

INTERNSHIP AT URAVU

INDUSTRIAL DESIGN PROJECT I

BY

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**INDUSTRIAL DESIGN CENTRE
INDIAN INSTITUTE OF TECHNOLOGY BOMBAY
2016**

A report on internship at
uravu

declaration

I declare that this written submission represents my ideas in my own words and where others' ideas or words have been included, 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 idea/data/fact/source in my submission. I understand that any violation of the above will be cause for disciplinary action by the institute and can also evoke penal action from the sources which have thus not been properly cited or from whom proper permission has not been taken when needed.

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acknowledgment

I would like to express my special thanks of gratitude to Uravu as well as our honourable faculty Sir. A.G.Rao who gave me the golden opportunity to do this wonderful internship, which also helped me in doing a lot of Research and i came to know about so many new things I am really thankful to them.

Secondly I would also like to thank my parents and friends who helped me a lot in within the limited time frame.

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introduction

Bamboo has a long and well-established tradition as a craft and building material through out the world's tropical and sub-tropical regions. It is widely used as a material for many forms of products and construction, in particular for traditional art and craft in rural areas. Bamboo is a renewable and versatile resource, characterized by high strength and low weight, and is easily worked using simple tools. It is widely recognized as one of the most important non-timber forest resources due to the high socio-economic benefits from bamboo based products. It is estimated that there are 1200 species growing in about 14.5 million hectares area. Most of them grow in Asia, Africa and Latin America. And India is the second largest producer of bamboo.

about uravu

URAVU is a non-government organization working with people, governments and businesses to implement programs for sustainable employment and income generation in rural areas. Uravu is a non-profit trust, established in 1996, registered under the Indian Trusts Act.

Uravu promotes social enterprises based on value addition of local, natural resources, especially bamboo, the "green gold". Uravu implements integrated, end-to-end programs in the bamboo sector, which include providing skill training in bamboo processing, establishing micro enterprises, marketing of bamboo handicraft, cultivation of bamboo and promotion of eco-tourism.

Uravu strives for empowering marginalized social groups, especially the traditional artisans, women and the Indigenous People.



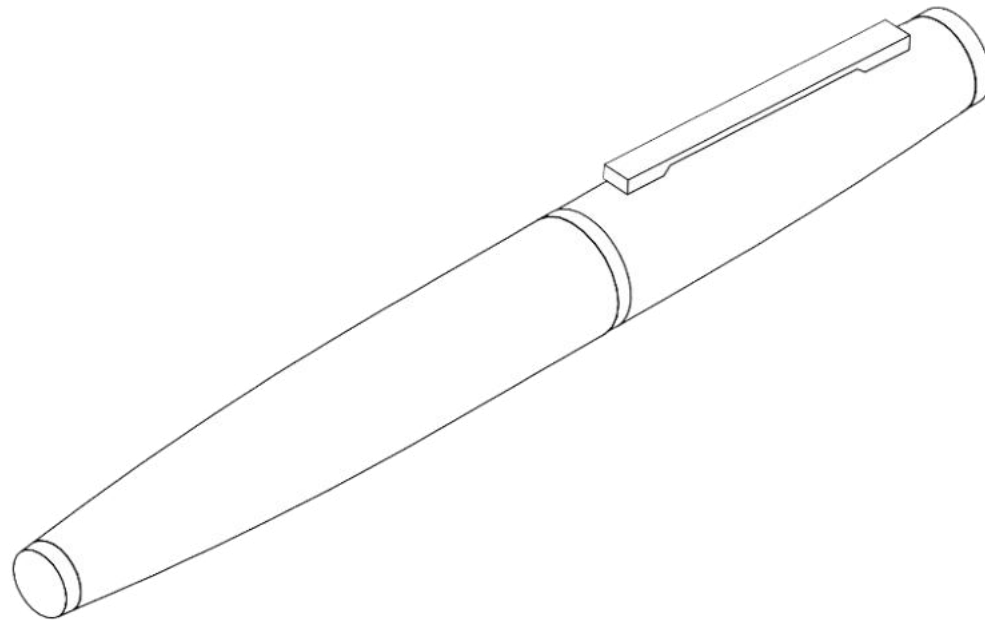
Bamboo Pen

brief

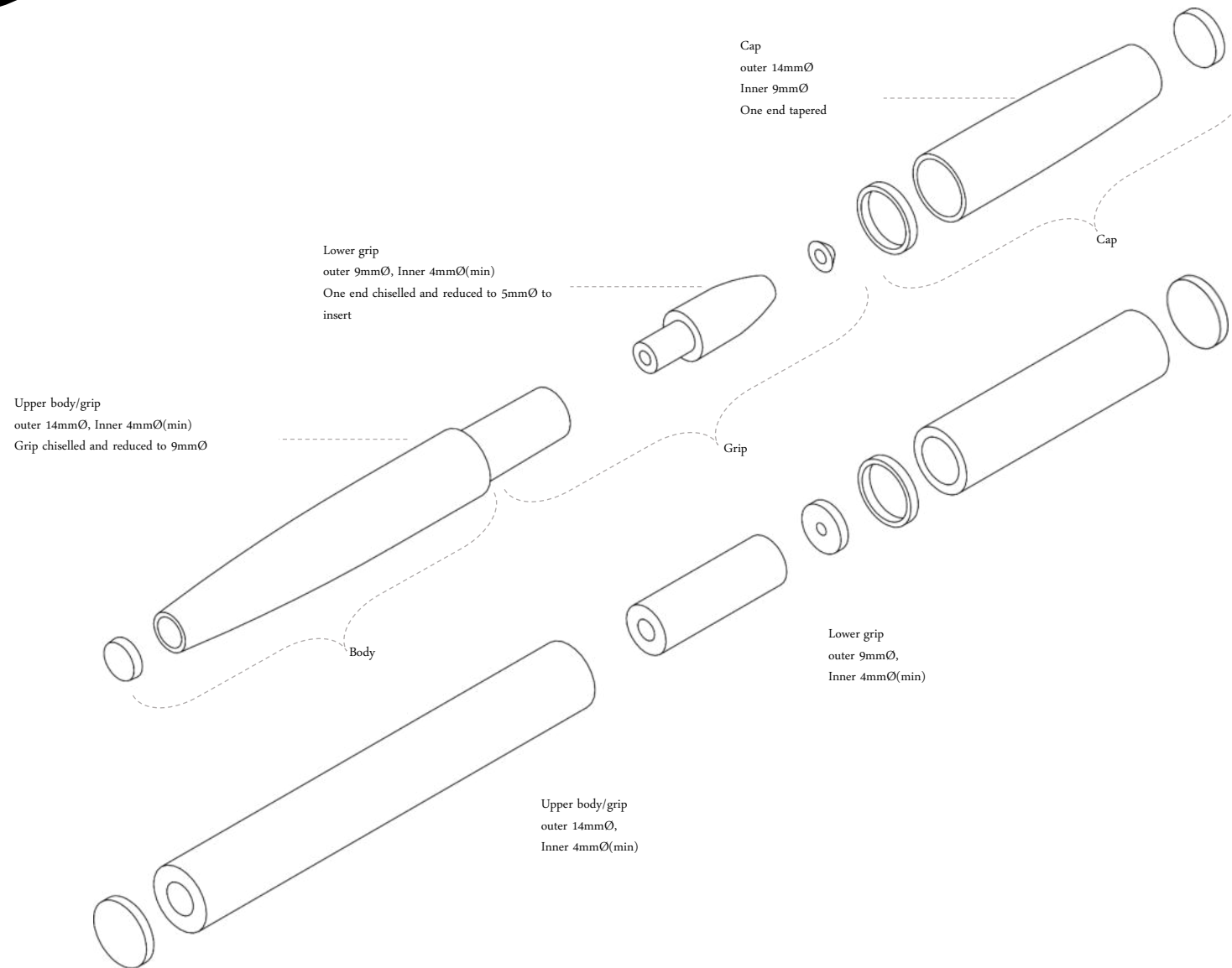
to re-design the process and the product, so as to increase the production units per day and to ease the process of manufacturing for better workmanship

