

Newsletter

Hunnarshala Foundation
for Building Technology
& Innovation

Issue V

Another Year of Hope, Change and Challenges

The year of 2016 came and went with its own share of highs and lows, and the first quarter of the year is already over. The world is moving at an unprecedented rate, a movement which is both forward and backward. As we make technological advancements that will help us colonise moon and mars, the housing situation back home looks rather grim. The economic, social, and environmental instability is displacing millions of people every year, depleting forests, polluting water bodies, and destroying resources. At Hunnarshala, we are constantly trying to engage with these issues of development, sometimes directly, and sometimes indirectly.

In this issue, we have tried to cover all the aspects of Hunnarshala's work, through our cover feature story on the post riots housing project in western Uttar Pradesh which concluded last year, a photo essay on Jharkhand where rural housing study was conducted, reporting on the various projects done by all our units and much more. There is also an additional technology section which talks about the shallow masonry domes, a technique of the north-western Gangetic plains.

The work ahead looks exciting, promising and challenging at the same time. We hope the same for the large community of thinkers, doers and challengers who believe in a better, inclusive and humane future.

We all have a long way to go.
Happy reading!

The Editorial Team
Prajesh Jethwa
Aditya Singh
Bhawna Jaimini

CONTENTS

ISSUE FEATURE 2

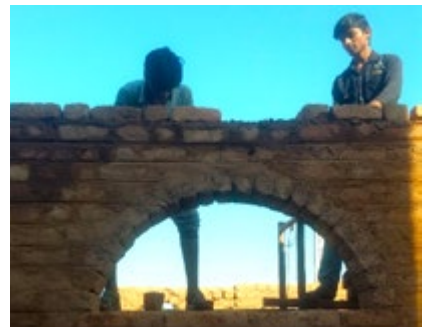


Can Brick Joints Heal the Cracks of Displacement?

PROJECT UPDATE 8



STUDENTS ON CAMPUS 17



TECHNOLOGY 19



PHOTO FEATURE 22



Can Brick Joints Heal the Cracks of Displacement?

Hunnarshala was invited by an umbrella organisation, Joint Citizen's Initiative (JCI) formed by Vanagana, Sadbhavna Trust, Janvikas and some independent citizens in response to the communal riots in Muzaffarnagar which displaced thousands of families. Hunnarshala provided technical support and facilitation to people for building houses and infrastructure, while JCI organised the community. They provided relief and helped them integrate into their new villages by organising their new identity papers like Aadhar Card, ration cards, electoral papers etc. They also helped the children with tutorials and exams, psychosocial counselling, admission into new schools, health camps and economic rehabilitation.

The rehabilitation program started in 2014 with the support of Misereor, a Germany based development agency and HT Parekh Foundation. A total of 230 houses were built and improved in three locations; Aryapuri, Kandhla and Bassikalan.



The houses decorated for the inauguration of the post riots housing

The Story of Post Riots Housing

By Sandeep Virmani & Tanvi Choudhari

The bright lights adorn the parapets of the houses in the newly built colony in village Kandhla in western Uttar Pradesh. All the houses have been freshly painted in bright colours, decorated with streamers and paper plates, to mark the formal inauguration of the new lives of their inhabitants. The youngsters are playing the latest Bollywood songs, women are wearing their best silk, children are running in the streets with their wooden toys and men are offering sweets to the guests who have come to see the inauguration. They are now ready to leave behind the painful memories of the communal riots that changed the subsequent course of their lives. The wounds have been plastered, painted and concealed, but they peep out of the window of nostalgia now and then. Vaheed Chacha makes the trip down memory lane as he welcomes people inside his house. "There was a huge Banyan tree in Hassanpur, my village, where many generations grew up. We would go there at 10 in the morning along with our khaats (cot) to spend the entire day there. The Banyan was big enough to provide shade to a 100 cots." The tree was central to him and others in Hassanpur, which held the community together under its sprawling branches. However, the tree no longer exists, just like Vaheed's broken ties with Hassanpur.

Vaheed chacha is one of 50,000 people who was displaced after the communal riots between Hindu Jats and Muslims in Muzaffarnagar district of Uttar Pradesh, in August-September 2013. The violence, claimed 62 Muslim lives, and forced the rest from these ten villages, never to return.

Communal clashes in India, between the two religious communities, have been happening since 1947, when independent India came into being. About

40 such rioting incidents have taken place in the last 65 years killing more than 1.5 lakh Indian citizens. After the Muzaffarnagar riots, the state government of Uttar Pradesh, in an unprecedented move, announced a compensation of rupees five lakhs for the Muslim families of the 10 worst affected villages. For many months, the displaced families lived in refugee camps.

Sadbhavna Trust invited Hunnarshala to visit the refugee camps and meet the Internally Displaced Persons (IDPs). The families used the compensation to buy land. They were now in the process of buying tarpaulin and tents to make temporary shelters on the land. Most communities were dispersed and dismembered, acquiring land within 100 square kilometres radius of their original villages. However, sixty families from Hassanpur decided to stay together and bought some 100 plots in Kandhla. Similarly, thirty families from Kutba village also bought land collectively in Kairana village, which is 50 kilometres from their native village. These families did not have the money to build as half the compensation was used to buy land and the remaining was to be used to reestablish their business. We suggested to the community that we would help raise half the funds required to build, if they agreed to put in the remaining. We also offered to provide technical and design facilitation and help the community integrate into their new neighbourhood, with school admissions and identity papers. The families agreed to this arrangement.

Going Back to Build Ahead

Three years earlier, we requested if they would take us back to their homes in the abandoned villages. It had only been five months since they fled their villages and people were still scared to

return, especially as the police had arrested many of the Hindu perpetrators. Nawab, a master mason who was one of the house owners in Kairana, took us to his village, Kutba. Nawab was defiant about going back. Perhaps it was his higher caste or his father's good reputation that made it relatively easier for him to return. The Jats met us with curiosity in the streets. The young Jat men made caustic jokes with Nawab and finally left us to visit the abandoned homes.

They were massive, ornate buildings, lying empty and looking like rusty parodies of their former selves. The vandalised homes still had the fragrance of burn. The old homes had huge Aangan (courtyards), which were now neglected and overgrown. There were many Kothas (rooms) with



An abandoned house in the old village

“Vaheed chacha is one of 50,000 people who were displaced after the communal riots between Hindu Jats and Muslims in Muzaffarnagar district of Uttar Pradesh, in August-September 2013”

Jamun tree in Kandhla



high shallow dome roofs made in exotic designs with a flower in the centre. Nawab explained with enthusiasm, going over every detail of their lifestyle and design. There was a huge gate at the entrance, with a smaller gate within, for everyday use. The Baithak in the front had its own entrance and it was largely for the male guests, as the women of the house worked in the Aangan and Baramda (Verandah). One could tell that many families lived together in the house, with many Kothas, which were occupied by the parents and the children's families. The Chabutras (rooms on the first floor) were reserved for the grandchildren.

