with all metrics indicating significant decreases.**

A similar study was conducted with a major U.S. retailer across two additional distribution centers during the peak-season periods of 2017 and 2018. Year-over-year injury rates for all decreased by 46% and 32% after the FUSE system was deployed.

Exhibit 3: Haptic Feedback Impact on Safety Score

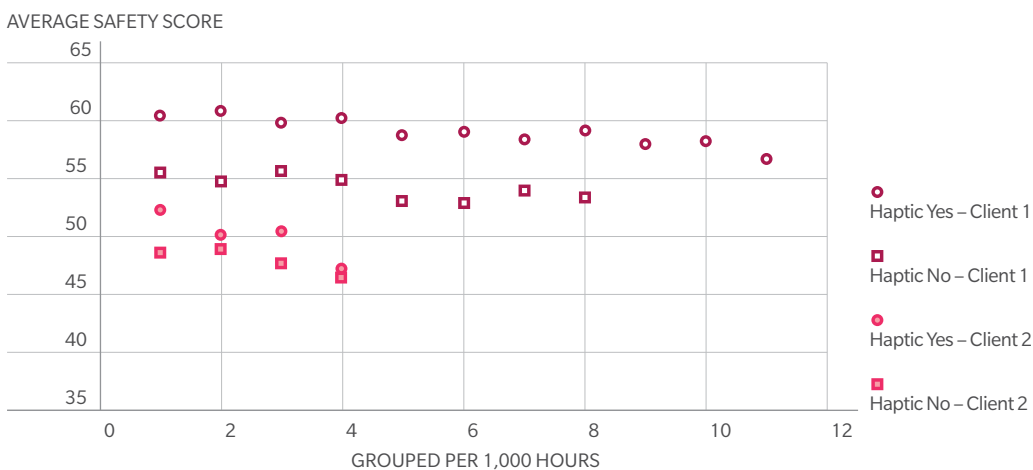


Exhibit 4: Client 1 – All Package Handlers

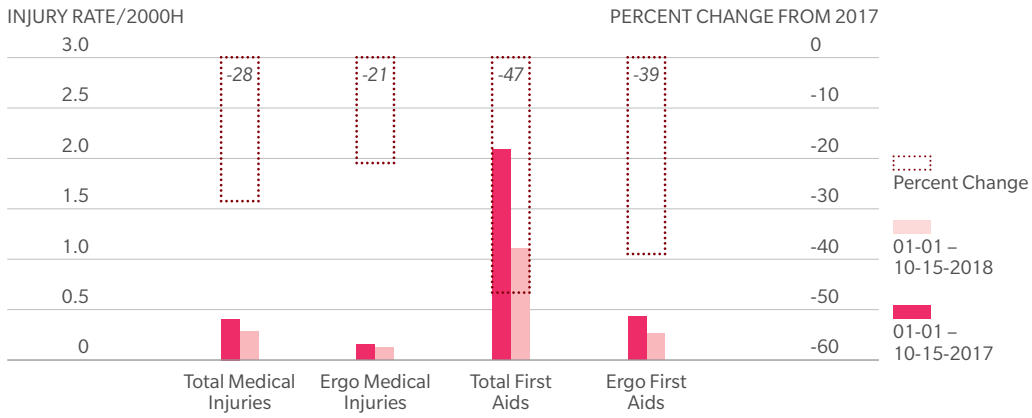


Exhibit 5: Client 1 – Load/Unload Only

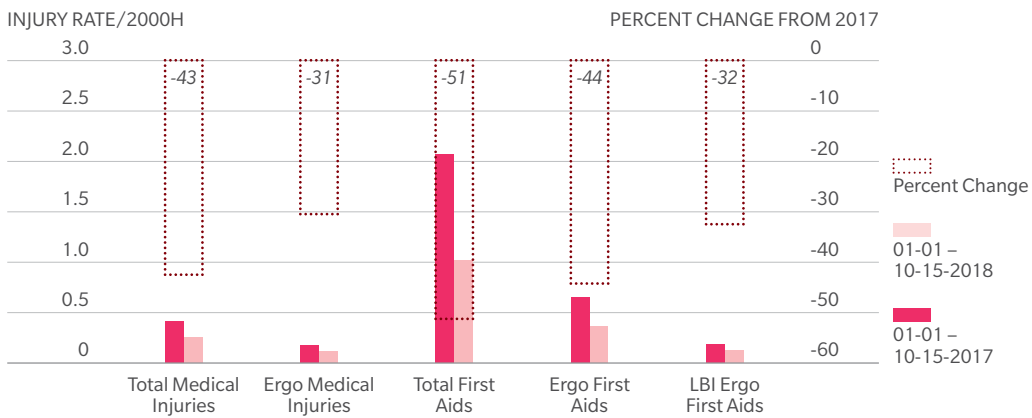
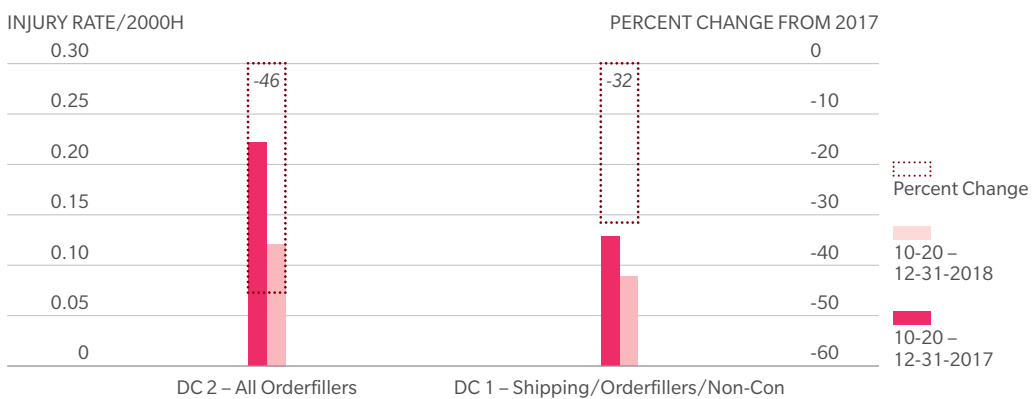


Exhibit 6: Client 2 – Total



A CALL TO ACTION

The results from StrongArm's products and work to date indicate clear improvements in workplace safety from the use of wearables. It is undeniable that employers who think ahead and innovate will have the advantage in a rapidly evolving human capital landscape characterized by skills shortages and a fiercely competitive economic environment where maximal productivity is essential. Using wearable device technology to push boundaries in the pursuit of Industrial Athlete safety to unlock both insights that were previously unavailable, and a competitive edge, seem natural courses for further exploration.

StrongArm and Oliver Wyman are seeking to expand our data set and develop even more powerful metrics to test the value and refine the use of wearable devices. We are seeking corporate partners who employ "Industrial Athletes" in physically-active job types, who are interested in piloting StrongArm's wearable devices in upcoming studies. We will be quantifying results in metrics which translate in an insurance context – changes in frequency of claims, average size of claims and total loss cost. Participation in the pilots will be at a discounted research cost and all results of the studies, while anonymized, will be shared among participants. If you are interested in hearing more or discussing participating in a pilot, please feel free to contact any one of the following StrongArm or Oliver Wyman team members.

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