

The background image is a photograph of a coastal landscape. In the foreground, a wide, light-colored path or road leads from the bottom right towards the middle ground, where it appears to turn or lead up a slight incline. To the left of the path, the ocean is visible, with gentle waves lapping at the shore. The sky is a deep, vibrant blue, with a bright, hazy area near the horizon where the sun is likely setting or rising. The overall mood is serene and contemplative.

Project 02

Temporary One-room living for beach shacks in Goa

Application development in FRP

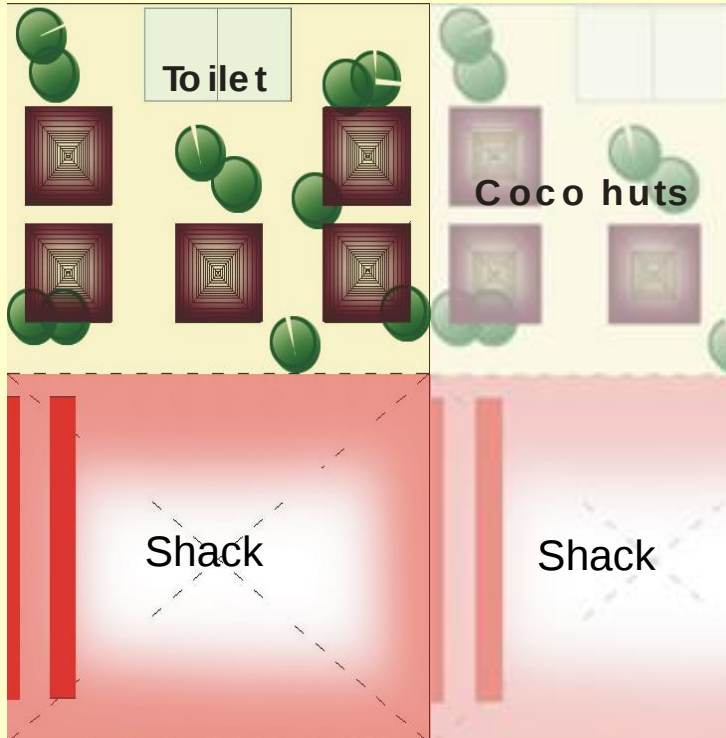
Guided by Prof K. Munshi

Submitted by Vinatha BabyPrakash (O5613007), M.Des(ID), IIT Bombay

The aim of the project is to develop temporary habitable
One room living units for beach shacks of Goa
that would cater to short term accommodation needs of
beach tourists.

- Project Brief
- Case Study
- User Study
- Bicultural Identity
- Ideation
- Concept development
- Final concept





Beach Shacks are ...



Beach

Sea

a part of the **food and beverage sector** of the tourism industry.

Provide **multi- cuisine food, snacks and drinks**

Provides **Sun and shade** by virtue of location

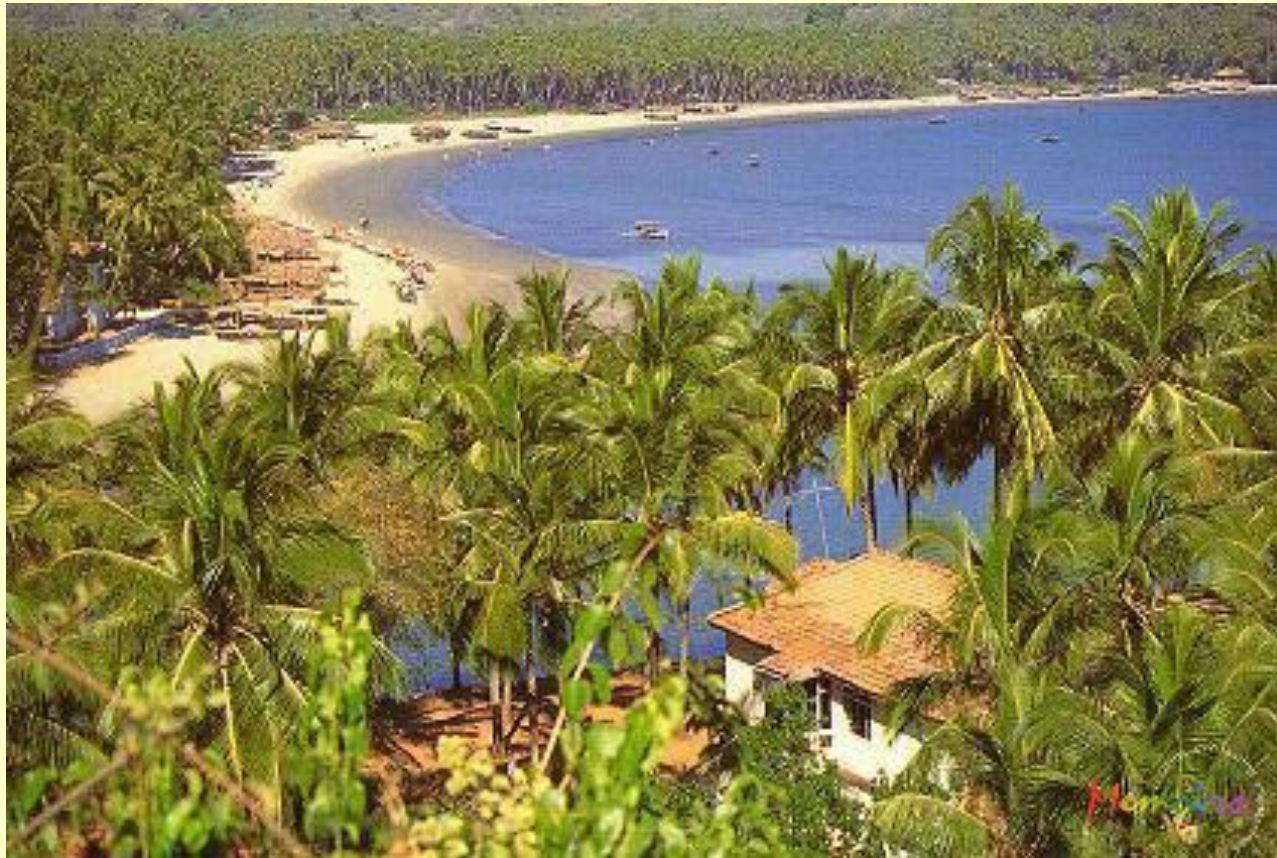
Rest room facilities

relevant **information** on available facilities

Area of shack ranges between **300 -600 sq.ft** (built and unbuilt)

Earliest beach shacks were fishermen settlements which ...
protected fishermen's boats in the non-fishing season
shelters in which to sit and sew or repair their nets
beach visitors for shade

History



Ownership



Private ownership

permanent structures

Public ownership

need for license

license is temporary

lottery system to select



Shacks Vs Restaurants

Parallel to shacks similar services are provided by restaurants
Shacks compete with restaurants in hotels for tourist revenue

serve food and drinks on
the beach itself

food served in the shacks is
said to be cheap and fresh

personalised service –
familiarity and a bond
between the client and
customer – feeling of
security



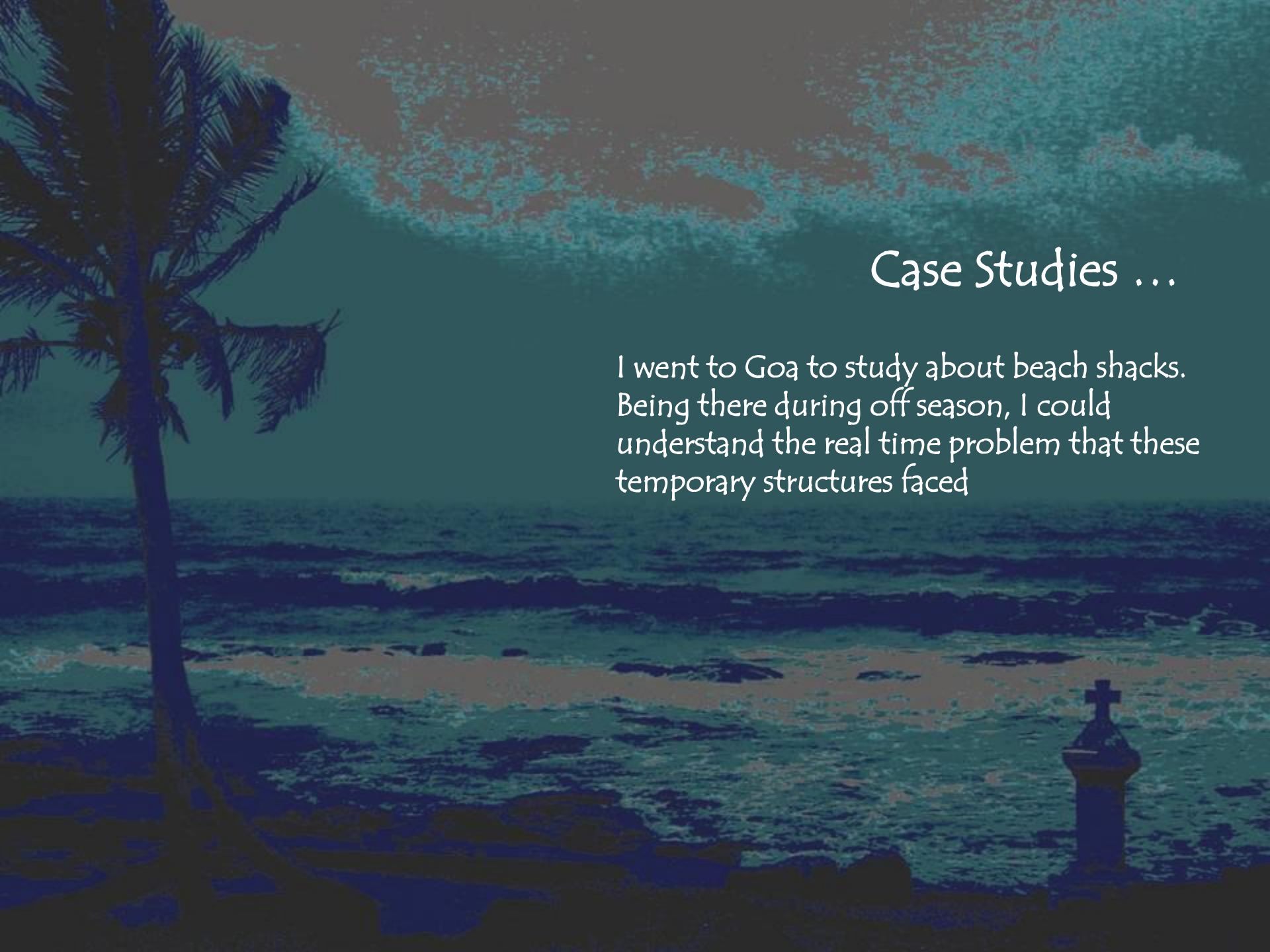
CRZ area at a distance of 10 – 20 ft from HT line

CRZ III

1981 – beaches had to be kept clear of all activities up to 500 m from the highest water line

Environment Protection Act of 1986 coastal stretches of seas, bays, estuaries, creeks, rivers and backwaters which are influenced by tidal action (in the landward side) up to 500 m from the High Tide Line (HTL) and the land between Low Tide Line (LTL) and HTL, as CRZ.

Clause 4 of the terms and condition 1998-99, state that shacks should not come up in front of any hotel property.



Case Studies ...

I went to Goa to study about beach shacks.
Being there during off season, I could
understand the real time problem that these
temporary structures faced



Inferences ...

Off season condition

Amenities

Activities

Services

Materials

Ambience



Calangote beach

Off season Condition

Abandoned during monsoon

Coconut leaf paneling was dispensed

Occasionally bamboo was reused but not for more than two years.



Calangote beach

Rainy season demanded additional protection

Need for a re-usable structure. Every year the shack owners spend @ 60,000 to 2 lakh rupees for a shack



Wagador beach

Amenities

Major amenities ...

Shaded area open to sea

Bar counter

Coco huts

Toilets / showers



Wagador beach

All shacks didn't have coco huts ...
tourists **didn't prefer to stay**



Calangote beach

Amenities

Outdoor catering

Demarcation of shack vicinity

Acts as an information centre

Facility for making phone calls



Calangote beach

Tourists **dine and spend time** in shacks for periods of **two to three months** at the largest, but they stay at hotels or guest rooms around...



Resorts and guest rooms around

Security

Improved quality of living

Permanent

Near to shacks

STAY



Tourists chose **secure areas nearest to their chosen shack** for permanent stay. Need for accommodation in shacks were **not properly met**.



COCO HUTS

Area - 2m x 2m.

One night rent - 500 to 1000 Rs.

Single room space without any space demarciation for activities

A single incandescent light

Furniture - 2 seater bed, shelf (occasional)

Common toilets



Calangote beach



Wagador beach

Quality of living provided to the tourists in these areas was sub standard... still they survived for short duration of stay



Out door living areas were important
The flooring gets sandy and dirty sandy
No privacy
Temperature is cool

COCO HUTS



The coco huts provided were not convenient and failed to ADAPT to the diverse crowd



Activities



Major activities ...

Food and beverages

Sun bathe /relaxing

Shopping

Reading

Yoga

Disco / Music

Sea

The beach shacks have **immense popularity** due to its proximity to sea



Calangote beach

Activities

Un-built areas were important

Furniture added to ambience

Interiors OPEN to sea breeze



Calangote beach

An identity portrayed the lifestyle on beach



Anjuna beach

Activities

Various games added to the ambience
Beach parties are organised



Calangote beach

Along the coastal stretch there were
hundreds of beach shacks ... so there
is a natural need to be **loud**

...various activities were promoted
for this



Calangote beach

Rustic appearance

Materials were all prone to be beaten by sea weather and monsoon

Materials



Murud beach

Structures on shore were developed on **stilts** (HT and soil erosion)

Every year trained crafts men are employed for redoing the structures



Ambience



Anjuna beach

The services provided at the beach shacks have a post-modernist nature for the following reasons:

- (a) blurred distinction between front and back, and inside and outside of the beach shack
- (b) an informal relation between tourists and shack owners and staff; and
- (c) personalised or customised service

Services

Water

Survey says, on avg. shacks use 8LT of water per table per day

Dependence on well water is more than 69%

Piped water accounts for 31% (source: www.goacom.news.org)

Waste

Very few system due to temp. ownership

Pay local village panchayat for garbage collection

There is no collection from shacks on beach

Practice of dumping waste into pits of sand is prevalent

Cooking

License is provided for cooking and selling alcohol

Electricity

Provided for tourist season

GUIDELINES FOR DEVELOPMENT OF BEACH RESORTS/HOTELS IN THE DESIGNATED AREAS OF CRZ-III FOR TEMPORARY OCCUPATION OF TOURIST/VISITORS, WITH PRIOR APPROVAL OF THE MINISTRY OF ENVIRONMENT & FORESTS.

flattening of sand dunes is prohibited

permanent structures are not allowed

construction of basements is not allowed

construction will not adversely affect free flow of ground water in that area

The overall height of construction – 9m – 2 floors

Ground water shall not be tapped within 200m of the HTL

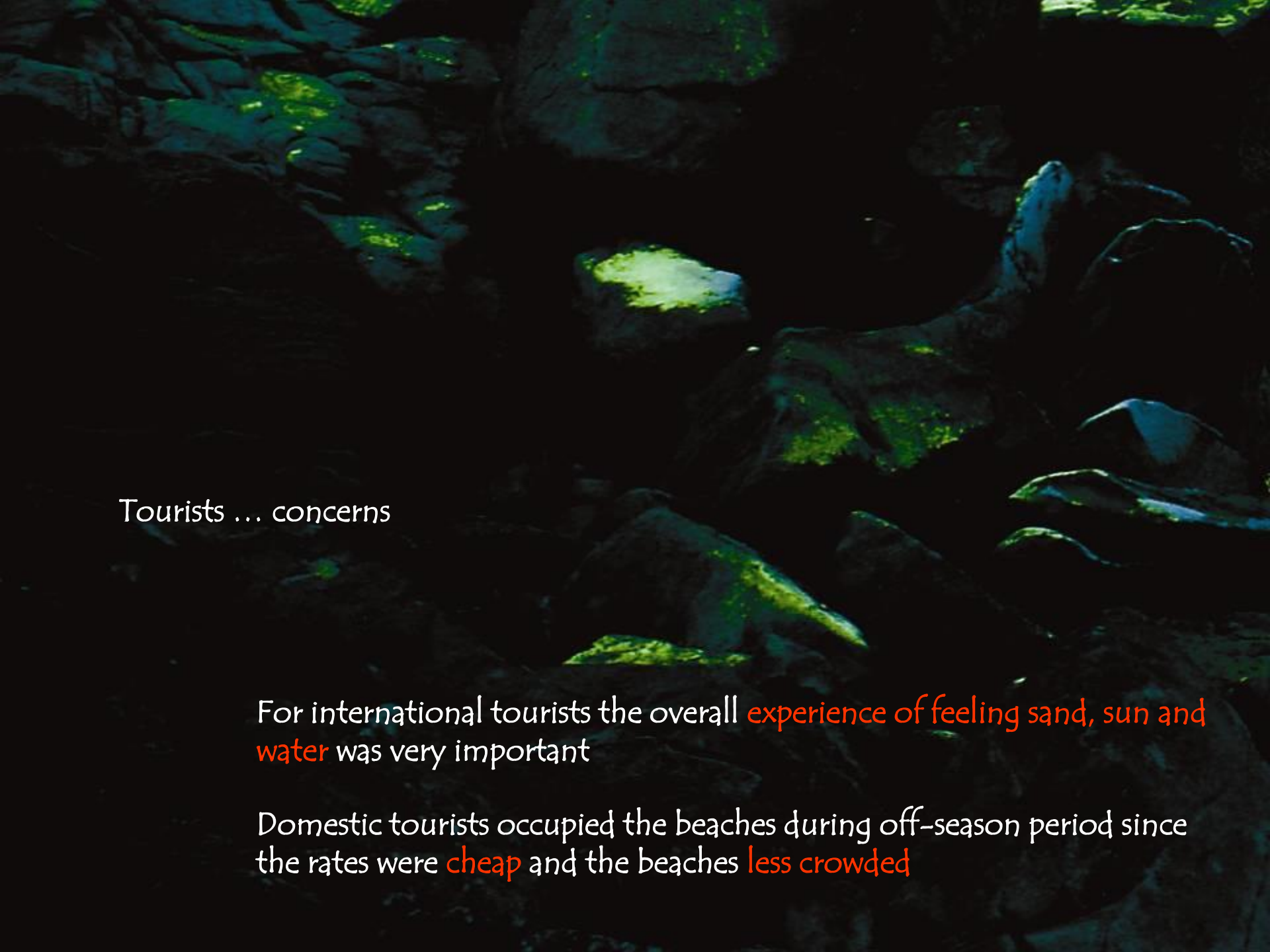
Consistency with the surrounding landscape

Talking to users ...

Tourists

Beach shack owners

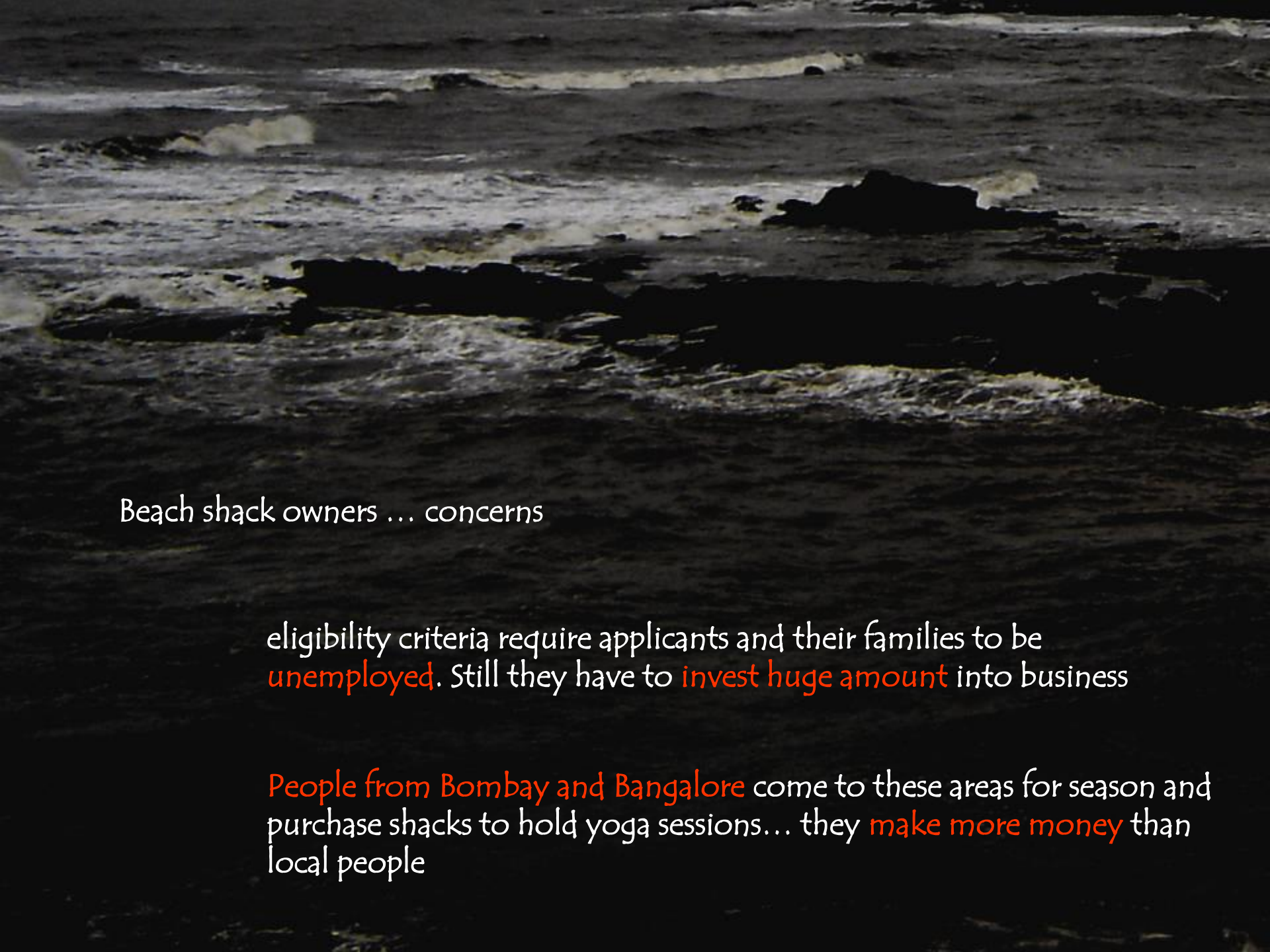




Tourists ... concerns

For international tourists the overall experience of feeling sand, sun and water was very important

Domestic tourists occupied the beaches during off-season period since the rates were cheap and the beaches less crowded



Beach shack owners ... concerns

eligibility criteria require applicants and their families to be **unemployed**. Still they have to **invest huge amount** into business

People from Bombay and Bangalore come to these areas for season and purchase shacks to hold yoga sessions... they **make more money** than local people



Functional Needs

- Security
- Facilities with in hut
- Mosquitoes
- Ventilation
- Attached toilets

Persona 01 Terry and Vandana



Persona 02
Shelly (36)

Persona 03
Rose Bromham (29)

Emotional Needs

- Sun, shade and sand
- Relax in huts
- View to sea
- Romantic experience

Inference from User Study (tourist)



Functional Needs

- Free of maintenance
- Easy to store, arrange and dismantle
- Increased life cycle
- Max. use of available plot
- Attached toilets



Persona 01

George

Emotional Needs

- Attract crowd so that they stay over
- Distinct and loud design
- Security of customers



Persona 02

Reyan and Mevin

Inference from User Study (Beach shack Owner)



Beach life through Scenarios



Individual Back pack tourists come to beaches of Goa and stay for 1-3 months together.



Group of two come for vacation to goa and stay for a duration of 4 days to 2 weeks



Larger groups stay do not stay for more than two days at a stretch



Beach huts on shore is a foreign idea that has been accepted over time in Goa with the promotion of tourism. There is a need for assimilating this foreign product with local manifests, notions and concepts.

As part of my project I'm trying to understand what product precedents beach huts have in non-local culture and what could make it a "Goan beach hut"

Biculturism in Goa



Non-local beach huts
were observed and
analysed



Observations

1. Huts are arranged repetitively in a linear pattern
2. Roofs are of sloping nature made of the same material as hut
3. Bright colors are used
4. Stilt type of construction is adopted

Biculturism in Goa

Understanding product precedents



Non-local
beach huts
were observed
and analysed



Observations

1. Roofs are made of temporary materials
2. Process of assembly is visible in form
3. Structures are open to sea breeze in and for max. view to sea

Biculturism in Goa

Understanding product precedents



Local beach huts were observed and analysed

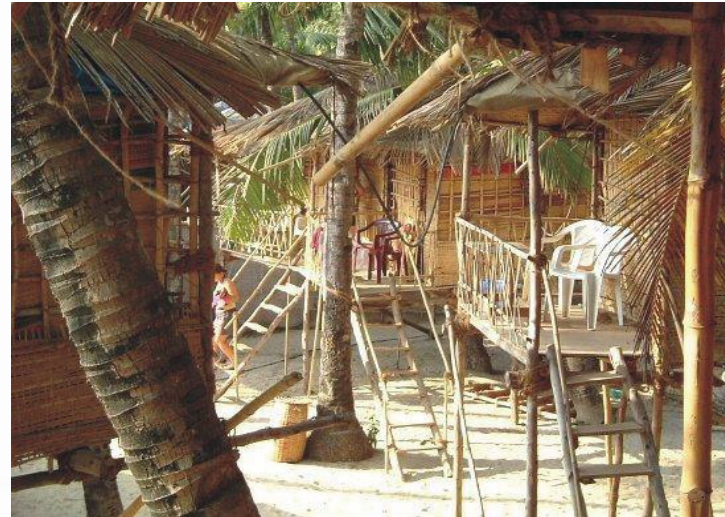
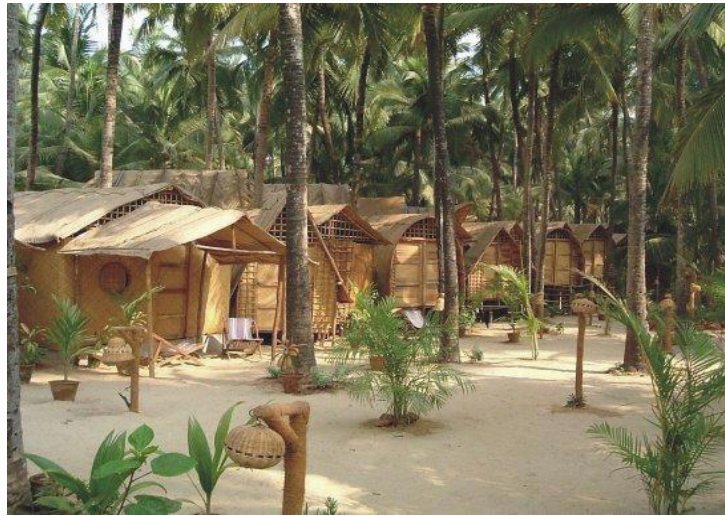
Observations

Mainly made of thatched roof and bamboo pole construction

Semi-open verandah in front to sit and relax

Stepped roofs are used for huts

Bamboo poles are used to raise structure above the ground



Biculturism in Goa

Understanding product precedents



Goan houses
were observed
and analysed



Observations

Bright colors, mostly red and
even blue is used

They have steeped sloping
roof

A semi open verandah space
which becomes an area for a
lot of activities

Broad frames for openings
stepped sloping roof



Biculturism in Goa

Understanding product precedents



Hut-ness of a beach hut

Notions are associated

Thatched sloping roof and bamboo poles. How they are tied with ropes at joints.

