AlertMeter

Rocky Mountain TSG

Available from
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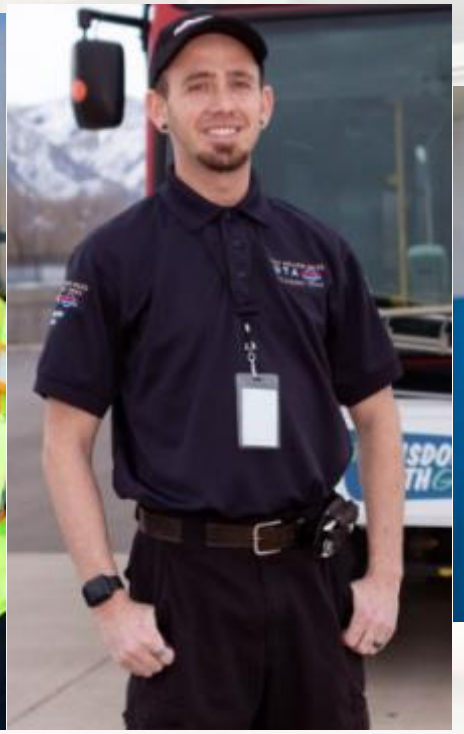
Manufacturers Representative

Fatigue and Impairment Detection & Prediction

Executive Overview

Answering this question




Which one could injure themselves or others because of fatigue or emotional distraction?

FTA understands that Impairment is more than alcohol and long hours:

Federal Transit Administration

Search

About Funding Regulations & Programs

- Transit Safety & Oversight
  - Overview
  - Office Leadership
  - Organization Structure
  - Transit Safety & Crime Prevention
  - Transit Worker Assault
  - Cybersecurity Resources for Transit Agencies
  - Fatigue Resources for Transit Operations
- Public Transportation Agency Safety Plans
- Safety Rulemaking
- Safety Guidance
- State Safety Oversight Program
- Safety Management Inspections
- Drug & Alcohol Program
- Program Oversight
- TRACS
- Safety Training

Fatigue Resources for Transit Operations

Signs of Fatigue and Exhaustion

To support the transit industry, FTA has compiled resources that can be used to better understand fatigue and fatigue-related issues in the workplace.

Expand All | Collapse All

Did you know....Impairments caused by lack of sleep are similar to impairments from drinking alcohol?

Did you know.... Overtime, extended shifts, and insufficient sleep may negatively impact your health?

Trusted By These Industry Leaders

Washington Metro Transit Authority

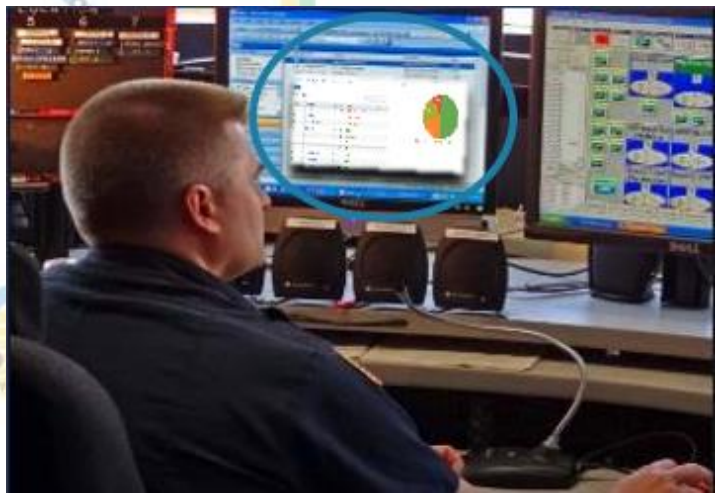
CONSTRUCTION

What is AlertMeter?

It measures the Operator's response compared to their individual baseline and gives a top-level indication of *within normal range*, ("green") or *outside normal range* ("red" or ONR).

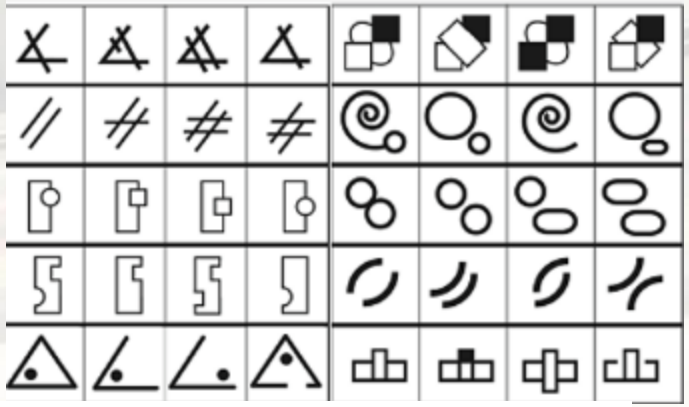
It does not identify the cause; ***it starts an objective conversation based on data.***

- *Conversations promote better leadership and engagement*
- *Engagement promotes improved human performance, reliability and safety.*



What is AlertMeter?

- Collects response and accuracy for shape families
- Baseline unique to each person



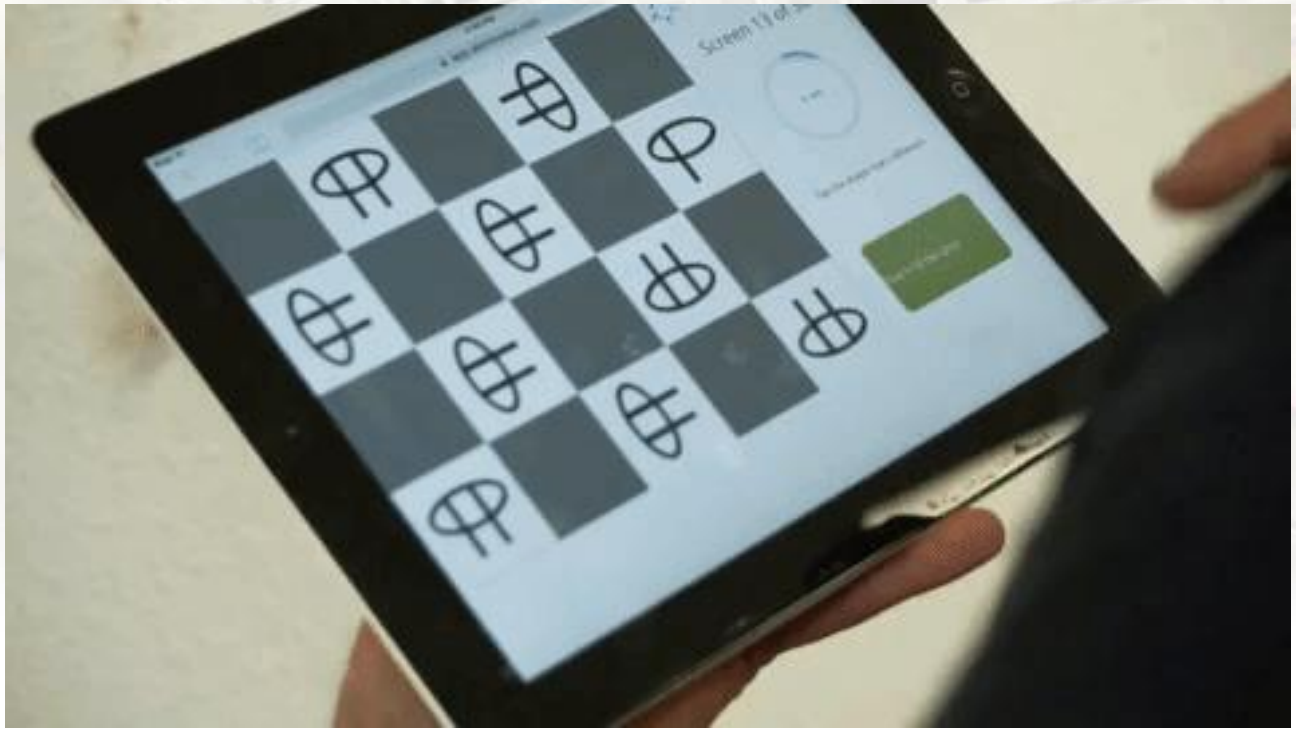
- Based on NASA science
- Funded by NIOSH
- 14 Patents

Baseline Example:
- Each point represents a test,
- Dark blue line=baseline.
- Red dots = scores outside of acceptable limits. (2 standard deviations)

Language independent, Non-Discriminatory, No Personal Information

Lets Take the Test!

21 screens, You have 4-6 seconds to respond to each



1. Tap the shape that is different.
2. If they are all the same, tap the GREEN BUTTON
3. Answer each question before the timer runs out

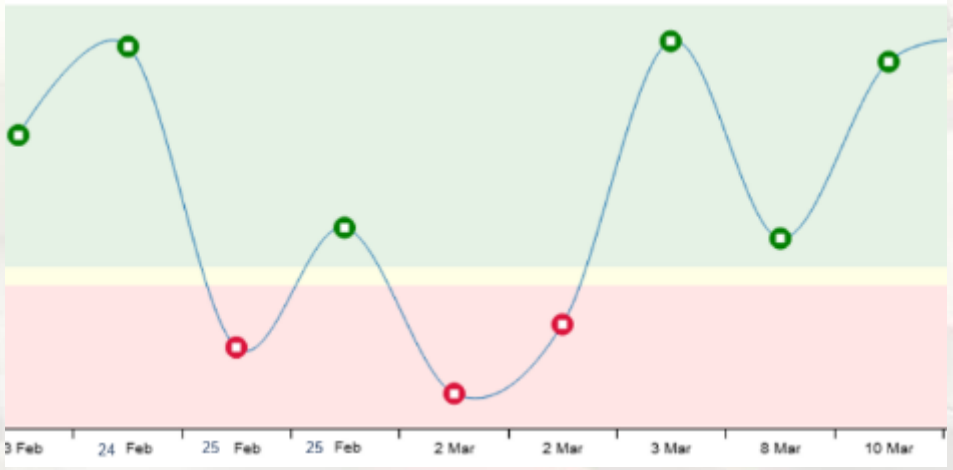
1. Open your browser and go to this address:

   https://app.alertmeter.com

2. Select **“Take the Test”**
3. Company Name = **“Train”**
4. Select **“Large Screen”** for desktop.
5. User ID = 111, or 222, or 333

Note: This demo is only to show you how the test runs. Since you don’t have a personal baseline established, your results are meaningless.

RULES OF THE GAME



Rule 1 – Play the game every day before pullout

Rule 2 – If you get a red dot, play again

Rule 3 – If you get a **second** red dot

Stop Playing

Find a Manager and have a conversation

Play as Fast as you can, as accurately as you can.
Speed / Responsiveness is just as important as accuracy.

Can you game the system? No

AlertMeter® Develops a "Brain Print."

As you learn the test, it also learns about you.

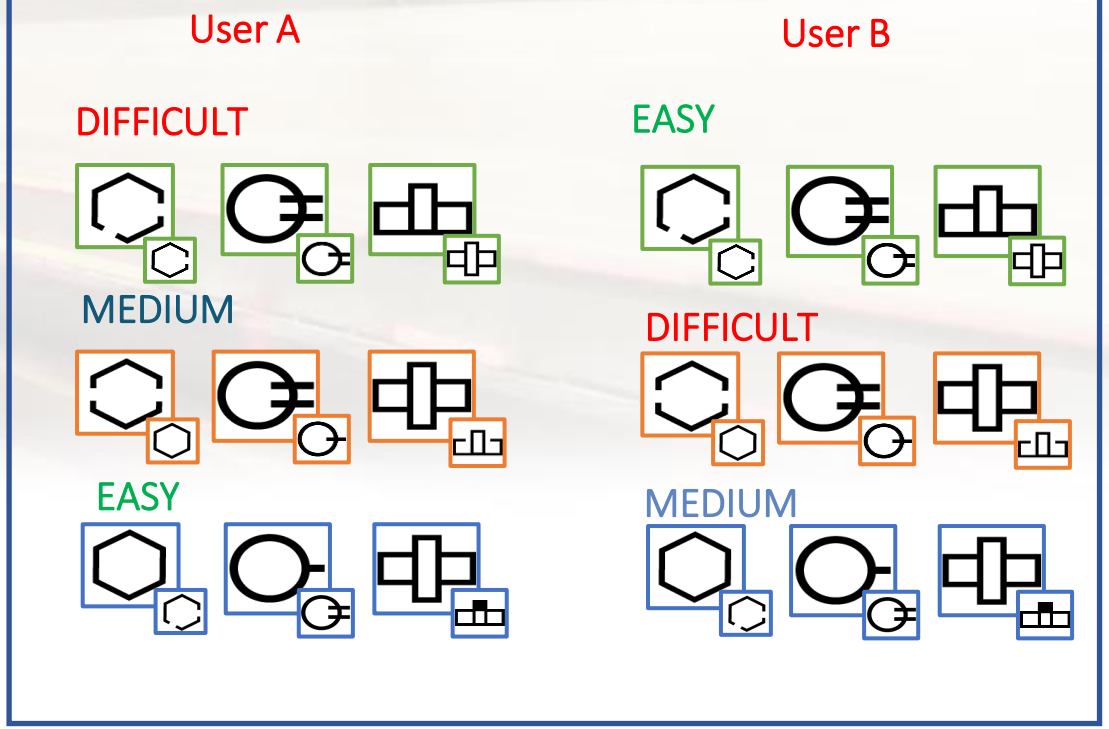
Patented Technology (14 Patents, 3 Pending) ● Language Independent ● Proven through over 80 million worker hours

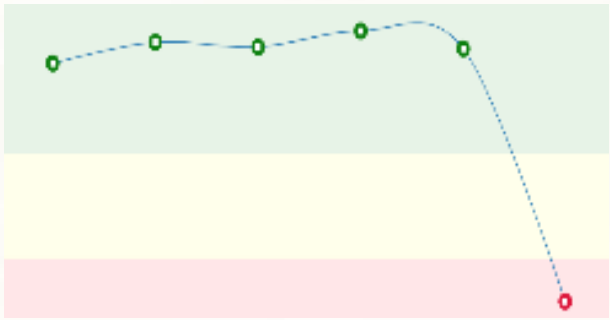
Results scored against a PERSONAL BASELINE

The test learns each person's behavior patterns

Algorithmic evaluation of personal responses to patterns and shapes

Never compares scores between individuals





You can get every answer correct but still score in the red.

Why

Because your timing on your easy and hard shapes is different today

Founded on Science from NASA. Developed under grants from NIOSH.

Scientific Validation

TRB
TRANSPORTATION RESEARCH BOARD

DOT Validation of AlertMeter® Fatigue Assessment Device for Transportation Workers

Supplemental Notes:

This document was sponsored by the U.S. Department of Transportation, University Transportation Centers Program.

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Fargo, ND United States 58108

Office of the Assistant Secretary for Research and Technology
University Transportation Centers Program
Department of Transportation
Washington, DC United States 20590

observed or reported. The AlertMeter® demonstrated strong validity as a measure of fatigue. It demonstrated significant concurrent validity with the psychomotor vigilance test (PVT) and self-ratings of fatigue (KSS). The AlertMeter® memory tests demonstrated inconsistent correlations with other measures of working memory. Overall, the AlertMeter® is an effective and valid tool for detecting fatigue in the workplace.

https://trid.trb.org/View/1867075#:~:text=The%20AlertMeter%C2%AE%20demonstrated%20strong,other%20measures%20of%20working%20memory

Positioning to Meet Proposed Federal Regulations

Regulations.gov
Your Voice in Federal Decision Making

https://www.regulations.gov/document/FTA-2023-0018-0022

RULEMAKING DOCKET

Transit Worker Hours of Service and Fatigue Risk Management

Created by the **Federal Transit Administration**

safety program and to advance transit safety further (88 FR 34917). While the NSP currently contains only voluntary standards, FTA is considering whether to propose mandatory standards for transit worker hours of service and fatigue risk management through a new rulemaking.

Transportation Safety Board (NTSB) and FTA's Transit Advisory Committee for Safety (TRACS), among others, have recommended regulatory action to address safety concerns associated with transit worker fatigue. NTSB has found fatigue to be a cause and contributing factor for dozens of fatal transportation events dating back almost 40 years.

B. Fatigue Risk Management Programs

HOS limitations do not account for other factors that contribute to fatigue, including work schedules; environmental factors, such as temperature and humidity; circadian rhythms; and the effects of the type of task being performed, such as the level of monotony or stress. FRMPs complement HOS requirements by addressing various workplace factors that contribute to fatigue to reduce the potential for fatigue-related safety incidents. An effective FRMP implements processes to measure, manage, and mitigate fatigue risk in a specific operational setting.

Meter®

Answering one of the core FTA Questions:

cta
CHICAGO TRANSIT AUTHORITY
January 29, 2024
Docket Management Facility
U.S. Department of Transportation
1200 New Jersey Avenue SE
Washington, DC 20590-0001
Re: Docket No. FTA-2023-0018
Transit Hours of Service and Fatigue Risk Management

marta
2424 Piedmont Rd. N.E.
Atlanta Ga, 30324
January 29, 2024
Dockets Operations
U.S. Department of Transportation
1200 New Jersey Avenue SE, West Building, Ground Floor, Room W12–140
Washington, DC 20590–0001.
Re: Docket No. FTA-2023-0018, Transit Worker Hours of Service and Fatigue Risk Management

2 Broadway
New York, NY 10004
646-252-5800
646-252-5815 Fax
Richard A. Davey
President
MTA New York City Transit
January 29, 2024
Nuria I. Fernandez
Administrator
Federal Transit Administration
1200 New Jersey Avenue SE
West Building Ground Floor,
Washington, DC 20590-0001
Re: Docket No. FTA-2023-0

pennsylvania
DEPARTMENT OF TRANSPORTATION
January 26, 2024
The Honorable Nuria Fernandez
Administrator Federal Transit Administration
1200 New Jersey Avenue S.E.
Washington, DC 20590
RE: Docket Number FTA-2023-0018

10. Is the prevalence of fatigue among transit workers and its safety implications tracked or measured? Please explain. Do you have any data on the prevalence or impact of fatigue among transit workers? And:

In the request for input from the FTA to transit authorities, this questions was asked. 95% of responses were blank or indicated that no such system was in place

AlertMeter® Biomathematical Circadian based Fatigue Reporting PLUS Daily Cognitive Assessment allows you to answer this question

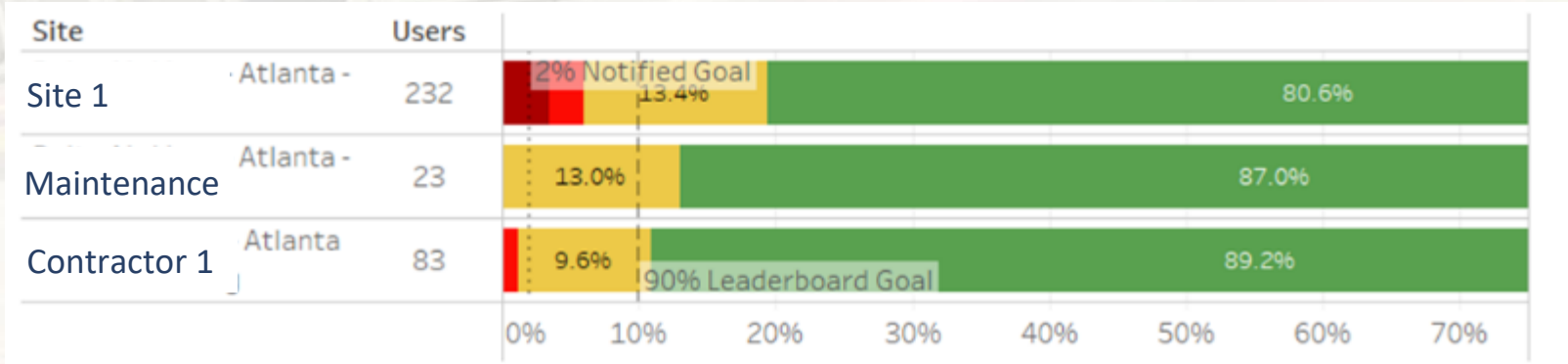
Driving Human Factor KPI’s

- **Participation-** Ensuring that **98%** or more of workers engage with AlertMeter fosters a stronger safety culture and brings anticipated benefits, reflecting management's active involvement with the workforce.
- **Alert and Ready for Work -** Aiming for **90%** of workers to achieve a Green/OK score on their first attempt significantly reduces incidents and boosts productivity.
- **Alertness Risk-** Minimizing the Red/ONR rate to **2%** ensures workers are well-prepared, and promoting effective recovery practices will help achieve this goal, leading to increased productivity and fewer incidents/injuries.
- **Wellness Opportunity** Keeping the rate under **8%** indicates an effective and engaging wellness program, along with clear and robust wellness communication.

Human Factor Compliance

Division Compliance to Human Factor KPI's

Companies are mandating use of AlertMeter by contractors to drive performance and reduce risk



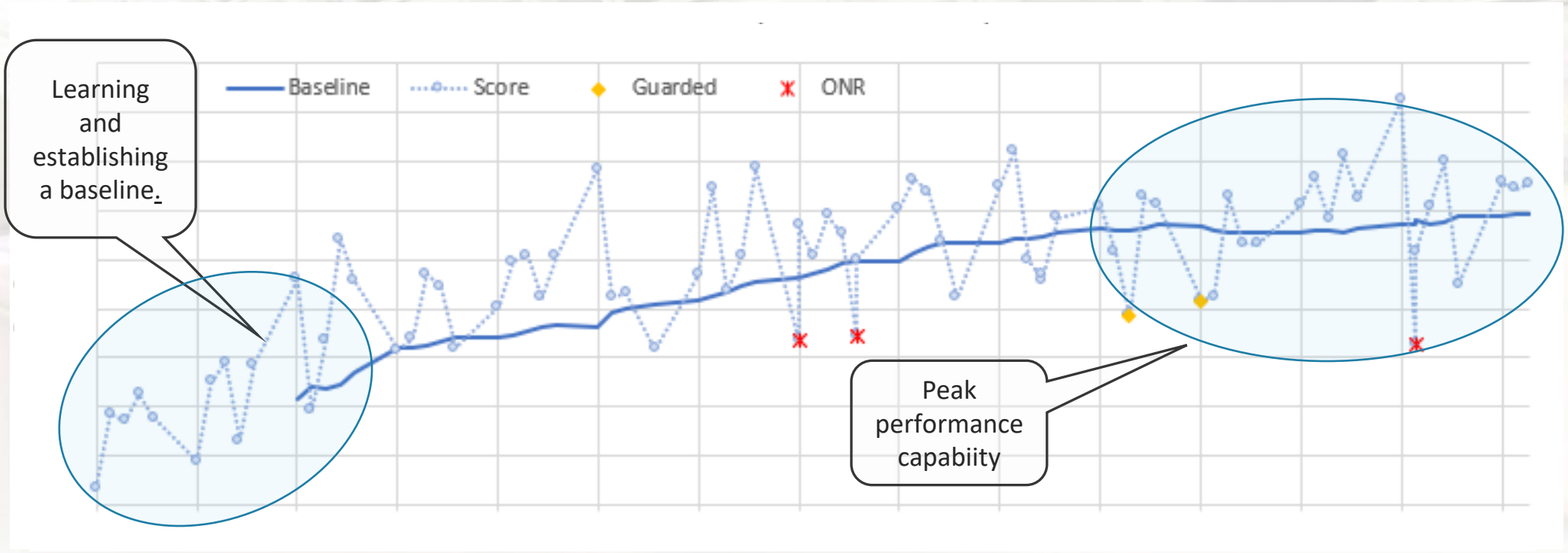
Green = Workforce that is Rested, Alert and Ready For Work

Yellow = Workforce Wellness Risk

Red = Alertness Risk

Wellness Monitoring and Reporting

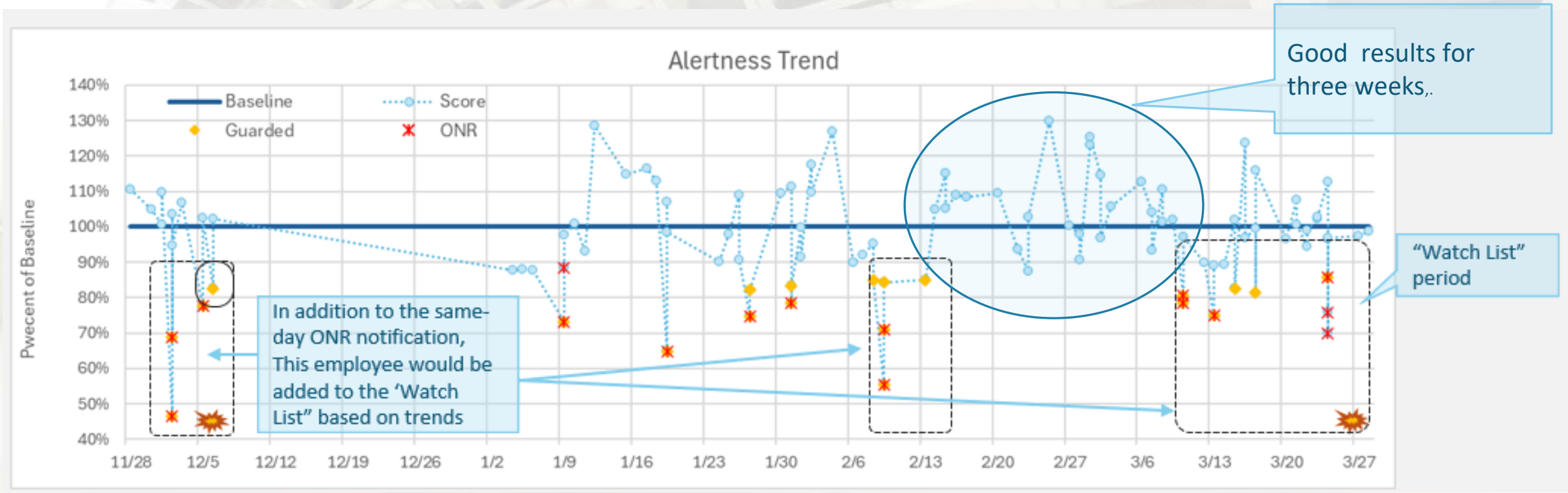
Normal Baseline



As people develop their baseline and after baseline development, patterns develop with the majority of games played being within tolerance and some occasional outliers

This is an example of a fairly “normal” baseline with a view to how it improves over time.

