



WISCONSIN  
SAFETY  
COUNCIL

## Data-Driven Safety: Wearable Tech and the Future of EHS Management

Wednesday, April 16, 2025  
11:15AM-12:15PM, Africa 80 Room

Tom West, SPHR, SHRM-SCP, COSS  
Vice President & Global Practice Leader  
MākuSafe

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MākuSafe - The Leader In Workforce Wearables



## #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.





**MĀKUSAFE**  
SMART. SAFE. MĀKUSAFE.



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

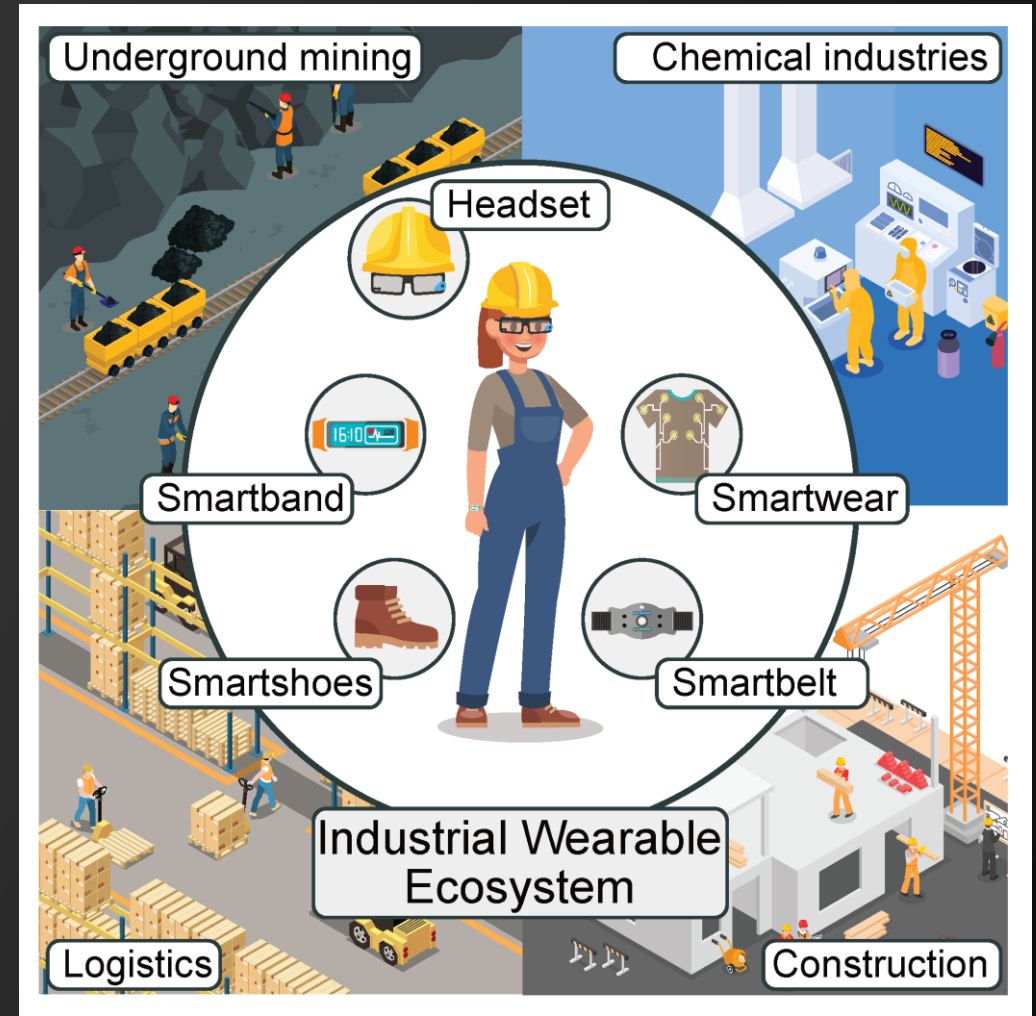
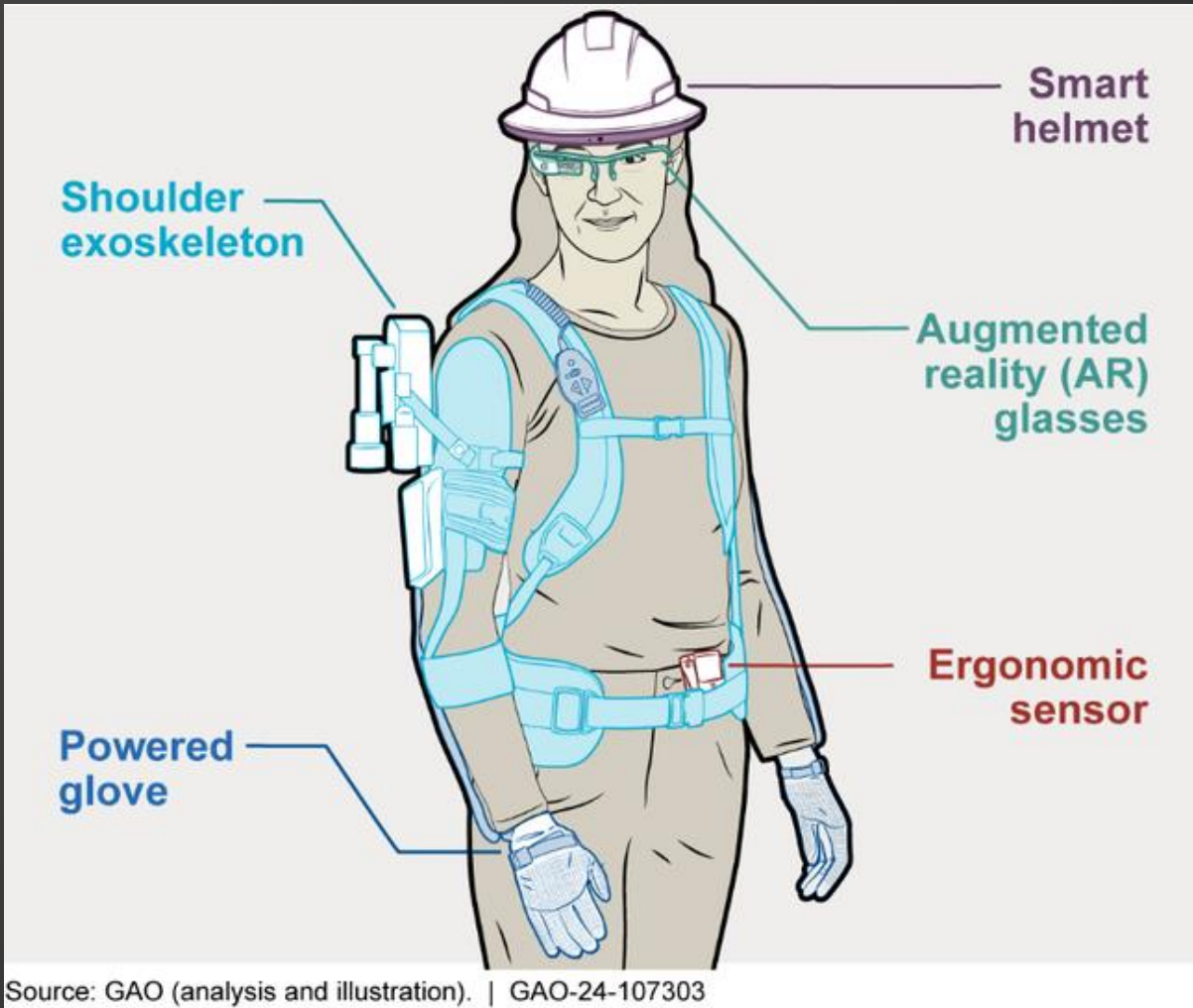
Reducing Incidents &  
Claims

And Improving Safety  
Culture!



