PROJECT - 2

DESIGN DEVELOPMENT & PRODUCTION OF COOKING ACCESSORIES

USING COCONUT SHELL, BAMBOO, WOOD AND METAL

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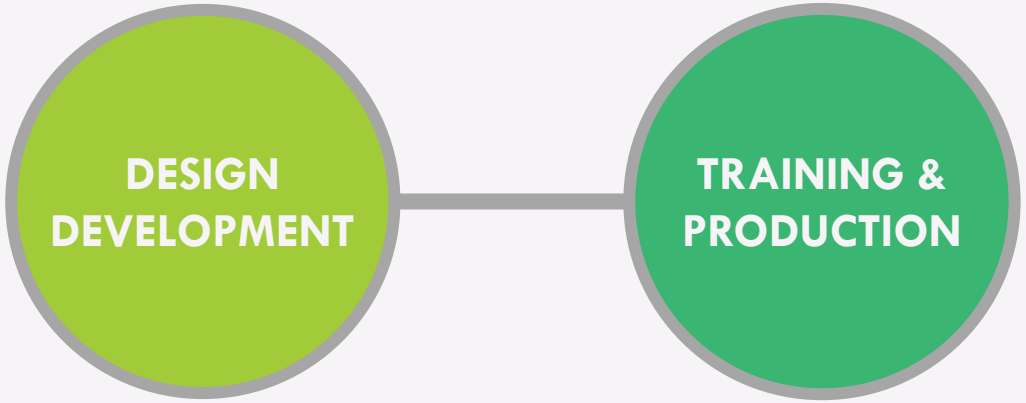
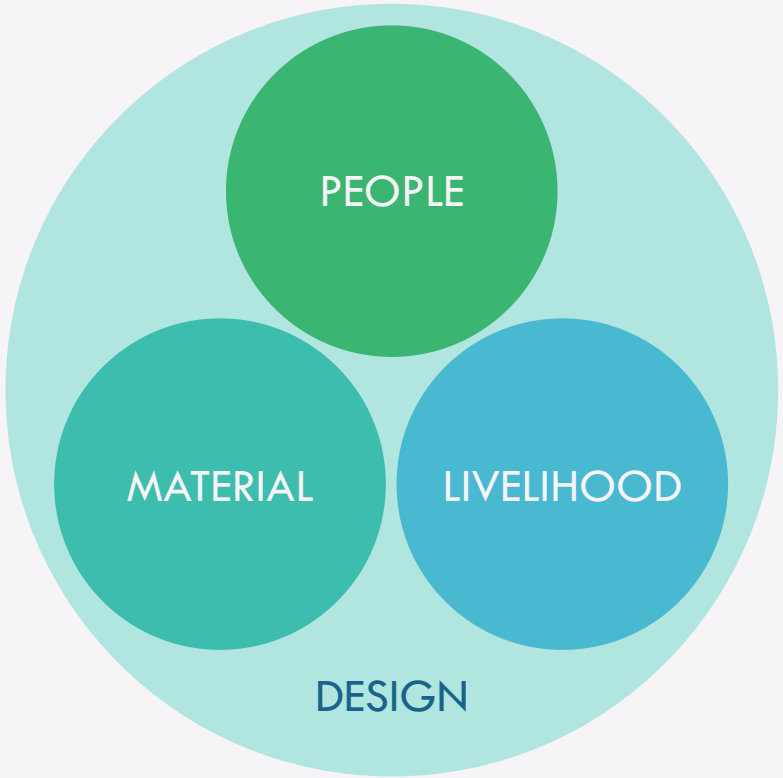
AREA

The focus area of this project is to look at how we can develop new designs, and reposition the craft products to a higher market segment, and how this can lead to the betterment of the coconut shell and bamboo craft community and the livelihood of the craftsmen.



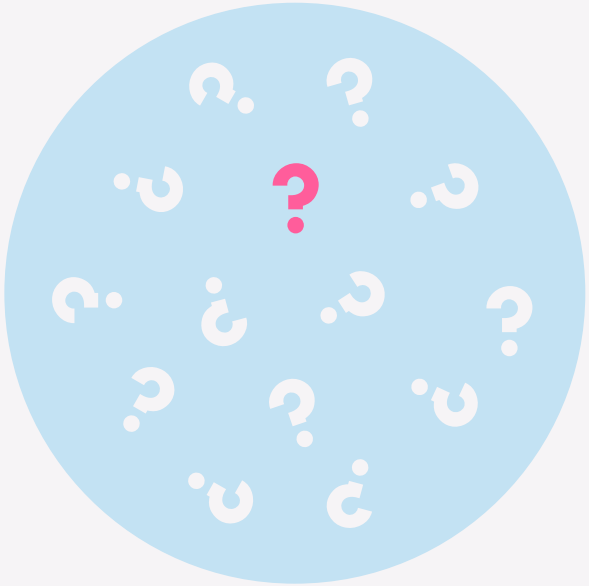
DESIGN MODEL



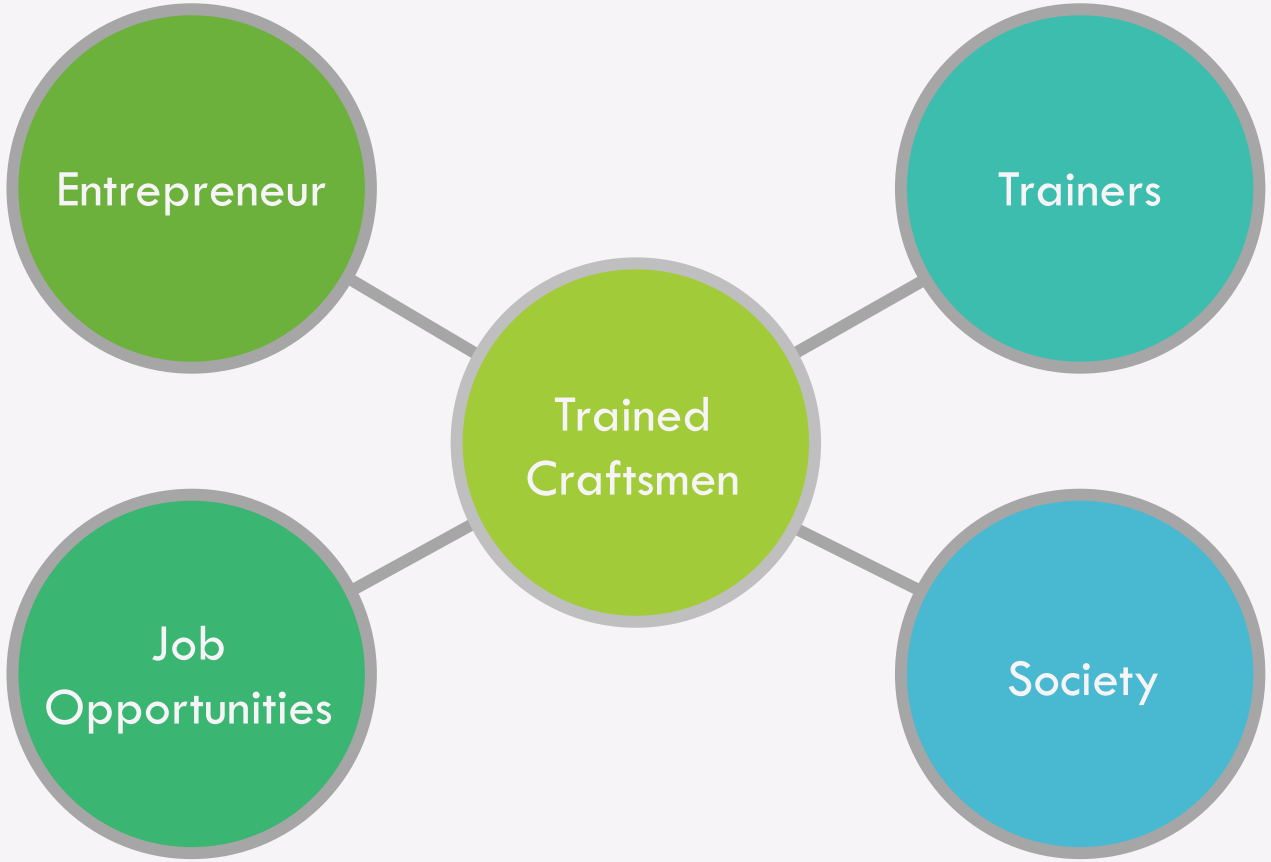
Source: Prof. Sandesh R

WHAT IS THE NEED?

