

Activities of Housing and Building Research Institute



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Principal Research Officer
Housing and Building Research Institute.

Housing and Building Research Institute



On 13th January 1975, the Father of The Nation Bangabandhu Sheikh Mujibur Rahman approved the Housing and Building Research Centre .

HBRI is an Autonomous research organization Under the Ministry of Housing and Public Works.

Important activities of the Institute are:

- **Research and Development of Sustainable Building Technology**
- **Research on Indigenous & Sustainable Building Materials**
- **Policy preparation in the field of Housing and Building Construction**
- **National Building Code Development (BNBC)**
- **Collaboration with other National and International Institute/Agencies**
- **Award Research Fellowship**
- **Dissemination and Awareness Creation**
- **Training Program**





To improve the quality of the traditional construction materials of the country.



To develop innovative building materials and construction methods.



To ensure safe, sound and sustainable housing.



Research and innovate modern technology on building construction materials and techniques.



Research in the area of environment-friendly structures, disaster-resilient infrastructure, etc.

Objectives

Activities



Liaison with different **national** and **international** government and **non-governmental** organizations, universities and various institutions, conduct **joint survey, research, research activities** to gain international acceptance, and **formulate policies** on housing and building construction.



Develop and implement **affordable, sustainable** new materials and technologies in building construction through **pilot projects**;



Formulation of building construction **codes**, conduction of research activities to encourage adoption of **quality control** measures in building construction.

Activities



Research on **environment friendly, disaster resistant** building construction and implement building **code**.



The institute may enter into bilateral or multilateral agreements with **foreign or international organizations** or bodies and for providing and receiving **technical advice** on housing and building construction technology .



To disseminate **latest knowledge** on the problems of housing and building construction;



To provide for **consultation and advisory services** in the field of housing and building research;

Structure of HBRI

www.hbri.gov.bd

HBRI

**Structural
Engineering &
Construction
Division**

**Building
Materials
Division**

**Soil Mechanics
and Foundation
Engineering
Division**

**Housing
Division**

**Physical
Testing
Laboratory**

**Chemical
Testing
Laboratory**

**Soil Testing
Laboratory**

Contributions in Policy Level



- **Bangladesh National Building Code (BNBC):**
 - **1993** – 1st published by HBRI.
 - **2006** – 2nd publication in the form of a gazette.
 - **2020** – Published as revised and updated version.

➤ Friendship Guidebook

Formation of guideline named “Standard Guideline for rural housing in disaster prone areas of Bangladesh” in collaboration with a NGO Friendship Bangladesh.





Honorable Prime Minister Instructed HBRI on Her Visit to MoHPW at 28th December 2014.

- Conduct Research to Produce Alternative Block from Dredged Sand.
- Use of HBRI Innovated Product in Government Construction Work
- Create Awareness of HBRI activities

স্বত্ত্ব নিয়ন্ত্রণ আইন
১৮৩০
২০১৫
১-৪৪

গণপ্রজাতন্ত্রী বাংলাদেশ সরকার
প্রধানমন্ত্রীর কার্যালয়

০৩.০৭৩.০২৭.২৫.০০.০১১.২০১৫-৯৫

তারিখ: ০১ মাস ১৪২৪ বঙ্গাব্দ
১৪ জানুয়ারি ২০১৫ খ্রি:

বিষয়: সরকারি নির্মাণ কাজে 'বিকল্প ইট' (ফাঁপা ইট) ব্যবহার।

সরকারি নির্মাণ কাজে 'বিকল্প ইট' (ফাঁপা ইট) ব্যবহারের জন্য মাননীয় প্রধানমন্ত্রী সদয় নির্দেশনা প্রদান করেছেন। সরকারি নির্মাণ কাজে HBRI কর্তৃক উদ্ভাবিত বিকল্প ইট ব্যবহারের বিষয়ে তাঁর মন্ত্রণালয়/বিভাগ/সংস্থা হতে কী ব্যবস্থা গ্রহণ করা হয়েছে তা আপামী ৪ সপ্তাহের মধ্যে এ কার্যালয়কে জানানোর জন্য নির্দেশক্রমে অনুরোধ করা হল।

(শামীম আহমেদ)
পরিচালক-০৬
ফোনঃ ৯১১০১৯০/ফ্যাক্স ৯১২৩৬১৬
E-mail dir6@pmo.gov.bd

১। সিনিয়র সচিব/সচিব
----- মন্ত্রণালয় (সকল)
বাংলাদেশ সচিবালয়, ঢাকা।

২। চেয়ারম্যান/প্রধান প্রকৌশলি/প্রধান নির্বাহী কর্মকর্তা/-----

অনুলিপি:

১। পরিচালক, হাউজিং এন্ড বিল্ডিং রিসার্চ ইন্সটিটিউট, ১২০/৩, দারুল-সালাম, মিরপুর, ঢাকা-১২১৬।

Instruction form Prime Minister's Office regarding the usage of HBRI innovated Alternative Bricks in all Government Construction Project.

