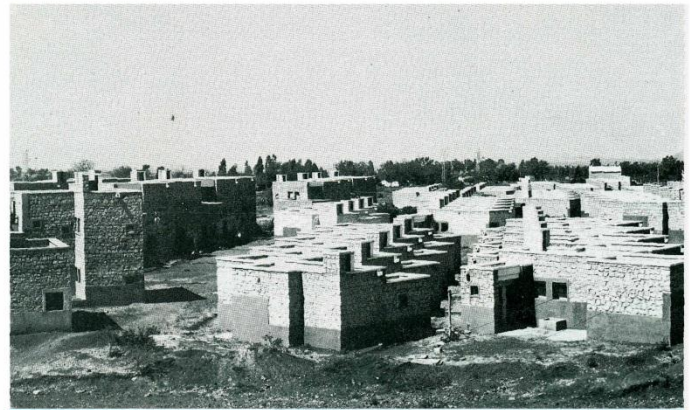


HOUSING FOR INDUSTRIAL WORKERS VYSANKERE, KARNATAKA

The scheme has a total covered area of 9450 m² and has a variety of floor plans for the same floor area. The buildings are **economically built using local indigenous materials** in the wall systems, doors and windows, etc. The layout in the first phase consists of 18 row houses around a common central court. Each courtyard is differentiated by planting a different tree. In phase two, the houses are grouped in rows with rear and front open spaces assigned to the individual units.

MATERIAL USAGE & CONSTRUCTION SYSTEM

TPOLOGY	Single or double storey terraced housing units
STRUCTURE	Load bearing stone masonry.
ROOFING SYSTEM	Roofing is of Cuddapah stone slabs with precast concrete roof joints (the only item using cement).
WALLING SYSTEM	Built of local granite stone using lime mortar. Lime plaster is used sparingly and only where it is absolutely essential, at window reveals and at the base, and wherever one is likely to touch a wall.
DOORS/WINDOWS	The doors and windows are of country wood, and in some units use of frames is eliminated.
SEMI-OUTDOOR SPACES	All the dwelling units are provided with their individual open space adjacent to them, either in the form of courtyards, or front and rear garden lots, or terraces for the two storeyed units.



SITE PLAN

LCCR FEATURES

Siting and orientation:

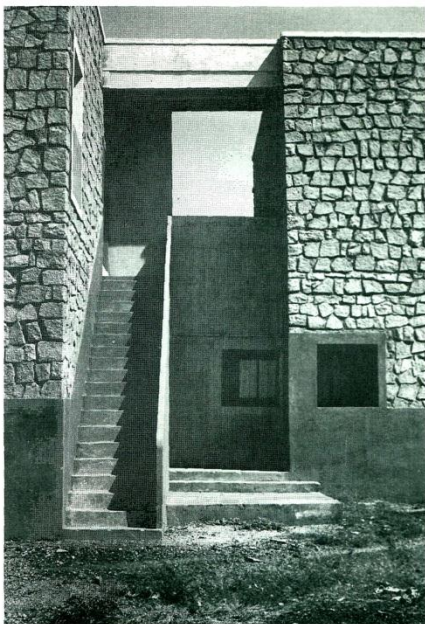
- The units are tilted in plan to achieve optimum north south orientation.

Morphology:

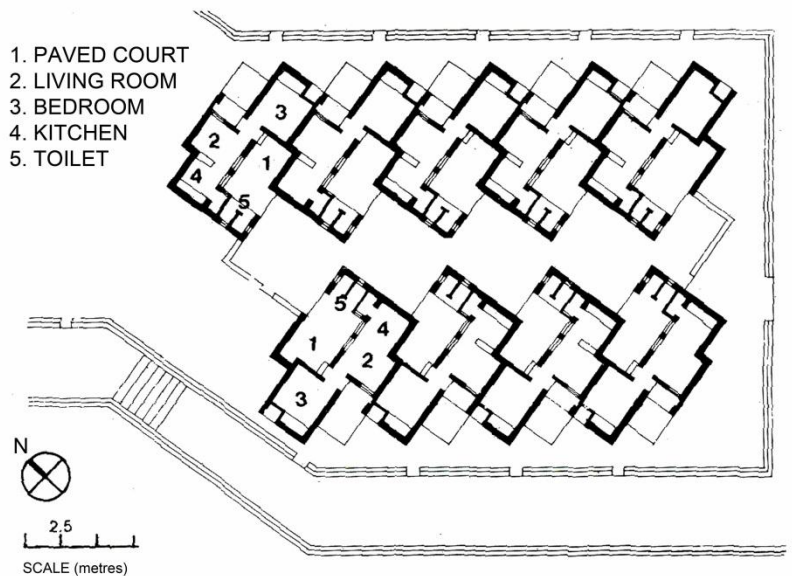
- The units are terraced along the east and west walls, making for a compact massing that will have minimum heat gain.

