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### Abstract

By developing a dynamic model for a retail shed coated with solar reflective materials, this paper aims to compare the annual cooling load, heating load and, as a consequence, the electricity consumption of the shed for six locations around the world. The study employs a range of different coloured coatings with different solar reflective properties, taking into account the effects of roof angle and skin type of the shed. Using these coatings, a comparison of the energy use by electric heating and heat pump has been performed. In addition, other performance issues, such as CO<sub>2</sub> emissions and cool roof studies, have been investigated. The modelling and computational results prove that the use of solar reflective coatings is effective in reducing cooling load and overall electricity consumption for most locations, in particular in hot climates with predominant cooling requirements.

Keywords Reflective coatings; Dynamic model; Energy; Commercial buildings; Building envelope

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