

Vivekananda Kendra
Natural Resources Development Project
Work in the Field of
Eco-Friendly Construction Technologies

Milestones



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Dear All,

Namaskaram.



Building industry consumes 40% of energy produced and raises emission of Carbon-di-oxide into the atmosphere by 40%. Indiscriminate use of natural resources - highly unsustainable, causes deforestation and damages the eco-system. This results in climate change, draughts and floods.

To overcome the above issues, we tried to reduce the Eco footprint of the building by taking care of embodied energy (green construction material) as well as operational energy (use of renewable energy and green technologies). In addition, Green buildings also encompass (i) Rain water harvesting (ii) Solid waste management and (iii) Grey and black water management.

Vivekananda Kendra – Nardep is working in the field of Cost Effective Green Construction Technologies since last 35 years. These are Environment Friendly, Cost effective, Labour Intensive, Energy Efficient, Encouraging local expertise, Aesthetic look, Durable and Affordable, and based on different Climatic Conditions. In addition, these are in tune with Indian Culture and Ethos. We propagated these technologies before people started talking about global warming and carbon footprint.

HUDCO as well as Govt. of Tamil Nadu recognised our Rural Building Center as a "Resource Center" for training different stakeholders. We have incorporated about 30 Appropriate Construction technologies which take care of 3-Es (i) Economics, (ii) Environment and (iii) Equity at our Technology Resource Center, Anjaneyapuram and Gramodaya Park in Vivekanandapuram.

This year, we have tried to document our Milestones in our journey of propagating "Organic Architecture and Green Technologies". Click here to have a glimpse of it.

With best wishes,

(V.Ramakrishnan)
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Eco Friendly Construction



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.

1988-89/93-96

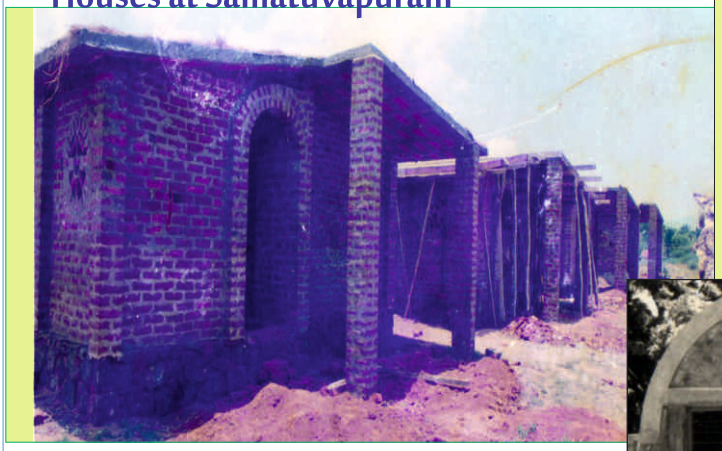
- Using cost effective construction technologies in creating community infrastructure constructed houses for samathuvapuram, eco-houses in Kazhakadu mundanthurai using Rat trap bond for walling and Filler slab for roofing .

1991-93

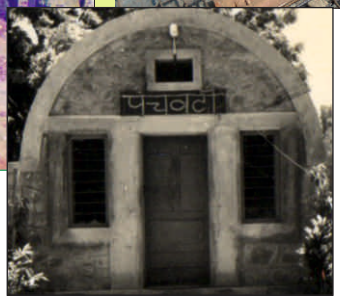
- Inspired by Mahatma Gandhi and Laurie baker VK-nardep develops a host of cost effective building technologies.
- Trained hundreds of mason on Cost -effective construction technologies particularly on Rat-trap bond wall , filler slab roof and different type of Arches
- Roof for Roofless booklet published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

