



#38 Data-Driven Safety: Wearable Tech And The Next Generation Of EHS Management (3) Tom West, Vice President, Global Practice Leader, MakuSafe Wearable Tech

Workforce wearable smart technology can go beyond biometrics and fitness, tracking usable data that's relevant to employee safety and focused on the environment around an employee and what they're experiencing, rather than tracking the employee themselves. This leading indicator data includes things such as environmental (IH) hazards, slips/trips/falls, strain and exertion risk, ergonomic concerns, and voice reported good-catches, providing a more complete picture of workplace risk and elevating input from the front line worker. With this data, manufacturers, construction, logistics, food production, and industrial organizations globally are gaining real time insights, enabling proactive and preventative hazard remediation to ensure their workers safety. This session will provide an overview of how wearables can work, key considerations in selecting and deploying wearables, and a deep dive into numerous use cases across industries, where deployments of wearable safety tech over time have resulted in data that has contributed to quantifiable reductions in incidents, recordables, claims, and costs, while positively impacting safety culture and enabling process improvement.

Key Takeaways





How do you...

- better understand where risk exists?
- become more proactive & preventative?
- develop participation, engagement, and build culture?
- become more data-driven and strategic?
- relate safety to the C-Suite and Production/Operations?
- make sure you know about things you know happen, but nobody reports?
- ESG? DE&I? TWH?
- optimize your safety management process?
- not waste time and resources, and stay practical?
- use tech to get measurable results fast, without making life more difficult?

Today's Challenges Are Many!



Wearable Safety Tech:

Enabling Safety Management 2.0 & HOP

Providing EHS Leading Indicators

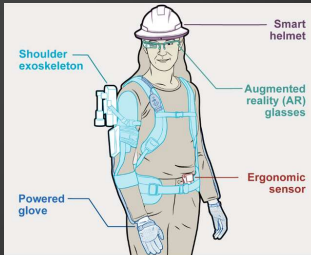
Reducing Incidents & Claims

And Improving Safety Culture!



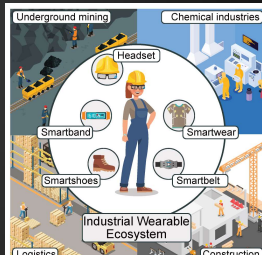
Tech with the right approach, can be human-centric, and enable success!

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Source: GAO (analysis and illustration). | GAO-24-107303

GAO 2024, <https://www.gao.gov/products/gao-24-107303>



<https://www.mdpi.com/1424-8220/21/11/3844>

Wearable Technologies in the Workplace

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SMART, SAFE, MAKUSAFE.

Safety and Wearable Technology: Impact, Applications, and Implementation in Industry

By Gabriel Glynn, Mark Frederick, Tom West
Copyright 2025, 1st Edition
CRC Press

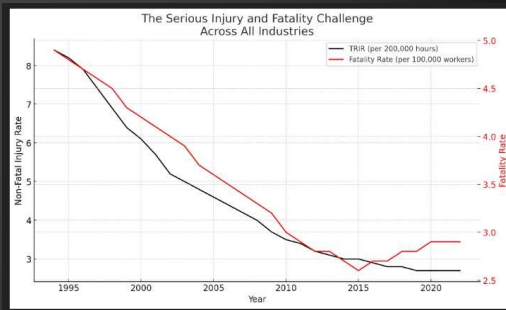
"Technology is available today that automates hazard identification and risk assessment, and provide insights and focus based on EHS leading indicators... However, the most advanced technology is meaningless without the leadership, culture, and systems in place to support it. Innovation in safety starts—and succeeds—with people."

— Tom West



A roadmap to understand, adopt, & use wearable safety tech!