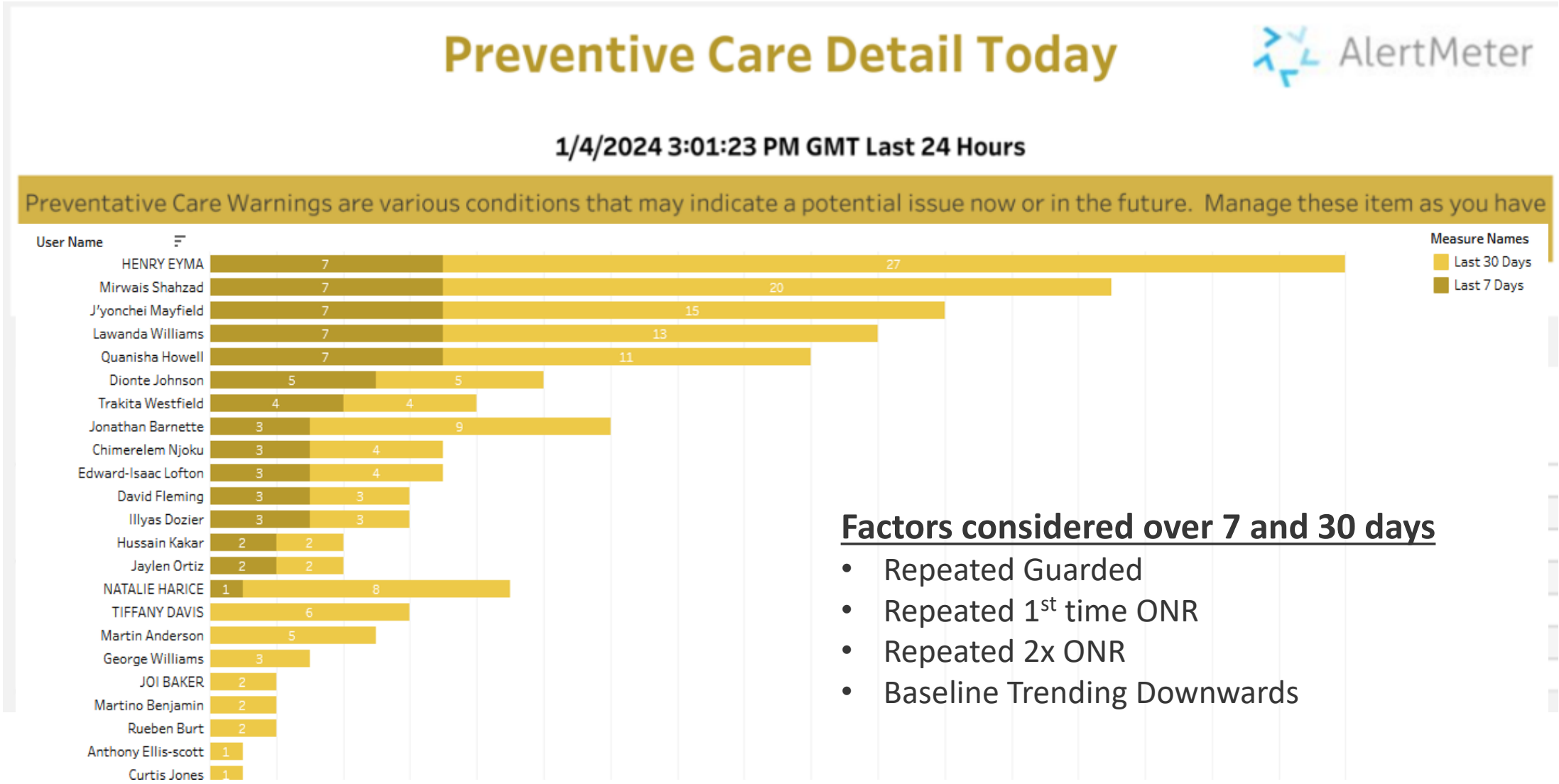
Baseline Showing Ongoing Distraction, Fatigue or Stress Issues



A person with systemic issues may be able to function effectively on many days. They may even be able to pass AlertMeter when THC or alcohol is in their blood. However, data analysis across thousands of users and feedback from clients shows that a people with systemic problems ultimately start to exhibit trends in AlertMeter that are leading indicators to a problem or potential risk.

The Preventative Care Report looks at these trends and identifies individuals presenting leading indicators to a potential incident or poor recovery behavior

Wellness Report Daily / Wellness Opportunity KPI



Factors considered over 7 and 30 days

- Repeated Guarded
- Repeated 1st time ONR
- Repeated 2x ONR
- Baseline Trending Downwards

Washington Metro Transit Authority
WMATA

Promoting Safety, One Game At A Time

1100 DRIVERS

AlertMeter in MetroAccess

- Primary contractors are required to have every operator play the game before they are allowed to enter revenue service
- Operators can only enter service after a successful game playing attempt
- Promote daily self-evaluations during the baseline development period
- Develops leadership sensitivity to real-life fatigue management issues

FINDINGS

- Improvements in self reporting for fatigue
- Reductions in overall incidents and fatigue reporting from camera systems
- Reduces subjectivity
- Promotes individual professional responsibility
- Provides a platform for meaningful conversations
- Improves the organizational safety posture
- Union support of the system

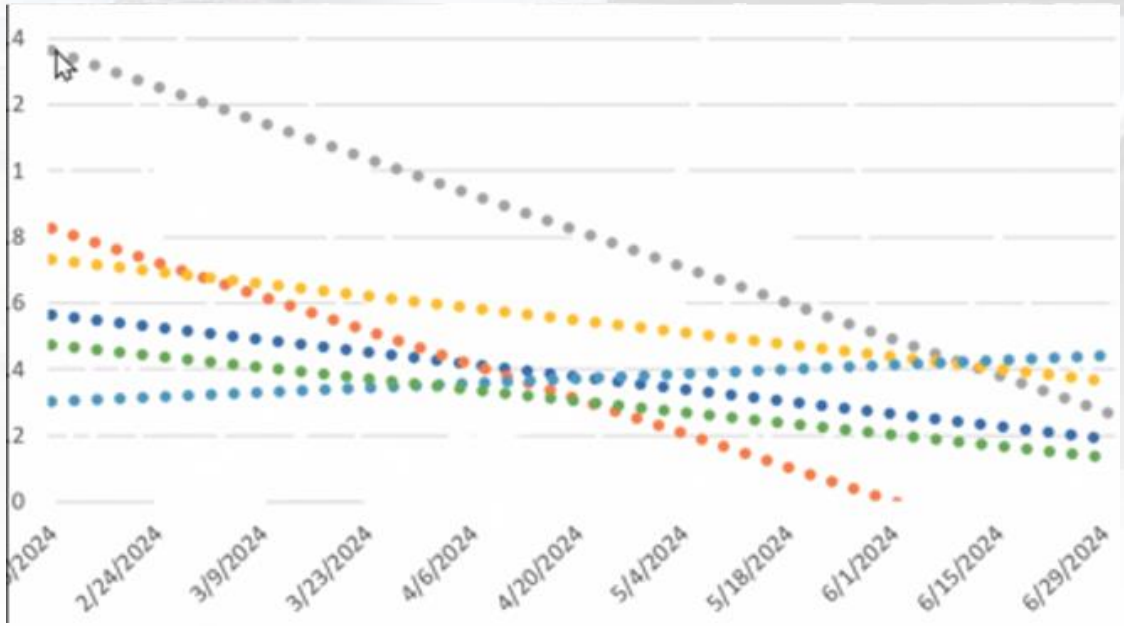
Data Discovery - 12 Months

- Total number of unique individuals tested: 2,015
- Total Tests Taken: 227,540
- Total Evaluations performed 2,519 (1.3% of all tests taken)
- Total Evaluations resulting in a driver being restricted from driving on that day: 616 (21% of 1.3%)

There has been no negative impact on-time performance.

Incident Reductions - 11 Months

COMPARISON	FY2023	FY2024	Δ (%)
Customer Injury Rate	1.86	1.43	-23%
Preventable Incident Rate	0.87	0.67	-23%
Total Incident Rate	1.92	1.55	-19%
Customer Injury Rate (ASP)	13.7	10.5	-23%
Employee Injury Rate (ASP)	6.9	5.3	-23%
Safety Event Rate (ASP)	28.5	22.1	-22%

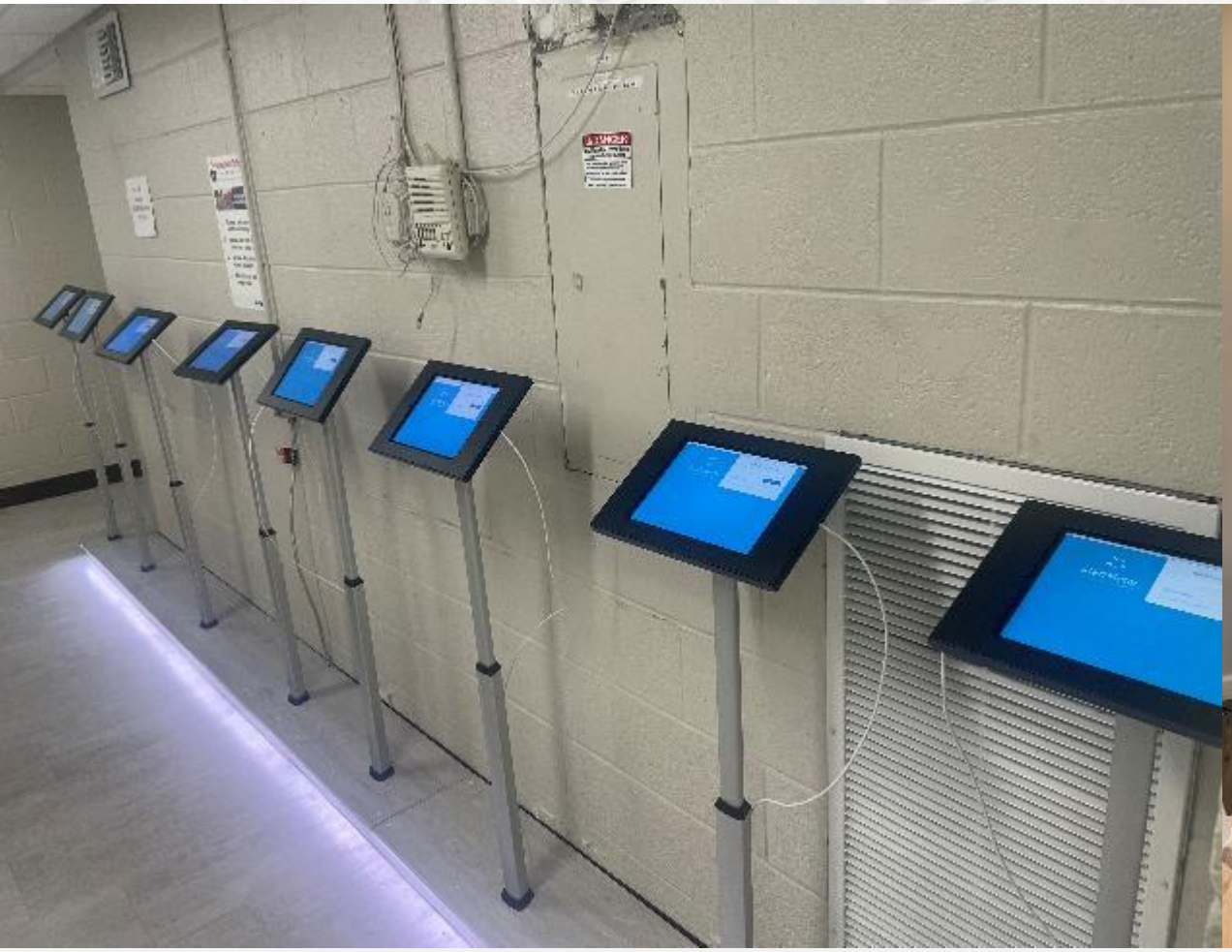


Fatigue event trending (mystery riders, samsara, curb strikes etc)

Examples of Evaluation Documentation

- "The operator was not focused, during self-evaluation the operator mentioned the loss of her mother, which is a possible reason for the ONR. The operator has not ONR in long time. Inconclusion the operator is not authorized for service".
- "During the interview with the operator, the operator self-admitted that he had been ill and was taking medication for the illness and although he felt better, he was not quite 100%. The operator was not fit for normal duty"
- "The possible cause of the ONR could have been due to outside stressors. The operator normally scores ok. Today he expressed that he was not feeling his best after recovering from an episode of gout. I advised him to go home and get some rest so can be 100% and alert for his next shift"
- "The operator showed signs of fatigue while being interviewed by management. The operator had delayed responses, bloodshot eyes, yawning, and consistently rubbing his face. The operator was evaluated and referred to HR for further evaluation"
- "The operator appeared fatigued while engaged in conversation with management. I observed the operator staring in one direction, slow reaction, and unable to answer questions. He expressed that he has been working overtime because of outstanding bills. I informed the operator about the importance of getting rest. The operator was evaluated and put on restricted duty"

WMATA Tablet Setup



WMATA Tablet Setup

Onboarding and Implementation

1) Union and Staff Training
2) Onboarding Phase
    a. No management view/oversight of results
    b. Focus on creating the habit and personal results
    c. Only rule – play the game every day after clock in
3) AlertMeter is Live and a part of your current Safety Protocol
    a. Play game every day
    b. Red score – play again
    c. 2 Red Scores – have a conversation with your union rep or a manager
4) Cadence of standup meetings with Predictive Safety
5) Reporting Key Performance Indicators

AlertMeter Biomathematical Fatigue Modeling

Alertmeter® Biomathematical Fatigue Modeling
Further meeting Federal Requirements

Seamless integration with TRAPEZE and other management systems

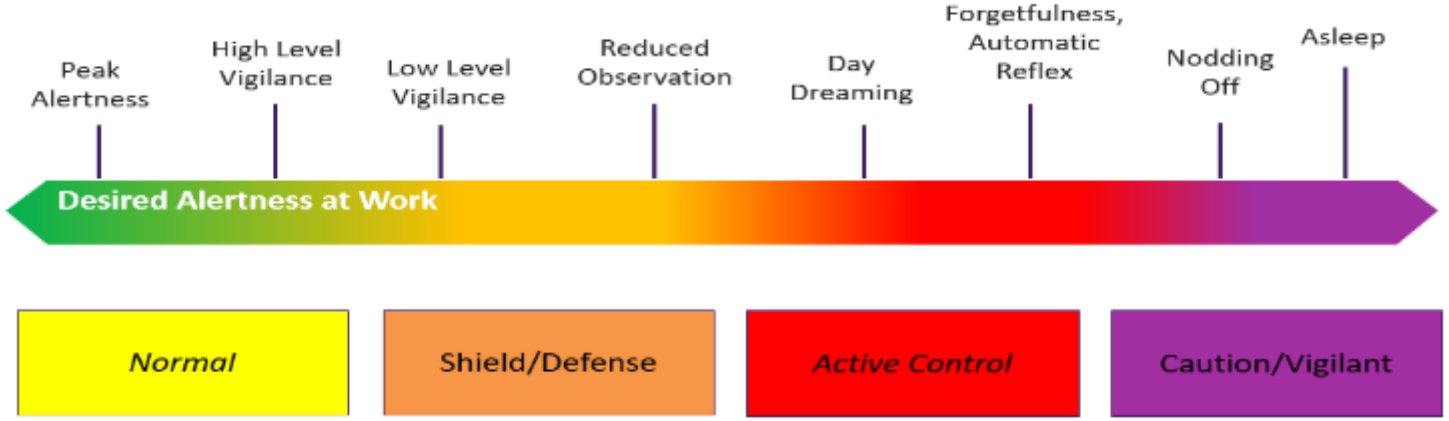
Enhances AlertMeter by providing real-time fatigue risk analysis based on factors under the control of the authority.

Alertmeter® Biomathematical Modeling

- The human body has predictable daily alertness patterns (**Circadian Rhythms**). The calculator measures inputs against biological pressure to calculate fatigue risk across a scale from low to severe.

- A fatigue management system with a biomathematical calculator evaluates how a persons work/rest/sleep schedule interacts with the natural circadian cycle. It provides management insights for fatigue across individuals, departments, contractors, or the enterprise. It can also provide actionable real-time insights for operators or supervisors.

- **Calculates Fatigue Risk across a scale of low to severe risk allowing for enterprise analytics across divisions to identify groups presenting the highest risk to the corporation**



Biomathematical Modeling to Predict Fatigue without the test

Factors Examined by the Biomathematical Model:

- The opportunity for sleep between working hours: Hours available for quality sleep after commute time, mealtime, family time, etc.?

- Alignment of sleep opportunity with the circadian cycle: How desynchronized is the body's sleep/wake cycle and scheduled work hours?

- Impact of sequential shifts worked: How much sleep debt is accumulated? What are the total hours worked in a given range of days?

- The impact of shifting work hours and the direction of the shift: Do shift cycles rotate from day to night shifts? What is the time given between shift pattern changes?

Leading Indicators used by the Biomathematical Model

- Akersted 3-Process Model applied over 14-day work history (collected via connection to timekeeping or site access systems) (Time awake, Opportunity for sleep, Circadian Rhythm position)
- Sleep Debt, cumulative days with less than 6 hours sleep (factored via AlertMeter scores when sleep data is not provided)
- Work/Recovery period ratio factored by interval length
- Ratio of total hours off shift over 14 days (Work Load)
- Shift pattern changes (Forward Rotating vs. Backward Rotating)
- Time between pattern changes
- Cumulative recovery debt
- Shift Pressure: cumulative sequential shifts factored by the length of shifts
- Recovery period between shift pattern changes and direction
- Dynamic Circadian Rhythm
- Job Risk
- Fatigue Risk related to a specific job
- Commute time

Daily/Weekly/Monthly – Fatigue Reporting Driving Better Management Around Fatigue Risk

Fatigue Risk Detail Today

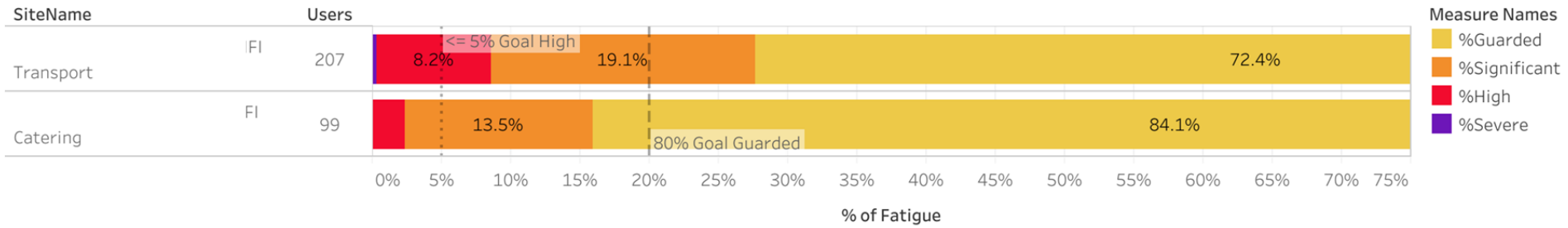
7/16/2024 3:12:38 PM GMT

Score Card

% Severe	Severe Goal	% High	High Goal
0.2%	0% Goal	6.2%	5% Goal

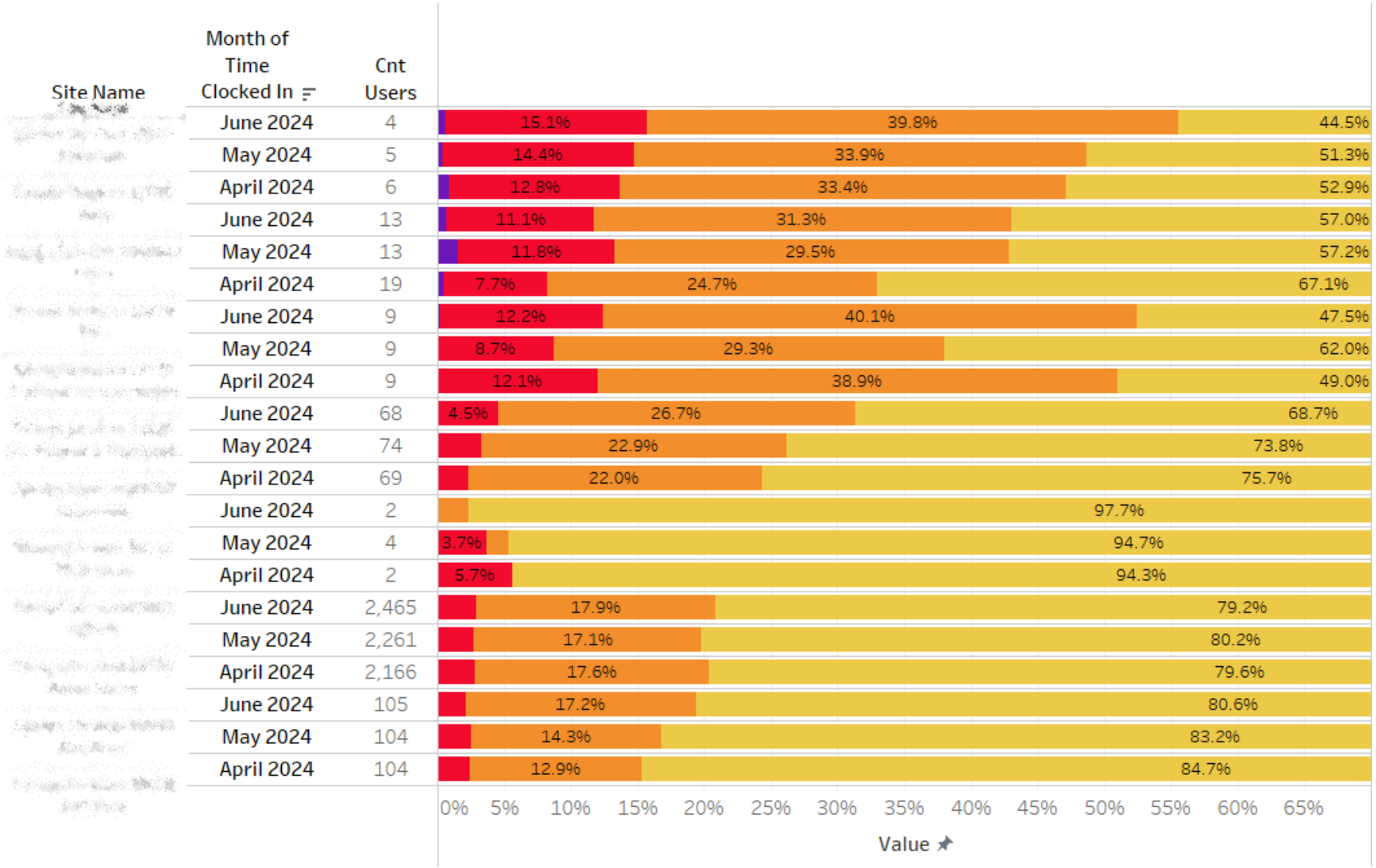
PRISM Fatigue by Site - Last 24 hours and Predicted