The design was like an organism, which grew, changed and was nurtured by its inhabitants. It expands as the family grows; when a son is married, a new room is added for him and his new bride. Standing in the abandoned Aangan, listening to Nawab's animated voice, we realised they did not just leave a building of bricks and mortar, but a history of several generations and many more to come.

Khaat and Chulha: The New Standards

Khaat or a cot is an integral part of their lifestyle. In one discussion, Rahisa, a woman in her late sixties insisted on having a baramda wide enough to fit the Khaat lengthwise. As the discussion progressed, she vehemently opposed the idea of having a doglegged staircase, as it would be difficult for them to carry a Khaat up to the first floor. She was ready to settle on either a straight flight or only a 90-degree turn. Thus the Khaat became our standard of designing spaces in the new houses.

On one of our visit to Rahisa's house while it was under construction, Shehzad, offered the plastic chair, showing respect. When we insisted on using the Khaat, as the plastic was uncomfortable in

"The abandoned homes were massive, ornate buildings, lying empty and looking like rusty parodies of their former selves."

Photo Credits: Nipun Prabhakar



Momina, one of the house owners, taking a Khaat to the terrace



A woman using the Chulha in the courtyard

the sweltering heat, he took some time to agree and then said, "In any case, a person can be quite lonely on a chair, on a Khaat there is togetherness!" Khaats are very versatile and multifunctional. Being lightweight, they can be moved easily from rooms to the Baramda to the terrace. On weddings and other important occasions, all the Khaats are transported to the venue for the guests.

The Chulha is another integral part of the traditional house. The concept of an assembled kitchen is very new and sometimes aspirational. The functions of the kitchen here are dispersed throughout the entire house. The utensils are arranged beautifully in the Kothas, firewood is stored on the terrace, and the Chulhas are put in the aangan. The Chulha is usually in the part of the Aangan where there is enough ventilation for the smoke to escape but no breeze to disturb the cooking. For this purpose, many families use moving Chulhas, which move with the shadows in the summers, and with the sunlight in the winters. However, the relocation from villages to a semi-urban situation wanted both, a fixed platform with the moving chulah.

New Plans

The families of Hassanpur received one compensation per joint family, while in Kutba, every married family received separate compensation from the government. The sixty families of Hassanpur purchased a hundred plots in semi-urban Kandhla, and twenty Kutba families purchased 32 plots in Kairana. The relocation and rehabilitation was painful. However, it was also an opportunity for the families to rethink the idea of their houses and settlements. People were living in joint families in the villages, in social and physical structures which were not changed or challenged for generations. Every family



Photo Credits: Nipun Prabhakar

A new house built in the post riots housing in Kandhla

now wanted to resurrect their lives around not just traditional family values but individual spirit and aspirations too. To infuse the traditional values with the modern aspirations, the design required a variety of arrangements to be negotiated between the joint and the nuclear-family. Most of the families wanted to live together, but with the possibility of subdividing the plot and home, if required in the future.

Rahisa and her three sons, Shehzad, Kallu and Zahir bought three plots together. They share the Aangan and Baramda and sometimes even their Chulhas, though they have separate kitchens and bathrooms. The youngest son Zahir who will have the option later to separate the house by making a wall in the middle of the Aangan would inherit Rahisa's house. Allah Meher on the other hand opted for making a house with six rooms in an L-shaped arrangement. The house is made for the entire family to share the common Aangan and Baramda. He wants his entire family to stay together.

Naushad and his three brothers, Ehsaan, Rahisu, Shahzad built

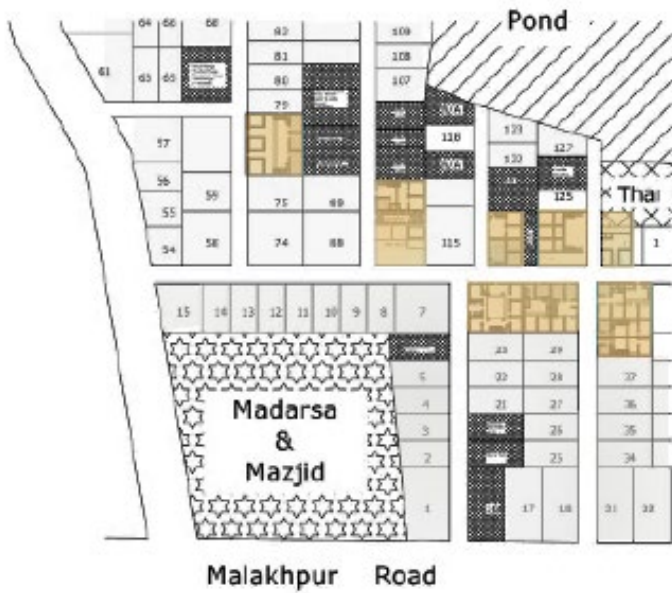
completely separate houses. He had a lot of ideas about the design and aesthetic of his house, and hardly took any of the architectural inputs from our team.

Every house was designed singularly, giving rise to about twelve different typologies ranging from the joint to the insular family, articulated in a range of plot sizes.

Brick by Brick

Bricks in the Gangetic plains compare with the best in the world. With modern kilns that provide uniform, high heat, the Avval (1st grade) brick has a strength of 150-175kg/cm², three to four times the average found in the country. Though historically these bricks were used with great prowess, today the buildings hardly have any foundation (6" to a foot), with mud mortar in the walls, and no connection with the roof. At the foot of the Himalayas these are earthquake prone areas, and such buildings will collapse very quickly.

Besides proper well entrenched foundations, we introduced two innovations for the walls and roof. Rat trap bonds for the walls reduced



“As architects, designers and supervisors who were facilitating the process of rehabilitation and relocation of the riots affected families, it was very important for us to strike a relationship with the people who were grappling with the mistrust, suspicion and loss of faith. Most of them had the capacity to build for themselves, what they didn't have, was the trust in their own capacities. Our work was to support the people build back the trust, brick by brick, as they rebuild their houses”



The plan of the house of Rahisa and her two sons.

the requirements for bricks by 25%, simultaneously improving insulation. The roofing traditions of the region were fascinating; they used six different types of flat roofs! Brick and joist, plank and joist, Reinforced Brick Concrete (RBC), RCC, jack arches and a unique cloister or shallow dome. We worked with the special artisans of plank & joist and shallow domes to make them safe and well connected to the rat trap walls.