- Broad range of industrially manufactured products available in the market with ample material choices, designs, and price range.
- Creates a great challenge, and a need for new designs and aesthetic approach in craft products.
- Craftsmen have been producing the same old designs over these years.
- The competition among various products in the market is very huge and the current crafts products fails to attract attention.
- The market for craft products are abating.



HOW WILL IT AFFECT?



HOW IS IT GOING TO BE PRODUCED ?

It will be produced by the Craftsmen and they should be production-able.
There are three important aspects to it

Standardisation – Very important

- Helps to understand the design easily
- Training will be easier because each component will be separate
- Production will be faster
- Quality of the product can be monitored

Where is it going to be produced?

- Small scale craft industry or NGO unit level production centres

Skill level and Use of Machineries

- Cannot implement solutions which requires a higher skill level or skills which have a longer learning curve.
- Use of costly or special machineries may not be suitable because of the higher affordability and availability.

KITCHEN ACCESSORIES

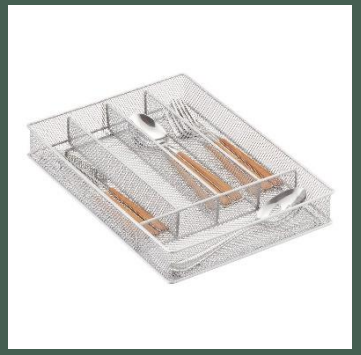
COOKING ACCESSORIES





RACKS AND TRAYS

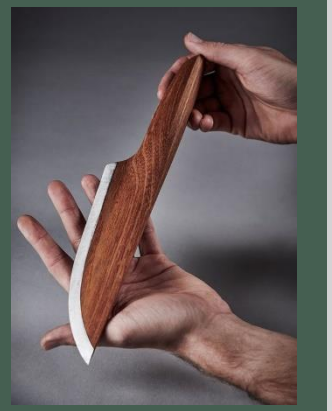




KITCHEN ACCESSORIES

CUTTING TOOLS



MISCELLANIOUS



COOKING ACCESSORIES

Product Range:

Ladle

Serving spoon

Draining spoon

Spaghetti fork

Serving spork

Sauté spoon

OBJECTIVE

To design and develop a new range of cooking accessories for an upscale market segment; using coconut shell, bamboo, wood and metal. To develop a protocol for production by standardizing the design details and processes for the purpose of training the craftsmen.

SCOPE

The scope of the project is to develop a new range of cooking accessories using coconut shell, bamboo, wood and metal and to develop a production protocol by standardizing the design details and processes.

CONSTRAINTS

- The design needs to be standardised
- There should be a proper training protocol for production.
- Should avoid process which require high skill level.
- Should avoid skillsets which require a longer learning curve.
- Should avoid use of costly or large scale industrial machineries

TARGETED MARKET POSITIONING AND PRODUCT POSITIONING

- Middle class to upper middle class users
- Modern kitchen interiors
- These products will be premium range products.
- Not looking at it as daily use products.
- Products which can be used on special occasions.
- Two functions: cooking and serving. Primary focus on serving.
- Gift-able items

TYPE OF PRODUCTION

- Small to medium scale production centres like
  - Small scale craft industries
  - Unit level – Craft units
  - NGO/ other small organisations

CHALLENGES AND OPPORTUNITIES

- Wide range of choices – Higher competition
- Quality and aesthetics of the product is very important.

- Larger market – very common in every household
- Scope for designed products – Design has an important role in-order to get the customer's attention.
- Coconut shell, Wood or Bamboo cutleries are suitable for non-stick cookware.
- A good product option for craftsmen which gives them opportunities.
- Craft – Gift-able item/ or artefact

GUIDING PRINCIPLES

Usability

- What are the functions?
  - Cooking
  - Serving
- Type of dish or cuisine?
  - Dal, Subji, Noodles, etc..
- What are the functions?
  - Frying, turning, sautéing, etc..
- Cleaning and maintenance
  - No tight areas where it is difficult to access and clean
  - No gaps at the joints
- Material understanding

GUIDING PRINCIPLES

Ergonomics

- Power grip/ Internal precision grip
- Everything is going to be used by hand.
  - Handle design, Holding postures and dexterity is important.

https://johngarzota.files.wordpress.com/2017/04/pressure.jpg?w=768&h=1024

GUIDING PRINCIPLES

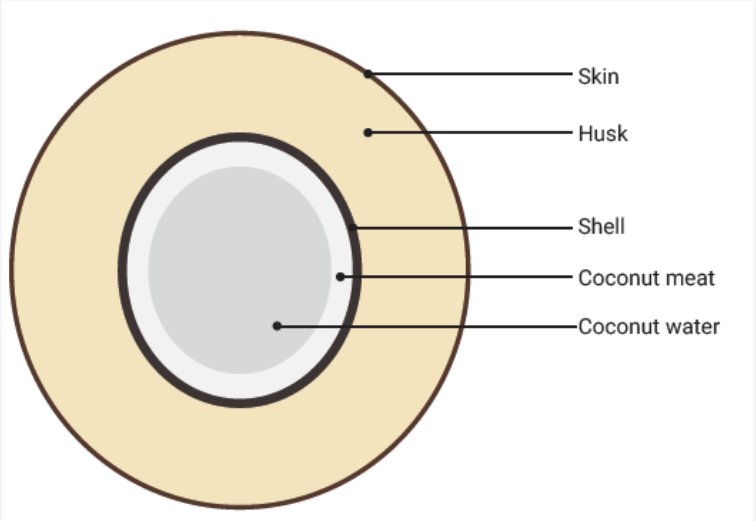
Production and Use of Tools

- Looking at
  - Small to medium scale production like
    - Small scale craft industry
    - Unit level / society level production
    - NGO/ other small organisation level production.
- Not looking at large scale industrial mass manufacturing

GUIDING PRINCIPLES

Understanding Materials – Coconut shell, Bamboo, wood and metal

- Coconut shell is tough material but brittle
- It is temperature resistant, durable, fungal attack resistant, and suitable for long standing use
- Coconut shell – It cannot be reshaped.
- Bamboo and wood – soft and warm to touch, offers good grip
- Bamboo – Can be bent easily using heat.
- Wood – Versatile material. Non conductor od heat.
- Metal – Versatile material. Good thermal conductivity.



NON TOXIC BAMBOO TREATMENTS

- There are various non toxic treatment methods for bamboo is available. But Bamboo can also be used without treating

- Treating bamboo can reduce moisture absorption and fungus attack.

- Non toxic treatment methods
  - Treatment with lime water (saturated calcium hydroxide solution)
  - Treatment in boiling linseed oil / oleo-thermal process

  (http://www.chalet-bamboo.com/treatment.html)

  - Plant extract-based preservatives/ Bio oils etc.