Severe Fatigue (Managment Notified) Goal 0% of hours worked
High Fatigue (Management Notified) Target <5% of hours worked
Medium Fatigue (Opeartor Awareness) Target <15% of hours worked
Normal/Guarded Status Target 80% or Greater



Comparative and Trending Fatigue Tracking

Last Three Months PRISM Fatigue by Site



Enterprise Fatigue Scorecards – DRIVEN BY UKG DATA

7/1/2024 11:03:21 PM GMT

Last Three Months Score Card

Month of Time..	% Severe	Severe Goal	% High	High Goal
June 2024	0.1%	0% Goal	3.0%	5% Goal
May 2024	0.1%	0% Goal	2.7%	5% Goal
April 2024	0.1%	0% Goal	2.8%	5% Goal

PREDICTIVE SAFETY, SRP 951 20th Street Unit #13467 - Denver, Colorado 80201 720-383-4963 - www.predictivesafety.com

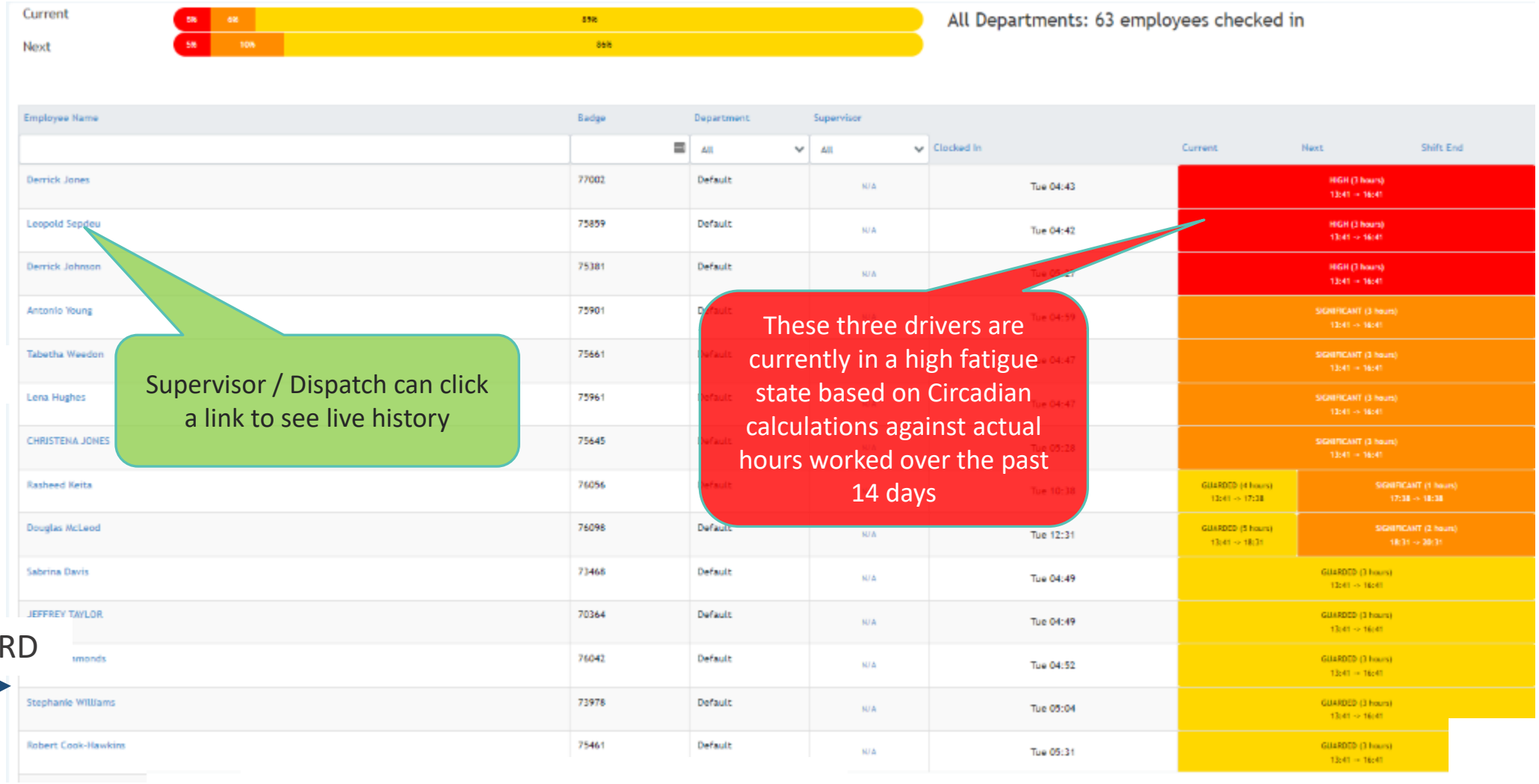
Optional Advanced Circadian Dashboard – Realtime or Reporting

Fatigue Risk Index

14 Day Work History
Clock-in/out Times
Workdays
Job Risk
Avg Commute Time

FATIGUE RISK SCORE

FATIGUE RISK DASHBOARD



Optional Individual Fatigue Map with Recommended Countermeasures

Required Countermeasures

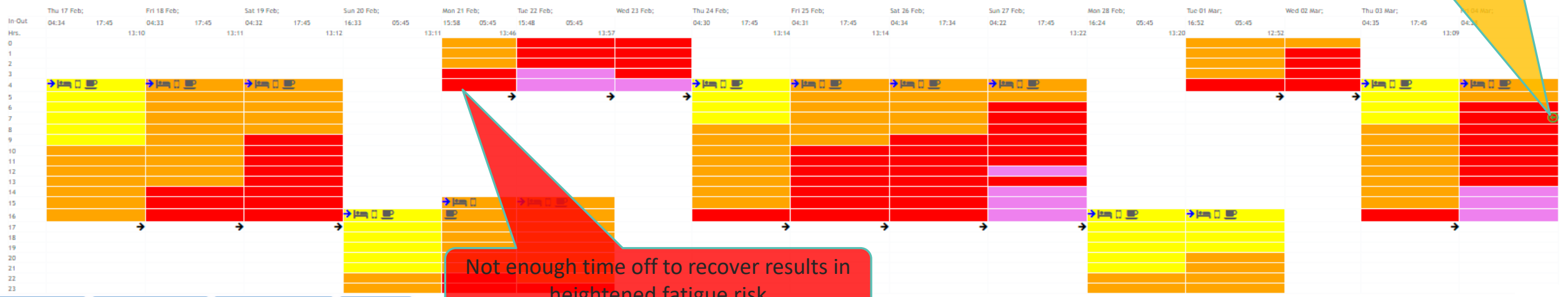
- [ ] (AW) Report fitness condition to dispatch/supervisor every 30 minutes
- [ ] (AW) Wash your face and hands with cold water every 2 hours in the dumping area or rest area with the permission of the supervisor
- [ ] (AW) Change job settings every 3 hours
- [ ] (AW) Stretching in the cab for 2 minutes, every 2 times loading
- [ ] (AW) Stretching 15 minutes before returning to work during meal and rest
- [ ] (AW) Drink 500ml of white water every 1 hour
- [ ] (AW) Paired with colleagues with good fatigue status
- [ ] (AW) Drink a cup of coffee during meal and rest and 4 hours before the shift ends
- [ ] (AW) Sleeping in the rest area

Actively managing fatigue by reviewing and recommending countermeasures

Accept

Biu, Thomas

History Recap Pulled by Admin, BUMA @ 04-03-2022 / 07:29



Current Time – Transitioning to Severe before end of shift

Not enough time off to recover results in heightened fatigue risk

Edit Employee | Recalculate History | Recent Shift History | Force Gate

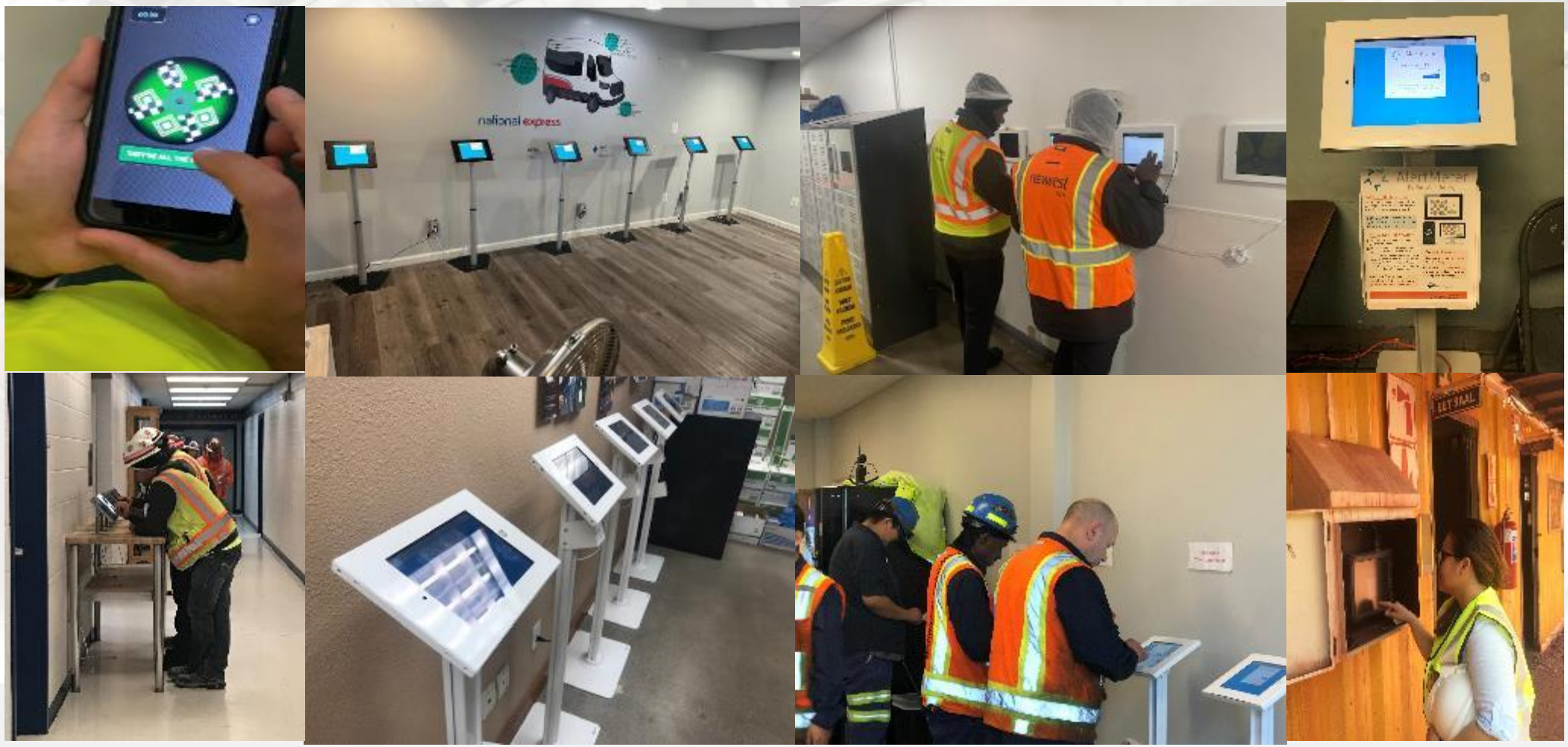
AlertMeter

Supporting Slides

- AlertMeter In Action
- Case Studies
- Background and Test Design
- Reasons for Adoption
- Enterprise Analytics
- Science
- FAQ’s

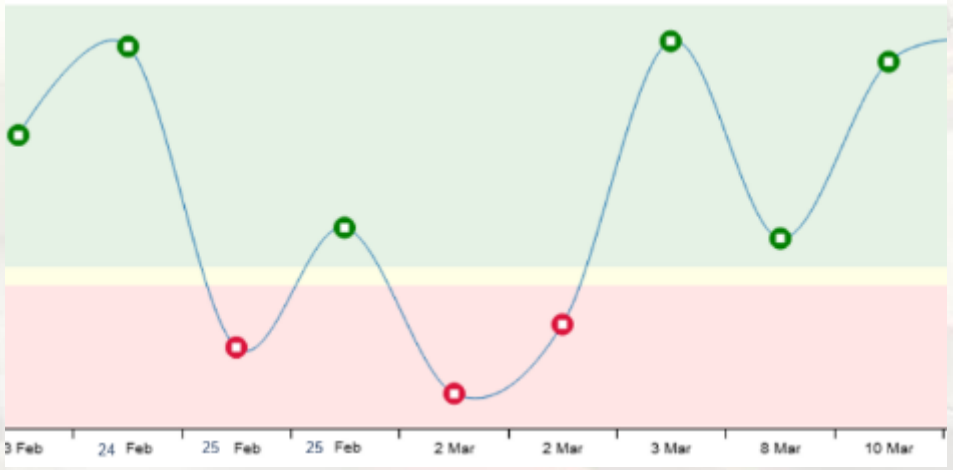
ALERTMETER IN ACTION

Everybody plays the game at least once a day



Device Agnostic, Testing Process Optimized for Setting

RULES OF THE GAME



Rule 1 – Play the game every day before pullout

Rule 2 – If you get a red dot, play again

Rule 3 – If you get a **second** red dot

Stop Playing

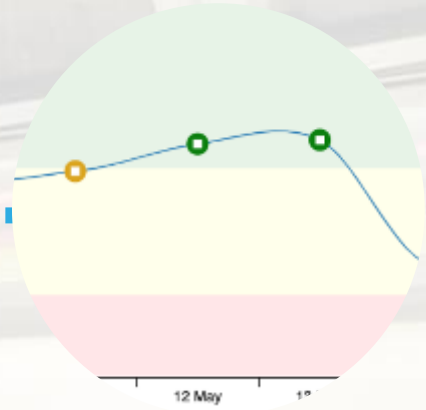
Find a Manager and have a conversation

Play as Fast as you can, as accurately as you can.
Speed / Responsiveness is just as important as accuracy.

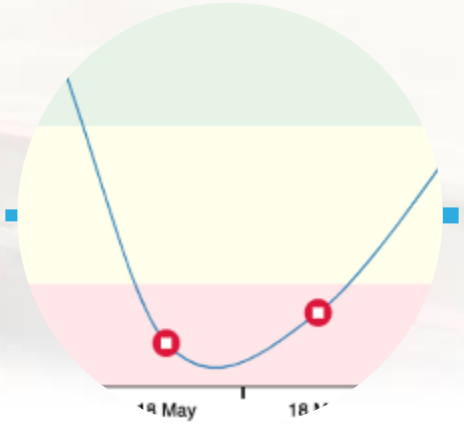
Workflow

1
45 second test at start of shift

2
Employee alertness levels compared to personal baselines



3 In cases of severe deviation, employees score red



4 Designated supervisor receives email or text

Text Message
Today 11:33 AM

Peri Eryigit scored below their baseline on November 24 at 11:26 AM.

5
Supervisor utilizes Fatigue Checklist to Evaluate Fatigue

Manager and Dispatch Visibility – Real-time Dash

Employees Reporting In 170 (of 171), 99% Participation

Actions...

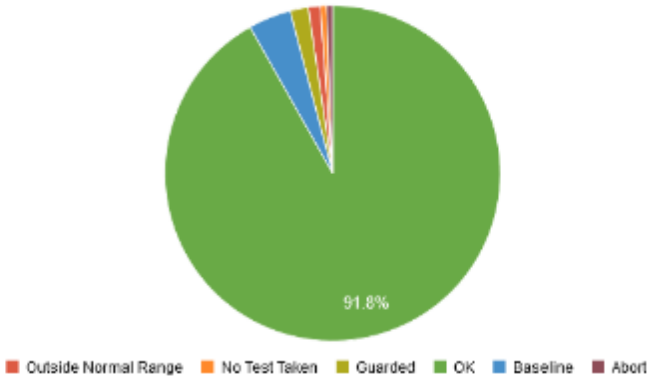
Sh

Search:

	In Shift	Employee	Clocked In Time	Test Time	Status	Retest	Survey Notification
☐		Brian		Tue 05:16	Outside Normal Range		
☐		ROBINSON		Tue 04:02	Outside Normal Range		
☐		[illegible]		Tue 04:43	Abort		
☐	✔	Williams	Tue 13:27	Tue 12:25	Guarded	✔	
☐	✔	man	Tue 12:56	Tue 12:47	Guarded		
☐		Wilson		Tue	Guarded		
☐	✔	Johnson	Tue 14:36	14:27	OK	✔	
☐	✔	Smith	Tue 12:28	Tue 12:01	OK	✔	
☐		Paul		Tue 07:02	OK	✔	
☐		DAVIS		Tue 06:31	OK	✔	
☐		Stepl		Tue 05:50	OK	✔	
☐		Don		Tue	OK	✔	

Outside Normal Range Note

Risk Profile



Two Operators out of 170 Required Intervention Before Pullout

Example of a Manager Interaction

Show 25 entries

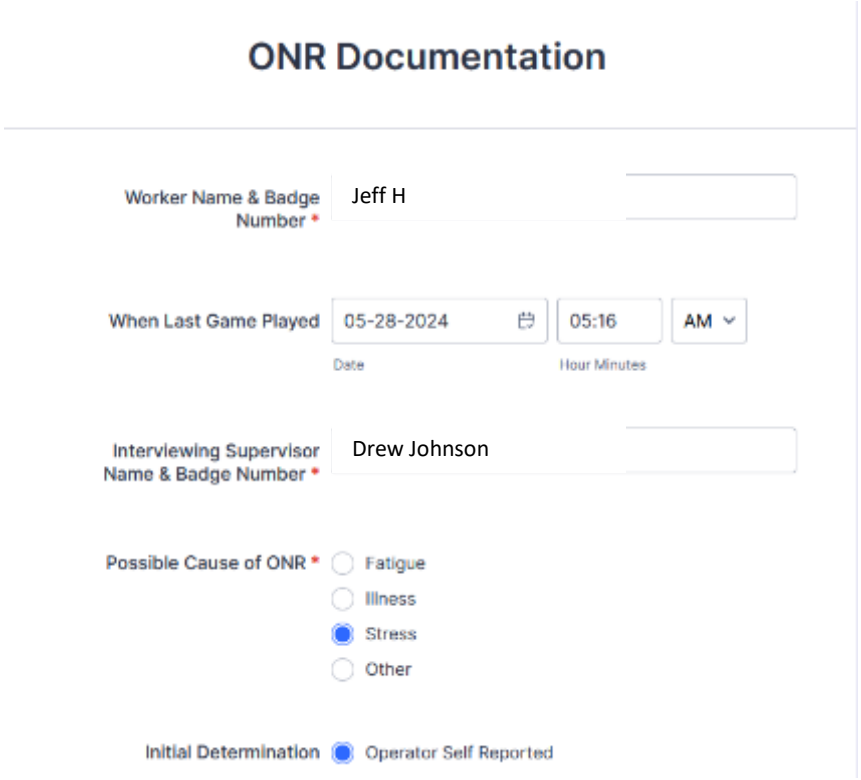
Search: jeff

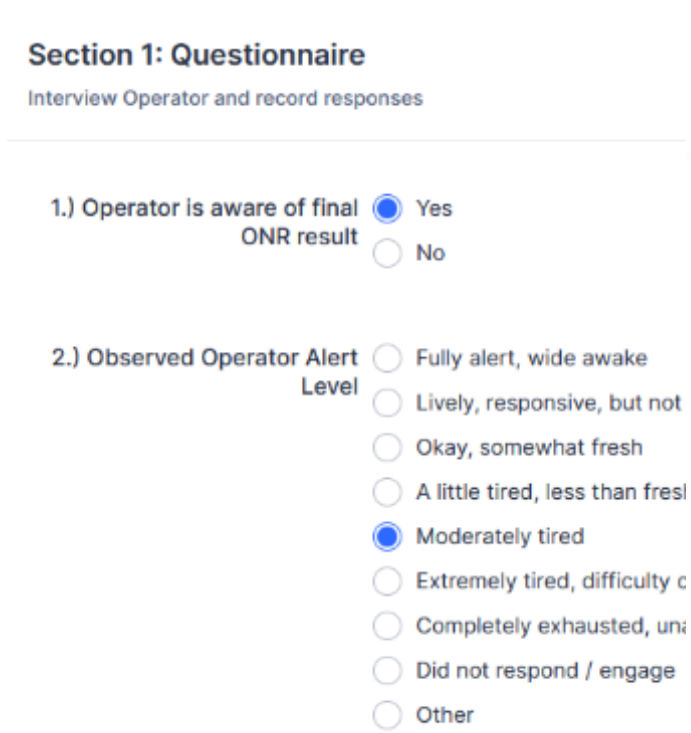
	In Shift	Employee	Clocked In Time	Test Time	Status	Retest	Survey Notification
☐		Jeff H		Fri 07:48	Outside Normal Range		
☐		Jeff T		Fri 08:20	OK		

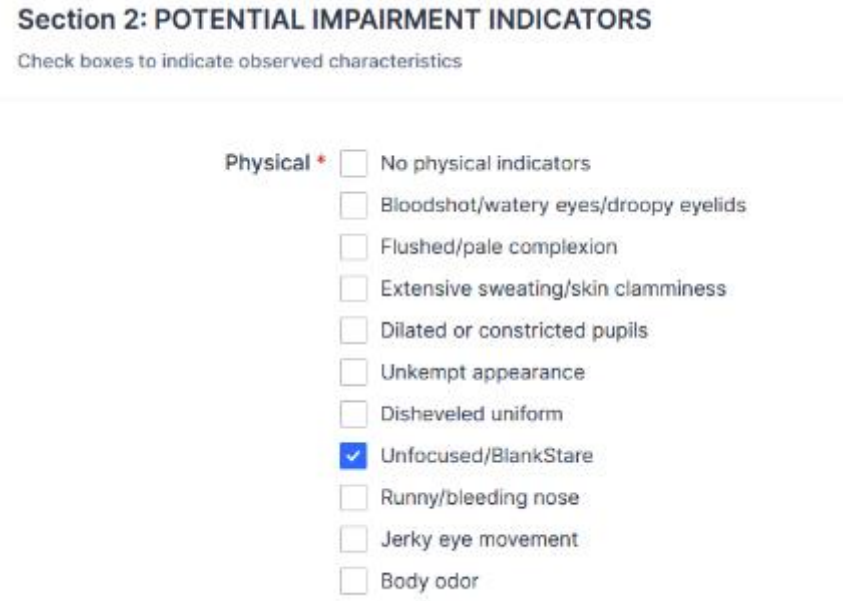
Jeff Hodges scored ONR 2X

1. Click on his name you can see he tried twice
2. He got 2 ONR's today, Jeff must report to a manager the manager has been notified.
3. The conversation with the manager will determine his disposition for the day.

