

Re designing of a two wheeler for fast food delivery

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Product Design project II
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Approval Sheet

Industrial Design Project II titled

Re designing of a two wheeler for fast food delivery

By

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Is approved for the partial fulfillment of the requirements for the postgraduate degree of

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Abstract

The business in fast food delivery is increasing as people are ordering food to their places rather than going directly to the places. One more reason is to get ready food without disturbing their busy schedule.

The system in this whole delivery business includes the members of fast food restaurants like manager, cooks and delivery men come waiters.

The project is focusing mainly to understand the entire system and how vehicle used for delivery purpose affects the business .And so study includes the user (deliverymen)and his interactions with the vehicle .The solutions related to the problems he faces during the process of delivery and try to make it more efficient .

One is also trying to look at the manufacturing aspect of the vehicle and so trying to make the vehicle more universal for various kinds of deliveries purposes it increases the scope of mass production as the number of users are increased and so one can design a vehicle which is economical and so more number of people can use it .



Introduction

Those that specialize in the delivery of goods from point of sale to the consumer are known as delivery services.

The project deals with the purpose of food delivery ,food delivery as a business and how vehicle are involved in that business and issues related to delivery as a process one is trying to understand the entire chain of activities involved and trying to solve those issues which helps making that process easy and affective.

Delivery it self is a business to increase the numbers in orders. Certain food chain business runs more on home deliveries .and that's the reason why one expect a qualitative and economical vehicle to run their business. And so there is a need for a efficient vehicle for delivery purpose

Maximum home deliveries are done free of charge. And so it becomes really important for any food delivery restaurants or food joints to have a good quality of delivery..In terms of serving fresh food at the given particular time..

A number of variables that factor into the efficiency of food delivery include map knowledge, driving skills, route planning, the quality of the vehicle, and customer management on the part of the delivery-person.

[Http://www.copelandbc.gov.uk/main.asp?page=2370](http://www.copelandbc.gov.uk/main.asp?page=2370)

The project is to modified the selective existing chasis of two wheelers and convert into a delivery vehicle to make it economical which carries all necessary aspect of being a delivery vehicle .

The scope of the project :

By understanding the food delivery service as a part of business, designing a vehicle that can be used by large number of categories ..

Scope of increasing the efficiency of service to help increasing the business

Modification and universal application on existing two wheeler for fast food delivery purpose

objectives

To understand of fast food delivery as a business and designing vehicle for food delivery by concerning the issues related to the systems and to understand the Issues related to the vehicle and concerns regarding those issues.

To understand the functional aspect of the vehicle, which also includes the comfort aspect of the user.

As one is trying to make it economical the project is taken to modified the existing vehicle.

And so after a survey of various two wheelers used for delivery purpose .the study is to find the appropriate vehicle which satisfy all necessary needs which are required as a delivery vehicle.

Modification in existing vehicle .(local modification)

Model .M-80 Bajaj

Study of the user interaction with the vehicle and issues related to it

The vehicle is studied and designed keeping few aspects into the considerations like ;

Universal application –in storage elements

Multi functional –for various fast food delivery

Mainly focusing on pizza delivery and secondary:

Packed dish food

Bowl -packed food

User statements

As per the users expectation one is trying to identify the needs of users like :

The vehicle should be Light weight ...should have more storage possibilities as they have to carry along.

Provision to keep coke and Pepsi like extra stuff.

Vehicle with good mileage.

Max surfaces are required to put up the advertisement that can be readable from a distance and also in dark .

Easy to maintain as the vehicle is provided by the company so people have very ruff and tough use of it .

The vehicles are provided by the company so there is a very rough use of vehicle as sometimes times the delivery man goes in awful speed to deliver the food.

Product brief

Used by the age group of 24 to 40 yrs.

Weight carrying capacity 150 max..

Easy to maintain even in condition of very rough usage.

Colours and graphics reflecting the image of the food joint or restaurant.

Vehicle should be easy to drive in traffic.

As delivery is done free of charge and so the system cant afford to spend more money on fuel .so the vehicle should have good mileage.

Material which are used to make body should have good shock absorbency as one of the quality.

Vehicle should be easy to maintain as the vehicle is provided by the respective companies .

Vehicle should be economical as various kinds of food chain restaurants are going to buy it so it should be universally affordable .

Any extra attachments should be removable or changeable easily as the vehicle is going to be used for various kinds and size of people, by various food joints and for various things to deliver.

To avoid few hazards of the accidents happens because of the rough and careless driving in high speed, vehicle should not allow one to increase the speed above 60.

Vehicle should be easy to put on or off to the stand

As sometimes one takes time to kick start the vehicle ,to avoid that vehicle should have provision of self start .

Vehicle should be easy to park between the vehicles easily.

Delivery box

Should contain heat inside to keep the food hot and fresh.

The box should be lighter in weight in case of breaking down of the vehicle in between the delivery , it should be easily removable to carry around.

Somewhere it should give an idea what is stored inside.

Enough visible surfaces should left open to keep the company logo and contact info in visible font and colors.

Weight should be not more then 20 kg.

Should be made of food grade plastic.

The box should be made of well shock resistant material.

The over all width of the box should not be more then 52 as per the biggest size of the pizza. Should be easy to maintain like easy to clean.

Seat should be comfortable enough for a rider as he has to drive vehicle for long distance and as per Indian road and high speed driving it gives more shocks to the lumbar part of the body.

Scenarios and drawbacks

Some fake orders

Wrong addresses given by customers or there is a mis-communication within the system.

When the vehicle breaks in between he has to catch the auto to deliver the food if place is not farOr has to call up the main office to inform the problem ...and then send another person to deliver the food ...where they have to inform the customer about the cause .Still according to their promise sometimes they have to give pizza free if they are late

“Customer refuses to pay for pizza because customer didn't get his drink.”

Sometime they just refuse to take delivery only

For small orders they have to go all the way to long distance with cost of money and so delivery costs him more then the cost of the food

Too many orders and lack of delivery man lose in business.

Reasons for being late for deliveries

Scooter breaks in between ...clutch breaks cause of very ruff and tuff useeven accelerator ...breaks ...

Traffic as an obstruction

Running out of petrol

In case of accidents

issues related to the management

Within the system

Communication

Issues related to the vehicle,

Parking

Storage to carry food inside

Carrying the food on the vehicle

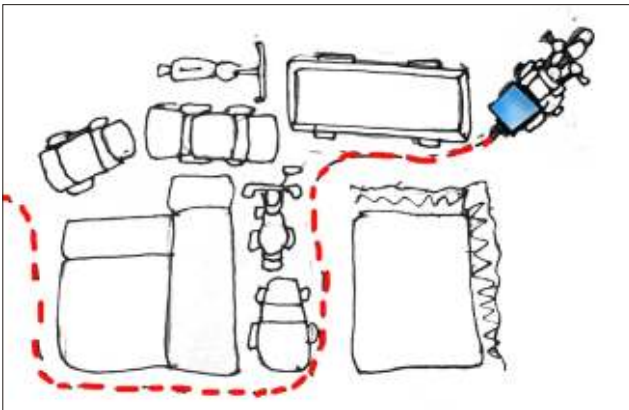
Breaking down in between

Carrying extra stuff..

Comfort

Maintenance

Getting off from the bike



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				



Putting pizza from the top into the box is a problem and also getting it out from the box



Easy to put pizza inside and also getting it out ...



Existing lock in the box

Existing box made up of fibers which has good resistance against shocks

Eco-friendly as its vacuum formed and both of the part the upper most and the lower most part are made from the same one die.

Very rough usage in terms of opening and closing of the box.

The box is been fixed on the rear seat of the vehicle with screw and bolt on the iron frame fixed on to the seat.

Very loose contact of the surface so sometimes it brakes from the hinge as the box is never closed after the delivery .

Box dimensions are 420 x 450 x 520 mm.

Total weight of the box with max pizzas loaded inside comes around 15 to 20 kg.

Insulated bag. Or hot bag

The device used to keep hot pizza hot while being transported to the customer is commonly referred to as the hot bag.

These bags are generally vinyl, with cotton insulation. They generally keep a hot pizza hot for about 15 minutes. They are both very light, and very cheap.

Pizza transport bags are designed with materials that breathe, keeping heat in, but letting moisture out.



Categories of food and kinds of food packages



Hot vegetables or kebabs and other hot dry items are packed in aluminum casserole. Gravy dishes are put into the plastic containers. Salads and chutney are packed in disposable plastic containers and sealed with plastic sheet and rubber band. All the packets are put in a plastic bag.

Frozen foods for eg. Kebabs which are heat and eat are available.

Fruit chat. Sprouts are packed in disposable containers.

Chutney pouches, napkins, aluminum foils, boxes on the packaging.

Aluminum foils are used to pack parathas, roti, and naan or sometimes even for dosas.



For outlets like McDonald's, a burger is packed in a paper, potato chips in a small container, and cold drinks in a small glass with the cover and straws.

Plate kind of food packets are mainly delivered in a high density molded thermocol material having different compartments for roti and semi liquid food and covered with aluminum foils.

Sizes of the plates vary from 8" to 12"



White paper plates, in two sizes

Medium 185mm diameter.

Large 225mm diameter.