INNOVATED ALTERNATIVE BUILDING MATERIALS AT HBRI



Sand Cement hollow block



CSEB



Sand Cement solid block



Thermal block



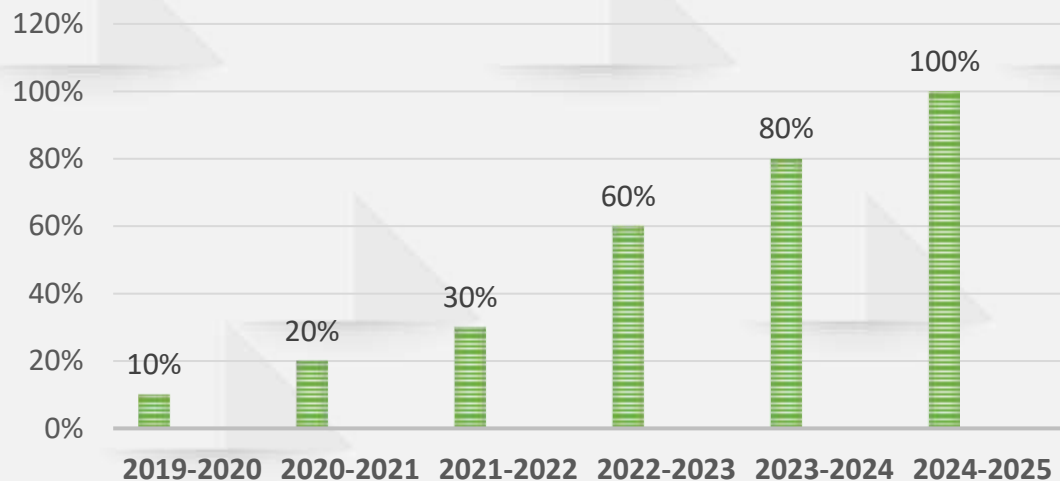
Interlocking block

Example of Buildings with Alternative Building Blocks



Achievement

NON FIRED ALTERNATIVE BLOCK



**National Environment
Award 2018**
For Research and Innovation
of Non Fired Environment
Friendly Brick Production.



Ongoing Research Programs

Dragging Sand Sample Collection From Different Riverbed



RESEARCH ON

Effect of Sand Collected From Different Riverbed on The Properties of Sand – Cement Block



OBJECTIVES OF THE PROJECT

To study the following aspects of different sand at different riverbed place in Bangladesh.

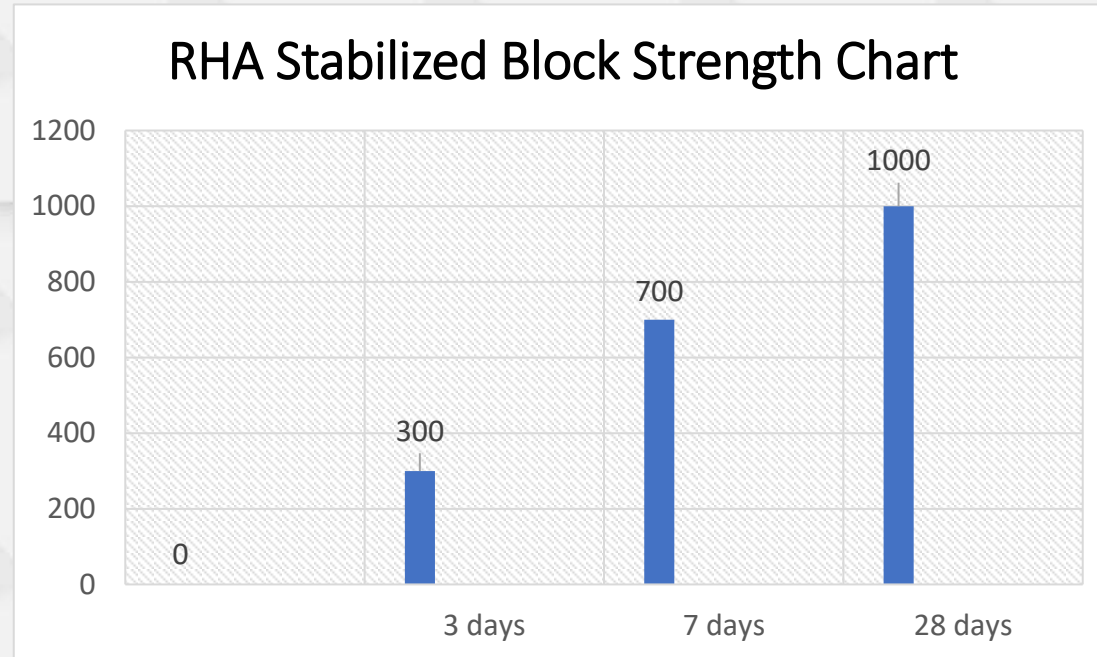
- ❖ **Quality**
- ❖ **Physical & Chemical properties**
- ❖ **pH and salinity of water contained sand and find the causes.**
- ❖ **Mechanical properties of compacts according to ASTM standers.**

