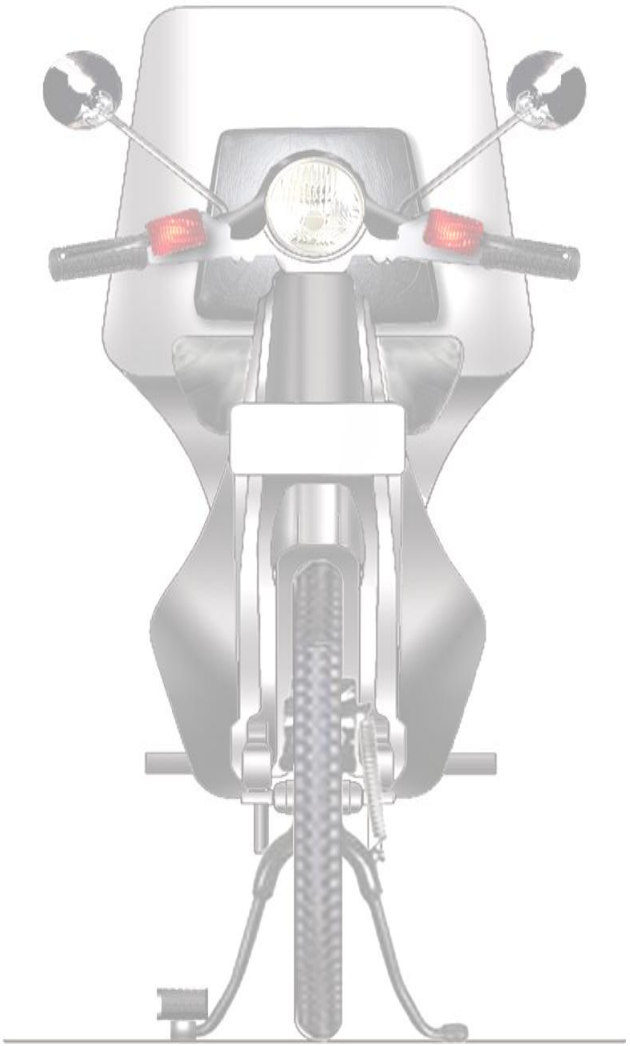
Redesign of a two-wheeler for fast food delivery

Industrial Design Project -2

IDC

IIT-Bombay



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INTRODUCTION

In today's context, most people have adapted to the habit of ordering for food from restaurants and fast-food eateries, not wanting to disturb their busy work schedules.

The business in fast-food deliveries has increased for this very reason.

The project looks at the area of developing an easy solution for delivery men employing two-wheelers to wean through traffic.

Interactions of the user with the vehicle and the delivery box are addressed to create a more efficient system.

DESIGN NEED

Prime drive behind Fast-food delivery service

Increasing the number of "orders"

+

Retaining the **freshness** of the food within the **time limit**

DESIGN SCOPE

The scope of the project lies in increasing the business for the fast-food joints, with providing an economical and efficient delivery system and extrapolating the design to be used by any restaurant other than the fast-food delivery sector also.

TARGETED DESIGN AREAS

Modifying the existing chassis for more efficient delivery system

Redesigning the delivery box to make the user interaction easier

Creating a visual identity for the fast-food delivery joints

DESIGN BRIEF

1) DELIVERY VEHICLE

•Designing a two-wheeler delivery vehicle which is easy to drive in **traffic jam situations**

•The vehicle should be **easy to maintain** and economical **(fuel efficiency, servicing**, etc) considering that the service provided is free of charge.

•The user age group is **24 - 40 years**.

•Additional **attachments should be easily replaceable** to cater to the change in users and their requirements from time to time.

•For want of avoiding accidents, the vehicle should not be allowed to cross a **speed limit of 60 km/hr**

•Weight carrying capacity of **100 kg.**

•Vehicles should be **easily put on / off stand** to cut down delivery time, furthermore, the option of a **self-start** should be provided.

•Creating a **visual identity** on the vehicle body and box for reflecting the image of the restaurant as well as **drawing visual attention** and **promoting the fast-food delivery service.**

DESIGN BRIEF

2) DELIVERY BOX

•The box should be **light-weight** (not more than 15 kg) to **facilitate portability** in case of break-down scenarios

•The box should **retain the heat** to enable fresh, hot-food delivery service.

•The material of construction should be **food-grade** and **corrosion resistant.**

•Surfaces should be provided for carrying the **company logo and visual identity graphics**.

•The box should be **impact-resistant** and **shock-absorbent**, in case of accidents or moving over speed breakers at high speed.

•The box should give a **hint of the content** carried within.

•The overall width of the delivery box should **not be more than 52cm**, keeping in mind the biggest size of the pizza delivered.

•The box should be **easy to maintain and operate**.

