Kyle Hubregtse

CEO ◤ Kenzen

"This is a tool for employees and their companies to help them understand their own physiology."

Kenzen has been making wearable monitors since 2015, and they are now used globally — from steelworkers in the UAE to border patrol agents on the U.S.-Mexico line. Kenzen CEO Kyle Hubregtse recently talked with *Wind Systems* about how outfitting outdoor workers, such as wind-energy technicians, with high-tech heat monitoring devices can signal when their bodies suffer from heat.

◤ What indicators are showing this summer will be the hottest on record?

Without having a crystal ball of what the season is going to look like, there are a few previous trends and indicators that we can follow — the long-term rise in greenhouse gases is certainly the primary driver to what we can expect. We also saw the return of El Niño in 2023; the fluctuation of warming surface temperatures adds to global long-term ocean warming and is also a significant factor. I think these developments significantly contribute to hotter-than-normal temperatures.

NASA and other agencies have sensors around the world that are collecting and aggregating real-time data and trying to make their best guesses and estimates of what we'll see in the future. We can certainly see what's happened in previous years and the trends. So, if it's anything that we've seen in the past, we're in for a warm summer.

The other thing to mention is that, not only is it warmer, but the weather patterns are much more intense. We're seeing higher highs and lower lows in some areas. That means there's a lot more energy in the atmosphere. The unpredictability and sudden change can be difficult for humans to adjust to, not only in our living conditions, but specifically with our work.

◤ Why do a majority of heat-related injuries occur within that first week of work?

The concept of acclimatization is important to know and understand because it takes a little bit of time for the human body to adapt to these changes in temperatures. Our bodies work to maintain a sort of homeostasis and a tolerable core temperature, so fluctuations in heat stress can provide a challenge for us. It takes days, or sometimes a couple of weeks, for us to acclimatize. When we're talking about the first week or two of work, more severe heat injuries can happen because somebody is un-acclimatized. This is also true if they have just returned from vacation, sick time, or time off, so it's going to take them a little bit more time to adjust.

Also, if you're a new worker or if you're new to a job or new to a task, that can provide a significant challenge because you may be unaware of how to moderate or regulate that task or your exertion while you're doing it. We tend to see a lot of avoidable problems due to culture, too. Workers may want to make sure that they're doing a good job, so they may overexert or overdo it. Acclimatization, combined with not knowing everything that's involved with the job or how to moderate themselves, can lead to a precarious state of physical strain. That's when we see a lot of injuries and also the highest prevalence of death due to heat illness in un-acclimatized workers.

◤ California has introduced a heat illness prevention bill. What does it entail?

California has a law for heat-illness prevention in outdoor places of employment. Under it, employers are responsible for providing water, shade, and first aid to somebody experiencing heat illness or symptoms. In some scenarios where the temperature is too high, there is work-rest scheduling where employees work for a predetermined amount of time and then employers are required to give them a break.

The new bill, which was introduced in February, is a mechanism to require employers to also provide training so employees can have greater awareness of warning signs and heat-illness prevention methods.

Employers must guarantee time off and access during hot, risky work scenarios, and workers must become certified in heat prevention. It's a small but important change. California isn't substantially changing its protocols around how to deal with heat, and I certainly don't think it's gone far enough. Until we can take an individual approach to heat

Kenzen has been making wearable monitors since 2015, and they are now used globally — from steelworkers in the UAE to border patrol agents on the U.S.-Mexico line. (Courtesy: Kenzen)

illness prevention with continuous, physiological monitoring, it's the blunt instruments that we're using to try and fix a complicated and nuanced problem.

Are there any similar steps being taken in other states or even countries to address heat-related illnesses with workers operating in extreme conditions?

Absolutely. I'll start globally and work my way down to local. In Europe, you see in a number of countries, that there are certain protections for some outdoor and indoor activities where it pertains to higher risk around temperature. In the Middle East, they have a well-known standard for the warmer months. There is a mandatory multi-hour rest period in the middle of the day that is a form or variation of a work-rest schedule. It's also a very, very blunt instrument and certainly hurts productivity a lot, but it is an instrument that they're using. You're seeing new regulations in western Australia and in Africa. Some countries in Asia are using WBGT, which is wet-bulb globe temperature, which is a sophisticated measurement of the external exposure (heat stress).

In Central America, places like Costa Rica are infamous for seeing high prevalence of chronic kidney disease due to heat and exposure. They're also providing more mechanisms and more tools for companies and individuals to implement. It's a growing movement dealing with the conditions that workers have to face, both externally and internally.

Within the U.S., OSHA is in the middle of a rulemaking process for federal standards that pertain to heat illness prevention and heat. They're on their way. Once again, do I have a crystal ball? No. Would we like to see the regulations come out to help protect workers? Absolutely. I don't know if it's going to be this year, next year, or the following year. I just know OSHA is far along in the rulemaking process.

