

Restyling of Tata Winger

Design Project II
MVD II- 26

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INDIAN INSTITUTE OF TECHNOLOGY
BOMBAY 2016**

DECLARATION

I declare that this written report represents my own idea in my own words, and where others, ideas or words have been included, I have mentioned the original source. I also declare that I have adhered to all principles of academic honesty and integrity and have not falsified, misinterpreted or fabricated any idea, data, facts or source in my submission. I understood that any violation of the above will be cause for disciplinary action by the institute and can also penal action from the source from which proper permission has not been taken, or improperly cited.

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Name:-

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Date:-

Place:-

APPROVAL SHEET

This Mobility and Vehicle Design project report entitled “ Re-design of Tata Winger”, by Shreyas Ganesh Barve is approved in partial fulfilment of the requirements for Master of Design degree in Mobility and Vehicle Design.

Project Guide:-

Chair Person:-

Internal Examiner:-

External Examiner:-

Date:-

Place:-

ACKNOWLEDGEMENT

I would firstly like to thank my guide, Prof. Nishant Sharma for the support and valuable inputs that he has provided during the course of project. I also thank Prof K Ramachandran for his inputs on the project.

Last but not the least, I would like to thank my family and all my dear friends at IDC and from other places for being a constant source of support and inspiration throughout the project.

Shreyas Ganesh Barve

Date:-

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ABSTRACT

The small commercial vehicle (SCV) is the largest segment within the Commercial Vehicle (CV) segment with 60 % of sales. SCV segment is dominating the commercial vehicle market which will account for 80 % of market share. The advantage of SCV is their versatility. These vehicles can only handle loads up to 2-3 tons but reach of these vehicles is impressive. Currently Tata Motors and Mahindra and Mahindra are the biggest player in this segment. The types of vehicles available are mini trucks and pick-ups. The use of commercial vans also known as transit vans in India is very limited in goods transport. Commercial vans are type of vehicles which can provide good comfort to the user and better product quality .This project deals with restyling the existing Tata Winger as a small commercial vehicle.

The current Tata winger is based on Renault Traffic MK1 model (1995-2001). The Renault traffic was upgraded twice afterwards. Existing Tata winger follows design language commonly used in late 90s. So there is a need to upgrade the existing design of the Tata winger so that it follows current

trends and design language of Tata motors. The expectations of user were briefly understood with the help of user study and study of reports depicting current situation of Indian commercial vehicle segment. The user study was useful in identifying the test of the user and its expectation from a commercial vehicle.

As per the research the brief was set up to restyle the existing Tata Winger as a goods carrier with upgraded design following the design language of the Tata. Various design directions were explored to suite the test of the user. While exploring , rugged and Quintessentially simple are the keywords considered.

MOTIVATION

In current Commercial vehicle segment we mostly see Pick-ups and mini trucks in India. These vehicle are far different than vehicles that we use in urban area aesthetically. Commercial vehicles in India never look to be a part of a vehicle family. So there is opportunity to work on restyling of Commercial Vehicle which looks new.

STAGE 1-RESEARCH

Market study

Case Study

User Study

User study Inference

Design Brief

MARKET STUDY

Demand Drivers

Need of last mile connectivity

Increase in consumption in urban and rural areas triggers growth in the light Commercial Vehicle segment. Small commercial vehicles play a important role in hub and spoke model.

Due to increase in number of vehicles in urban areas now there are restrictions on the movement of higher tonnage vehicles in urban areas.

Along with road network India is also witnessing development of other transportation network like metro, monorail etc. For these systems also LCV play a important role in providing last mile connectivity.

Better operating economics.

Economically 4- wheel higher tonnage vehicles prove to be better than smaller 3- wheel commercial vehicles.

Within the small commercial vehicle segment 2-3.5 ton segment is preferred due to its higher tonnage without hampering its reach.

Availability of finance/interest rates

SCV sales depend heavily on the ease of availability of loan. In current scenario due to higher delinquency rates in CV loan have led to tightening of lending norms.

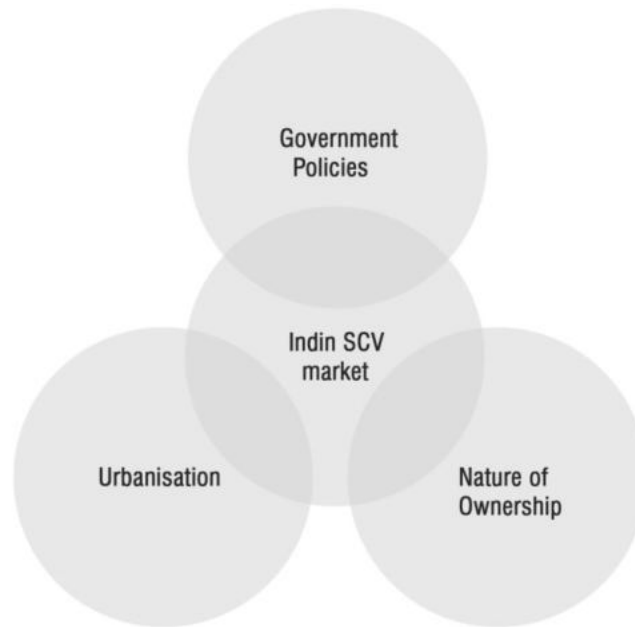
Better Product Quality than 3W

Small commercial vehicles provide more leg room and head room to the occupant.

Small commercial vehicles come with independent strut suspension which helps in reducing noise, vibration and shaking of the vehicle. These features take the driving experience close to car like driving comfort.

MARKET STUDY

Factors in SCV market



Government Policies

Government policies influence the Commercial Vehicle Market to a maximum extent. Government controls the number of permits to be given, it also imposes regulation to reduce the load on infrastructure. Hub and Spoke method is the example of such regulation.

Urbanization

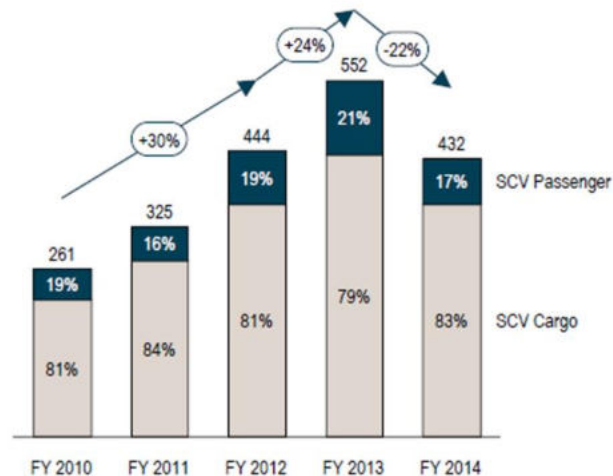
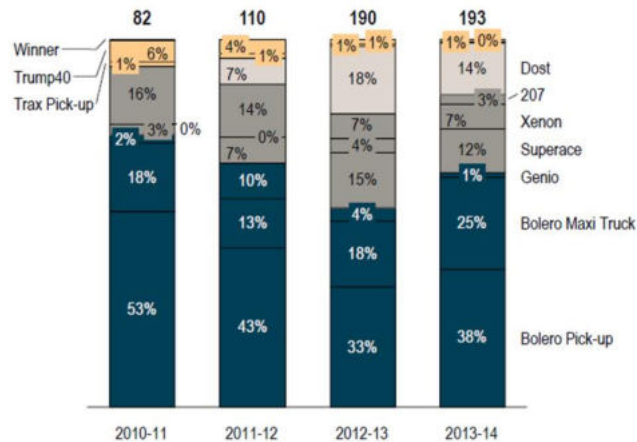
Change in population pattern will change the need of goods to be transported. India is witnessing rapid urbanization. Government planning to introduce smart city projects to reduce load on metros.

Nature Of Ownership

Expectations from vehicle change according to its ownership. Fleet owners look at operating cost as a priority. Drivers demand better comfort and less maintenance cost.

MARKET SHARE

SCV



SCV Cargo segment has outperformed SCV Passenger segment driven by growth in the 2 Ton – 3.5 Ton category which includes the successful Bolero Maxi Truck.

M&M has also managed to attract customers from less than 2T category by keeping the price gap between Bolero Maxi Truck and lesser tonnage ACE to less than INR 39,000 as a result of which it has gained 12% market share over the last 2 years.

M&M dominates the pick-up segment with its products derived from SUV/ MUV platforms.

CASE STUDY

Ford transit



IR 01



IR 02



IR 03

Among commercial Van class Ford transit is the most popular vehicle. Vehicle started its life as vehicle which can reach the people easily and at the same time can deal with the urban traffic.

Ford taunus transit (fk 1000)

The vehicle started its life in Germany as Ford Taunus Transit (FK1000). Vehicle was provided with 1.5 liter engine. It was similar to VW transporter.

Ford transit mk-1(1965 - 1978)

Vehicles styling showed influence of American Design. Significant with its wide body and boxy shape. Vehicle was a instant hit in England. Company also offered multiple alternatives based on same platform.

Ford transit mk-2(1978 - 1986)

Significant change was the change in the nose design. Headlamps and Grill are part of the same cutout.

CASE STUDY

Ford transit



IR 04



IR 05



IR 06



IR 07

Ford transit mk-3(1986 - 1991)

We can see complete change in the front nose. Windscreen was more inclined and it matched the angle of bonnet.

Ford transit mk-4 (1991 - 1994)

Design wise vehicle remained the same. Only modified feature was the headlamp, which became slightly rounded.

Ford transit mk-5 (1994 - 2003)

Minor changes took place in the Grill area. Main intent behind the vehicle was to improve the comfort level of the vehicle.

Sixth generation - transit mk-6 (2000 - 2006)

The Vehicle received sharp styling featured on the company's cars of that period, such as the Ford Focus.

CASE STUDY

Ford transit



IR 08



IR 09

Seventh generation - transit mk-7 (2006 - present)

Company launched the vehicle as a sport van. Lot of sporty feature were added such as big alloy wheels, new grill , big headlamps. Company tried to attract young customers.

Eighth generation - transit custom (2012 - present)

Custom takes its design cues from Ford's car range with an interior reminiscent of the Fiesta and Mondeo.

CASE STUDY

Ford transit

Ford Transit MK-1



IR 10

Ford Transit MK-4



IR 11

Ford Transit Custom



IR 12

The images shown represent 3 different versions of Ford Transit with significant changes in the styling of the vehicle.

For MK-1 belongs to the generation of vehicles designed post second world War. The dominant presence of front bonnet is one of the features associated with the version.

For MK-4 version the significant change is in the front fascia. Front fascia becomes flatter and inclined which brings dynamism to the form. The fillets provided to the vehicle form gives it a boxy look.

For Ford Transit Custom the form shows significant dynamism. The front bonnet appears again.

CASE STUDY

Ford transit



IR 13

Headlamp

The position of headlamp changed its position for all versions. From first version onwards the position of the headlamp keeps going down. For MK-7 and Custom version the headlamps move upward again in a more aggressive position.

Grill

Shape, size and position of the grill changed throughout the evolution of the vehicle. The grill were getting longer and smaller till Mk-6 version. The grill is big and boxy for MK-7 version. For custom there are 2 grills provided , the lower grill is hexagonal shaped which is now common in

ford vehicles.

Bumper

The bumper is a independent and dominant part of MK-1 version. During the evolution of the vehicle it became an integrated part of the overall form of the vehicle. For Ford Custom the body coloured bumpers are provided

CASE STUDY

Ford transit



IR 14

The images show the relation between the different versions of the Ford vehicles. The front grill is the most significant feature which connects them all. The nature of shoulder line is another feature which shows resemblance among different versions of the vehicles.