The artisans who make shallow domes continued to work with us to research, develop standards and market this amazing technology. The communities built their own homes, negotiating with markets and labouring on the site of their homes together. Besides the homes, they also built their infrastructure, including roads, sanitation and water connections.

Our first meeting in Kandhal, took place under two large jamun trees, on the banks of a pond. The enthusiasm was as tepid as the empty plots in front of us. Under the shade of the jamun trees, we sowed the first seeds of hope. Today, three years later, Waheed Chacha took us back to the pond; the entire village was here to greet us; the women peeling vegetables in a cohort, children climbing the trees to pull down ripe jamuns, old men taking turns to smoke hookah, others gambling or sleeping. The mood was upbeat, they had finally found a home, a village, and hopefully their faith in humanity

“Three years later, Vaheed Chacha took us back to the pond; the entire village was here to greet us; the women peeling vegetables in a cohort, children climbing the trees to pull down ripe jamuns, old men taking turns to smoke hookah, others gambling or sleeping. The mood was upbeat, they had finally found a home, a village, and hopefully their faith in humanity will restore with time.”



A woman offering namaz in her home in Kandhla, while men go to the mosque to pray.

Photo Credits: Nipun Prabhakar



Community Empowerment

URBAN INTERVENTIONS

Slum Redevelopment

Team: Rupesh Hurmade, Dinesh Charan, Karamshi Rangani, Dhiraj Thakkar, Khimji Chavda, Hiren Gohil, Madhu Jora,

Interns: Sritoma Bhattacharjee, Tahir Noronha

Housing is one of the major areas where Hunnarshala has been actively involved with the communities. Through the slum redevelopment program under Pradhan Mantri Awas Yojna- Urban, the ideas of owner-driven construction and community focused approach are being explored thoroughly. The pilot project at the three sites in Bhuj: Ramdevnagar, GIDC Relocation Site and Bhimraonagar with a total of 314 houses are nearing completion and work on the infrastructure is now to begin. The District Collector, Mahendra Patel has played a very influential role in release of land

for the project, which is a major challenge. Other major challenge faced during the implementation was difficulty in timely release of funds to the beneficiaries by the government.

Additionally, a proposal to tackle the housing shortage at the city level was prepared using land as a resource and keeping in focus the participation of communities in the process. The proposal was discussed in the presence of representatives of several government departments and the Collector, Kutch. The proposal was well received and another Detailed Project Report (DPR) following these city level guidelines was prepared and submitted to the municipality for approval. The new DPR was prepared for 610 households at two different sites, where about 300 beneficiary families are listed to be rehabilitated in the first phase. The house typology for the proposed DPR has been revised to achieve higher densities.

Shelter for Urban Homeless

Team: Rupesh Hurmade, Dinesh Charan,

Intern: Sritoma Bhattacharjee

Taking forward its program with urban poor, Hunnarshala recently started working with urban migrants in the city of Bhuj. Homes in the City (HIC) helmed a study of migrants in the city which was supported by the students of Urban Policy and Governance Department, Tata Institute of Social Sciences, Mumbai. The study stated a fluctuating

population of about 2,000 migrants around the city.

A rental housing stock being managed by a local organisation was envisaged as the solution and a proposal for the same was prepared and discussed with the municipality here. Ajeevika, an organisation working with migrant workers in Rajasthan was also invited, and is now supporting the program. However, a new site has been allotted for the shelter by the Collector, on which a new proposal is currently being worked on keeping the core idea same, and is expected to be submitted soon.

Housing For All Plan of Action (HFAPoA)

Team: Rupesh Hurmade, Aditya Singh, Ramesh Chauhan, Madhu Jora, Rajesh Gor, K-Link (Bhuj), SETU (Bhuj), Dustudio (Auroville), People In Centre (Ahmedabad), Malini Kutti (Mumbai) Intern: Vivek Rudani

The government of India, in its ambitious plan to provide housing for all, has launched Pradhan Mantri Awas Yojana - Housing for All (PMAY-HFA) to not only look at the slum housing but also to cover in its purview the other low income households requiring assistance with housing. Under this scheme the government of Gujarat through Affordable Housing Mission (AHM), empaneled a group of consultants to study housing scenario of about 160 cities in the state and propose a suitable 'Housing For All Plan of Action'. Hunnarshala was allotted eight cities around the state: Bhuj, Bhachau, Rapar, Jamjodhpur, Khambhalia, Chaklasi, Mansa and Dehgam. Hunnarshala formed a group with its partner organisations Dustudio, PiC, SETU and K-Link to perform the task. An experienced urban planner from Mumbai, Ms Malini Kutti provided her valuable guidance to the project.

The surveys of all the cities have been concluded and currently the draft strategies for provision of housing to these cities are being formulated. Several interesting facets and depths in the housing scenario came up during the study; and the proposed strategies



are being worked upon in a manner that they become as contextual as possible. After the preparation of a draft city-specific report of the study and the proposed strategies, a consultation with the stakeholders is required to be done before finally submitting the proposals to the government.

Lakefront Development: Desalsar Lake, Bhuj

*Team: Aditya Singh, Arid Communities and Technologies (Bhuj), SETU (Bhuj)
Intern: Krishna Barot*

The work on Desalsar lake was initiated a few months ago with the purpose to prepare a proposal for redevelopment of lakefront and submission of the same to the urban local body. Desalsar is a historic lake in the city of Bhuj that has a significant historic value. The context of the lake was studied in detail and several discussions with the local representatives were done. Suleimanbhai, an active community leader has taken immense interest and is playing pivotal role in taking this project forward.

In addition to the issues with water quality, encroachment of lake edge by shops and severe solid waste dumping by the nearby areas were identified as

issues that require immediate intervention.

A proposal for the redevelopment was prepared with active involvement of the local representatives. The proposal takes care that the shops be relocated in a manner that would not affect the livelihood of the shopkeepers, and still the area could be developed as an accessible public space for the city. The proposal has been submitted to the municipality to be reviewed under Atal Mission for Rejuvenation and Urban Transformation (AMRUT) scheme.





