



Reimagining the Clay Craft in Interior Architecture An earthen wall module inspired from clay crafts of India

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Abstract— Clay is one of the oldest and extensively used materials in Art and Architecture. Clay Craft and Construction form a thick coil of timeless and elegant art. It gives an insight to the human culture, history and evolution of various civilizations. Every place has its own technique of clay craft and the local men are the masters of it. Clay is the base material for all the clay crafts across India while the add-on materials, techniques and tools make each clay craft unique. In the phase of rapid modernization many such crafts are lost, forgotten and are replaced with machine made replicas of craft. The skilled craftsmen are migrating to urban areas in search of livelihood. A re-integration of the bond between clay craft and architecture would provide a sustainable solution to this problem. The artists would make the crafted clay wall modules from their own craft towns and ship them to the places of need. Integrating various clay crafts with interiors would shed light over dying clay crafts and provide a different perspective on how the traditional techniques can be used in the modern day. Each wall shall be an art work and earthen walls are one of the cheapest, sustainable and durable building options of construction. Earthen walls have been around for more than 1,000 years and stood the test of time while emanating their beauty and strength through ages. The wall shall be divided into smaller interlock able blocks to make it convenient to work with at the craft villages and towns. Later, the Crafted wall blocks are interlocked and arranged on site. This would bring down the overall cost and duration of the project. Thus, protecting the heritage and harmony of clay crafts and the Craftsmen.

Index Terms— Clay, Traditional, Craft, Culture, Traditional techniques, Sustainable, Interior wall, Interlocking.

1 INTRODUCTION

Clay craft has been around for over 1,000 years. Clay is one of the prominent materials in the human history and civilizations. The material is timeless and the artifacts crafted out of clay last centuries. They don't just tell about the history of the place, they paint a clear picture of the life style and culture of the people who lived in that place. They freeze the traditions, customs and cultures of the time that they were made in. They are nothing less than a photograph of the traditional age. Clay crafts and artifacts like bull carts, pots, stamps, etc. obtained from the archeological sites tell the history and culture of the bygone era, whereas the artifacts obtained from the present-day like a man riding a bicycle, modern art sculptures, fashionable jewelry would illustrate the contemporary styles and cultures. Clay has just not been a medium of craft in decorative artifacts, utensils, etc. it was also an integral part in the traditional construction techniques. Clay and terracotta temples in West Bengal still stand strong with their terracotta sculptural pattern tiles etched on to the façade. With the changing times and trends the traditionally crafted clay artifacts and modules are losing their importance as they are being replaced by the machine made look alike sculptures and utensils. Machines are replacing the work of skilled craftsmen leaving them jobless. The skilled craftsmen who lose their job are moving to cities in search of livelihood. They are working as daily wagers for the works which won't admire their traditional craft expertise. With that, the younger generations of such migrant crafts men are unaware of their traditional skill. It is the changing style of décor and interiors that is replacing the beautiful art piece with the machine made crafts. In order to save the craft the craftsmen have to keep up with the challenges of the changing times and adapt to the contemporary styles and artworks. However the artworks illustration the relatable life events and emotions would be timeless and never go boring, outdated or disinteresting. The stories that the sculptures or artifacts tell are not relatable anymore, but the techniques used in the crafts can never be irrelevant. With the falling demand for the craft, the techniques of craft are falling into the black hole of forgotten traditional crafts of history. Such craft techniques should be treasured, embraced and restored.

2 BACKGROUND

Decoration on the clay and terracotta objects is limited to adding pigment motifs, getting textural effects at the time of firing or making appliquéd motifs with clay itself. In unique instances, the clay core becomes the primary source for the decorations to be obtained on the metallic object. The core clay is decorated with threads or sheets of wax or resin. These take impression on the

upper layer of clay mixed with rice husk. The molten metal takes the design of the wax or resin on middle layer of clay. The remains of terracotta vessels, sculptures, beads, blocks, seals and tools found in every section of Indian history from Indus Valley Civilization, i.e. 3500 BC to the beginning of twentieth century are similar to those used today by the craftsman as the living practice. Therefore there is continuity in the knowledge of materials, the techniques used to shape various forms. The paper is an attempt to bring this traditional knowledge with a contemporary variation into a sequence.

