

Cutlery Explorations using coconut shell



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Approval

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“Cutlery Exploration using coconut shell”

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It is approved as a partial fulfilment of requirements of a post graduate degree in Industrial Design at IDC, IIT.

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External Examiner:

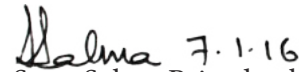
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Declaration

I declare that this written submission represents my own ideas and where other's ideas or words have been used, I have adequately cited and referenced the original sources. I also declare that I have adhered to all the principles of academic honesty and integrity and have not misrepresented or fabricated or falsified any ideas/source/fact in my submission. I understand any violation of the above will be the cause for a disciplinary action by the institute and can also issue penal action from the sources which has been thus not been properly cited or from whom proper permission has not been taken where required.


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I take this opportunity to thank the entire Industrial Design department for the success of the project.

I express my gratitude to my guide- Prof R Sandesh for his consistent support and faith in the project and on me. The learnings from the project has been immense. I am immensely thankful to Sir Vinayak Nabar for providing useful study materials and his valuable feedback.

I am grateful to my classmates for contributing their valuable insights to this project

Design Brief

Working in the area of cutlery exploration using coconut shell primarily and other materials, and looking into useful intervention of technology in making the products.

Abstract

Coconut palm tree is one of the most valuable natural resources. It is called 'Kalpavriksha' meaning wish-fulfilling divine tree. It is because almost every part of the tree is used in some or the other way. Coconut shell has always been used as a cooking fuel and to make small multiple-utility bowls or serving spoons with simple bamboo joinery. Coconut Shell has remarkable properties such as strength, hardness, durability and resistance to fungal attack. These properties can be used to make products of different varieties and it has a huge scope in market. The project aims to change the perception of coconut shell to something that could be used creatively and aesthetically as a lifestyle accessory espousing crafts, craftsmanship and related livelihood.

An in-depth study of coconut shell such as its anatomy, structure, composition, patterns and texture was done. Not only this, the variety of cuts to produce different forms was also looked into. Understanding appropriate and relevant tools to work with shell was one of the crucial parts of the project. This led to discovering new tools that could be used. Example of one such tool is the ordinary wire brush that could be mounted in the drilling machine to clean the insides of the shell. Prior to this, cleaning the insides of shell was done manually which was took more effort and was time consuming. After an initial phase of exploring possible product range, cutlery (ladles and spoons) was chosen for further exploration. Study of available cutlery, its anatomy, proportions and usage was done. Since the shell is

hard, quick and dirty mock-ups were done through soft prototyping. In this, plastic balls were used in place of coconut shell. Similarly, other materials such as PVC pipes, styrene, soft aluminum etc. were also used. Joinery details to improve stability, strength and to enhance aesthetics of the product were tried out. Various mock-ups were made and the desired ones were selected to be developed with coconut shell. The process then focused on combining the shell with other materials such as bamboo, wood, steel, brass and aluminum for material exploration. The explorations fell in these categories:

- 1) Combining shell with natural materials such as wood, bamboo, cane etc.
- 2) Combining shell with industrial material such as steel, brass, aluminum etc.
- 3) Combining shell with both natural and industrial materials etc.

We went ahead with the third category because it was a new area where industry and craft could come together. Three materials—coconut shell, aluminum wires and bamboo were used. Jigs were designed for easy production and replication of different parts in less time. As part of the final deliverable a range of a family of ladles was proposed. Branding and logo details were done to complement the product. 'Utsavam' which means celebration chosen as the name of the product range. This was to imbibe the celebratory nature of the product.

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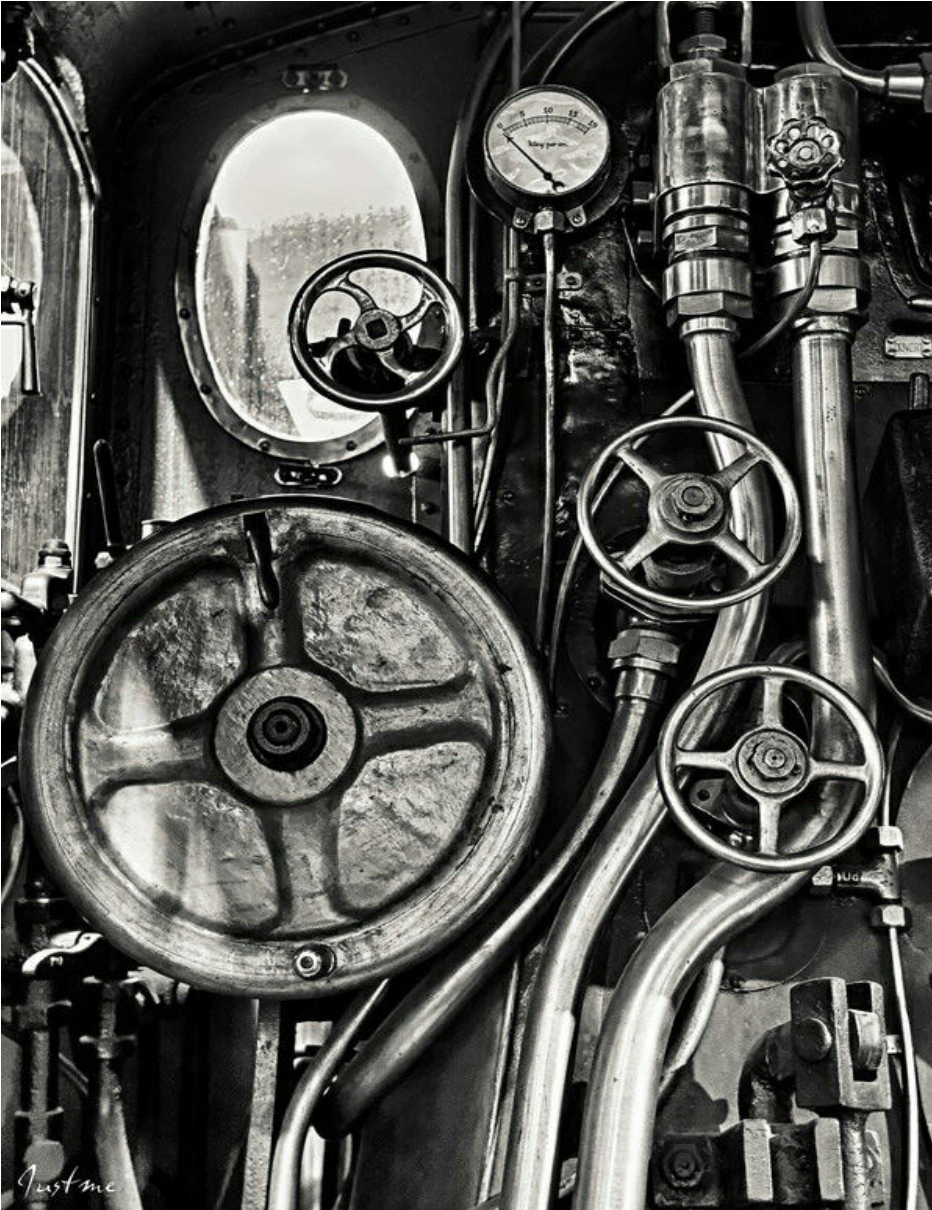
Introduction

The art of making products using natural materials for decorative and utility dates back long in human history. In early days the productive economy of a state was based upon its craft system. Craftsmen formed the spine of the society. From black-smiths to carpenters to weavers, all were such important threads of the social garment.

The coming of Industrial revolution marked a time where craft system declined. Breaking down highly complex tasks to a series of simpler ones, industrial machines increased the scalability of consumer goods. In an age where man and industry have such a strong connection with each other, it is important to ask a few questions. Will craft survive? How will it survive? Is it important for craft to survive?

This project is an effort to understand a few of these questions and the importance of design in it.





Technology and Industry

Technology - “The application of scientific knowledge for practical purposes, especially in industry” [1]

Industry - “Process of making products by using machinery and factories” [1]

Technology drives our societies today. How many objects can we see around us untouched by technology? In one hand where technology has helped us in advancing economies to an extent that we now call it global economy, in the other hand it has also given rise to a state of physical and psychological pollution.

Technology has been a boon as well as curse. We can mass produce goods today without much dependence on highly skilled labour. A rise in industry has gone in parallel with a fall in traditional norms. The extent to which technology is to be used has often raised ethical questions. Does technology improve or worsen human conditions has been a constant philosophical debate over many years.

Craft

“An activity involving skill in making things by hand”[1]

Craft, skill and experience goes hand in hand. Craft be it for pastime or a profession needs the knowledge of skills to achieve the desirable product. We have moved from an age where craft was passed on from the craftsman to his/her apprentice to an age where it can be learnt on online forums.

Although rich in value, craft and craftsmanship have limitation. Consistency in products, mass production, quality can all be questioned when one looks at the competence craft. Craft depends on the craftsman. Age, social and economic influences may force craft as well as the craftsman out of their space.



Coming Together

The benefits of machine-made and man-made has to be compared to understand what is more conducive to the process of making the artefact. The beauty of design is that it can get technology to enhance craft and craftsmanship. The gaps of one can be symbiotically filled by the other.

Careful design can over-come the difficulties of working with natural materials. Technology has made it possible to see natural materials like wood and bamboo in a commercial space. Specially in case of wood many dedicated tools and machinery have been designed which elevated it to be treated as a industrial material.

A similar path can be taken for many natural materials so that they can sit at par with industrial materials as plastics, steel. Although one can go to the extremes and make a product completely machine-made or completely handmade, developing products which merges industry and craft was one of the major aims of the project. One existing example of such a model can be seen Corrugated bamboo roofing sheets (CRBS) developed by IPIRTI, Bangalore. The bamboo mats are woven by people and these mats are then pressed between two specially designed corrugated pressing plates. This model produces products balancing and

enhancing both human and machine aspects.

One has to be sensitive to understand the balance of these two aspects to see that both are useful and appropriate interventions for each other.

Scope of the project

The properties and composition makes coconut shell sustainable, eco-friendly and durable to be efficiently used in products. It is believed that products using coconut shell carving could have been first experimented by sword making community, Vishwakarma community, in Kerala[2]. Mostly even now coconut craft is found in Kerala. India shell craft cannot boast much in creative employment unlike countries such as Cambodia, Thailand, Java, Philippines, Java etc.

The scope of the project is large in terms of what one can do with the material. The products can be made as a craft or parts of it could be made industrially and then fit into the product or the product can be entirely made in industry. Many products such as cutlery, jewellery, storage products, tiles etc can be made. People have also gone to an extent to crush the shell into powder and mix it with concrete to make construction architectural blocks.

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09 Research
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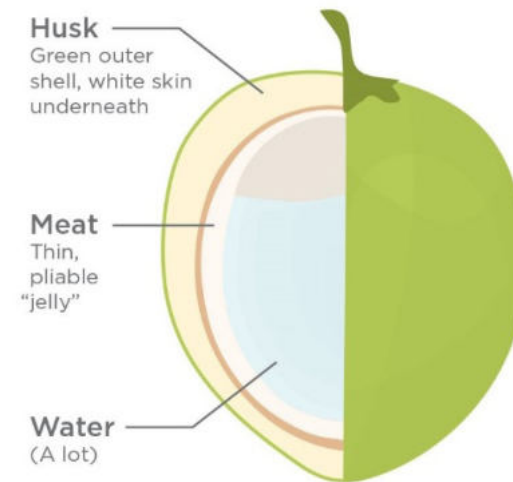


Coconut

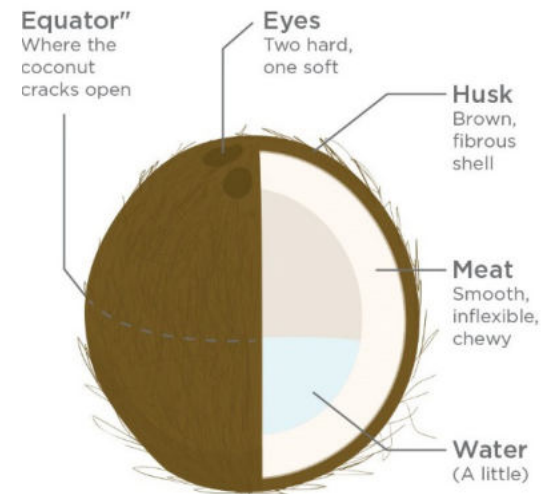
The beauty and challenge in working with coconut shell lies in the fact that it is a natural material. The material has to be worked in its natural inconsistent form. It needs a delicate and sensitive handling of the material if one decides to make products out of it. Every individual coconut shell would vary from the other and hence no product would be the replica of the other. Even the texture, fibres, thickness, a slight bump or dent on the surface makes every shell unique.

