

## Challenges to achieving comfort with double skin facade in a hot climate

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*This paper presents the findings of preliminary thermal analysis for a building in Abu Dhabi with double skin facade. The building is a 17 storey office building (approximately 15,000 sqm floor area). The building is fully glazed and curved in shape. The outer skin is single glazed with sophisticated properties. The inner skin is double glazed and the gap in between includes motorized blinds to reduce the solar gains.*

*Due to the high temperatures and intense solar radiation in the region, preliminary analysis showed that the air temperature in the double skin facade cavity would reach over 70 degC. This high temperature would not be optimal for the blinds' motors.*

*Occupants comfort is another key issue. High temperatures of the internal glazing could result in uncomfortable indoor conditions particularly for the spaces close to the perimeter of the building.*

*A novel exercise have been carried out with several iterations of detailed thermal simulations to determine the optimum energy strategy to minimize the building overall energy consumption while maintaining indoor comfort and keeping the double skin cavity at acceptable air temperature for the blinds' motors.*

*The results of this study demonstrated that the optimum strategy would be to partially ventilate the double skin cavity with the return fresh air supplied to the offices space. Our analysis also showed that areas of the facade, which is more exposed to solar radiation i.e. south facing areas, would have higher cooling requirements than the north facing areas. Dividing the double skin gap into four sectors allow to independently ventilate each sector as required and that would result in an effective use of energy.*