2.1 Materials

Clay is one of the cheapest materials, which requires very few unsophisticated tools and easy to improve by adding tempers such as ash, sand and cattle dung. The temper counter acts excessive shrinkage, warping or splitting which may occur in sun drying or firing. Donkey dung is mixed in Maharashtra and Madhya Pradesh, the black soil area. Ash or sand is mixed in the desert area of Rajasthan. The proportion of temper mixed in clay varies according to the requirement of a particular surface area. Two different proportions of clay and sand are among the types used for preparation of a single pot and cooking pot. handle but the imaginative skills of the artisans transform this simple material into an aesthetic art. Any clay is not used as found in nature. There are different varieties of clay obtained from river bed and fallow land. These are different in their texture color and composition. The clay is first cleaned by removing pebbles, fine gravels, roots and other impedimental materials. This requires fine sieving of the clay. Apart from mixing to or more variety of the clay is also improved by adding tempers such as ash, sand and cattle dung. The temper counter acts excessive shrinkage, warping or splitting which may occur in sun drying or firing. Donkey dung is mixed in Maharashtra and Madhya Pradesh, the black soil area. Ash or sand is mixed in the desert area of Rajasthan. The proportion of temper mixed in clay varies according to the requirement of a particular surface area. Two different proportions of clay and sand are among the types used for preparation of a single pot and cooking pot.

2.2 Techniques

2.2.1 Hand moulding

Hand is the most important tool for creating any forms from clay. Four important processes of hand mouldings are pressing, moulding, strip method and smearing. Smearing is processes, where clay mixed with cattle dung is used to reconsolidate the walls, floors, storage containers, hearth, etc. in a traditional Indian home. The process, known as lipaee was essential to the everyday living in an Indian village. Even today, many of the rural houses smear different courtyards of their houses and decorate with drawings as part of the everyday cleaning activity.

2.2.2 Pressing

Lump of clay is pressed in hand between the thumbs and fingers to create forms. This technique has been followed by Handakia potter of Almora, Hatere potters of Bundelkhand , Bhonid potters of Maharashtra, Mulela potters of Rajasthan and Manipur and women potters of Goalpara of Assam.

2.2.3 Strip Method

The base is prepared by flattening a rolled sheet and moulding its edges inwards to create a bowl like shape. The height of the object is raised by sticking separate strips of clay one after other and pressed with hand to unite. The strip may be flat or rolled. This technique is also called coil pottery.

2.2.4 Revolving Base

The potters of Manipur use a technique, where a flattened clay sheet is placed on the circular wooden base. This sheet is rolled into a cylinder by lifting up the edges with both hands. The lump diameter of the cylinder pot is directly proportionate to the desired size of the pot. After curving, the edges are completed and the 2 shorter ends are joined. The other end of the tube is closed by squeezing or if required by adding another round cake of clay for the base. The surface is smoothed with fine strokes of bamboo split. This basic shape is placed on the wooden platform.

2.2.5 Wheel Throwing

A lump of prepared clay is placed on the hub (thala).

The potter creates a form using both the hands while the wheel is still in motion. The wheels are also made of wood and sand stones. Wooden wheel has spokes and the hub (thala) is made up of wood, while mixture of clay creepers, ropes, hair, etc. is used to bind the rim. Sand stones wheels have central hub with no spokes. A circular slab with a depression adds one point and a central hub is the sand stone wheel. These days' motorized wheels are also used. These to give the circular momentum to the wheel.

2.3 Firing Technique

Since the sun baked clay objects do not last long, their use was restricted to making the tiles and the votive forms and offerings. Sometimes, these votive images were emerged in water or buried in the ground. Firing is an important technique practised by the potter to give sturdily to the clay object. There are 2 types of firing, the open firing and the close firing. In open firing, the pots, plaques and other forms are placed in the centre in an open area. These are then covered with cow dung, cakes, shredded terracotta, dried husk, etc. Sometimes, a ring of fired pots used for water wheels is placed around the circumference to the pile. The gaps in between become the stocking passage for wood. This practice is followed in Molela village of Nathdwara (Rajasthan). In villages Masora of Madhya Pradesh and Mandipur, pots are laid on a bed of wood preheated with ignited cow dung placed

