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

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

2 Types of Bricks (based on Raw Materials)

- Soil-Cement
- Concrete
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.
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