

Design of Cutlery for Indian Cuisine

Industrial Design **Project II**

Project Guide
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APPROVAL SHEET

The Industrial Design project titled

“Cutlery for Indian Cuisine”,

by Karthik Narayan (07613801)

is approved for the partial fulfilment of the requirement for the
post graduate degree in Industrial Design.

PROJECT GUIDE:

EXTERNAL EXAMINER:

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CONTENTS

Acknowledgement	iv
1. Abstract	01
1.1 Design contribution	01
1.2 Design Objectives	02
1.3 Project Brief	02
2. Introduction	03
3. Cutlery and Indian Cuisine	04
3.1 History of cutlery	04
3.2 The Indian Cuisine	06
3.3 Use of Cutlery with Indian Cuisine	08
4. User study and Analysis	11
4.1 Types of Dosa	11
4.2 Classification of Dosa	12
4.3 Understanding Dosa ‘material’	13
4.4 User study	15
4.5 If tools were used for eating dosa	19
5. Ideation and Design	27
5.1 Ideation	27
5.2 Functionality evaluation	33

CONTENTS

5.3 Test Ratings	43
5.4 Problem analysis	45
5.5 Solutions	46
5.6 Implementation of Solution	47
6. Semantic Study	49
6.1 Semantic Analysis	49
6.2 Results of Semantic Study	50
7. Concept Rendering	51
8. Final Model	54
9. Conclusion	59
10. References	60

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1. Abstract

The project aims at designing cutlery for Indian food that would replace the spoon, fork and knife. The western cutlery is not designed for Indian cuisine, and yet we manage to use them with many items of Indian food. Moreover, one would not want to get their hands dirty when in an upscale restaurant or an aircraft.

Hence, the need for a completely new cutlery for Indian Cuisine was identified.

1.1 Design contribution

As it is going to be a completely new design, the project should pave way for further research in this arena. This should, in the future, become a completely usable product that is present in every household and every restaurant.

1. Abstract

1.2 Design Objectives

- Should address hygiene issues
- Should emulate the way we eat with our hand
- Should have minimal training time

1.3 Project Brief

Designing a high end cutlery for an item of Indian cuisine.

2. Introduction



Though cutlery is traditionally not used in India, we have started using various cutlery and crockery with our food. We have started using plates instead of banana leaves, and spoons with rice, as we find it convenient. The basic perk is the fact that we would have our hands clean; but what we have essentially done is trained ourselves to use spoons and forks for whichever Indian food items they work with. This leaves out major food items like Roti, Dosa etc. which are very difficult, if not impossible, to eat with existing cutlery.

There should be a convenient and efficient way of eating items like Dosa and Roti with cutlery, and hence the project.

3. Cutlery and Indian Cuisine



fig 3.1 Made of an unknown bronze alloy , found in ancient middle east. Not used for dining but used by blacksmiths for handling mercury in gold mining.

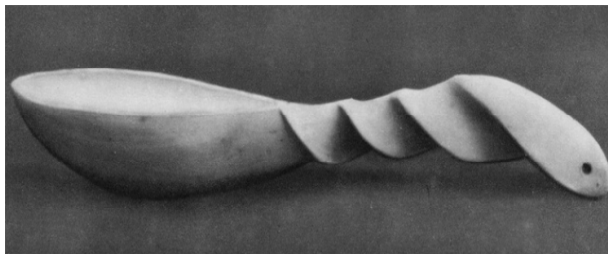


fig 3.2 An ancient spoon from easter island, made from a shell of a giant mollusk.

3.1 History of cutlery

Cutlery: A collective ensemble of eating and serving utensils such as knives, forks and spoons.

Cutlery or tools to aid eating, was invented by Neanderthals over 300,000 years ago. These were made of flint and stone. The tools were mainly used for cut animals into bite-sized pieces.

Metals replaced stone slowly, hence, even though bronze (an alloy of copper with tin) was available, stone continued to be used for a long time. However, once the merits of bronze knives became known, they took hold and far surpassed the capabilities of their stone ancestors.

As the iron age began in 1000 BC, the tools were beginning to be made in iron. The Etruscans were working iron ore mines on the island of Elba (now part of Italy) in 600 BC. The Etruscans seem to be the first people to have extracted iron ore from the Island of Elba and they supplied iron to the Romans during the early centuries. During this period the number of tools and weapons made from iron grew tremendously and replaced those made from bronze. Cutting and shaving knives, scythes and sickles, then ultimately scissors with springs completed the list of cutting implements being made by the end of the Iron Age.

3. Cutlery and Indian Cuisine

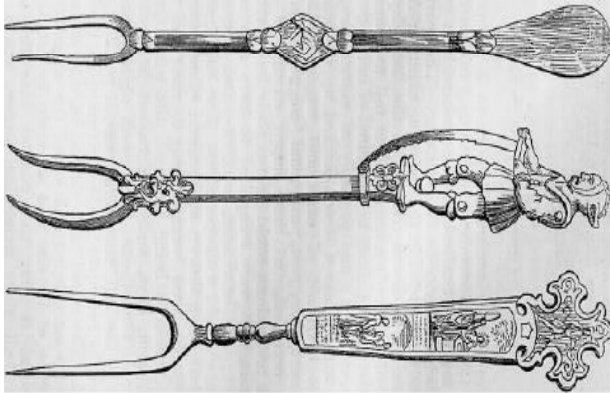


fig 3.3 The forks were introduced in Italian high society in the 12th century. It was considered immoral and effeminate.



fig 3.4 Antique three tined fork.

The precise date for the introduction of cutlery is unknown but it is believed to have been around the mid 17th century that forks were first used at the dinner table. Sheffield in England and Solingen in Germany were the major producers of cutlery in Europe.

In the early 20th century, stainless steel was discovered and it soon saw application in cutlery because of its high resistance to corrosion. It took almost 30 years of expensive research by large cutlery manufacturers to develop the right combination of alloys to produce the grade of stainless steel that is still used today.

Today's cutlery steel manufacturers have fully integrated operations, computerized processes and control procedures that enable them to produce the highest quality medical and cutlery grade steels, at a lower cost than ever before. Newer materials like zirconia are being used cutlery these days. Thus, cutlery has come a long way since its invention.

3. Cutlery and Indian Cuisine

3.2 The Indian Cuisine

The term 'Indian cuisine' cannot be categorized as the varieties are too many. The better way is to categorize it based on region. Even regionally, there are numerous sub-categories. The figure shows regional categories in Indian food items.

- Northern Indian
- Western Indian
- Southern Indian
- Eastern Indian
- North-eastern



fig 3.5 North Indian cuisine



fig 3.6 Western Indian food

3.2.1 Northern Indian cuisine

North Indian cuisine is distinguished by the proportionally high use of dairy products; milk, paneer, ghee. North Indian cooking features the use of the “tawa” (griddle) for baking flat breads like roti and paratha, and “tandoor” (a large and cylindrical coal-fired oven) for baking breads such as naan, and kulcha; main courses like tandoori chicken are also cooked in the tandoor. Fig 3.5

3.2.2 Western Indian

Western India has three major food groups: Gujarati, Maharashtrian and Goan. Maharashtrian Cuisine depends more on jowar and bajra as staples. Saraswat cuisine forms an important part of coastal Konkani Indian cuisine. Gujarati cuisine is predominantly vegetarian. Many Gujarati dishes have a hint of sweetness due to use of sugar or brown sugar. Goan cuisine is influenced by the Portuguese colonization of Goa. Fig 3.6

3. Cutlery and Indian Cuisine



fig 3.7 South Indian cuisine



fig 3.8 Eastern Indian food

3.2.3 Southern Indian

South Indian cuisine is distinguished by a greater emphasis on rice as the staple grain, the ubiquity of sambar and rasam (also called saaru and rasa), a variety of pickles, and the liberal use of coconut and particularly coconut oil and curry leaves. The dosa, poori, idli, vada, bonda and bajji are typical South Indian favorites. These are generally consumed as breakfast. Hyderabad biryani, a popular type of biryani, reflects the diversity of south Indian cuisine. See fig 3.7

3.2.4 Eastern Indian

East Indian cuisine is famous for its desserts, especially sweets such as rasagolla, chumchum etc. Traditional Bengali cuisine is not too spicy, not too faint. Rice is the staple grain in Eastern India too. A regular meal consists of many side dishes made of vegetables. Fig 3.8

3.2.5 North-east Indian

The food of the North East is very different from other parts of India. This area's cuisine is more influenced by its neighbours, namely Burma and the People's Republic of China. Its use of well known Indian spices is less. Yak is a popular meat in this region of India.

3. Cutlery and Indian Cuisine

3.3 Use of Cutlery with Indian Cuisine

Though Indian cooking uses an extensive array of specialized utensils for various purposes, Indians traditionally do not use cutlery for eating. Traditional Indian cutlery does not recognize the use of forks and knives while eating, limiting their use to the kitchen only. Spoons were made of wood in ancient times, evolving into metallic spoons during the advent of the use of the thali, the traditional dish on which Indian food is served.

As mentioned earlier, even though we traditionally do not use cutlery with our food, we have slowly started to eat different items with western cutlery owing to convenience. We have started using high end crockery too, as it is convenient and classy.

Here we examine the various items of Indian food, the process/action that we use to eat with hand and the cutlery used with it. It also shows how comfortable one is, using cutlery with the respective items. The comfort ratings were based on past experiences and hypothesis (table 3.1).

3. Cutlery and Indian Cuisine

Sno	Food item	Process used	Cutlery used	Comfort rating
1	Roti	Tearing with support of plate, and usually filling insides with dry side-dish.	Knife and fork	1/10
2	Dosa	Tearing/pulling with minimal support and dipping the dosa into the sambhar or chutney	Spoon/fork or knife/fork (works only with thicker dosas)	2/10
3	Naan	Tearing, sometimes with two hands and filling the insides of the piece with gravy.	-	0/10
4	Paratha	Pulling with minimal support and dipping into the curd.	Pulling with minimal support and dipping into the curd.	4/10
5	Idli	Cutting, holding and then dipping into the sambar.	Spoon	7/10
6	Vada	Cutting, holding and then dipping into the chutney.	Knife and fork	6/10
7	Rice	Mashing and scooping	Spoon	7/10
8	Kebab	Picking (piercing)	Fork	7/10
9	Syrupy sweets	Picking sweet with syrup on it	Spoon	6/10

Table 3.1 Cutlery use with Indian food

3. Cutlery and Indian Cuisine

3.3.1 Issues related to using cutlery

Eating Indian food requires intricate hand movements that are almost impossible to be simulated by the existing cutlery. 'Picking up the curry with the bread' is an action that is too complex to be performed with cutlery. Other issues particular to various food items:

- Roti cannot be torn easily by the knife
- Thin dosa/masala dosa cannot be had with fork/knife
- Naan is impossible for cutlery
- Rice can be eaten, but mixing of rice with dal, rasam etc. is difficult.
- Vada sometimes cannot be cut easily

3.3.2 Dosa - the central member

Dosa is one item that has many varieties and most of the eating actions are required to eat it. Various types of dosas have varying textures that makes it challenging, and hence has been chosen as the central member for the research. Also, it is a commonly ordered dish not only in south India but also other places, even abroad.

4. User Study and Analysis

As the central member has been chosen as *Dosa*, all further research and data collection was centralized around dosas.

4.1 Types of Dosa

Sada Dosa - Plain dosa with moderate thickness

Masala Dosa - a dosa stuffed with spiced potatoes

Uthappam - uthappam is thick and not filled, with ingredients cooked right into the batter.

Rava Dosa - made with rava or semolina, which doesn't need fermentation

Onion dosa - chopped and sautéed onions are spread on the dosa.

Paper dosa - a long and very thin delicate dosa which can be spread over 2 feet.

Chilli dosa - chilli powder is spread on the dosa.

Egg dosa - a dosa spread with an omelette.

Adai - a dosa prepared from a combination of dals namely Urad, Channa & Moong dal.

Wheat dosa - made with wheat flour, and served with coconut chutney, mysore masala dosa



fig 4.1 Sada Dosa



fig 4.2 Masala Dosa

4. User Study and Analysis



fig 4.3 Stack of Uthappam



fig 4.4 Paper Roast

4.2 Classification of Dosa

Even though there are more than twenty varieties of Dosa in all, the dosa, as far as the texture and thickness etc. are concerned, it could be classified into three or four varieties. For this purpose, four major categories were chosen for classification

- Sada Dosa (Fig 4.1)
- Masala Dosa (Fig 4.2)
- Uthappam/Set Dosa (Fig 4.3)
- Paper Roast (Fig 4.4)

The images of the various types of dosas are shown.

4. User Study and Analysis

4.3 Understanding Dosa 'material'

To understand how to act on a substrate (dosa in this case), one has to thoroughly understand the material behavior of the substrate. This would help in finding out what processes would be suitable for obtaining the required results.

Dosa was thought to be a material rather than a food item. The characteristic of the material dosa, was analyzed by observing how the dosa tears or breaks and how its 'material' properties vary with time. It actually involved observing the dosa, then, feeling it with eyes closed and trying to sense what had never been sensed before. To see how it breaks or tears depending on the type of dosa. This is because dosa may not have been observed in material aspect. Based on this 'meditation,' the findings were mapped as shown in the next page.

