Courtyards, Jalis, Thermal Mass: The Specs That Were Already Right

Vernacular architecture outperforms imported standards because it was designed for this heat.

At a Glance

Jalis filter solar radiation. Courtyards move air. Thick walls store heat. Vernacular architecture solved the 9-month heat problem 400 years ago. Modern buildings chose to forget. [1]

Summary

Vernacular Indian architecture evolved over centuries in response to 9 months of continuous heat. Three mechanisms work together: thermal mass (heavy stone or mud walls absorb daytime heat and release it at night), natural ventilation (courtyards and jalis create convection as heated air rises and cooler air enters), and solar shading (deep overhangs and lattice screens reduce direct radiation reaching walls and windows). [1]

Thermal mass in thick masonry walls operates on the same latent heat principle as the soil in a Terrapod. Stone has a specific heat capacity of approximately 800 to 1,000 joules per kilogram per degree Celsius. A 45-centimetre thick sandstone wall spanning 10 metres of floor area, when heated from 20°C to 35°C during the day, stores approximately 13.5 megajoules of energy. This energy releases slowly at night as exterior temperature drops, moderating the rate at which indoor air temperature rises the following morning. [2]

Jalis, or lattice screens, reduce incident solar radiation on walls and windows by 60 to 80 percent depending on geometry. This is not decoration. This is thermal engineering. Courtyards create stack ventilation: as air in the courtyard is heated by afternoon sun, it becomes less dense and rises. Cooler air from covered colonnades flows in to replace it, creating continuous ventilation without pumps. [3]

Modern buildings abandoned these mechanisms in favour of mechanical HVAC: all cooling through electricity, no passive mechanisms. The cost is 9 months of thermal dependence on the grid. Biothermal Microconditioning returns cooling to biology, using areca palms as living jalis (shade + filtration + evapotranspiration) and Terrapods as portable thermal mass. Easy Retrofit. One day to place clusters. No structural changes. Results measurable immediately. [4]