AlertMeter® Case Study

Promoting Alertness and Wellness While Mitigating Fatigue and Impairment Risk at Washington Metro Transit Authority

About WMATA

One of the largest metro transit authorities in the US providing bus, rail, and paratransit services to more than 600,000 customers per day.

The Challenge

Fatigued and distracted drivers can pose a danger to the public and themselves. The authority has significant investments in fatigue detection and camera systems for their vehicles. They also created a comprehensive evaluation process whereby each operator was evaluated against a standardized observation checklist prior to receiving a route each day. These preventative measures were effective and delivering results, but the authority recognized that the evaluation process lacked objectivity. The authority was looking for a faster, more effective, objective and sustainable way to reduce fatigue risk and promote operator alertness.

The Requirement

Find a way to evaluate driver fatigue and cognitive alertness prior to each pull-out. It had to be noninvasive and union friendly and sustainable. It also needed to promote wellness throughout the workforce and provide a foundation to meet upcoming federal regulations for fatigue management for transit workers.

The Solution

The authority settled on the forty-five second game-like cognitive assessment provided by AlertMeter® to address their needs.   AlertMeter® proved to have the necessary scientific background, field data and operational expertise to be a viable solution. AlertMeter® also provided the objectivity required and met requirements for lack of invasiveness to support labor relations. Other evaluation criteria included:

- SaaS based solution reducing IT requirements to just local infrastructure.
- Device agnostic allowing adoption with existing IT supported tablets.
- Scientific validation by Transportation Research Board as a viable fatigue detection solution.
- Fast, objective, non-discriminatory and language independent.
- KPI's to hold contractors and managers accountable
- Labor friendly workflows to promote wellness generate effective coaching opportunities.

Addressing Implementation Challenges

- Impact on pullout time by having every operator spend 45 seconds executing AlertMeter®.
- Legal and HR concerns and questions
- IT privacy requirements and technology execution concerns.
- Training and deployment in a dynamic environment without impacting commitment to riders.

These concerns were satisfied, and the project was green lit to move forward.

Implementation

Initial implementation was with the Paratransit Division. This division utilizes a contracted / unionized workforce split between 5 transit bases and four providers with ~1000 drivers. IT infrastructure audits were required for each provider's location and minor improvements to Wi-Fi availability and speed were required. IT setup was simply a matter of supplying enough tablets mounted in kiosks to manage the number of operators for each pull-out to ensure on time performance requirements. The solution is SaaS based so there was no server-side setup required. Onsite training was provided to each facility independently for management, dispatch, safety, supervisors, and operators.   Initial roll out included a 90-day period when operator results on AlertMeter® were not visible to dispatch or managers. The only requirement for operators during this period was that they must "play the game" before they could be assigned a route. During this time, the current paper-based drivers' checklist was still in use. After 90 days, the system went "live". At which point, the system generates a notification to manager / evaluators for operators that cannot score within their personal baseline after two tries. The evaluators are trained to perform a step-by-step interview including physical observations which are documented and signed by the evaluator in the AlertMeter® system. Operators that do not pass the evaluation process are not allowed into revenue service. Those that pass the evaluation are allowed into revenue service but are monitored throughout the day more closely.

Process and Workflow

- Drivers are required to execute AlertMeter® in order to be assigned a route. Average test time = 45 seconds.
- If the driver scores "green" they proceed to dispatch.
- If the driver scores outside of their normal range (receives a red dot) they are allowed a second try.
- On a second try, if the driver scores green, they proceed to dispatch.
- If on the second try, they receive a second red score, an evaluator is automatically notified and an interview and evaluation is required before the driver is allowed to go into service.
- Dispatch utilizes a simple dashboard lookup to confirm driver status prior to assigning a route (~5 seconds)
- Reporting is provided to the authority and operational managers on all aspects of engagement
- Evaluations are captured through a comprehensive online form, electronic evaluators signatures are required, forms are automatically sent to both site management and the authority.