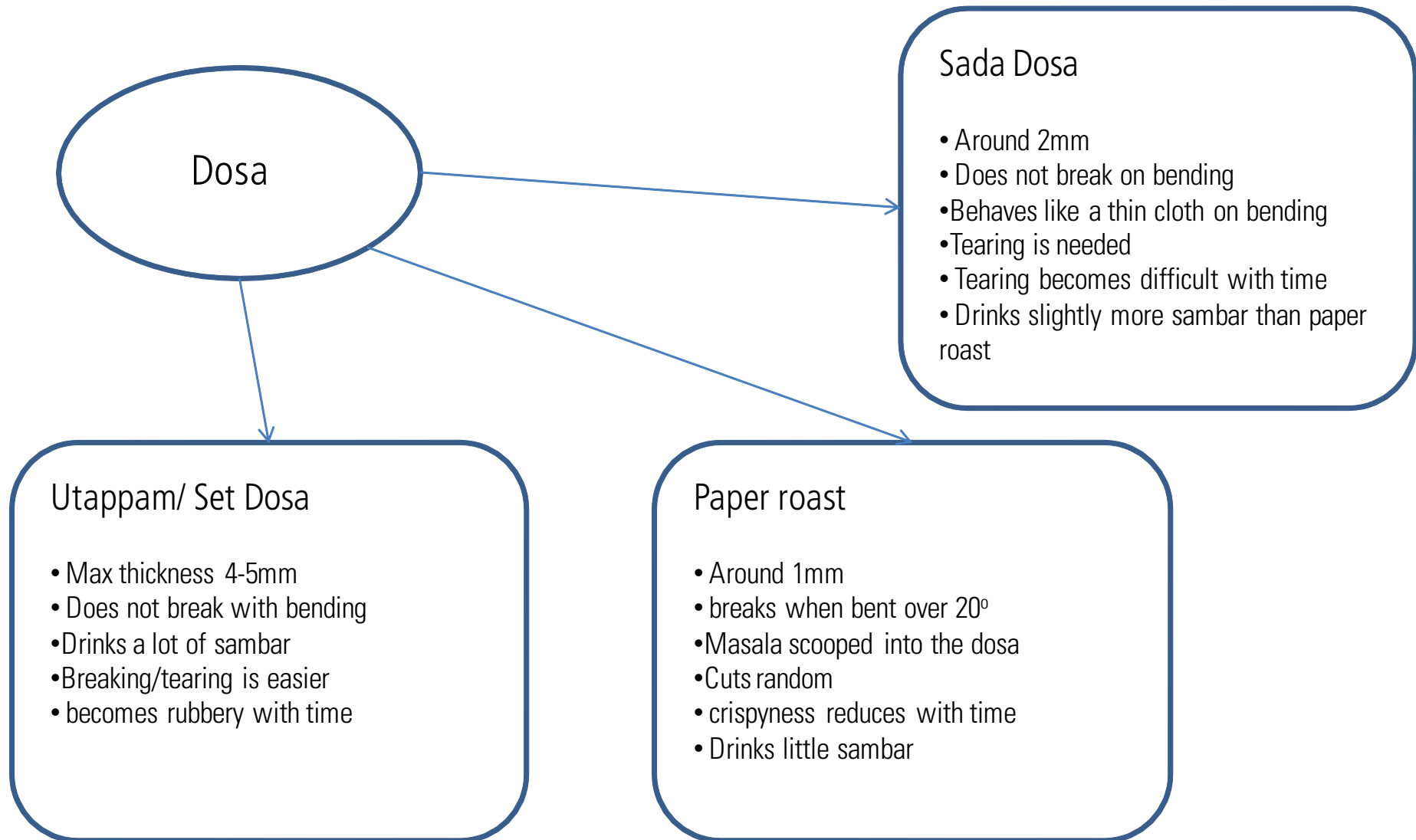


fig 4.5 Dosa Map

4. User Study and Analysis

4.4 User study

The following methods were adopted to conduct user study and get design insights.

- Observing the intricacies of eating with hand. This would give direct design insights if the action were simulated.
- Getting ideas from Foreigners eating Indian food
- Understanding the Dosa material
- Taking inspiration from various tools

4. User Study and Analysis

4.4.1 Observing how people eat

The users were made to eat uthappam and Dosa, first with hand. Their actions were observed and recorded. Then, they were asked to eat with cutlery of their choice. This would give an idea as to what the exact actions are and movements that happen when a person eats with hand. It would also tell how differently one would eat the same type of dosa while eating with the cutlery. The of various actions involved while eating were recorded. The screenshots from those videos are shown in the fig 4.5.

The various actions involved and their sequence are shown on the following page. The observations are also shown.



fig 4.5 Screenshots

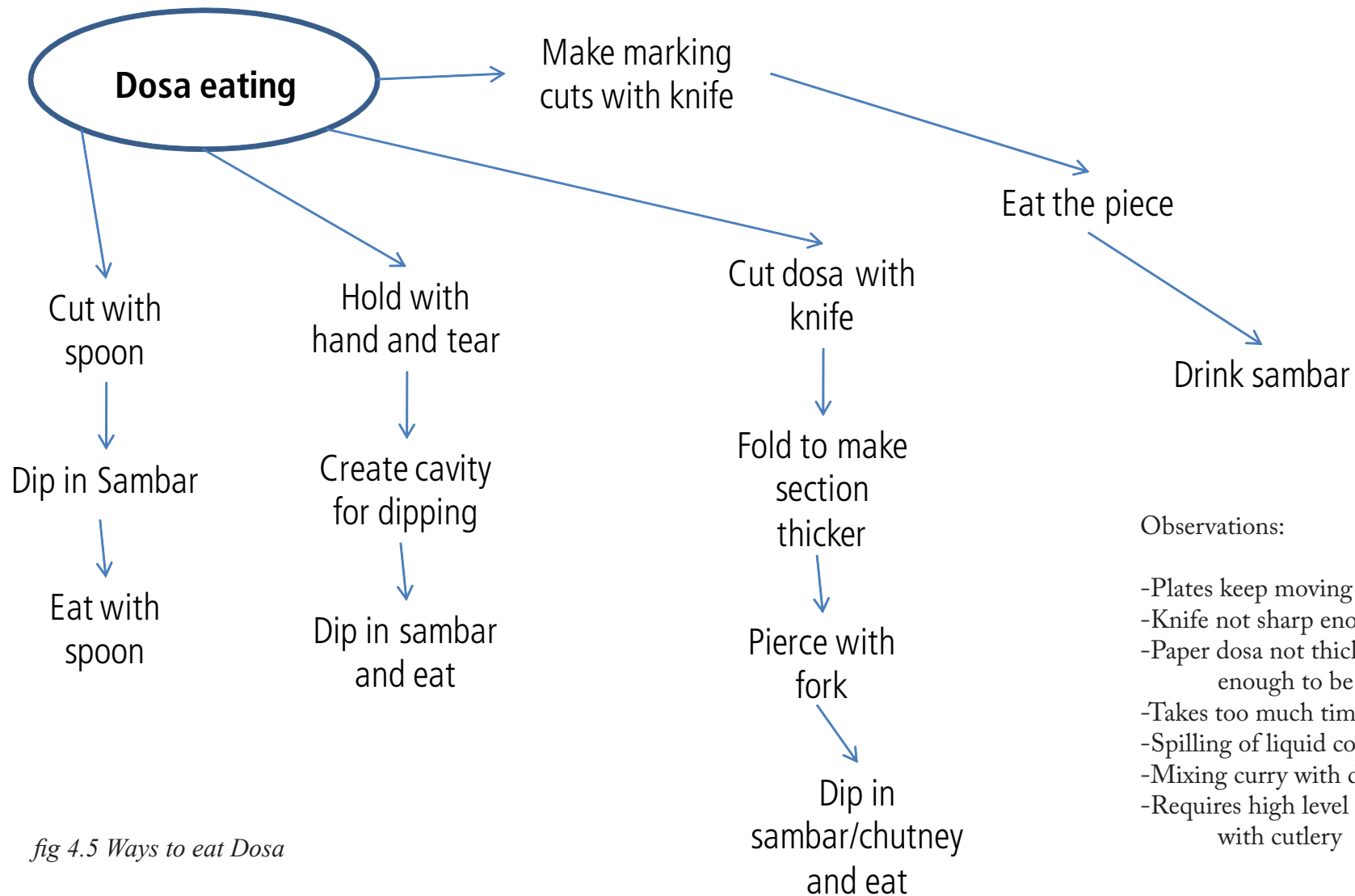


fig 4.5 Ways to eat Dosa

4. User Study and Analysis



fig 4.6 Robert, Foreign user

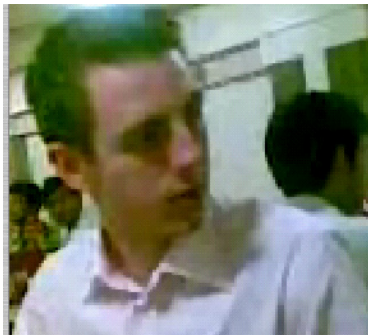


fig 4.7 Roman, Foreign user

4.4.2 Foreigners eating Indian food

Foreigners do not have a fixed approach to eat Indian food. Hence, making them eat Indian food with existing cutlery would give insights.

They were served Dosa, roti-subzi, Dal and idli and the cutlery and the method they used with each item was studied.

The cutlery they used were,

Roti – fork and knife

Paneer – fork

Dosa – spoon/fork/knife and hand

Idli – spoon

Observations:

It was found that fork did not have enough grip for cutting and tearing. Also, the knife was not sharp enough to cut dosa. It was also found that dipping into sambhar causes dripping, which foreigners were not very comfortable with.

4. User Study and Analysis

4.5 If tools were used for eating dosa

Eating food by hand involves a lot of complicated movements that, finally put together, becomes a complete eating action. If these complicated actions could be broken down into simpler ones, implementing them on cutlery would become easier. Hence, in this chapter, the entire eating action has been broken down into a set of simpler actions. These simpler actions would be compared to tools that perform similar actions.

So, tools which performed actions that might be used in eating dosa were listed down. A few were related to food, but most were not. Based on the observations of the actions performed while eating a Dosa, either by hand or by available cutlery, tools were listed down that simulated the actions performed while eating a dosa. The idea was to capture the essence of the tools and implement them in cutlery. For each of these actions, the essence of what actually happens was captured and understood.

The mind map of this process is on the next page. The image board is on the page after that.