Support - CAPART, New Delhi & DRDA, Tamilnadu

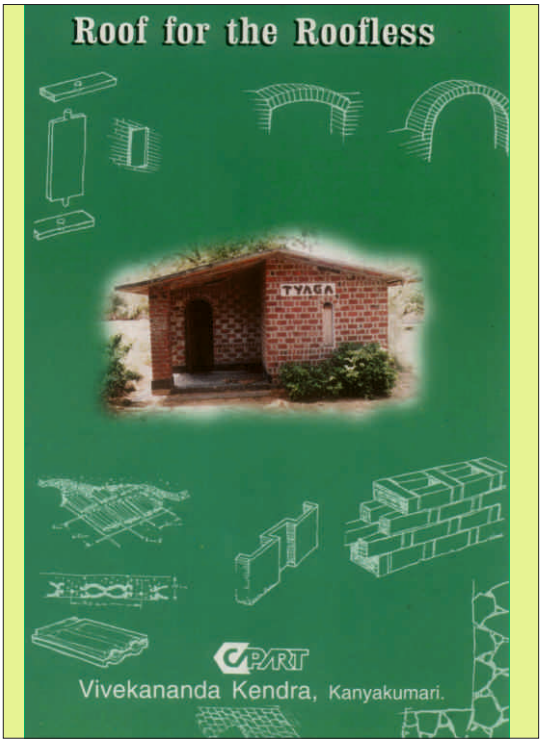
Houses at Samatuvapuram













Constructed 6 eco centers at Kalakkad Mundanthurai -Tiger Project

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

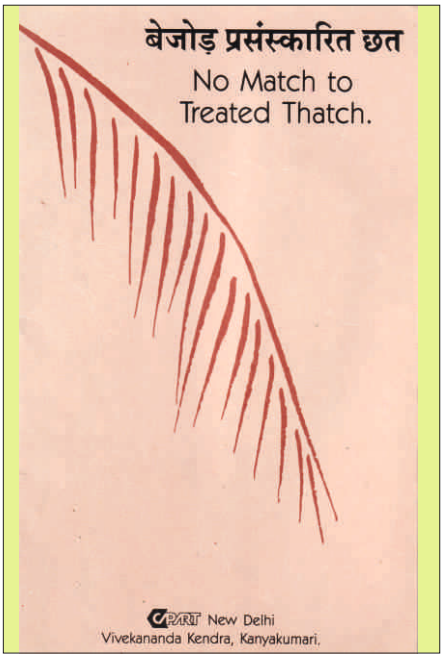
spornsored by CAPART, New Delhi







Tamil and English book on Chemically Treated thatches





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

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

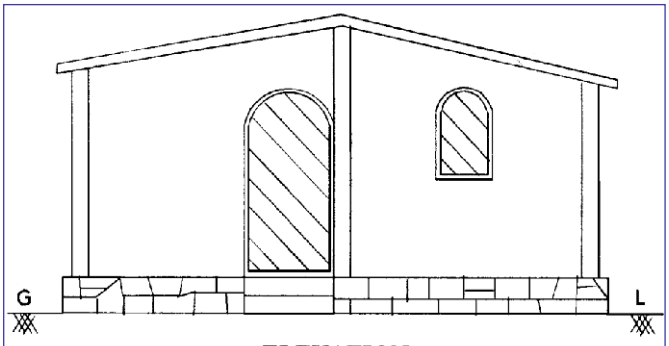
35 Group Houses constructed (Nattarkulam-5, Puliyankulam-15 Karunkulam-15)

1995-98

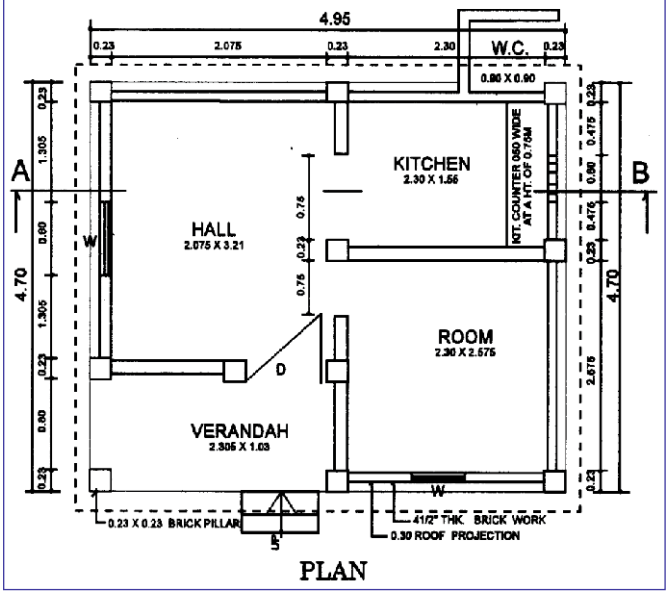
15 Group Houses constructed Perunkottoor village, Sankarankovil Taluk,