The Big Picture





Safety Management Practices





T.R.U.E. Leading Indicators of Hazards & Risk

T – Timely
R – Relevant
U – Unique & Useful
E – Easy & Economical

Leading Indicator Characteristics

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Liberty Mutual Insurance

The WSI Top Ten: results across all Industries

In 2021 (2024 WSI), U.S. industries spent \$58.07 billion on the direct costs of worker injuries, and 82.5 percent of that cost (\$47.9 billion) was for the top 10 causes of disabling injuries and illnesses. The 10 most costly causes of workplace injuries and illnesses are as follows:

The top 10 most costly causes of injury and their direct costs to U.S. businesses

Cause	Cost (billions)	Percentage
Overexertion involving outside sources	\$12.49	21.5%
Falls on same level	\$9.99	17.2%
Falls to lower level	\$5.68	9.8%
Struck by object or equipment	\$5.55	9.6%
Other exertions or bodily reactions	\$3.68	6.3%
Roadway incidents involving motorized land vehicles	\$2.76	4.8%
Slip or trip without fall	\$2.34	4.0%
Caught in or compressed by equipment or objects	\$2.05	3.5%
Struck against object or equipment	\$1.84	3.2%
Repetitive motions involving microtasks	\$1.54	2.7%

The 2024 Liberty Mutual Workplace Safety Index ranks the top causes of serious workplace injuries by their direct cost to U.S. businesses.

Top 5 alone nearly \$31B
Those that likely had movement/motion leading indicators = 75.13%

LiMu WSI 2024 USA - <https://business.libertymutual.com/insights/2024-workplace-safety-index/>

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*** My personal re-interpretation of results! ***

"All employees, at all levels, have clear safety and health goals and responsibilities."
● 71.6% of respondents not able to strongly agree that everyone has clear safety and health goals.

"Workers in my organization feel comfortable voicing opinions, problems and concerns about safety and health."
● 66.8% of respondents did not strongly agree that workers feel comfortable raising safety concerns.

"How engaged is executive leadership in your organization's safety and health mission, goals, and practices?"
● 67.7% of respondents not able to say leadership is very engaged in safety efforts.

"How engaged are workers in your organization's safety and health mission, goals, and practices?"
● 81.8% of respondents cannot say workers are very engaged in safety efforts.

NSC 2025 Survey - <https://www.safetyandhealthmagazine.com/articles/26558-2025-state-of-safety?> 



*** My personal re-interpretation of results! ***

"What are the 10 biggest challenges the OSH field needs to address in next 5-10 years?"

90.1% Safety culture
80.2% Worker complacency
68.8% Worker engagement in safety & health
57.9% Safety Leadership

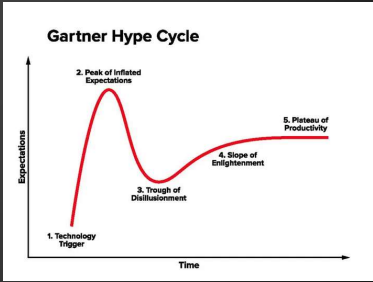
"Which technologies are you using to improve worker safety and health?"

Only ~0.9% of respondents reported using any of the listed technologies to improve worker safety and health — reinforcing that technology adoption in this area is still extremely low.

NSC 2025 Survey - <https://www.safetyandhealthmagazine.com/articles/26558-2025-state-of-safety?> 




