

Interlocking Soil-Cement Brick Technology



Habitech Center

a Research and Development unit
for the Housing and Building
Components

School of Engineering and Technology

Asian Institute of Technology

Habitech Center, SET

Mission

- Research construction technologies that can provide affordable housing and social infrastructure buildings to communities;
- Develop building materials, equipment and techniques for the construction sector that can sustain life without polluting the environment;
- Disseminate the results of research and development activities through demonstration projects, educational programs, training and publications.

Technology Dissemination

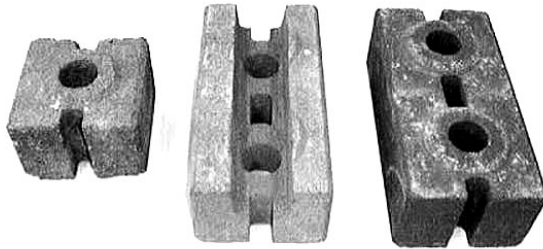
- Knowledge transfer through seminars and trainings
- Supply of equipment to the projects
- Technical support through field trips by inspection
- Quality control
- Project Constructions

Habitech Building System

Building Components

- Interlocking Bricks – for Walls
- Concrete Door Frame – for Walls
- Concrete Window Frame – for Walls
- Concrete Joist – for Floors
- Concrete Pans – for Floors
- Concrete Stringer – for Staircase
- Concrete Treads – for Staircase
- MCR Tiles – for Roofing

Interlocking Bricks



2 Types of Bricks (based on Raw Materials)

- Soil-Cement
- Concrete

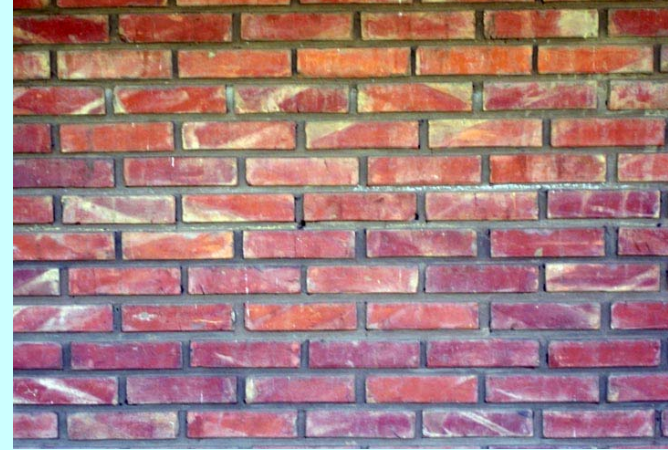
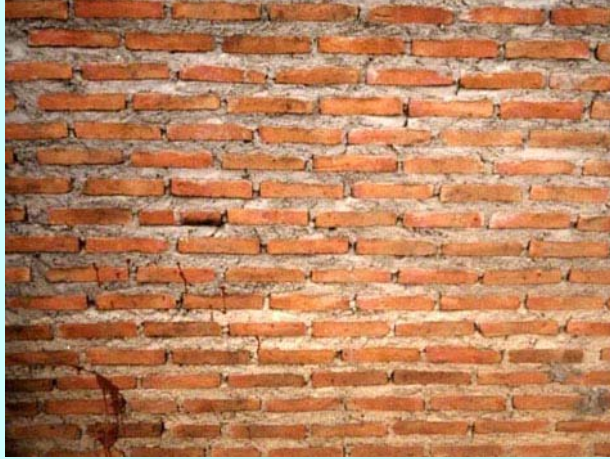
4 Types of Bricks (by size)

Regular	- 15 cm x 30 cm x 10 cm
Half	- 15 cm x 15 cm x 10 cm
U-shape	- 15 cm x 30 cm x 10 cm
U-half	- 15 cm x 15 cm x 10 cm



Masonry Walls

Traditional Brick Masonry Wall



Masonry Walls

Interlocking Brick Masonry Wall



Production of Soil-Cement Interlocking Bricks

- Selection of raw materials
- Preparation of Mixes
- Filling mould box with mixes
- Compression
- Removal of brick and placing it on a pallet
- Air curing / storage
- Water curing
- Testing



Why Interlocking bricks?



- Can be produced at or near the site – reduced transportation cost
- Green technology – Zero carbon emission
- Energy Efficient
- Uses local available materials
- Reduces the need for skilled labor
- Maximize the use of unskilled labor
- Faster to build – shortens construction time
- Creates local employment
- Permits self-help construction or community based projects
- Can be used to build all types of buildings

Construction with Interlocking Bricks



- Load bearing construction system
- No need for mortar between 2 layers of bricks
- Reduces reinforcements as it eliminates concrete lintels, beams and columns
- Cement based and Reinforced wall – resists fire, wind and earthquakes
- Modular - No material wastage
- Simple construction – with little training unskilled labor can be used to build the buildings
- Cost-effective construction system
- Can be use as composite structure

Is it Expensive?