Sl. No	Riverbed Name	FM	Specific Gravity	Salinity (ppm)	TDs (ppm)	pH	Silt (%)	Water Absorption (%)
1	Padma River, Muktarpur, Munshiganj.	1.01	2.86	20	26	8.5 2	3. 63	2.31
2	Sitholokkha River, Narayanganj, Dhaka.	1.26	2.75	20	26	8.1 4	3. 20	2.25
3	Buriganga River, khulamora, Karanigonj, Dhaka.	1.23	2.78	30	32	8.0 8	3.8 6	2.11
4	Kopothakho River, Kashobpur Jessore.	1.22	2.72	22	27	8.3 0	3.5 6	2.46
5	Jamuna River, Vuapur, Tangail.	1.5	2.65	19	25	8.0 1	3.4 8	2.20

RESEARCH ON RICE HUSK STABILIZED CONCRETE BLOCK

INGREDIENTS:

1. River Dragged Soil or Fine Sand: 75%
2. Rice Husk Ash (RHA): 10%
3. Portland Cement: 15%
4. Admixture
5. Water



Sand+Cement+RHA



Transformation of Traditional clay burnt Brick production towards nonfried Brick Production.

BRICK SECTOR OF BANGLADESH AT A GLANCE

NUMBER OF KILN
APPROX. 7000

ANNUAL PRODUCTION
23 BILLION.

COAL
5.68 Million
TONS

CO2 EMISSION
15.67 Million
Tons.

CLAY CONSUMPTION
3350 Million
Cubic Feet



Source:

National Strategy for Sustainable Brick Production by Department of Environment, May 2017

MAPPING OF ENVIRONMENT FRIENDLY ALTERNATIVE BRICKS



Concrete Block Manufa...

Housing and Building Research Institute (HBRI), Ministry of Housing and Public Works. 101,752 views

Dhaka

- Housing and Building Research Institute ...
- Concord Ready Mix & Concrete Products...
- Mir Concrete Products Ltd.
- Raja Eco Bricks
- ... 19 more

Sylhet

- Shamim Concrete Blocks Ltd.
- Ecolit (ইকোলিট)
- Three Brothers Block Enterprise

Chittagong

- N S R Hollow Block Industry
- Freedom Eco Concrete Block Ltd.
- Fakhri's Green Building Resources Ltd.

Map of Bangladesh

Map data ©2021 Google. Terms 50 km

Inset Image: A person is shown using a laptop and a smartphone. The laptop screen displays the same Google Maps interface with the search results and map of Bangladesh. The smartphone also displays the map. A cup of coffee is on the table next to the laptop.

Ongoing Disaster Resilient Programs



Preparation of
“Standard
Guideline for
Rural Housing in
Disaster Prone
Areas of
Bangladesh”.

Retrofitting
risky buildings
of Fisheries
Research Institute
of coastal areas.

Collaborative
Research on
Structural, Fire and
Electrical Safety for
RMG Factories in
Bangladesh between
BGMEA and
HBRI.

