



# The Future of Safety Cost Effective Solutions to OSHA and EPA Challenges

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THE UNIVERSITY OF ALABAMA

**UA** SafeState

**HR, SAFETY &  
ENVIRONMENTAL  
CONFERENCE**

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# Free, On-Site OSHA Consultation



# OTI Training



# Conferencing

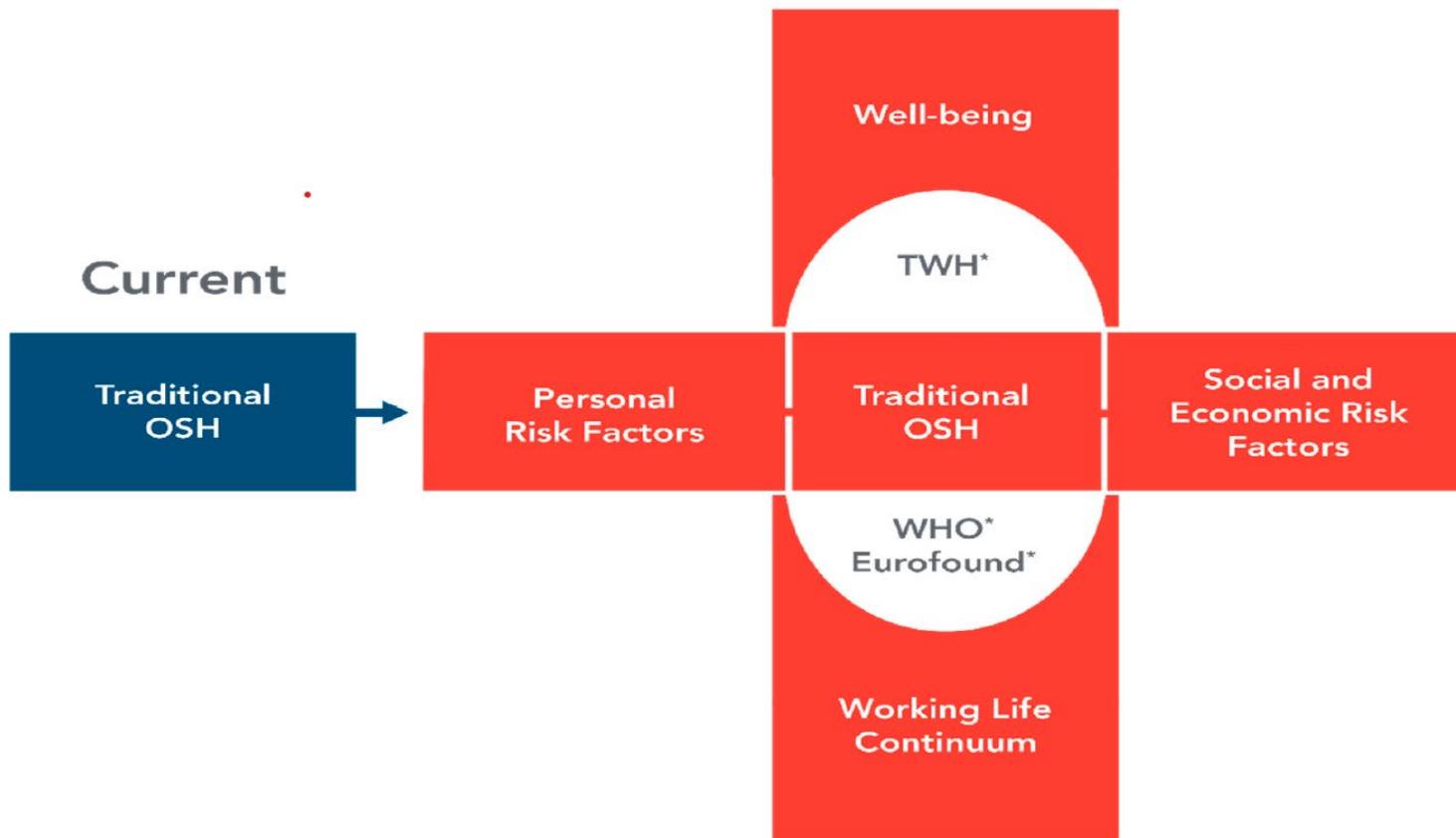


# Environmental Programs





# Future of Environmental, Safety, Occupational Health (ESOH)



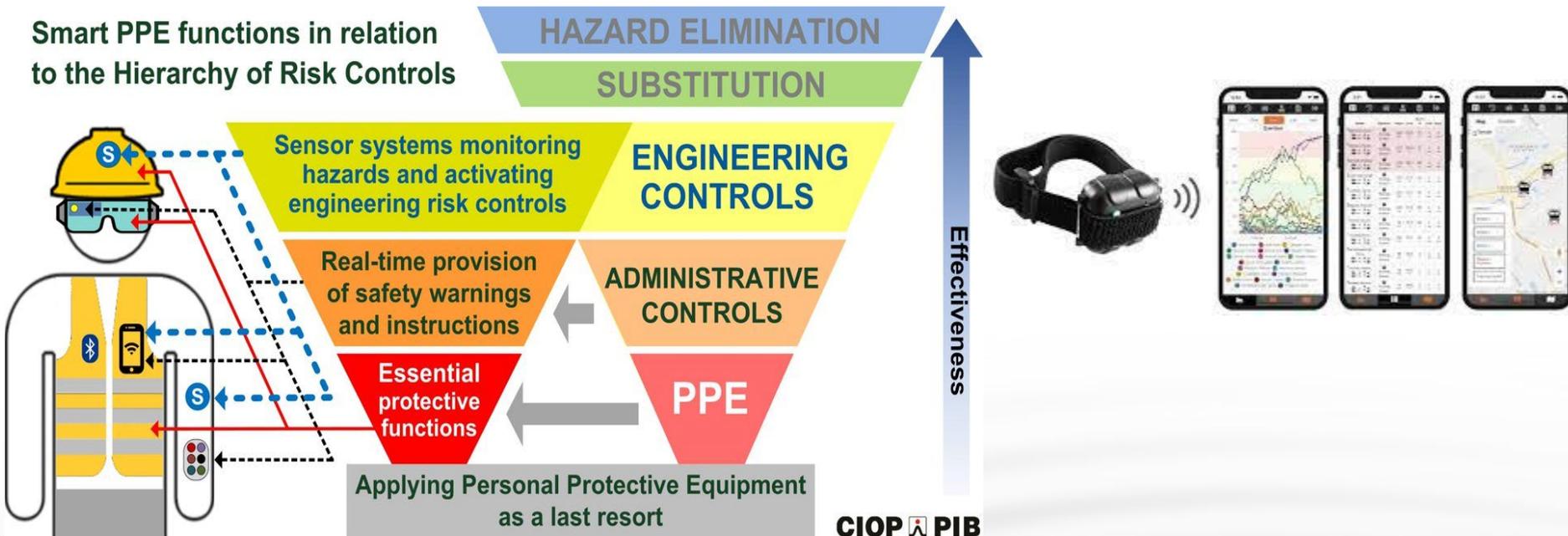


# Future of Environmental, Safety, Occupational Health (ESOH)

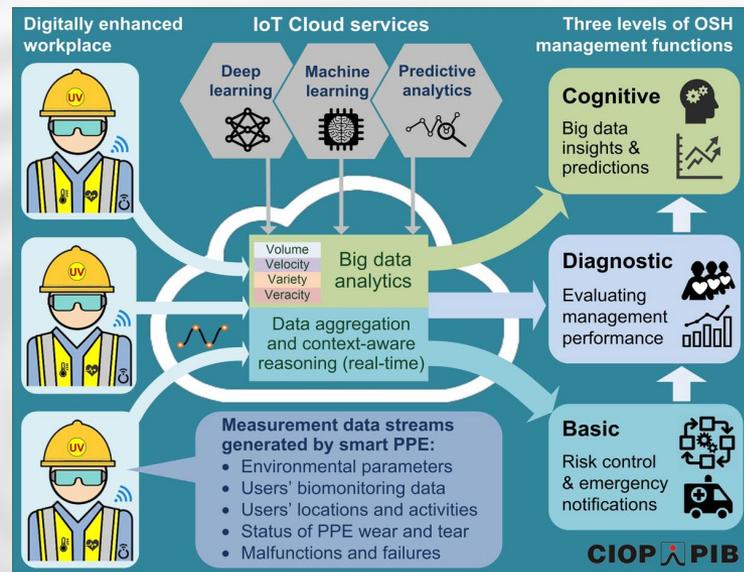
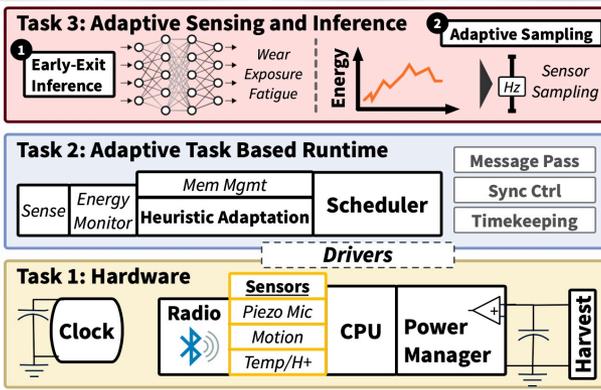
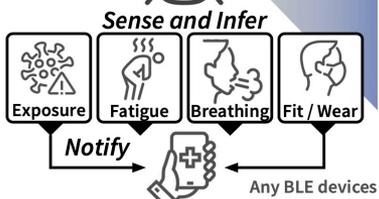
- **Technology – Smart PPE**
- **Education – Instructor Lead  
