Technology and Risk Reduction

March 2025

Berkshire Hathaway HOMESTATE COMPANIES
Workers Compensation Division ™

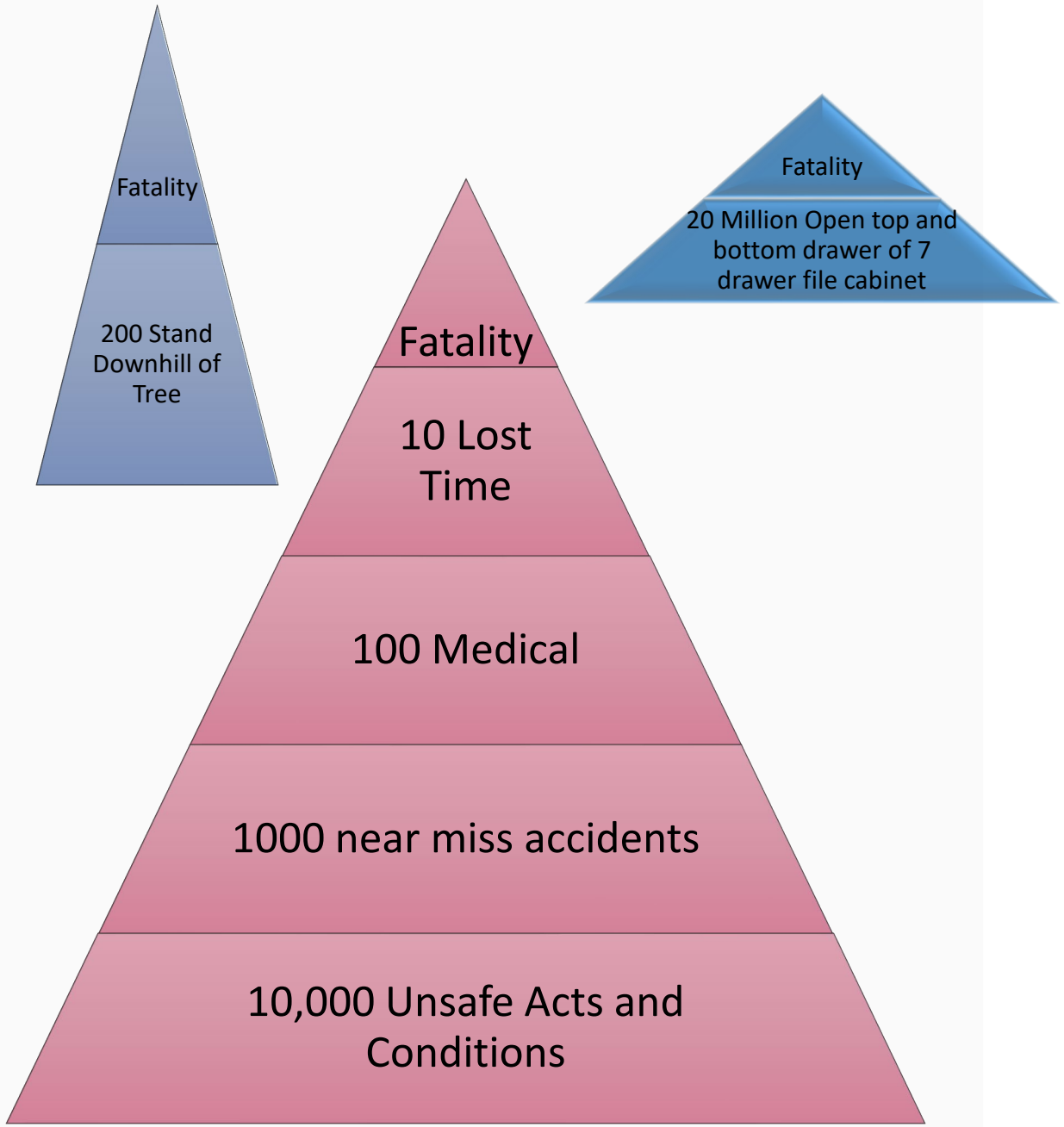
AGENDA

- Fundamentals of Safety & Risk
- Defining Safety Technology
- Importance of Technology in Ensuring Safety
- Potential Risks and Challenges in Technology and Safety
- Promising Technologies Enhancing Safety