inside each pot, animal figures are other forms are laid on the top and covered with more wood and straw. This kiln is enclosed with shred and ash before firing. In the open firing technique in Gujarat, the outer rim is created by placing the inverted pitchers all around the circumference of the votive offerings, called Dhabu. The inverted pot shred are covered with buffalo dung cakes and straw. A mixture of cut grass and border clay is spread over the straw to weigh down. In Maharashtra, Tamil Nadu, Delhi and Uttar Pradesh, the firing pits are made by dung and a boundary with terracotta bricks is made. Such pits are pathway between an open firing and close kiln firing. Reinforced brick wall on the 3 sides conserve the heat and helps to protect the pots from the elements. Furrow of husks are formed in the bottom of the pit. The large pots are placed in between these furrows on the support of terracotta pieces to allow the heat to circulate underneath. Wood is stocked in between the rose of pots once the rice husk is burnt away. In Delhi, the circular kilns without an opening are used for firing. The pots are placed in circular sequence one upon the other, with smaller pots placed above the bigger pots. Wood, rice husk, saw dust, etc. are fed into the kiln through a small opening at the base. In Tamil Nadu, the kiln is made in an open horseshoe shape. The construction is done by bricks and stone walls with slow tapering inwards. The floor of the kiln has movable tabular props with support shreds under which the fuel is stopped. The entries of the kiln are at a higher level than the back, where there is a stocking mouth. In the Paddukotai area of Tamil Nadu, large Aiyanar horses are fired in these kilns along with large and small pots. The wood is arranged around the large horse placed in the center, interspersed with shreds. The pots are stacked, inverted on top of the horse with more wood and shreds. This pile is covered with the shreds and cow dung cakes.

There are several potters, who are practicing smoke firing to give black colour to the pottery. The potters of Ajamgarh in Uttar Pradesh are known for such black wares, which are fired in the pots. The firing chambers are several egg-shaped containers about 90 cm height with enlarged openings. A mesh of thick and thin metal wires is formed to cover these pots for firing. These firing pots are placed in a 45 cm deep pit filled with thick layer of ash from previous firing and buffalo dung. The pit is lined with dung cakes and the fire chambers are fitted inside. After arranging the chambers several other containers are also put into the cover with a lid and a mixture of ash, dung, and water is sneered around the seam to seal it. Bricks are placed in a line around the circumference of the base leaving a gap through which to stoke the ignited fuel.

Shreds are propped up with bricks and stat about 2/3rd of the weight of the height of the kiln. When the kiln is completely packed with damp ash compressed against the surface to hold the fuel and retain the heat. The kiln lighted and all the smoke is packed inside by adding more damp ash on the surface. The blackening of the pots is enhanced by adding some dried goat dung into the kiln and again resealing with the ash. This process is done repeatedly 2-3 times after the kiln has been lighted for 2 1 hrs. This chamber is then covered completely with ash again and left until next morning. The lid of the chamber is removed and highly polished black pots are taken out. The technique of black firing or the smock firing has been amicably adopted these days by the potters of Delhi, Manipur and Haryana, whereas a black patch on the pitcher or a surhai was considered to be a lacuna in open firing. These days deliberately certain portions of large pots are covered with dung cakes and sealed to retain the smoke within the selected areas of the pot. This kind of firing gives a tonar lusture to the pot with smoke spreading in gradation around a particular surface with black colour. Black pots are also available in Madhya Pradesh. Giriraj, a potter recently awarded with Shilpguru is a skilled in this kind of smoke tarnished firing.

2.4 Clay Forms

Architectural forms in terracotta have been found in the earliest civilizations. The clay bricks baked in sun, which have been found in archaeological excavation are made even today by the Meghwal and other communities of Indian desert. The eastern part of the country, i.e. Bengal and Assam developed the terracotta bricks with iconographic details. The terracotta bricks of Maurya Sanga period show detailing of dresses discovering facial characters, which speak of the high skill of workmanship. Bengal terracotta rose to a great height in the beginning of Kala period under the liberal patronage of Dharampal, who was responsible for the temple at Paharpur and huge monasteries. Local clay modellers were engaged to perform the task of carvers. Slim elongated well modelled figures of God and Goddesses of Hindu pantheon, figures of Buddha and other dignities of Mahajama skill were produced in the lush profusion for nearly 500 yrs. However, this art met its own slow natural death for lack of patronage from the rulers. Known as terracotta plaques, these were carved in the sequence of the story and then fired. These were fixed in the series of panels according to the narrative. Today in twentieth century, terracotta plaques are manufactured by the local potter in Mulela (Rajasthan) for the installation in local shrine of Devnarayan and other Gods in various anthropomos of Rajasthan region including Bheel, Gujari and Gurijat reached the village Mulela in the month of January to buy the terracotta plaques depicting their Gods. The deity is worshipped before returning home for installation in the shrine near the bank river Banas. Thus, plaques depicting local deities' heroes are painted in shocking colours and highlighting several in silver colour. The tradition of Mulela terracotta plaques has taken a new turn today, when the consumer market is fitting such plaques as part of the interior and exterior in the homes and hotels, etc. The ritualistic significance of the plaques gets defused. However, the decorative perspective gains importance.