Addressing Sustainability

Authority trainers were equipped with appropriate materials and exposure to continue necessary training as part of the normal driver and manager onboarding process. A cadence of standup meetings with project owners was developed to assist in refining best business practices.   Contractors / Providers are held accountable to key metric goals through daily scorecards and live dashboards. Operators adjusted to "playing the game" as a part of their normal safety process and it is now an established component of an already robust safety culture .

Results

During 12 month study period:

- Total number of unique individuals tested: 2,015
- Total Tests Taken (routes pull outs): 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.

Stories from the 616 drivers that were found unfit to drive on a specific day:

- "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"

Implementing Human Factor KPI's

In addition to cost and incident avoidance benefits, the system has also provided the authority with human performance KPI's with which to hold their managers and contractors accountable.

- % of workforce that is engaging in required policy
- % of workforce that is "Rested Alert and Ready for Work"
- % of workforce that could benefit from additional wellness activities
- % of workforce that poses an alertness risk
- % of workforce that is receiving coaching due to AlertMeter® results

Analysis

The authority performed a through analysis of the impact of AlertMeter® on both incident and fatigue reporting metrics.

Measures of safety performance and Drive Cam triggers were calculated as a rate of # of incidents/triggers per 1000 routes assigned.

Drive Cam Trigger Reductions

Drive Cam Trigger Reductions	-17%

Telematics Reports Reductions

Cornering triggers	-18%
Rough,/uneven surface triggers	-47%
Other triggers	-11%

Incident Reductions

Incident Frequency Rate	-21%
Preventable Incident Rate	-18%
NTD Major Event Rate	-23%
Customer Injury Rate	-45%
Employee Injury Rate	-26%

Federal Regulations

In 2024 the Federal Transit Administration announced proposed new regulations for hours of service and requirement for agencies to implement fatigue risk management systems. Implementation of AlertMeter® has positioned the authority will to respond to and meet these new federal requirements.

AlertMeter Meeting Federal Regulations on Fatigue

Regulations.gov
Your Voice in Federal Decision Making

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

R 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.

About AlertMeter®

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.*
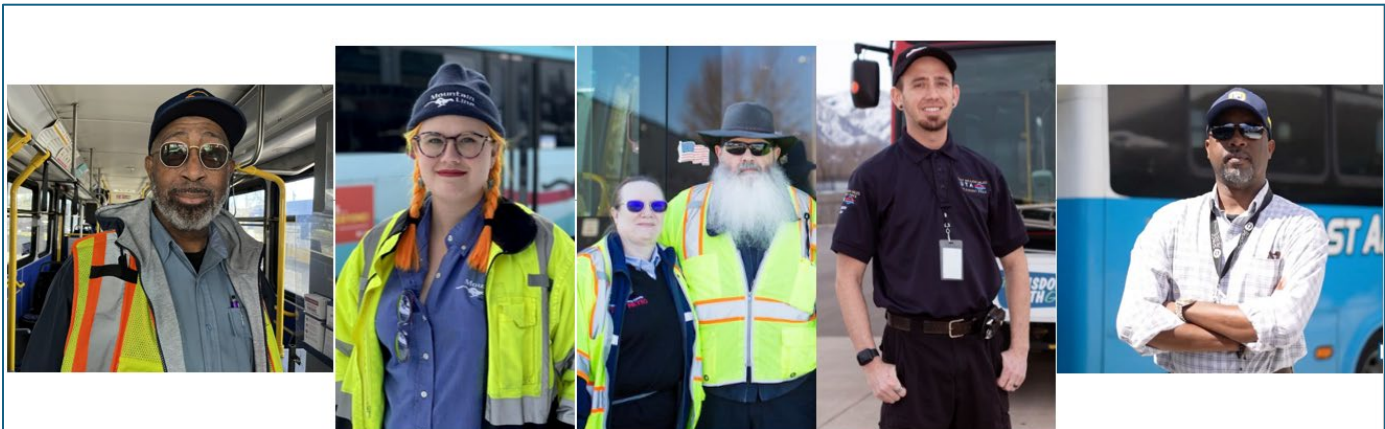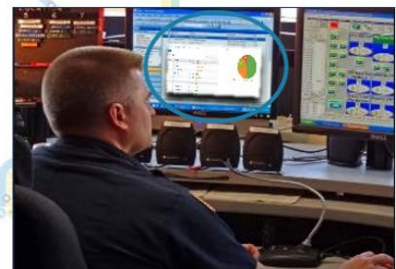
Answering the Question:
Which one could injure themselves or others because of fatigue or emotional distraction?