Participant Centered**
- **Emerging Professionals**



## Smart PPE functions in relation to the Hierarchy of Risk Controls



## Smart PPE Platform







# Indirect Cost of Injuries

**IMPLEMENTING**  
a safety & health program



can help employers avoid the



such as

**TIME LOST** due to work stoppages and investigations, **training and other costs associated with** and **LOSS OR DAMAGE** to material, machinery and property.

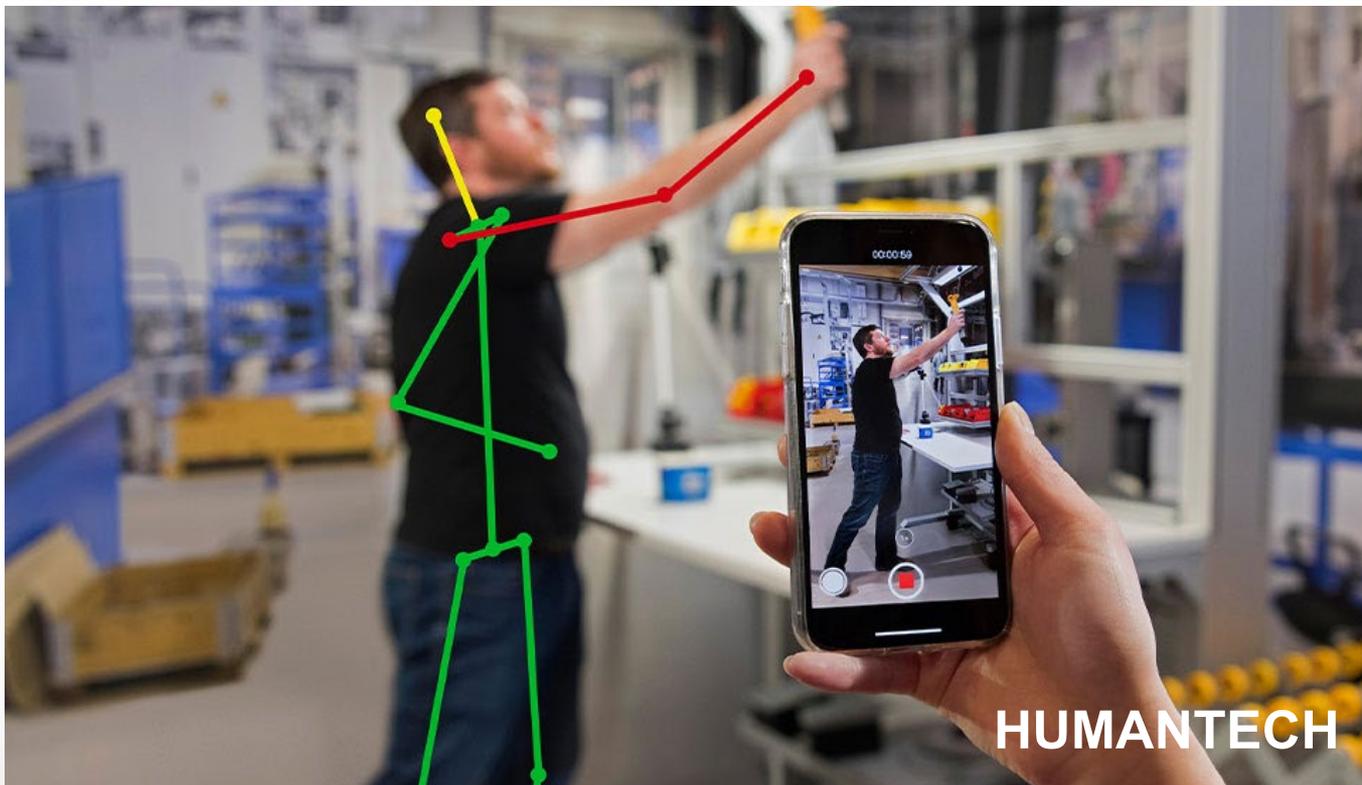
**REPLACING INJURED WORKERS**

These **INDIRECT COSTS** have been estimated to be at least

**2.7**  
times the  
**DIRECT COSTS**



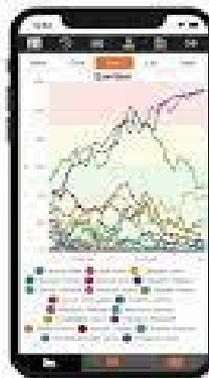
Source: Leigh, J.P. (2011), Economic Burden of Occupational Injury and Illness in the United States. Milbank Quarterly, 89:728-772.\*