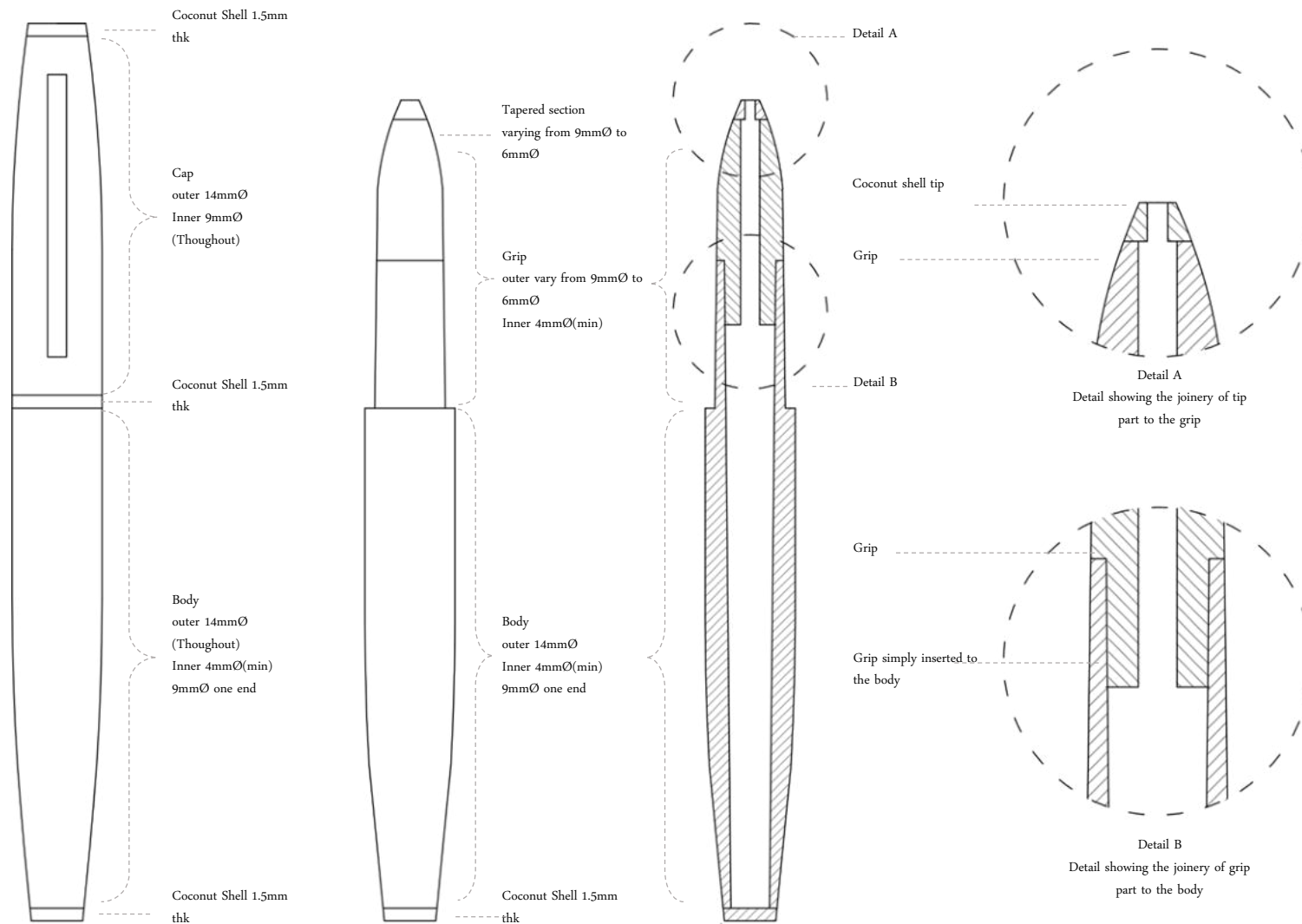
Existing Pen

A writable pen made of natural bamboo. A very good use of the natural form of bamboo



Exploded View



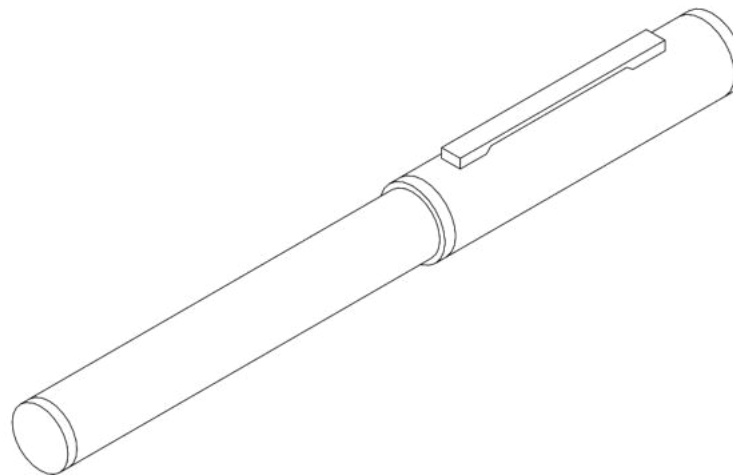


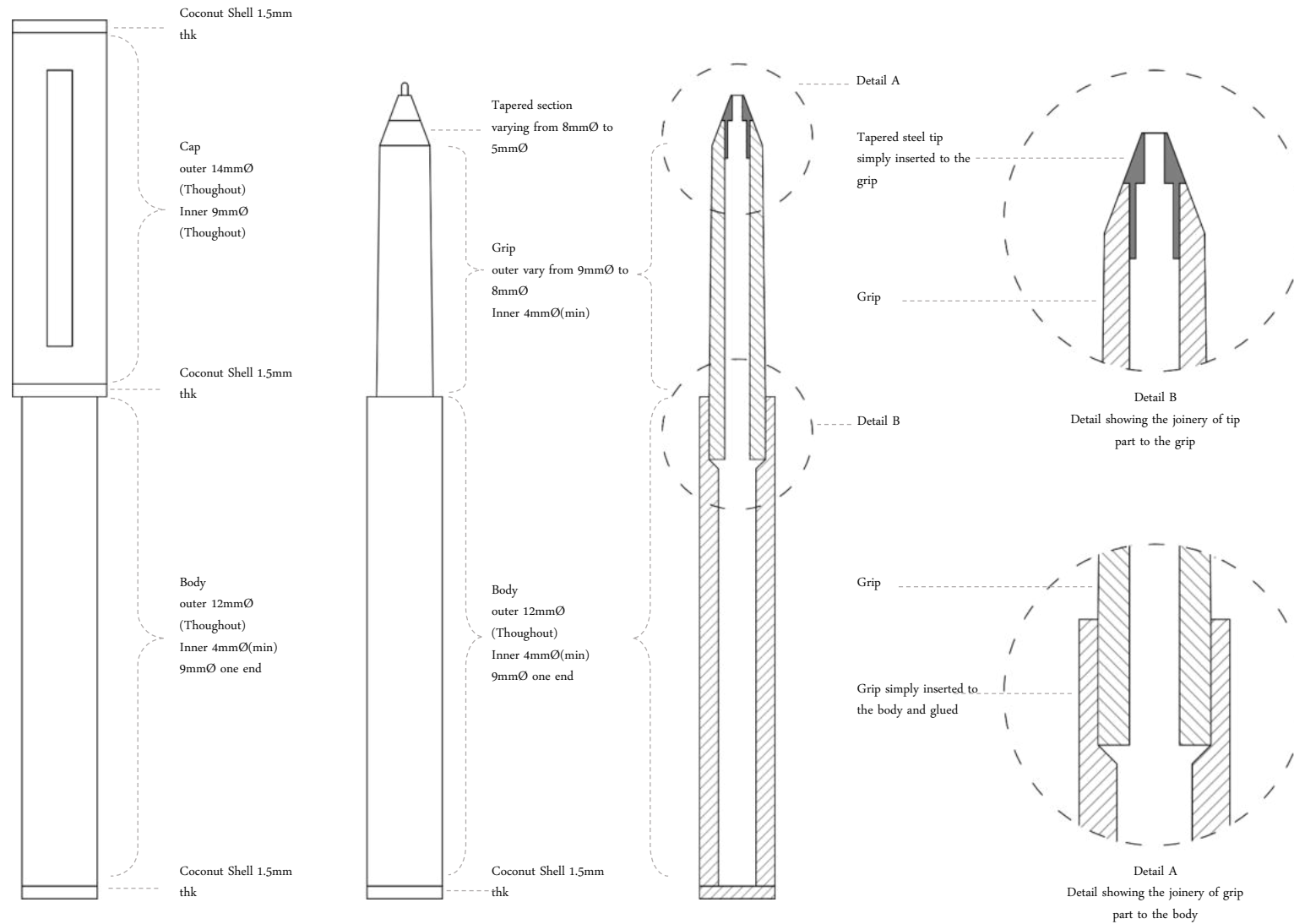
Proposed Design

The new pen is designed to ease the process of manufacturing for better workmanship and also increase the production units per day.

