Lamps in Bamboo

Guide
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Acknowledgement

I thank,

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Approval Sheet

Industrial Design Project III Titled ‘Lamps in Bamboo’ by Kiran Kumaran is approved for the partial fulfillment of the requirements for the postgraduate degree Master of Design in Industrial Design.

Guide:

Chairperson:

Internal Examiner:

External Examiner:

Contents

Abstract

Bamboo is rich, eco-friendly and a sustainable material. This project aims to reposition Bamboo in 'Table Lamps' in the present market scenario. It started of with looking at various table lamps and finding segments where bamboo can be introduced. Bamboo craft was looked at closely to understand the various aspects of it. New forms and processes were explored in coil technique. Lamps were designed using the newly generated forms. The overall goal of the project being production of craft objects with an industrial discipline, yet maintaining the craft variety and richness.

01

Bamboo Craft

Bamboo like any other natural material was used for making daily use objects. It was apt and evolved naturally as craft. This chapter deals with Craft and its issues especially bamboo craft in the present day scenario.

The craft experience

The experience of craft could either be in the personal touch the craftsman gives to the object or the value and the richness of the natural material that is used to make the object. The experience is in its aesthetics. And finally the social concern of using a sustainable natural material.

The craft production

Traditional craft was centered around the craftsman. During industrialisation the shift was towards mechanisation. The worker no longer obtained the importance that the traditional craftsman had. In this postmodern era the focus is towards a system where the industrial processes and the worker/craftsman are equally important.

In a country like India labour intensive setups have been looked upon as the means for growth and stabilisation. This postmodern concept of craft could therefore be advantageous to a country like India.

Bamboo provides a lot of variation in terms of the weaves, texture, surface finishes etc. The ability to produce a variety in the same mass produced product is the greatest advantage that bamboo based products has to offer. The variation and richness of craft products and the ease of use of the industrial products could be combined to make products that are truly postmodern.

Traditional Craft Discipline Vs Sustainable market dynamics

Traditional craft was well known for its discipline and process order. But todays craft has moved away from this discipline and it has affected the quality of craft products. Todays market dynamics and mechanisms could automatically guaranty the same quality that used to exist in traditional craft products. For this there has to be a sustainable profit motive. An entrepreneurship-based setup could ensure the quality and the manner in which work is executed as compared to the organisations that are run by NGOs and govt. institutions etc.

Business Relationships

In craft it is desired that a Goodwill Agreement based on trust exist between the Craftsman, NGO, Entrepreneur, Designer and all the people involved. And the business relationships are fair and non-exploitative . All of them work for a common good, enriching each other. This might be an utopia. But craft must finally lead to it.

The Craft challenge and the Design challenge

Traditional craft can produce one time high quality products. The craft challenge is in the hand made richness and the uniqueness of it. It is observed that these products would easily sell at a very high price for its beauty, but usually are sold in very few numbers.

The design challenge in the current market scenario is to industrially produce products deriving elements from craft, the use of industrial means yet maintaining the old craft variety and richness. Proper optimisations and design could make the products cheaper for production, more usable and produced in multiple number at the same time having the richness that traditional craft had.

Competing the Industrial products

To compete the other industrial products Bamboo Craft needs repositioning , for which we need to look at each and every aspect of bamboo craft namely.

1) Bamboo cultivation.
2) Harvesting/ Procurement.
3) Distribution of bamboo to craftsmen.
4) Production.
5) Marketing and distribution of final products.

- Moving from short term irregular demand to long term continuous demand. Craft used to be seasonal, harmonically clubbed with other activities like cultivation. In the current scenario it has to move from this seasonal behavior to a more continuous production.
- Craft is often based on short term demands and short supplies as compared to industrially produced items which usually is observed to have very long-term

basis. And since there is no constancy in the demand craftsmen remain under employed.

•Industrial products usually made of plastics are made in large numbers and stored for the demand to rise which cannot be done with the case of bamboo and other craft products. Sudden demand in large numbers is a real difficulty in case of craft products.

•Bamboo products must be treated as a consumer item which accounts for certain commitment and quality from the manufacturer. It can no longer sustain itself by just selling in exhibitions where there is no accountability after the product is sold.

There has to be newer structures that integrate all the people involved in craft. There could be mechanisms for bamboo procurement and distribution. Craftsmen could have bamboo ration cards which ensures his supply of bamboo through out the year. New ways of thinking are required right from bamboo cultivation to product marketing. This project tries to focus on the production aspect of it.

Craft and Order

Order in craft could be seen in two different perspectives. One the visual order of the craft objects, other the process order of craft objects.

Visual Order.

Geometric shapes with symmetry is orderly. Nature is at order despite being non-geometric and asymmetrical. Order in nature is of a higher complexity. For us order exist in a pattern that is repeated regularly. But a greater order exist in natural rhythmic repetition.

Natural variations in a bamboo object adds to its aesthetics. An unnatural irregularity is looked upon as a defect.

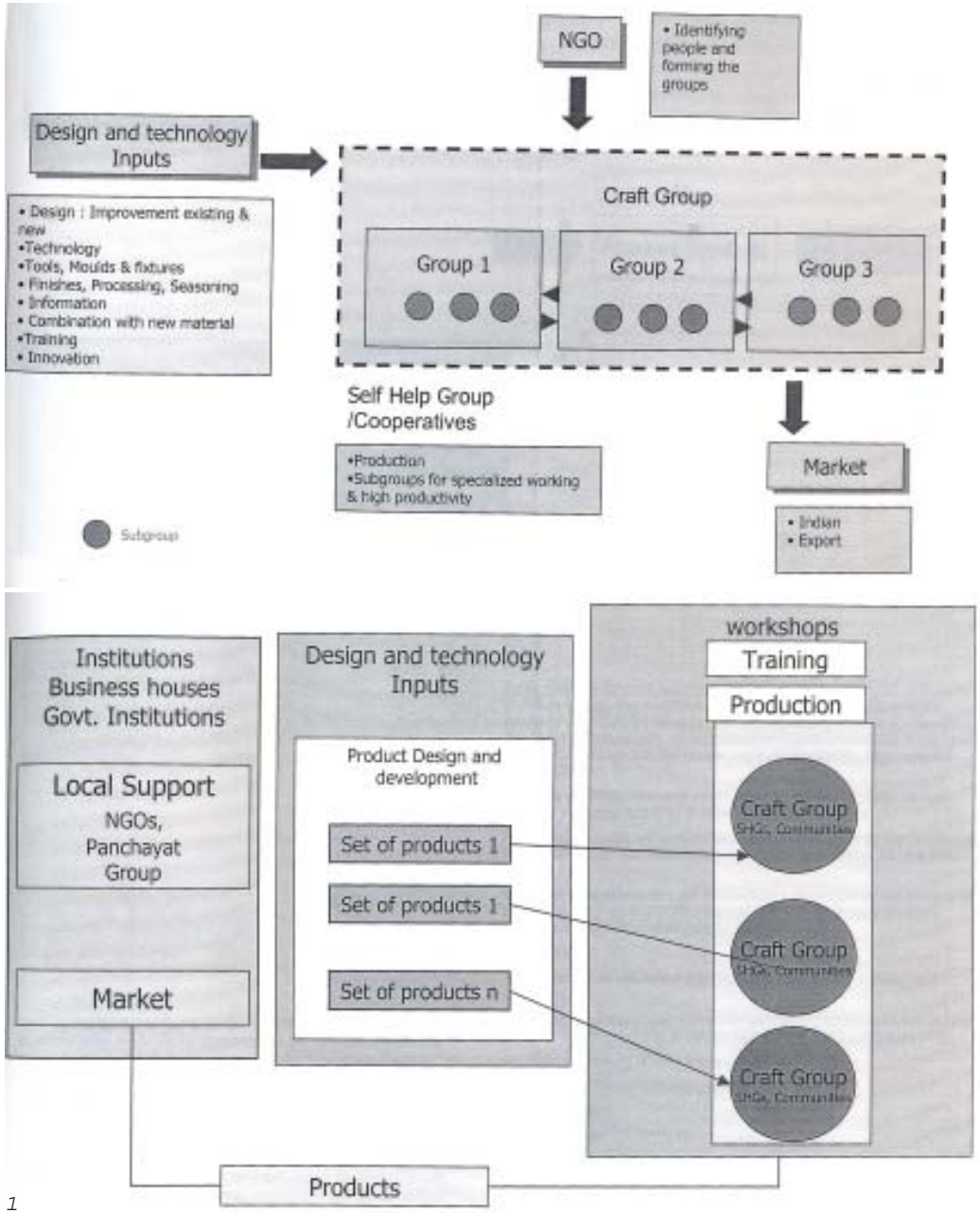
Process Order.

There has to be certain process in the creation of any craft object. The process right from procuring the bamboo, making of the strips, weaving and finally making a basket is very crucial. This process order to a great extent ensures the visual order of the basket that is finally made.

Art Craft to Industrial Craft.

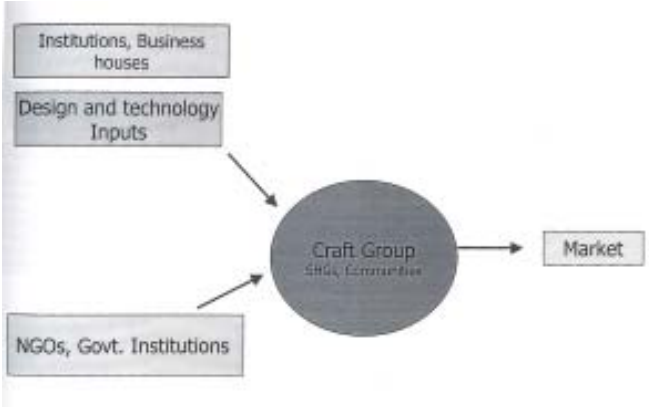
Art is intuitive, one-time and complex. Craft is intuitive but more optimised and made in multiple numbers. Industrial products are highly optimised and mass produced with mechanised processes.

Craft shifting towards Art and craft shifting towards the industrial are two diversions that craft can take. This project tries to focus on the latter.



Craft Industry Models

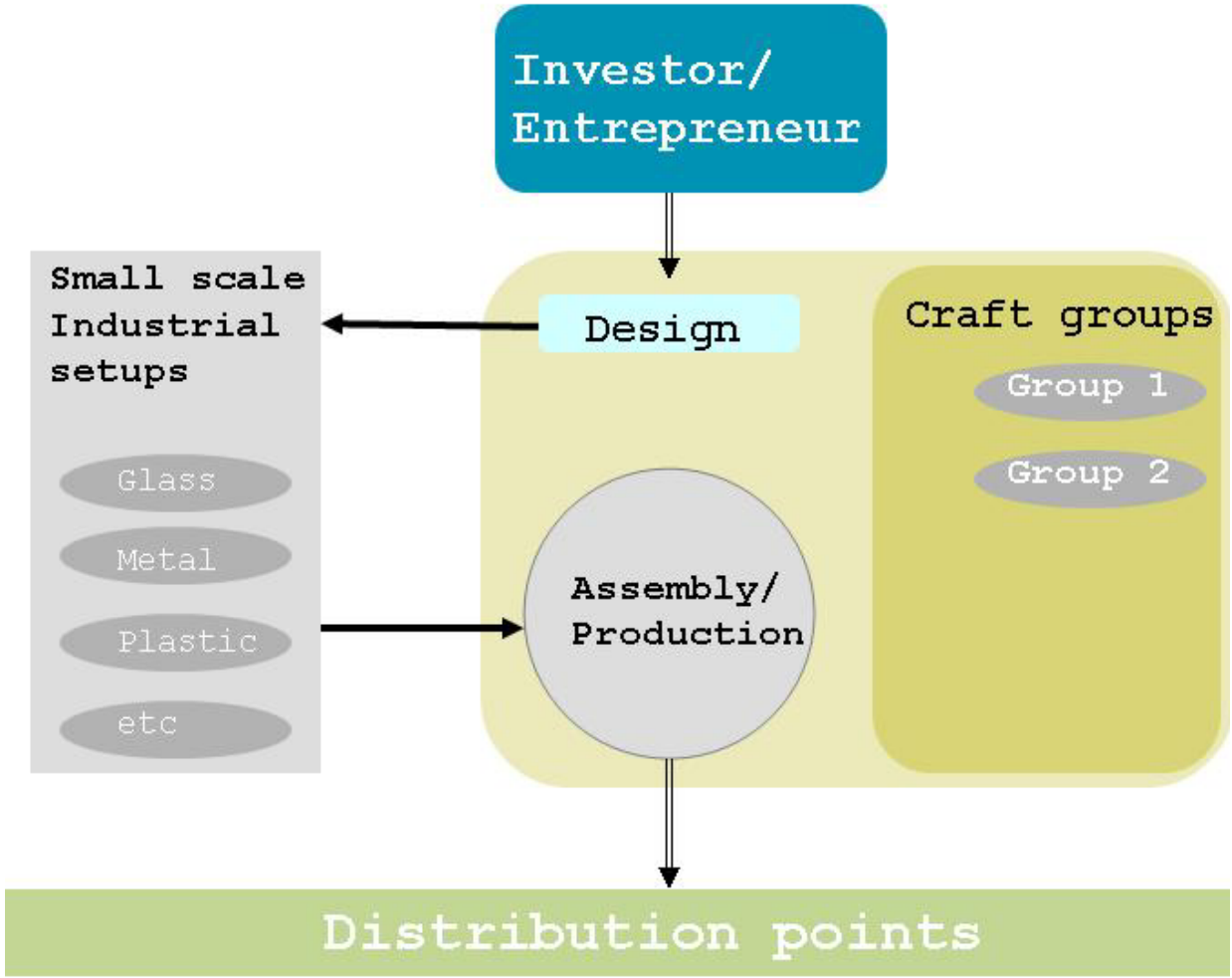
The existing craft industry models work with either govt institutions or NGOs. Different craft groups are formed and trained and given design and technology inputs. The products are produced and introduced in the market.



Refered from 'Design of wall clocks from coil technique in Bamboo with the focus of Design transfer.'

-Ajay Desai

1



The Entrepreneurship Model

This project looks at a model where an entrepreneur sets up a production unit which either employs craftsmen or work in union with existing craft groups by placing order for the bamboo based parts. The other material parts are out-sourced to other small scale industrial setups working in glass, metal, plastic etc.

02

Table Lamps

A table lamp can be defined as a lamp that sits on a table. They live on our Desktops. They are alive even when put off. They talk to us, interact with us. They are objects of personal expression, of personalisation. They show us the light.

They are of various types and sizes and differ according to the way they are used, the psychological and physiological need it satisfies, the visual drama it creates, the environment it is placed, the kind of technology it uses.

This chapter discuses some of the types and attempts to categorise them.

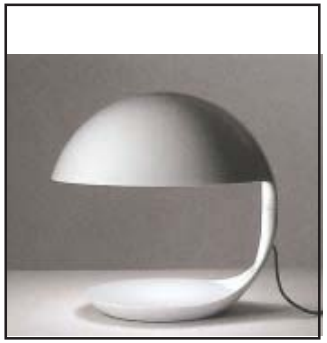
The oriental lamps

These lamps are the most commonly seen table lamps. These lamps lend quality to light as well as provide direct usable light.

The illuminating Object

These lamps are made of a frame and the form is created by materials like paper or cloth in tension. They provide more of ambient diffused light.

They are objects that glows. Divine !!! The translucency, giving the object divinely qualities.

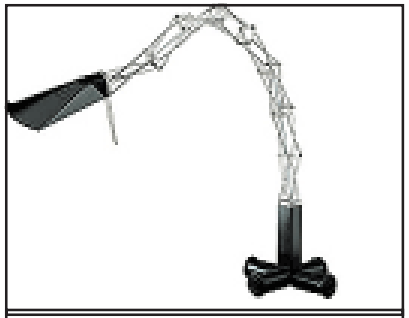


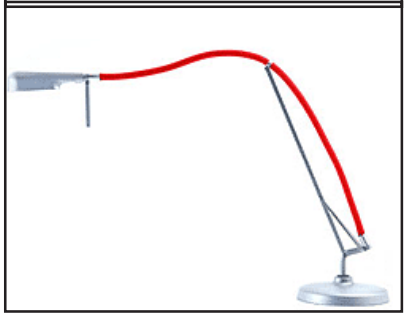
Simple sculptural lamps

These lamps have simplicity as its charm. The proportion of the different elements creates the beauty. Here the object gains importance than the light. The light adding to its beauty. The staticity of the object gives it a sculptural integrity.

Rotating shade lamps

These lamps could be an effective aesthetic element on the table. Not a definite task light, but good enough for reading. Could be effective products for children. The sphereness makes it look inviting, homely and safe.





Tasks Lamps

These lamps are specific task lamps. They are based on various mechanisms like constant tension, ball and socket, sliding mechanisms etc for its functional requirements. Most of them are minimalistic. The emergence of smaller lighter bulbs has enabled them to be more sleek and sophisticated, as if they do not exist on the table.

Function and beyond

Some of the task lights go beyond the function of task lighting and make a statement in terms of its meaning and expression. The functional mechanisms are no longer for the function of flexibility alone but also to create meaning and for aesthetics too.

Reflection lamps

Lamps based on reflection. These enable directional control of the light beam have the ability to produced focussed light as well as reflected gentle light.