under Jawahar Velai Vaippu Thittam

Guest House constructed at Sankarankovil , DRDA

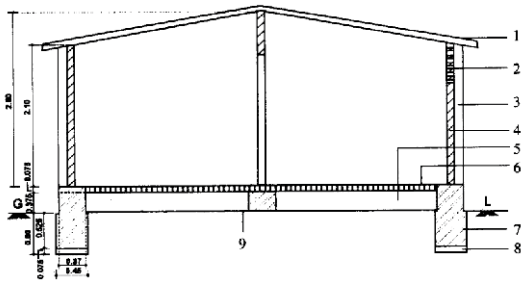


ELEVATION



PLAN

SECTION A-B



1. R.C.C. Filler slab with Mangalore tiles infilling
2. Brick Jali
3. 0.23 x 0.23 Brick Pillar
4. 0.115m Thick Brick Wall in C.M. (1:6)
5. Sand Filling
6. Brick bat flooring with cement mortor finish
7. R.R. Masonry in mud mortar and pointing in C.M. (1:6)
8. Sand filling

NOTES

1. Do not scale drawings, follow only written dimensions.
2. All dimensions are in meters unless mentioned otherwise.
3. Plinth area 250 sq.ft. — 23.2 sq.m.

OPENINGS

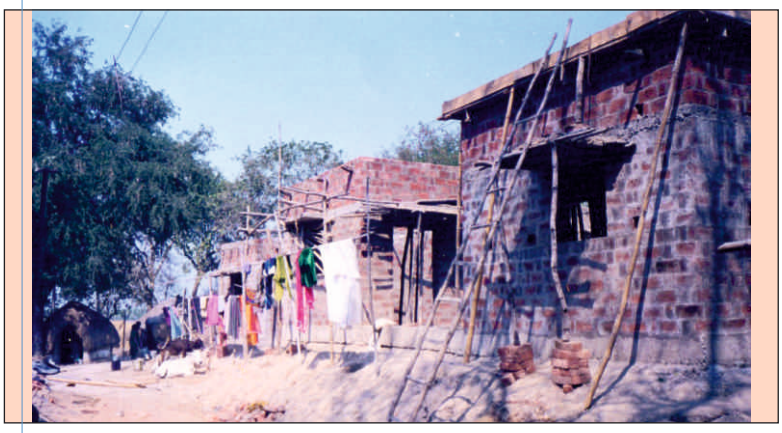
1. DOOR - FRAMELESS
   D - 0.75 x 2.00
2. WINDOW - PIVOT (2 Nos.)
   W - 0.60 x 0.90



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.

1994-1999

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
- ⇨ Catanary 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.

Working yard for Hands on training



Micro Concrete roofing tiles technology
as a substitute to Mangalore tiles



Technology Resource Center Entrance Arch

1998

Cost effective construction technologies for Architects and Mason -16 attended

Masons training for 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 Praesh, 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 Programes - 3 nos - 20 each
- Mason training and ferro-cement technologies – 2 programes - 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







Training Hall and staying arrangement

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
- corbelling

Rural Building Center





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

Flooring : Artificial Marble



3. Soma

Wall: Rat Trap bond Wall, No plastering

Opening : Different type of Corbeled Arches

Roof: Corbeled Arch Roof

Flooring : Kota Stone

Brick Jali



4. Apa

Wall: compressed Earth Block, No plastering

Opening : Different types of Corbeled Arch

Roof: Catenary Vault (Brick)