  (Dua, Perminder & satya, Santosh & Pant, Kamal & Naik, Satya. (2016). **Eco-Friendly Preservation of Bamboo species: Traditional to Modern Techniques**. Bioresources. 11. 10.15376/biores.11.4.Kaur.)

NON TOXIC ADHESIVES

- Food grade Silicon Sealants
- Food grade epoxy resin adhesives
  - Kohesi Bond - KB 1452 HT-2 FG
  - Fine Finish Organics - Epofine-250/Finehard-847
  - Reoltech 3030 AL/3038 AL Hardener

www.amazon.in

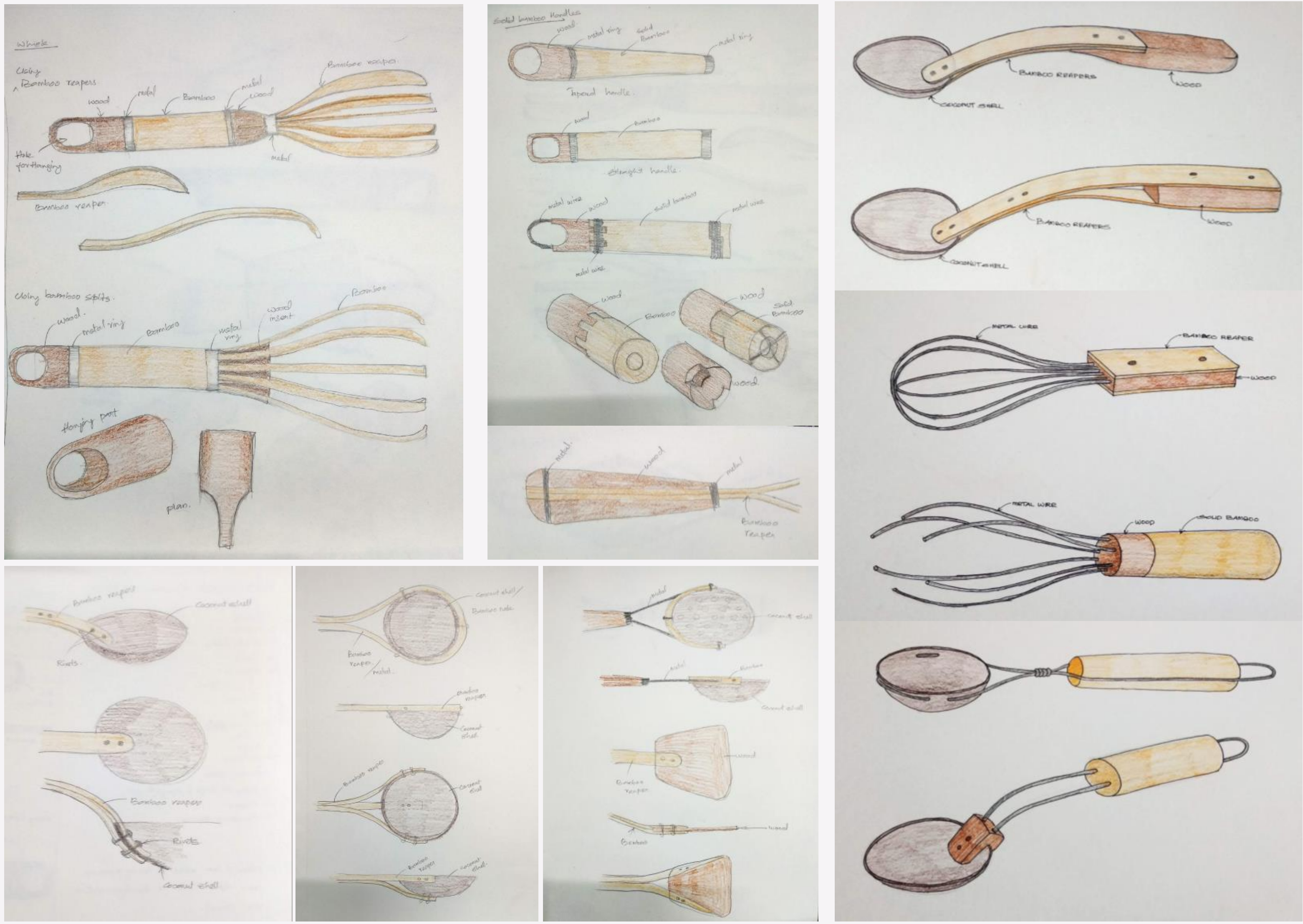
www.amazon.in

NON TOXIC FINISHES

- Pure Tung oil
- Raw linseed oil
- Walnut oil
- Bee wax
- Carnauba Wax (from palm tree)
- Shellac

EXISTING PRODUCTS

Initial Ideation sketches

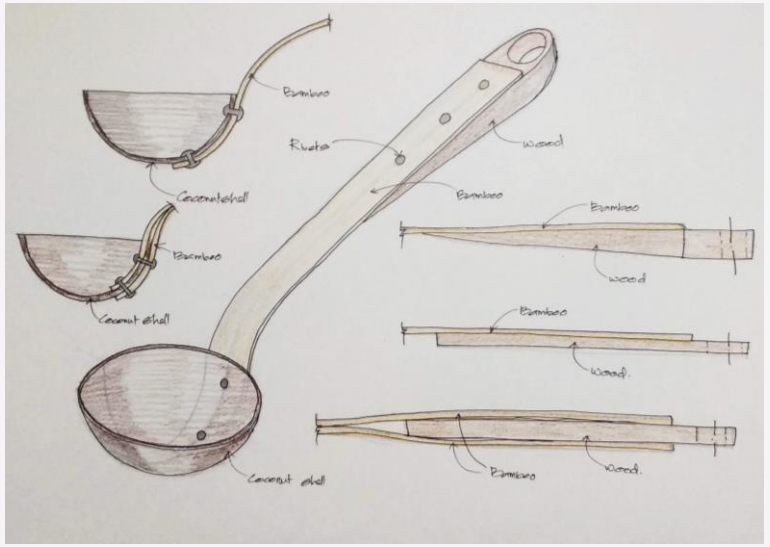


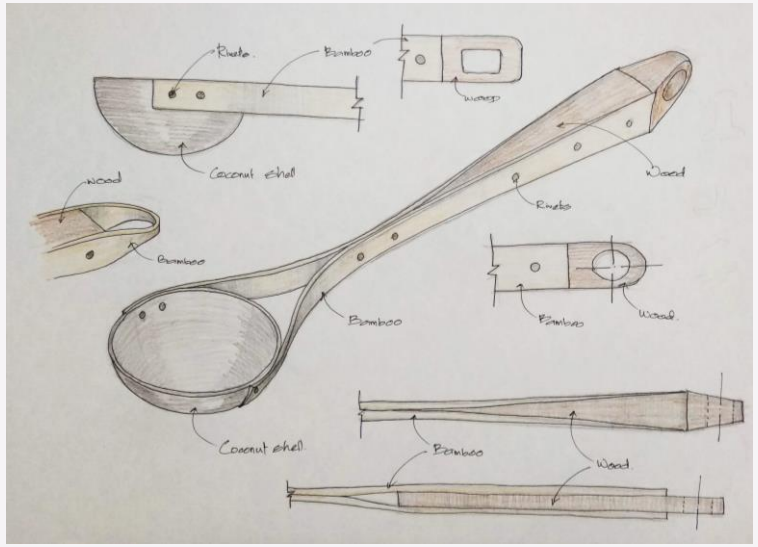
Various joinery details between materials