Cyclone Resilient
Model House
Construction on
Coastal Area of
Bangladesh.
With Friendship
NGO



Research Projects



Eco-House Urban type-01



Eco-House Rural type-03



Eco-House Rural type-05



Eco-House Rural / Semi-Urban type-02



Eco-House Rural type-04



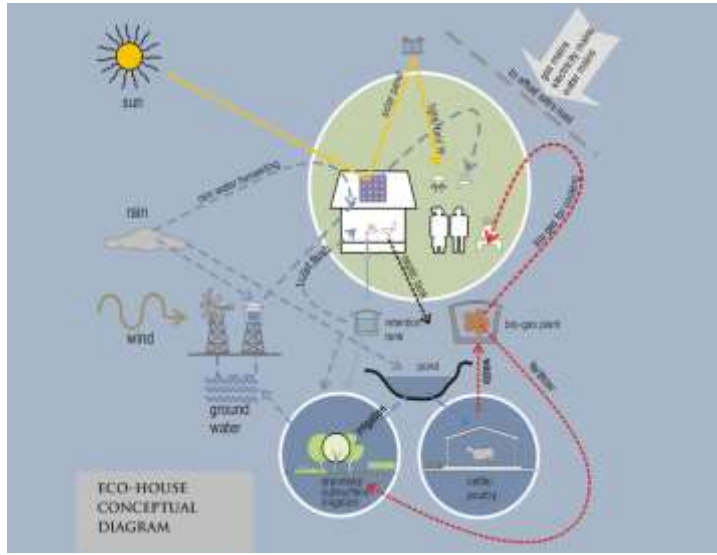
Eco-House Rural type-06

Eco Housing Project

a Sustainable Housing with-

- Traditional Building Materials
- Solar Energy
- Wind Energy
- Bio gas
- Rain water harvesting
- Waste Management
- Sustainable Agriculture

An Instigated housing solution of all Resources





Ferrocement Floating House





Cyclone and Surge
Affected Areas (Satkhira)



River Bank Erosion areas
(Gaibandah)



Resilient house for coastal
areas using ferrocement
channel and hollow blocks



Floating House (HBRI)

**Disaster
resilient house
with
FERROCEMENT**



Multi-storied rural houses constructed using HBRI-invented construction technology

Material and technology used:

- Ferrocement Channel (Floor & Roof)
- 3D Panel (Wall)
- Stabilized soil (Ground Floor)
- Sand cement hollow block (dredged soil)
- Ferrocement (Wall)
- Ferrocement (Stair)

Training Program

**Training Program
for Students of
Polytechnic
Institutes**

**Industrial
Attachment
Course**

**Workshop for
National and
International
University
Students**

**Training for
Construction
Workers**

**Training for Home
Owners /
Builders/
Contractors**





TSUIB (A Research Project for Enhancement of Disaster Resilience of the Urban Areas)

- Development of performance evaluation methodologies of buildings before/ during earthquakes.
- Development of retrofit schemes for collapse prevention of low performance buildings.
- Development of efficient and effective urban planning strategies to make cities safer and more resilient against disasters.



Promoting Sustainable Building in Bangladesh

- Encouraging the use of sustainable and eco-friendly construction materials in compliance with Bangladesh's environmental policies



Green Building Code Development

- Compilation of the Green Building Code with the assistance of International Finance Corporation (IFC) based upon an signed agreement.



Disaster resilient house design development

- Development of Disaster Resilient Affordable House Design for flood prone Regions of Bangladesh.



Rural Housing Program

Investment Program in Sustainable Green Housing



Cool roof Program

- Implementation support on Building Energy and Environment Rating System in Bangladesh and a Cool Roof Program