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





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

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





MĀKUSAFE

SMART. SAFE. MĀKUSAFE.

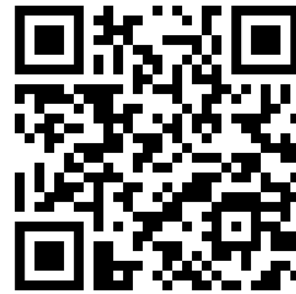


# Safety and Wearable Technology: Impact, Applications, and Implementation in Industry

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

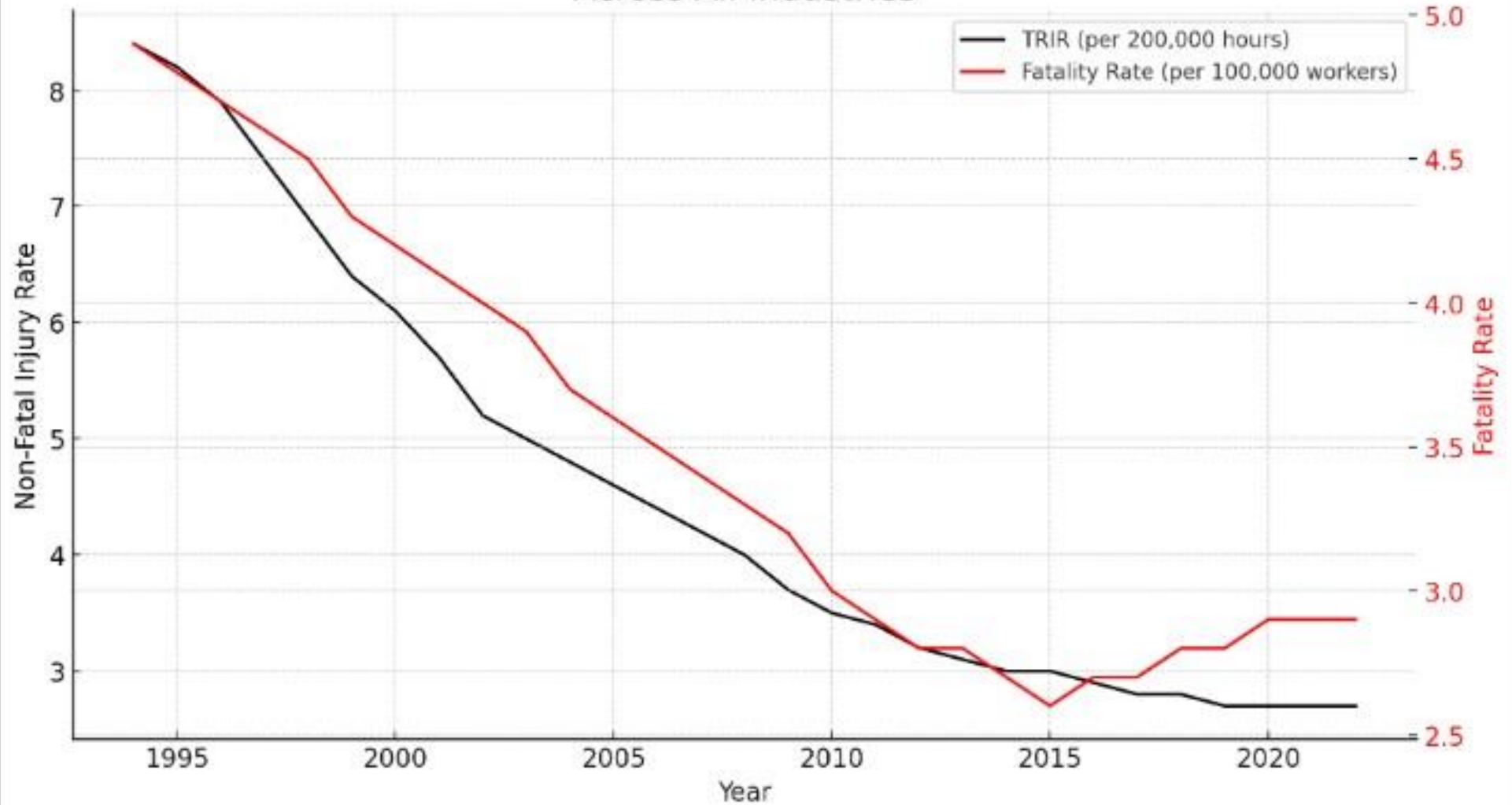


A roadmap to understand, adopt, & use wearable safety tech!