4. User Study and Analysis

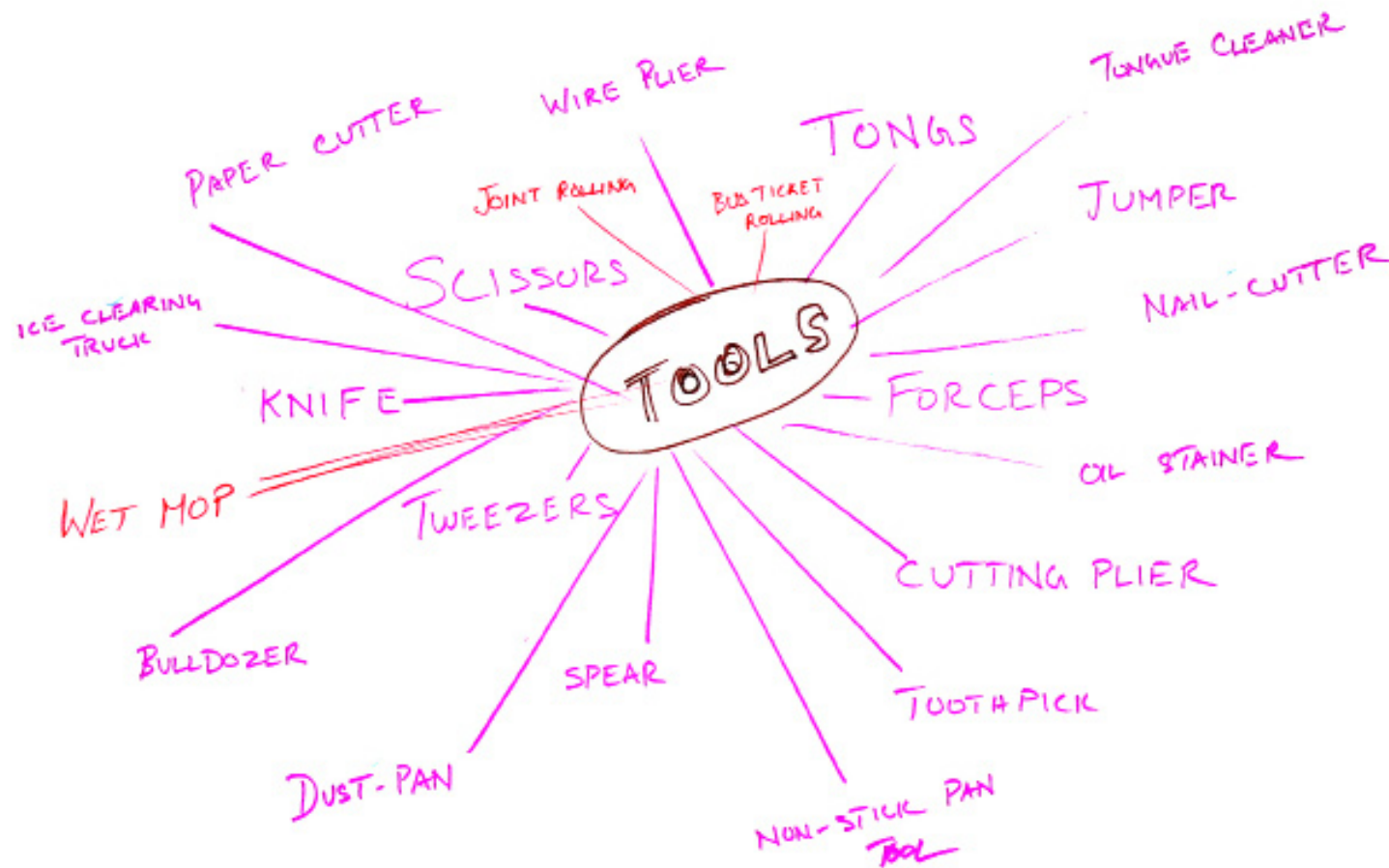


fig 4.7 tools mind map

4. User Study and Analysis

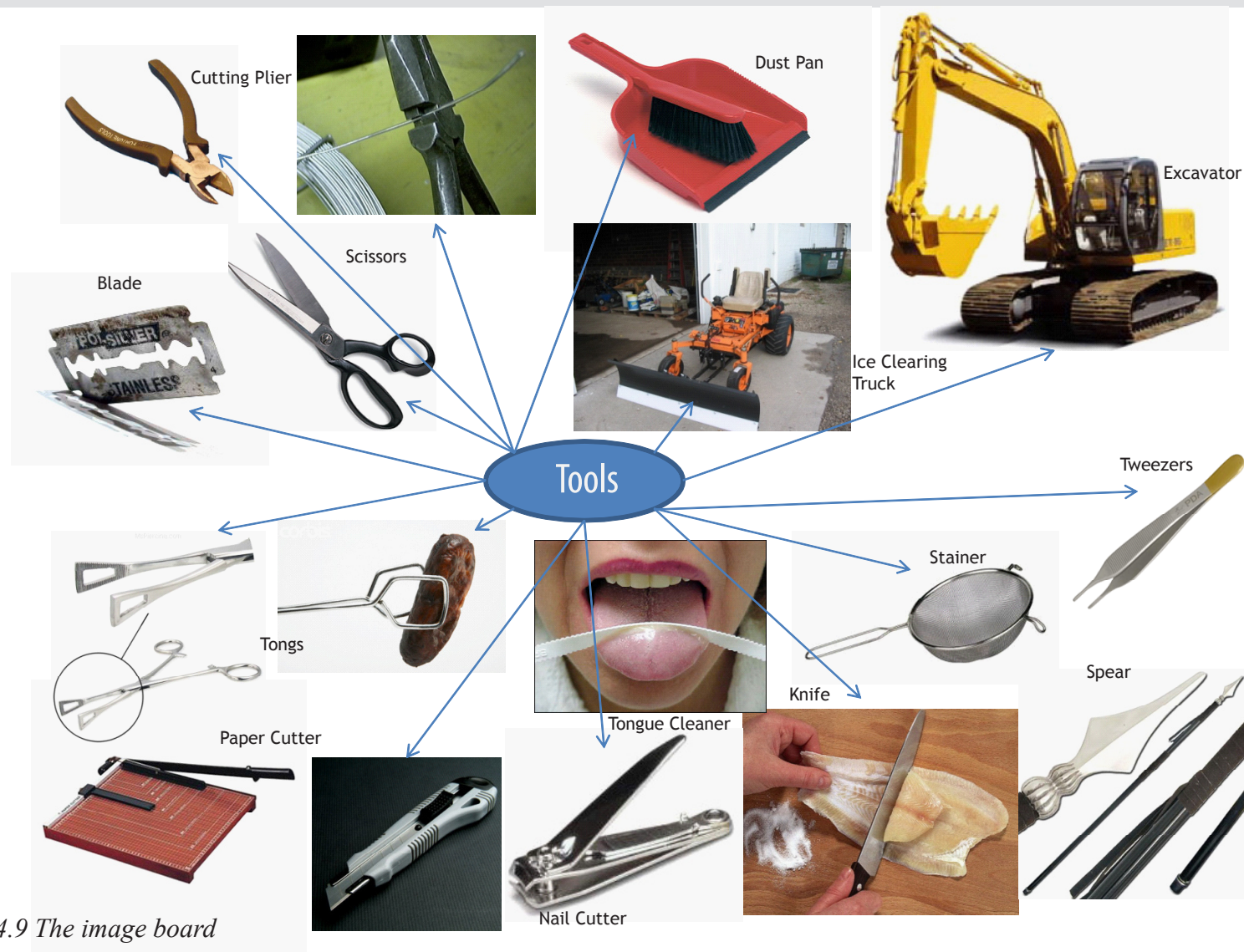
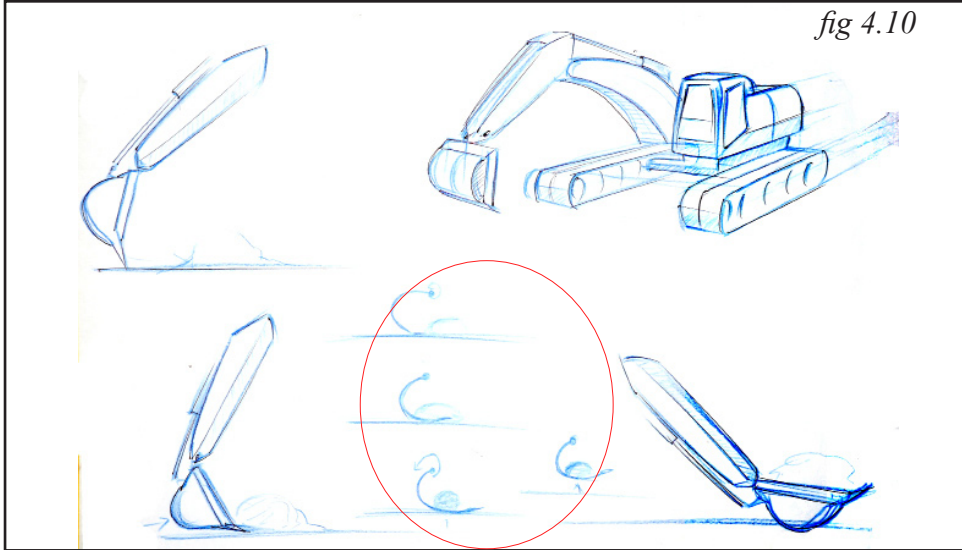


fig 4.9 The image board

4. User Study and Analysis

fig 4.10



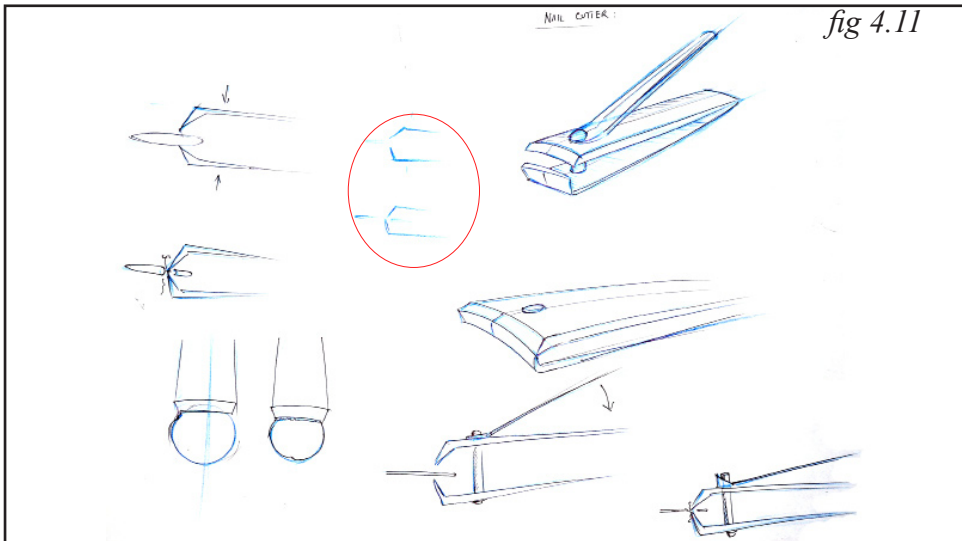
The Excavator

The excavator is an engineering vehicle that digging of trenches, holes, foundations etc. The functioning of the excavator was found similar to the way one scoops chutney into the dosa. The way the excavator scoops up material into the scoop was observed. The Scooping was found as the essence (encircled) of how the excavator works as illustrated in the figure 4.10.

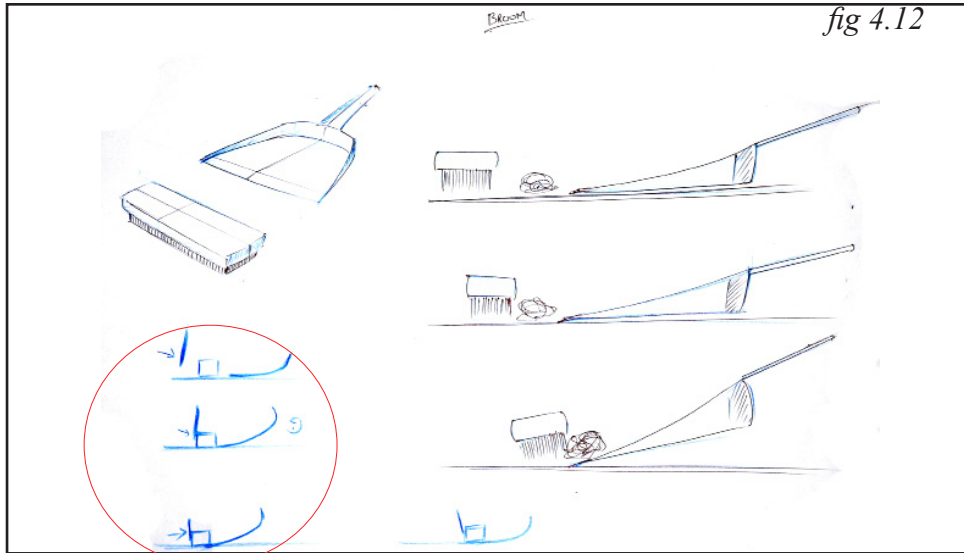
The nail cutter

The nail cutter simulates the breaking action that one usually follows while eating. The essence of the cutting action is that, there is a pivot, and the two cutting edges aligned parallel to the axis of the pivot. The cutting edges take the item between them and cut. The movement makes the cutting edges meet and the material is cut (essence encircled). See fig 4.11

fig 4.11

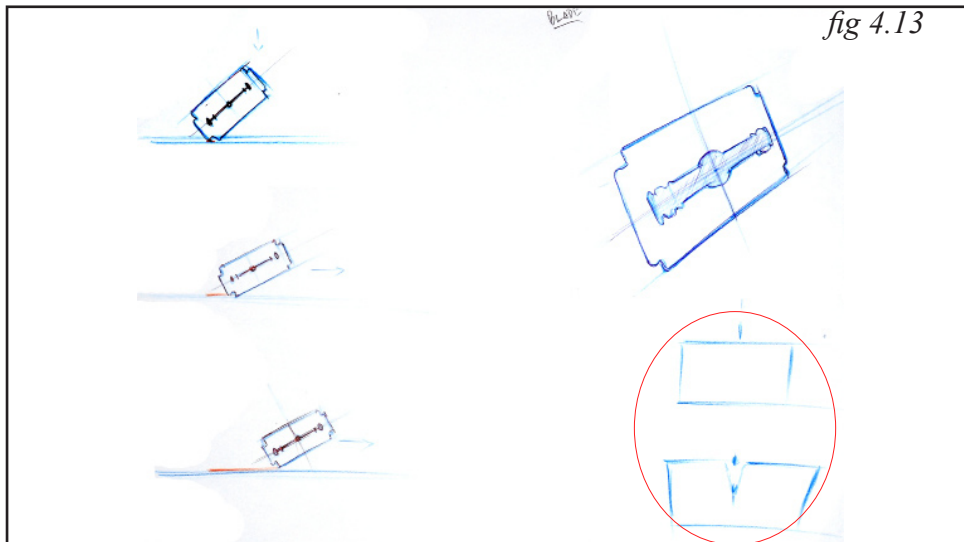


4. User Study and Analysis



Dust pan

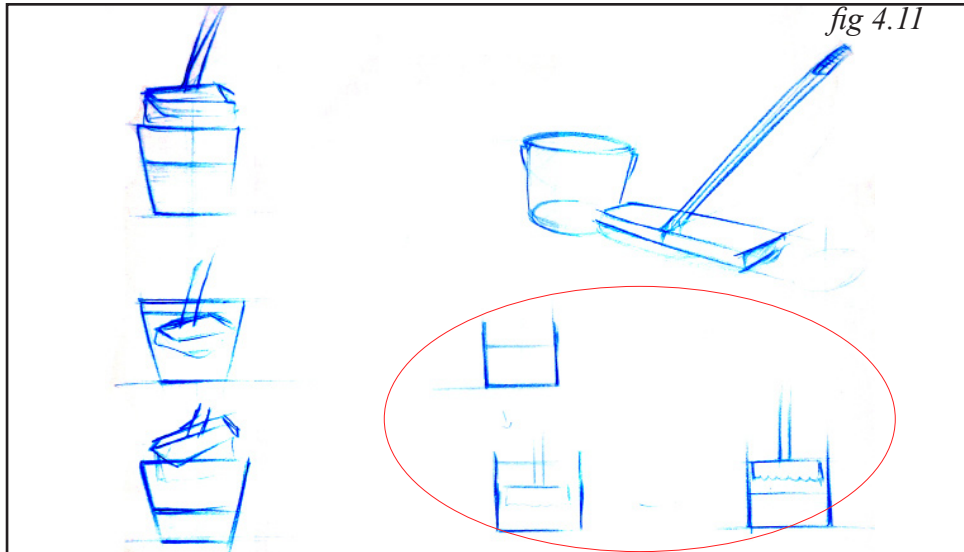
The broom/brush and the dust-pan's relation was studied. The way the waste is pushed onto the dustpan was observed. It involved the dustpan having a flat surface that contacted the ground and the broom/brush helping the dust along the path onto the dustpan. This could metaphorically be compared to how the food might get onto the spoon or similar cutlery. Fig 4.12



Blade

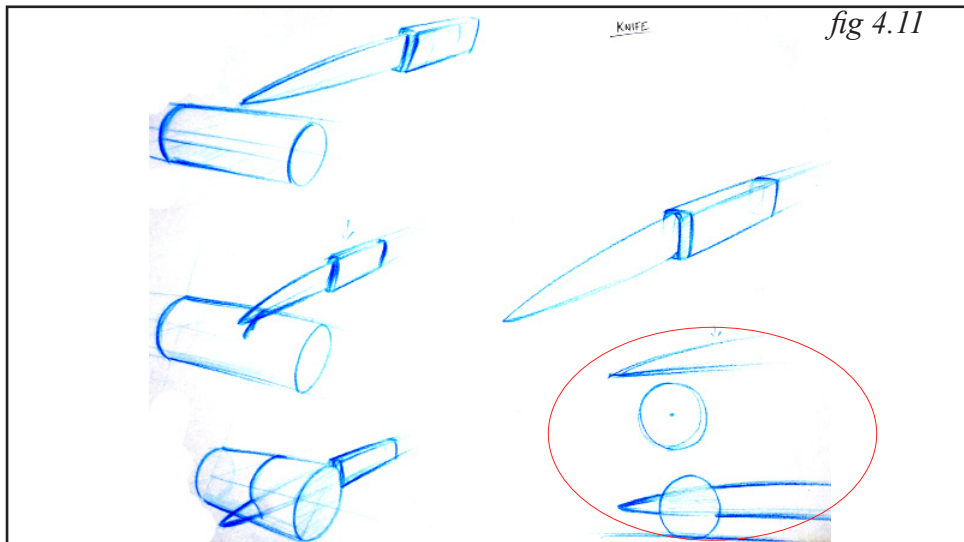
How the blade cuts was analyzed. It was observed that the blade cuts efficiently at an angle. A slight pressure is applied normal to the angle in which the blade is. Movement along the same direction causes the cut. Desired cut can be achieved by this method. Fig 4.13

4. User Study and Analysis



Mop

The dipping of the mop into the solution is similar to dipping of dosa into sambhar. The mop is dipped into the solution and the extra solution is drained/squeezed off so that it does not drip. This is analogous to the fact that one drains off the extra sambhar from the dosa to prevent dripping. Fig 4.14.