The floor being raised above the ground by means of stilt type of construction

The experience of sitting on a deck drinking chilled beer and the sea breeze blowing through your hair

Goan-ness of Goan built structures

Notions are associated

Bright colors mostly red and even blue is used

Steeped sloping roof made of traditional mangalore tiles

A semi-open verandah space which becomes an area of interesting activities – the node of life

Broad frames are used to define openings

Temporary-ness of temporary structures

Use of rustic materials

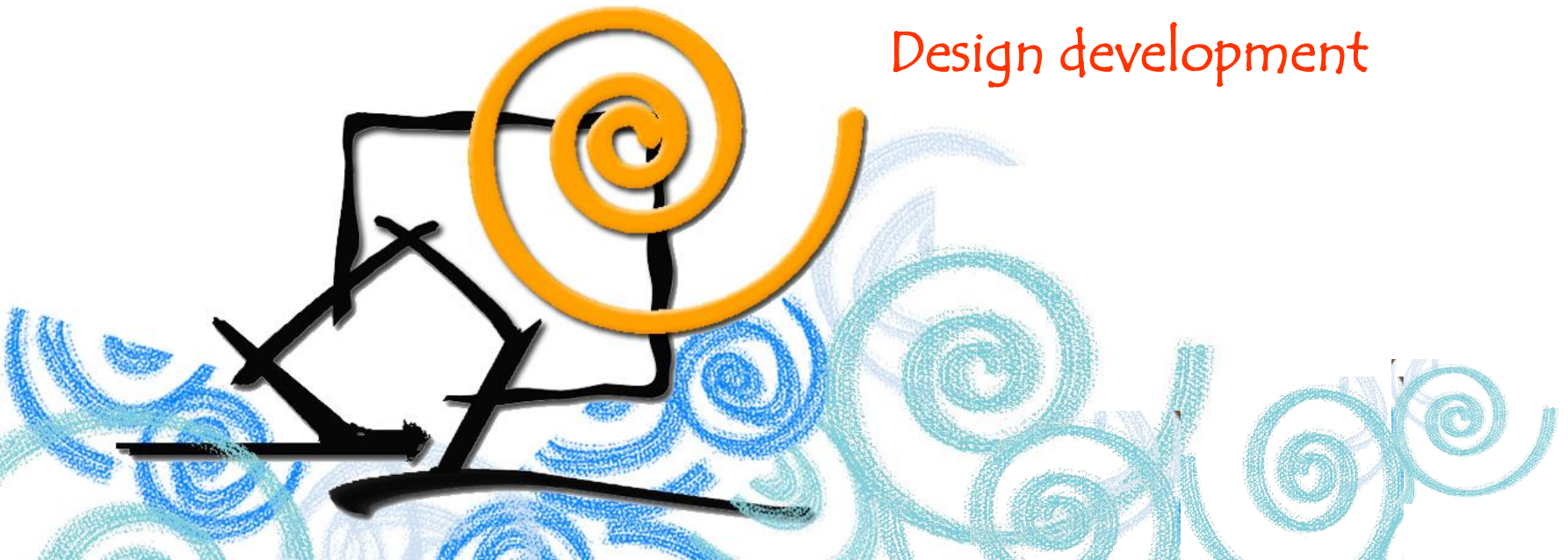
The joints are visible giving away the 'process of its making'

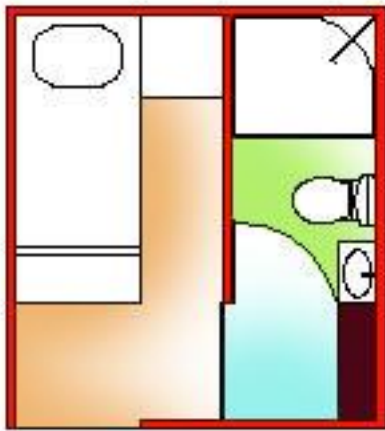
Biculturism in Goa

Inference



Design development



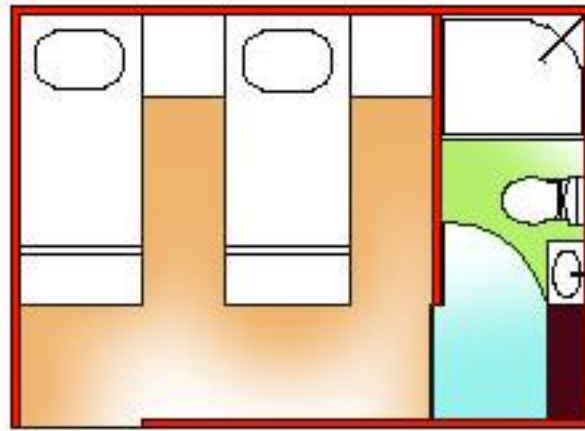
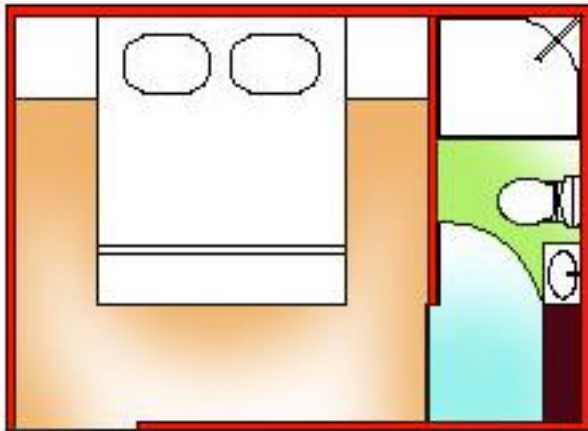


Type I – Single Occupant
270 x 300 mm (9'x10')

Based on initial vision and study, spaces were organized to understand area required for the project. An ideal plan was developed on its basis

Drawbacks

Failed to address the essence of short term accommodation. Even the smallest plan occupied more area than the existing structures which is a double occupant



Type II – Double Occupant
300 x 420 mm (10'x14')



Idea Sketches

Initial Idea Sketches
were done classified
into four major types

Collapsible tubular sections that can be developed into modules
Developing a single module that can be used for both structure and furniture
Integrating tensile roof along with FRP structure
Double storied design solutions



Idea Sketches

Initial Idea Sketches were done classified into four major types

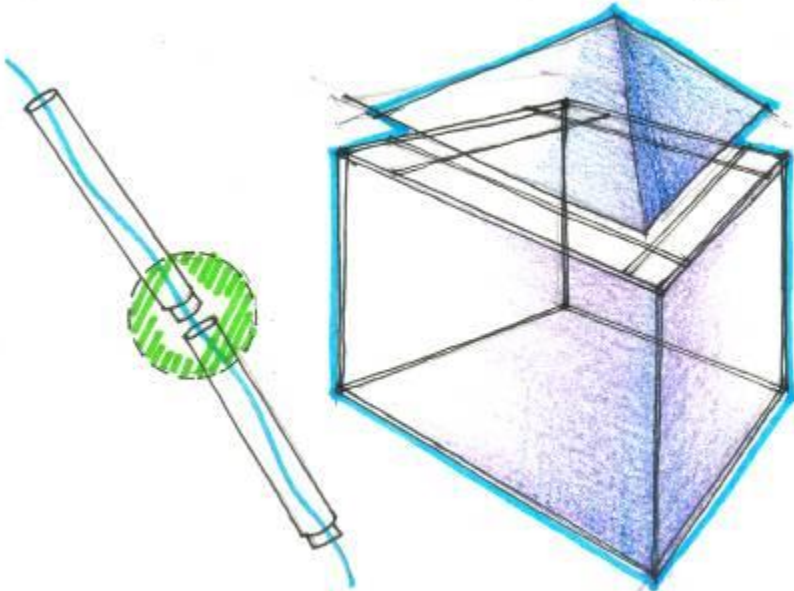
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Double storied design solutions

Idea 01



Tent made of FRP tubes which can fit into each other and can be held in position by a string of elastic that passes through it

Idea Sketches

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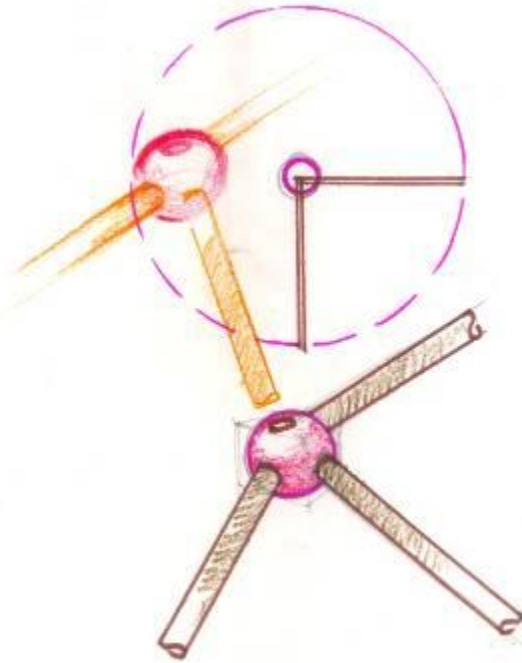
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Double storied design solutions

Idea 02



A sphere with three holes and three spokes become a module to create an frame for the house

Idea Sketches

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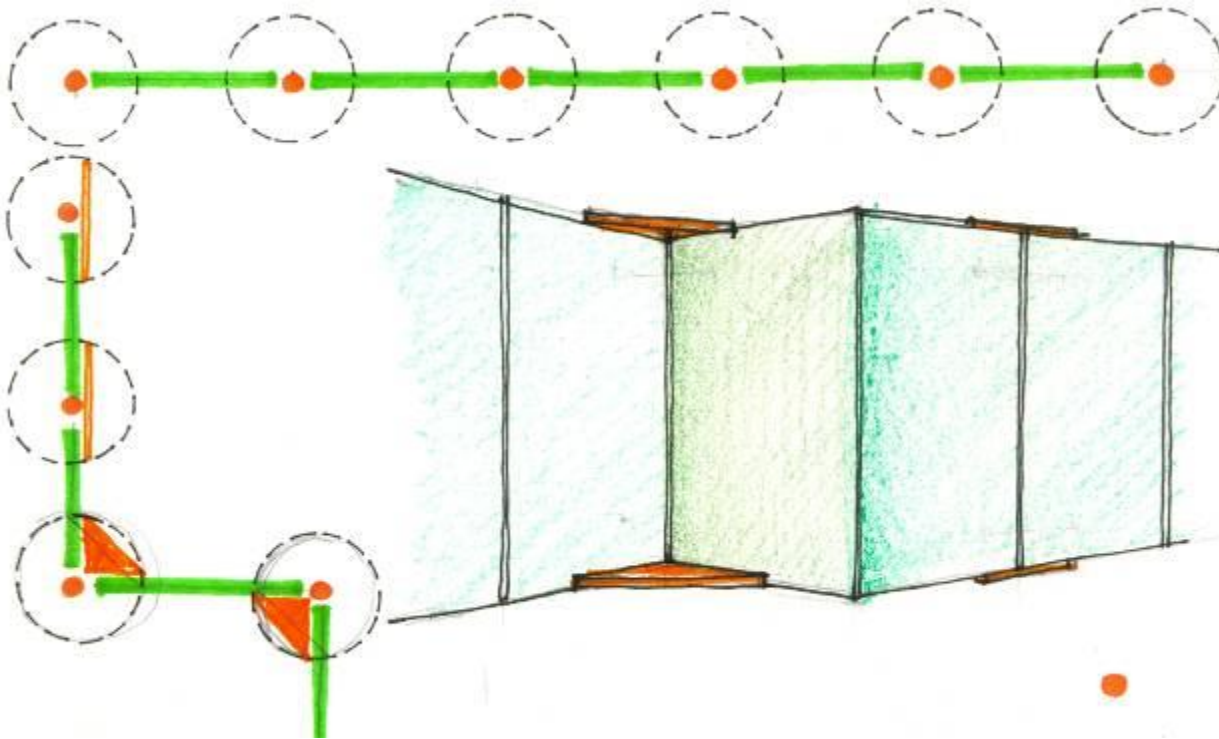
Collapsible tubular sections that can be developed into modules

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Integrating tensile roof along with FRP structure

Double storied design solutions

Idea 03



A chain of FRP panels that are connected but can be swayed in either direction to lock to required angle

Idea Sketches

Initial Idea Sketches
were done classified
into four major types

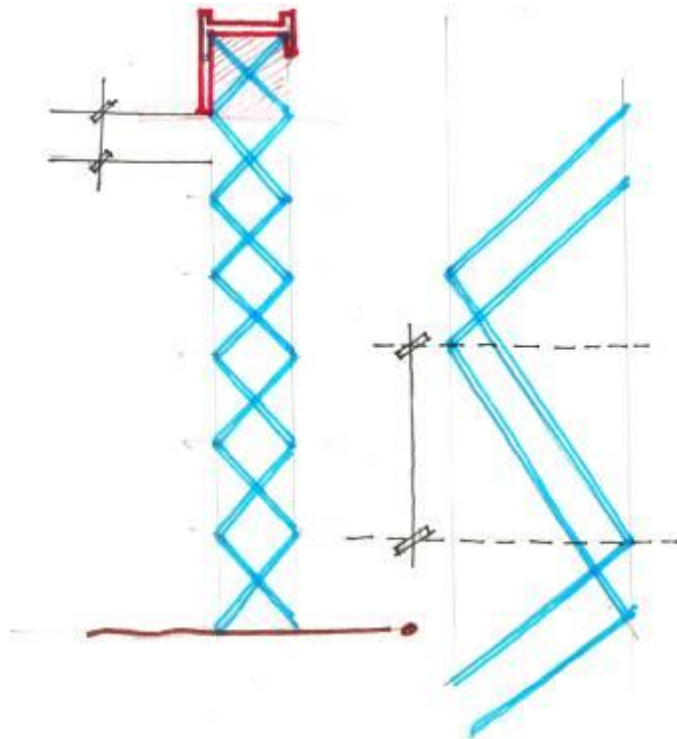
Collapsible tubular sections that can be developed into modules

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Double storied design solutions

Idea 04



The wall is collapsible. The traditional system can be rearranged to increase visibility to sea from shack

Idea Sketches

Initial Idea Sketches
were done classified
into four major types

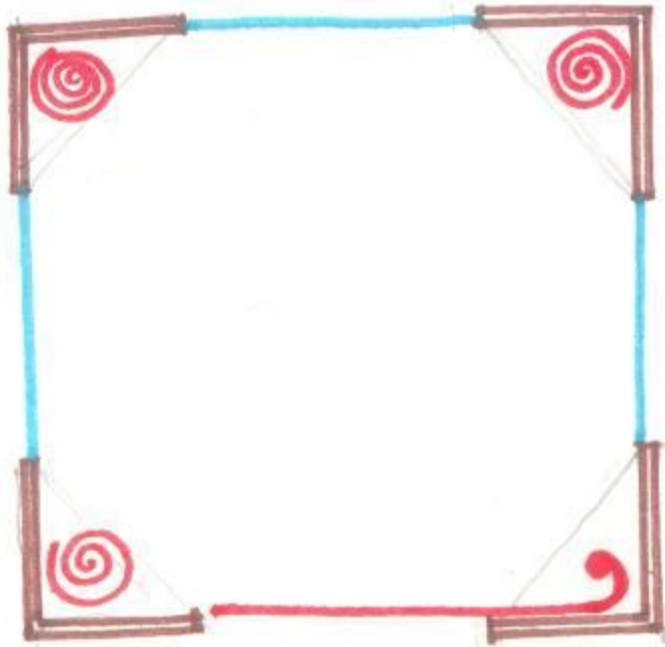
Collapsible tubular sections that can be developed into modules

Developing a single module that can be used for both structure and furniture

Integrating tensile roof along with FRP structure

Double storied design solutions

Idea 05



The interiors is treated as open
space is demarcated using corner
pillars which has a retractable wall
integrated along with it

Idea Sketches

Initial Idea Sketches
were done classified
into four major types

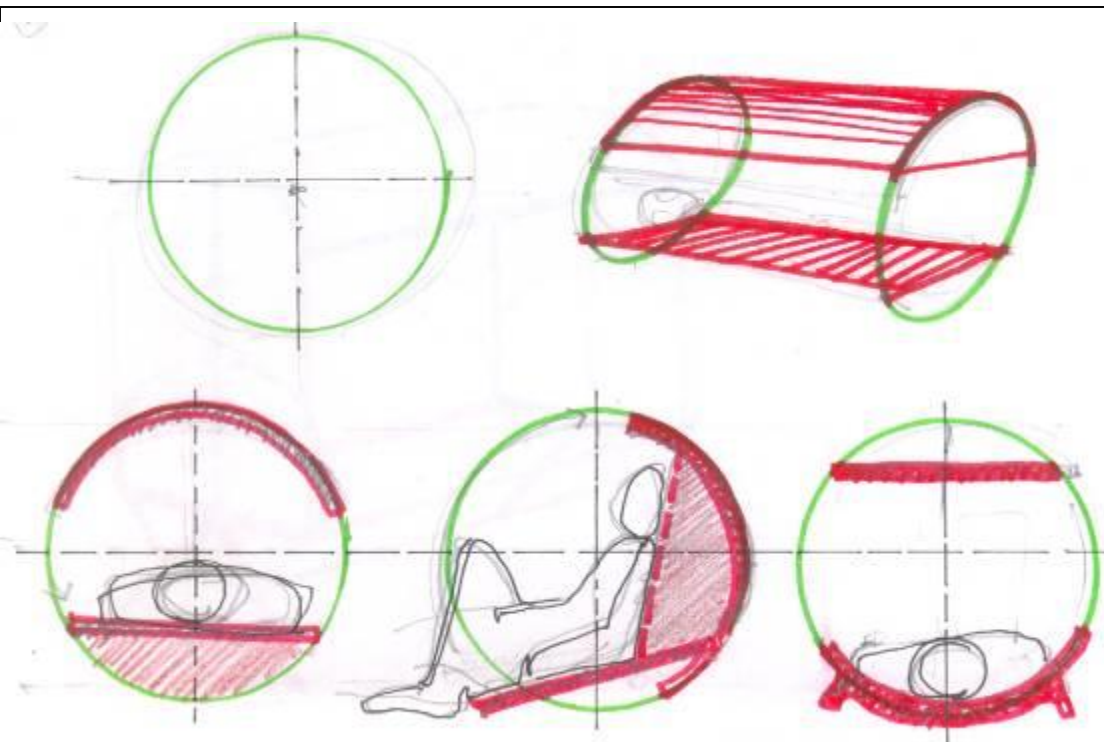
Collapsible tubular sections that can be developed into modules

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Integrating tensile roof along with FRP structure

Double storied design solutions

Idea 06



Two circular rims held together
in tension by fabric and board.
Individual members can be rolled
around the central axis to take
various forms

Idea Sketches

Initial Idea Sketches were done classified into four major types

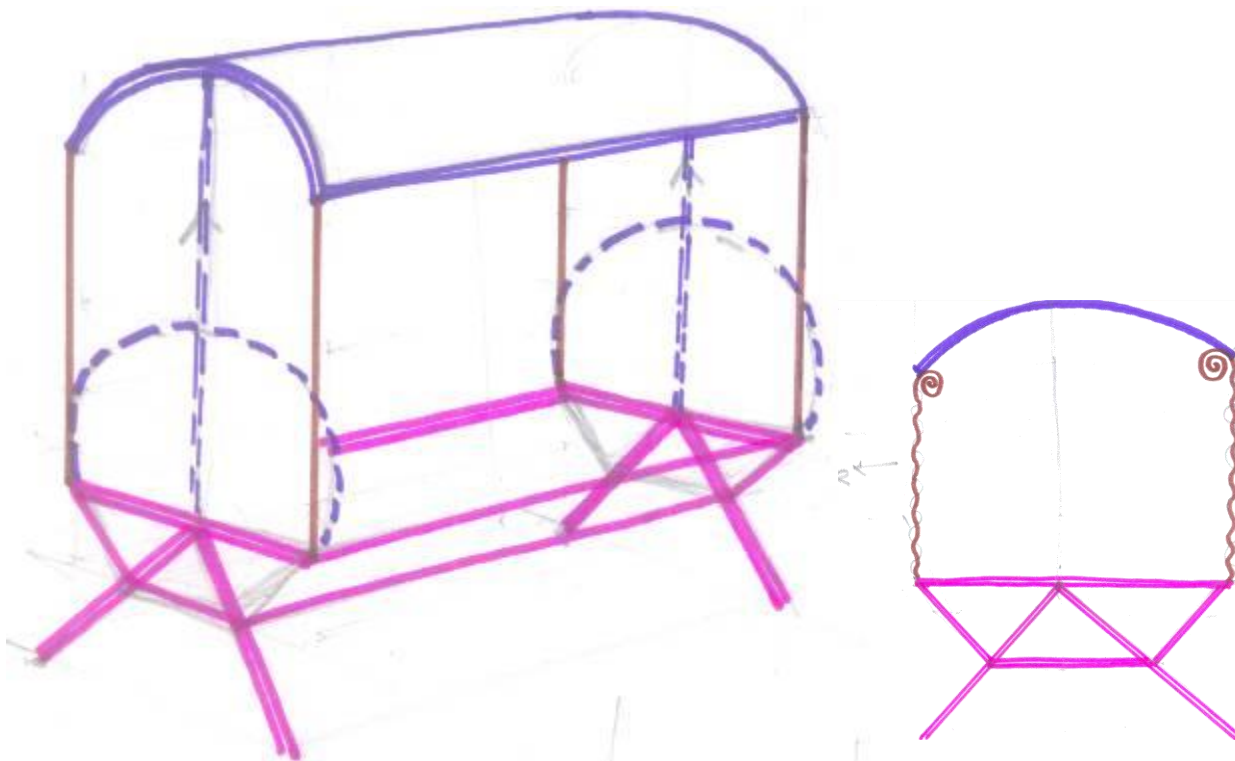
Collapsible tubular sections that can be developed into modules

Developing a single module that can be used for both structure and furniture

Integrating tensile roof along with FRP structure

Double storied design solutions

Idea 07



A collapsible roof that can fall into position to be stored away easily. It is an extension of Idea Sketch 06

Idea Sketches

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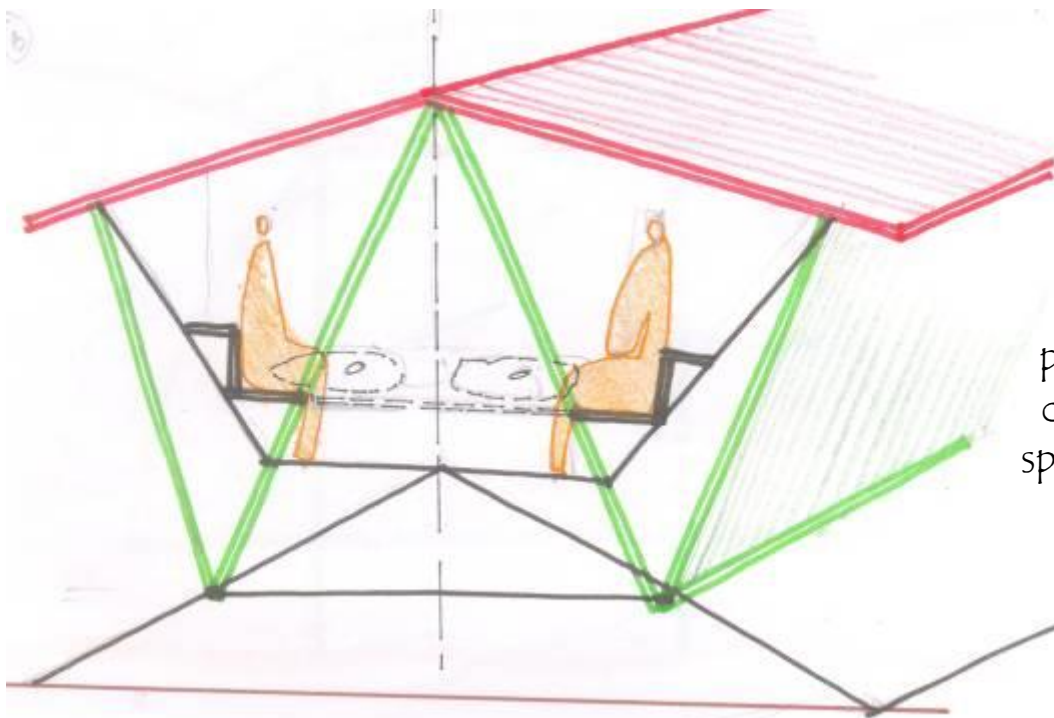
Collapsible tubular sections that can be developed into modules

Developing a single module that can be used for both structure and furniture

Integrating tensile roof along with FRP structure

Double storied design solutions

Idea 08



Collapsible sections that can be folded to a sheet which can be propped on to a vehicle roof and carried to your favourite holiday spot. The bed is detailed to also act as seats as and when required.