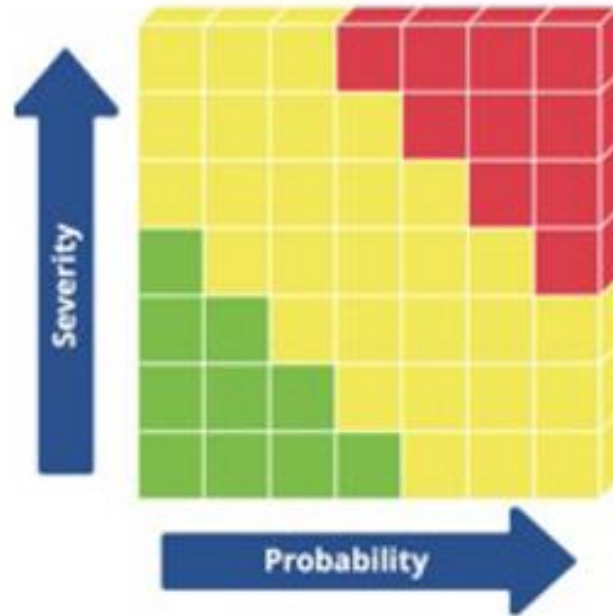


## The Serious Injury and Fatality Challenge Across All Industries

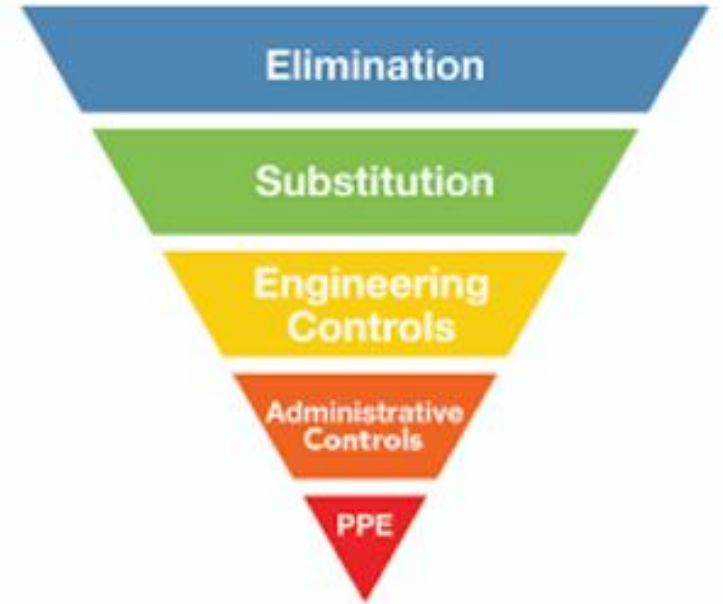




**Identify  
Hazards**



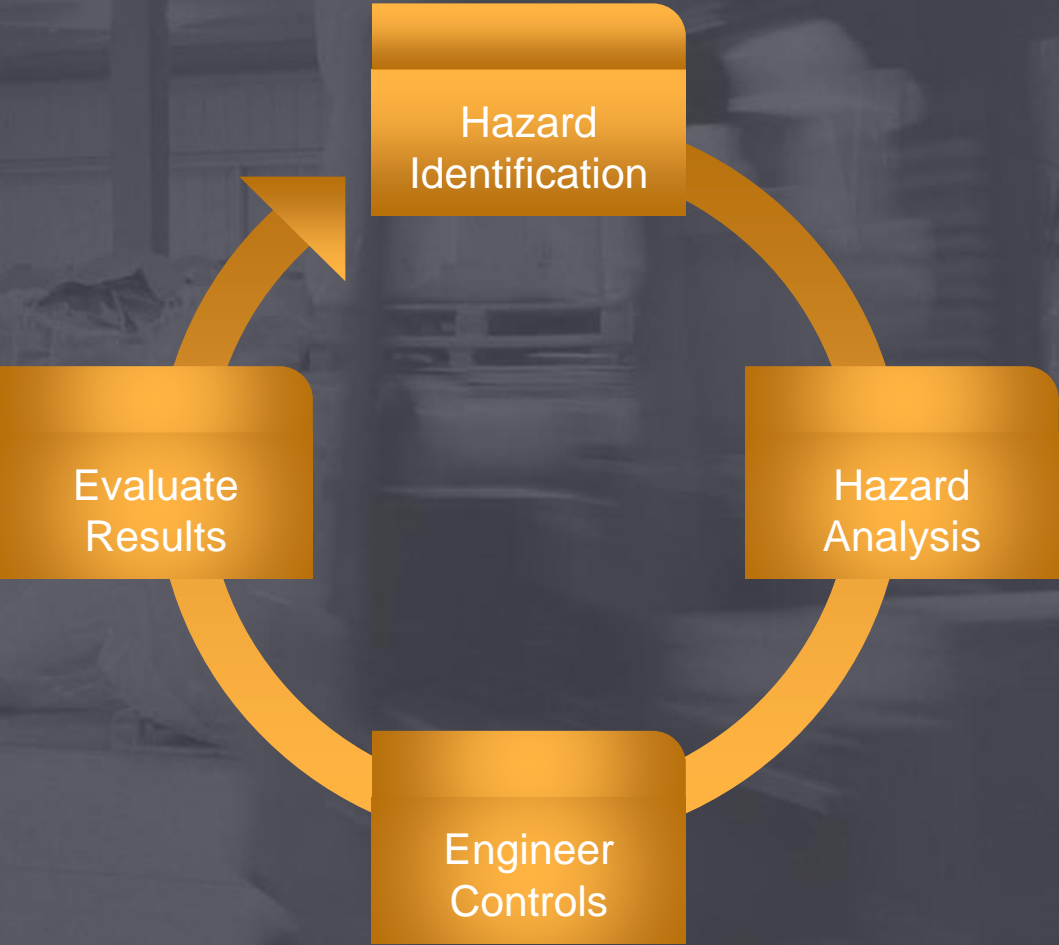
**Assess the  
Risk**



**Control the  
Hazard**



# Safety Management Process



People, Culture, Engagement, Mindset  
Learning, Humble Curiosity, Positive Recognition



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

**T – Timely**

**R – Relevant**

**U – Unique & Useful**

**E – Easy & Economical**

This facility  
has been  
accident  
free for  
1 hours





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

## 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%

Top 5 alone nearly \$31B

Those that likely had movement/motion leading indicators = 75.13%

\*\*\* 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.





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

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

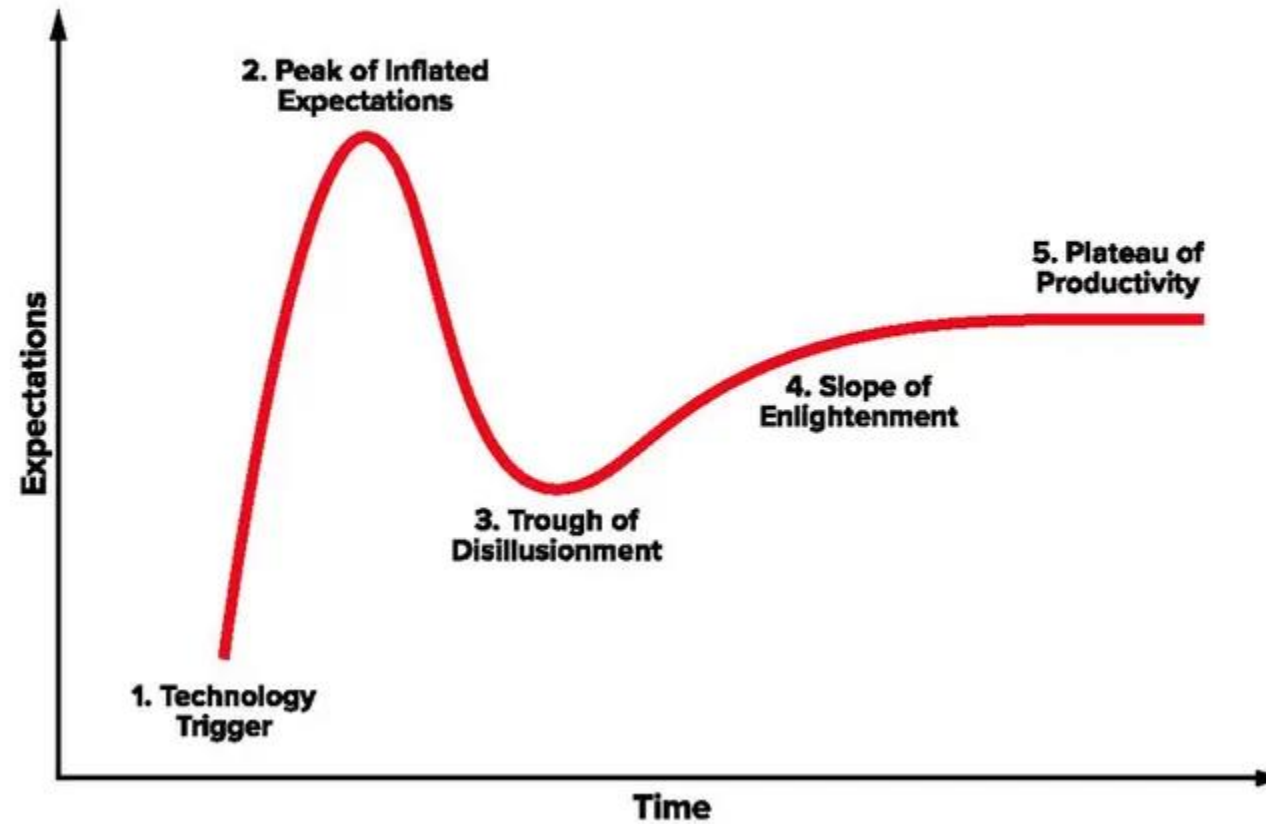
- 90.1% Safety culture
- 80.2% Worker complacency
- 68.8% Worker engagement in safety & health
- 57.9% Safety Leadership

“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.



