



Hand-Made School

Rudrapur, Bangladesh



<i>Architect:</i>	Anna Heringer, Eike Roswag
<i>Client:</i>	Dipshikha Society for Village Development
<i>Built Area:</i>	325 m ²
<i>Cost:</i>	US\$ 22'835

This village school adapts the traditional materials of earth and bamboo to make them more durable. In terms of the earth construction, the most important technical advances were introducing a damp-proof course, adding a brick foundation and mixing straw into the loam. The potential of bamboo construction is demonstrated by the ceiling (a layering of bamboo sticks, bamboo boards and earth) and the first-floor walls and roof (a frame construction consisting of beams - four layers of joined bamboo sticks - and vertical and diagonal poles). The project was hand-built by local craftsmen, pupils and teachers working in collaboration with European volunteers.



2007 On Site Review Report

3392.BAN

by Jimmy C.S. Lim

Hand-Made School

Rudrapur, Bangladesh



Architect

Anna heringer, Eike Roswag

Client

Dipshikha Society for Village Development

Design

2004 - 2005

Completed

2005

Hand-Made School

Rudrapur, Bangladesh

I. Introduction

The school is in the village of Rudrapur, about ten hours by road from Dhaka. The 370-kilometre drive is gruelling, but passes through beautiful verdant countryside and rice-fields. The site is near Dinajpur, in the northwest of the country close to the Indian border.

The project is located in the compound of a Bangladeshi NGO, Dipshikha (meaning 'Sparkle of Light'), that is dedicated to helping children in rural areas learn to read and write.

Local traditional building materials have been combined with learned construction knowledge to produce a building that is not only sustainable but also a much-needed facility for the village children.

The lower portion consists of rammed straw-reinforced mud walls finished with battered mud; the upper floor is a framed bamboo construction with slatted bamboo for walls, windows and doors; and the roof is finished with sheets of corrugated galvanised iron.

II. Contextual Information

A. Historical background

This project materialised from a series of events. Anna Heringer came to Bangladesh in 1997 to assist Dipshikha as a gap-year volunteer with a German NGO, 'Partner Schaft-shanti Bangladesh'. She then went on to study architecture in Austria, but maintained her links with Dipshikha. In 2002, she and three other students from the School of Architecture & Industrial Design in Linz came to Rudrapur to do their Diploma research project, which I believe was entitled 'Place, Relationship and Function of the Bangladesh Village'. As part of their research, they made a proposal for the compound that was being planned under Dipshikha's METI (Modern Education and Training Institute) programme. Whilst Anna's compatriots eventually melted away, she maintained her commitment to the Bangladeshi people and their indigenous building methods and materials. After graduating she was a regular visitor to the compound. It was on these visits that her input for improving the facilities was sought.

B. Local architectural character

The only buildings you see are the farmers' houses, which have mud walls and straw-thatched roofs. The building materials are available within the villages. Bamboo is used extensively – as structural members (fastened with jute ropes/string), or flattened for wall panelling, or simply woven together to act as screens.

C. *Climatic conditions*

The climate is generally mild in winter and hot in summer. The thick mud walls are obviously good for heat insulation and the thatched roofing does not allow heat to penetrate the interior. This use of locally available construction materials appears to be a good solution, a traditional method that is sustainable.

D. *Site and surroundings*

The immediate surroundings consist of rice fields – miles and miles of them, occasionally interspersed with cornfields. The whole of the countryside is well irrigated; water is plentiful, forests lush and laden with fruits. The water holes dotted around the landscape help to induce wind movement during hot days.

III. Programme

A. *History of the inception of the project*

Paul Cherwatigga – a former director of Dipshikha – was always keen for local people to use local materials for construction. He had apparently approached many Bangladeshi consultants to help implement his desire for a mud-walled construction, but the logistics of dealing with Dhaka proved too difficult. When the idea for the new classrooms was mooted, Anna – having maintained contact – was ideally located, and she was appointed architect for the project. After this, there was the question of funding, which had to return to the German NGO, Shanti. Anna played an active role in fund-raising, as did many others in her hometown. A total of USD 35,000 was raised for the school.

B. *How were the architects and specialists chosen?*

Anna Heringer's involvement has been explained above. Other specialists were enlisted by her, through her connections in Austria and Germany. Why no local specialists were involved was not explained to me.

C. *General programme objectives*

Dipshikha wanted to build additional classrooms for their expanded METI programme. The programme was worked out between Anna and Cherwatigga. There was some initial opposition to the idea of a mud-walled building: Dipshikha wanted a monumental concrete-looking building like all you see all over the place – but eventually they were persuaded.

D. *Functional requirements*

There was no formal brief as such. All Dipshikha wanted were classrooms not unlike those already in the compound. Anna changed all that. The planning, the architecture and the final result bear testimony to her ideals.

IV. Description

A. Building data

Site dimensions: not available, part of the Dipshikha compound

Front setback from boundary: from visual inspection, about 50 metres

Floor-to-floor height: 3 metres

Floor-to-ceiling height: 2.5 metres

Ground floor Area: 275 square metres

Total combined floor area: 325 square metres

B. Evolution of design concepts

With the encouragement of the client the architect took up the challenge of using local materials to explore a new building dynamics in the design of a mud-wall construction.

The project provides the classrooms which were required by the client as well as additional spaces for children to interact and be creative, which were not asked for. The classrooms at the ground floor are enclosed by a mud wall, with apertures and doorways strategically positioned to allow light and wind penetration. The classrooms on the first floor have walls of slatted bamboo that allow diffused light into the space as well as natural ventilation. These classrooms are generally better than all the NGO's existing facilities.

Massing: In this rural vernacular setting the blockiness of the design appears alien, particularly as it lacks a pitched roof. This is mitigated by the more contextual choice of materials: mud load-bearing wall with bamboo framing.

Articulation of facades: Rhythmically spaced vertical bamboo trusses (at one-metre centres) are juxtaposed with horizontal bamboo slats to create a powerful imagery. The intricate decorative effect of the trusses is accentuated by the play of sunlight. The horizontal slatted window frames are camouflaged as part of the wall.

There is no landscaping apart from the mango and lychee trees that form part of the surroundings.

C. Structure, materials, technology

Three layers of bamboo post are bound together for the floor beams and anchored at both ends into the mud wall with a one metre by one metre mud mass as a balustrade. The infills to the lightweight bamboo frames are window frames with slats that allow light and air to penetrate. There is no rendering per se, but the rammed earth of the walls has been straightened with shovels, exposing the straw reinforcement.