IR 15



IR 16



IR 17

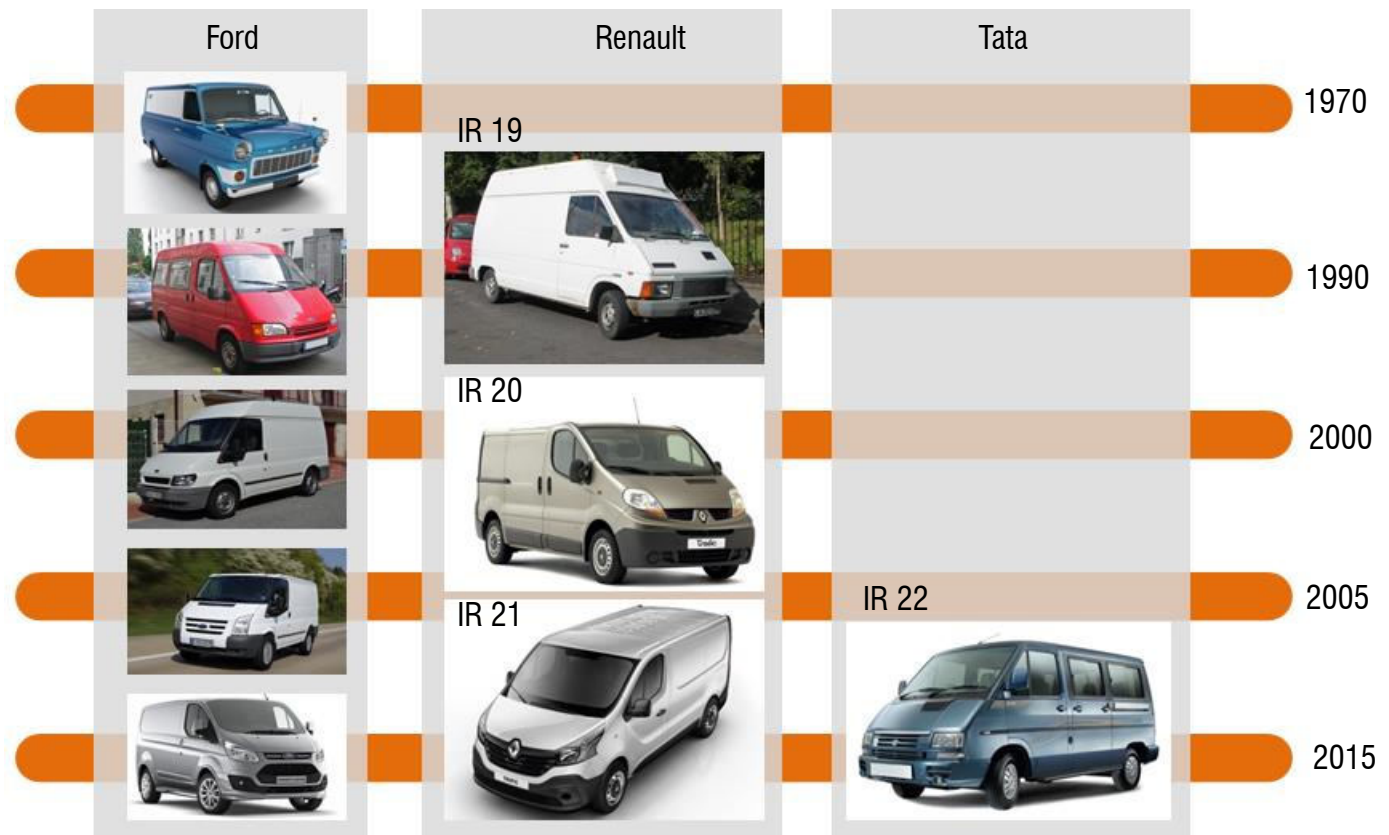


IR 18

CASE STUDY

Ford transit

The chart shows that the current design of the Tata Winger resembles with the vehicles of 90s.



CASE STUDY

Ford transit

Renault Trafic First
Generation
1981 - 2001



IR 19

Renault Trafic
Second
Generation(X83)
2001 - 2014



IR 20

Renault Trafic Third
Generation (X82)
2014 -



IR 21

Current Tata Winger is a version of Renault Trafic First Generation. It shows that design of the vehicle is almost 10 to 15 years old. .

Tata Winger

IR 22



USER STUDY

Process

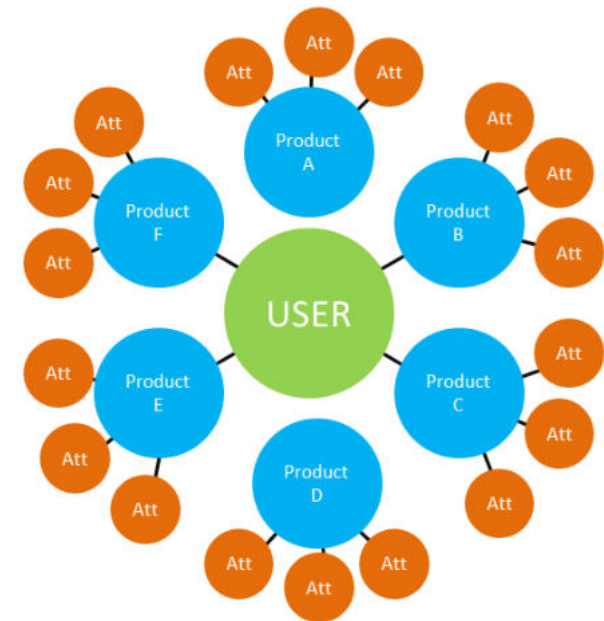
Probable Attributes

Products
possessing above
attributes

User Study

Shortlisting the
attributes

The objective of the user study is to identify the liking of the users. The user study was targeted basically 3 aspects of the project which includes trend analysis, perception of brand among users and reaction of user to different commercial vehicle forms.



USER STUDY

Questioner

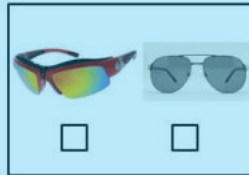
Name:-
Age:-
Occupation:-
Years:-

Perception of Brand

Which Tata vehicle you like the most?

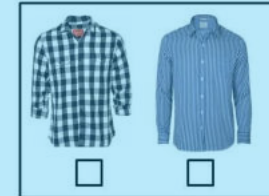
☐☐☐

Which of the following products do you think Tata will make?

☐☐☐☐☐☐☐☐

Page 1

Trend
Analysis

☐☐

Which of the following animals you associate with your vehicle?

☐☐

Which actor do you think can be a brand ambassador for Tata commercial vehicle?

Which of the following vehicle you will prefer the drive?

☐☐☐

Page 2

Perception of
Commercial
Vehicles.

USER STUDY

Result

IR 23



6

IR 24



5

IR 25



7

IR 26



11

IR 27



4

IR 28



3

IR 29



7

IR 30



5

IR 31



6

IR 32



3

IR 33



12

IR 34



3

USER STUDY

Result

IR 35



7

IR 36



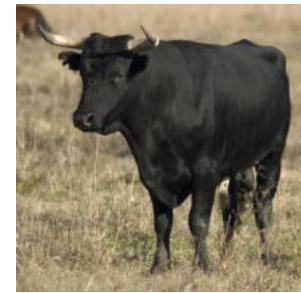
8

IR 37



3

IR 38



15

IR 39



3

IR 40



7

IR 41



1

IR 42



10

IR 43



6

IR 44



8

IR 45



4

USER STUDY

Inference

- As per my analysis while comparing the products users first find closeness between any two products and then chose the option.
- Example:- Most of the users shortlisted two out of three products quickly and then look for details.
- Most of the users show interest in products in 2 tones (multiple colors).
- Users don't prefer products which stand out, They mostly go for products which look familiar.
- Users also prefer products with balanced proportions.
- For dynamic products people prefer bulkiness and for stationary products people like sleekness.
- Most importantly 'Bigger is Better' is the approach observed among all users.

BRIEF

Restyle the existing Tata Winger considering the current trends in commercial van segment and current design language of Tata, keeping the vehicle architecture the same.

Objectives

Styling the vehicle so that it belongs to the current family of vehicles.

The aesthetics of the vehicle should connect with the other products used by users.

Technical Specifications

The vehicle is based on current Tata winger architecture. The vehicle will be a goods carrying vehicle.

Load capacity :- 2 ton

Length/ Width/ Height (mm):- 4520/1905/2050

STAGE 2- DESIGN

Mood board

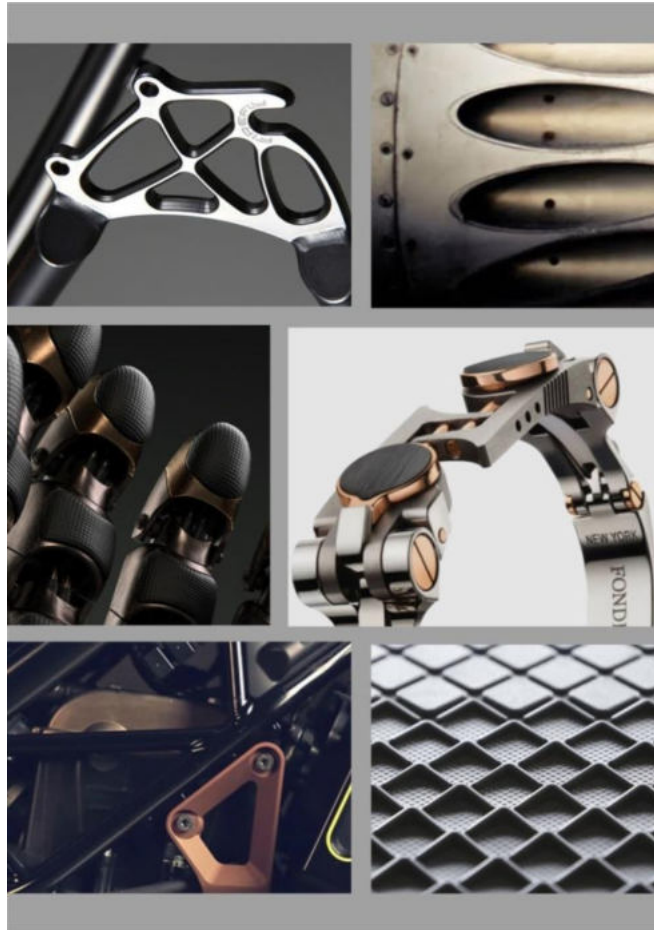
Explorations

Evaluation

Final Concept

MOOD BOARD

Attempt one



Based on conclusions drawn from users ruggedness is the feeling that users prefer in the products they use at the same time ruggedness also proves to be a correct expression for the commercial vehicle.

During this attempt the images included show structural strength. The images taken are not showing entire product to avoid biased opinion.

Feedback

The images included in the mood board do not connect with the product. Images appear to be more high-tech.

While selecting the images the overall effect of composition is not considered.

MOOD BOARD

Attempt Two



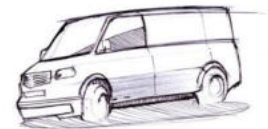
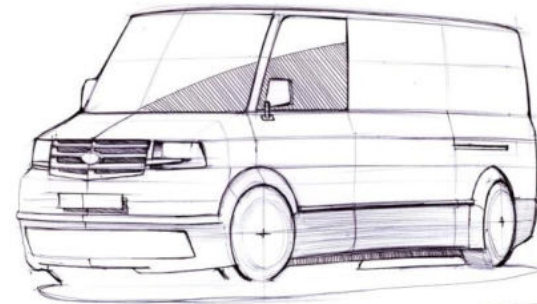
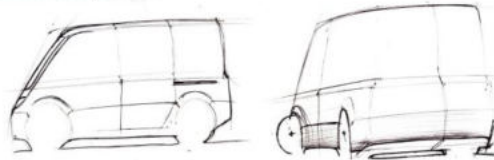
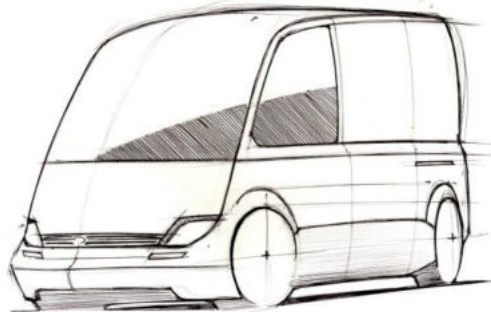
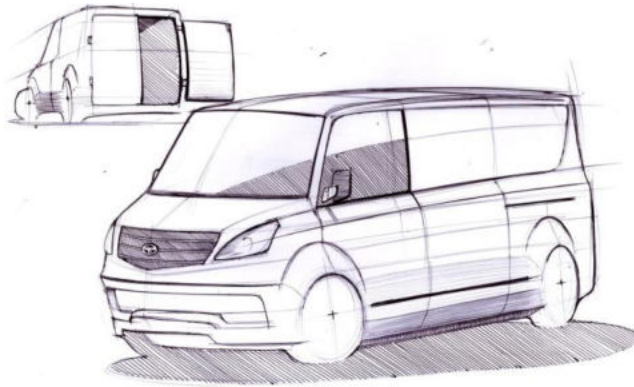
Based on feedback, the images in the mood board were changed, new images exhibit expressions like frugal, rough, hard etc. along with Rugged , which goes well with my product.

Further modifications on the images are performed to connect different images.