Features:

- 1) Various dimensions available
- 2) Made of advanced pollution-free aluminum
- 3) Shape: round, rectangle, square, ellipse,
. A full line of aluminum catering trays embossed and in black with dome lids specifically designed for strength and viewing.

Existing delivery vehicles



Scooters for pizza delivery purpose



www.pjchmiel.com/.../pictures/192-9209_img.jpg



Motorbikes and moped



Bajaj CT 100



www.planetbikes.co.uk/.../tgb_scooter_1.jpg

TGB Delivery Scooter

The TGB Delivery Scooter is designed for commercial use. The Delivery™ is perfect for delivering pizzas, take-out food, letters, packages, and more. The rear box has an optional built-in heater to keep food warm

Various categories studied in terms of vehicle designed or used for delivery purpose.

That includes various kinds of vehicles three wheelers and two wheelers.

Where two wheelers includes categories of scooters, motorbikes and mopeds.

First three images are three wheelers, which are used to carry heavy load behind almost of a weight of more than 30 kgs and so two wheels at the back provides good strength and stability to the vehicle though its not as easy as two wheelers to zoom through the traffic but one has tried to design as smaller as possible to carry it around for delivery purpose.

Case studies :

Case studies are taken from the various categories of the food joints near by to Powai and other areas near by .

The categories are divide in respect to their scale of income.

High scale joints where the business runs more on home delivery. And so they have number of two wheelers along with the storage box to carry the food along. These kinds of food joints' business runs 40% on home delivery .

Delivery done on the bicycle for the low income restaurants:

Harish ,Powai
Sujata Palace
Navjivan ,galleria, Hiranandani

Dominos : CT 100

Pizza hut : Bajaj chetak

Mc Donald's: kinetic dx

Time line :

Study of time line helps one to understand the kinds of activities involved into the system in respect to the amount of time taken. And also to understand the area where vehicle performs its part and where there are scopes for one to understand the issues related to it which are further solved in the design process.

One is trying to understand the entire chain of the activities which are involved into the delivery process and also the amount of time taken in each activities. The system in fast food delivery business involves manager, waiters, cooks and some amount of time taken in activities happening along with the vehicle.

Main focus of the study is to find out the issues related to vehicle where it affects the time and try to make it more efficient and so to make the entire process fast .Time line is shown only when the user starts interacting with the vehicle along with the delivery box and the entire activity pattern is divided into four categories :

Loading time

Driving time

Unloading time

Post delivery time

Any delivery services requires speed ,not only because they have to deliver the food on time but also taking one thing into the consideration that one more delivery is waiting next. And that's the reason to have vehicle which helps reaching to the places as soon as possible

Time line :

1. Loading time

After Collecting stuff from the joint

If there are more number of pizzas or food in quantity	Reaching to the vehicle	2 minutes or more
	putting it on the seat	4 seconds
	Opening of the box	3 seconds
	Taking pizza from the seat	4 seconds
	Putting stuff inside the box	6 seconds
	Closing of the box	3 seconds
	Getting on the bike	3 seconds
If the vehicle parked in the parking he has to draw it out	Putting it off the stand	4 seconds
	Drawn it out from the parking	6 seconds
If there is a queue at the petrol pump If vehicle breaks in between Removing stuff from the box and carrying along to put it in auto 7 to 8 minutes	Starting of the vehicle	3 to 8 seconds
	Waiting at the crossing	
	Going to petrol pump for fuel	3 to 5 minutes
	Asking for the address	15 to 20seconds
	Registering at the gate	1 or 1 min 30 seconds
	Reaching to the destination	5 to 10 minutes

2.riding time

3.unloading

If there are more number of pizzas or food in quantity	Getting off from the vehicle	4 seconds
	Putting it on the stand	5 seconds
	Locking it	3 seconds
	Opening the pizza box	3 seconds
	Removing stuff from the box	6 seconds
	putting it on the seat	4 seconds
	Closing of the box	3 seconds
	Taking pizza from the seat	4 seconds

4.delivery time

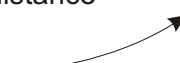
If the parking area is at a good distance then it might increase the time.



Reaching to the destination	1 minute or more if
Giving the pizza in hand paying bill	3 minutes
Takes empty bag puts it into the box	30 seconds to 15 minutes
Close the box	3 seconds
Wears the helmet	5 seconds
Starting of the vehicle	5 seconds
Goes to petrol pump	6 minutes
Stops at the crossing	2 minutes
Stops at the gate for registration	
Opens the case for checking	4 seconds
Stops to ask the address	6 seconds
Stops to call up the customer	1 minute

4.post delivery time

If the parking area is at a good distance then it might increase the time.



Coming back to the bike	2 minute or more
Opening of the box	3 seconds
Putting empty bags inside the box	3 seconds
Closing the box	3 seconds
Getting on to the bike	3 seconds
Putting it off the stand	4 seconds
Starting of the vehicle	3 to 8 seconds
Checking at the gates	6 seconds
Driving till the food joint	15 to 20 minutes

Case study 2

Study includes the categories of low income where the delivery happens on the bicycle

There are less number of person for delivery.

Average of number of bicycle is 4 to 5

Waiters delivers the food

Other categories like Harish

Takes the order	28 seconds
Passing it to the cook	10 seconds
He prepares for the food	10 minutes
Packs the food into the foil	3 minutes
Puts it all into the bag	25 seconds
Takes change from the manager if customer is giving round figure it becomes convenient for him to give change	15 seconds
He hooks the bag onto the bicycle	3 seconds
Ask for the address	
Reaches to destination	10 to 25 minutes
Gives food and takes money	7 seconds
Gives change to the customer	2 seconds
Leaves back to the restaurant	15 to 30 minutes

Summary

In this particular case one has arrived to the conclusion that the interaction between the user and the vehicle happens for almost 30 minutes . For such restaurant there is no constrains of the timing to reach to a particular place in given time. Sometimes it takes more then 30 minutes also. 4

Basic activities

Loading

Reaching to the box

Opening of the box

- Leg operated mechanism as both the hands are carrying pizza.
- Opening of the box is controlled by some key operation provided in the control only.
- Push button that it opens by itself by pneumatic system.
- Its can be like a drawer as its divided in to two parts which can be removable.

Putting pizza in the box and locking it

- the box can be translucent
- the bottom most box can

Be translucent

- Compartmentalized
- If there is less quantity of pizza box can be made smaller ..
- Auto lock system

Collecting helmet

Getting on to the bike

He stands on the foot rest and climb on the bike holding one handle and an edge of the box to balance ...

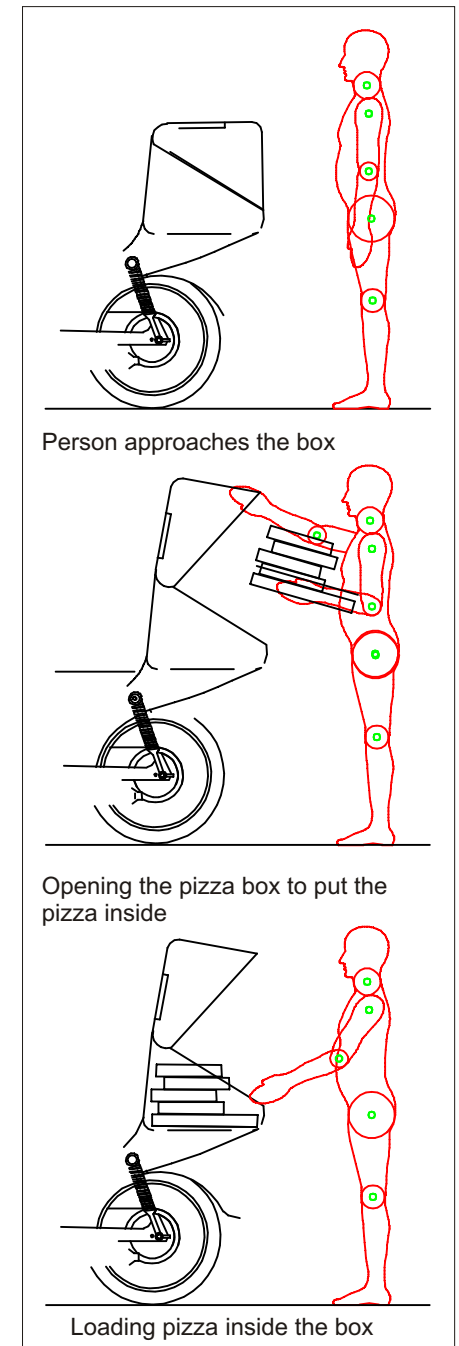
Key inserting

Put off the stand

Getting the vehicle out of the parking
He pushes bike it to off stand from the main stand

Starting the vehicle

- Issues
- Concerns
- Requirement
- Sub activity



Unloading

Opening the box

Collecting the pizzas and cap

Putting Empty hot bag

Remove helmet and wear it

Stands on one foot rest and
seats on the vehicle

Auto lock system as they
don't lock it

Checking at the gate

Gate man checks the box
opening it ,and then he does` t
lock it. so it breaks at the hinge
point

Provision of charger within
the hot bags so that bags can
be charged even on the way
back to collect another order

Charging provision for hot
bags so that he doesn't
have to wait for hot bags
getting heated for the next
delivery

Suggestion level

Foot rest size can be increased

Kick start

Extra compartment to put bottles and
the small beverages....

