Abstract

Existing literature on double-skin facades is reviewed, including classifications and its transferability to hot and humid climates. The analysis led to evaporative cooling spray, where objectives are drawn to quantify its benefit.

For research tools, selection process for appropriate software is undergone followed by training to achieve proficiency. Basic software validation is conducted using an actual building consumption comparison.

The simulation parameters are established by changing a Prototype configuration to determine its energy consumption, mass air flow and CFD patterns. Governing equations are explained and utilized for manual calculations together with the Psychrometric chart that plots values against various air conditions. Simulation results are post processed and integrated into the equation to achieve values not covered in the software capability.

Results show 5% energy consumption savings utilizing double skin facades. There are little energy savings with the tested variables in configuration. Air mass flow is generally improved by increase of width and height while orientation air flow results vary. Using the proposed spray on the double skin façade, Prototype day design savings on an office building is improved by 3% while a residential building could benefit from 50 – 90% reduction.

The dissertation concludes with limitations and suggestions for future studies.

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