Inauguration of the School Shelter

Community Organisation

*Team: Bhawna Jaimini, Malaram Bishnoi, Juhi Pandey (Khamir), Kirit Dave (Shrujan), Lataben Jolapara (Community Teacher)
Intern: Joel John George, Sritoma Bhattacharjee, Tahir Noronha*

To deepen the engagement with slum communities in Bhuj, another project of 'Community Organisation was conceived to look into the issues of the urban poor closely, the issues directly or indirectly related with housing.

This was conceived under the Homes in the City (HIC) fellowship program, supported by Misereor that enables individuals within different organisations to work closely on the issues they want to deeply engage with. The work started with Vansfoda where 50 families from the bamboo weaving community live without access to housing or any other services. Though the housing proposal was submitted, it was realised that there is a much larger need of looking at the issues of an urban poor community in a more holistic manner.

The project seeks to address issues of livelihood and education within the community. The women of the community were traditionally bamboo weavers but due to migration to Bhuj, they are currently working as ragpickers. In partnership with Khamir, new products in bamboo and other materials are being designed, with the possibility of connecting the artisans to markets.

On the education front, evening classes for the children were started with the support of Arunbhai Vachhrajani, a citizen of Bhuj who is keen on supporting ground initiatives for the urban poor in the city. Recently, a school shelter was also built with crowd funding from various citizens of Bhuj who put monetary contributions to the shelter as part of the Daan Utsav, the Joy of Giving Week. The entire shelter was built in a span of 10 days where the whole community contributed with their labour and love.

Animal Hostels

Team: Aditya Singh, Sahjeevan (Bhuj)

The cities in India are not only inhabited by Humans but animals too. Any proposed development scheme should take into account the fauna of the urban environment and how to preserve it. With the same aim, the project of animal hostels began by envisioning a local system for the cattle of the city which would decentralise the milk supply to the citizens of Bhuj. It is also expected to create a relationship between the cattle owners and the citizens as well as restaurants

to collect daily left-over food as cattle feed. Further these hostels are expected to have gobar gas plants which can supply fuel for cooking to the cattle-owners who are expected to stay near the hostels. The cow dung then can be supplied to local farmers as manure, who in turn can help the cattle owners with the fodder.

The project is led by Sahjeevan, and Hunnarshala is preparing the design and architectural drawings for the hostels. The proposal has been submitted to the Animal Husbandary Department of Gujarat.

Vendors' Formalisation and Traffic Management

Team: Aditya Singh, Bhawna Jaimini, SETU (Bhuj), TISS (Mumbai)

While working with the slums in the city of Bhuj, it was realised that vending is a major livelihood source for the slum dwellers and it requires exploration. Taking this further, vending activities are being studied in the city. A pilot project was developed for a major junction, Jubilee circle, and, vending as well as traffic were analysed for the chosen stretch. A proposal was developed and shared with some of the stakeholders. Further, a city-wide reconnaissance was done with the help of students of the Urban Policy and Governance Department, Tata Institute of Social Sciences (TISS) to understand the present layers in the system. A presentation was made on the work done to the citizens of Bhuj and representatives of various local organisations as well as government representatives in a workshop conducted under 'Homes in the City' program. Several suggestions were made by the attendees on the study and proposal for vendors of the city.

The scope of the project has now been further expanded to not only look at vendors and traffic, but



Presentation to city stakeholders at 'Seher Pade Saad' event organised under HIC

to understand the 'streets' of the city themselves, and what constitutes a 'street'. This will be taken as a research project with the help and guidance from TISS. Meanwhile, the Government of Gujarat has launched a new policy for the vendors in urban areas. Based on the findings of the research, a proposal shall be developed in accordance with the new policy for vendors.

RURAL HOUSING

Appropriate and Affordable Rural Housing (PMAY-G) for Jharkhand

Team: Aditya Singh, Pratik Zaveri, Hardika Dayalani, People In Centre (Ahmedabad)

United Nations Development Program (UNDP) sponsored a study and recommendations project for the rural housing of Jharkhand in the context of Pradhan Mantri Awas Yojna- Gramin (PMAY-G), previously IAY, for Ministry of Rural Development (MoRD). After few visits to almost all the parts of the state to understand the context (housing, materials, technologies, life-styles etc), a state level workshop was organised to propose rural housing designs that incorporate the traditional technologies which can be well adapted to the geographical and the community context. A draft report on study and guidelines was presented to the stakeholders, which included government officials, architects, beneficiaries etc, to get the feedback. Based on the feedback and the study done, a report on documentation and recommendations was submitted to the state government.



Models of proposed housing typologies

INSTITUTIONAL INTERVENTIONS

GIC School, Pithoragarh, Uttarakhand

Team: Pratik Zaveri, Rupesh Hurmade, Likhin KV

Interns: Ekta Gohel, Harsh Bhatia

GIC School at Baram is a Secondary/Higher Secondary school facility for nearby 8-10 villages providing education to students from grade sixth to twelfth. It is a government school which was started in early 60s and development took place, as and when funds were available from the government. At present day, the Baram Inter College has been declared as one of the hundred model schools by the government of Uttarakhand. It caters to the students from a radius of about twenty kilometers.

Hunnarshala Foundation was approached by the Tata Relief Committee (TRC), Dehradun, which was working in the state for rehabilitation activities in the state post the floods in 2012. The project is an expansion of the rehabilitation work in the region by TRC. Hunnarshala has proposed 17 structures in total, with 11 Classrooms, 4 labs, 2 toilets, an administration block for the principal and staff, a kitchen, an open air amphi-theatre with green room and a storage facility integrated with the existing as well as planned landscape. The design shall incorporate technologies using the local materials and Kolkata based architect Laurent Fournier is collaborating to design roofing for the school.