Fundamentals of Safety

- Documenting Safety efforts is critical to allow for trend analysis and to document compliance efforts
- Formal Safety Responsibilities with accountability are critical in any safety effort
- Executive Management must be committed to preventing accidents and to the well being of employees

Systems Approach	Human Factors	Near-Miss Reporting	Safety Culture	Leading Indicators
Complex interactions among multiple factors	Factors such as fatigue, stress, workload, distractions, and cognitive biases	Potential hazards and risks can be identified and mitigated before they lead to accidents and injuries.	Empower employees to make safety-related decisions, and provide adequate training and resources	Leading indicators, such as safety training, risk assessments, safety audits, and proactive safety initiatives



The Accident Triangle

- Original research by Henrich of Travelers Insurance Company in 1930's
- Concept that for every major or fatal accident, there were a certain number of minor accidents or near-misses, and an even greater number of unsafe acts and unsafe conditions that could have resulted in an accident
- The narrower the base the more likely a serious accident will occur
- *To reduce risk of accidents, reduce the unsafe acts and conditions that allow them to occur*

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Safety Effort Cost of Entry

Hazard Recognition & Control

- Inspections to identify and then control unsafe conditions
- Observations to identify and then control unsafe behaviors
- Audits to identify if programs and procedures need to be adjusted

Accident and Incident Investigation

- Learning from accidents and near missed
- Identification of Accident Causes
  - Direct Accident Causes
  - Indirect Accident Causes
- Reducing risk of recurrence
- Trend analysis

Education & Training

- Educate – Provide employees with the knowledge they need to do the job safely
- Train – Provide employees with the training needed to develop the skills that they need to do the job safely

Emerging Safety Technologies

- Wearable Technologies
  - Smart Helmets
  - Wearable Sensors
- Smart Cameras & Drones
  - Geofencing
  - Inspection & Surveillance
- Artificial Intelligence & Machine Learning
  - Predictive Analytics
  - Risk Assessment Tools
- Robotics & Automation
  - Collaborative Robots
  - Exoskeletons
  - Automated Safety Systems
- Virtual Reality & Augmented Reality
  - Training Simulations
  - AR for Onsite Guidance
- Remote Monitoring & the Internet of Things (IOT)
  - Connected Devices
  - Safety Management Platforms
- Mobile Applications
  - Safety Reporting Tools
  - Inspection Tools
  - Health Monitoring
- Data Analytics & Big Data
  - Incident Analysis
  - Behavioral Safety Programs
- AI in Assessing
  - Ergo Assessments
  - Machine Guarding
  - Cloud Dispersion

Benefits of Emerging Technologies

Hazard detection and monitoring:	• Sensors and wearable devices can detect hazardous conditions in real-time, alerting workers to potential risks like excessive noise, hazardous chemicals, or unsafe postures, allowing for immediate corrective action.
Data analytics and predictive modeling:	• By analyzing large datasets of workplace incidents and safety data, AI algorithms can identify patterns and predict high-risk situations, enabling preventative measures to be taken before accidents happen.
Virtual reality training:	• VR simulations provide realistic training scenarios for workers to practice safety procedures in a controlled environment, improving their preparedness for potential hazards.
Remote monitoring:	• Cameras and other monitoring systems can be used to observe high-risk work areas remotely, allowing supervisors to identify safety concerns and intervene promptly.
Ergonomics analysis:	• Advanced software can analyze worker movements and postures to identify ergonomic risks, preventing musculoskeletal disorders.
Automated systems:	• Robotics and automation can replace workers in dangerous tasks, reducing exposure to hazards like heavy lifting or working in hazardous environments.
Improved communication and reporting:	• Digital platforms can streamline incident reporting, allowing for faster response times and better analysis of safety issues.

Technology Solutions are focused on specific needs

Safety Management Solutions

Safety Management Platforms

- Suites of Tools to address multiple needs
- Process Safety Level Platforms to Inspection Only Platforms
- Accident Investigation
- AI Assistants in some platforms
- Integrated with Wearables in some platforms

Our enterprise-wide, fully integrated health and safety software platform reduces the likelihood of incidents and operational losses. Advanced software provides digitized workflows to capture, track, investigate, report and analyze health and safety information.