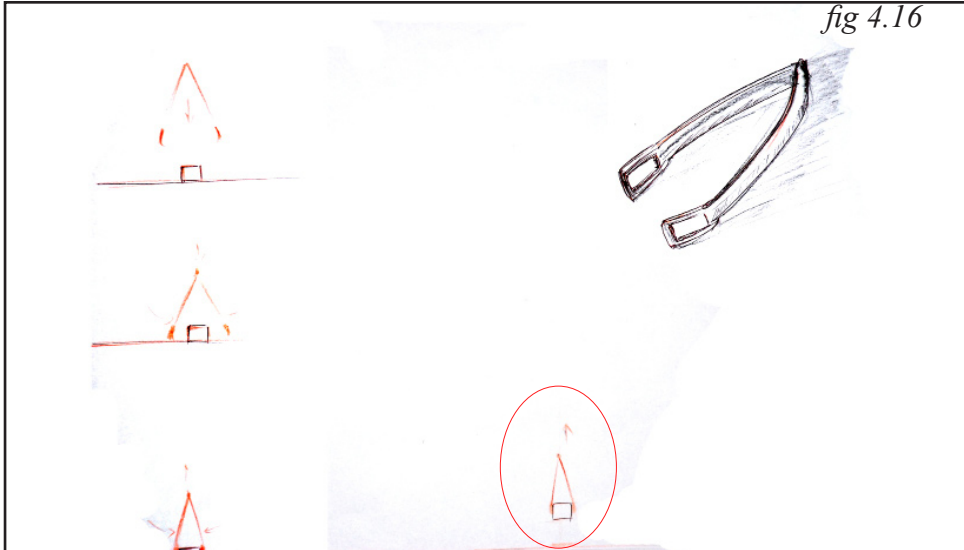


Knife

The cutting action of the knife was studied. Pressure is applied in the direction of the cutting edge of the knife. The edge cleaves the substance to be cut. Here the vertical pressure and the movement of the knife are vital. Fig 4.15.

4. User Study and Analysis

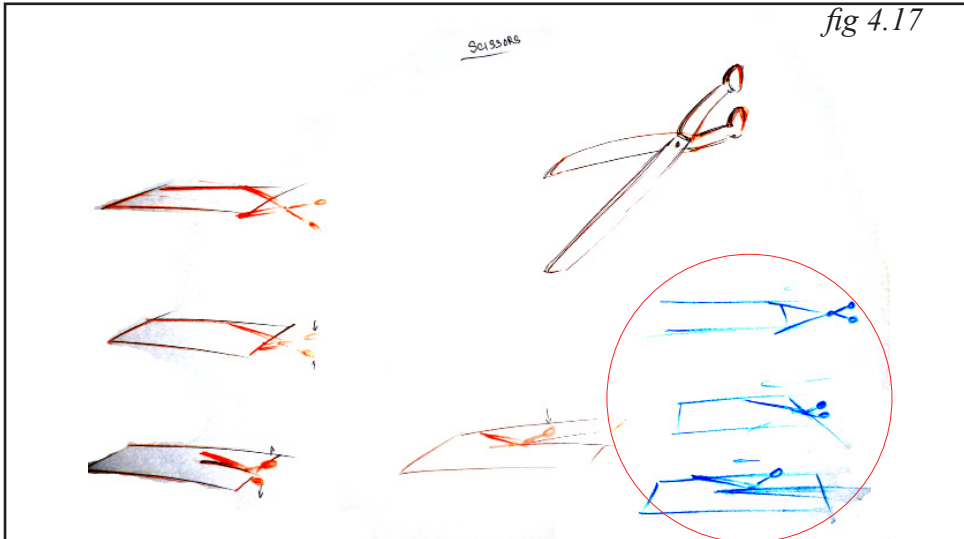
fig 4.16



Tongs

The tongs are usually used to pick up things. It has a variety of applications ranging from medical, metallurgical to everyday use at home. It has a pivot with two hands that is used for holding and picking up objects. It has spring action on its hands, usually by material property. Objects are picked up by holding near the pivot. Fig 4.16

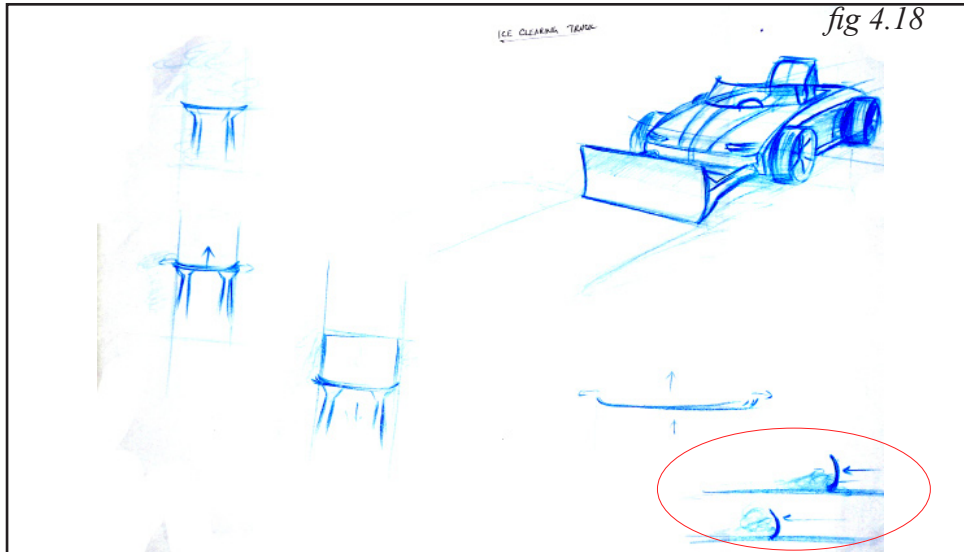
fig 4.17



Scissors

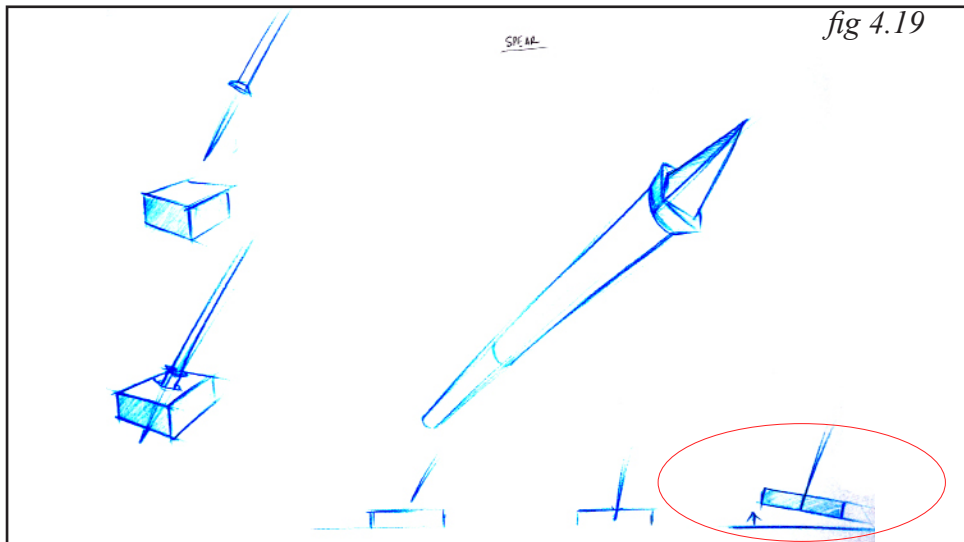
A pair of scissors was observed. It has a central pivot. The functionality is self-explanatory. Fig 4.17

4. User Study and Analysis



Ice clearing truck

Ice clearing vehicle is analogous to scooping of chutney with the dosa. The surface of the front part is almost in contact with the ground. The movement scoops up the contents on the way into the front scoop. Fig 4.18



Spear

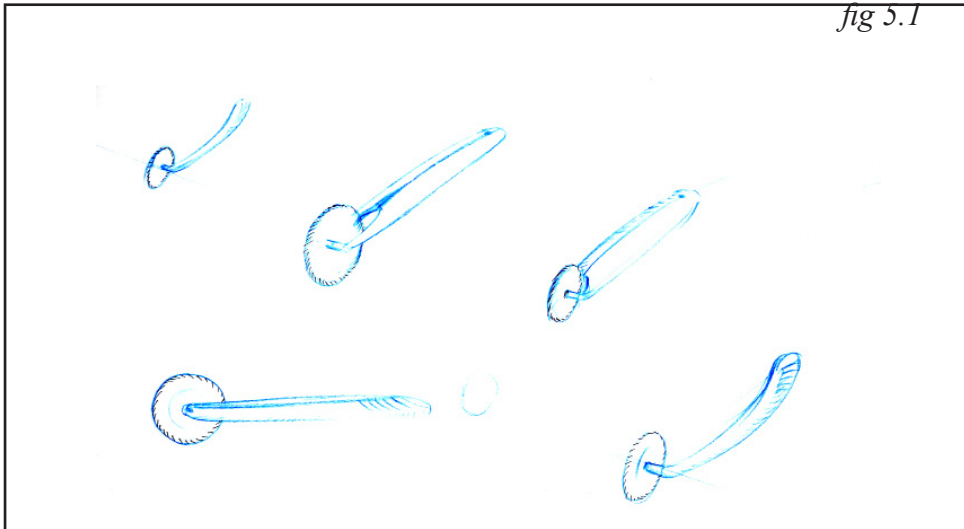
The spear is used to pierce objects and pick them up. For the spear to work, the object needs to be of a certain thickness (depending on the material) and needs to have less cross-sectional area. The pierced object is stuck to the edge of the spear. Removal is comparatively difficult. Fig 4.19

5. Ideation and Design

5.1 Ideation

The process of ideation was ongoing since the analysis stage. Instead of churning out random ideas and refining them later, a systematic method to get ideas was adopted. Based on the research that was done earlier on the essence of the tools, attempts were made to adopt them into a cutlery. In this stage, the action used was given the priority over practical application. The elimination would happen later.

fig 5.1

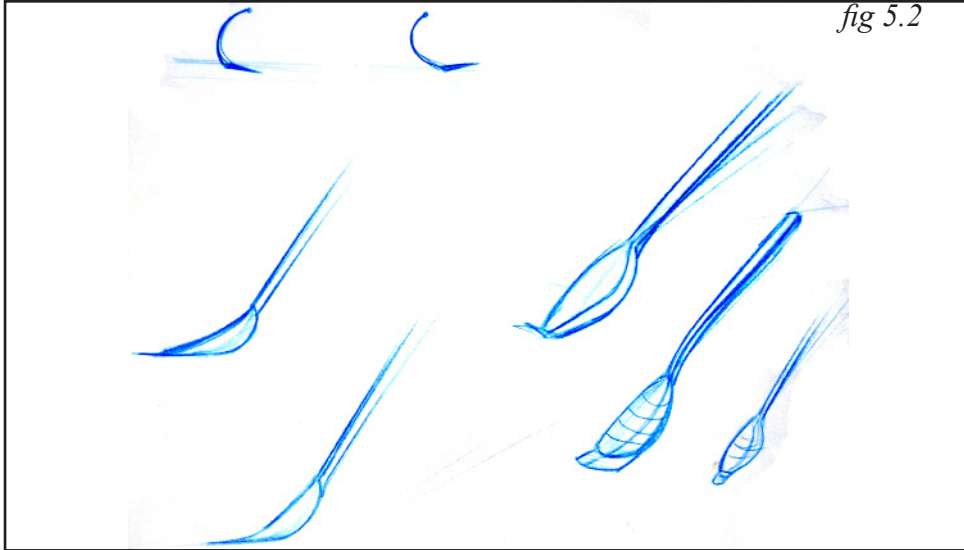


Pizza cutter

This idea is directly derived from the pizza cutter. The circular cutting edge was made smaller. The axle was attached to one arm. The other side was open. Fig 5.1