HUMANTECH



FireHUD





# Advanced Tool

The Advanced Tool uses **motion capture** technology to assess work postures and provide a more accurate and detailed assessment of Muscular Skeletal Disorder (MSD) risk.

Motion capture provides **continuous posture** data throughout task, leveraging **machine learning** to constantly improve data quality.

The Advanced Tool increases **thresholds** for force categories capturing different ways force is exerted in the workplace.



**ADVANCED TOOL and MOTION CAPTURE**

Select a video for helpful hints on using the **Advanced Tool** and the **Motion Capture** feature in The Humantech System®

 03:42 About artificial intelligence	 03:16 Introduction to the Advanced Tool	 04:54 Interpreting Advanced Tool results
 02:22 Recording a video for motion capture	 01:56 Introduction to forces	 02:42 Measuring forces

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## Input Requirements

1. Capture **video** for posture evaluation
2. Measure and input **forces and weights**
3. Enter posture, duration, and frequency evaluation for the **hands** only

Advanced Tool Assessment

Advanced Tool Priority Score: 30

Hands/Wrists		Elbows		Shoulders		Neck	Back	Legs
Left	Right	Left	Right	Left	Right			
1		4	5	3	6	7	1	3

Forces Hand/Wrist Risk Factors

Play Processed Video Show Matrix

All Media (5) Add Media



# Priority Score Results

**Baseline**

Direct Causes

Improvements

Projected

Follow-Up

Location: North America > Ellisville, MO > CDC    Product: TEST    Shift:

Ref #: TEST    Time: 20 - 40 hours    # Operators: 1

Qualitative    Quantitative    **Advanced**

Advanced Tool Priority Score

30



**Advanced Tool Assessment**

Hands/Wrists		Elbows		Shoulders		Neck	Back	Legs
Left	Right	Left	Right	Left	Right			
1	1	3	6	4	5	4	4	2

Forces
Hand/Wrist Risk Factors

Play Processed Video
Show Matrix








All Media (4)

Add Media

JA #: 12472  
Created: 11/20/2019  
Modified: 03/12/2020

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Move to Do

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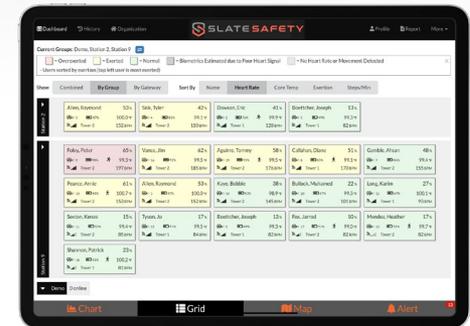


# Exoskeletons



# BioTrac System

- An intuitive, edge-based system that collects, transmits, and alerts on critical data in real-time.
- Specifically designed to be **easy-to-use** with large groups of people.
- Key metrics in real-time including: **Exertion, Heart Rate, Core Temperature, Fall Detection, and TapAlert.**



Real-time Dashboard

- Configurable alerts with vibration and LEDs for low severity, high severity and return to work.
- Use cases such as: **Heat Stress and Overexertion prevention, Lone Worker, Confined Space and more.**



BioTrac Band V2

# Differentiation

- **Easy-to-Use System with No End User Configuration**
  - The wearer simply puts on a device for it to start working. No buttons!
  - After a one-time setup, the platform “just works”
- **Rugged and Reliable Device**
  - The wearable devices are built tough to withstand harsh conditions and are waterproof up to 150 feet.
- **Direct Cell Connection with Native Redundancy**
  - The band connects over the cellular network (just like a smartphone). If in a cell-denied area, it will automatically switch to a nearby SlateSafety gateway or store the data on the band until cellular connectivity is restored. Alerts will still trigger on the person even in a cell-denied area!
- **Flexible Software**
  - Powerful cloud-based software runs on any device



# Recent Success Story: BioTrac System for DoD

## DoD Fire Training Academy

- Very high ambient temperatures in summer months
- Problem with heat-related injuries and class attrition rates (over 30 in 2018)
- Needed to observe 300 firefighter trainees at a given time
- Since July 2020: Over 1500 students monitored through 180,000 training hours and only 5 'fall-outs'. **Over 92% reduction in heat related injuries through the hottest months of the year as compared to 2018.**

“This wouldn't be possible with the [other system]- you would need a guy following everyone around with a laptop”

-Contracting Officer



“I think this is the answer to what we are looking for up here at the DoD Fire Academy”

-Lead POC



# Dedicated team with proven track record

Department of Homeland Security (DHS) [Next Generation First Responder \(NGFR\) Partner](#)

National Science Foundation Phase I SBIR: [Biometric IoT System for First Responders](#)

National Science Foundation Phase II SBIR (Active): [Biometric IoT System for First Responders](#)

U.S. Air Force Phase I SBIR: [Biometric IoT System for Air Force](#)

U.S. Air Force Phase II SBIR (Active): Biometric IoT System for Air Force

U.S. Air Force Phase I SBIR : [Wearable Medical Sensor](#)

U.S. Patent Numbers: 10,052,034, 10,470,671

Leadership recognized on [Forbes 30 Under 30](#)

Awarded the [2021 Occupational New Product of the Year Award](#)

Awarded the [2021 Industrial Hygiene Award for IoT - Connected Devices](#)



U.S. AIR FORCE



**NEXT GENERATION  
FIRST RESPONDER**  
PROTECTED, CONNECTED & FULLY AWARE™



THE UNIVERSITY OF ALABAMA



## TECHNOLOGY CAN HELP WITH...

- Increasing visibility and transparency
- Training deployment, management and documentation
- Audits, inspections and corrective actions
- Safety teams management
- Risk analysis/Job Safety Analyses (JSAs)
- Incident management, including mobile reporting capability
- Better reporting and metrics
- Driving employee engagement and buy-in