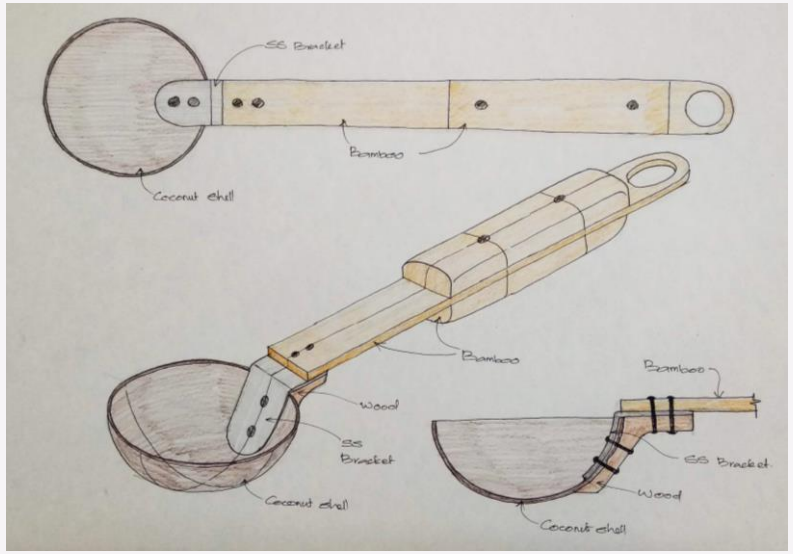
Initial product visualization in 3D

Visualizing product forms

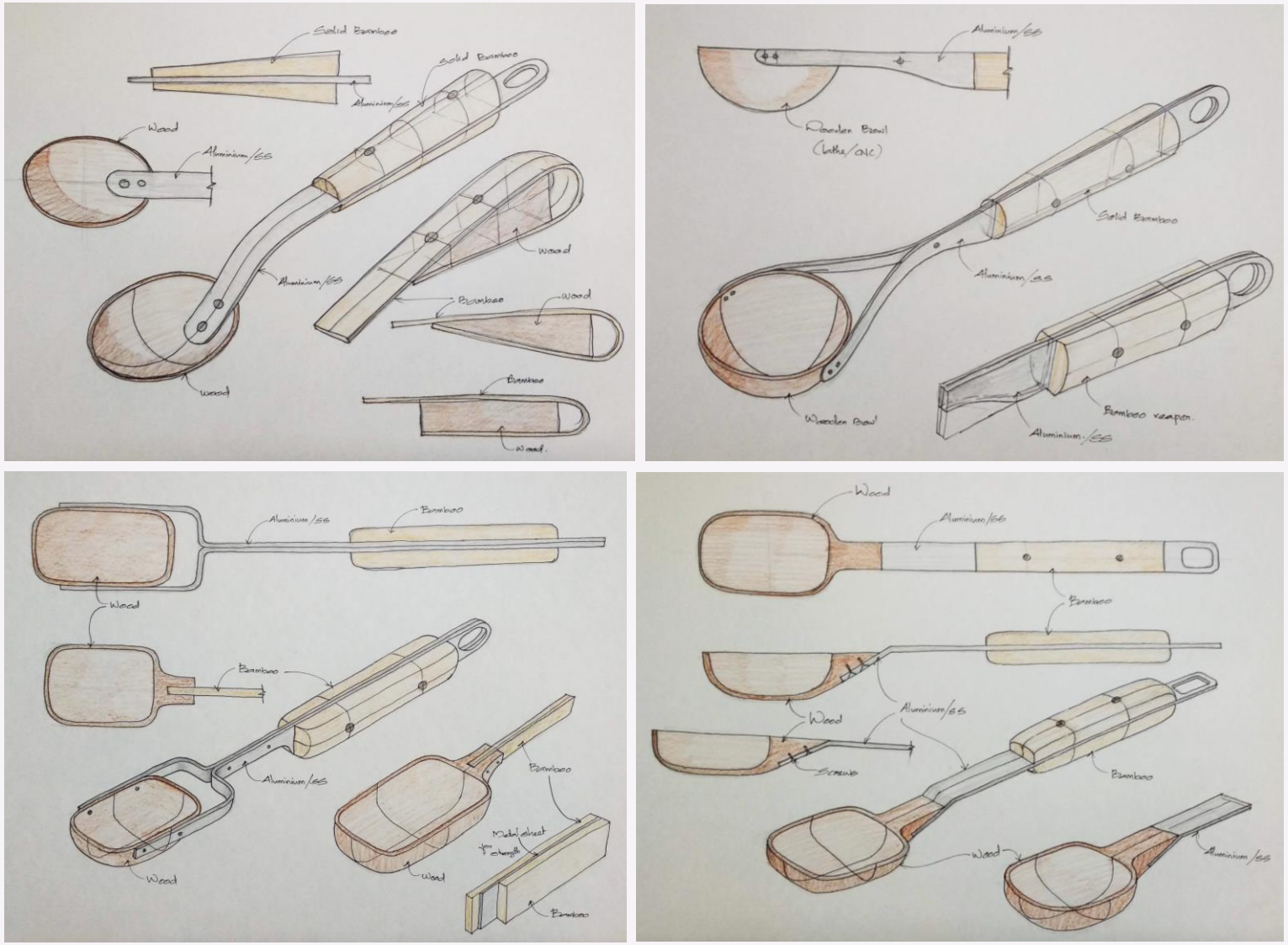
More Ideations



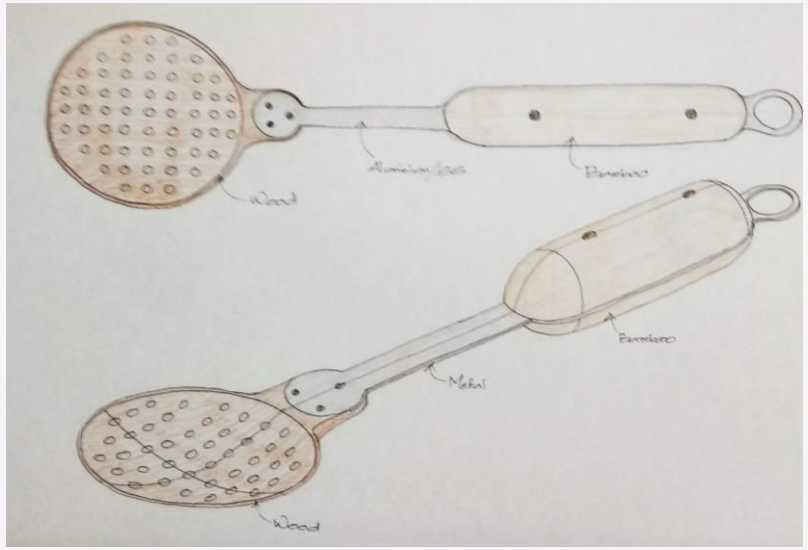


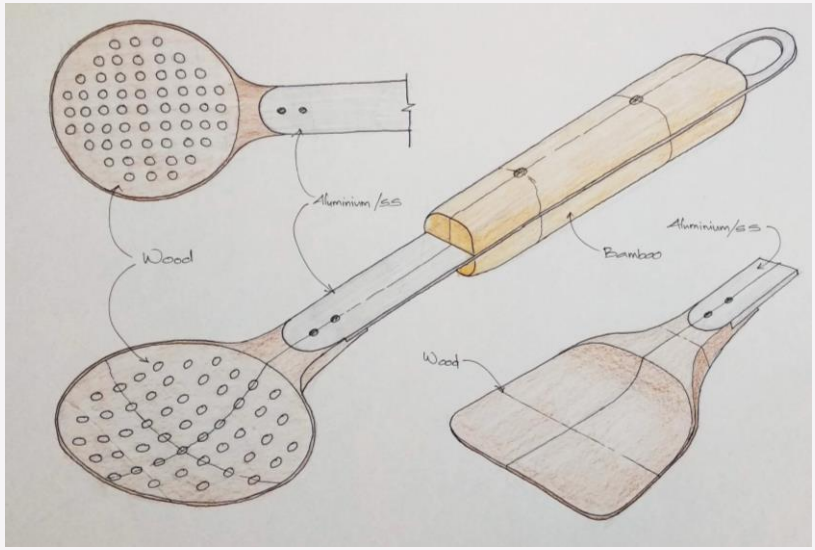


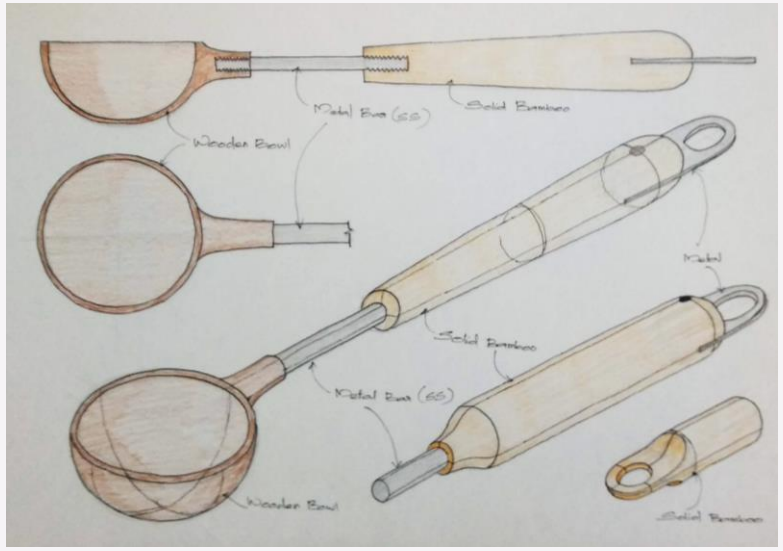
Coconut shell, Wood and Bamboo

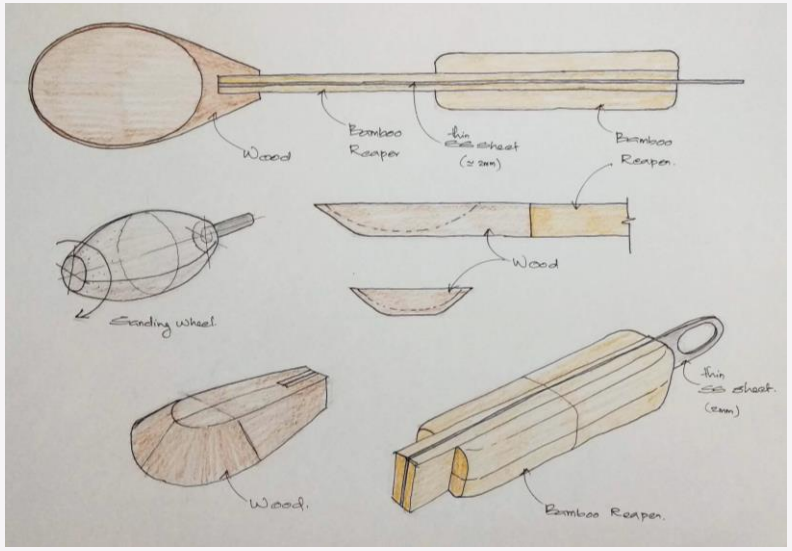