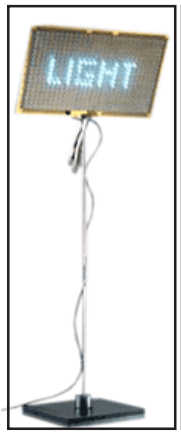
Folding lamps

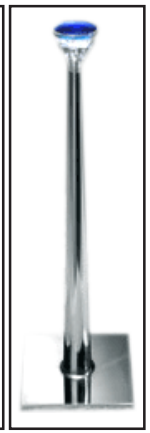
These lamps are foldable portable compact lamps. The form of the lamp changes when in use and when not in use. Hence enables the usage of lamps as an aesthetic element when not in use.

Could suit students or people on the move due to its compactness and portability.

Flourascent tube lamps

These Lamps originated mainly due to a technological breakthrough thin fluorescent tubes. New forms evolved to suit the new light source.





LED Lamps

LED's are the state of the art technology as far a lighting is considered. The miniature size and the greater control of light makes it a good option for lamps in future.

Lamps as Expression

These lamps are more as a statement, than providing light for a specific purpose.

Art Lamps

Lamps which are artistic and crafty which sell for their art value.

03

Bamboo Lamps

This section looks into the various kinds of bamboo lamps.

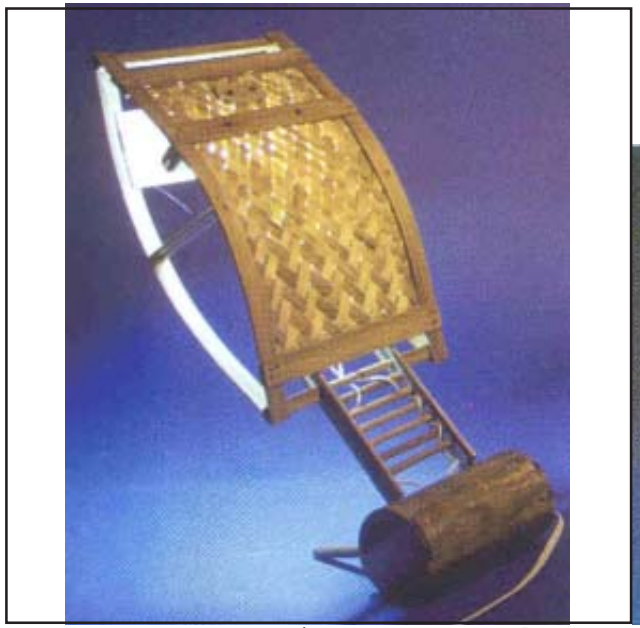
Bamboo is used for making the frames onto which bamboo mats or paper are fixed.

Bamboo splits are used which are either stuck or wound with cane.

Woven bamboo forms are used to create the lamp. Woven forms are very effective as lamp shades because of its lightness and the way light percolates through it.

Long bamboo strips are used to create the lamp. The gap in between the strips create an interesting play of light.

Raw bamboo is used in combination with bamboo weaves. Light percolated with through the weaves in contrast to the raw structural bamboo which is opaque.



IDC project- Sameer Damle

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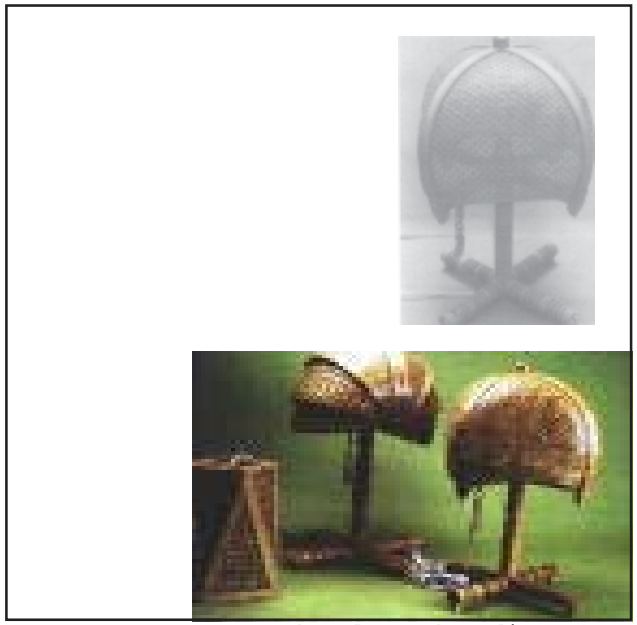
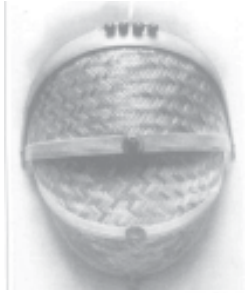


Bamboo lamps by Adi Crafts



Combination of strips and weaves, creating interesting forms.

04

Technology

This section discuses the various Light Sources available. The four most common types of lamps used in table lighting are

Incandescent lamp
Fluorescent (CFL)
Low voltage halogen lamp
LED lights

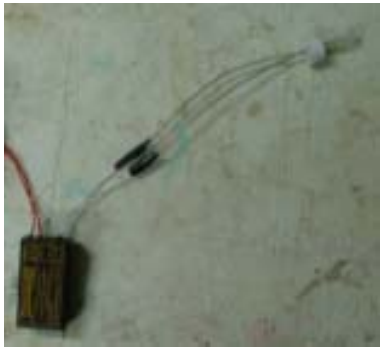
Incandascent lamp

Incandescent lamps produce light by heating a thin Tungsten filament to very high temperatures (around 2200°C), causing it to incandesce or glow.

Incandescent lamps are cheap to install but expensive to run. They can be justified if initial costs must be kept to a minimum and the annual hours of use are small or they are to be used intermittently with frequent switching. These lamps are dimmable.

Halogen lamp

Tungsten-halogen is an expensive incandescent lamp that has a very compact envelope which makes it an excellent lamp where optical control is important. It still has all of the negative aspects of the standard incandescent which are a relatively short life and a low efficacy which makes the tungsten-halogen expensive to operate and maintain. Color rendition is good. The normal voltage (120/240 V) lamp requires no auxiliary equipment (no ballast) which results in a slightly lower initial cost, but generated more heat. The low voltage tungsten-halogen lamps require a step down transformer to reduce the line voltage from 120/240 V to 12 V. The transformer adds to the initial cost of the system and introduces a device that may require additional maintenance. Tungsten-halogen lamps are also dimmable.



Compact Flourescent Lamp(CFL)

Light is produced when electric current is passed through a low pressure gas. The initial investment of these lamps are more , but they have very low energy consumption and last much longer.

LED lamp

LED lamps are state of the art technology as far as lighting is considered. These lamps have only very recently been introduced to the general public for lighting purposes. LEDs have a lot of advantages over conventional sources. It is better in terms of light output. The power consumed is extremely small compared to other electricity based sources. The LEDs have ultra-long life of 100,000 hours. They can be used for 40 years at six hours per night and almost maintenance-free.

There are various kinds of LEDs that are available in the market in different sizes and with different kinds of light output. The advantage of led being that they are small and do not heat up. They could e arranged in any shape required.

Technology VS cost

Technology	Bulb		Holder	Extra	Total
Filament	12	6		18	
Fluorescent	135 - 175	6		150	
12 volt Halogen	12	5	40- 100	120	
LED	20/piece		200	300	

The technology is chosen based on
1) The heat generated
2) The initial cost vs maintenance cost is also an important factor for the selection of light sources. A lamp which is not used very frequently can have incandescent sources, which would make the initial investment less.
2) There would be better demand for the lamp if it can take a wide variety of bulbs rather than making the lamp specific to a certain bulb.

Electricals

Switches ,Wire, Dimmer

Standard ones available in the market could be used. But they need to be customised depending on the design of the lamp.

05

Market Segmentation

The various lamps available in the market where studied and the different segments where created for the product to be positioned.

Market Segmentation and how to penetrate.

Design for a sensitive upper middle class crowd who are aware of bamboo as a material.

For **youth,** portable, easy to maintain.

Gift item for **girl students (age 10-15)** costing more but Promoting value.

Designing for **lower level ambient light supplemented by task lighting** in critical areas.

As **Eco products** for hotels companies etc.

A design that would enable **customisation** and suit most of the needs of the home. The components could be configured according to the needs. The general requirements of table lamps, floor lamps, wall lamps, ceiling lamps.

A new theme of lamps . A range of them that can be bought to a house, suiting the environment. Kitchen*, bedroom, Children, Living room Study/Office.*

06

User study

A few upper middle class homes where looked at to find out the different lamps they buy and what they look at when they buy. The study gave an understanding of the kind of environment it is placed and the way they are used.

A lamp enthusiast homemaker.

She had Personally chosen the lamp for her living room from Lohar Chaul.

Proffessor

Study room lamp.
Uses the lamp for reading for reading.
Uses it along with a tube light.

Bed side lamp.

Lamps were bought specially for the aesthetic value added to the room.

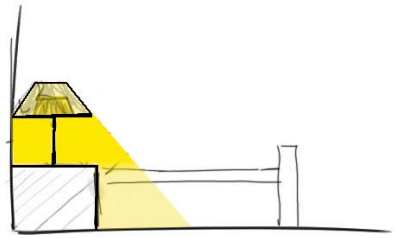
Craft Enthusiast.

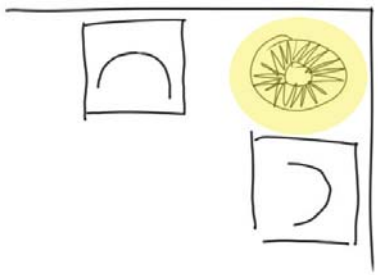
Bamboo lamps as pure display lamps.

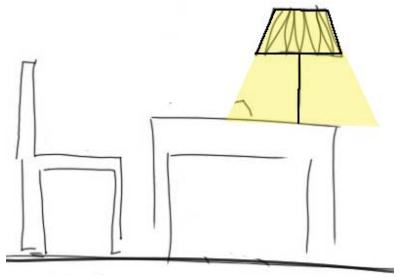
Young couple. The small display lamps had been gifted to them.

Grand Hyatt Bombay.
The hospitality industry uses lamps that are a part of the décor of the room. Matches with the theme and colour. Lamps of similar design are bought in large numbers.

Conclusion







Two categories of lamps that where found in homes.

1) Ambient lighting or display lamps.
2) Task lighting lamps for reading. Needs minimum mechanisms for height and angle adjustments.

They could be
1) Bed side Lamps
2) Sitting room lamps
3) Study table lamps

Some lamps are used for pure functionality like reading, majority of the other lamps are used as a display element. These lamps are used for a short duration.

Though quality of light is the crucial aspect of a lamp, users also consider the beauty of the lamp when it is not lit.

Bamboo would be more suitable for simple display lamps that purely stress on its form and aesthetics . So it was decided that the project would look at display table lamps.

07

Design Brief

Develop display table lamps in bamboo and combination material.

Industrially produced deriving elements from craft.

Competitive to contemporary lamps in aesthetics and in use.

For sensitive upper middle class who are conscious of the bamboo as a sustainable material.

08

Bamboo

Bamboo could be used in so many different ways.

Bamboo Roots
Whole Bamboo
Bamboo Sections
Bamboo Strips
Thin Strips
Bamboo Sticks
Flattened Bamboo
Bamboo Boards

Each of them gives us a wide variety of form possibilities. **Thin strips** are advantageous as they are easy to make, treat and are less prone to insect attack. **Weaving** and **Coil Technique** are two ways that are used for creating objects with thin strips.

Bamboo Weaves

Weaves allow light to percolate there by accentuating its own form. The weave pattern gets highlighted.

Direct lighting on weaves creates interesting shadow patterns.

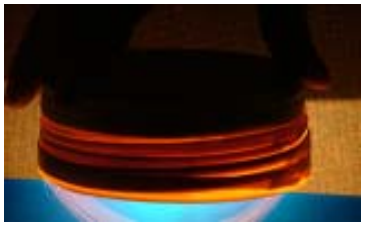
Bamboo Coil technique

Coil technique in bamboo consists of coiling bamboo strips to create form. It provides flexibility to get variety of forms with required structural strength and finish in the product. The Technique creates a certain texture that gives it a contemporary look. This technique has many advantages over the traditional craft techniques for providing better rims and frames and better dimensional accuracy. Due to high dimensional control in the technique making it is possible to be used in combination with electrical and electronic fittings.

Bowl are made coiling as flat plate and pressig on the mould to obtain the desired form.

This form is created by winding the coil in flat and pushing the rings outward from one side.

Coil techniques create forms that are opaque to light. Direct lighting highlights the patterns of the coil.



Single layer coil

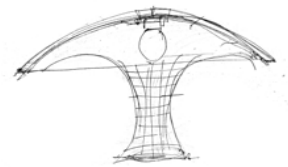
Single layer coil is translucent to light. If the thickness of the coil is reduced to a minimum it becomes translucent.

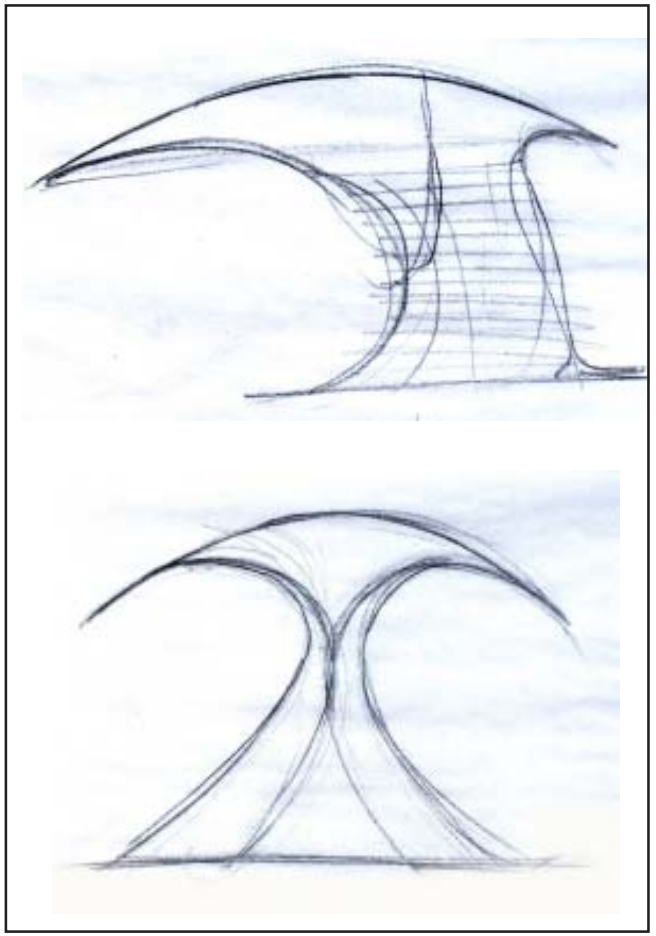
09

Concepts

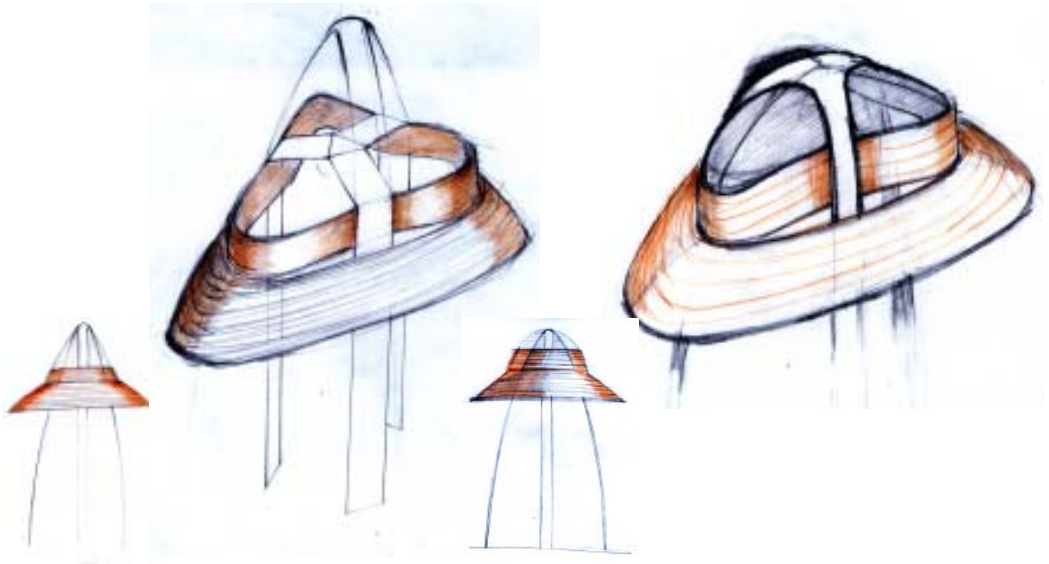
Concepts where generated as the exploration was done.

Lamps using the coil bowl as lamp shade. Idea was to create very natural shapes with an inverted coil bowl. The stand for the shade could either be glass or metal wire.

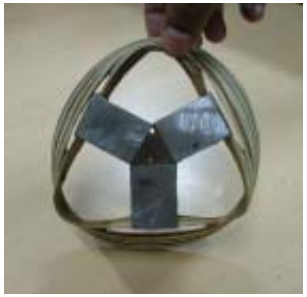


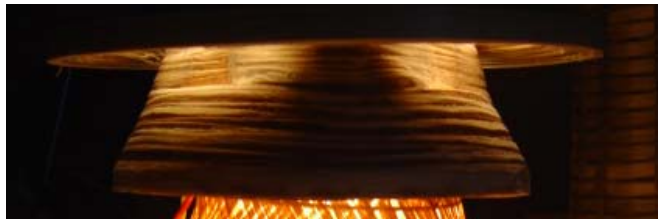


Bamboo Coils have a natural tendency to circle out even if the coiling was begun on a triangular shape. A bowl made from a triangular shape has a beautiful transition.