Traditional village houses are formed from mud balls reinforced with straw and stacked one on top of the other. The mud walls are not properly compact and have cavities that provide a ready habitat for rats from the rice fields. The school project has devised a new method of mud wall construction where the straw is laid lengthwise in a stretcher bond fashion and then

knitted with straw laid perpendicular to the stretcher bond. The bamboo trusses and bamboo frames follow simple engineering principles, using a steel dowel as the principal connector between three layers of bamboo and nylon rope fastenings (as opposed to the traditional jute ropes). The roof is covered with uninsulated sheets of plate-iron coated with zinc.

There is a limited electricity supply to the village. At best, in the evening, electricity is supplied via a diesel generator set that is used for the compound. There are some energy-saving lamps in the classrooms. Wiring is through conduits basically tagged onto the bamboo frame.

D. Origin of technology, materials, labour force, professionals

Technology is essentially local as most of the things have been done locally without the benefit of modern technology. Materials were all sourced locally. The labour force was made up of locals, while the architect and consultants came from Austria and Germany.

V. Construction Schedule and Costs

A. History of project

The project was commissioned in January 2004. Design started in March 2004 and was approved by the client in August 2005. Construction started in September 2005 and was completed in December 2005.

B. Total costs and main sources of financing

Land owned by Dipshikha.

Total construction costs USD 22,835.10, broken down as follows:

Labour: USD 5,099.10

Materials: USD 15,519

Landscaping: USD 2,217

VI. Technical Assessment

A. Functional assessment

The Dipshikha NGO seems very pleased with the new facility and the attention it has attracted. The teachers who are involved with the project enjoy teaching here. As an exercise in the transfer of technology, however, it is less successful. From talking with the various workers, it appears that most of them are of the opinion that the project was an interesting experience, but one they will be unable to repeat due to a lack of equipment and resources.

B. Climatic performance

The school functions very well in the hot summer and is apparently very comfortable, temperature-wise, in the winter. Natural lighting filters into the building through apertures in

the mud wall, while the slatted walls provide a stimulating environment for the students. Artificial light is provided by halogen lamps supported by a generator.

C. *Response to treatment of water and rainfall*

The corrugated galvanised iron roof allows water to be dispersed onto the ground and absorbed naturally. There are no other facilities within the building that utilise water. Bamboo slats are naturally water-repellent. The mud walls will weather naturally and time should enhance their finishes.

D. *Environmental response*

Although, as mentioned earlier, the boxiness of the building takes some getting used to, it blends in well with the environment overall, nestling comfortably into the vegetation and the colour of the earth.

E. *Choice of materials, level of technology*

In this remote location the choice of materials was dictated by availability. As mud and bamboo are readily available and inexpensive they were a natural choice for the structure.

F. *Response to, and planning for, emergency situations*

The mud walls for the ground floor should not pose any direct danger in the event of a natural disaster. As the ground is much higher than the surrounding and the water level is very low, flooding will not be a threat. Bamboo was an ideal choice for the first-floor structure, walls and roof, which have been designed to withstand winds and earthquake, making use of bamboo's inherent resistance to bending movements. There will be no open fires on the first floor of the building, so fire should not be an issue.

G. *Ageing and maintenance problems*

The project appears to be ageing well. The mud walls have dried and gained their inherent strength and will continue to mature over time. The bamboo, on the other hand, may present some problems in the future. Talking with both the architect and the workers, it seems that the bamboo was cured by immersion in the still water of the pond, and the recommended traditional method of immersion in running water was not carried out. As a result, some of the bamboo is showing signs of borers' activities.

H. *Design features*

The proportion of the internal spaces is well handled, receiving an enthusiastic response from the users. Compared to most of the houses that the villagers live in, this is luxury, with natural light and natural ventilation. The repeated rhythms of the bamboo structural elements introduce a decorative feature into the environment.

I. Impact of the project on the site

Set on a greenfield school compound, this building is a delight in the wilderness.

J. Durability and long-term viability of the project

The project demonstrates the values of sustainable construction in an exemplary manner and its impact on the natural environment is minimal. It should be accepted that any building material that is sustainable and renewable needs regular maintenance. For long-term viability, more structures should be built using similar techniques so that the locals may experience the benefits of these new approaches and ideas over a period of time.

K. Interior design and furnishing

Since it is the local custom to sit on the floor, there was little need for furnishing apart from cane and straw mats. Colourful cotton drapes hung at ceiling level and in doorways soften the harsh walls of the mud structure. Light passing through the drapes fills the spaces with an interesting glow.

VII. Users

A. Description of those who use or benefit from the project

The main beneficiaries of this project are children between the age of 6 and 10 from lower-income families, mainly farmers, who earn less than Taka 60 a day. Their teachers certainly enjoy this new environment, which is a bright and breezy setting for the imparting of knowledge. (An existing structure near the new school is still used for extra-curricular activities. Though it is dark, hot and stuffy, the children and the teachers make the most of it.)

B. Response to project by clients, users, community, etc.

Everyone in the village is very happy with the school. The adults think it is great that the children have a nice place to study. The children enjoy it because it is bright and cheerful. However, there is a general feeling that the project would be a bit difficult for them to replicate, as it involved more work and so may be slightly more expensive. It is my understanding that a second phase being planned by Dipshikha and Anna will include the construction of a prototype mud wall house for the people. The people's reaction to this will be a better gauge of their true feelings.

VIII. Persons Involved

Client: Dipshikha Society for Village Development represented by Paul Cherwatigga

Architect: Anna Heringer

Associate Architect: Eike Roswag

Facilitator: Prodip Francis Tigga, METI

Area Manager: Sepal Ch. Debsharma

Supervisor: Afser Ali (Local Engineer)

Civil Engineers: Christof Ziegert, Uwe Seiler
Carpentry/ Supervisors: Emmanuel Heringer, Stefanie Haider
Craftsmen: Suresh Chandra, Khali Pudo, Romesh Chandroi, Bhomal Dib

Most of these people were unavailable. I was able to speak only to Anna, Prodip and four craftsmen and traditional workers.