SCENARIOS – THINKING ABOUT THE PRODUCT'S POTENTIAL

Traffic jam scenarios cause delays in delivery time – *making the vehicle maneuverability higher*

Miscommunication in providing addresses – *communication systems fitted to the vehicle*

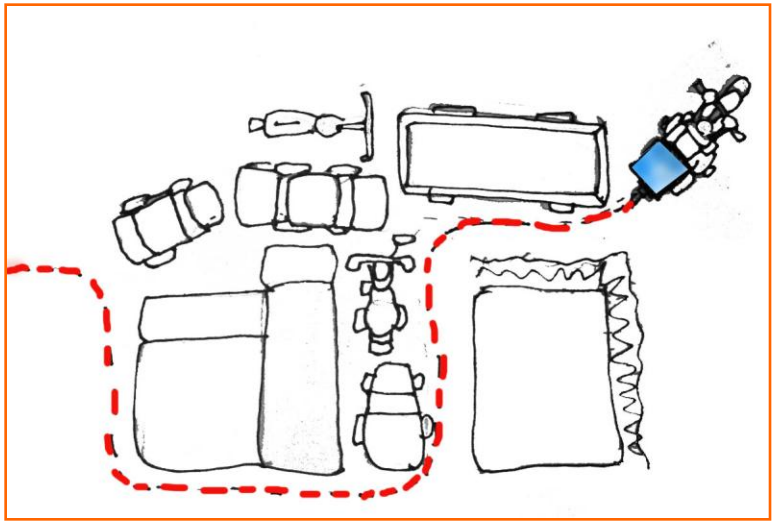
Fake orders at the main fast food center – *Confirming orders before delivery by phone*

Long distance deliveries to be met within the given time limit – *optimum speed to be reached with better fuel efficiency*

Parking issues and putting the vehicle on stand – *compact vehicle that can fit into tight spaces*

Running out of petrol, breaks down during journey hours – *easy maintenance and economically feasible options*

Lack of man-power on service routes leads to loss in business – *providing maximum comfort to engage potential users*



EXISTING VEHICLES – BENCHMARKING

EXISTING FOOD PACKAGING

Existing pizza boxes – corrugated board

Stiff card containers

Plastic disposable plates

Aluminium catering trays

EXISTING FOOD PACKAGING

Box Size (in or cm)		Paper Type	Fluting	Printing
7 "	17.8	White - white kraft White - brown kraft Brown - brown kraft	E	Flexo
8 "	20.4			
9 "	22.9			
10 "	25.5			
11 "	28.0			
12 "	30.5			
14 "	35.6			
15 "	28.2			
16 "	40.7			
Others upon request				

Delivery hot bags

The insulated hot bags are employed for maintaining the heat in the bag

The bags are made of vinyl with cotton insulation

Bags are kept for charging at least for 15 minutes, before the delivery

CASE STUDY AND ANALYISIS

Harish ,Powai
Sujata Palace
Navjivan ,galleria, Hiranandani

Dominos :	CT 100
Pizza hut :	Bajaj chetak
Mc Donald's:	kinetic dx

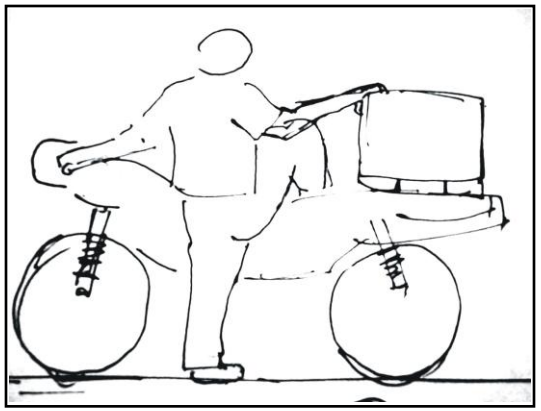
ACTIVITY TIME LINE

LOADING TIME	DRIVING TIME	UNLOADING	DELIVERY TIME	POST DELIVERY TIME
90 seconds to 2 minutes	10 to 18 minutes	60 to 90 seconds	Minimum to 30 seconds to 5 minutes	5 to 20 minutes

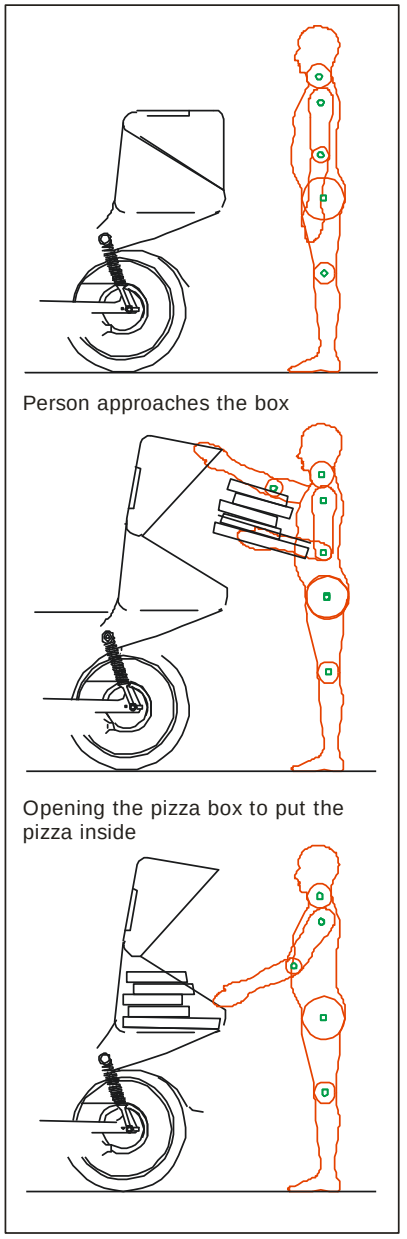
Identification of Issues related to the vehicle and the box from the case studies