# Gartner Hype Cycle




Click here to join for free!

\*TAAFT.com for short

# THERE'S AN AI FOR THAT<sup>®\*</sup>

33,588 AI tools for 13,635 tasks and 4,990 jobs

Spotlight: [Korbit \(Code reviews\)](#)

#1 website for AI tools. Used by 50M+ humans.

 **Generate images**

**New**  
 **Free tools**

**New**  
▼ **Latest**



For You

↗ **Trending**

## Just released





HateToCall

 **Calls** 



Polymer DSP...


 **Data security** 



VideoTube

 **Videos** 

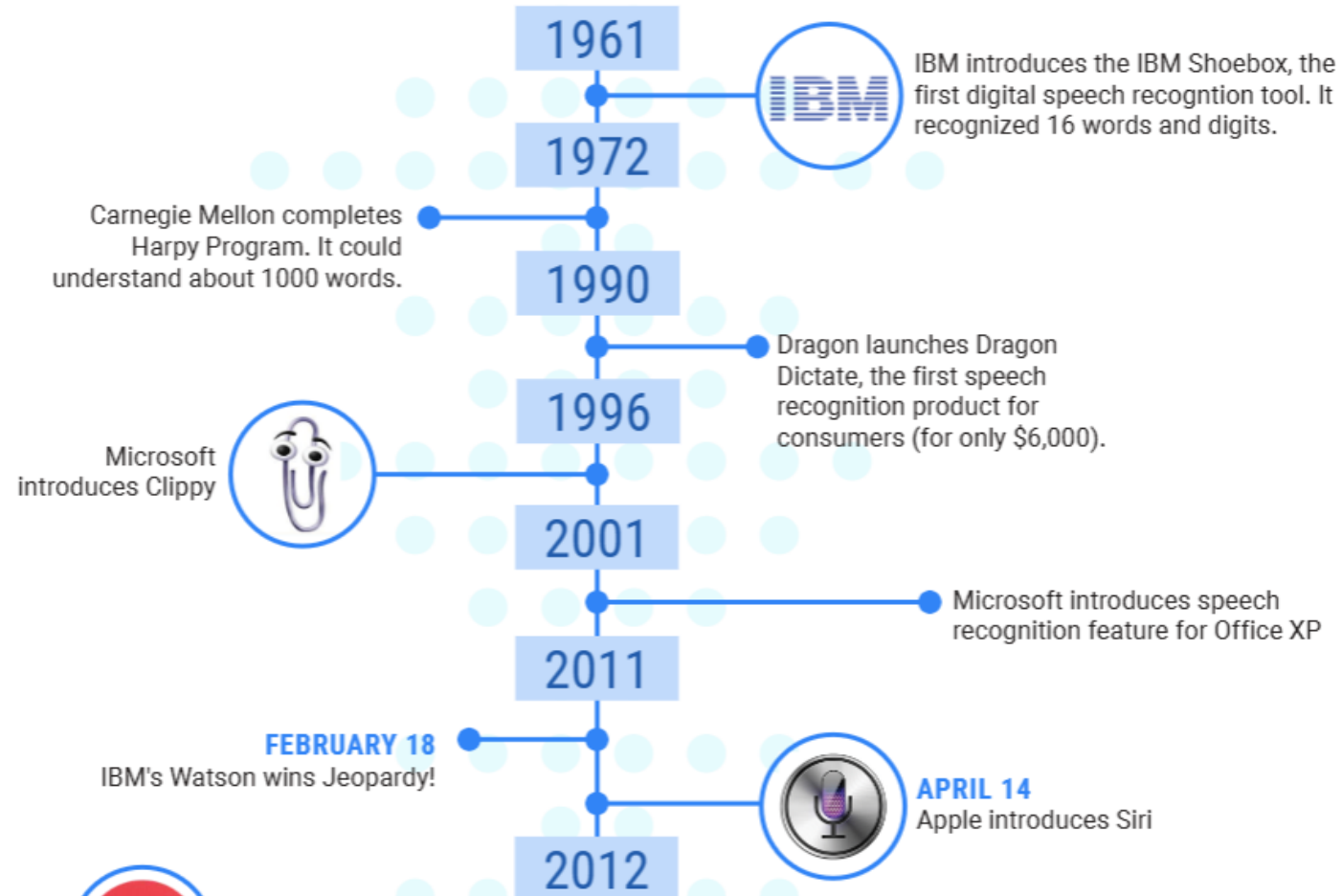


MindSmith 

 **Courses** 

## Trending





# New Thinking, Tools, and Approaches to Safety Management

It's time to evolve.

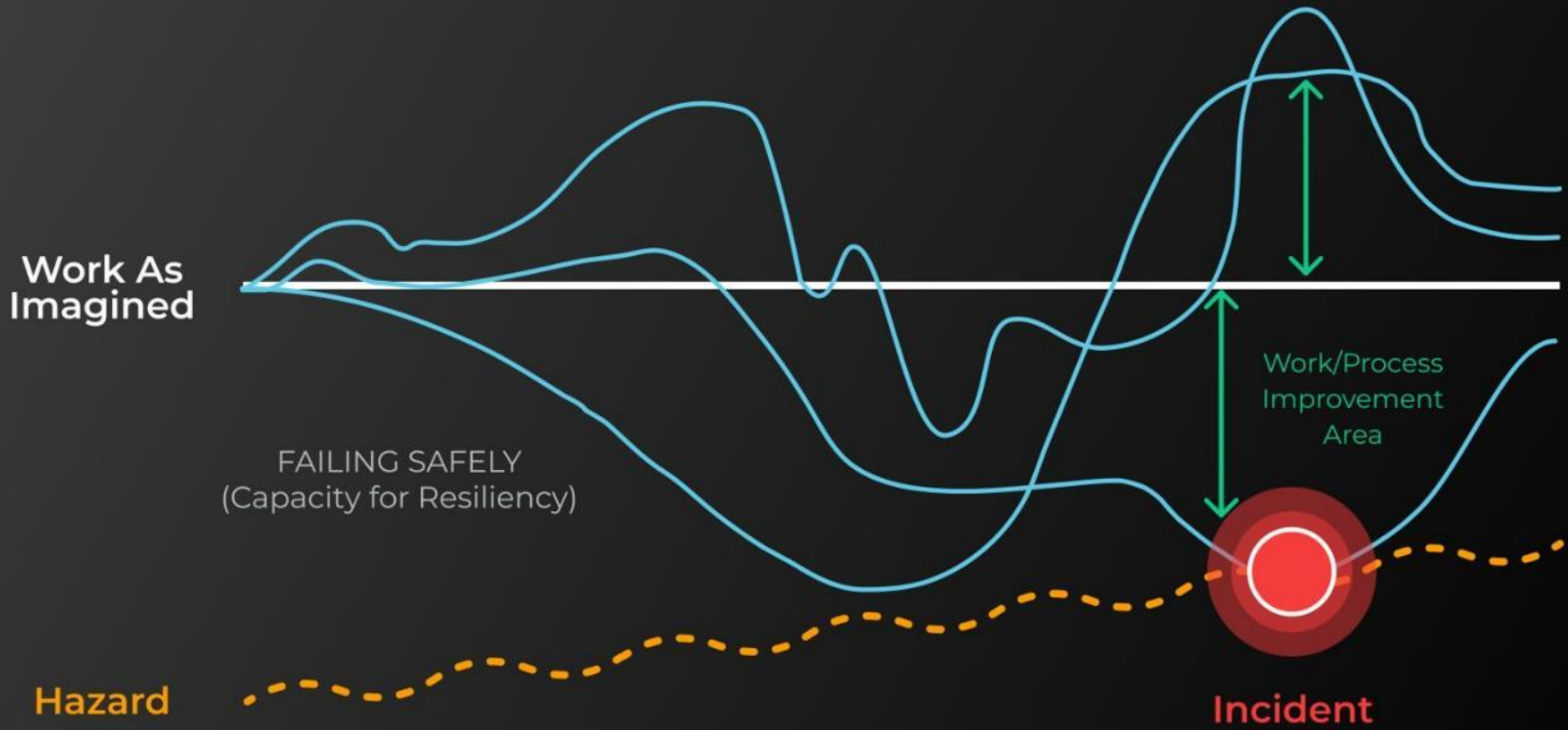
Human and Organizational Performance (HOP) is a science-based approach to looking at mistakes so we can address them more effectively. It builds an understanding of how humans perform and how we can build systems that are more error tolerant.