IX. Bibliography

da! Architecture from and in Berlin 2006, catalogue of an exhibition hosted by the German Chamber of Architects in Berlin

Architectural Review, December 2006 (English)

architektur.aktuell, October 2006 (German /English)

bauwelt 32, 2006 (German)

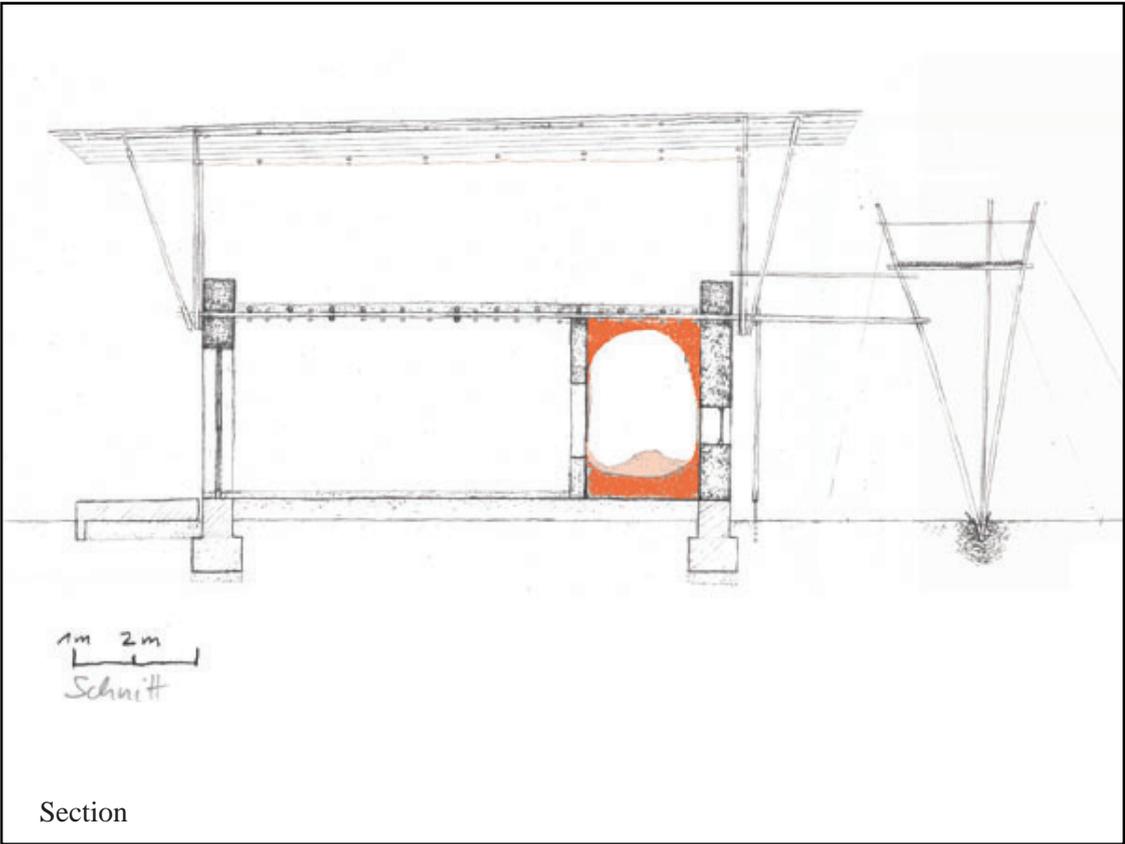
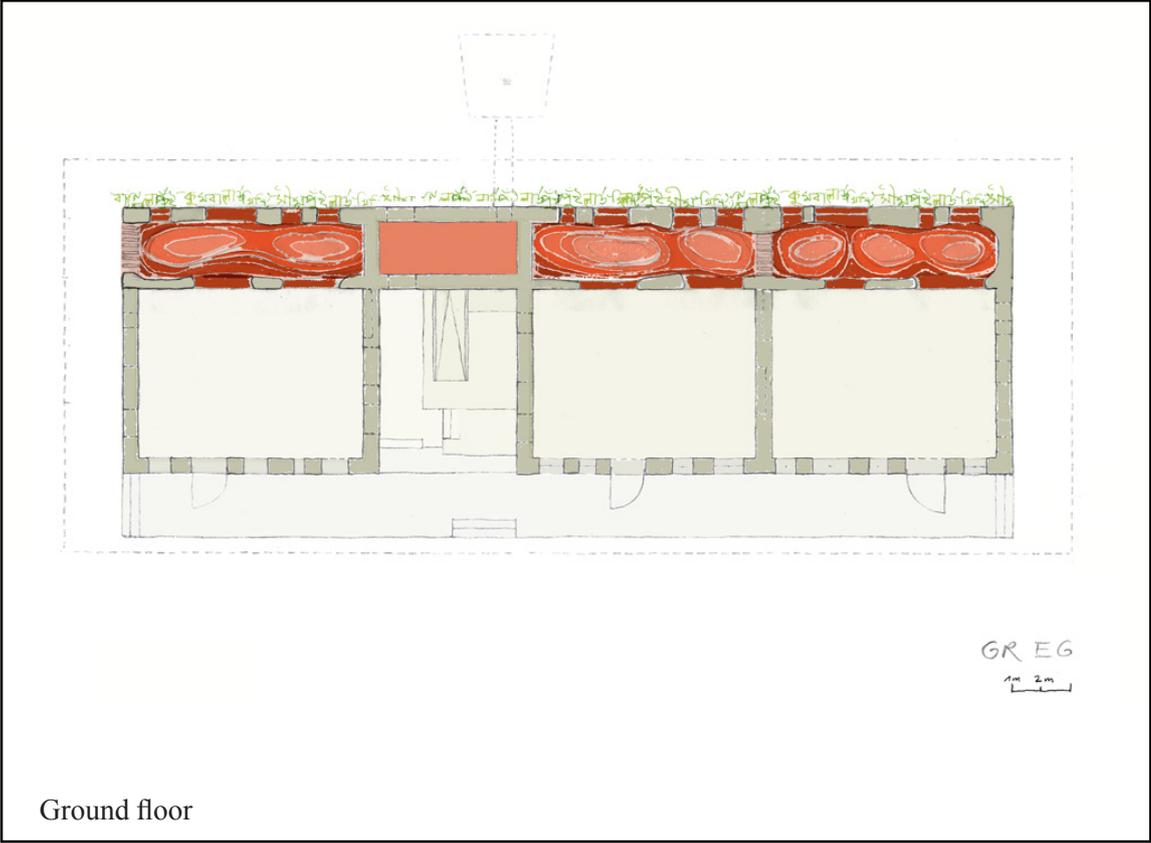
Flair, September 2006 (Italian)

Award: 2007 Kenneth F. Brown Architecture Design Award Winner

Jimmy C.S. Lim

May 2007







South east view.

South west view. The school is the only two-storey building in the surrounding.





North east view.



The roof is a frame construction consisting of beams - four layers of joined bamboo sticks- and vertical and diagonal poles..



Tower supports, made of bamboo sticks.



Outdoor steps.