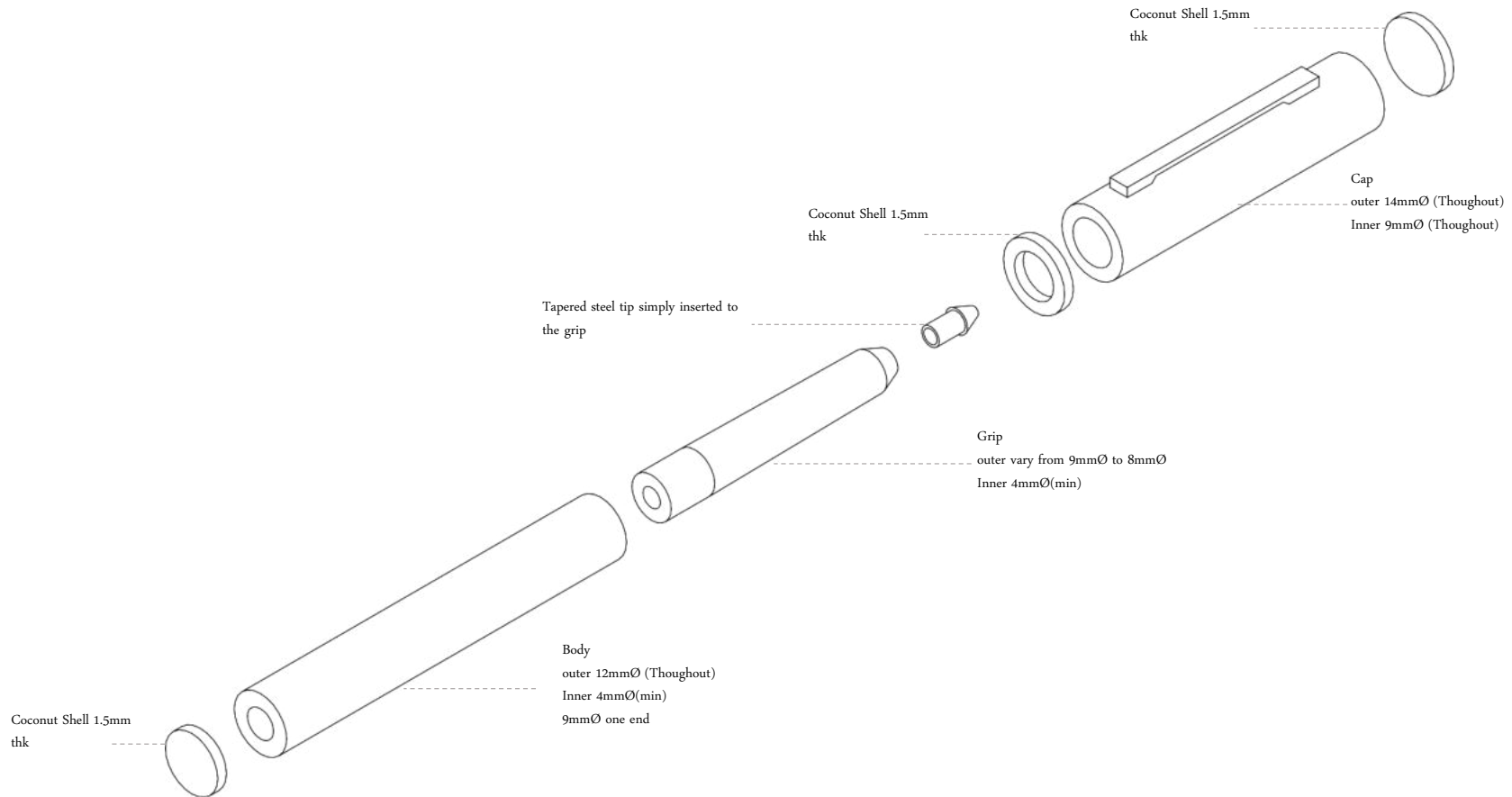
The proposed design is just an assembly of regular cylindrical parts of different diameters with lesser chamfers (gradual change in $\varnothing$ in single part), which ease the skill required for making it.

The cylindrical parts can be mass produced of various diameters by choosing appropriate materials and then machine sanding it and finally cutting in numbers.





Exploded View



Bamboo
Pen



Resort Furniture

brief

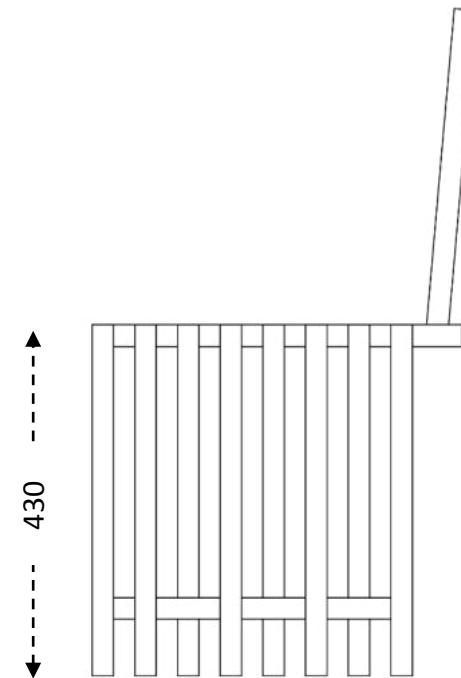
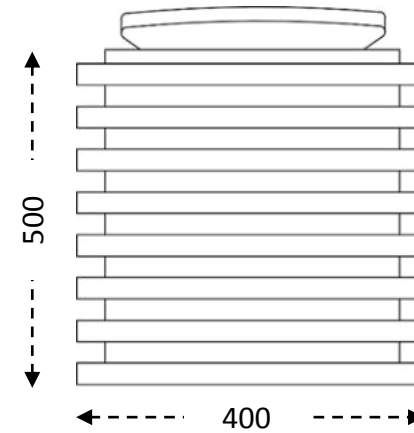
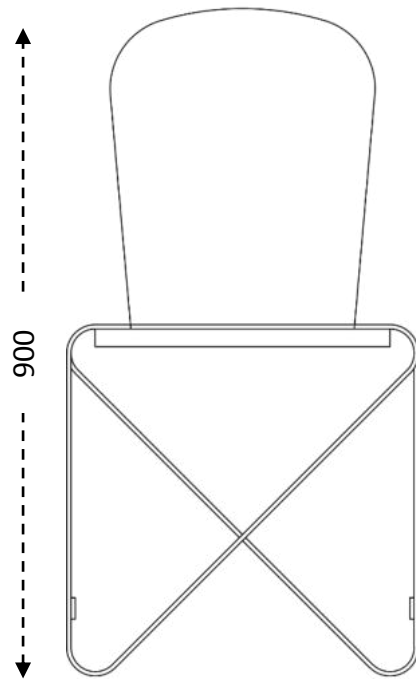
to design a set of furniture for Uravu Bamboo Resort which will look elegant, that can be also be sold as a product in the market which can obviously be mass produced and transported easily.

Existing Chair

the existing resort chair is a part of a set of a furniture they are using currently in the Uravu resort. The design of the furniture follows certain aesthetics created by bending of bamboo flats. There were few issues which were required to address.

Problems with the chair:

- extensive use of material
- looks quite bulky
- unstable when someone sitting, CG moves backward
- front back shear motion



Existing
Chair



#1

Placing less members at the sides of the seat pan

Pros:

Less members

Cons:

Not a stable structure, shear movement



#2

Placing less members at the sides of the seat pan but separating it apart like a trapezoid

Pros:

Less members

Cons:

Structure did not work, shear movement



#3

Placing members about the centre

Pros:

Less members,
Better aesthetics,
Resembles organic forms,
stable

Cons:

