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AX01238

Worker heat stress and health monitoring

The technology marketplace for heavy industry

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WORKER HEAT STRESS AND HEALTH MONITORING

How it works

In mining and other heavy industries, heat stress, amongst other health issues, is a serious problem affecting both businesses and employees. In the hotter climates especially, it's extremely important to have cost-effective yet reliable predictive technology to avoid health issues before they happen.

This solution provides a unique combination of hardware and advanced software to monitor, predict and enable mitigation of major workplace issues including thermal stress in high temperature environments such as mining sites, industrial processing plants and many more.

Thermal stress in heavy industry settings is increasing and core body temperature sensors to measure and mitigate this risk are inadequate. A multi-dimensional approach that measures the psycho-physiological changes that occur as the body attempts to compensate for temperature changes is a more predictive and robust method to mitigate thermal stress. Furthermore, there is a need to monitor for other physical injury scenarios (e.g. form and posture) and provide alerting and intervention before it's too late.

This AI powered platform combines unique hardware and software to monitor for, and predict, a range of common workplace health issues that happen in hot, industrial environments such as mining operations, construction sites and industrial processing plants.

Off-the-shelf smart watches with custom software combine with 'form & posture monitoring' hardware units, feeding into an advanced AI platform that can accurately predict issues before they happen in areas such as over-exertion, thermal stress, sweat loss, fatigue and many more. The system alerts both the workers and the supervisors to ensure action can be taken to eliminate accidents and issues and provides a holistic risk management view across the workers being monitored.

Key facts

>90%

accuracy on sweat loss prediction

100%

(up to) injury elimination

20%

top 20% of at-risk workers identified

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TOP BUSINESS BENEFITS

There are many business benefits of this solution including:

- Independently Validated - validated by the US Army, DARPA, & Samsung
- Field Tested - successfully deployed by US Steel and award winning
- Covers all major workplace injuries - overexertion, heat stress, bad form, fatigue, falls, slips and trips and more
- Predictive and proactive - helps you avoid injuries not react when they happen
- Open and flexible – comes with dashboard but can be integrated into other safety systems

The solution is backed by very solid science, field tested by expert organisations, and easy to deploy in a pilot to see its benefits.

Top benefits

- Validated by the US Army, DARPA, & Samsung
- Covers all major workplace injuries
- Open and flexible system
- Proven to reduce workplace injuries

How it Works

1 User puts on watch at the beginning of the day.

2 Critical physiological & biomechanical data collected measures risk shown in green, amber, & red. If risk is too high haptic feedback alerts the worker.

3 Data is continuously collected on the watch and uploaded to the cloud when connectivity is established via wifi or cellular.

4 At this time, managers, executives, and workers can view the data from the dashboard on their computer or phone.

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CUSTOMER SUCCESS STORIES

Road Construction Company

Customer challenge:
Road construction in high temperature environments can be very challenging. Equipment operators and crews work together to lay gravel, concrete and rebar. Interfacing with heavy equipment and working in awkward positions while exposed to the weather is what they do everyday. In this customer's operations the most common injuries were lower back and heat injuries. As a baseline, 20 equipment operators and road crew were fitted with the watch and pod. The results were typical of what is found in the construction sector: 48% of lifts were 'bad lifts', the combined risk of dehydration, fatigue, and overexertion was 57, which is high amber, and the average heart rate was high at 107 bpm.

Solution:
Using the baseline data, a combination of training and process (e.g. lifting training), plus improved safety provisions (e.g. more available drinking water), delivered excellent improvements. Supervisors received proactive risk notifications and could also intervene before incidents. Using the system as an ongoing platform, provided significant, and importantly, sustained benefits:

> 61% reduction in "bad lifts" from 48% to 16%
> 14 BPM reduction in heart rate from 107 to 93
> 35% reduction in dehydration, fatigue, and overexertion from 57 to 37