Part of that process is looking to states that have already implemented solutions that have been effective. California, Washington, Oregon, and Minnesota all have their own standards in different variations. And we're seeing legislation come from other states, like Maryland, which hasn't been adopted yet, but the process is moving. And notably, there was a petition last year for emergency temporary standards for occupational heat exposure for outdoor and indoor workers. I think we're up to 12 states that have already signed on, asking the federal government for emergency standards. You're starting to see a swell of interest from states being able to provide some sort of authority to force employers to take an active approach in prevention.

To help combat heat-related injuries, your company, Kenzen, has developed a prevention system including a wearable device. Can you explain how it works?

I'll start with the "why." Kenzen, in Japanese, actually means "in good health." Our mission is to ensure workers have the best health outcomes possible. Prevention of death is No. 1, then prevention of injury and illness on the job, both acutely and long-term, is very important to us. With the right preventative tools, you can improve cognition dexterity, and therefore prevent safety incidents and accidents. These all contribute to an improved health outcome for our workforces.

Kenzen takes into account an individual worker's physiology. We're looking at leading indicators such as core body temperature, increased cardiac load, and more. When somebody is reaching a difficult area or a dangerous physiological strain, we alert the worker through the use of a wearable device. Physiological data is also collected and processed on the device itself, and it gives the worker the ability to stop work and return to work when their physiology is OK to do so.

We've built a suite of dashboards, insights and analytics to help employers best manage the system and use it as a comprehensive prevention tool. Sometimes an employee may be dehydrated or fighting an illness or taking medications that affect their body's ability to thermoregulate. The fact is, it's hard for employers to know the condition their workers are going to show up. Sometimes the workers don't even know themselves. This is a tool for employees and their companies to help them understand their own physiology and take the necessary breaks and, at the end of the day, go home safely to their families.

Can the system be accessed by a worker's manager as an added safety check?

The Kenzen system can be set up to where alerts are given after certain thresholds are crossed. If a worker decides they don't want to stop or they're pushing it beyond the reasonable limits, there are alerts that can be set up to prompt managers to intervene, not from a punitive standpoint, but from the ability to say, "Hey, you're pushing it a little bit far. Let's get you some rest, some shade. Let's cool you off. Let's take the recommended action." Without physiological monitoring, the only way to really identify if somebody is having a heat illness is by identification of symptoms. Once you hit the symptomatic standpoint, it's already too late. You already have the illness.

When workers try to push themselves too hard, that's when accidents happen. There can be a sentiment of, "Well, I'm going to keep going. I can do it. I can do it." Until they can't.

What makes the wearable technology advantageous to wind-energy technicians?

It is advantageous to any worker, but I'll explain a little bit about its use among wind technicians. There are a few complicating factors with technicians who work in the wind space. First is the amount of PPE that they wear. Second, they are often in enclosed spaces, and many times have to climb stairs, which can prompt high exertion, high heat. In certain desolate areas, which can be very hot, they may be alone. That brings into perspective how dangerous their work can be. In these cases, prevention is critical because, if an accident happens when you're climbing or in a structure, it could be catastrophic. And so, at all costs, you want to implement the preventive techniques we've discussed.

The other part of this situation concerns cognition. It's important to stay focused, especially when you're working on such large and expensive machinery. You want to be careful, so being mentally astute is very important. When you start to get hot, your body starts to overheat or overexert, you tend to get confused, fatigued, and you don't always make the best decisions. This is a critical point.

Finally, it's important to consider the long- and short-term benefits. We talk a lot about prevention on site, but the long-term consequences of repeated exposure to heat and not dealing with it can be catastrophic as well. You can see it in chronic kidney disease, chronic cardiovascular and chronic pulmonary disease. That's being well reported on now, and it can happen in a matter of a couple years. Chronic disease isn't something that always takes a lifetime to present itself. So, it's important for workers to be safe in the short term and healthy in the long term.

I really believe that's why it's not just our company mandate -- it's really a societal mandate: to take care of people.

Has there been any interest within the wind sector to pursue your wearable monitoring tech?

There has been a lot of interest in the transition to renewable energy, especially in the capital markets, but I think there is not enough emphasis placed on those who are getting us there — the workers. Whether it's manufacturing, maintenance, or construction, workers are the key components. The more we can do to protect them, the better off we'll all be. My view is: until everybody who's in the industry has this sort of life-enhancing technology, we still have more work to do. Is there interest? Yes. Is it enough? No. Until everybody has this technology, we will keep working.

Is there anything else you'd like to mention that we didn't talk about?

The reason why people should consider this technology is its return on investment. It's a return on investment from an individual standpoint: You're healthier, "happier," more productive, and your body takes less of a beating. From a company standpoint, it is an investment. You get safer, more productive workforces. It makes sense from a fiduciary standpoint. And economically, we want to take the burden off our healthcare systems and families. We want to make sure families are happy and healthy. Across the board, this is a very small investment to make with huge returns.

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