Small twisting movement



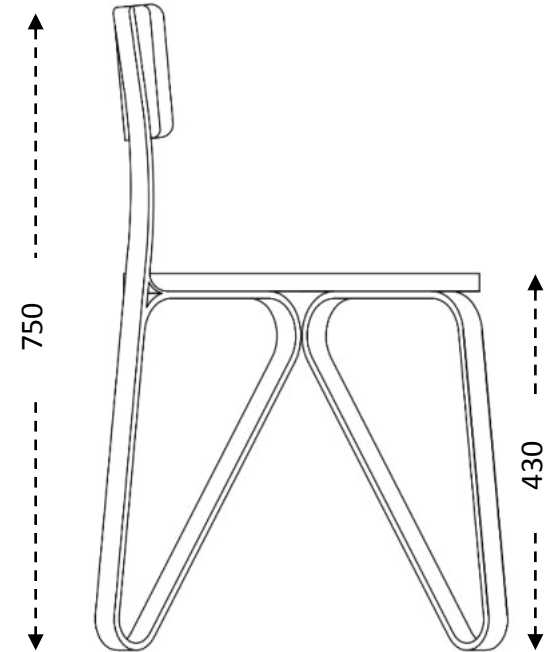
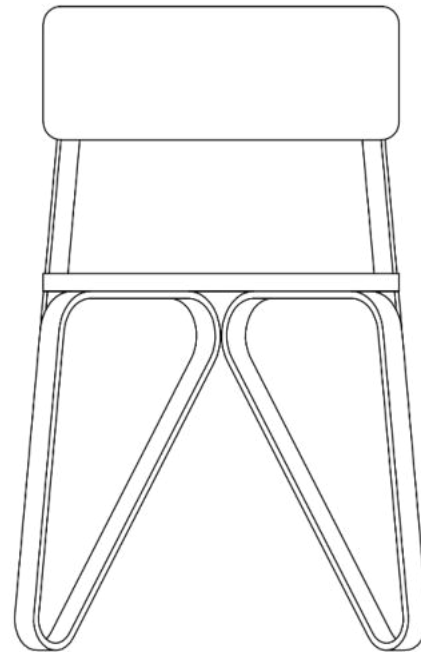
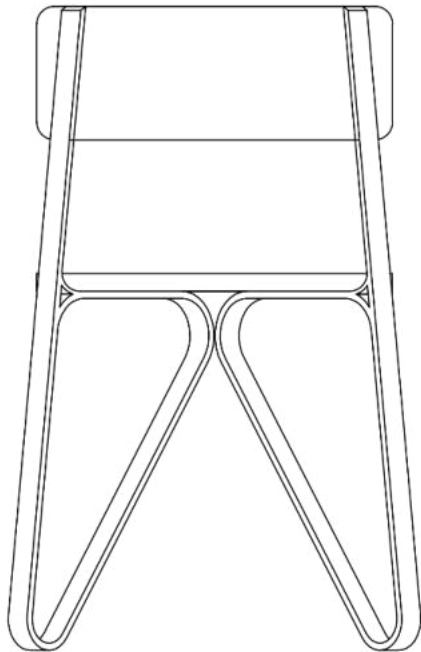
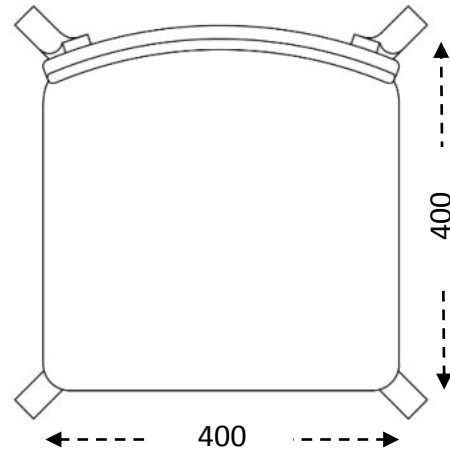
#4

Placing members about the centre and same legs becomes the backrest.

Pros:

Less members,
Better aesthetics,
Resembles organic forms,
Stable,
Twisting movement restricted





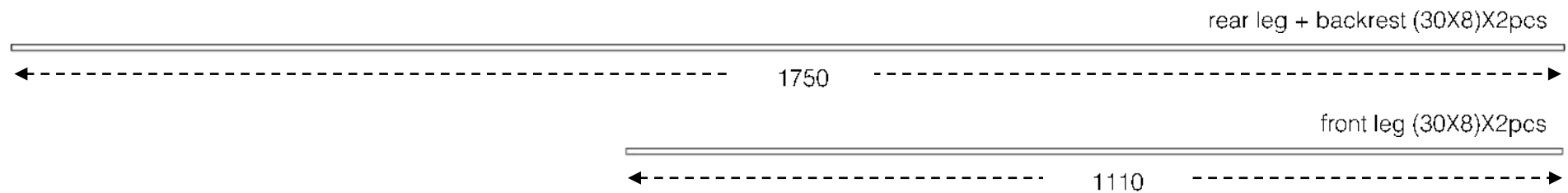


The Process

Legs

The process making the bamboo flats starts right from the choice of raw treated bamboo, one need to be sure that the bamboo to choose shall have the wall thickness not less than 9mm.

Then the bamboo are split in equal sizes which is 40mm width(5mm tolerance on both side) and pass through the planar machine.

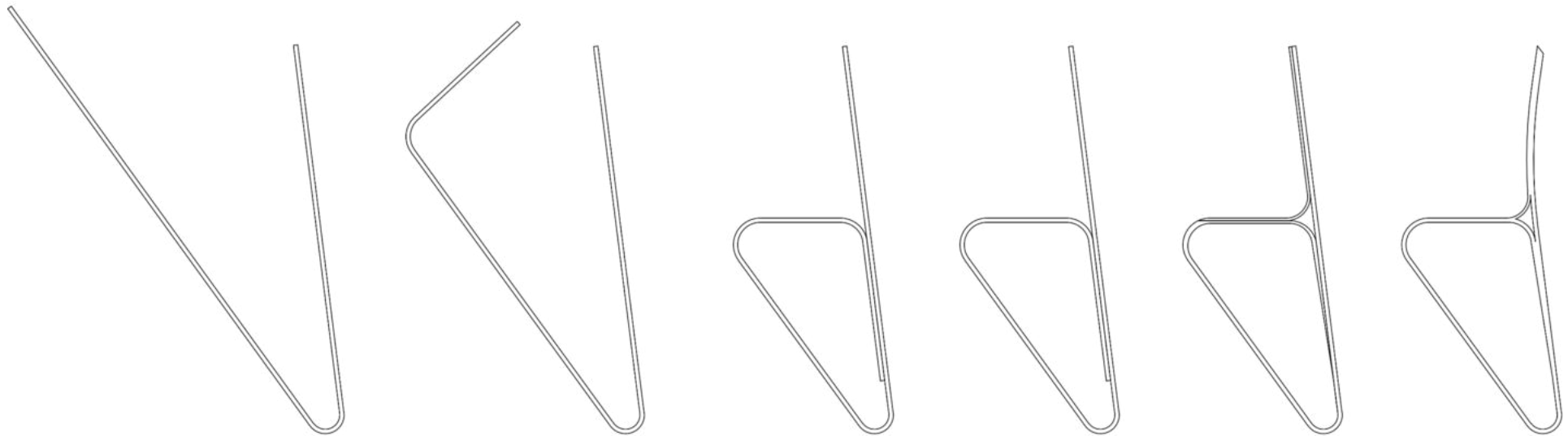


Legs

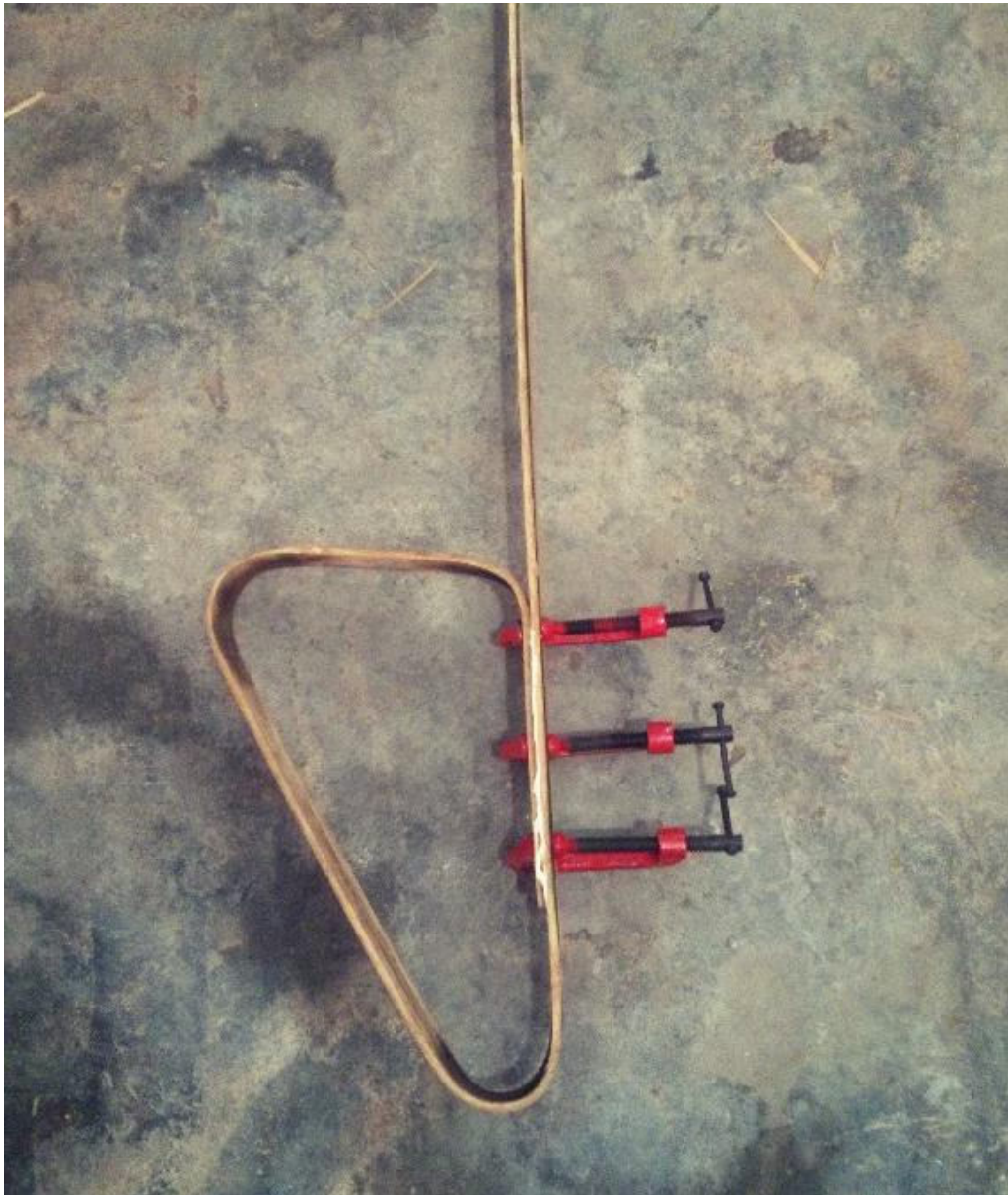
The flats are cut as per the desired size and then heat bend very slowly by using blow torch or hot air gun.

