

EXTENDED ABSTRACT

Development of a Thermal Risk Assessment Tool for Drivers

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Objectives

With the increase in the demand for home deliveries with online shopping, some delivery vehicles are being used that do not have air-conditioning and it has resulted in injuries and fatalities in America. This study was focused on the effect of the internal environment of vehicles, based on colour and sun exposure, to determine if these are the main parameters that increase the risk of heat strain on drivers during the summer months.

Methods

Utilising two family sedans of different colours (dark blue and white) and a van, the internal temperatures were recorded and compared against the ambient temperatures. The van was used to assess the impact of full sun against full shade and to determine the airflow across the driver at different speeds common in urban areas. To determine the differences between full sun and full shade, the FAME lab predicted heat strain program was utilised to model the core temperatures at different metabolic loads. Various metabolic loads were used to simulate the effect of loading vehicles with packages in the different conditions that could be experienced by drivers.

Results

From the data, there was some differences between the colours, with the dark colour having higher temperatures and lower humidity when compared to the white sedan. All vehicles, when in full sun, stabilized internal environments within 2 hours which were significantly higher than that of the ambient temperatures. Using the results from the van tests for predicted heat strain, it was found that the conditions on the average person would not result in core temperatures above 38°C.

Conclusions and Recommendations

The risk of thermal stress to drivers is not exclusively on the environment within the vehicle which is being operated but also the physical work that they complete alongside the driving. This was determined through the utilisation of a predicted heat strain program comparing the effects of full sun to that of full shade. The results for the full sun testing were below the recommended core temperature of 38°C indicating that other factors outside of the vehicle could be the main contributors to the issue. Through the development of a basic thermal risk assessment targeted at drivers, the main focus will be on the delivery of packages as this is where the most variation within their tasks is found. This is due to the packages themselves varying in weight and shape, but also carry distances, whether there are stairs and also the number of deliveries that are required to be carried out.

Keywords

Drivers, predicted heat strain, basic thermal risk assessment