Dr. Veena Chaudhary

Task 1.3 Design & field implementation of hybrid space conditioning system for climate-resilient buildings (HCP059)

Objective: To study and improvise passive space conditioning systems for climate-resilient buildings.

Abstract: Passive cooling is inevitable for buildings to be resilient to global warming. It is one of the energy-efficient methods which can be addressed in sustainable design to decrease overall building energy consumption. Passive ventilation in buildings depends on climatic conditions and the airflow pattern. Wind towers, cross ventilation, stack ventilation, and solar chimneys, and radiative cooling are some of the passive ventilation techniques which can be adapted in buildings. It is considered a power-saving and environment-friendly technique highly required in the ongoing crisis of global warming. The proposed passive space conditioning system integrates a windcatcher and a passive heat transfer device. The system has two modes of operation: (1) natural ventilation, by means of the kinetic energy of wind, and (2) Mixed mode, where the flow is driven by a fan. Windcatcher is usually placed on the roof, and the catchment area of the windcatcher consists of louvers, an anti-air circuit system, and anti-bird mesh. The air circulates to the desired space either through the kinetic energy of the wind or forced circulation. Through thermal buoyancy, it generates a driving force that causes the room to be exhausted from the space and replaced by fresh air outdoor entrain from the windcatcher opening.

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Task Leader: Dr. Veena Chaudhary

Team Member: Dr. Kishore Kulkarni (20%), Ar. Anup Kumar Prasad

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