Earlier, i.e. in 80s, when these plaques were brought into the city the traditional folk deities were moulded. However, under the influence of the urban environment, the Mulela potters started hand moulding various themes including their own world view. The basic shape of these plaques was also changed from a temple like appearance to rectangular or square tiles with the holes in 4 corners, these plaques could be comfortably screwed into the wall. Roof tiles are other set of architectural utility items used for covering the roof. Generally, these are the elongated cylinders cut into half. These are used to cover the roof by placing them on the rectangular place. In many part of eastern India, particularly Bihar and Orissa, it is customary to place a figurative clay roof tile interspersed with the plain tiles. The potters from village Barpali, Sambalpur of Orissa were traditionally making figures of birds and animals, ghosts and spirits with a belief that these figures would prohibit the malevolent influence of the spirits from entering the house. Today, few potters of Barplai village, particularly the Manbodhrama introduced several moods and gestures of the common monkey, other birds and animals, thus bringing the making of roof tile into the anterior decoration in the cities.

Roof tiles with various themes are also made in Raigarh and Sarguja districts of Madhya Pradesh.

Clay/terracotta firing have been used for the simultaneous purposes as below:

i) Forms for architectural utility such as bricks, roof tiles or terracotta tiles ii) Shrines such as terracotta Aaiyannar (Tamil Nadu); Dev Narain Shrine (Rajasthan); Shaileshsthan, Brahmasthan, Madhubani, Darbangha (Bihar); and Bankura (Bengal). iii) Votive offerings: Dhabu of Gujarat, Madhya Pradesh, Votive horses, etc. iv) Storage bins v) Utility containers, pots for storing, drinking water, cooking, storing oil, food, etc.

vi) Fashion accessories; beads for jellery, etc.

Clay mixed with other materials has been extensively used as the core model and upper layer for making a metal images by lost wax process. The basic shape of the form is designed in core clay, which wrapped with sheets or threads of wax. The wax layer is covered with an upper layer of clay with funnel opening and channel for pouring out and draining out the wax. It is used in medicine and beauty industry extensively.

2.4 Terracotta Shrines

Terracotta shrines are found all over India on the roadside as well as village centre or under a tree or village outskirts. There are several levels of worships among the Hindus. The worship may be done at a temple or at a local shrine, within the household or some other defined, sanctified area. These local deities sometimes are linked to the classical Hindu religion but generally they are associated with Mother Earth, fertility agriculture, forces of nature, illness and disease, and its ceiling, etc. The votive terracotta shrine may have many forms depicting horses, elephants, bulls, camels' figures, boars with or without rider figures of mother & child, saptmatrika, etc. Some of the votive shrines have very large horses erected to protect the village. Ayanar shrine from Tamil Nadu is the exclusively characteristic shrine, which has very large horses, human figures up to the height of about 2.13-2.43 m. A shrine from Mansha, a snake Goddess in Bengal, has a terracotta shrine depicts coils of snakes and snake hood. Darbanga and Madhubani districts in Bihar have clay and terracotta shrines of Shailesh sthan, Brahmsthan, where apart from the principal deity of a rider or elephant or tiger, female and male characters also make an important component of the shrine.