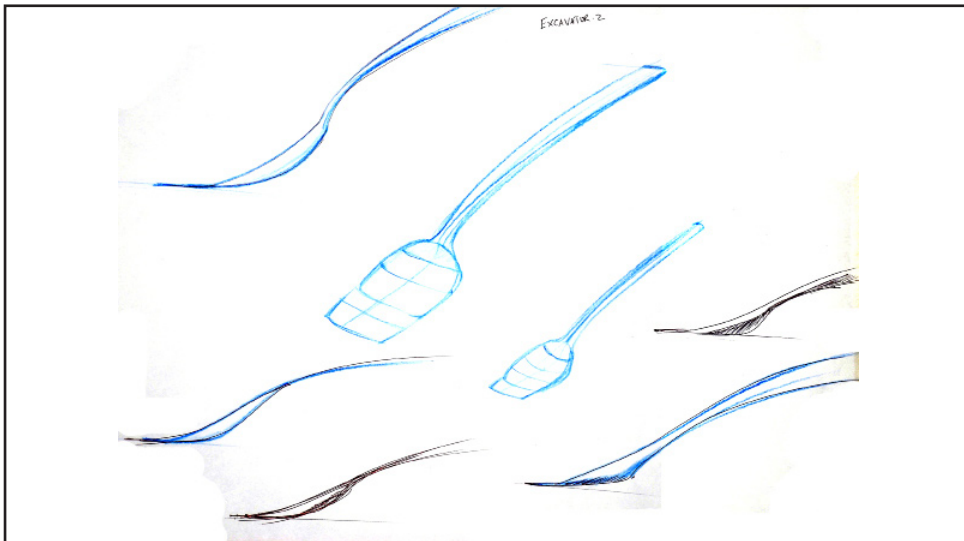
5. Ideation and Design

fig 5.2



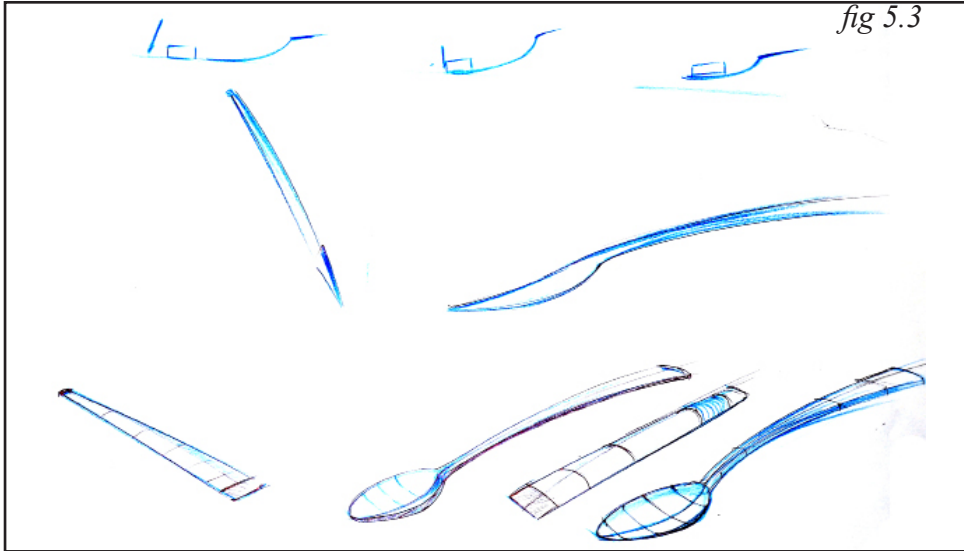
The excavator

The essence of the excavator's functionality was found out as the scooping action and the flat surface at the end, which is used to pierce the substrate. The curve helps in scooping. With these inputs a spoon was sketched with the specific scoop angle as shown in fig 5.2



5. Ideation and Design

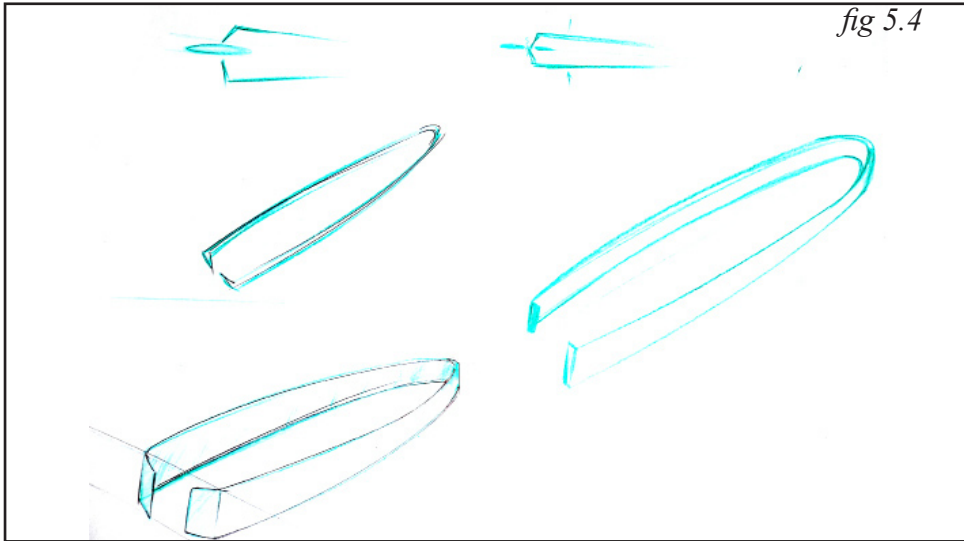
fig 5.3



The dustpan

The essence here was pushing the object onto the pan. This was analogous to pushing the food item onto the spoon. The idea here was to have a flat surface that contacts the plate and aids in the transfer. A secondary tool needs to be used to push the object onto the spoon. The sketch is shown in fig 5.3

fig 5.4

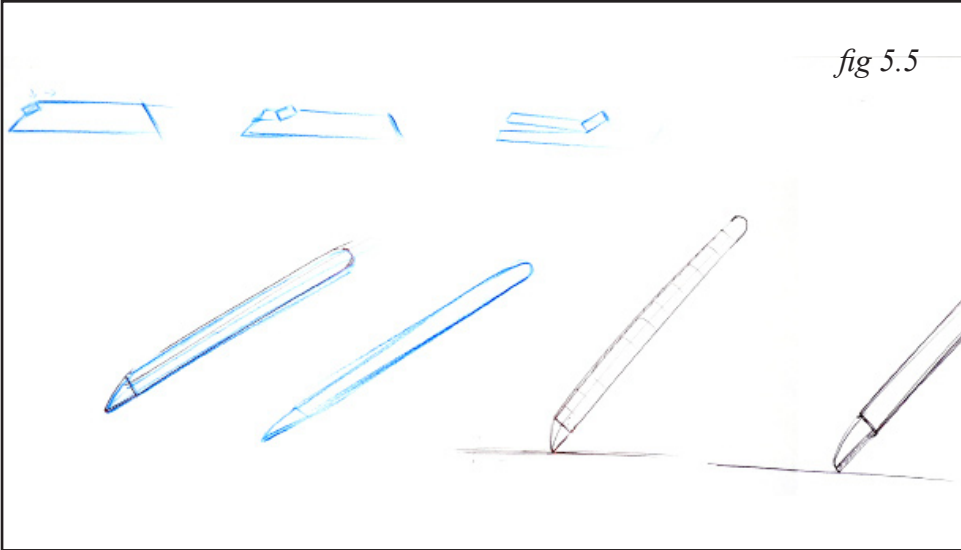


The nail cutter

Here the idea was rather a direct simulation of how the nail cutter works. The cutting edges are pointing inwards. The food item to be cut, is placed in between the cutting edges. This tool could be used to make series of cuts along the dosa to cut it into a desired shape. Fig 5.4

5. Ideation and Design

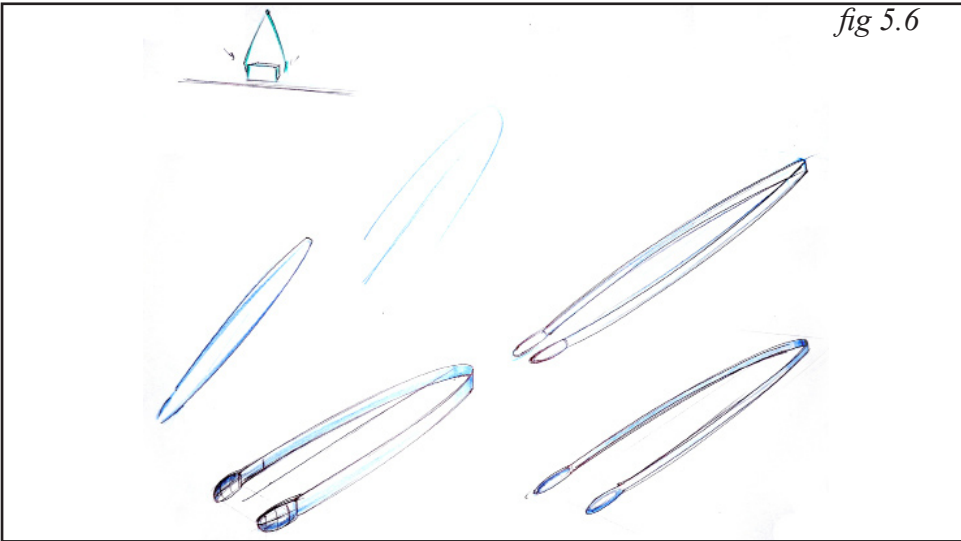
fig 5.5



The blade

The edge of the blade is used to cut the food item in the desired shape.
fig 5.5

fig 5.6



Tong

Here the tong was made to essentially pick up objects. A small spoon like depression was given on either hands of the tong to enable picking up of subzi etc. fig 5.6

5. Ideation and Design

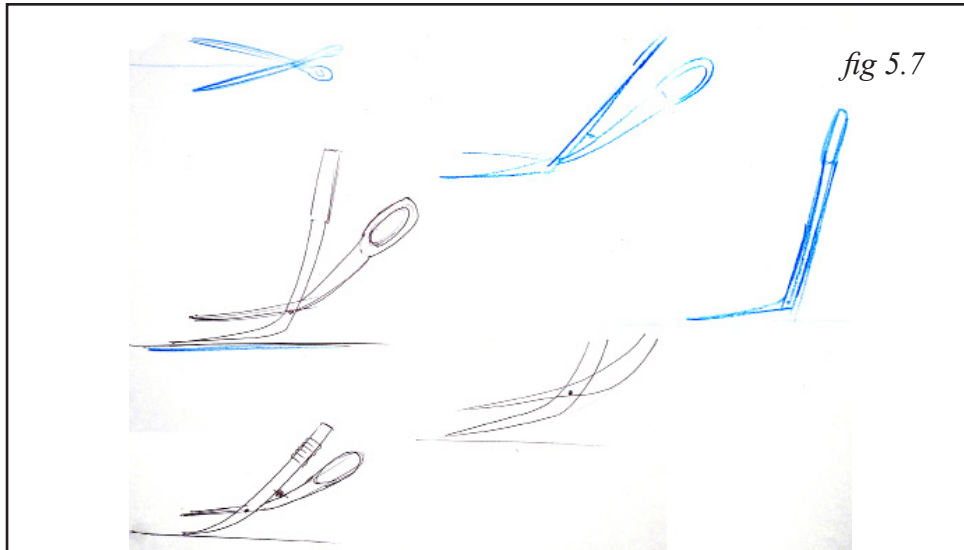


fig 5.7

Scissors

Here again, direct inspiration was taken from how the scissors works. One cutting edge was made parallel to the ground to enable the tool to enter the underside of the food item without having to lift it up. Fig 5.7

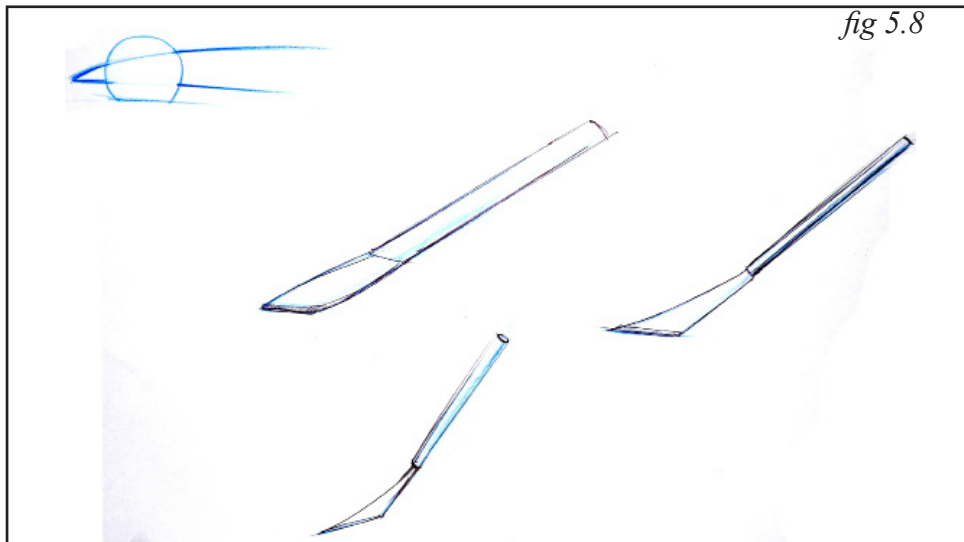
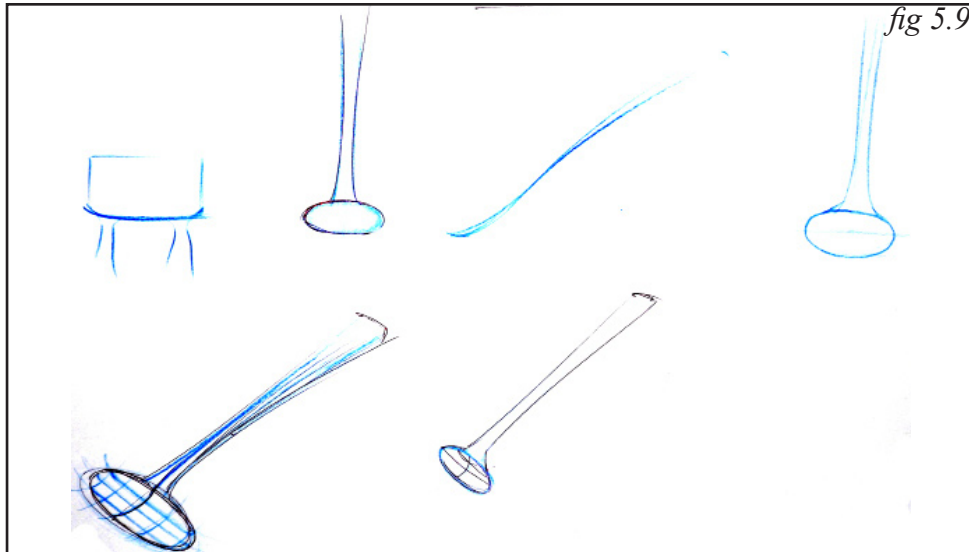


fig 5.8

Knife

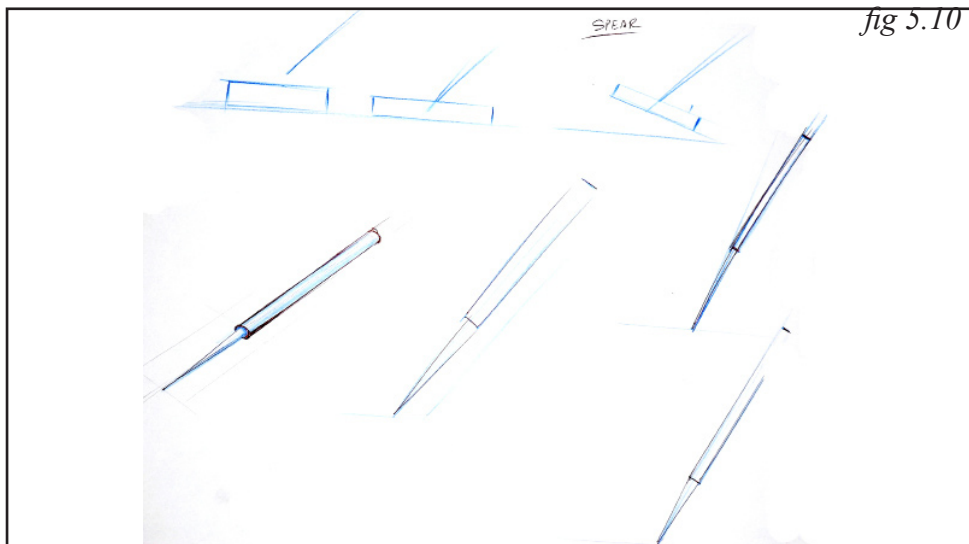
Based on the analysis of the knife, the sketch was made. The cutting edge was made at an angle so that applying pressure becomes easier. Fig 5.8