Actions Software
Manage risk with company-wide action tracking, reporting and remediation.
Learn more →

Analytics Software
Use real-time data get insights on performance and improve decision-making.
Learn more →

Audits Software
Centralize, plan and automate audits and inspections with customized workflows.
Learn more →

Behavior-Based Safety Software
Capture immediate and detailed observations to reduce potential risk.
Learn more →

Contractor Safety Software
Mitigate third-party risks across contractors and the supply chain.
Learn more →

Data Collection Software
Simplify safety data collection and monitoring across your organization.
Learn more →

Incident Management Software
Optimize safety performance with end-to-end incident management.
Learn more →

Management of Change Software
Effectively manage and mitigate risks to optimize your change process.
Learn more →

Document Management Software
Secure, control and standardize the management of your documents.
Learn more →

Risk Assessment Software
Assess and mitigate health and safety risks in one central application.
Learn more →

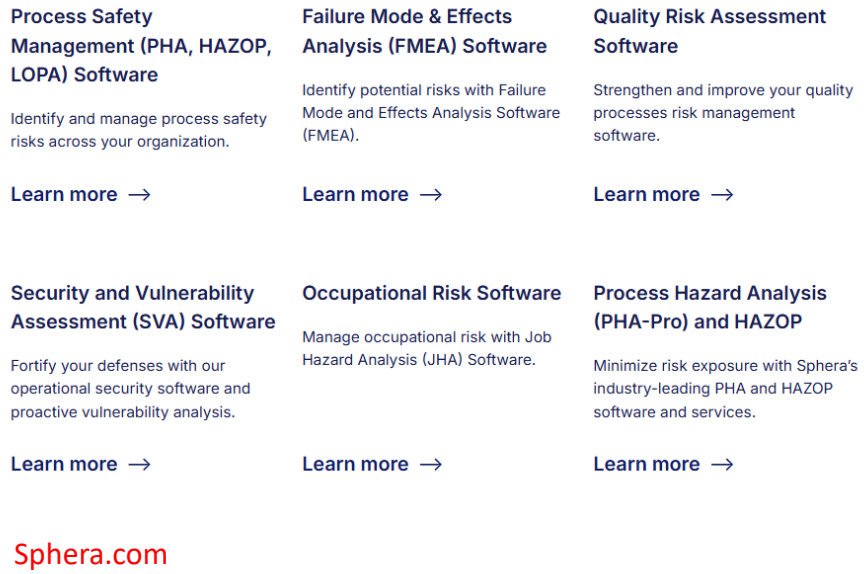
Training Management Software
Easily monitor and manage training needs across your organization.
Learn more →

Sphera.com

Risk Assessment & Management Solutions

Risk Management Platforms

- Risk assessment focuses on assessment frequency, likelihood and severity of associated operations
- Higher end assessment tools can enable a more in-depth understanding
- Automated traditional risk assessment tools FMEA, HAZOP, SVA, Process Safety



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Safety Management Platforms

Managing & reporting incidents

Detailed incident recording process with comprehensive root cause analysis.

Task management

Task management system with notifications and alerts.

Document management

Documents in one place to maintain consistency and easily track the document life cycle and audit trails.

Inspections and audits

Inspections and audits with efficiency, transparency and visibility.

Training and certification

Training materials that can be planned and managed within a central platform.

Mobile access

Employee participation and visibility of incidents with a mobile app

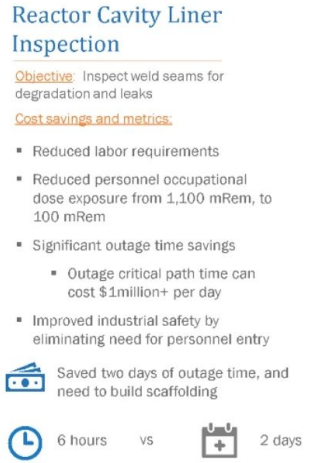
Remote Monitoring

Drones

- Roof Inspections
- Pre-Climb Tree evaluations
- Indoor inspection of elevated equipment and areas
- Entering and inspecting areas after an accident when too dangerous to enter
  - Confined Spaces
  - Post Accident

OSHA uses drone for inspection (OSHA)

