



The Role of Heat in Workplace Incidents



The Role of Heat in Workplace Incidents

Whether they're working under the searing sun or near processes and machinery that are blasting heat, some roles expose workers to extreme temperatures.

Safety professionals need to understand how heat contributes to unsafe conditions and what to do about it on their sites. By anticipating heat as an environmental risk factor, we can establish more effective controls and help prevent incidents.



Heat and Workplace Incidents

When we investigate an incident, our goal is to establish a cause deeper than placing fault on an individual. Reporting that an incident occurred because “Joe wasn’t paying attention” misses the point and it doesn’t provide us with any actionable information.

An investigation needs to turn up systemic problems that suggest corrective action.

**If Joe wasn’t paying attention, we need to identify the reason he wasn’t.
Could it be the heat?**

Inattention is never the root cause – we always need something to explain the inattention. It could be tiredness due to an exhausting schedule, distraction by attempting to multitask, or working in extreme heat for too long.

Heat stress has both cognitive and physical effects, and they can directly affect how a worker performs their tasks.

The list of symptoms include:

- Confusion
- Dizziness
- Fainting
- Muscle weakness
- Cramps



Any of these could contribute to an incident. So, Joe is off the hook – it’s the heat we need to address.



Controlling for Heat Hazards

Heat is not a subtle or unpredictable variable in most cases. That means it has to be controlled.

Applying proper controls requires some understanding of heat's effect on a worker. The body's main mechanism for getting rid of excess heat is radiation, which happens passively across a gradient. If the surrounding temperature is higher than the body temperature of **98.6°F**, the radiative mechanism won't work and actually reverses. In other words, the body will take in heat instead of releasing it.

In an environment hotter than body temperature, sweating is the only defense mechanism the body has left, and it can only work if the sweat can make contact with the air and evaporate.

Clothing can prevent that from happening effectively, and the heavier the clothing, the greater the effect.

Wearing fewer layers isn't always an option, though. A lot of the really hot jobs also happen to be the ones that require heavy PPE. Think of the work done in a foundry. The ambient heat from molten metal and heavy machinery easily reaches hazardous levels.



The heavy gloves, coveralls, and hoods needed to protect workers from sparks, slags, and other hazards directly increases the risk posed to them by the heat.

Ultimately, heat-related illness mainly results from dehydration. The body sweats, loses water and electrolytes (salts) in an attempt to cool itself when it's hot. Those lost fluids need to be steadily replaced to avoid negative impacts, ideally with an electrolyte beverage.



3 to 4%

Most healthy people can tolerate 3 to 4% body water loss before displaying significant symptoms

2%

But it only takes 2% dehydration for mental functions to become substantially impaired

Most healthy people can tolerate **3 to 4%** body water loss before displaying significant symptoms, but it only takes **2%** dehydration for mental functions to become substantially impaired. A worker's reaction time, attention, and multitasking capability simply become less reliable when they're overheated. In these cases, heat stress' contribution to an incident may masquerade as inattention or distraction.



Controlling for Heat Hazards



So, what can we do to mitigate the risk that heat contributes?

Engineering Controls

Engineering controls such as improved ventilation can help facilitate the body's natural cooling mechanism. Moving air is far better than stagnant air for allowing the body to radiate heat by constantly removing and replacing the air layer around the body. The same mechanism facilitates the evaporation of sweat.

When ventilation isn't practical or doesn't do the trick, a cooling vest might be useful. Cooling vests are either designed to hold freezer packs or circulate water around the body. If the ambient environmental temperature can't be altered, a product like this might help reduce the effects of heat stress.

Administrative Controls

We can also apply some administrative controls.

One control for a specific scenario is scheduling acclimatization periods for new workers. Over time (and to a point), an individual can acclimate to working in a hot environment so that the body gradually gets used to it.

New workers should be phased into a schedule with less time between breaks for the first few weeks working in a hot environment. Special care should be taken to ensure that heat stress doesn't combine with the already-high incident potential that new workers face. Being new to a role means they are already three times more likely to get injured during that first month on the job. The impaired faculties caused by heat stress can multiply the probability.

Special consideration should also be given to fitness for work when heat is a factor. Those with high blood pressure or other cardiac conditions are at additional risk of serious consequences when the heat is on.

For the acclimated worker, ongoing administrative controls could include frequent breaks and awareness of dehydration.

The latter is a key strategy. In the confusion of heat stress, a worker may not recognize the warning signs in themselves, but a co-worker may spot them before a serious situation develops – provided they know what to look for. Heat exhaustion produces some telltale symptoms such as heavy sweating, paleness, cramps, and dizziness.

Catching it at an early stage provides an opportunity to handle the situation and reduce the impact. The worker can take a break in a cool place, drink water or an electrolyte drink, and remove excess clothing to beat the heat.



Always Factor in the Heat

Heat is one hazard that can rarely be eliminated. Outdoor work can't be taken indoors just because it's hot, and heavy machinery and hot work processes are always going to raise the temperature.

But heat is often very predictable. So, be sure to factor it in your planning, your safety program, and implement the control methods needed to keep workers safe.

Check out our [Heat Stress Knowledge Center](#) for more content.