Transition in coconut

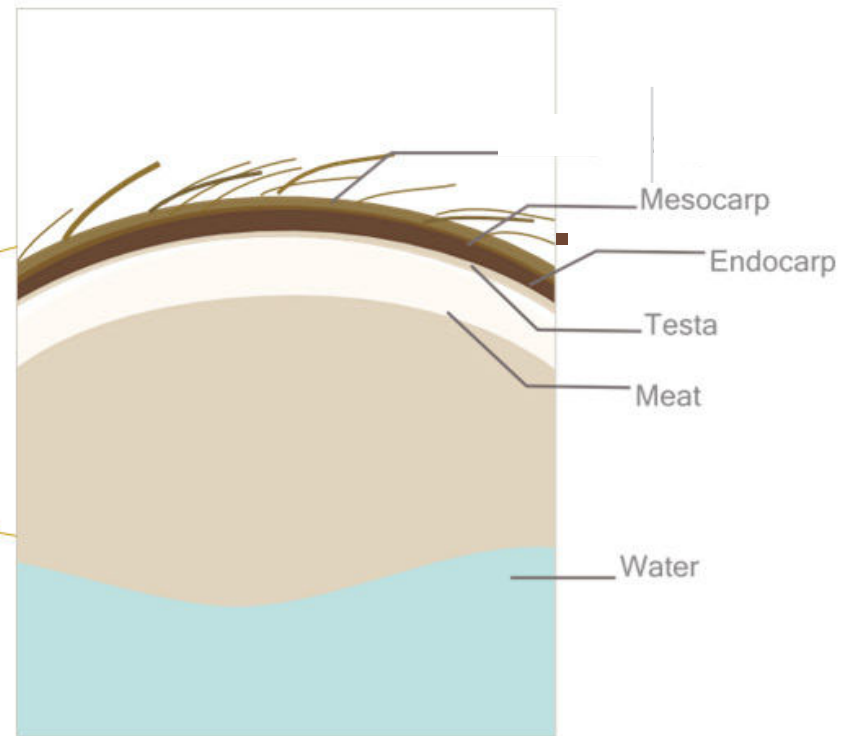
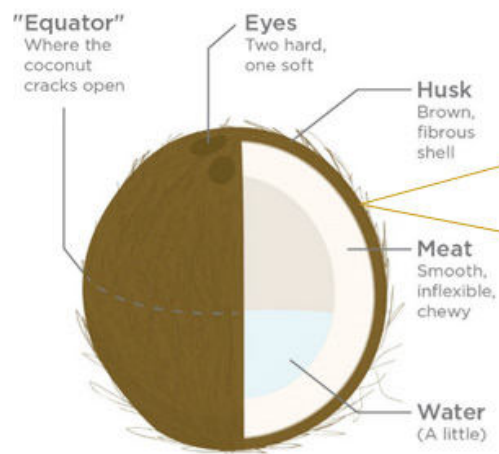
The tender coconut has a thick, fibrous outer husk. Underneath of it, it houses coconut water in an almost spherical case. This water slowly turns into edible meaty layer as the coconut matures. Slowly as the coconut matures the greener huskier cover becomes less in moisture content. The case in which coconut-water is stored hardens and becomes more brittle. The meaty layer thickens and becomes more chewy as the amount of water decreases.



Young Coconut



Mature Coconut



Shell Anatomy

A closer look at the shell reveals multiple layers. The outer layer of fibrous husk is mesocarp. The moisture content in this layer keeps decreasing as the coconut matures making it more drier. Below the mesocarp lies the endocarp, the layer that surrounds the seed. Testa a thin layer that lies under the endocarp. Endosperm(or the coconut "meat") lies underneath the testa.

Shell Structure

The shell has three eyes/pores at one of its ends. Two of the pores are plugged and one is functional. The functional pore is thinner and easily breakable. It is through the functional pore that the shoot comes out after germination.

The shell is divided into three parts by three clear ridges which runs along the body of the shell. Each of the three ridges start from one of the eyes of the shell dividing the shell into three parts. One of these parts is bigger and wider than the other two parts.



Composition

The strength of the coconut shell comes from the various compounds that form it. The various compounds are as follows-

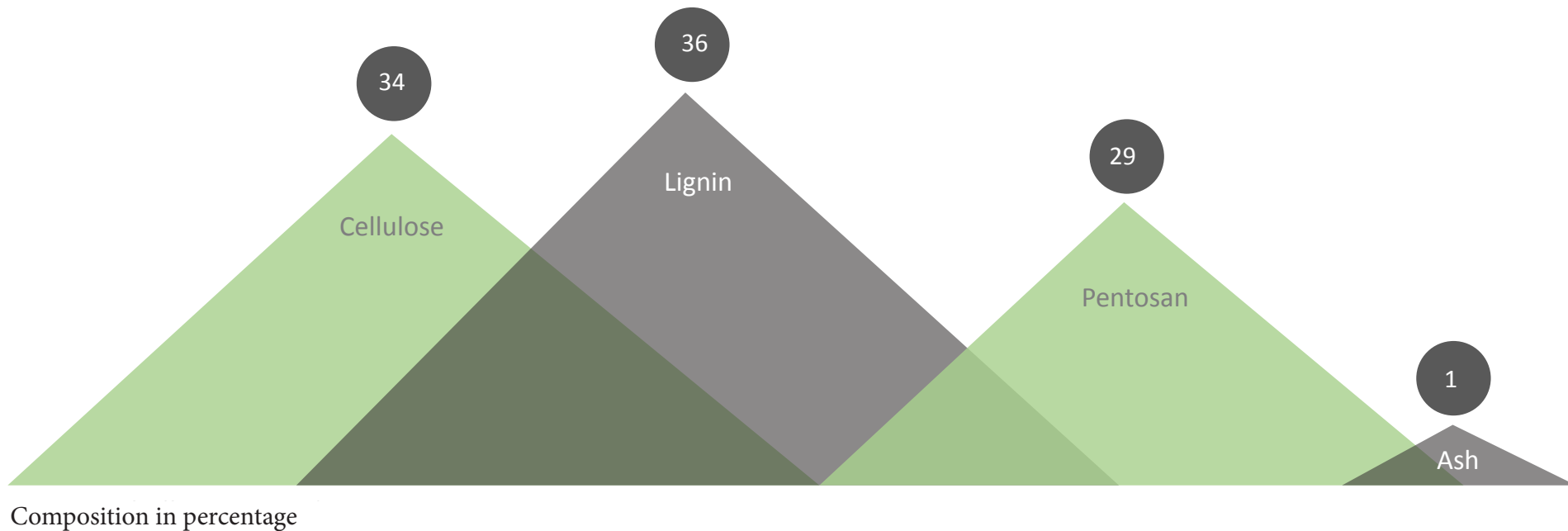
Cellulose: Cellulose is a long chain of linked sugar molecules that gives wood its remarkable strength. It is the main component of plant cell walls

Lignin: Lignin are one of the main classes of structural materials in the support tissues of vascular plants and some algae. Lignin are particularly important in the formation of cell walls, especially

in wood and bark, because they lend rigidity and do not rot easily.

Ash Content: Measure of the total amount of minerals present within a food such as Ca, Na, K and Cl by burning a given quantity under prescribed conditions and measuring the residue.

Pentosan: It is one of the polysaccharide that yield pentose on hydrolysis.





Properties of the shell

The composition of the shell lends its remarkable properties. Few of the properties are listed below.

- Good durability
- High toughness and abrasion resistant
- Suitable for long standing use
- The shell is similar to hard woods in chemical composition, though lignin content is higher & cellulose content is lower.
- Because of its hardness(rigid nature), the shell is a bit fragile when impact forces are applied to it.
- Resistance to fungal attack.



Different sizes and forms

Although natural materials follow a common syntax, they are never same. Coconuts come in different shapes and sizes. Some small enough to fit into the palm of hand (approximately 5-6 cm in diameter) and some as big as 12-15 cm. Not only in size, they also vary in shapes. While some are closely spherical some tend to be elongated in an axis.

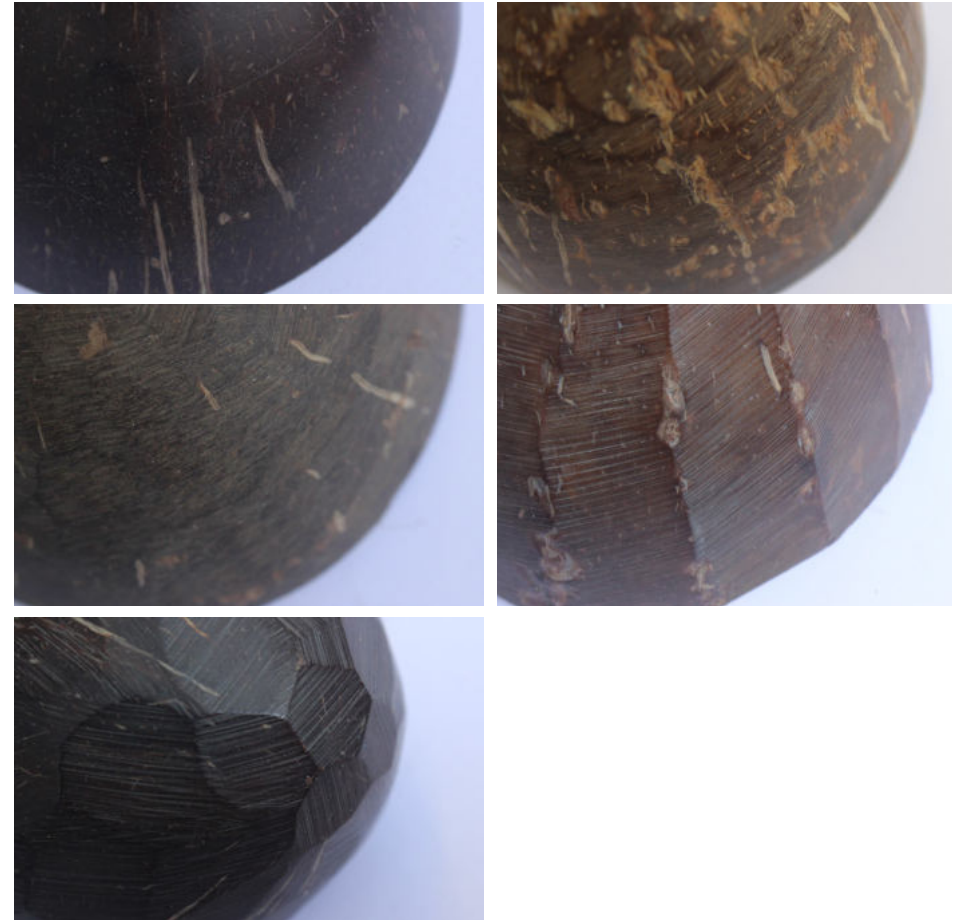
The availability of these various shapes and sizes gives one the freedom to explore in different scales.

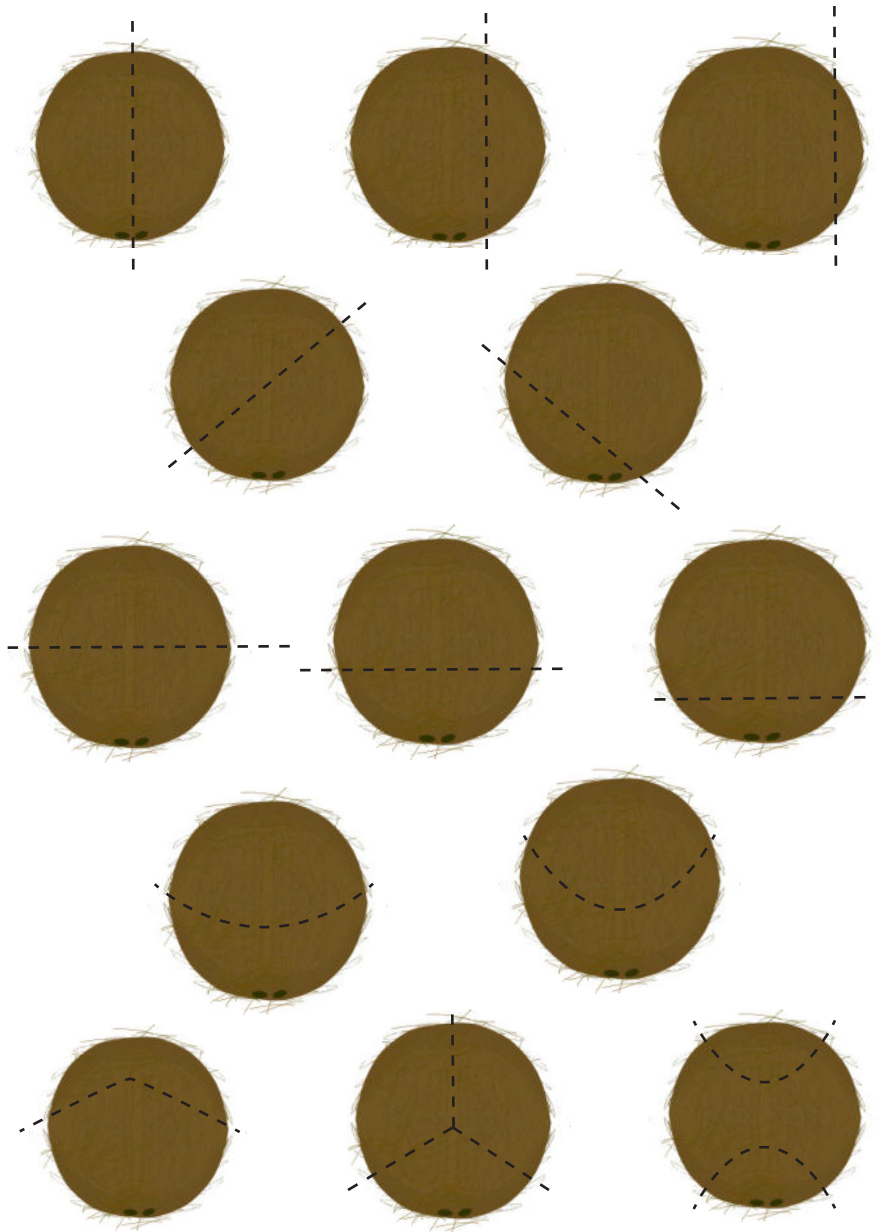
Texture

It is the texture on the paintings that gives the urge to take our fingers and run over the canvas.