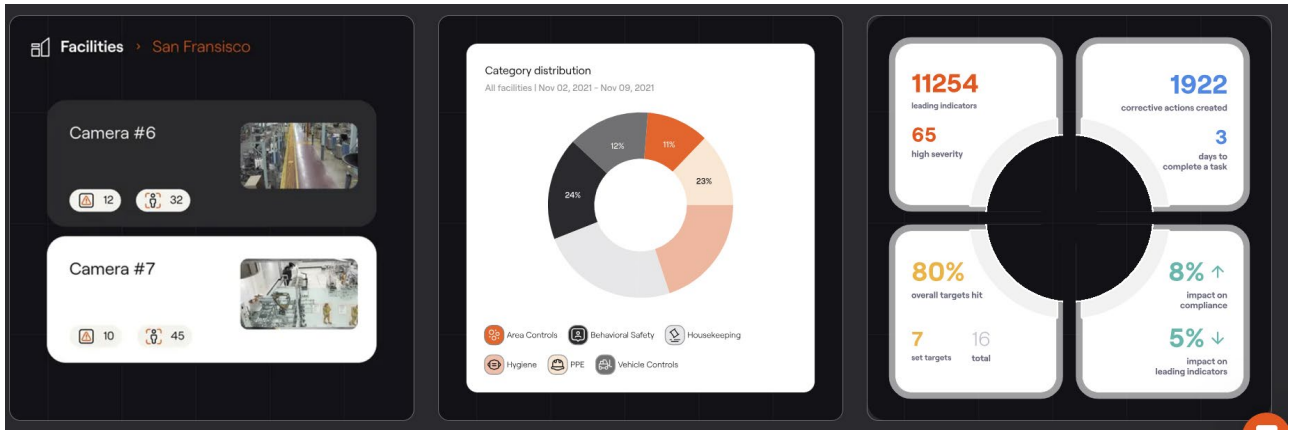
NRC uses drones for reactor inspection



Remote Monitoring

Smart Cameras

- Hazard Recognition
  - Unsafe Behaviors
  - Unsafe Conditions
- Dashcams for Vehicle Safety
- Geofencing



Intenseye.com

Samsara Dashcam

Litum.com

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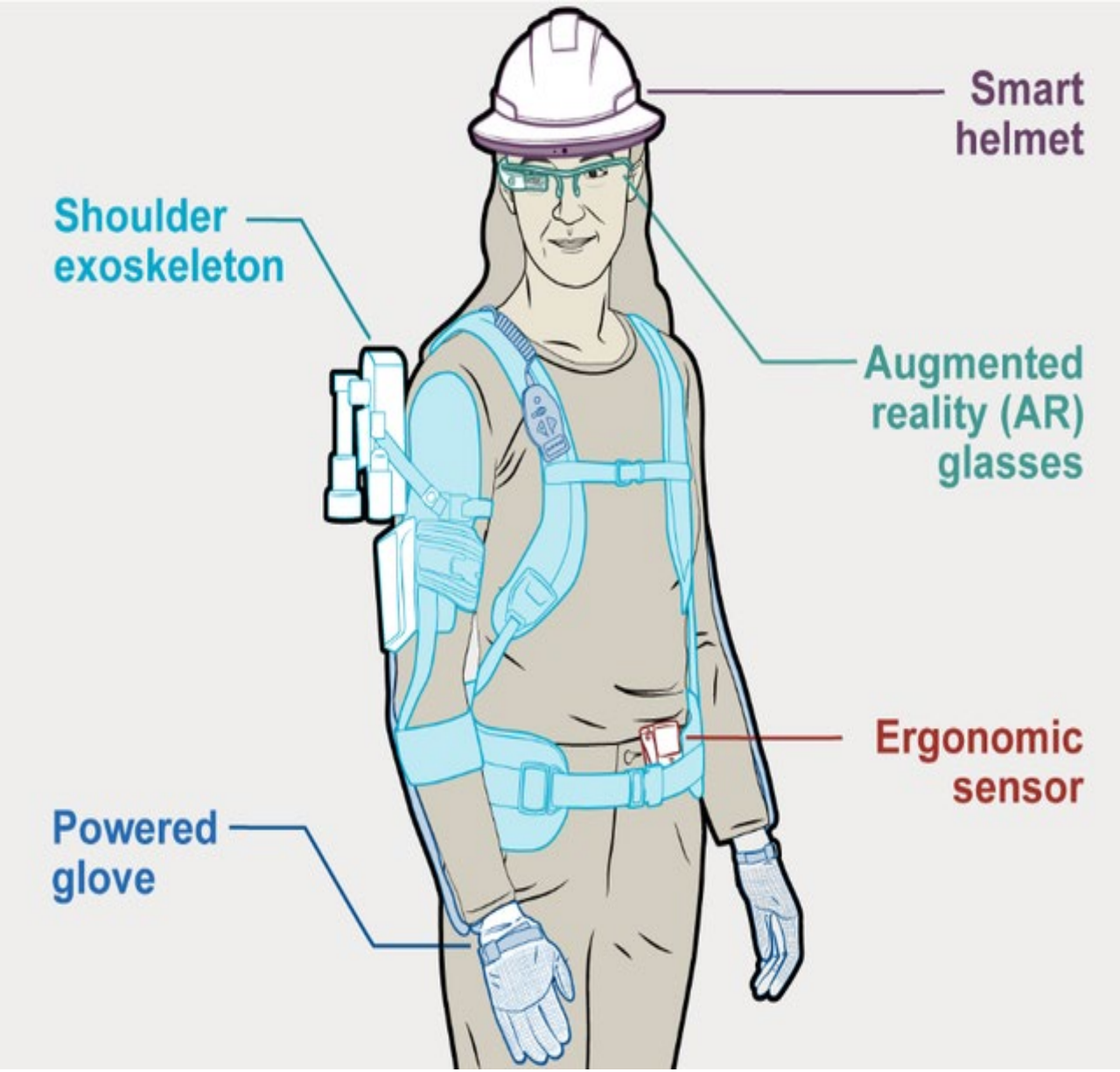
Remote Monitoring