Proposed school in Baram

Guest Rooms for RAMBLE, Hodka, Kutchh

Team: Mahavir Acharya, Dinesh Charan, Karamshi Rangani
Intern: Tahir Noronha

A few years ago, Hunnarshala had helped Banni Pashu Ucherak Maldhari Sangathan (BPUMS) with the construction of a training hall for maldharis (cattle-owners) in Hodka in Kutch district. Later on, the facility was expanded through several expansion phases and turned into a Research Centre And Monitoring in the Banni Landscape (RAMBLE). In the latest expansion exercise, two additional guest rooms have been designed and are under construction currently. The civil works are almost finished and the finishing work is currently undergoing. Stone masonry has been done in the walls till the sill band, whereas stabilised adobe has been used for the masonry above the sill level. Stabilised adobe was used in the project



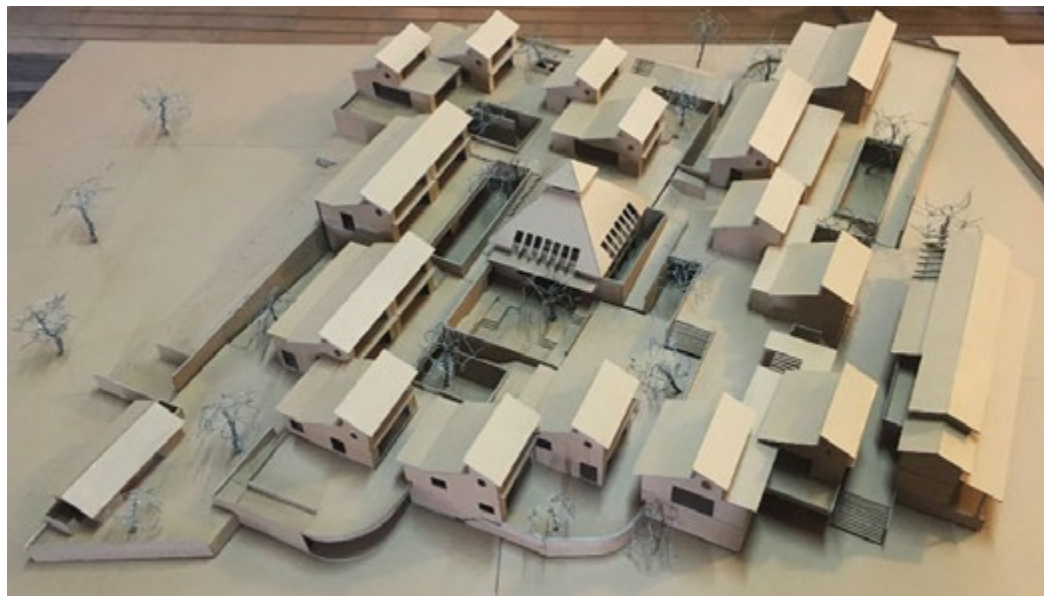
Extension block of Ramble, Hodka

with a larger purpose of popularising the material in the region. Adobe is a traditional material found in the region, however in the recent years it is increasingly being replaced by industrially produced concrete blocks. The extension is built in Stabilised Adobe to introduce the technology in Banni.

Alma Mater School, Jodhpur

Team: Pratik Zaveri
Intern: Ekta Gohel

An alternative education school that will cater to the students from kindergarten level to secondary level is being designed in Jodhpur, Rajasthan. The school is in the conception and design phase currently, and the implementation will start in a few months. The traditional techniques of lime and stone are being incorporated in the design along with other alternate techniques like Stabilised Ramed Earth, CSEB, and Shallow Domes. The school is an opportunity to collaborate with the local artisans as Jodhpur has a plethora of building traditions.



Proposed Alma Mater School in Jodhpur

DISASTER RESPONSE

Post-earthquake Reconstruction in Nepal

Team: Mahavir Acharya, Tapas Upadhyay, Tanvi Choudhari, Kishore Chawda
Intern: Marina Boaretto

Rehabilitation of a Buddhist Nunnery, Bhakhang

The reconstruction of a village, supported by American Jewish World Society (AJWS) in Bhakhang, inhabited by about 170 Tibetan nuns has been in the process. The village situated on the Nepal-Tibet border was destroyed in the devastating earthquake that wrecked Nepal in April 2015. About 150 houses have been partially completed using the technique developed by Prof. KS Jagadish, which uses locally available stones and mud mortar with galvanised wire mesh at every 2 feet in the masonry. The technology is developed in the context of remote areas where materials like steel and cement cannot be transported easily.

The local masons are trained in the technique to build the houses and till now, all the stones from the destroyed houses have been recycled into the new houses. A participatory process has been followed to incorporate all the concerns and issues of the nuns who are to inhabit the houses.



Nuns doing mud plaster on their houses.

Rehabilitation of Urban and Rural Settlements in Kathmandu Valley (With Lumanti)

Hunnarshala is supporting Lumanti, an organisation based in Kathmandu to redevelop and rehabilitate four settlements; Macchegaon, Thecho, Siddhipur and Chitlang. The work has already started in Chitlang, which is a rural settlement outside the Kathmandu valley. Initial assessment of damage and discussions with the community are going to lay a roadmap for the reconstruction work. The work on the other three urban settlements is at design and discussion stage where possible solutions are being worked out with the community to rebuild the settlements in a holistic manner. The role of Hunnarshala involves providing technical support and facilitation to Lumanti at the designing, planning and execution stages of the rehabilitation work.



Chitlang Village



The Art Village, Karjat

Team: Tejas Kotak, Jignesh Gor

Artisan Empowerment

The Art village at Karjat is a dream project of Ms. Ganga Kadakia, an artist. The first phase of the project is complete. This project is a combined effort of artists, architects and artisans who lived together and created an expression using natural materials to build facilities consisting of recreation center, dining & kitchen and guestrooms. The entire facility is made of earthen construction techniques like adobe, stabilized rammed earth, thatch and recycled wood.

In this project, the students of Karigarshala participated to make doors, windows and table. The selection of adobe as a walling material provided an opportunity to promote an individual artisan named, Bhav Singh Himla, as an entrepreneur. Bhav Singh belongs to Madhya Pradesh and has effectively participated in past projects undertaken by Hunnarshala. Similarly, ex-students of carpentry course in Karigarshala who are now involved in the incubation company Ozari, participated in the making of the wooden roof understructure.

The facility has been inaugurated and is being utilised to organise tours, events and workshops.

Penha de Franca, Goa

Team: Tejas Kotak, Bharat Chauhan

The Church – “Penha de Franca” situated in Britona, Goa is an ancient religious structure built by the Portuguese. This architectural marvel is 450 year old. It is one of the very few churches that are located directly along a water body.

The church is being restored and renovated under the supervision of Heritage Acoustics. Hunnarshala was contacted by Mr. Buland Shukla of Heritage Acoustics to provide its expertise for the application of lime plaster. Father Alan, a priest, who closely works with Mr. Buland Shukla on restoration projects of churches in and around Goa provided the entire traditional recipe of preparing lime for application on the walls of the church. He has preserved this and guides the restoration team.

This project was instrumental in providing an opportunity to promote an artisan entrepreneur company “Lustre – specialist in finishes”, wherein the artisans are focused on providing various construction finishes to the clients. More than 60 artisans got an employment opportunity through this project.