5. Ideation and Design



Ice clearing truck

The mouth was made wide so that the scooping action would happen more efficiently. Fig 5.9



Spear

This tool was essentially made to pick up objects by piercing action. It contained a long handle with a spear like end which could be used to pierce objects and pick them up. Fig 5.10

5. Ideation and Design

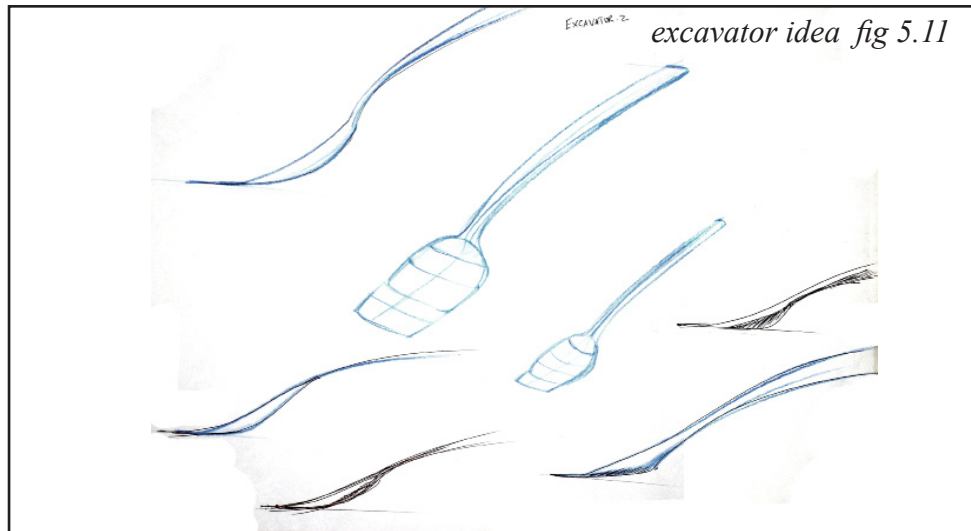
5.2 Functionality evaluation

The ideation phase resulted in many ideas which were dispersed in nature. Hence, it was decided to cluster them based on a criterion. The ideas were analyzed for the action it performs while acting on the food item. This criterion was chosen to be 'Actions' and the clusters were –

- Cutting action
- Piercing action
- Tearing action

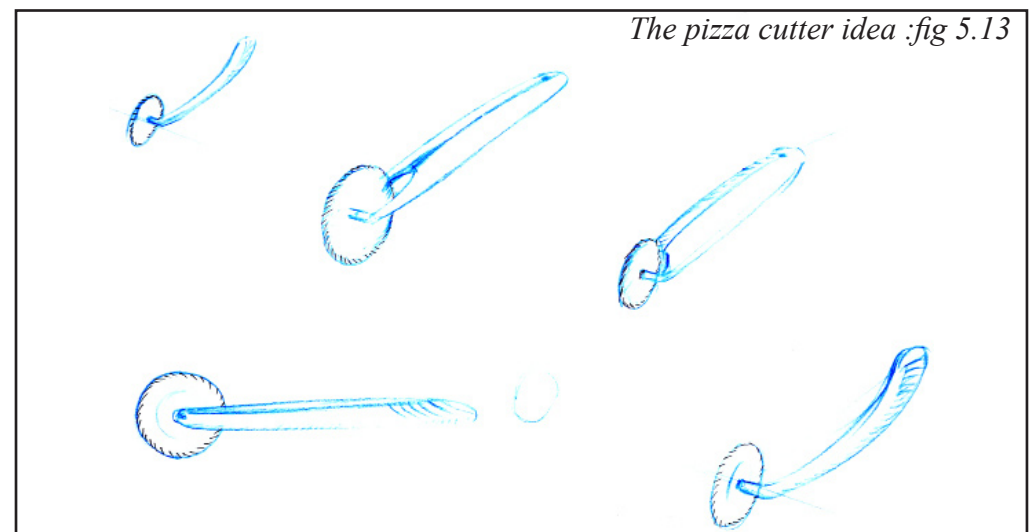
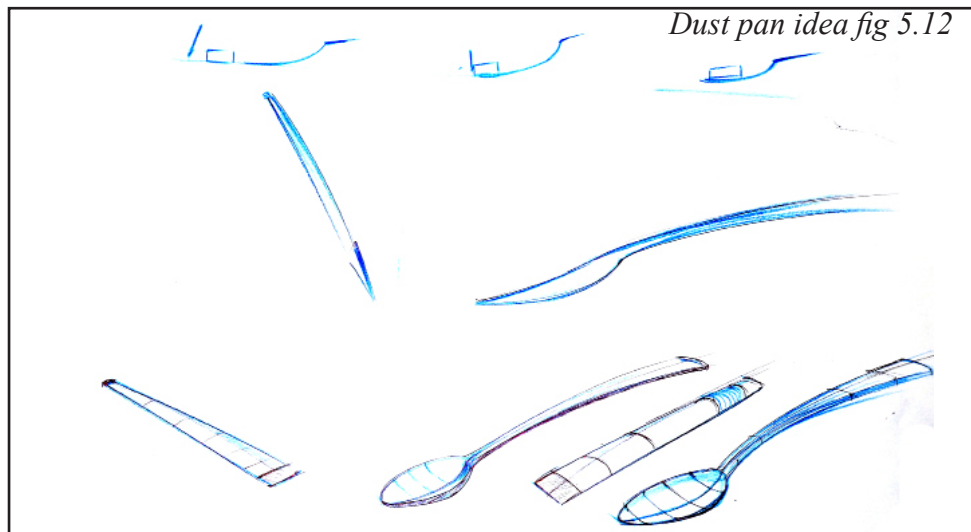
After this, mock ups would be made for each cluster and would be tested out with actual dosa. Based on different parameters, the functionality would be rated.

5. Ideation and Design



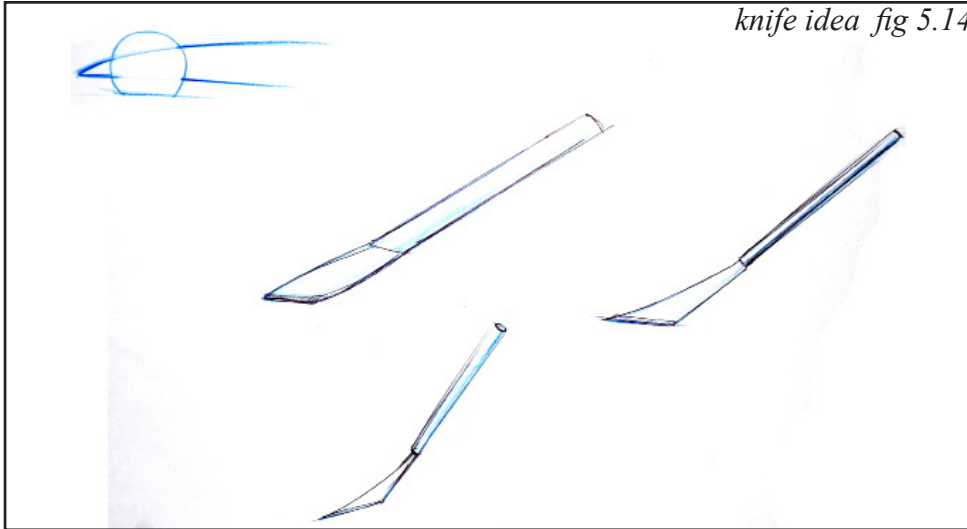
5.2.1 Cutting Action

In this cluster, the dosa was CUT with the edges of the tool. 'Cutting' is the action used for separating the dosa into smaller pieces. This was tried with different types of dosa and effectiveness was tested.



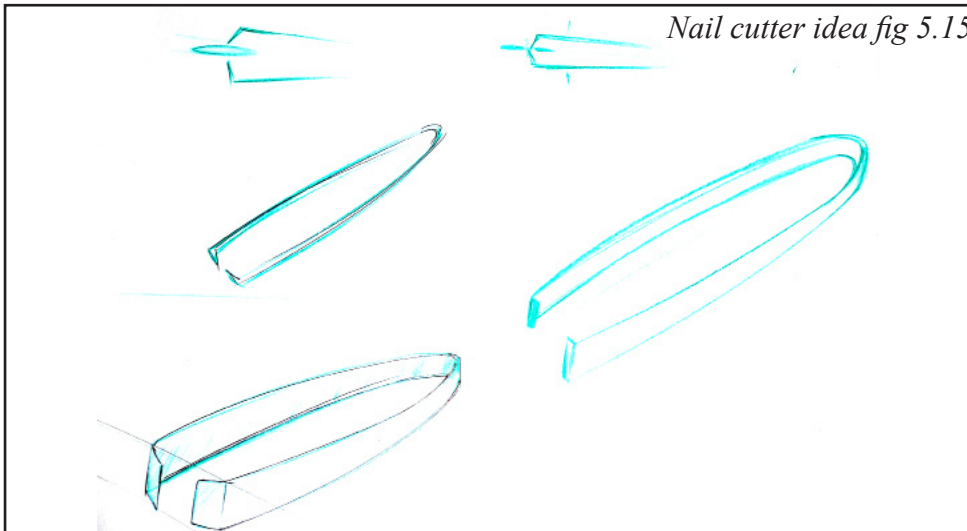
5. Ideation and Design

knife idea fig 5.14

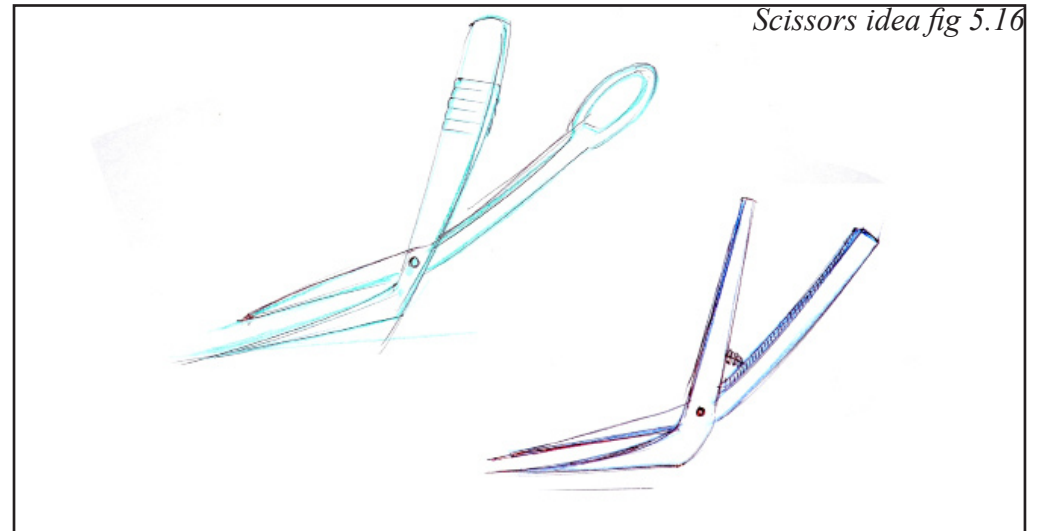


Remaining ideas of the 'cutting action' cluster are shown in the fig 5.14, fig 5.15 and fig 5.16.

Nail cutter idea fig 5.15



Scissors idea fig 5.16



5. Ideation and Design

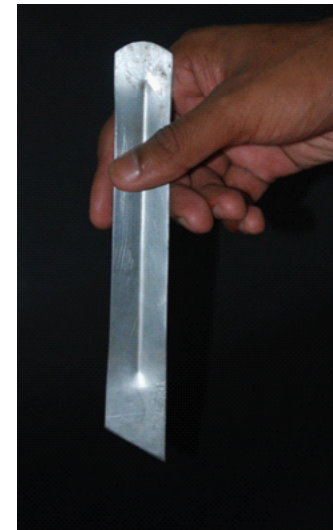
excavator Mock-up fig 5.17



Mock-ups: Cutting Action

Figure shows the Sheet metal mock-ups that were made to test out with dosas.