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.

# Key Principles of HOP:

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





# 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

**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.**



Wearables can be a powerful tool for identifying hazards and risk







**In every work environment there are**

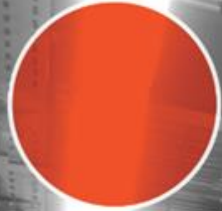
**clues...**





**...leading indicators & near-misses  
that we collect automatically,  
analyze and use...**





Light Levels

High Temp



High TVOC



High Sound dBA



Tripping

...to predict & prevent injuries & claims.

- 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





Workers check out and return wearables from kiosks

MākuSmart  
Cloud

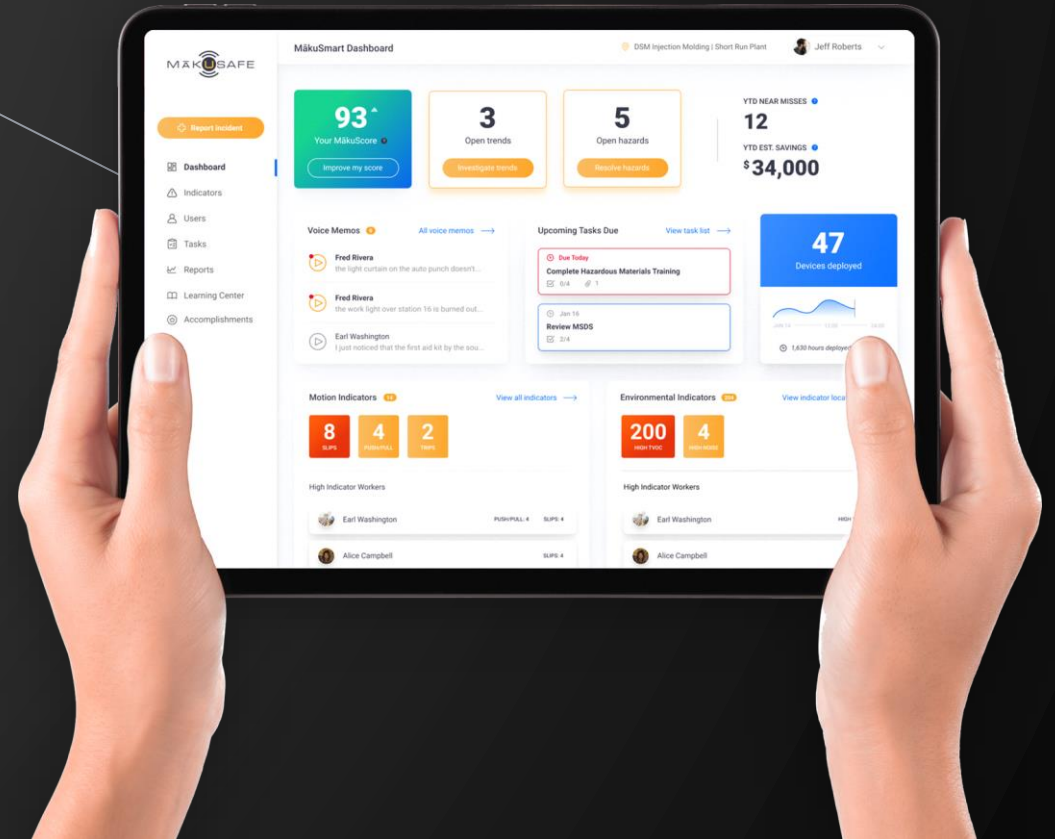
MākuSmart Web & Mobile Application



Wearable



Base Station







Connected Safety Ecosystem







The MākuSafe Ally™ gathers & transmits data in real-time to the MākuSmart 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 