- Next to the container
- In the front on the front wheel
- One side of the tank

Issues related to rain

Mud guard is required as the
existing one is just an extra
addition

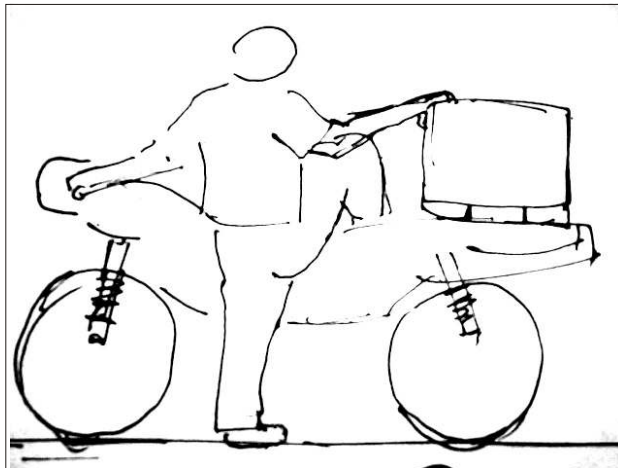
Elements should be in respect to the
present design language looks part of
the vehicle only

Silencer lill raised as in rainy the water
should not go through it

The top of the box should be tilted at
the back side so the rain water does
stay on to the top

- Issues
- Concerns
- Requirement
- Sub activity

Riding the bike



- Issues
- Concerns
- Requirement
- Sub activity

Zooming through traffic
Fuel filling at petrol pump
Waiting at cross road

He doesn't switch of the bike as he wants to reach earlier

He stops at the raised platform to make sure the inclination is not so much that it falls

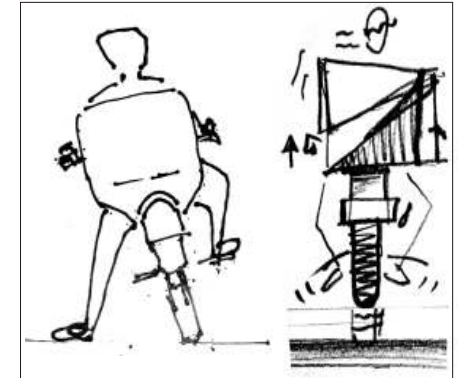
Gate passing
Asking address

Careless driving at the bump

Increasing race his back bangs on the box

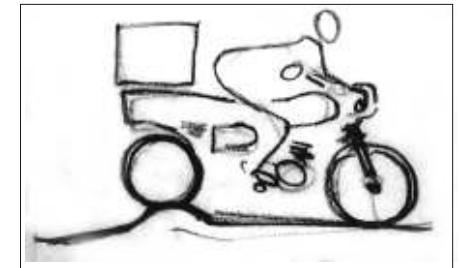
In case of any break down he collects the pizza from the box and catches auto and delivers the order

Removing helmet and put it onto rear view mirror



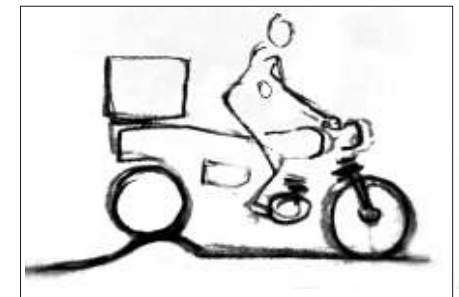
He stands somewhere at the raised platform to balance him self

They keep the box open once delivery is done so it keep banging and sometimes brakes from the hinge side



Very rough use during driving time ,they don't speed down on rough road

So they get shocks at the seat level



Two different kind of cushioning as if there is only one box the back rest is still there

Use same seat and fold it as a back rest

Removable box

Slots on the either side to hold it when u remove it ...



Advantages

- good speed
- Shock absorbency is good
- Comparatively good average
- Slim and light weight body
- Comparatively good for long distance driving
- good for zooming from the traffic
- Form is aerodynamic
- 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

Easily getting in and out from the vehicle

Don't have to pay tax as the box's top line is not above the overall height of the vehicle

Enough leg space

Front space is empty so good for person wearing raincoat

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



Disadvantages

Speed is lesser in comparison to bike

Shock absorbency are not good in rough drive

Lesser average

Maintenance problem

Filling up petrol he has to get off from the scooter

Form is not aerodynamic

The height of the box is low so he has to bend 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 easy



Advantages

- Controlled speed
- 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
- Four stroke engine
- Zooming into traffic is easy
- Indian road
- Make it comfortable during long distance
- Good shock absorbency

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

Comparison

Bajaj CT-100



Bajaj M-80



Important aspects for delivery purpose in two wheelers			
Pick ups			
Easy maintenance			
Lighter in weight			
More universalizes for other delivery purposes			
Good mileage			
Easy getting on the bike			
Should be applicable for various kind of body profile .tall or short			
Affordable price for other delivery joints			
Shock absorbency			
Zooming through the traffic			
Image as a pizza delivery			

Better then other option or good i
 Can be improved or change
 Not present
 Lesser then other option

Summary :

According to the study of comparison of two various kinds of vehicles used for delivery purpose one is trying to identify the appropriate existing chasis for modification .

The study was required to choose the right type of chasis and engine which fits to the requirement of being a delivery vehicle.

Having equal amount of advantages in case of CT 100 and M-80 one is trying to identify which one is more appropriate .

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 get on to the bike

It should be applicable for any 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

The figures shown below is to study the ergonomic of the vehicle.

The subject A and subject B are taken as respective of 5 th percentile and 95 th percentile.

Issues related to height of the vehicles

Issues related to mud guard

Issues related to put the vehicle on stand and off the stand

The size of the steering



Enough space between knee and the steering its easy for subject A to rotate the steering



The distance from the knee to the steering is very less so its not easy for subject B to rotate it



Height of the seat is high in for subject A and so the legs remains bit in the air .



Legs from the knee side spreading out as the height of the seat from the foot rest is less for subject B



Image 1

Image 1 :user gets off form the vehicle and trying tho put the vehicle on the stand by holding with one hand on the steering and another behind the seat to pull the vehicle from behind .

Keeping his leg against the stand and then pull it to put it on the stand

Image 2: user is holding the steering with one had and holding the front edge with another hand of the back seat and pull the vehicle to put it on stand ..

Keeping his leg against the stand and pull to put it on the stand



Image 2

Image 3: user is trying one more method to put the vehicle on the stand

He is trying it to pull it with one hand on the steering and with another hand holding it from the tip of the front seat which is protruding out like almost 2" from the body and pull it

Keeping his leg against the stand and pull to put it on the stand

Summary :

As per the observations done .there are issues related to the activity of putting the vehicle on the stand

One holds the steering to to pull the body and another hand is to pull it from the seat where there are possibilities of seat being weak from the contact areas and so it becomes loose to make sounds in rough road

Provision where one can hold the vehicle to pull it while putting it on stand

as one puts his leg against the stand and pull it ,there is an effort involved in it ..



Image 3

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 absorber can be introduced

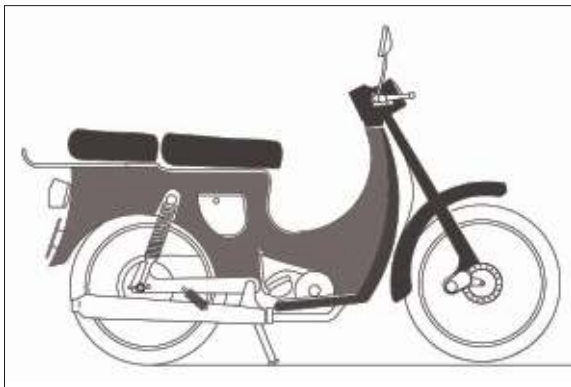


Mud guard can be redesigned and make it more appropriate for various size of people ..

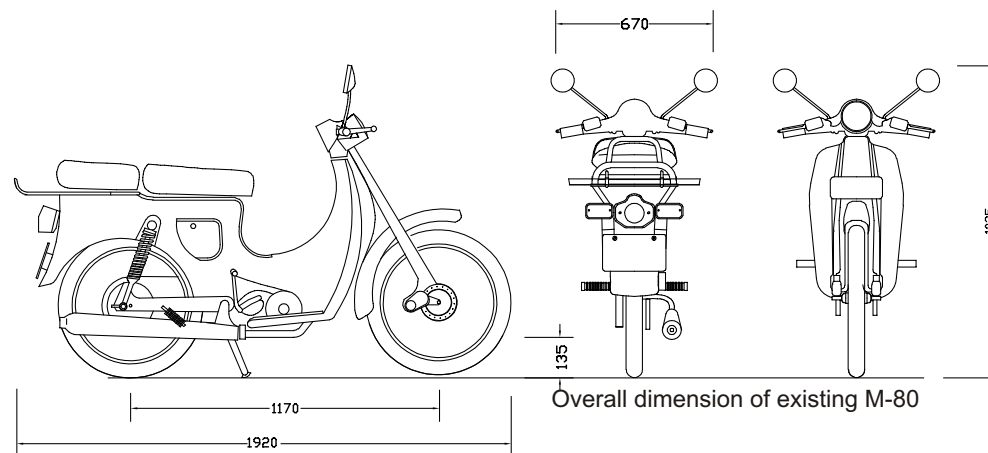
Steering can be made more longer for easy turning