Texture forms a very important part of a product. It decides how the eye moves and perceives the product one sees. We feel the texture both visually and by tactility. Hence other than form, space, colour, texture forms an integral part of the product.

Graphics, patterns on the shell can contribute to visual texture. Patterns can be made using nontoxic paints, pyrography (using heat to write) using a hot iron etc. Different textures were tried on the surface, ranging from rough and grainy to smooth and glossy. Facets can be made on coconut shell. One always needs to consider the thickness of the shell while playing around with textures.





Cuts, forms

In case of working with shells, a sphere can be transformed into different forms. Although the segments carry the part of the original sphere, they make their own statements with their new forms.

Due to its physical properties its usually at the equator that the coconut shell breaks on impact. This creates two hemispheres. During exploration we looked at the usual hemispherical form. Not only this ,one can cut the shell in a different contours to get new and surprising forms.



Example

The coconut shell is cut in the plane parallel to the axis passing through the eyes on the top. One can achieve different depth by manipulating the planes at which the coconut is cut.





Natural Patterns

Other than the eyes at one end and three ribs running from the eyes, branch like structures emerge out in either side of the ribs of the shell. These beautiful natural patterns gives coconut shell a unique character.

Natural patterns such as these can become part of the design detail. Such intentional use of natural patterns might enhance the visual aesthetics of the product.

Combining other materials

Combining different materials and balancing in terms of colour, texture, form is what design strives to do. Combining a different material adds more interest to the product. It sometimes breaks the monotony of a only using a single material but if not used carefully creates confusion. “But what is confusion for one might be an interest for other” In either way, even the confusion should be a careful, intentional and calculated dependent on what one wants to finally achieve through the design.



Natural Materials

Bamboo, Cane, Wood etc

Natural materials look more acceptable to be used with natural materials. Sometimes our frequent interactions with products of certain material combination seems to be more easy to accept.

Our perspective of combining two natural materials seems to be more cohesive. Bamboo, cane, wood(coconut wood itself can also be used) etc. are few materials one can look into to combine with coconut shell.

The dark brown colour of coconut shell can very sublimely go with the greenish yellow of bamboo tinge of bamboo or the wooden textures. Combination of two natural materials build a harmonious relationship with one another as they complement each other in their characteristics.

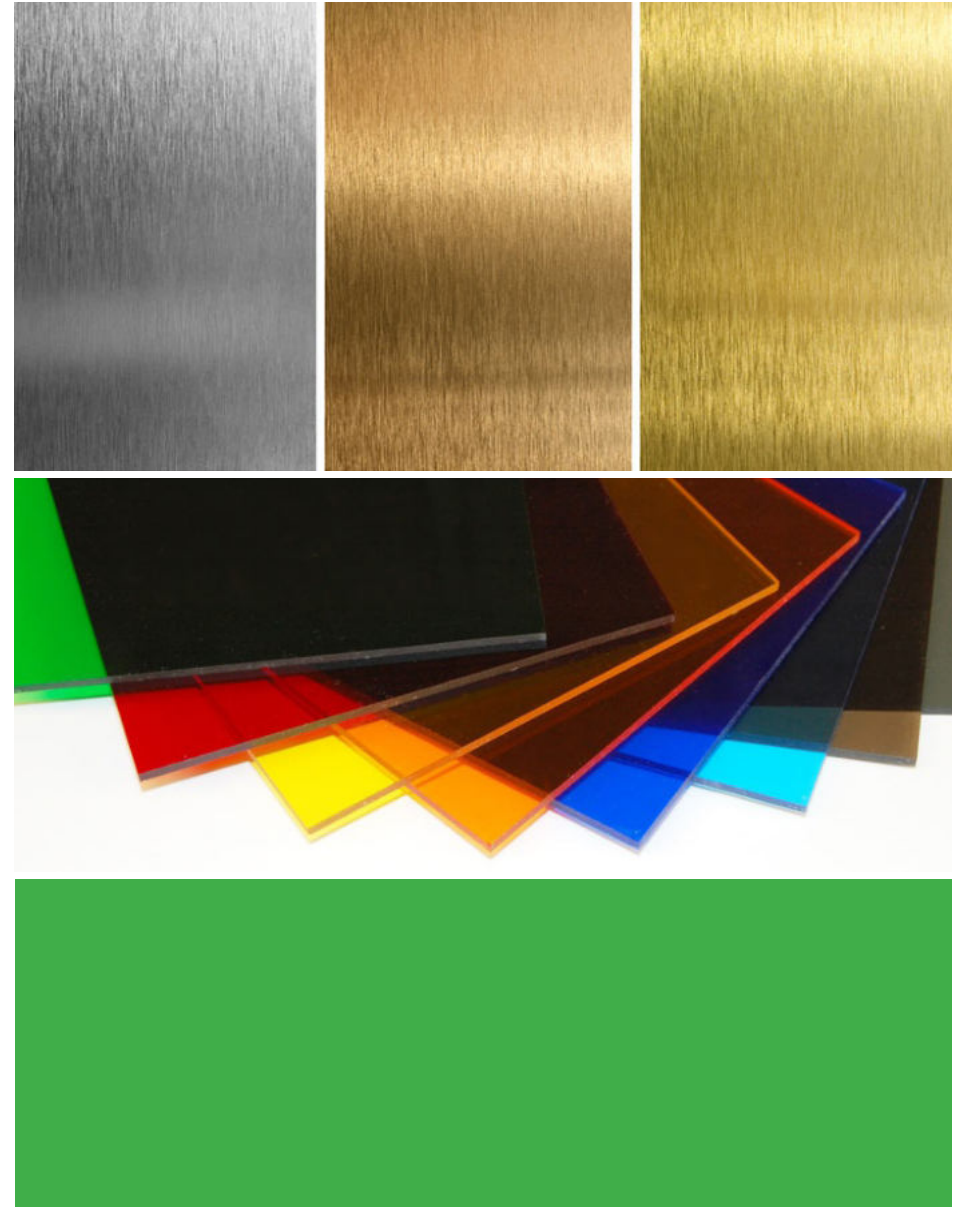


Materials from Industry

Plastic, Acrylic, Silicone, Steel, Brass etc

Wood and bamboo, for their relative ease to work with, has been emerging as industrial material. Hence, the combination can be seen widely.

Combining shell with non-natural material is a challenge as one has to see relationship between the two materials in terms of many criteria such as colour, texture etc. One has to see the affordance of the two materials are matching to come together peacefully or are the two materials which do not communicate with one another but have come together to make contrast and a statement. For example, during the project, many people when shown the combination of coconut shell which is dark brown in colour with aluminum which is bright silverish in colour, think it is a sudden and of high contrast when used together.





Tools

“Handheld device that aids in accomplishing a task”[1]

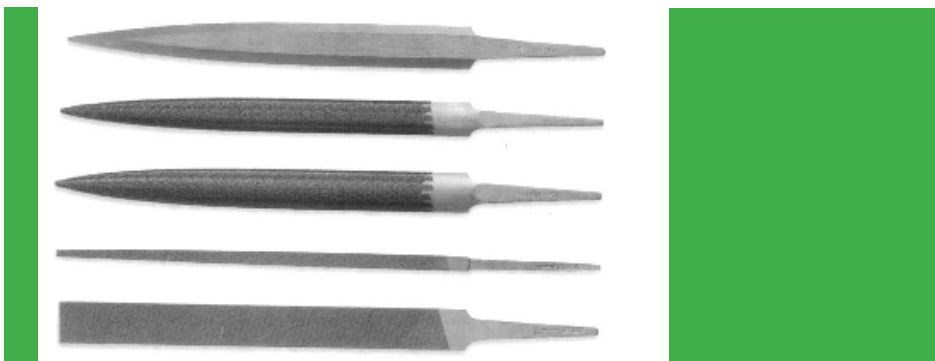
“A machine, such as lathe, used to cut and shape other objects”[1]

The transformation of the material to the product required the use of both manual and power tools.

The project wanted to be a handshake between craft and technology (in terms of use of machines, industrial joints etc.) It was an effort to be in a space which is in between purely craft and purely industrialised products.

Manual Tools

The list of manual tools which was used included hand saw, pliers, screw drivers, files, knives, brushes, heavy metal cutting scissors, hammer etc



Power Tools

The list of power tools used included heavy machines which were fixed on the floor that included driller, circular sander, band saw, circular saw and buffing machine. Hand-held manual power tools included power driller, sander, grinder etc. were used. Other than this various kinds of metal wire brushes and sanding tools for drill was used.



Processes on shell

Few of the processing that could be done on the shell are listed here.

The husk on the coconut shell is removed using sander disc [fig 1]

Sanding the surface using the sander [fig 2]

Refining using the sanding bit on a drill machine [fig 3]

Cleaning the inner part of the shell [fig 4]

Cutting it to the desired size using circular saw [fig 5]

Polishing using the buffing machine [fig 6]

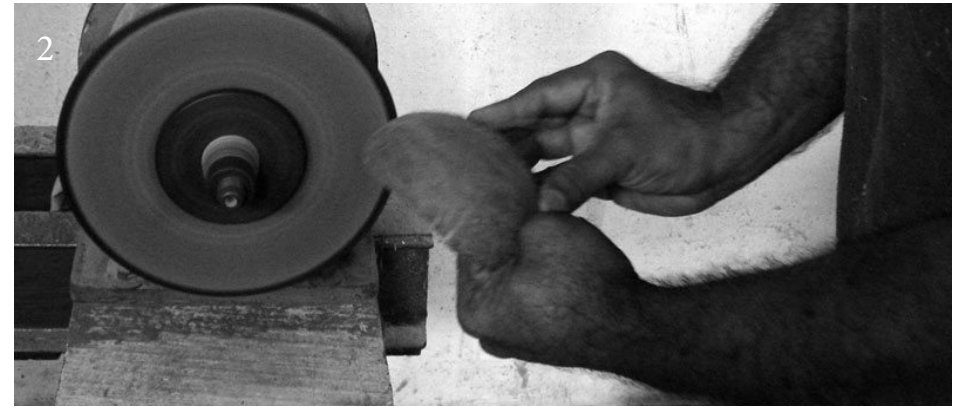


Image Source : <http://www.dsource.com>(as seen on 15/07/2015)



Indonesia: 30%
Phillippines: 26.4%
India: 17%
Brazil: 4.8%
Sri Lanka: 3.3%

Availability

Where do we stand globally?

Globally India is the third largest producer of coconuts after Indonesia and Philippines [3]. The abundance of resources for coconuts can make it a hotspot for products using coconut shell.

India

Area, Production and Productivity

The table shows data collected according to survey[5] by Horticulture Division, Dept. of Agriculture & Cooperation, Ministry of Agriculture, Govt. of India in 2013-14. Although Kerala ranks in the top in area in which coconut is cultivated, Tamil Nadu ranks highest in both production and productivity. Now it is mostly in Kerala and Goa where coconut craft has thrived. Since coconut production in other states is also good, it is possible to expand and set up production units for coconut based products in other states of India.

<i>Sl.no.</i>	<i>States /Union Territories</i>	<i>AREA (1000 Hectares)</i>	<i>Production (Million nuts)</i>	<i>Productivity (Nuts/hectare)</i>
1	Kerala	797.21	5968.01	7486
2	Karnataka	517.29	5041.15	9745
3	Tamil Nadu	465.11	6917.25	14872
4	Andhra Pradesh	121.92	1828.46	14997
5	Odisha	50.78	324.93	6399
6	Gujarat	31.63	295.03	9328
7	West Bengal	29.30	370.83	12656
8	Maharashtra	28.08	187.47	6676
9	Goa	25.75	128.13	4976
10	Andaman & Nicobar Islands	21.90	129.97	5935



Existing Products

In order to understand how coconut shell has been used in various parts of the world, various products were looked at.

Traditionally, crafting objects out of coconut shell to make household objects was practiced by coconut farmers. In India coconut shell and wood craft is prevalent in Kerala. Other states where this craft is practiced are Goa, the Andaman and Nicobar Islands and few parts of Tamil Nadu and Pondicherry.

Bambu Home, a studio based in Portland, Oregon, USA has its production units close to raw-materials. One of its production facilities is based in China and imported to USA [Fig 1]. Coconut shell craft is prevalent and popular in countries such as Cambodia, Thailand, Philippines, Java, Maldives and Sri Lanka.

Fig-1: www.bambuhome.com (as seen on 16/07/2015)

Fig-2: www.kerala-crafts.com (as seen on 16/07/2015)



Fig-3,4: www.dsource.com(as seen on 16/07/2015)

Fig-5,6: www.srilankabusiness.com/coconut(as seen on 16/07/2015)

Fig-7, 8: www.etsy.com/holycow(as seen on 16/07/2015)



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The Process

“Series of actions or steps taken in order to achieve a particular end[4]”

Even though the project had few clear goals, it was still a dive into the little known. It started with less knowledge on the materials, its procurement, what all processes can be done on the materials, the tools used and lot other procedures.

Understanding the coconut shell ,other materials and tools came naturally as the first step. This section is a continuation of steps to what was done after that.

Soft Prototyping

Thin walled plastic ball having the size of an medium sized coconut (approximately 10 cm in diameter) was chosen to work with instead of working on the hard coconut shell. The initial form exploration was done with it because it was convenient to use in terms of cutting, shaping etc. when compared with shell. Other materials such as paper, styrene (to imitate sheet metal), aluminum wires(to imitate brass and steel) where used. This process was economical in terms of effort to work with the material and in time consumption.