The terracotta shrines of Rajasthan are the hand mould plaques. Apart from the religious shrine, terracotta, human and animal figures are also made for offering as the votive on the shrines or other shrines. A vast range of folk stylization and characterization of different animal and human forms are seen in these shrines. These forms have marked regional stylization. The votive offerings at time also have different parts of human body such as eyes, ears, hands, naval, feet, ankles, male and female genitals, which are offered by Chaudhary and Bhil and tribes for the healing or curing an ailment in that particular part of the body. For example, a clay eye is offered for an injury in eye; an arm is offered for a fractured arm, etc. The complete figure is offered for the physical ailments including fever, etc. Dhabu is an offering to the spirits in Gujarat. Dhabu (spirit houses) are placed near the shrines and allowed to be weathered. The freshly prepared Dhabu are made to accompany a dead man's spirit. The Dhabus are painted white and have vermillion dots. Dhabus are generally available ready in the potter's family for anyone to buy to perform the funeral rights. Ambika Kalna (or simply Kalna) is located 82 km from Kolkata (Howrah) on the Bandel - Katwa line. Located on the west bank of the Bhagirathi, Ambika Kalna once flourished as a prosperous port town. It reached its pinnacle of glory during the late 18th century under the patronage of the Maharajas of Bardhaman, who built several magnificent temples with intricate terracotta ornamentation. The smallest but the most ornate of the temples of the Rajbari Complex. The 1849 built temple stands on a high podium. The Pratapeswar Temple is built in rekh deul style, with curvilinear sikhara and single arched entrance. All the four sides of the temple has rich terracotta ornamentation depicting images of gods and goddesses to scenes from the great epics. It also contains panels depicting war scenes and also scenes from day to day life.

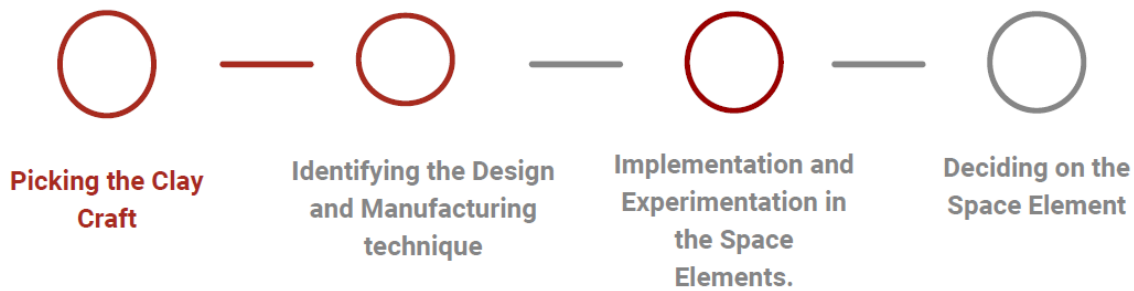
3 METHODOLOGY

Building and construction is never-ending field of work which has neither a pause nor an end. Man needs shelter as long as he lives on this earth. Even modern the construction techniques are abusive to nature, as they are loud, human intensive and the materials used are deteriorating the nature each day. With rapid construction techniques and mass construction the art factor of the construction that has been there since ages is lost. Rapid and mass replicated construction are standardized and the interior spaces end up being plain, bland and lifeless. By integrating clay craft with wall sections would shed some light towards the revival of the traditional craft and techniques. It would revitalize the interior space with new energy and art. Keeping up with the changing times, the art and the walls shall be integrated. A whole wall would be an artwork or a sculpture, replacing the isolated traditional artifacts while adding up to the idea of minimalistic and contemporary forms of art and construction. The wall art work shall depict the story and nature of space. They can be mood setters and depict the theme of the space in thematic interiors. The whole wall shall be made in the craft villages in predesigned assorted blocks. This shall help the craftsmen stay close to their home while working on the new form of the art works, resulting in overall reduction in cost of the project. The craftsmen shall not end up being in the city as daily wagers for unskilled works, once the project they were working on is completed. The method brings down overall project cost and time required for the completion of the project.