Accelerator grip can be redesigned as there will be enough use as per

Styling of the vehicle can be improved to give an image of a pizza delivery



Rendered area indicates the elements which can be redesigned



At the side area can also be used to provide extra provision for storage

Cluster 1

Image 1



Image 2

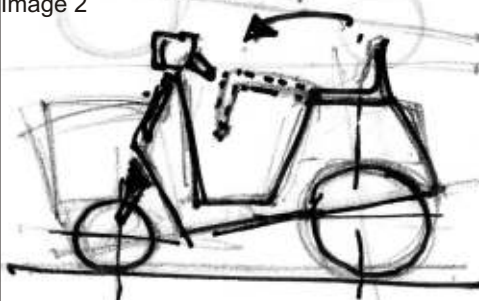


Image 3



Image 4



The sketches in the clusters are various ideation to solve the problems which are being addressed in previous studies

Problems like to have enough step-in in front

Extra provision to store extra beverages and other stuff

Image 1 and 2 explains about the storage under the seat to reduce the length of the vehicle and also to make it more lighter

And so the vehicle can be electrical where it does not take much of space in the body

The explorations are about to solve two major problems of creating easy getting in space in front and come up with various options for the storage image 4,5,6 explains only about various kinds of leg room. while image 7 explains about the complete idea of having storage in front and at the back

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 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

Image 5

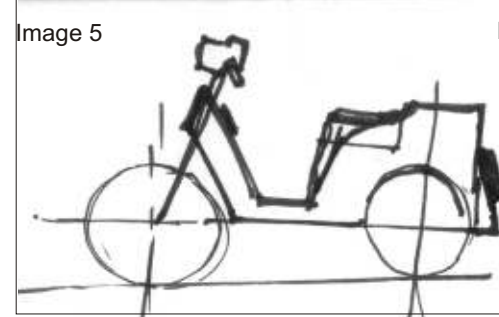
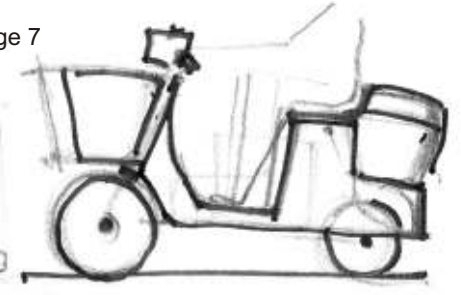


Image 6



Image 7



Cluster 2

Image 1

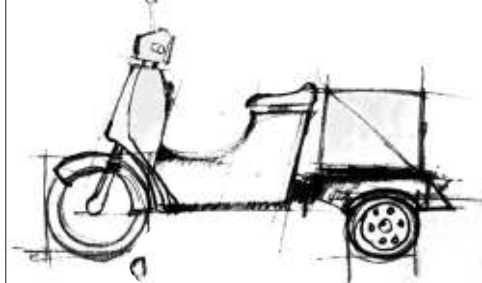


Image 2

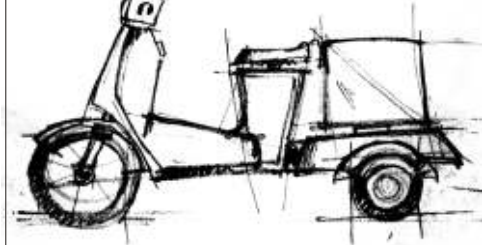


Image 3



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 an obstruction to get on to the bike, so trying to make it lower so one can easily get on to the bike.

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

Putting it on the double stand to balance it and keeping vehicle 90 degree is a problem so to make it three wheelers to make it more balanced. and so there is no need to make an effort to put it on stand.

Image 3 trying to explain that the rear seat can be removable so that place can be used to attach extra storage box and at the front extra provision for storage which is structurally attached to the main body and not to the steering that way steering is still lighter and easy to swing.

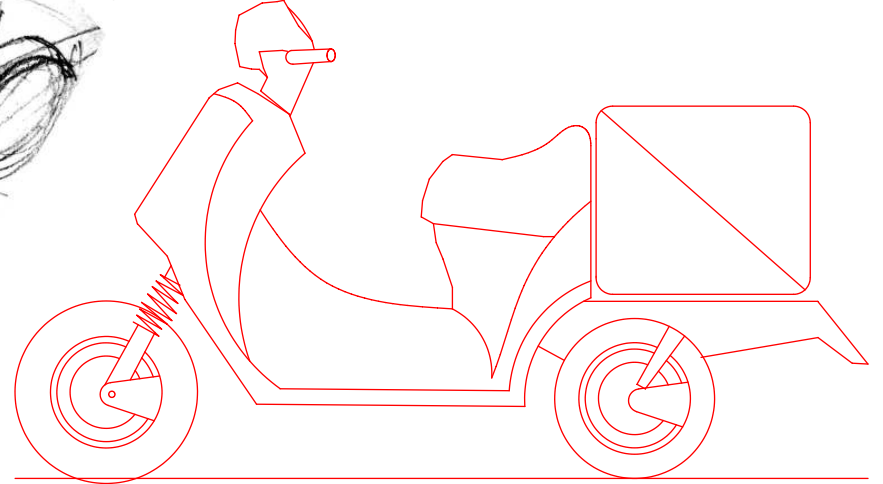
As the vehicle is carrying a load of not more than 90 kg and only one person is riding with extra 10 kg of pizza box the material quantity is reduced and made single seater.

With the box attached to it behind can be removable. Image 5 is a concept having all aspects mentioned above