EXPLORATIONS

Phase one

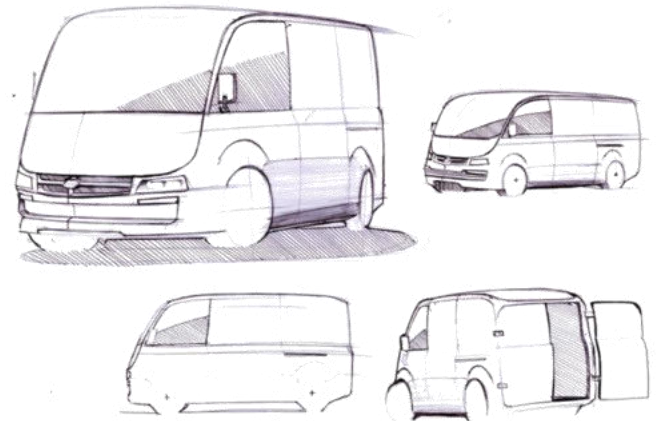
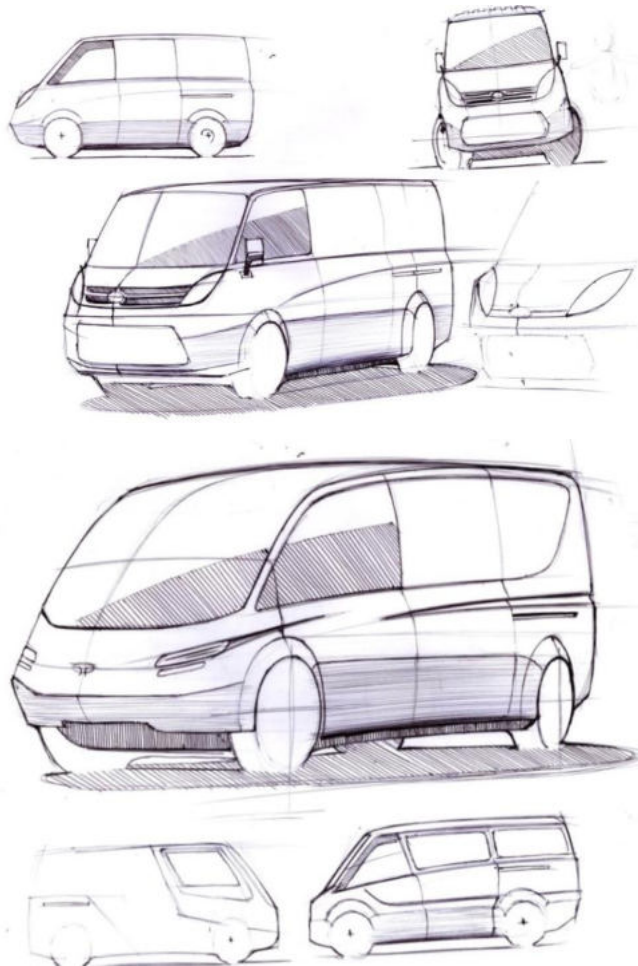
Initially the ideation was based on the different vehicles belonging to different class all belonging to Tata. Different types are Passenger vehicles, compact vehicles and multipurpose vehicles (MPV).



EXPLORATIONS

Phase one

The possible variation with existing approach does not possess the potential to generate new and non conventional ideas as it limits the scope .



EXPLORATIONS

Phase one



Concept 1



Concept 2

The previous sketches were taken to the next level and rendered to present the complete concept representing behavior of different surfaces.

Idea 1 shows flat front fascia similar to current design of Tata Winger. The intention was to link the new design with the old.

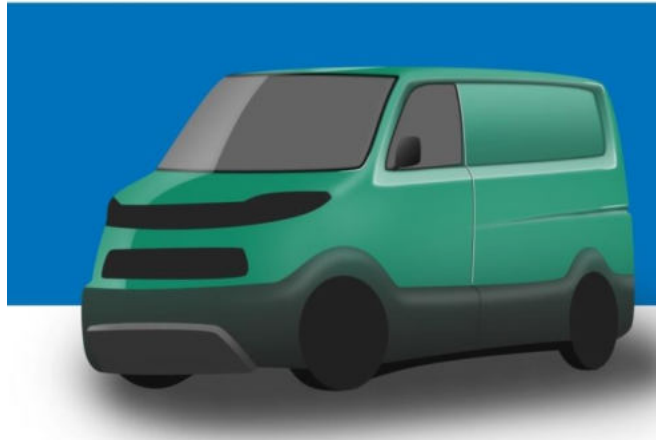
Idea 2 is inspired by expression of a MPV with bold features.

EXPLORATIONS

Phase one



Concept 3



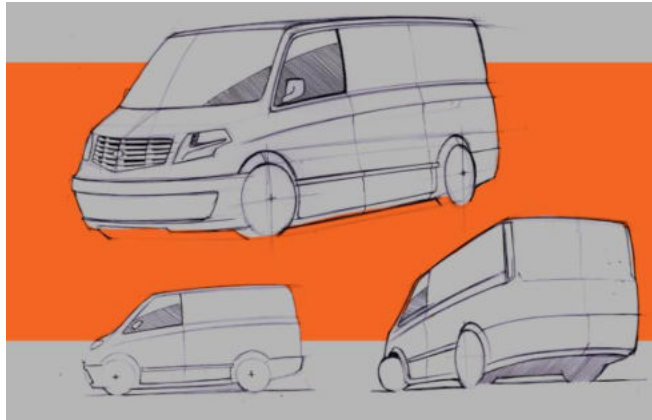
Concept 4

Idea 3 shows aggression and volume in its expression. These expression are extracted from the user study carried out.

Idea 4 is associated with the SUV segment of the brand. It dominantly shows its height.

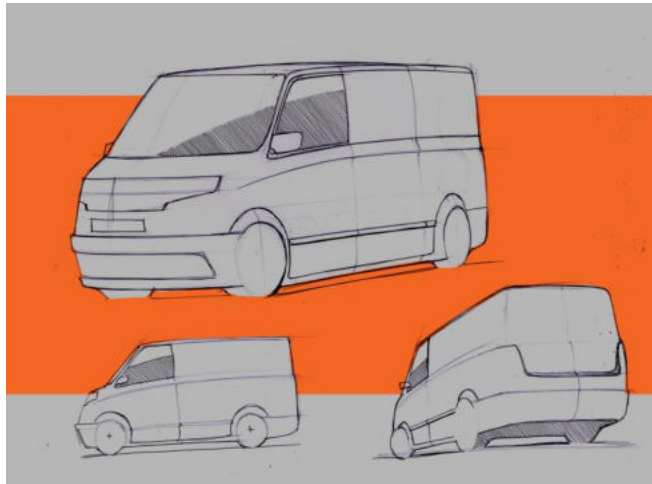
EXPLORATIONS

Phase Two



During this exploration the intent was to generate an idea and taking it forward by carrying out different changes. The exploration provided information about different expressions conveyed by different sets of proportions. The images show 2 variants with different height to length ratios. The concept with less height shows speed and muscularity.

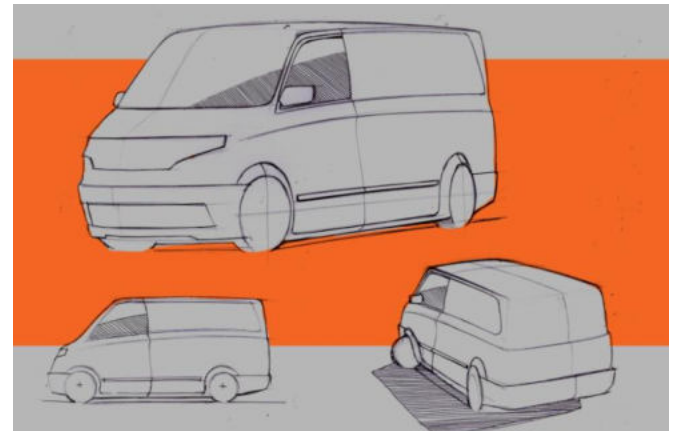
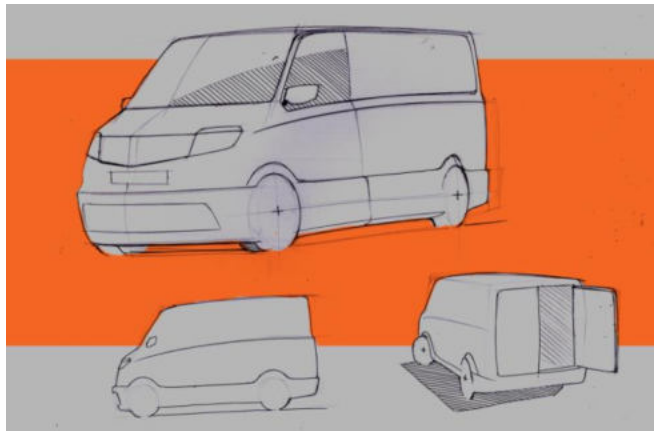
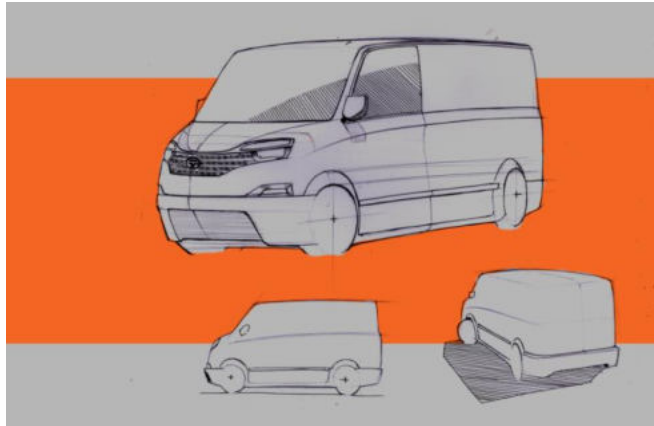
The 2nd concept with more height conveys its volume and balance.



EXPLORATIONS

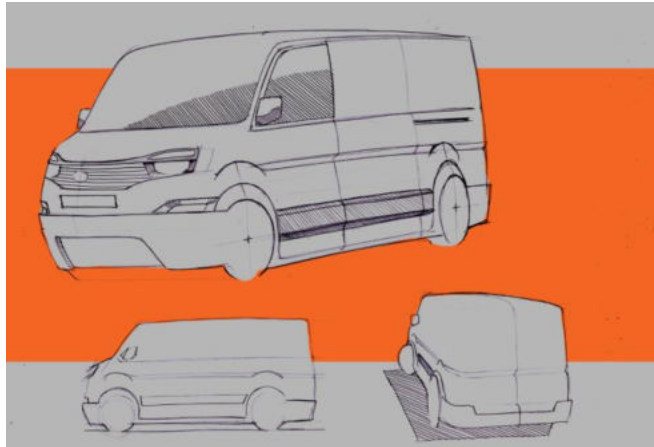
Phase Two

Different possible grill ,headlamp and bumper designs were looked at to identify the best suitable composition complimenting the form , brand and the expression. The front fascia is an important aspect of vehicle aesthetics. For many vehicles it carries the brand identity. The grill design it self is capable enough to communicate the brand.



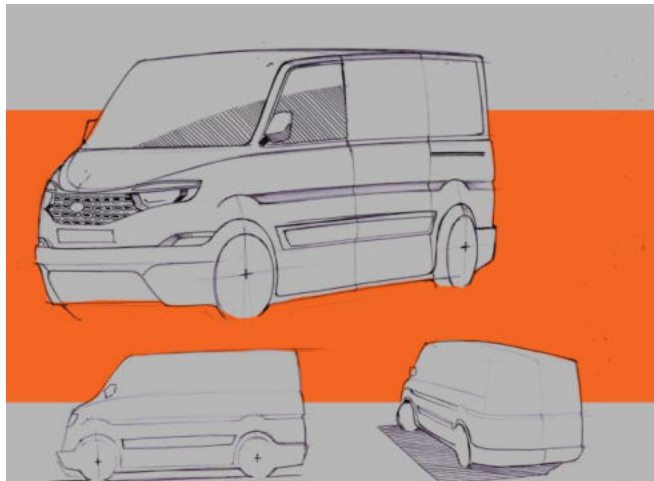
EXPLORATIONS

Phase Two



The objective was to work on different ideas for side skirts and other accessories to bring in the expression into the design. Accessories like Wheel arch cladding and side skirt cladding do influence the overall impression of the vehicle.

