

Evolving a space-making vocabulary for luxurious hospitality projects using traditional crafts and techniques

Diyashi Pavagadhi

Space Designer,
Anant National University, India
diyashi.pavagadhi@anu.edu.in

Sangramsinh Parmar

Architect, Urban Planner
Associate Professor, Anant National University, India
sangramsinhparmar@gmail.com

ABSTRACT

This study explores how some of the traditional construction techniques, materials, finishes and crafts of the a specific geographical region / culture can be used to evolve a specific design language / space-making elements that may be used by designers to create high-end, luxurious hospitality spaces. This is done through the example of the Kachchh region of Gujarat, India – which has a rich, vibrant and diverse legacy of traditional crafts and building techniques that have evolved over centuries and are still practiced in that region.

KEYWORDS

Crafts, Vernacular, Kachchh, Hospitality, Luxury, Space-making, Interior design, Traditional

1. INTRODUCTION

The aim of this study is to study how traditional crafts, techniques and vernacular materials can be used in the design of built environments – specifically in interior design, to create luxurious, sustainable and authentic hospitality spaces that provide a unique experience.

For the purpose of this study – one has taken into consideration the Kachchh region of the state of Gujarat in Western India.

This study is done through a series of case-studies where a similar approach has been adopted towards creating hospitality spaces in different contexts.

Then the various crafts and techniques of Kachchh are introduced and explained in the context of how they are made and used, so that one can understand their applications in the design of the built environment.

LOCAL + SUSTAINABLE = AUTHENTIC + LUXURIOUS

Increasing in the hospitality industry, throughout the world - the concept of luxury and authenticity are taking priority over a lot of other aspects. One can observe this in the approach adopted by numerous high-end, ultra-luxurious resorts across diverse regions and geographies of the world – and customers are willing to pay a bomb to enjoy these experiences.

Being frugal and sustainable and employing local materials, people and processes are the buzz-words in the design, construction and operations of luxurious hospitality projects. It is no longer an either – or situation where one has to choose between being sustainable and being luxurious.

Let us look at how such luxurious resorts have integrated sustainability, local elements and vernacular materials, finishes in their design. These studies will help one put in context the importance of this subject and establish the fact that more and more clients and designers are looking at these methods to create hospitality properties that are not only sustainable – but also offer an authentic and highly luxurious environment, creating an experience that is very unique and cannot be replicated anywhere else.

Designers like Nunzio Marc DeSantes who specialize in highly luxurious resorts vouch by this approach; *“Inspiration comes by way of the local people and their culture—the clothing, food, architecture, flowers, colours, landscape and skies of the surrounding site. We also consider materials that we can source locally instead of import, to create a more authentic bond to the area and its people. Inspiration can be literal, but I much more prefer it when the place creates an idea or direction and then design takes over through adaptation and editing. This is not only a visual experience, but also an intellectual one for our guest.”* (1)

Similarly, designers look for inspiration in the vernacular architecture of the place and the elements of the built environment that are native to the site. The local topography, climate, materials – all provide a very powerful set of tools and palette for the design of luxurious spaces.

As documented by Beata Lorincz in her article „The Architecture of the Exotic: Designing Luxury Resorts“ (1) the designers of these resorts very often take cues from the local geography and climate;

„When in tropical climates and beach locations, we use breeze ways between buildings to capture natural breezes for cooling. We incorporate landscape to provide living fences, green walls between units and add private locations to provide moments of tenderness, privacy and exclusivity.

In the desert, we design buildings with large overhangs and introductions of water to provide a cooling escape from the sun.

When we are designing mountain resorts, we think about snowfall and how that impacts and rests on our buildings. We include larger closets knowing the importance of wearing layers and accommodate heavier jackets that guests are packing. We design outdoor living spaces, even though it may be very cold or snowing. We enhance the exterior experience with heated fireplaces and fire pits, and we include integrated heat systems to keep decks pleasant and usable.”



1.1 Resort by Anantara



1.2 Amanpuri in Phuket



1.3 Resort in Bali

One of the most important observations made is how one of the greatest challenges facing luxury hospitality design is the evolving and changing definition of „luxury“ - what one person sees as luxurious, another may see as cliché. In this context it is vital to understand the importance of the „local“, the „vernacular“ which could become a unique selling point to create an experience of luxury that is not available anywhere else.

In terms of the built environment, the architect or interior design too has a significant role in developing this aesthetic that evolves from the roots and is vernacular to the place – yet is extremely luxurious and sophisticated. The selection of materials and finishes is a very important issue in the interior design process, as these are one of the most important elements of interior spaces.



1.4 Sample collage of finishes & materials derived from local crafts and traditional surface application techniques of a particular region

2. CASE STUDIES

2.1 Soneva Jani, Maldives - Luxury goes Local



2.1.1 Guest villa at Soneva Jani

The Soneva Resorts are based on the philosophy of creating highly unique and luxurious experiences use the base of a local thriving community, working hand in hand with the environment and the local cultural richness.

Here, luxury also depends on the planning and location of the site and creating special vistas. The planning and divisions of cottages are very meaningfully designed in a way that the space is public but each cottage gives the sense of private space to the customers.

Luxury always doesn't mean to design something expensive; it can be just like a simple dome restaurant serving on some exotic local cuisine with a beautiful view of sunset.

Even the selection of materials is determined largely by this philosophy.

They reuse and recycle lots of wood and glass to decorate the guest rooms; a lot of their wood are grown on local plantations. They also use a lot of cotton fabrics which are hand woven by local women living in the countryside.



2.1.2 Coconut wood, Bamboo and Teak wood from local plantations, used at the property

They have in-house carpenters who create and build a lot of the furniture. Around 99% of the villas' fittings, furnishing and decor are made in-house, the remaining are bought off the shelf or we have it specially made just for us. All of this ensures that these items are unique to Soneva.

Several of their four-poster beds are made using sturdy coconut wood. Coconut trees grow in abundance in tropical countries, making it a sustainable wood choice.

With natural ventilation being so critical, the cupboard doors have been designed using salvaged branches to create elegant latticework. The branches are in keeping with Soneva's rustic-chic aesthetic, with the dual purpose of allowing in natural airflow.

Panelling in hallways is done with recycled wood blocks, which are whitewashed to blend in with the resort's whitewashed walls.



2.1.3 Coconut wood in poster bed



2.1.4 Lattice work using tree branches



2.1.5 Wooden blocks re-used for wall panelling

The designer creates a dynamic and exciting space using small pieces of leftover wood that is crafted to create a monolithic experience of columns and ceiling (fig 2.1.6).



