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Effects of passive elements on thermal comfort in residential buildings

Sri Lanka is presently facing a serious energy crisis due to rapid increase in energy demand. One of the solutions for this is energy consideration, and one consideration is residential buildings. The energy used for thermal comfort cold be reduced using passive element.

To determine the effects of passive elements, computer simulations with DEROB-LTH program was used. The average climatic data for of the warmest months of the year, March, was used. The thermal performance of a house with desirable passive features was compared with one planned with no regard for passive elements. The same internal loads are used for both cases. The thermal performance of a volume sheltered by an upper floor and a volume sheltered only by the roof were considered.

A comparison of similar volumes in two houses indicated that there can be a temperature rise of about 4 ^{o} C when passive elements are disregarded. Most importantly, the indoor temperatures of the houses with passive elements remained below 30 ^{o} C, which can be considered as an upper limit for providing thermal comfort with enhanced ventilation. Thus the houses with passive elements offer a greater possibility to operate avoiding forced ventilation offered by fans. This could lead to saving in energy for operating the houses. Such savings could have benefits at national level since large energy savings could be possible if a large number of houses are designed with passive elements.