Wearable Technology

- Belt or Arm Wearable Devices
  - GPS Navigation and Location
  - Health Monitoring and mobile app integration
  - Heptadic Feedback and Dashboards
  - Ergonomics and Fall Prevention
  - Environmental Monitoring
- Smart Helmets
  - Safety Features
  - Communications
  - HUD with Cameras
  - GPS Navigation and Location
  - Health Monitoring and mobile app integration
- Smart Phones

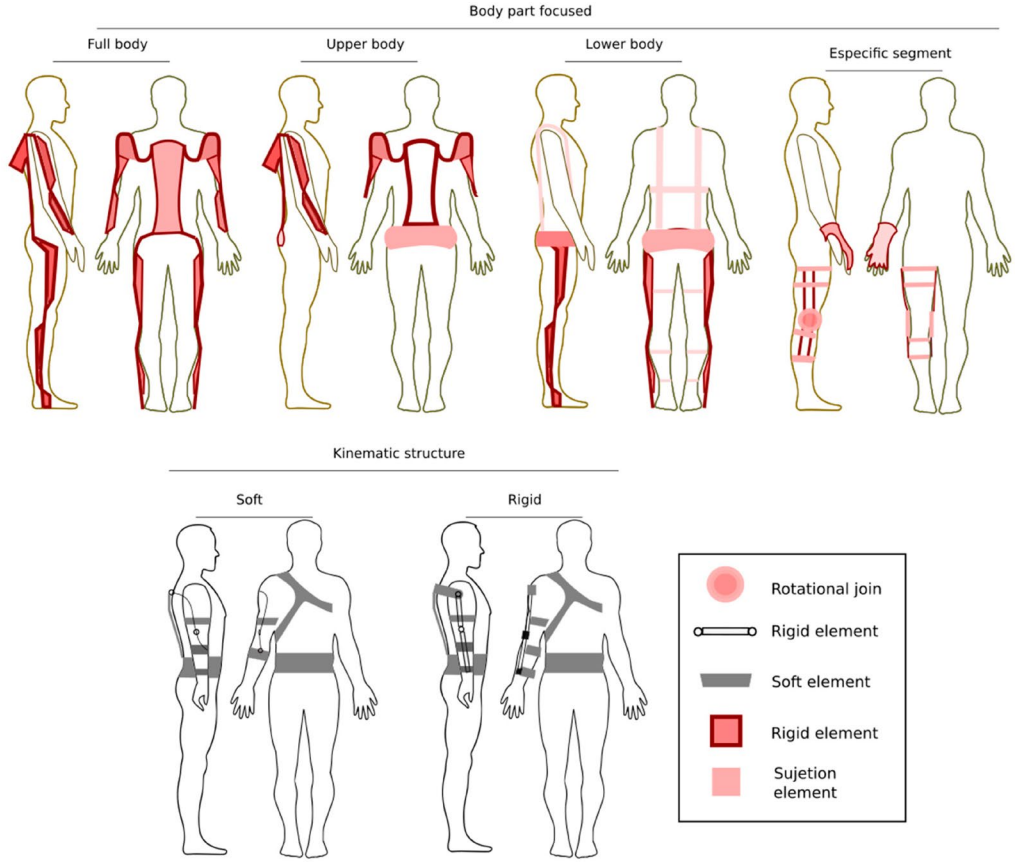


Government Accounting Office (GAO)

Robotics and Exoskeletons

Exoskeletons

- Material Handling Support
  - Support Squatting (Carpet installation)
  - Support Shoulders (Fiberglass Gun Sprayer)
  - Support Hand (Assembly)
  - Construction Use starting
  - Warehouse Use (Amazon)
- Fully Automated Robots
  - High Hazard Operations – Confined Space Entry
  - Repetitive Production - Welding

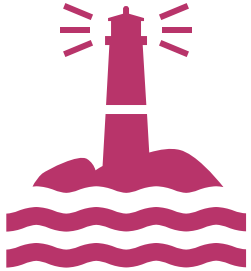


National Institute of Occupational Safety and Health (NIOSH)

Internet of Things & Data Analysis

- Connectivity allows data collection from equipment and other sources
- Improvements in capturing the data that has historically been collected to allow for analysis – OSHA 300 Data for example
- AI Based analytics to evaluate large data and draw conclusions, creating efficiencies
- Your agent and carrier can help you access large data for your industry
- *Garbage in Garbage Out*

How Does Technology Help

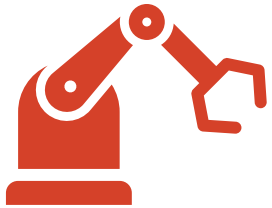


Enhanced Situational Awareness

Improved Worker Protections

Training & Skill Development

Intelligent Safety Management



Increased Productivity and Reduced Physical Strain

Artificial Intelligence

- Improved Efficiency – AI tools can automate repetitive tasks
- Precise Decision-Making – AI can analyze large amounts of data and provide accurate insights and predictions.
- Enhanced Customer Experiences –AI-powered chatbots and virtual assistants, businesses can provide 24/7 customer support.
- Personalization – AI tools can analyze customer data and behaviors, allowing businesses to deliver personalized recommendations and experiences.