Flooring : Kota Stone

Use of Bottles in making Brick Jali

2001 - 04

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

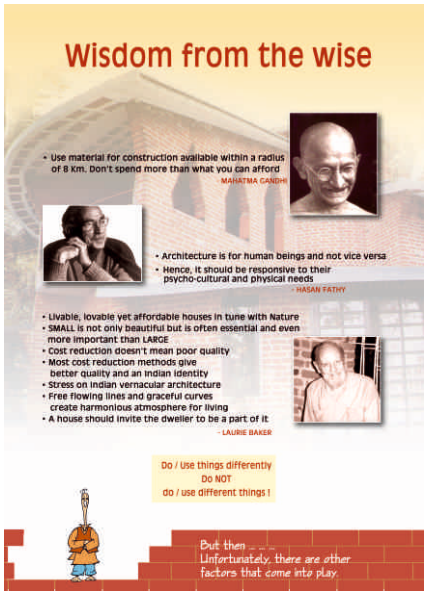
Opening : Different type of Arches

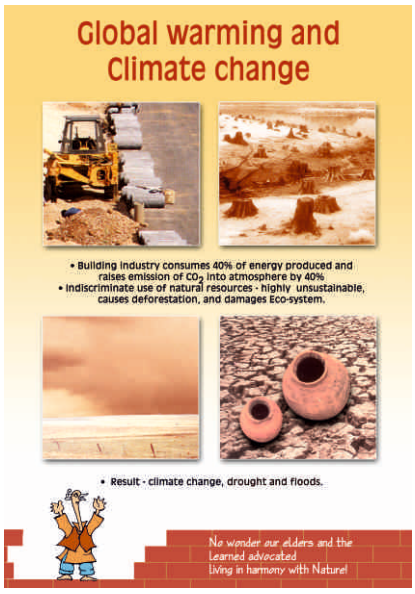
Roof: Micro Concrete Roofing tile

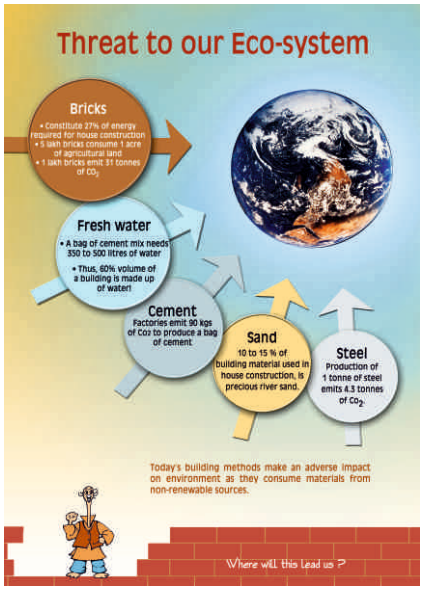
Different type of Brick Jalies

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 progs. - 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 progs. - 6 days - –54 attended

-

- Construction technologies for SHG Members
Kanyakumari, Tirunelvei and Thoothukkudi – 3 progs. - 6 days - 83 attended

2005

- Construction technologies for SHG members (Tsunami programme)
Thanjavur, Perambalore, 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