Issues during various activities

Loading



Opening of the box	difficult task to open the box with having a lot of pizza in his hand
Putting pizza in the box	he has to hold the cover while putting the pizza inside the box
Getting on to the bike	step in and step out



Driving

Rough driving	very rough driving cause of the time limit which causes serious accidents sometimes .as there is a very limited timing for the delivery, delivery men doesn't speed down and so the box behind becomes loose from the contact area
He stands on some raised platform	to balance
Gate passing	he has to get off from the bike and open the box to show it to the gate man what is inside .

Post delivery

Getting on to the bike

Putting empty bag into the box

he doesn't lock the box

Gate passing

gateman checks the box .keeps it open and so the cover of the box keep banging and becomes loose point .

at the hinge

Advantages

Good speed

Shock absorbency is good

Comparatively good average

Comparatively good for long distance driving

Good for zooming from the traffic

The height of the box is good enough to get the pizza out

Disadvantages

Getting off from the vehicle is

Putting on the stand is problem

Costlier for few pizza delivery joints

Advantages

Easy to get in and out from the vehicle

Enough leg space

Front space is empty extra stuff can be put in front

Front body is wider which acts as a leg guard

Disadvantages

Pick up is not as good as bike

Shock absorbency are not good in rough drive

Lesser average

Filling up petrol he has to get off from the scooter

The height of the box is low so he has to bent himself to get the pizza out

Problem in swinging the steering

Putting on the stand is problem

Back pain after a long distance

Zooming from the traffic is not as easy as bike

Disadvantages

Filling up petrol he has to get off from the scooter

The height of the box is low so he has to bend himself to get the stuff out from the box

Not good shock absorbency

image

Advantages

One can not go higher then speed of 60 (to avoid hazards)

Easily getting in and out from the vehicle

Affordable for goods transport in villages and other places so applicable for wide number of users

Easy maintenance

Front body is wider so prevents getting it dirty from the mud

Slim and light weight body

Zooming into traffic is easy

Indian road

The assessment is done on basis of few points like :

The vehicle should have good pick up.
It has to be easy to maintain.
It should be lighter in weight so that one can easily zoom through the traffic.
It has to be in affordable prize including the modifications .
It should be easy to in grace and e grace
It should be applicable for various size or profile of users.

cause of the quality of road and the limitation of time one drives the vehicle very roughly so it should have good shock absorbency .

It should reflect the image of respective fast food joint restaurant.

As per the results one can see Bajaj M-80 has more quality or possibilities of modification which can lead it to convert into a delivery vehicle.

So one has decided to modify Bajaj M-80 into a fast food delivery vehicle

Issues related to M-80

Pulling the vehicle to put it on the stand he holds it from the back side of the seat or from the front of the seat
..

Taller person leg remains out side and sometimes after a long drive he seats back
Which required longer seat

Enough space in front to get in and get out

Flat surface at the back easily removable seat to put the box

Space in the front to put extra stuff

Good shock absorbency can be introduced

Image 1

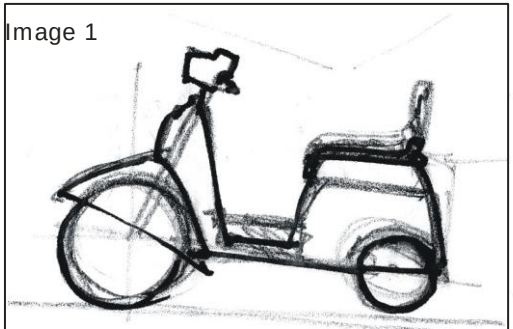


Image 2

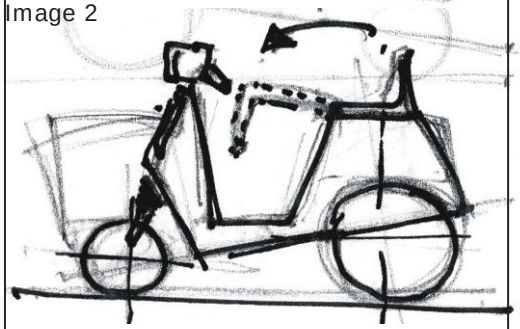


Image 3

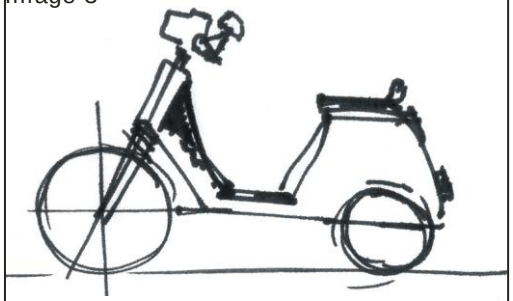


Image 4

The clusters are made in basis of the issues which are addressed before like:

Image 1 and 2 explains about stepping in to the bike,
Box carried behind becomes and obstruction to get on to the bike ,so trying to make it lower so one can easily get on to the bike.