The circling out could be restricted using metal strip that restricts the outward push. This restriction could create more forms that bamboo coils naturally do not form.





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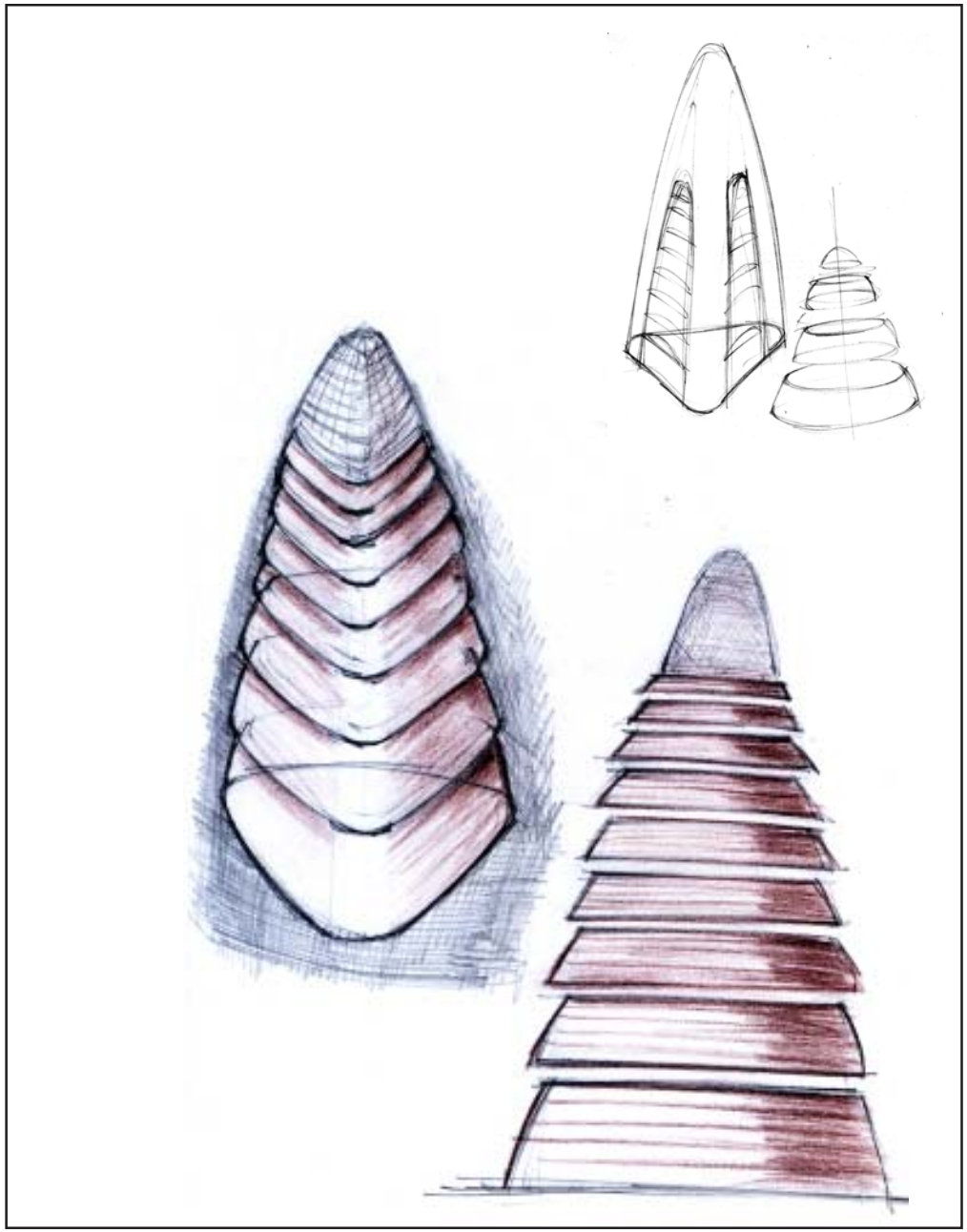
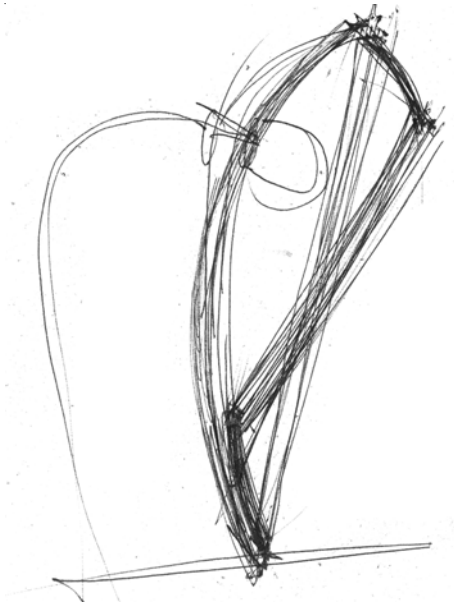
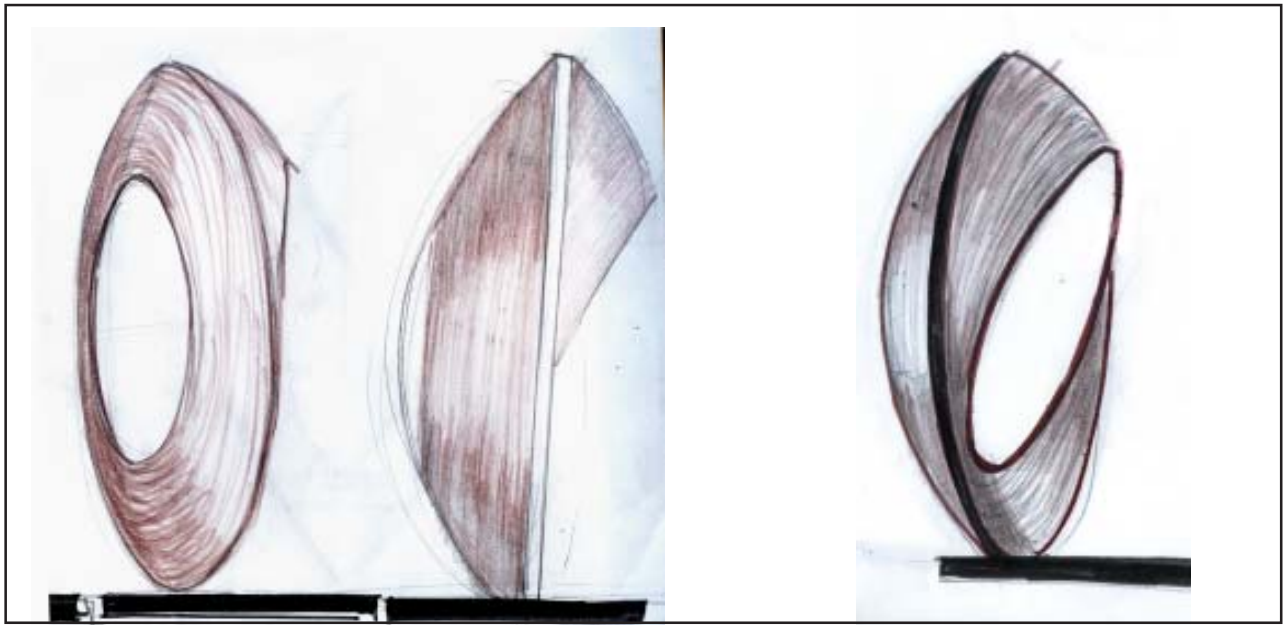


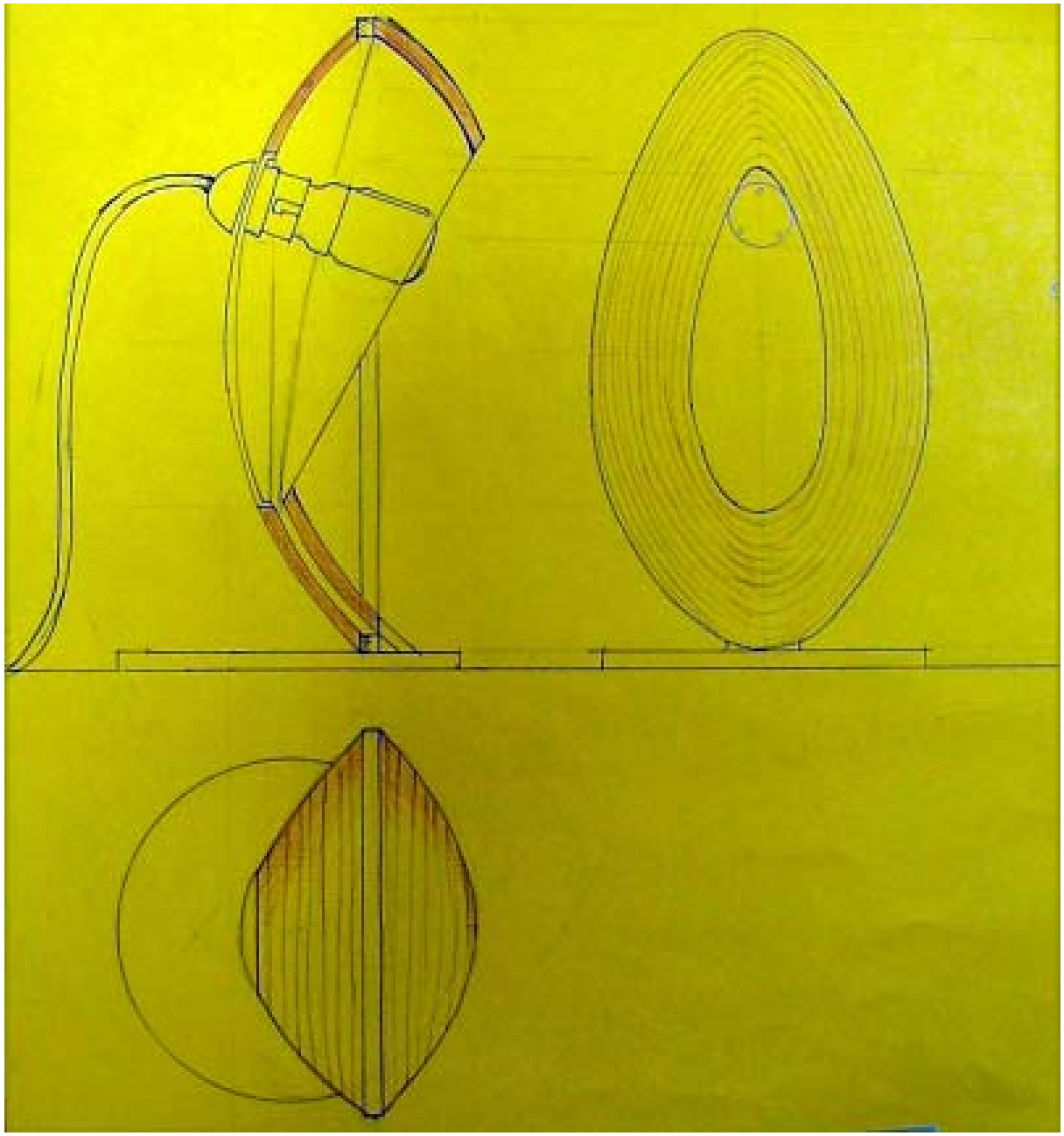
Lamp using the triangular form
with intermittent gaps in between which
create an interesting play of light.

3



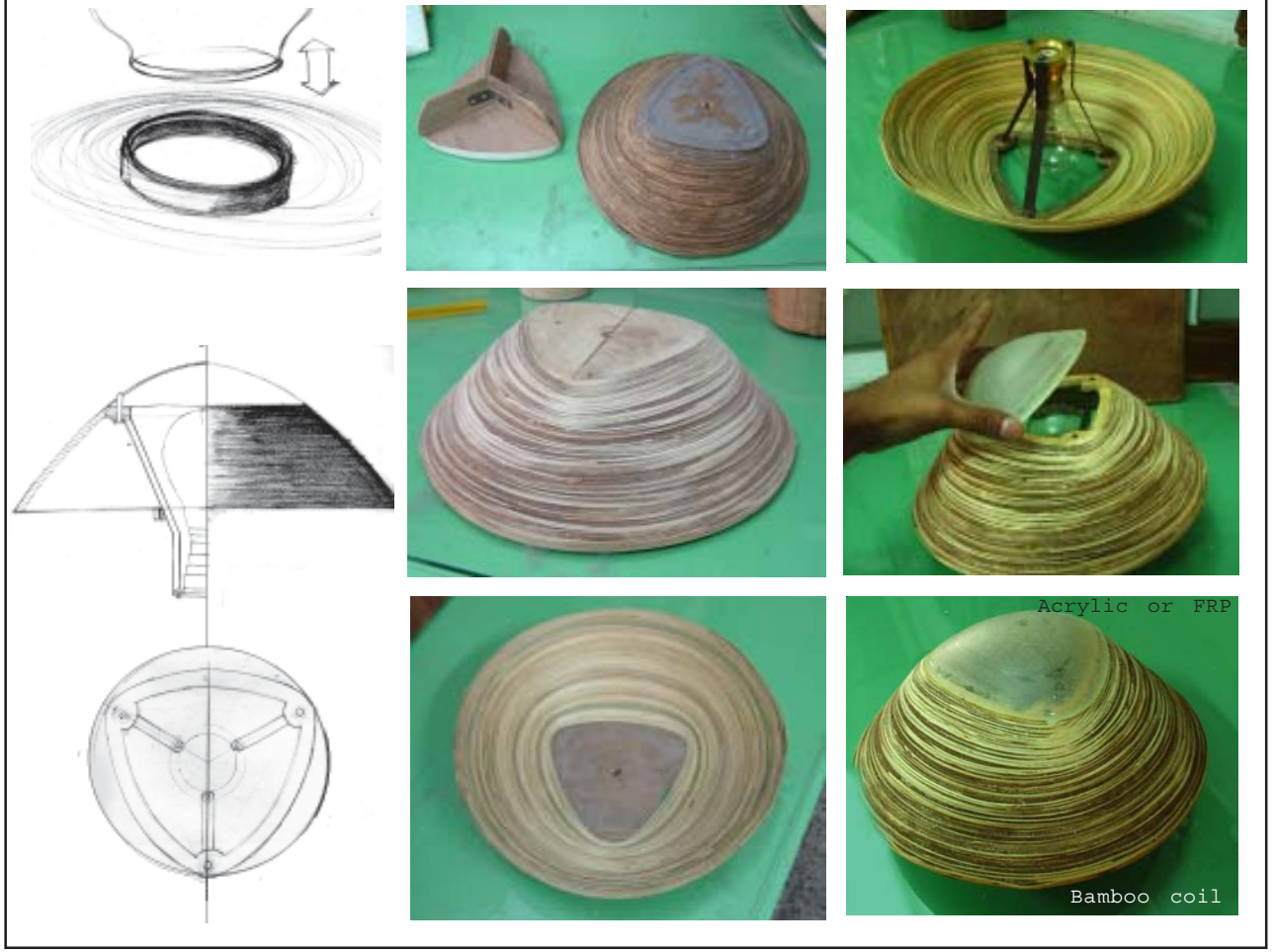


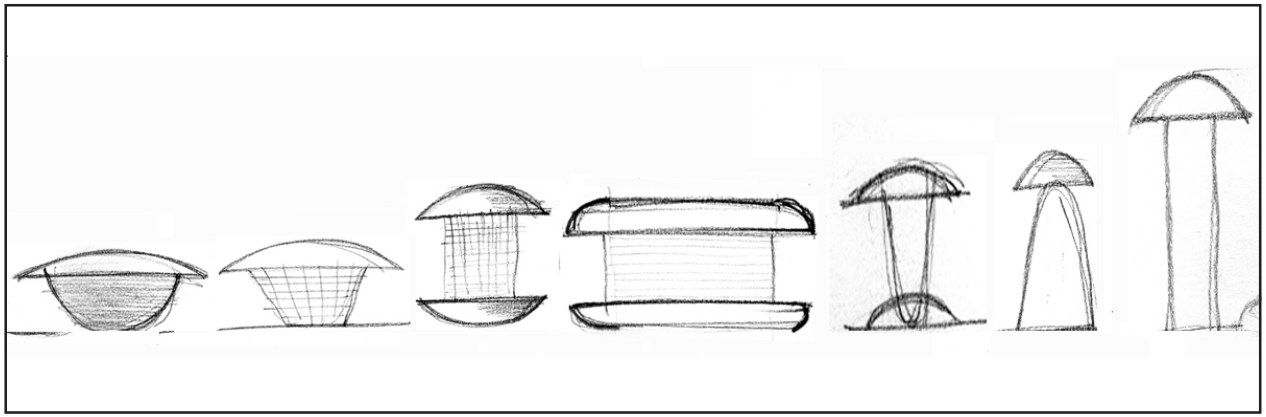
A flame that shows the light.Here the exploration in coil technique is unique because of the twist. Combination of coils results in a very interesting form and openings for the light to pass.