A Sensor-Packed Data-Gathering Ally™



## 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





Frontline communication via Voice Memos

Real-Time Alerts

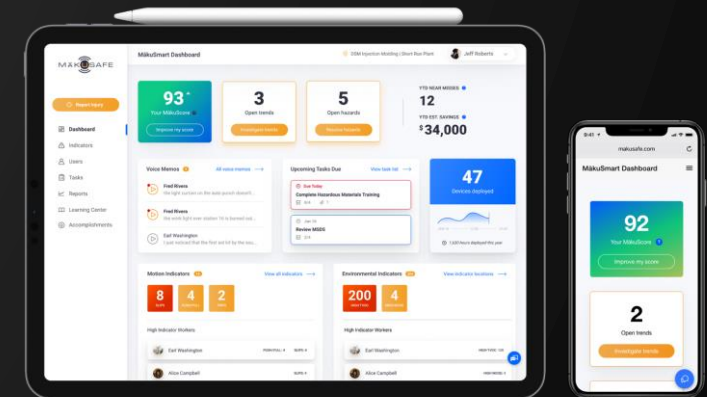
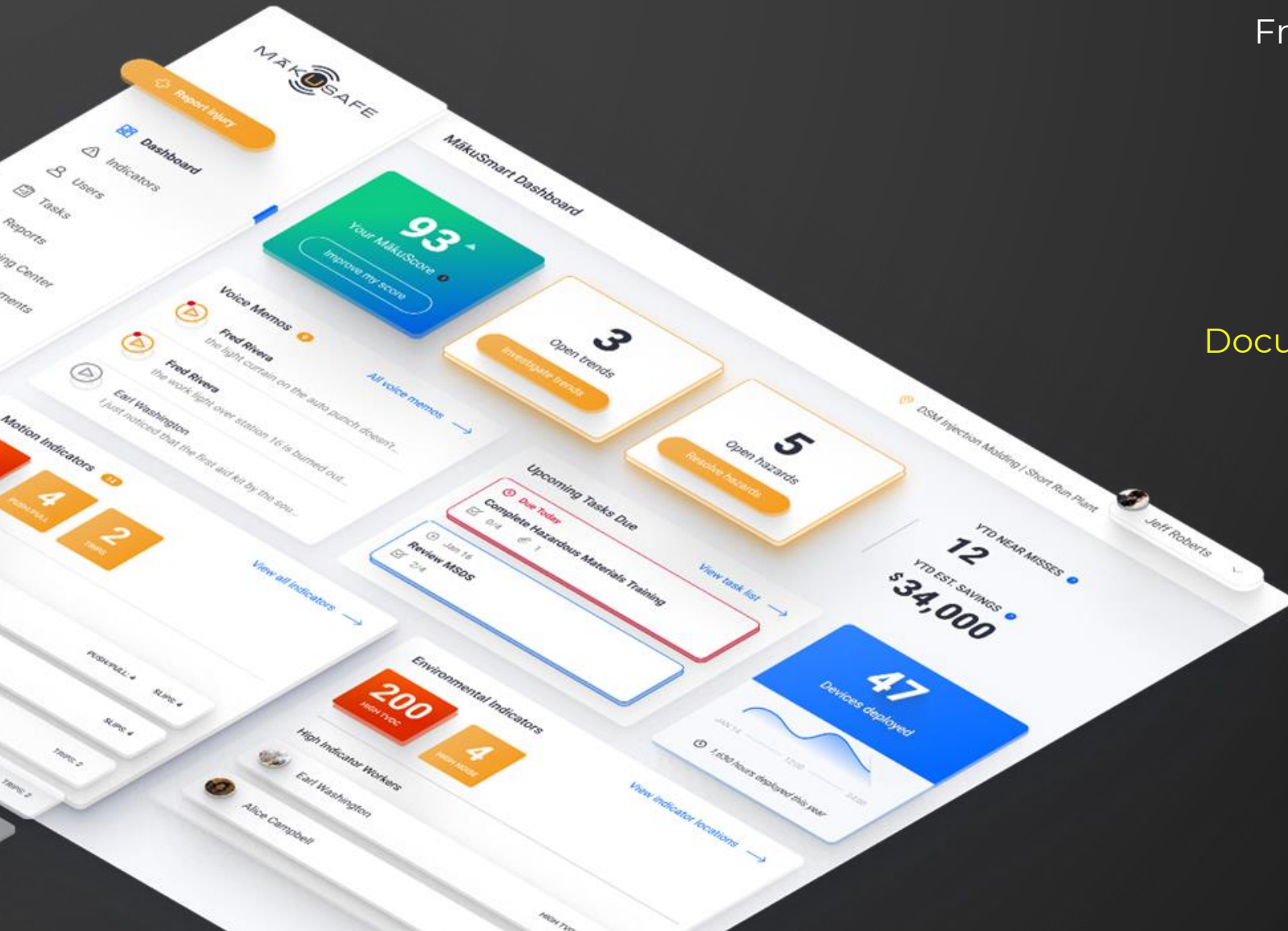
Location Conditions

AI-Driven Trends

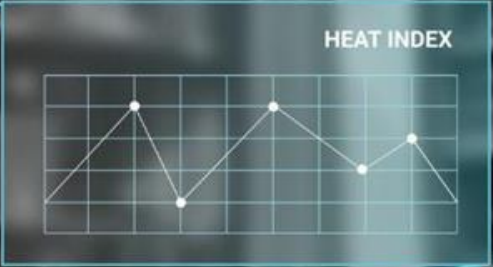
AI-Driven Motion & Physicality Analysis

Document Incidents, Injuries, Tasks & Hazards

Reporting & Analytics



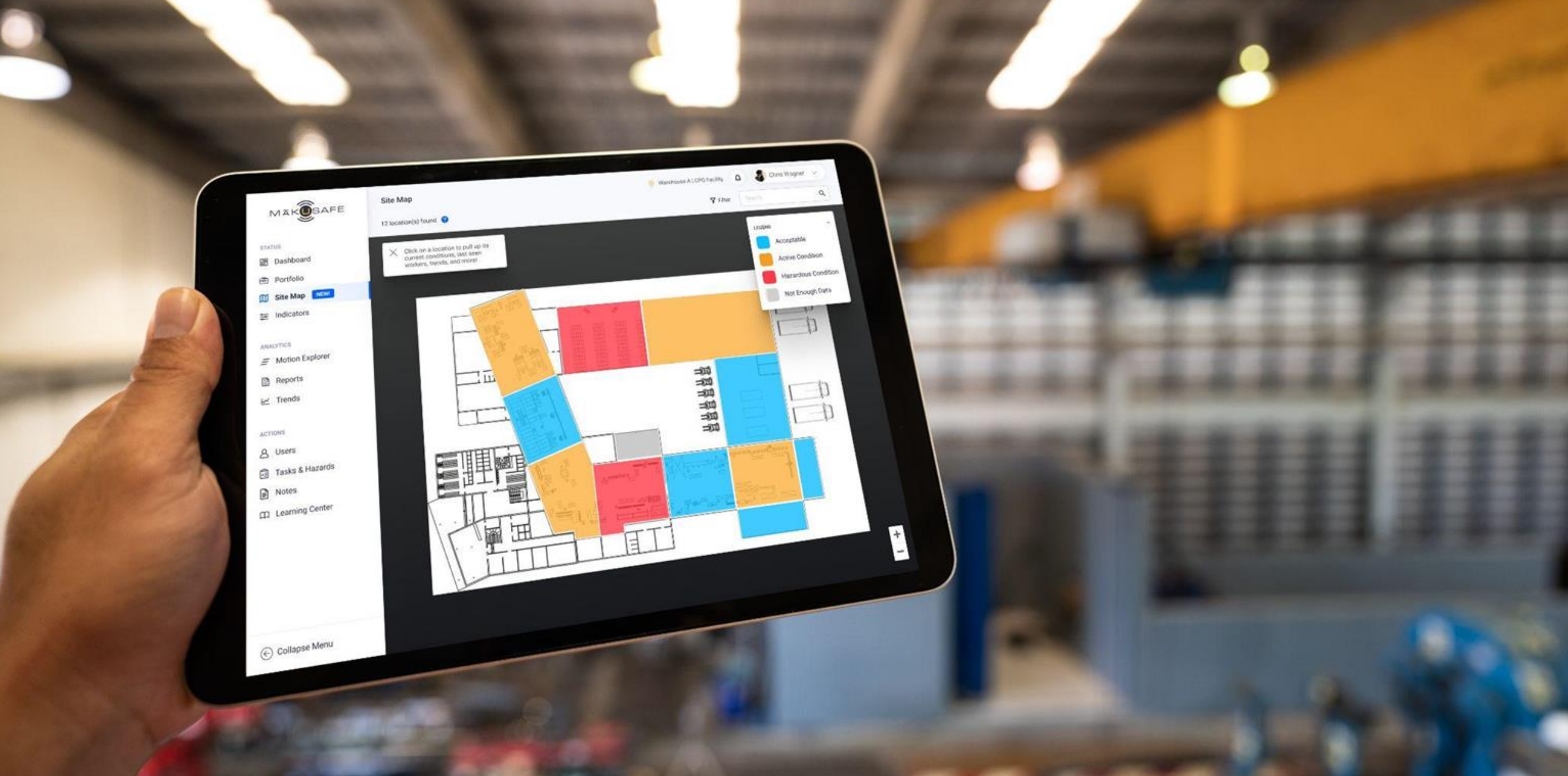
Support for Multiple Devices



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







Location Services & Environmental Hazards



- 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 MākuSafe is being used
- 31 months

**WEITZ**

## YOUR VIRTUAL SAFETY TEAM: MAKUSAFE + DATA CENTERS

LEADING WITH SAFETY IN MISSION CRITICAL

**CONTRIBUTORS**

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Project Executive  
Mission Critical  
LEED AP  
kasozenar@weitz.com

**GREG MARTIN**  
Vice President & General Manager  
Mission Critical  
LEED AP  
greg.martin@weitz.com

The Weitz Company has always put safety at the forefront of our projects. With Mission Critical and data centers becoming a bigger focus of our efforts, MakuSafe was a great way to implement new technology and help protect workers. MakuSafe is a data analytics company located in West Des Moines, Iowa. They specialize in equipping workers with wearable safety devices that record data to help safety managers predict and correct potential hazardous issues on the job site.