As only one person is going to ride the vehicle ,so it can be a single seater with the provision of extra storage behind the vehicle.

More balanced as one does not need to put it on the stand

Image 5

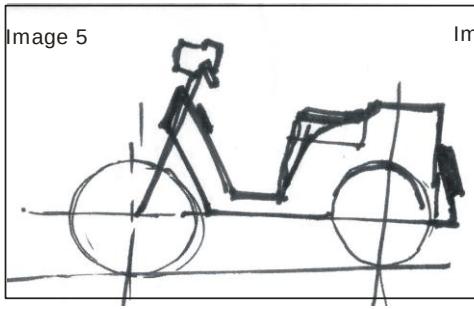


Image 6

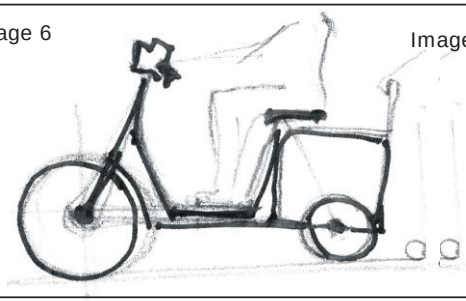
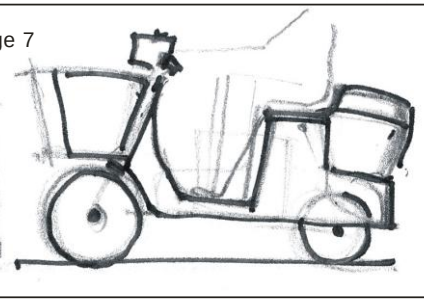
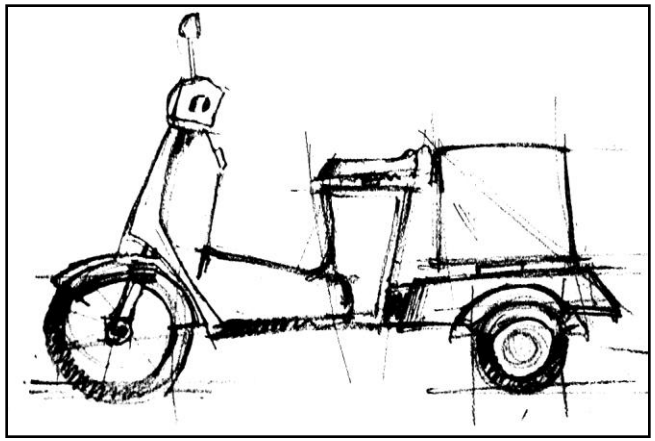
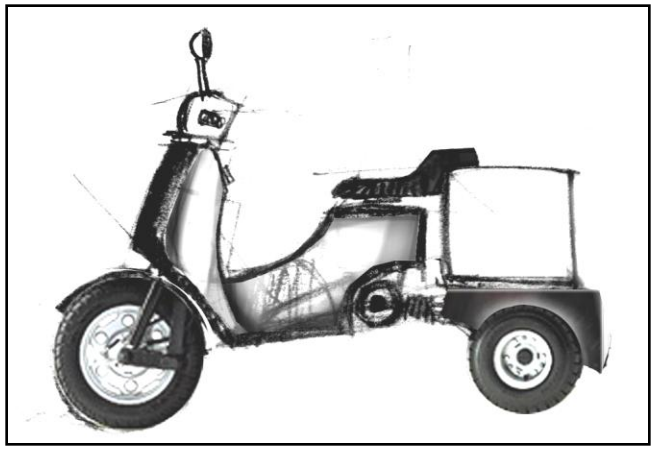
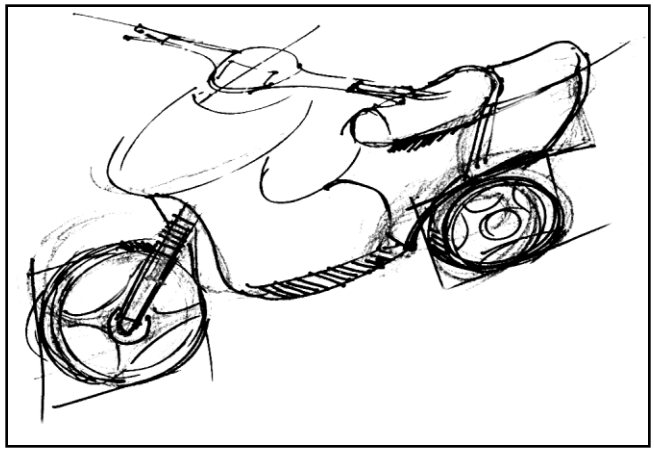