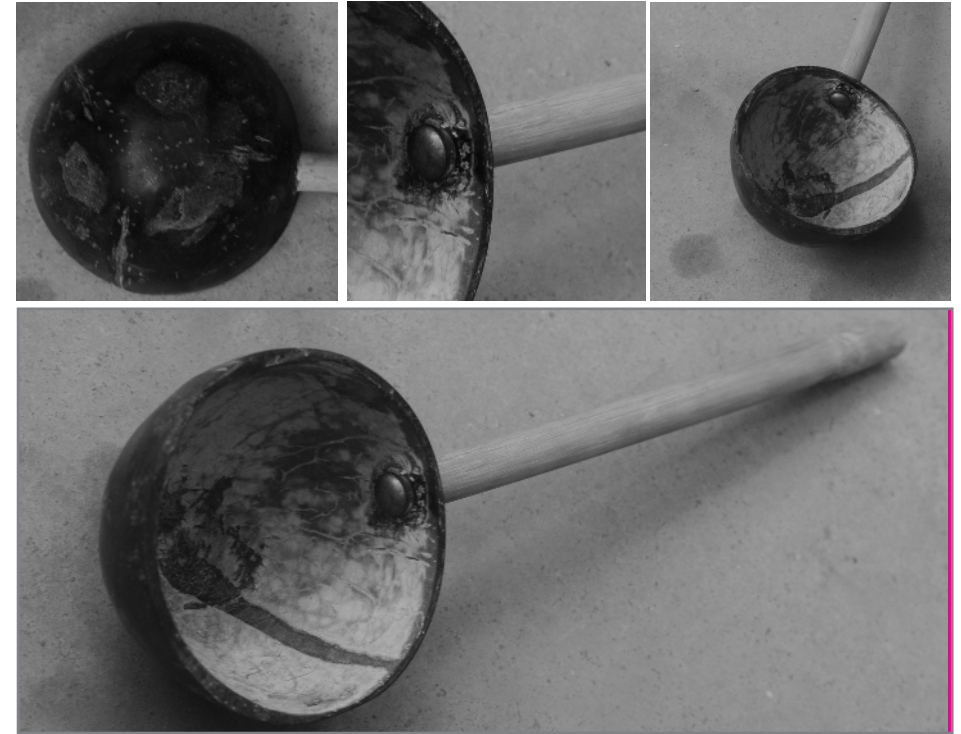
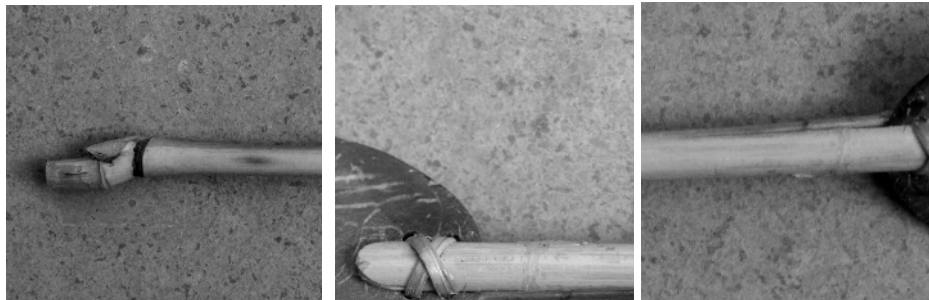
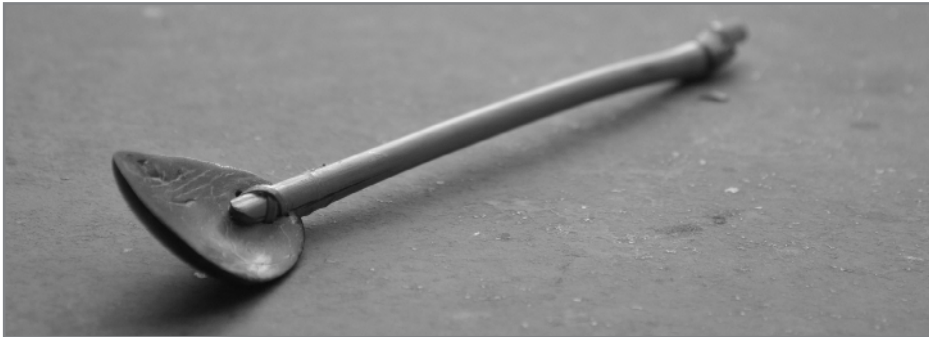




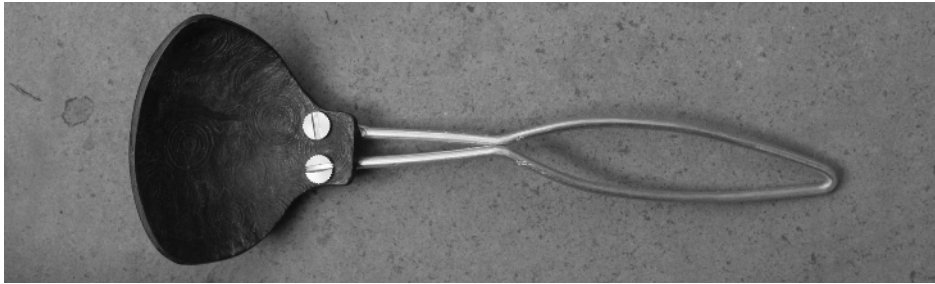
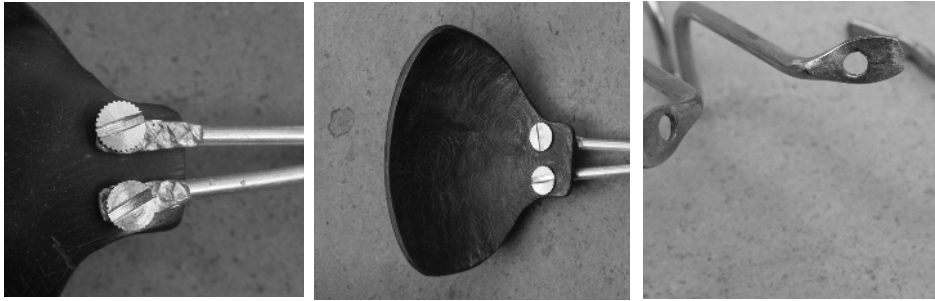
Exploration on joinery

Designing joinery for integrating different materials with coconut shell was one of the most important and challenging part of the project. Joinery was tried with natural materials such as bamboo and with industry-manufactured materials such as wires and sheet metal.

The joinery involved a weave over the bamboo using cane. A gap in between where the bamboo was split to insert the shell was one of the problem areas to be resolved in this

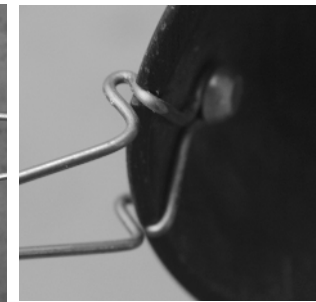
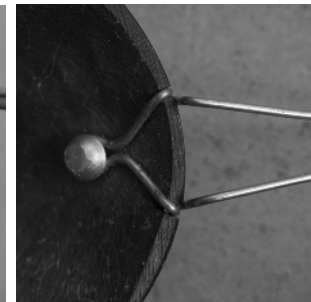
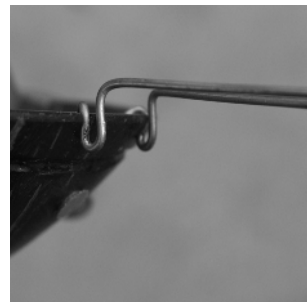
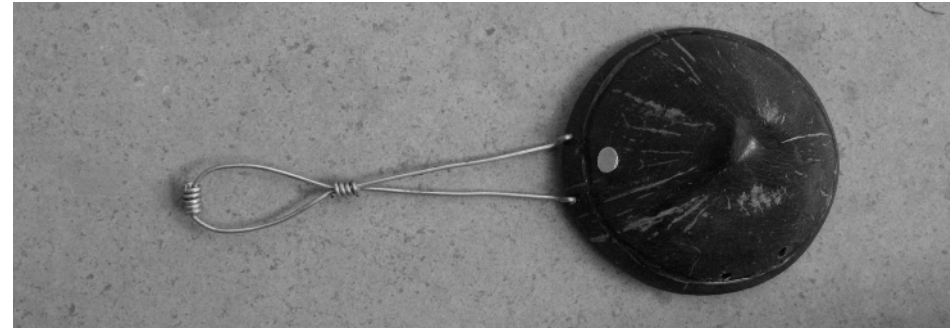


A hollow bamboo was inserted into a hole made in the shell and a screw of the inner diameter of the bamboo handle was fixed to secure the bamboo.

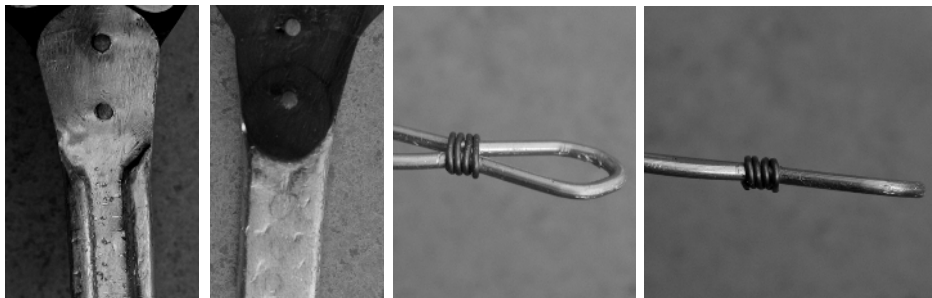


The ends of the wire was flattened and a hole was drilled on the flat end. A screw-rivet was inserted in each end and fixed with the shell.

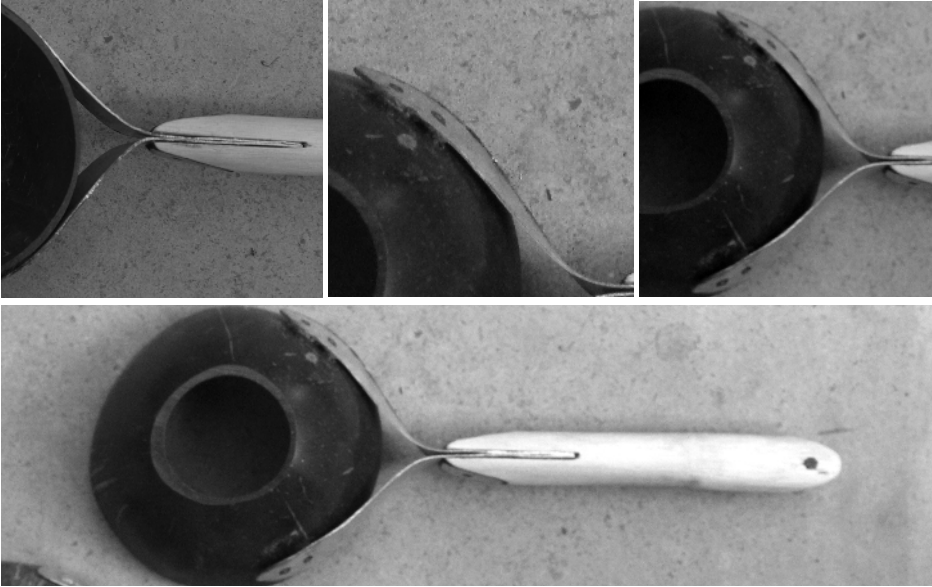
The wire was bent into a circle to accommodate a rivet. Two grooves were made on the edge of the shell and the wire was inserted and then bent forward to form the handle. A triangulation was formed by the rivet and the two wire insertions in the grooves.



The design involved rolling flat metal sheet to accommodate the ends of a single piece of wire inside. One end which was fixed to the spoon blade was kept flat and riveted. The other end had the wire bent in a tear drop. A wire of thinner diameter was wound to secure the tear drop shaped part.

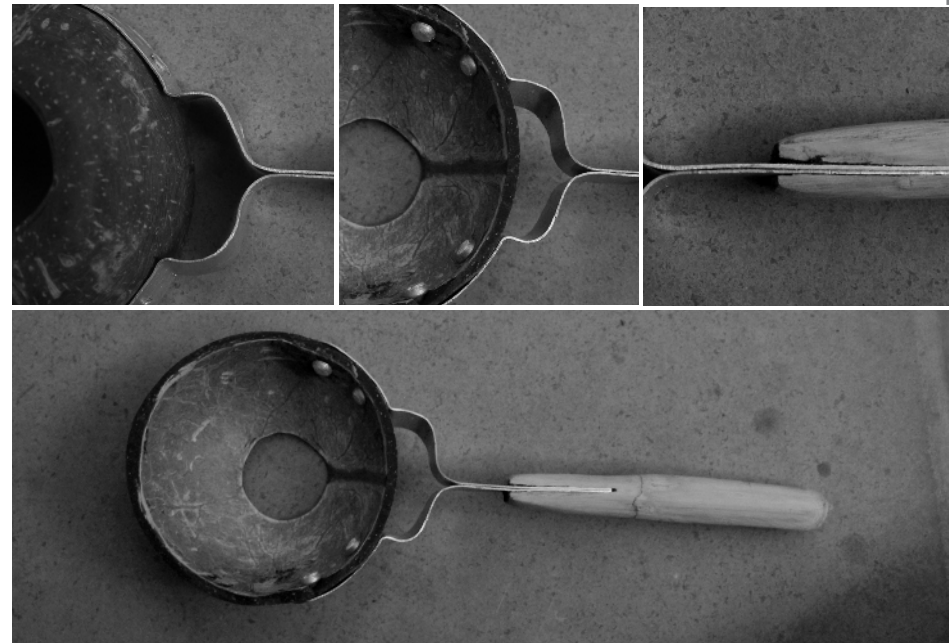


Although similar to the previous design, this uses two thin metal sheets instead of one. The shell is riveted in between the two sheet metal.