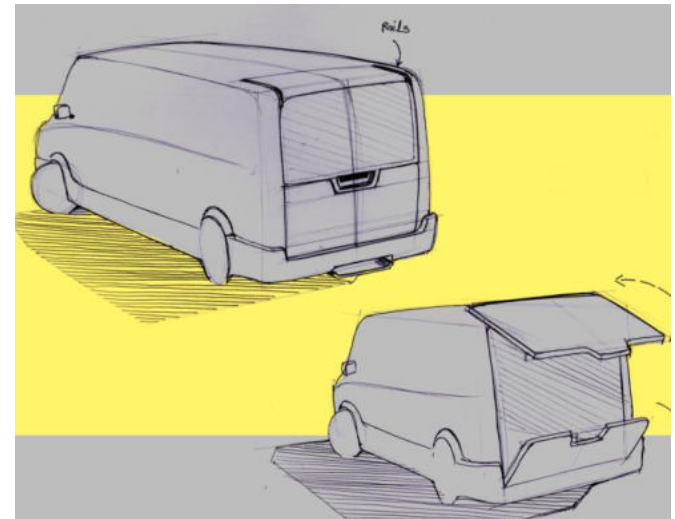
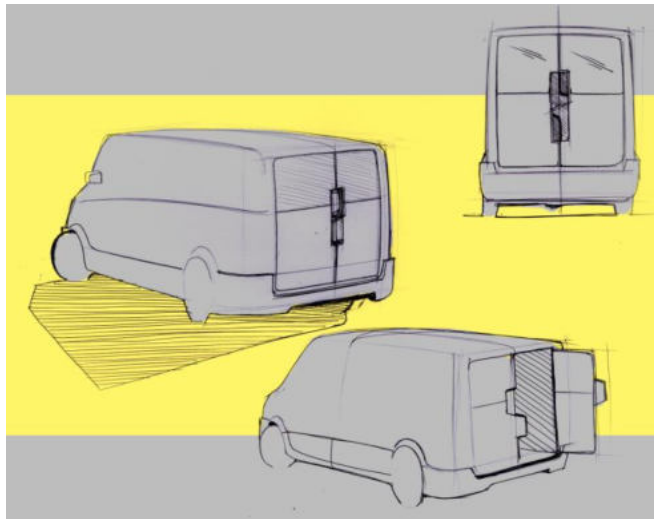
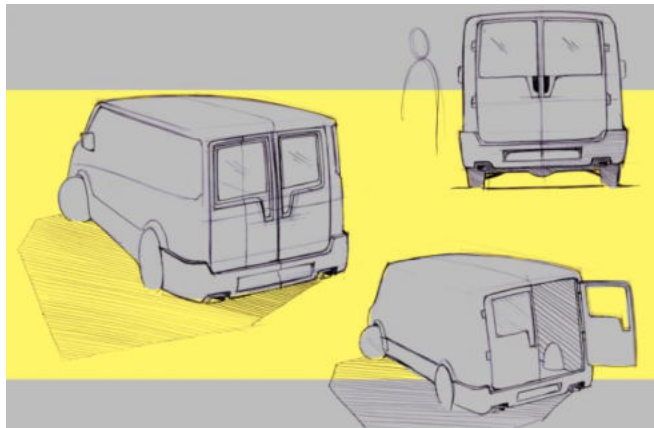
The use of accessories in case of SUVs is significant as it tries to convey its off road capability by being rugged , strong and tough. The objective for the current exploration was the same.



EXPLORATIONS

Phase Two

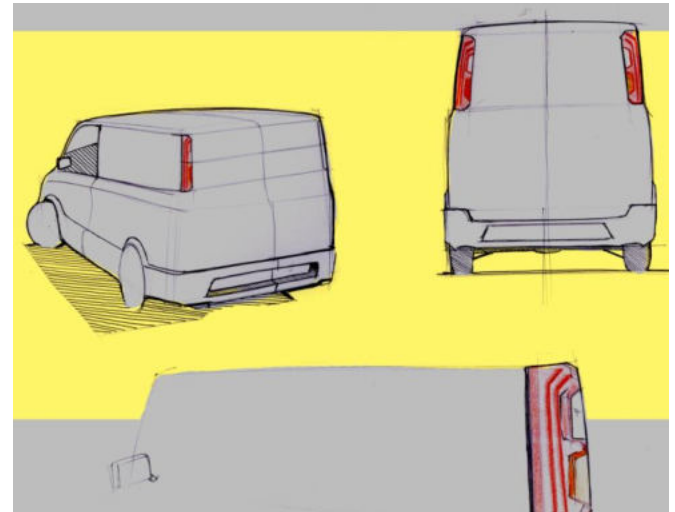
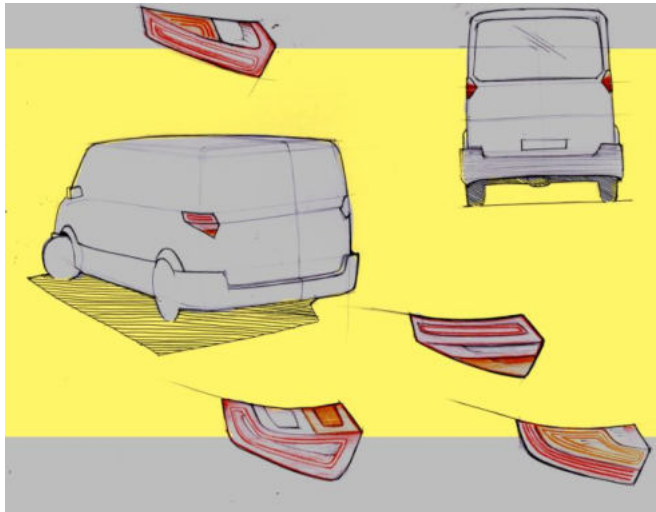
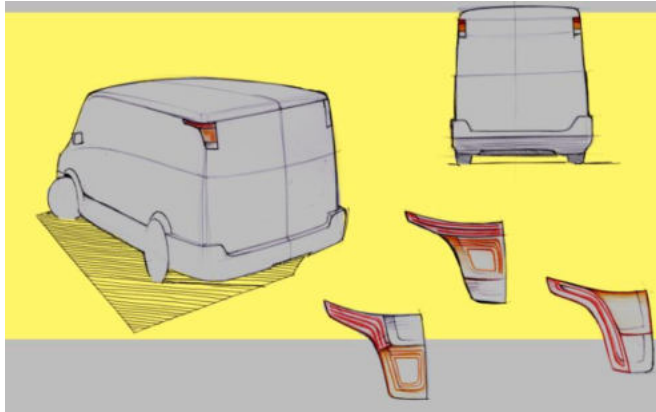
Through these exploration variations of different components present at the rear end of the vehicle are explored. The opening at the rear should also communicate the same thing as the overall vehicle form is communicating. Different and interesting door handle arrangements are explored to find the best suitable combination.



EXPLORATIONS

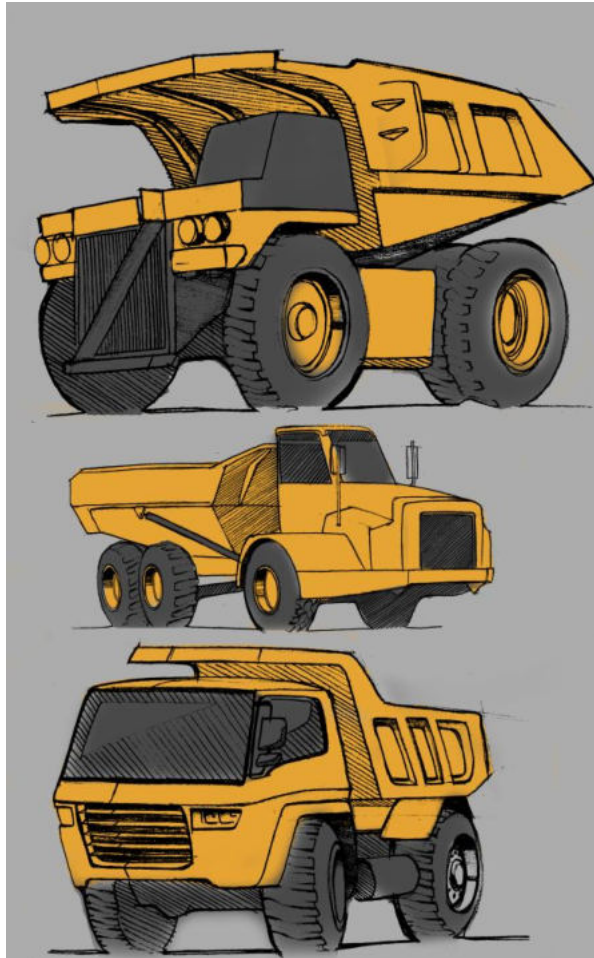
Phase Two

The images represent different possible tail lamp positions and shapes. The intent is to come up with the form which compliments the form and especially the character lines.



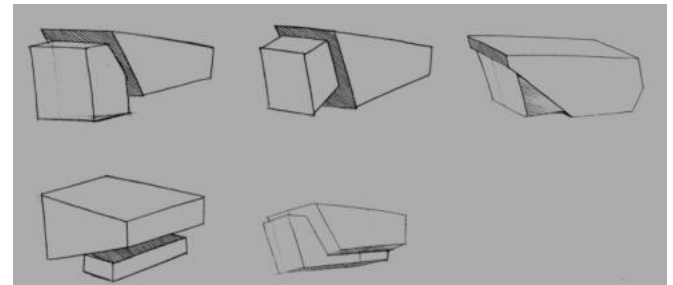
EXPLORATIONS

Phase Three



The intent behind the exploration is to explore different forms that can originate from the form of earth moving equipment. The expression of these earth moving equipment is similar to what users expect from their commercial vehicle as per my user study.

To start with firstly the an abstract form was extracted from the basic form which can be further used as a foundation for form exploration.

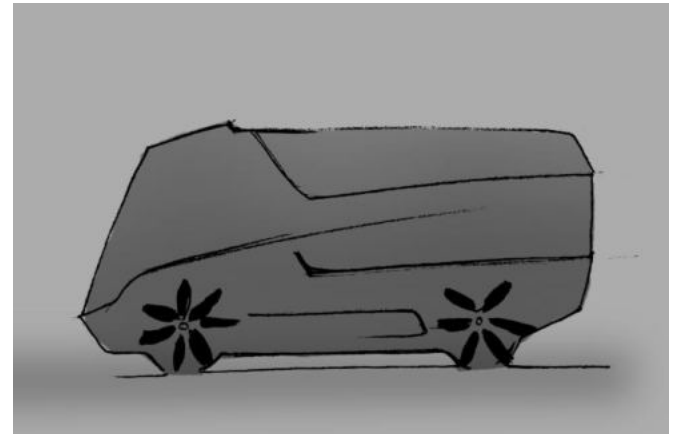
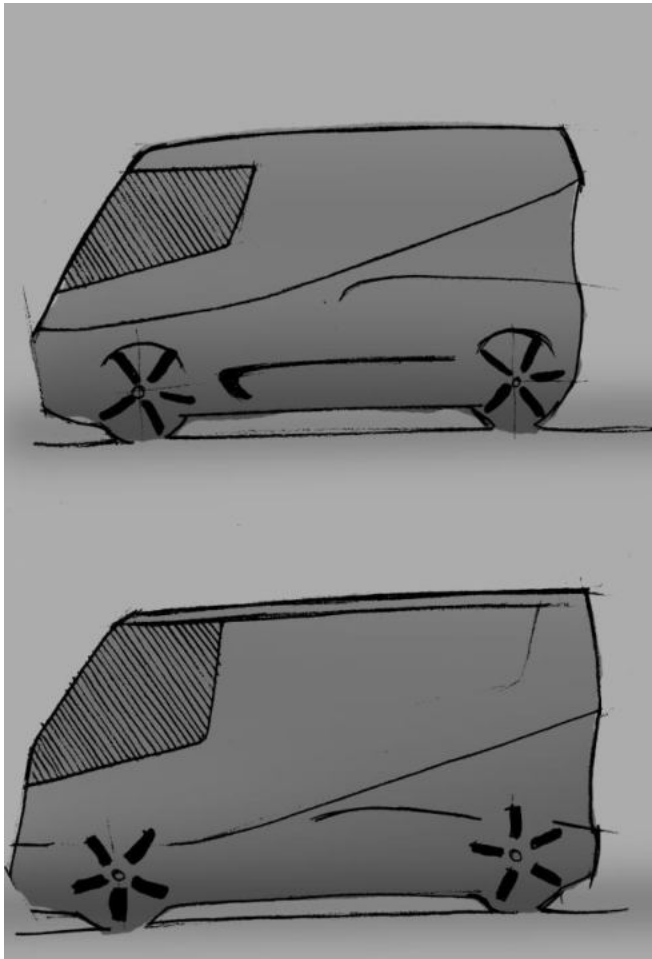


Abstract Forms

EXPLORATIONS

Phase Three

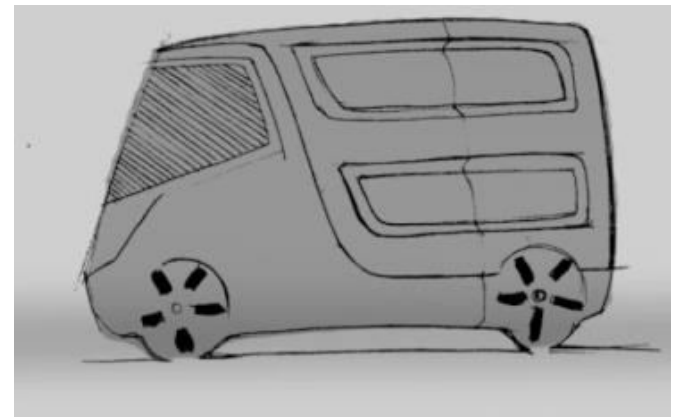
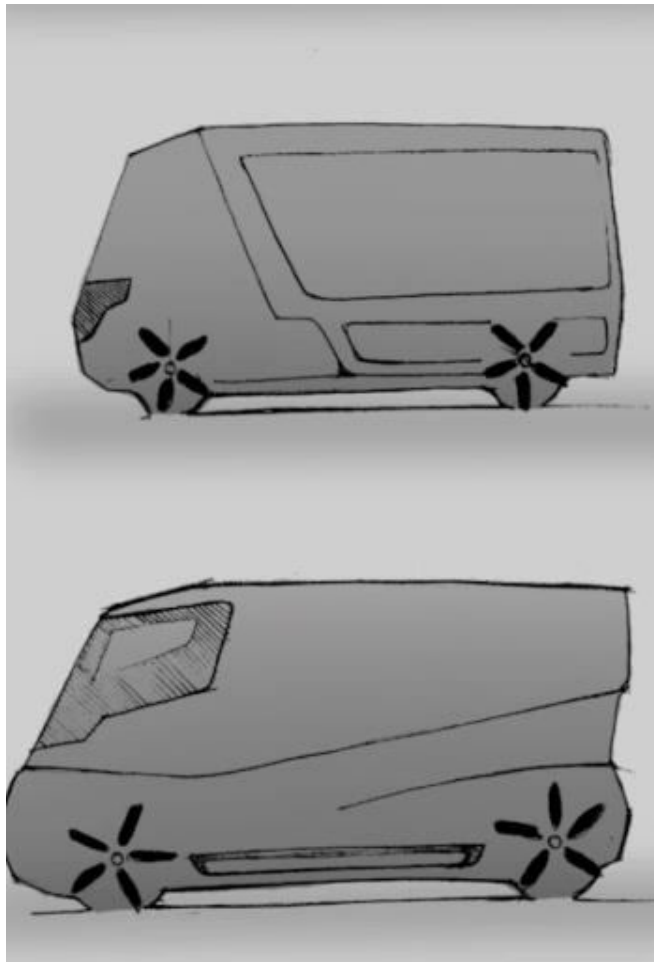
Based on abstract forms defined different explorations of the side views are performed. The intention is to bring in the essence of the abstract form in to the automotive form with all the constraints associated with commercial vehicles.