4

When the bamboo coil is wound on a piece of wood or FRP and finished with fevicol and sawdust, the bamboo coil gets attatched to the material that it is wound on. That material on which the coil is wound could be the surface onto which other fixtures could be attatched. This enables the combination of bamboo with metal, FRP etc.

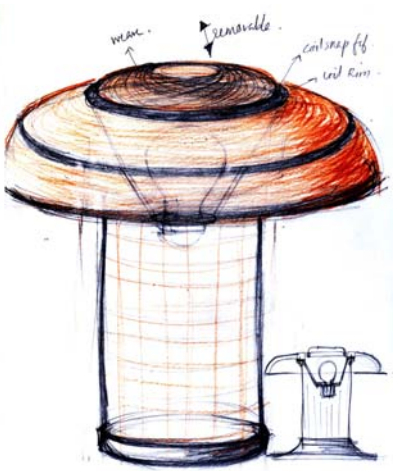




4.1

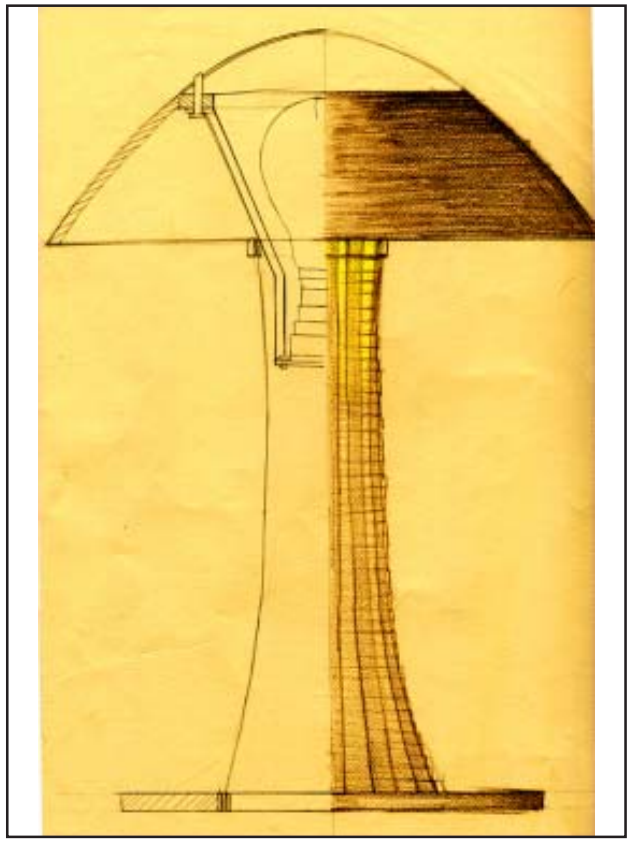
Various kinds and shapes of fixtures in different materials can create interesting forms. With the fixture detail there could be variations in the lamp.

4.2



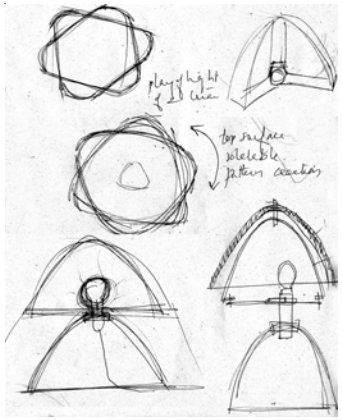
This concept tries to integrate both coil and weaves together. The coil being opaque reflects light to the table. The weaves contain the light giving a glow to the stand.

4.2



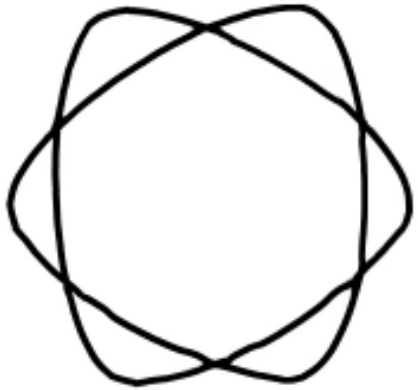
Coil and weave together worked out in detail and in actual senario.

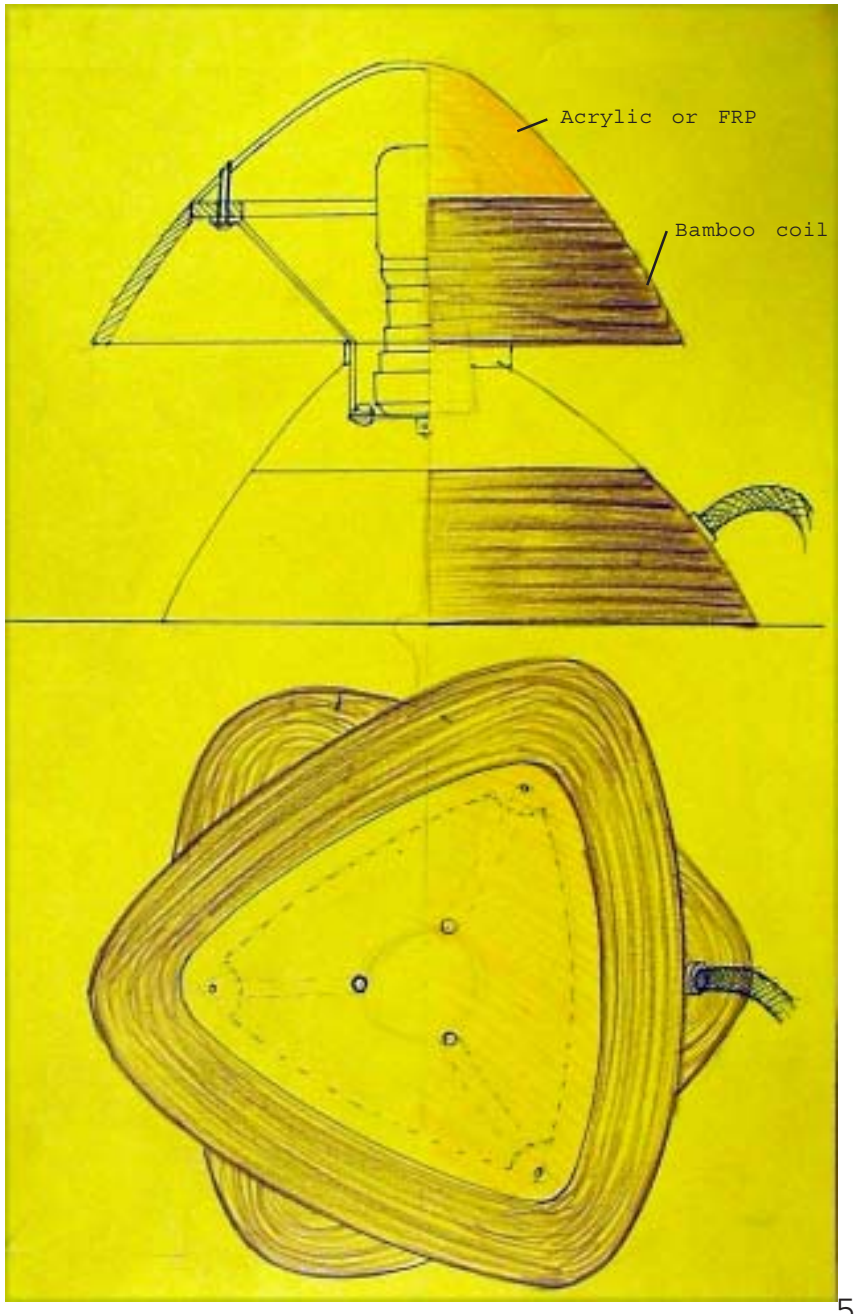
4.3



Two triangular forms are placed one on top of the other. The light falls in a triangular pattern like a star on the table.

4.3



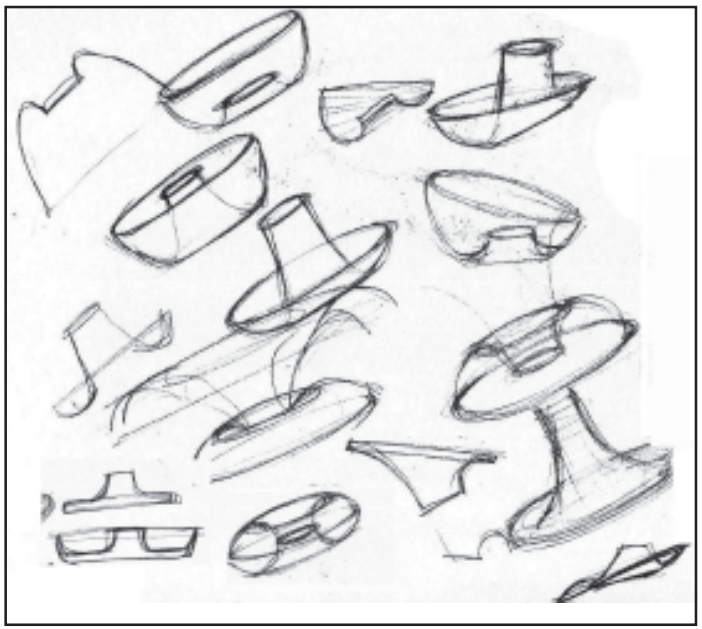


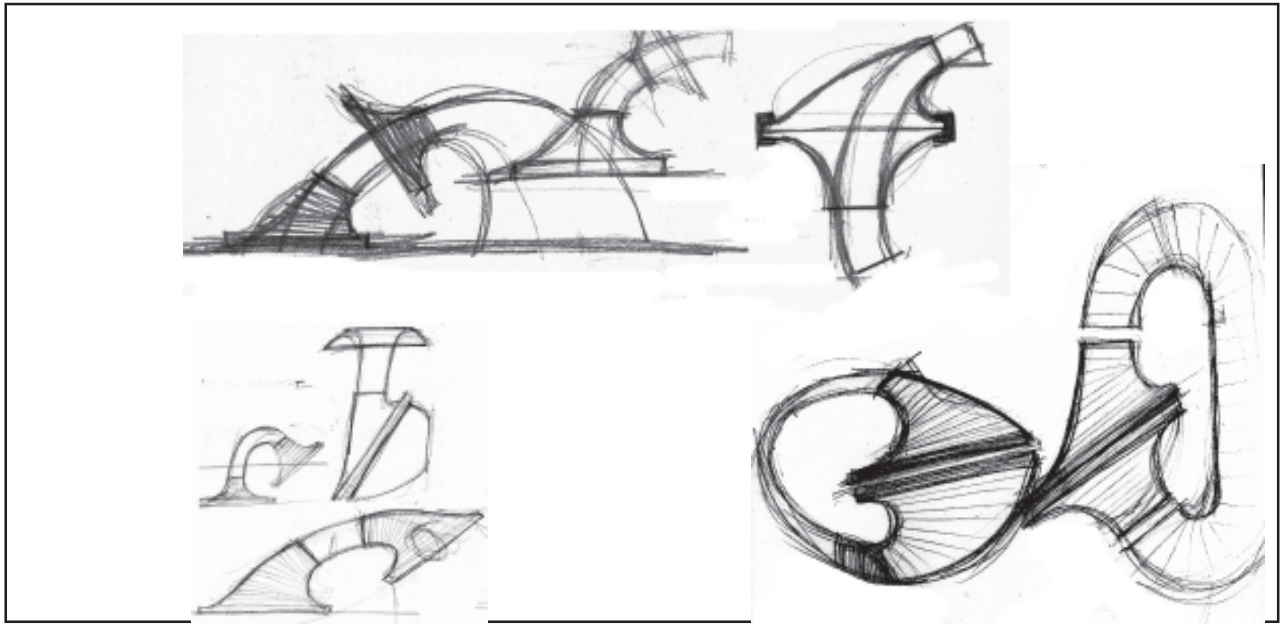
Detail drawing

5

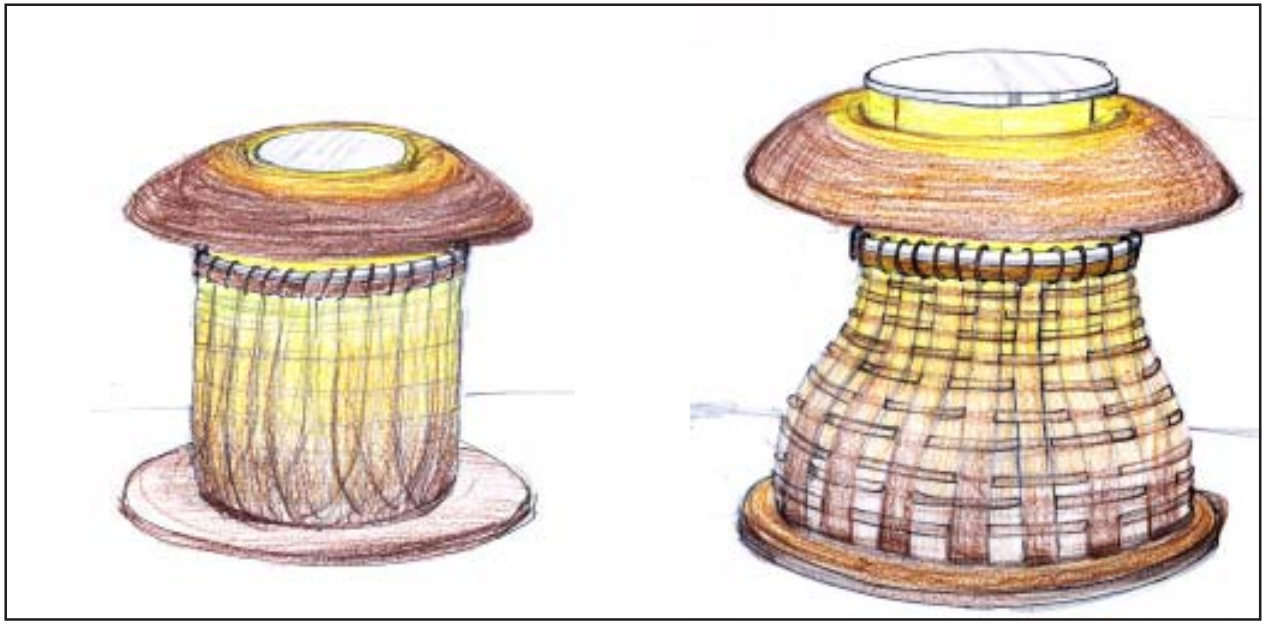
Conventional coil technique is done by winding from inside to outside. Winding from outside to inside was found to be much more easier as it required less effort. The outward thrust from the coil would ensure that the coil is wound tightly.

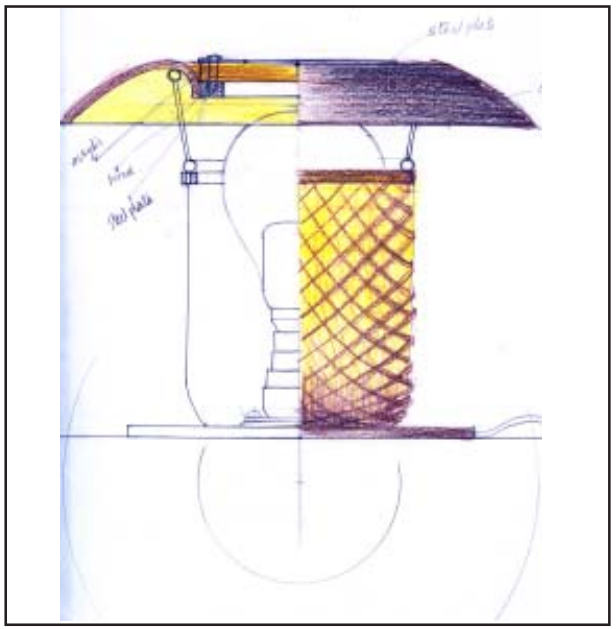
It was found that using a mould under the round die enables the creation of lot more form options which where not possible using conventional coil technique.





5.1



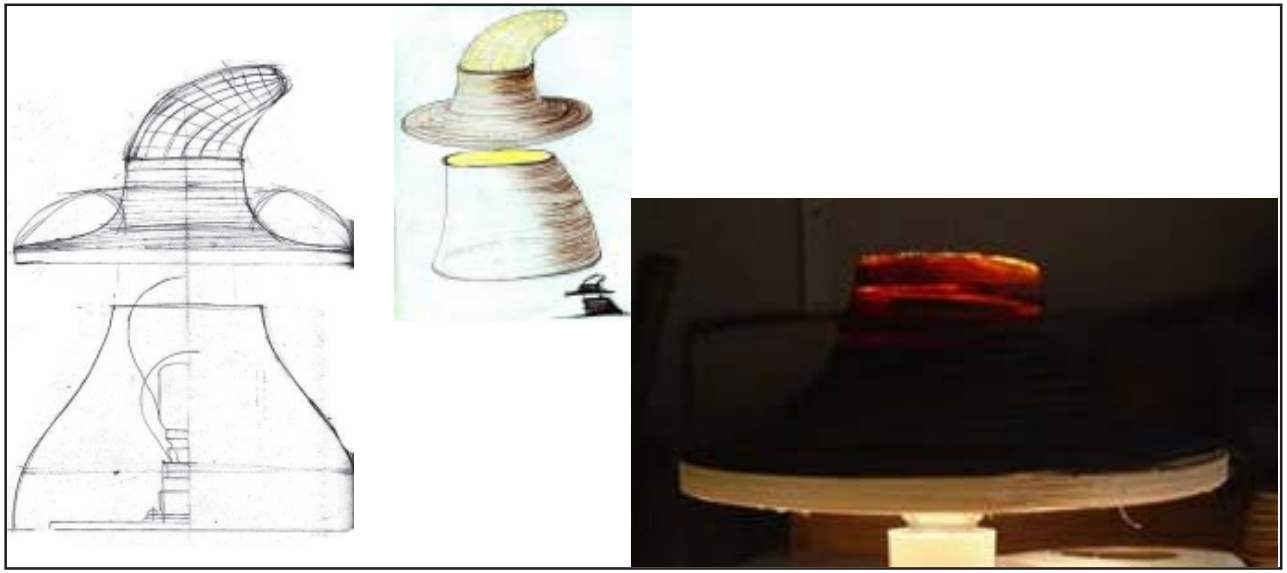


This unique coil technique creates a forms which are is unique. One of the form which has a feature of shade, of which the central portion curves inside leaving a hole in the centre, giving an imprssion of a half cut circular pipe.