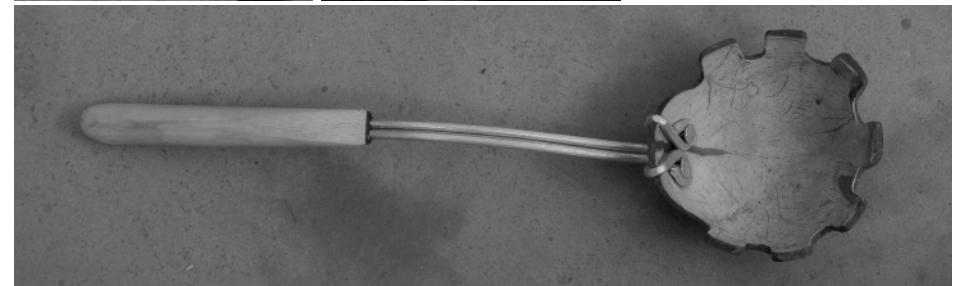
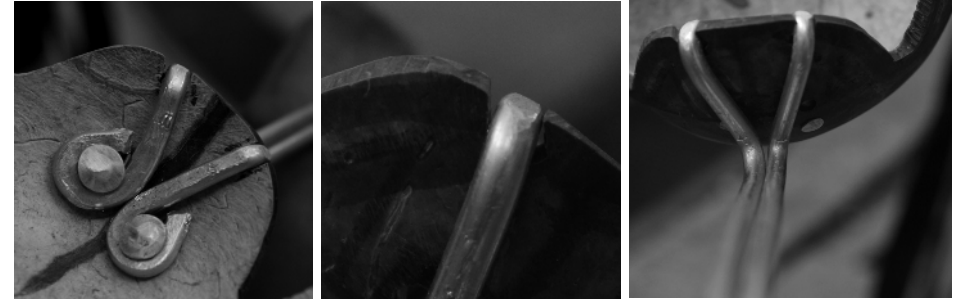
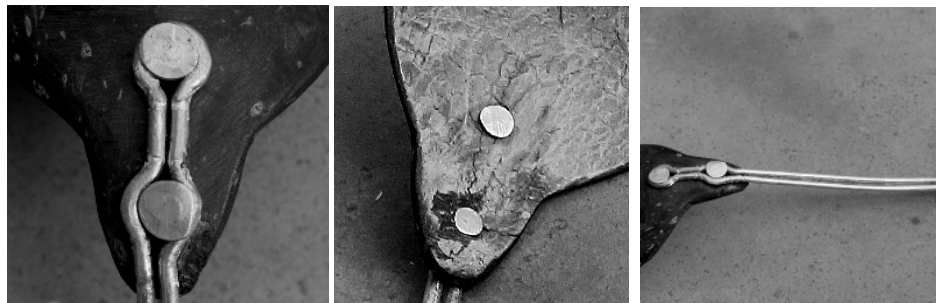
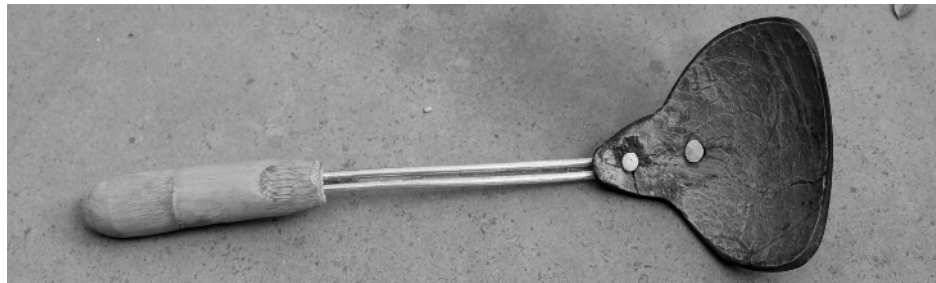


Two flat sheet metal pieces and a solid bamboo was used. Two holes were drilled in each sheet metal part to be used for riveting it to the shell. The other end of the metal sheets is inserted into the bamboo. In this design there is a space created in between the shell and bamboo was difficult area to clean and would have accumulated dirt

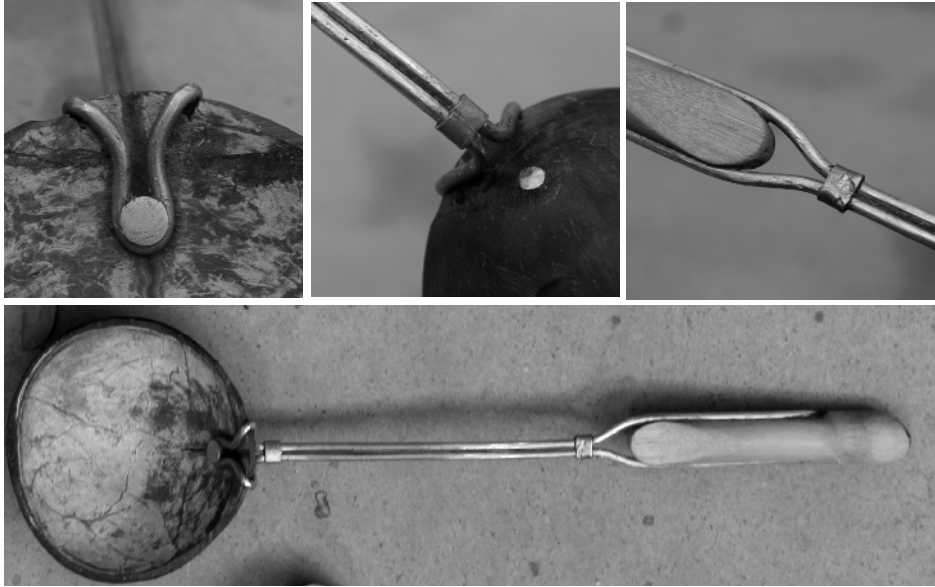
This design tried to resolve the previous design. The sheets are bent to leave the shell perpendicularly, it moves straight before bending and coming together and inserted into the bamboo handle. Although it doesn't completely resolve the issue, it works better than its previous design.



Uses a single wire and a solid bamboo handle.
The wire has bent to form two circular sections
for riveting. The end of the wire are inserted
and glued to the handle

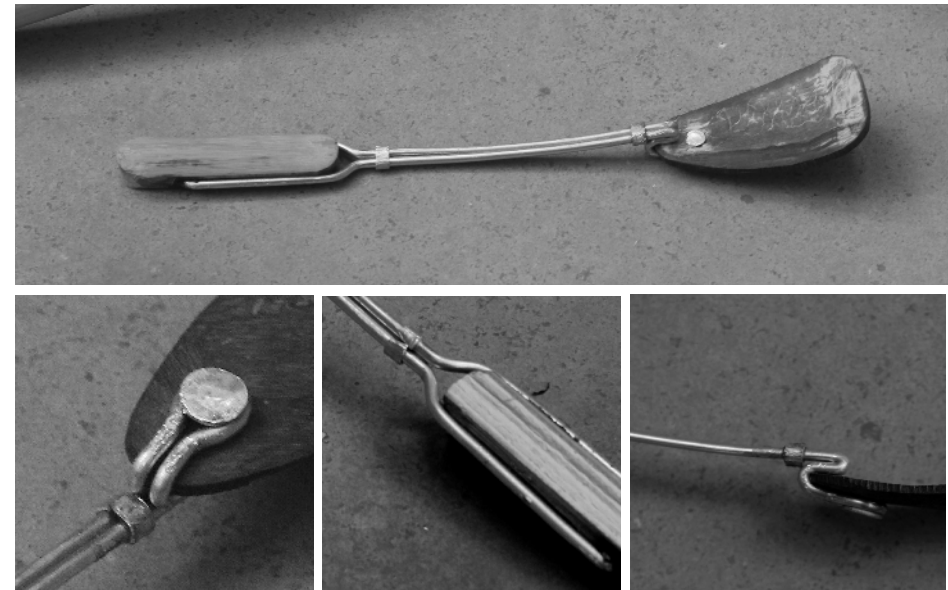


Two pieces of wire and solid bamboo
was used. The end of wire to be fixed to
the shell was curved into a small circle
to accommodate the rivet. A groove was
made to hold the wire before it leaves
the shell. The other end of the wire was
inserted and glued in the bamboo handle

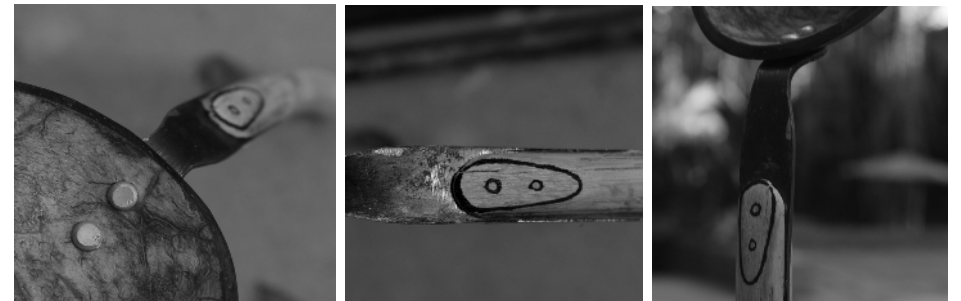


A single wire and solid bamboo is used. The wire has a bent in center to accommodate the rivet and passes through grooves in the shell before it leaves the shell body. Even in the handle it passes through a groove along sides of the handle and is inserted into a hole.

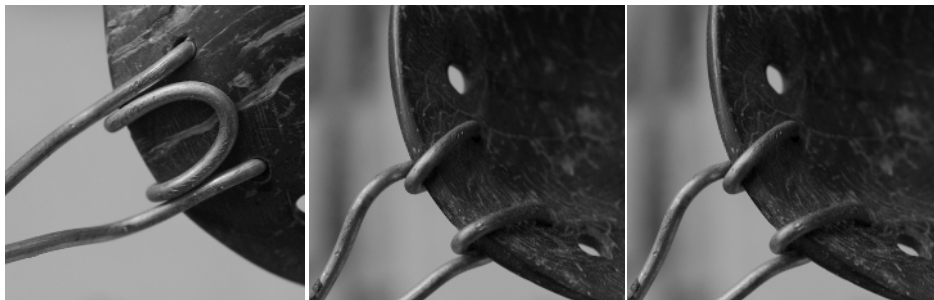
Although this design has similar elements as that of previous design, here the wire bends and goes over the shell before bending once again to move out to the handle.



The joinery involved lot of manual work which goes around the coconut shell. Although a secured and strong joinery, the crafty nature of the joinery made it difficult to work with the joinery



Uses a single metal sheet having two holes used to fixed it to the shell using two rivets. The metal then moves and inserted into the cane and fixed to it using rivets.



More Explorations

Explorations help in understanding and learning what are the possibilities using the material. What all can and cannot the material afford? These explorations helped in diverging in different ideas and then based on factors such as ease of use, manufacturability, hygiene etc. we could converge on few ideas.





A small family of cutlery consisting of similar design details and graphics was prototyped. A strainer, a small spoon and a service spoon was designed. The coconut shell were cut and finished in a form to the get the desired functional attributes of the spatula.





Few more explorations were also done to include cups in the set of cutlery. Different kinds of stands were designed to house the spherical base of the shell. Different kinds of base and handles were explored. Although not completely used, few elements derived from these explorations were included in further designs.







Concept 1

Materials Used:

Natural materials like bamboo, cane, wood with coconut shell

Joinery would also be in natural materials



Concept 2

Materials Used:

Industrial materials like wires, sheet metal of brass, stainless steel, wrought iron, silicone etc with shell

Joinery would also be industrial like rivets, clamps etc.



Concept 3

Materials Used:

Both natural and industrial materials would be used in combination with the shell.

The joinery would be made industrial (rivet) such that assembling of parts would be economical in time

Final concept

Concept 3

The third concept was chosen to take forward. Coconut shell with industrial material was an area not explored much and provided a huge scope. It was decided to have a hybrid product, the one which combines both natural and industrial materials.

Combining shell with industrial material was moving the product range where the two materials could create contrast.