Wood, Metal, and Bamboo





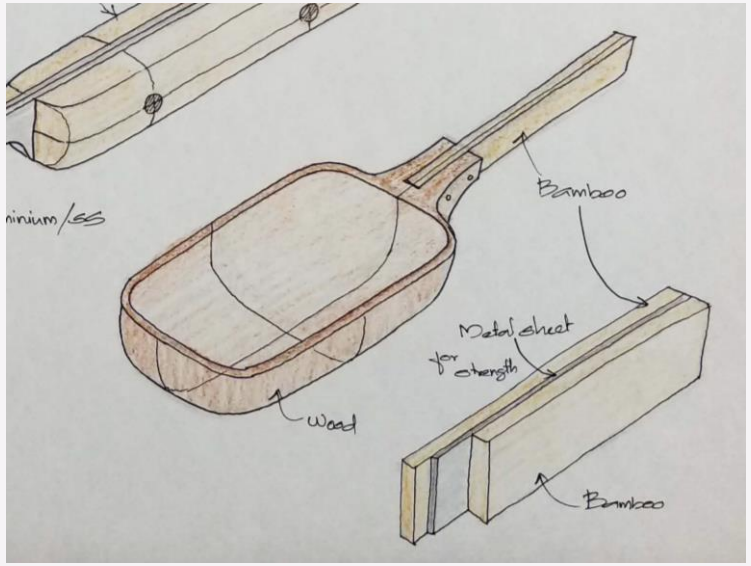


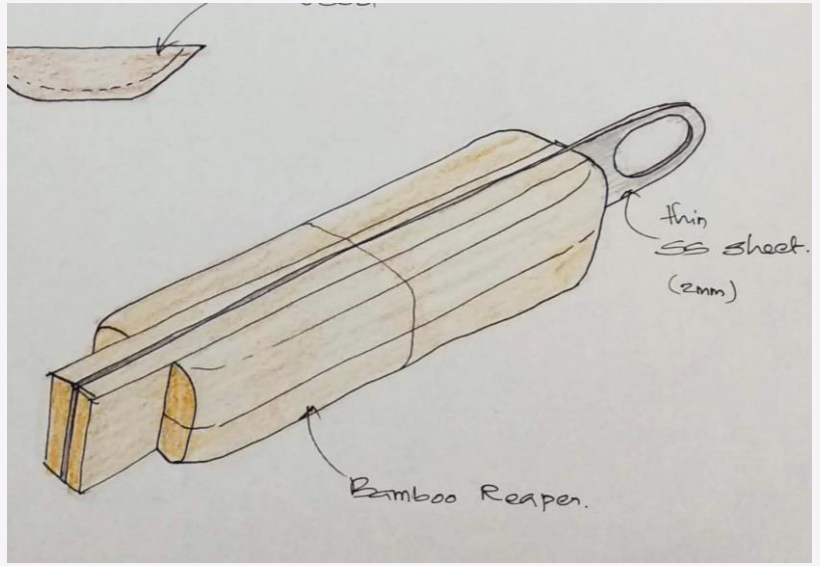


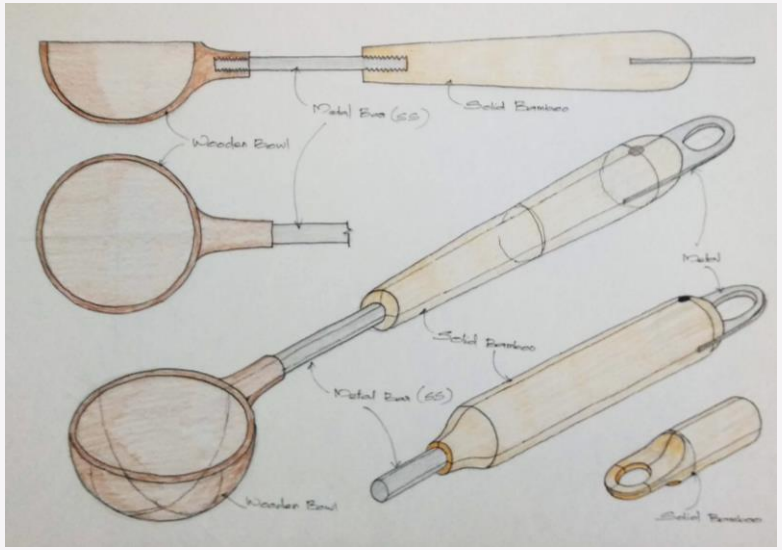
Wood, Metal, and Bamboo

Design discussions:

- In order to make wooden cutleries, More industrial/ machine processes are required.
- It takes away the craft element and the craftsmen will ended up as assembly line workers.