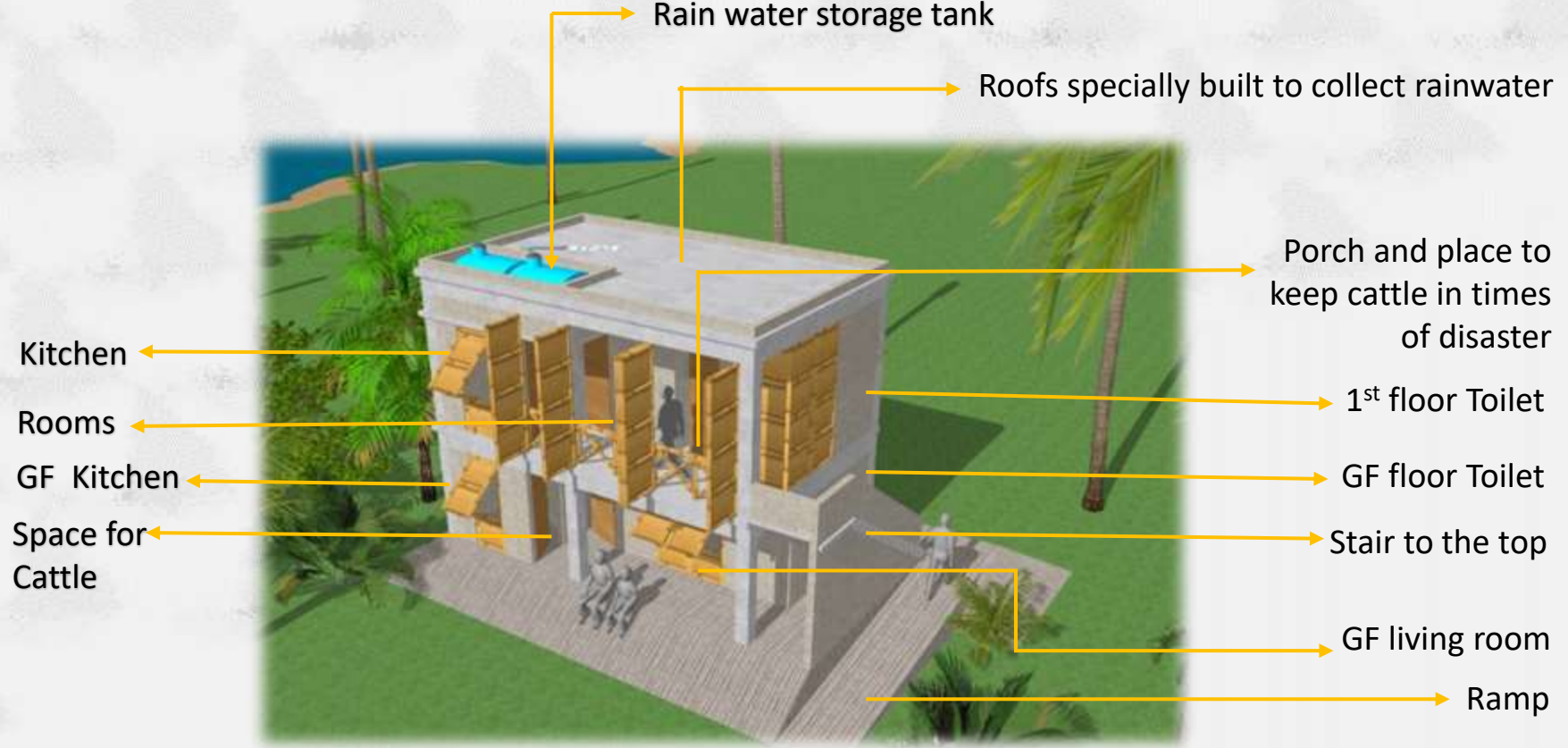
HBRI, Bangladesh Institute of Architects and Linz University jointly organized a workshop titled "**Hands of workshop on Rammed Earth Structure and Architecture**" in which about **70 architects** from different countries including Bangladesh participated. Building of a **Rammed Earth** house is taught in that workshop. Currently, research is being conducted on how to build houses with **Rammed Earth** in the context of Bangladesh.



Joint R&D Programs



Cyclone Resilient Model House Construction at Coastal regions of Bangladesh



HBRI and Friendship jointly constructed 4 pilot cyclone resilient houses to protect the lives and property of the people in the coastal areas.

Site challenges:

- >> Distant cyclone shelter
- >> Salinity
- >> Water logging
- >> Lack of biodiversity.
- >> Potable water

General aspects of design:

- Simple form**
- User friendly and flexible**
- Rainwater collection and storage facilities**

Future plan



Collaboration in Pilot Project Development for Mass Housing .



Establishment of testing sub center for construction materials .



Implementation of pilot projects on coastal zone of Bangladesh.



Joint research activities with Universities.

**Future plan
& Areas of
Collaborati
on with
Partners**



Block plant establishment.



Green Building and Industries Construction Sector



Peri Urban and Rural housing Program.

**Investment
Program**

**Future plan
& Areas of
Collaborati
on with
Partners**

**Training
Program**



Collaboration in Human Resource Development in Construction and Design Sector **ToT.**



Establish a Center of Excellence for Engineering and Architecture Field (Post Graduate Diploma Course Collaboration with Foreign Institute).



Training Program for Construction Workers and Forman.



Training Program for Building Simulation Software and Drafting, 3dGraphics.



Sustainable Construction Entrepreneurship Development in Rural Areas.



Scholarships for researchers and scope of higher studies;

**Future plan
& Areas of
Collaborati
on with
Partners**



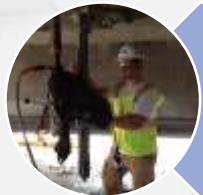
Fire Lab.



Electric Appliances Tasting Lab.



Building Materials Lab.



**Building and Infrastructure Construction Quality
Diagnosis Lab.**



State of Art Soil Lab.

**Establishment of
standard Labs**

Promotion and extension activities:

Promotion of various programs and videos on television and other media





www.hbri.gov.bd

Thank You