53 Final Concept

54 Study of Cutlery

56 Family of Cutlery

58 Proportion

59 Material Used

60 Final Joinery

61 Jigs

63 Stem Design

64 Parts of the ladle

65 Dimensions

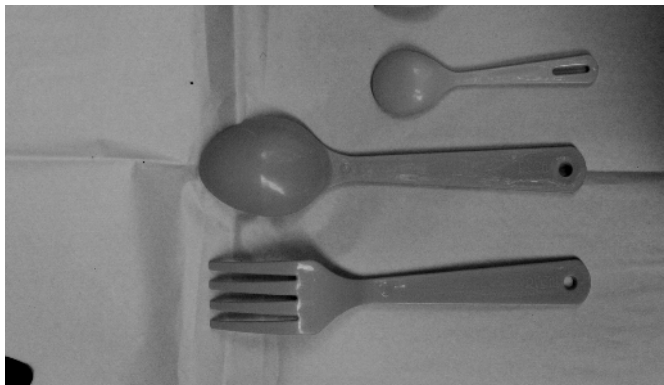
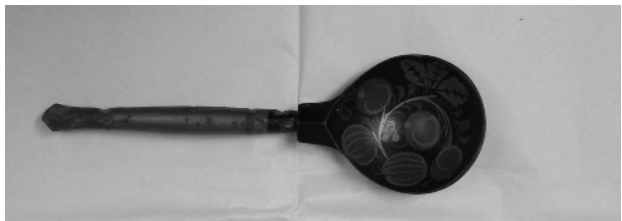
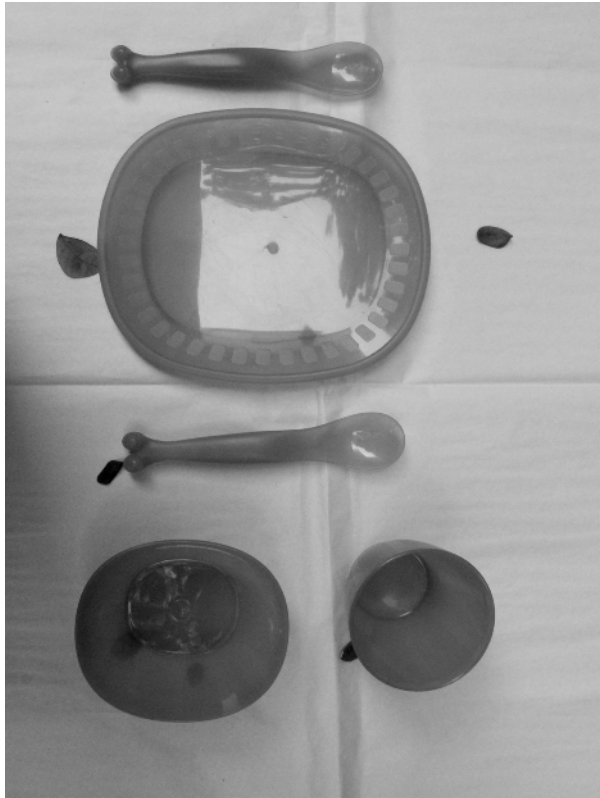
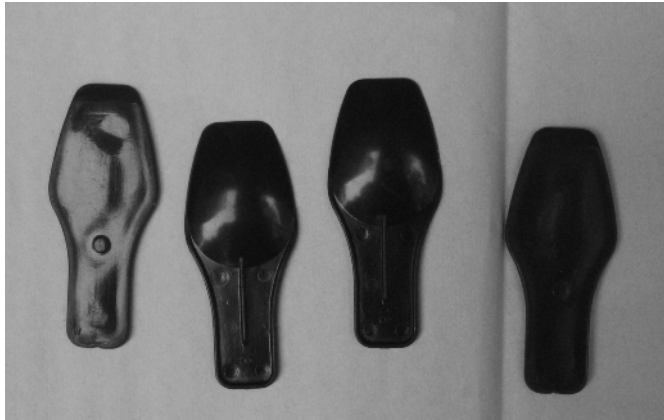
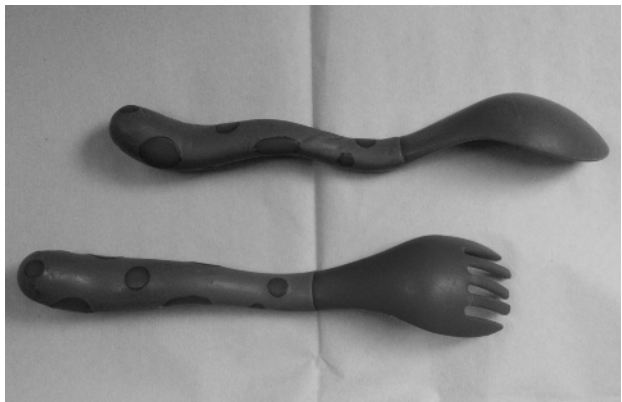
70 Family of cutlery

75 Logo and brand-name



Study of Cutlery

Different kinds of cutleries were studied to understand the value which is already embedded into it. The proportions, the grip, the curves of the handle, the various utility, the material combination, the graphics, the joinery, the members in a family/ set of cutlery, the movement of the spatula or spoon from the top of the blade to the end of the handle

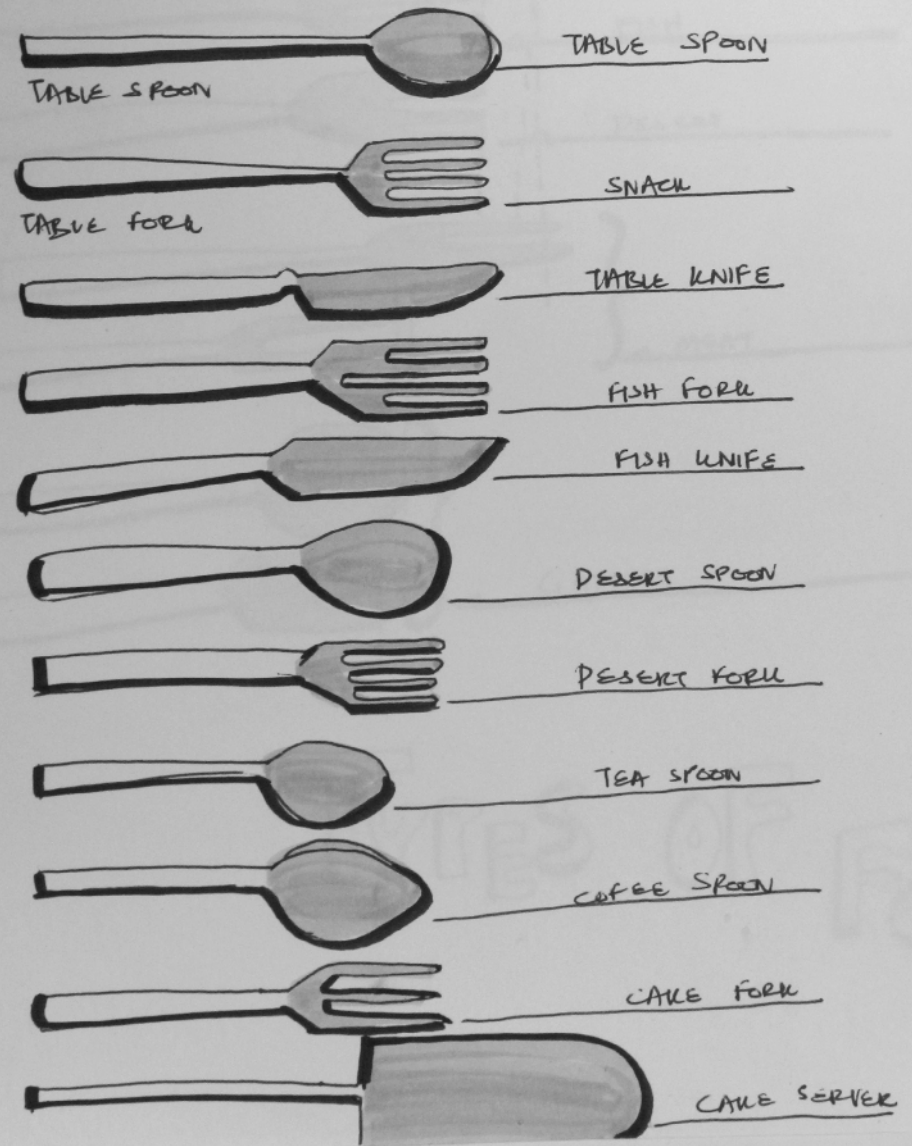
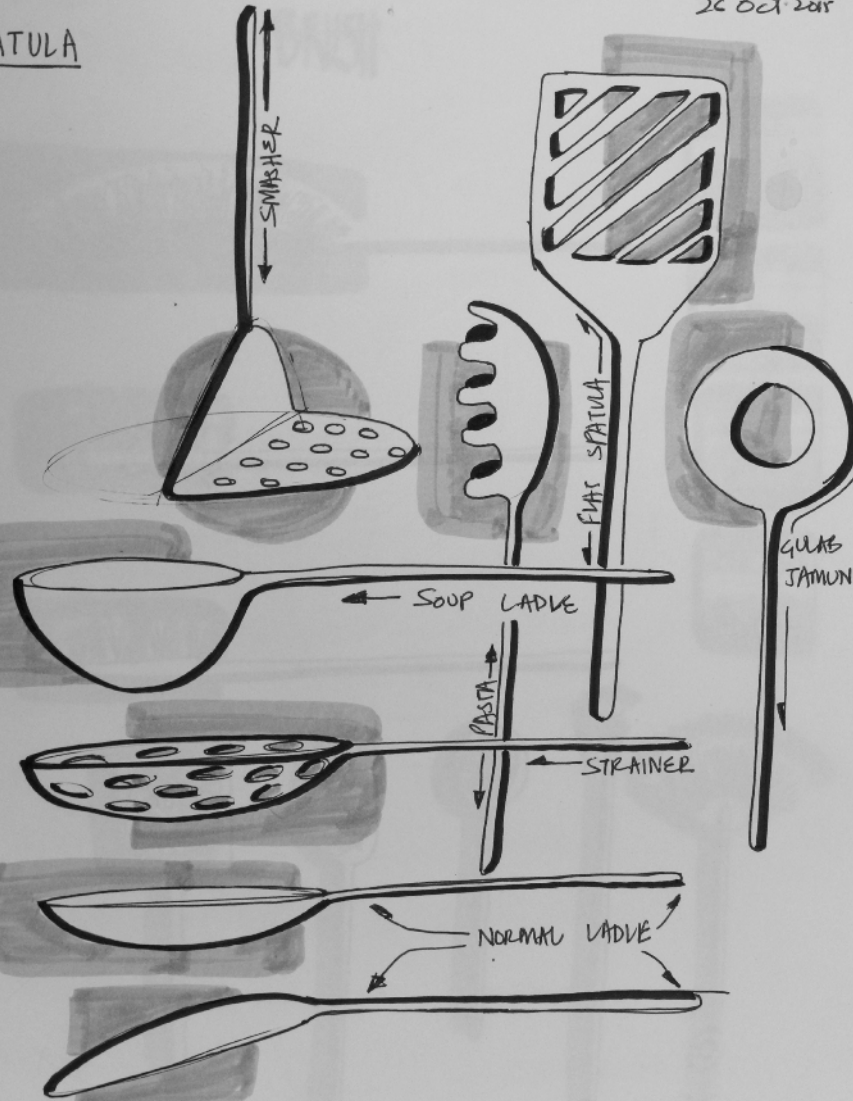


The Family

A set of various utility spatulas and spoons were included in the family. The ladle set includes- normal ladles, soup ladles(which has more depth than the normal ladle), strainer and pasta ladle. Other than ladles there are spoons of various sizes in the set.

SPATULA

20 Oct 2015





Proportion

Tracing the contours of the cutlery in a two dimension formed a major leap in the project. This gave a clear understanding of the proportion of spatulas. Proportions not only in terms of the length of the spatula but also the width of the spatula's blade (it is the part of a spoon/ladle used for scooping) to its relationship with the width of the handle.

While ratio of the width of blade to that of the handle was a little flexible, it was seen that the length of blade to the handle ratio approximately for service spoons was found out to 1: 2 to 1:2.5

Materials used



Bowl
Coconut shell
(polished and buffed)



Joinery
Flat head solid rivet
Diameter: 3mm
Material: Aluminum



Stem
Aluminum wire
Diameter: 3mm diameter



Handle
Solid bamboo
Diameter: 20 -30 mm diameter

Fig 1: <http://island-costumes.myshopify.com/products/coconut-shells-sanded-and-polished>(as seen on 8/07/2016)

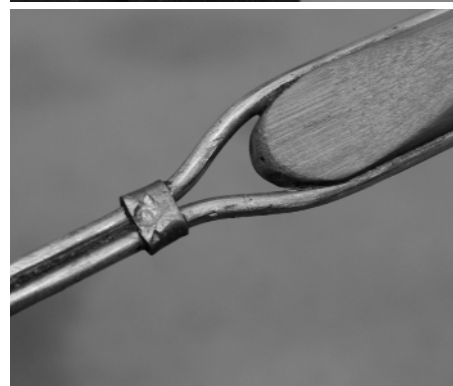
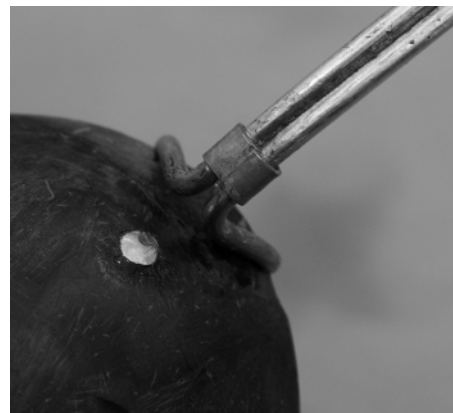
Fig 2: <http://www.smartclima.com/custom-cold-forged-rivets-fabricate-heading-rivets.htm>(as seen on 8/07/2016)

Fig 3: <http://www.texasdisposal.com/non-ferrous-gallery/>(as seen on 8/07/2016)

Fig 4: <http://sorbco.com/product/wee-wee-couture-bamboo/>(as seen on 8/07/2016)

Final joinery

This detailing was selected because it was economical in terms of material use and assembly of parts. The joinery was exposed to celebrate its detailing. The way the wire passed through the groove on the shell provided a notch. This triangulation made the joinery stable and strong.