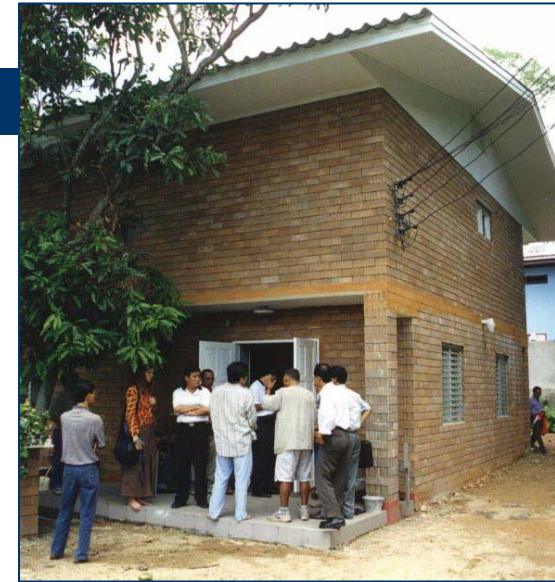
- Initial cost for the equipments and trainings might seem big amount, but once it is in place, it will show that it is much cost – effective than traditional technologies.
- Construction cost can be reduced as much as 50% in comparison with conventional system depending upon the local price.
- Thailand - 20% to 40%
- Bhutan - 40% to 50%
- Nepal - 13% to 30%

Where can we use it?

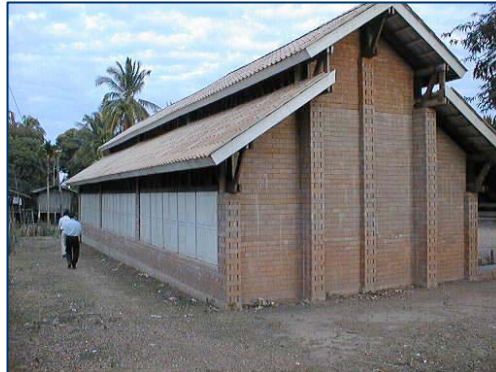
- Residential Buildings
- School Buildings
- Health Clinics
- Office Buildings
- Resort Villas
- Self-help or Community based projects



Residential Buildings



Primary School Buildings



School Buildings in Myanmar

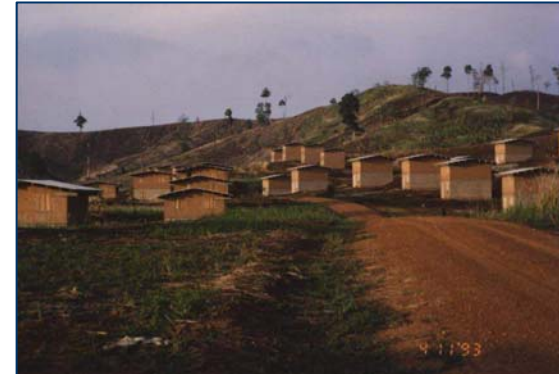


Health Clinics, Office Buildings, Hotels etc.



Community Projects

Khao Kho Resettlement Project, Phetchabun Province, Thailand



- **Location:** - Phetchabun Province, Thailand
- **Total no. of houses:** - 150 units
- **Floor area:** - 32 sq.m. x 2 storey = 64 sq.m.
- **Area of the Plot:** - 400 sq.m.
- **Construction cost:** - approximately US\$ 20 / sq.m. (500 Baht/sq.m.)
- **Total construction cost:** - approximately US\$ 1,300 (excluding labor cost)

Community Projects

Post-Tsunami Rehabilitation Project

- Location: Baan Nam Khem Village, Phang-nga Province, Thailand
- Number of Houses: 56 units and 1 Community Center
- Sponsors: 32 units (EU) and 24 (Rotary)
- Plot Size: 120 sq. m.
- House Size: 74 sq. m. (Two Storey)
- Cost per Unit: 256,200 Baht (~ US \$ 7,500)
- Cost per sq. m. 3,462 Baht (~ US \$ 100)
- Wall Construction: Interlocking Brick Technology
- Project Duration: 10 months





Awards and Achievements



Award

In 1994, Habitech Center was awarded the **Matsushita Memorial Prize** by the Japan Housing Association “**in recognition of excellent achievements in improving human settlements in Asian countries by promoting research and development related to technologies for low cost housing as well as providing educational programs and facilities to disseminate the results of their research efforts**”.

Recognition

The Habitech Building System has been recognized by the United Nations Human Settlement Program and the international community as contributing to housing and economic development through the transfer of technology and has been compiled on the **Habitat Best Practices** database for others to learn from and incorporate in their own work.

Award

“**Post-Tsunami Rehabilitation Project**” in Thailand was awarded “**Best Community Housing Project**” for year 2008.

Lessons Learnt from past projects

● Community based Projects

- Coordination between concern agencies
- Transparency and accountability
- Regular consultation with the community at all stages
- Provision of technical support at all level
- Active community participants at implementation stage
- Cost effectiveness
- Improvement of health, sanitary and environmental conditions
- Improvement of quality of life
- Return of Livelihood of people

● Others Projects

- Need proper training for BM production and construction
- Provision of technical support whenever necessary
- Cost effectiveness
- Create local employment
- Save foreign currencies
- Improved environmental conditions
- Capacity building for local people
- Improvement of quality of life