# Talkin' 'bout my generation

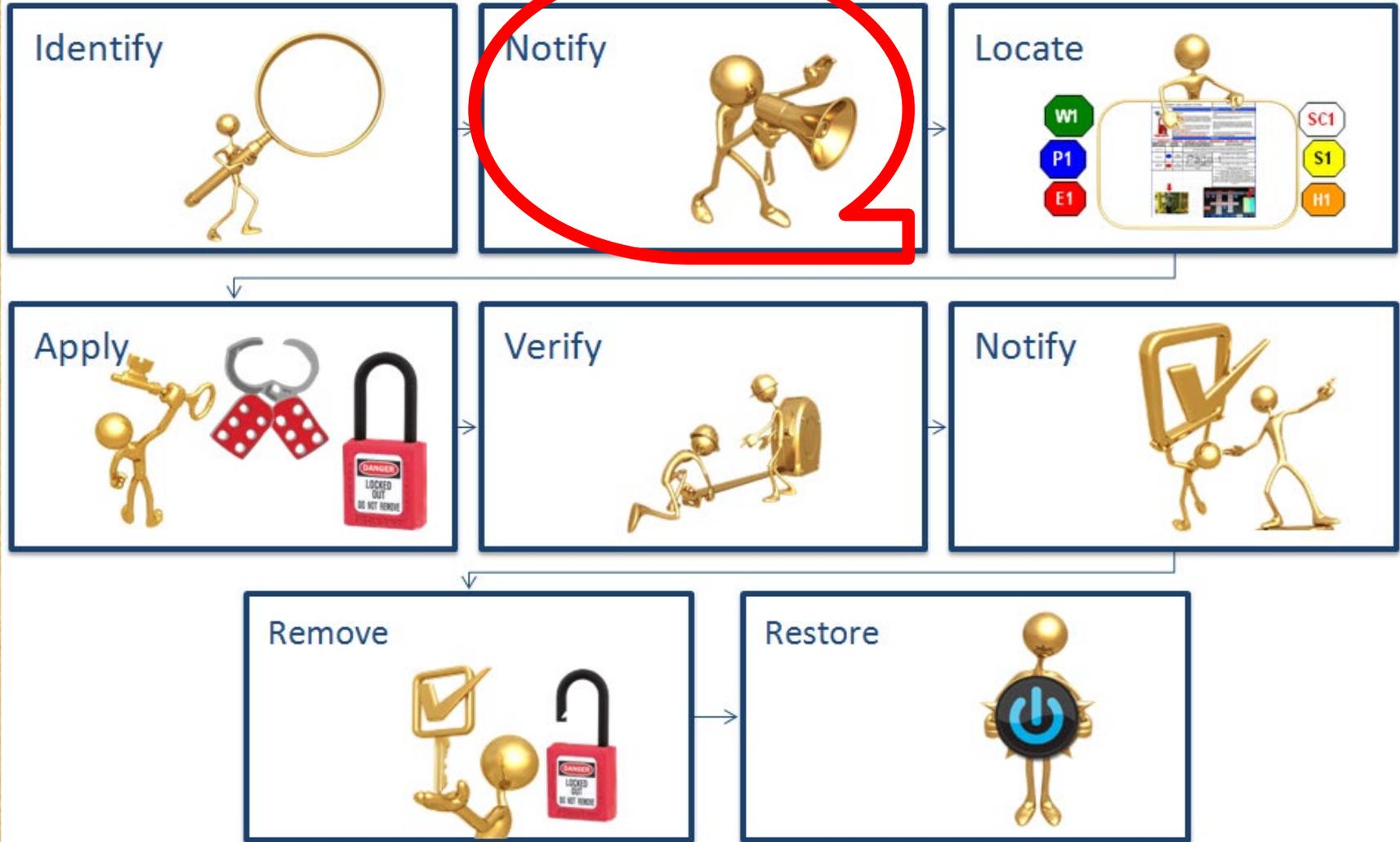


# OSHA EIGHT STEP LOTO



# OSHA EIGHT STEP LOTO

## 2<sup>ND</sup> STEP LOTO



# OSHA EIGHT STEP LOTO

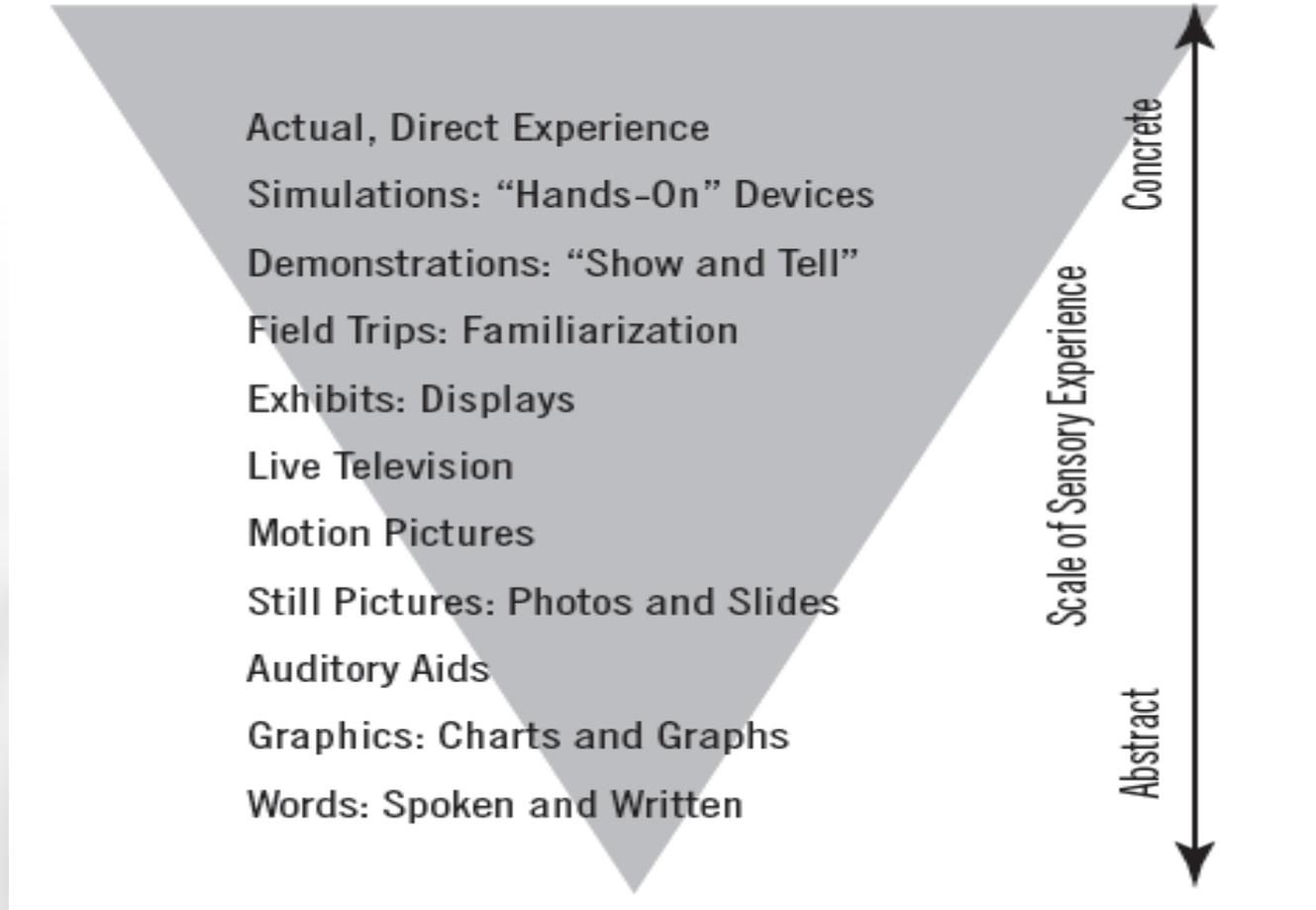
## STEP #2 ACTIVITY

- “There is a man who is scared to go home because there is another man waiting for him with a mask on”





# The More Concrete the Medium of Communication, the More Effective It Is





# Basic Human Interests and Corresponding Activities

## BASIC HUMAN INTERESTS AND CORRESPONDING ACTIVITIES

### Basic Interest Factors

**Fear** of painful injury, death, loss of income, family hardship, group disapproval or ridicule, supervisory criticism.

**Pride** in safe workmanship, in good records, both individual and group.

**Recognition:** desire for approval of others in group and family, for praise from supervisors.

**Participation:** desire to be “one of the gang,” “to get in the act.”

**Competition:** desire to win over others, such as shown in sports.

**Financial gain** through increased departmental or company profits.

### Ways to Use These Factors

**Visual material:** emotional or shocker posters, dramatic films, pictures, and reports of serious injuries on bulletin boards, in company papers.

**Recognition** for individual and group achievement; trophies, personal awards, letters of appreciation.

**Publicity:** photos and stories in company and community papers, on bulletin boards.

**Group and individual activities:** safety committees, suggestion plans, safety stunts, campaigns.

**Contests** with attractive awards.

**Monetary awards** through suggestion systems, profit-sharing plans, promotions, increased responsibility.

# TRAINING VIDEO



# EXERCISE— UNSCRAMBLE THE WORDS

To make training successful, you should:

- 1 Encourage **participation**
- 2 List **objectives**
- 3 Build **understanding**
- 4 Break material into **chunks**
- 5 Ask **questions**
- 6 Lead the **discussion**