EXPLORATIONS

Phase Three

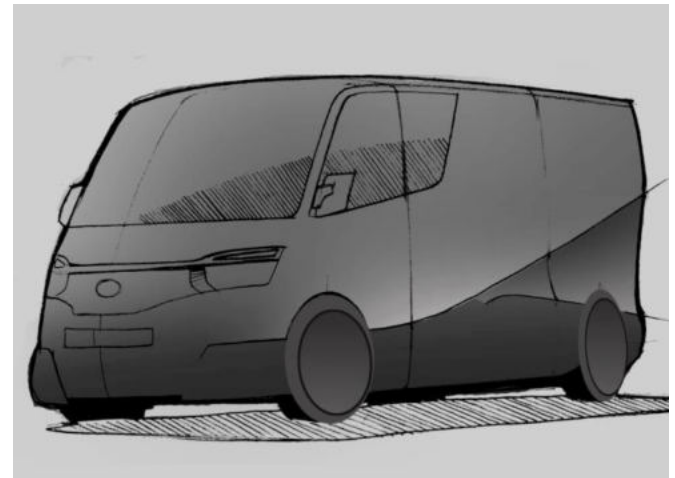
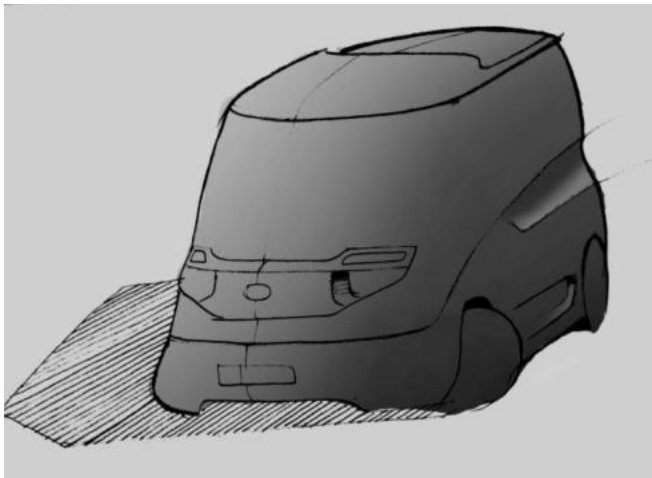
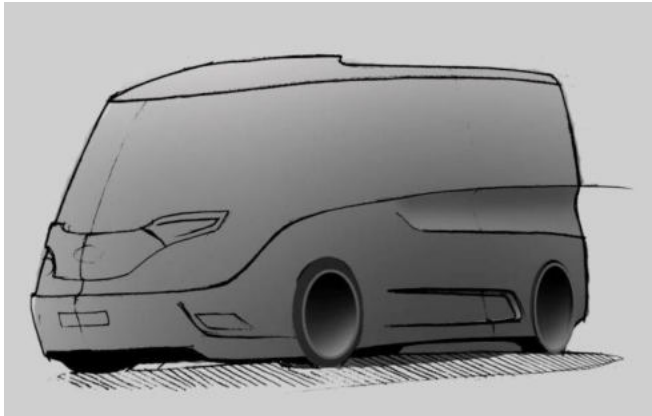
The objective is to obtain a combination of curves and silhouette of the vehicle which matches the desired expression of the form. As the inspiration is a tipper truck the character lines are straight and edges are sharper.



EXPLORATIONS

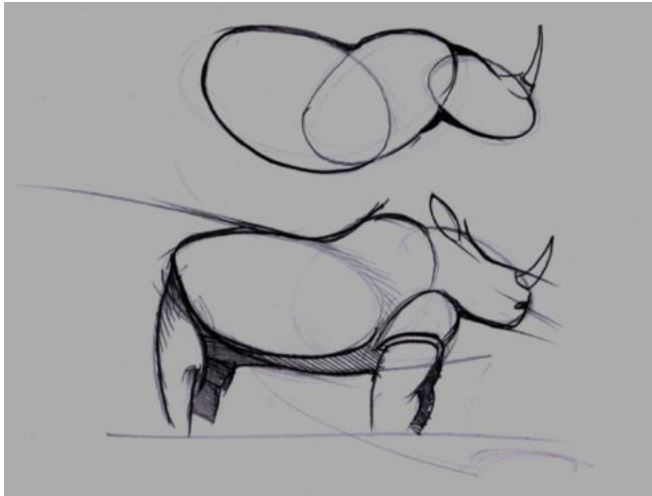
Phase Three

The volume flows toward the front of the vehicle in case of tipper trucks. The attempt is to bring that forward flow in these renders. The renders are based on the side views explored previously.

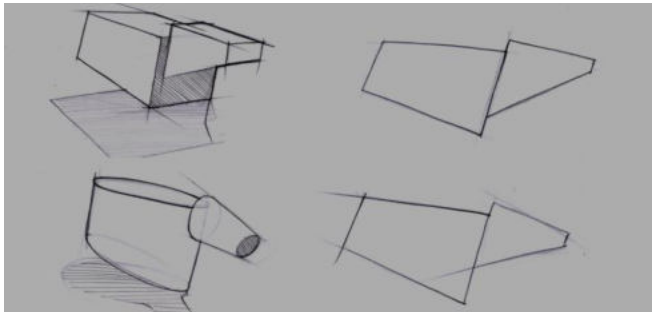


EXPLORATIONS

Phase Three



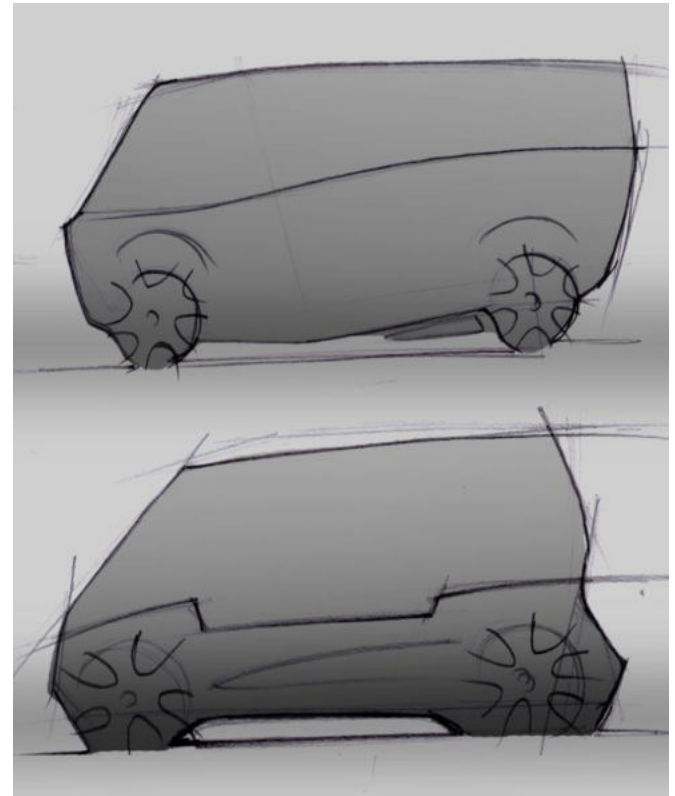
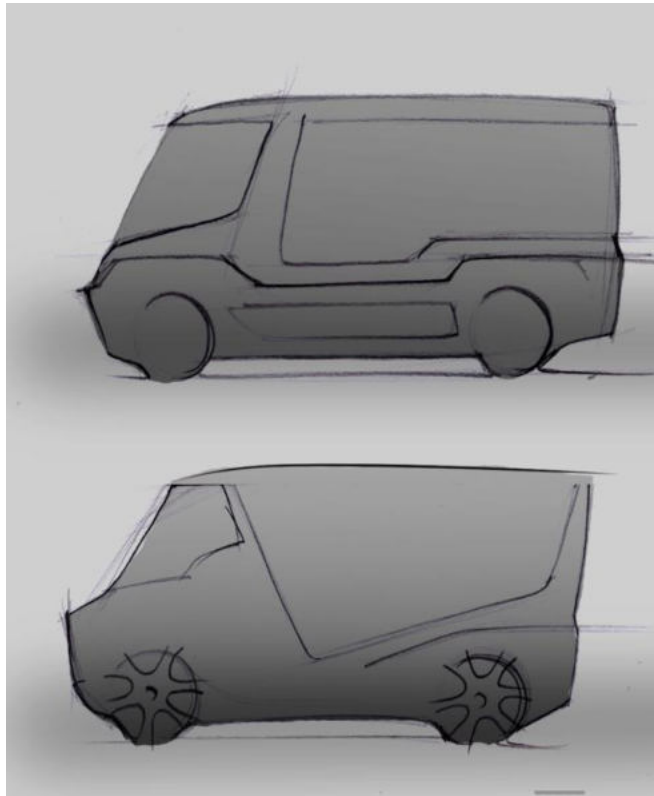
Most of the commercial Vehicles are voluminous and rugged function wise. It was appropriate to look in the nature for geometries with similar nature. The rhino is a possible wild animal matching the profile. The approach towards is as mentioned. The first objective is to come up with convincing abstract form as shown in the second figure.



EXPLORATIONS

Phase Three

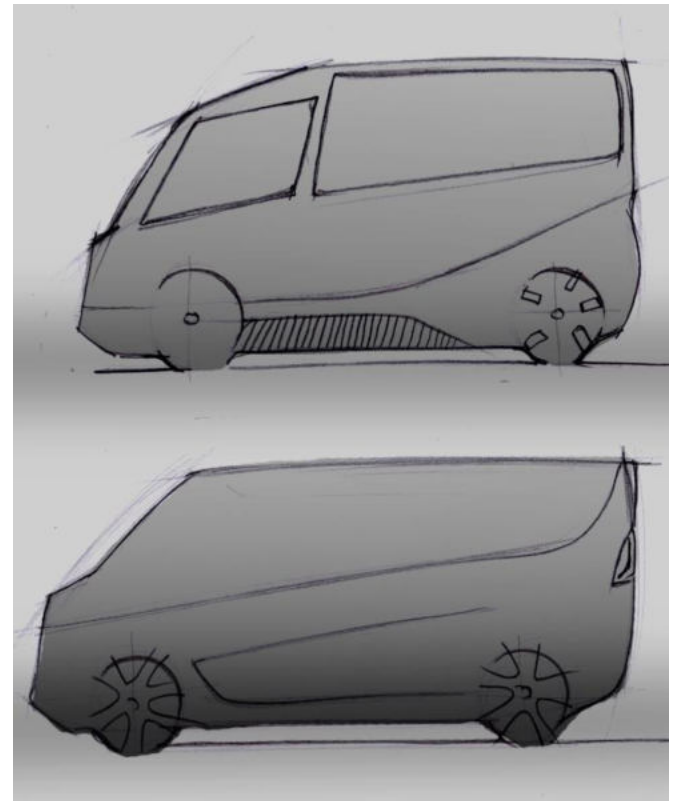
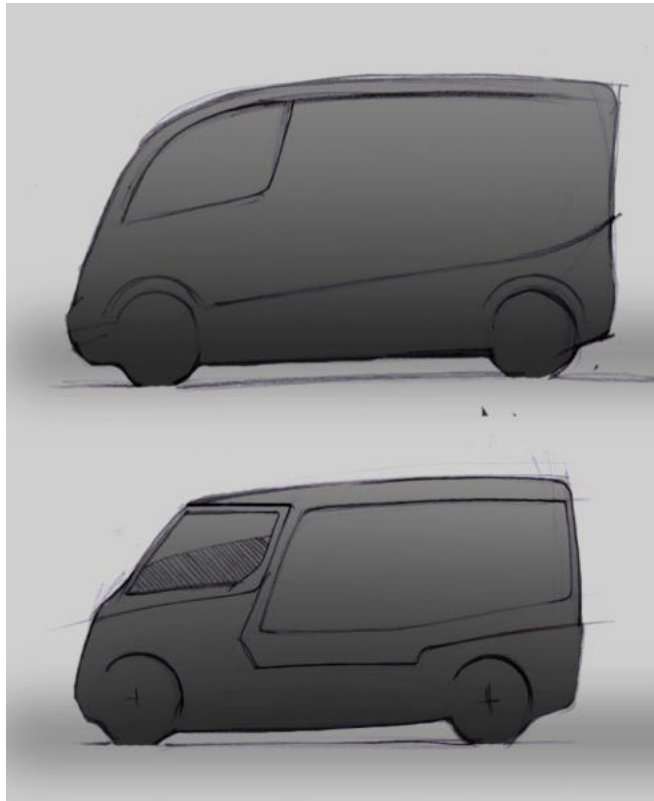
Different possible side views are explored to bring the rhinoness in the design.