Gartner Hype Cycle

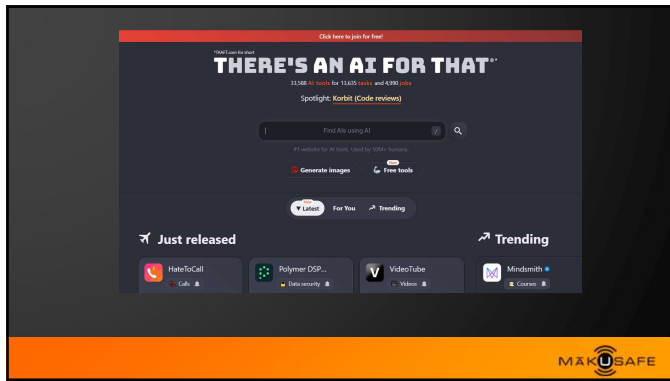


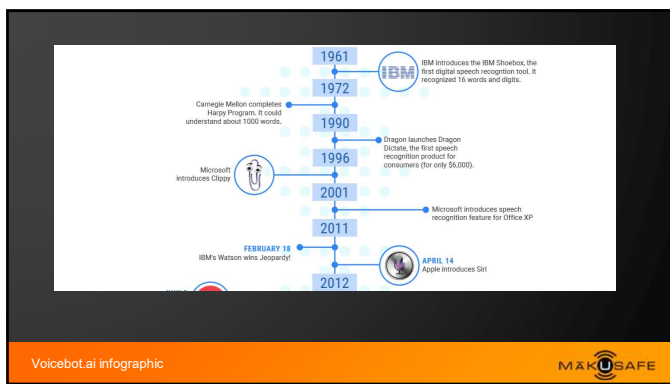
1. Technology Trigger
2. Peak of Inflated Expectations
3. Trough of Disillusionment
4. Slope of Enlightenment
5. Plateau of Productivity

Expectations

Time









Human and Organizational Performance (HOP) is a science-based approach to looking at mistakes so we can address them more effectively. It builds an understanding of how humans perform and how we can build systems that are more error tolerant.

HOP Definition 1



Human and organizational performance (HOP) is a risk focused OPERATING PHILOSOPHY which recognizes that to ERROR is human and that an organization's PROCESSES AND SYSTEMS greatly influence employee actions and choices, and consequently, their likelihood of success.

HOP Definition 2 – ORC/NSC



Key Principles of HOP:

1. People are fallible, and even the best make mistakes
2. Workers are masters at adaptive problem solving

Principles of HOP





Key Principles of HOP:

1. People are fallible, and even the best make mistakes
2. Workers are masters at adaptive problem solving
3. Context drives worker actions and behaviors
4. Leadership's response to failure matters
5. Blame Fixes Nothing
6. Improvement happens through learning

Principles of HOP



Safety? The absence of errors in outcomes, or presence of capacity and resilience in systems to ensure things go well?

Investigations? Only failures, or normal work?

Focus? Containing sources of energy, or engagement participation and learning?

People? The problem to be fixed, or masters adaptive problem solving and therefore the solution to be harnessed?

SHMS? Compliance and bureaucratic accountability upward, or ethical responsibility downward?

What's happening when nothing bad is happening?

Change the work, not the people.

Book Recommendation: Do Safety Differently - Conklin & Dekker (pub. 2022)











- **Reduction in Accidents**
Claim Frequency - Down 50%
Total Claims - Down 50%
Claims severity - Down 90%
ROI estimated at over 1000% +
- **Increased Transparency & Communication, Culture Building**
Increase in "Good Catches / Near-Misses" & reported observations from front lines.
- **Uncover Unknowns**
Harness data and sensor technology to discover insights previously unavailable.
- **Simplify EHS Documentation**
Immediately shows EHS value.
- **Safety & Health Management System**
Effectiveness, Efficiency & Productivity Impact