Bamboo
Metal sheet
for strength
Wood
Bamboo

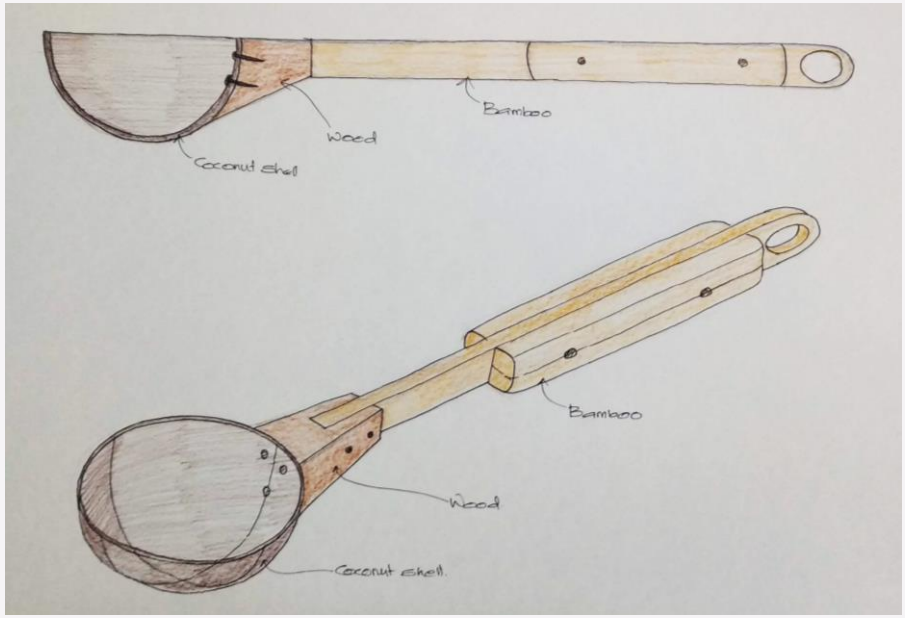

thin
SS sheet.
(2mm)
Bamboo Reaper.

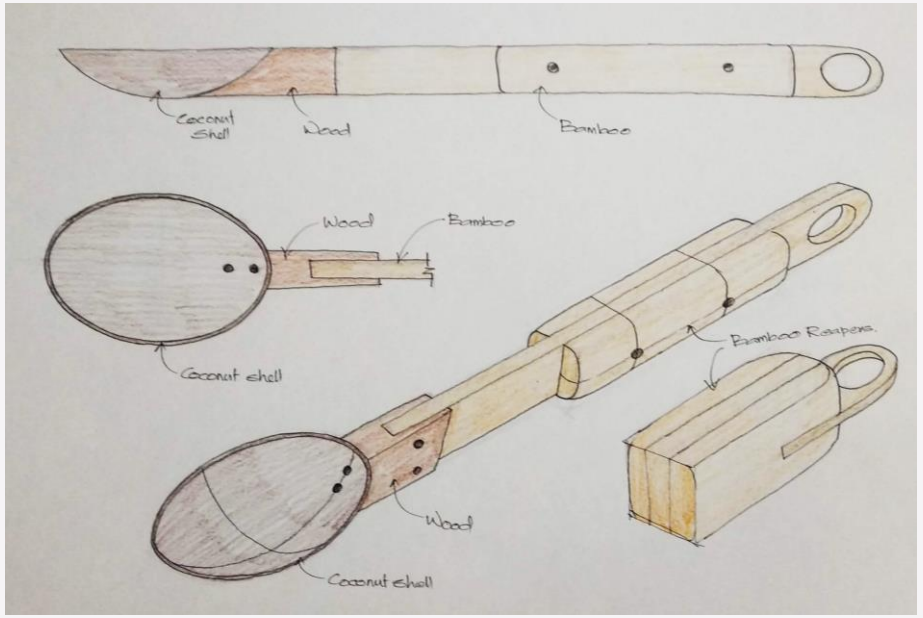


Take aways

Design discussions:

- Two directions
  - Flat sections
  - Round sections
- Decided to go ahead with one idea and then come back to the second one later.





Coconut shell, Wood and Bamboo

Study Models

Prototypes using actual materials

Prototypes 1

- The idea was of giving an inward taper was to reduce the area of contact to get a seamless joint.
- The inward taper at the joint creates a visual tension.
- Break in the flow of the design
- Handles were too bulky




Prototypes 1

Prototypes 2

- Gap at the joint – Filling with silicon
- Making grinding wheels to match the coconut shell profile
- Detail of bamboo and wood joint
- Hole provided for hanging is on the side.
- Incorporating metal in the handle.



Prototypes 2

Prototype 3

- New detail to bring the hole in the front.
- Not a strong detail
- Big copper pins – Creates burn marks.
- Difficult to make.
- The joint between the coconut shell and wood not working out.

Prototype 4

- New joint detail to join coconut shell and wood.
- Too many elements

Prototype 4

Prototype 5

- Removed one strip of bamboo
- Bamboo in the front side creating a step at the joint and breaking the flow.
- Try to bring in copper in the front side.

Prototype 5

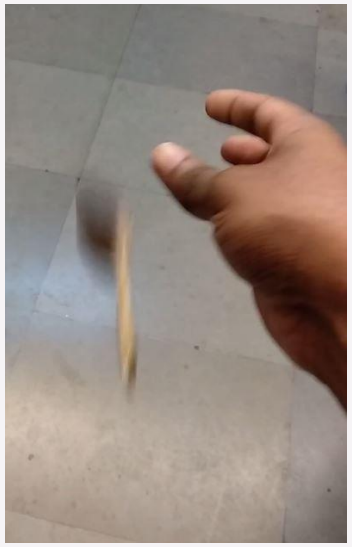
Concept 1 - Final

Prototype 6

- Finalized the concept 1.
- Detail of bamboo piece at the back creating a step.
- Opened up the possibilities to explore textures in metal.

Prototype 6

Tests



Drop test

- 27 drops – Coconut shell broke at 27th drop
- No effect on the joint

Tap test

- 100 Taps
- No effect on the joint

Dip Test

- Dipped in hot water for 30minutes
- No effect on the joint

Explorations

Explorations in coconut shell

- How to cut coconut in desired shape?
- How to obtain useful shapes from discarded coconut shells?