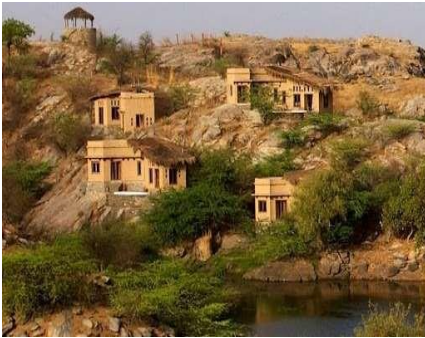
2.1.6

As the design philosophy is based on being vernacular and sustainable, the design also focuses on the old traditions of the place: creating a very elegant group seating place inside every private cottages, just to recall an old time where people sit in circle and eat together. Thus, this is a modern and luxurious way of designing and defining old traditions in a new way. (fig. 2.1.7)



2.1.7

2.2 Lakshman Sagar – Rajasthan, India



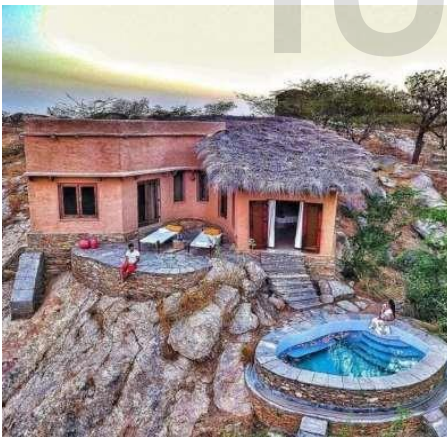
2.2.1 Lakshman Sagar

The Lakshman Sagar, located at the foot of the Aravalli range was built in the late 19th century as a hunting lodge by the then Thakur Lakshman Singh. It was later renovated and re-conceptualized as a high-end boutique resort. There are 12 cottages spread over an area of 32 acres with rocky terrain and a small lake that collects the rain water from the nearby areas.

This resort is designed and operated following the “zero kilometre” notion – wherein maximum materials and people are sourced locally. They stress that while design should be innovative and functional, efforts should be made to involve local craftsmen and preserve local traditions.

This not only brings down the cost of a project substantially, but also reduces environment pollution entailed by transportation and makes quality control easier to manage, in addition to involving the local craftsmen and sustaining livelihoods in the region.

The architecture and interior decor reflects the local way of living – the striking bright pink curtains, reminiscent of the local women’s dresses, or the grey slate and mud cottages with thatch roof made in a rough style – like the village huts nearby.



2.2.2 Cottages expressing the local flavour in their architecture

Influenced by the indigenous architecture, the cottages have reinterpreted design using locally sourced products like wood, stone and mud. They are located in the natural topography taking into account views, trees, rocks, wind, sun, and drainage patterns. Design responses to these factors gave each cottage a distinct form and identity. The materials used for building were all sourced locally- the foundations were made of local slate; sandstone was used for door and window frames and brackets, lintels and roof slabs. “Kikar” (Acacia) a widely growing native tree provided abundant local wood for the building elements. The ceiling is made up of natural wood and a hearth is placed in the room in a traditional way.



2.2.3 The vernacular style bedroom



2.2.4 Spa sit-out with thatch roof



2.2.5 Elements of local culture inside room



2.2.6 Minimal and raw expression of local materials



2.2.7 Local colours, fabrics and embroidery is used everywhere



2.2.8 Traditional way of eating

All rooms are designed considering the view points and wind flow with the luxury of private pools and a breath-taking view of the natural surroundings. Majority of the dyes used in fabrics are derived from natural vegetation and minerals, extracted in the traditional method.

By briefing looking at these two examples it is quite evident that design, construction and finishes inspired and derived from the local context and vernacular traditions can provide very luxurious, rich and unique experiences in the hospitality industry.

Now, let us look specifically at the Kachchh region of Gujarat, India and study the possibilities available before a designer, to adopt this approach.

3. CRAFTS & TRADITIONAL BUILDING TECHNIQUES OF KACHCHH (KUTCH)

Kachchh is a dry and arid region at the Western edge of India – geographically part of the Thar Desert. Temperatures can go as high as 48 degree C. and as low as 5 degree C. Yet there is a thriving eco-system and huge variety of flora and fauna in this region. Culturally also, it has a very rich, diverse and vibrant history of various kinds of arts and crafts – with a unique version evolved by the multiple ethnic groups residing in this region.



3.1 Map and visuals showing Kutch



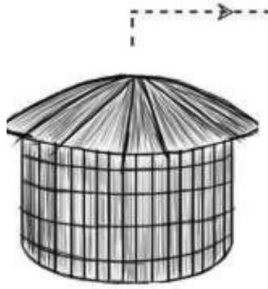
3.1 The built environment: Construction techniques – ‘Bhunga’

The Bhunga is a circular, single unit space (sometimes combined with other such units) that serves as the home of several agrarian and nomadic communities of Kachchh. It is made from mud and thatch.

TYPES OF BHUNGAS

BAWAD NI BHUNGI

Bawad is Babul a tree. They use babul sticks because it was easily available in the surrounding.



MATTI NO BHUNGO

Matti no bhungo are the Mud bricks

can see in most of the villages now a days.



Now-a-days the Bhunga are constructed by using cement but the structure remains the same.

Image on the left is of a Bhunga in Bhirandiyara village



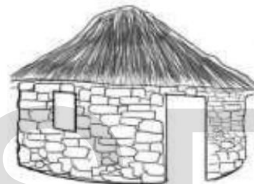
CHAN MATTI THIPI

The people started coating the Bawad ni bhungi by using the mixture of clay (Matti) and cow dung coating, which was available in the surroundings.



PATHAR NA BHUNGA

People used Kala Dungal, nearby mountain's stone and built bhunga.

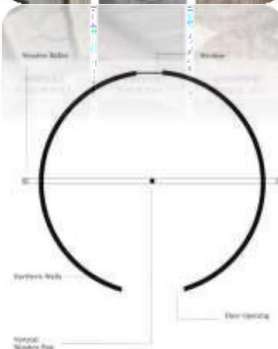


EVOLUTION OF BHUNGA

Meghwal Marwada people migrated in search of work.

The people use to construct their houses by the materials they found in nature.

The evolutions seen in the materials used in the construction of Bhunga but the structure mostly changed from temporary to permanent Bhungas



Bhunga Plan

Materials of the Bhunga are easily available in the environment of Banni region.

The Authentic materials used were Chikani Matti (clay) and cow/ camel/horse dung for the walls and flooring.

Gando Bawado (Babul) tree, Vaas (Bamboo) is used for the roof.

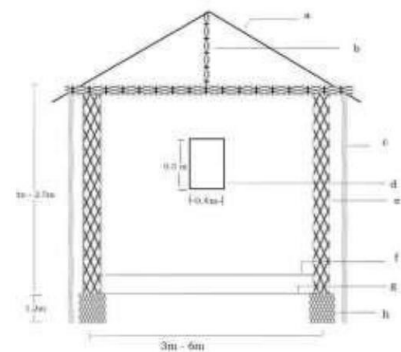
The construction of Bhunga cost nothing in the past, as they had no money.

In today's scenario cement and

bricks are used for the construction because the process is fast and takes less time but cement makes the bhunga cool in every season.