MakuSafe prides themselves as an award-winning safety, data & analytics solution aimed at improving worker health, safety, and productivity while reducing incidents and mitigating workplace hazards and risk exposures. This innovative wearable technology provides immediate access to real-time EHS data with predictive value.

**THE BENEFITS OF PREVENTATIVE TECHNOLOGY**  
The vast majority of near misses on the job site do not get reported. These small indicators can be huge signs of a potential hazard to come. When you can approach your job site from a proactive stance, you can begin to see a

0.0  
TRIR in the last 31+ months for Mission Critical

we teamed up with our trade...  
ing data looking for trends...  
ing to an injury report - we're...  
National...  
st for a slip...  
to costs a

these...  
ditions...  
mation.

**Wearable Anatomy**

LED  
Microphone  
PWC and CO<sub>2</sub>  
Heart Rate  
GPS  
Bluetooth

Visible Light & Ambient Light  
Temp  
Humidity  
Air Pressure  
Acceleration  
Battery

Abilities: GPS, CO<sub>2</sub>

Environmental Conditions | Physical Status | Location | Video Recorded Activity

**WEITZ CASE STUDY**

1



Last 30 Days | Last 7 Days | Yesterday

Filter

RANK	USER	PHYSICALITY	WORK ROLE	LAST 30 DAYS
1	JR Jaime Rodriguez	CRITICAL	Packer	
2	RB Robert Brown	VERY HIGH	Packer	
3	GJ Gracie Jones	VERY HIGH	Loader	
4	AR Alejandro Riviera	HIGH	Welder	
5	JM Jose Martinez	HIGH	Welder	
6	JR Jaime Rodriguez	HIGH	Packer	
7	RB Robert Brown	CAUTION	Packer	
8	GJ Gracie Jones	CAUTION	Loader	
9	AR Alejandro Riviera	CAUTION	Welder	
10	JM Jose Martinez	ACCEPTABLE	Welder	

MacBook Pro

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



- 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

**CSB**  
CONSTRUCTION  
SAFETY

## CASE STUDY

### WEARABLE TECHNOLOGY AS A SOLUTION FOR WORKPLACE SAFETY

As a founding member of BuildBack Better 2025, CSB remains a leader in identifying innovative and impactful strategies to bring cutting-edge solutions to the insurance industry. CSB strongly recommends MakU Safe, a B2B distributor partner, as a prime technology partner for this pilot. CSB strongly continues to explore wearable technologies with established and emerging companies and will recommend the best fit for our clients.

**THE SCENARIO**

A leading third-party logistics provider (CSB) that is using, pushing, and pulling product cases among their top facilities, but wanted more and better information on the other hazards their employees faced, and where they were most prevalent.

The company collaborated with the CSB Strong & Building Red Cross team to address this challenge through a multi-step strategy, including implementing a strong and proven, 5Rg risk reduction program, and piloting wearable technology to monitor other hazards, such as slips/trips/falls, repetitive motion, heat/cold, and noise. The company then used the data from the wearable technology to inform where they needed to further enhance employee safety initiatives and correct them where necessary. The program was very well received, as it was implemented with maximum transparency and an open and consultative vendor approach.

**CONSTRUCTION & BUILDER**

**MAKUSAFE**  
1 Superior  
Columbus, OH

**A LIFTING MECHANICS PROGRAM... TECHNOLOGY, THIS COMPANY... \$450K IN 2022.**

**CSB CASE STUDY**



IL Ian Lawrence

DEC 12, 2023 4:55 PM

▶ 0:00 / 0:06 🔊

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

Archive

Create Hazard

- 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

**WORKtoZERO** Safety Technology Case Study

---

### Data Analytics and Wearables

**What's the Risk?**  
According to the [National Safety Council](#), musculoskeletal disorders (MSDs) are the most common workplace injury, affecting nearly one quarter of the global population. They often result from workplace tasks that involve actions like repetitive movements, awkward or static postures, and forceful exertions. Examples of MSDs include:

- Strains and Sprains
- Muscle Rupture
- Tendinitis
- Carpal Tunnel Syndrome
- Herniated Discs
- Hernia

To reduce injuries and better understand the leading indicators of MSDs, NFI Industries began piloting the MakuSafe system, which combines wearable technology with data analytics to deduce the intensity of a worker's effort expended, arrive at conclusions about the level of potential impact on them for each day, and provide other data-driven insights (e.g. movement type, incident time, and location).

**Impacts**  
NFI is currently piloting 120 MakuSafe wearables across three locations, primarily focused on workers performing material-handling tasks (e.g. loading and unloading). Data insights provided by MakuSafe, combined with customized lifting training and behavior-based safety tactics, have allowed safety leaders to **successfully offer support and coaching** to at-risk employees. In fact, quarterly injury results found a **74% reduction in injuries** at the pilot sites.

**Employer**



**NFI**  
Based in Camden, New Jersey, NFI is a third-party logistics provider that offers domestic and international supply chain solutions. NFI employs an estimated 16,000 associates nationwide.

**Technology**



**MakuSafe**  
Based in Des Moines, Iowa, MakuSafe is a Safety, Data & Analytics solutions. The MakuSafe system combines a safety management software platform with wearable technology, providing real-time EHS data with predictive value.