The church management, after seeing the results of the lime plaster, is now collaborating again with Lustre for other finishing work apart from lime plaster



Penha de Franca Church in Goa



Load testing of spaceframe made out of PVC pipes



Load testing of spaceframe made out of bamboo

Space Frames

Research started on using materials other than steel to construct space frames for usage in high salinity conditions where steel is susceptible to corrosion. With the support of AgrocCell Industries and assistance of Magan Bijlani, proprietor of an artisan company called 'Span-The Space Frame Systems', the research was set up.

The first test was conducted to ascertain the tensile strength and load testing on space frame structures made out of PVC pipes and supported on the edges. The result: when a load of 280 kg was applied the PVC structure started bending.

The second test was conducted to ascertain the tensile strength and load testing on space frame made out of PVC pipes filled with concrete and not supported at the edges.

The result: when a load of 768 kg was applied the PVC structure started bending.

The third test was conducted to ascertain the tensile strength and load testing on space frame made out of PVC pipes filled with concrete and supported at the edges.

The result was that even after a load of 929 kg was applied the PVC structure did not bend.

The next step was to introduce a combination of material i.e. PVC pipes and bamboo to prepare grids. The tests for its performance are being carried out.

The result: a load of 2482 kg was applied on the space frame structure, after 5 days the joints in the structure broke.

Artisans formed a new partnership firm, named “Sohath” – specialists in Stabilized Earth Construction. This company will be providing its services in various stabilized earth construction techniques. The company has already been commissioned the work of producing CSEB and constructing stabilised rammed earth walls for two different projects.

KARIGARSHALA

In masonry, the learning programme covers brick-joining exercises, walls, right-angles, joints, etc., The students also learn about the importance of good masonry in the house and do masonry on site. Until all the students get the concepts with clarity, the on-site building activity is repeated. After this foundations are introduced to the students which is taught by Mukeshbhai Tank.

In carpentry, the students learnt identification and use of different tools. This is very important before the student learns to cut along the line using a ruler, which is taught next. The first product made by the students was a 'Patla' which didn't leave the students satisfied. The entire exercise was thus repeated by the students. Good carpentry rests on the joinery systems, making it imperative for the students to understand complex joints. After this, the next step was studying and interpreting drawings, which the students took some time to understand. However, after that they were confident enough to make stools which came out well, leaving the students satisfied with their work.

Apart from masonry and carpentry course, the students are encouraged to learn new things that interests them. Every Monday, Mr. Ramesh Sanghvi comes to teach something new. We are trying to create an environment where students are able to express themselves freely and treat Karigarshala as their home.

New Batch, New Beginnings, New Hopes

By Atul Vyas

Karigarshala entered its sixth year of existence on 15th June 2016 without the realisation that it was five years ago that we all started this artisan's school. This year has seen a higher intake of students from Kutch. Of the 20 students admitted, 3 are from Jhabua in Madhya Pradesh. The remaining 17 are from Kutch (Rapar, Bhuj, Nakhatrana and Abhdasa talukas). In the first semester of three months, all the students study basics of carpentry, masonry, electrical work, and plumbing work together. After the first three months are over, each student pick up their major subject of learning. 13 students decided to learn carpentry and 7 chose to learn masonry.

STUDENT'S DIARY



કારીગરશાળામાં અભ્યાસ માટે આવ્યા પછી મને મારી બાળપણની વાત કહેવાનું મન થાય છે. મારુ નામ કાનજી મને મારા ભણવાના દિવસો યાદ આવે છે. કે હું શું કરતો હતો? સામાન્યતઃ ઘરમાં માતા-પિતાને થતું કે હું ભણવા જાઉં છું. પણ ભાગ્યે જ શાળાએ જતો કારણ કે મને સાહેબ અને બહેનના મારની બહુજ બીક લાગતી હતી. કાઈપણ ન આવડે એટલે મારનો વરસાદ વરસે. મને મારના ડરથીજ શાળાએ જવાનું જ ન ગમે. બહુજ થોડા દિવસો શાળાએ જતો અને ગુહકાર્ય પણ મારા વર્ગના વિદ્યાર્થીઓ પાસે થી કરાવી લેતો તેમને લાલચ આપતો ક્યારેક ડરાવતો પણ ખરો આમને આમ મારો સાતમાં ધોરણ સુધીનો અભ્યાસ પુર્ણ થયો.

આમ મારો પ્રવેશ આઠમાં ધોરણમાં થયો ત્યારે મે જાણ્યું કે અહિં સાહેબ ખૂબજ મારે છે લાકડી થી મારે છે તેથી મે તો એકાદ પિરિયેડ ભરીને ભાગી જ ગયો ખૂબ જ ડર લાગે સાહેબને જોઈને અને એક વાર એવું થયું કે બે વિદ્યાર્થી મારા ઘરે આવ્યા એક પત્ર લઈને અને મારા પિતાજી ને કહ્યું કે આમા સહી કરી આપો મારા પિતાજી કહે આ શું છે? તો મે કહ્યું કે આ અમારો પ્રવાસ છે તે માટે તમારી સહી કરી આપો તેમણે કરી ખરેખર તો શાળામાંથી નામ કાઢી નાખવા માટે સંમતિનો પત્ર હતો હવે તો મારે શાળાએ જવાનું જ નહતું હું દરરોજ ગામમાં વાડીમાં રખડ્યા રાખતો હતો એક દિવસ એવો આવ્યો કે ઘરે ખબર પડી ગઈ કે આપણો કાનજી શાળાએ જતો જ નથી. આમ ઘરનાએ પણ સ્વીકારી લીધુ આમ જુઓ તો મારો અભ્યાસ બીલકુલ ન થવા બરાબર જ ગણાય.