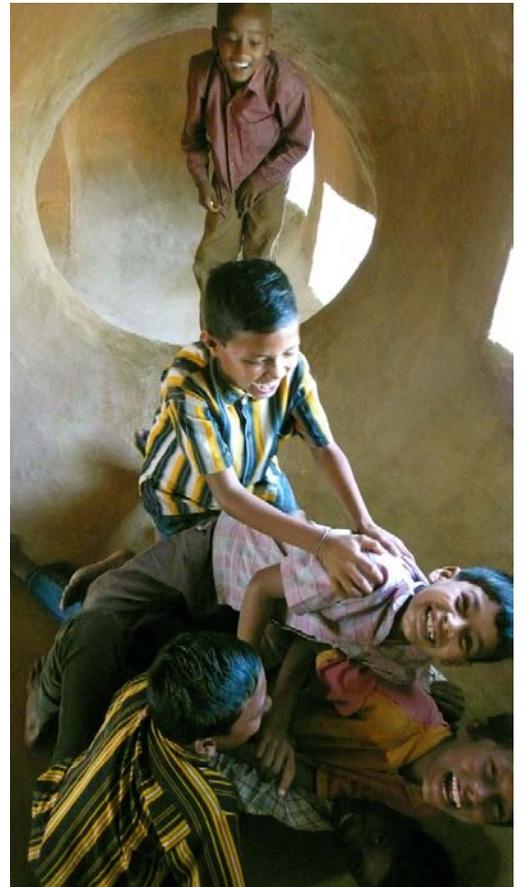
The three classrooms in the ground floor are connected to caves through holes.

The students sit on mats at the rammed-earth floor, as it is tradition in Bangladesh.





Cave opening.



Children playing in cave.



The airy first floor opens the view wide across the paddy fields.



The panels, made of small bamboo sticks, provide shadow and air for a good temperature.

School Handmade in Bangladesh

Rudrapur, Bangladesh

Architects Anna Heringer, Eike Roswag Laufen, Germany

Clients Dipshikha Society for Village Development Dhaka, Bangladesh

Commission 2004

Design 2004 - 2005

Construction 2005 - 2005

Occupancy 2005

Site n.a.

Ground Floor 275 m²

Total Floor 325 m²

Costs US\$ 22'835

Programme This village school adapts the traditional materials of earth and bamboo to make them more durable. In terms of the earth construction, the most important technical advances were introducing a damp-proof course, adding a brick foundation and mixing straw into the loam. The potential of bamboo construction is demonstrated by the ceiling (a layering of bamboo sticks, bamboo boards and earth) and the first-floor walls and roof (a frame construction consisting of beams - four layers of joined bamboo sticks - and vertical and diagonal poles). The project was hand-built by local craftsmen, pupils and teachers working in collaboration with European volunteers.

school in Bangladesh *Handmade*

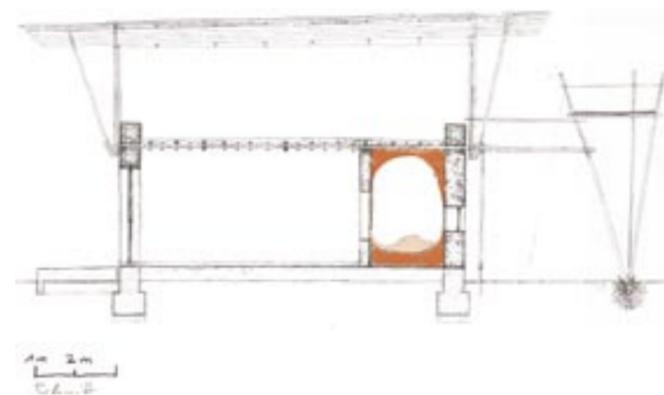
A school – handmade by local craftsmen, pupils and teachers together with a European team of architects, craftsmen and students.

The philosophy of METI (Modern Education and Training Institute) is learning with joy. The teachers facilitate the children to develop their own potentials and to use it in a creative and responsible way. The building is reflecting these ideas in terms of materials, techniques and architectural design.

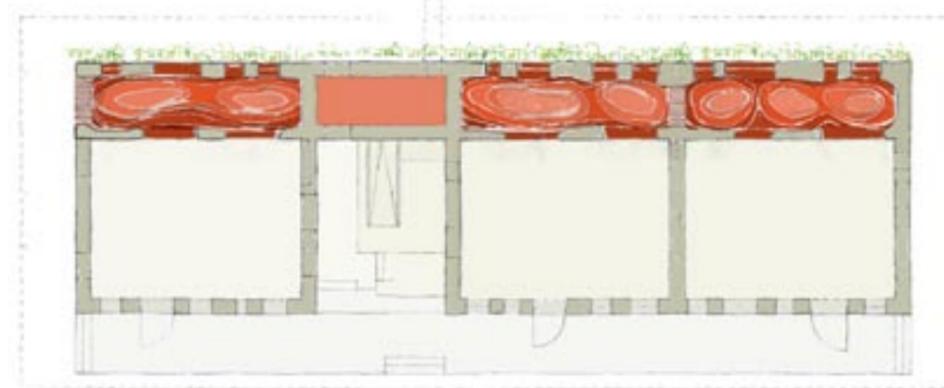
The aim of the project was to improve existing building techniques, maintaining sustainability by utilizing local potential and strengthening regional identity.

»We believe that architecture is more than shelter. It is intimately connected with the creation of identity and self-confidence. And this is the basis of development.«

section: foundation (brick), mudwalls, bamboo frameconstruction 1st floor



groundfloor: classrooms and caves for individual work, staircase



The caves are a retreat area for the students to read, to concentrate, to reflect, meditate... alone or in small teams.



The 3 classrooms in the ground floor are connected through 'bolt - holes' that lead into caves.



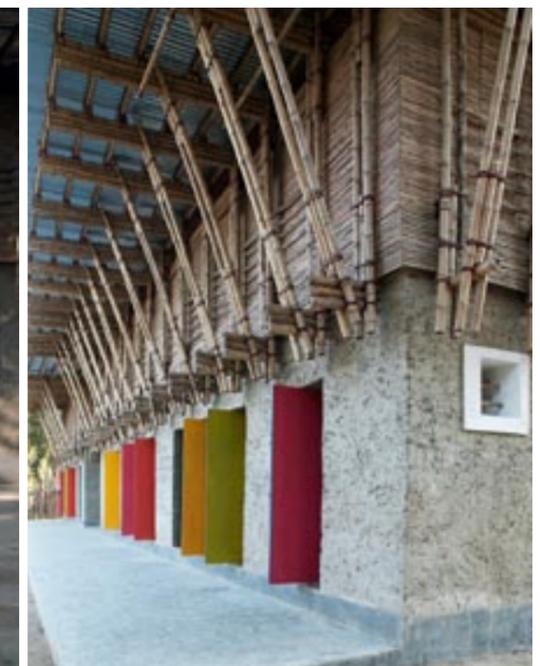
The students are sitting on mats at the rammed-earth floor, as it is tradition in Bangladesh.