Thermal strategy:

- The windows are deep set into the walls effectively shading the opening.
- The use of granite stone lends thermal mass to the envelope stabilising internal temperatures during the summer and winter seasons.



1. PAVED COURT
2. LIVING ROOM
3. BEDROOM
4. KITCHEN
5. TOILET



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LOW CARBON CONSTRUCTION IN THE RURAL AREAS AND SMALL
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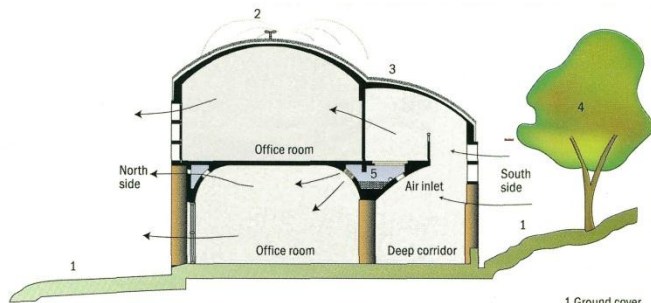


WATER AND LAND MANAGEMENT INSTITUTE BHOPAL, MADHYA PRADESH

The WALMI was established with the objective of **increasing the effectiveness of irrigation projects**. The Institute conducts research and training programmes in classes and in the field. The scheme has a total built up area of 10,800 m² and the site is located on a flat top hillock adjoining the Kaliasote dam. The building blocks follow the contour of the hill it sits on.

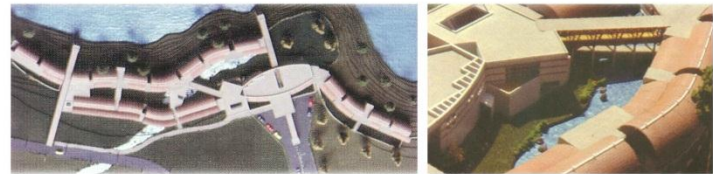
MATERIAL USAGE & CONSTRUCTION SYSTEM

TYPOLOGY	Built as a 230 metre long "landscaper", using of a modular unit of 7mx 25m, that is easily adaptable for use as laboratories, a library and administrative functions, constitutes the main bulk of its built form.
ROOFING SYSTEM	The roof is insulated with a 2.5-cm layer of thermocol over RCC shell and topped with stone tiles.
WALLING SYSTEM	High bulk local stone walling
FLOORING	Local natural stone
SEMI-OUTDOOR SPACES	South facing single loaded corridor along length of the building.



SECTION OF MODULE SHOWING PASSIVE STRATEGIES

- 1 Ground cover
- 2 Water sprinkler
- 3 Insulated roof
- 4 Shading trees
- 5 Water trough



GROUND FLOOR PLAN



LCCR FEATURES

Orientation:

- The building is oriented along the east-west axis for north-south exposure. The extensive north exposure ensures good daylighting through window openings, while the deep-set south facing corridor reduces solar gain, glare and induces cross ventilation.

Thermal strategy:

- Use of high bulk local stone walling adds to thermal mass to ensure the interior is 10°C cooler than the outdoor.

Landscaping:

- Adjoining areas with soft ground cover and drip irrigation avoid all reflected heat and glare. Dense planting of evergreens that reuses water from the building. Use of indigenous trees requires minimum maintenance.

Use of water:

- Water pumped from the Kaliasote reservoir is stored in overhead water tanks above the building. Cascading water is used as a coolant for air-conditioning units.

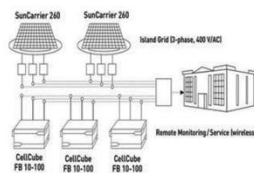
- Water sprinklers on the roof allow cooling through evaporation. On the lower floor, the air is admitted through a built-in trough of water ensuring higher humidity and coolth during dry hot summer months.

Waste/ sewage management systems:

- 2 gobar gas plants that not only effectively manage waste disposal but also yield fertilizer and methane gas.

