Vivekananda Kendra
Natural Resources Development Project

Work in the Field of Eco-Friendly Construction Technologies

Milestones
VK-NARDEP went in quest of locally available alternatives. The traditional knowledge bases dominated grand temples, which stand even today, sans mortar and steel rods, after centuries of ravages of time. Today that knowledge is being rediscovered in the Cost-effective Housing Technology movement that has sprouted throughout India started by organisations like that of Laurie Baker and Auroville etc.

The salient features of such houses are avoidance of excessive use of cement and steel and usage of locally available material. The innovative shapes of doors, windows and domes lend aesthetic appeal and beauty to these “Love-able, Live-able and Afford-able” homes. These are economical in terms of embodied energy and leave lesser eco- footprints.

Using the strength through shape principle, curved forms such as arches, vaults, domes and spheres are strong, more efficient and more economical than the equivalent rectilinear structure.
1987-92
- Chemically treated Thatches for economically weaker sections of the society
- Trained local people
- Thatches roofing done 150 house
- Constructed 20 houses with Chemically Thatched Roof

sponsored by CAPART, New Delhi

process

- Coconut leaves are plaited (thatch making) after soaking in water (making soft)
- Thatches are soaked in the copper sulphate solution to make it anti fungus
- Thatches are dried in the sunlight
- Cashew nut shell oil is sprayed on the thatches to make it water resistant
- Thatches are ready for use as a roofing material
1988-89/93-96

- Using cost effective construction technologies in creating community infrastructure constructed houses for samathuvapuram, eco-houses in Kazhakadu mundanthurai using Rat trap bond for walling and Filler slab for roofing.

1991-93

- Inspired by Mahatma Gandhi and Laurie baker VK-nardep develops a host of cost effective building technologies.
  - Trained hundreds of mason on Cost-effective construction technologies particularly on Rat-trap bond wall, filler slab roof and different type of Arches
  - Roof for Roofless booklet published based on Low cost construction Support - CAPART, New Delhi & DRDA, Tamilnadu

Houses at Samatuvapuram

[Images of houses constructed using sustainable materials]

Roof for the Roofless

[Image of the book cover for Roof for the Roofless]

[Image of a constructed eco center at Kalakkad Mundanthurai Tiger Project]
1993-94
34 Group Houses constructed, Alwarthirunargari Panchayat, Tuticorin Dst

1994-95
22 Group Houses constructed, Tenkasi Panchat Union
under Jawahar Velai Vaippu Thittam

1995-96
40 Group Houses constructed, Perukottar village, Kurivikulam block, Tirunelveli Dist.

1996-97
35 Group Houses constructed (Nattarkulam-5, Puliyangalum-15 Karunkulam-15)

1995-98
15 Group Houses constructed, Perunkottoor village, Sankarankovil Taluk,
under Jawahar Velai Vaippu Thittam
Guest House constructed at Sankarankovil, DRDA

Model house -230 sq.ft

*
Orissa Cyclone

Constructed 67 houses at Sologaon in Balasore Dist of Odisha after the Super Cyclone named BOB -06 in the year 1999 - 2000

Speciality - Raised the plinth level by 10feet height, Pile foundation as the soil was black cotton, Rat trap bond wall, and filler slab roofing

Installed Hand pumps - 8 nos.
Established “Technology Resource Center” at Anjaneyam with the support of CAPART, NEW DELHI

Construction of Training Hall, kitchen and dining Hall, Laboratory, office building etc.,

**Kitchen and Dining Hall**
- Novel Openings
- Sunshade with corbelling
- Catenary vault as a roofing made of bricks alone
- No symmetry in the design
- De-conditioning
- Very less carbon footprint as less use cement and steel

**Laboratory Building**
- Interlocking Mud blocks
- Ferro cement vault for roofing and above additional floor constructed
- Domes for roofing
- Spiral staircase with Ferro Crete steps etc.

**Office Building**
- Rat trap bond walls
- Filler slab for roofing
- Dome structure made of bricks for 1st floor roofing
- use of bottles for light
- Brick Jalis for ventilation
- Doors without frame etc.
Cost effective construction technologies for Architects and Masons - 16 attended
Masons training for 21 days - 22 attended

2000

- Exposure visit to Cost effective housing technologies -
- 7 programmes sponsored by HUDCO
  Bengal, Orissa, Bihar, Himachal, Jammu and Kashmir, Uttar Pradesh, Madhya Pradesh, North East states - 123 participants
2000-2001
- Hudco recognised as Rural Building Center
- Pre-fabricated technologies developed
- 5000 sq.ft of Training center cum staying arrangement constructed
- Working yard for practical demonstration constructed.