Idea Sketches

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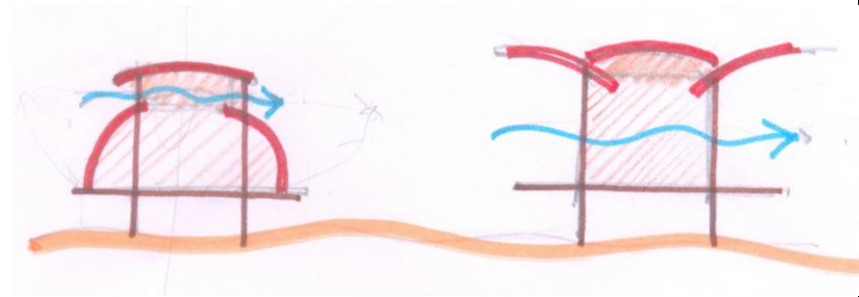
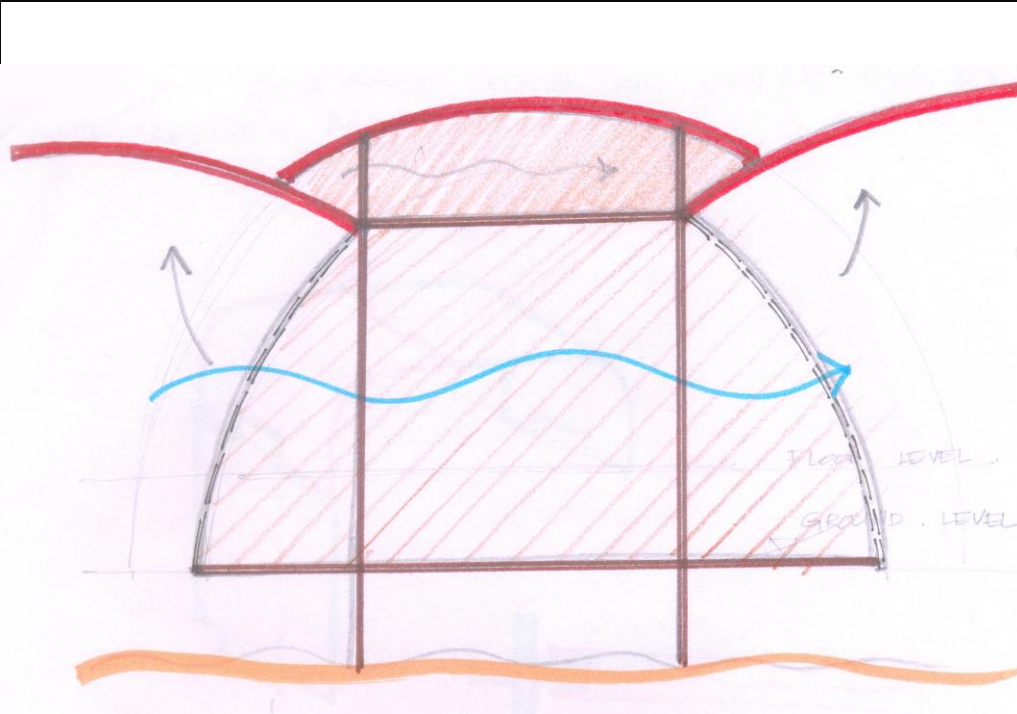
Collapsible tubular sections that can be developed into modules

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Integrating tensile roof along with FRP structure

Double storied design solutions

Idea 09



Here the form tries to exploit the sea breeze on the shore to develop an efficient design. There are two states of form when the walls are open and closed. The form give rise two type of ventilation through the hut

Idea Sketches

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were done classified
into four major types

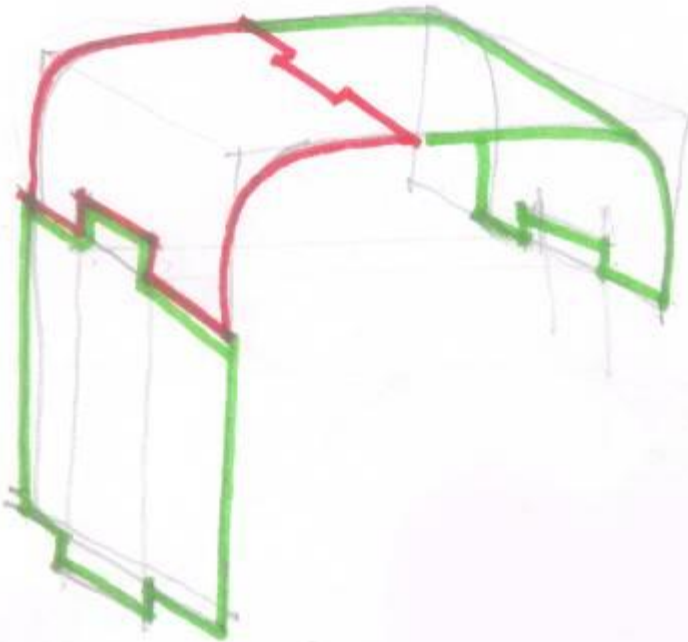
Collapsible tubular sections that can be developed into modules

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Integrating tensile roof along with FRP structure

Double storied design solutions

Idea 10



The entire structure including the furniture is modular and is developed from a few basic members

Idea Sketches

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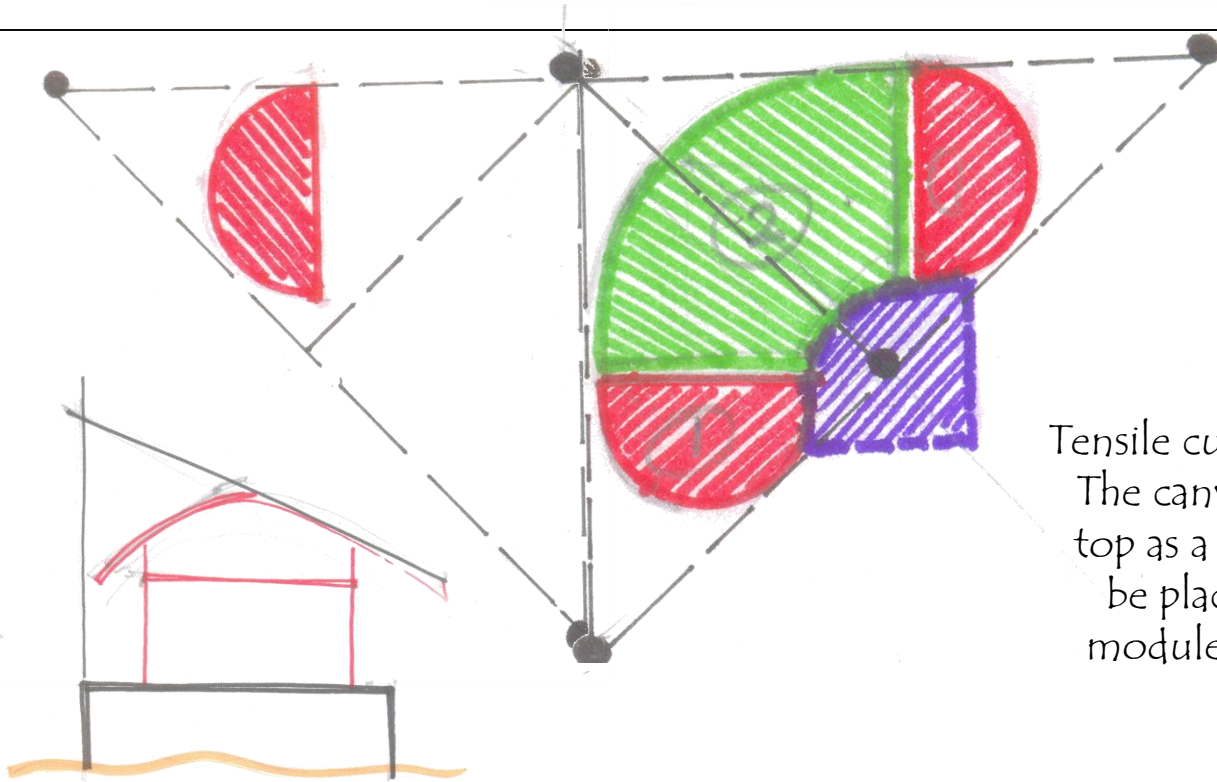
Collapsible tubular sections that can be developed into modules

Developing a single module that can be used for both structure and furniture

Integrating tensile roof along with FRP structure

Double storied design solutions

Idea 11



Tensile cubicles are joined together. The canvas is pulled to spread on top as a triangle. Similar huts can be placed together to develop modules sharing the same roof.

Idea Sketches

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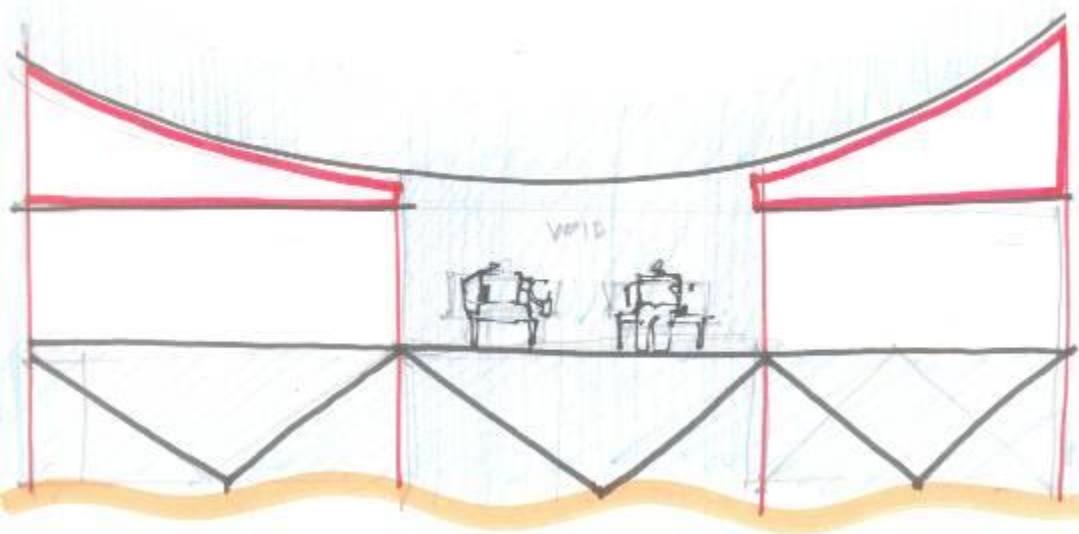
Collapsible tubular sections that can be developed into modules

Developing a single module that can be used for both structure and furniture

Integrating tensile roof along with FRP structure

Double storied design solutions

Idea 12



The extension between huts can also be developed as semi-open areas for relaxing. The tensile roof when stretched between huts give rise to such spaces

Idea Sketches

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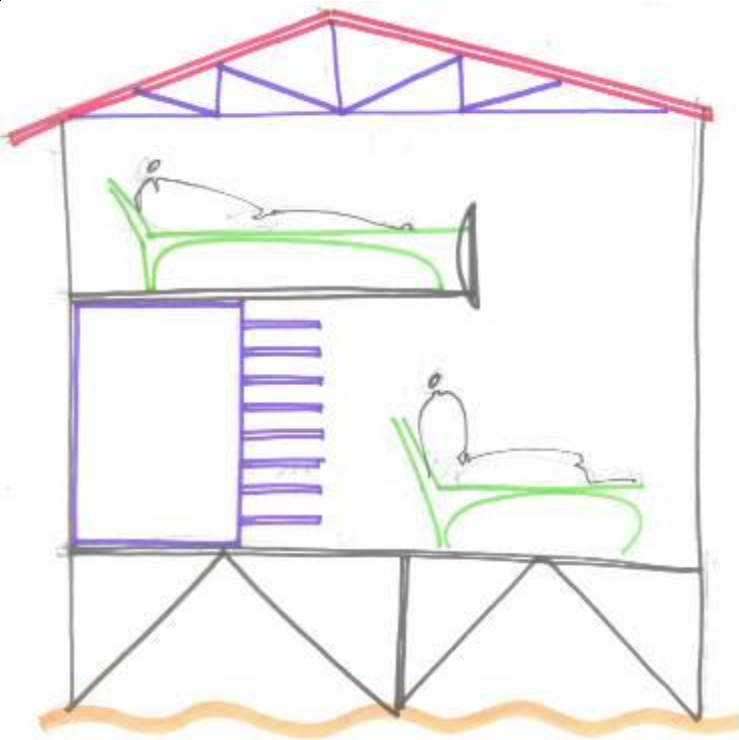
Collapsible tubular sections that can be developed into modules

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Integrating tensile roof along with FRP structure

Double storied design solutions

Idea 13



Double storied arrangement which allows unhindered view of the sea

Idea Sketches

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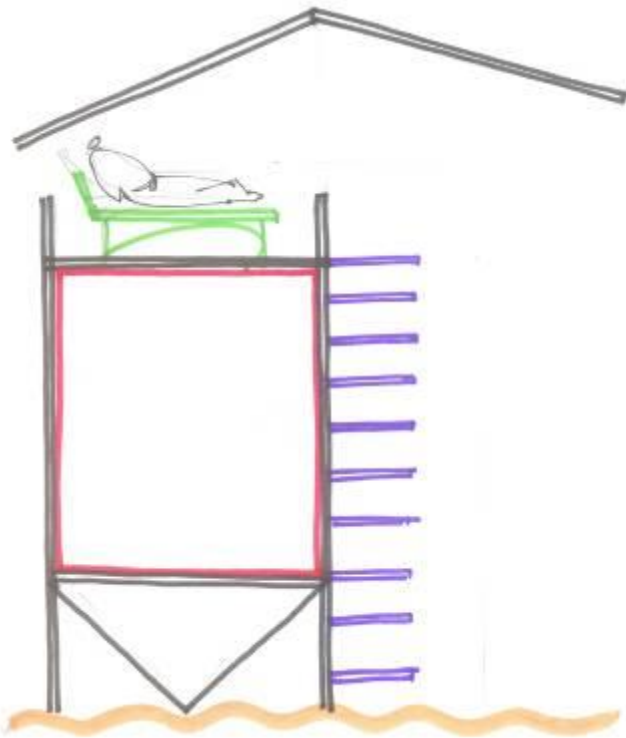
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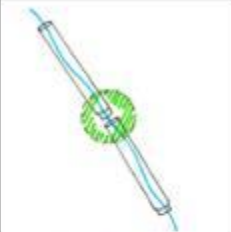
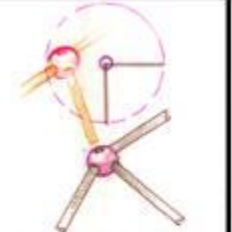
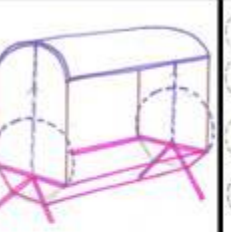
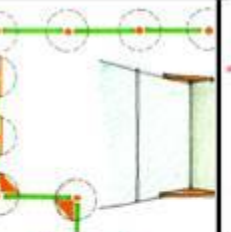
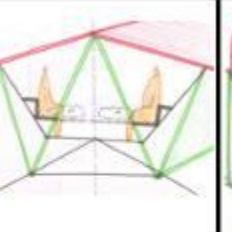
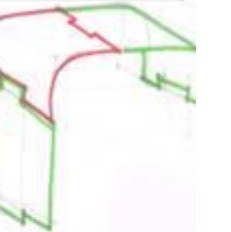
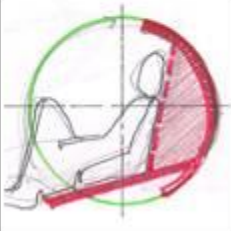
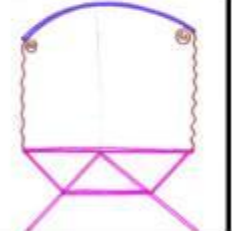
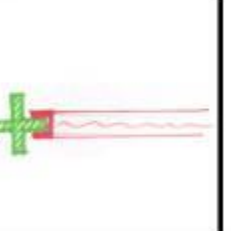
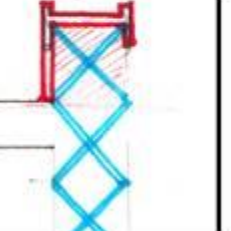
Integrating tensile roof along with FRP structure

Double storied design solutions

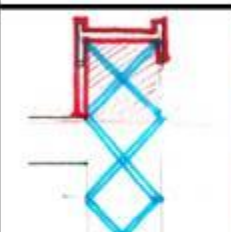
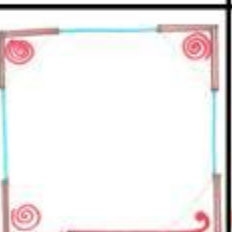
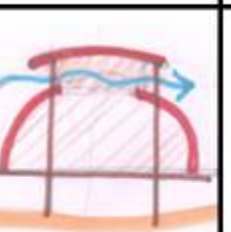
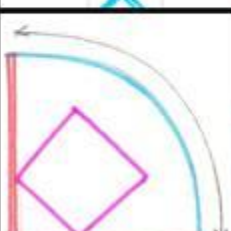
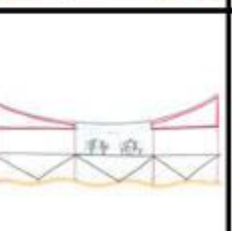
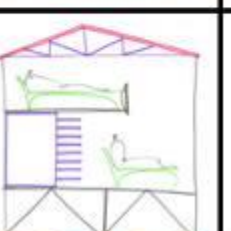
Idea 14



Manipulation of Idea sketch 13 to use minimum plinth area

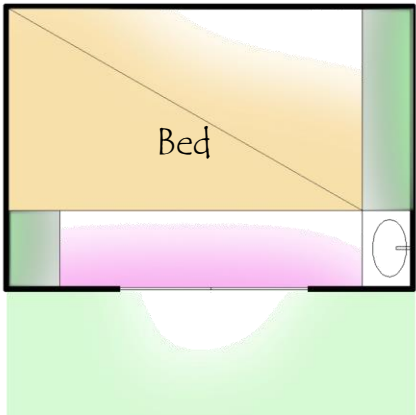
	1	2	3	4	5	6
Frames						
Screen						

Many of the ideas were mostly in parts catering to an element or character of the entire structure. They were tabulated to understand how they could be exploited for a wholesome design

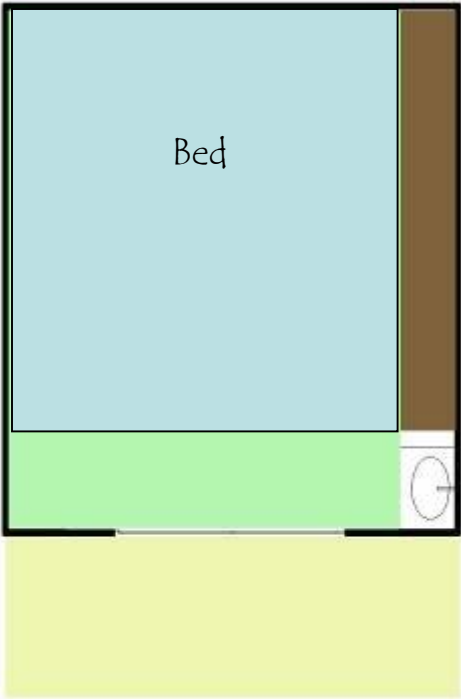
Walls						
Outdoor Space						

Option 01

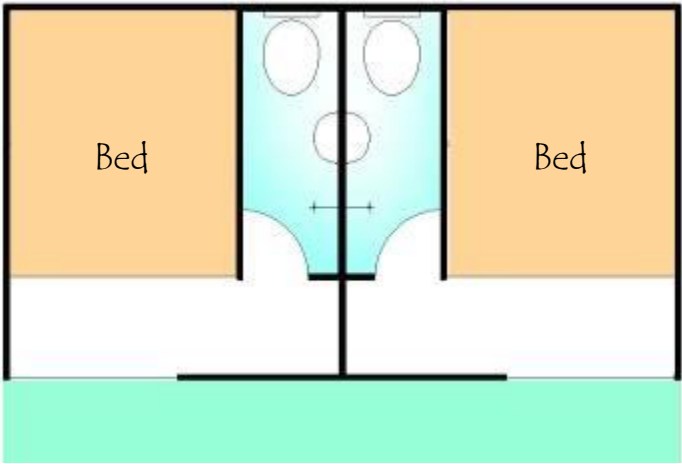
Interior layouts No.1



Type I – Single Occupant
240 x 240 mm



Type II – Double Occupant
240 x 360 mm

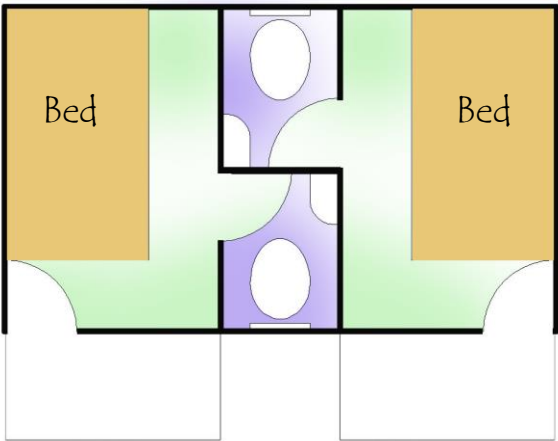


Two Double Occupant
480 x 720 mm

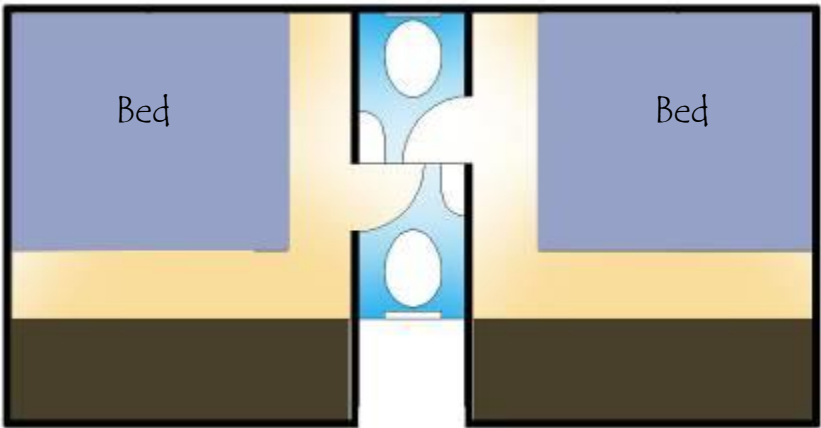
Bed placed parallel to sea (difficulty in viewing sea in case of single occupant)
Min. area for circulation

Option 02

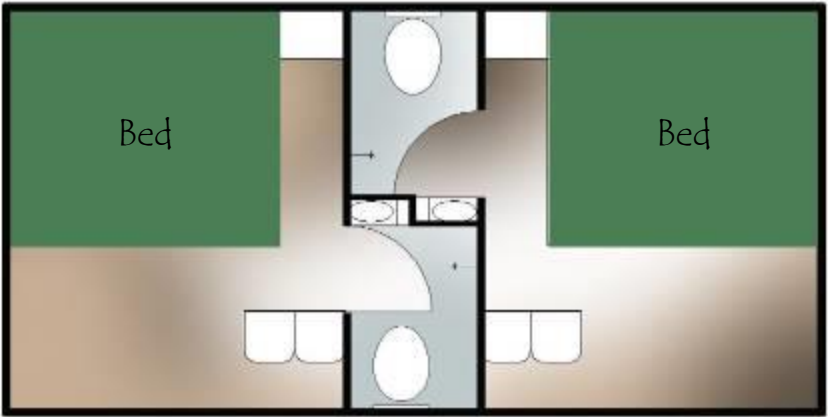
Interior layouts



Type I – Single Occupant
480 x 360 mm



Type II – Double Occupant
720 x 360 mm

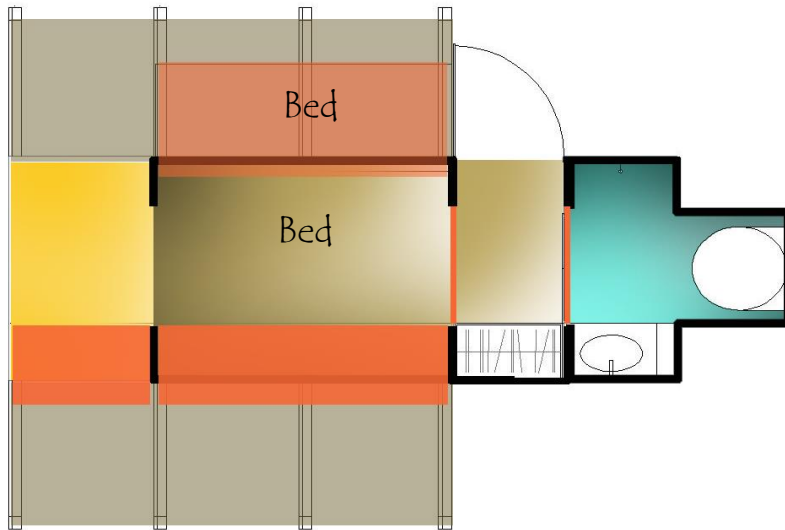


Double Occupant
720 x 360 mm

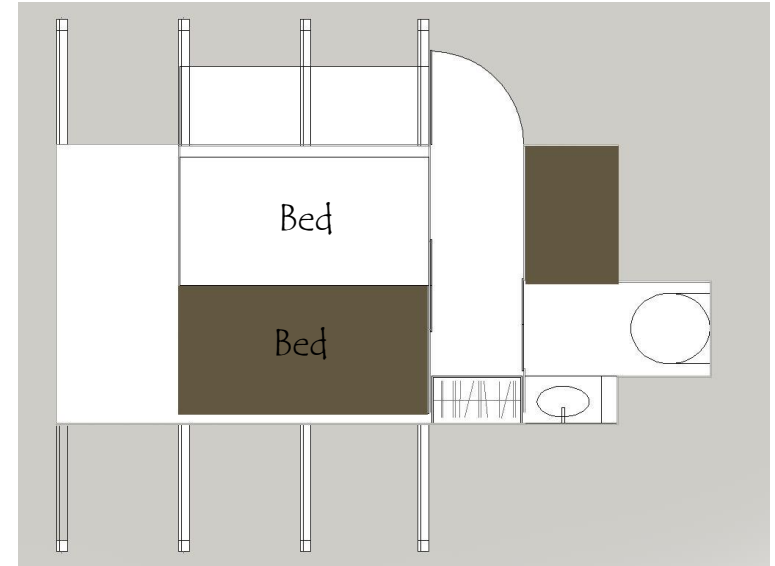
Bed placed perpendicular to sea in both cases
Occupies lesser area