Loam wall, bamboo joints



West facade, the windows got a lime plastering as rain protection.



The veranda in front of the classrooms keeps the feet dry during rainy-season

The general housing conditions in rural Bangladesh indicate a lot of problems (short longevity of about 15 years, fungus, dark and humid rooms...). Although the traditional building materials earth and bamboo are highly sustainable, people seek for durable materials like bricks, concrete, C.I. sheet and steel that only very few can afford.

The challenge of the project was to meet the needs and dreams of the people in an economic reasonable, ecological, social and aesthetic way.

Sitemap Dipshikha- Centre, Rudrapur



The strategy was the development of knowledge, information and skills for the optimal use of locally available resources respecting existing culture but transforming it in a modern way.

In Bangladesh earth and bamboo as building materials are supposed to be “old fashioned” and “the materials for the poor”. The School as a representative public building in a modern architectural style was a beginning to rethink this image. Meanwhile the school had several thousands of visitors from the surrounding villages and towns. They are appealed by the comfort of the indoor climate and the architecture of the building (in aesthetical and technical aspects): Comfort, durability and style as attractors – sustainability as concept.

The local materials offer advantages from an economic point of view: they strengthen the local economy and create jobs. To build up a capacity in sustainable architecture it was essential to include local workers in the building processes. Training through “learning by doing” should facilitate the local craftsmen to improve their general housing conditions.



Workers fitting by hand one of 25 big bamboo frames at the 1st floor.



“Wireless mixing machine” - cows mixing loam and straw



The building techniques were based on human labour and not on sophisticated technical equipment.

The airy first floor opens the view wide across the paddy fields and has enough space to romp around.



Small sticks of bamboo shadow and air for a good climate



All METI students subscribed with their names in Bengali on the doors that appear now like blackboards after a long school day.



Vertical expansion in the country with highest population density worldwide is vital. The school is the only two story building in the surrounding.





METI kids studying in the garden, waiting for the new classrooms.



The students reflect their social surrounding often in self-written dramas, presented in front of the villagers in a critical but humoristic way.



Students built an oven in the METI school building techniques and prepared bread.

METI/Dipshikha

The philosophy of METI is a very special kind of educational approach. It is the result and outcome of long experiences of the NGO Dipshikha in children's education and integrated rural development, initiated in 1999 in the village Rudrapur. Muslims, Hindus and a few Adivasi Christian families live here. METI (Modern Education and Training Institute) consists of a school up to class 8, training courses in tailoring, carpentry, electrics and construction.

METI philosophy: There are two dimensions in the education system: formational and life-oriented education. Aims are: to help bring out the best in a child, to prepare and form individuals with the capacity of logical, analytical as well as holistic and creative thinking, to promote leadership and managerial skills from childhood, to form responsible and efficient individuals for the future. Inter-religious dialog is very much practiced in METI.

METI kids are helping on site, learning to build and so becoming a living part of the building.



Ceremonious starting of the first loam wall with students, workers and villagers.



Joint project aims: training and production of the 1st floor façade by carpentry trainees



The Students of tailoring training prepared the textile ceiling and curtains.



Construction techniques

According to principles of development work the appreciation and use of the endogenous potential is the most sustainable solution. This is also true for the use of local materials and resources. This vital knowledge should not be destroyed by the use of materials which need a high amount of energy and rely on imported raw materials.

The most important technical progress in comparison to the traditional house is the introduction of a damp proof course, a brick foundation and mixing of loam with straw. The traditional building technique (where very wet loam is used) was replaced by the "Weller" technique that is quite similar to the traditional one. The 'Wellerbau' is a historical earth building technique. Loam is mixed with straw, which is a kind of reinforcement for the wall.

Utilized Materials:

83 m3 brickwork for foundation and veranda
 350 m2 damp proof course
 270 m3 loam-straw mix for walls, ceiling, floors, caves
 400 to loam
 230 kg steel for poles
 2.300 bamboo poles for ceiling, roof and façade
 2.500 bamboo slats for façade

Utilized Tools:

4 Weller spades // 2 pitchforks // 3 drill machines //4 hammers
 2 soldering metals // Tension belts // 2 cows and 2 water buffalos
 Baskets



"Weller"- technique: the walls are trimmed on the sides with a spade to get the accurate shape.

Traditional buildings and their decay after 8 to 10 years



Cows mixing loam, straw with a little bit of water



A steel pin, fixed with a nylon lashing forms the junction of the bamboo sticks. With this simple and single junction the entire bamboo construction was built.



Placing the "Weller"-mix on the foundation by hand.



The frameconstruction (25 pieces) of the 1st floor was build on the ground



The frames are fixed as a whole on top of the ceiling construction.



Each layer is 65 cm high and can be „cut“ after 3 to 5 days.



Dessimination / Impression

Suresh, loam worker, Banglades:

»It was good to do tests and experiments together before starting the real construction, so we could understand it although we did not know the language. And everybody learnt a lot from each other. I learned how to build strong walls, how to use measurement tools and the foreigners learnt, that the best mixing machines are water buffalos.«

Paul, Executive Director Dipshikha - Bangladesh

»We already feel that this new ideas of the METI building have raised hope and confidence for an improvement of living conditions for the poor in our rural areas.«

Press conference in Dinajpur, Bangladesh 2005



Member of parliament opening METI school in december 2005



24 workers were trained in METI building technics and got a certificate



opening fair december 2005



lectures

- Lecture at Ministry of Housing and Public Works, Department of Architecture, Government of Bangladesh
- Lecture at South Asia University Dhaka, Bangladesh 2006
- Lecture at BRAC University, Dhaka, Bangladesh 2006
- Lectures at Technical University Berlin, Germany 2005, 2006
- Lecture at Technical University Munich, Germany 2006
- Lecture at University of Art and Industrial Design, Linz, Austria 2005
- Lecture at the »international meeting for sustainable architecture and ecobiology«, Italy 2006

press/books

- architektur.aktuell 10.2006
- Bauwelt 32 / 06, Wochenschau
- flair Mondadori September 2006
- Reports and documentation in several Bangladeshi, Austrian and German Newspapers 2005, 2006
- Press conference in Dinajpur, Bangladesh 2005

exhibitions

- Exhibition "From village to town" with project presentation in Dhaka, Bangladesh 2006
- Exhibition in Berlin "da! Architektur in und aus Berlin", Germany 2006

»Back to the roots – in an age of self infatuation architecture has regained something of it's indigenous strength.« (architektur.aktuell 10.2006)