Joy of getting a good quality compressed Earth Block



Showing the Rat trap bond

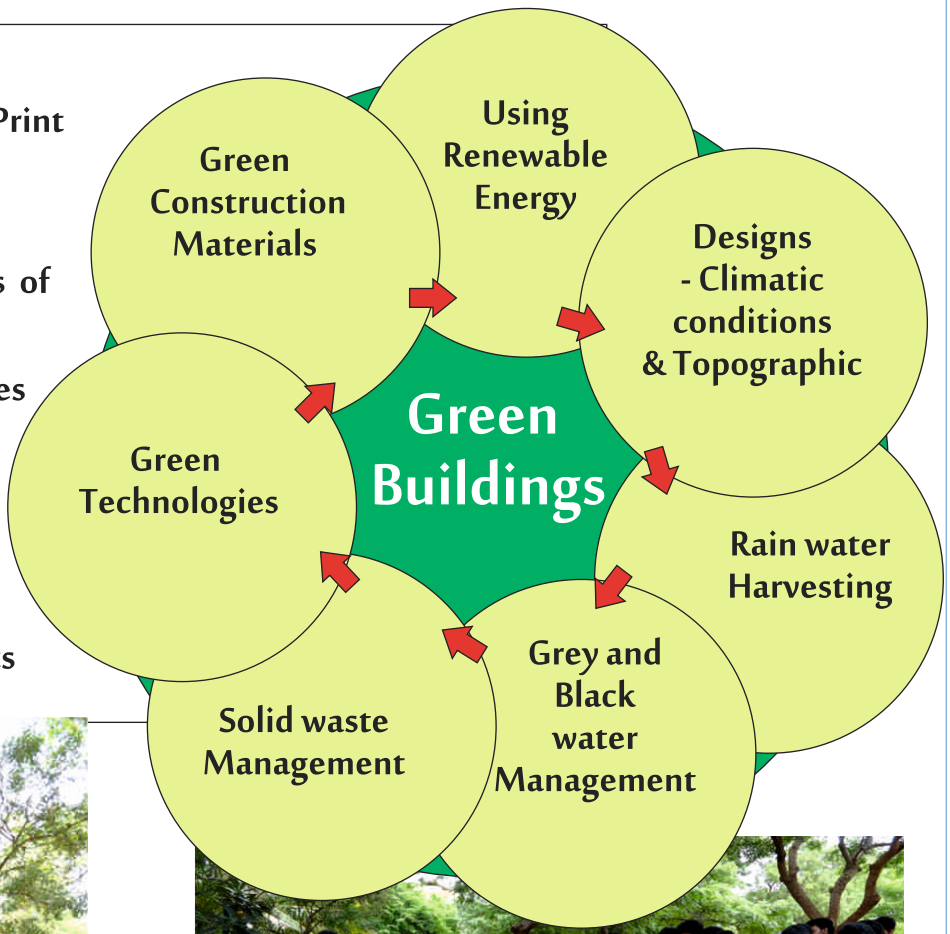


House of Stakeholders

2010-15

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











2015-16
Avvaiyar Green Health Corner



Model design for Health corner



Rejected mangalore tile arch

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



Before Renovation

After Renovation

















Mohabeer Dharmashala - Before Renovation



After Renovation - Green Rameswaram project Office



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

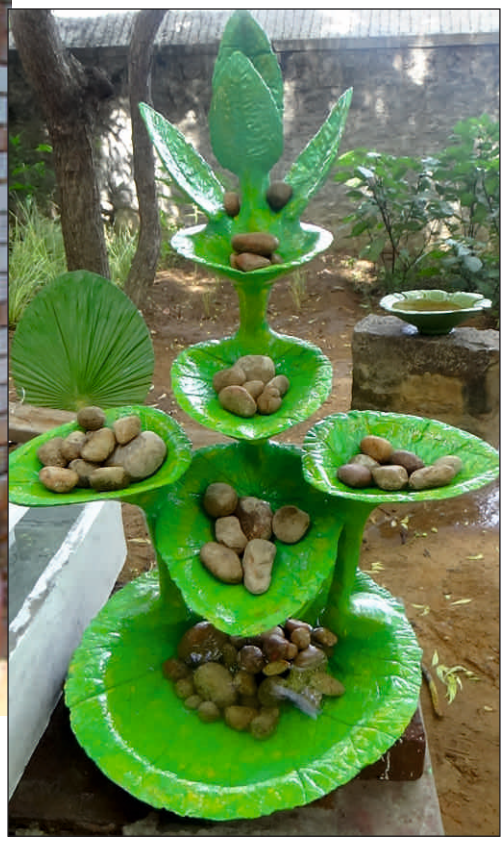






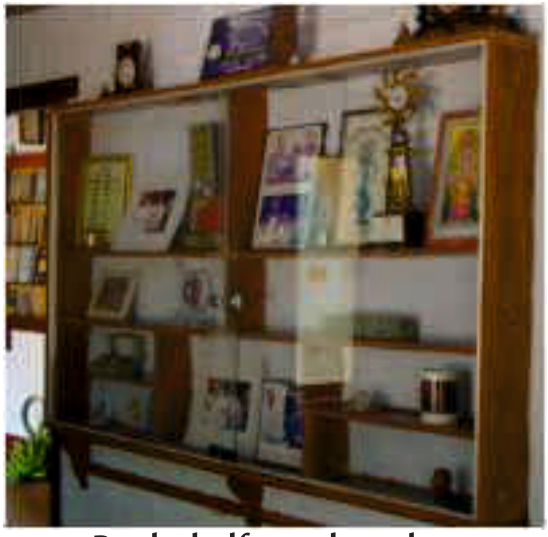


Ferro Cement Doors with Design



Ferro Cement water fountain

Multiple usages of Ferro Cement Technologies



Book shelf -cupboard



Display Shelf



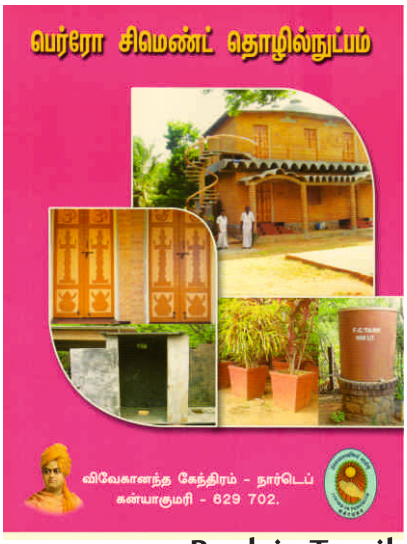
Vault for partician



Toilet



Beautiful Art piece



Book in Tamil

2019-20

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 rood
Joinery - Different type of Arches
Flooring - Traditional oxide flooring
Ferro cement doors and windows

Presented number of papers at different levels on Green construction technologies .