Option 03

Interior layouts



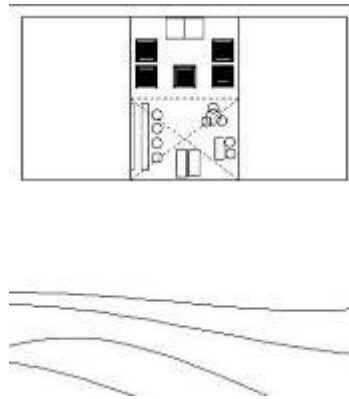
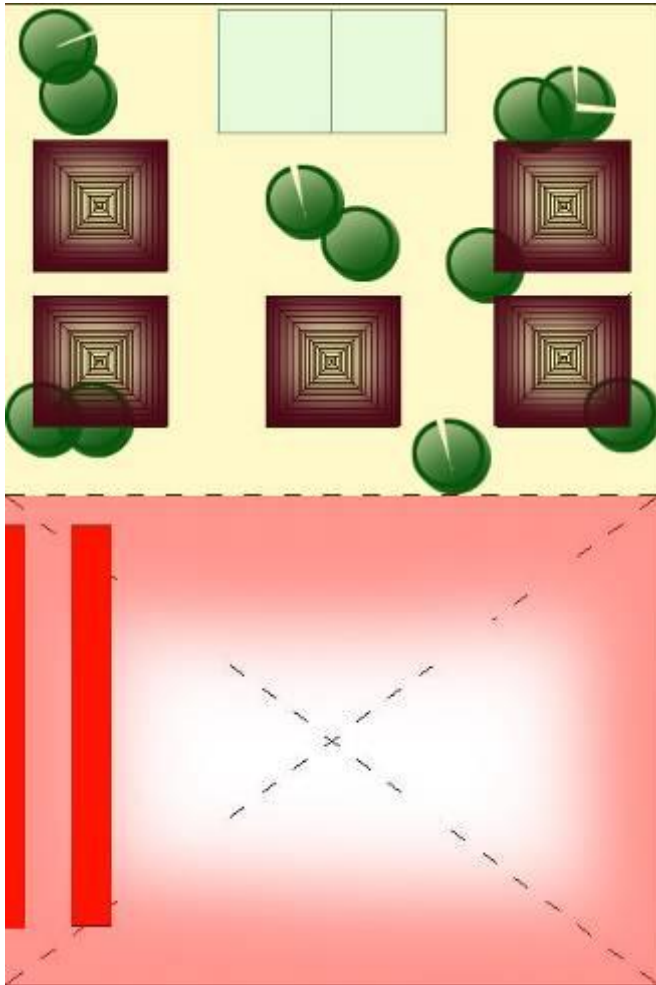
Type I – Single Occupant
120 x 420 mm



Type II – Double Occupant
240 x 420 mm

Toilet is placed behind to get a more linear arrangement
Occupies lesser frontage

Layout in shack



Area of shack = $24\text{m} \times 24\text{m}$



Copyright Priya Shah

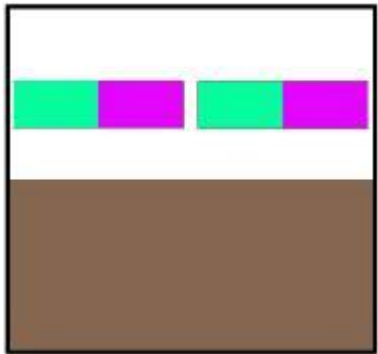
A single shack area being $24\text{ m} \times 24\text{m}$

Layout in shack

Option 01

Type I – Single Occupant

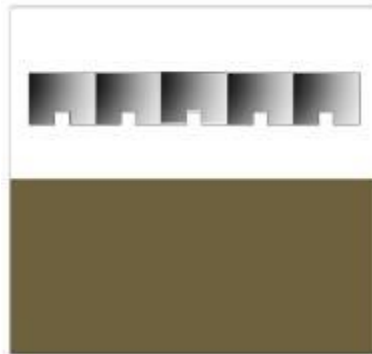
Number of
houses



4

Option 02

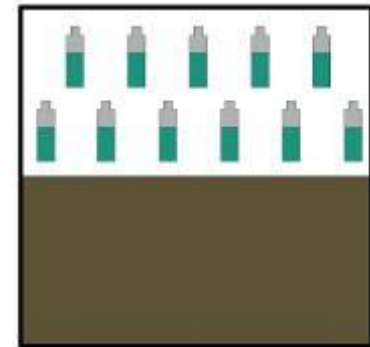
Number of
houses



10

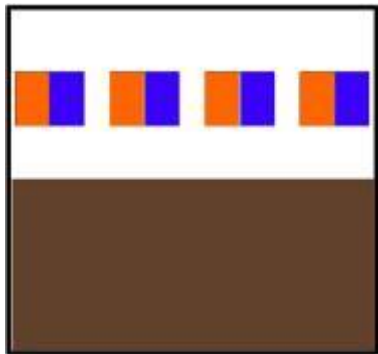
Option 03

Number of
houses

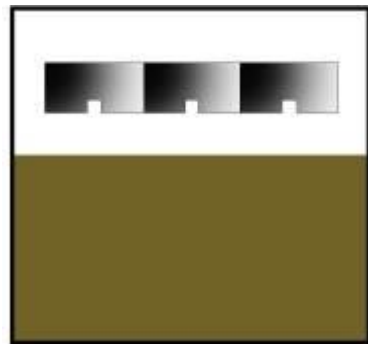


11

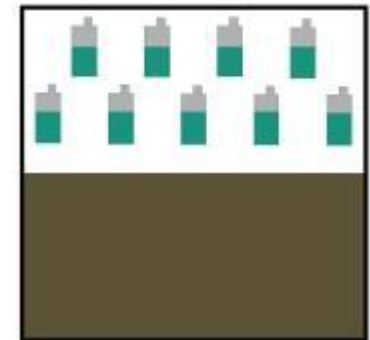
Type II – Double Occupant



8



6



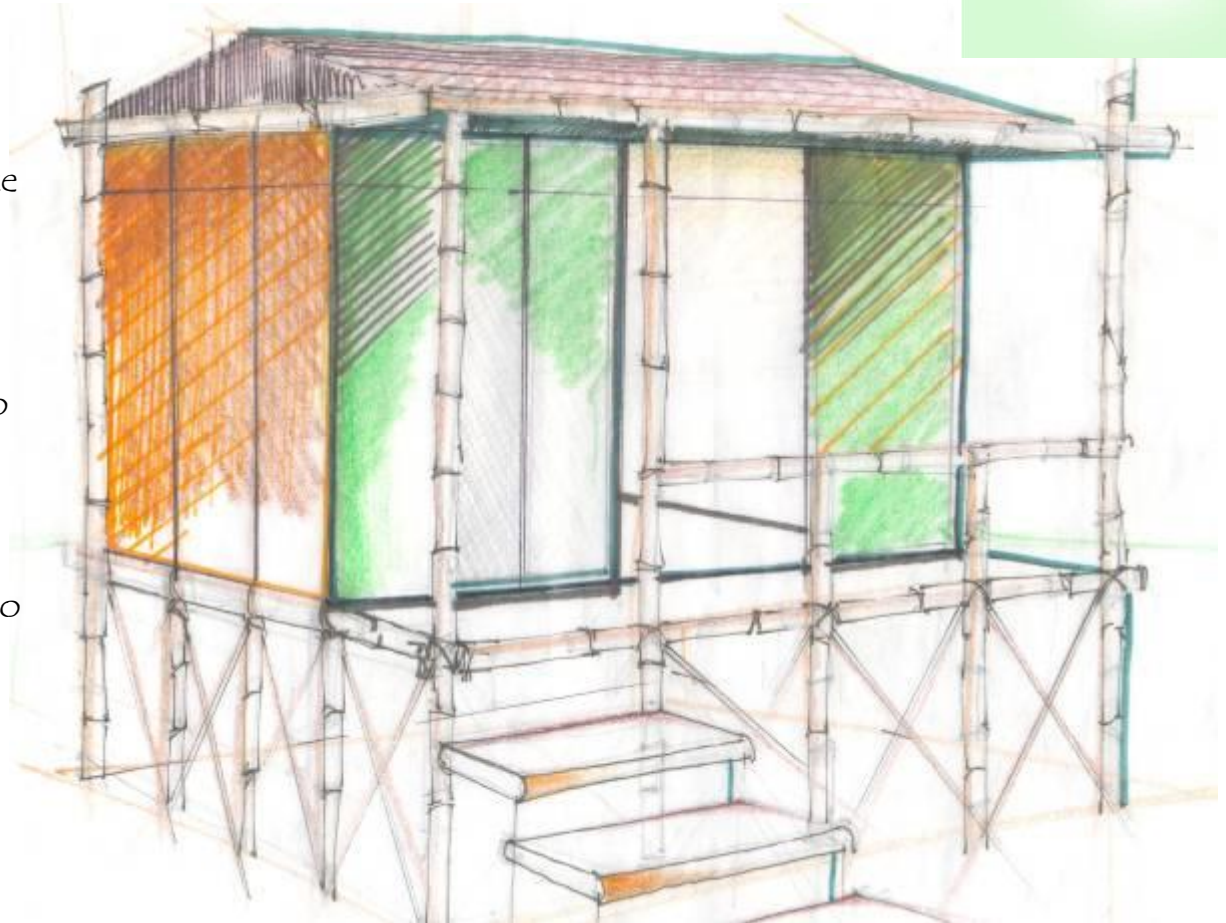
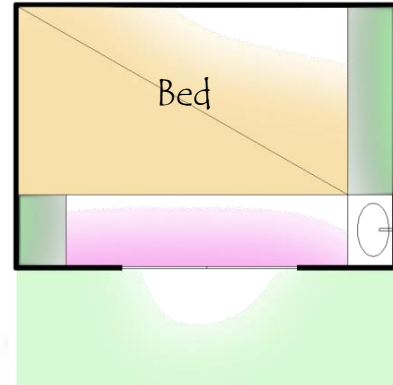
9

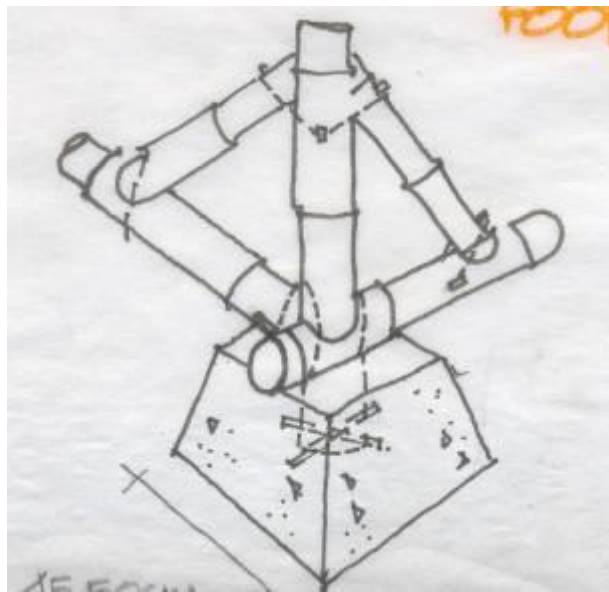
A single shack area being 24 m x 24m

Concept 01

Bamboo frames
structure with FRP
panels slid into
them

- ◊ Had an overall rustic appearance
- ◊ Panels were of two types either plain or with a screen integrated with it
- ◊ Module size was maintained to plan option -1
- ◊ Range of allowances to be thought of when using a natural and manufactured material had to be thought of

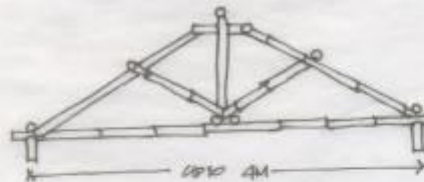
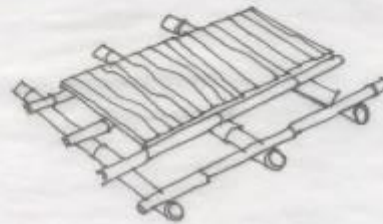




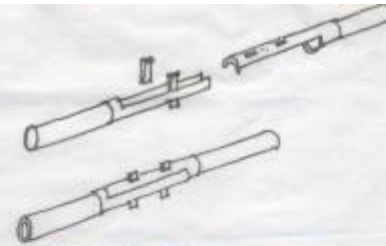
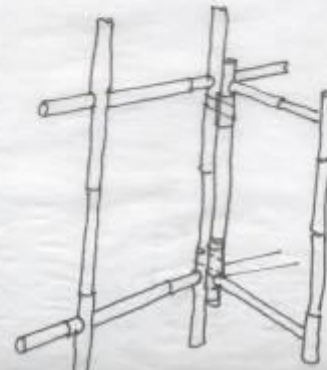
ROOF DESIGN: THIS IMPROVES COMFORT AND HYGIENE AND CAN PROVIDE A COVERED STORAGE AREA BELOW THE FLOOR

FLOOR

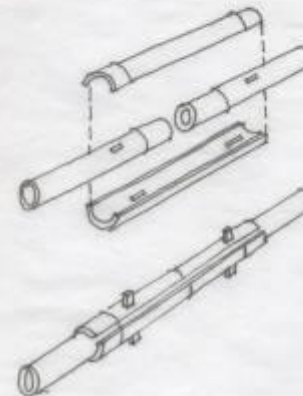
DAMPED BEAMS FIXED TO FOUNDATION POSTS...



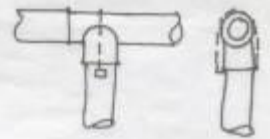
SLIDING DOOR



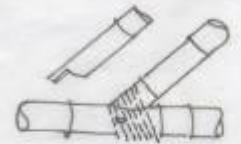
HALF LAPPED SPLICE JOINT



BUIT JOINT WITH SIDE PLATES



SADDLE (BUIT) JOINT



ANGLED JOINTS WITH INTEGRAL TENONS



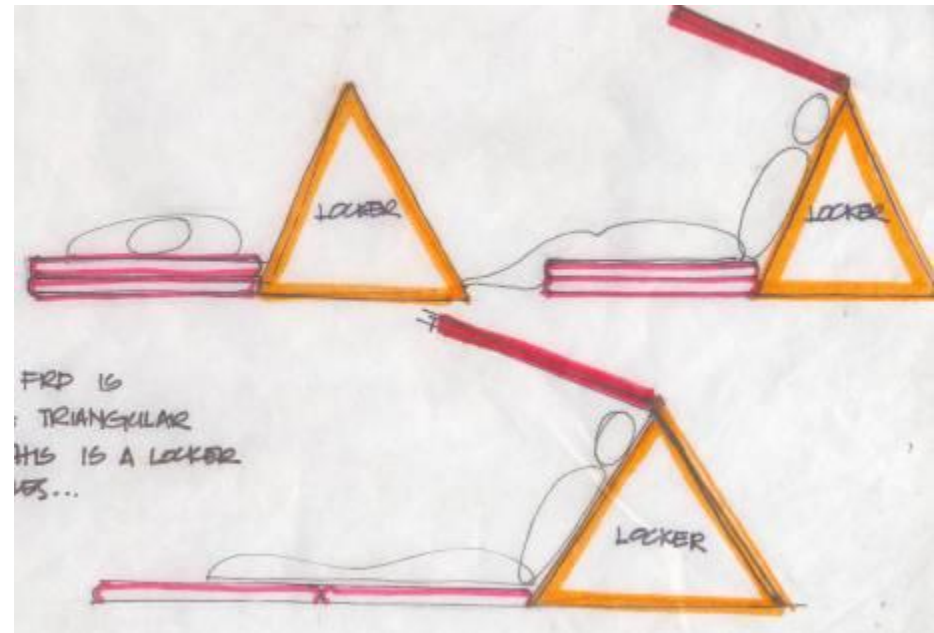
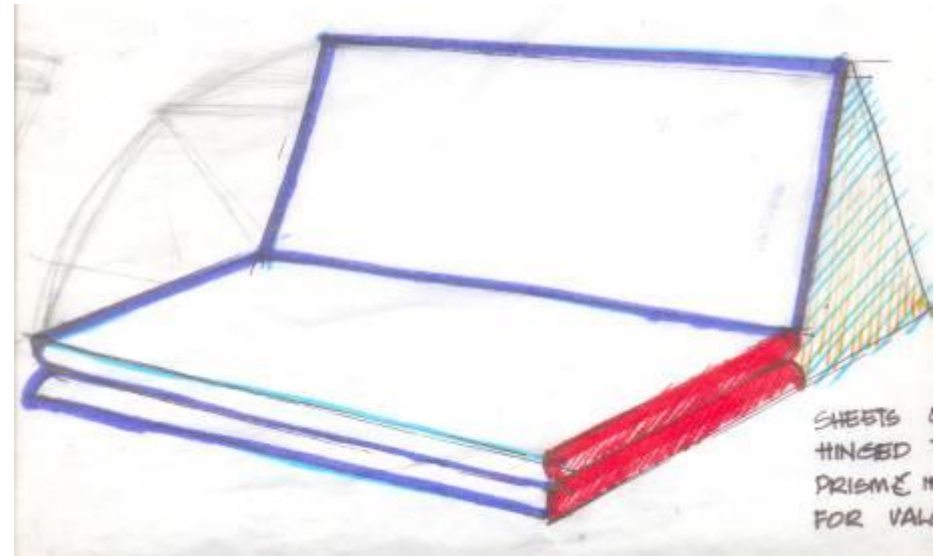
THROUGH JOINT

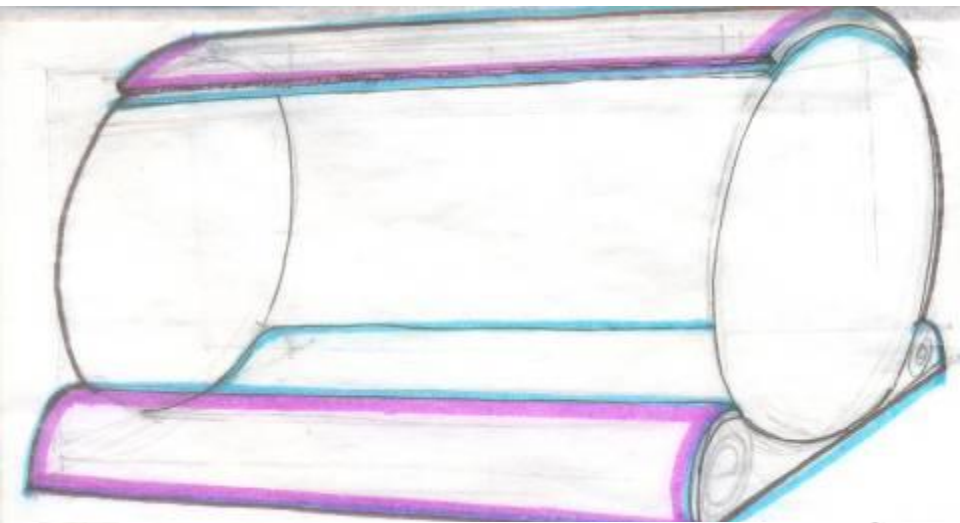


Concept 02-a

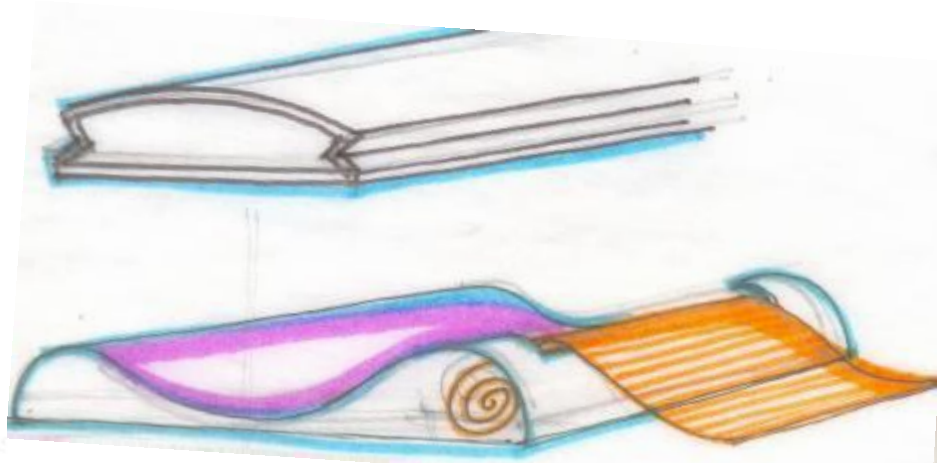
A mobile home
that can be put
anywhere on the
beach

- ♦ A triangular prism element in FRP is used as storage for personal belongings and also backrest when individual is sitting
- ♦ The entire structure is collapsible
- ♦ The solution doesn't include a toilet
- ♦ There is an absence of privacy
- ♦ Being mobile the structure maybe stolen

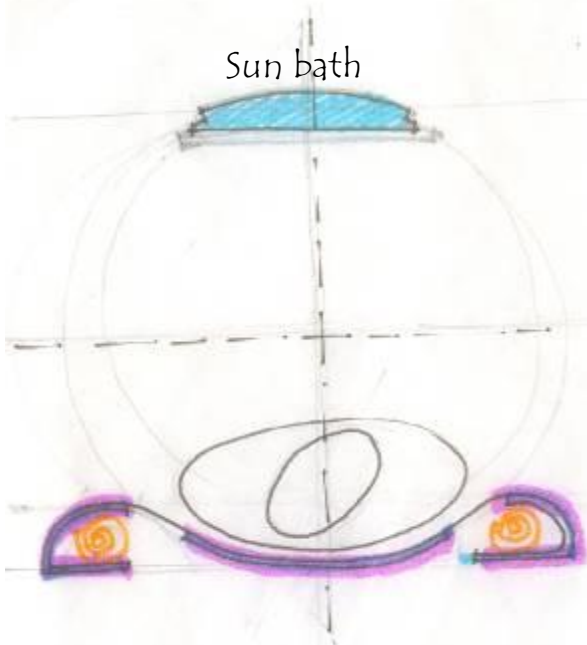




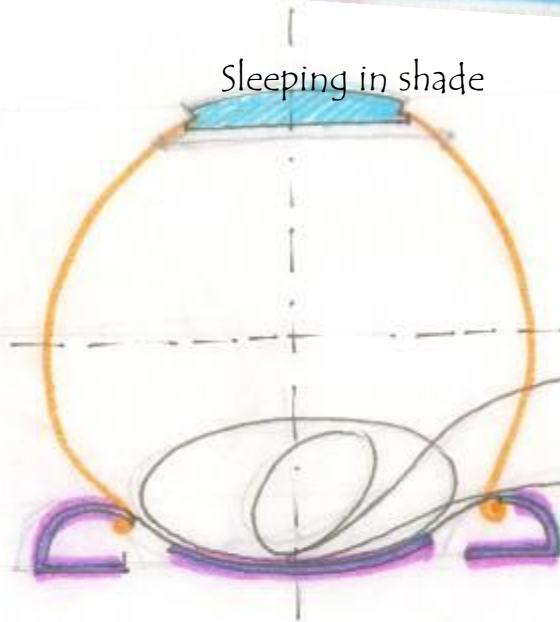
- ◊ Being mobile the structure maybe stolen
- ◊ Absence of proper storage system