EXPLORATIONS

Phase Three

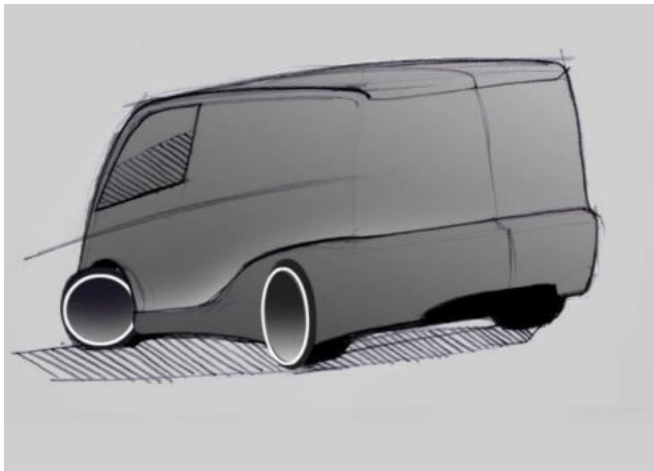
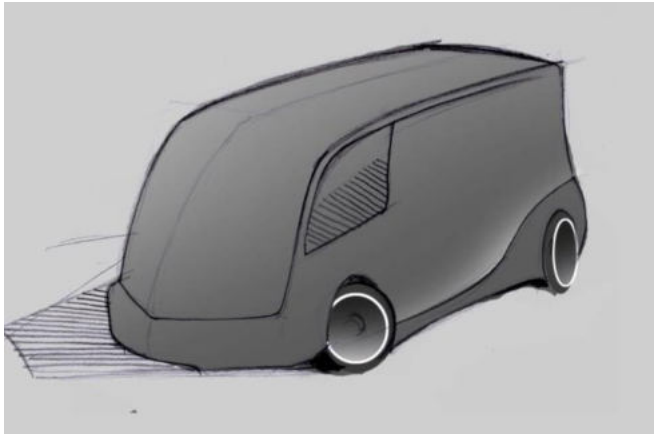
The geometry of the rhino is such way that it appears that the body of the rhino is placed on the strong legs of the rhino.



EXPLORATIONS

Phase Three

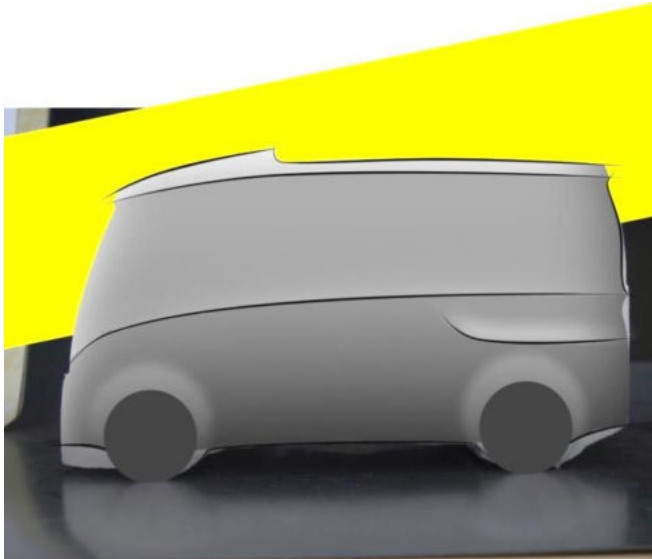
Based on side view exploration $\frac{3}{4}$ th views are generated and rendered. Considering the expression of abstract the wheels of the vehicle are given more importance. The wheels are bigger to bring the dominant look to the vehicle.



EXPLORATIONS

Phase Three

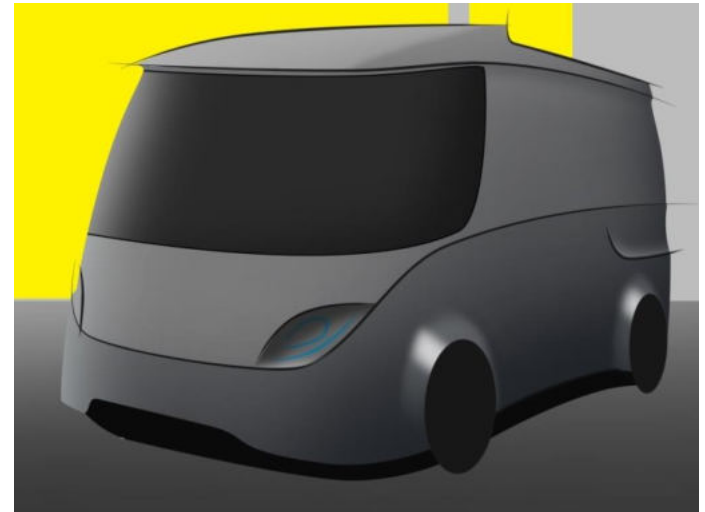
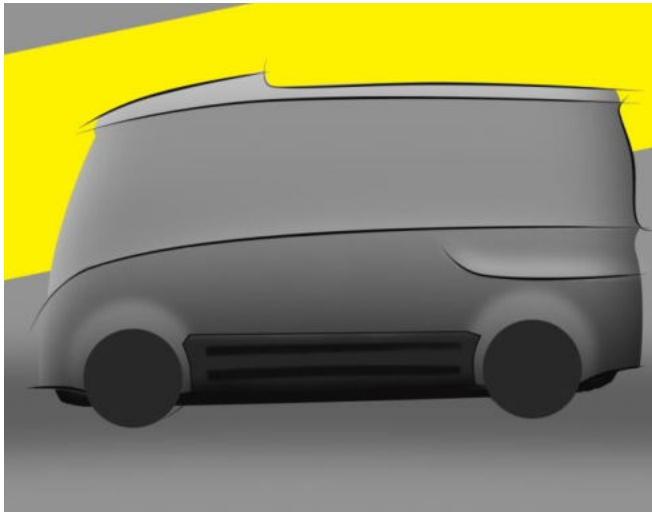
To understand the volumes better and to experiment with different surfaces, mock ups were prepared. Taking model as a background rendering is done.



EXPLORATIONS

Phase Three

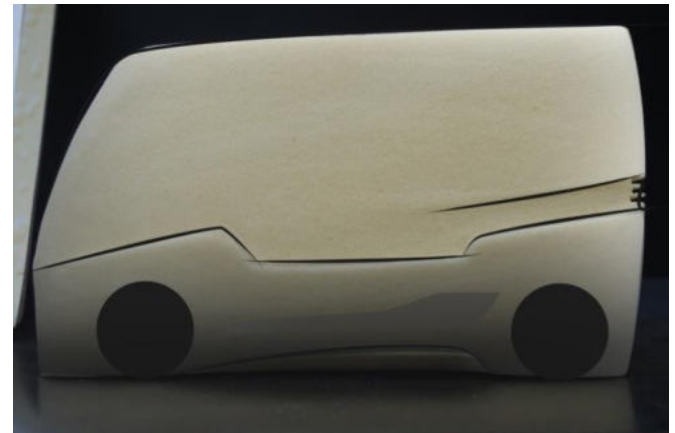
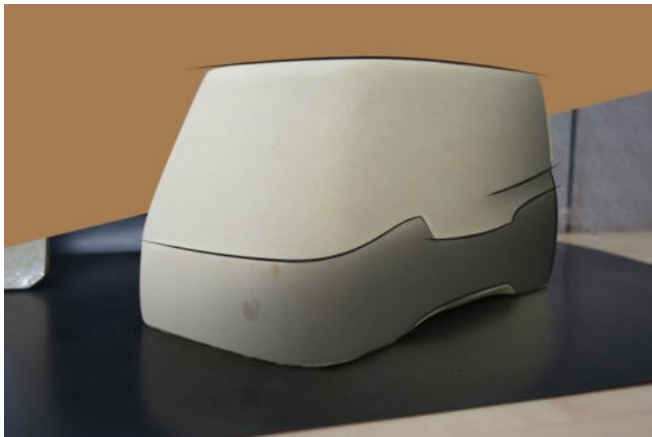
The objective is to come up with different shapes and profiles of different accessories to come up with the number of variations possible. This allows to judge different accessories on same scale.



EXPLORATIONS

Phase Three

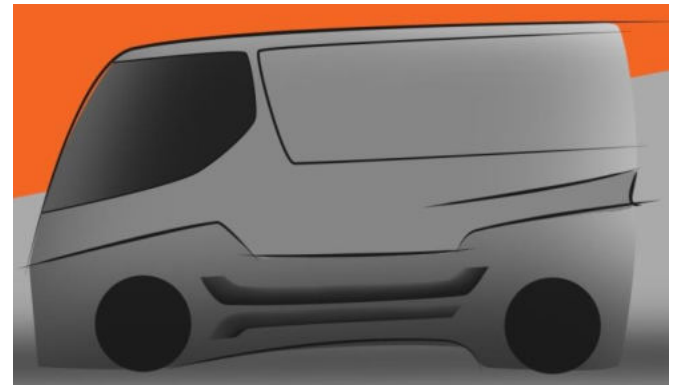
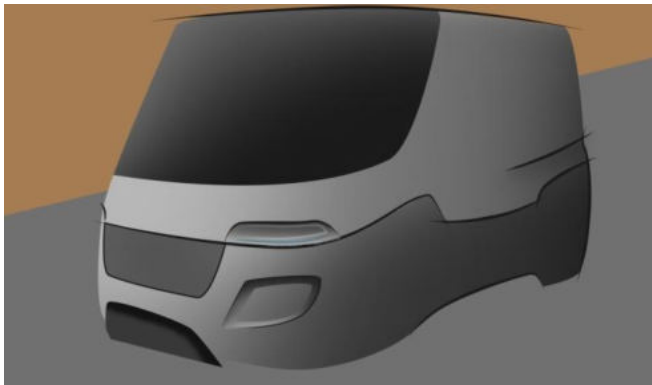
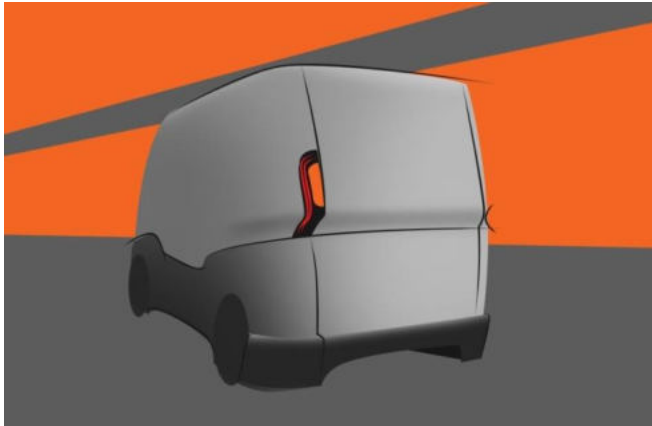
As the model is based on the abstract of rhino. The value of fillets is kept less as rhino is animal with boxy feel. Importance is also given to the positioning of the wheel also.