PLAN AND ELEVATION OF BHUNGA

Bhungas are circular in plan, with cylindrical shaped walls and topped with conical roof. The inner diameter of bhunga is typically between 3m to 6m. It has three openings one door and two windows



SECTION OF BHUNGA

- a: Thatched/Tile roof
- b: Vertical Wooden Post
- c: Vertical Wooden Post
- d: Window
- e: Masonry Walls
- f: Floor Level
- g: Ground Level
- h: Wall Extension

3.1.1 Illustrations and drawings depicting construction of vernacular house form

STEPS OF MAKING BHUNGA

CONSTRUCTION PROCESS OF BHUNGA

A trench is dug in a circle for the foundation for the construction of bhunga.



More layers of mud eggs

Another layer is laid on the top, the sides are smoothed so that the holes and cracks disappear.

The diameter of a bhunga is approximately 18 feet and has a depth of foundation up to 24 inches.

A mixture of Chikni matti (Clay) and cow dung with little water is mixed, a stiff mud is made. A large lump is roughly moulded into the shape of a huge egg.



Mixture of chikni matti and cow dung

Openings of doors and windows are made



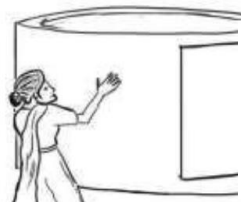
Forming openings

Lightweight thatched roofs; low walls plastered with mud, twigs, and dung; and an independent circular structure without any corners have made these bhungas disaster-resistant.



Laying of mud

A row of these mud eggs are laid neatly side by side and pressured together.

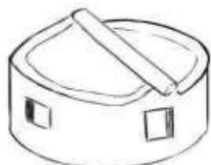


Plastering

The walls are plastered with the mixture of cow dung and water called lippan. The women of the house do this process.

All these features are helpful against the lateral forces of both earthquakes and storms.

Moreover, the mud walls of the bhungas are thick and thus the surface is less susceptible to heat.



Horizontal Beam

Adi (the horizontal beam) is placed on the wall, perpendicular to the door's axis. The ends of the beam slightly rest on the raised portion of the wall and fixed with pegs.



Finishing

Kheep (bundle of straw) are tied to the roof structure starting from the bottom.

Khapatis (Culms of split bamboo) fill the span between valis (joists) and are fixed to them.

The small openings keep the room cool in the searing Kutch summers and warm in harsh winters.

Patli (the vertical kingpost) rest on the middle of the adi. The Mann (cone) is fixed on the top of the kingpost.



Vertical Beam

A rope's net is dropped from the top of the roof in order to hold the straw bundles.

The entire construction takes around 20 to 30 days. The kheep needs to be change once in a year.

The circular shape does not obstruct the wind and hence reduces pressure on the structure during cyclones, another frequent occurrence in the region.



Vali fixing

The vali (joist) are fixed at the top of the mann (cone) with a kathi (rope).



Adding thatch to the final roof

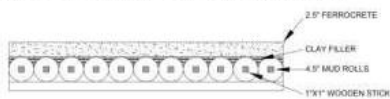
Bhungas, with their elaborate design and artistic elegance, portray Kutch culture, tradition, and lifestyle. They demonstrate the ecological, social, and aesthetic aspects of the region.

3.1.2 Illustrations and drawings depicting construction of vernacular house form

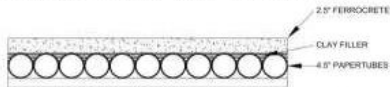
Mud is also extensively used in Roofing and Flooring – in combination with several materials (which have changed over the passing of time)

Base Module Selection

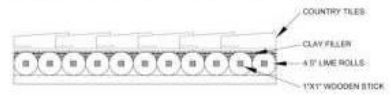
Module 1: Mud Roll with Ferrocrete



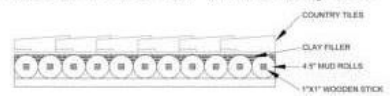
Module 2: Paper Tube with Ferrocrete



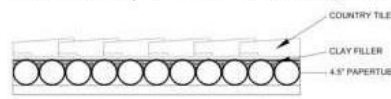
Module 3: Lime Roll with Country tiles



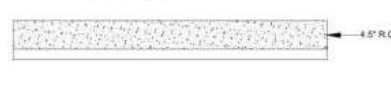
Module 4: Mud Roll with Country tiles



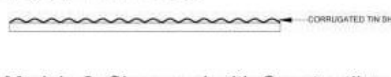
Module 5: Paper Tube with Country tiles



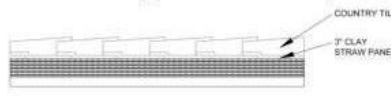
Module 6: Concrete



Module 7: Tin Sheet

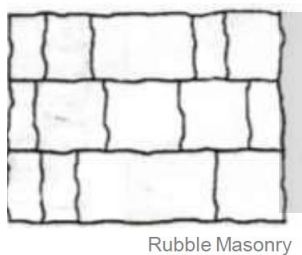


Module 8: Clay panel with Country tiles



3.1.3 Mud in Flooring and Roofing techniques as demonstrated by Hunnarshala, Bhuj

Several vernacular houses were also made using Stone – wherever it was available locally.



Rubble Masonry



Random Rubble Masonry



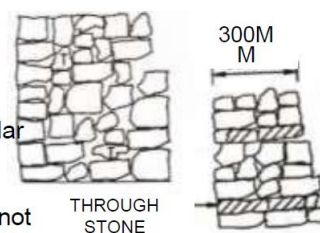
In this types of stone masonry, all the stones have the same height.

The height of each Course is the same.

The thickness of the Mortar joints should not exceed 10 mm.

This types of stone masonry involve arranging stones of irregular shapes and sizes to create an aesthetic-looking wall.

If it is made with a hammer and the thickness of the joint is not more than 12 mm, it is called second class random rubble masonry.



Un – coursed Rubble Masonry



3.1.4 Stone masonry techniques used in the region

The other important and unique aspect of Kachchhi homes was the decoration done inside and outside. This was a very complex and pain-staking process, mastered over centuries; but producing results that were not only extremely beautiful, but also very durable and extremely sustainable. All the materials / ingredients were derived from their surroundings.

DECORATING - MAATIKAAM



Dough making



Adding water



Adding paper mache and dust



Adding horse dung



Mixing all



Coiling



Final finishing



Refined coil



Fig. 6.3.4 Materials used in Mirror work



Fig. 6.3.5 Kutchi Mirror work

The home's interiors are attractive with flowing white clay walls that seem to merge into their furniture.

The use of intricate motifs that glitter with mirrors renders an overall dazzling effect.

The completely unique art form makes the homes a visual treat.

Mattikaam is generally done by the women of the house.

It is done for one time and stays forever unless it is removed manually.

The artisans of mattikaam are so experienced that they do not tend to draw any design or pattern on the wall before starting the work. They divide the area into halves with vertical and horizontal lines.

But before doing the mud work on wall, the wall is given a clay base and the face is roughened upon which the mud work is carried away.

MATERIALS FOR MUD MIRROR WORK

Initially it was camel dung or wild ass dung used for preparing the dough that is mixed with clay.

Here dung is the main binding agent of dough.

The clay used for this work is mud that has been sieved thoroughly to obtain the fine particles which blends easily with the other particles.

This Chikani Mattiis from the Talavdi sand of marshland that is rich in salt content.