SUN CAREER OMEGA ZERO NET ENERGY BUILDING BHOPAL, MADHYA PRADESH

A Net Zero Energy Building is highly energy efficient and produces at least as much energy over the course of a year as it consumes. The SunCarrier Omega Net Zero Energy Building (NZEB), is an example of how organizations that can, to go beyond adopting the best in energy conservation technologies, and augmenting the energy supply by implementing 'green' energy systems that maximise the use of solar energy.



Solar PV system:

- SunCarrier SC 260 sun-tracking solar PV system with a designed energy yield that was 35-40% higher than that of similarly rated static systems.

Reduced operational energy:

- Design incorporates daylighting for high utilization of natural lighting; LED lighting and occupancy monitoring sensors.

Non-polluting systems:

- Air conditioning system with ozone friendly refrigerant and carbon dioxide monitoring sensor system and low noise inverters.

Efficient water usage:

- Water harvesting system, controlled water discharge toilets, and sewage treatment with zero discharge.

Energy management system:

- Integration of a large capacity (100kWh) energy storage system, the Cellcube FB 10-100. Excess energy produced during the day by the SC 260 is stored in the Cellcube, which in turn supplies energy during the night hours, and during monsoon days when the sun does not shine.

Harnessing wind energy:

SunCarrier Omega has planned to integrate small Wind Turbines of power rating of 10 kW, the WindCarrier, in the energy mix that has the ability to harness wind power regardless of wind direction.

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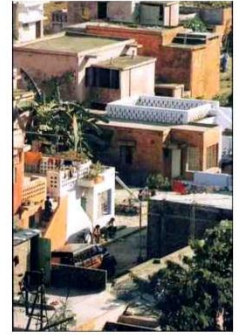


ARANYA HOUSING INDORE, MADHYA PRADESH

The Aranya housing can be deemed as one of the best examples of **climate responsive planning in housing in semi-arid region**. The Aranya housing, with a net planning area of 89 hectares, was designed as a site and services project laid out in six sectors that converge on a central spine. This example of low cost housing essentially works incrementally, with no single repeating design of dwellings. The architect's demonstration units while following standardized requirements for utilities and foundations, was varied across the project resulting in a diverse morphology.



Site Plan



MATERIAL USAGE & CONSTRUCTION SYSTEM

Users decide how much to build

A kit of meaningful building elements is developed. Form variations on a standardized plan is achieved through permutations combination of various elements which are to be exercised by users. This participatory process satisfies users' priorities of house form while offering pleasing varieties to the street facade.

Users choose how to build

Users make their own combination of elements



LCCR FEATURES

Siting and Orientation:

- The varying volumes of the dwelling units are orientated such as to minimise heat gain and increase mutual shading.

Building Morphology:

- The circulation system has been made informal and staggered mainly due to mutual shading, low solar exposure, wind movement and value of interactive public spaces.

Material Usage:

- The project showcases the efficient usage of materials by allowing user control of the building form.

