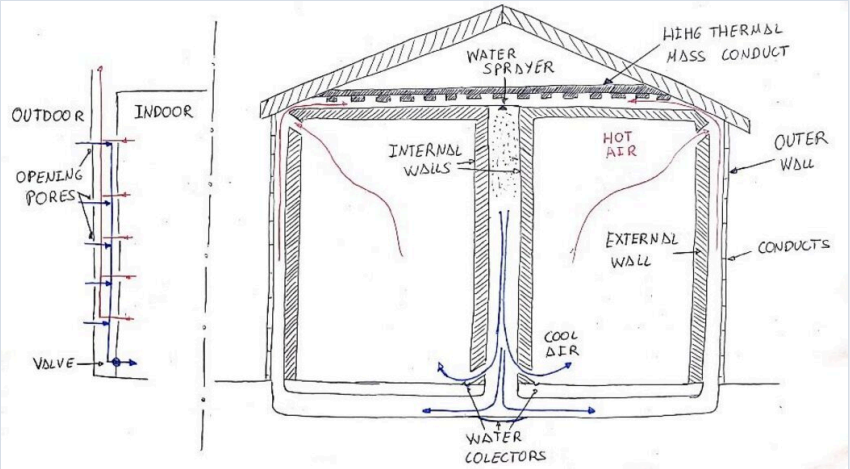
STUDY 03 · CREATIVE REFRAME / BIOMIMICRY · SOLO PROJECT

Passive Cooling from Termite Mounds

Reframing a big-building cooling principle into a self-regulating family house.

THE STUCK PROBLEM

Building cooling consumes a large share of global energy and emissions — and the existing termite-inspired designs exist only at large commercial scale. The challenge: extract the underlying principles and apply them to an ordinary family house that regulates its own temperature with little or no active cooling.



Convective-flow circuit — outer walls drive a stack-effect loop; air is cooled against high-thermal-mass walls and by evaporation, then delivered to the floor.

HOW THE THINKING WORKED

Extract. Distil the termite mound to its transferable mechanisms — heat-induced convection between low- and high-thermal-mass structures, and Venturi-driven induced flow — rather than copying its shape.

Translate. Re-express those as five concrete design features: an outer air-gap, high-thermal-mass internal walls and conduits, low-mass breathing outer walls, a connected chimney-and-flute network, and an optional water pulveriser for evaporative cooling.

CONCEPT & SANITY CHECK

The outer walls heat quickly and drive a stack-effect flow; air is cooled against the overnight-charged walls and by evaporation, then delivered to the floor. The loop reverses at night and stops in winter. Rather than asserting it would work, a first-order stack-effect calculation estimated a flow of about 0.46 m/s for a 100 m² house — enough to show viability and to flag a full thermo-fluids study as the honest next step.

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