ત્યારબાદ પાંચેક મહિના હું ઘરે જ બેસી રહ્યો શું કરવું કાઈ ખબર જ ન પડે ભણવાનું મન થાય પણ આ રીતે નહી કયા જવું ખ્યાલ જ ન આવે તે સમયે મારા પિતાજી એ મને તેના મિત્રને કામે લગાડ્યો અને મહિનાના મને ૬૦૦ રૂપિયા પગાર મળે મને મજા ન આવે પણ કરુ શું? આમ ને આમ મે બે વર્ષ કાઢ્યા પછી થયું કે અહી થી તો નીકળી જ જાઉં. ઘરે વાત કરી તો પિતાજી એ ગેરેજમાં કામ શીખવા લગાડ્યો પણ ત્યા મને મજા ન આવતી કારણ કે શીખવાનું હતું જ નહી માત્ર કામ કરાવે સાફ કરાવે મારી સાથે વાત પણ ન કરે હું તો મુંઝાઈ ગયો કે હવે કરવું શું? મને કામ શીખવામાં રસ હતો મને પણ એક કારીગર બનવું હતું મારા પણ સ્વપ્ન હતું. પણ મને સમજનાર કોઈ નહતું તેવામાં મારા મોટાભાઈએ મને કહ્યું કે એક કામ કર તું કારીગર શાળામાં જા અને કામ શીખ હું રાજી થઈ ગયો અને અહી આવ્યો અહી પણ મને ડર જ હતો કે સાહેબ મને નહી આવડે તો મારશે પણ અહીનું વાતાવરણ જ કાંઈક અલગ હતું અહિ કોઈ જ સાહેબ નહી અહી બધાજ આનંદ કરે શાખે ન આવડે તો કોઈ સજા નહી ફરી થી શીખવાનું તેમાં જરાપણ ડર ન રાખવો આ વાતાવરણમાં મે નકકી કર્યું કે હું શીખી જ જઈશ અને થોડું લખતા પણ આવડી ગયું હવે મને ચોક્કસ વિશ્વાસ સાથે કહેવાનું મન થાય છે કે હું જરૂર એક કારીગર બનીશ મારા જે સ્વપ્નો હતા કે કામ કરીશ વિદેશ જઈશ આ બધી આશાઓ મારી હું પોતે જ પુરી કરી શકીશ તેવું મને લાગી રહ્યું છે.

A workshop with the students of Karigarshala was conducted where the importance of expressing oneself through different mediums was discussed. Each of the student was asked to pick up any form of expression like painting, writing or any other and express their thoughts through it.

Kanji, a 17 year old boy was one of the students who started keeping a diary to pen down his thoughts on his life before and after Karigarshala. The following is an excerpt from his diary.

I am Kanji. My parents used to think that I'm going to the school. But as fate had it; I was scared of my teachers. I didn't like going to the school because the teachers used to beat me a lot if I didn't know anything. I used to go to the school rarely and got my homework done by my classmates too. Sometimes I would lure them; sometimes scare them. Somehow I finished my 7th standard.

When I started 8th standard, the teacher used to cane students a lot. Attending only one period; I ran away from the second. Once, my classmates came to my house asking my father to sign a paper which said that my name was struck off the roll. My parents got to know that I wasn't going to school and instead roaming around the village. My studies came to a complete halt.

For five months I stayed at home. I wanted to study; but not like this. My father got me job at his friend's place, which paid Rs. 500 a month. I didn't like the job but what could I do? Somehow I spent 2 years at that job but then I couldn't stay there anymore. I told my father and he got me a job at a garage. However, there was nothing to learn there. I just had to clean the place. And no one even talked to me. I wanted to learn and dreamt of becoming an artisan.

One day my elder brother asked me to join Karigarshala. I was happy but also scared. But here, the environment was completely different. Everyone could learn and have fun. If you don't know anything; there was no punishment. They would teach you again and you needn't be afraid at all.

I started learning a lot and even learnt a little bit of writing. Now I will also become an artisan. I think I can fulfill my dream of going abroad to work.



Shallow Masonry Domes

“The tradition of building these domes is passed through the ‘Ustaad-Chela’ (Master-Student) system”

History

The construction of masonry domes and vaults started together in India. However, the use of domes and vaults became popular during the reign of the Mughals. The building technique started parallel in the north with the construction of Qutub Complex in Delhi and the buildings of the Bahamani Kingdom in the south. Each region further developed their own techniques, which were widely used by both Hindus and Muslims.

The technique of masonry shallow domes also developed along the lines of other domes and vaults. The oldest shallow dome found in western Uttar Pradesh and Haryana is around 400 years old, built in lakhauri bricks with lime mortar. The rise of the dome varies from 9 inches to 2 feet. A team from Hunnarshala visited this building during the rehabilitation of the riots affected people of Muzaffarnagar. Nawab, a house owner in the rehabilitation program and an artisan who specializes in the construction of shallow domes introduced the technique of building these domes.

The tradition of building these domes is passed through the ‘Ustaad-Chela’ (Master-Student) system. The chela learns about the technique with the master and only when the master thinks that the chela is ready, he can individually construct the dome. Once the student starts constructing the domes, he further experiments with the technique to develop his own signature style. The technique has gone through several changes through the time, as new materials like cement and steel gained recognitions, which impacted the aspirations of the people. The general aspirations tilted towards having flat roofs. The artisans were able to reduce the rise by using ties and also reduce the thickness of the wall required by using a ring beam.



Process of Construction

Step 1: Shuttering



Step 2: Form-work for the shape of dome



Step 3: Finishing of the form of the dome



Step 4: Placement of the bricks



Step 5: Laying of concrete



Step 6: Opening of shuttering



Current Practices

There are two types of shallow masonry domes, which are presently built in western U.P. and Haryana, dish type and the tray type. Two distinct methods, one with shuttering and one without shuttering are used to build these domes. In the villages of Uttar Pradesh, the masons use shuttering method for building the domes and produces variations in the dome using the same. Nawab, an artisan from the same region makes dish type domes and pours concrete in the joints where as Salim, another artisan makes tray type domes with rich cement mortar. Maumin, on the other hand makes both dish and tray type domes using rich cement mortar. The domes rest on walls built in mud mortar and is supported on a ring beam with a 12 mm dia bar.

In Haryana, the artisan's building method differs. Narayan, and his family make dish type shallow domes without shuttering with rich cement mortar. The ring beam supports it, which is an L beam with six 12mm dia bars. The dome also rests on walls built in cement mortar and the artisans refrain from building mud mortar walls unless they are at least 2 feet thick.

Apart from these artisans, many architects and engineers have started to explore this technique. Prof. Yogananda constructed dish type dome in a residential building in Bangalore after understanding the technique in Muzaffarnagar. The shallow dome was built in CSEB using a curvature template. Another architect, Laurent Fournier is using the shallow domes in different ways. He is collaborating with Nawab for "The Institute for Indigenous Food and Culture" in Odisha where they are using shallow masonry domes as floor slabs and inverted shallow domes in place of strip foundation.