Image 7









Advantages

Three wheelers for better stability for heavy goods carrying.
Convertible for large number of people with provision of removing box one Can attach a seat for one more person.
Idea where to reduce the height of the box so that one can always swing His leg and get on to the bike .
The box can house more number of pizzas in quantity of 10

Disadvantages

Three wheelers are not easy to drive in turnings in a high speed.
Increasing a cost of the vehicle.
For a very rough driving three wheeler scooter has low resistance towards Shocks on the rough roads

Concept 1

rotate the steering without any obstruction

Raised seat from the back for comfort

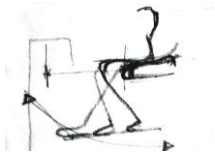
Enough room more than 400 for easily moving in and out

Occupies 4 more pizzas

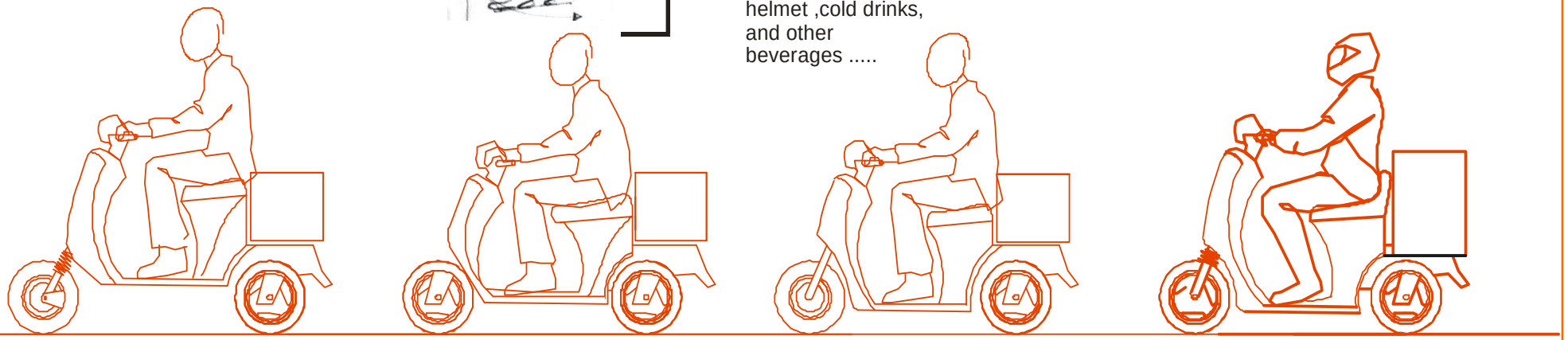
Lowering down the seat helps increasing quantity of pizzas in the box

According to R.T.O rules putting extra box on the bike asks for a tax

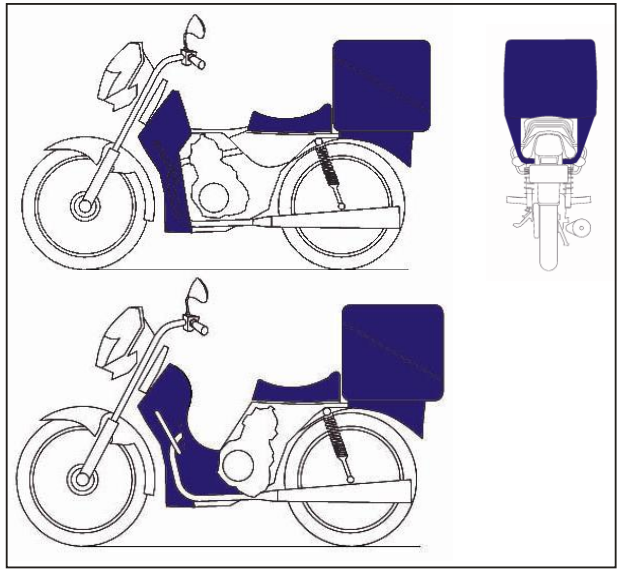
Enough leg space for various sizes of people for various position



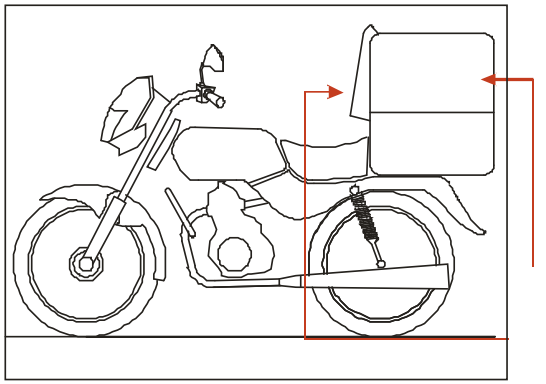
Possibility for providing extra spaces to put other artifacts like documents, tool kit, helmet ,cold drinks, and other beverages .....



