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Thermal Comfort in Office Rooms in a Historic Building with Modernized Heating, Ventilation and Air Conditioning Systems

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Abstract : Envelopes with low thermal performance is a common characteristic in many European historic buildings which leads to higher energy demand for heating and cooling as well as insufficient thermal comfort for the occupants. This paper presents the results of a study on the thermal comfort in the City Hall (Rådhuset) in Gävle, Sweden. This historic building is currently used as an office building. It is equipped with two relatively modern mechanical heat recovery ventilation systems with displacement ventilation supply devices in the offices. The district heating network heats the building via pre-heat supply air and radiators. Summer cooling comes from an electric heat pump that rejects heat into the exhaust ventilation air. A building management system controls HVAC equipment (heating, ventilation and air conditioning). The methodology is based on on-site measurements, data logging on the management system and evaluating the occupants' perception of a summer and a winter period indoor environment using a standardized questionnaire. The main aim of the study is to investigate whether or not it is enough to have modernized HVAC systems to get adequate thermal comfort in a historic building with poor envelope performance used as an office building in Nordic climate conditions.

Keywords : historic buildings, on-site measurements, standardized questionnaire, thermal comfort
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