“Architect, Laurent Fournier is collaborating with Nawab for “The Institute for Indigenous Food and Culture” in Odisha where they are using shallow masonry domes as floor slabs and inverted shallow domes in place of strip foundation”

Scientific Validation

Two tests were conducted in the Hunnarshala campus with the support of Mrinmayee, Bangalore to understand the behavior and strength of the dome by subjecting it to static loading. Nawab, an artisan from Muzaffarnagar who has been making the shallow domes was called to make these domes. The data generated from the first test was analysed and subsequent alterations and changes were made to the dome before testing it the second time. This shallow dome built with Compressed Stabilised Earth Blocks (CSEB) took five times the live load stated for residential buildings and would now be tested for dynamic loading.

“...with this agenda, Hunnarshala Foundation along with BMTPC and Development Alternatives organised a workshop, “Alternative Traditions in Roofing Systems-A consultation on Shallow Masonry Domes” in New Delhi on 21st July 2016”

Taking Shallow Domes Forward

Shallow Masonry domes can be a possible sustainable alternative to R.C.C slabs, which use more steel and cement. They are an excellent example of a roofing system that is stable and has low carbon footprint. The application of shallow domes has been limited to rural areas and its potential in the urban context has not been explored much. As India looks forward to meet the enormous housing shortage in the next few years, shallow domes can play a huge part in meeting this demand.

With this agenda, Hunnarshala Foundation along with BMTPC and Development Alternatives organised a workshop, “Alternative Traditions in Roofing Systems-A consultation on Shallow Masonry Domes” in New Delhi on 21st July 2016. The main aim of the consultation was to bring together the larger community of construction practitioners, including engineers, architects, academicians and artisans to unlock the potential of this building technique. Many practitioners including Prof. K.S. Jagadish, Zeenat Niazi, Ashok B. Lall, Dr. Yogananda, Laurent Fournier, Satprem Maini, etc gave presentations on various aspects of domes. Artisans from western UP and Haryana were also invited to talk about their current practices and challenges. Many ideas were discussed on taking the shallow domes ahead in the mainstream construction. Various possible collaborations amongst practitioners and artisans were discussed with the objective of taking the technique of building shallow domes forward.

The workshop was also the first in “Artisans in Architecture” series to bring the contribution of artisans in architecture, to the forefront. Artisans through centuries have been keeping building traditions alive. These building traditions are deeply rooted in the geographical and social context of our country and therefore must be preserved, validated and improvised for future.



JHARKHAND

THE LAND OF EARTH AND FORESTS By Aditya Singh

Photo Credits: Field Team of People-In-Centre and Hunnarshala (Rushank Mehta, Pratik Zaveri, Aditya Singh, Shruti Nikhar)



Picture 1: Reservoir near Maithon, Nirsa on Jharkhand-Bengal border. A part of Damodar Valley Corporation.

Jharkhand is one of the eastern states of this country. A land-locked territory, sharing its border with five other states, it is a land of forests, hills and rivers. The region is one of the richest in minerals like coal, iron and bauxite. It also has one of the highest tribal population in the nation, with about one-fourth of the population belonging to several tribes. The state is also infamous for being an active Naxal (Maoist Communist Centre-MCC) activity zone.



Picture 2: One of the several rivers in the state.



Picture 3: One of the hundreds of open-cast coal mines in the state, near Dhanbad; and a villager carrying bags of coal on his bicycle from a nearby mine.

Discovery and mining of coal reserves has been one of the most important events in shaping the history of the people in the region. Jharkhand has third highest coal production after Odisha and Chhattisgarh, and accounts for more than half of national energy supply. Even though coal mining is in general seen as livelihood generating activity in the region, its far reaching implications are disputed. Contributed little to local livelihoods, it has caused mass displacements of millions of people across the state. It is fairly common sight of men pushing bicycles dangerously overloaded with coal, which is generally acquired illegally and sold in local markets.



Picture 4: Women using the courtyards of their houses.

One of the most notable aspects of, the tribal communities in the state, and perhaps one might find it across the country, is that the tribal women enjoy a freer status as compared to general caste based communities. They play a central role in the economy of these communities, where the major livelihood activities are performed by them. In general, a relatively more forward position of women in these communities can be observed. In some tribes, in fact, a live-in relationship is encouraged before the girl decides to marry a man. She has the right to refuse if she's not satisfied with the relationship and go for another man. Many such progressive rituals exist and are still practiced among these communities. However, most of these are looked down upon by the general non-tribal society, which form the majority of the population, and the tribal communities are demoralised and discouraged to practice these.



Picture 5: Entrance to a Santhal house, made of earth and finished with different compositions of the same.

Jharkhand is home to some of the most beautiful earth houses, not only in the country, but perhaps the world. Both, the tribal communities as well as non-tribal communities build houses that use un-stabilised earth as one of the important construction materials. The construction and maintenance of these houses, like other parts of the world, is ingrained into the rituals of these communities. The Santhal tribe is one of the tribes with exceptional skills and craftsmanship of building with earth. Other than earth, locally made bricks are also popular construction material. These are generally made on demand when a new house is to be constructed, and the earth from the family's own farms is used.



Picture 6: A typical Santhal earth house; and a local brick kiln called 'bangla-bhatha'.



Picture 7: 'Sohrai' wall painting, narrating stories of the forest.

Painted houses of Jharkhand are another marvellous piece of craftsmanship in the region. There are different kinds of these. 'Sohrai' wall paintings are one such example. The paintings are done by women, and tell stories from the forests. Traditionally, natural colours were used, however synthetic colours have made in-roads now. 'Comb-cutting' is another technique, where women use broken combs to produce patterns on the walls.



Picture 8: A painted house of a family belonging to potter community. 'Comb-cutting' technique has been used.

Jharkhand is counted as one of the most under-developed parts of the country. Even though it produces coal, at a staggering environmental and social cost, to satisfy more than half of country's energy needs, it itself struggles to have a reliable supply of energy. Even though it is the mineral-basket of the country and home to several industries, the local communities still live without access to the most basic services. During the first ten years of its formation, it already had eleven chief ministers. This clearly tells the story of mayhem in the political system here. On the bright side, glimpse of traditional systems can still be seen here, albeit fading fast. The state is at a position where a positive mix of traditional systems and the changing lifestyles can be generated. Lessons can be learnt from the other more developed states and regions, where the traditional systems have been completely wiped out due to a very rapid influx of foreign systems. However, the people are fast running out of time.



Faces that make Jharkhand.



**Hunnarshala Foundation for
Building Technology and
Innovation**

8-16, Mahadev Nagar -1 B/H Valdas
Nagar, Nr. Mirzapar Highway ,
Bhuj-Kutch – 370001, Gujarat, India

Website: www.hunnarshala.org
Email: hunnarshala@yahoo.co.in