Media also gave a good coverage to our work.

Vivekanand Kendra's building at Rameswaram was old and dilapidated and so we constructed Eco friendly building which covers guest room, kitchen, toilet and open auditorium.

The building was inaugurated on 6th June, 2019. Shri. Balakrishnanji, Vice-President of Vivekananda Kendra performed Puja. By chance Smt. Rema Mohan CEO of National Stock Exchange Foundation Mumbai was also present. Shri. Balakrishnanji honoured all the workers & Masons who carried out the building construction





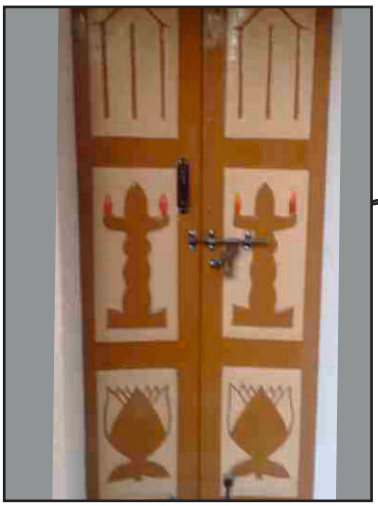




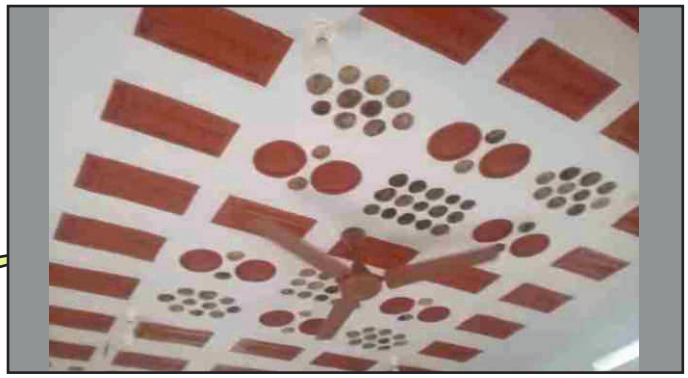
Eco-Friendly Technologies:



Rat Trap bond wall which saves 25% bricks and 40% cement mortar. This wall gives thermal insulation and so room temperature will be less in summer



Compare to wooden door, Embodied energy of Ferro cement door is less and it is cheap .Moreover, we save the trees



Filler slab tech. saves 20% concrete and steel. In addition, it gives good thermal insulation

Ferro cement roofing channel - above toilet It requires less material and no need of shuttering and thus cheaper than normal roofing.





