

Solar Passive Hostel University of Jodhpur

Architect Vinod Gupta

This hostel for married students is designed for a hot-dry climate. The main design constraints were a great water scarcity and the strong desert winds. Predications of thermal performance have been made but no results are as yet available.

This building was put up as part of the research project undertaken by Centre of Energy Studies, IIT, Delhi. Although energy conservation was stated as the objective, the design attempted to test and demonstrate suitable methods of providing thermal comfort in the hot, dry climate of Rajasthan.

The air being very dry, evaporative cooling in summer can prove to be extremely effective in Jodhpur. Unfortunately, the city faces water scarcity in summer, and any water dependant cooling system is bound to fail. The design, therefore, uses a favourable orientation, massive structure,

and air gap in the roof for nsulation, reflective external finishes, deep sunshades, and a wind tower for making use of the cool winds. An experimental evaporative cooling system using wires for water distribution, has also been installed on the wind tower.

The prevailing direction for cool winds in Jodhpur is the southwest. Window apertures are difficult to provide in this orientation as it the least favourable as regards solar radiation. To overcome this, a wind-tower concept was used. The tower faces the wind direction and is located over the staircase, thus minimizing costs. Cool air is provided to each room from this tower and Normal windows or smaller shafts (towers) facing the lee of the wind have been provided to distribute the cool air throughout the building. The tower catches only the cool wind from the south-west, avoiding warmer air from other directions.

Walls are built to local light coloured stone. Large slabs of the same stone have been used for roofing, staircases, partitions, and for lintels over windows. Roof insulation is provided by using small inverted terracotta pots over the stone slabs, and filling up the intervening spaces with lime concrete. Since very few manufactured materials have been used, this is a low-embodied energy building.

Since the university is normally on vacation during the worst summer months, winter comfort is as important as summer comfort. South facing windows have been provided in most of the rooms. To prevent heat loss during night, solid timber shutters have been provided in addition to glass. A common bank of solar water heaters has also been installed. Although no temperature measurements are available, the building has been found to be very comfortable in winter.

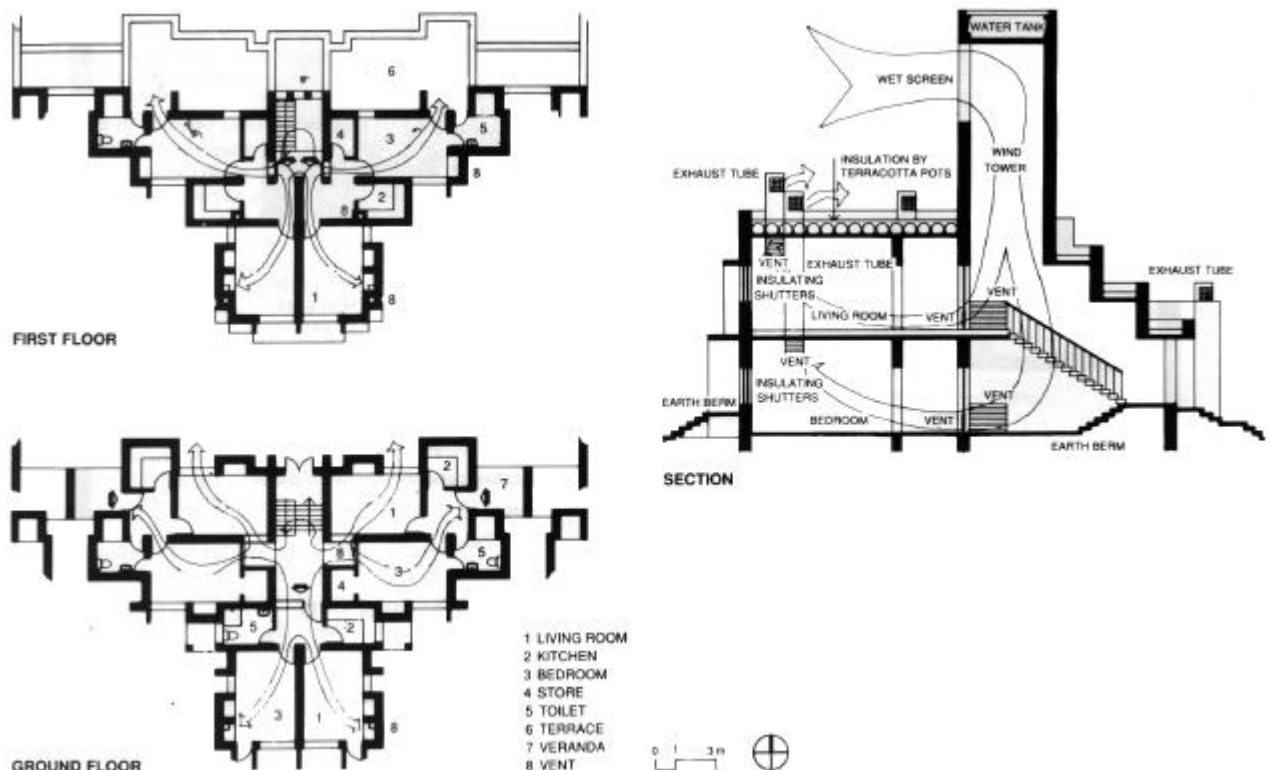




Photo Vinod Gupta

Owner University of Jodhpur
Consultants Centre of Energy Studies, Indian
Institute of Technology, New Delhi
Contractor Engineering Cell, University of
Jodhpur
Area 420 sqm
Cost Rs. 1,600,000
Date of completion 1987