Though the lippan kaam is of white color yet now a days the shades of red, green and blue are painted on the dried clay work. It is said that the use of Aabhla Mirror is to deflect the evil eye which can be overpowered by anything that dazzle and makes it blink.

3.1.5 Process of preparing for applique work on walls using mud and other ingredients called 'maati kaam' (mud craft)

WORKING ON WALL



Process of doing Mirror Work

The coil is pinched on the wall to make the clay stick on the wall.

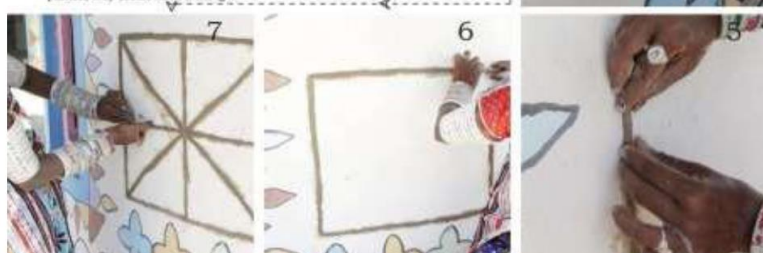
Earlier they used to dip the coil in water before sticking it to the wall but now they use fevicol water for dipping.



The coil is smoothen by using wet hands to remove cracks and merging joints.

The border is created first and divided into parts.

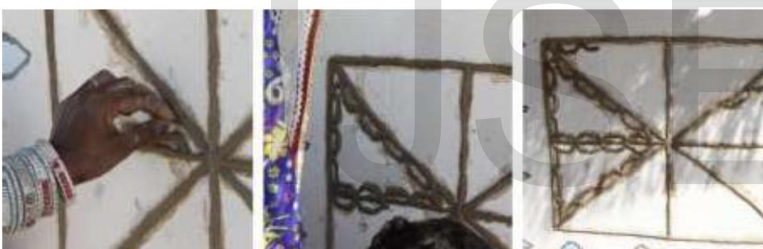
The artisan are so experienced that they do not draw the pattern, they decide while making it.



PATTERN MAKING

Intricate motifs and patterns are created, similar to the embroidery work on the clothes worn by the women of the community.

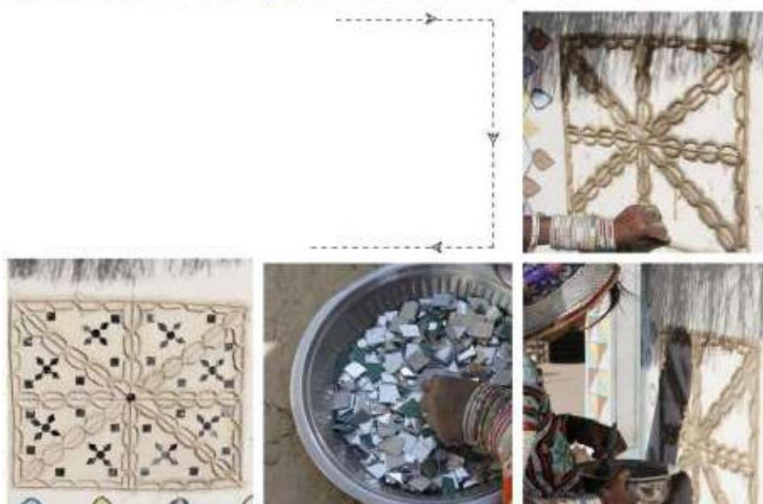
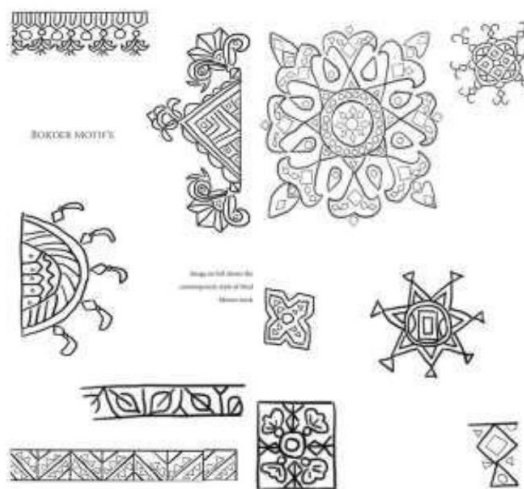
Kutch is renowned for its stunning embroidery patterns, which are also embellished with mirrors, the motifs of which are also common to work.



White clay is coated on top of the finished mirror embellished artwork, to get a pristine white look.

MOTIFS

INSPIRED BY FLOWER & PLANTS



3.1.5 Process of preparing for applique work on walls using mud and other ingredients called 'maati kaam' (mud craft)

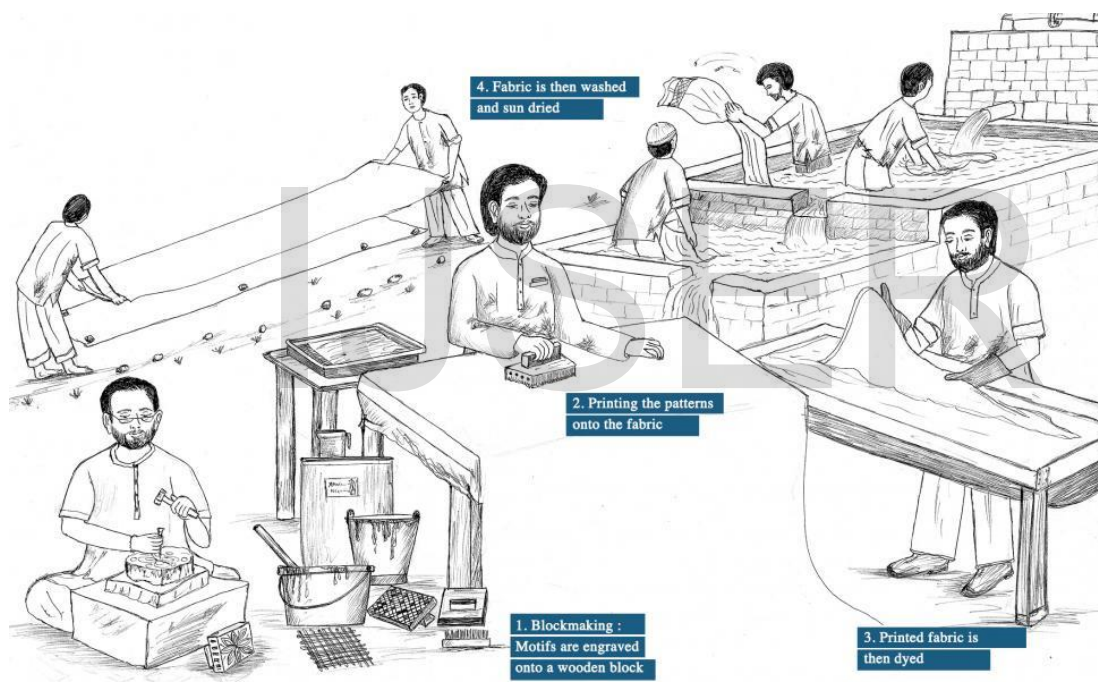
3.2 Other Crafts that can be used as elements of Décor

AJRAKH PRINTING on fabric



3.2.1 Ajrakh prints, tools & techniques: documented by Khamir, Kutch

Ajrakh patterns use complex geometry to create starry constellations in indigo, madder, black, and white across lengths of cloth. The shapes and motifs of Ajrakh echo the architectural forms of Islamic architecture’s intricate jali windows and trefoil arches. Printers prepare fabric for printing by tearing un-dyed fabric into 9 meter lengths, washing it to remove starches, wax and impurities and then dye it. From a collection that may be up to 100 years old, artisans select a wooden block carved with traditional designs.