Beautiful Arch rather than a regular beam . Shape itself gives strength rather than the steel and the cement.



Traditional red and black oxide flooring , Cost effective and will go on shining as the days will pass.....



Using the strength through shape principle, curved forms such as arches, vaults, domes and spheres are stronger, more efficient and more economical than the equivalent rectilinear structures.
See the beautiful welcome Arch at the entrance of Varma Research and Resource Center made of old earthen pots given by our close well wisher. He was eager to dispose of old pots from his temple which people left after preparing pongal (sacred rice)





Innovative boundry wall from the waste Mangalore tiles which people have thrown as they opt for concrete roofing.





Varma Research and Resource Center new building opened
Shri.Hanumanth Rao, All India Treasurer performed the pooja.

Trainingprogramme on "Ferro Cement Technology"	6	-189 participants
Awareness programme on "Ferro Cement Technology"	1	- 39 participants
Trainingprogramme on "Green construction technologies"	3	- 93 participants
Trainingprogramme on "Traditional flooring technologies"	1	- 16 participants

Mud Road

We made use of the pandemic by carrying out our activities within our campus as field work was not possible.

We made mud road at our Technology Resource Center by using Rammed earth technology









Various stages of construction of mud road..... nobody can make out that it is a mud road.



Also experimented with beautiful craft items by using ferrocement technology such as varieties of water fountains, leaves, pumpkins etc.

2022-23 **Training on "Green Construction technologies - 2 nos. – 56 attended**

participants learnt.....

- Embodied energy , operational energy and Life cycle assessment of different type of Eco-friendly construction technologies.
- Production of compressed earth Block , selection of soil and make it suitable for available soil at the site
- Different type of moulds and usages and method of construction .





- Method of construction of Rat-trap bond wall with different joints.
- Construction of Different type of Arches , vault and Domes .and making moulds during the construction





- Manufacturing of Ferro cement doors - 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
- Precautions, Do 's & Don'ts & Repairing and Maintenance etc.,



- Participants visited..... Gramodaya Darshan park and different type of Green building technologies.
- Building design based on six Different climatic conditions in India.
- How Green building technologies helps in betterment of Sustainable development Goals

2023-24

Training Programme:

Training programme on "Sustainable technologies" for Vivekananda Kendra Vidyalaya, Hurda, Rajasthan was held from 10th to 14th May. The emphasis was on "Eco friendly construction Technologies" .18 members attended the programme.





The entire programme was conducted by VK-Nardep staff. The training consists of the following:

- Morning prayer and yoga class
- Interactive sessions, practical and field visits on different verticals
- Night – light assembly – interesting Indoor games to release the tension, improve awareness and team building
- Reporting and reflections on the day's activitiesby the participants

All the participants enjoyed the training, which was most memorable for them in their life. All of them promised to adapt at least 2-3 technologies after returning to their places.



The team comprised teachers, the Principal and the Correspondent, all of whom demonstrated a keen interest in learning. Each evening, they reviewed and reflected on the day's sessions to reinforce their understanding. Following their return, the school authorities informed us that the students had begun applying some of the technologies learned during the programme in their school. They also reported a significant improvement in the students' understanding of the Sustainable Development Goals (SDGs) as a result of the training

2024-25

Training Programme:

Saraswathi nadar College of Engineering:

26 students from Dept. of Civil Engineering, Nadar Saraswathi College of Engineering and Technology, Theni attended one day training programme on "Green Construction Technologies. dated on 12th April , 2024.