Explorations

Laser etching

Explorations

Textures and patterns on metals

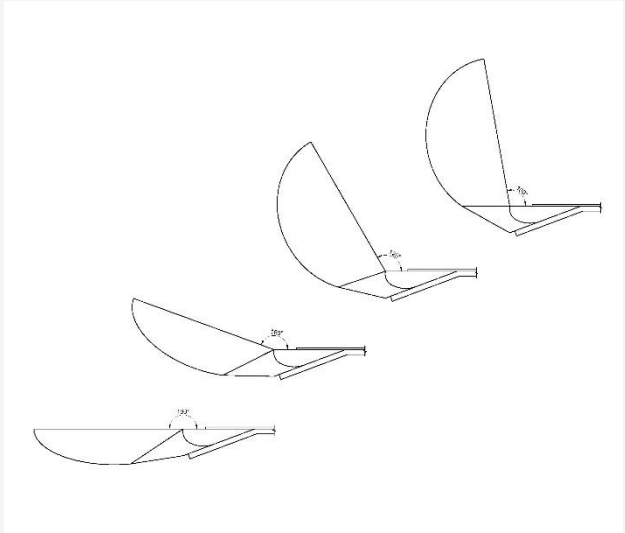
Explorations





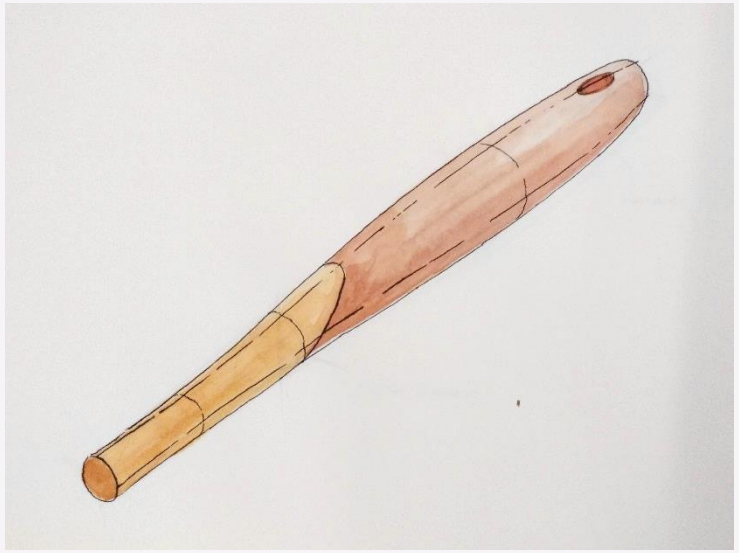


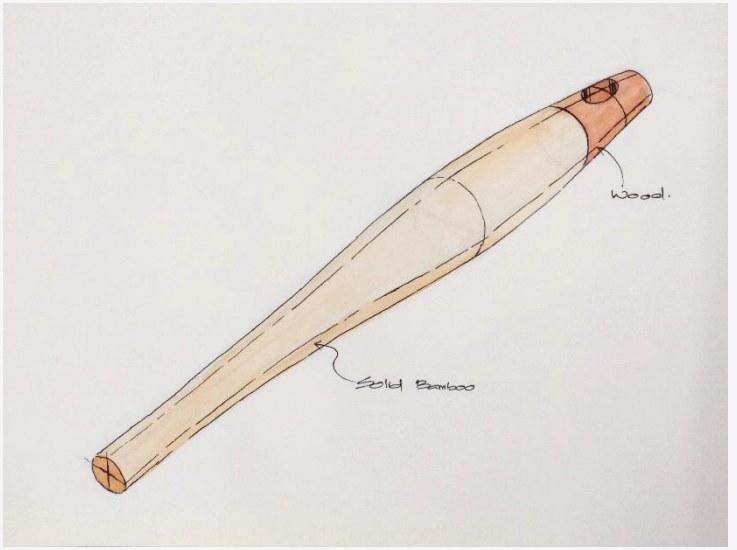
Product range , form and angle variations

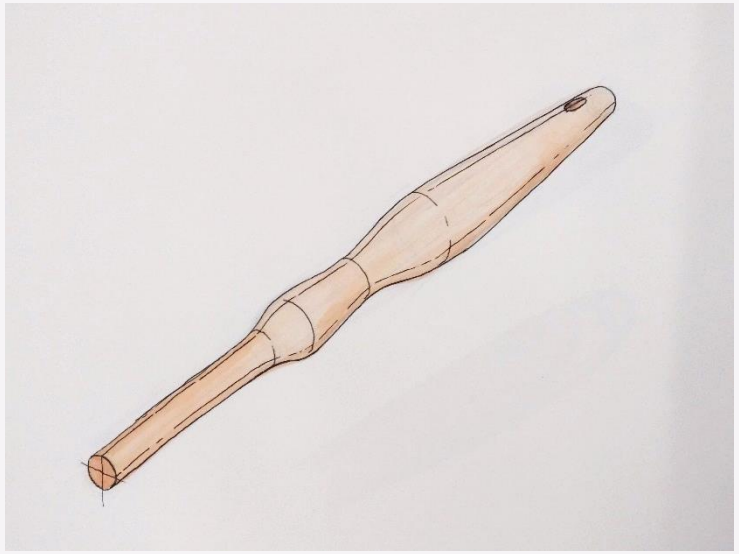


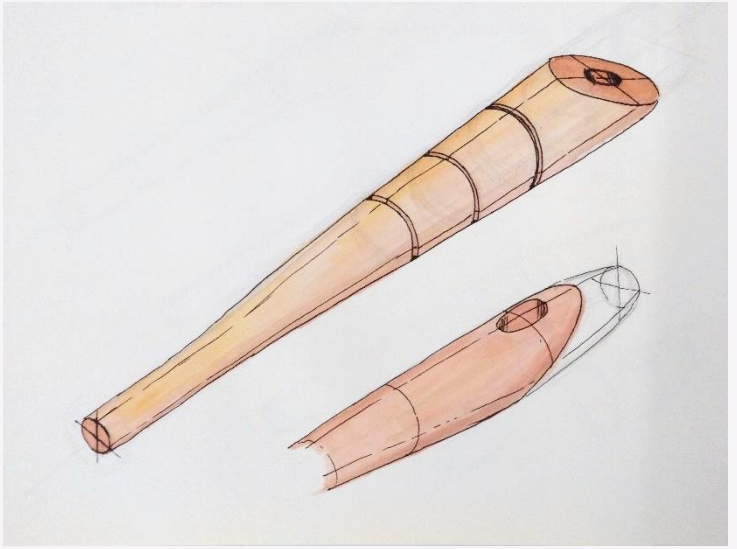
Concept 2

Further Explorations on handle design









Further Explorations on handle design

Explorations in handle groves

Explorations in joineries






Concept 2 - Iterations

- Handle is inserted into the neck piece.
- Creating a step at the junction

- Handle is joined with adhesive and an angle cut.
- Creates a seamless joint
- Strength needs to be tested

Design discussions:

- Finalized on second design.
- Try out a new joint detail combining both the details.