Knife Mock-up fig 5.18



nail-cutter fig 5.19

5. Ideation and Design



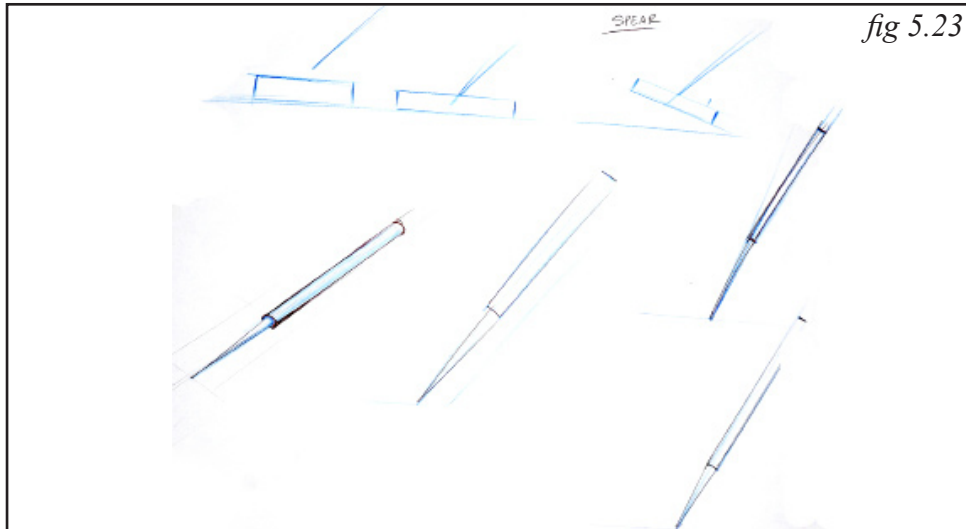
Mock-up testing:

Mock-ups were made for all significant ideas, with material carefully chosen to produce the desired effect. These were tested with different types of dosa.

It was observed that only thicker dosas work with this action. Thinner varieties do not get cut. The application, hence, is limited.



5. Ideation and Design



5.2.2 Piercing Action

Here, the Dosa was pierced to pick up from the plate. The sharp edge was used to pierce the dosa and take it to the mouth. Fig shows the sketches (fig 5.23) and the mock-ups made for piercing action fig 5.24 and fig 5.25.



5. Ideation and Design



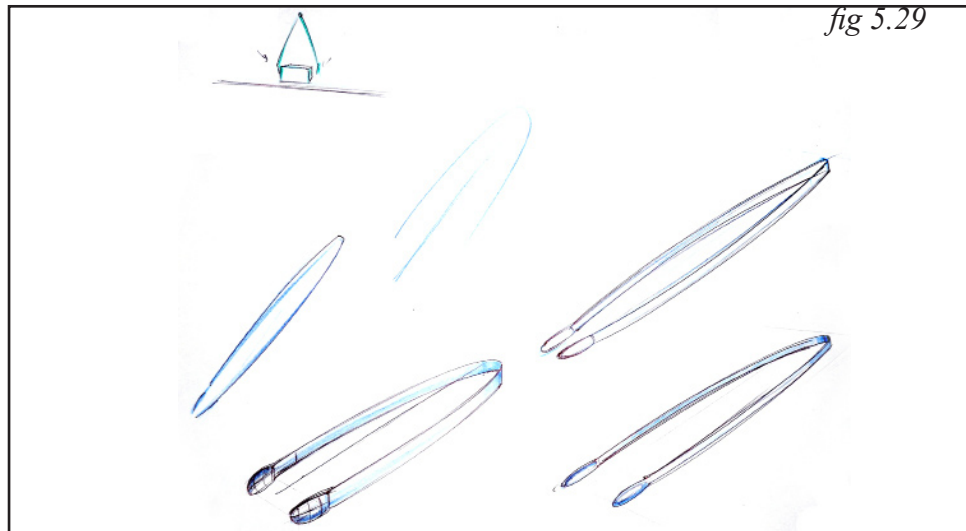
Mock-up testing:

Mock-ups were made for all significant ideas, with material carefully chosen to produce the desired effect. These were tested with different types of dosa.

It was observed that this action too, works with thicker variants of dosas.

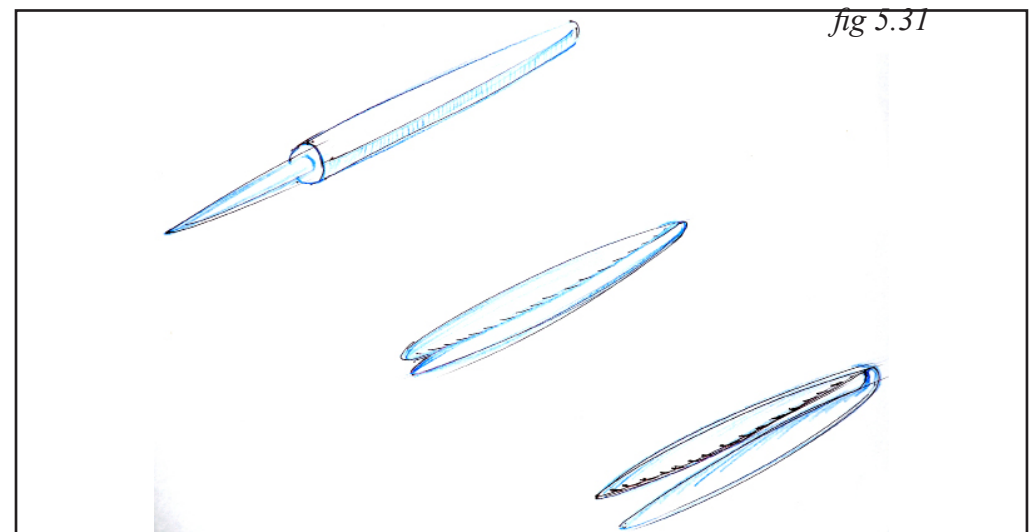
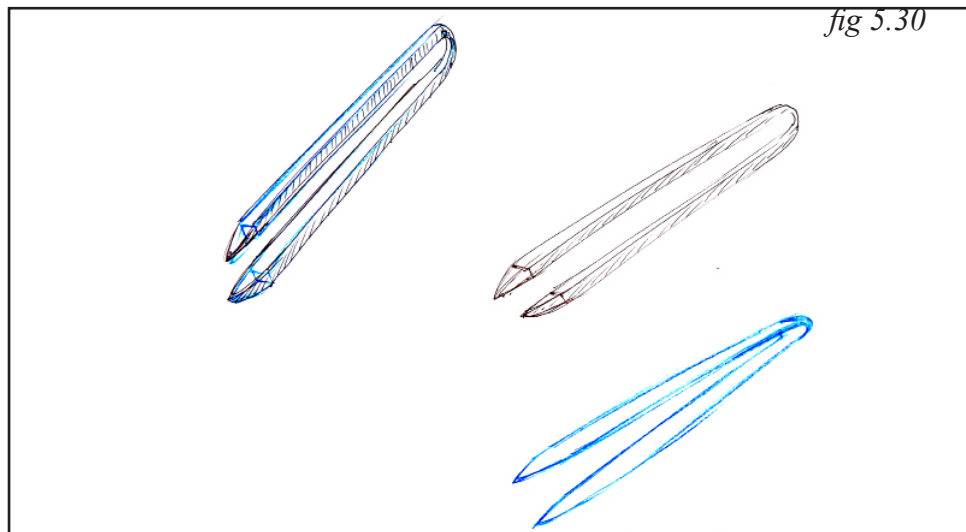


5. Ideation and Design



5.2.3 Tearing action

The dosa is torn into smaller pieces with tearing action. The part of dosa to be removed is held with the tool and is pulled and torn into smaller pieces. The Clustering is shown in the figure.



5. Ideation and Design



Tearing Action: Mock-ups

Mock-ups were made for all significant ideas, with material carefully chosen to produce the desired effect. These were tested with different types of dosa.



5. Ideation and Design



fig 5.34

Mock-up testing:

Mock-ups were made for all significant ideas, with material carefully chosen to produce the desired effect. These were tested with different types of dosa.

It was observed that more variants of dosa work with this action.



fig 5.35



fig 5.36

5. Ideation and Design

5.3 Test Ratings

Test Rating parameters

After testing of mock-ups was complete, each action was rated based on the following parameters.

1. Usage (cleanability, stackability, ease of use)

When the cutlery is used in hotels, it should be in such a way that it could be cleaned easily with little scope for accumulation of dirt etc. So, the surfaces have to be pretty simple. Also, it is better if it is stackable. The way the user uses the cutlery should be simple with minimum number of actions in eating the food/dipping in sambhar/taking masala.

2. Types of dosas it works with (TOD)

There are different types of dosas – sada dosa, Masala Dosa, Uthappam, Paper Roast, Rava Dosa.

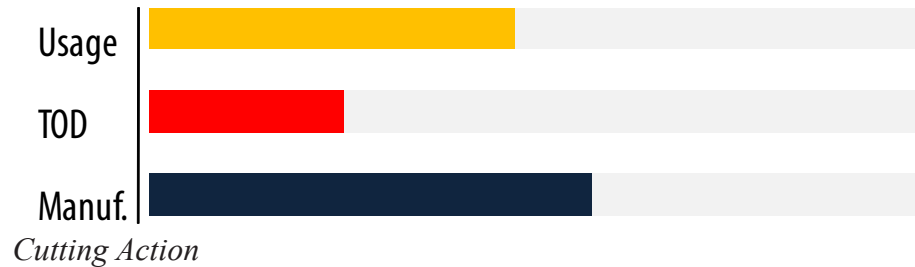
The cutlery should work for most of the dosa items.

3. Manufacturing

The basic criterion is that, the surfaces should be simple.

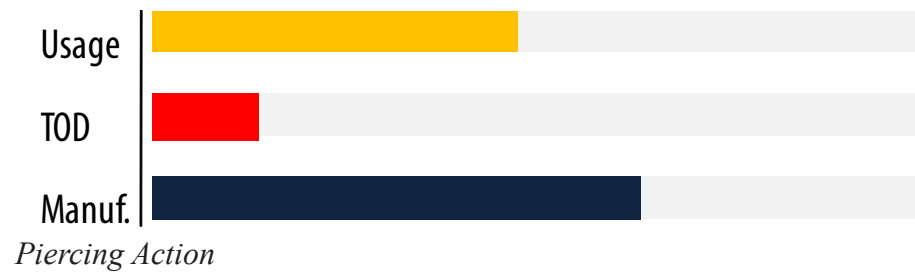
The overall performance of each Action was considered rather than the individual mock-ups. The eating action was rated on the above parameters and not the individual mock-ups.

5. Ideation and Design



Cutting Action

The ratings of cutting actions are shown in the graph. It was found that cutting works with only thicker dosas.



Piercing Action

The ratings of piercing action are shown. It did not have scope for wider application either.



Tearing Action

The ratings of tearing action are shown. This action is what we utilize for eating dosas with hand, and that maybe the reason for its higher rating.

Conclusion: Based on these results, the tearing action was chosen to be taken forward. The tool that performs this action is the tong. This method was followed to just choose the action and not the complete idea itself.

5. Ideation and Design

5.4 Problem analysis

The immediate noticeable problems were listed down and were analyzed.

- Different hands for tearing and eating

Here left hand is used for tearing the dosa. The piece that is cut, is kept on top of the spoon which is on the right. Then, this is used for dipping in sambhar. Hence the number of processes done to consume the dosa is four.

- No convenient way to take masala

It was really difficult to fill the insides of the dosa with masala. Presently, the masala was just placed on the spoon. There was no convenient way.

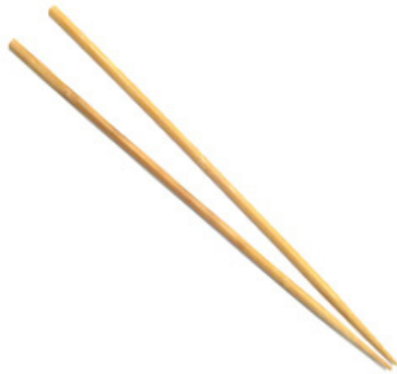
- Ergonomics

The hand bends too much to take the food comfortably. This is another issue to be addressed.

5. Ideation and Design

5.5 Solutions

To minimize the number of steps and to increase convenience while eating, the tearing of the dosa and taking the torn piece into the mouth must be achieved by the same tool. Both these processes should be done with the same hand. For achieving this, chopsticks were analyzed.



The chopsticks are used to feed the food into the mouth. If the orientation of chopsticks is observed, the two sticks are parallel to the mouth. The lips close and the food is taken in. This needs to be implemented in the tong so that tearing and eating can be done with one hand.

Ergonomics

Wire models were made to try out the ease of eating action.

Also, the cross-section of the ends was modified to go with the way one would eat off chopsticks. It is in the form of “D”. The curve part is what will be in contact with the lips. The straight part is the part which holds the food in the tong.

5. Ideation and Design



fig 5.37

5.6 Implementation of solution

The solutions were implemented on a mock-up model. Simple angles were given for giving the ergonomic hold. These mock-ups were tested with dosas as shown.

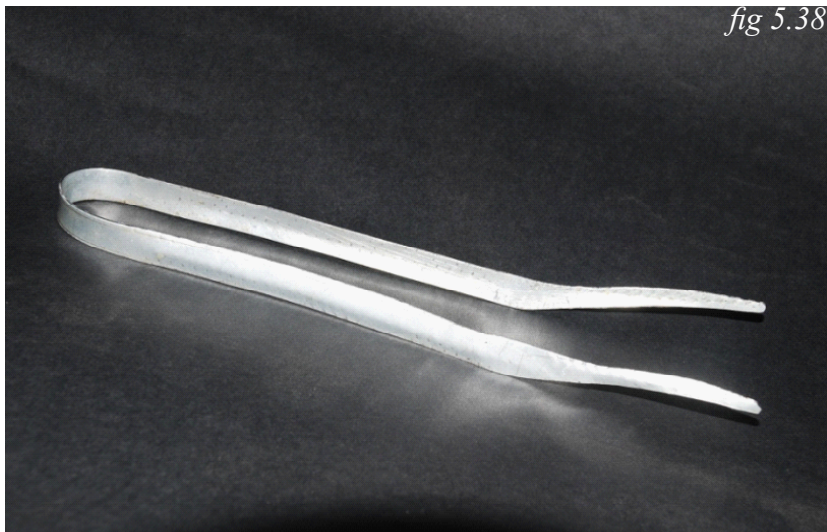


fig 5.38



fig 5.39

5. Ideation and Design



fig 5.40

Testing results

It was found that eating dosa required lesser steps as the same hand was used for tearing and eating. The masala could be stuffed into the dosa as shown in the fig 5.41. Hence the functionality of the cutlery was fixed, but on the whole, the concept did not have a cutlery feel to it. Hence, a semantic analysis was carried out.



fig 5.41



fig 5.42

6. Semantic study of cutlery



fig 6.2



fig 6.1



6.1 Semantic analysis

The analysis was carried to find out what makes cutlery look like cutlery, as opposed to other items of the same material. The cutlery was studied for its finish, the form and the overall visual language. The relationship between the pieces of cutlery within the set was also studied.



fig 6.3

6. Semantic study of cutlery



fig 6.4



6.2 Results of Semantic study

- Clear demarcation between where the hand goes and the part in contact with food
- The shape of the demarcation is also different as compared to geometrical demarcation in other items
- Glossy finish in stainless steel.
- The items of the cutlery belong to a family. All the items of the same cutlery set have an identity that makes it part of a visual family.