EXPLORATIONS

Phase Three

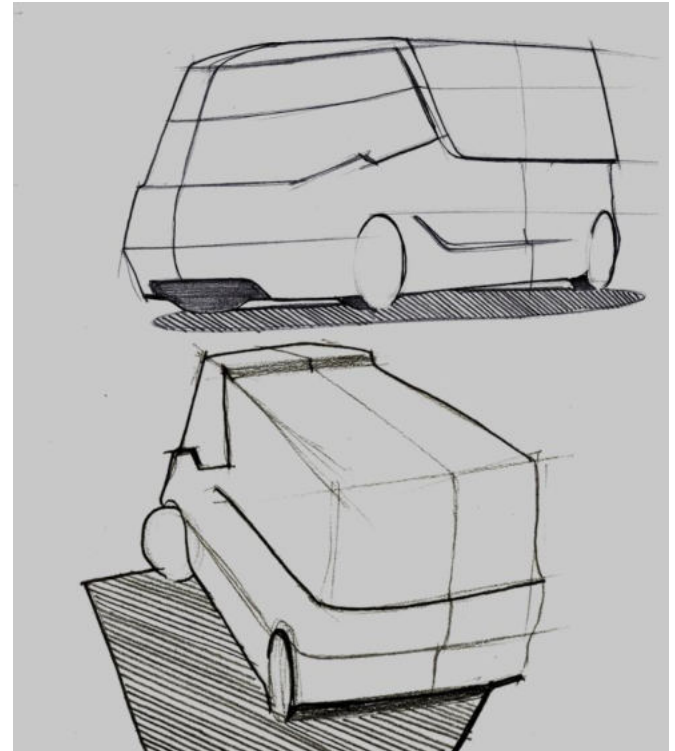
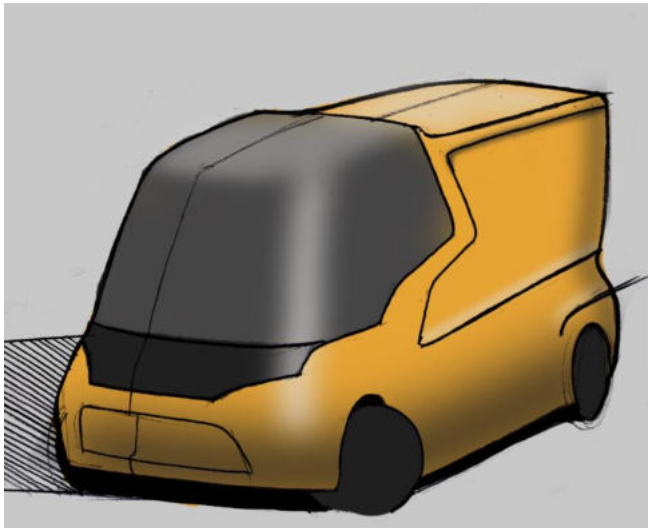
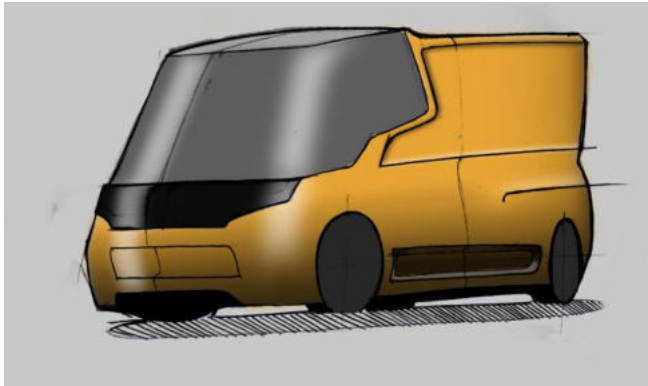
The intention is to get an idea about the possible location and profile of accessories and different components such as windshield, mirrors etc.



EXPLORATIONS

Phase Three

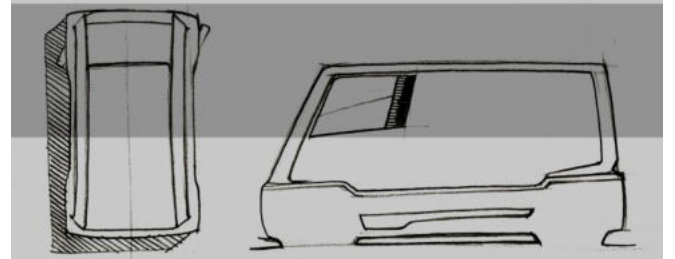
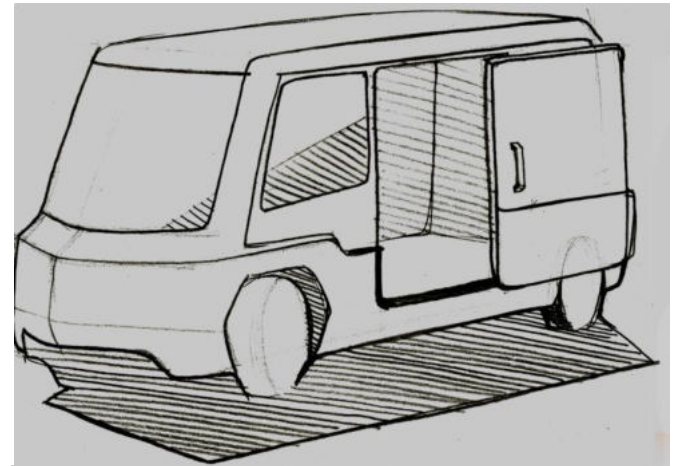
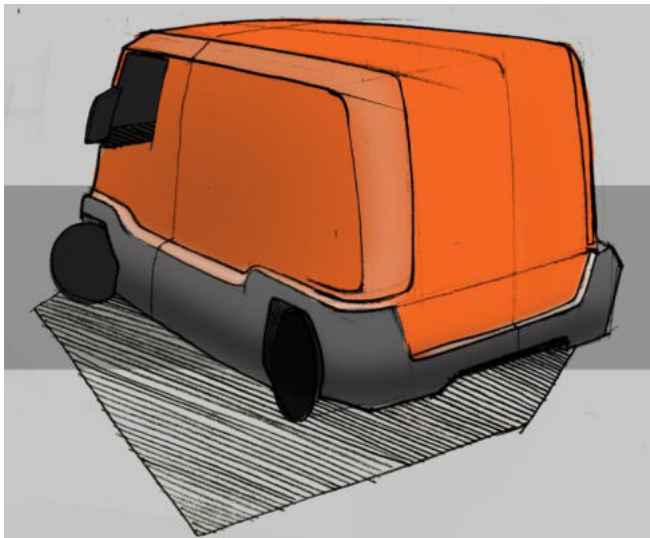
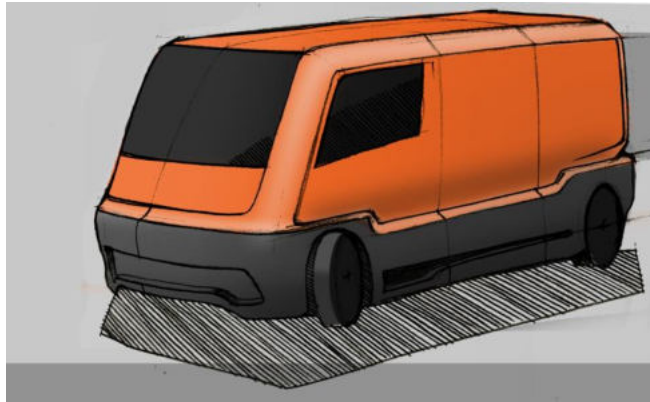
The explorations belong to the concept based on the tipper truck. To achieve the expression the top profile of the vehicle is provided with a small step. The concept is based on the side view explorations done previously.



EXPLORATIONS

Phase Three

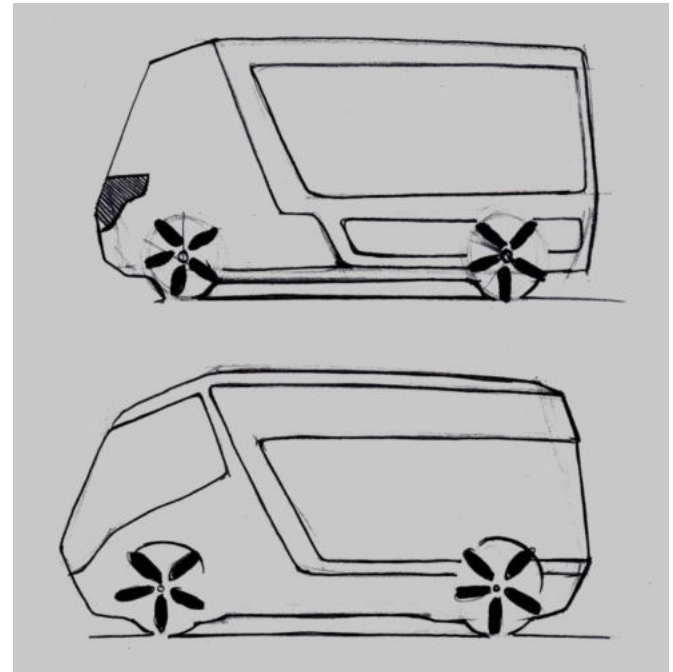
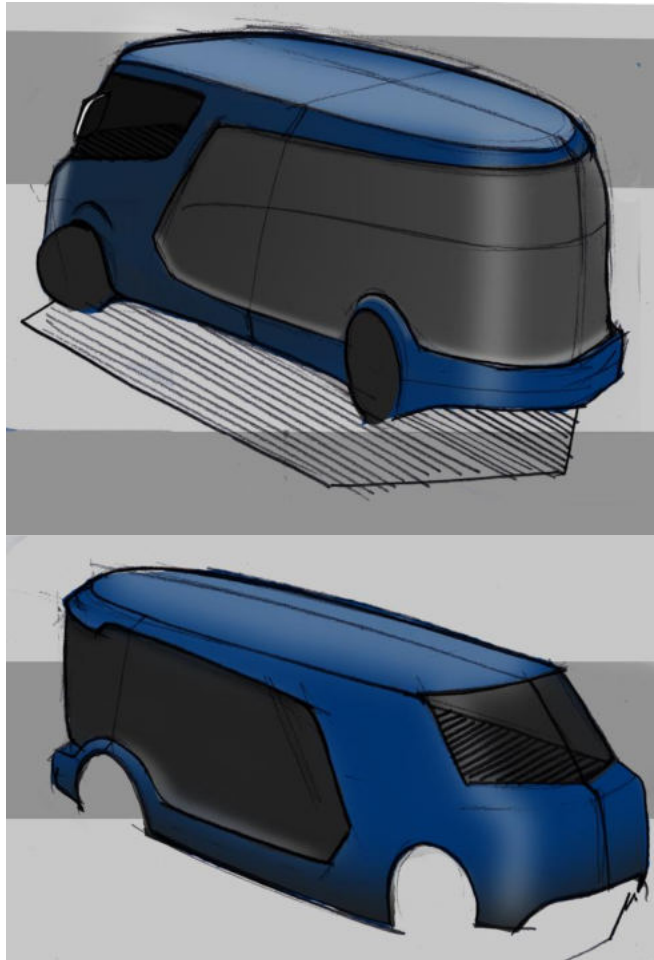
Ideas belong to the previous ideation done inspired from Rhino. In addition to previous exploration the chamfer is added to communicate the strength of the form.



EXPLORATIONS

Phase Three

To bring in the variety the third direction was explored inspired from the form of elephant. To communicate the bulge of the elephant the rear end of the vehicle is given a big fillet creating a big and continuous surface.

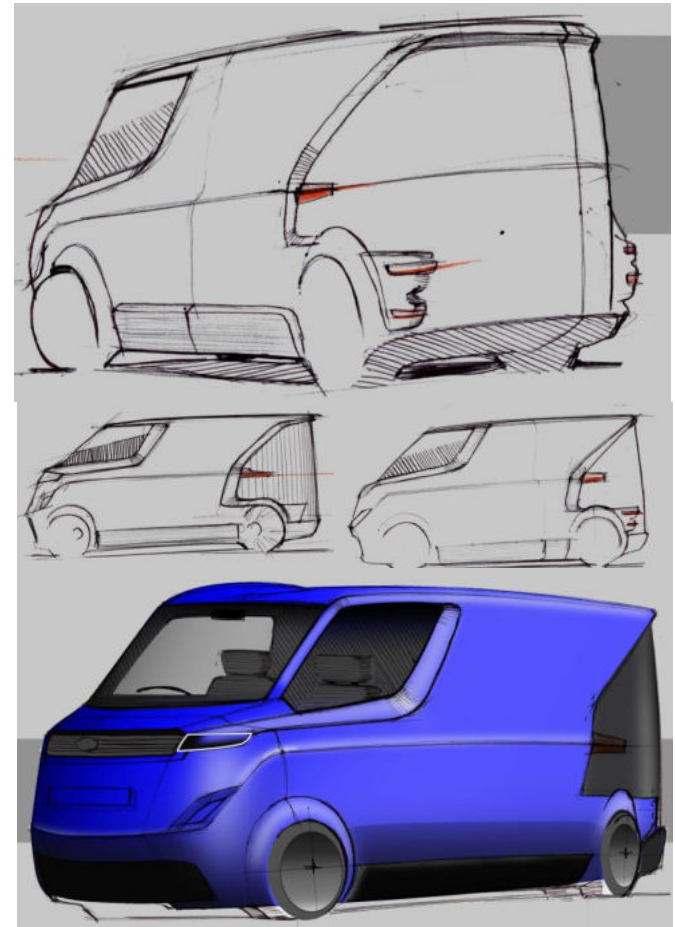
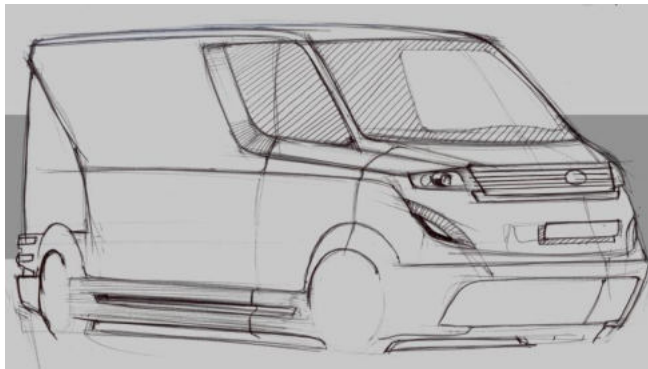


CONCEPT 2

The concept is considered for the purpose of user evaluation.