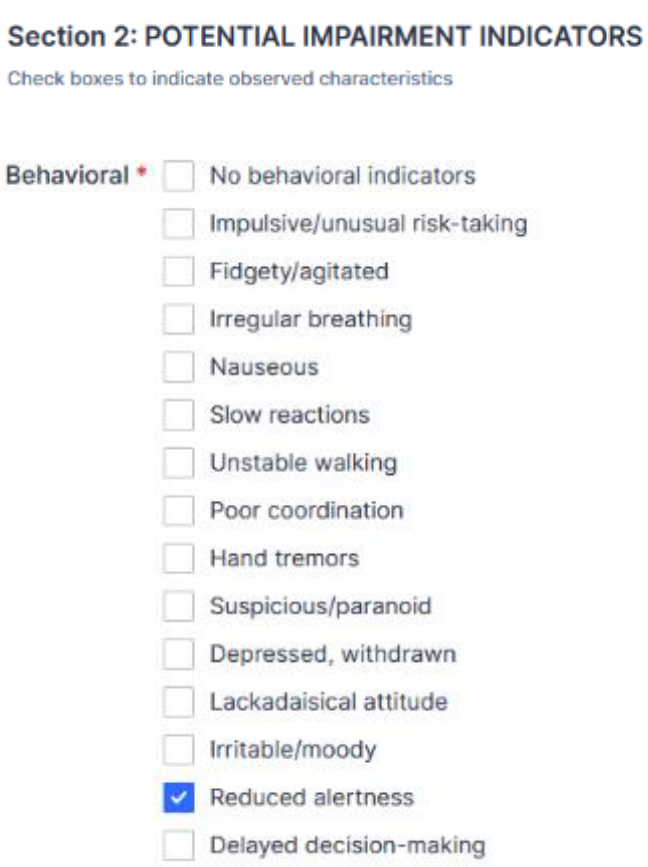
Example of a Manager Interaction

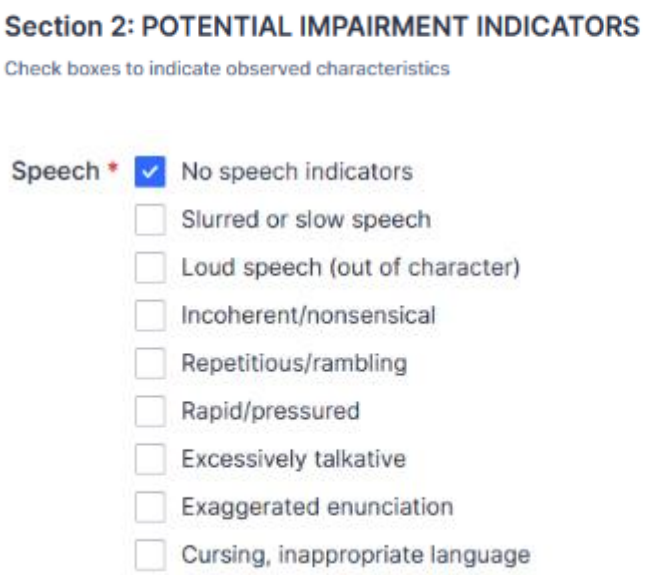


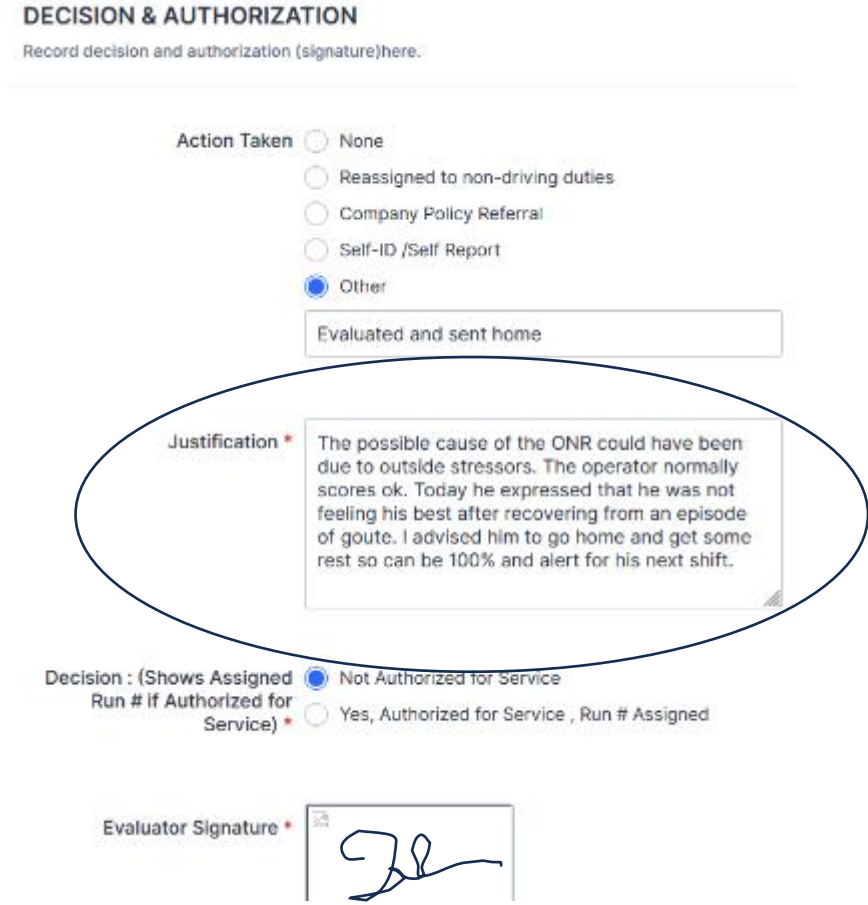




Example of a Manager Interaction

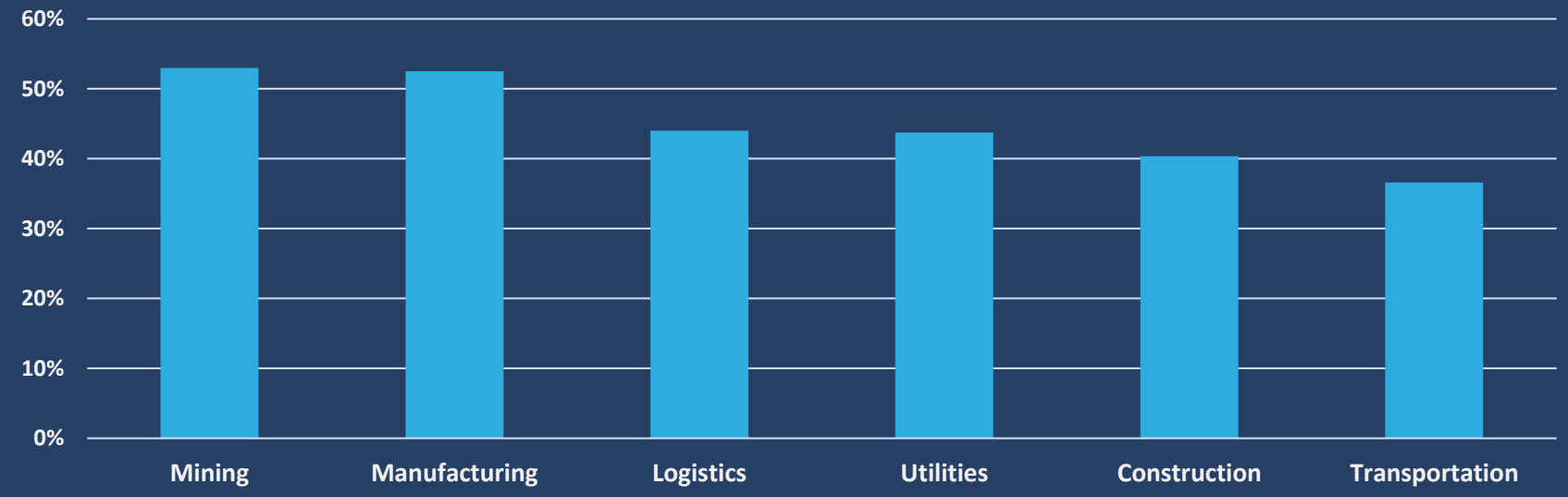




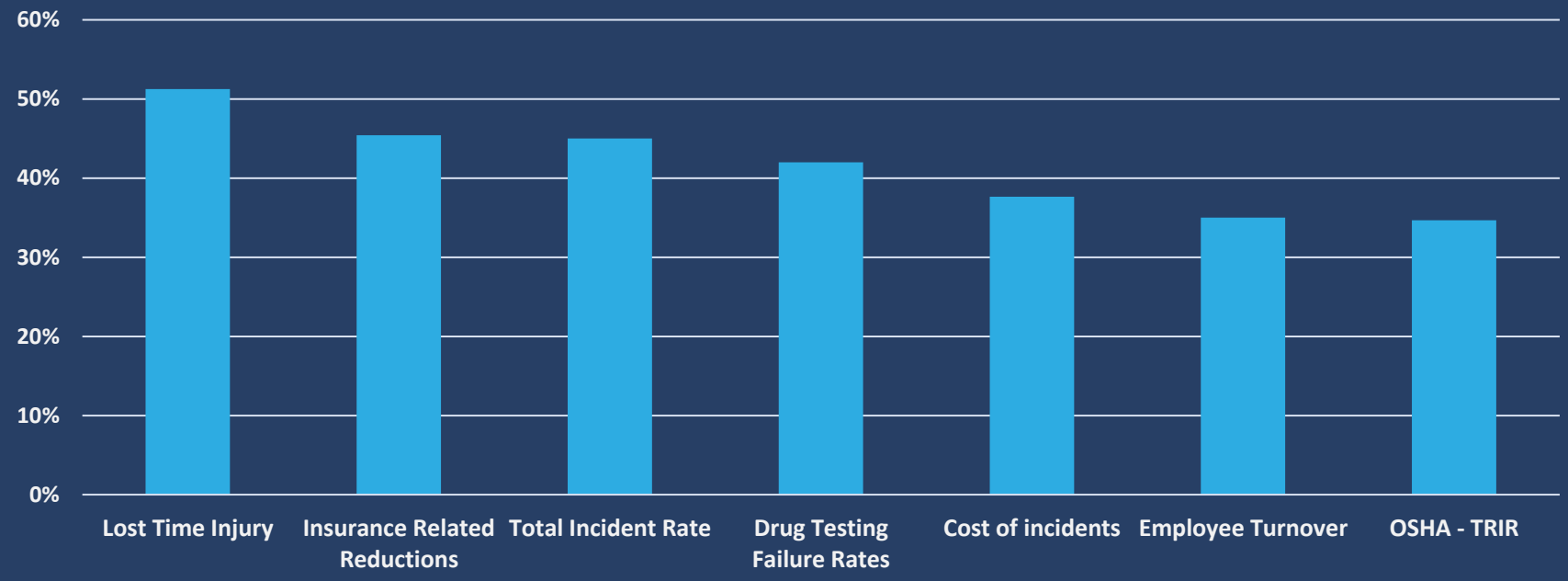



CASE STUDIES

AVERAGE KEY METRIC REDUCTION FOR INDUSTRIES SERVED



KEY METRIC REDUCTIONS AVERAGED ACROSS INDUSTRIES SERVED



KEY METRIC REDUCTION DETAILS

INDEPENDENT CASE STUDIES

INDUSTRY	METRIC USED	IMPACT	DETAILS
INCIDENT RATE			
Manufacturing / Logistics	OSHA - TRIR	-50%	Based on a YOY 4 year study. 2 years prior, 2 years after
Transportation	OSHA - TRIR	-22%	Based on data from one year before and one year after implementation
Construction	Total Number of Incidents	-37%	Includes injury and non injury. Comparative study of 3 identical projects, 1 using AlertMeter
Mining	Lost Time Injury Rate	-27%	5 year comparison between country / industry sector and mine site
Utilities	Total Incident Rate	-21%	Based on 1 year before and after study
Utilities	Total Injury Rate	-46%	Based on 1 year before and after study
Utilities	Collisions per million miles	-77%	Based on 1 year before and after study
Energy / Transport	Auto Vehicle Incident Rate	-45%	Based on 1 year before and after study
Mining	Lost Time Injury compared against sector average	-71%	4 year study at platinum open pit mine comparing LTI rate against all South Africa Platinum mines
Mining	Lost Time Injury compared against country average	-61%	4 year study at platinum open pit mine comparing LTI rate against all South Africa mines
CLAIMS - WC (Workers Comp), AL (Auto Liability), GL (General Liability)			
Energy / Transport	WC, AL, GL	-48%	Based on data from one year before and one year after implementation
Manufacturing / Logistics	WC	-30%	Based on a YOY 4 year study. 2 years prior, 2 years after
Manufacturing	WC	-70%	Reduced claims cost by 50% year 1 and additional 20% year 2
Energy / Transport	Total # of Claims	-26%	Based on data from one year before and one year after implementation
COST OF INCIDENTS (INJURY AND NON INJURY)			
Manufacturing / Logistics	Average Per incident Cost	-52%	Measured average injury and non injury incident cost for 24 months prior and 26 months after
Energy / Transport	Average Per incident Cost	-30%	Based on a 1 year before and one year after study
Utilities	Overall Cost of Incidents	-31%	Based on a 1 year before and one year after study
HR and DRUG TESTING			
Construction	Random drug test failure rates	-34%	Based on a comparative study of 3 identical projects in same market, 1 using AlertMeter
Construction	Pre employment drug test failure rates	-50%	Based on a comparative study of 3 identical projects in same market, 1 using AlertMeter
Manufacturing	Dollars spent on drug testing	-90%	Eliminated random testing and removed THC from pre employment
Manufacturing	Employee Turnover	-35%	Based on a YOY 4 year study. 2 years prior, 2 years after
Manufacturing	Productivity	+11%	Based on a YOY 4 year study. 2 years prior, 2 years after. No additional staff or equipment
SUBJECTIVE FEEDBACK			
Manufacturing / Logistics	"Interaction between leadership and employees is greatly improved and employees embrace the system" - VP Safety		
Manufacturing / Logistics	"Provides an extra layer of protection in states where marijuana is legal" - VP Safety		
Construction	Out of 150 workers surveyed, 20% reported improved sleep and reduced alcohol consumption		
Manufacturing	"Shot across the bow that we are serious about your safety" - CEO		
Transportation	"Our insurance provider recommends rolling AlertMeter out enterprise wide" - Corporate Workers Compensation Program Manager		

Data provided by client internal teams, 3rd party auditors and other independent analysts.

Predictive Safety

DELTA

Currently 3500 Operators with Onboard Services

2024 Expanding to 27,000 Below and Above Wing

Hartsfield Jackson Runway Transit Fully Deployed

Demonstrated reductions in incidents and aircraft damage

newrest CATERING

unifi

Sky Café

MAINLINE AVIATION FLIGHT SERVICES

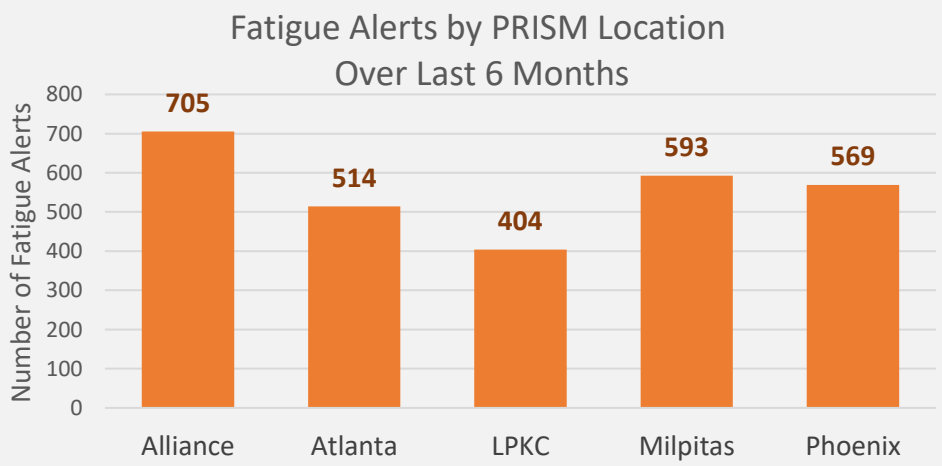
PREDICTIVE SAFETY JOURNEY TO SAFER WORKPLACE

Recognize Risk:
ConGlobal recognizes that fatigue is a significant risk across its operations

Identify Risk:
By using the PRISM/AlertMeter® system, ConGlobal was able to identify **2785 fatigue** risk conditions over the last 6 months

- PRISM has been implemented at 5 locations over the last 6 months: Alliance, Atlanta, LPKC, Milpitas, & Phoenix
- PRISM has been monitoring approximately 350 workers across the 5 locations
- PRISM monitored fatigue risk across 35,000 shifts in real time

PRISM/AlertMeter® sends out a fatigue alert to the location management team 1 hour prior to the fatigue risk condition.



Based on the 10 incidents over the same period last year, ConGlobal was able to reduce their TRIR by ~72% for this population in the last 6 months.

Reduced from 5.98 to 1.70 incidents per 200,000 worker hours

ConGlobal can potentially achieve an incident cost avoidance of ~$4M annually by implementing PRISM and/or AlertMeter® across all operations.

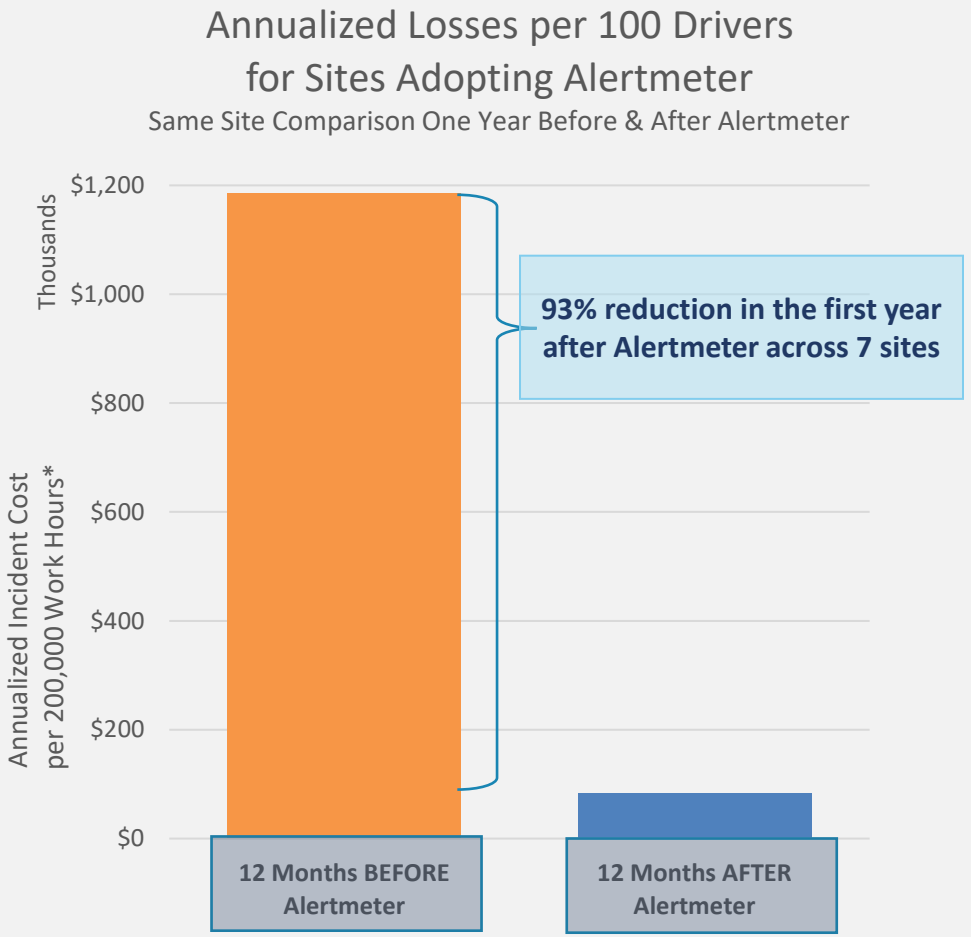
- TRIR Reduction = 4.18 per 100 employees (2200 total field workers)
- Cost Avoidance Calculation: 5.98-1.7 *42000 * 22 (# of field workers) = $3,954,720
- Based on Dept of Labor Statistics of $42,000 average cost per Recordable Incident.

Success Story Transportation

"We think the AlertMeter® is the best bang for the buck of any of our safety practices. The feedback it gives to our employees motivates them to take responsibility for their off-time lifestyle behavior. They are definitely arriving more alert and more rested than they used to."

Dickson Morley, SH&E Director Savage Services

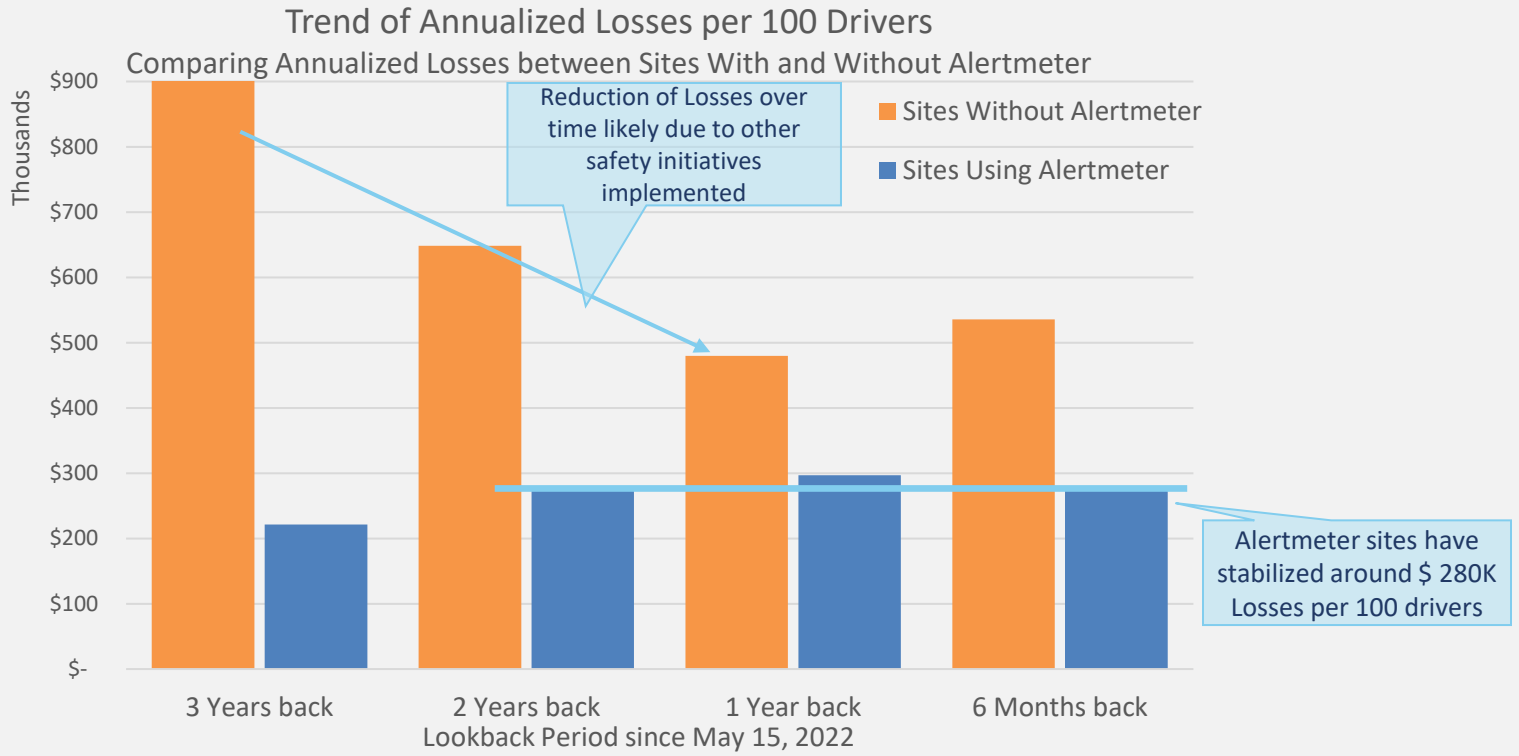
Fleets, rail and marine operations. 400 facilities in the US.