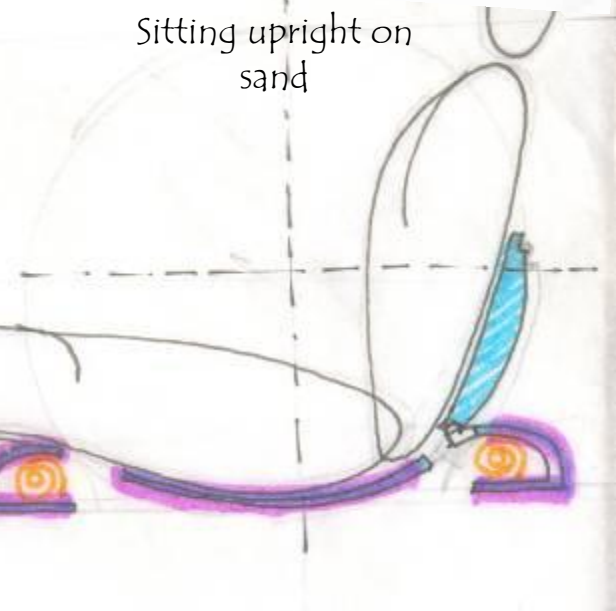
Sun bath



Sleeping in shade

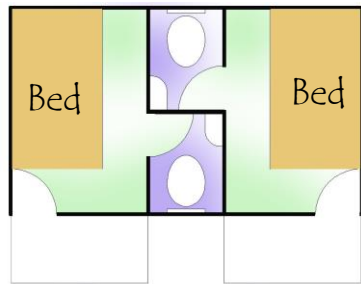


Sitting upright on sand



Concept 03-a

A cabin in FRP

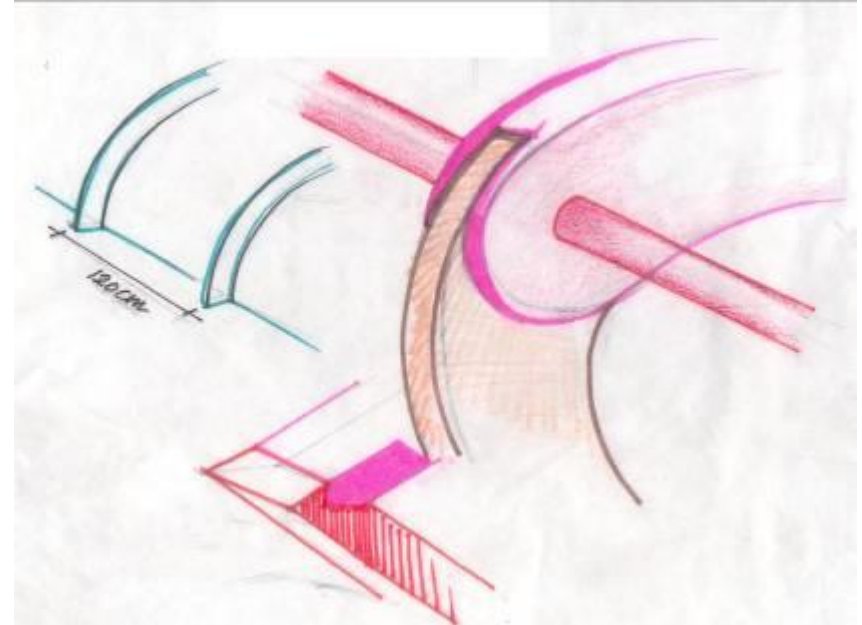
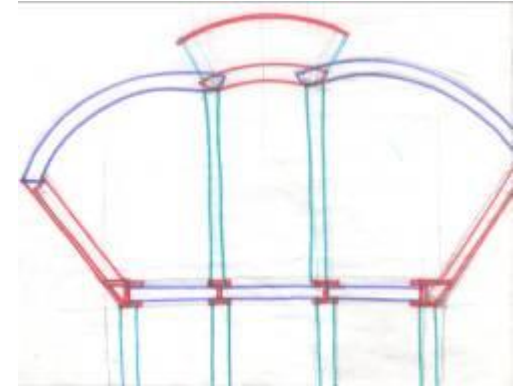
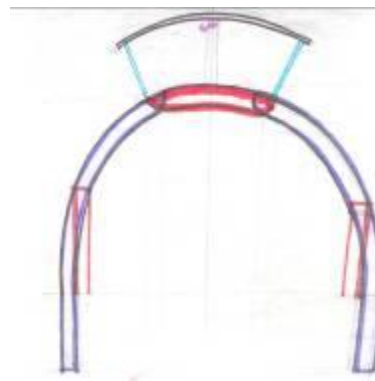


♦ Form developed from basic understanding that these structures required two kinds of ventilation at different times of the day

♦ A continuous curved frp panel with flanges @120mm to add to its strength

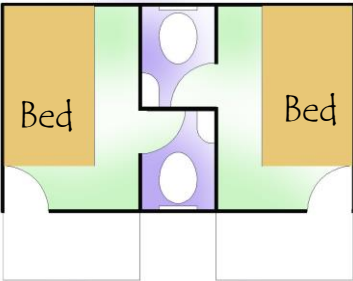
♦ Hand lay-up was used to get a textured finish on the outside

♦ Had poor head room above the bed when closed

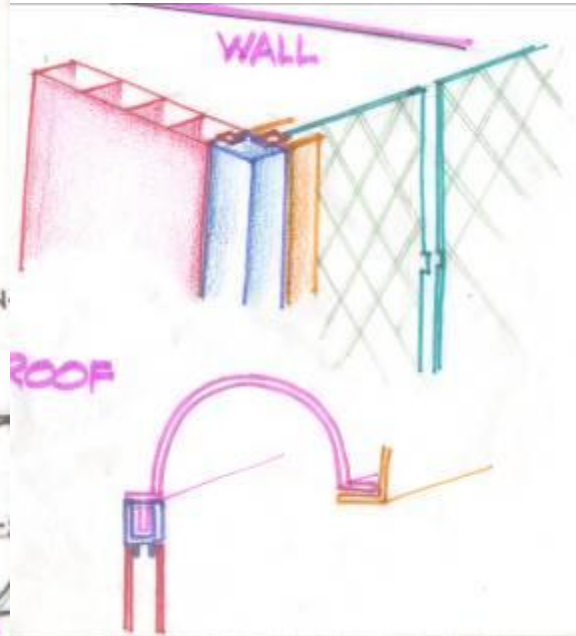
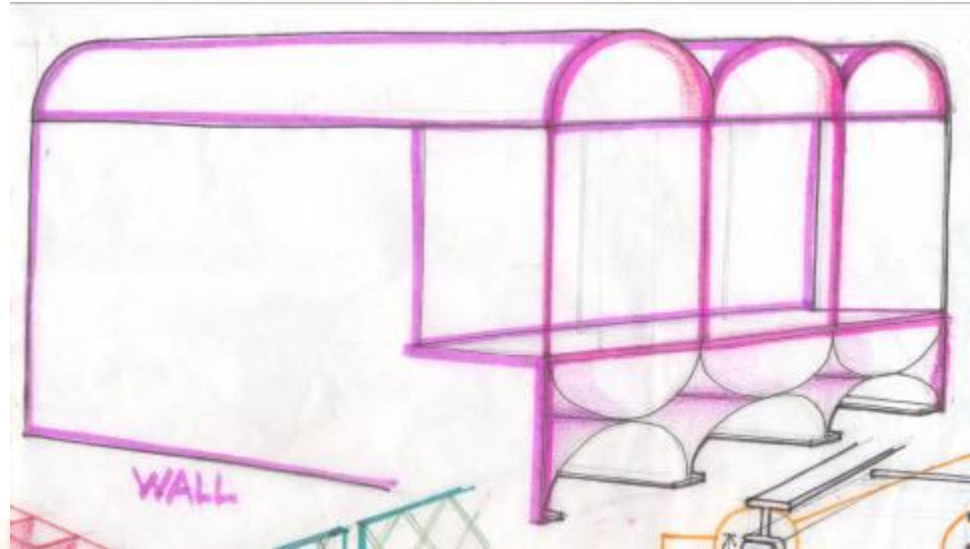
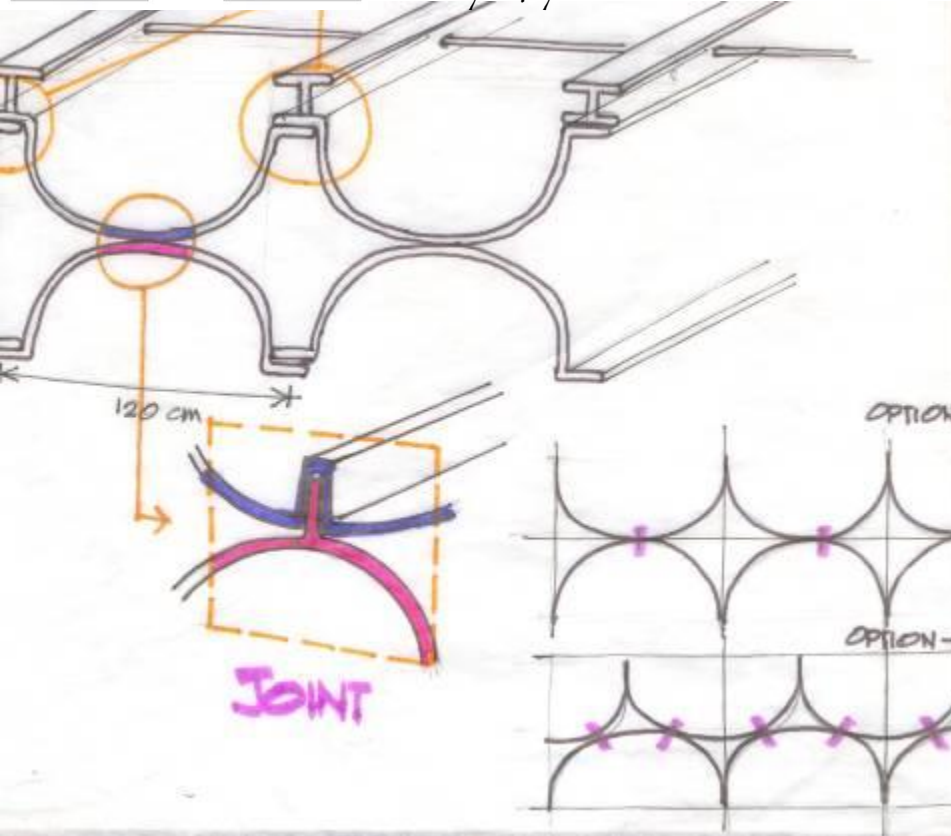


Concept 03-b

A cabin in FRP

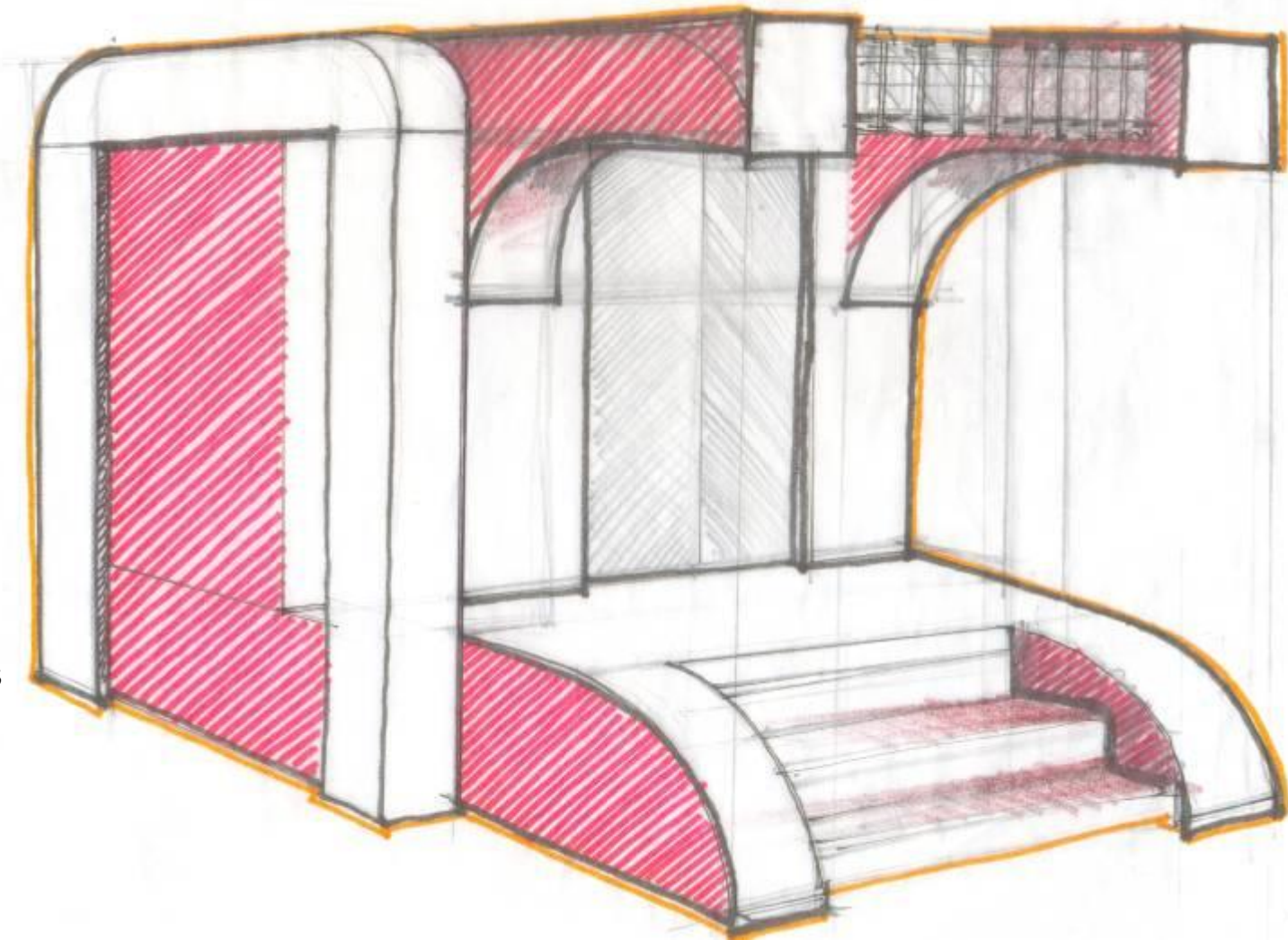
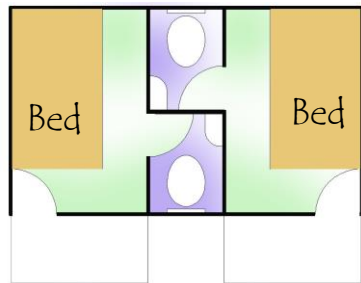


- ◊ Comfortable head room through out plan
- ◊ Integrate roof panel and foundation panel to the same shape for ease of manufacture (hand lay-up), construction storage and to develop a visual grammar
- ◊ Even combination of huts is very easy



Concept 03-b

A cabin in
FRP



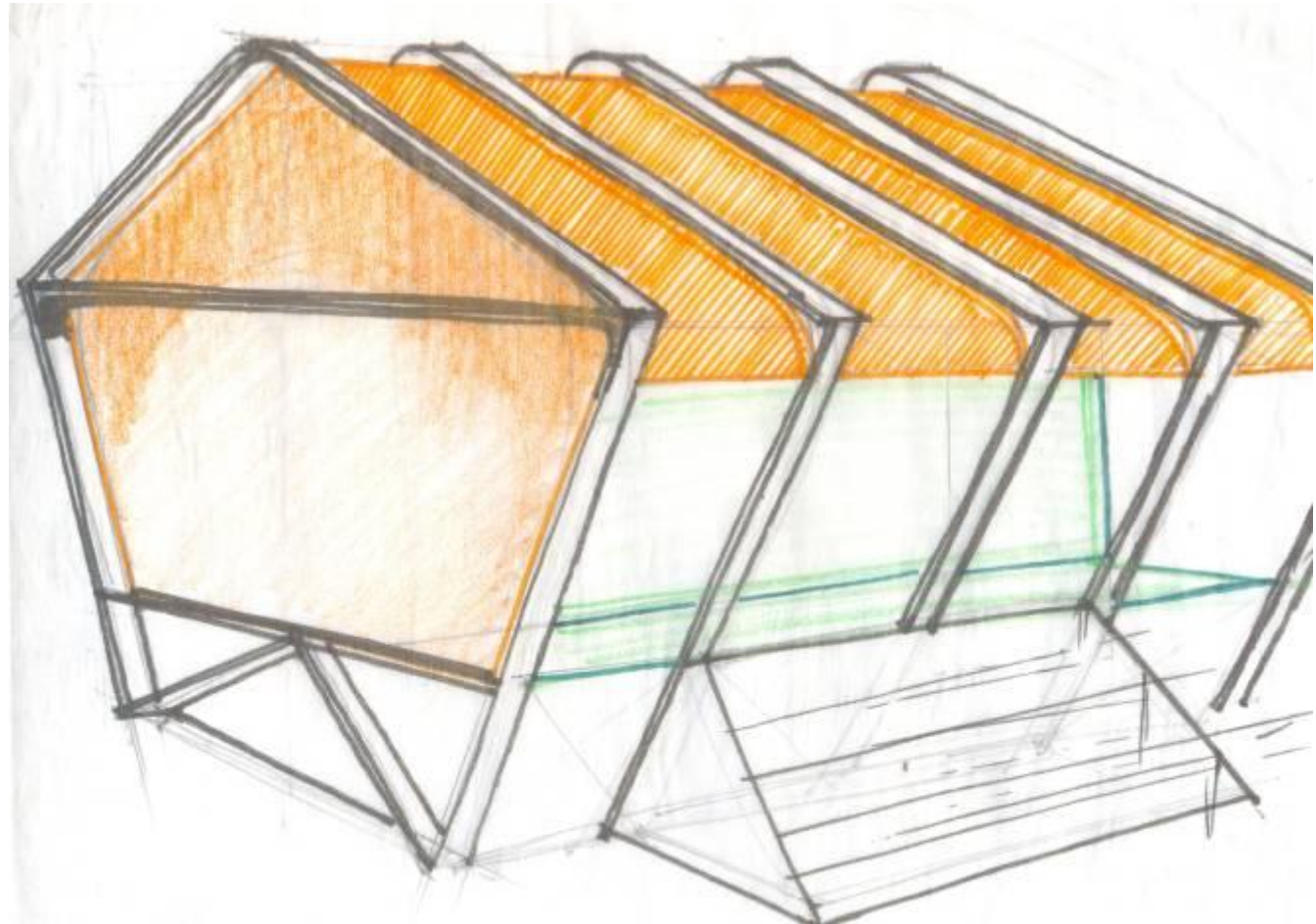
♦ Attempt to play with form to suit the same concept where poltruded FRP sections were used to develop pergolas for verandah and support for roof and foundation

♦ Poltrusion of FRP panels is very expensive

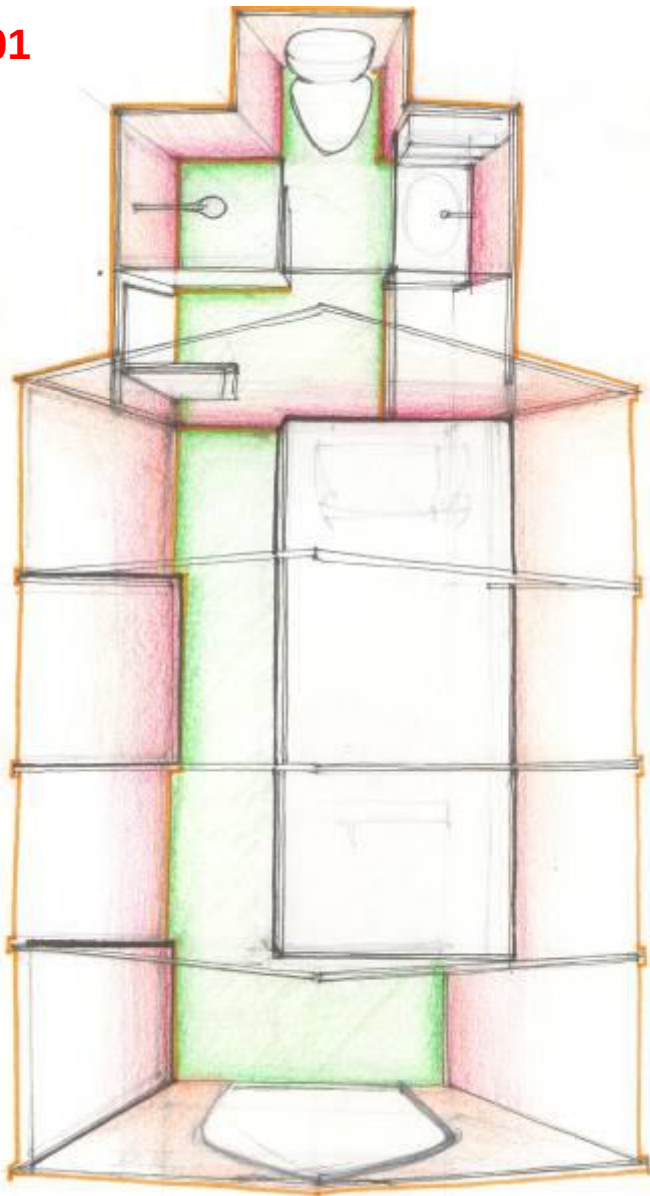
Concept 04

Frames of FRP for living area where skin is completely retractable

- ◊ The concept was a derivative of taking into consideration the **emotional qualities** tourist expect from such huts
- ◊ Everyone wanted a **space of their own** to lie down and watch the sea
- ◊ the **sky** as viewed from lying on their back was important
- ◊ the structure allows **sea breeze** through it
- ◊ The **secured area** is separately treated with care and is taken to the rear of the cabin

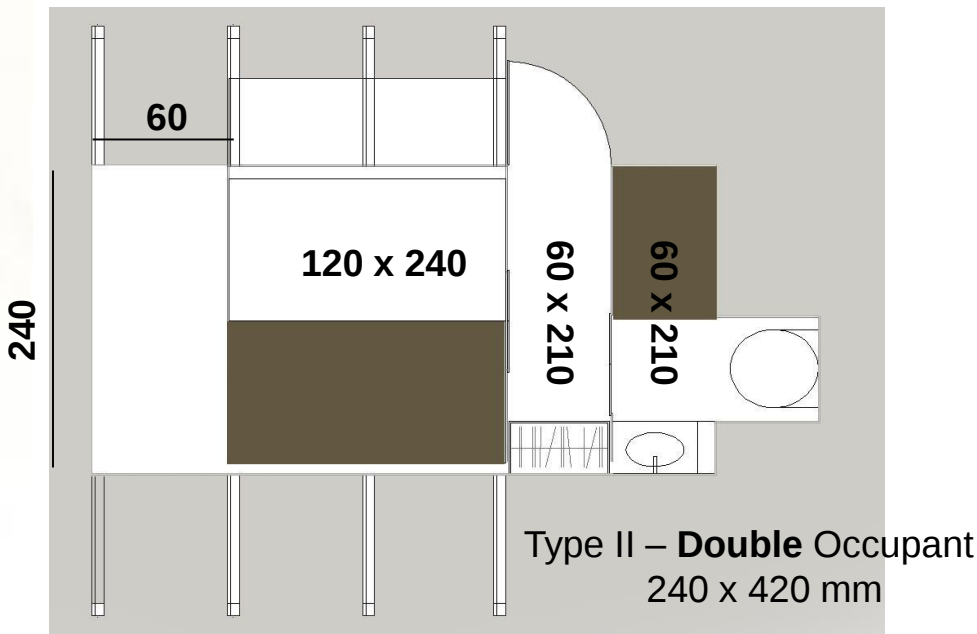
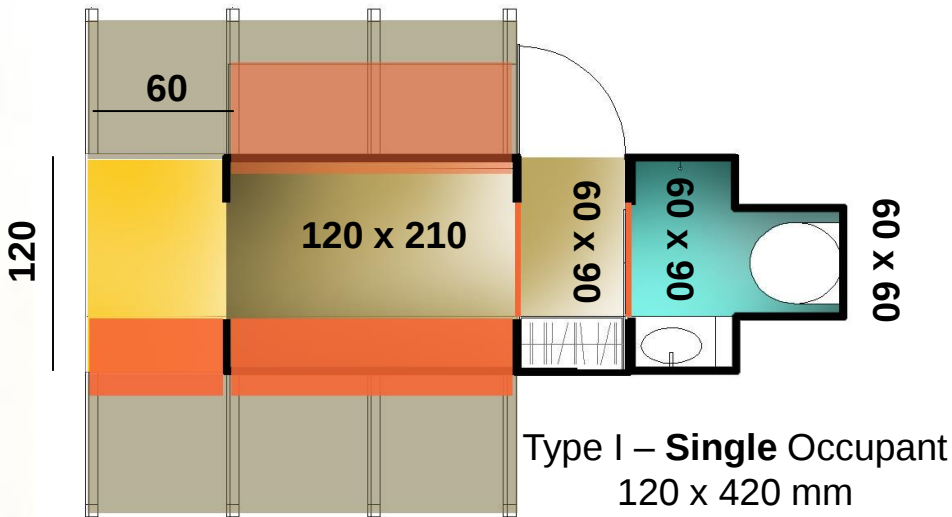