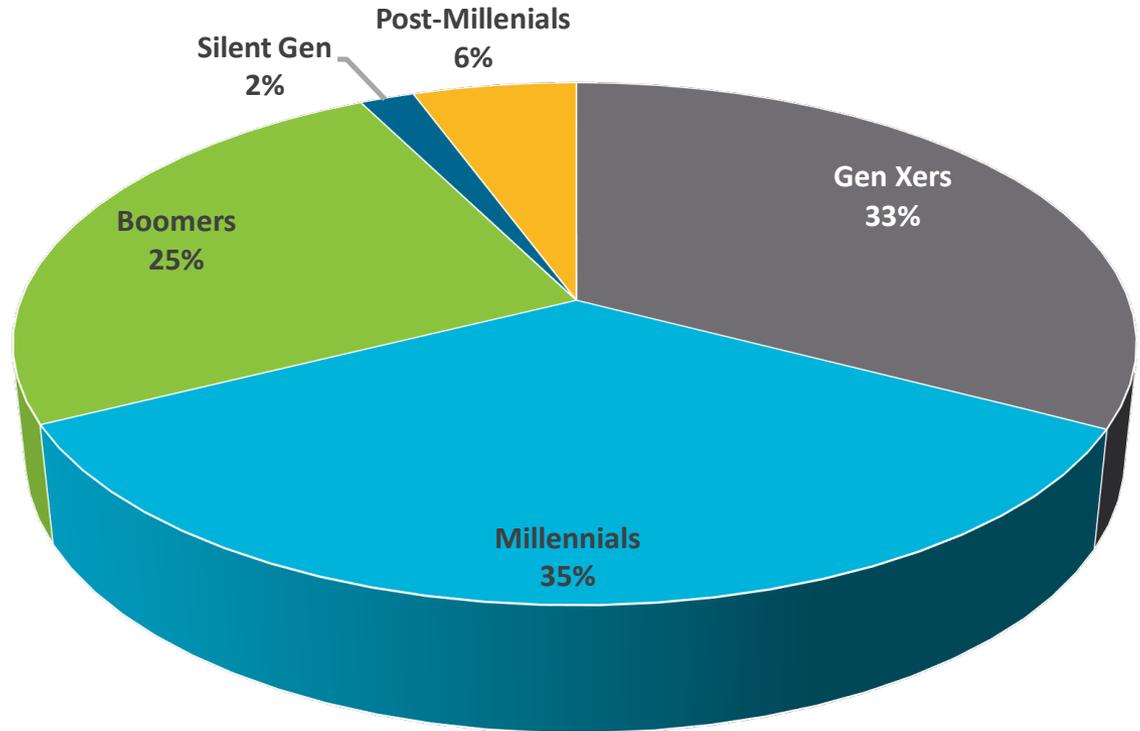


# Emerging Professionals



# LARGEST GENERATION IN LABOR FORCE

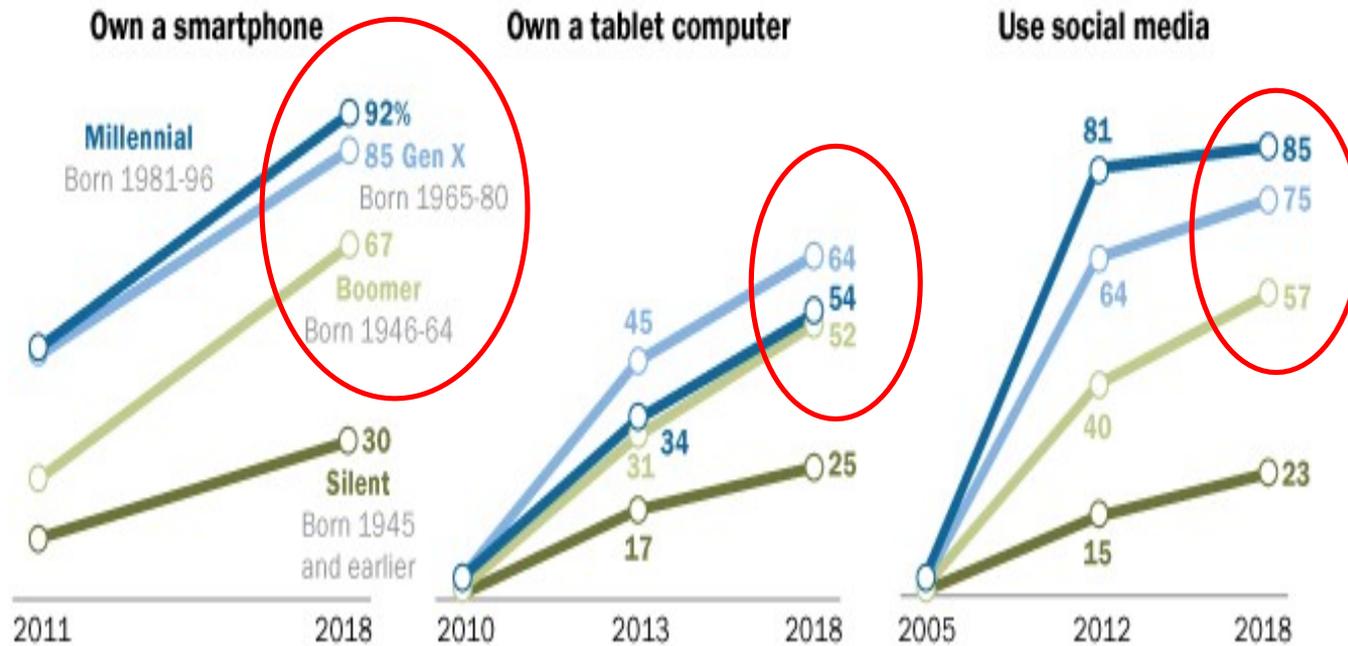
- Largest generation in the US labor force (as of 2016)
- 1/3 of all workers!
- 72% of Millennial women and 83% of Millennial men are employed



# TECHNOLOGY

## Millennials lead on some technology adoption measures, but Boomers and Gen Xers are also heavy adopters

% of U.S. adults in each generation who say they ...



- 69% of Millennials use social media to stay up-to-date on news
- 80% say the web helps them feel connected to people in other countries

Source: Survey conducted Jan. 3-10, 2018. Trend data are from previous Pew Research Center surveys.



## The OEHS Expert's Foundation for **KNOWLEDGE**

### NEW MEMBER CATEGORY! EMERGING CAREER

**Voting Member** (\$205): A professional who currently spends greater than 50% of his or her employment in the field of Occupational and Environmental Health and Safety.

**Retired Voting Member** (\$50): A professional who has retired from employment that involved greater than 50% of his or her time in the field of Occupational and Environmental Health and Safety and who is employed less than twenty-five percent (25%) of full-time.

**Student Voting Member** (Complimentary): A full-time student officially matriculated in an undergraduate or graduate program in environmental health, occupational health and safety or a related discipline.

**Organizational Supporter** (\$650): An organizational supporter is an institution or organization supporting the activities of ACGIH. Organizational supporters are not eligible to vote for or serve on the Board of Directors.

- Must have 5 years or less of work experience in the field of occupational and environmental health and safety.