**Work Hours: All incident data normalized to 200,000 work hours per OSHA Incident Frequency Rate, (100 workers X 2000 hours/year)

Reduced losses by 93%
in the first 12 months
on AlertMeter

Comparing losses between AlertMeter sites and Non-AlertMeter sites within the same organization



Sites Without AlertMeter

Sites With AlertMeter

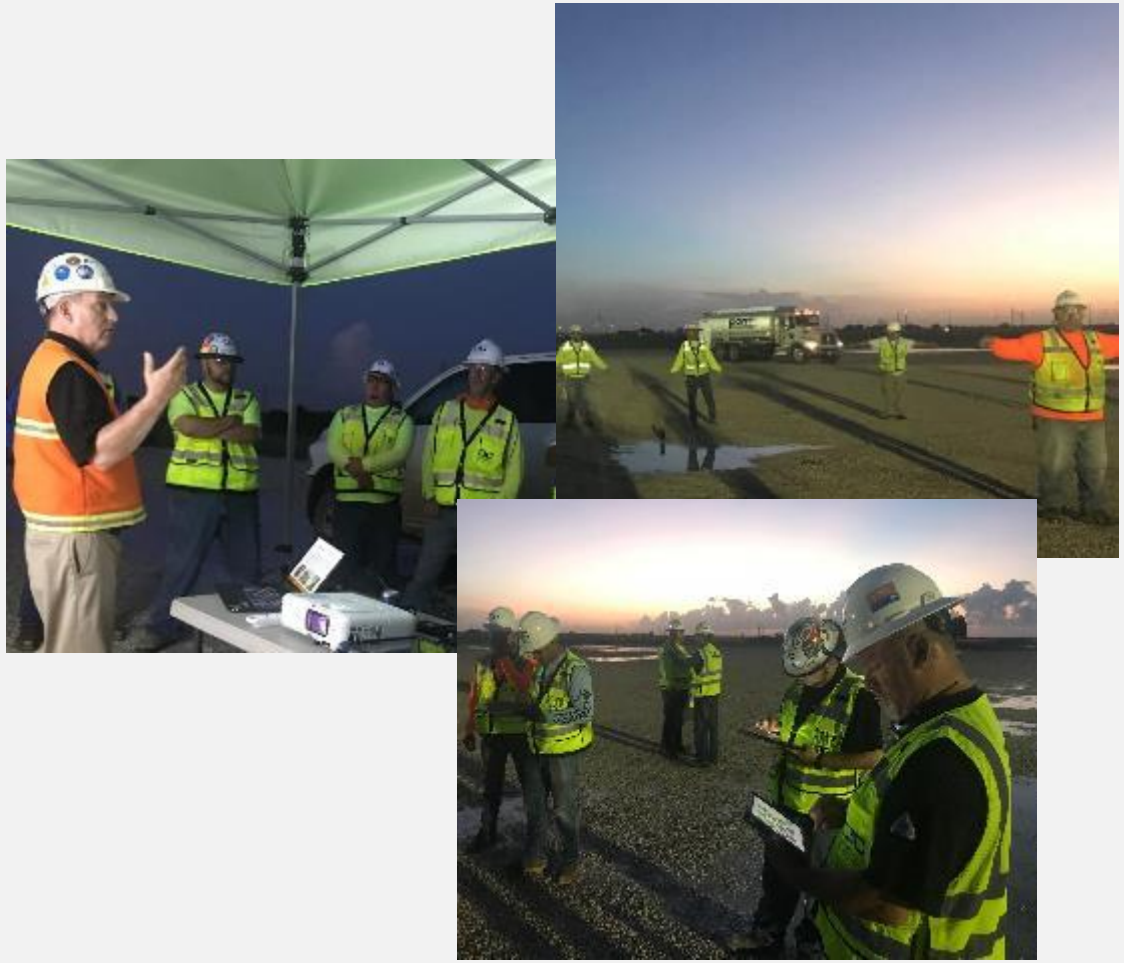
The sites using AlertMeter provide same services and function to the enterprise as those not using AlertMeter

Safety initiatives were initiated at ALL sites over the past three years.

The AlertMeter sites performed better than non AlertMeter sites

Success Story: Global Construction Company

- Three Month Study
  - **Three identical projects in South Florida**
  - **One project uses AlertMeter®**
- Results:
  - **37% fewer incidents at the AlertMeter® Project**
  - Quality was better at AlertMeter® project
  - 34% lower on random drug test failure, 50% lower on pre-employment failure



20% of participants stated improved sleep and reduced alcohol use.

Success Story: Global Construction Company

- Survey Results:
  - "AlertMeter® **improved my safety**, I am safer, I feel safer."
  - 50% agree or strongly agree
  - 40% Neutral/10% Disagreed
  - **20% of respondents stated improved sleep and reduced alcohol use.**

Energy and Telecommunications

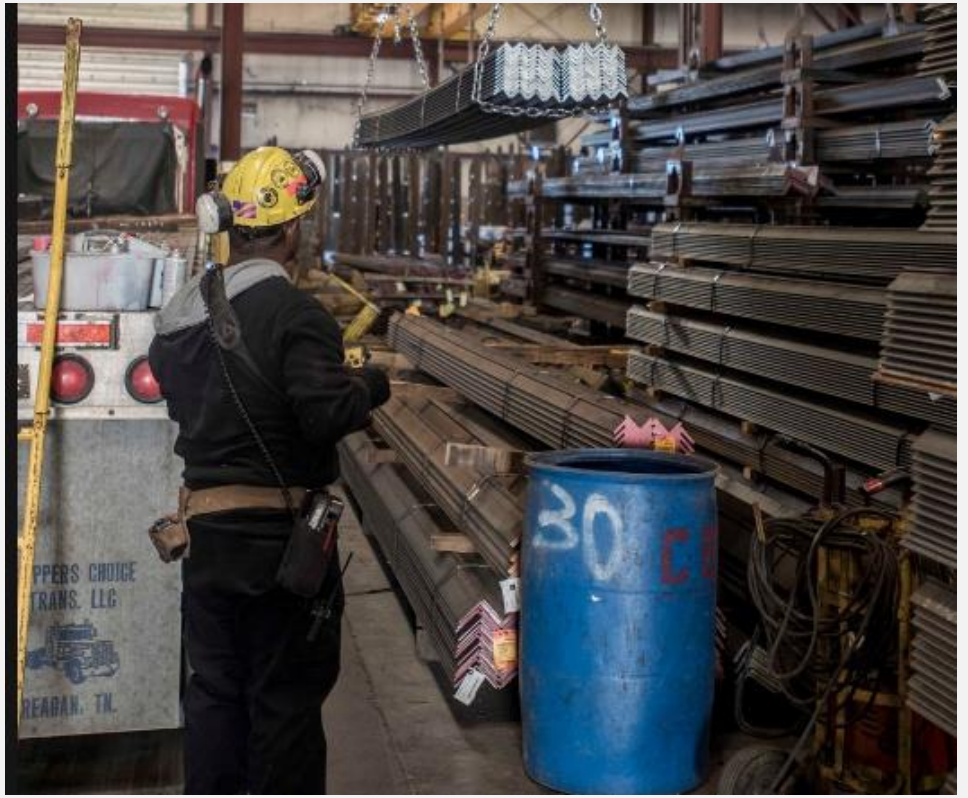
Success Story: Steel and Pipe Supply

Steel and Pipe Supply has been utilizing AlertMeter® for all their locations throughout the United States for the last year and a half.

In 2023, their Tulsa Flat Roll location was understaffed yet had high production goals.

Temperatures were extreme and fatigue was inevitable.

They could not send people home without impacting production.



Success Story: Steel and Pipe Supply

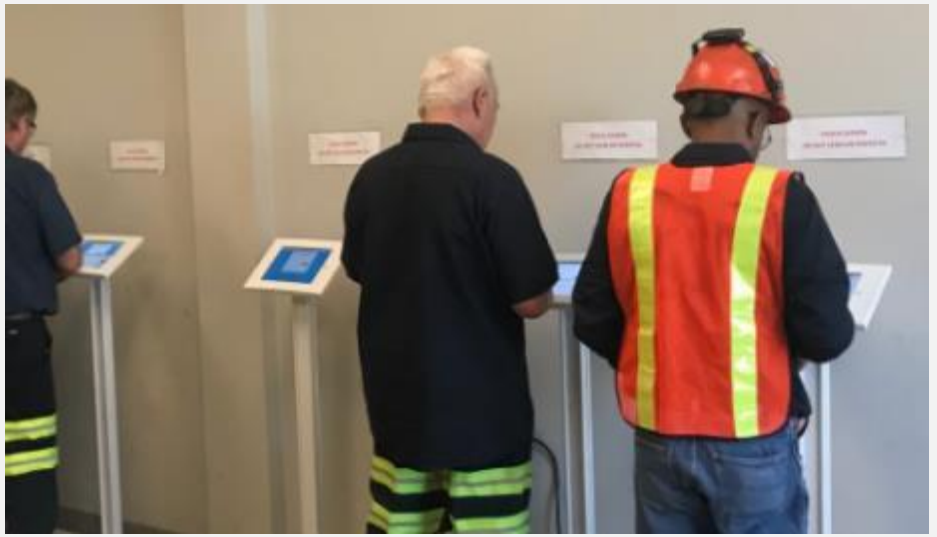
STEEL AND PIPE SUPPLY

- At Tulsa Flat roll – Site 4
- Average Notified ONR Rate is 2.5% for other six sites.
- ONR Rate of 8.5% for the quarter
- Hit production records
- **Incident Rate = ZERO**

INCIDENT RATE WAS ZERO BECAUSE THE PEOPLE NEEDING COACHING WERE BEING IDENTIFIED AND MANAGED

Distribution Warehouse Transportation

- **30% reduction** in Workers Compensation Insurance claims
- **50% reduction** in Total Recordable Incident Rate (1.6 down to 0.8)
- **52% reduction** in total average cost of incidents



40 warehouse / distribution centers supplying construction supplying any industry that needs steel. (Oil, Construction, Mining etc.)

BACKGROUND AND TEST DESIGN

AlertMeter Background

Invented as a response to the Exxon Valdez incident

(vessel pilot had a rough night prior to the accident)

Based on science originally developed by NASA to assure that astronauts are fit for duty

Funded by the National Institute for Occupational Safety and Health

(The science arm of OSHA)

Field tested for 10 years in the South African mining environment

(80 million worker hours)

14 Patents

AlertMeter®

Design Requirements

1. AlertMeter must **NOT be a medical test**
2. AlertMeter must be **non-discriminatory** and **language independent**
3. AlertMeter must **NOT contain personally identifiable information**
4. AlertMeter must be able to be **executed in under 90 seconds (Today it's 45 seconds)**
5. AlertMeter must have a **low annoyance factor**

AlertMeter®

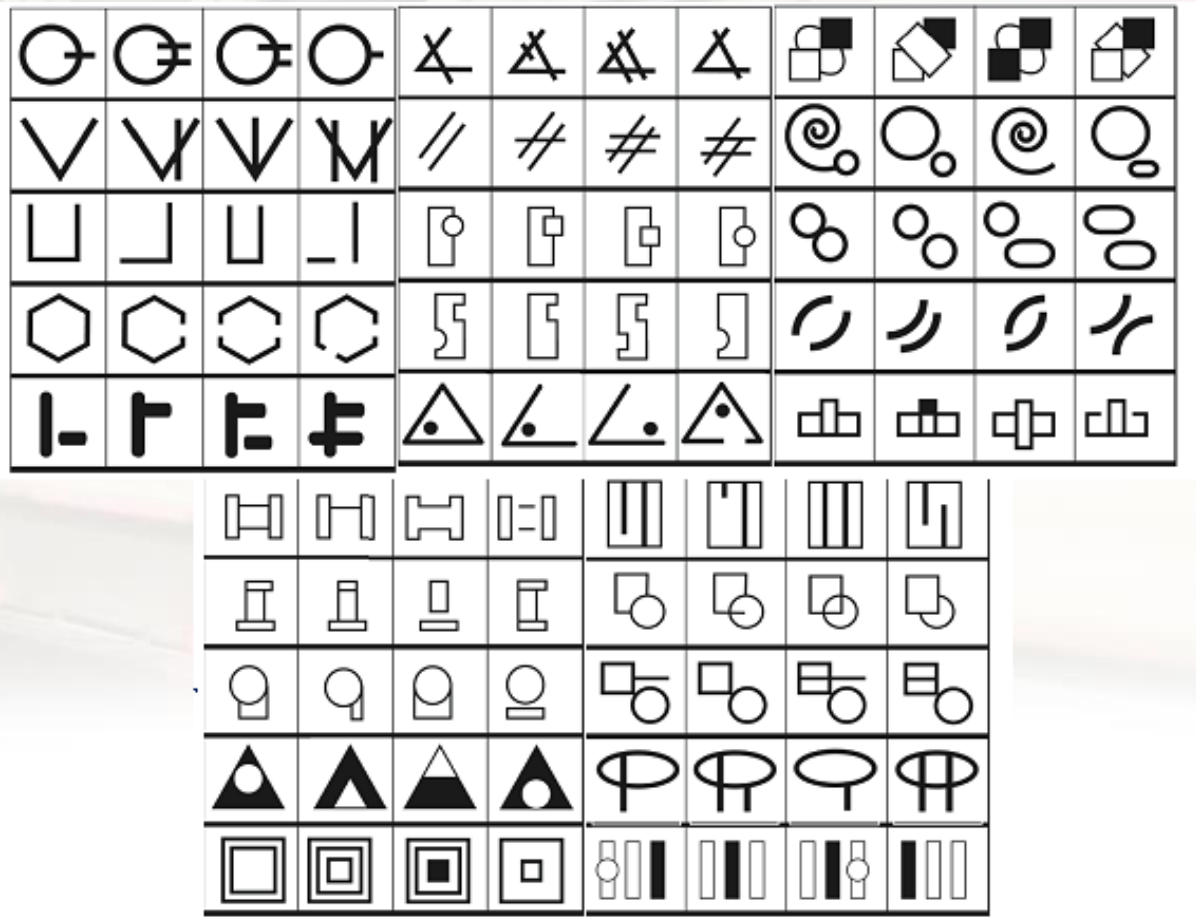
Test Design

The number of shapes are finite.

You get better but you can’t memorize

As performance improves, the test gets better at recognizing abnormal behavior.

Requires 10 tests/4 days to establish a baseline



AlertMeter®

Can you game the system? No

AlertMeter® Develops a "Brain Print."

As you learn the test, it also learns about you.

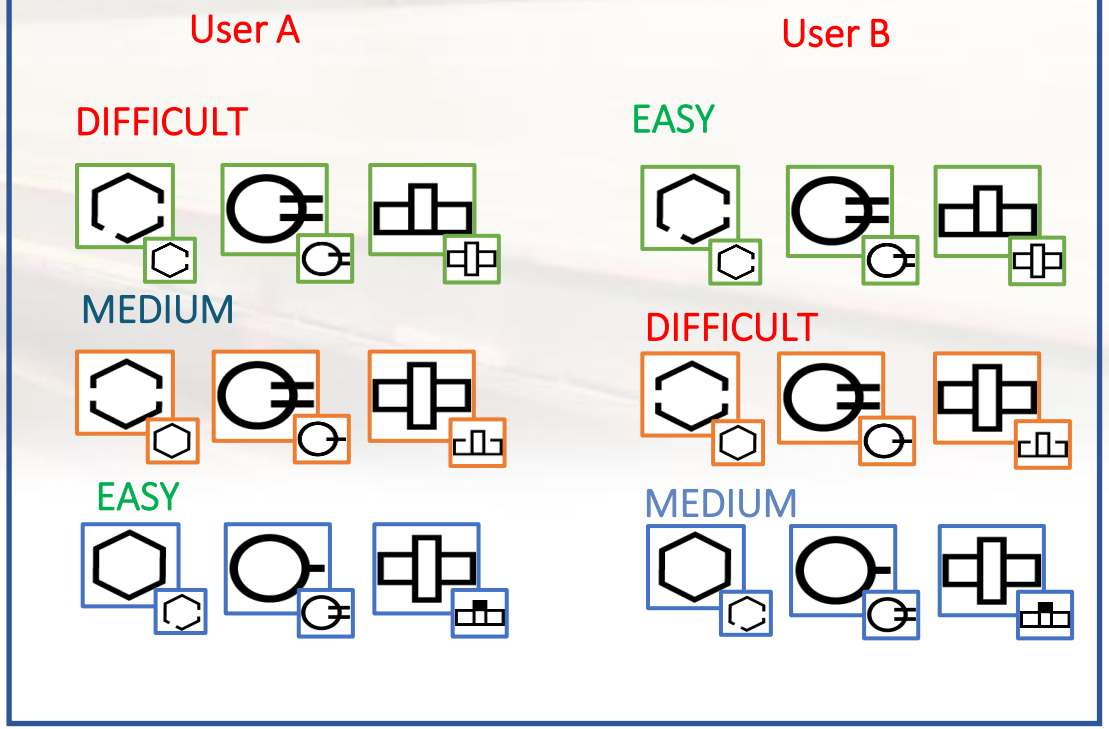
Patented Technology (14 Patents, 3 Pending) ● Language Independent ● Proven through over 80 million worker hours

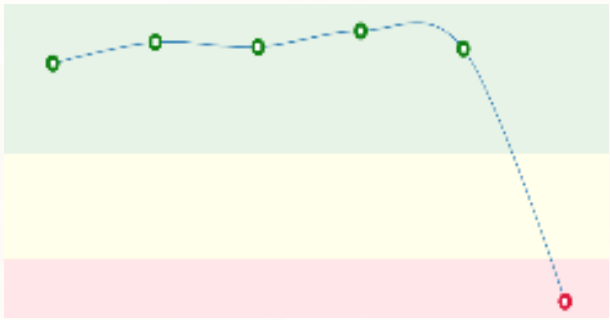
Results scored against a PERSONAL BASELINE

The test learns each person's behavior patterns

Algorithmic evaluation of personal responses to patterns and shapes

Never compares scores between individuals





You can get every answer correct but still score in the red.

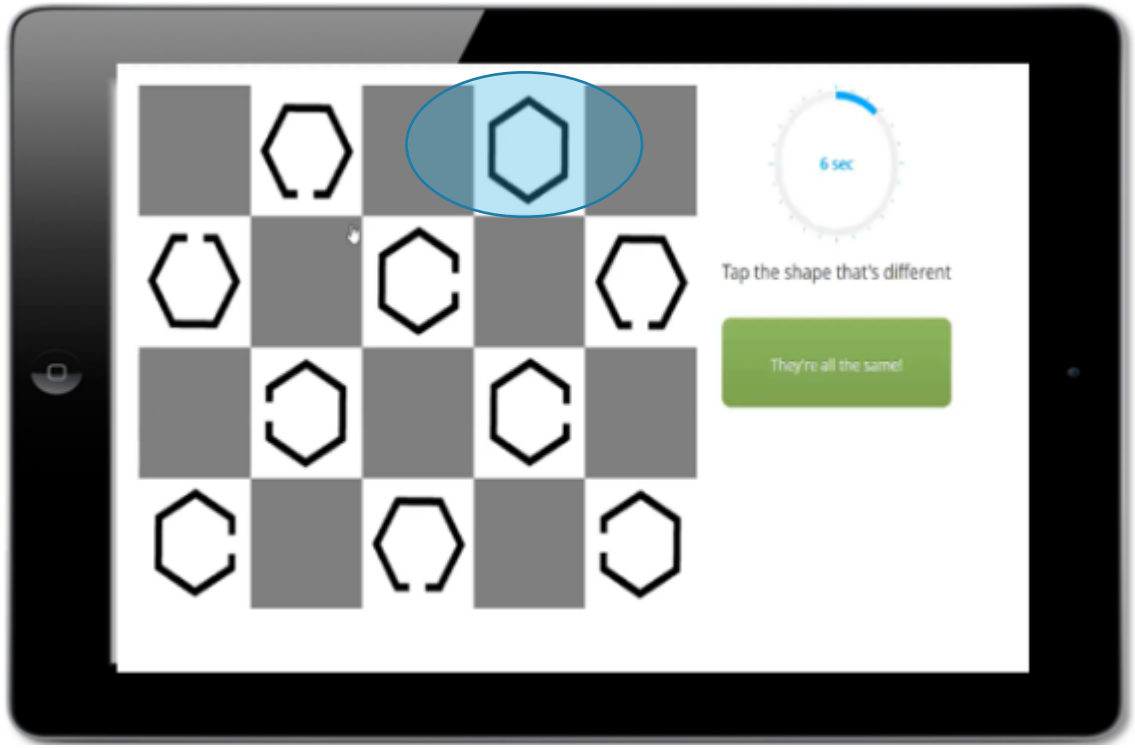
Why

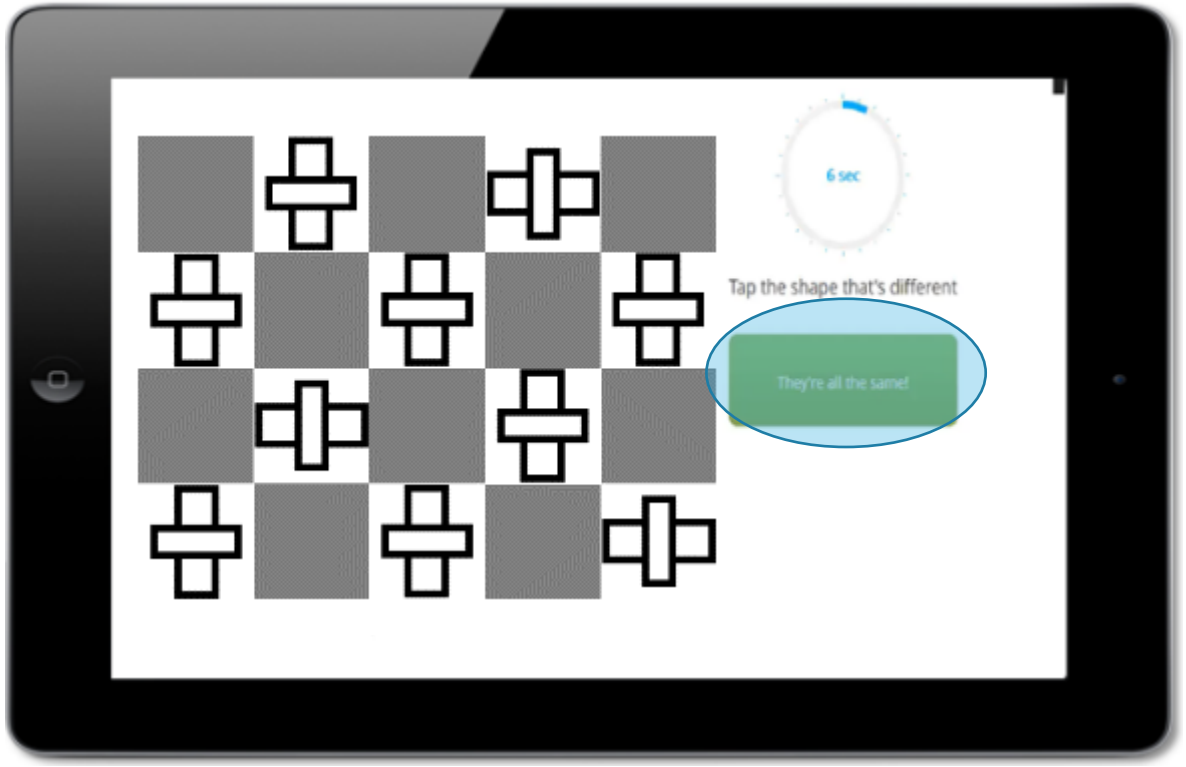
Because your timing on your easy and hard shapes is different today

Founded on Science from NASA. Developed under grants from NIOSH.

