GREEN BUILDING, A PRACTIONER’S VIEW POINT

Ar. Siddhartha Wig
THE ELEMENTS building with nature
RESIDENCE IN SECTOR 21, PANCHKULA
(completed in 2000)
AREA – 2000 sft

A small urban residence where a combination of passive thermal control techniques have been tried.
Key features:
1. Solar chimney
2. Insulation on west wall
3. Sun shades to allow ingress of winter sun and shut down summer sun.

The building is oriented due South with cavity wall on West side.

Picture of west elevation

Central courtyard
Light shelves and white ceilings in the rooms allow for enough day lighting in the rooms.

Solar chimneys designed on the south face of the building, augment the air circulation.
OFFICE BUILDING FOR
HAREDA, Panchkula

A GRIHA 5-star rated government building

12-06-2013
Site Area: 3900 m²

Built up Area: 5,111 m²

Air-conditioned Area: 1208 m²

Non Air-conditioned Area: 3903 m²

EPI: 15 KWh/ m²/year

Renewable Energy: Rated capacity of solar PV installed on site is 42.5 KW
EVOLUTION OF DESIGN
EVOLUTION OF DESIGN

SITE BOUNDARY

DIFFUSED LIGHT AVAILABLE, NO DIRECT SUN

210'-5"

SUN AT A LOWER ANGLE IN THIS DIRECTION DURING SUMMER
SO DIFFICULT TO CONTROL THE INGRESS OF SUN RAYS

210'-5"

DIFFICULT TO CONTROL THE INGRESS OF SUN RAYS

ENTRY

EXIT

MAIN ROAD

SUN AT HIGHER ALTITUDE IN THIS DIRECTION SO EASY TO CONTROL INGRESS OF SUNRAYS WITH HORIZONTAL SUN SHADE
EVOLUTION OF DESIGN

COMMERCIAL
COMPLEX SECTOR 17

SITE BOUNDARY
SERVICE ROAD

SHORTER NORTH WALL
ACCOMMODATING
ALL NON HABITABLE
AREAS

ALL WINDOWS ON
THIS WALL ORIENTED DUE
EAST TO HAVE EASIER SUN CONTROL

SOUTH SIDE
COMPLETELY
GLAZED TO GET
MAXIMUM
WINTER SUN

ENTRY

EXIT

MAIN ROAD

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EVOLUTION OF DESIGN
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OVERALL DESIGN STRATEGY

The habitable spaces (excluding courtyard, lobby, corridor, toilets etc.) are about 4200 sqm.

Of these, 1200 sqm are deemed apex at 25 ± 1 °C (apex offices and conference room) to be always air conditioned.

700 sqm are deemed controlled at 25 ± 3 °C (other offices, training room etc.) to be cooled in summer

2300 sqm are passive 25 ± 5 °C (workshops, exhibition etc.) to be cooled in summer and ventilated in monsoon.
SALIENT FEATURES –

Sustainable Site Planning:
Reducing water consumption:
1. Annual reduction in water consumption by 70% by using efficient fixtures.

2. 6.25 lac Litres rain water storage tank has been designed in the basement to collect water from the roof and courtyard. Percolation pits designed along the driveway to collect rain water from the driveway, the overflow of which has been directed to the municipal sewer.

3. Rain water collected is treated and used for drinking purpose, HVAC plant and horticulture.

4. ETP plant installed to treat grey water collected from kitchen and toilet, the treated water is reused for horticulture. Soil waste is directed towards municipal sewer line.
WATER FLOW DIAGRAM

RAINFALL

RAINWATER FALLING ONTO SOFT, HARD PAVED AREA

TO THE GROUND TABLE

PERCOLATION FIT IN THE DRIVEWAY

TREATMENT

294KL/YEAR

149 KL/YEAR

6/4 KL/YEAR

WATER FROM MUNICIPAL SUPPLY 598 KL/YEAR

HVAC WATER DEMAND 892 KL/YEAR

DOMESTIC WATER DEMAND 149KL/YEAR

LANDSCAPE WATER DEMAND 762KL/YEAR

90% OF 169KL/Year

BLACK WATER GENERATION 36.45 KL/YEAR

GREY WATER GENERATION 97.673 KL/YEAR

OUTPUT FROM TIP 88 KL/YEAR

90% efficieny of treatment plant

TO CORPORATION MANHOLE 36.45KL/YEAR
SALIENT FEATURES –

Reducing energy consumption while maintaining occupant comfort:

For achieving thermal comfort:

1. The south face has solar chimneys to aid ventilation in some of the non a/c spaces.

2. Misting done in the courtyard to cool the ambient air which is sucked into the building through solar chimneys. The achieved internal air Relative Humidity range from 60% - 75%.
SALIENT FEATURES –

Reducing energy consumption while maintaining occupant comfort:
For achieving thermal comfort:

3. Use of THERMATEK roofing tiles for increase in re-radiation back to the sky, which reduces the heat ingress from the roof.

4. Cavity walls with XPS foam insulation constructed in east and west facade of the building.
SALIENT FEATURES –

Renewable energy technologies installed on site:

1. **42.5 KW SPV plant (with 5 kw B.I.P.V installed above the courtyard)** has been installed.

2. **Solar water heater for capacity of 600 litres installed for cooking and bathing purpose.**
SALIENT FEATURES –

Site landscaping:

1. The south area at site has a wide spread landscaped area.

2. The selection of vegetation and integration with the native landscape

3. Use of landscape elements as buffer zones – Evergreen high foliage trees (delonix regia) planted in the berm along the main road to reduce noise pollution.
Grass pavers used as driveway floor
Social Initiative by HAREDA-

Solar Van parked on the southern set back of the building for public awareness
View of the louvers, B.I.P.V above the central courtyard from the first floor
Segregation of waste generated on site
The Team
Sanjay Prakash & Associates, for Energy efficiency, Sustainability & Structural Design
McD Built Environment Research Laboratory Pvt Ltd, Bengaluru for MEP, HVAC and Simulation
Haryana Police Housing Corporation, Panchkula for Project Management Consultancy