Various styles and height of the steering and the seat inrespect to the user

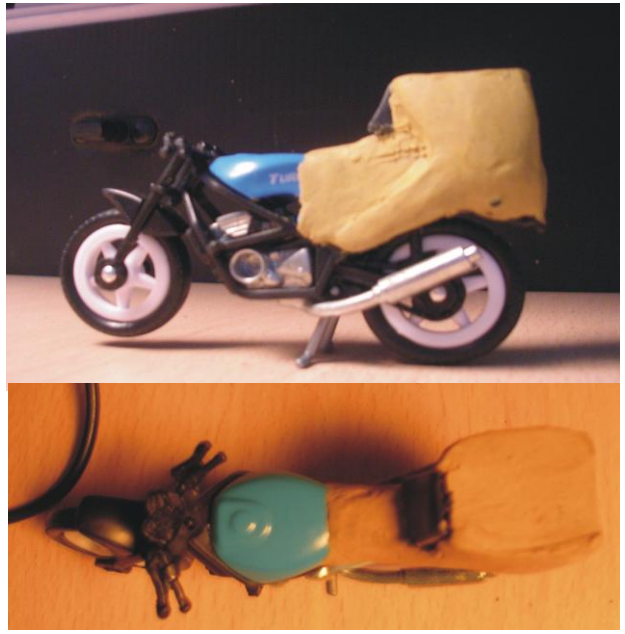


Effort was to provide some space in front for easily step in and step out

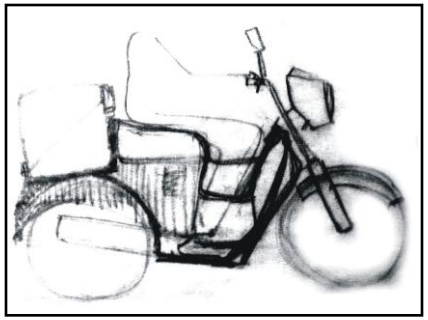


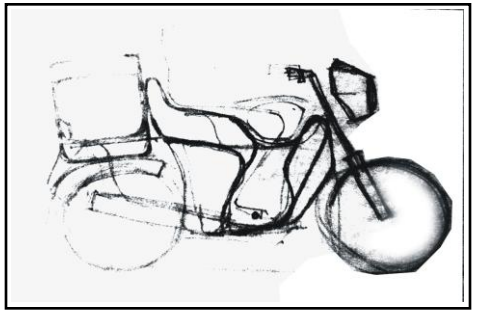
One is trying to focus on design solutions, where the box and the vehicle gives one identity

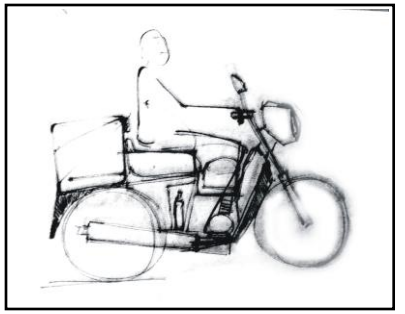
Concept 2



Sketches showing
Various possibilities of storage to put extra beverages and also to provide leg room for easily getting in and out of the vehicle