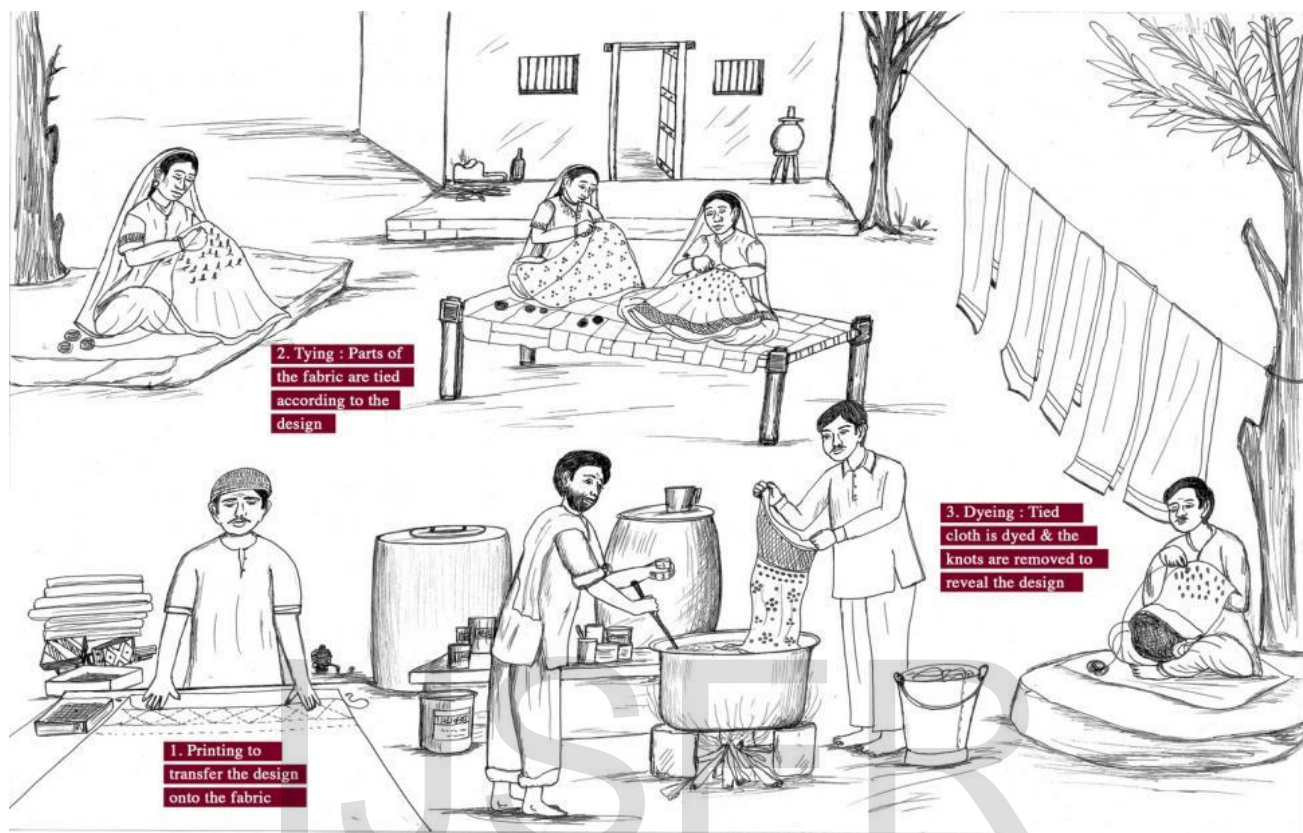
3.2.2 Illustrative depiction of the process of printing on fabric

BANDHANI (Tie & Dye) on fabric



3.2.3 Bandhani woollen shawls & process of dyeing: documented by Khamir, Kutch

In a series of dots, Bandhani designers create peacocks, flowers, dancers or constellations across a dyed piece of cloth. The dot designs are mapped onto the fabric by an artisan, using butter paper. A simple cotton thread ties the cloth to create a single dot. The tied material is dyed with various techniques, depending on the type and shade of the dye. The dyeing is done as many times as many colours are required in the fabric.



3.2.4 Illustrative depiction of the process of tie & dye on fabric

Camel WOOL WEAVING

Though primarily used for milk and transportation, camels produce high quality wool that is very warm, water-resistant and highly durable. It can be used to make textiles, carpets and ropes. Moreover, there is a great demand for its natural colors.



3.2.5 Pastoral camel herders, weaving yarn and final product: documented by Khamir, Kutch

BELA PRINTING on fabric

Bela prints are bold and graphic. They grab your attention with a vibrant palette of printed color on a plain white background. Diverse hues are achieved using natural and vegetable dyes.



3.2.6 Probably the only remaining Bela printer and his work documented by Khamir, Kutch

BATIK PRINTING on fabric

Originally, Batik prints were made by dipping a block into hot piloo seed oil, which was then pressed onto fabric. After dyeing, the oil paste was peeled off to reveal a print. Over time, wax was adopted in the technical process of Batik printing as a more practical alternative to oil. The adoption of wax changed the appearance of the textile - thin webs of dye run through the motif creating a beautiful veined appearance.



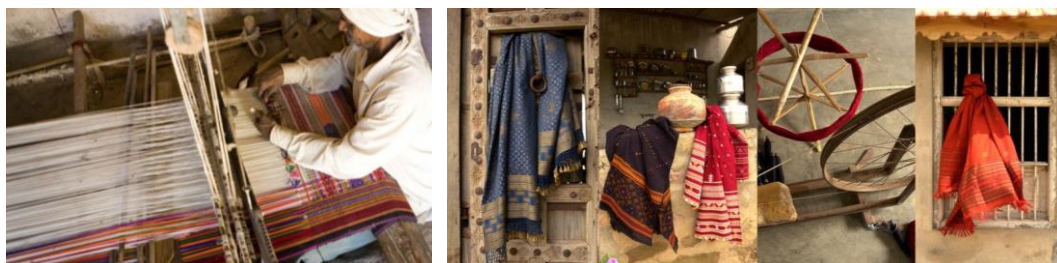
3.2.7 Batik printed fabrics documented by Khamir, Kutch