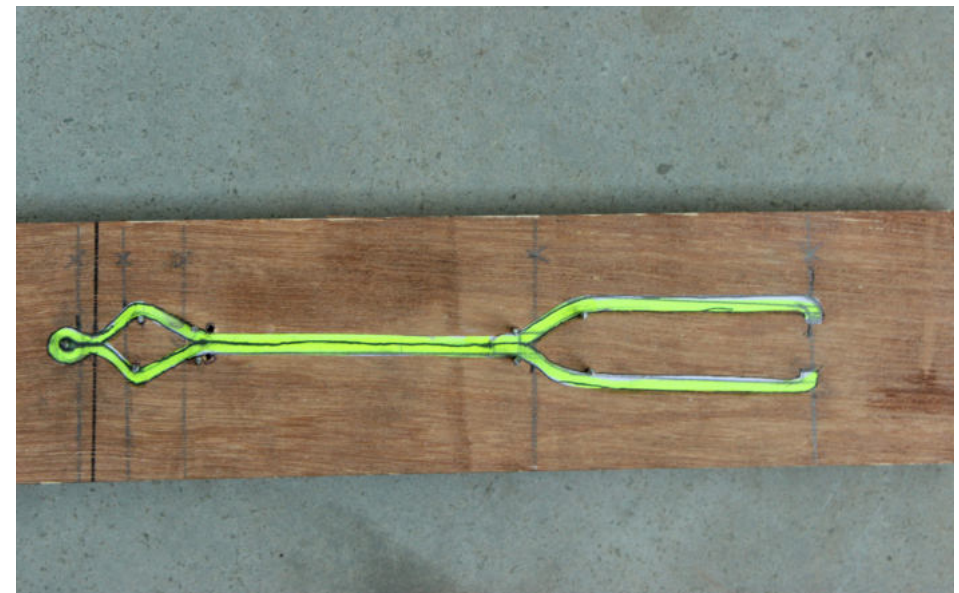


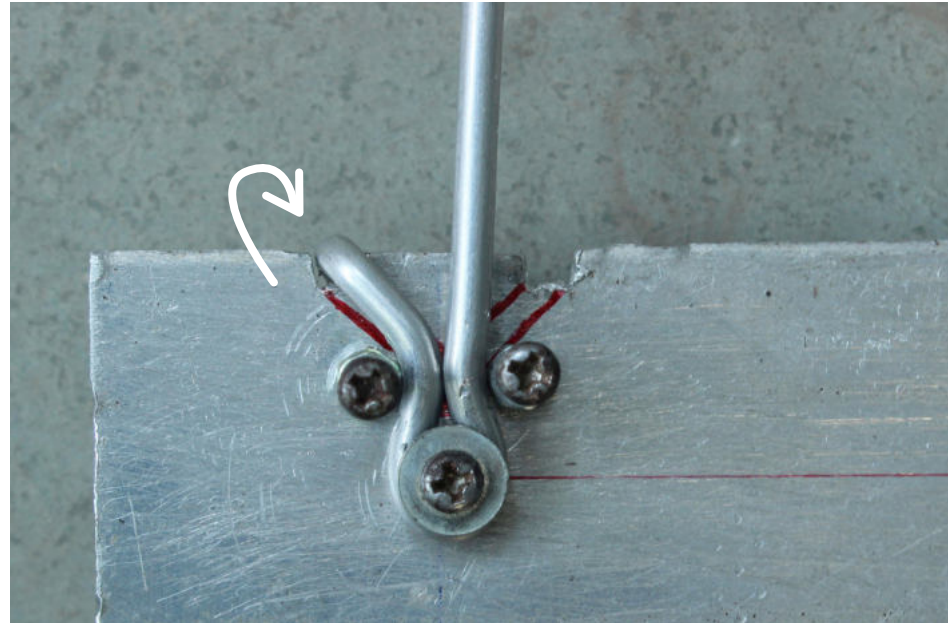
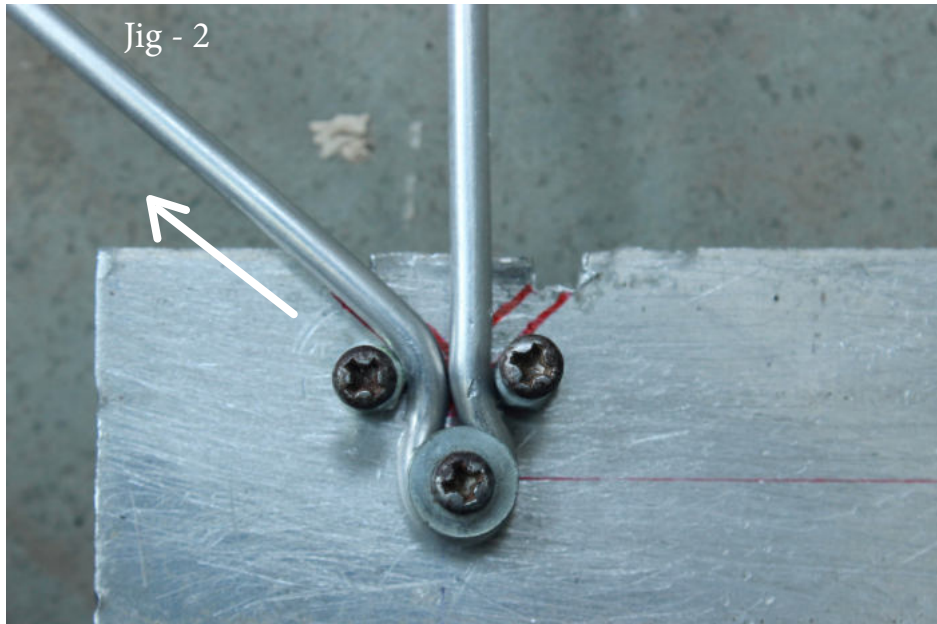
Jigs

A jig is designed to provide ease in repeatability and accuracy in the making of the products. The handle can be made by bending aluminum wires along the jigs provided.

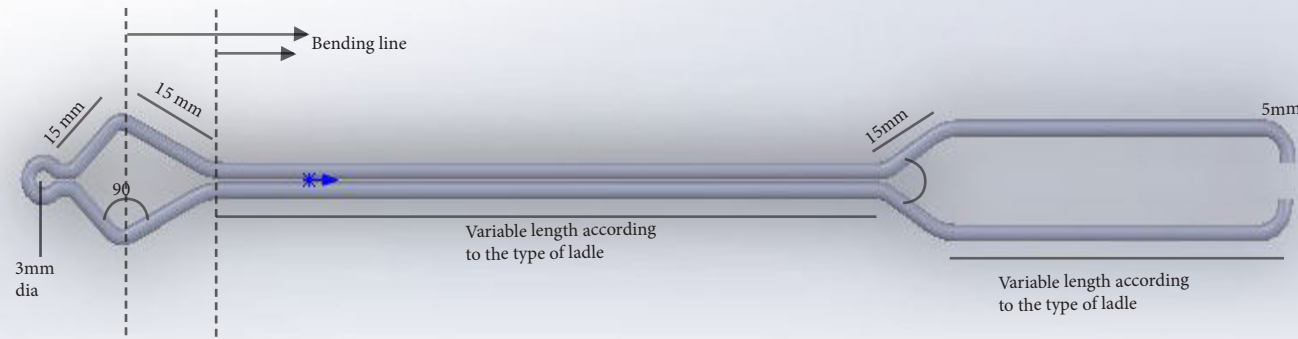
Jig-1 The wire has to bent along the pathway (shown in neon colour in the picture). Once bent it can be removed and fixed to the shell.

Jig-2 The required bends on the wire were made on the jig itself and then job was removed by unscrewing the bottom screw.





Stem when flat



Stem Design

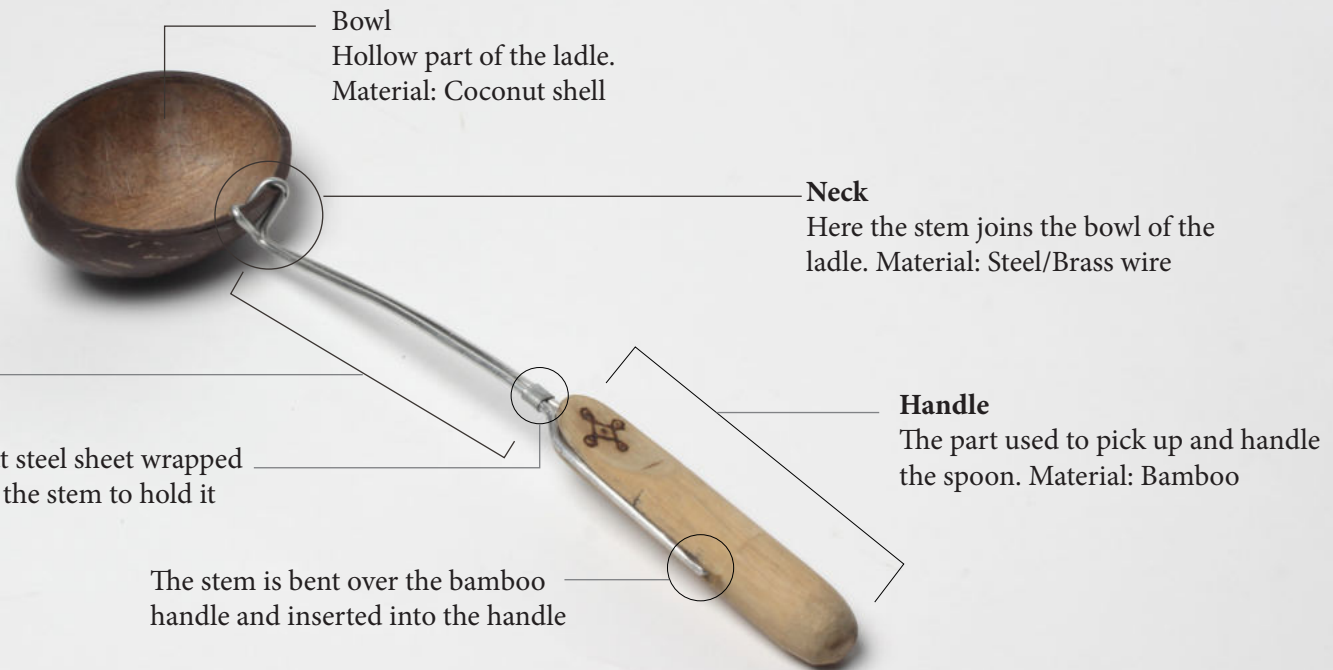
The stem connected the bowl and the handle. It was designed in such a way that it once riveted it fit tightly into the bowl. Once fit into the bowl it transforms to form the transition and meets the handle. It travels along the length of the handle for a certain distance and then inserted into the handle.

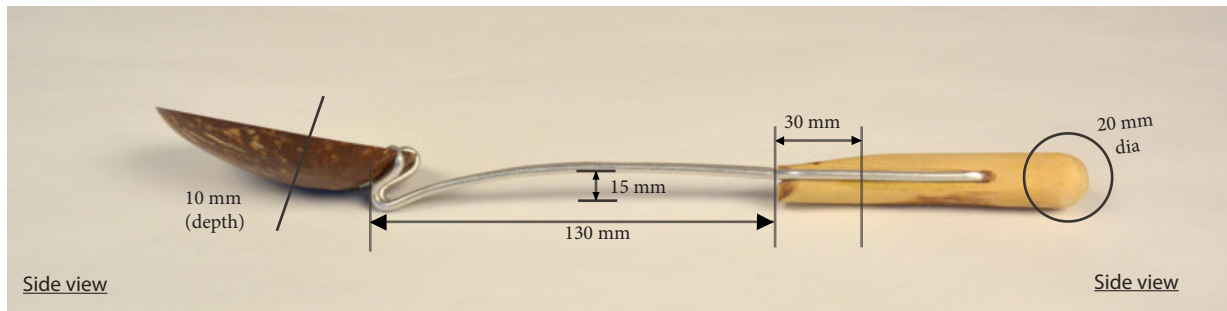


Front detail

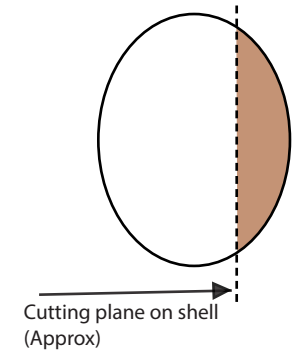


Parts of the ladle





Ladle dimensions



Shallow ladle

Coconut

Shape: Oval

Height: 100 mm

Width: 70 mm

Thickness after processing: 3 mm

Wire

Diameter: 3 mm

Length: 520 mm (approx)