Test Design

AlertMeter®

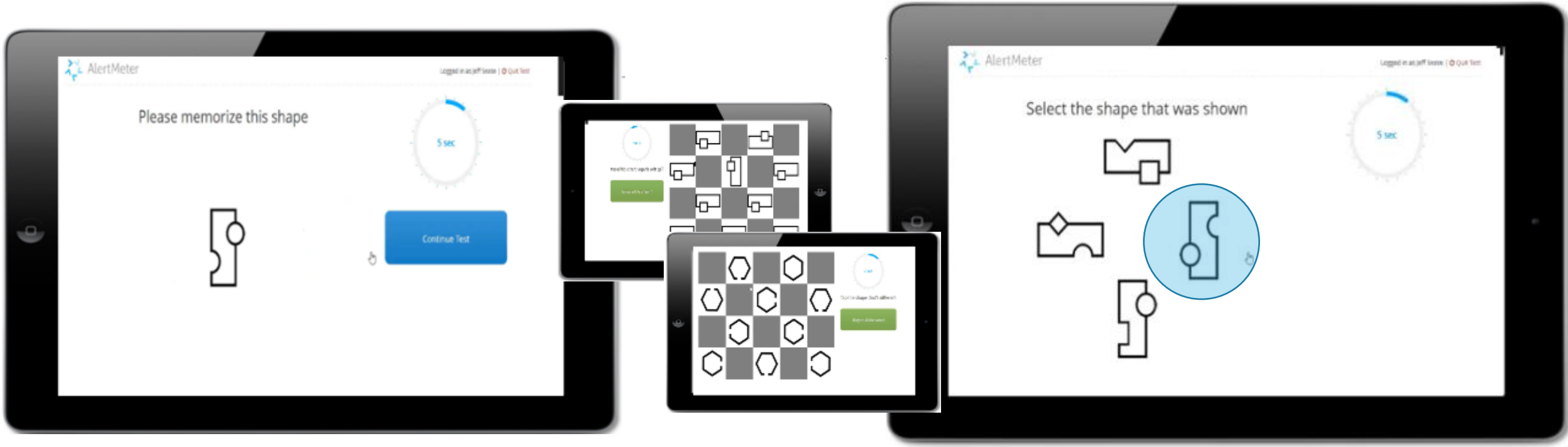




Determine if all shapes presented are the same, or if one shape is different

21 Questions, 4-6 Seconds to answer each question

Test Design

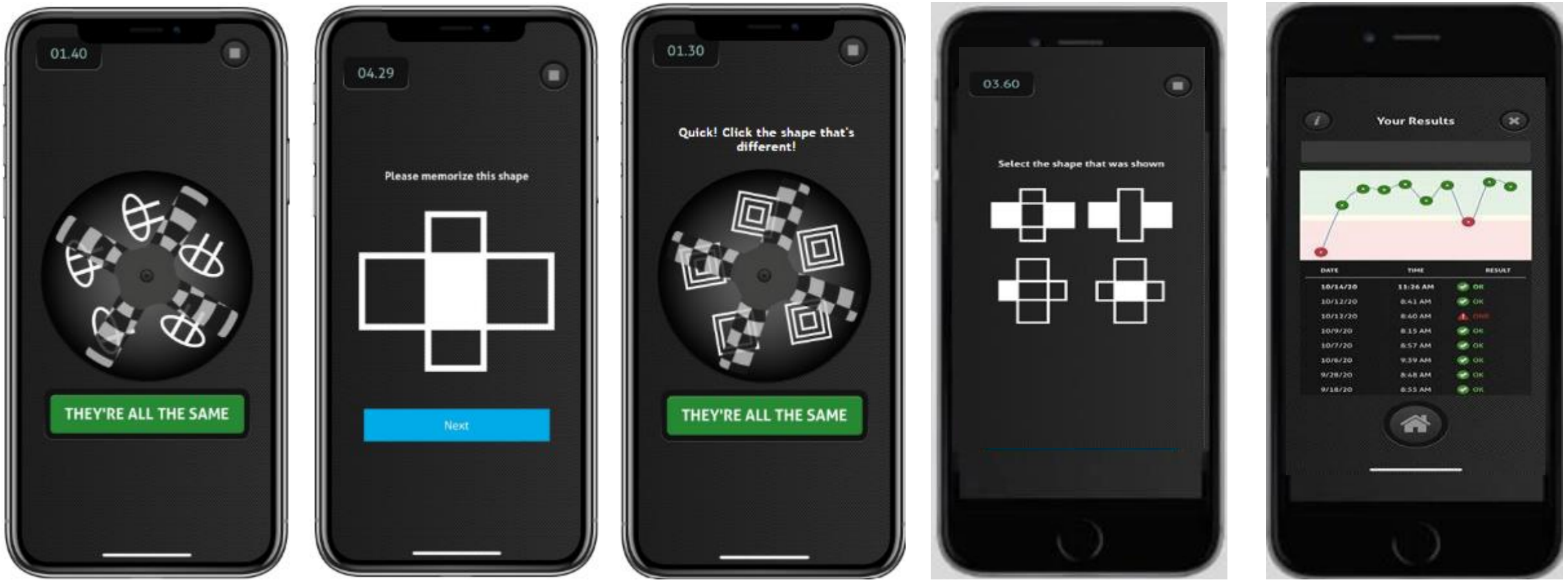


Memory Challenge

Tests short term memory and speed of switching executive functions

5 Challenge Screens

AlertMeter®



Mobile Test Requires Different Design

Shapes move since screen is smaller

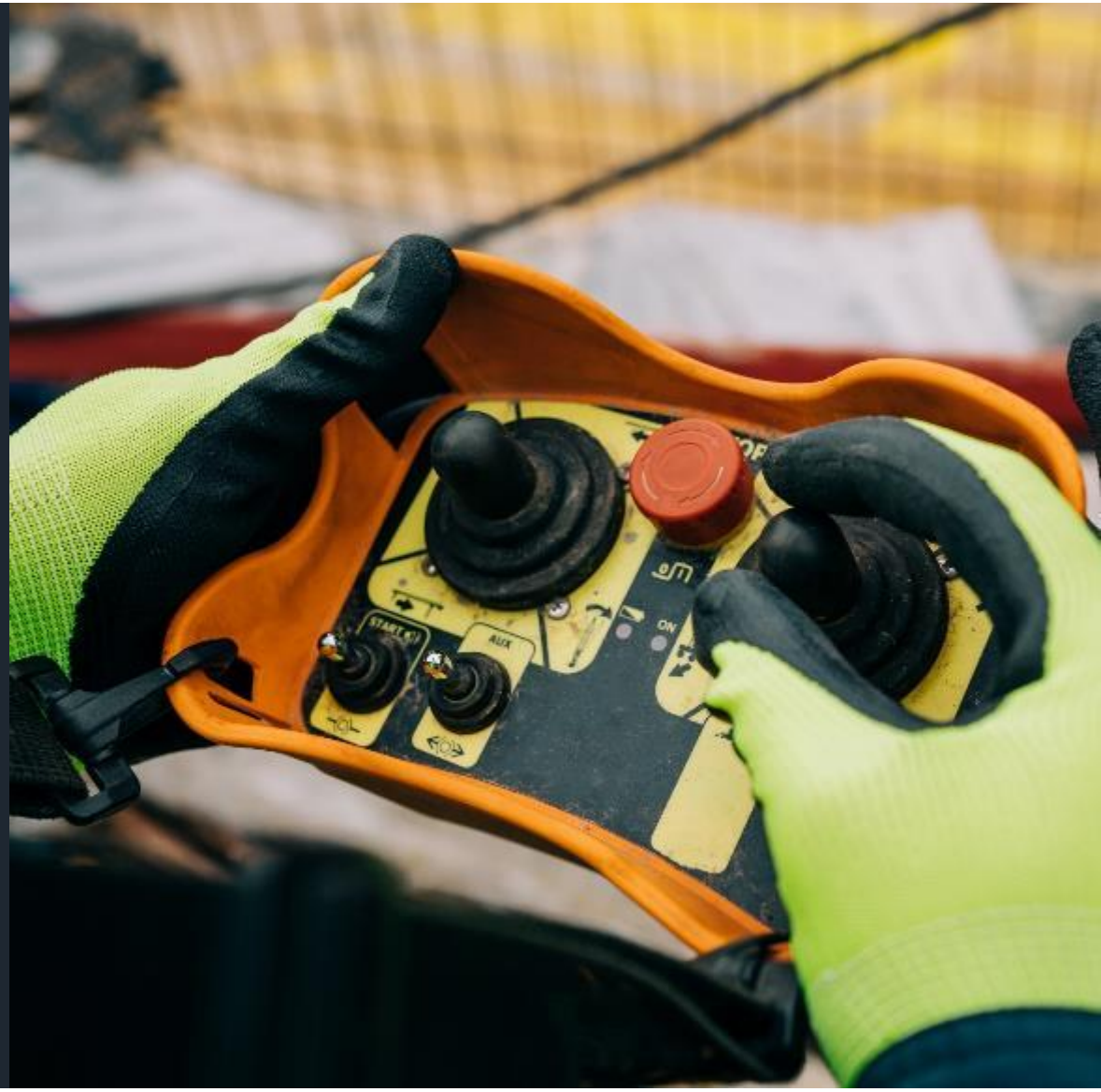
Creates a separate baseline

REASONS FOR ADOPTION

Focus on Attentiveness is on the rise

Incidents that are due to Human Factors are not always drug and alcohol related. Often, people don’t know why they made the wrong decision or ignored policy and procedure. Distraction or lack of attentiveness is often at the root.

Companies are looking for new ways to enhance worker / manager engagement

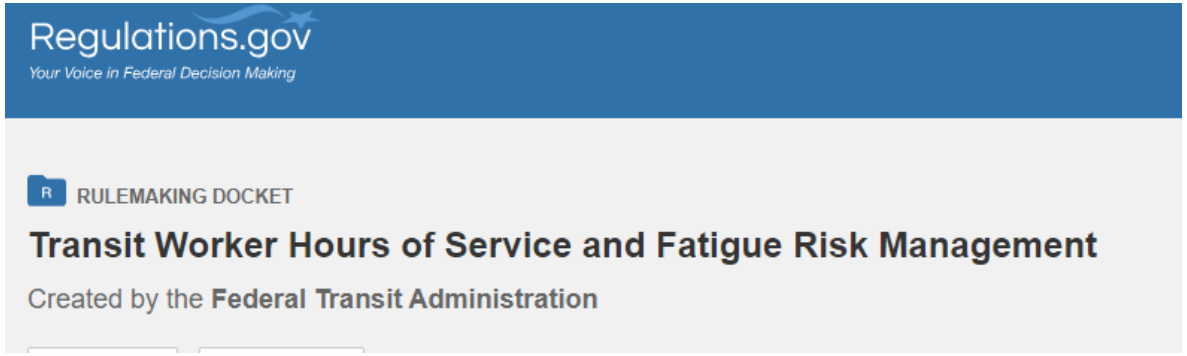


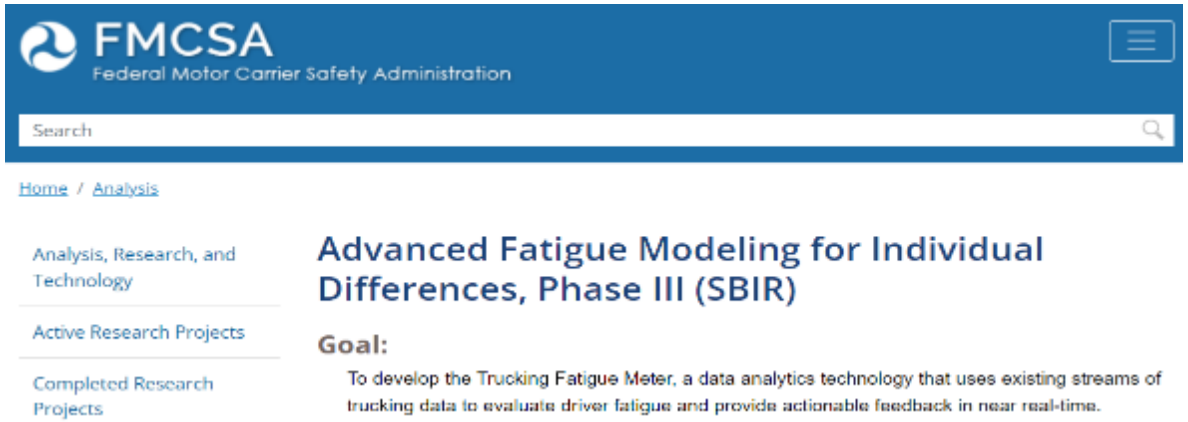
Regulatory Compliance

Federal Regulations are increasingly recognizing Fatigue as valid and serious impairment. You can't blood test for fatigue.

Companies are getting ahead of regulatory requirements

Corporations are adopting stricter fatigue and impairment standards

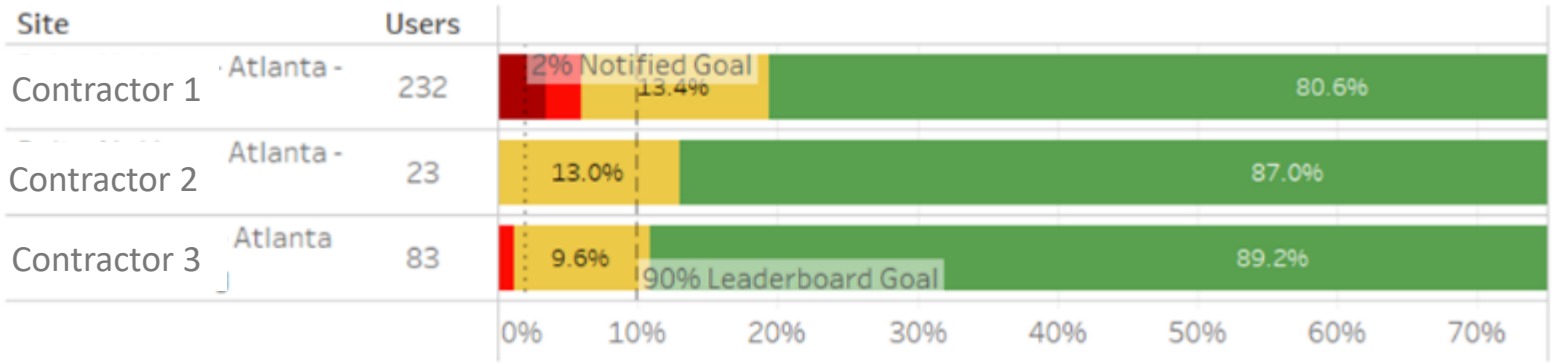




source: CDC, 2

Contractor Compliance to Human Factor KPI's

Companies are mandating use of AlertMeter by contractors to drive performance and reduce risk



Green = Workforce that is Rested, Alert and Ready For Work

Yellow = Workforce Wellness Risk

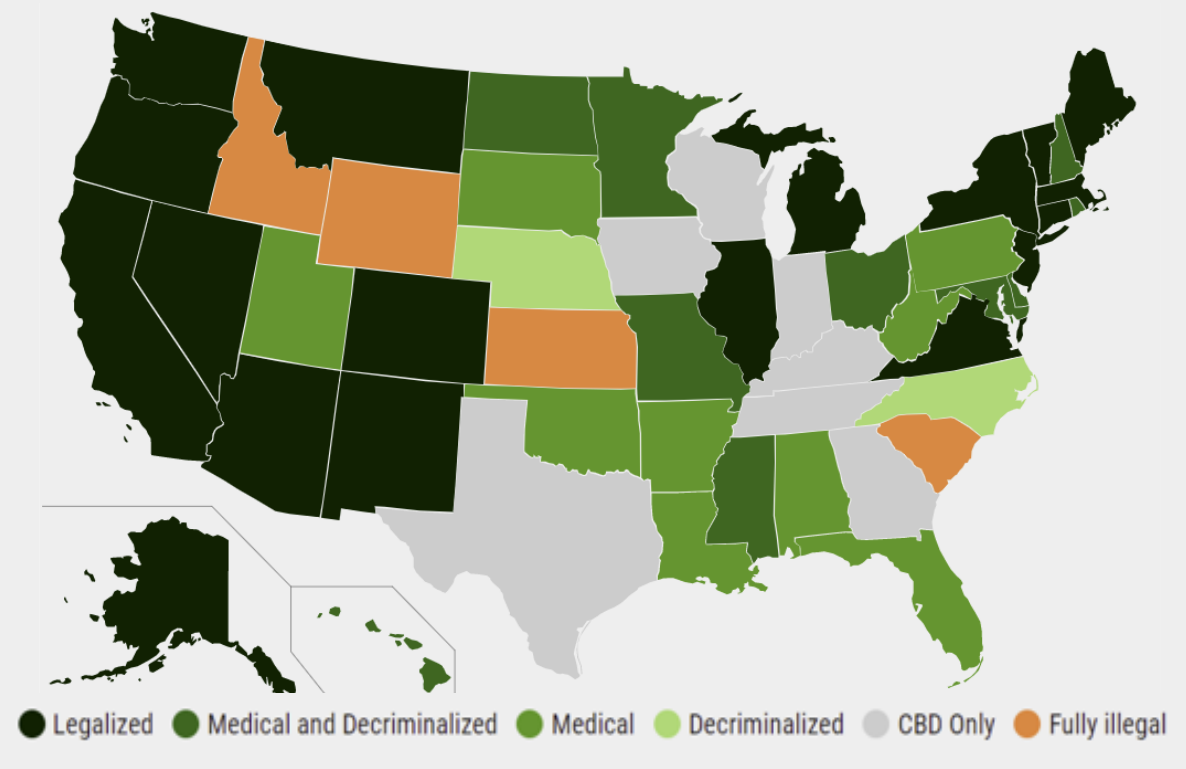
Red = Alertness Risk

source: CDC, 2

Fatigue Awareness is on the rise

- Impact of shift work
- Home life/work-life balance
- Second and third jobs
- Family stressors

Legalized Marijuana



Source: disa.com

- Fully illegal in only 4 states
- Legal challenges for job termination based on THC positivity
- Inconsistent legislation from state to state

NYC Mobile Dispensary

Balancing workplace safety and employee rights

It’s not easy.

D.C. lawmakers pass a bill that would ban firing employees for failed marijuana tests

NJ EMPLOYERS NEED SPECIAL EXPERT'S SIGN-OFF BEFORE DISCIPLINING BASED ON A POSITIVE TEST FOR CANNABIS

Amazon sued over drug tests after man says his job was taken away over positive marijuana test

Kmart pays over $100,000 to settle discrimination lawsuit over inflexible drug testing policy

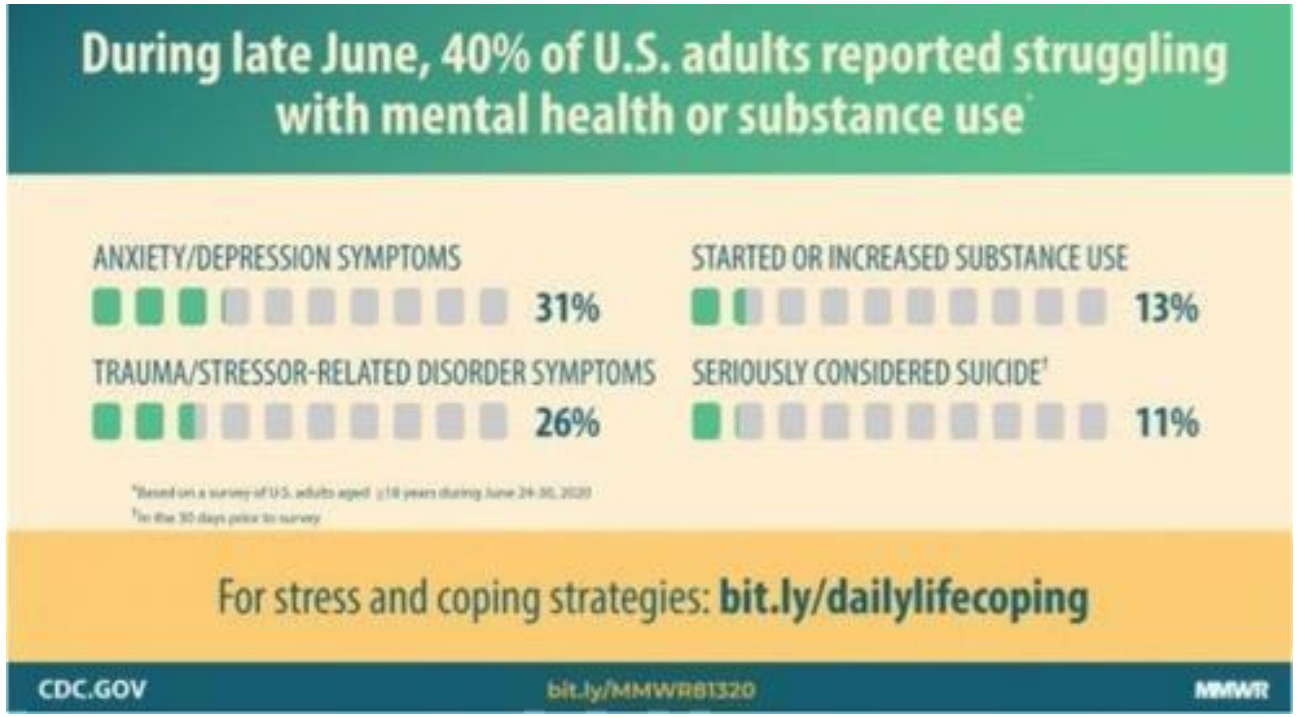
Rhode Island Legalizes Recreational Marijuana and Protects Off-Duty Use

Mental Health Awareness

Increasing suicide rates

Increased use of anti-depressants and anxiety medication

Role of COVID-19

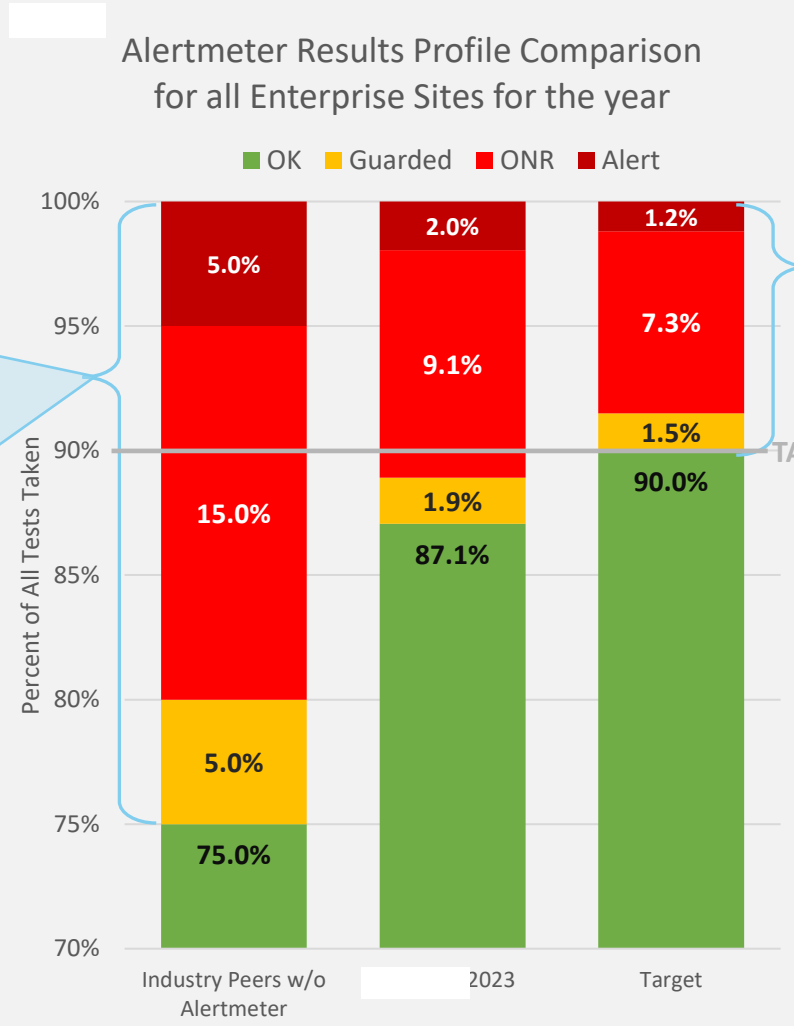


source: CDC, 2020

Alertness Risk = Financial Risk

ENTERPRISE ANALYTICS

Enterprise Analytics Across Sites and Groups - Example



Data models predict that 52% of incidents occur in this range.

Employees are 2 to 5 time more likely to have an incident in this range

Incident risk is reduced by 40% by achieving the target profile

ID sites performing at this level

Safety Journey with Alertmeter

1. **Compliance:**
   Enforce Daily Participation
2. **Address Outliers:**
   Act on ONR Notifications
3. **Manage Daily Variation:**
   Reinforce Good Recovery Behaviors – Fit for Work

Example - Modeled Incident Cost avoidance is **$1.832 M** for 2023 when compared to rest of industry peers (NAICS: 423510).

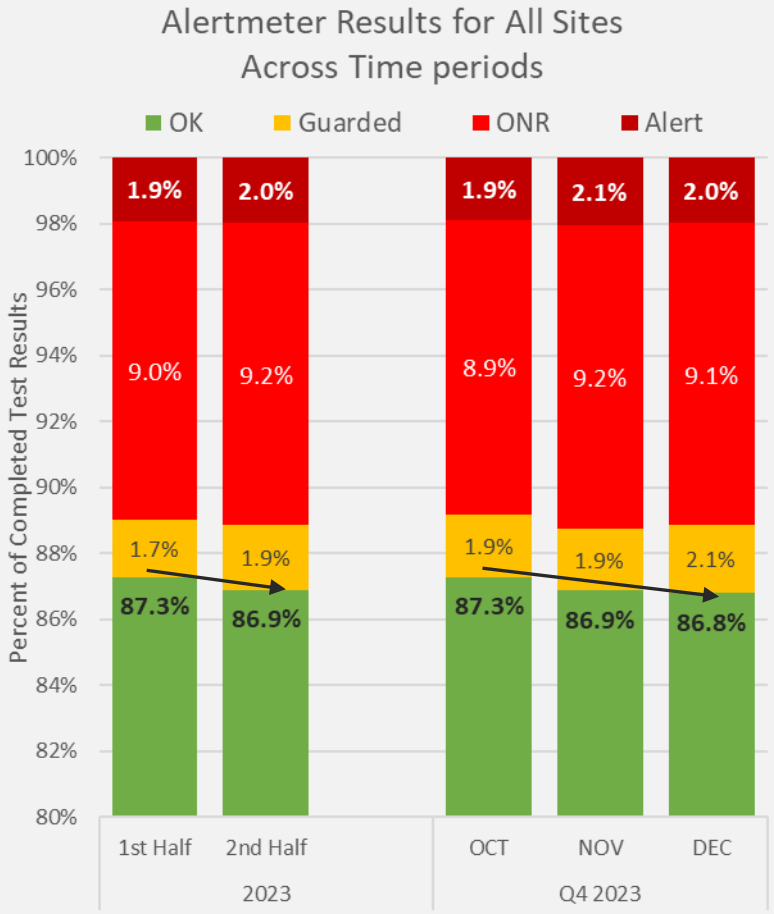
Using like type industry rate of 3.4 TRIR, client results using Alertmeter profile predicts client should be operating 26% below peer group incident rate. This is across 1080 Employees that were using the Alertmeter in this period encompassing 2.1 M worker hours.