- Collects response and accuracy for shape families
- Baseline unique to each person
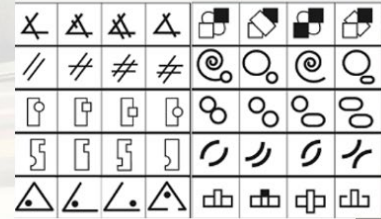
- Based on NASA science
- Funded by NIOSH
- 14 Patents

DOT Validation of AlertMeter® Fatigue Assessment
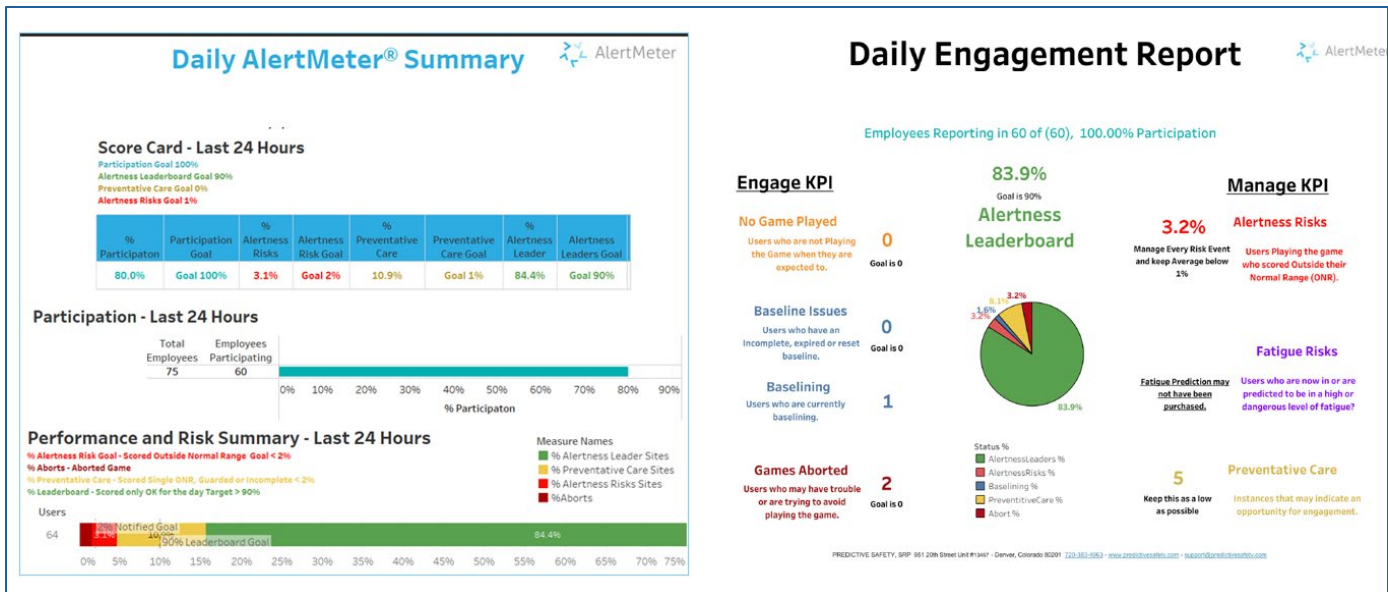Device for Transportation Workers

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

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.

Daily AlertMeter® Summary

Daily Engagement Report

AlertMeter Scientific Validation for Transit

TRB
TRANSPORTATION RESEARCH BOARD

Validation of AlertMeter® Fatigue Assessment Device for Transportation Workers

Supplemental Notes:
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participants were able to stay awake the entire study. No adverse events were 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

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