1 2 3 4 Demonstration Housing Kit Of Elements

Staircase Options

Openings Range

Railing Variations

House Extensions Choices

Street Elevation Showing Facade Variations

Part Plan With Varied House Layouts

Brick

Steel

RCC

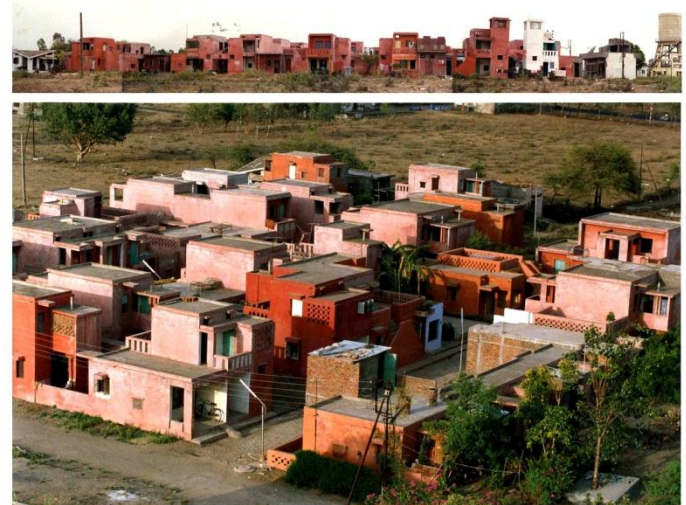
Chajja

Balcony

Over



House form variations

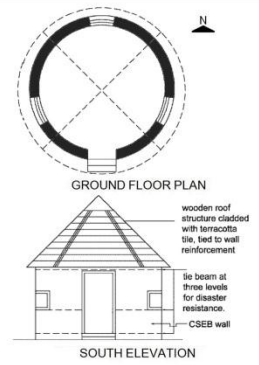


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RUDRAMATA - ARTISAN'S VILLAGE KUTCH DISTRICT, GUJARAT

This project demonstrates a village habitat development model with emphasis on the **traditional craftsmanship of the local artisans using locally available materials**. The artisans' huts or bhungas are made of compressed earth blocks and each bhunga enclose spaces meant for a different purpose. The most decorated one is used as a workplace, selling unit and as a guest room for visitors. The second hut for sleeping and adjoining structures as kitchen and bathrooms rotated to achieve a circular plan form.



MATERIAL USAGE & CONSTRUCTION SYSTEM

TPOLOGY	Detached single storey huts of circular plan form
STRUCTURE	Sand columns have been used as part of the foundation while the walls are load bearing.
ROOFING SYSTEM	The roof is made up of Mangalore tile and has a wooden understructure, which is well tied to prevent collapse during earthquakes.
WALLING SYSTEM	Compressed earth blocks with traditional mirror work on the interior. The exterior is either covered with plaster or left exposed.
DOORS/WINDOWS	The doors, windows and the frames were made of wood.
SEMI-OUTDOOR SPACES	The huts are joined with temporary covering to form a sitting place (verandah).

LCCR FEATURES

Earthquake Resistance:

- The entire structure is disaster resistant due to reinforcement tying the structure.
- Tie beams have been provided at three levels – plinth, sill and lintel to secure the structures against possible earthquakes.

Use of renewable energy:

- The families also use solar lamps for lighting their houses at night. This has reduced the dependence on grid electricity.

Thermal strategy:

- Compressed earth blocks in the walls have high thermal mass which helps regulate temperature peaks.
- The overhang of the roof provides adequate shade to the walls below.

AZADPURA RURAL HOUSING MADHYA PRADESH, INDIA

The Azadpura Rural Housing programme has created shelter for villagers **using innovative processes and materials**. 49 homes and 44 toilets were completed within 6 months the programme which catalyzed the overall development of the community. The Azadpura project attempts to combine locally available skills with the appropriate technologies and all of the materials used were produced in a decentralised manner, creating local employment. The houses were built in a dispersed manner through the village without relocating the villagers. All the houses were almost identical in size (14 feet by 10 feet).

MATERIAL USAGE & CONSTRUCTION SYSTEM

TPOLOGY	Single storey detached houses
STRUCTURE	Concrete block masonry was adopted in foundations and the walls are load bearing.
ROOFING SYSTEM	Micro-concrete roofing (MCR) tiles on a wooden understructure as the roofing material.
WALLING SYSTEM	concrete block masonry up to the sill level, compressed earth blocks (CEB) as the main walling
DOORS/WINDOWS	Wooden doors and windows. The windows and inner niches were unique to each house.



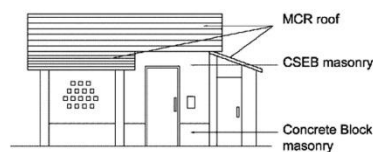
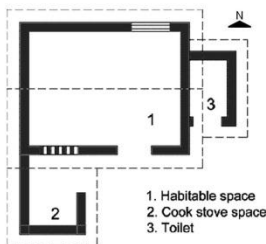
LCCR FEATURES

Waste Utilization:

- Concrete block masonry that uses stone dust, a waste material from stone crushers that is dumped regularly along roads and causes health hazards in the region, was adopted in the foundation.

Water, sanitation and infrastructure:

- Although the main focus was on houses, other elements in the scheme included toilet and infrastructure development. Infrastructure developments were determined in consultation with the villagers and included otlas (threshold platforms), chulas (cookstoves), and the construction of platforms around taps and hand-pumps to prevent water-logging.
- The toilet construction was based on the two pit Sulabh latrine pattern, with seating type selected by the home owner.
- The tap surrounds and platforms were designed to reuse and recycle water.
- The water was collected in a trough and used for animals while excess water flowed into a soak pit.



GROUND FLOOR PLAN

SOUTH ELEVATION

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