A COMPARISON BETWEEN ATRIUM AND COURTYARD THERMAL RESPONSE TO DIFFERENT PASSIVE COOLING STRATEGIES IN HOT TROPICAL CLIMATE

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Abstract: Atrium is an enlarged modern type of courtyard is being incorporated increasingly in different type of buildings. Courtyards have been around for millennia in the Middle East and the Mediterranean regions. They are common open spaces in houses implement natural ventilation as a passive strategy to provide thermal comfort and fresh air for the occupants of the buildings. Since buildings sectors have high energy consumption, proper courtyard/atrium design in modern buildings could provide an appropriate indoor environment for the occupants, while simultaneously decreasing the energy use. For this purpose, monitoring and measurement of a naturally ventilated atrium in an office building is reported which was conducted in November 2013 in Putrajaya, Malaysia where the weather is Hot and humid. The results is compared with field study results of two common courtyard houses in hot and humid climates. Then, the impact of using different passive cooling strategies on both atrium and courtyard indoor thermal environment is investigated. Furthermore, this paper proposes some design recommendations that enhance the courtyard and atrium passive cooling performance for buildings in hot and humid climates.

Key words: Courtyard, Atrium, Natural ventilation strategy, Passive cooling design, thermal performance, Low energy.