HEAT STRESS MANAGEMENT

Q&A With Tom Bobick, Subcommittee Chair of the ANSI/ASSP A10.50 Heat Stress Management Standard

According to the U.S. Bureau of Labor Statistics, more than 400 work-related deaths have been caused by environmental heat exposure since 2011. To discuss heat-related hazards, *PSJ* sat down with Tom Bobick, subcommittee chair for the new ANSI/ASSP A10.50-2024, Standard for Heat Stress Management in Construction and Demolition Operations.

Tom Bobick
Thomas G. Bobick, Ph.D., P.E., CSP, CPE, is a safety engineer and president of Bobick and Associates Consulting, Spokane, WA. He holds a Ph.D. in Industrial Engineering specializing in Ergonomics from West Virginia University; an M.S. in Industrial Hygiene from University of Pittsburgh; and a B.S. in Mining Engineering from Penn State University. Previously, he was employed for 33 years with NIOSH, Division of Safety Research in Morgantown, WV. He serves as subcommittee chair for the ANSI/ASSP A10.50 heat stress management standard. Bobick is a professional member of ASSP's Inland Northwest Chapter and a member of the Society's Construction, Engineering and Ergonomics practice specialties.

PSJ: Describe the scope of the A10.50 heat stress standard.

Tom: The standard outlines the requirements to help prevent heat illnesses from occurring on any construction or demolition site. It provides suggestions for using engineering and administrative controls to reduce the risks from excessive heat exposures. It also provides an approach to help workers acclimatize to working in high-heat conditions so they can tolerate the heat better. Training requirements are provided for both employees and supervisors, and the responsibilities of the competent person are also itemized in the standard.

PSJ: What are some heat-related hazards workers may face when working inside or outside?

Tom: Outside hazards include direct sunlight, high ambient temperatures and high humidity along with any extra local heat sources, such as kettles for tar and on low-sloped roofing work or the lack of shade where workers can take a break. Inside hazards can include high temperatures and humidity as well but may involve other secondary sources—such as steam piping or other hot processes—in an enclosed space with no cross ventilation available for extra cooling. What should also be mentioned is the metabolic heat that is generated by the workers themselves, especially when they are working very strenuously, which also adds to the overall heat load to the body. Wearing clothing or PPE that restricts sweat evaporation can also increase the risk of heat-related health problems.

PSJ: What are some signs of heat-related stress?

Tom: Heat-related illnesses can occur if workplace activities in a hot environment overwhelm the body's ability to cool itself. Physical symptoms can range from uncomfortable, such as heat rash, to life-threatening, such as heat stroke. Some heat exposure conditions include heat rash (skin irritation); heat cramps and spasms, which usually occur in the arms, legs and abdomen and can be caused by heavy exertion; heat syncope (fainting); heat exhaustion, which is characterized by headache, dizziness, heavy sweating, and elevated heart rate and body temperature; and heat stroke, which is the most serious illness and is characterized by confusion, slurred speech, seizures and loss of consciousness.

These symptoms do not progress from one to another. Heat exhaustion can occur without any heat rash forming or fainting occurring. However, once a worker begins to exhibit heat exhaustion symptoms, if resting, hydrating and body cooling are not initiated right away, the condition can easily advance to heat stroke and become a fatality if not treated.

PSJ: What are the differences in heat stress between indoor and outdoor environments?

Tom: The main difference is the exposure to direct sunlight. Any underlying personal risk factors or personal health condition—such as obesity, poor diet, poor physical fitness, diabetes, cardiac conditions or high blood pressure—remain the same whether the worker is indoors or outdoors. I should mention that any personal health conditions remain private with the worker. However, the workers should discuss with their doctor or their primary healthcare provider how those personal health factors can contribute to possible negative health effects because of exposure to excessive heat.

In addition, the metabolic heat load caused by work activities can also be the same for indoor and outdoor work. Different tasks, whether they are conducted inside or outside, can cause the body to react at the same level of exertion.

Another important point that I haven't mentioned is whether the worker is acclimatized to the hot environment. Whether inside or outside, the worker's acclimatization status would be the same. Acclimatization to the heat is critical so workers can become adjusted to the heat that is occurring to the body. Section 5 of the standard discusses two aspects of initial acclimatization and then re-acclimatization, which is necessary after a worker is off of work for 1 week or longer. Appendix 6 of the standard presents a decision flowchart to help decide when to implement a heat acclimatization program.