Note: Using Blow torch makes burnt marks on the flats which needed to be scrapped out and that results in the loss of the thickness.

The bending process can be made easy and mass produced by making a jig and coiling it around for making identical pieces.

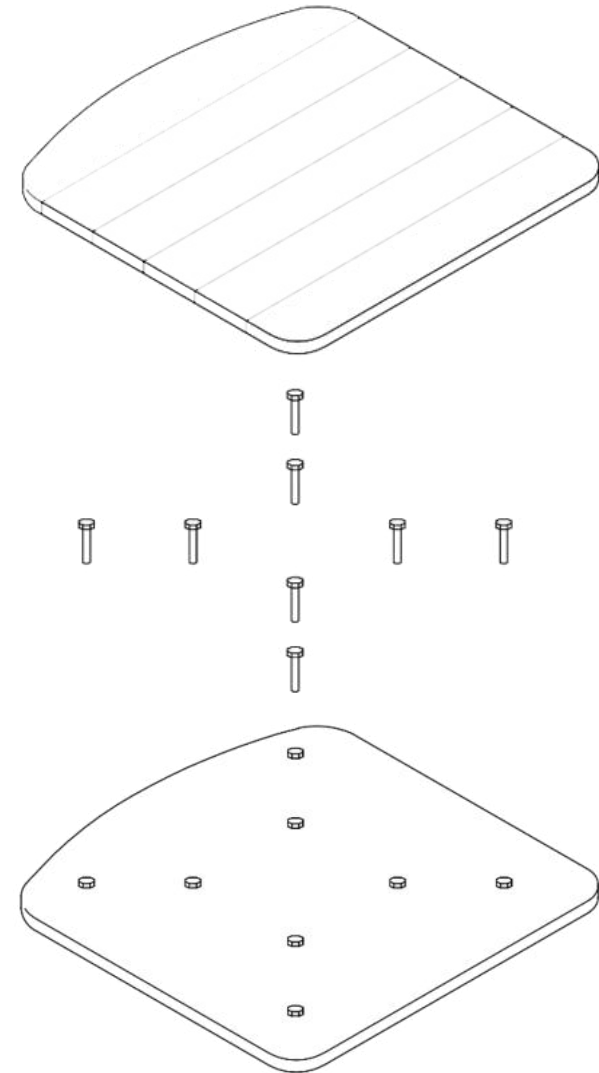
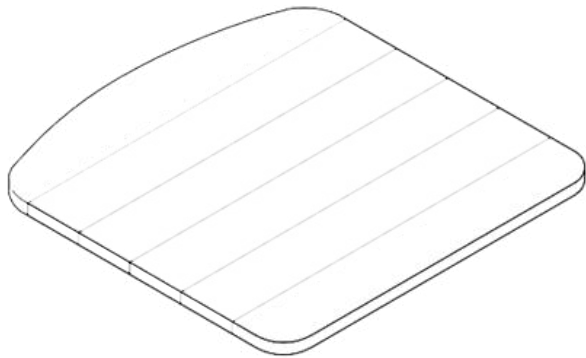


Legs



Seat Pan

The seat pan comprises of two parts; the base, which is of plywood and the bamboo top. The bolts are fixed in on the base for the attachment of the legs. To give the finish of bamboo and to flush bolts, a layer of bamboo flats is pasted on it.



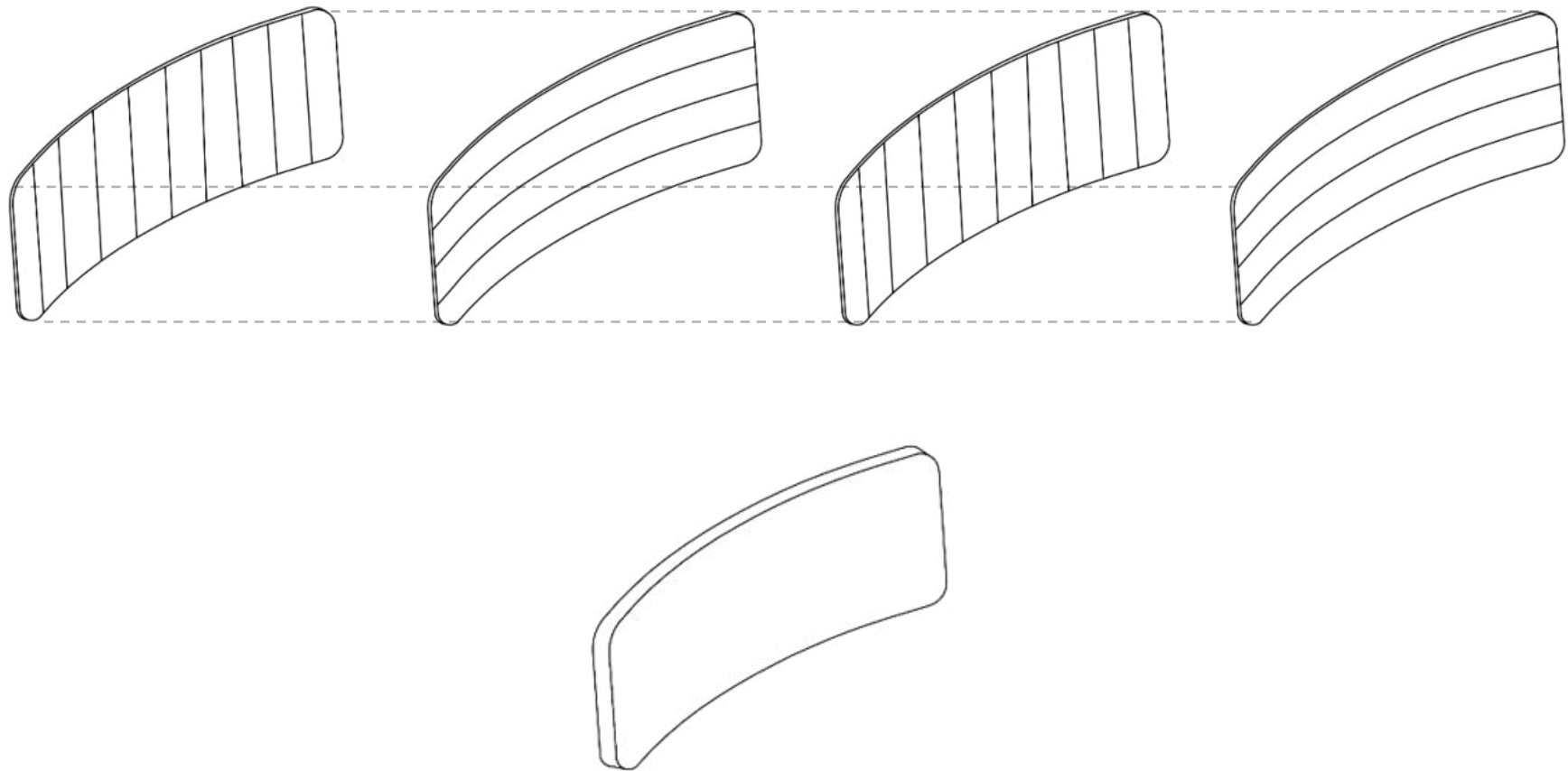
Seat Pan



Back Rest

The back rest is made on same principle how plywood board are used to made. Since I didn't had the mould for pressing it, I had to paste layer by layer. Whole part comprises six layers of bamboo stripes placed alternately horizontal and vertical manner, where each strip of 1.5mm thick.

