

Computational Modeling of Thermal Comfort and CO₂ Distribution in Common Room-Lecture Room by Using Hybrid Air Ventilation System, Thermoelectric-PV-Silica Gel under IAQ Standard

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Abstract : In this paper, simulation modeling of heat transfer, air flow and distribution emitted from CO₂ was performed in a regenerated air. The study room was divided in 3 types: common room, small lecture room and large lecture room under evaluated condition in two case: released and unreleased CO₂ including of used hybrid air ventilation system for regenerated air under Thailand climate conditions. The carbon dioxide was located on the center of the room and released rate approximately 900-1200 ppm corresponded with indoor air quality standard (IAQs). The indoor air in the thermal comfort zone was calculated and simulated with the numerical method that using real data from the handbook guideline. The results of the study showed that in the case of hybrid air ventilation system explained thermal and CO₂ distribution due to the system was adapted significantly in the comfort zone. The results showed that when CO₂ released on the center of the other room, the CO₂ high concentration in comfort zone so used hybrid air ventilation that decreased CO₂ with regeneration air including of reduced temperature indoor. However, the study is simulation modeling and guideline only so the future should be the experiment of hybrid air ventilation system for evaluated comparison of the systems.

Keywords : air ventilation, indoor air quality, thermal comfort, thermoelectric, photovoltaic, dehumidify

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