Based on these results, the above mentioned aspects were applied to the output of the 'Ideation and design' stage (page 48).

7. Concept Rendering

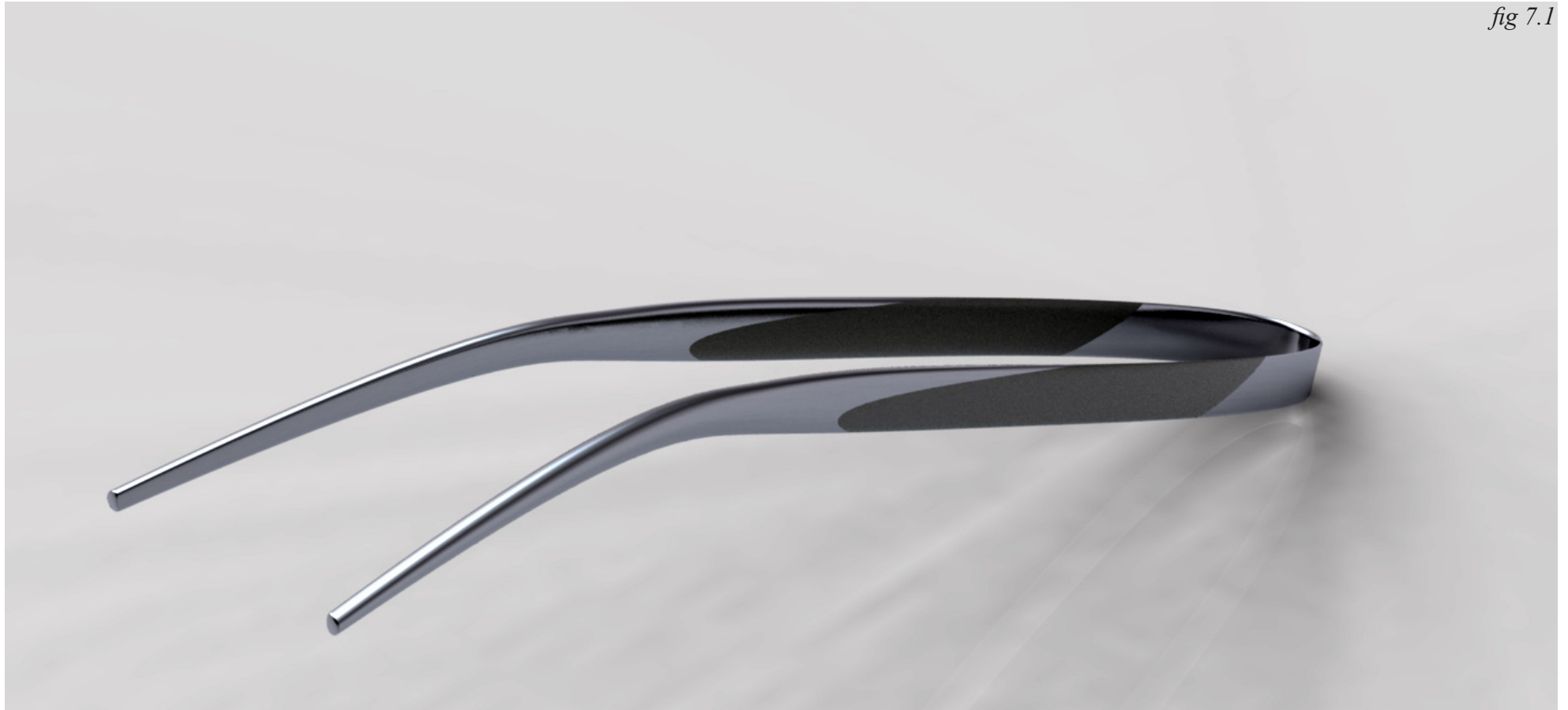


fig 7.1

7. Concept Rendering

fig 7.2



fig 7.3



Design Features

The most prominent feature of the design is its simplicity. The surfaces and the form are as simple as they get. This makes it extremely elegant and graceful for use in upscale restaurants. This would complement the silverware that is utilized extensively in such places. The fig 7.2 shows the side orthographic view. The bend in the neck is essentially for ergonomics. It also enhances the cutlery feel and makes the side profile look more like a bend in the fork.

The formal simplicity caters to the fact that cleaning becomes very simple. There are no places on the surface, no crevices, that might act as dirt traps. This would take care of the hygiene aspect.

The fig 7.3 shows the top view; open mouth is seen which joins when pressed. The shape aids in stacking sets one into the other, which saves critical storage space in restaurants.

7. Concept Rendering



The fig 7.4 shows the section of the front part, shaped like “D”. This is one of the most important design features that makes this cutlery work. The insides which are flat, hold the dosa when held together and the curved outsides comes in contact with the lips.

Hence this concept is a perfect example of “form follows function”.

8. Final Model



fig 8.1

8. Final Model

fig 8.2



fig 8.4



fig 8.3



fig 8.5



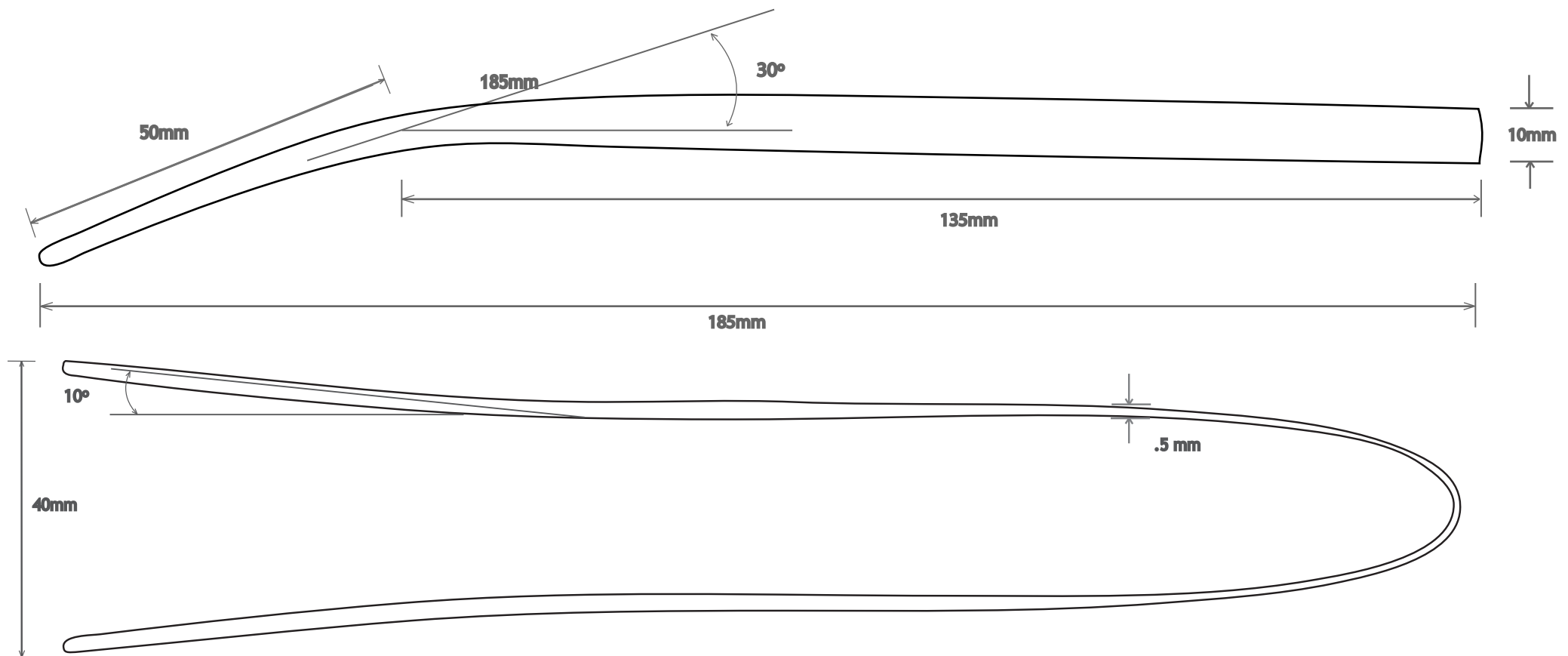
8. Final Model



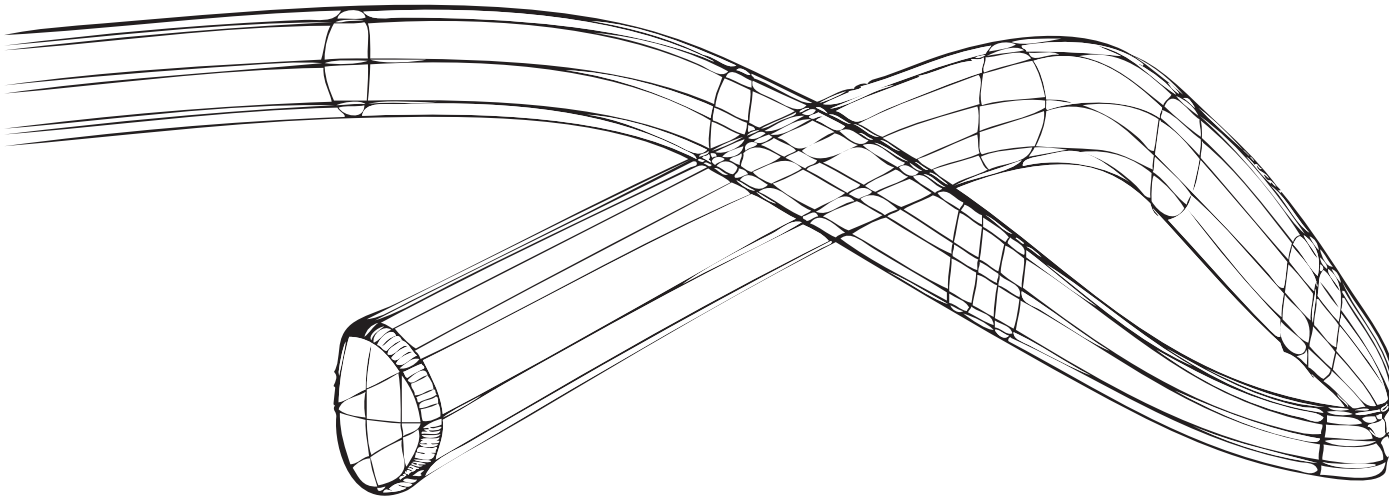
Fig 8.1 thru fig 8.5 shows the model of the cutlery in various angles. Fig 8.6 and fig 8.7 shows the stainless steel model developed for testing the working.



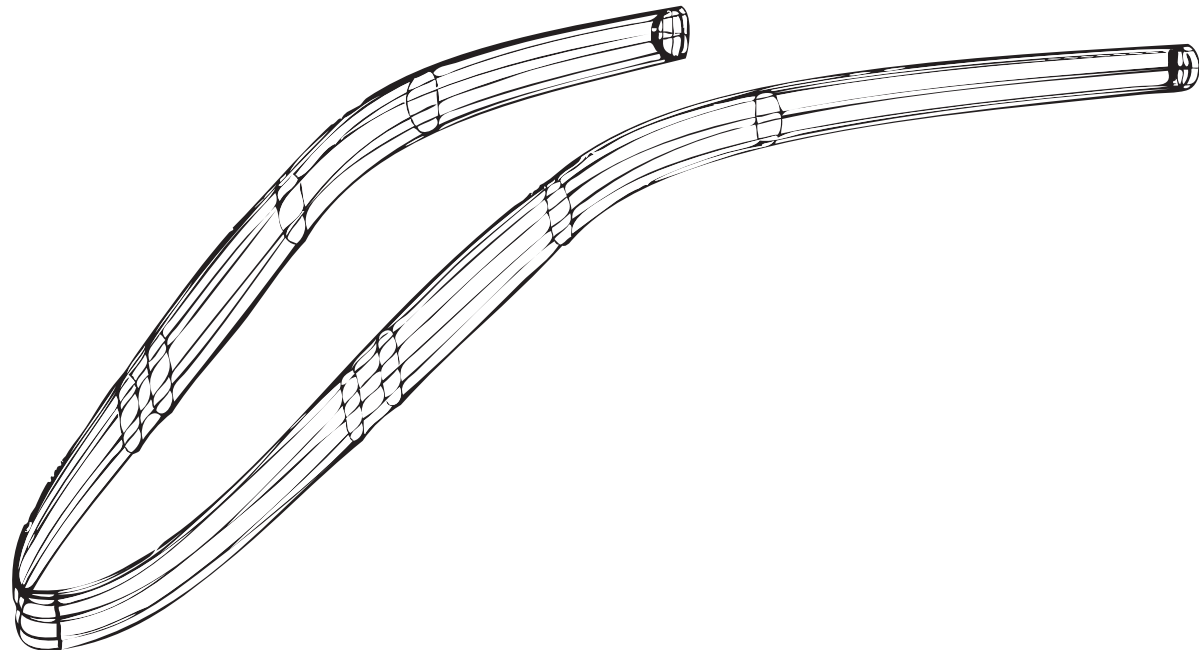
8. Final Model



8. Final Model



Material : Food grade stainless steel



9. Conclusion

This project is just a small step towards designing a cutlery for Indian Cuisine. Indian cuisine by itself is too vast, and so, cutlery that would satisfy all the requirements is virtually impossible. In the future, a set of three or four items of cutlery should be designed or 'invented', that would meet almost all the needs of Indian cuisine.

The demand for Indian food abroad is constantly on the rise. Having cutlery with an Indian touch to it, will go a long way in making Indian Cuisine popular internationally.

10. References

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