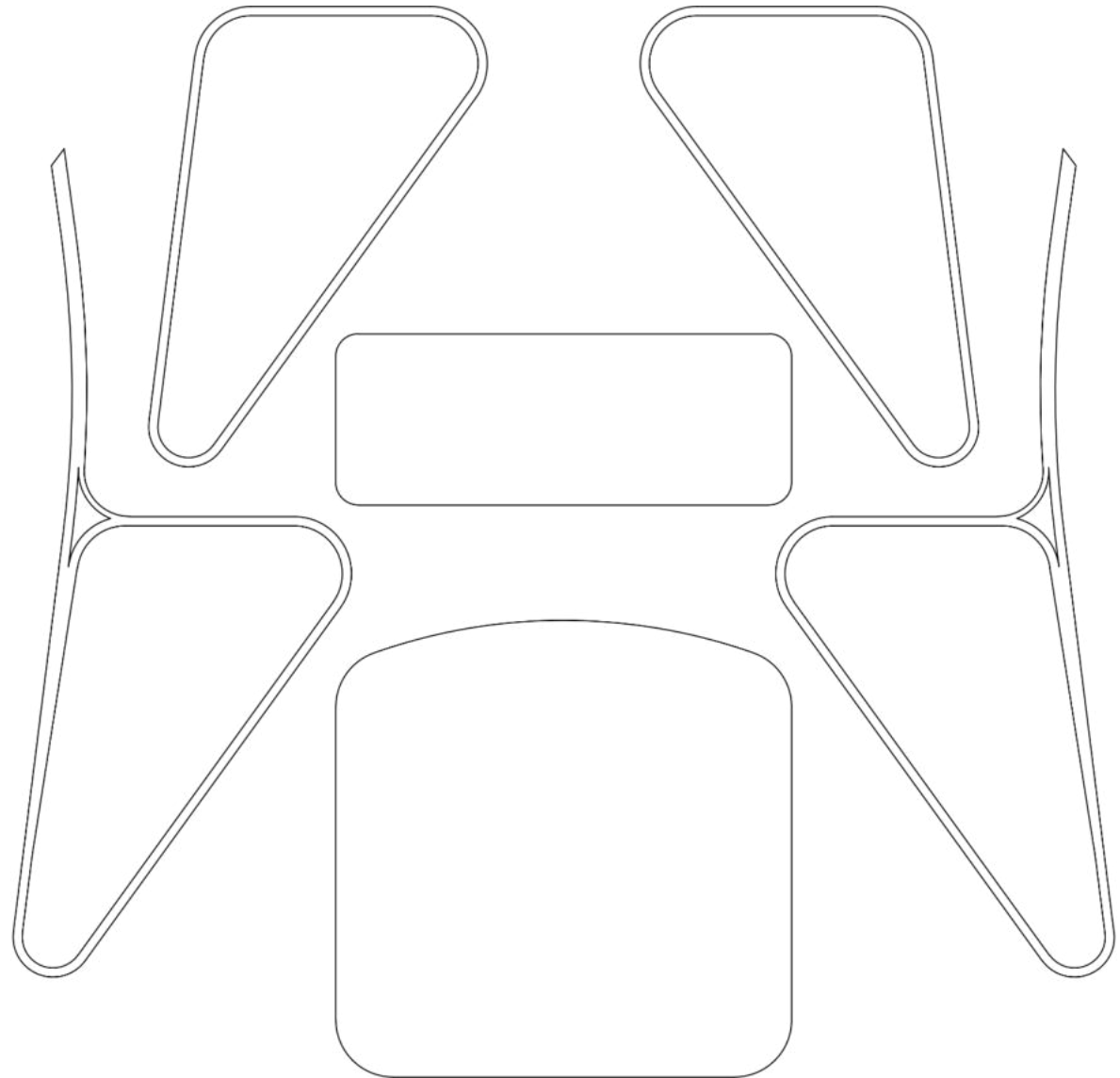
This part can also be produced very quickly if we can use moulds and use the same process how plywood boards are bent.

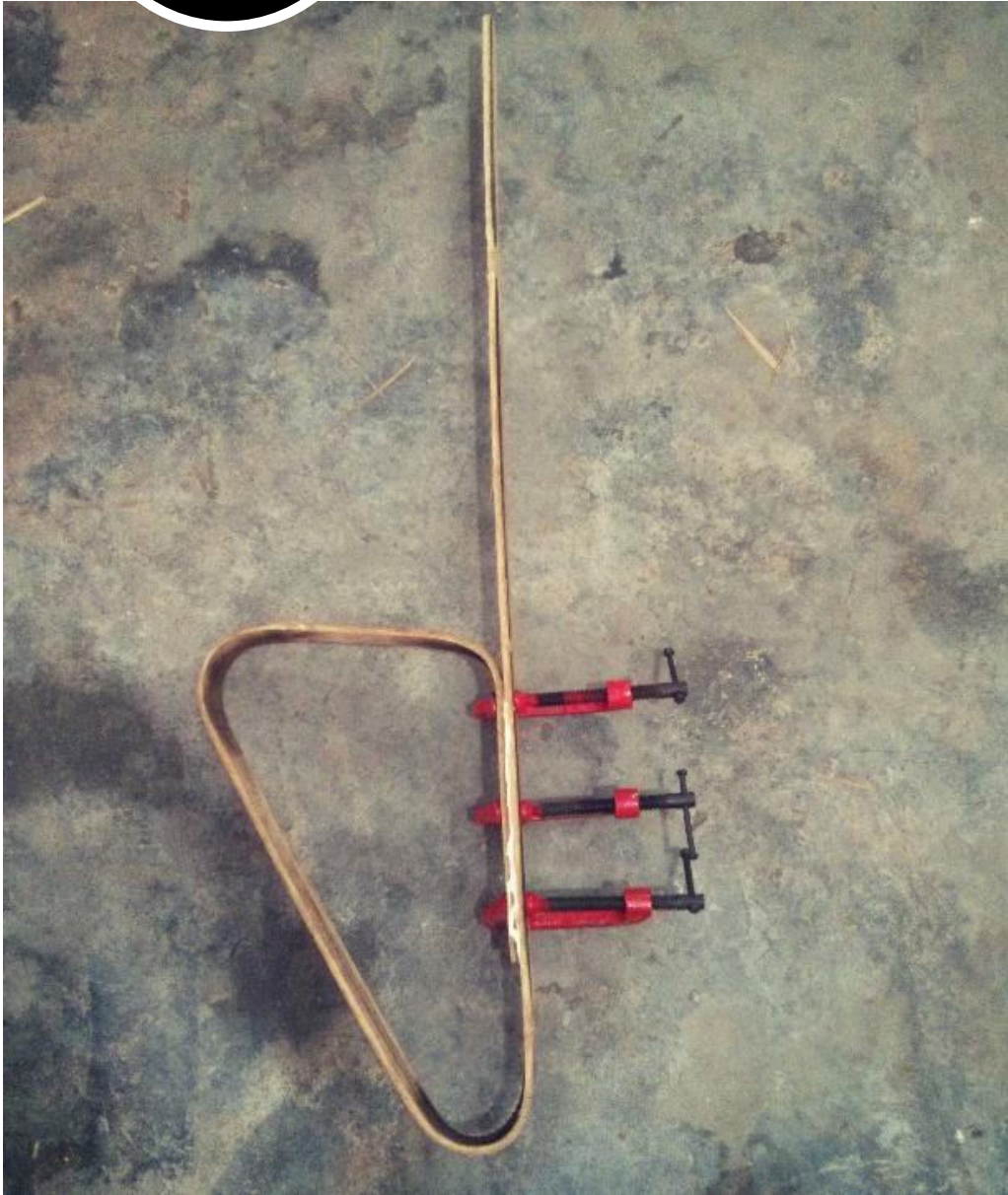




Parts

The seat pan comprises of two parts; the base, which is of plywood and the bamboo top. The bolts are fixed in on the base for the attachment of the legs. To give the finish of bamboo and to flush bolts, a layer of bamboo flats is pasted on it.