This form with combination of weave for the stands provides aesthetics which has lightness, textures and play of light.

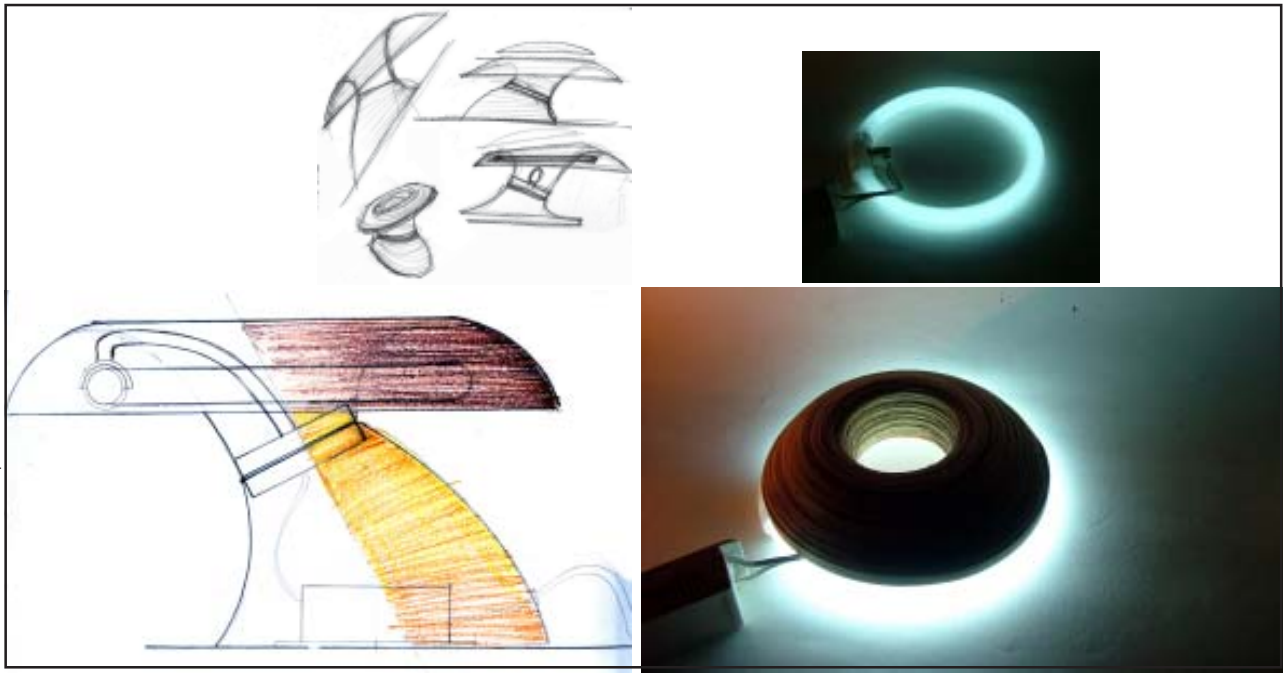
5.2

Here combination with other forms in coil are used.
The surface of the coil can be made translucent to reduce the heaviness of the lamp form.



5.3

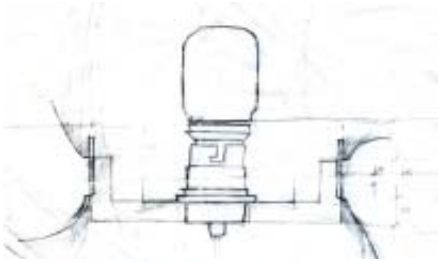
The unique form enhances the possibility of using an entirely different technology for the light fixture.
The curve of the form can easily house a circular tube-light. Tube-light which is low energy consuming, gives a white light can be fixed on to the inner portion. The form has a opening in the centre which enables some amount of light to flow to the top and dark area of the lamp.

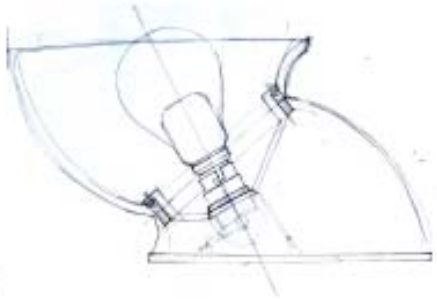


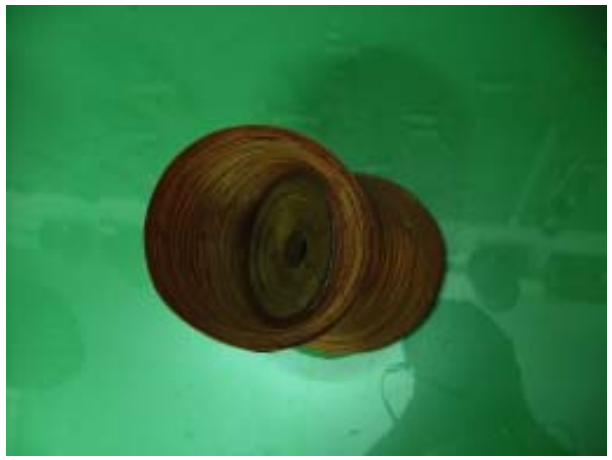
6

This form is generated by coiling on a flat surface and then pushing the coil outward on one side. Identical shapes could be created by using the same thickness strip and coiling to a required diameter. If the coil is wound on a ring, dimensional accuracy can be maintained as well as it as well as simpicity in fixing can be achived.

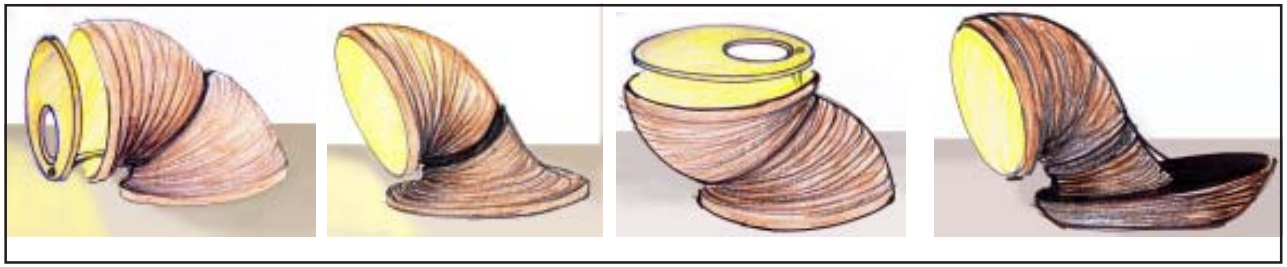
6





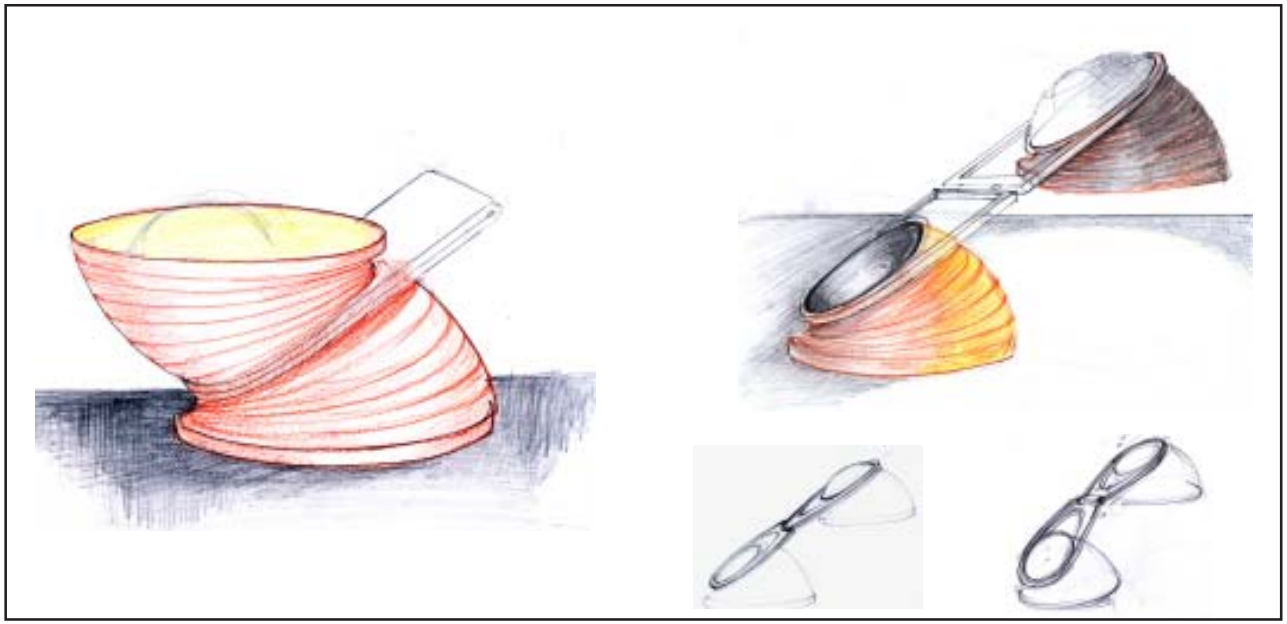


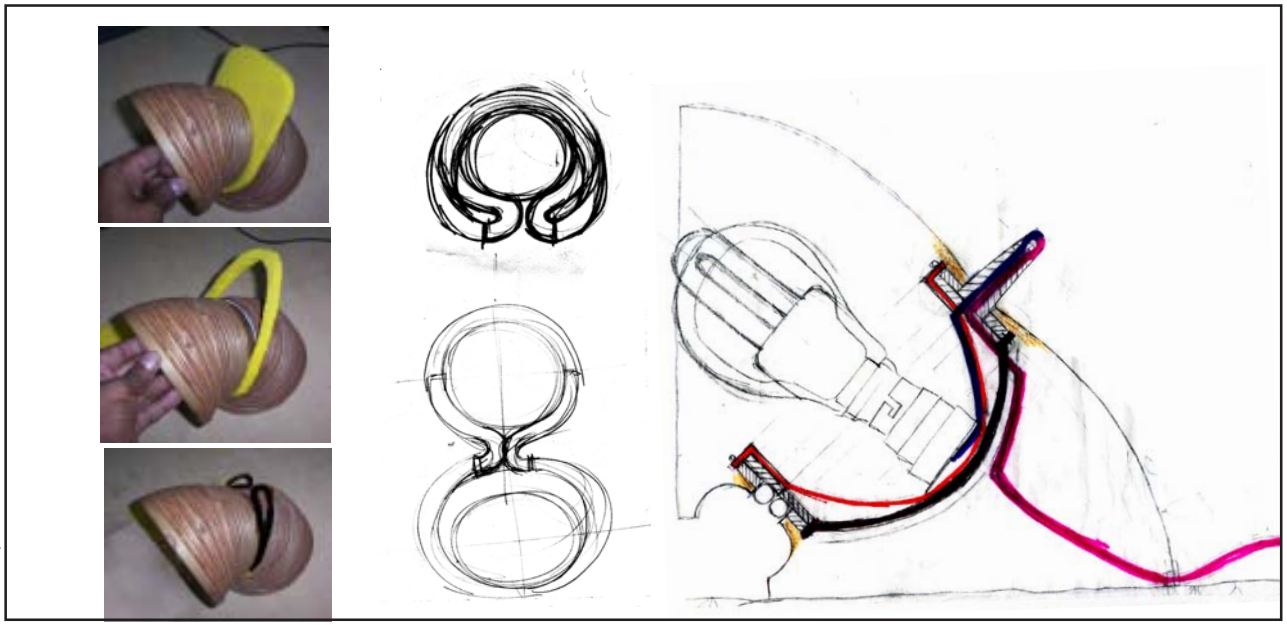
6.1



Like a worm beside the bed.

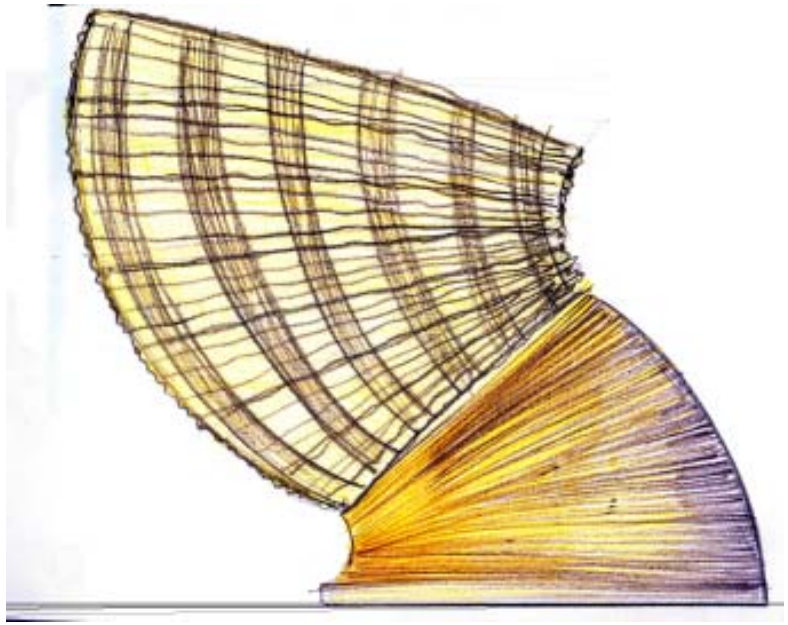
6.2

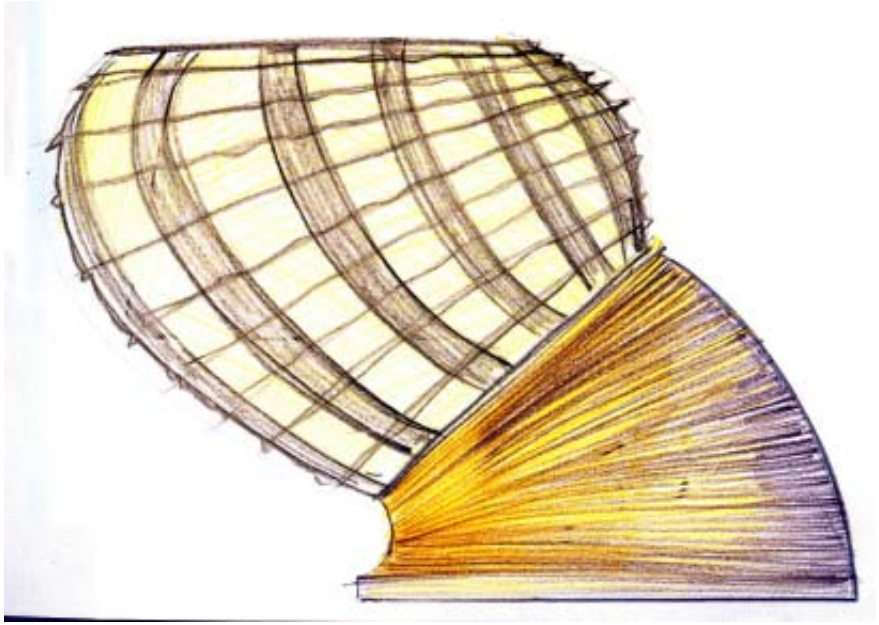




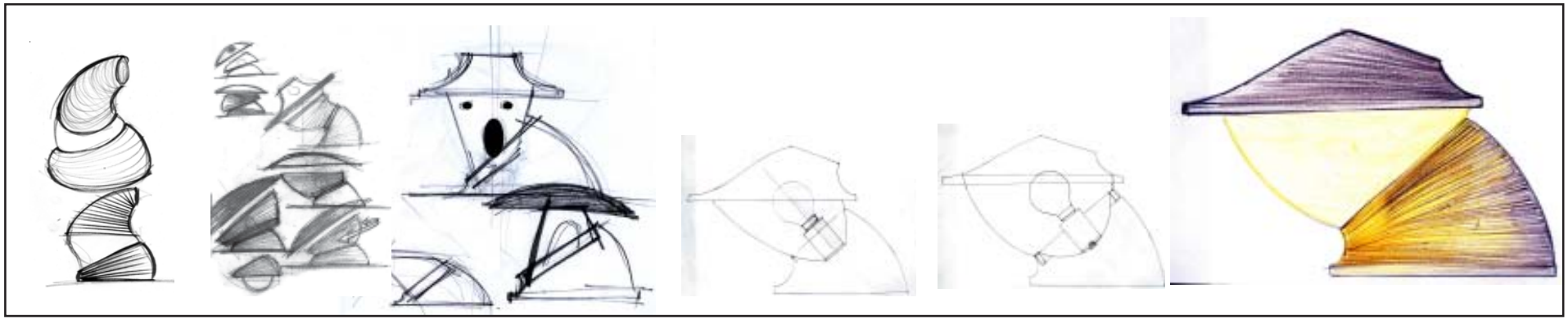
Providing a simple hinge the display lamp could be used as a reading lamp.