*Total Work Hours: Calculated based on number of workers who completed 10 or more games in a month time 168 hours/month

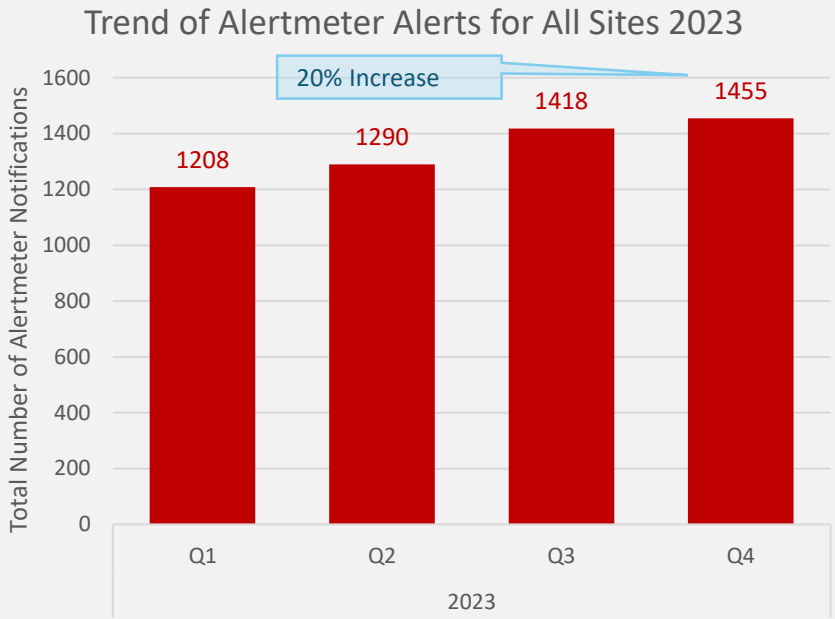
*Incident Cost Assumptions: Average cost of incident for industry peers is $33.8 K. Modeled cost saving based on achieving ~50% in average incident cost. Calculated based on $17 K per incident.

Predictive Safety

Enterprise Alertmeter Results - Trend Analysis



Observing an increasing Risk Profile based on Alertmeter results during 2023. Percent of OK test results has been decreasing. This indicates that changes in management or other pressures are resulting in increasing overall risk.

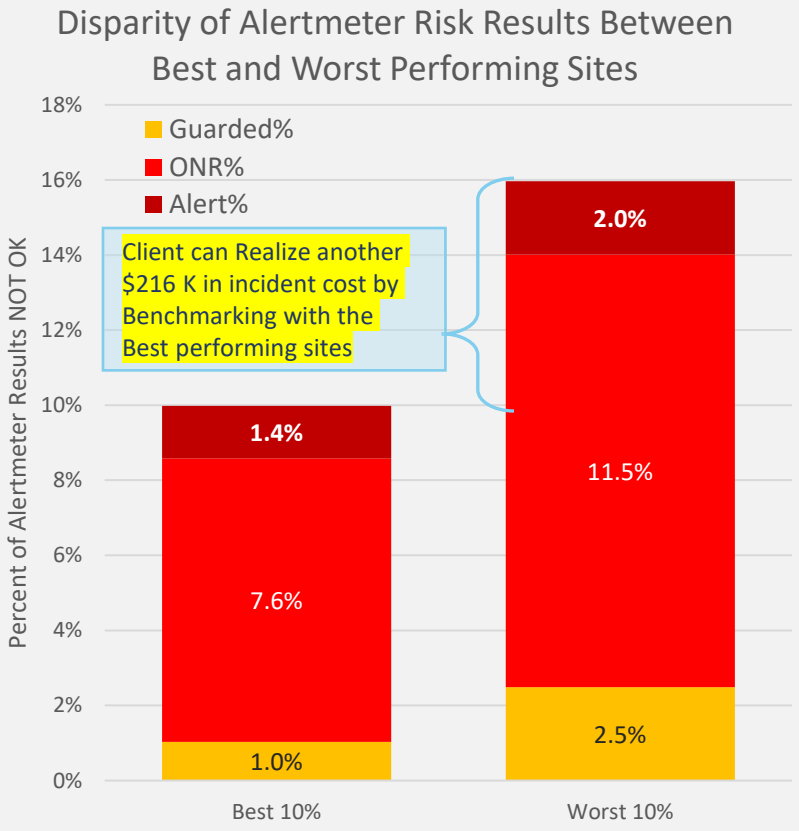


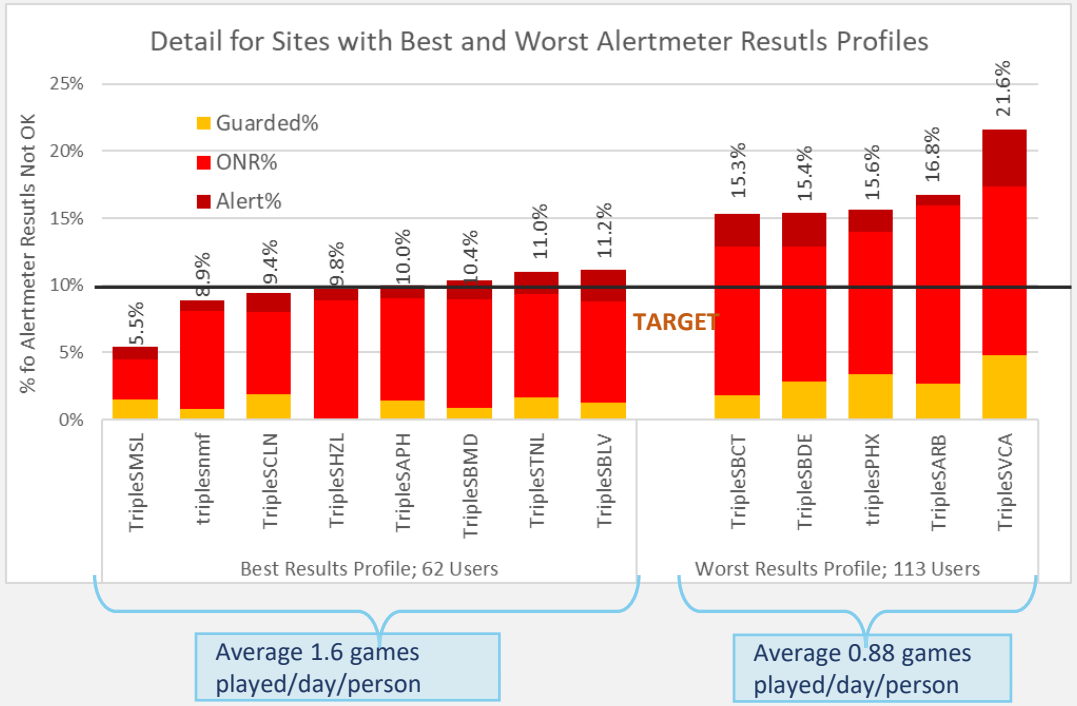
While company had only a 2.5% increase to the total Alertmeter population in 2023. The rate of Alertmeter alerts has increased by 20% since first quarter of 2023.

Client needs to make sure they are responding to each alert and have the safety conversations with each employee.

Predictive Safety

Best and Worst Site Performance in 2023





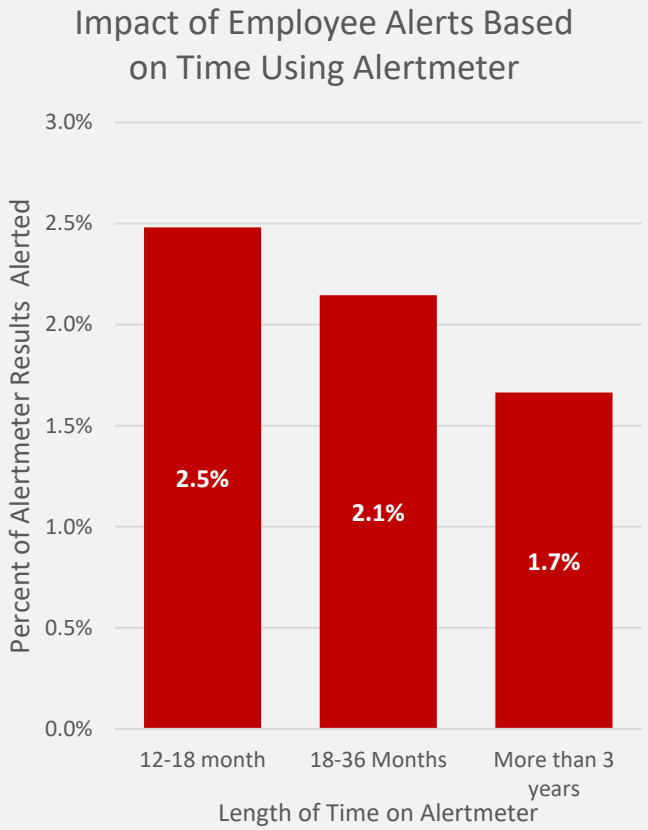
Sites with the best Alertmeter results profile also have the best participation compliance.

Sites with the worst Alertmeter results profile have low participation as well.

This suggests that safety culture and management follow at these sites has room for improvement

Predictive Safety

Organizational Learning Example



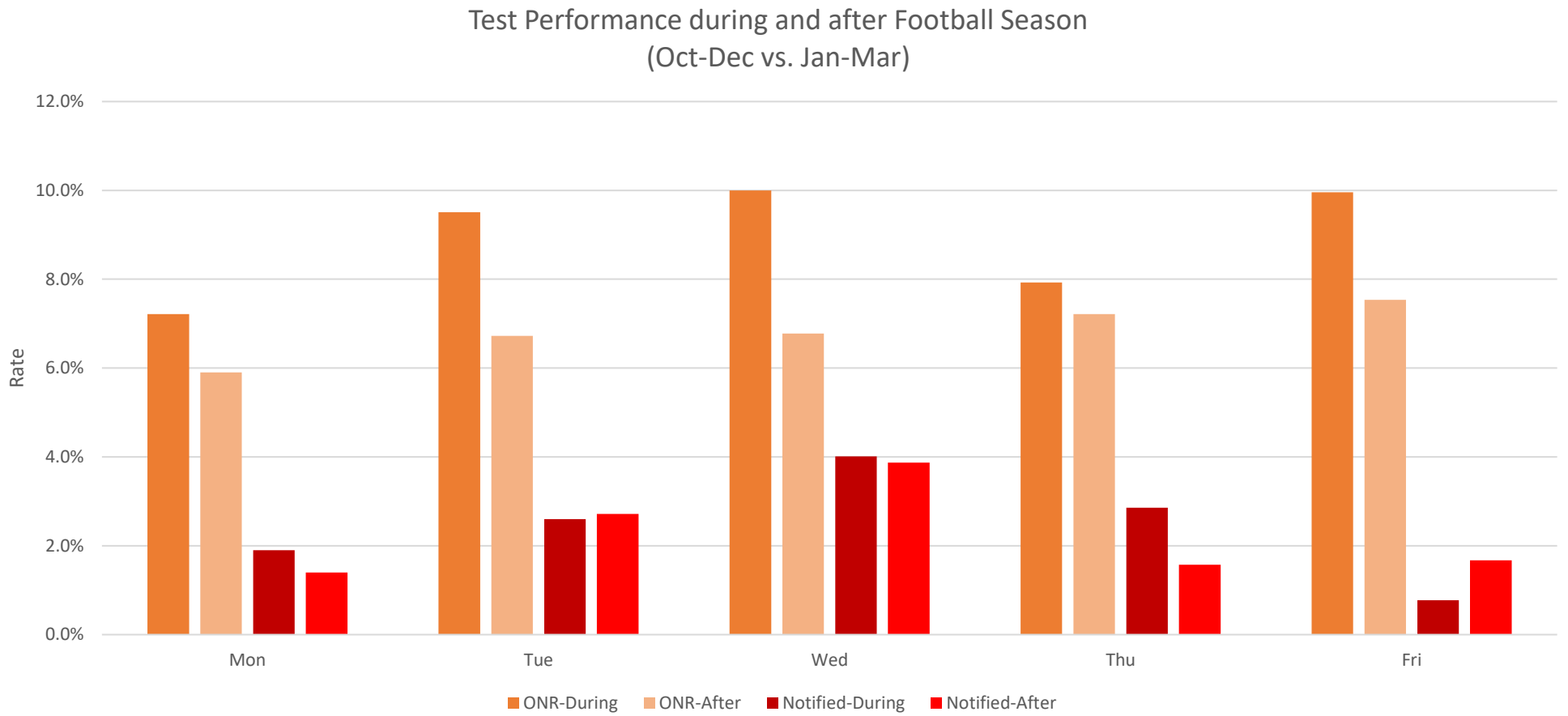
Several employees have been using Alertmeter for more than 3 years

We observe lower notification rates among the more senior employees when compared to employees that have been using Alertmeter for less time.

This suggests that improved recovery behaviors and organizational awareness around the factors the influence alertness

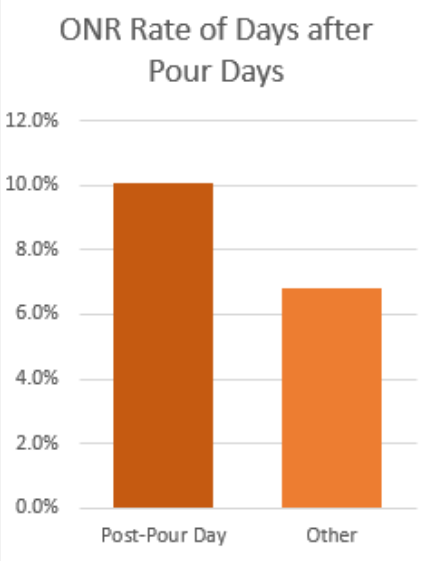
Predictive Safety

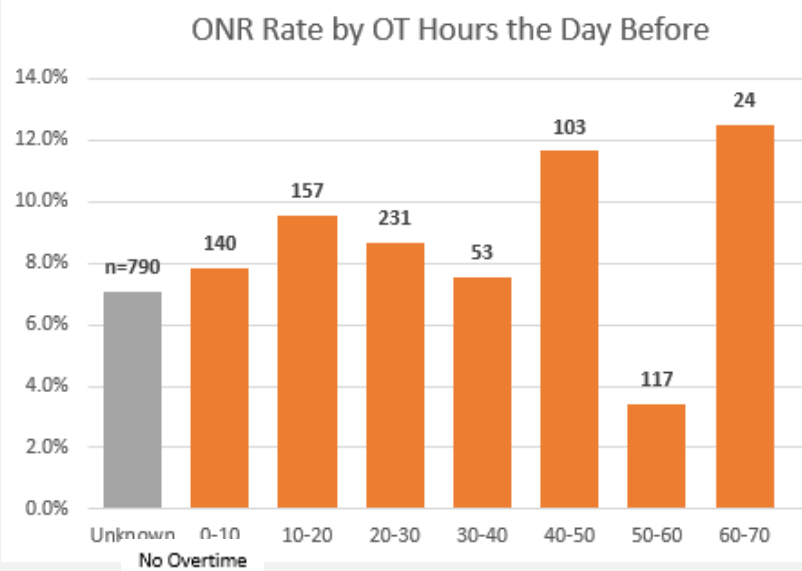
Post-Football Season

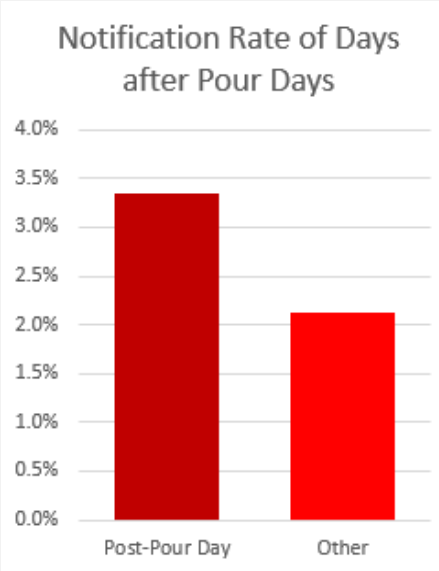


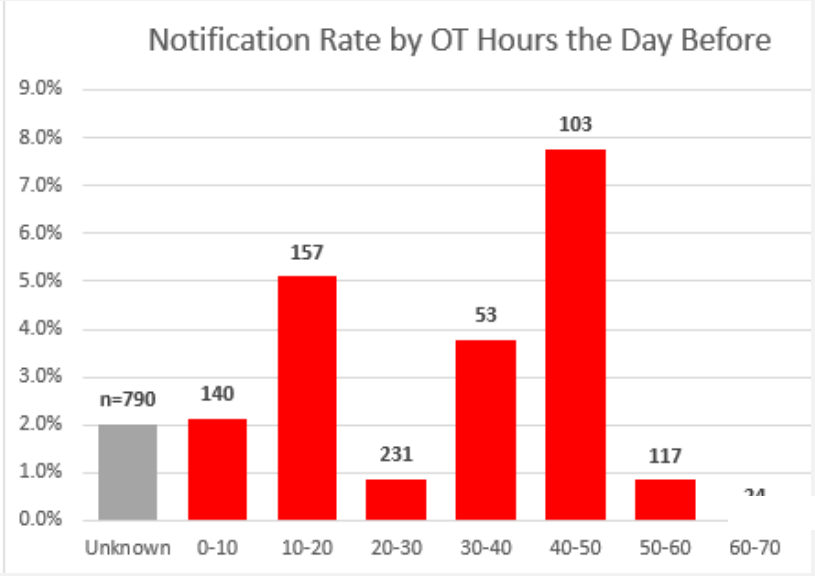
- ONR Rates on Tuesdays dropped after football season was over, although notifications remained consistent.
- Not expected was that ONR rates across all days also dropped after football season.
- Fridays remained at the highest ONR rate post football season (as expected), however, notification rates on Friday are low which may indicate that more attention is being paid to alertness and additional vigilance is coming into play.

Heavy Concrete Pour Days / Overtime Effect



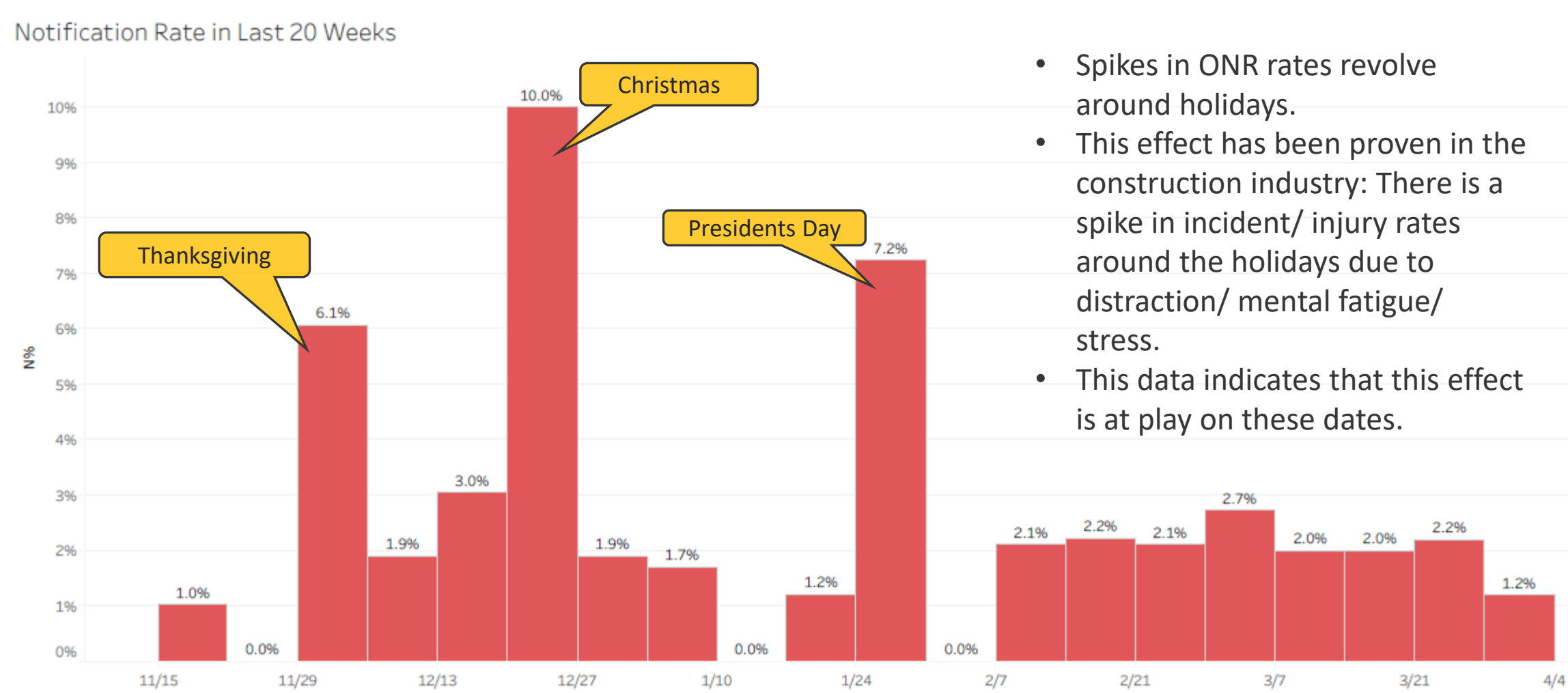






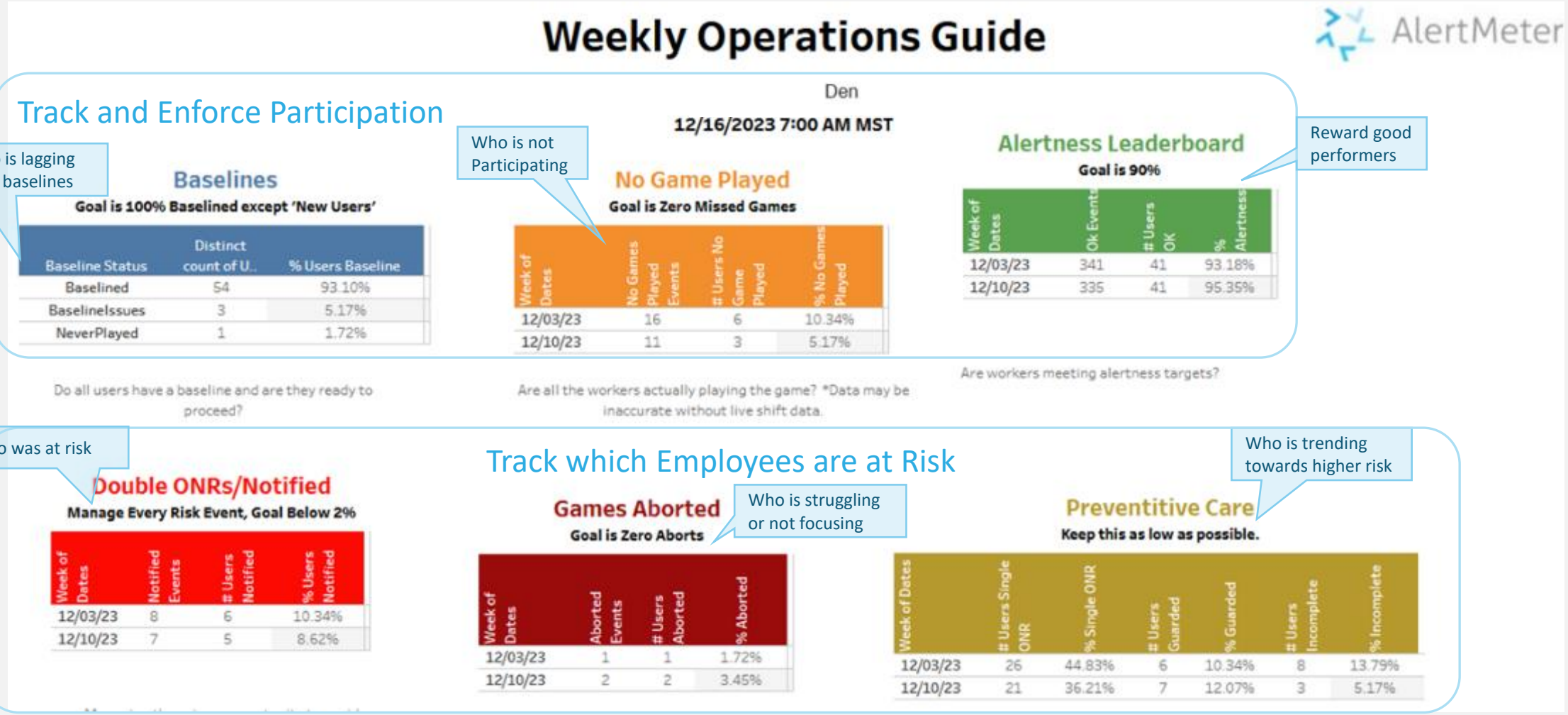
- Here, we looked at hours worked in overtime and the impact on total ONR and Notified ONR rates for the day after large pours.
- Both the total ONR rate (brown) and the Notified ONR rate (red) were significantly higher on days after a large pour.
- There is some inconsistency in the specific number of overtime hours worked, but in general the data shows that larger amounts of overtime generate higher rates of stress, inattention and fatigue which results in the higher ONR rates.