- Only \$95 – 1/2 off full membership price

#### COMPLIMENTARY Benefits of Individual Membership

- Annual TLVs and BEIs Book (Save \$54.95)
- "The Action Level!" (Save \$249)
- (10) Downloadable TLV and BEI *Documentation* (Save \$600)
- Online monthly issues of the *Journal of Occupational and Environmental Hygiene* (JOEH)
- FREE Shipping and Handling on all domestic publication orders

#### COMPLIMENTARY Benefits of Organizational Supporter Membership

- (5) Annual TLVs and BEIs Book (Save \$54.95)
- (Unlimited) Downloadable TLV and BEI *Documentation* (Save \$600)
- Online and print monthly issues of the *Journal of Occupational and Environmental Hygiene* (JOEH)

# Define Your Science

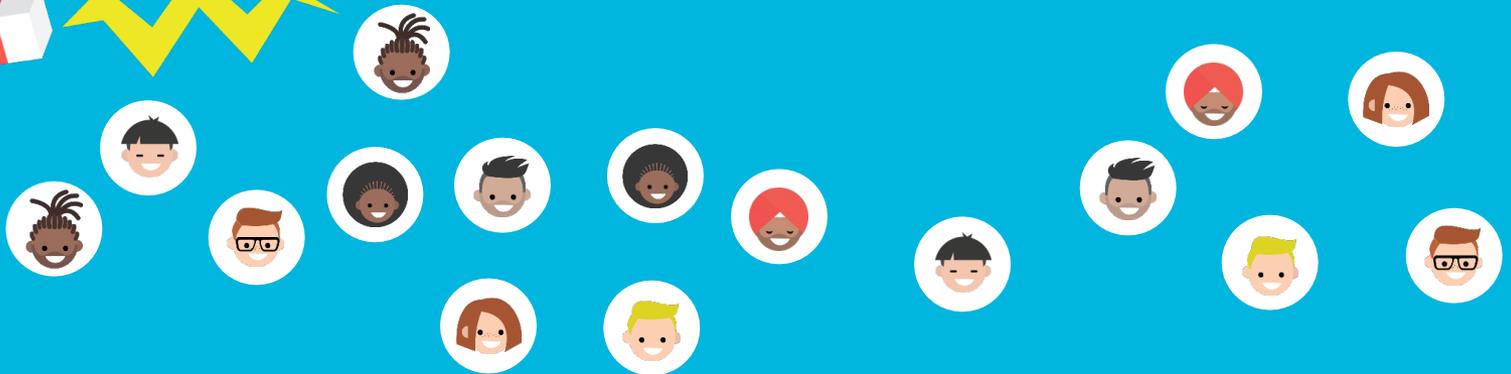
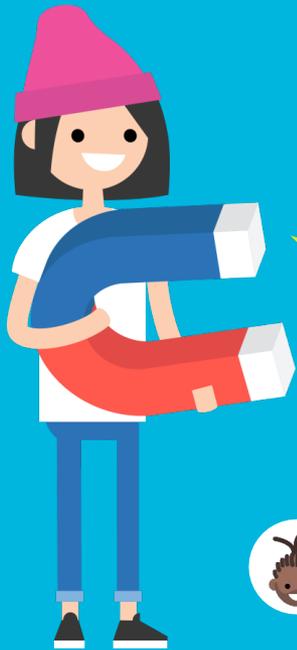
# Invest in an ACGIH Membership

For more benefits and information, visit [acgih.org/membership](http://acgih.org/membership)

**5 KEY STRATEGIES FOR**

**MANAGING WORKFORCE**

**& IMPROVING SAFETY**



A purple suitcase is shown on a luggage carousel. The suitcase is positioned diagonally, with its front and right side visible. It has a textured purple fabric and silver-colored zippers and trim. The background is a blurred airport setting with a blue and grey luggage carousel. Overlaid on the left side of the image is a black circle containing the number '1', and two black rectangular boxes containing the text 'CHECK YOUR' and 'BAGGAGE' respectively.