6.3

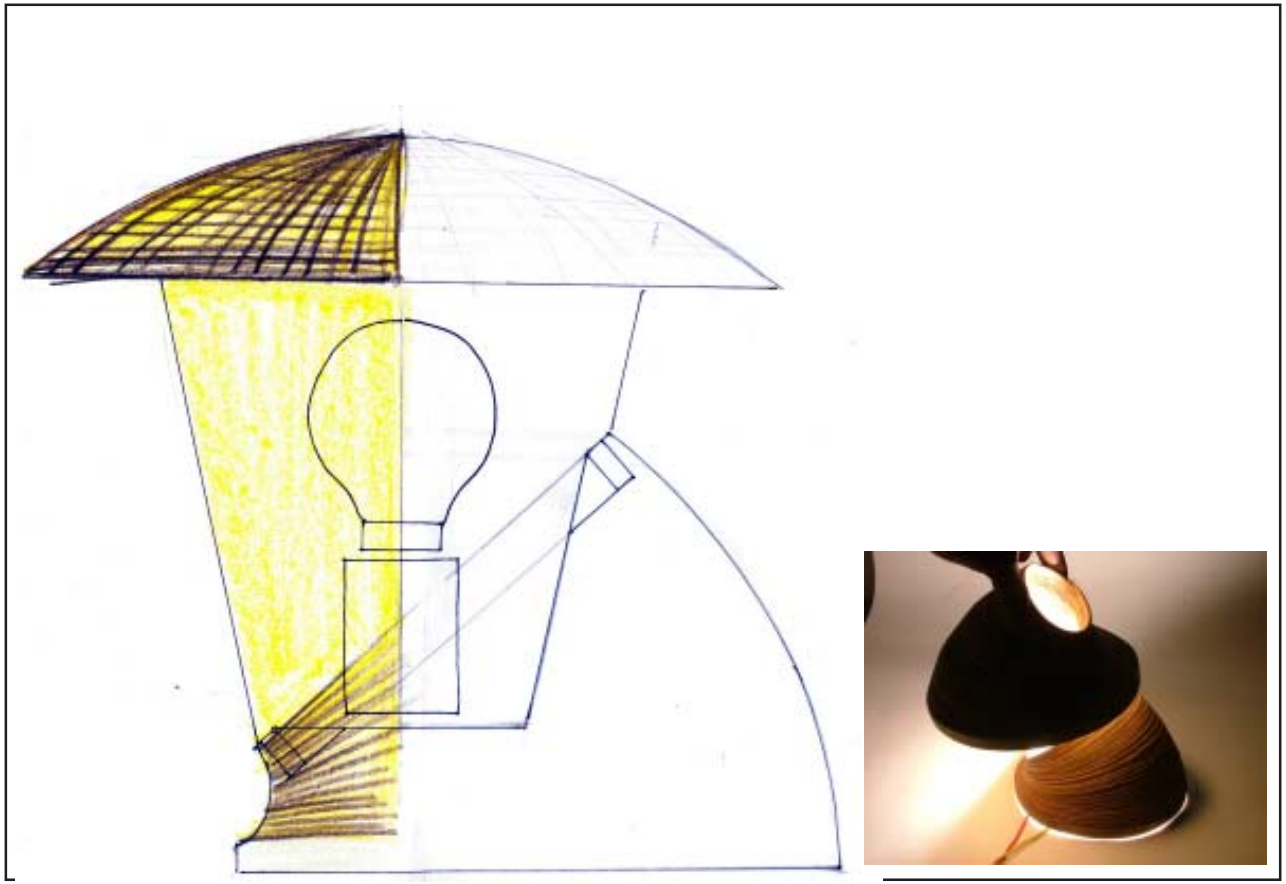


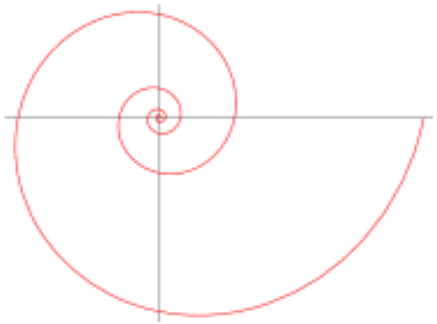


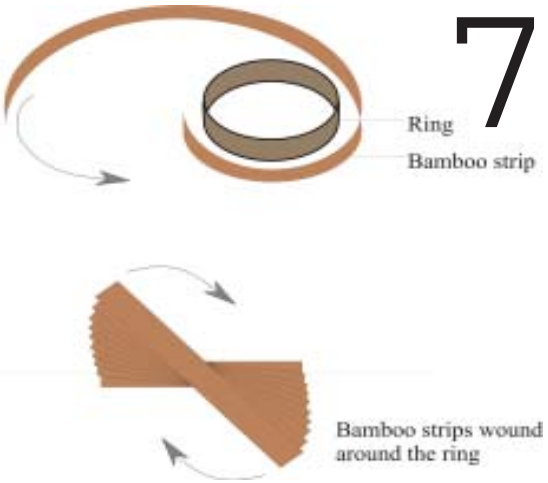
Keeping the base same there could be other variations using weaves.



6.4

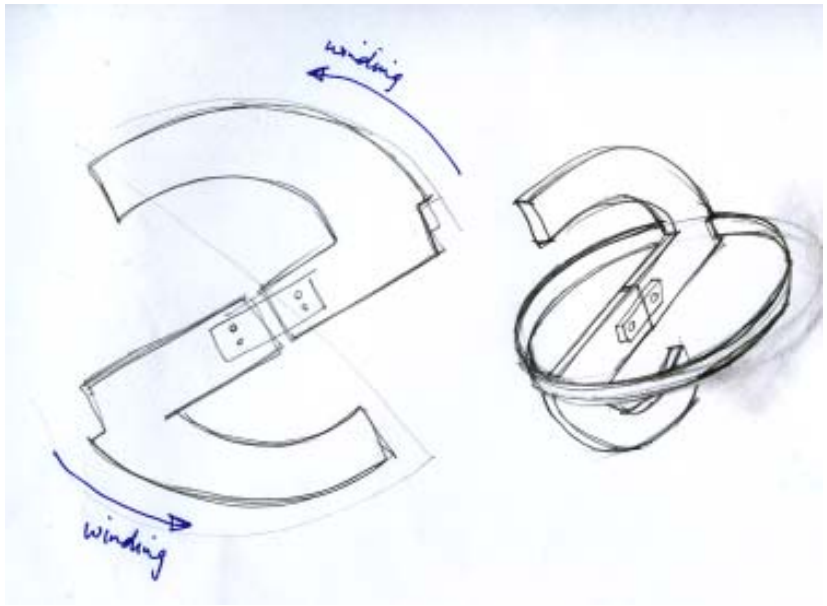




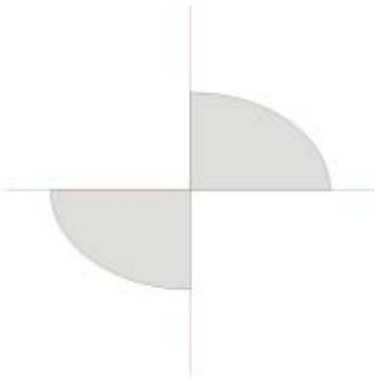


Unlike the process of winding and then pushing the coils in or out to create the form, the coil could be wound around shifting definite amounts to create the form shown in the figure. The form is much lighter as the overlap is very less.

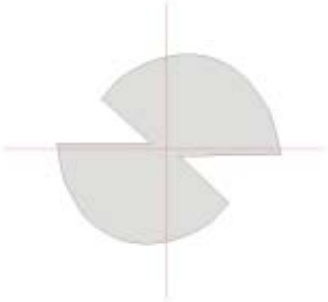
Further winding would make the form more interesting. Various size were tried out.



