รูปแบบ Abstract (บทคัดย่อ)

Project Code : MRG4980164

Project Title : Measurement and prediction of indoor environment by coupled building energy and CFD simulation

ชื่อโครงการ : การวิเคราะห์ประสิทธิภาพของการใช้โปรแกรมร่วมของ Energy Simulation และ CFD เพื่อการประเมินผลและวิเคราะห์ความต้องการการใช้พลังงานและผลกระทบของสิ่งแวดล้อมภายในอาคารในขั้นตอนเบื้องต้นของการออกแบบอาคาร

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Abstract

The information provided by computer fluid dynamics (CFD) and building simulation (BS) program is essential for the evaluation of the most significant building performance, including thermal comfort, indoor air quality, mechanical system efficiency, and energy consumption. However, the uniform indoor air temperature assumed by ES simulations is not true for most indoor spaces. The assumption may cause serious problems in predicting building cooling/heating load for cases with air temperature stratification. The integration of these two applications can eliminate the primary assumptions employed in the separate simulations and thus results in more accurate predictions of building performance. For example, an ES program can provide building cooling load and interior surface temperatures of building envelopes to CFD as boundary conditions while CFD can determine surface convective heat fluxes for ES. This study describes an approach to integrate ES and CFD program and validates the coupled application by using sets of experimental data from literatures. The program was then used to calculate environmental indoor conditions of Shinawatra University's atrium, Thailand. The comparison of the simulated results with the experimental data reveals the benefits of the coupled simulation over the separated ES and CFD application.

Keywords : Coupled building simulation; Computational fluid dynamics; Energy simulation