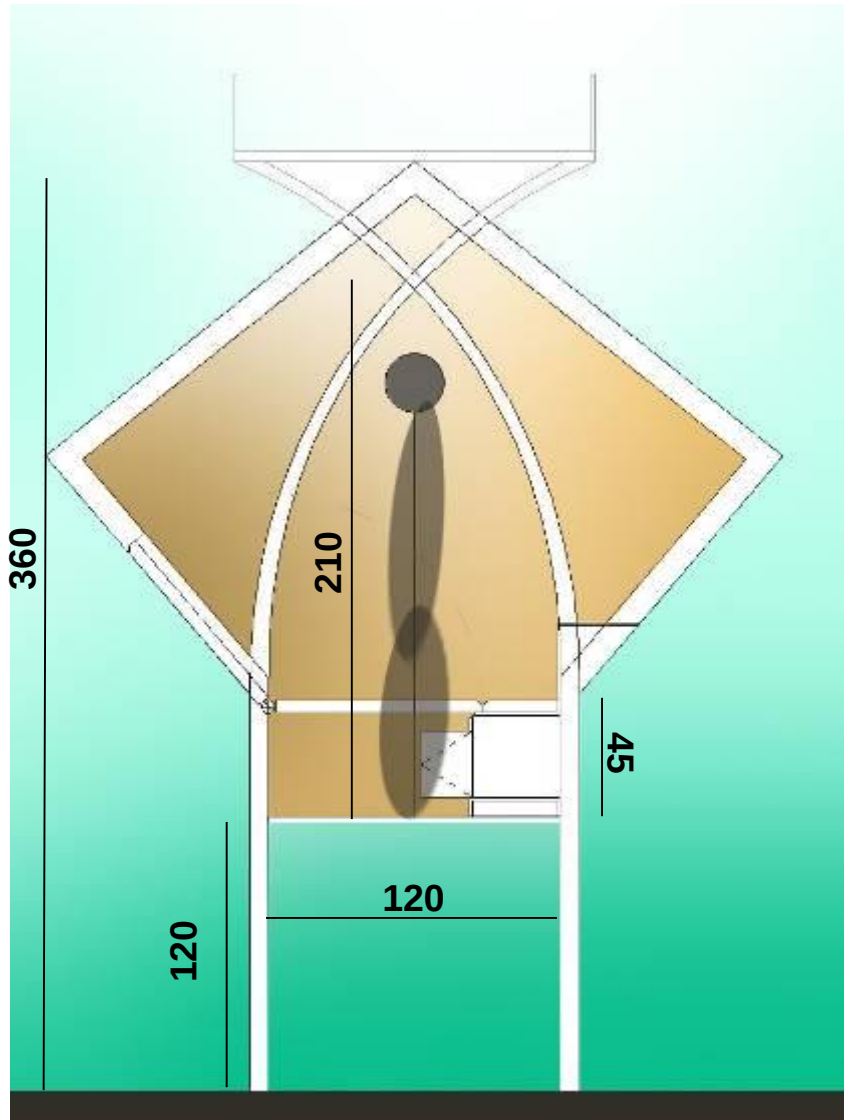
Option 01



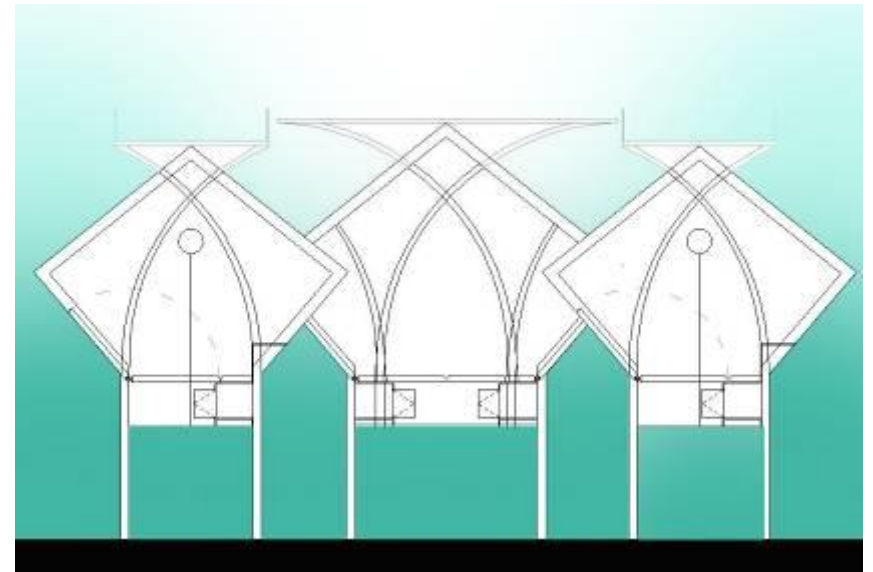
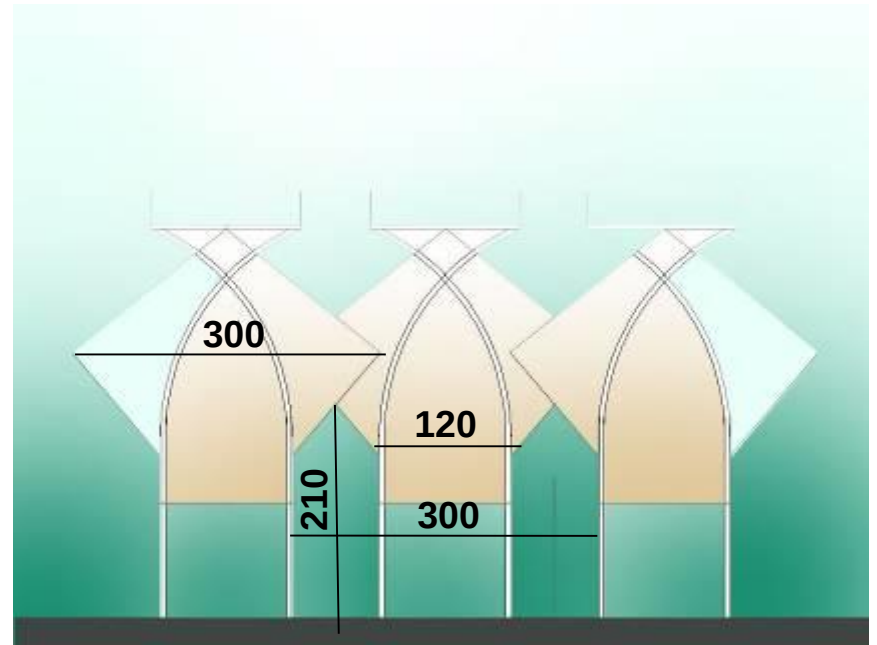
All dimension in cm

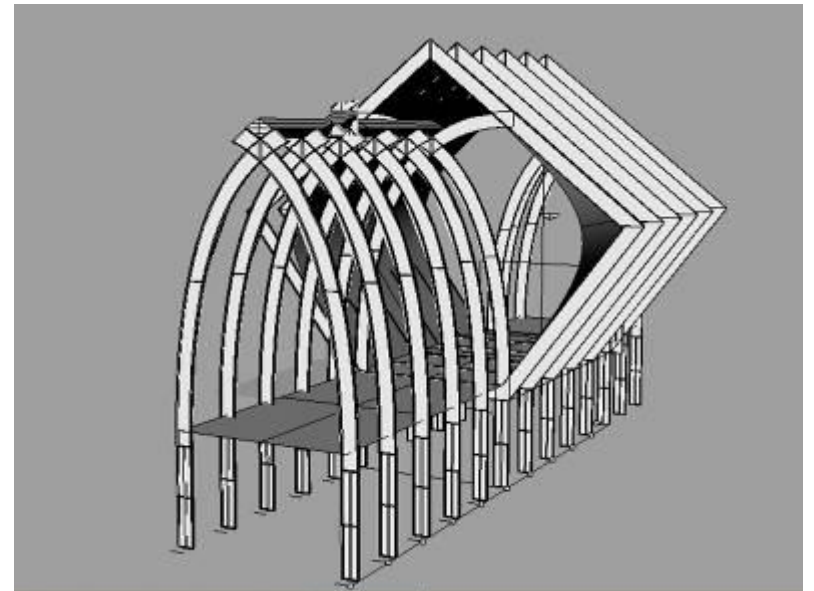
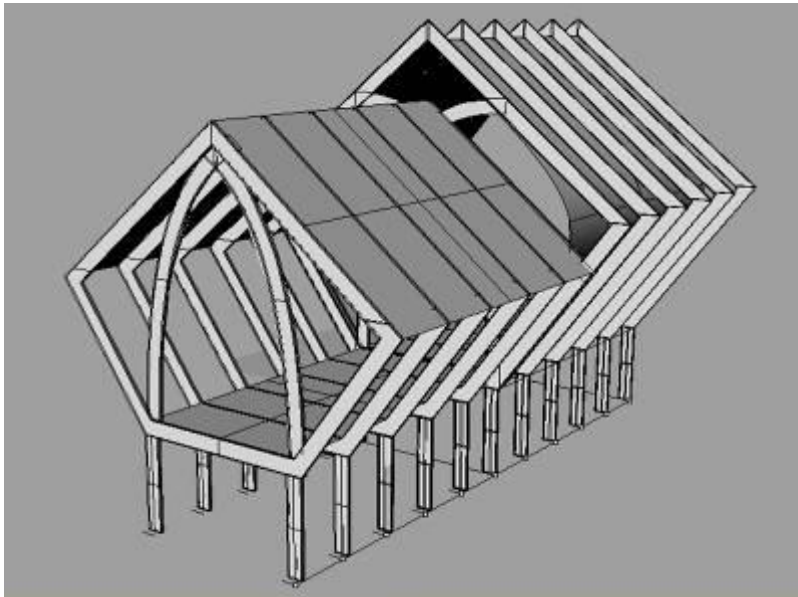
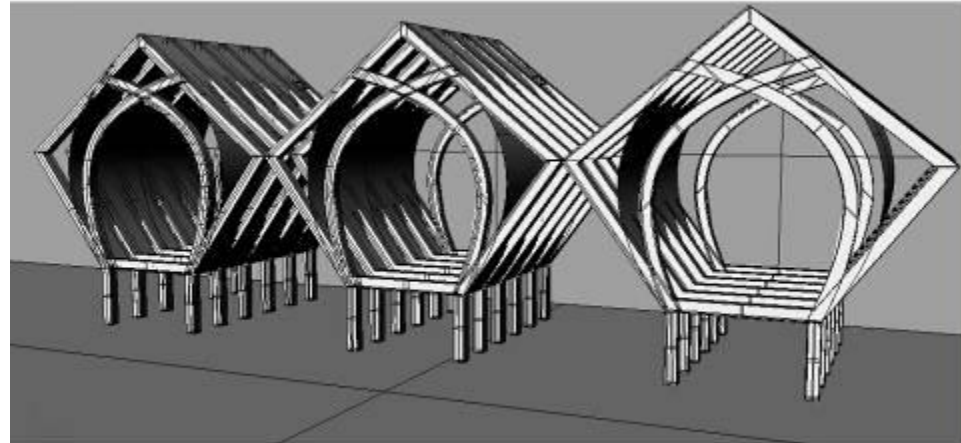
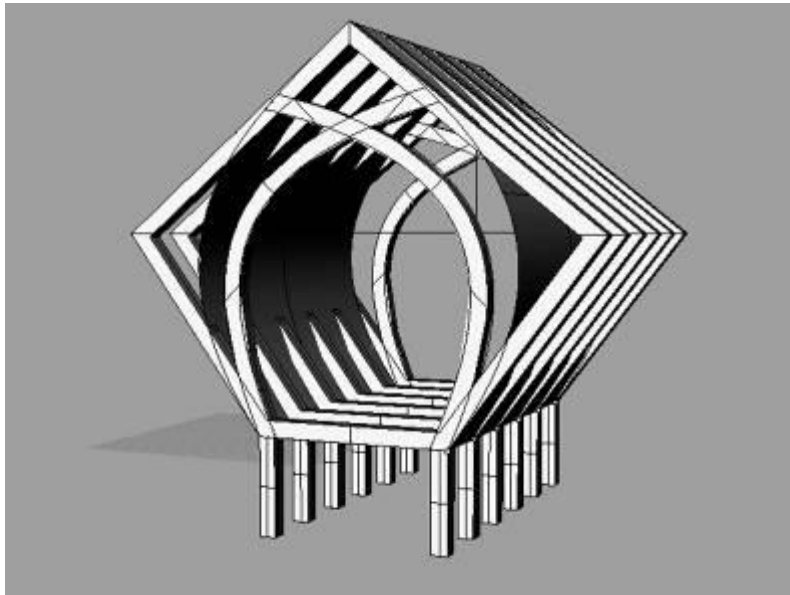
Option 02

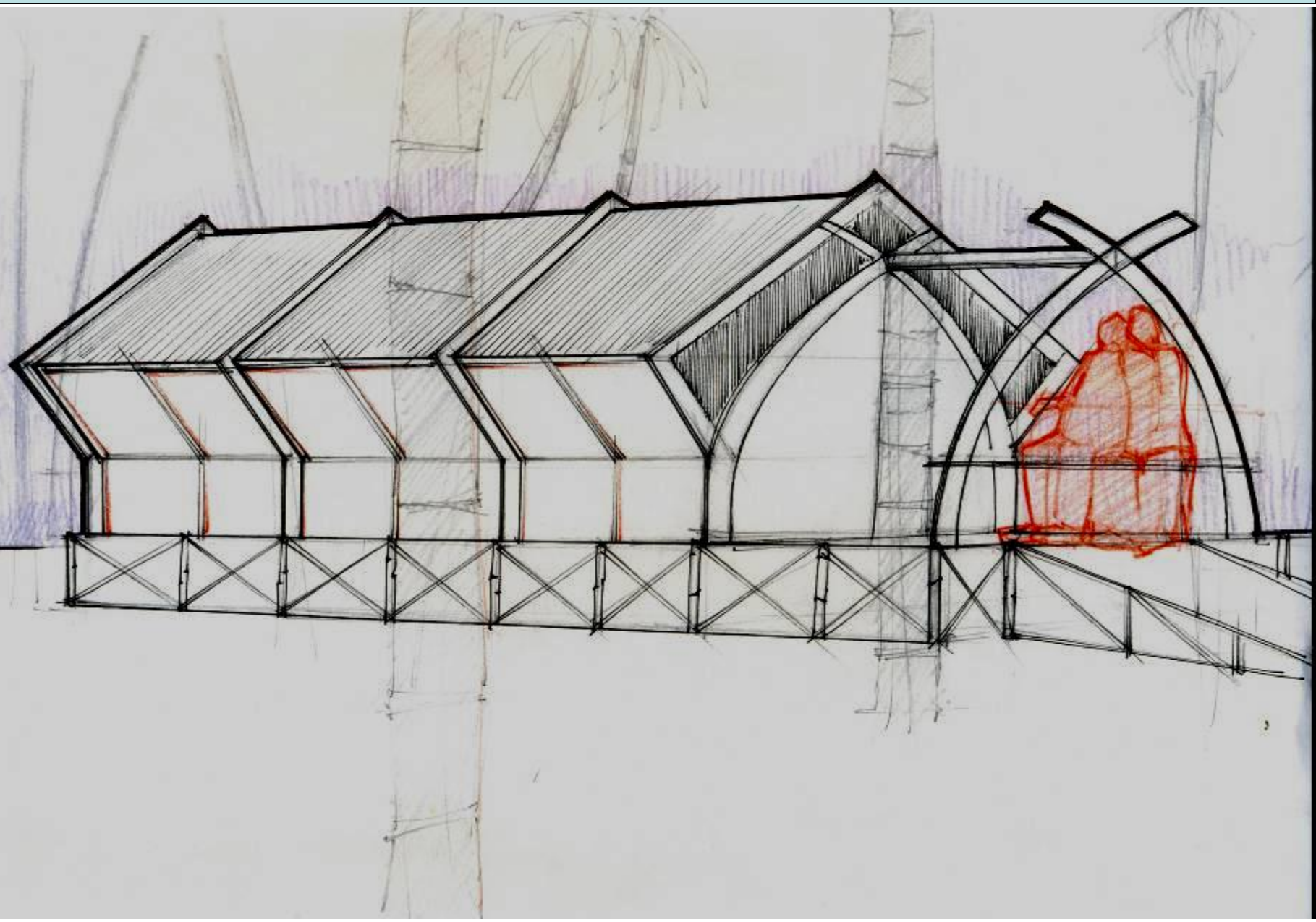


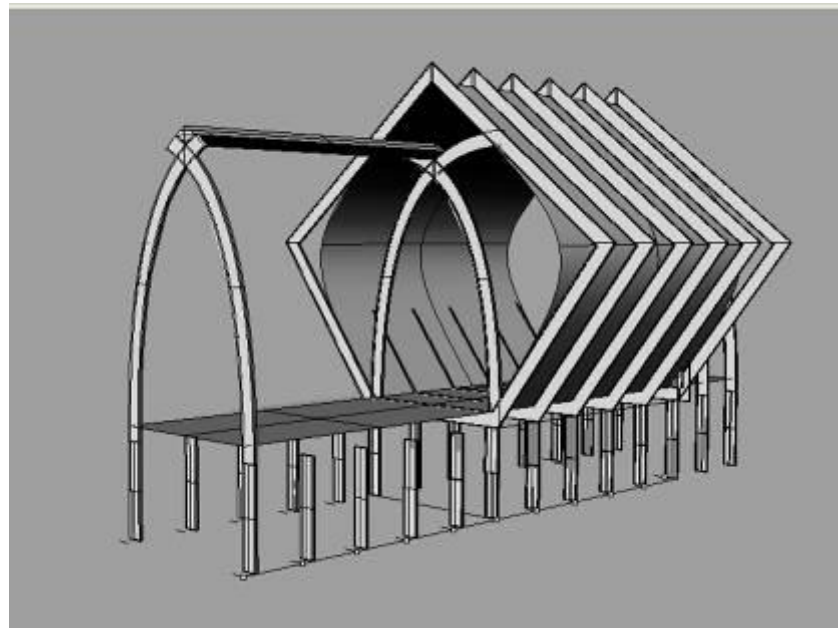
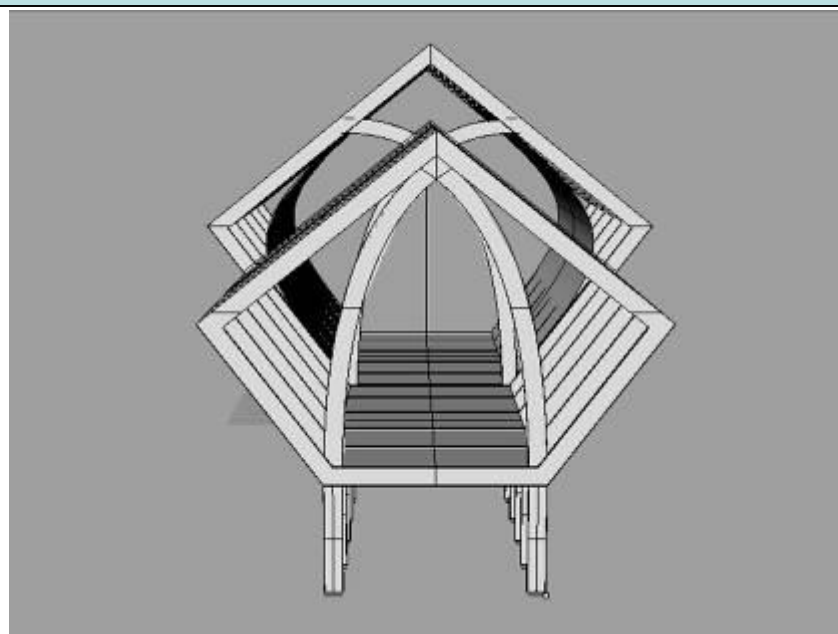


All dimension in cm

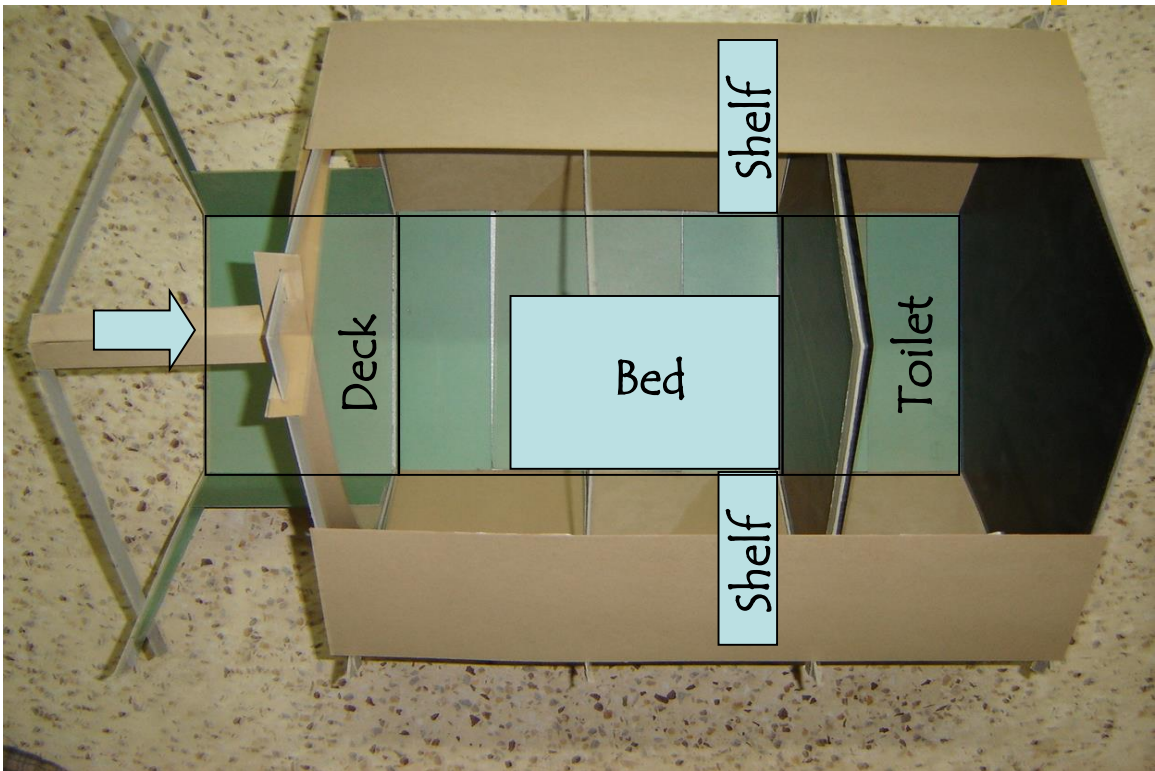
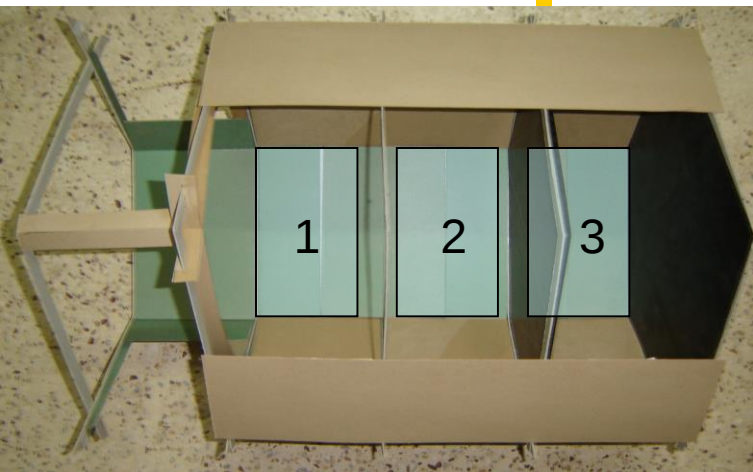








Concept 01 and Concept 03-b were condensed to form a holistic design.



- Assembly is complicated and time consuming
- Repetition of forms and panels
- No exploration of molding properties of FRP
- Large number of elements
- Large number of joints
- Deck at a lower height

Exploratory Model

Final Concept



The structure was envisioned in FRP which stands on bamboo stilt foundation and has thatched roof



Present

Bamboo structure
Coconut leaves for
walls and roof

Complete
replenishment

Local
craftsmen

Vision

FRP structure
Bamboo stilt
foundation and
thatched roof

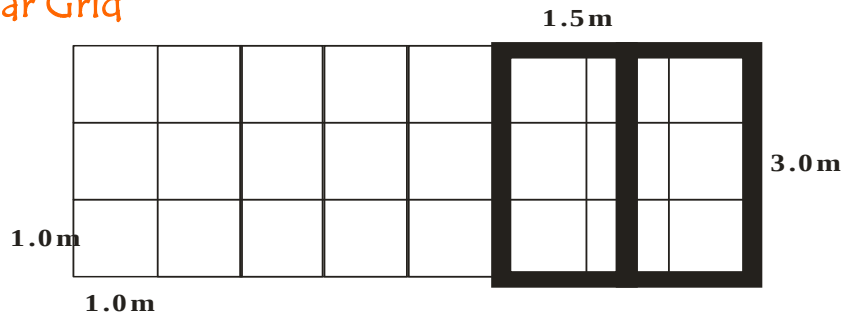
Partial
replenishment

Local
craftsmen

Further refinement

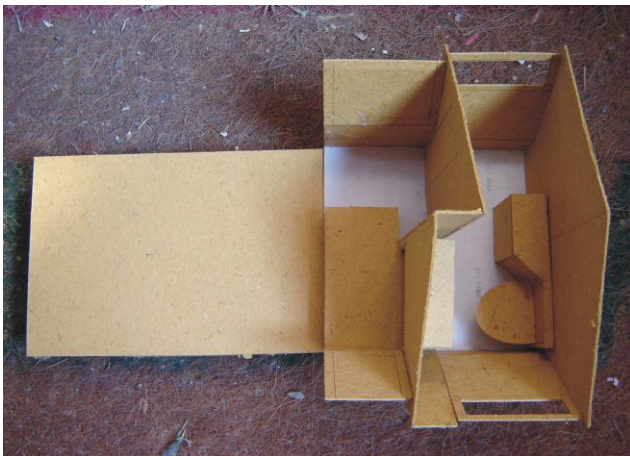
Final Concept

Modular Grid



Grid
Module size

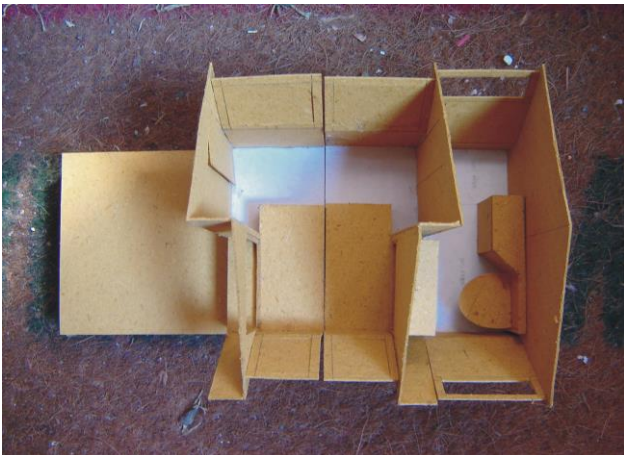
- 1 x 1m
- 3.0 x 1.5m



Type I

Single Occupancy

Built area - 3.0 x 3.0m
Modules - 2 No.s
Unbuilt area - Verandah

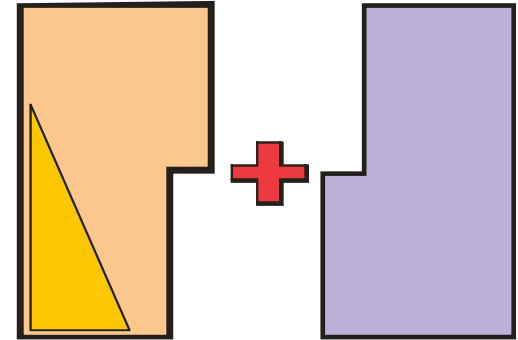


Type II

Double Occupancy

Built area - 3.0 x 4.5m
Modules - 3 No.s
Unbuilt area -
Verandah

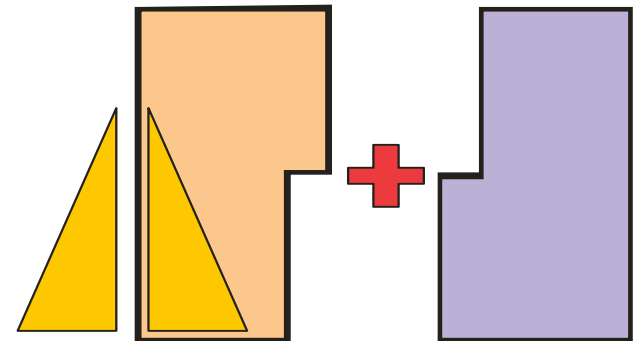
Arrangement of modules



Room
Module

Toilet
Module

Type I
Single Occupancy



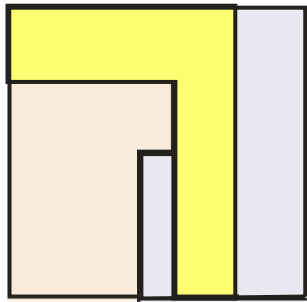
Room
Module
(RM)