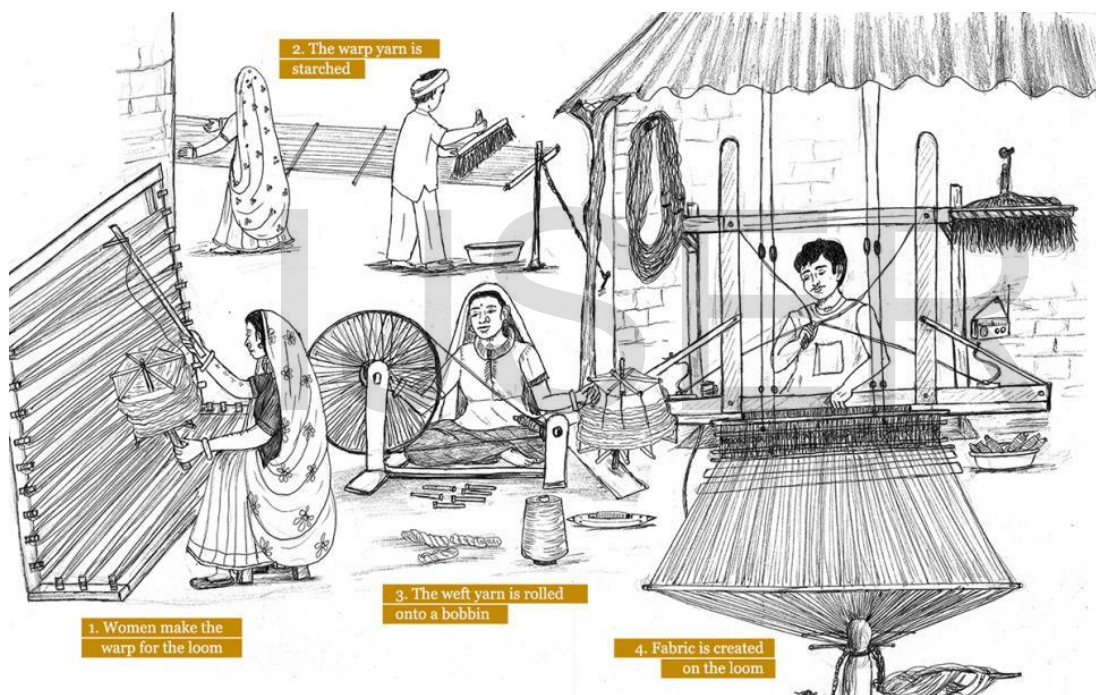
3.2.8 Illustrative depiction of the process of batik printing on fabric

Kachchhi WEAVING

Kachchhi weavers traditionally come from the Marwada and Maheswari communities. The Maheshwaris transitioned into the art of mashroo, while the Marwada style is now well known as Kachchhi weaving. Each weaver was once personally linked with a Rabari family, who would supply yarn from sheep and goats. Farming communities like Ahirs cultivated kala cotton, which produced woven textiles for shoulder cloths and headgear. Sheep and goat wool was used for veils, skirts, shawls and blankets.



3.2.9 Traditional & contemporary Kachchhi weaving documented by Khamir, Kutch



3.2.10 Illustrative depiction of the process of textile weaving

LEATHER ART

The Meghwals of Rajasthan migrated to Kachchh, bringing an artful leather craft with them. The trade was kept alive by a partnership with nomadic pastoralist Maldharis. When a Maldhari cattle died, the Meghwals converted the raw hides into leather. The work was tough, taking eighteen labor intensive days to treat and wash the hide. By recycling the dead cattle, the Meghwals gave new life to waste, transforming it into a product of utility. The Meghwals' close relationship with the Maldharis resulted in a remarkable fusion of cultural customs which can be seen in the shared styles of dress and embroidery traditions of the various communities in the region.



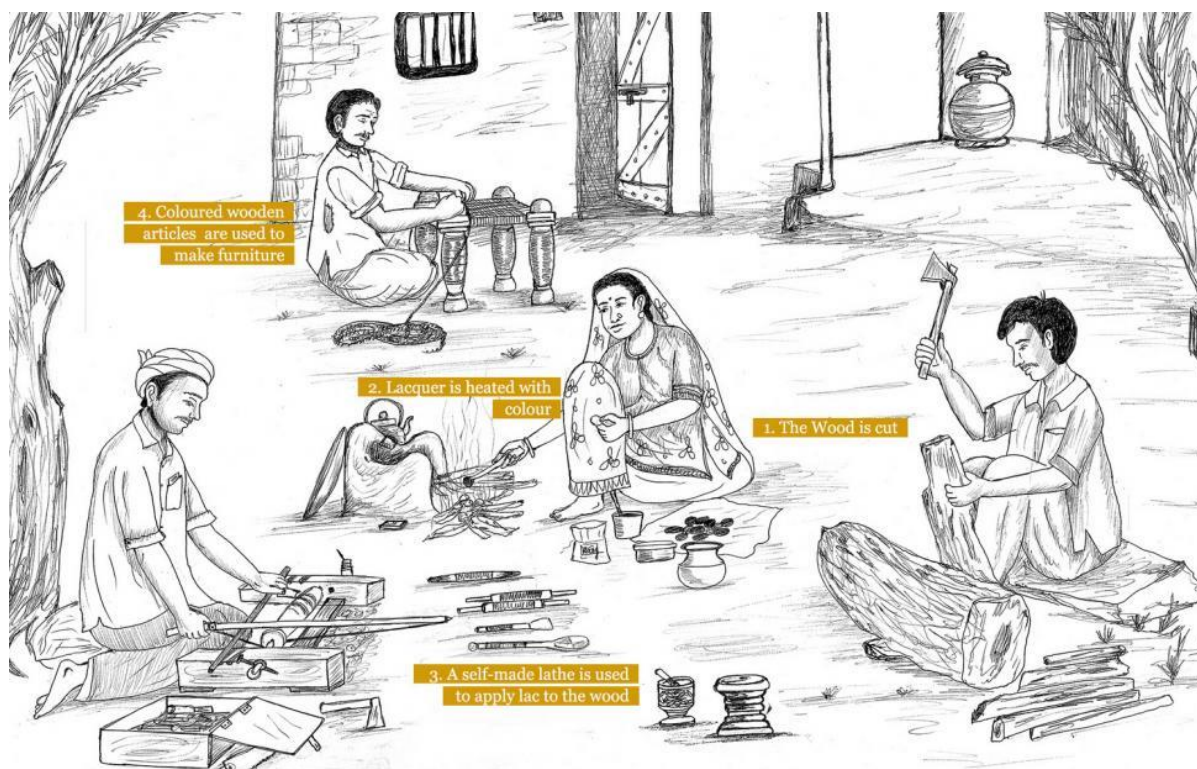
3.2.11 Kachchhi leather art documented by Khamir, Kutch

LACQUERED WOOD

Lac, a material taken from insect resin, has been used in Indian craft for centuries. Coloured lacquer is applied to wood by heat through turning with a hand lathe. In the process, the artisan maneuvers the lacquered colors to create patterns by hand in kaleidoscopic designs. This form of lacquered patterning is found only in Kachchh. The Vadhas are a nomadic community that moved throughout Kachchh and collected natural stones and colors from forests and created lacquer goods.