PSJ: What are some of challenges employers may face when developing or implementing a heat stress management program?

Tom: Establishing a heat stress management program requires some planning and effort. Appendix 1 of the standard can assist with this planning, as it provides an example of a heat stress management program that can be modified and customized for use by both small and large businesses when developing their own heat stress management program. There are two checklists at the end of Appendix 1 to help companies of all sizes: a heat stress program checklist and a daily worksite checklist.

An additional challenge for employers is that medical monitoring will be needed for workers who are

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covered by the standard. Medical monitoring is discussed in detail in Appendix 8. The standard also discusses a buddy system that can help workers keep track of their coworkers so they can watch for physical signs and other symptoms that workers may be starting to be affected by the heat.

Another challenge is estimating the metabolic rates based on observations of work activities and work intensities. To help with estimating the metabolic workload, Table 2 in Appendix 2 provides examples of different tasks of four different categories of work intensity, from light to very heavy. This information is used when determining the overall effect that exposure to excessive heat has on the worker's response. The A10.50 standard helps companies address these challenges and many others.

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PSJ: What are some ways that employers can use the standard to address heat stress hazards in the workplace?

Tom: The standard gives advice for getting employees properly acclimatized to working safely in the heat. It gives advice for setting up water, rest and shade on the jobsite, as mentioned by OSHA. It gives a procedure for converting the heat index values that you can get from a smartphone to an approximate value of what is called the wet bulb globe temperature index, which is a better measurement of the real conditions that are occurring on the jobsite. One of the problems with just the heat index that you get from the smartphone is that the measurement of the air temperature is actually taken in the shade. I'm sure there are a lot of workers out there who wish they could work in the shade all day.

The standard also provides a step-by-step procedure to evaluate the conditions that workers are exposed to. The standard provides suggestions for using engineering controls and administrative controls to reduce a worker's exposure to excessive heat. The standard also presents a table of values used as corrections to the wet bulb globe temperature index to consider different types of work clothes that are worn. And finally—hopefully it won't be needed—the standard also provides a detailed emergency action plan in case a worker has a severe reaction to excessive heat.

PSJ: How does the hierarchy of controls fit in as OSH professionals and employers are applying this standard in their workplaces?

Tom: The traditional hierarchy of control starts with elimination. We really can't eliminate the outside hot environment when constructing a building or road. Similarly, the second step is substitution. There really isn't anything to be substituted to reduce exposure to excessive heat. So that brings us to engineering controls, administrative controls and PPE use. The standard does provide information for all three of those areas. Engineering controls are ways to block or reduce heat exposure through physical barriers and mechanical devices, such as a portable air conditioner when working inside or a fan in a designated rest area that could be used both indoors and outdoors. Misting fans can also be used to cool workers outside. For reference, sometimes you see those types of fans used on the sidelines of football games.

Administrative controls include changes to the way work is done that can reduce the heat exposure, such as scheduling to start at dawn and take a break during the hottest time of the day, which is normally 11 a.m. to 2 p.m. If possible, maybe work could be extended a little bit into the cooler hours at the end of the day. Another administrative control is rest, which reduces workers' metabolic load and allows them to cool off in a shady area while drinking water to replace fluids lost through sweating during the day. PPE can also include cooling vests or hard hats with shade visors attached at the back to block the direct sunlight. This does not include clothing that is meant to protect against chemical exposure. That type of clothing is impermeable and can actually add to the person's heat load.

PSJ: Any final thoughts?

Tom: Dealing with excessive heat is a complicated process because of so many environmental conditions and such a wide range of work tasks that must be considered. If it were easy to deal with, the standard would have been prepared a long time ago. The subcommittee considered all aspects of the problem when preparing this document to give companies as much help as we could. The standard itself is 18 pages, but there are an additional 34 pages of very helpful information in nine different appendixes that gives both management and workers advice on how to deal with working safely in excessive heat.

Lastly, the A10.50 subcommittee consisted of 30 members who represented small and large businesses, trade unions, consultants, universities, and government agencies. We worked well together over the 3 years it took to develop the standard, and I want to extend my thanks and appreciation for everyone's effort. **PSJ**

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