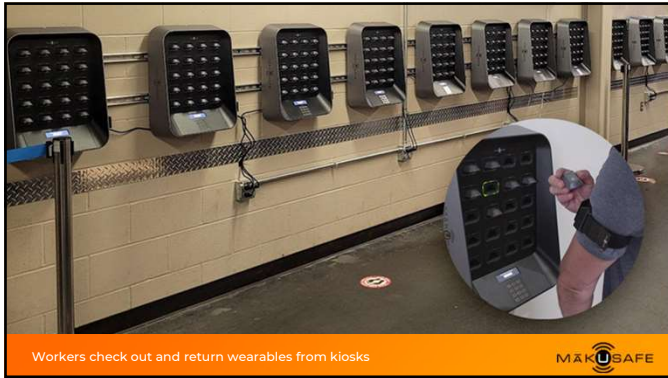


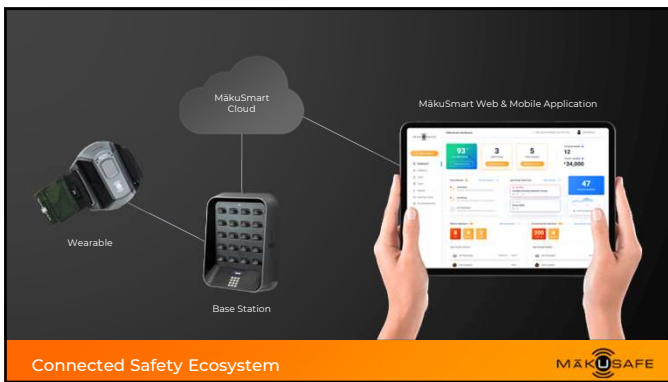
Benefits Realized!




Workers check out and return wearables from kiosks







The MakuSafe Ally™ gathers & transmits data in real-time to the MakuSmart Cloud.

Motion Detection

- Slips, Trips, and Falls
- Repetitive Motions
- Worker Physicality
- Forceful Exertion

Battery

- 22 Hour Battery
- Multiple Shifts

MyVoice™

- Audio Messaging
- Voice-to-text
- Push-to-talk

Spatial Awareness


- Location Identification
- Worker-to-worker Proximity
- Access Control & Factory 4.0
- Contact Tracing

Environmental Sensors


- Ambient Light
- Air Quality (TVOC & CO2)
- Noise / Sound Dosage
- Air Pressure
- Humidity
- Temperature

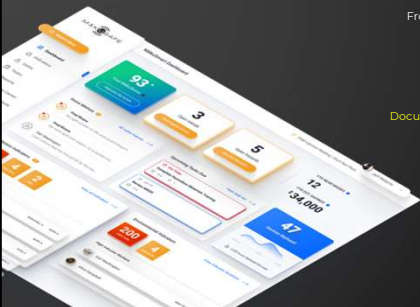
MākuSafe Does Not:

- Collect anything personal (No PII)
- Monitor any biometrics
- Deliver any negative feedback to the worker; haptic, visual, or auditory
- Assume the worker is the problem, or knows what to do to correct it
- Continuously track the individual



Respect For Worker Privacy





Frontline communication via Voice Memos

Real-Time Alerts


Location Conditions

AI-Driven Trends

AI-Driven Motion & Physicality Analysis


Document Incidents, Injuries, Tasks & Hazards


Reporting & Analytics




Support for Multiple Devices

MākuSmart Cloud Application





Environmentals - Heat & Noise Exposure, Air Quality, Light Levels





- Client Case Study
- Long standing construction client
- Deploying across numerous large data center projects
- Multi employer job sites
- ESG & Safety management program reporting to customer helps win projects
- Achieved and maintained 0.0% TRIR on sites where MakuSafe is being used
- 31 months

YOUR VIRTUAL SAFETY TEAM: MAKUSAFE + DATA CENTERS

WEITZ CASE STUDY

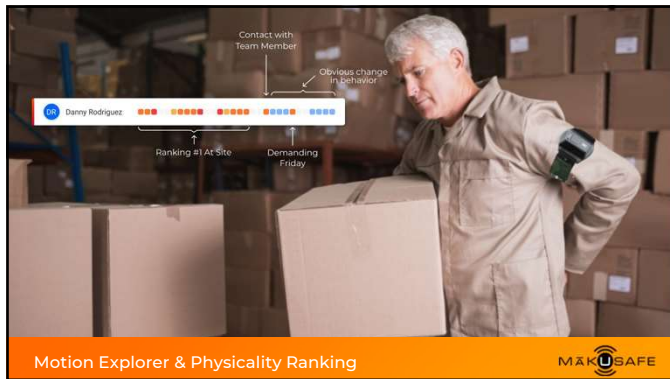
0.0 TRIR in the last 31 months for Millipore

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Visualize worker's expended effort and potential impact on them for the day

Motion Explorer

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- Client Case Study done through their insurer
- Trucking & transportation
- Reduced strain & exertion injuries by 56% in year one.
- They realized \$450,000 in WC savings per site



The graphic includes a QR code and the text 'CSB CASE STUDY' and 'LIFTING MECHANICS PROGRAM'. The MAKUSAFE logo is in the bottom right corner.