The “Life Happens” Effect



- Spikes in ONR rates revolve around holidays.
- This effect has been proven in the construction industry: There is a spike in incident/ injury rates around the holidays due to distraction/ mental fatigue/ stress.
- This data indicates that this effect is at play on these dates.

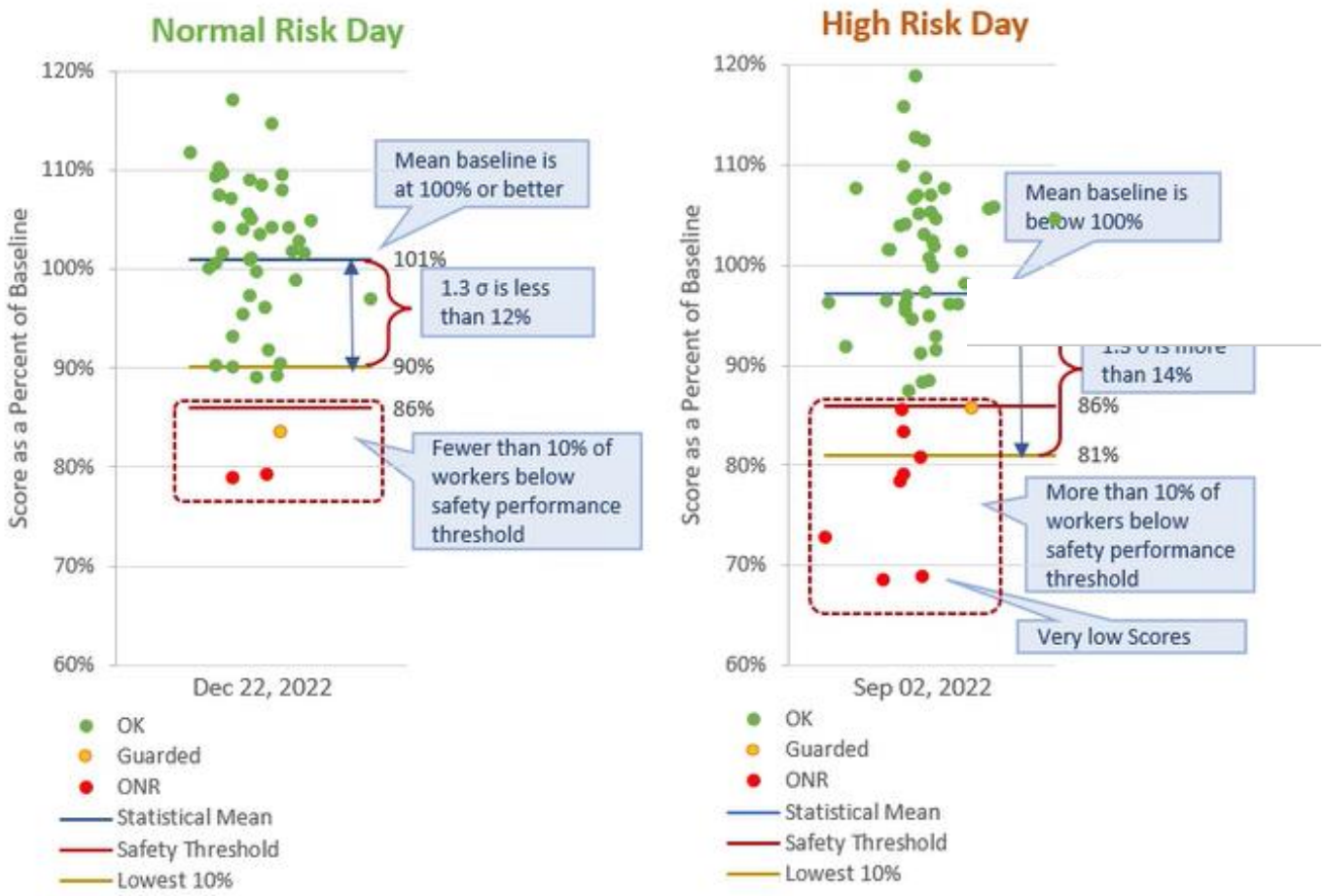
Week Over Week Engagement and Risk

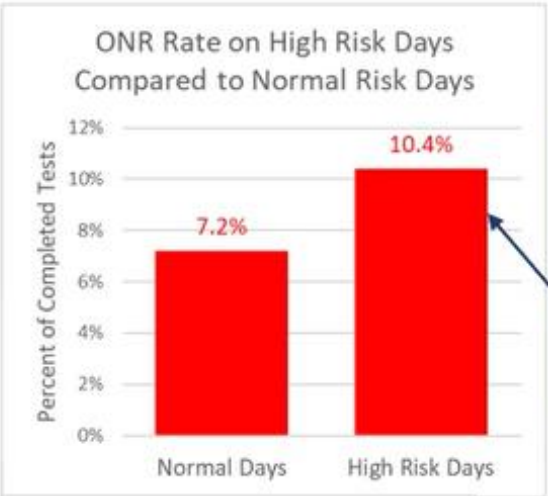


Predictive Safety

Analyzing Daily Alertmeter Results for High Risk Days

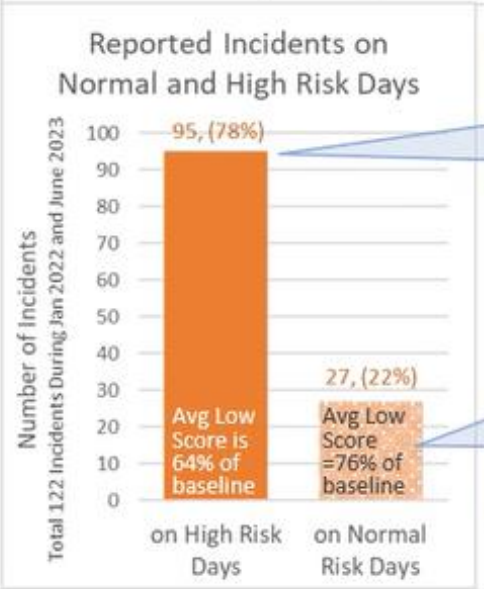
Defining Risk Based on Test Result Distribution Analysis





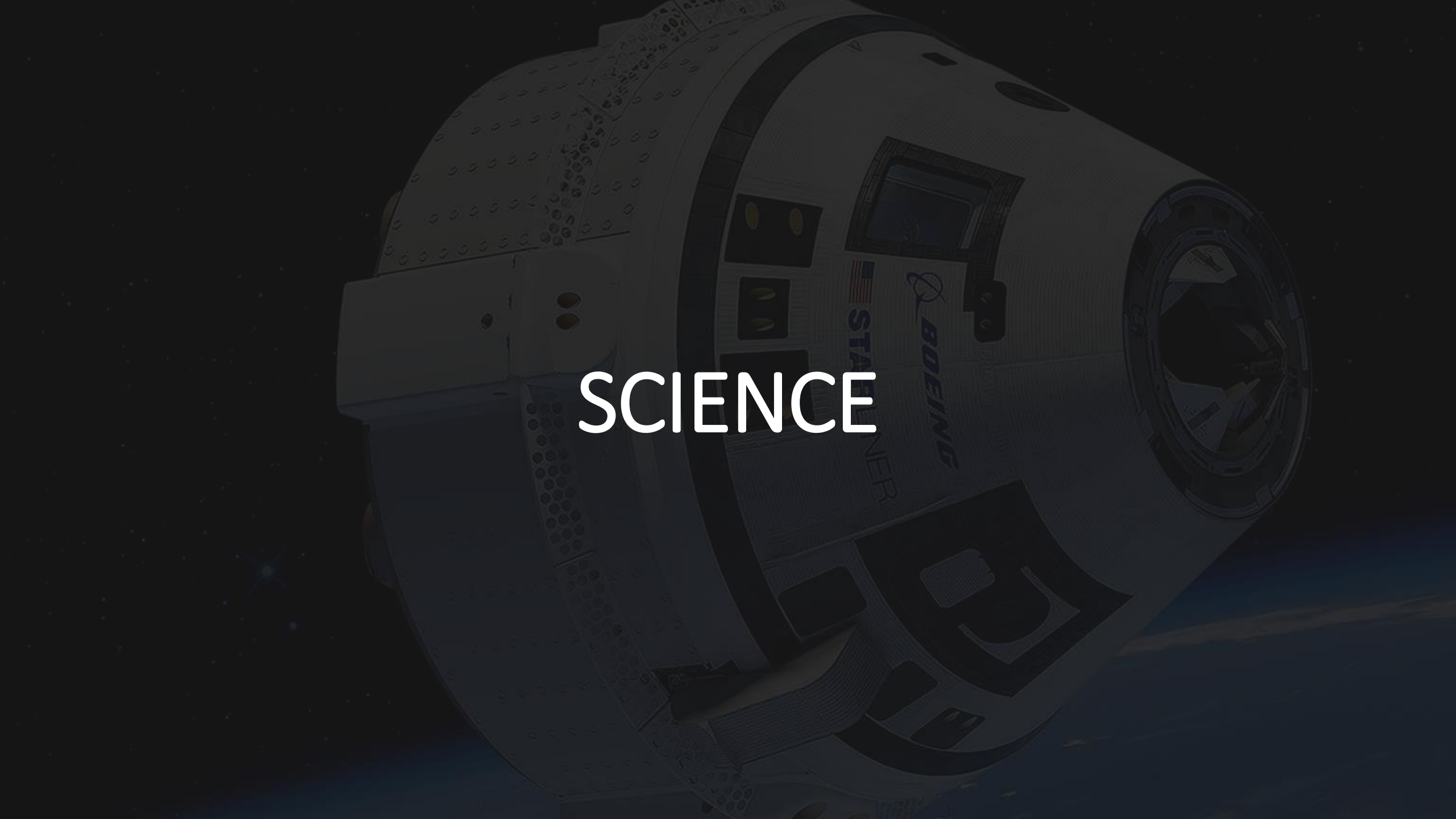
ONR Rate can be used to identify High Risk days.

Workers had scored 43% more ONR's on High Risk days



Provide more effective follow up and Group awareness to avoid incidents on High Risk days.

Due to inadequate process and controls or loss of alertness after testing



SCIENCE

Final Report:
Measuring Human Fatigue With the BLT Prototype

Date:	9.24.09
Project Title:	Measuring Human Fatigue with the BLT Prototype
Grantor:	National Institute for Occupational Safety and Health (NIOSH) http://www.cdc.gov/niosh/
Grant Number:	5R44OH007664-03
Principal Investigator:	Dr. Theodore D. Langley, Ph.D.
Project Title:	Measuring Human Fatigue with the BLT Prototype
Institution:	Bowles-Langley Technology, Inc.
Contact Information:	Bowles-Langley Technology, Inc. Suite 200 1801 Clement Avenue Alameda, CA 94501 Phone: 510 864 3111 Fax: 510 864 3112 tlangley@bowles-langley.com hbowles@bowles-langley.com
Co-Investigators:	Dr. Anneke Heitmann, Ph.D. Dr. Deborah L. Schnipke, Ph.D. Dr. J. Wesson Ashford, MD. Ph.D. Karen Hansen, MD. Henry M. Bowles (Project Administrator)
Project period:	06/01/2002 - 07/31/2009

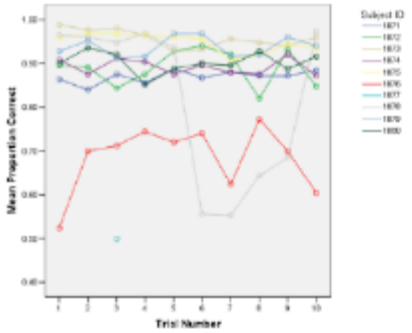


Fig. 4. Subject results showing significant drops in accuracy were eliminated. In this case Subjects 1076 and 1077 were eliminated based on low accuracy. Trials 6-10 for Subject 1078 were also eliminated because of data errors and low accuracy.

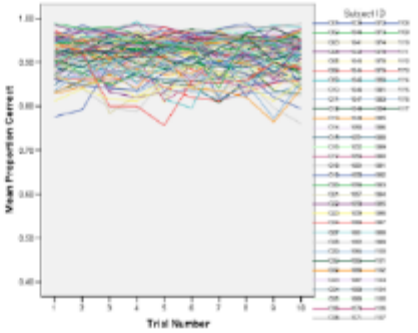


Fig. 5. Graph shows proportion correct (accuracy) by trial for each subject categorized as having "clean data". Note that accuracy is above 80% for most subjects.

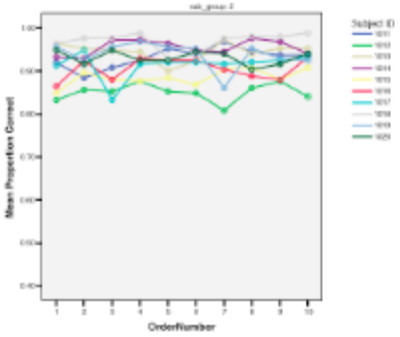


Fig. 6. Mean Proportion correct for different orders (see text).

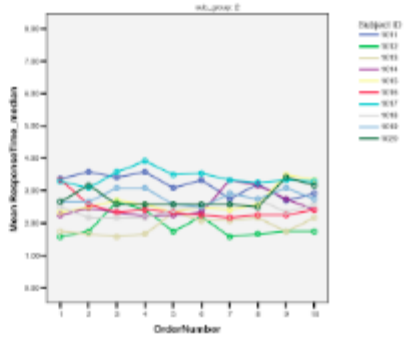


Fig. 7. Mean Proportion Correct and Mean Response Time and was constant for most subjects through all 10 sessions.

AlertMeter®

On each test day, subjects completed ten bi-hourly test sessions (starting at 12:00). Each test included several subjective alertness/mood tests (e.g., Visual Analog Scales, Thayer Activation-Deactivation Adjective Checklist, Karolinka Sleepiness Scale), performance tests (5-min performance vigilance task PVT, 25-min driving simulation task, 50-screen four-choice reaction time test), and four BLT Alertness Tests.

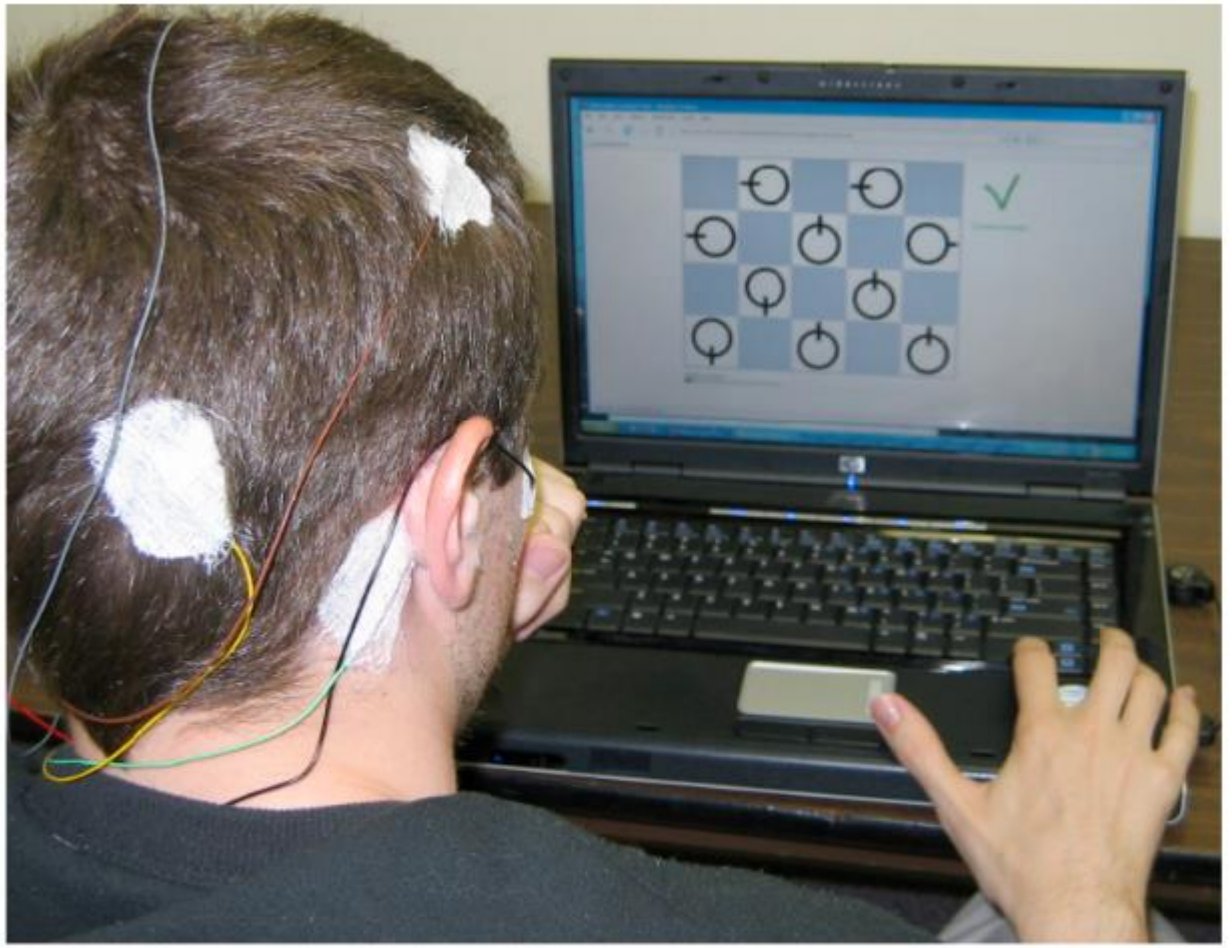


Photo 2. Subject during Aim 2 experiment.

Clinical Proof

Validation of AlertMeter® Fatigue Assessment Device

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March 1, 2021

TESTING ALERTNESS OF EMERGENCY PHYSICIANS: A NOVEL QUANTITATIVE MEASURE OF ALERTNESS AND IMPLICATIONS FOR WORKER AND PATIENT CARE

Brian A. Ferguson, DO, MPH,* David R. Lauriski, MA,† Martin Huecker, MD,* Marcus Wichmann, BSC,† Jacob Shreffler, PHD,* and Hugh Shoff, MD, MS*

*Department of Emergency Medicine, University of Louisville, Louisville, Kentucky and †Predictive Safety SRP Inc., PRISM Services, Centennial, Colorado

Reprint Address: Martin Huecker, MD, Department of Emergency Medicine, University of Louisville, 530 S Jackson Street, Louisville, KY 40202.

Registered Clinical Trial

Title: Examine the Feasibility of a Standardized Field Test for Marijuana Impairment: Laboratory Evaluations
Examine the Feasibility of a Standardized Field Test for Marijuana Impairment: Laboratory Evaluations

Lead Sponsor: Yale University

Funded by: National Highway Traffic Safety Administration

Collaborators: Hartford Hospital, Montana State University, Maastricht University, The Mind Research Network, National Institute on Drug Abuse (NIDA)

Sample: 24 subjects over 2 years (data collected from 11 subjects so far); sample split between "occasional users" and "frequent users"

Clinical Proof

Yale Study

Brief Summary

Marijuana is one of the most widely used substances. This study will characterize the persistence of cannabis' (CNB's) acute effects on cognitive test performance and simulated driving over a several hour time period. The data obtained from simulated driving, cognitive tests, and biological assays of THC will be used in analyses aimed at identifying what tests or combination of tests predict both recent use and driving impairment risk. Eligible participants will undergo a full day screening visit, if still eligible they will come to Hartford Hospital in Hartford, Connecticut to take part in the full study. Participation requires overnight stays between each of the five study visits. On each of the study days participants are dosed with either a low dose of THC marijuana, a high dose of THC marijuana or placebo marijuana, (the low and high which the study drug is given is double blind and chosen at random.)

DU Study

Conclusion

In conclusion, the AM was significantly correlated with the PVT Reaction time, PVT-Lapses, as well as subjective measures of alertness and fatigue from the Karolinska Sleepiness Scale all of which showed decrements over time in association with increased amounts of wakefulness. The results of the study demonstrate the concurrent validity of the AM with the PVT as a measure of fatigue and alertness. Moreover, reaction time magnitude varied as expected with increased amounts of wakefulness and in accordance with expected circadian patterns further supporting the validity of AlertMeter® as a measure of alertness and fatigue. Findings were inconclusive with respect to the memory assessment as no consistent interpretable results were obtained that demonstrated a correlation with the WMTB standard measure of memory and recall.

CONCLUSIONS

Emergency Physicians Study

Overall, providers demonstrated the lowest alertness scores at the end of the evening shift and the greatest reduction in score during the night shift. The alertness software technology appears to be a viable method for monitoring alertness among emergency physicians regardless of shift time or length. The ability to monitor, measure, and quantify individual alertness as exhibited in this study marks the potential for physicians to manage their own fatigue and alertness in real time. This could have positive implications on shift and task scheduling and potentially reduce errors in patient care by providing a prompt, objective measure of fatigue so that countermeasures can be taken. Future research could involve real-time feedback of scores to residents to inform such countermeasures.


FAQ’S

FAQ's

<u>This sounds invasive, my workers won't do it</u>

In surveys ~70% of respondents agreed that AlertMeter improved their safety

Workers prefer it to wearable devices

Workers think it's fun & they know their co-workers are safe, too

®

FAQ's

<u>This is going to increase my liability – now I know a driver scored "in the red"</u>

Using AlertMeter puts your company on the leading edge of safety. Legal opinions indicate that the simple fact that you are going the extra mile to assure your workforce is fit for duty overrides the liability of "knowing".

Companies protect themselves by putting the liability back on the worker

- Workers and drivers are required to test at start of every shift
- A double score in the red indicates a mandatory conversation with a supervisor.
- Supervisor asks employee "Are you sure you're okay to work today?"

®

FAQ's

I have workers that don't speak the language or are poorly educated, won't this discriminate against them?

AlertMeter is completely language independent (shape based)

Assessment results are based on comparison to personal baseline, not an expected population average (It is NOT an IQ test)

®

FAQ's

We are so busy, my people won't have time in their day to do this

The AlertMeter assessment takes ~60 seconds

It is usually performed right after clock-in and becomes part of the routine

Out of range results are only 1.5% of all tests. Thereby overhead for managers for interventions is minimal

®

FAQ's

Are you storing Personally Identifiable Information (PII) and is it secure?

The only user demographics that are stored are:

- Name
- Supervisor
- Shift assignment
- Job Role

Testing data is encrypted, never stored on a personal device and cannot be accessed or interpreted without Predictive Safety's algorithms

All data is stored in Microsoft Azure environment. GDPR and ISO27001 certified

®

More FAQ's

ALERTMETER®
FAQS BY DEPARTMENT

Rocky Mountain TSG

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720.443.3256
Manufacturers Representative

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