Room
Module
(RM')

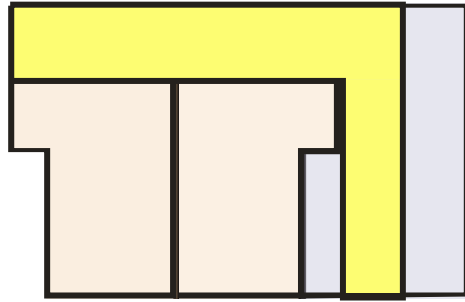
Toilet
Module
(TM)

Type II
Double Occupancy

Circulation



Type I



Type II

Toilet

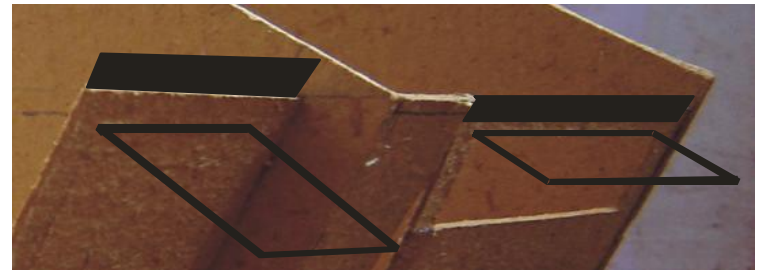
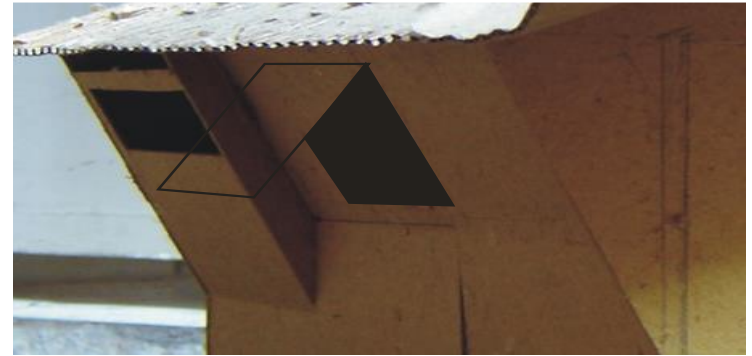
Wet
Area



Dry
Area



Ventilation



Ventilation band above openings

Openings are repeated in panels in same position

Windows are hinged from top

Position of window is offset to create **overhang**

Continuous ribbon of **ventilation**

Toilet as a **secure zone**

The design was evaluated
under the following heads

A. Based on viewpoint of **tourist**

B. Based on viewpoint of **manufacturer**

C. Based on viewpoint of **Beach Shack Owner**



N0.	Criteria	Points (0-9)
-----	----------	-----------------

1.	View to the Sea	5
2.	Sea Breeze with in the hut	5
3.	Semi open verandah	8
4.	Orientation of the bed	3
5.	Sand accumulation on floor	7
6.	Security of valuables	8
7.	Storage for clothes	7
8.	Toilet (Planning & Circulation)	7
9.	Ease of cleaning & maintaining	6
10.	Tactile sense	4
11.	Visual Image of Interior	6
12.	Form (Bi-cultural Identity)	7

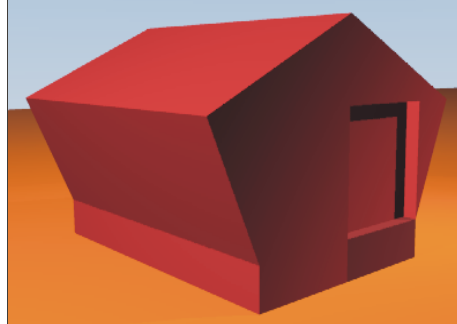
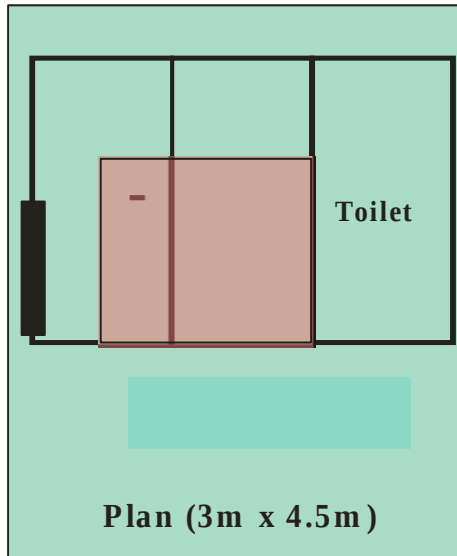
13.	Ease of Manufacture	8
14.	Modularity	8
15.	Number of Joints	4
16.	Structural Strength	4

17.	Cues for integrating furniture	3
18.	Ease of assembly / dismantle	4
19.	Storage of module after dismantling	6
20.	All huts when arranged in a shack	7

Evaluation
Final Concept

Based on the evaluation table the design was refined to three different options

Option 01

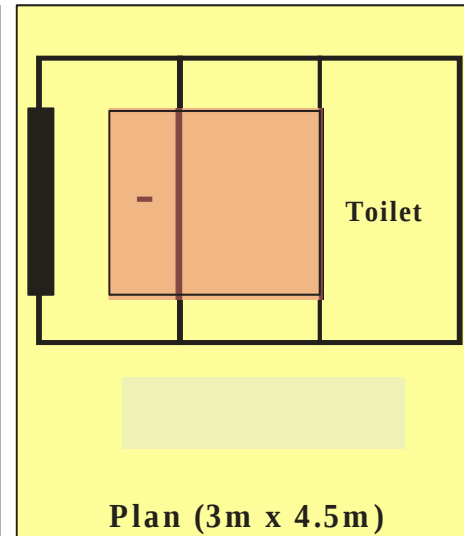


Salient features

Integrated furniture was replaced with cues for wooden furniture

Joints were reduced as compared to previous model. Hence had better structural strength

Option 02



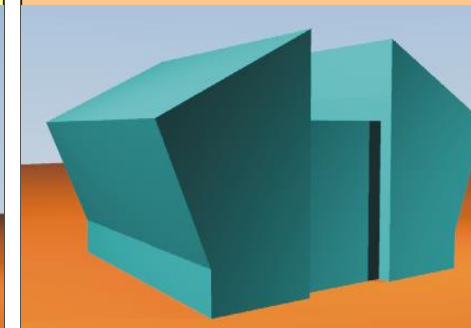
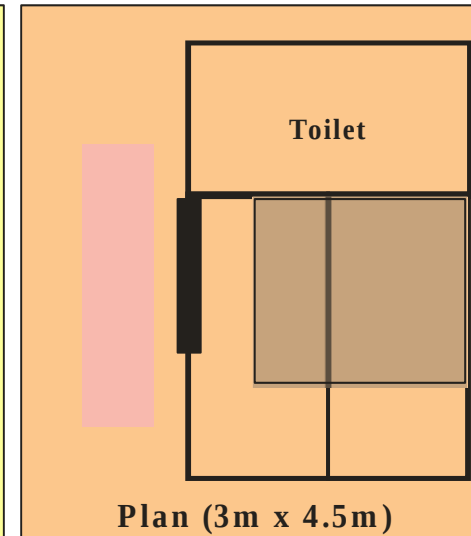
Salient features

Bed was positioned at center for better view of sea and interiors

The main door is centrally located and the form is more or less symmetrical

The main deck has longer seats on either side

Option 03



Salient features

Toilet can be accessed as soon as you enter

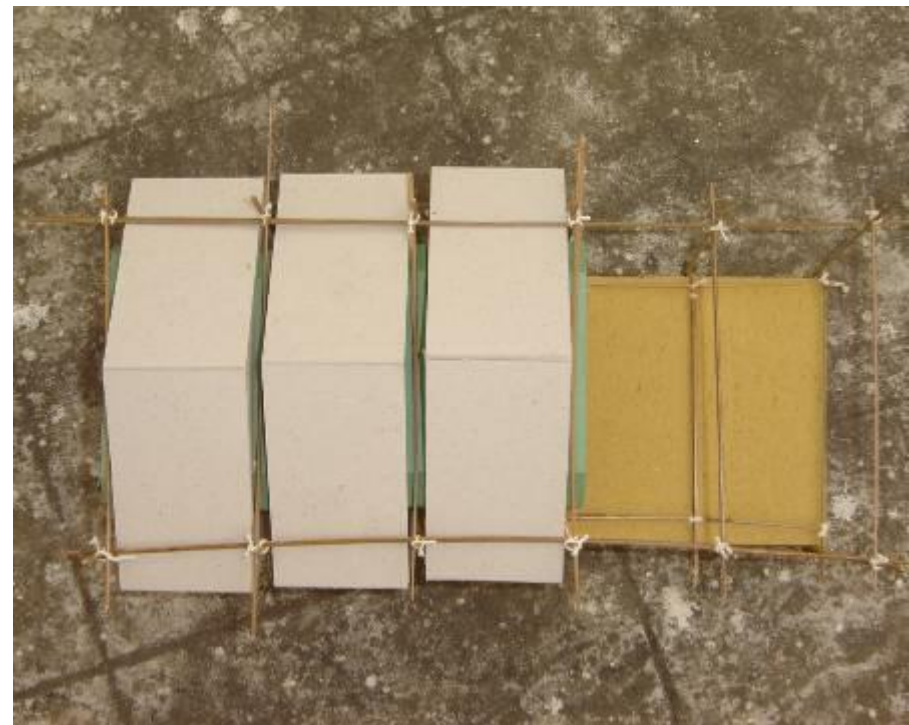
Though the module has achieved a good design, it rates low for modularity and view to the sea from interiors

All three options were evaluated for the same criteria

Evaluation of options		Option 01	Option 02	Option 03
1.	View to the Sea	5	8	6
2.	Sea Breeze with in the hut	5	8	8
3.	Semi open verandah	8	8	8
4.	Orientation of the bed	3	8	8
5.	Sand accumulation on floor	7	5	7
6.	Security of valuables	8	8	8
7.	Storage for clothes	7	8	8
8.	Toilet	7	7	5
9.	Ease of cleaning	6	6	6
10.	Tactile sense	6	6	6
11.	Visual Image of Interior	6	8	8
12.	Form (Bi-cultural Identity)	7	8	3
13.	Ease of Manufacture	8	8	5
14.	Modularity	8	8	3
15.	Number of Joints	8	7	7
16.	Structural Strength	4	7	7
17.	Cues for integrating furniture	7	7	7
18.	Ease of assembly / dismantle	4	7	5
19.	Storage of module	6	5	5
20.	All huts arranged in a shack	7	8	5
Total		127	145	125



Form Exploration
Final Concept



Form Exploration
Final Concept

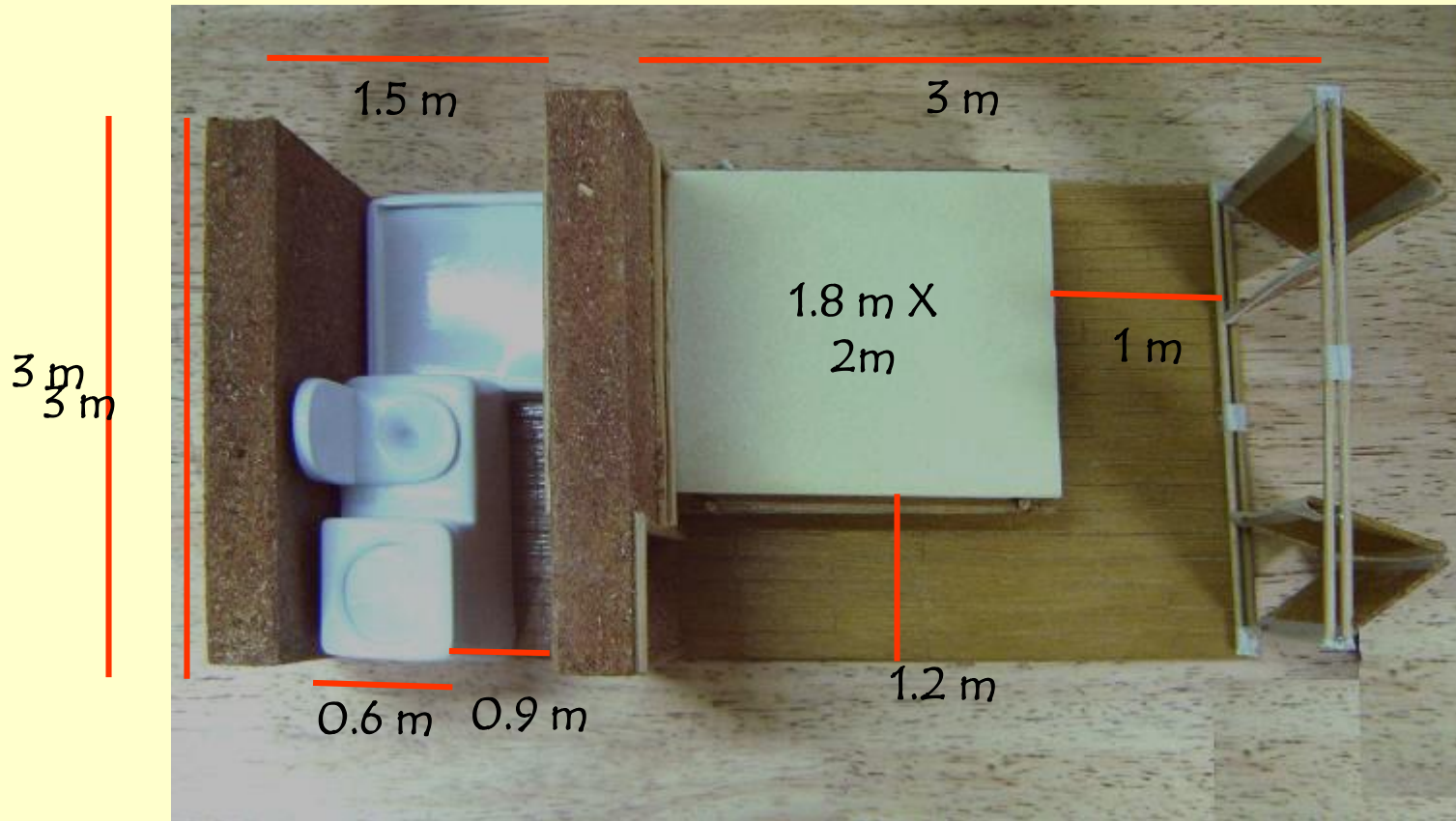


Final Design





3 basic modules combined together for a double occupancy hut. One module removed makes a single occupancy hut



Secure Zone
(PRIVATE)

Semi-open Zone
(PUBLIC)

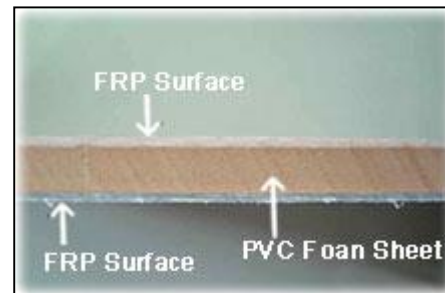


Planning
Design



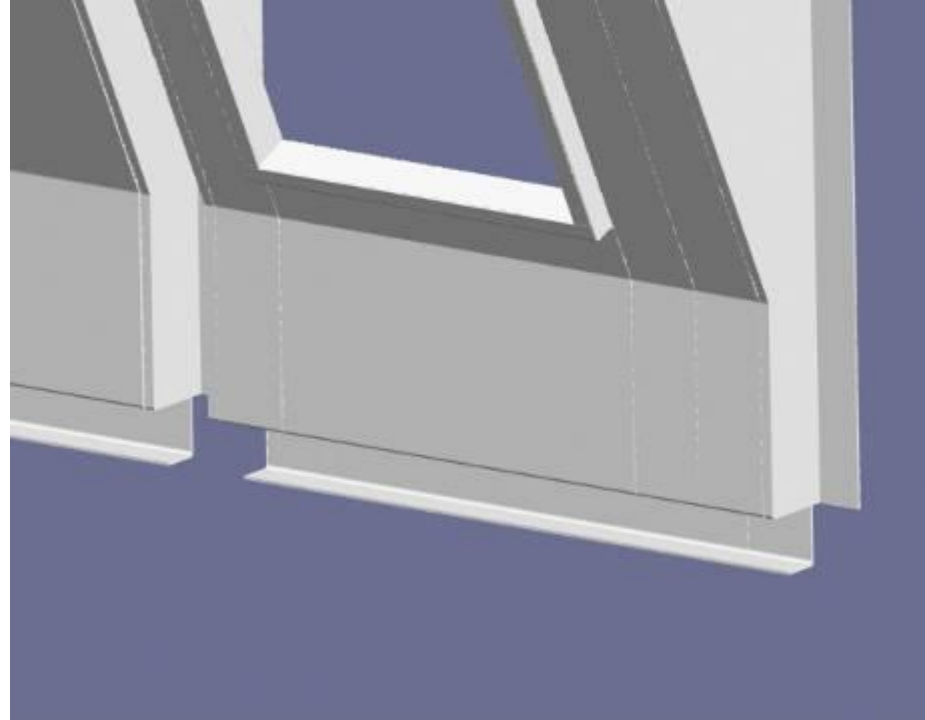
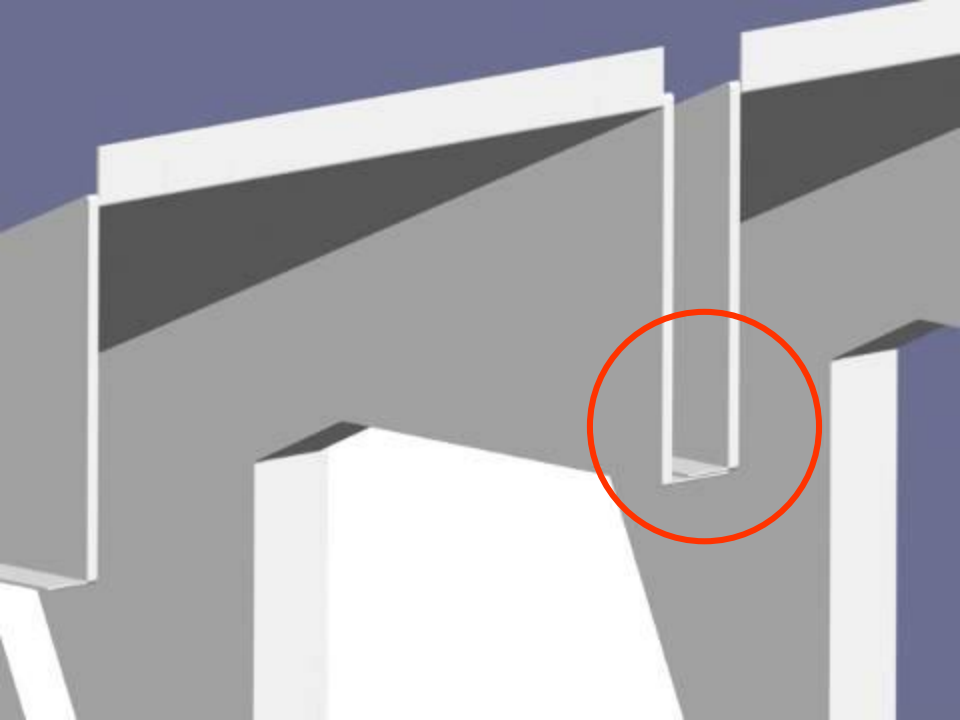
One half of the basic module (1.5m X 1.5m) fits into the other half and can be easily stored when not in use for 6 -7 months.

The composite FRP has Aluminium extrusions moulded at flanges for strength and joining details



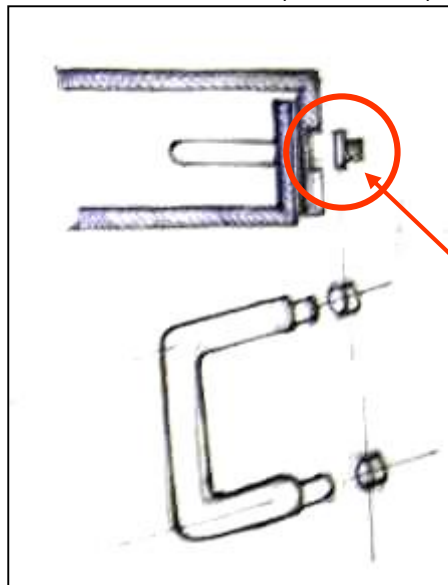
3 cm thick FRP sandwich walls

FRP Modules
Design



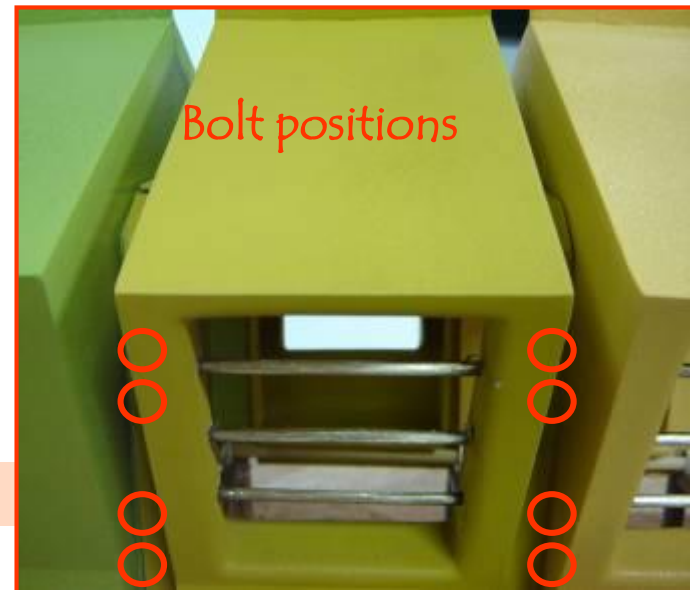
The 2 halves are slid into each other and bolted at 6 nodes

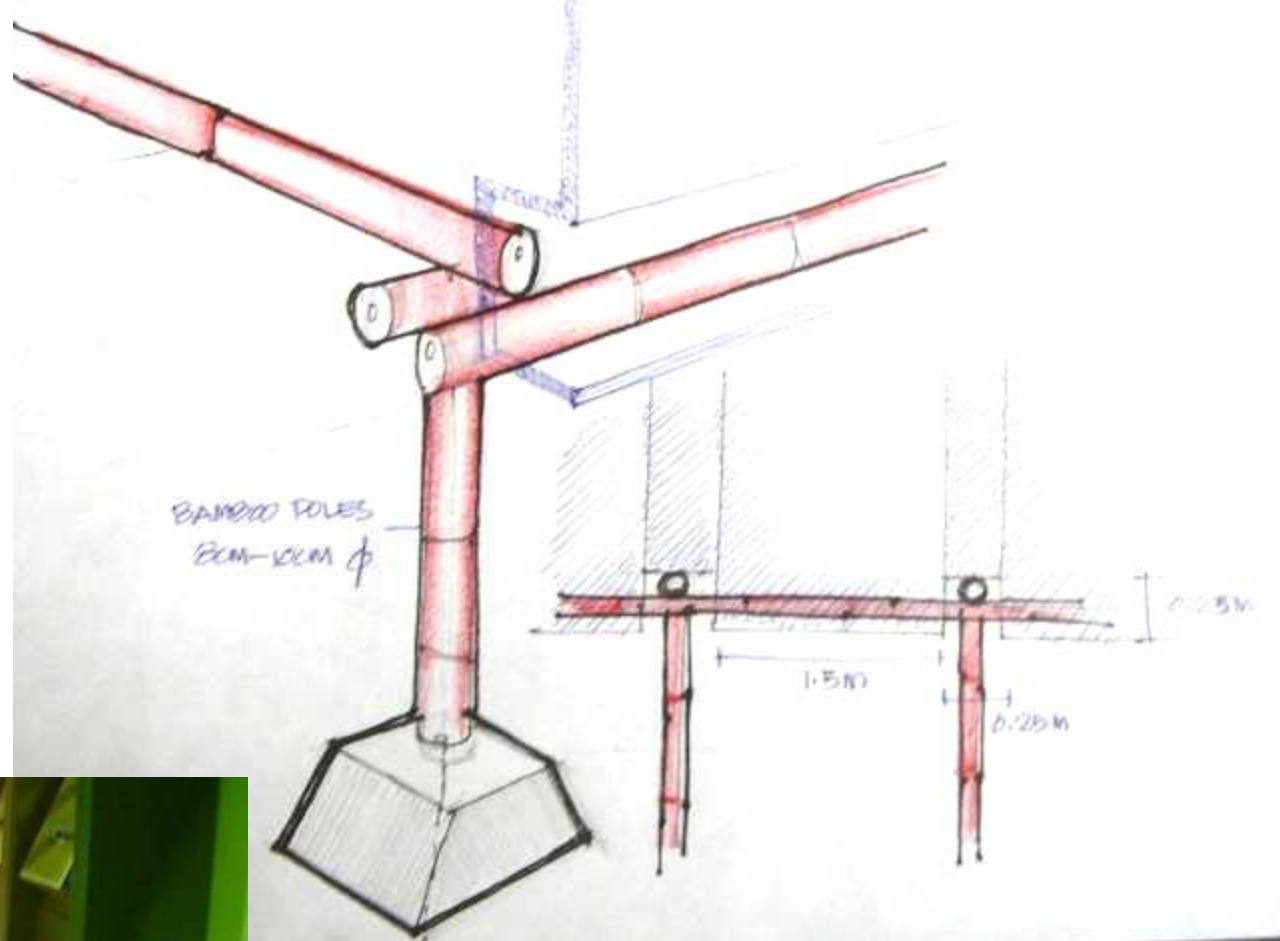
The moulds are designed to incorporate bamboo into the FRP joints



Fixing the panels is made easier by means of double-screw headed stainless steel joints.