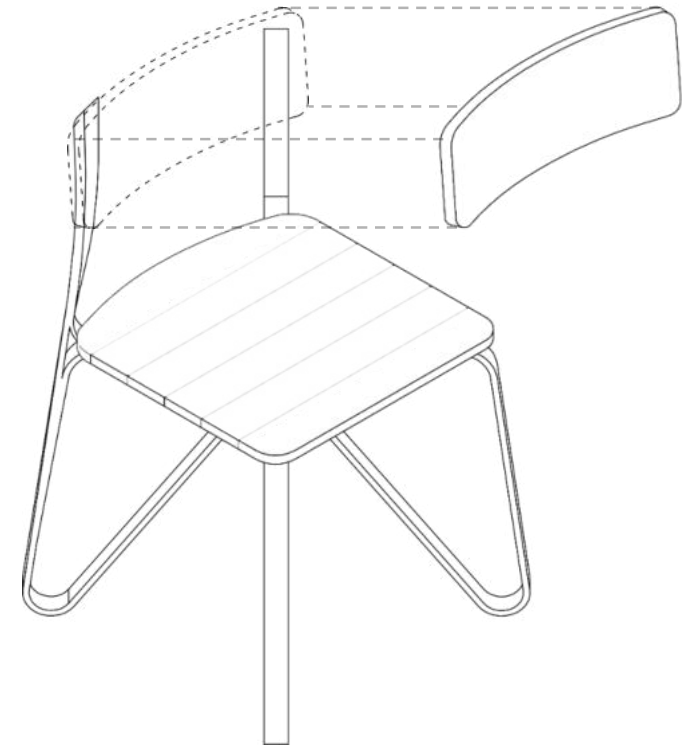
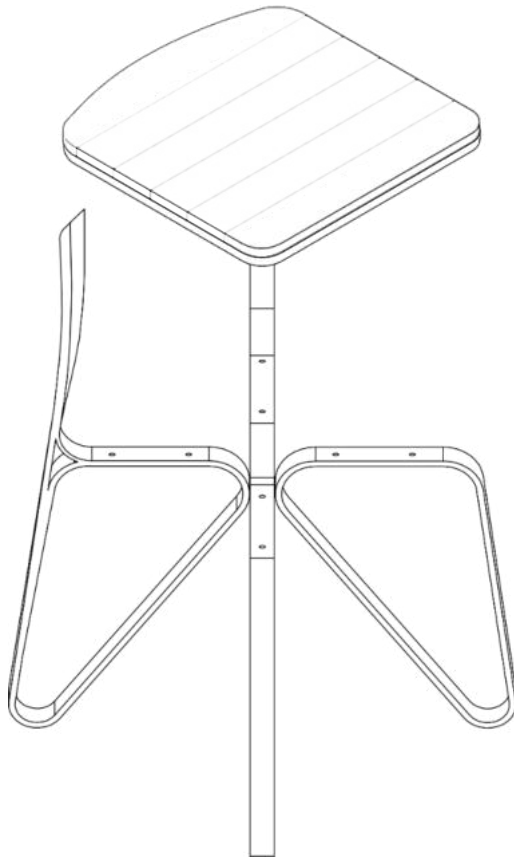




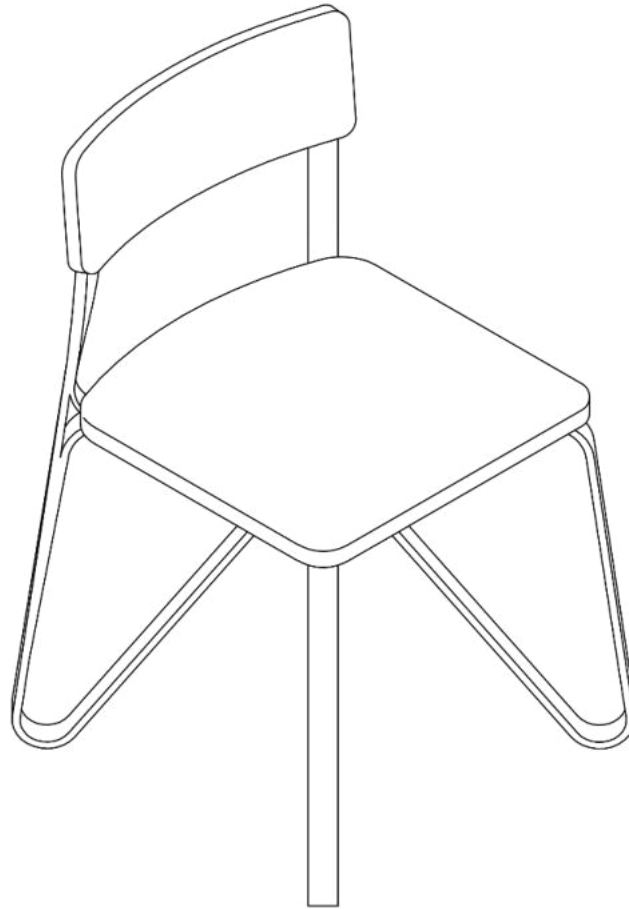
Assembly

The assembly of the chair is very easy. The whole process of assembly is designed by keeping in mind that user can easily assemble it by using the tools available in their home.

The holes in the legs can be simply inserted on the bolts which are protruding out below the seat pan and tightened with a spanner. And the back rest can also be assembled on the same way.