**WORK TO ZERO  
NSC CASE STUDY**

- 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







## Front Line Conversations

**Build Culture, Engagement, and Mindfulness**

# Shifting Safety Culture



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+

# Shifting Safety Culture



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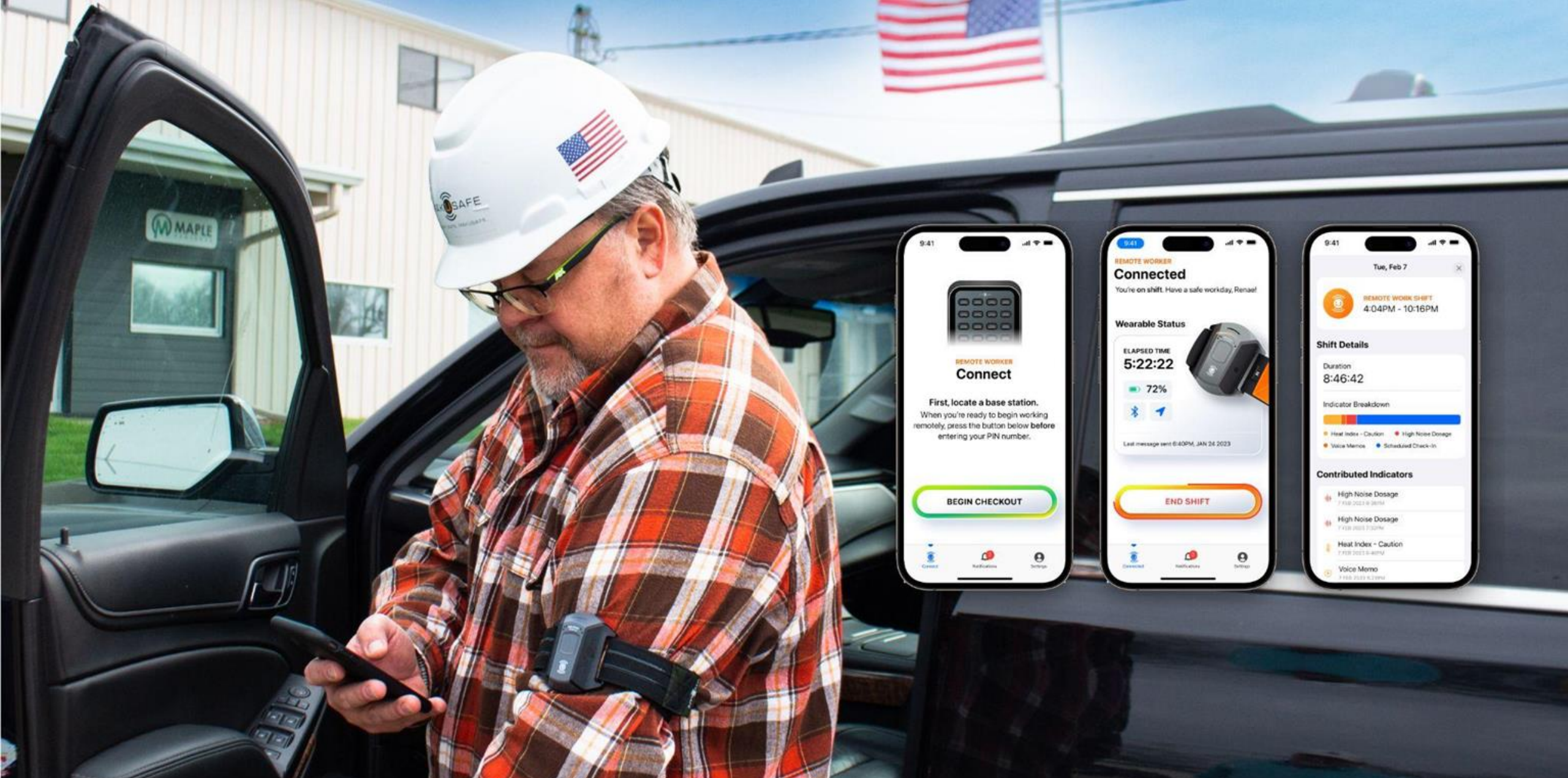
+

Stronger Cultures + Safety Mindfulness + Worker Engagement =

**14X Safer Workplaces with 70% Incident Reduction**

**Higher Quality & Higher Productivity**





Remote Worker





# MākuSafe RāngeView

Worker Proximity  
Contact Tracing  
Connected Workforce





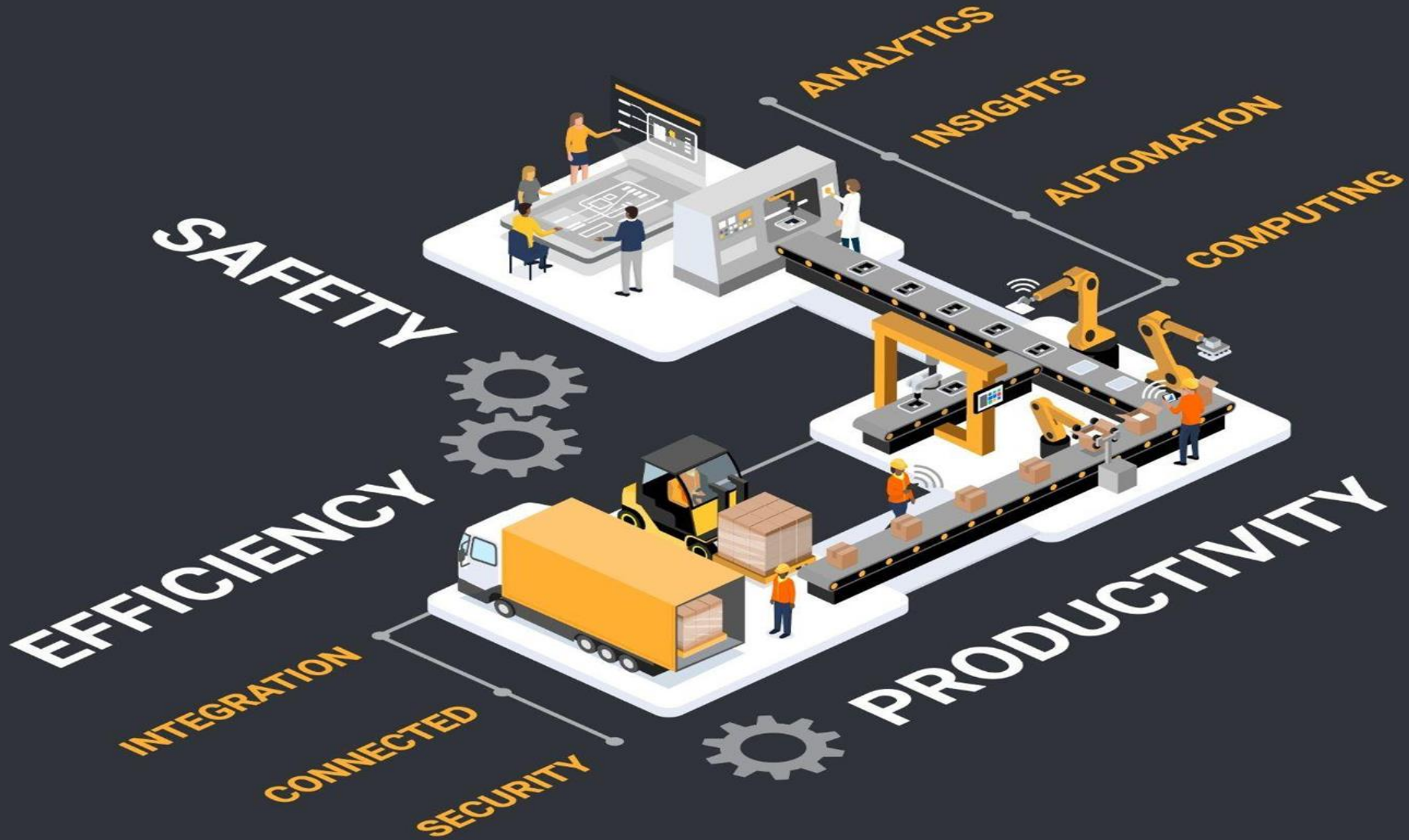
SCOUT™ real-time alerting  
with exposure data capture for  
predictive risk analytics



Forklift Safety With SCOUT™







**DANGER**

**BE CAREFUL  
WHEN BELT  
IS IN MOTION.**





# MAKUSAFE





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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The Ally™ gathers & transmits data in real-time to the MākuSmart 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 
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# QUESTIONS?

A Sensor-Packed Data-Gathering Ally™



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— Tom West



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





Thank you!



**OVERVIEW  
FLYER**



**PRODUCT  
SUMMARY**



**MANUFACTURING  
USE CASES**

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**Tom West**

Vice President & Global Practice  
Leader at MākuSafe, ...