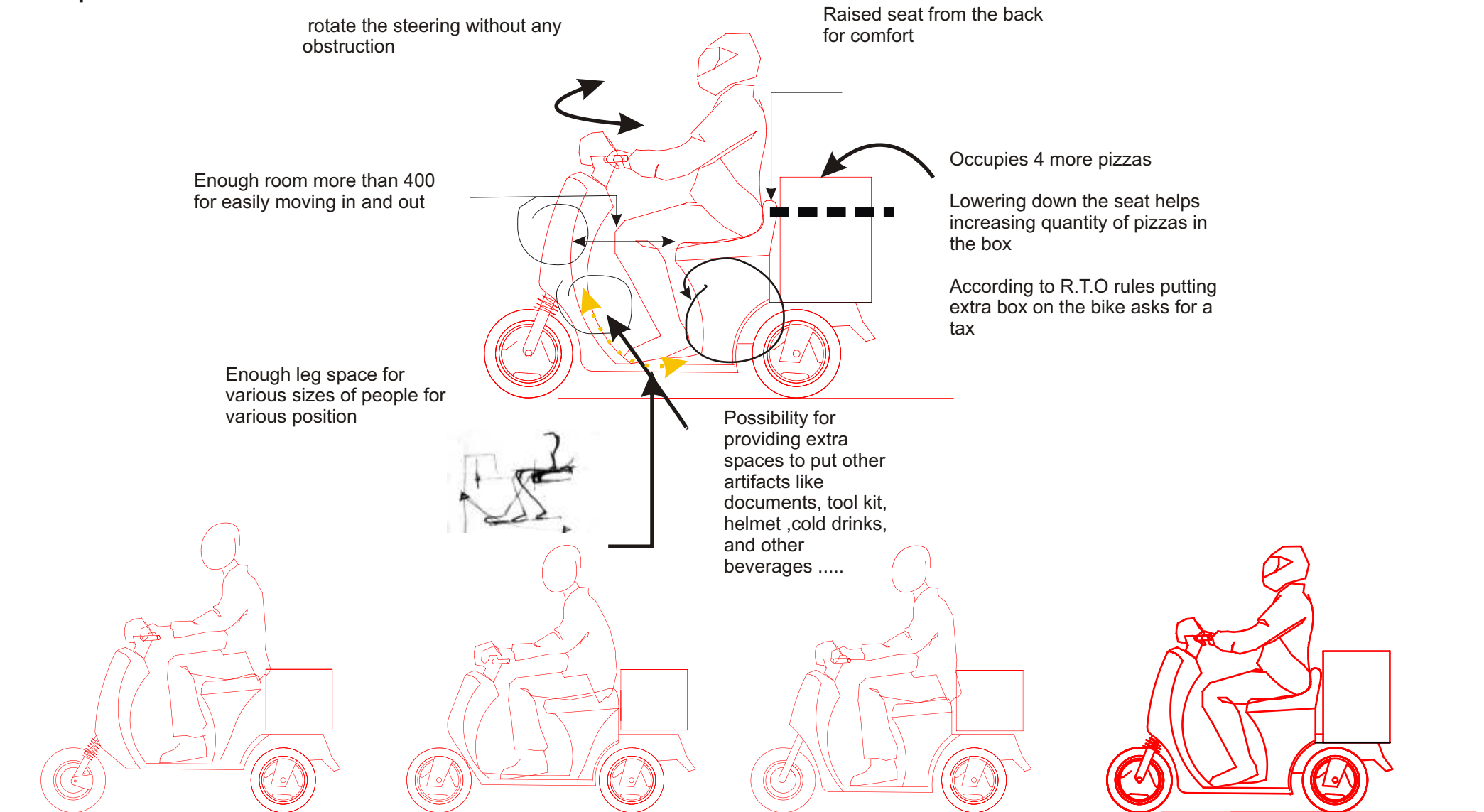
Image 5



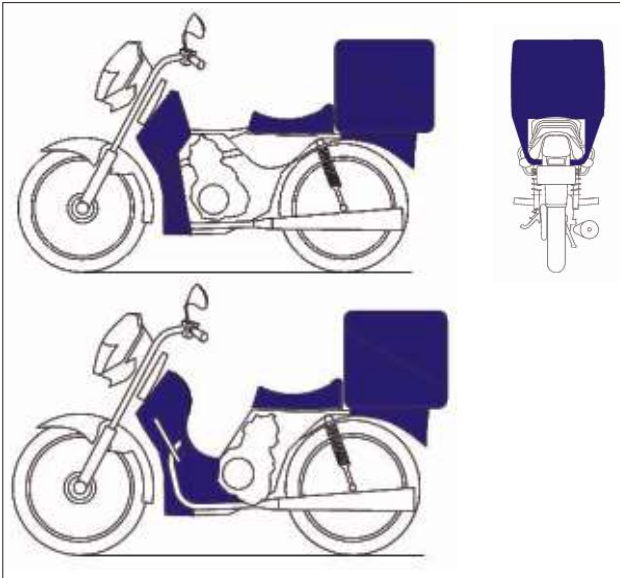
Image 6



Concept 1



Cluster 3



As per the study one has observe that cause of the box attached behind the bike is an obstruction for user to get on to the bike or get off to the bike.

One is trying to solve the problem by changing the orientation of the tank by keeping it vertically yet the mouth of the tank remains on the top so its easy for him to fill the petrol unlike scooters he has to get off from the bike. And so he gets more step in space in front ..but in terms of modification the idea doesn't convince to change the orientation of the tank as it might turn out to be a costly solution.

The rear body making it more flat so that it becomes easy for one to slide in the box and also the base of the box can remain flat. By removing a seat from behind one has increased the height of the box and so more number of pizza can be stored inside.

As i ve mentioned the delivery system affects the food business in major scale and so one always expect to have a vehicle that reflect the identity of particular food joint.

And in image u can see the box and the bike are not really look a part of one family.

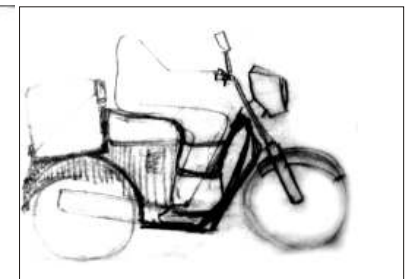
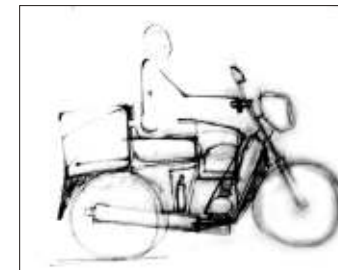


So one is also trying to focus on design solution where the box and the vehicle gives one identity



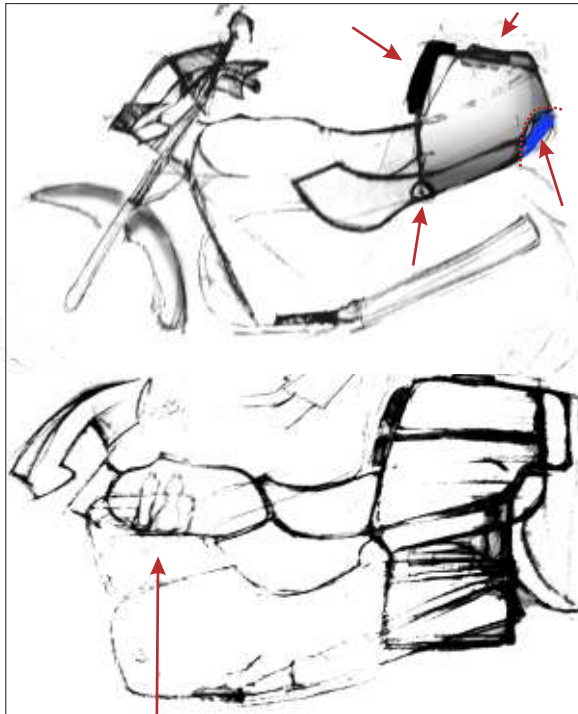
Back seat folded and resting on to the box acts as a back rest

In design one is trying to incorporate box as part of existing styling as box and bike doesn't look two different entities.



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

Styling clay model to understand the merging of the sides of box and the side of the panel on the bike



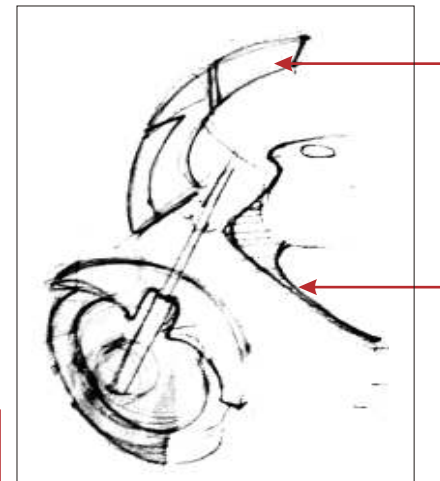
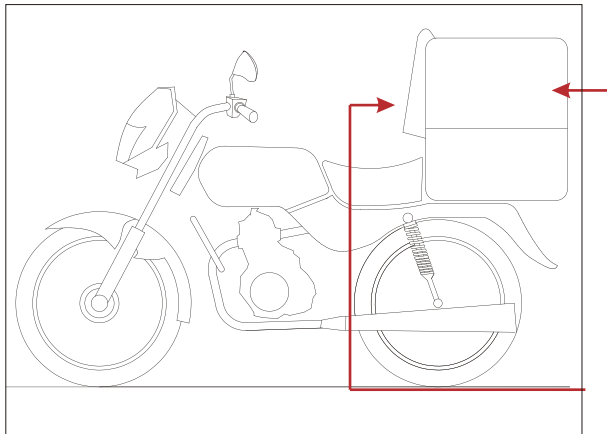
As shown in the figure the box to store food has a back rest attach to it and its easily removable and certain language followed by introducing an extra attachment can be in different colors according to various food joints and their choices they can attach to it.

Handle on the top and also few language followed to make it looks like a part of same family

The box is been made into two different compartment as a modular system where one can remove extra when there is a less quantity in food order and also becomes easy for one to carry it around as it becomes smaller. It has two different back rest if one box is not there the back rest still remains there.

The side part is to store extra beverages like coke and small boxes and packets like shown in the image

Extra storage to put beverages and also at the location where he can easily remove it and take it along



Fairing on the controls to avoid water going into the clutch and other part of steering

Leg guard being a part of the body unlike an extra attachment that normally been found in any bike shown in the image