2001-03
- Compressed Earth blocks – 21 days Programs - 3 nos - 20 each
- Mason training and ferro-cement technologies – 2 programs - 22 each
- Traditional techniques of floor making – 1 programme -12 participants
- Cost effective construction technologies - 3 nos - 21 days – CAPART 89 attended
- 6 poor people houses constructed

Technologies Adopted
- Compressed Earth Block
- Different type of filler material used for roof slab
- Varieties of ferro-cement doors and windows
- Traditional oxides floorings
- Artificial Marble for flooring and walls
- Different type of Jalis
- Air circulation design at the Roof top
- Roof top water harvesting structure
- corbeling
2001 - 04
Established “Gramodaya park for Right living” with 35 Green construction technologies having panels and 8 live models of Green construction technologies

1. Dhara
- Wall: Flemish bond with Decorative corners
- Opening: Different types Semi Circular Arches
- Roof: Different type of Filler Slabs
- Flooring: Red and Black oxide Flooring
  Different type of Brick Jali

2. Dhruva
- Wall: Concrete Block, No plastering
- Opening: Different type of Segmental Arches
- Roof: Ferro Cement Roofing Channel
  Artificial Marble
  Flooring

3. Soma
- Wall: Rat Trap bond Wall, No plastering
- Opening: Different types of Corbeled Arches
- Roof: Corbeled Arch Roof
  Kota Stone
  Brick Jali

4. Apa
- Wall: compressed Earth Block, No plastering
- Opening: Different types of Corbeled Arch
- Roof: Catenary Vault (Brick)
  Kota Stone
  Use of Bottles in making Brick Jali
5. Anila
Wall: Rammed Earth Wall
Opening: Rectangular opening with beam
Roof: Dome (mud block)
Flooring: Mud Flooring
Roof top - Ferro cement Cap

6. Anala
Wall: Rubble Filler Block, No plastering
Opening: Semi circular & Corbelled Arches
Roof: Reinforced Brick Panel Slab
Flooring: Terracotta Tiles

7. Pratyusha
Wall: Laterite Stone
Opening: Different type of Arches
Roof: Funicular Shell
Flooring: Chettinad tiles

8. Prabhasa
Foundation: Arch
Wall: 7" Brick Wall
Opening: Different type of Arches
Roof: Micro Concrete Roofing tile
Different type of Brick Jalies
2001 - 04
25 nos. of Educative exhibition panels on Eco Friendly construction Technologies

Different Arches is the speciality of VK-nardep -(i)Spiral Arch (ii)Compressed Earth block Arch (iii) Plastic bottle arch and (iv) Arch with Waste Mangalore tiles etc.,
2003
• Production of Compressed Earth blocks (HUDCO Rural building center) – 3 prog. - 29 masons
• Cost effective construction technologies (CAPART) 1 prog - 21 days - 29 NGO’s attended

2004
• Construction technologies including Ferro-cement Rural Building Center – 5 prog. - 6 days - 54 attended
• Construction technologies for SHG Members Kanyakumari, Tirunelveli and Thoothukkudi – 3 prog. - 6 days - 83 attended

2005
• Construction technologies for SHG members (Tsunami programme) Thanjavur, Perambalure, Thiruvarur, Ramnad, Kanyakumari, Nellai, Madurai – 8 prog. – 185 womens
• Construction of Resource Center at State Institute of Rural Development – 900 sq ft.
2005-06
• Construction of Resource Center at State Institute of Rural Development – 900 sq ft.
  Construction technologies – 2 progs. -6 days - 54 attended

2007-09
• Construction of Core houses -8 nos during training - 230 sq.ft area
• Awareness programme on Disaster Resistant housing 12 prog -525 attended
  • Disaster Resistant Housing for Mason (UNDP)
    – 12 progms. - 6 days each - 191 attended
  • Disaster Resistant Housing for Engineers and Architects (UNDP)
    – 2 progms. - 2 days each - 76 attended
• Production of CEB and Ferro-cement technologies (BMPTC, New Delhi)
  – 2 progms 6 days each – 40 attended
2008-09

- Construction of Avvai Agam used FAL-G bricks (Flyash, Lime and Gypsum) and Ferro cement Vaults and Ferro cement curvature door technologies

2009-10

Training programmes for Architects and Engineers (BMTPC, New Delhi supported)
- 2 Programmes – 3 days - 141 attended
2012-13
Training programmes for construction supervisors (BMTPC, New Delhi supported) – 2 progms - 3days– 100 attended
Green construction technologies for college students - 3 days - 40 nos.

2012- 13
Training programmes for Engineers and Supervisors (BMTPC, New Delhi) - 3 days- 33

2012-13
Carbon Foot Print of a building – DST, New Delhi - 3 days - 40 attended

2014-15
• Vernacular architecture DST, New Delhi– 2 progs – 2 days - 84 attended
  • Construction industry and carbon foot prints - 54 attended
  • Helped Constructed 10 houses at Kanyakumari Dist
Dissemination of Eco-friendly cost-effective Construction technologies supported by DST, New Delhi

(I) In this project tried to measure Eco Foot Print Embodied energy, Operational Energy and Life cycle assessments of

(II) Eco-friendly construction technologies Trained Many Engineering students Research scholars, Supervisors, Engineers and Architects

Green Buildings

- Green Construction Materials
- Using Renewable Energy
- Designs - Climatic conditions & Topographic
- Rain water Harvesting

