

SWACSM Expanded Abstract

Heat Strain in Road Construction Workers During the Summer, An Observational Study

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ABSTRACT

Road construction workers perform physically demanding tasks, typically including building frames, laying concrete and asphalt, and operating heavy machinery. These activities result in high metabolic demands, leading to significant internal heat production. When combined with environmental heat stress during warmer periods of the year, road construction workers may experience substantial heat strain, making them susceptible to heat-related illnesses and ultimately heat-related deaths. In fact, construction workers are 13 times more likely to die from heat related illness compared to other occupations. Despite these statistics, no studies have assessed heat strain in road construction workers during the summer. **PURPOSE:** To quantify heat strain in road construction workers during a typical workday in the summer. **METHODS:** Seven male road construction workers were monitored for markers of heat strain during a typical work day in the summer. Core and skin temperatures were continuously monitored on participants throughout the day, and hydration was assessed via changes in urine specific gravity (USG) and body weight from the beginning to end of the workday. Heat index (HI) was calculated from dry bulb temperature and humidity continuous measurements for the duration of the workday. **RESULTS:** Two of the seven workers (29%) reached a peak core temperature of greater than 38.0°C, which is a threshold used by OSHA to identify the risk of heat stress. The average peak values for core temperature were $37.89 \pm 0.16^\circ\text{C}$, with work shift average values being $37.42 \pm 0.36^\circ\text{C}$. The average peak values for skin temperature were $36.71 \pm 0.62^\circ\text{C}$, with work shift average values being $34.21 \pm 1.43^\circ\text{C}$. The peak heat index was 34.1°C , with a peak dry bulb temperature of 36.1°C . There were no significant changes in USG ($p=0.30$), but a significant decrease in body weight ($0.85 \pm 1.0\%$) from pre- to post-work ($p=0.02$). There was a moderate, positive correlation between heat index and core temperature ($p=0.001$, $r^2=0.38$) **CONCLUSION:** Road construction workers experience significant heat strain while working in the summer, even when working in moderately hot dry conditions. This heat strain is likely dependent upon changes in environmental heat.

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