**1**

**CHECK YOUR**

**BAGGAGE**

# CHECK YOUR BAGGAGE

- Challenge Stereotypes
  - Acknowledge your bias, acknowledge your fear
  - Think back to your own experiences of being put in a box
- See the Individual, Not the Cohort
  - No individual perfectly embodies their group
  - Move past labels
  - Find common ground
  - Allow for range of perspectives and work styles



2

**BE A BETTER**

**COMMUNICATOR**

# TAILORING COMMUNICATION

- Invest Time
  - Assume everyone has value to contribute
- Ask Questions
  - Listen with an open mind
  - Don't speak to them only when there's a problem
  - Look for shared points of view
- Be Clear and Transparent
- Pay Attention to Conversations Already Taking Place
  - People are already talking to each other
  - Social media is an outlet for all kinds of conversations
  - Surveys help get you beyond the polite chatter

3

TAKE

ACTION



# TAKE ACTION

- Apply What You've Learned
  - Listening is just the first part of the conversation
  - Demonstrate that you care through your actions
- Differentiate Where You Can
  - Your people are motivated by different things
    - This is not new
- Acknowledge Short Comings
  - Be transparent about things you cannot do
- Stay Engaged
  - Test how efforts are received

**Embrace the Paradox of Diversity: It's a source of challenges – and also the solution**

# CHAMPIONING TECHNOLOGY

- Identify people interested in software/technology
- Include them in planning stages for adoption
- Get them involved in implementation – spreading the word
- Sharing ideas, championing company success and values on social media



A man and a woman are in a workshop, looking at a tablet together. The man is holding the tablet and pointing at the screen. The woman is looking at the screen. They are both wearing work clothes. The background is a blurred workshop with various tools and equipment.

4

**TAKE TRAINING**

**SERIOUSLY**

# TAKE TRAINING SERIOUSLY

- Be the Coach Your Team Needs
  - If you not you, who?
  - Be a day-to-day presence
  - Test efficacy of training – did it catch?
- Invest in Future Success
  - Don't shortchange your people on professional growth
  - Develop a tailored professional development plan
  - Aim for transparency
- Everyone Deserves Feedback
  - Be kind, but honest

# STRUCTURE YOUR MANAGEMENT TEAM

- Avoid having too many people report to one manager
- Smaller ratios allow more coaching, direction and mentoring
- Employees are 23% more likely to stay if their manager clearly explains their roles and responsibilities



# SHARPEN YOUR TRAINING PROGRAM

Training management is a thread that connects many components of your system together:

- Compliance
- Awareness of policies and procedures
- Safe work best practices
- Reporting/metric accuracy

In general, training is how you ensure that you actually do what your SMS says you do!



# ACCOMMODATE ALL LEARNING STYLES

- Make it **mobile**
- Make it **real** (experiential)
- Make it **collaborative**
- Make it **engaging** (e.g. gamification)
- Make it **bite-sized** (on-demand & micro-learning content)



5

**MATCH**

**INCENTIVES**

**TO MOTIVATIONS**

# MATCH INCENTIVES TO MOTIVATIONS

- Don't Guess – Ask!
  - Engage your employees; what programs do they WANT?
  - Form employee committees to solicit input
- Pick the Low Hanging Fruit
  - 80% of employees are motivated to stay at their jobs longer when they receive appreciation for their work
  - 21.5% of employees who don't feel recognized, report having interviewed for a job in the past three months
- Reconsider Focus on Tenure
  - 51% of employees said receiving a milestone or tenure-based award had no impact on their view of their jobs

# DEVELOPING YOUR INCENTIVE PROGRAMS

- An inclusive workplace culture
- Fair salary/compensation
- Generous benefits
- Work-life balance
- Flexible schedules & work arrangements
- Timely promotions
- Giving back to the community

# BEST WAY TO PROVIDE RECOGNITION

- Recognize Often
  - At least every month, if not more frequently
- Make It Unexpected
  - Ex: Teamphoria
- Be Specific
  - Reinforce desired behaviors
- Personalize Recognition
  - Offer the freedom to choose an award/incentive
- Start the First Day
  - Engage new workers and incentivize adoption of company culture

# THE FINAL WORD

**YOUR PEOPLE**

**ARE NOT**

**STATS**



“When you look at the Millennials’ value system, what Millennials want, they want to have meaning in work. They want to understand that the company they’re working for is not just building products and selling products.”

MARC BENIOFF, CEO SALESFORCE

**DALAI LAMA:**

**“We are all born in the same way,  
and we all die. All of us want  
happiness and do not want to  
suffer.”**

# UA SafeState



Enhancing your environmental management...



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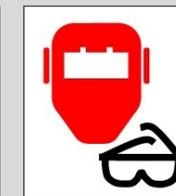
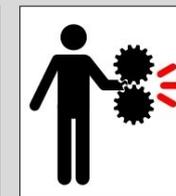
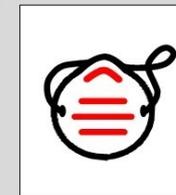
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# OSHA<sup>®</sup>

**Occupational Safety  
and Health Administration**

## Most Frequently Cited Violations





# OSHA Misconceptions

- **OSHA does not cover very small employers**
- **Citation funds pay for OSHA's operation**
- **Inviting OSHA in will not result in penalties**
- **OSHA enforces company safety policies**
- **We need OSHA-certified \_\_\_\_\_ !**
- **AND...**



# OSHA will shut us down





# OSHA Emphasis Programs

- **Safety** – amputations, falls, excavations, etc
- **Health** – Silica, lead, noise, welding, hexavalent chromium
- **High focus industry:** Construction (all types), Inpatient health care, primary metals, & more





## On-Site Consultation helps:

- improve workplace safety
- avoid workers' compensation claims
- increase productivity

[www.osha.gov/consultation](http://www.osha.gov/consultation)



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# On-Site Consultation During the Pandemic