Paul, Executive Director Dipshikha, Anna Heringer, Eike Roswag





Aga Khan Award for Architecture

ARCHITECT'S RECORD

2007 AWARD CYCLE

I. IDENTIFICATION

Project Title School handmade in Bangladesh
 Street Address Gana-Aloy, Rudrapur, Birol, Dinajpur
 City (Village) Rudrapur Country Bangladesh

II. PERSONS RESPONSIBLE

A. Architect/Planner

Name Anna Heringer Mag. arch, Eike Roswaq Dipl.-Ing. Architekt
 Mailing Address Lehrter-Straße 57 Haus 4
 City Berlin Postal Code D-10557
 Country Germany Telephone 0049.30.89 73 37 73
 Facsimile 0049.30.89 73 37 72 E-mail eike-roswaq@meti-school.de
 Principal Designer Anna Heringer anna-heringer@meti-school.de

B. Client

Name Dipshikha non-formal Education, Training and Research Society for Village Development
 Mailing Address 282/5, 1st Colony, Mazar Road Mirpur-1
 City Dhaka Postal Code 1218
 Country Bangladesh Telephone 0088.028 01 22 76
 Facsimile 0088.028 01 53 14 E-mail dipshika@agni.com

C. Project Affiliates / Consultants

Please list those involved in the project and indicate their roles and areas of responsibility (e.g. engineers, contractors, economists, master craftsmen, other architects, clients, etc.) Please cite addresses and telephone numbers separately

Name	Role
<u>Paul Tigga</u>	<u>Executive Director, Dipshikha</u>
<u>Prodip Francis Tigga</u>	<u>Chief Facilitator, METI</u>
<u>Sepal Ch. Debsharma</u>	<u>Area Manager</u>
<u>Afser Ali - Local Diploma Engineer</u>	<u>Supervisor</u>
<u>Dr.-Ing. Christof Ziegert, Dipl.-Ing. Uwe Seiler (ZRS-Berlin)</u>	<u>Civic Engineers</u>
<u>Emmanuel Heringer, Stefanie Haider</u>	<u>Carpenter/Smith, Supervisor Bambu</u>
<u> </u>	<u> </u>
<u> </u>	<u> </u>

III. TIMETABLE

(please specify year and month)

A Commission	<u>January 2004</u>		
B Design	Commencement	<u>March 2004</u>	Completion <u>August 2005</u>
C Construction	Commencement	<u>September 2005</u>	Completion <u>December 2005</u>
D Occupancy	<u>December 2005</u>		

Remarks, if any:

IV. AREAS AND SURFACES

(please indicate in square metres)

A Total Site Area	<u>no information, Area is a small part of the Dipshikha Center in Rudrapur</u>		
B Ground Floor Area	<u>275 m2</u>		
C Total Combined Floor Area	<u>325 m2</u>		
including basement(s).ground floor(s) and all upper floors)			

Remarks, if any:

V. ECONOMICS

(please specify the amounts in local currencies and provide the equivalents in US dollars Specify the dates and the rates of exchange in US dollars at the time)

	Amount in Local Currency	Amount in US dollars	Exchange Rate	Date
A Total Initial Budget	<u>---</u>			
B Cost of Land	<u>Land is owend by</u>	<u>Dipshikha</u>		
C Analysis of Actual Costs				
1 Infrastructure	<u>the building uses</u>	<u>existing</u>	<u>Infrastructur</u>	
2 Labour	<u>345.000,- Tk</u>	<u>5.099,10 USD</u>	<u>0,01478</u>	<u>12.11.2006</u>
3 Materials	<u>1.050.000,- Tk</u>	<u>15.519,- USD</u>	<u>0,01478</u>	<u>12.11.2006</u>
4 Landscaping	<u>150.000,- Tk</u>	<u>2.217,- USD</u>	<u>0,01478</u>	<u>12.11.2006</u>
5 Professional Fees	<u>Profes. Volunteers</u>	<u>via Shanti e.V.</u>	<u>Germany</u>	
6 Other				
D Total Actual Costs (without land)	<u>1.545.000,- Tk</u>	<u>22.835,10 USD</u>	<u>0,01478</u>	<u>12.11.2006</u>
E Actual Cost (per sq meter)	<u>no facility</u>	<u>management</u>		

Remarks, if any. on costs:

VI. PROJECT DESCRIPTION

The project is a school-building – handmade by local craftsmen, pupils and teachers together with a European team of architects, craftsmen and students. The philosophy of METI (Modern Education and Training Institute) is learning with joy. The teachers facilitate the children to develop their own potentials and to use it in a creative and responsible way. The building is reflecting these ideas in terms of materials, techniques and architectural design. The aim of the project was to improve existing building techniques, maintaining sustainability by utilizing local potential and strengthening regional identity. „We believe that architecture is more than shelter. It is intimately connected with the creation of identity and self-confidence. And this is the basis of development.“ The general housing conditions in rural Bangladesh indicate a lot of problems (short longevity of about 15 years, fungus, dark and humid rooms...). Although the traditional building materials earth and bamboo are highly sustainable, people seek for durable materials like bricks, concrete, C.I. sheet and steel that only very few can afford. The challenge of the project was to meet the needs and dreams of the people in an economic reasonable, ecological, social and aesthetic way. The strategy was the development of knowledge, information and skills for the optimal use of locally available resources respecting existing culture but transforming it in a modern way. In Bangladesh earth and bamboo as building materials are supposed to be “old fashioned” and “the materials for the poor”. The School as a representative public building in a modern architectural style was a beginning to rethink this image. Meanwhile the school had several thousands of visitors from the surrounding villages and towns. They are appealed by the comfort of the indoor climate and the architecture of the building (in aesthetical and technical aspects): Comfort, durability and style as attractors – sustainability as underlying concept. The local materials offer advantages from an economic point of view: they strengthen the local economy and create jobs. To build up a capacity in sustainable architecture it was essential to include local workers in the building processes. Training through ‘learning by doing’ should facilitate the local craftsmen to improve their general housing conditions.