3.2.12 Tools and process involved in lacquered woodwork documented by Khamir, Kutch



3.2.13 Illustrative depiction of the process of wood turning and applying lacquer

4. DEMONSTRATION

In order to demonstrate the intent expressed in this paper, the authors have done an exercise wherein a hospitality project’s interior design is being proposed, keeping in mind the techniques and crafts of the region. Here are some snapshots of the spaces designed using that unique and curated design vocabulary;

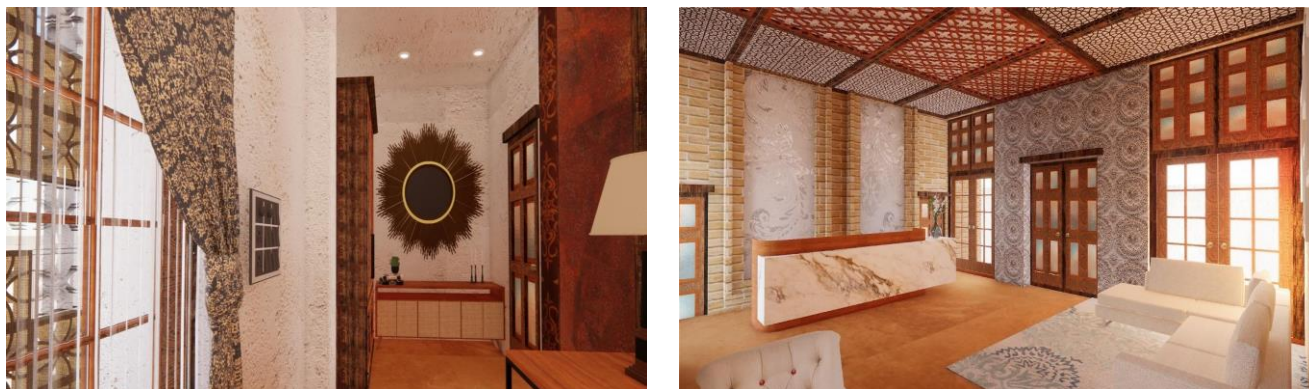


4.1 Proposed layout of a Suite showing the use of local materials, traditional crafts and vernacular finishing techniques

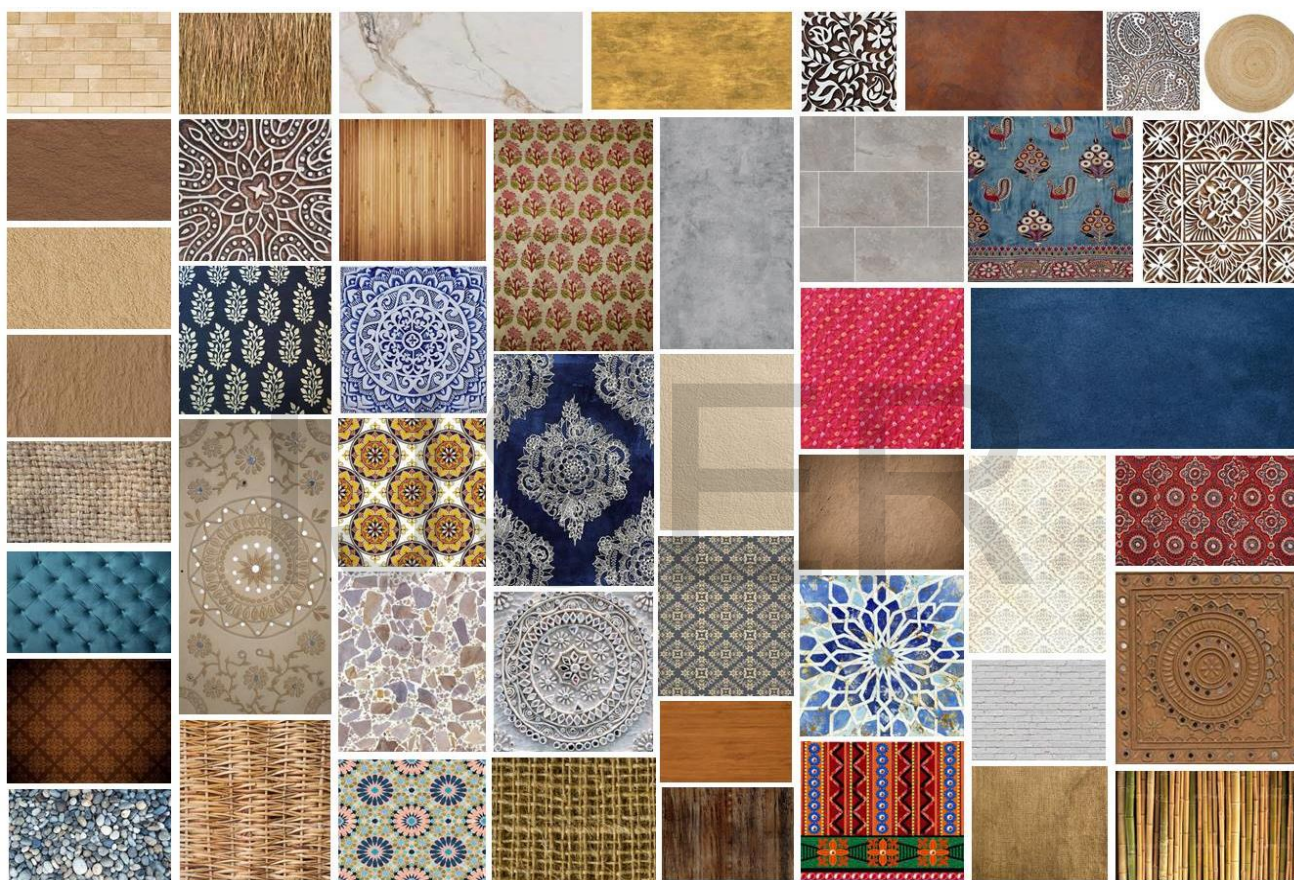


4.2 Schematic section highlighting the design approach





4.4 Renders indicating the finishes proposed in the interior spaces



4.5 A collage depicting the finishing and styling palette for the interior spaces

5. THE WAY AHEAD

Through the above demonstration, we hope to encourage more designers to take up this approach of using the vernacular and rich traditions of a place to create a unique and luxurious spatial experience.

As we have seen, the Kachchh region has immense craftsmanship and artistry across all aspects of life; and the artisans are still there to execute these crafts in their original form. Besides, there are several organization and experts working with those artisans to preserve and sustain these art forms in the contemporary world.

Designers and creators of habitable environments can easily tap into this talent pool and create unique experiences in the luxury and hospitality sectors.

The same template can be applied to several regions across the world where local techniques and vernacular arts can become a way of creating luxurious and unique experiences.