- ★ Participants learnt general about eco friendly construction technologies like Compressed Earth Blocks, Arches , Vault, and Domes,
- ★ Ferro cement technologies like doors , Roofing channels, water tanks etc.,
- ★ Participants learnt importance of Embodied energy, Operational energy and Life cycle Assesment.
- ★ Participants learnt practical and Theory





TNAU - Dept of Energy , Ecology and Environment:

Dept. of Energy and Envrionmental Engineering,Tamil Nadu Agricultural University, Coimbatore -24th April 2024 - 26 nos attended.

Students learnt various green construction technologies along with Rainwater harvesting and solid waste management.

Visited Gramodaya park as hundred green technologies depicted are useful in their engineering subjects.





2025-26

Training Programme:

Training on “Eco friendly construction” and “Green Architecture”

- 09.02.2025 - Vaikunda Polytechnic College, Pillayarpuram - 37 students
- 11.02.2025 - Viveknanda Polytechnic College,Agasteeswaram - 51 students
- 16.02.2025 - Lord Jeganath College of Engineering, Ramanathichanputhur - 128 students

participants learnt about Different type of Green Construction Technologies and advantages
Calculating Embodied Energy, Operational Energy and
Life Cycle Assessment of the building materials





Vaikunda Polytechnic College





Viveknanda Polytechnic College





Lord Jeganath College of Engineering, Ramanathichanputhur

Training Modules

Training Module : CT-01

Training on Green Architecture

Duration : 3 days Residential

(Residential -simple and vegetarian food)

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









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 Module : CT-02

Training programme on "Ferro Cement Technology"

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.,



Note:
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Target group:

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

Training Module : CT-03

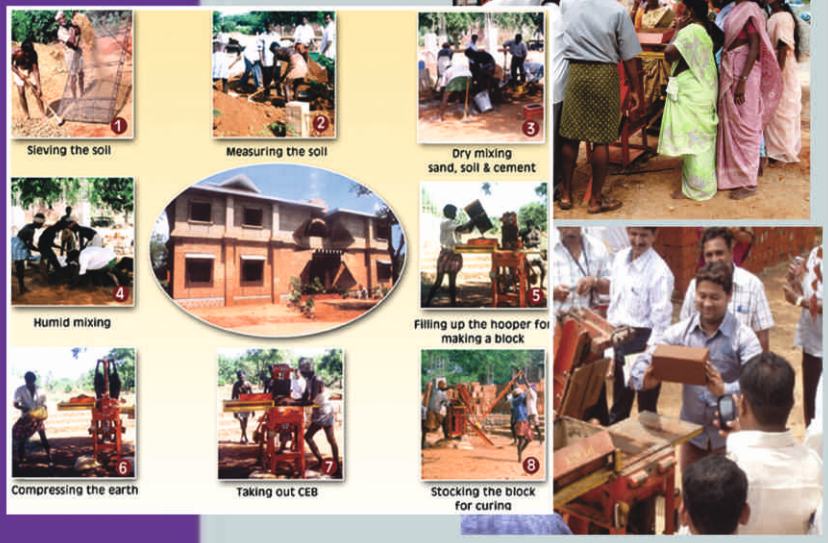
Training on "Production compressed Earth block"

(Residential -simple and vegetarian food)

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



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Target group:

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Training on Pre-cast Technologies

Training Module : CT-04

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









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Target group:

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

Training on "Arches Vaults and Dome"

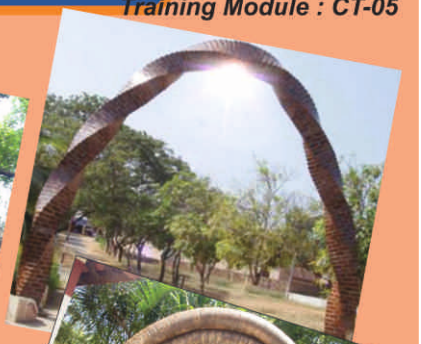
Training Module : CT-05

(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.,









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Target group:

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Training on Masonry Technologies

Training Module : CT-06

Duration :6 days

(Residential -simple and vegetarian food)







Subjects

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

Note:
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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

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. Emphasising 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.