VII. MATERIALS, STRUCTURE, AND CONSTRUCTION

According to principles of development work the appreciation and use of the endogenous potential is the most sustainable solution. This is also true for the use of local materials and resources. This vital knowledge should not be destroyed by the use of materials which need a high amount of energy and rely on imported raw materials. Earth construction: The most important technical progress in comparison to the traditional house is the introduction of a damp proof course, a brick foundation and mixing of loam with straw. The traditional building technique (where very wet loam is used) was replaced by the “Weller” technique that is quite similar to the traditional one. The ‘Wellerbau’ is a historical earth building technique, which is ideal for ‘self’ building. Loam is mixed with straw, which is a kind of reinforcement for the wall. The “Weller” - wall is constructed in layers. Each layer is built approximately 70 cm high, dries in a couple of days and will be trimmed on the sides with a spade to get the accurate shape. After a second drying period, another layer can be added. Bamboo construction: The roof, the ceiling and the walls on the first floor had been constructed with bamboo to reveal the potentials of bamboo as building material. The ceiling consists of three orthogonal placed layers of bamboo sticks, bamboo boards and an earth filling as surface of the floor. The walls and the roof designed as frame construction consists of beams (four layers of joint bamboo sticks), vertical and diagonal poles. A steel pin, fixed with a nylon lashing forms the junction of the bamboo sticks. With this simple and single junction the entire bamboo construction was built. As it is a modified traditional lashing technique the local workers easily adapted it. Utilized Materials: 83 m³ brickwork for foundation and veranda. 270-m³ loam-straw mix for walls, ceiling, floors, caves. 400 to loam. 2.300 bamboo poles for ceiling, roof and façade. 2.500 bamboo slats for façade. Utilized Tools: 4 Weller spades. 2 pitchforks. 3 drill machines. 4 hammers. 2 soldering metals. Tension belts. 2 cows and 2 water buffalos. Baskets.

VIII. PROJECT SIGNIFICANCE AND IMPACT

The impact of the Project METI-school was on various levels

168 students got new classrooms

"I believe that nobody has such a beautiful school like us. What I like most is the auto-aircondition inside and that we could sign our names. Really I am happy that we could build this school!" (letter from Poritosh, Class 8)

Christine, teacher - Austria

"The METI-students must be involved into the building construction process. So they co-create it and understand it. This identification is so important that the building becomes „their“ building and they will handle it carefully

On technical level the METI building shows a construction method that assures much more durability than the traditional houses, maintaining sustainability unlike the "modern" materials such as bricks, concrete and iron.

30 local constructors were trained on new methods to ensure a long-term benefit for the villagers: Skills to help themselves improving their general living conditions

We already feel that this new ideas of the METI building have raised hope and confidence for an improvement of living conditions for the poor in our rural areas (Paul, Executive Director Dipshikha – Bangladesh)

Suresh, loam worker, Bangladesh

"It was good to do tests and experiments together before starting the real construction, so we could understand it although we did not know the language. And everybody learnt a lot from each other. I learned how to build strong walls, how to use measurement tools and the foreigners learnt. that the best mixing machines are water buffalos "

Building together – learning together was not only the motto in architectural aspects, but especially in intercultural and inter-religious understanding. Durga Puja, Eid, Advent, the birth of the first child, National Day, rice festival – through this work we got close to each other's culture, religion and personality. Antoine de Saint Exupéry once said "You lead your people to decay by strewing corn amongst them. But you unite them if you let them build together." In that regard we believe that projects like this contribute to a peaceful future

Stefanie, smith and Emmanuel, carpenter - Germany

"Thanks a lot to Dipshikha for the open and warm welcome. We've made so many experiences by being part of the village life and by working with the village people together on METI-School building "

Kogen, bamboo worker, Bangladesh

"The work with the foreigners is hard, but the aim - building something together for the community is worth all the effort. The German - Austrian team is very much educated but they work as well physically side by side with us "

Anna, architect - Germany

"Development cooperation is a vital chance, to see global challenges such as peace keeping, energy conservation, rural development, nature conservation from different cultural perspectives, to find sustainable strategies together and make it real by joint potentials. My hope is, that this METI building is a motivating start and example for an architecture, that serves the people in their entire physical and psychic being "

Architecture is said to be the mirror of society. In several discussions with architects, architecture students and teachers we tried to motivate to seek for an architecture that is based on the endogenous potentials of Bangladesh, rooted in tradition but transformed in a modern way according to the needs of the people - now and in future generations

Zaqlul, student of architecture, Bangladesh

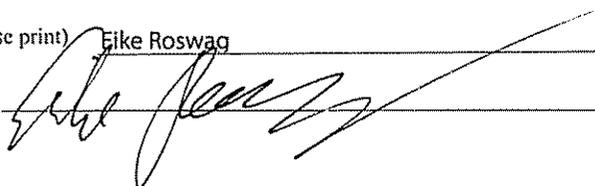
„being a Bangladeshi it really makes us proud when we see that we have got so many 'unique' materials and contexts to work with ... and your work was particularly inspiring!!! so next autumn it would be great if I get the opportunity to work with you "

"Back to the roots – in an age of self infatuation architecture has regained something of its indigenous strength " (architektur aktuell 10.2006)