REFERENCES

- (1). Nunzio DeSantis | Hospitality Design, interview by Jennifer Young: <https://images.app.goo.gl/YhViFzGpuGskNtWH8>, (APRIL 25, 2018).
- (2). The Amanpuri in Phuket, Thailand , Incorporating Local Culture is the Latest Trend in Resort Design | Folio , Available at : <https://images.app.goo.gl/a2pG9VRWk8ozoAmE7> .
- (3). Bamboo Indah Resort In Bali, Indonesia – An Unforgettable Experience For Nature Lovers, By Alexandra Belgun | Published on Jul 2, 2014 , Available at : <https://images.app.goo.gl/Q1pDkGjFpfdD5ATSA>
- (4). Author : Mamun Rashid , Dilshad Ara , Modernity in tradition: Reflections on building design and technology in the Asian vernacular , February 2015 Frontiers of Architectural Research 48(1). Available at : <https://images.app.goo.gl/WbtdRAxHeAY7Rt4o9>
- (5). A Cinema in Paradise at Soneva Jani | Available at : <https://images.app.goo.gl/ezg1z6eyMwJ7iBNm6> , [MALDIVES INSIDER](#) (MARCH 13, 2017)
- (6). Authors : Andy van den Dobbelssteen , Eric van den Ham , Tess Blom , Kees Leemeijer | MOOC Zero-Energy Design. Available at : <https://images.app.goo.gl/XxU3Ug9xr491yTHG8>
- (7). Authors : Mesbah Shams , Akbar Rasekhi , Mohammad Ali Ostovan , Gholamhossein Ranjbar Omrani , Available at : <https://images.app.goo.gl/uYaWoTuG9pMMXzj96>
- (8). Tranquil and Beautiful Lakshman Sagar, Rajasthan , Available at : <https://images.app.goo.gl/JMqhV4Bx59XqtKMy7>
- (9). The Method of Joints , Available at : <https://images.app.goo.gl/yFRwiLzByDvPJT7v6>
- (10). Author : Lori Zimmer , D-House Urban Sandwich: Aging Polish home renovated with a sky garden oasis , Categories: Architecture | Available at : <https://images.app.goo.gl/i7XASZxbWgjaDBTo7>
- (11). Author - Stanford University Title -Effects of the poly hydrogel crosslinking mechanism on protein release, Available at <https://images.app.goo.gl/bhSNyVF4T9Jn3oun8>
- (12). Author -kaushik patel Title - Kutch rann utsav gujarat , Available at: <https://images.app.goo.gl/Uk53ExjgAkf4Tc4BA>
- (13). Author -shelter publication, Title-wonderful houses around the world, Available at :: <https://images.app.goo.gl/uMHTESkVWD1TpBj48>
- (14). 6.6, Author -miranda penders. Title-Reconstruction of a Roman siege engine at the Masada Sound and Light Theatre , Available at: <https://images.app.goo.gl/qiQfM3Muy64NzJxR9>
- (15). Author -Bhushan Mahajan , Title-rubble masonry and its types , Available at: <https://images.app.goo.gl/1qb19ynYQqByGvZp9>
- (16). Author –max Fajardo , Title, simplified method of building construction , Available at: <https://images.app.goo.gl/hRjPAYqTAi9v4N1C9>

ILLUSTRATION CREDITS

All visual content is web sourced.

- 1.1 - Qasr Al Sarabi Desert | Resort by Anantara , VISA Signature Luxury Hotel Collection; <https://images.app.goo.gl/CJe1beBUF8FuD4Hr9> accessed on 14.04.2022
- 1.2 - The Amanpuri in Phuket, Thailand , Incorporating Local Culture is the Latest Trend in Resort Design | Fohlio , Available at : <https://images.app.goo.gl/a2pG9VRWk8ozoAmE7> accessed on 14.04.2022
- 1.3 - <https://images.app.goo.gl/qXY3xxzFRj1ZzURv9> accessed on 14.04.2022
- 1.4 – by author
- 2.1.1 - <https://soneva.com/resorts/soneva-jani/> accessed on 14.04.2022
- 2.1.2 to 2.1.7 - Soneva Jani Villa Ownership, <https://images.app.goo.gl/ocs1yHAtgSaVvwWr5> accessed on 14.04.2022.

2.2.1 to 2.2.8 - <https://www.brijhotels.com/lakshman-sagar-raipur-resort/gallery.html> accessed on 14.04.2022

3.1.1 – Illustrations collated from multiple sources (accessed on 14.04.2022) as follows;

<https://images.app.goo.gl/yfR5vf2jerHYhedC7>, <https://images.app.goo.gl/Df7nwKvzwT7JVmpC6>
<https://images.app.goo.gl/EG3siQ2Fhx7iS7dc7>, <https://images.app.goo.gl/2ANZGicHHz5zLeeUA>
<https://images.app.goo.gl/auUSncekjLza2upT8>, <https://images.app.goo.gl/xhCKTXqQyLHHnJtd7>
<https://images.app.goo.gl/miug5LRWtgSD3NHi6>, <https://images.app.goo.gl/DDxQ2LvGcKqa48W58>
<https://images.app.goo.gl/nxvCkPfDDDvcqBvo6>, <https://images.app.goo.gl/po6KHExKWjpEGNXa7>

3.1.2 – Illustrations collated from multiple sources (accessed on 14.04.2022) as follows;

<https://images.app.goo.gl/2Bhfw624PwveeYMLA>, <https://images.app.goo.gl/z8iKWBKVSERQuKG8>
<https://images.app.goo.gl/EjxxDPMMMNRTzuNq6>, <https://images.app.goo.gl/cSSGuSz4DTAXmjUn7>
<https://images.app.goo.gl/UdjMQEdqWR2JEKAdA>

3.1.3 – <http://www.hunnarshala.org> accessed on 14.04.2022

3.1.4 - Illustrations collated from multiple sources (accessed on 14.04.2022) as follows;

Bhushan Mahajan , Title-rubble masonry and its types <https://images.app.goo.gl/1gb19ynYQqByGvZp9>
Max Fajardo , Title, simplified method of building construction ,
<https://images.app.goo.gl/hRjPAYqTAi9v4N1C9>

3.1.5 – Illustrations collated from multiple sources (accessed on 14.04.2022) as follows;

<https://images.app.goo.gl/qyDUof7BZ7BTK31K7> , <https://images.app.goo.gl/QsrjzNQJUSfk5VV2A>
<https://images.app.goo.gl/djydeJz4K32r22LY6> , <https://images.app.goo.gl/4LwL6VaHDfTeUykY6>

3.2.1, 3.2.2 - <https://khamir.org/crafts/ajrakh-blockprint> accessed on 14.04.2022

3.2.3, 3.2.4 - <https://khamir.org/crafts/bandhani> accessed on 14.04.2022

3.2.5 - <https://khamir.org/crafts/camel-wool-weaving> accessed on 14.04.2022

3.2.6 - <https://khamir.org/crafts/bela-printing> accessed on 14.04.2022

3.2.7, 3.2.8 - <https://khamir.org/crafts/batik-print> accessed on 14.04.2022

3.2.9, 3.2.10 - <https://khamir.org/crafts/kachchh-weaving> accessed on 14.04.2022

3.2.11 - <https://khamir.org/crafts/leather-art> accessed on 14.04.2022

3.2.12, 3.2.13 - <https://khamir.org/crafts/lacquered-wood> accessed on 14.04.2022

4.1 to 4.5 – by author