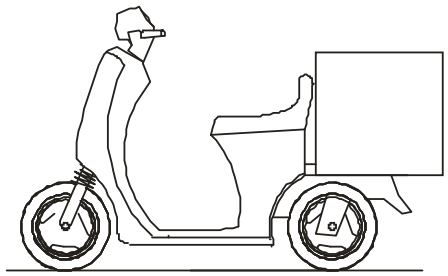




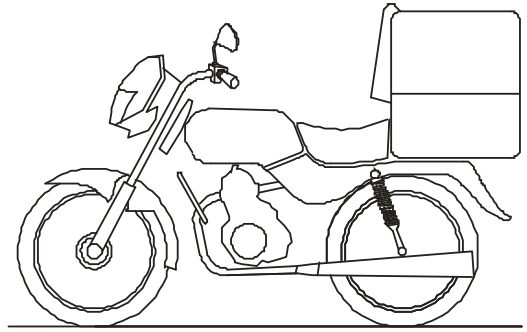


Concept evaluation

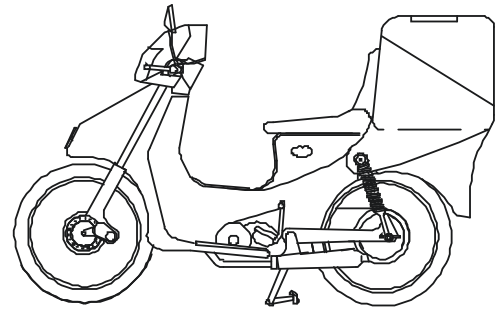
Three wheeler



Modifications on Ct100



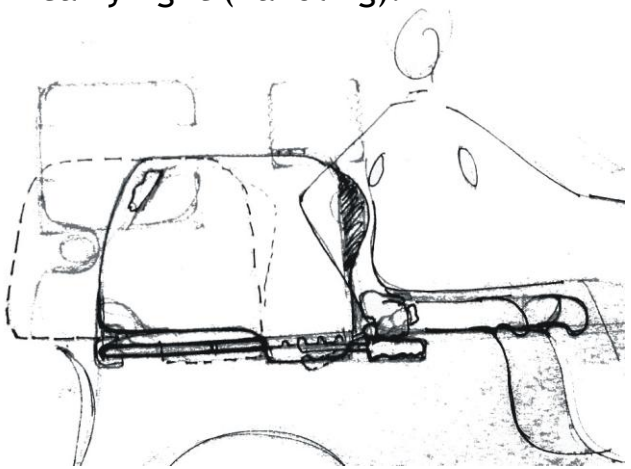
Modifications on M-80

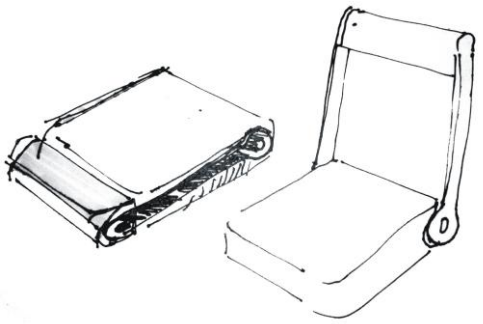


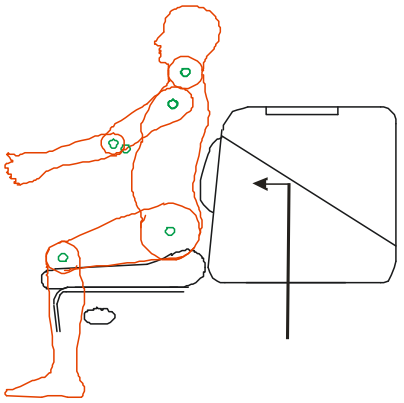
	Concept 1	Concept 2	Concept 3
Easily to step- in and out	* *		*
Storage capacity	*	*	* *
Economical			* *
Withstanding against rough driving		* *	* *
Easy to Zoom into traffic and turnings		* *	* *

As mentioned before maximum interactions happens with the box like;

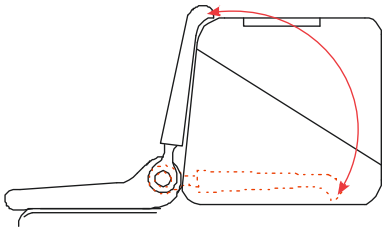
Opening of the box ,
Loading food inside the box ,
closing the box,
removing of the,
carrying it (handling).





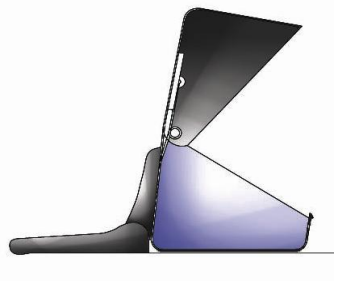


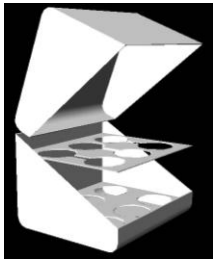
Back rest can be fold behind when box is not there ,so the back seat can be used for a person to sit



Push back seat where the back rest is attached behind the box

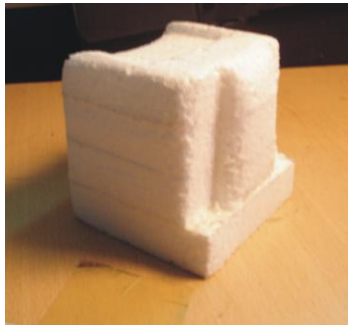
One can pull the lever and push the box at his comfort





The seat and the back rest are integral parts ,where the back rest can be fold in front

There is a torsion spring provided within the box which helps opening the cover by it self and there will be an adhesive which helps opening the cover slowly



Various ideas regarding the box

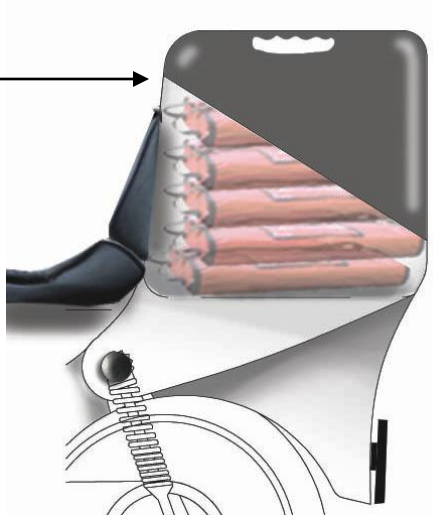
The back side of the box will have some cushioning will act as a shock absorber

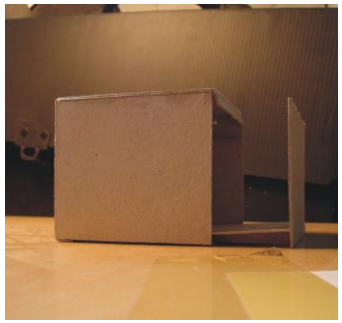
Idea of making it collapsible so that the height of the box can be reduced to half when there is not much of the food material inside