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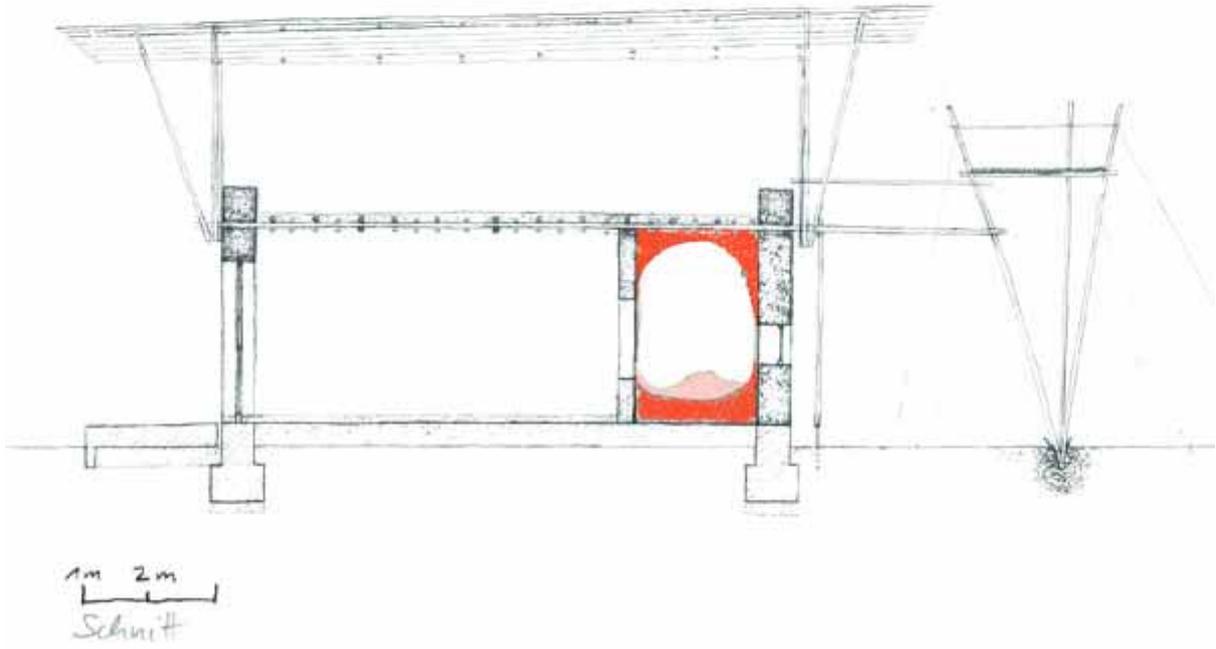
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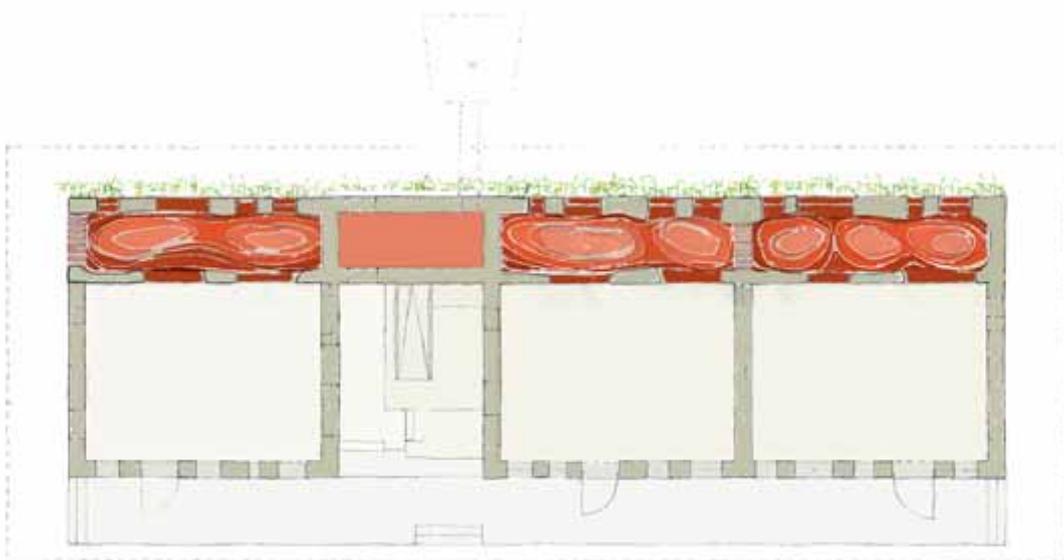


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Area

library/
administration

guesthouse

studios

teachers flats

school

assembly hall

residential

planned

realised

existing

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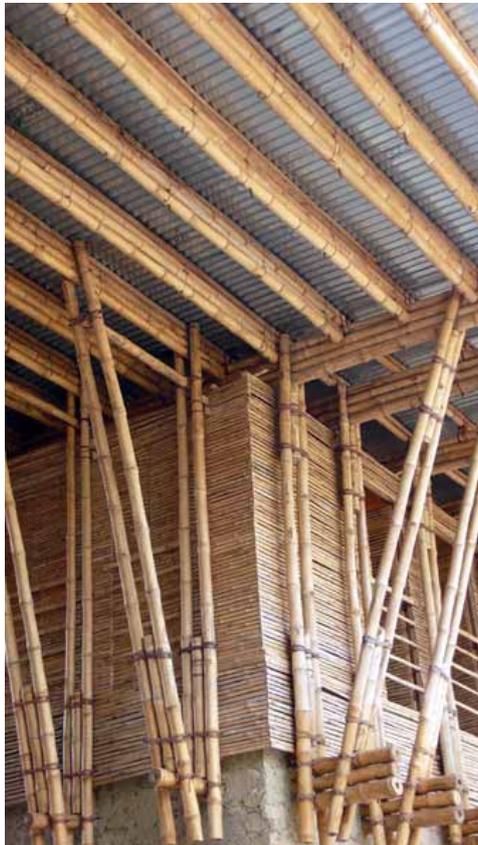
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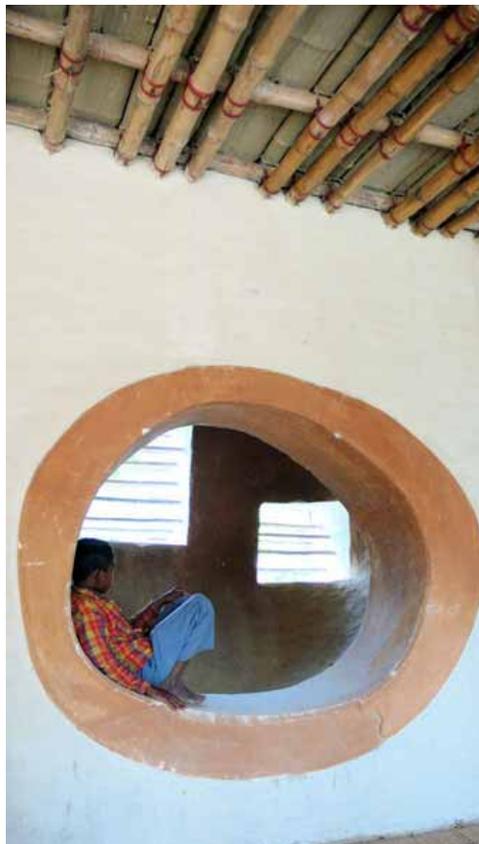
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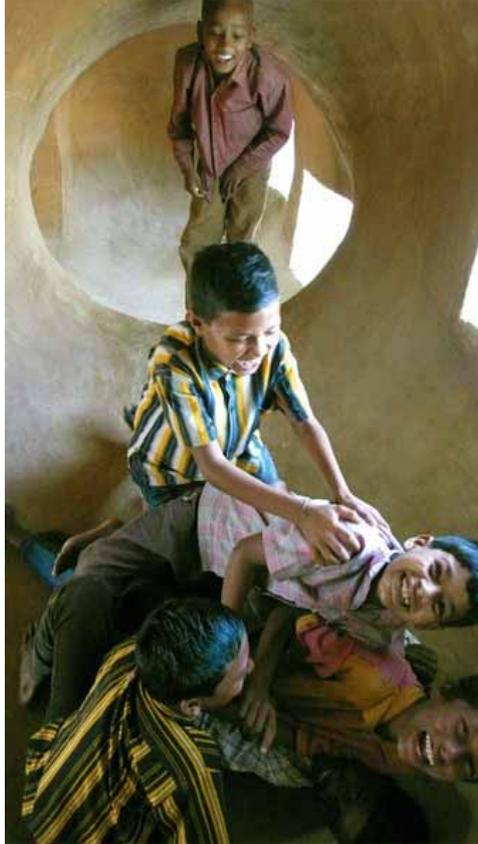
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