

The Assessment of Natural Ventilation Performance for Thermal Comfort in Educational Space: A Case Study of Design Studio in the Arab Academy for Science and Technology, Alexandria

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Abstract : Through the last decades, the impact of thermal comfort on the working performance of users and occupants of an indoor space has been a concern. Research papers concluded that natural ventilation quality directly impacts the levels of thermal comfort. Natural ventilation must be put into account during the design process in order to improve the inhabitant's efficiency and productivity. One example of daily long-term occupancy spaces is educational facilities. Many individuals spend long times receiving a considerable amount of knowledge, and it takes additional time to apply this knowledge. Thus, this research is concerned with user's level of thermal comfort in design studios of educational facilities. The natural ventilation quality in spaces is affected by a number of parameters including orientation, opening design, and many other factors. This research aims to investigate the conscious manipulation of the physical parameters of the spaces and its impact on natural ventilation performance which subsequently affects thermal comfort of users. The current research uses inductive and deductive methods to define natural ventilation design considerations, which are used in a field study in a studio in the university building in Alexandria (AAST) to evaluate natural ventilation performance through analyzing and comparing the current case to the developed framework and conducting computational fluid dynamics simulation. Results have proved that natural ventilation performance is successful by only 50% of the natural ventilation design framework; these results are supported by CFD simulation.

Keywords : educational buildings, natural ventilation, , mediterranean climate, thermal comfort

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