The screenshot shows a worker, Ian Lawrence, in a factory setting. An overlay displays a message from 'DEC 12, 2023 4:55 PM' with a play button and a progress bar. The message text reads: 'The electrical panel on the vacuum sealer is hanging open and there's exposed wires in there. I think maintenance needs to get down here and get that closed up before somebody shocks themselves'. Below the message are 'Archive' and 'Create Hazard' buttons. The MAKUSAFE logo is in the bottom right corner.

- Client Case Study done with NSC
- Nationwide Logistics Organization
- Reduced lost time injuries by 74% in year one
- Continuous stream of feedback from the front lines
- Positive cultural impact documented



NSC Case Study

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- Over 335 "good catches" (or near misses) were reported with 82% mitigated
- Reduced Workers Compensation costs by 60% from 2021-2023
- Fewer hours of lost time, fewer trip hazards, and a cleaner, more efficient work area
- Enhanced employee morale and engagement



National Council on Compensation Insurance (NCCI) Case Study

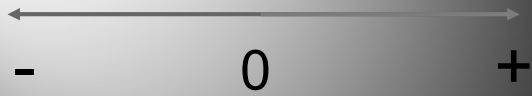
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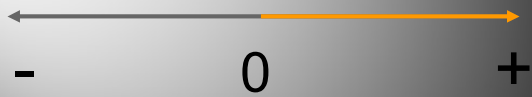
Front Line Conversations

Build Culture, Engagement, and Mindfulness

Shifting Safety Culture



Shifting Safety Culture



Stronger Cultures + Safety Mindfulness + Worker Engagement =
14X Safer Workplaces with 70% Incident Reduction
Higher Quality & Higher Productivity







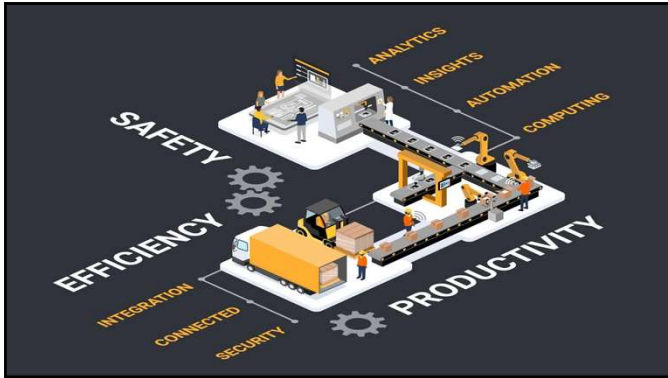
"MākuSafe has delivered a very practical, easy, and useful solution in Scout.

It has helped us reduce forklift-pedestrian interactions by 86% within six months, without sacrificing productivity of drivers or workers on foot.

We have been able to use actionable insights delivered by Scout to re-engineer work processes and eliminate risk!"

- Regional Logistics EHS Manager









Do you believe that tech / wearables can help you...

- better understand where risk exists?
- become more proactive & preventative?
- develop participation, engagement, and build culture?
- become more strategic?
- relate safety to the C-Suite and Production/Operations?
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- Temperature

Battery

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QUESTIONS?

A Sensor-Packed Data-Gathering Ally™

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A roadmap to understand, adopt, & use wearable safety tech!

Thank You!

MĀKUSAFE



OVERVIEW
FLYER



PRODUCT
SUMMARY



MANUFACTURING
USE CASES

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