- Improved Security – AI software can identify and prevent potential security threats by continuously monitoring systems and detecting anomalies.
- Increased Productivity – AI tools enable individuals and teams to work more efficiently, enhancing overall productivity.

Photo from Viact AI Platform

Sample AI Platform Features

- Large Language Model – ChatGPT
- Photo and Video Hazard Recognition
  - Regulatory Recognition - OSHA Compliance
  - Critical Behaviors – Ergonomics, MMH, Fall Prevention
- Program Audits using Standards
- Development
  - Programs and Policies
  - Toolbox Talks
  - Job Hazard Analysis from Job Steps
  - Other

Risks and Challenges

1. Job displacement and loss of employment opportunities.
2. Privacy concerns and potential misuse of personal data.
3. Ethical issues surrounding AI decision-making and accountability.
4. Technological failures leading to increased safety risks.
5. Lack of regulatory frameworks and standards for emerging technologies.
6. Cybersecurity threats and potential for hacking or sabotage.
7. Dependency on technology leading to a decline in human skills.
8. Unequal access to advanced safety technology, creating societal disparities.
9. Increased reliance on automation may lead to human complacency.
10. Limited public trust and skepticism in AI systems and algorithms.

Promising Future

Our Observations

- Wearable Technology will become more common as acceptance increases
- AI platforms for assisting in Safety Management will become more common
- Use of Virtual Reality and Augmented Reality will help move training from knowledge building to skill building
- Use of Exoskeletons and robots will become more cost effective increasing their use in the workplace
- Smart Camera utilization will increase as algorithm development improves
- *CHALLENGE – HOW DO WE ACT ON ALL THIS INFORMATION?*

SUMMARY

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- Promising Technologies Enhancing Safety