

Control Strategies for Hybrid Ventilation of Office Buildings

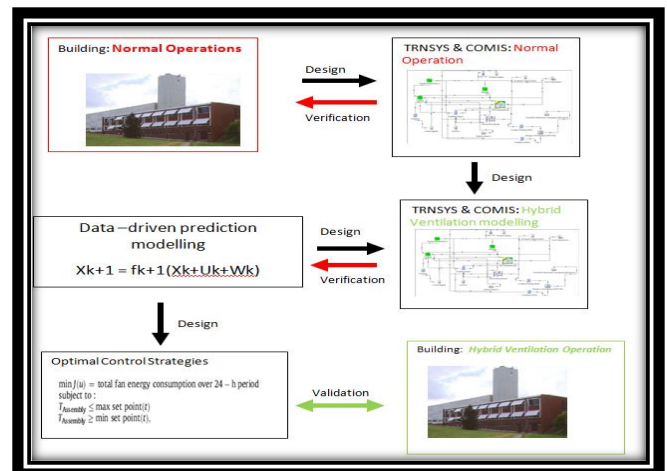
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Abstract: Hybrid ventilation makes the best use of mechanical and natural ventilation to maintain a satisfactory indoor environment with minimum energy consumption. In other words, hybrid ventilation involves a control system that can select between natural and mechanical modes in order to minimise the energy consumption within acceptable criteria. Even though many Hybrid ventilation buildings have been built in recent year, there are no general control strategies for these buildings. The control algorithms are developed using data-driven modelling for each individual building. It is unclear how to develop the control strategies at the design stage before adequate required data can be obtained. Practical design guidance for hybrid ventilation and control strategies modelling is the expected outcome for this study.

Methodology

In order to acquire data before buildings are built, TRNSYS & COMIS – a validated transient simulation software is used to produce the performance data. The predicted data set obtained from the simulations is used to develop simplified predictive models. The data set and the predictive models developed are validated with the measured data. Then the predictive models are applied to identify the optimal control strategies.



Progress

-TRNSYS & COMIS models and predictive models for hybrid ventilation were successfully developed, corresponding with the first experimental case study, a test shed in Burnley Campus, the University of Melbourne.

-Optimal control algorithm based on physical insight of buildings was developed using MATLAB 2012a. The proposed method was found feasible.

-The research is in progress to validate with an actual building. Level 4 ATC building at Swinburne University was selected for the second experimental case study.



Shed D



ATC building