Solid waste Management

Green Technologies

Grey and Black water Management

Designs - Climatic conditions & Topographic

Using Renewable Energy

Green Buildings

2010-15
2015-16
Avvaiyar Green Health Corner

Rejected mangalore tile arch

Model design for Health corner

2015-17
Renovation of Mohabeer Dharmashala (Heritage Building)

200 years old abandoned building reconstructed by using traditional techniques - Use of lime, Jaggery and Kaduka seeds

Madras Terrace Roofing, Old domes, Pre fabricated staircase steps and Amphitheater etc.,

Green Rameswaram Project is housed in this building
Before Renovation

After Renovation
2017-18
Compressed Earth Block – DST, New Delhi - 4 days - 18 attended
Training on Ferro-cement technologies – DST, New Delhi - 7 days - 16 attended
Traditional flooring technology – DST, New Delhi - 6 days - 16 attended

2019-20
Mud pot arch Entrance of Varma center (used damaged mud pots, tiles and plastic bottles)
2015-20
Dissemination of Eco-friendly cost effective construction technologies / integrated package for the replacement of wood in buildings with ferro-cement components -DST
New Delhi
- 35 programmes - 1380 participants
Constructed a building at Rameshwaram using different Green building technologies

staying arrangement for social workers which includes kitchen and store

Technologies adopted
- Wall - Rat trap bond
- Roof - Filler slab roof
- Joinery - Different type of Arches
- Flooring - Traditional oxide flooring
- Ferro cement doors and windows
Training Modules

Training on Green Architecture

Training Module: CT-01

Duration: 3 days Residential

Simple stay and vegetarian food

- Eco Details about Foundation, walling,
- Flooring, roofing and joinery etc.,
- Eco friendly construction practices.
- Renewable energy system for efficient home
- Roofwater harvesting
- Waste water management
- Solid waste management
- Practicals

Target group:
Engg. Students interested in Eco friendly construction technologies/Architects/ Masons/ Asst.masons/Engineering students.

Training programme on “Ferro Cement Technology”

Training Module: CT-02

Duration: 6 days
(Residential - Simple stay and veg. food)

Subjects

★ Doors and Windows
(Platform making, Mesh laying, casting, curing, Handling, fittings etc.)
★ Ferro Cement Roofing channels
( Different type of Moulds, casting, Transport, fittings etc.)
★ Ferro Cement Water Tanks
(Different Sizes)
★ Ferro Cement Toilet & Bio gas Plants
★ Miscellaneous Items
(shelf, decorative items, name boards, partition walls, toilets etc.)
★ Precautions, Do’s & Don’ts & Repairing and Maintenance etc.,

Target group:
Engg. Students interested in Eco friendly construction technologies/Architects/ Masons/ Asst.masons/Engineering students.

Note:
Date will mentioned once 15 persons joined or Join as a group of 15 persons
Training on “Production compressed Earth block”

Duration: 6 days

Subjects

- Soil Identification
- Production of compressed Earth block
- Block yard organisation
- Mass production
- Manufacturing of different type of block and usages
- Mud block testing
- Rammed Earth wall construction
- Wall construction

Target group:

Engg. Students interested in Eco friendly construction technologies/Architects/Masons/Asst. masons/Engineering students.

Note:
Date will be mentioned once 15 persons joined or join as a group of 15 persons.

Training on Pre-cast Technologies

Duration: 6 days

(Residential - simple and vegetarian food)

Subjects

- Reinforced Brick Slab roofing
- Funiculars Shell roof
- Jack Arch Roof
- Ferro Crete Technologies
- Chettinad tiles
- Door and Window frames
- F.C. Wall

Target group:

Engg. Students interested in Eco friendly construction technologies/Architects/Masons/Asst. masons/Engineering students.

Note:
Date will be mentioned once 15 persons joined or join as a group of 15 persons.
Training on “Arches Vaults and Dome”
(Residential - simple and vegetarian food)
Duration : 6 days

- Appropriate Technologies
- Different type of Vaults
- Different type of Domes
- Different type of Vault
- Different type of Arches
  Semi Circular
  Segmental
  Pointed
  Corbel etc.,

Note:
Date will mentioned once 15 persons joined or Join as a group of 15 persons.

Target group:
Engg. Students interested in Eco friendly construction technologies/Architects/ Masons/ Asst.masons/Engineering students.

Training on Masonry Technologies
(Residential - simple and vegetarian food)
Duration : 6 days

Subjects
- Rat trap bond
- Rammed Earth wall
- Rubble filler block
- Filler slab roofing
- Different type of Arches
- Polished oxide flooring
- Artificial mable.

Note:
Date will mentioned once 15 persons joined or Join as a group of 15 persons.

Target group:
Engg. Students interested in Eco friendly construction technologies/Architects/ Masons/ Asst.masons/Engineering students.
Organic architecture is rooted in a passion of life; nature and natural forms, and is full of vitality of natural world with its logical forms and processes. Emphasizing beauty and, its free flowing curves and expressive forms are sympathetic to the human body, mind and spirit. In a well designed “organic” building, we feel better and freer.