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CUSTOMER SUCCESS STORIES

US Steel Manufacturer

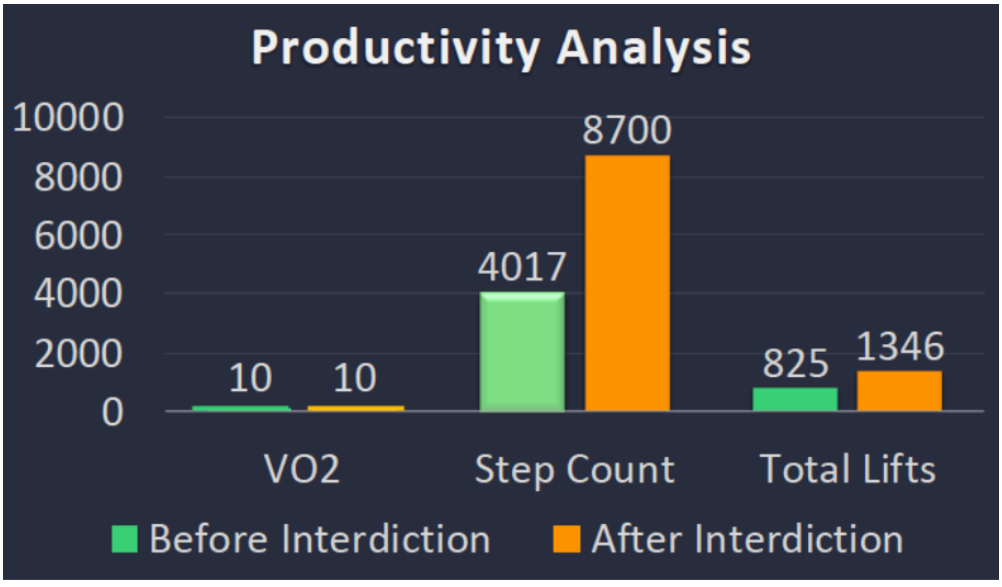
Customer challenge:
Workers at one of the largest propane tank manufacturers in the US have a demanding job, rotating from multiple stations to lift, test, and package the tanks. Each tank weighs 15lbs to 50lbs (6-22kg). The company experienced high turnover and worker fitness issues led to low productivity.

Using this solution on dozens of workers to form a baseline, the company found

> 825 propane tanks lifted/shift (productivity)
> 4,017 total steps/shift (productivity)
> Average VO2 was 10 ml/min/kg (fatigue)

Solution:
The baseline data gave a platform for insightful change – and the key challenge was to reduce the energy required for each lift. By deploying the solution and an exo-skeleton device, the company was able to provide sustained improvements and constant monitoring and risk assessment of its team.

> 1,346 propane tanks lifted/shift (productivity)
> 8,700 total steps/shift (productivity)
> Average VO2 was 10 ml/min/kg



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FAQ

Why is core temperature monitoring not sufficient to prevent heat stress?

Core temperature is a lagging indicator – this system focusses on leading indicators to allow preventative action when required.

Can the system be deployed in a modular way?

Yes – you can work with either or both of the pods (for tracking form) and watches (for tracking heat stress and vital signs) flexibly.

What sort of professional validations do you have for this solution ?

There have been numerous tests and validations including the US Army and DARPA.

In another validation, Samsung tested 50 Korean men and women between the ages of 16 – 60 years old with ambient temperatures ranging between 50 C to 350C. Using a multifaceted approach, this solution predicted with 90% accuracy the total body mass loss (BML) of everyone to an average of a cup of sweat.

We can provide more information on our validations on request.

What versions of the Samsung Watch does the system work with?

Samsung Galaxy version 5 and 6. Both LTE and WiFi versions.

About Axora

Axora is the global technology **marketplace** for heavy industry. We source the best innovative solutions, to solve the biggest industrial problems.

Our service helps industrial companies to discover, evaluate, procure and deploy technology from all over the world.

Entrusted globally by 100s of industrial leaders and innovative solution providers, we help companies take action to hit their safety and sustainability goals.

About the Solution Provider

Based in the US, this solution provider brings the world's most advanced all-in-one enterprise safety solution to prevent the top workplace injuries including future heat, fatigue, musculoskeletal, slips/trips/falls and fitness related injuries. The solution has been independently validated by the Defense Advanced Research Projects Agency (DARPA), US Army, and Samsung.

Your next steps

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