# The Process: **STEP ONE**

**Contact UA SafeState**  
Phone  
Email  
Website

**Scope of Request and  
Consultant**

**Schedule On-site Visit  
(or virtual)**



# STEP TWO

**On-site Consultation  
Opening Conference**

**Site assessment:  
Walkthrough  
Testing  
Program review  
Interactive**

**Closing Conference**



# STEP THREE

**Report to Employer**

**Employer Hazard  
Corrections  
(Consultation  
Assistance Available)**

**Employer Response  
to UA SafeState  
SUCCESS!**

# Hierarchy of Controls

## Elimination

Complete redesign of the system to remove the exposure

Exposure  
Eliminated

## Substitution

Switch out a process step with a less hazardous step;  
Use low voltage system versus high voltage; replace a toxic material with a non-toxic material

Exposure  
significantly reduced

## Engineering Controls/Isolation

Isolate hazard; install guards and/or interlocks;  
build barriers; use light curtain;  
develop new tool

Exposure possible during  
maintenance operations or  
emergencies

## Administrative Controls

Post signs and warning;  
Write procedures and rules  
Train employees

Exposure controlled IF employees rigorously  
comply and IF culture supports compliance and  
IF leadership maintains commitment to oversight

## Personal Protective Equipment

Provide protective equipment for  
Employee (e.g., hard hats,  
respirators)

Used when hazard is unpredictable or pervasive;  
control is dependent on proper selection and use.

## Gimmicks; incentives; hollow threats

Employee seen as the cause of exposure and requiring  
motivation, no change in exposure

**Most  
effective**

**Least  
effective**

31%  
Fix the  
Exposure

69%  
Fix the  
Employee

Safety  
depends  
*LEAST*  
On  
employee  
Behavior



Safety  
depends  
*MOST*  
On  
employee  
behavior



**Employer  
correction of  
hazards  
found**

**Employer  
can change  
scope of visit**

### On-site Consultation



**Employee  
involvement**

**Confidential  
visit and  
report to  
employer**

OSHA's On-site Consultation Program offers free and confidential safety and occupational health advice to small and medium-sized businesses in all states across the country, with priority given to high-hazard worksites. On-site Consultation services are separate from enforcement and do not result in penalties or citations. Consultants from state agencies or universities work with employers to identify workplace hazards, provide advice on compliance with OSHA standards, and assist in establishing injury and illness prevention programs.

**OSHA not  
bound by  
Consultation  
findings**

**Program 90%  
funded by  
OSHA  
10% by State**



# ECONOMIC BENEFITS

- Avoided injury - \$ 77,000 / case (2015 dollars)
- WC - \$ 30,526 / case
- Indirects: Hiring & training replacement workers, administrative costs, lost productivity
- OSHA Consultation Impact Study
- OSHA Penalties – Serious/OTS \$13,653
- Repeat or Willful – 10 X



## OSHA's Recommended Practices for Safety and Health Programs

1. Management leadership
2. Worker participation
3. Hazard identification and assessment
4. Hazard prevention and control
5. Education and training
6. Program evaluation and improvement
7. Communication and coordination for host employers, contractors and staffing agencies





# Environmental Programs

## Environmental Compliance Reviews

- Confidential, low cost option for businesses who need help getting their environmental program on track

## Environmental Accreditation Agency for Individuals

- Asbestos Professionals
- Lead Based Paint Professionals and Renovators (RRP)
- Training Providers

## Field Services

- Conduct Lead Based Paint and Asbestos Inspections, Mold Assessments, as well as support IAQ –related projects for businesses and consultants.

## AHERA Compliance Monitoring

- Support Local Education Agencies (LEAs) with asbestos technical resources, compliance assistance, and training.

## Pollution Prevention (P2)

- Provides businesses with technical assistance and training to find ways to reduce waste and save money.



# MICROTRAINING



SafeStateAL - YouTube

https://www.youtube.com/user/SafeStateAL/videos

Search

HOME VIDEOS PLAYLISTS CHANNELS ABOUT

<p><b>UA SafeState</b></p> <p>2:07</p> <p><b>UA SafeState Promo Video 2021</b></p> <p>51 views • 1 week ago</p>	<p>1978 Lead Based Paint Consumer Products Ban</p> <p>either vital organs.</p> <p>3:01</p> <p><b>Alabama - Basic Intro to LBP for PHA</b></p> <p>2 views • 1 month ago</p>	<p>Myth Reality</p> <p>5:18</p> <p><b>Alabama - Common Misconceptions for Lead...</b></p> <p>2 views • 1 month ago</p>	<p>away a performance bonus based on lost productivity.</p> <p>4:46</p> <p><b>OSHA Safe and Sound Video 2021 Worker Participation</b></p> <p>925 views • 2 months ago</p>
<p>prior heat-related illnesses</p> <p>3:11</p> <p><b>MSSHeat Stress</b></p> <p>78 views • 3 months ago</p>	<p>Least Abrasive Material Always Work Wet No abrasives on dry or unfinished floors!</p> <p>3:12</p> <p><b>Best Practices for Cleaning and Maintaining Asbestos...</b></p> <p>36 views • 3 months ago</p>	<p>years and can take as long as 40!</p> <p>3:02</p> <p><b>Health Effects of Asbestos</b></p> <p>20 views • 3 months ago</p>	<p>windows and pipes, and how to...</p> <p>3:29</p> <p><b>What do You do if You find Mold?</b></p> <p>11 views • 4 months ago</p>
<p><b>SUCCESS</b></p>	<p>Myth Reality</p>	<p>Prior to 1978</p> <p>Durability</p>	

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12:26 PM 10/18/2021



# Monthly Webinars



Search

Respiratory Protection

GHS HazCom

Recordkeeping

LOTO

Fall Protection

Ergonomics

Fit Testing

Noise Fundamentals

**ALABAMA STRUCK-BY ALLIANCE**

Alabama AGC  
 Alabama Road Builders Association  
 OSHA  
 UA Safe State at the University of Alabama  
 Federal Highway Administration - Alabama  
 Alabama Department of Transportation  
 The 3M Company  
 Alabama Technology Transfer (T2) Center at Auburn University  
 Alabama Asphalt Pavement Association  
 Alabama Power Company  
 Lamar Outdoor Advertising  
 Alabama Department of Public Safety (Alabama – DPS)  
 Alabama Public Employee Safety Council (PESCA)  
 Associated Builders and Contractors of Alabama  
 Mobile Gas—A Sempra Company  
 Alabama Rural Electric Association (AREA)  
 Alabama County Commissioners Association  
 Meadowbrook Insurance  
 McInnis Construction

**Distracted Drivers K**

**AGC ALABAMA**

"Please Slow Down in Work Zones!  
 I miss my people!" Millie  
 AlabamaAGC Work Zone Safety Dog

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