Image 4 explains about one of the way the box opens where one can remove the material from the box from both the side

Image shows the overall concept of the box where the bottom part of the box is kept visible so that one need not open the box to see what's inside

The box can be integral part of the main body of the vehicle such a way that it becomes part of the same language





To design the box one is trying to use an economical technology where here one has tried designing a box which is made of two main components cover and the base

And both the parts are being made using only one dye

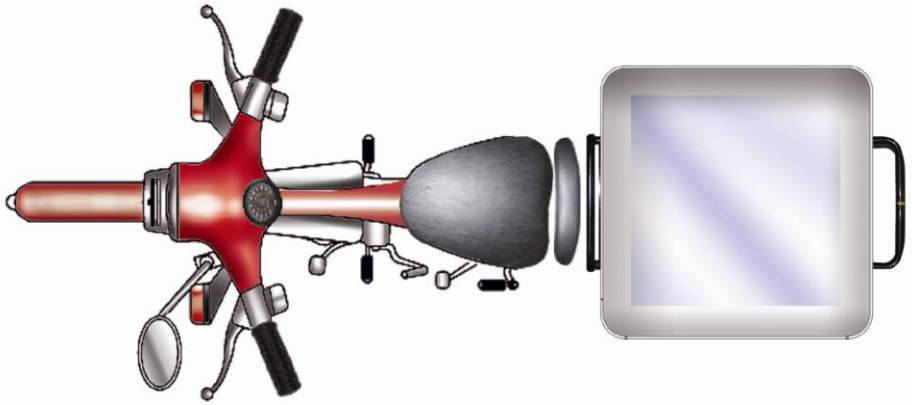
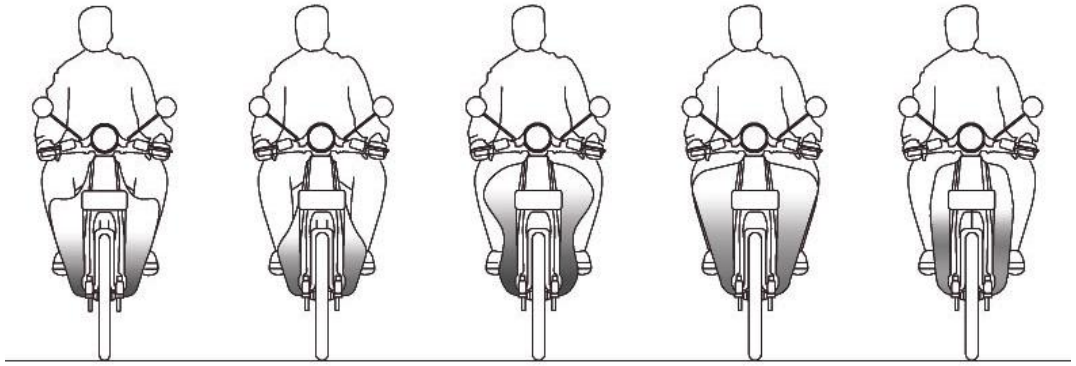


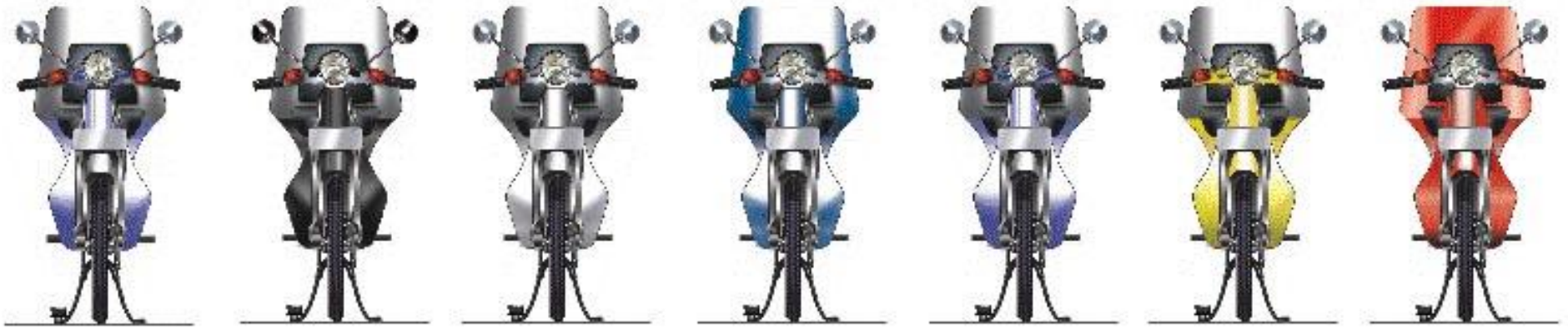
Image showing the top part having a transparent material (polycarbonate) so that one can just see what's inside without opening it .

Cam lock handle,

Heating rod to keep the air hot inside the box ..

Various possibilities of color combinations along with the box behind the vehicle





Examples

Pizza hut

Domino`s