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Experimental study on occupants' interaction with windows and lights in Mediterranean offices during the non-heating season

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Title:

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Abstract

The modelling of human behaviour is an important challenge for the building sector, as the actions of users have significant impacts on both energy consumption and comfort assessment. In the search for a comprehensive understanding of the behaviour of occupants, many researchers have directed their efforts towards determining typical patterns and developing models to predict human-building interactions. This study investigates the behaviour of building users during the summer season in offices in Mediterranean climate. Studies focusing on this area are still lacking, despite their importance for cooling loads. A survey is conducted using a dedicated sensor network to monitor environmental variables, and to determine the presence of people and their interactions with windows and lights in three offices. The driving factors for the actions of users are assessed and behavioural models are proposed. The results indicate that interactions with windows and lights are driven by both time-related events and environmental factors, confirming previous findings. A comparison of the proposed models with others developed for different climate zones suggests that interactions with windows are affected by the geographic area, while light switching behaviour seems to be very similar for the different case studies. A simplified approach for the consideration of different user-device interactions is also proposed. This novel method, developed to evaluate the interactivity between users and building systems, is based on a coefficient of interactivity, C_i . Both the behavioural models and the simplified approach could be introduced into future simulations to improve predictions of energy use in buildings.

Keywords

Occupant behaviour; behavioural modelling; offices; windows; lights; Mediterranean climate

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