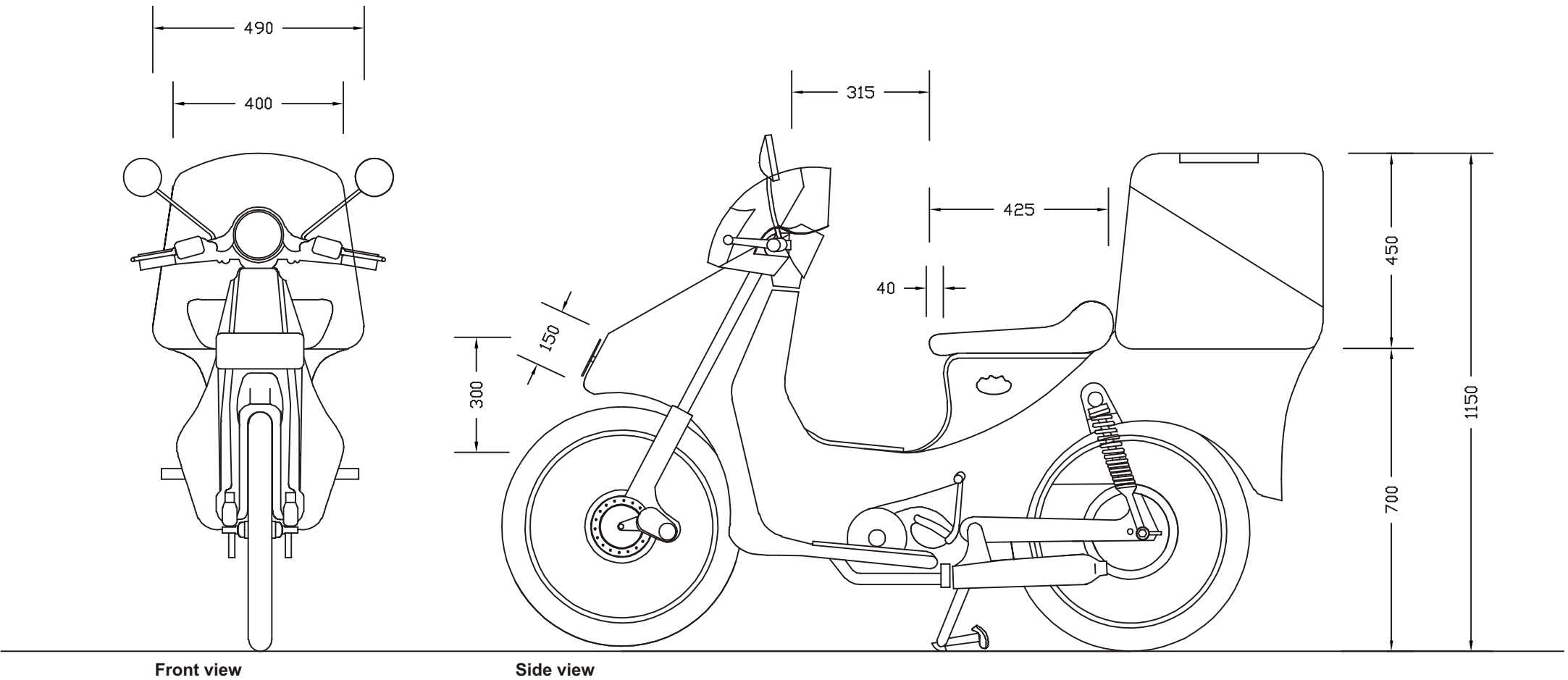


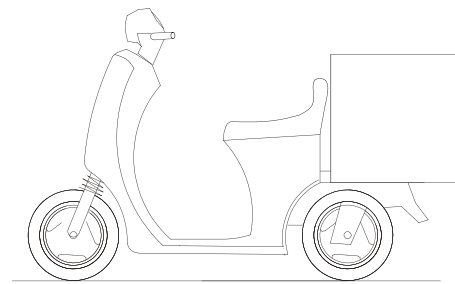
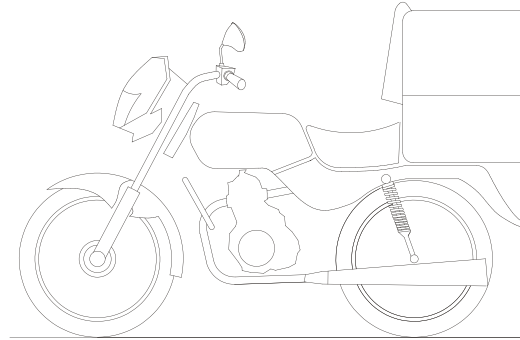
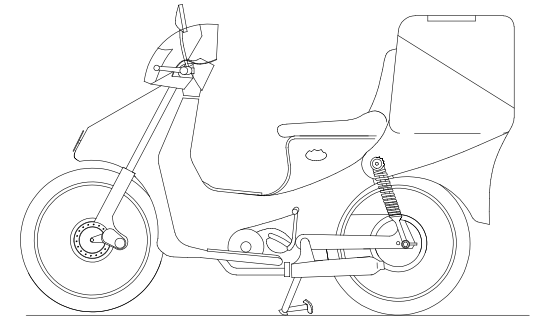
Concept shows the box in two different compartment where one can be removed in smaller orders.

Some times in strong acceleration back of the rider hits on the box to avoid that and also to provide comfort to him for a long distance riding the extra back rest is provided

Concept 2

Overall dimension of the concept



Three wheeler**Concept 1****Modifications on Ct100****Concept 2****Modifications on M-80****Concept 3**

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

The comparisons are done on based of certain factors that the design should have. .

The major difficulty of having a box behind and so to step in the vehicle is solved in concept 1 and 3 but not in 2.

The concept 1and 2 has storage capacity but concept 3 has more possibility of storage.

Concept 1 is totally designed three wheeler , but 2 and 3 are modified where ct 100 is costliest to modified then m80.

Concept 1 is not good enough to drive on the rough road with rough driving then concept 2 and 3.

Having three wheels its not easy to handle on turning with a good speed so its not easy to drive through the traffic with major turnings .where concept 2 and 3 are good enough to drive through the traffic as well as at the turnings

one can see the concept 3 has more relevancy in terms of having all the factors

Concept



The concept shows the overall look of the vehicle in respect to the other features which are derived from the studies done previously.

Extra storage for cold drinks small packets of food and papers .

Easy access on to the bike as having a leg space in the front.A bigger foot rest for comfort .

Fairing on the steering to avoid rain water affect the controls.

Pizza box attached behind with the back rest attached to it along with the seat.

Details of the box is explained further



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)

Brief derived from the studies

Its has to be collapsible in case of less quantity of food the size of the box can be reduced and also it becomes easy to carry around in case of breaking down of the vehicle.

It should be made economical.

Quick locking mechanism also easy to remove from the stand.

Somewhere should give any hint to show what's inside.

Easy to open

Should be made of lighter but strong material

Food graded material

Well insulated to maintain the heat inside

Proper in contact with the surface on the carrier so that it doesn't give movements at the back

Technology used should be economical

Ideation



The development of making box having an aspect of being it economical, easily removable, collapsible, strong enough against shocks during driving, leading to certain solutions and ideation shown below

Idea of making it flexible in increasing or decreasing the height of the box as its required when there is less quantity in food .and also it becomes easy to remove and carry around.

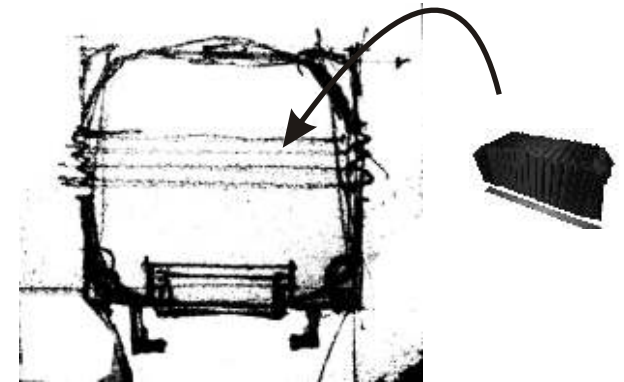
The sketch showed has a bellow mechanism in between top and the bottom so one can increase or decrease the height of the box.

The material used for the box is fiber glass cause of its strength and also the material used for economical technology of vacuum forming .

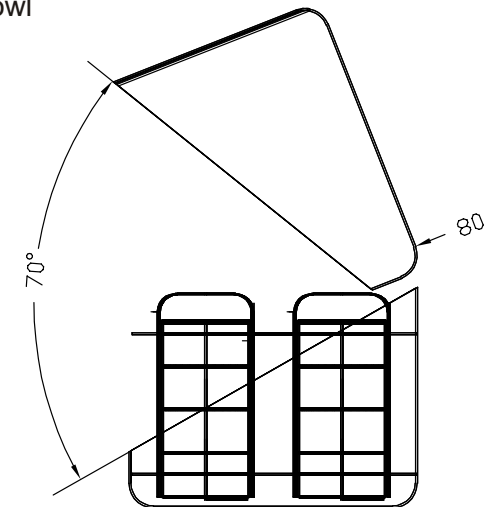
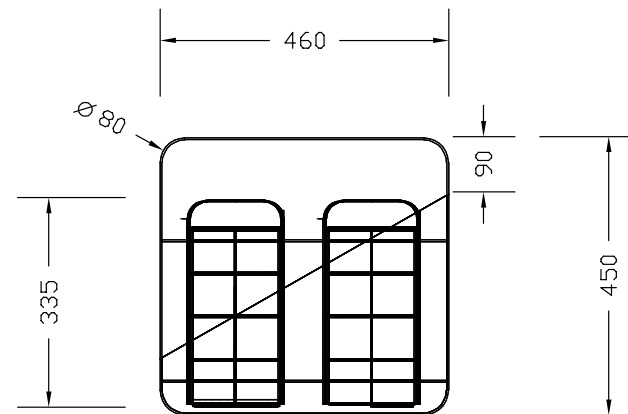
The top and bottom are made from one die that also helps increasing the cost of manufacturing.

Second idea is to design the internal part easy to put tiffins inside the box with such a way that it doesn't shake inside.

Same compartments can be used even to put plastic bowl packages

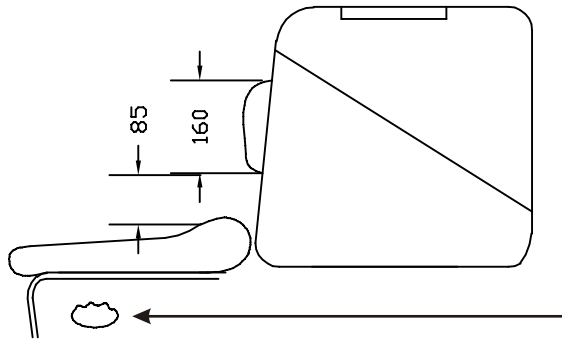


Idea 1



Idea 2

Ideation of the seat along with the box

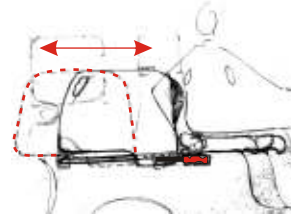


A slot given in the body itself to hold the bike and pull it while putting it on the stand

Seating posture on the vehicle showing the relation of the back rest with respect to the profile of the body

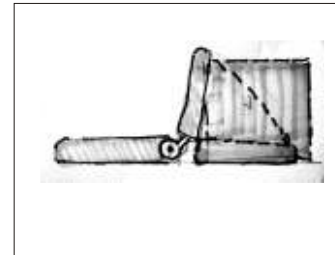
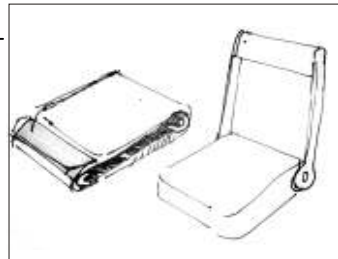