FINAL MODELS

Concept 1

Product Range







Concept 2

Product Range





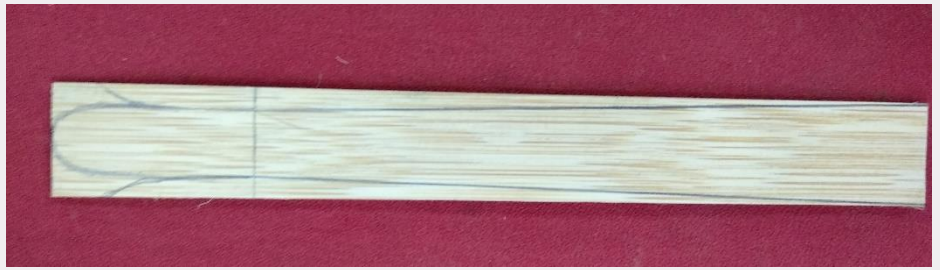

PRODUCTION

Documentation of the process

Making neck piece

Assembling head part

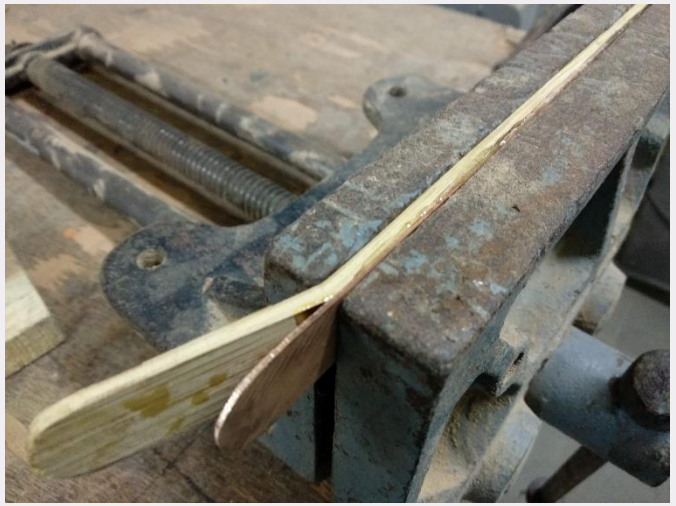
Documentation of the process



Assembling head part

Preparing Handle pieces

Documentation of the process



Assembling Handle

Final Assembly

Documentation of the process

Final Product

Tools and Machines used

Chisel

Hammer

Knife

Angle grinder

Hand drill

Hot air gun

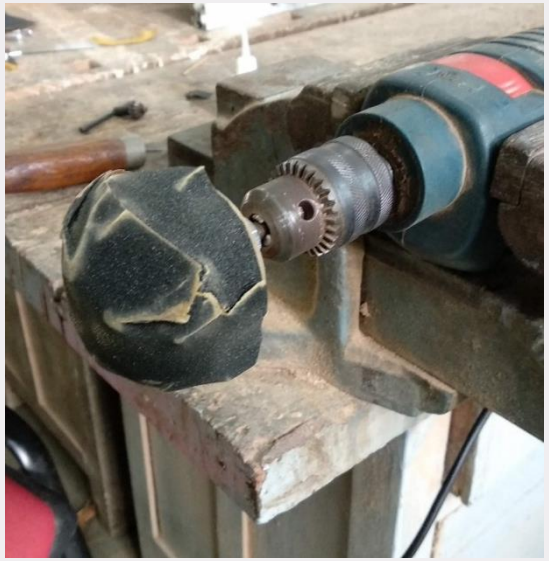
Drill Machine

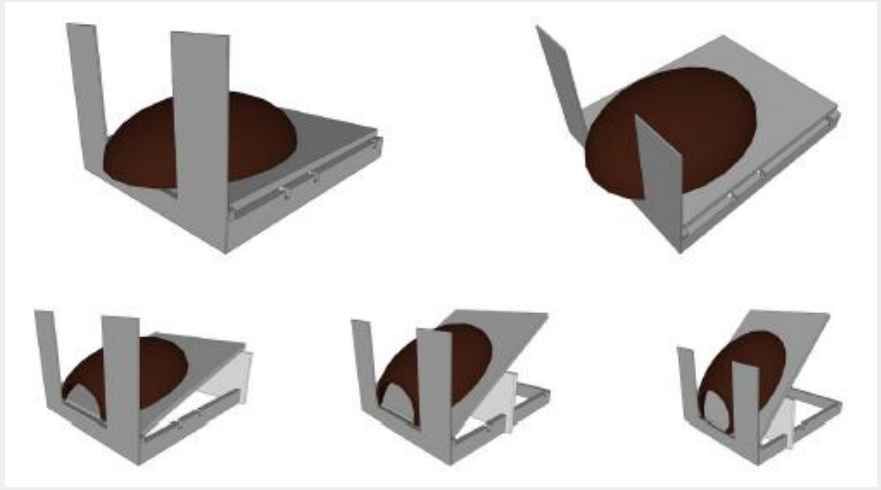
Band saw

Disc sander

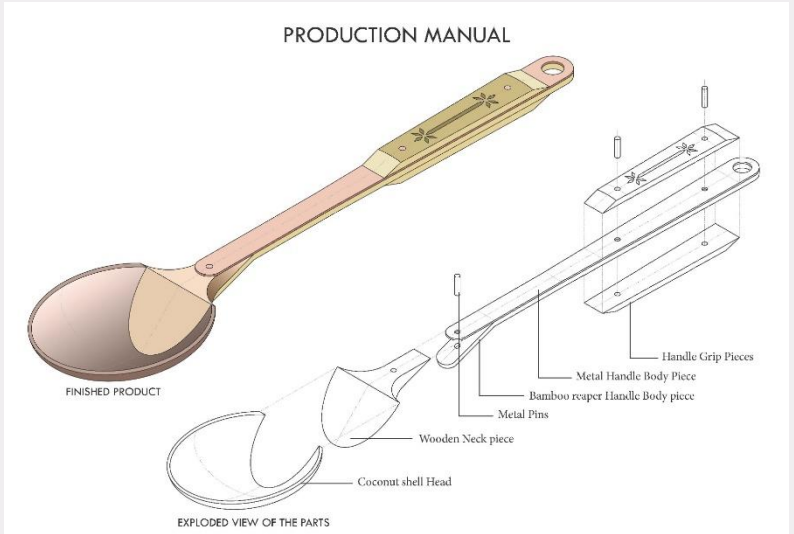
Laser cutting machine

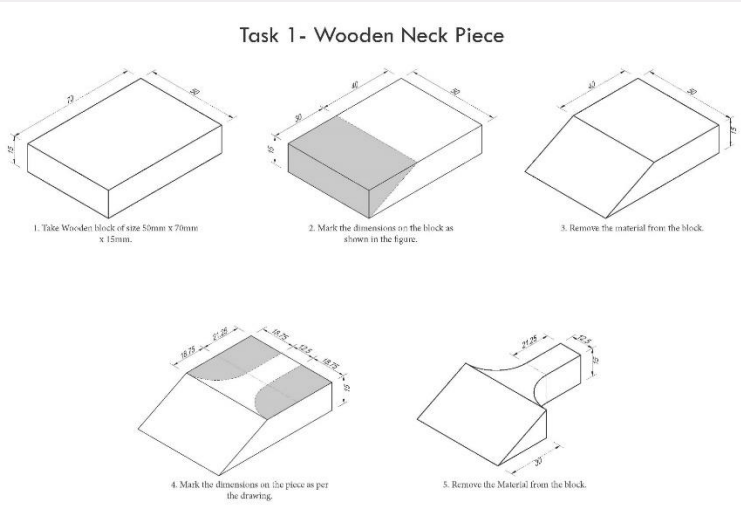
Jigs and other tools development

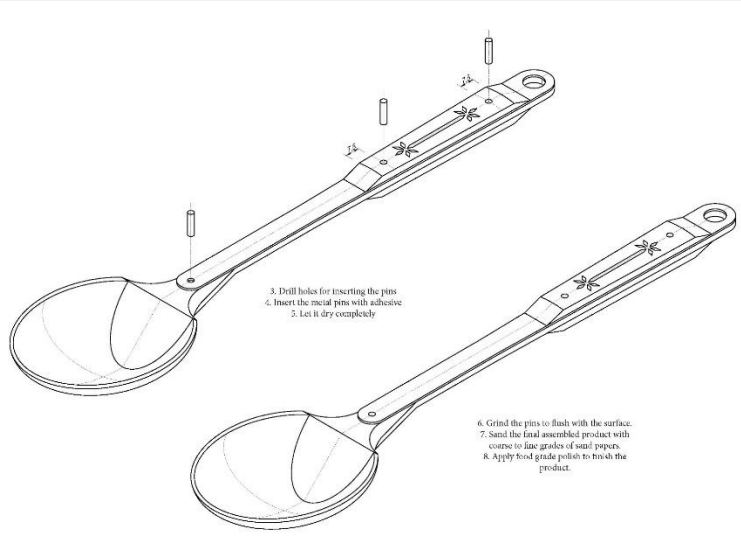




Production Manual







THANK YOU...