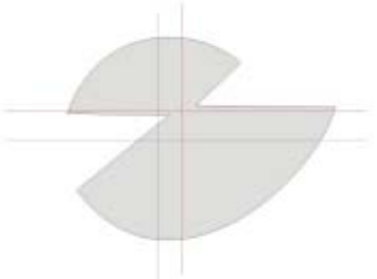
A



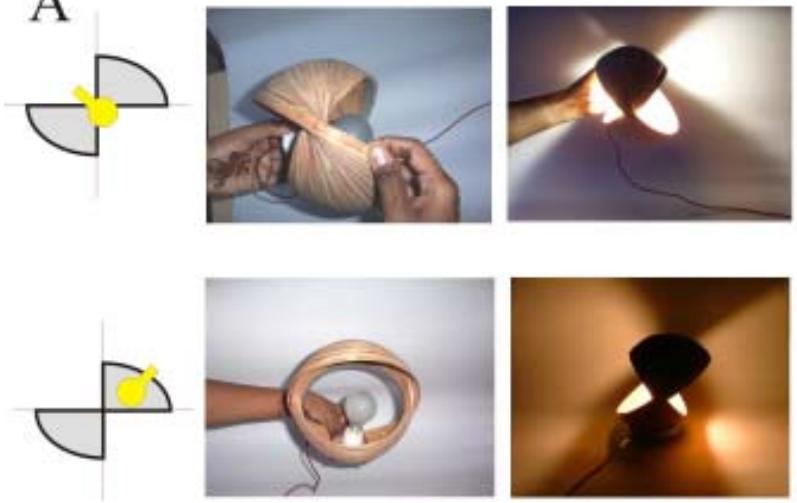
B



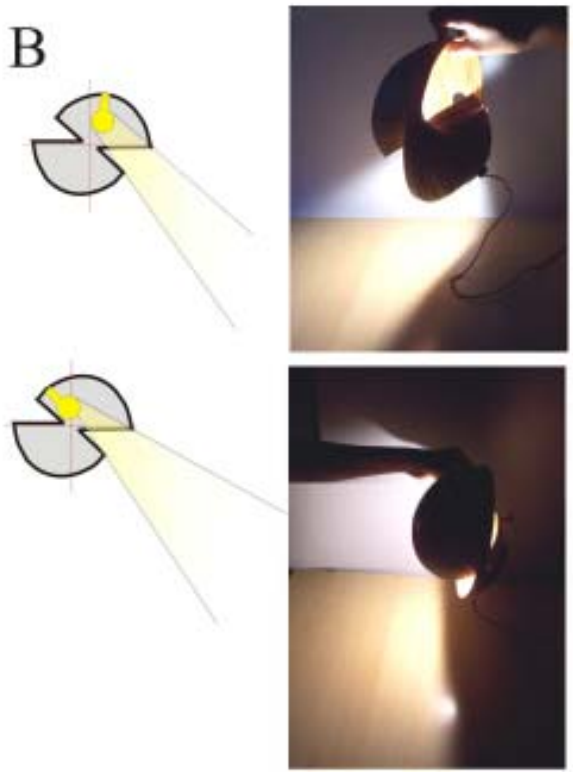
C



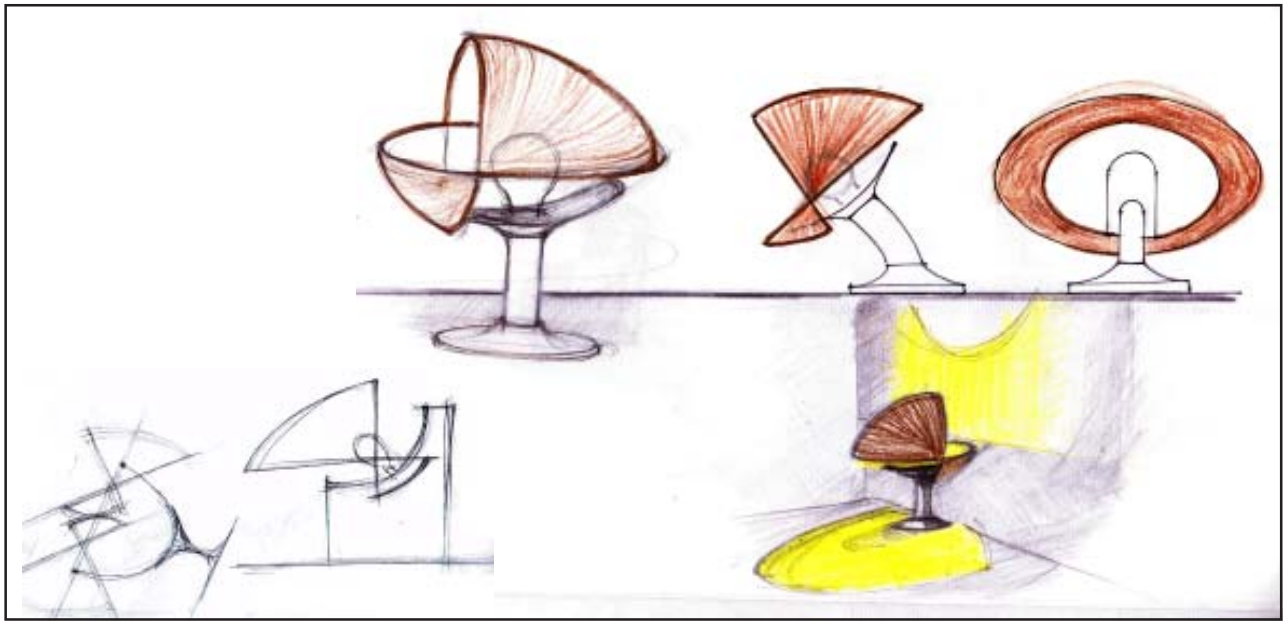
A



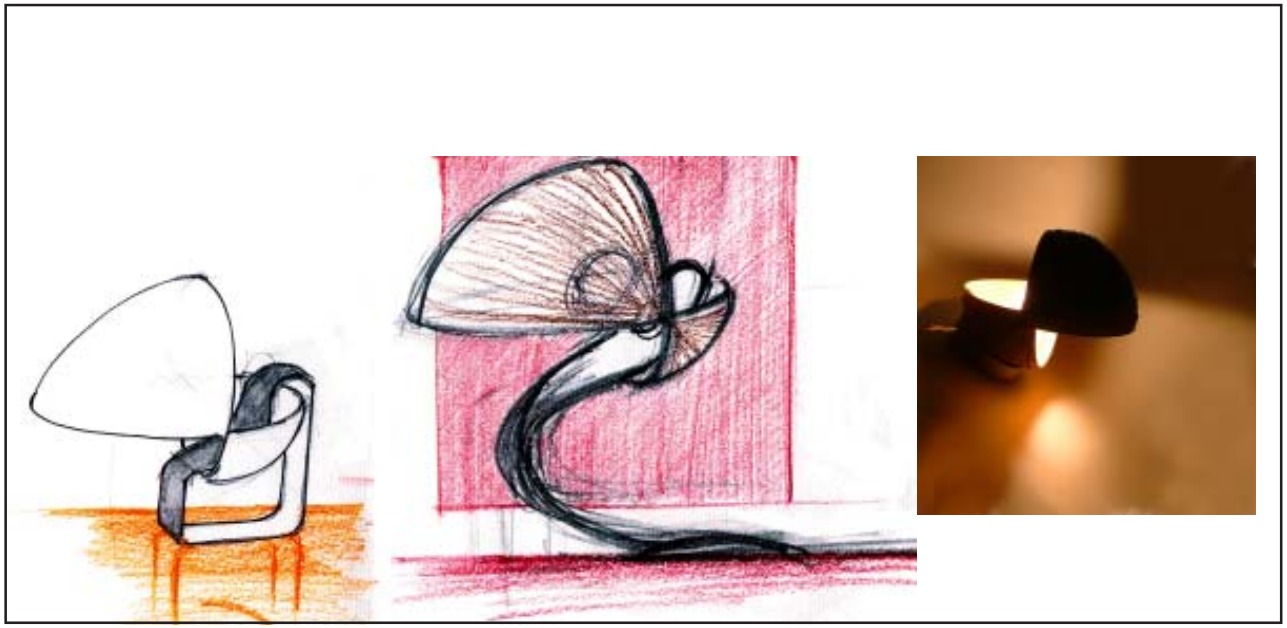
B



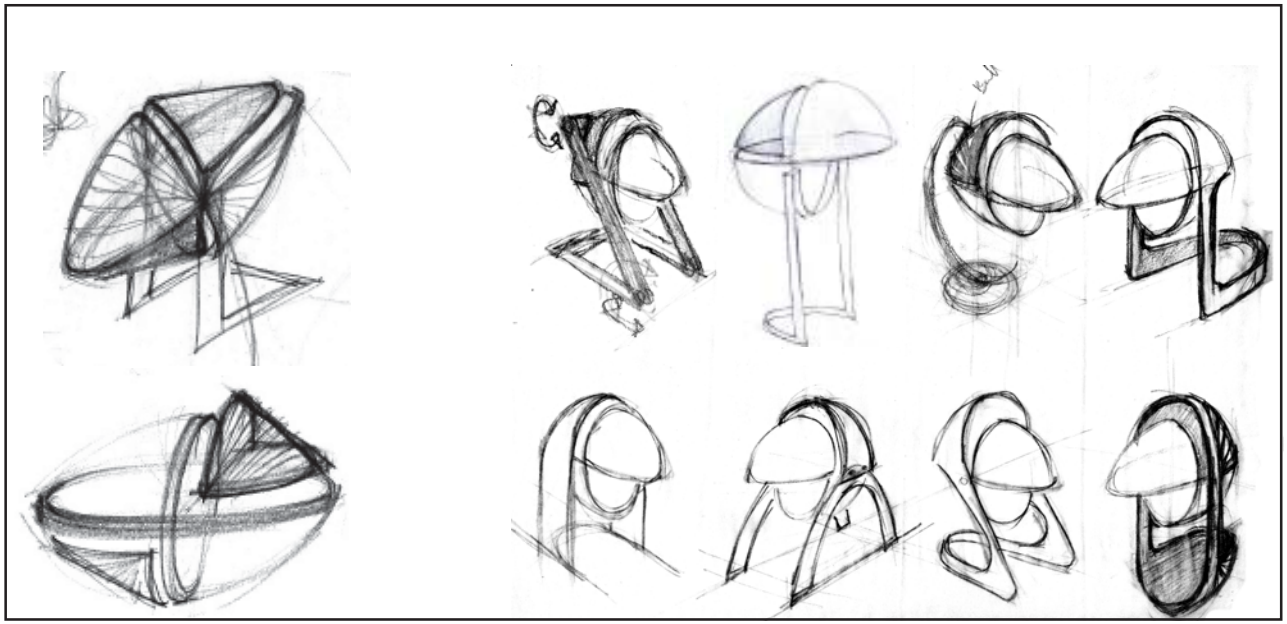
C



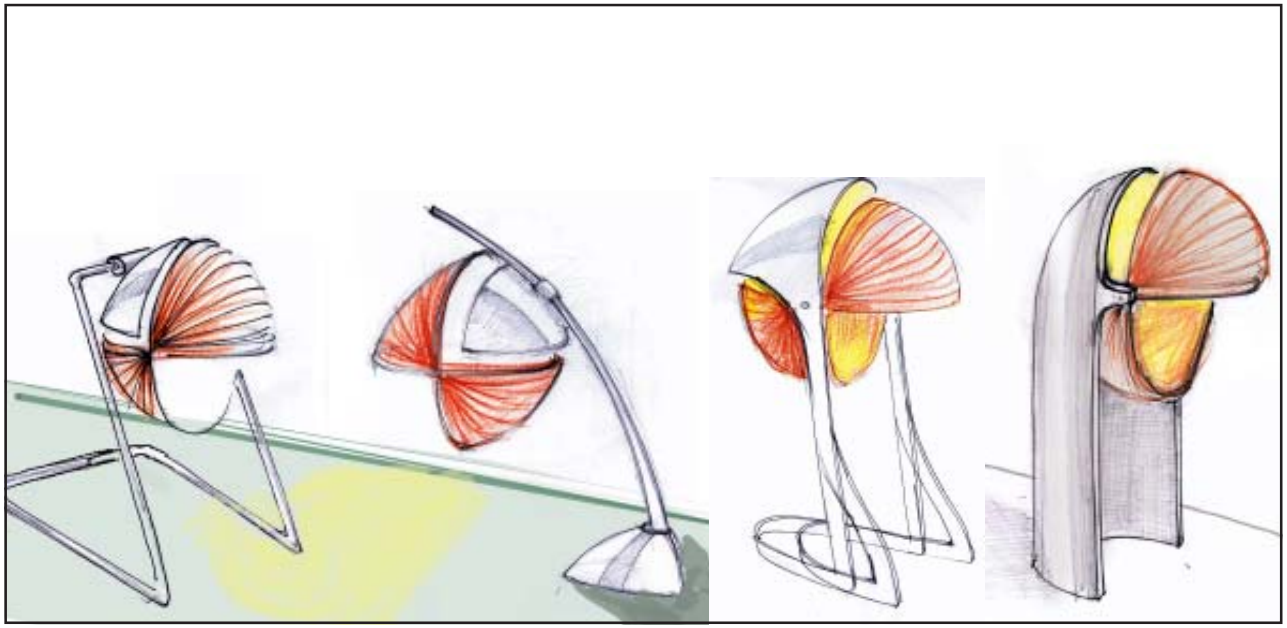
7.1



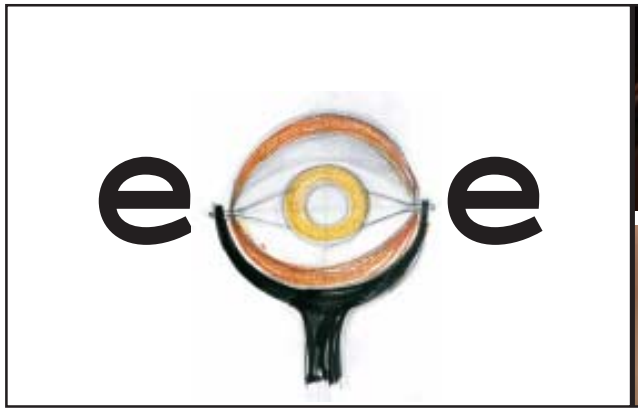
The two openings could be used for effect by letting light to flow out in each direction. One could be directed at the table surface while the other could light up the wall.

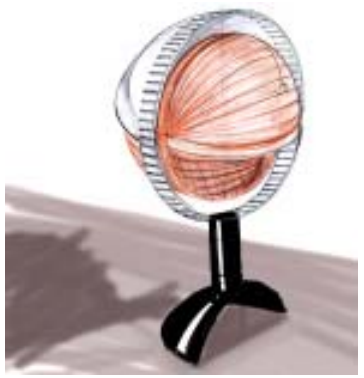


7.2

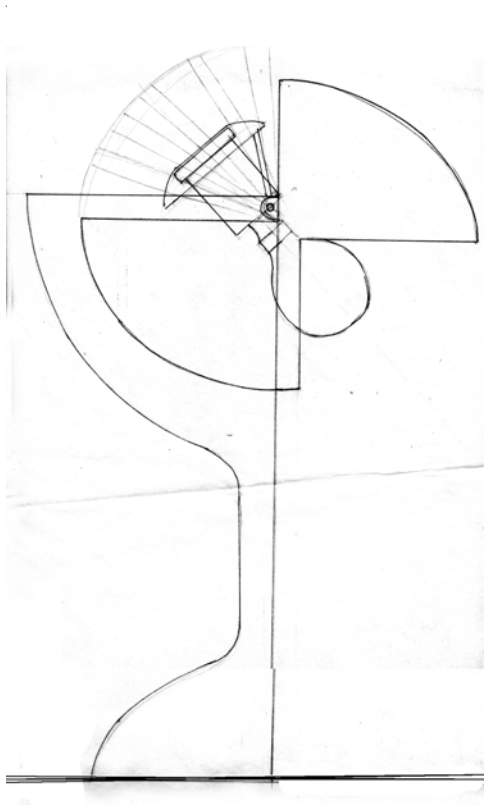


The form has two opening. One of the openings could be covered by using some other elements like weaves or steel.



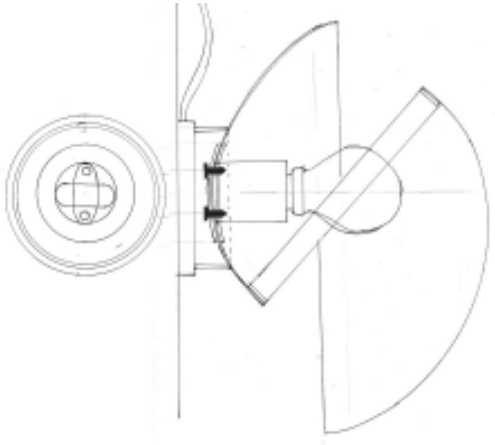


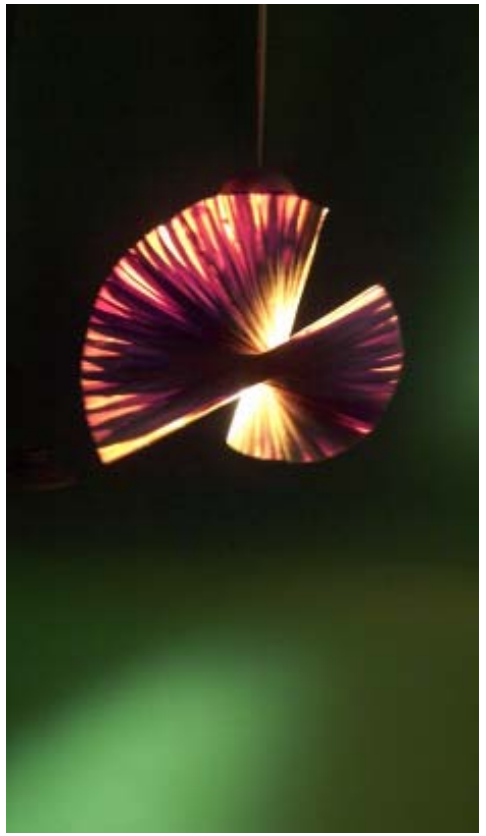
7.3



The shade could be rotated along the central axis. It increases the playfullness of the lamp as well as directional control of light. One quarter is open for the light to fall out while the other qualrter is enclosed by bamboo weaves. The stand made in stainless steel contrasts the bamboo coils.

Like a shell on the floor. As a floor or a wall lamp





There could be variations of the lamp as a wall mounted lamp, floor lamp, pendant lamp and table lamp . So here the same lamp form could be sold as three different lamps.

10

Training Workshop

I had the opportunity to attend a Bamboo training workshop held at Maldah, West Bengal. The workshop was on Tools, Small Machines and new product designs.

The design transfer process

Teaching tools and techniques.
Teaching methods of production.
Teaching using different media
Compter presentation
Manuals
Demonstration
Practice

Ensuring quality.
Costing Estimation
Finishing.

The various categories of people that attended the workshop.

1) Young educated, but with no experience in working in Bamboo. Lesser understanding of the bamboo as a material. They are enthusiastic to learn new things and are even capable of starting small set ups on their own.

2) Medium skilled people who are already engaged in making products that do not require very high skills like mango baskets, bamboo hats etc. This group understand the material-Bamboo, but are not exposed to very fine work.

3) High skilled group who are real craftsmen who make heir living by making high end craft products. They work either working independently based on orders. They also work as a group if the orders are huge. They also make products through out the year and sell in yearly exhibitions.

A place like Maldah has different groups with different skill levels. Each village has more or less same level of skills. Any product like a lamp that require different skill levels in making could easily be made. Their levels of understanding vary. Hence they need to be trained accordingly. Moulds and jigs need to supplied. Craftsmen need to taught how to make the lamp.

Usage of locally available things combined with bamboo could actually work as a unique selling feature. It also becomes economically feasible because the locally available materials would be cheaper than any other place. For e.g.. silk is locally produced. So is simple clay pots used for drinking tea or serving curd. These local specialities where integrated into the products which would make the product economically advantageous.

The workshop gave me deeper understanding of bamboo craftsmen and bamboo products. Finer issues related to tools techniques production where understood.

11
Final Concept

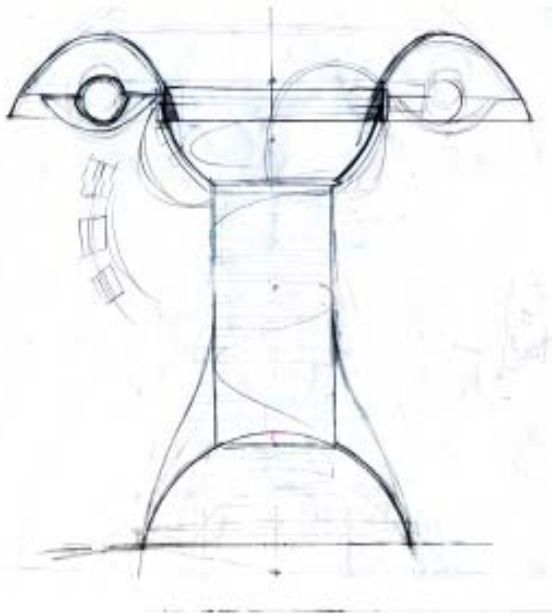

















Process of making of the top shade


making the rim of the top shade


making the other parts using mould

Parts before assembly

figure 1

Fixing the tube holder and the top shade.

The tube holder is stuck with fevicol and the gaps are filled with fevicol saw dust mixture.

figure 2

Fixing Bamboo part the connecting rod

A nut and bolt arrangement as shown in figure 2 is used to fix the bamboo part with the connecting rod.

This arrangement makes it easy for transportation.

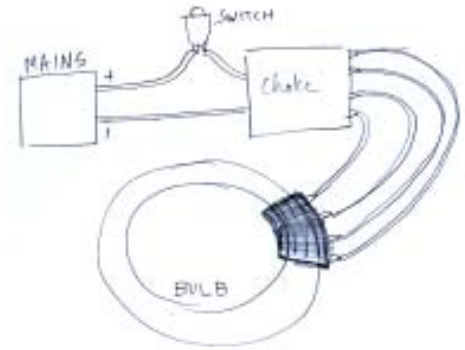
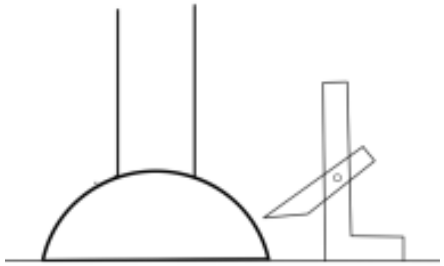


figure 3

Wiring details.

The electrical connection details are as shown in figure 3.



Marking the vertical heights on spherical surfaces can be done by using an L plate and a marker that can pivot.

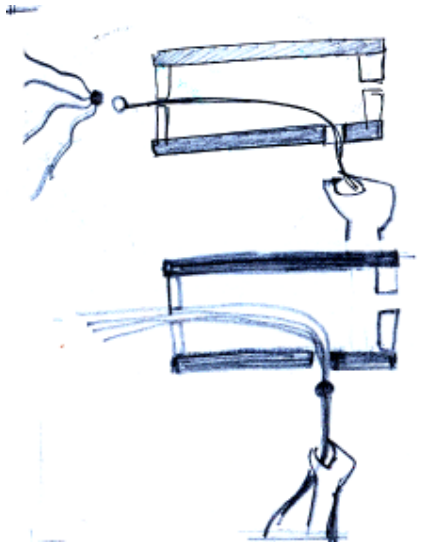
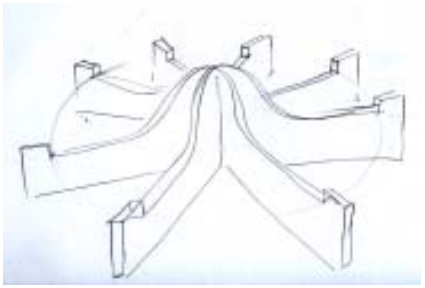


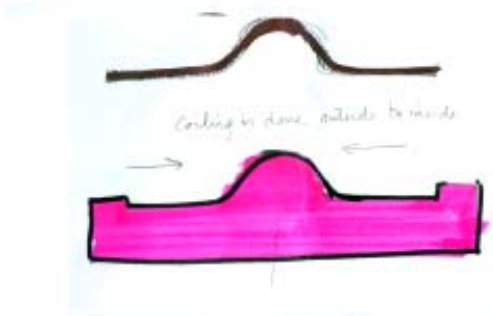
figure 4

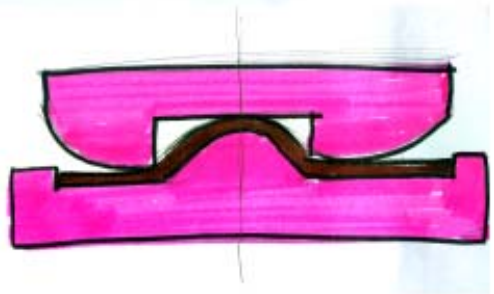
Wiring details.

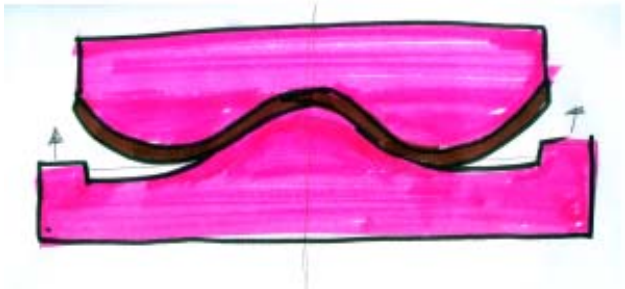
The electrical connection details are as shown in figure 3.

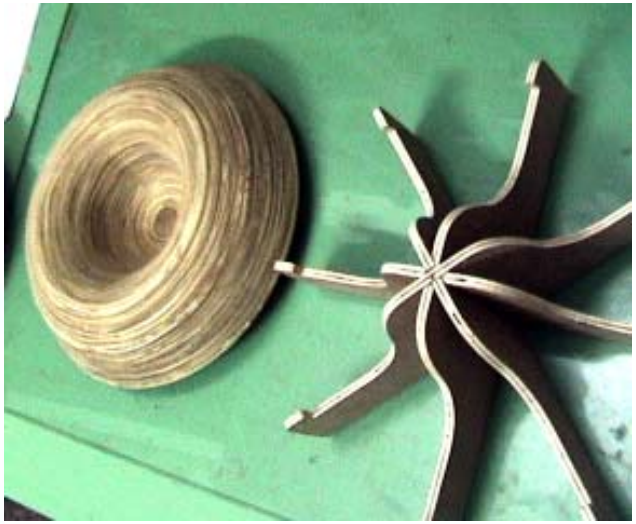
Figure 4 shows how to insert the wires through the connecting rod during assembly.