Detail at A

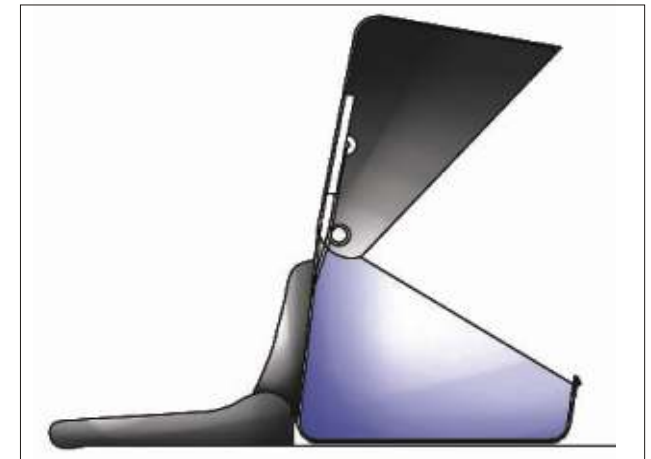
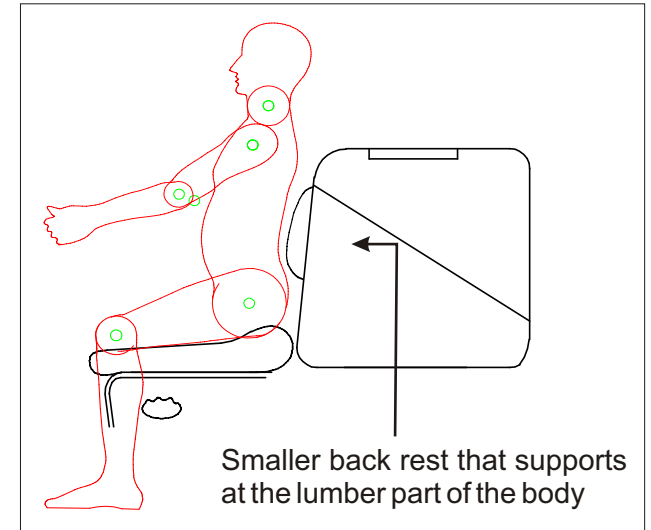


One holds the front of the seat to pull when vehicle is been put on the stand

Idea of having a lever attached to the box so that taller person can shift the box behind to adjust according to his height



Spring loaded seat that easily comes up and in absence of the box it can be put down and lock to the stand .so it can be used as a back seat



Seat attached to the box where the bottom part is translucent and the top is opaque

And the top opens up by only one press as its attached to the bottom part with the torsion spring as shown in the above image .and it has a snap lock which is easy to open and close

Threedifferent ideas of the seatin relationto the box

Clustering of the box in terms of its form derived from few aspects



A slope on the top to let rain water flow back side

Smooth edges all the sides



The shutter can be slide inside so the top and the front side opens up so one can get more area and so it becomes easy for pizza to load into the box a seat attached to it



Collapsible box where the top can be pushed down and so the height can be decreased

It becomes easier to carry around if vehicle breaks

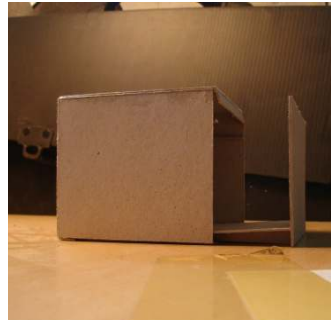


The back seat can be folded and use it as a back rest where the box can have an angle and also smooth edges

Slightly slop on the top so that rain water doesn't stay on it



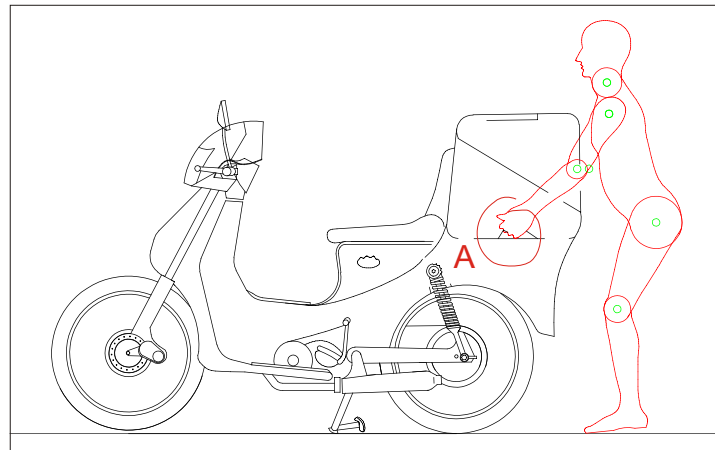
During gate passing gate man opens the box to check and then he leaves the box open which keeps banging while riding the bike



Drawer kind of opening at the back side so one can remove the pizza from both the side and one doesn't need to keep holding the shutter like in existing box



Shutter can be just pushed little bit it rolls up inside the box and so it easily opens up



A click locking mechanism when one press at A and box can be removed from the stand and carry around



The box contains 7 or 8 pizzas at a time

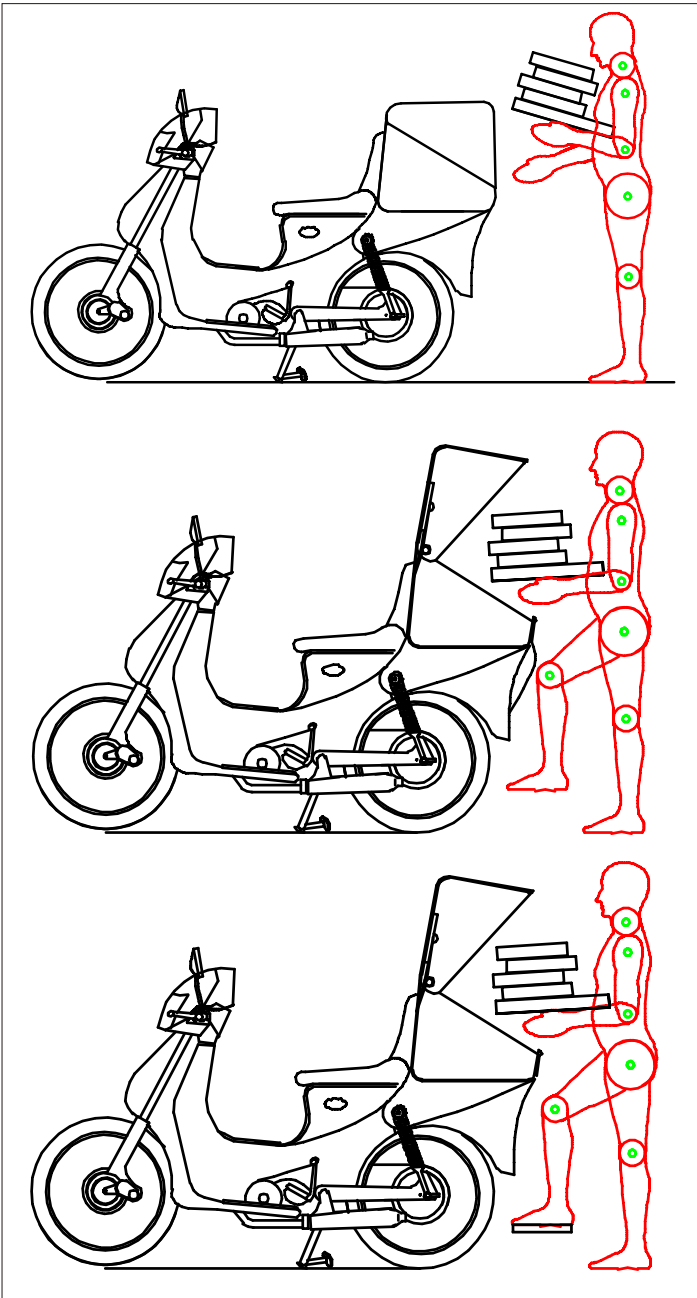
Handle on the top in case of breakdown it can be removed from the vehicle and carry it around.

Slight angle to give proper angle to the back rest.

Bottom part is translucent so that one need not open the entire box to see inside.

Made of fiber glass for making it strong against the harsh shocks while driving.

Two side panels a part of aesthetics can be in different colors according to the clients requirement .an effort to make it part of the vehicle that gives a look of one language



Carrying too many pizza packages or other stuff in both the hands it's a difficult task to open the box.

Three different solutions .

1 One with the one hand where very minor press of the button opens up the box by itself with the provision of torsion spring mechanism at the hinge area ...

And at the opening side its snap fit that closes the box properly so it remains air tight.

2 Knee operated mechanism where its been pushed by knee to open the box ...

3 Leg operated opening.

That an extension from the vehicle that acts as a lever to open the box.