Capping screw sits within the FRP wall for flush surfaces





30cm X 30 cm concrete footing

Vertical strut - 150 cm

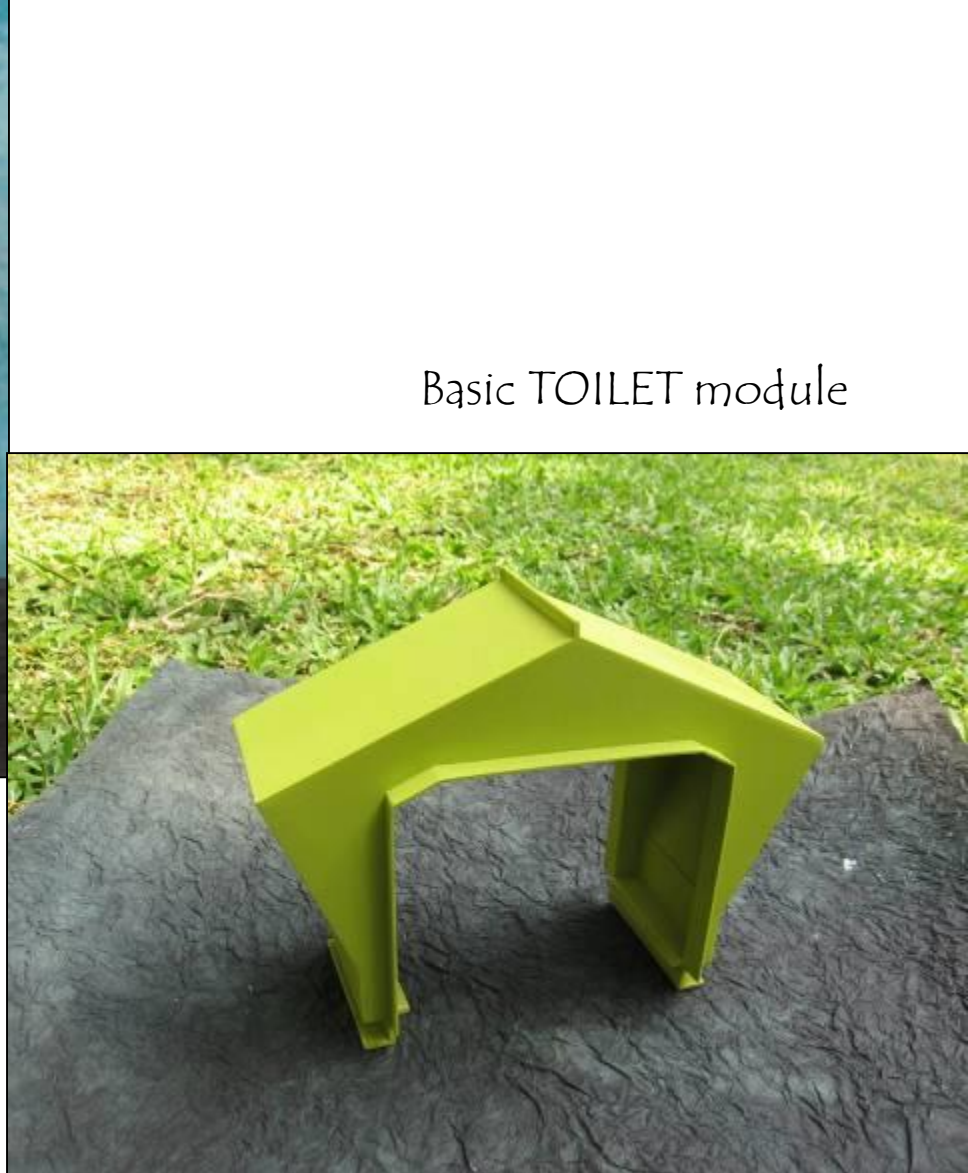
FRP section for seating bamboo - 25 cm

Construction

Detail



Basic ROOM module

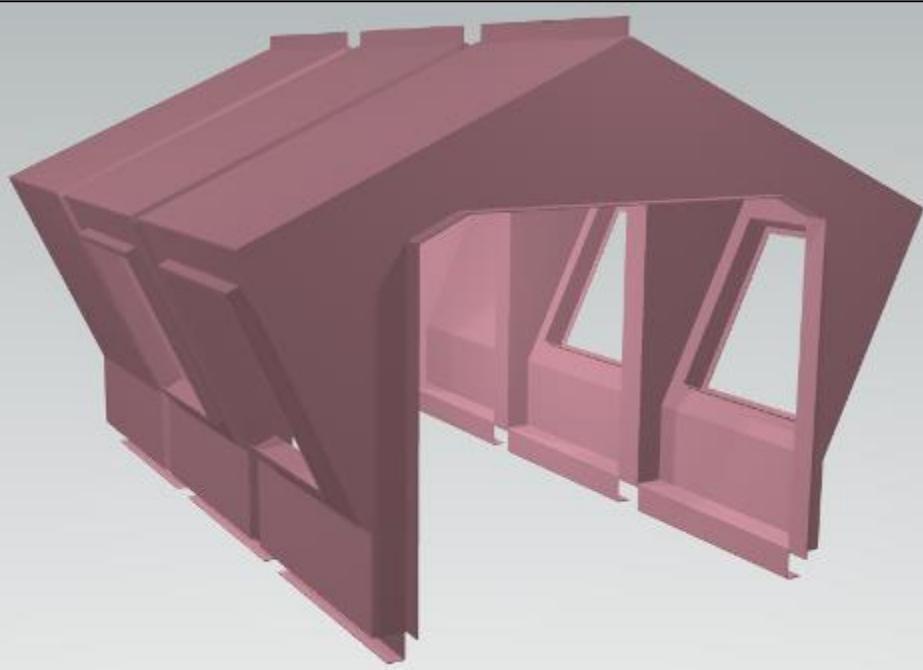


Basic TOILET module



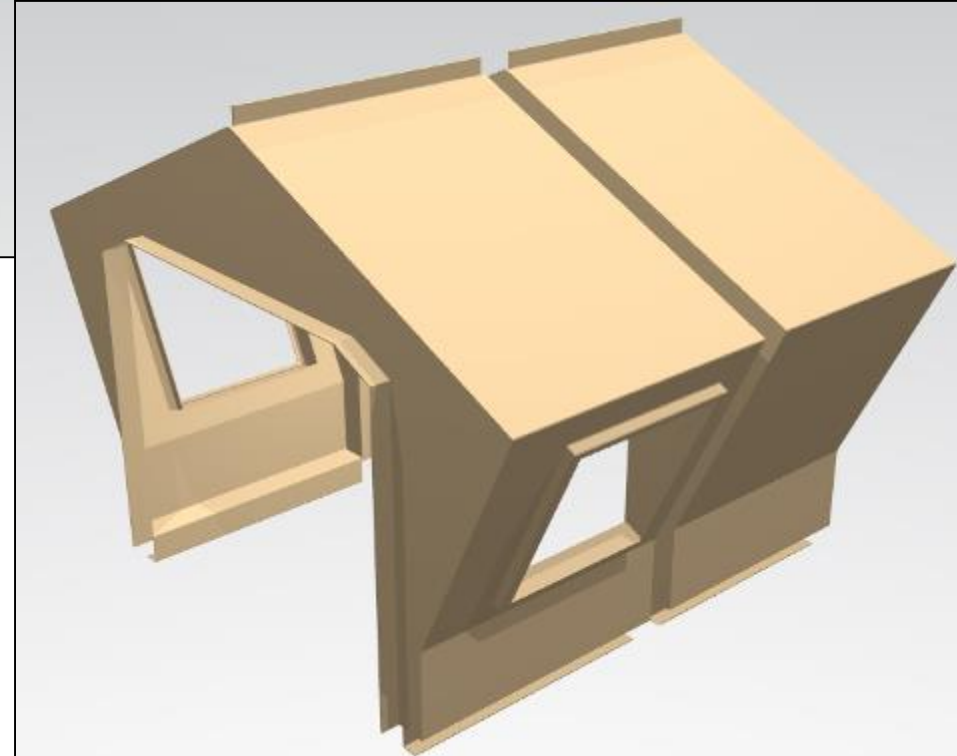
FRP Modules

Design



Double occupant unit

Single occupant unit



Mode of Assembly

Design





Bright colours are used to bring in zest in the beach life

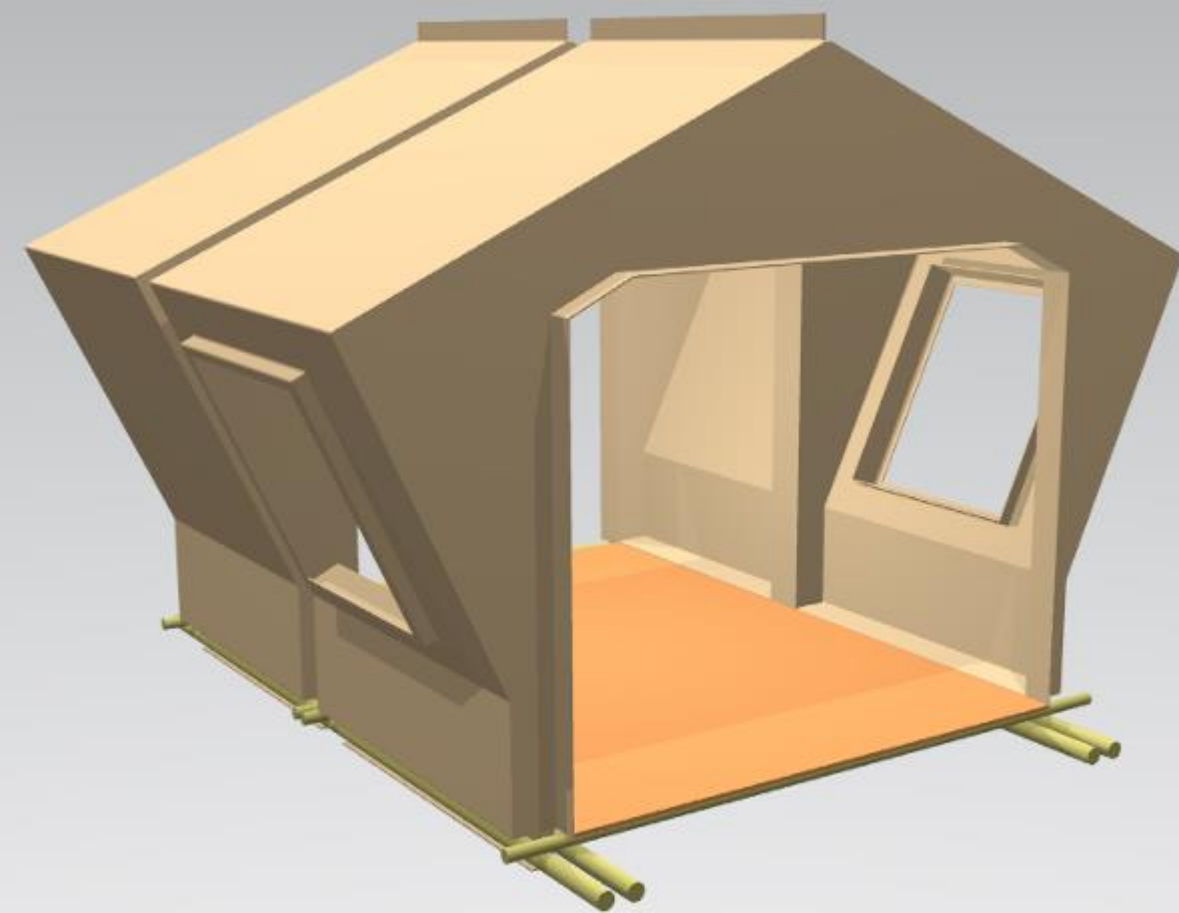
Modular units can be repeated to suit the shack owner's requirements



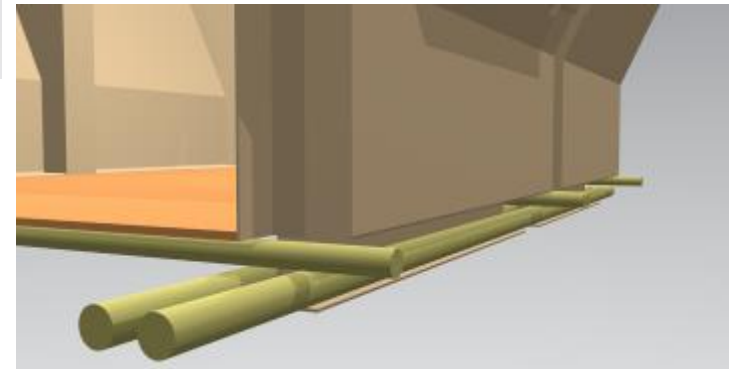
Customisation

Design





FRP units are assembled into Bamboo frames through sections and flooring is slid into thereafter.



Construction

Details





Outside porch provided in the floor deck – provides a sit-out space with a good view to the beach

Floor deck

Design



The structural bamboo that comes within the hut extends to form the support structure of the deck

The deck is further bounded by bamboo railings for the parapet

Vents provided above for good ventilation through and through.

The deck floor is placed 10 cm below the actual floor level – This helps brushing off sand from the feet before entry into hut.

Further, it also controls the seepage of rain water into interior floor.

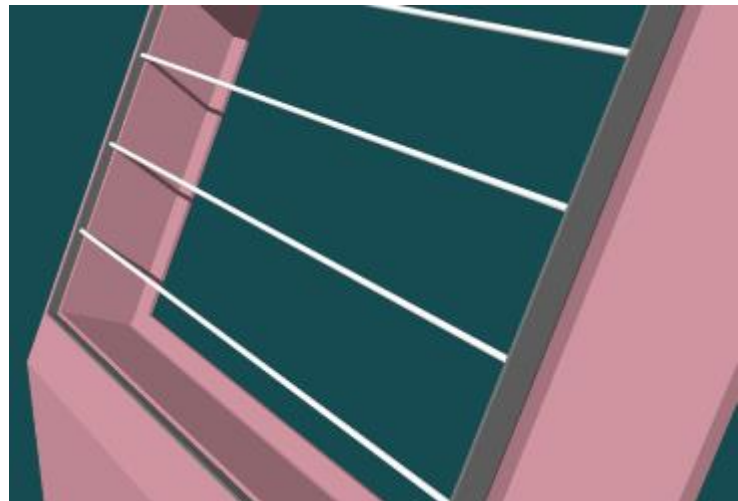
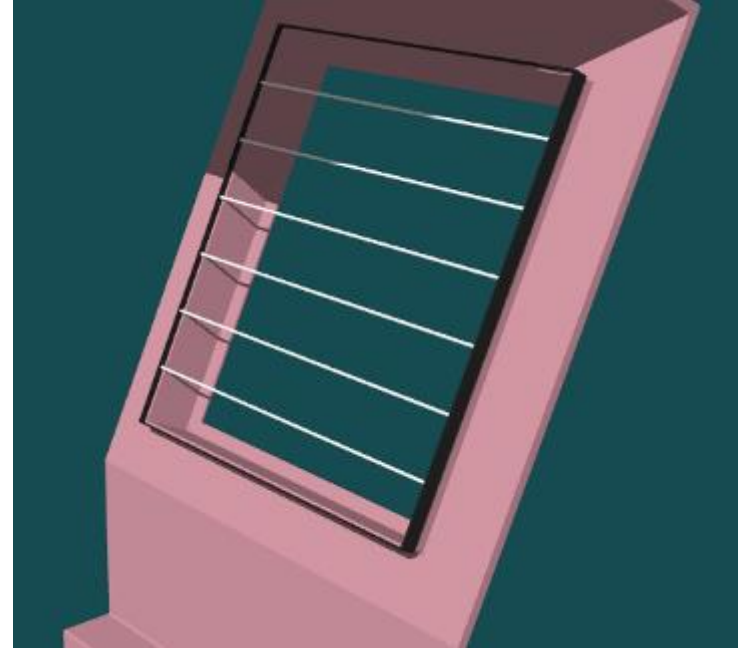


Floor Deck

Design



Initial explorations of window detailing



Window aperture

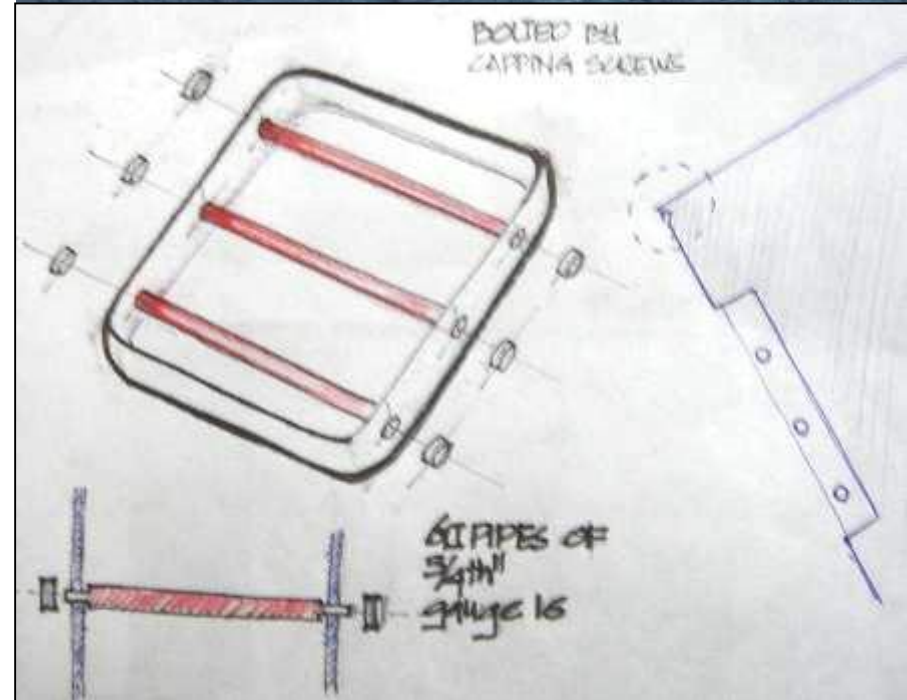
Design



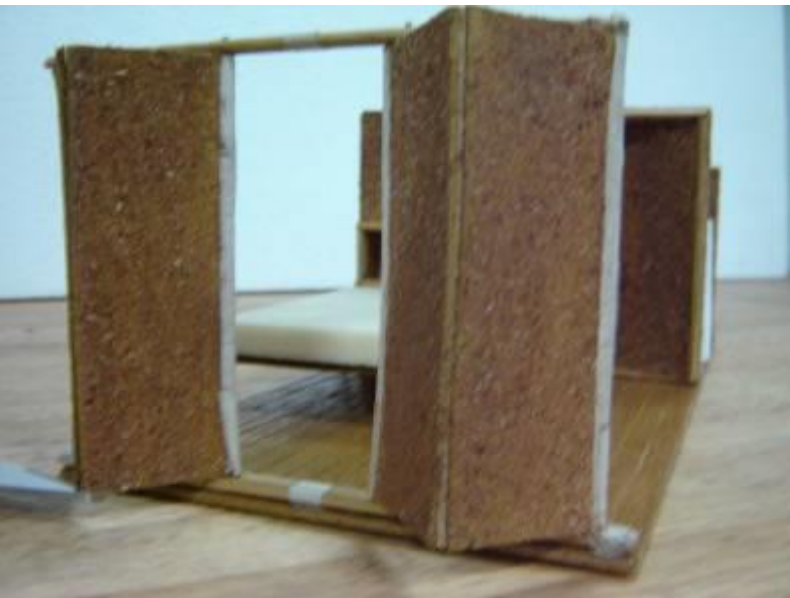
$\frac{3}{4}$ " GI pipes with screwed heads are bolted using capped screws securely onto the FRP window flange



Bamboo chik screens are used as curtains. They can be treated once for one tourist season



Window detailing



Shutters are provided for the main entry. Sliding details with laminated marine ply are provided



Shutter detailing
Design



Hut-ness of a beach hut –

Sloping roof, Bamboo poles, Stilt construction, Experience of sitting on a deck, Large front opening

Goan-ness of Goan built structures –

Bright colours, steep sloping roof, verandah space as a node of life, broad frames for openings

Temporary-ness of temporary structures –

Use of bamboo for foundation, visible joints using ropes



Bicultural identity



Interiors
Design



Partition walls are made of plywood for a better tactile sense.

Storage shelves above bed-head

Partition wall, 25 cm, accommodates double sided shelves to both room and toilet area.

25 cm FRP flanges are exploited for positioning partition walls, ducts.



Interiors

DUCT WALL

25cm thick duct wall to accommodate the water inlets, waste water and soil outlet pipes.

Well demarcated WET and DRY areas in the toilet



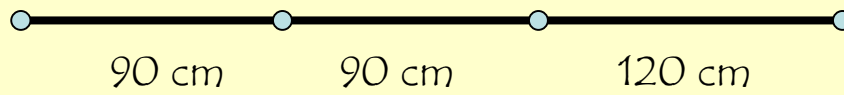
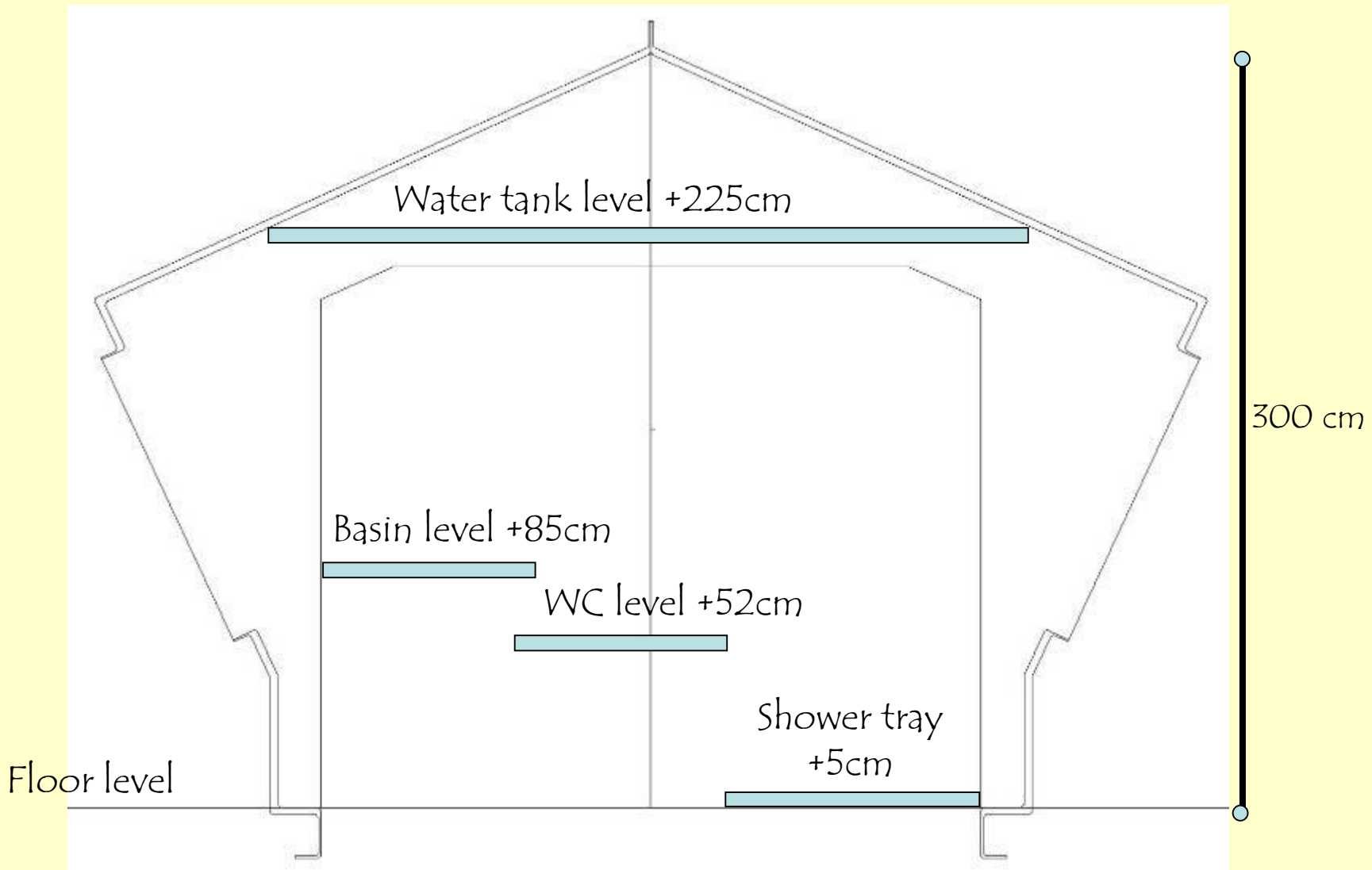
Wash basin 0.9m X 0.6m
W.C 0.45m X 0.6m
Shower Cubicle 1.2m X 1.5m

Single moulded FRP unit into which WC and Basin sits

Bath and toilet

Design





Toilet section

Elements	Material
WINDOW	GI pipes – grills specially designed – Glazed Aluminium extrusions
PARTITION WALL	Marine ply – FRP molded units – Rubber wood panels
INTERIOR WALLS	Paneling on interiors surfaces



Levels of upgrading





Thank you