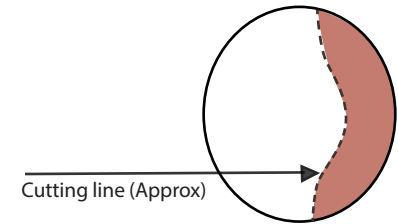
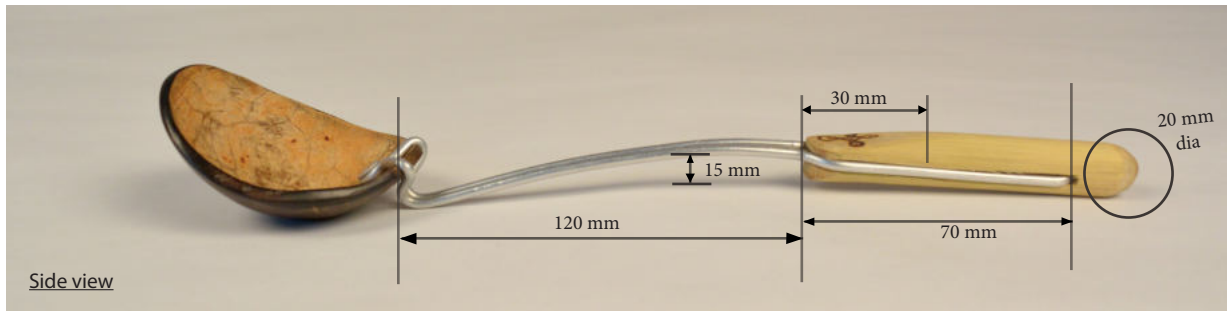
Bamboo

Diameter: 20 mm

Length: 100 mm

Rivet

Diameter: 3 mm



Shallow Ladle

Coconut

Shape: Oval

Thickness after processing: 3 mm

Wire

Diameter: 3 mm

Length: 520 mm (approx)

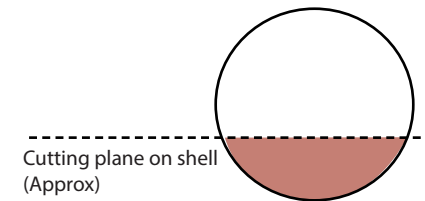
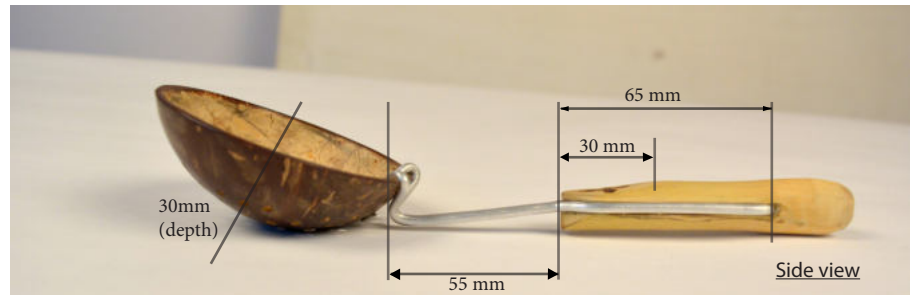
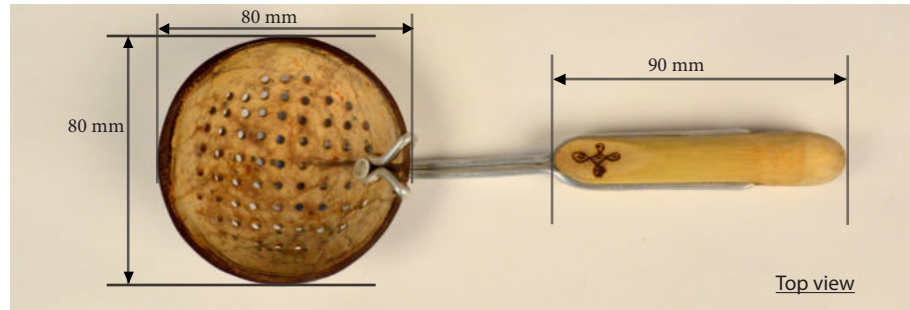
Bamboo

Diameter: 20 mm

Length: 100 mm

Rivet

Diameter: 3 mm



Strainer

Coconut

Shape: Spherical

Diameter: 90 mm

Thickness after processing: 3 mm

Wire

Diameter: 3 mm

Length: 315 mm (approx)

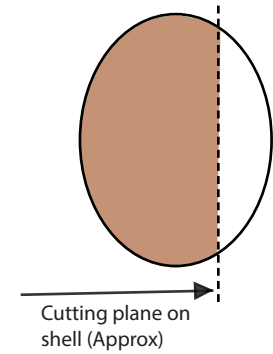
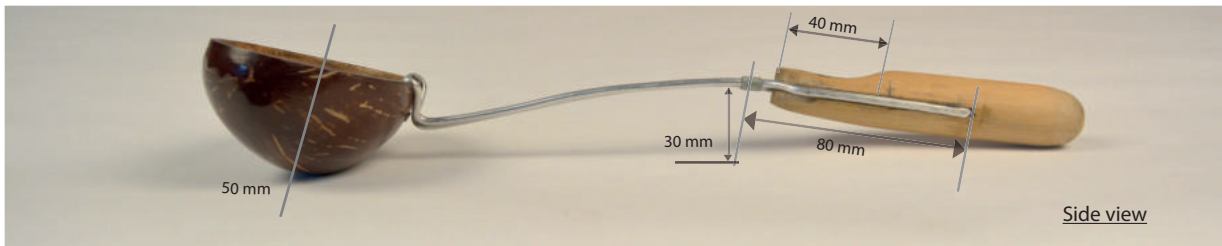
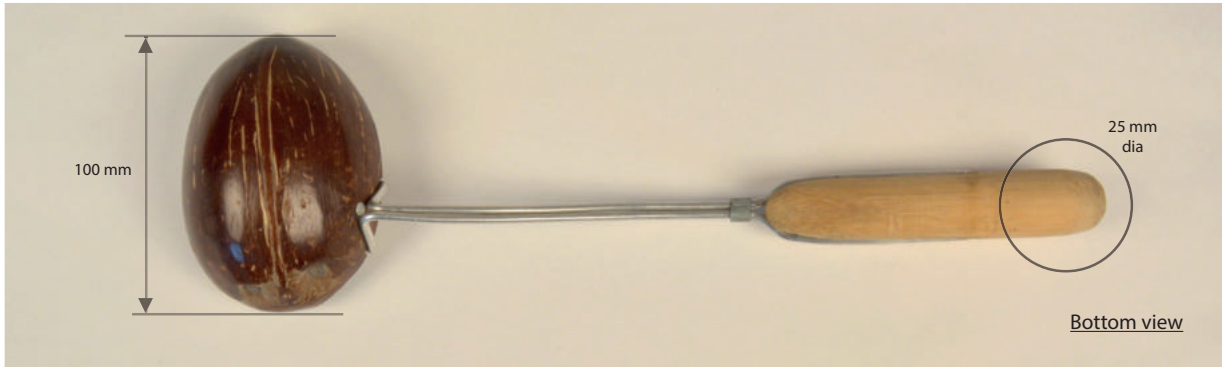
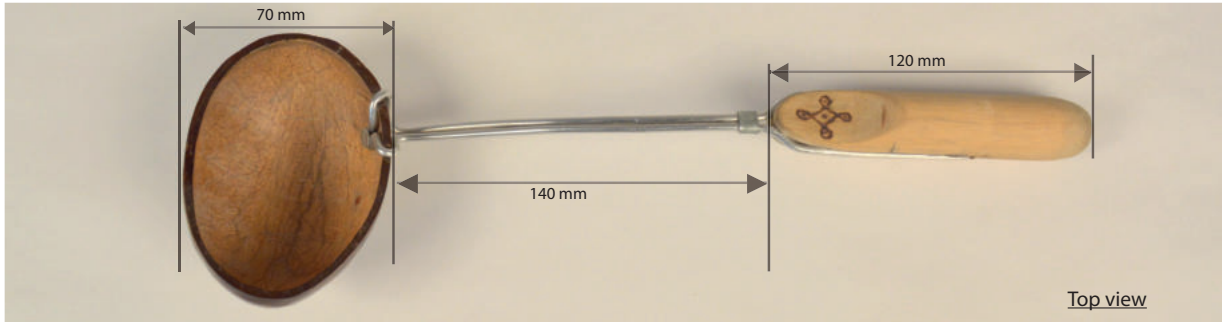
Bamboo

Diameter: 20 mm

Length: 90 mm

Rivet

Diameter: 3 mm



Sauce ladle

Coconut

Shape: Oval

Height: 100 mm

Width: 70 mm

Thickness after processing: 3 mm

Wire

Diameter: 3 mm

Length: 520 mm (approx)

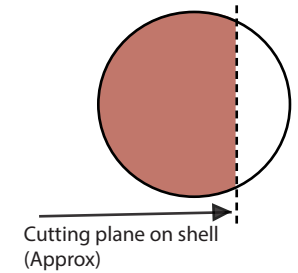
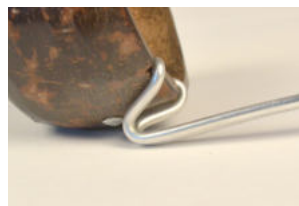
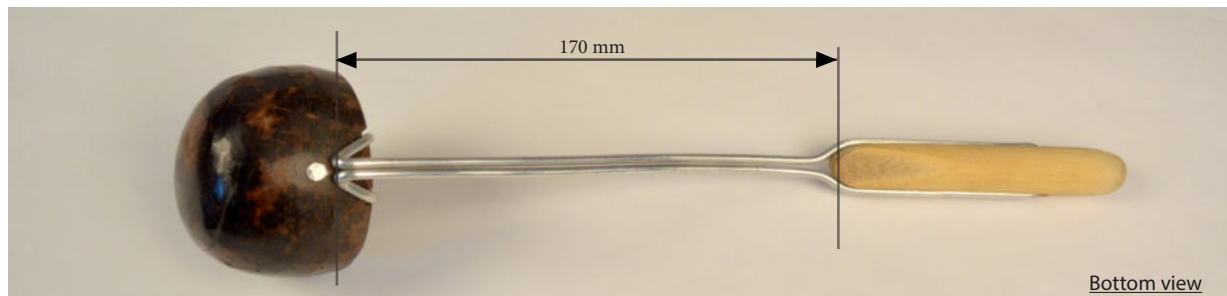
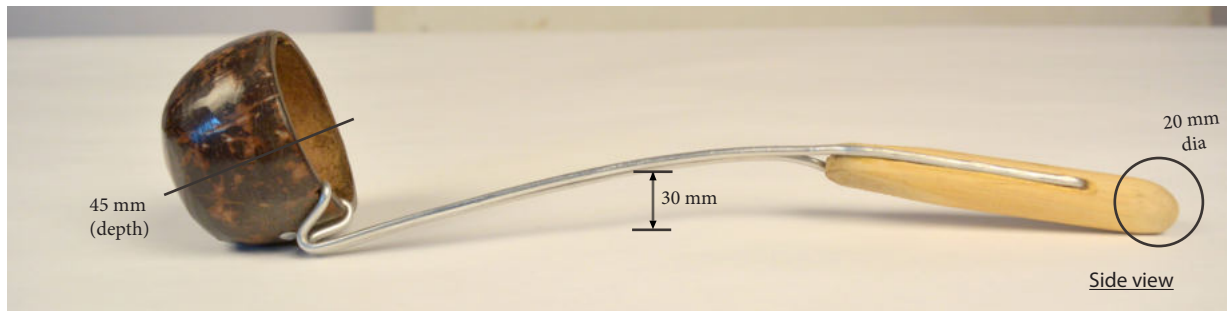
Bamboo

Diameter: 25 mm

Length: 120 mm

Rivet

Diameter: 3 mm



Soup ladle

Coconut

Shape: Spherical

Diameter: 65 mm

Thickness after processing: 3 mm

Wire

Diameter: 3 mm

Length: 595 mm (approx)

Bamboo

Diameter: 20 mm

Length: 110 mm

Rivet

Diameter: 3 mm

Range of Cutlery











Logo and name

'Utsavam' meaning celebration was chosen as the name for the cutlery range. The logo for 'Utsavam' is inspired from the 'Kolam' designs. Kolam is form of drawing that is drawn by using rice flour/chalk powder in south India. The designs usually have line drawings drawn symmetrical in a grid. Kolam is thought to bring prosperity and can be seen in the front verandah in festival days. Like Kolam 'Utsavam' range of furniture is celebratory. It tries to capture the essence of the product by shows the movement of wire.

The logo was taken further to form the graphics to be made on to the surface of the product and also in graphic design like in for packaging, tags, brochures etc.



A large, bold, black number '50' is positioned on the left side of the page. The '5' is slightly tilted to the right, and the '0' is a simple, thick-lined circle.

77 Short comings
79 Project Shortcomings

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Shortcomings

User Study

The products were designed studying similar products available in the market. User study or testing of product in real environment was not done.

Explorations

More explorations in terms of different material use could have been possible.

90

81 References

83 References

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References

- [1] www.merriam-webster.com/dictionary.com
 - [2] Coconut art carving a culture.pdf
 - [3] Jasper Guy Woodroof(1980). Coconuts: Production, processing, Products”. 2nd ed.AVI Publishing Co. Inc
 - [4] www.dictionary.cambridge.org
 - [5] <http://www.coconutboard.nic.in/stat.htm>/Horticulture Division, Dept. of Agriculture & Cooperation, Ministry of Agriculture, Govt. of India.
-
- www.dsourc.com
 - www.shreebalajeemagnesite.com/coconut-shell-powder.htm
 - www.wikipedia/coconut
 - [www. timesofindia-economicstimes/tendercoconutconsumptionbooming /](http://www.timesofindia-economicstimes/tendercoconutconsumptionbooming/)
 - [www.quora/Whatdopeople of different states of India and dinner](http://www.quora/WhatdopeopleofdifferentstatesofIndiaanddinner)
 - www.activz.com/blog/conquer-your-fear-of-coconuts/