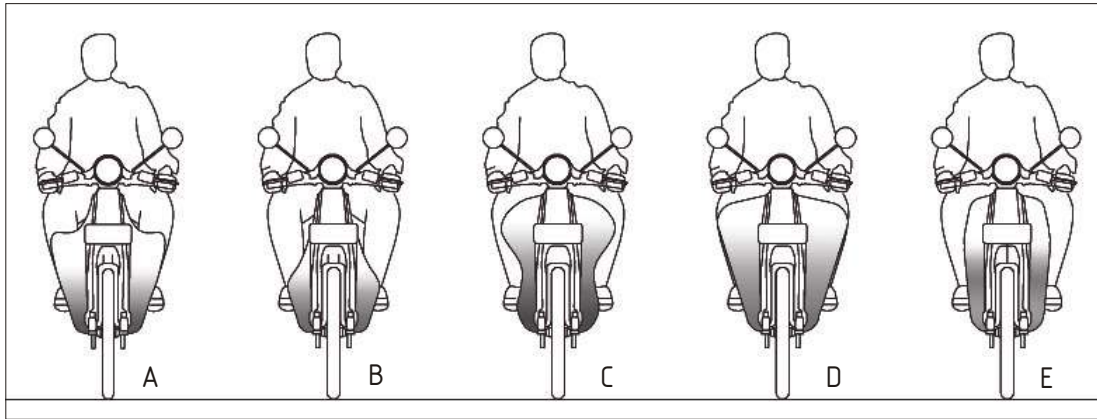


image no.1

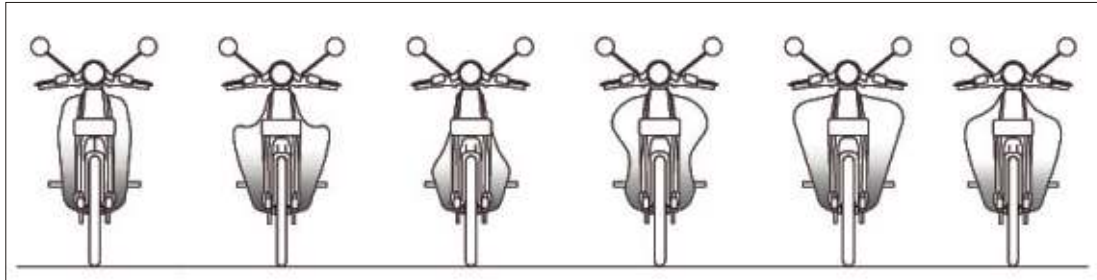


image no.2

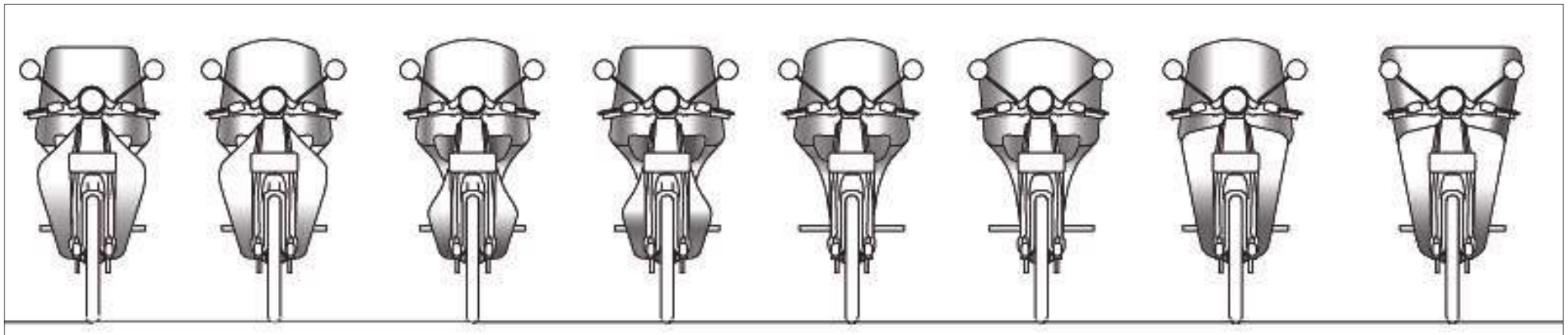


image no.3

Leg guard is not only a functional element but also an element of aesthetic in vehicle .

As shown in the image no 1 one is trying to understand that how much of area does leg guard covers and so there are various possibilities of the form .

E is an existing form of a leg guard.

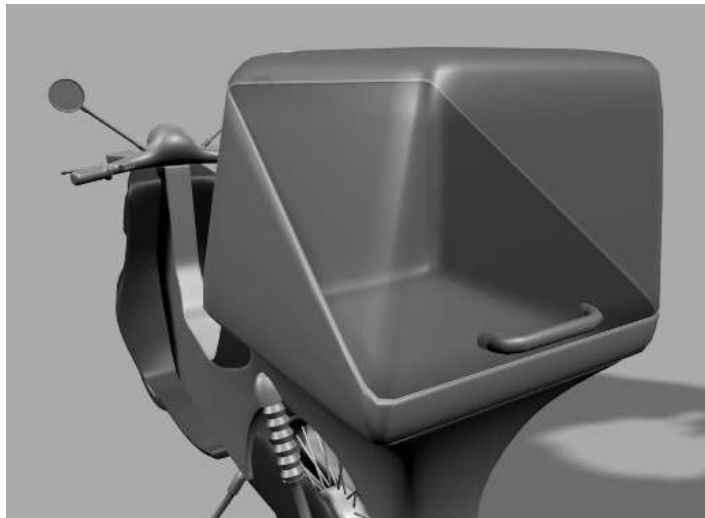
D and E are almost similar that covers maximum area of the leg in respect to the profile of the user as shown in the image.

B is derived from the area where there is maximum of splash happens cause of the high speed driving on the mud or water n the road.

C option is again one variation in form which covers the area of the splash at the bottom and the knee part which is closer to the leg guard.

Image 2 shows all the forms derived from the profile of the user and also from the area

Image 3 explains about various combination of leg guard along with the form of the box .



Final Design model

Final design houses the front box to provide storage of cold drinks and other beverages.

The rear most box with provision of transparency to see what is inside without opening the box.

The seat along with the back rest prevents shocks on the box.

Two side shockers to prevent shocks during rough driving.

The vehicle is been made slim and so it can travel through the traffic easily.

The main body of the vehicle and box are two different entity so one has tried to come up with the form that boh the entities are one body.



Overall Design experimented on the vehicle



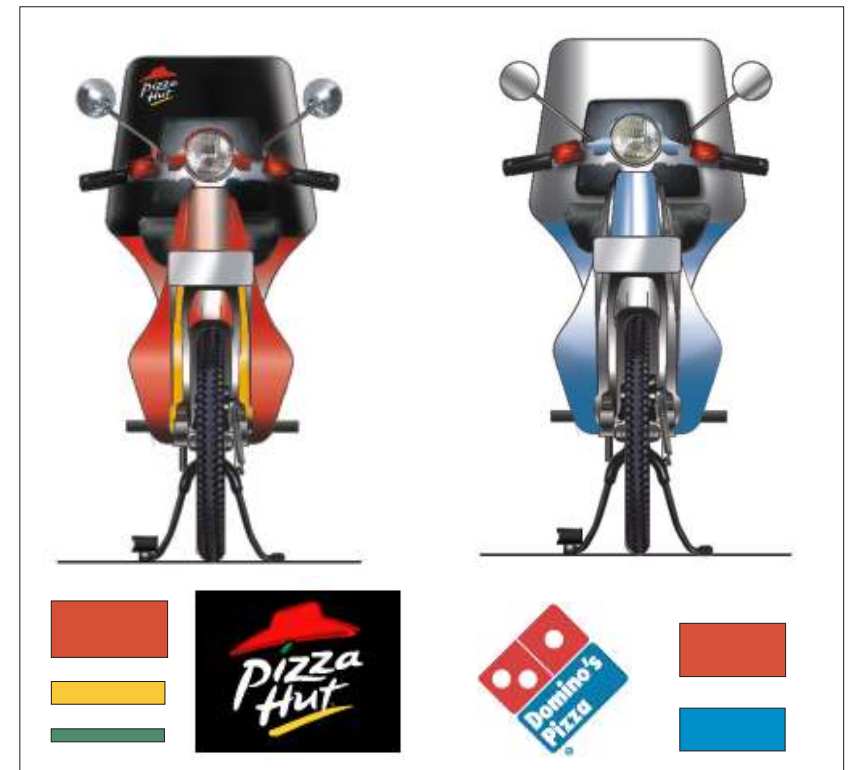
Various colour schemes of the vehicle :

As one has observed two important points as a part of design that one has to think of an image that vehicle carries for particular food joint .it should reflect that image .and another point is to make the box behind the vehicle part of the vehicle that it should not look like a different element.

The vehicle houses few elements which can be modified or one can make combinations of their own choices where elements like leg guard , box , various fairing and also the side panel attached to the box and the vehicle .for an example for pizza hut and dominos there are combinations which can be worked out like according their colour scheme and proportions of colours which are decided from their identity ..

In shown example for pizza hut there are relative proportions of three various colors .And so the same proportions can be apply in colour scheme used for the styling elements in the vehicle. Red is more in proportion so the main body can be red. Black is used as a background so the box can be black in colour. Yellow is used in very little proportion. For another example of dominos the colour scheme can be red and blue in colours as shown in color palette so the main body can be either red or blue.

The rest surfaces are left for displaying the logo and the contact no of particular restaurant



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