

DATA ANALYTICS AND WEARABLES FOR HEAT STRESS MITIGATION

What's the Risk?

At Fratco, extruders are used to melt and shape clay, plastics and other materials during the manufacturing process. These machines are extremely hot (400-500°F), contributing to the ambient heat inside the facilities. Furthermore, during the summers, outside air temperatures often reach daytime highs of 90°F, offering workers little reprieve from the extreme heat. In general, occupational heat stress is associated with negative health, safety and productivity outcomes. For example, excessive heat exposure has been linked to a number of illnesses and injuries, including:

- Heat cramps
- Heat rash
- Heat exhaustion
- Heat stroke
- Death (NIOSH, 2020)¹

After opening a new plant in Iowa, Fratco observed an influx of frequent injury reports and sought an innovative way to identify and manage their risks. Supported by a financial grant, the company began piloting the MākuSafe system, which combines wearable technology with data analytics to provide real-time and predictive EHS data, including:

- Environmental conditions (e.g., heat, humidity, light, noise)
- Any hazardous motions experienced by, or performed by, a worker
- The location of the worker at the time of an event
- Voice memos from workers about the conditions they are experiencing or observing

¹ National Institute for Occupational Safety and Health. (2022b). *Heat related illness: Types of heat-related illnesses*. U.S. Department of Health and Human Services. <https://www.cdc.gov/niosh/topics/heatstress/heatrelillness.html>

Impacts

In general, a key benefit observed from implementing the MākuSafe system was the ability to monitor real-time worker safety. For example, the system can monitor both ambient temperature and humidity, and from those calculate a personalized heat index for each individual worker. When conditions are getting too hot for a worker, custom notifications alert their supervisor of the potential hazard and ultimately help leaders prioritize their heat reduction efforts. Fratco has used this data to identify the highest risk jobs and areas, and ensure appropriate accommodations are made for employees (e.g., cooling rags, extra breaks, additional fans, water breaks). Consequently, while they cannot eliminate the heat exposure, Fratco has seen consistent reductions in the number and severity of alerts.

Moreover, the benefits of the MākuSafe system were not only limited to heat stress cases. Within 6-7 months of implementing the technology, Fratco saw drastic reductions in both their incident rates and DART (Days Away, Restricted, or Transferred) cases, particularly those resulting from falls, slips or trips. In general, Fratco has seen improvements in reducing or addressing several hazards, including:

- Falls, slips or trips
- Heat stress
- Excessive noise
- Poor or inadequate lighting
- Ergonomics



Lessons Learned

- **Take advantage of grant programs and other funding to support the pilot program**

Fratco received a financial grant to support their pilot of the MākuSafe system. Grants and other funding opportunities are available to support employers, especially small-to-medium-sized organizations, offset the initial expenses associated with piloting new technologies. Grants are often available from government agencies, industry associations, research institutions or nonprofits.

- **Include employees throughout the piloting process**

Initially, employees expressed concern regarding data privacy and being tracked while on the job. To address these concerns, Fratco included workers early on in the pilot process. They began by introducing workers to the data dashboard to demonstrate what data was being collected and how it would be used. They also showed employees the location of the beacons within the facility, which can show the proximate location of an incident or event. Finally, Fratco leveraged monthly meetings and informal conversations with employees to address any questions or concerns, and to maintain a consistent line of communication.

- **Start small and scale up**

Fratco took an iterative process toward adopting the MākuSafe system. First, they recommend focusing on only the most severe or frequent incidents to avoid being overwhelmed by new features or additional data points. Fratco began the trial with 20-25 wearables in one pilot location. Only once they saw the technology's benefits did they scale up to a second location, with a third facility expected to adopt the solution soon.

Fratco

The logo for Fratco, featuring the word "FRATCO" in white, bold, uppercase letters on a red rectangular background.

Fratco is a leading manufacturer of drainage pipe and products, ranging from agricultural to commercial applications. Fratco has five locations across Indiana, Illinois and Iowa, and employs an estimated 90 workers.

MākuSafe

The logo for MākuSafe, featuring the word "MĀKUSAFE" in white, uppercase letters with a stylized yellow and black circular icon to the right.

Based in West Des Moines, Iowa, MākuSafe is a Safety, Data & Analytics solution. The MākuSafe system combines a safety management software platform with wearable technology, providing real-time EHS data with predictive value.

Contact Us:
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Learn More:
nsc.org/WorktoZero

The logo for the National Safety Council (NSC), featuring a stylized grid icon to the left of the letters "nsc" in a bold, lowercase font, with "National Safety Council" written in a smaller font below.