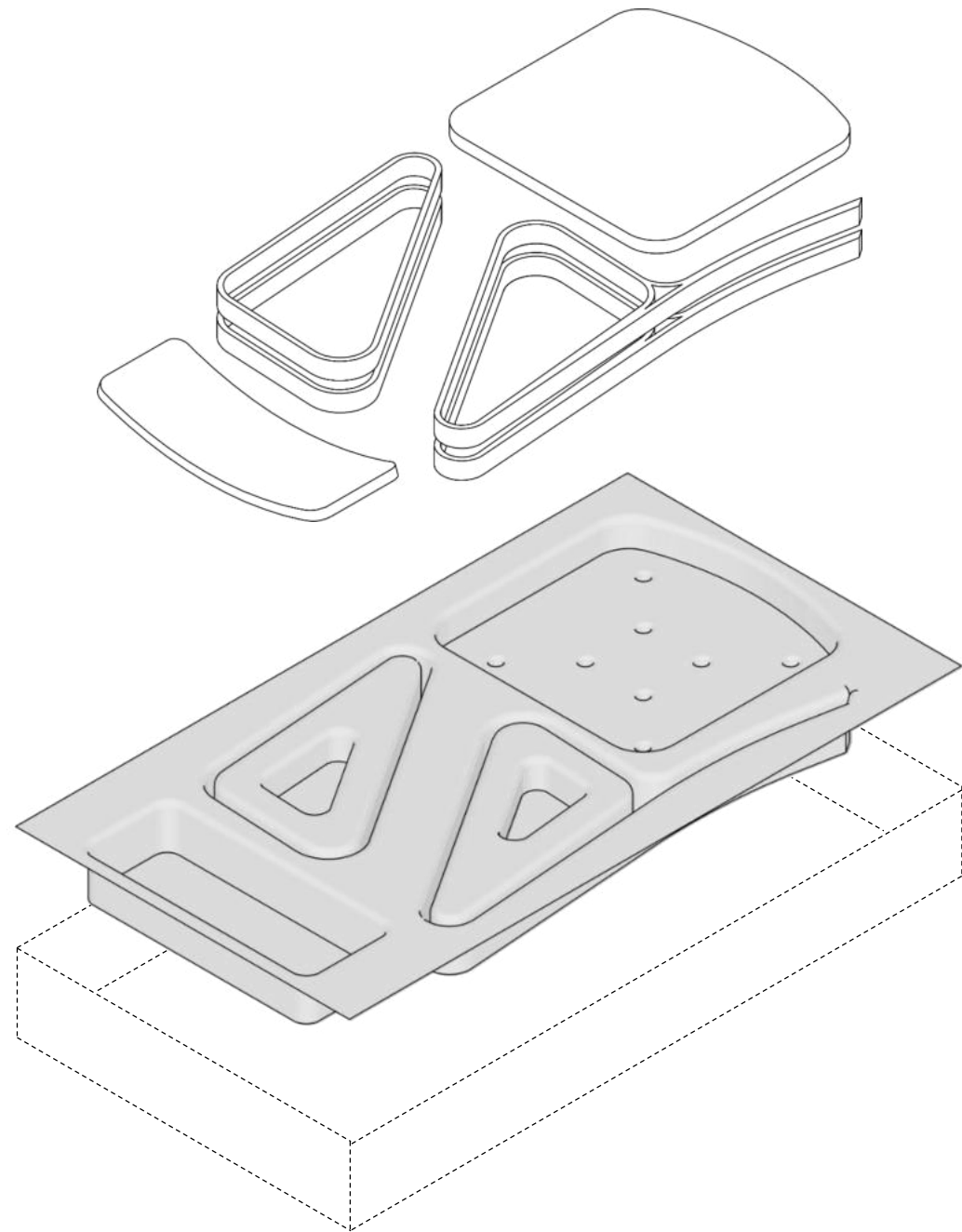


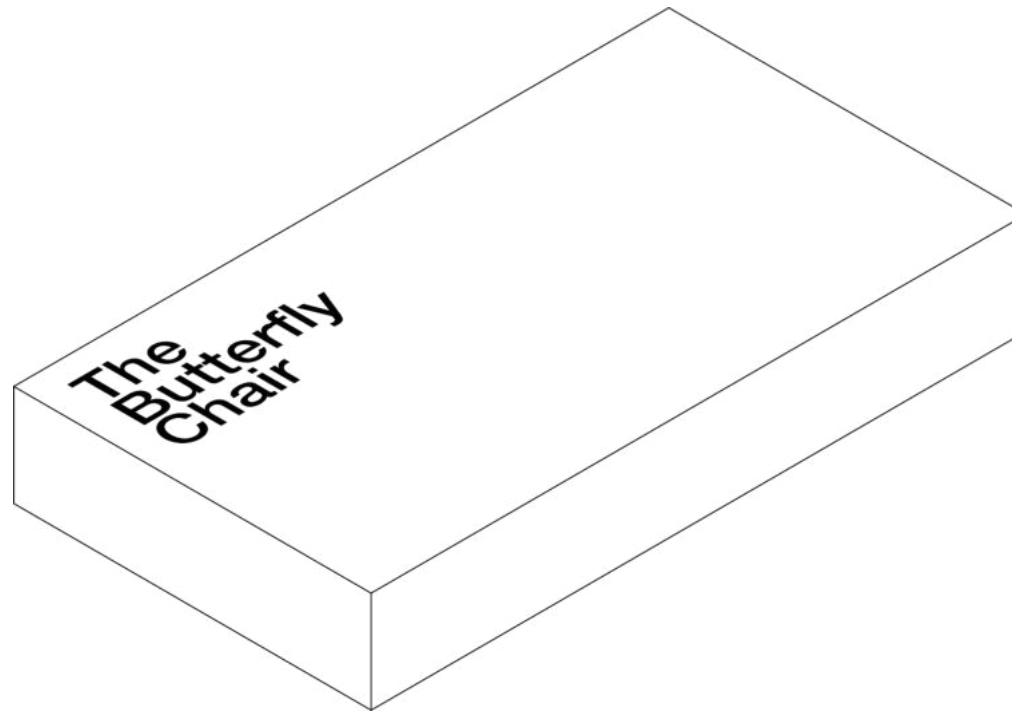
The Butterfly
Chair



Packaging

The six parts are arranged in a manner so that it can fit in a 600mm X 1200mm X 150mm cardboard box and can be transported easily. The parts can be kept in a vacuum formed paper pulp protective casing, which also considered as a sustainable packaging material.







The Butterfly
Chair



COMMUNITY CENTER FURNITURE

ASHRITA SHETTY | RUTVIJ JOSHI | SHASHANK GAUTAM

1 who are the BENEFICIARIES ?



COMMUNITY ELDERS

COMMUNITY MEN & WOMEN
INVITED MEN & WOMEN FROM OUTSIDE

COMMUNITY CHILDREN
VISITING CHILDREN & STUDENTS

2 what are their ACTIVITIES ?

Film screenings
anganwadi
exhibitions
workshops
overnight camps
social gatherings

cultural activities
studying
children's club
library
storytelling
training center

Thus, the community center and its furniture has to cater to multiple user groups who have varying needs throughout the day.

3 what is our MATERIAL ?

BAMBOO |

Working with the unique properties and characteristics of bamboo as a material was intrinsic to our design process. Bamboo comes in irregular sizes. Thus the designs were kept simple so that the construction process doesn't become too specific. Bamboo as a material is light, but strong. The furniture can be moved around for flexibility. As bamboo is an available resource, simple joinery details and modules can be used to allow the furniture to be easily replicable by others. Growth of fibres gives it unidirectional strength [along its length]. It can be utilized for splitting.






FURNITURE TYPOLOGIES

The typologies were broadly classified as |

Tables
Partitions
Chairs
Stools
Shelves
Outdoor Furniture
Pantry storage

After further analysis these were narrowed down |

OVERALL DESIGN IDEA

Keeping in mind the various activities and user groups that the community center has to cater to., we decided that the furniture should be an extension of the space and further facilitate these multiple needs.

Moreover, the intent was to design furniture that could be constructed, maintained and repaired by the beneficiaries themselves by use of simple joineries and simplified construction techniques.

adaptable

modular

easy to assemble

easy to store

easy to use

adjustable



CHAIRS



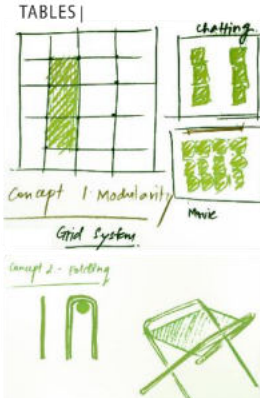
TABLES



STORAGE

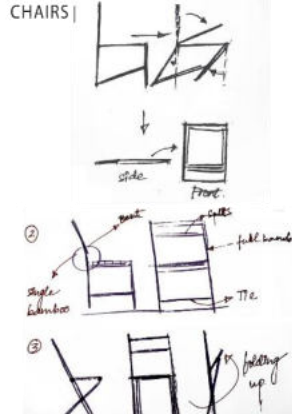
DESIGN & PROCESS

TABLES |



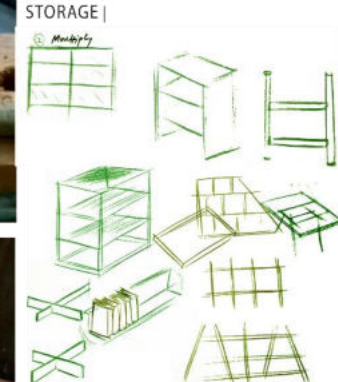
The activities taking place in the community center have largely varying age groups and group sizes. Hence, it is vital that the tables can accommodate various options.

CHAIRS |

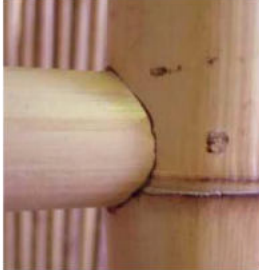


Due to the multiple activities taking place in the community center and the limited space, it is important that the chairs are easily adjustable and can be stored without occupying too much space.

STORAGE |



Library storage is one of the most important storage needs for the community center. We used that as a starting point for developing a language for the furniture line. The library module can be tweaked to suit varying storage needs.





COMMUNITY CENTER FURNITURE

ASHRITA SHETTY | RUTVIJ JOSHI | SHASHANK GAUTAM

3-D VIEW

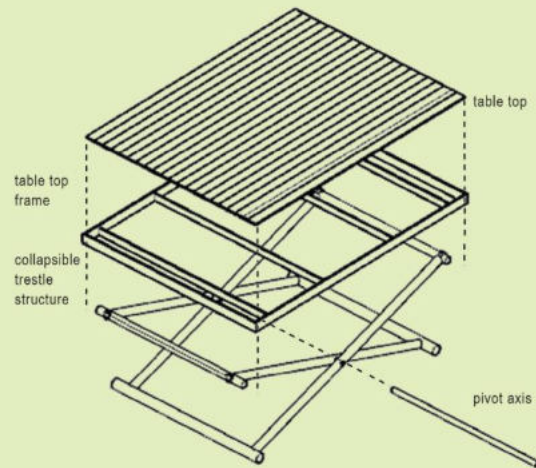
EXPLODED VIEW

DOCUMENTATION

TABLE



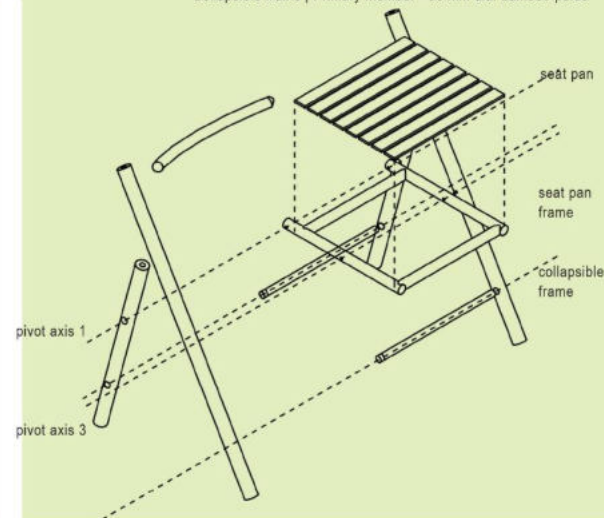
Table top | Bamboo slivers - 35 mm wide
Collapsible trestle structure | 35 mm dia. bamboo poles



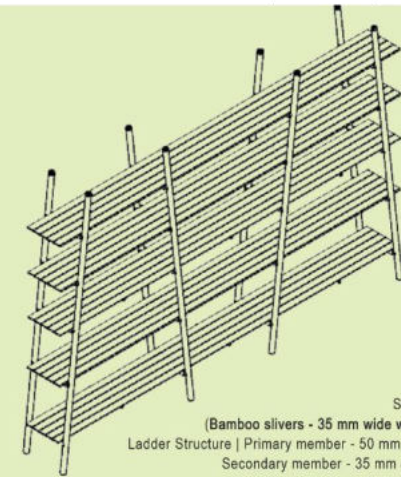
CHAIR



Seat pan | 400 mm x 400 mm
(Bamboo slivers - 35 mm wide with bamboo frame)
Collapsible frame | Primary member - 35 mm dia. bamboo poles



BOOK SHELF



Shelf | 300 mm wide
(Bamboo slivers - 35 mm wide with bamboo frame)
Ladder Structure | Primary member - 50 mm dia. bamboo poles
Secondary member - 35 mm dia. bamboo poles