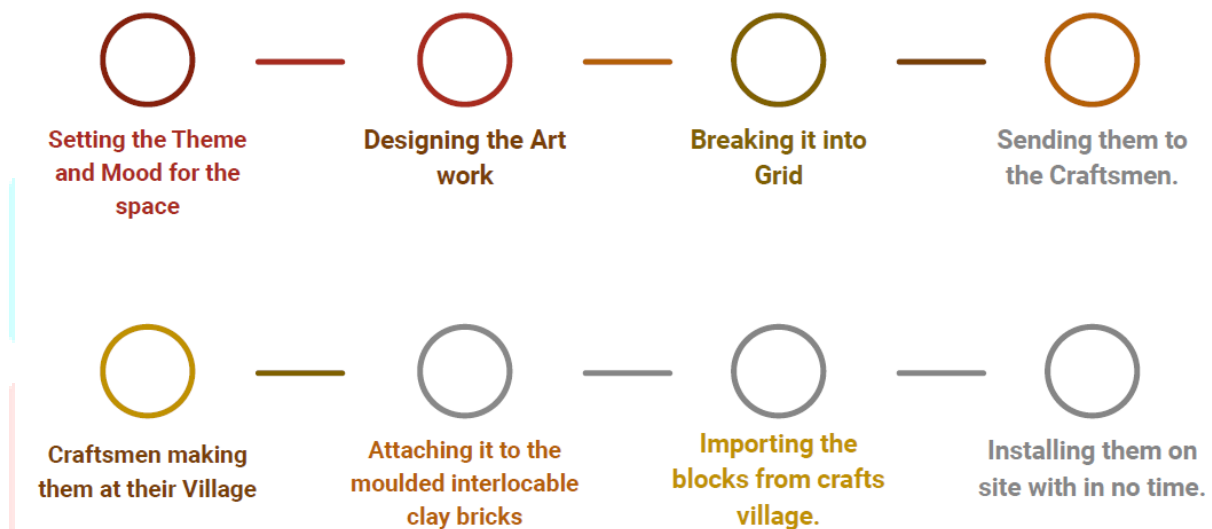
After studying the case studies and exploring the design possibilities and material properties of clay and ceramics, it is observed that clay is highly malleable and can be used in different aspects and varieties. We have seen the clay and ceramic ware in the ceilings, Decorations, flooring, curbing, partitions, decorative artifacts, etc. To start with designing the space the initial step

would be forming a space by defining and enclosing it. The elements that define the space are walls, roof, flooring and columns.

Stage 1



Stage 2



A re-integration of the bond between clay craft and architecture would provide a sustainable solution to this problem. The artists would make the crafted clay wall modules from their own craft towns and ship them to the places of need. Integrating various clay crafts with interiors would shed light over dying clay crafts and provide a different perspective on how the traditional techniques can be used in the modern day. Each wall shall be an art work and earthen walls are one of the cheapest, sustainable and durable building options of construction. Earthen walls have been around for more than 1,000 years and stood the test of time while emanating their beauty and strength through ages. The wall shall be divided into smaller interlock able blocks to make it convenient to work with at the craft villages and towns. Later, the Crafted wall blocks are interlocked and arranged on site. This would bring down the overall cost and duration of the project. Thus, protecting the heritage and harmony of clay crafts and the Craftsmen.

5 RESULTS AND DISCUSSION

Natural Building includes variety of wall construction techniques which are typically drawn from old traditional methods of shelter making. These techniques differ from place to place, depending on the availability of materials and its response to moderate and extreme climate. It emphasizes the use of locally available materials, practices which sensitive towards mother earth. They blend with the natural and cultural surroundings and focus on skills and resources that are locally sourced and economically viable. These walls create micro-climates inside them to provide high thermal comfort levels, thus a healing effect on one's mind, soul and health. In addition to it, the earthen wall also displays a dramatic variation in terms of textures and colours. Each wall systems specified below are purely done in Mud, stabilized with lime and natural Admixtures. Sustainable practices involve eco-friendly, pure materials used and affordability being in par with the conventional construction costs. Use of cement should be strictly avoided because it harms the quality of such walls. Following are the natural building techniques.

1. Rock and cob
2. Wattle and Dub
3. Rammed Earth
4. Adobe
5. Earth Bag
6. CMB (Compressed Mud Brick)
7. Mud 3D Printing
8. Cordwood Masonry

Dirt, lime, marble, mica, natural powdered oxides and minerals, and natural glazes and wax are the natural materials used for plasters. They protect the walls from the natural elements (Rain, sun and wind) and bees. Straw Bale wall can be finished with 5 coats lime paint with iron oxide added and wax sealed; over many layers of earth plaster and gypsum plaster. Drywall walls do well with same treatment.

Thermal Mass: Heavy materials that absorb temperatures slowly and act as a battery of temperature and then release them again. Following is the list commonly used Thermal mass materials. A thermal mass wall of a house, a floor, or even a wall of water theoretically does is absorbs sunlight, fire heat, or ambient heat or cold energy and releases this later. □ Rammed Earth (Walls and Floor)

- Adobe (Walls and Floor)
- Cob (Walls and Floor)
- Stones (Walls and Floor)
- Wattle and Daub (Walls including interior)
- Stabilized earth bricks (Walls and floor)
- Concrete (Walls and Floor)
- Brick (Walls)
- Tiles (roof and Floors, sometimes walls interior and exterior)

Insulation: Airy materials that slow the exchange of temperature between the inside and the out.