Making of the top shade was found to be time consuming and difficult hence the process of making has to be altered to as shown in the diagram. Changes were brought about in the design for faster production by reducing the number of parts etc.

Costing

Bamboo parts

Top shade	17	Nos	10 feet(long)	6 mm(width)	1 mm(thickness)	1 Rupee/strip	17.00
Top shade holder	6	Nos	10 feet(long)	6 mm(width)	1 mm(thickness)	1 Rupee/strip	6.00
Rims	1	Nos	10 feet(long)	15 mm(width)	1 mm(thickness)	1.50 Rupee/strip	1.50
Base	9	Nos	10 feet(long)	6 mm(width)	1 mm(thickness)	1 Rupee/strip	9.00
Bamboo rod	1	Nos	12 cm long 50 mm diameter				2.00

wood parts

tube holder		2 nos	20.00
wood piece for fixing bamboo rod	50 mm dia, 6 mm thickness	2 nos	5.00
centre piece for Base	50 mm dia, 6 mm thickness	1 nos	2.50
centre piece for Top shade holder	20 mm dia, 6 mm thickness	1 nos	1.50
Base plate	140 mm dia, 10mm thickness	1 nos	4.00

metal parts

sleeve for switch	1 nos	10.00
sleeve for wire holes	2 nos	10.00
Nut bolt	2 nos	5.00

Electricals

Bulb + choke	220.00
inside Wires	10.00
outside wire + plug	20.00
Switch	5.00

Other Materials

fevicol	15.00
feviqwick	10.00
Sandpaper	20.00
sawdust	2.00

Labour

2 man days making and finishing and assembly	100/day	200.00

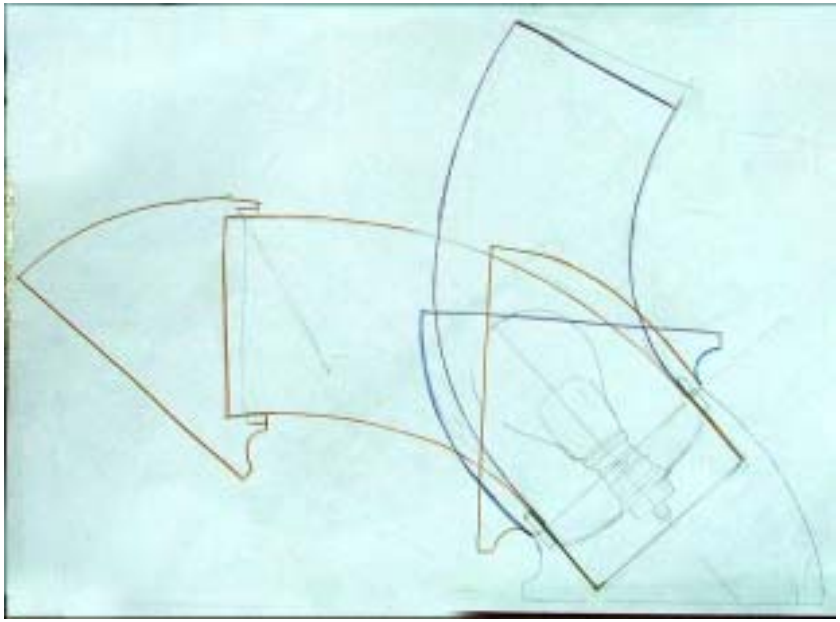
Total 595.50

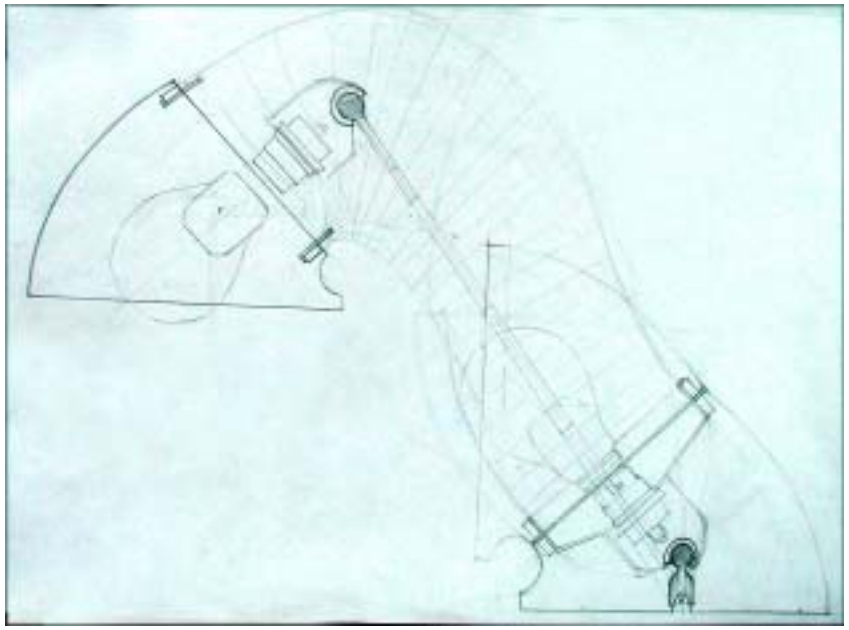
Reference.

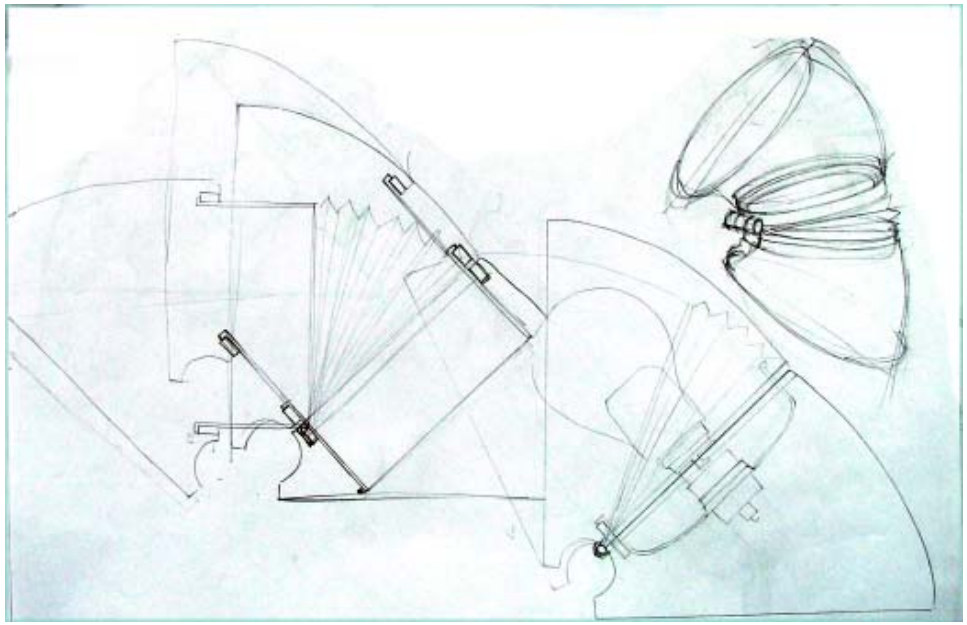
http://www.designboom.com/history/writinglamphistory.html
http://www.ambient-lighting.com

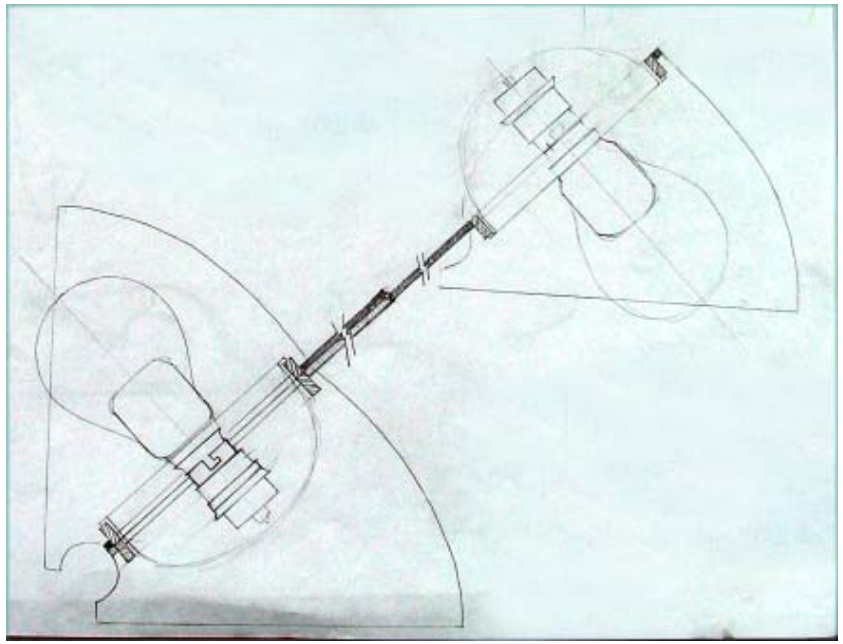
Bamboo Craft Design
-edited by A. G. Rao and Madhavi Koli.
Design of wall clocks from coil technique in Bamboo with the focus of Design transfer
-Ajay Desai

Appendix

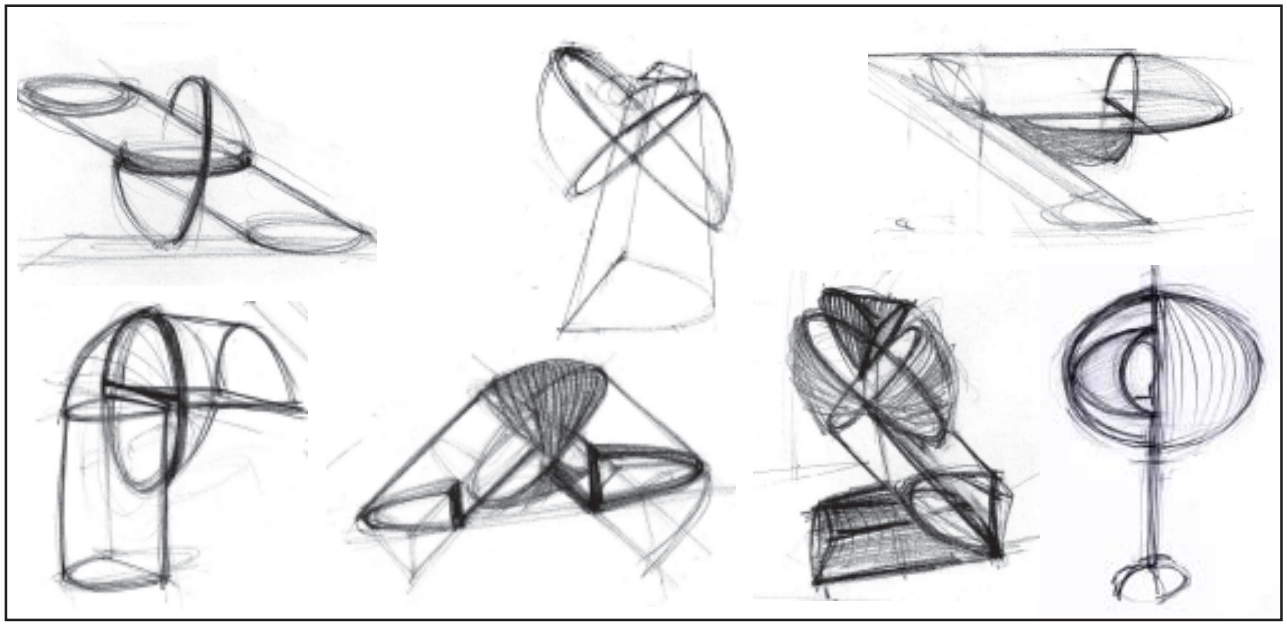


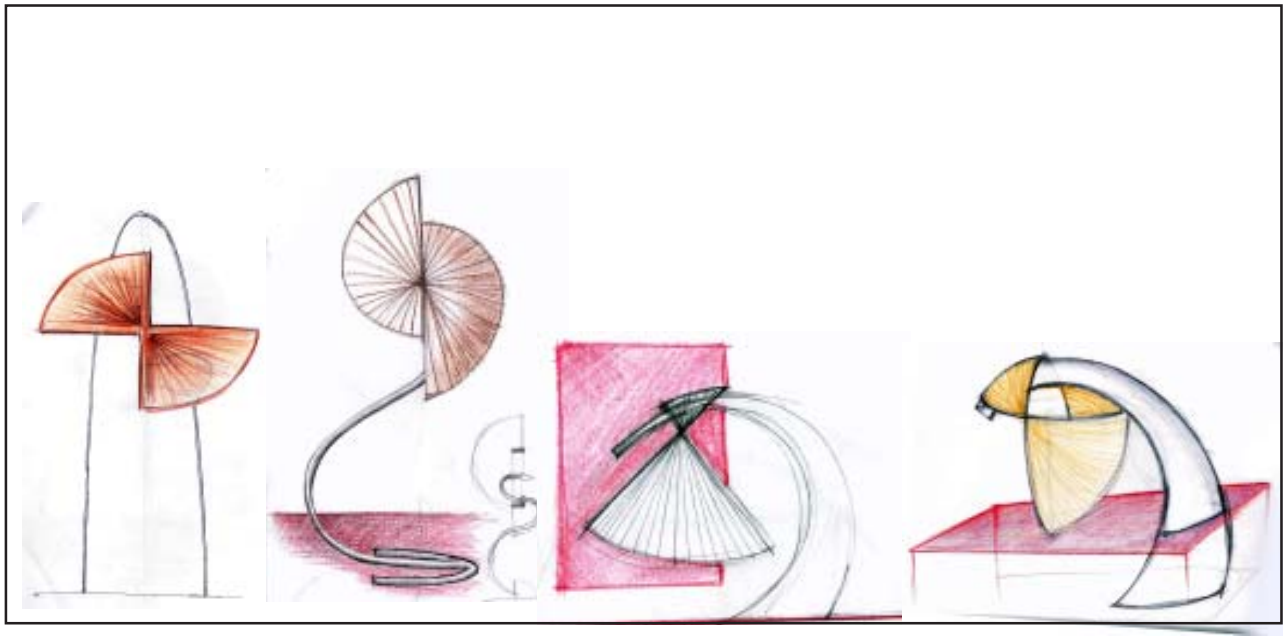






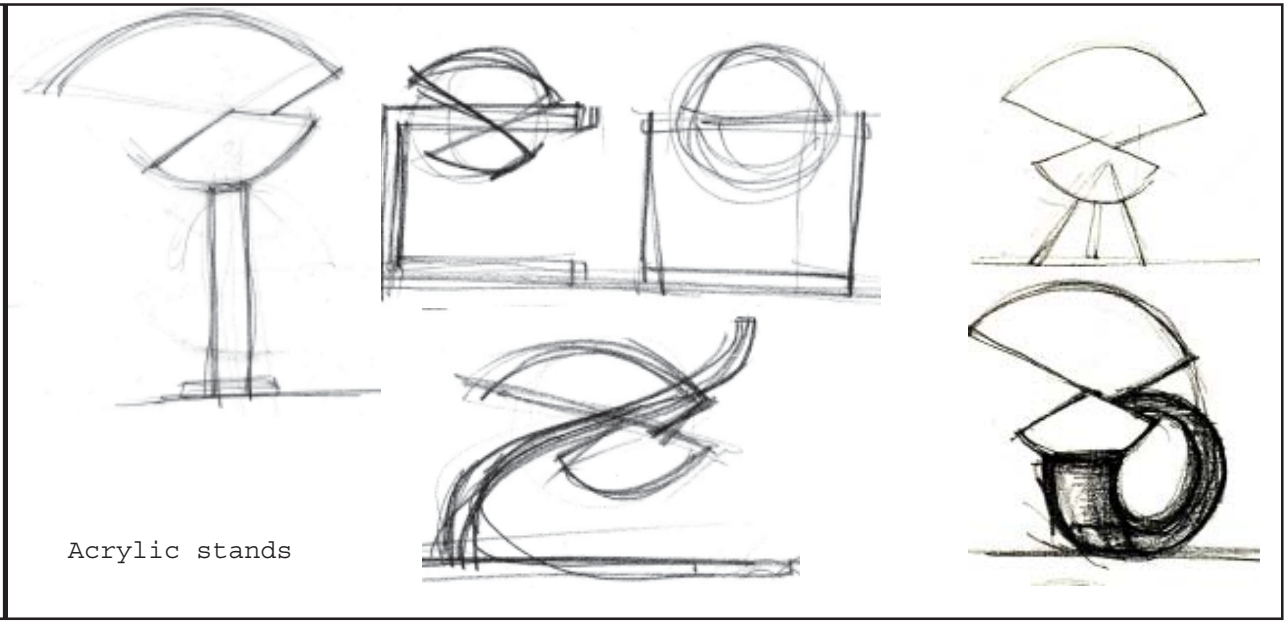
7.1





Here the attempt was to make the lamp look very scuptural.

Buterflies on a creeper



Acrylic stands

8.2