- Straw bale (Walls)
- Light clay straw or light earth (Walls)
- Thatch (Roofs)
- Straw (Roofs, on top of liner for green roof)
- Cork (Addition to walls or ceiling or floor)
- Wool (Addition to walls or ceiling or floor)
- Carpets, rugs tapestries from cotton or wool (Addition to walls or ceiling or floor)
- Double glazed windows.
- Hempcrete.

Along with the access to local materials, the properties of thermal mass and insulation should be weighed paramount, while also meeting your social and environmental context. For example, while cob is a fantastically moldable choice for funky and functional buildings, they are an example of thermal mass. A look into micro climates is an important choice when you get down to the detail and knowing well your overall climate is crucial. While many in the Permaculture and Natural Building movements gravitate towards a particular building material selection based on certain priorities, in this article I will present two vital factors to consider. Remember

Permaculture is not rubber stamp development so cob in one locale might work but in another it will be energy inefficient. Thus this is what ecological design hinges upon, the conservation and generation of energy through a holistic framework. Henceforth, thermal mass and insulation can be looked at in the context of energy exchange and interaction.

At the end of the day, all natural buildings should be a balance of the two and most commonly are a hybrid between Thermal mass and Insulation. Essentially a house that is well designed with proper materials (including thermal mass vs. insulation balance), dimensions, glazing placement, roof overhangs, and orientation will provide you with the exact microclimate you are looking for throughout the entire year with only minimal input of energy to maintain.

Protective Measures

Water is essential for life, but when it comes to building with earthen materials and cob homes, water is sort of its main enemy in a way. Cob and earthen materials are much more resilient. For example as you build a cob building you can leave that building exposed under the weather, meaning it can get rained on a lot, and in most cases it's not going to take major damage.

1. To build your foundation stem wall high. Usually about a foot or foot and a half high up off the ground. This keeps your earthen walls off the ground meaning any water runoff going along the ground is not going to touch you're your earthen walls and any water splash back is not going to bounce up onto your walls. Having a high stem wall foundation is number one.
2. To Have a roof and you want to have the roof overhang about two feet over the sides so this will prevent any water from dripping on your walls. If you have heavy winds during a rain storm it's going to help prevent the rain from hitting the sides of

your building so having about a two-foot overhang is good.

3. To put a render over your cob walls. Normally with cob you put a render, meaning an earthen plaster or a lime plaster. Either one of these is going to help to protect your cob walls. My recommendation is to do a lime render. Lime is much more resilient and requires a lot less maintenance over the years whereas earthen plasters tend to require more maintenance. So lime plasters essentially re-calcify once you apply them and they turn back into limestone. It acts like having a limestone coating over the building. There can be an insect problem as certain types of bees like to burrow into cob walls and they make little burrowing holes. The way around to solve this issue is to put a lime render over the walls because they don't like to eat the lime. They don't go through the lime so they don't mess with the walls then. That's the only case where insects have been a problem as far as cob and earthen systems. So generally naturally buildings don't have a problem with rodents and insects and termites and all that with a cob or earthen building than with a conventional building.

6 INTEGRATION ITERATIONS

6.1 Rammed Earth Wall Art

The idea is to fuse the sand art technique and earth ramming technique to create artistic walls in the interior space. The art can represent the spirit and story of the place and walls can be customized according to the place they are used in.



Fig. 1. Pictures showing Sand Art and Rammed Earth Walls

6.2 Cordwood walls with terracotta artifacts

This design iteration talks about replacing wood panels with terracotta panels, Clay art blocks, and sculptures depicting the story of the place.



Fig. 2. Picture showing Cob Walla

6.3 Baked terracotta panels on earthen walls

Baked terracotta earthen panels have been used in many Indian shrines and temples. The panels used to depict the lifestyle and traditions of the place. They were a creative and alternate depiction of Historic paintings. The idea is to provide the terracotta panels with support pins and incorporate them with rammed earth walls and cob walls.



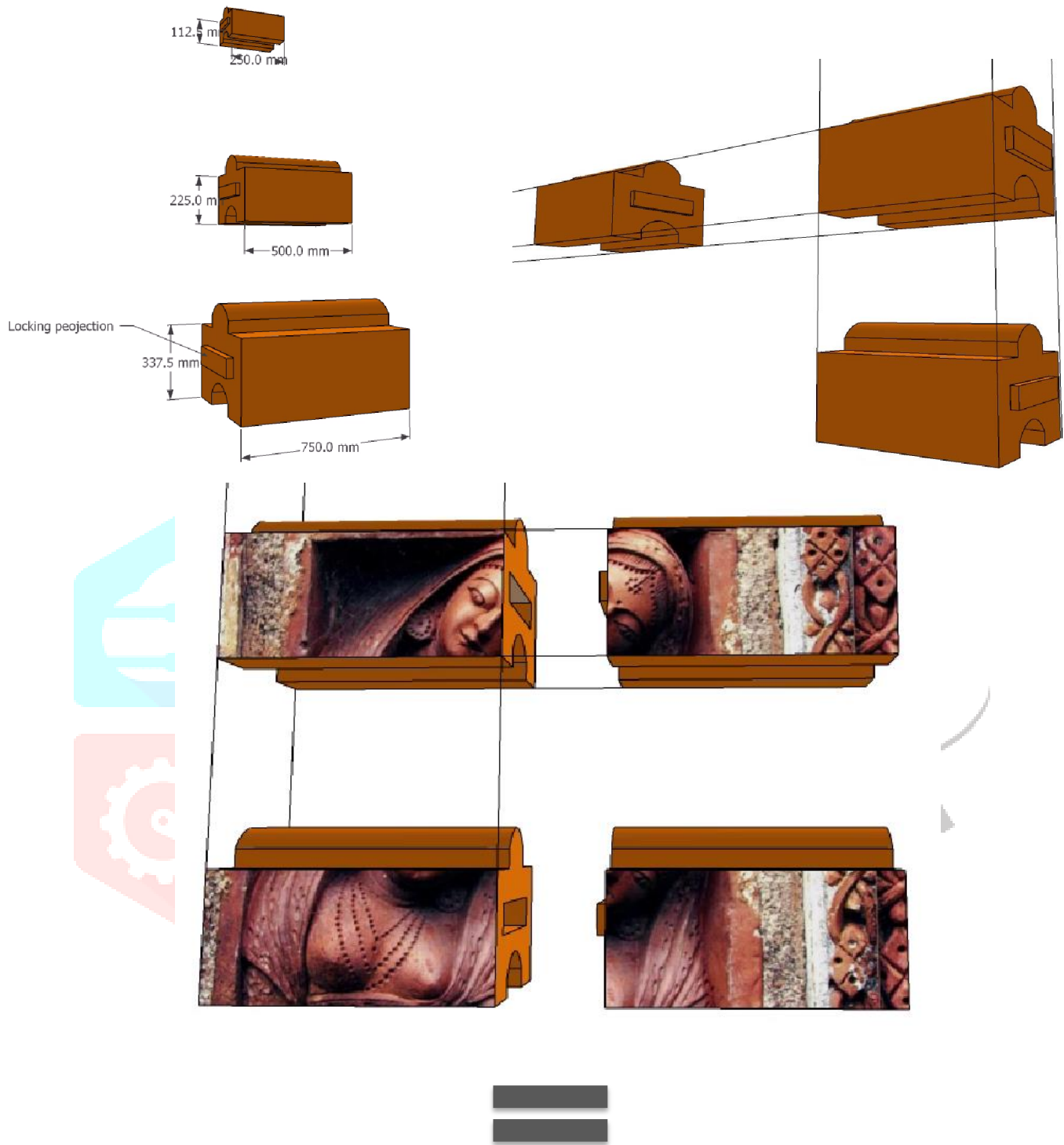
Fig. 3. Pictures showing Terracotta panels on a shrine.

6.4 Earthen blocks for 3D walls

Hollow earthen Sun dried Bricks can be made using Specific modules and arranged and plastered to for a 3D wall



Fig. 4. Picture showing Mud blocks





4 CONCLUSION

Each wall shall be an art work and earthen walls are one of the cheapest, sustainable and durable building options of construction. Earthen walls have been around for more than 1,000 years and stood the test of time while emanating their beauty and strength through ages. The wall shall be divided into smaller interlock able blocks to make it convenient to work with at the craft villages and towns. Later, the Crafted wall blocks are interlocked and arranged on site. This would bring down the overall cost and duration of the project. Thus, protecting the heritage and harmony of clay crafts and the Craftsmen.

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