The design is a composition of sharp edgy surfaces and the surfaces with larger fillets.

The form expresses a voluminous shape retained by a rigid and tough body.



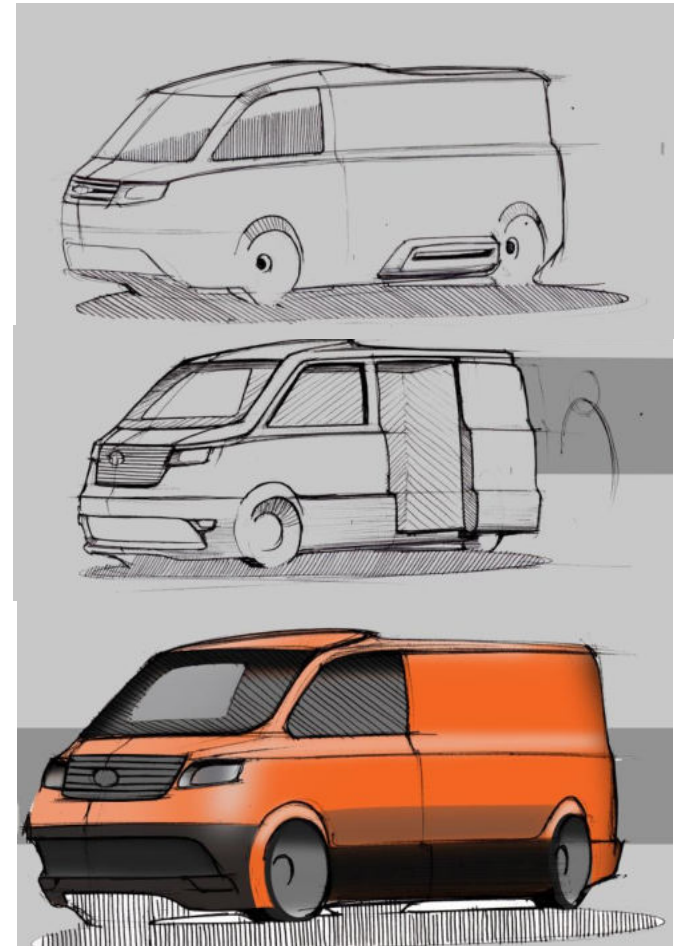
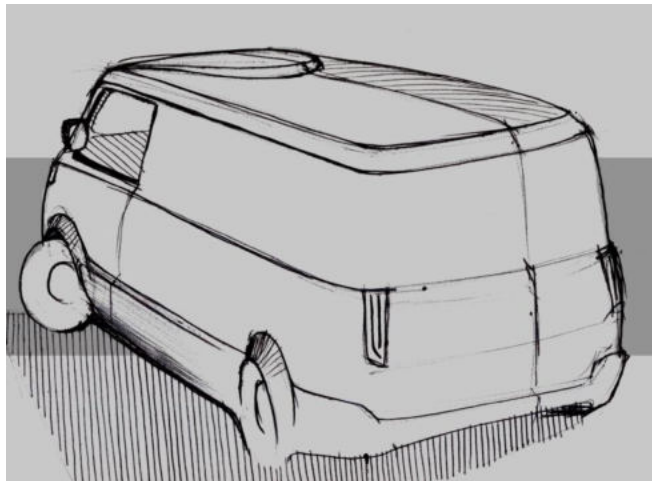
CONCEPT 3

The concept is considered for the purpose of user evaluation.

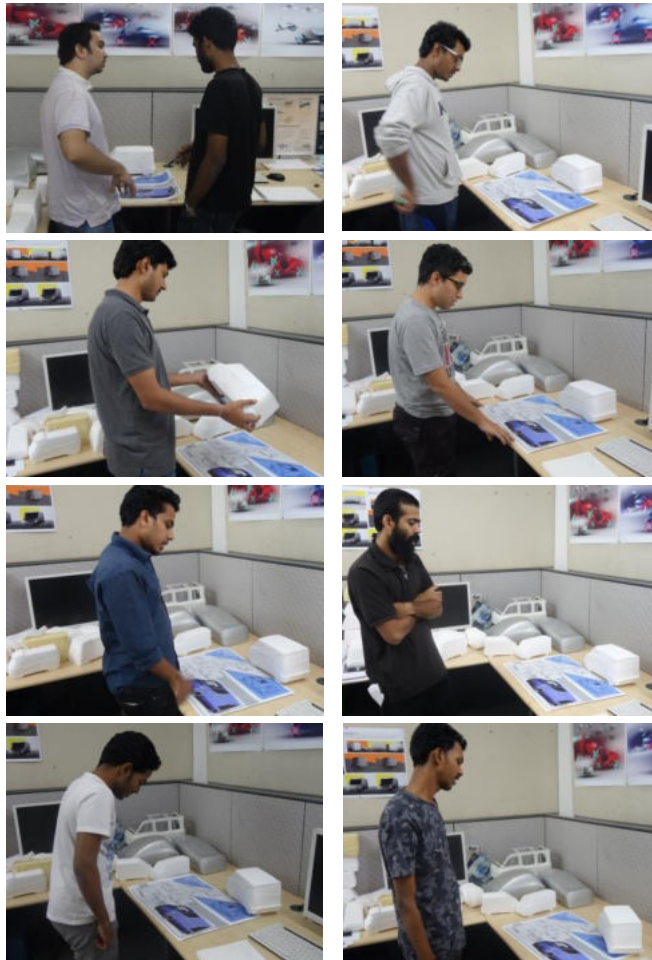
The design shows its proximity to conventional vehicle forms as well as design language of the brand.

The bump provided at the top of roof gives an different look to the vehicle.

It also brings dominance in the stance of the vehicle.



User Evaluation



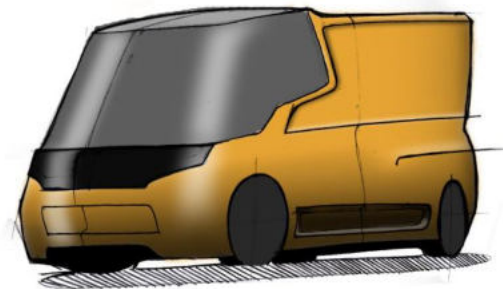
The objective of the activity is to understand the reactions of different people to
Qualification:- Designer.

User was asked to respond based on following points.

- Does it belong to the Brand?
- Does it convey that it's a commercial vehicle?
- What are the features you like or not like.?
- Does it blend with the current generation of vehicles?

User Evaluation

Concept 1



Sagar

The concept looks very boxy.
The rear end is awkward.
Tata wont make it because its too unconventional.
It does look like a goods carrier.

Gaurav

It looks like a earthmoving equipment.
The cutout at the back makes it look a passenger vehicle.
It looks heavy.
The design of drivers cabin is interesting.

Jinesh

The form looks unstable.
Its too atypical considering the Tata as a brand.

Drivers cabin is interestingly resolved.
The form appears to be top heavy.

Patric

The concept looks rugged and strong.
The 2 tone structure makes it interesting.
Its too unconventional and Tata wont make it..
The front fascia does show aggression.
The composition looks fragile.

Nikhil

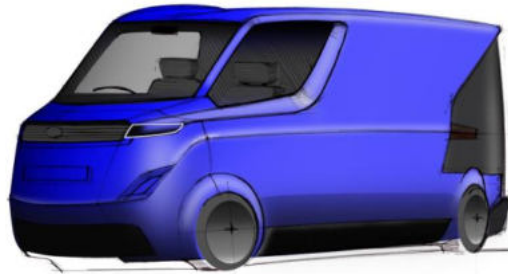
The form does connect with the tipper trucks.
It does show a strong forward motion due to shape of drivers cabin.
Its appears to be vey unconventional.
Its does not show any feature which connects it to brand.

Ajit

The behavior of driver cabin appears similar to that of storage of tipper truck. It shows intent to tilt forward.
The form does show strength.
It does not carry features to make it Tata.

User Evaluation

Concept 2



Sagar

The proportions look balanced.
The surface treatment around the DIO is interesting.
The rear of the vehicle looks fragile.
It does look like a goods carrier.

Gaurav

The concept looks fresh,
The rear end of the vehicle is interesting.
The front fascia does look like something that Tata can make.
Area occupied by grill is bit less.

Jinesh

The concept does belong to the Tata design

language..

The rear cutout and curvature at the rear end is new.

Patric

The concept looks voluminous and strong.
The flow generated in the surfaces due to rear cutout is interesting.
The position of indicator is something new.

Nikhil

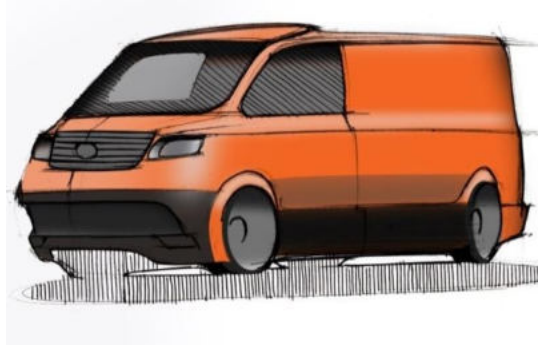
The treatment for fog lamp housing is interesting .
The surface treatment does take the concept close to existing range of urban vehicles like passenger vehicles, SUV's, MPV's and compact cars.
Forward flow of surfaces created due to DLO and rear cutout is new.

Ajit

The stance of the vehicle shows forward motion.
The form also shows certain kind of alertness in it due to front fascia.
The surface treatment around the DLO is fresh and new.

User Evaluation

Concept 2



Sagar

Vehicle looks a bit short to be a commercial vehicle.

It look very close to current Tata vehicles.

Its bit dull.

It look heavy.

Gaurav

It looks very common due to shoulder line position and its behavior.

It looks short to be a goods carrier.

Front bumper looks very common and old.

Jinesh

The bump provided at the front of the vehicle is

interesting.

The concept looks more like a passenger vehicle than gods carrier.

It does appear similar to the current range of Tata vehicles.

Patric

The concept looks very conventional.

The height of the vehicle is less for a goods carrier.

Front fascia is very common for Tata MPVs.

It does look muscular.

Nikhil

The design does blend with the current range of vehicles.

The front bumper is very common.

Ajit

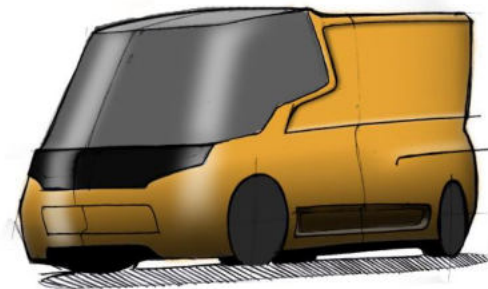
The vehicle shows more speed but it does not show intent to start and stop quickly.

The structure of the vehicle is very common.

Front grill does link it to Tata MP vehicles.

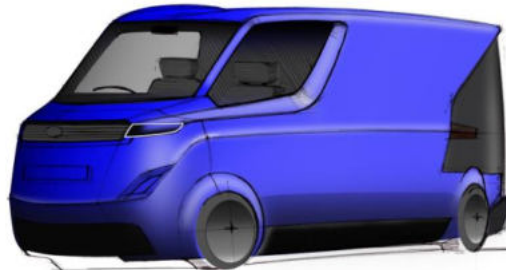
User Evaluation

Results



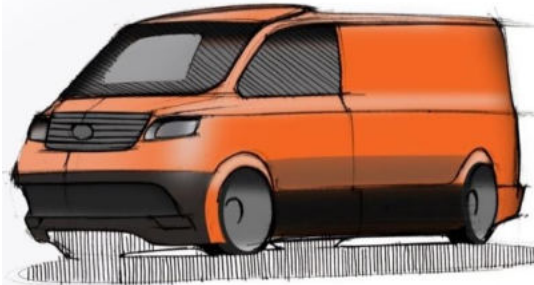
Concept 1

The feedback received indicates that the product connects well with the inspiration but fail to communicate brand and its work profile.



Concept 2

The concept links well with brand and its work profile. It also exhibits different new features not present in the existing commercial vehicle. Overall the concepts conveys all the expression expected from it.



Concept 3

The concepts 3 falls very close to the current range of vehicles. The concept does not show any new or interesting feature.

Final Renders

Side View



Final Renders

Front 3/ 4 View



STAGE 3-MODEL MAKING

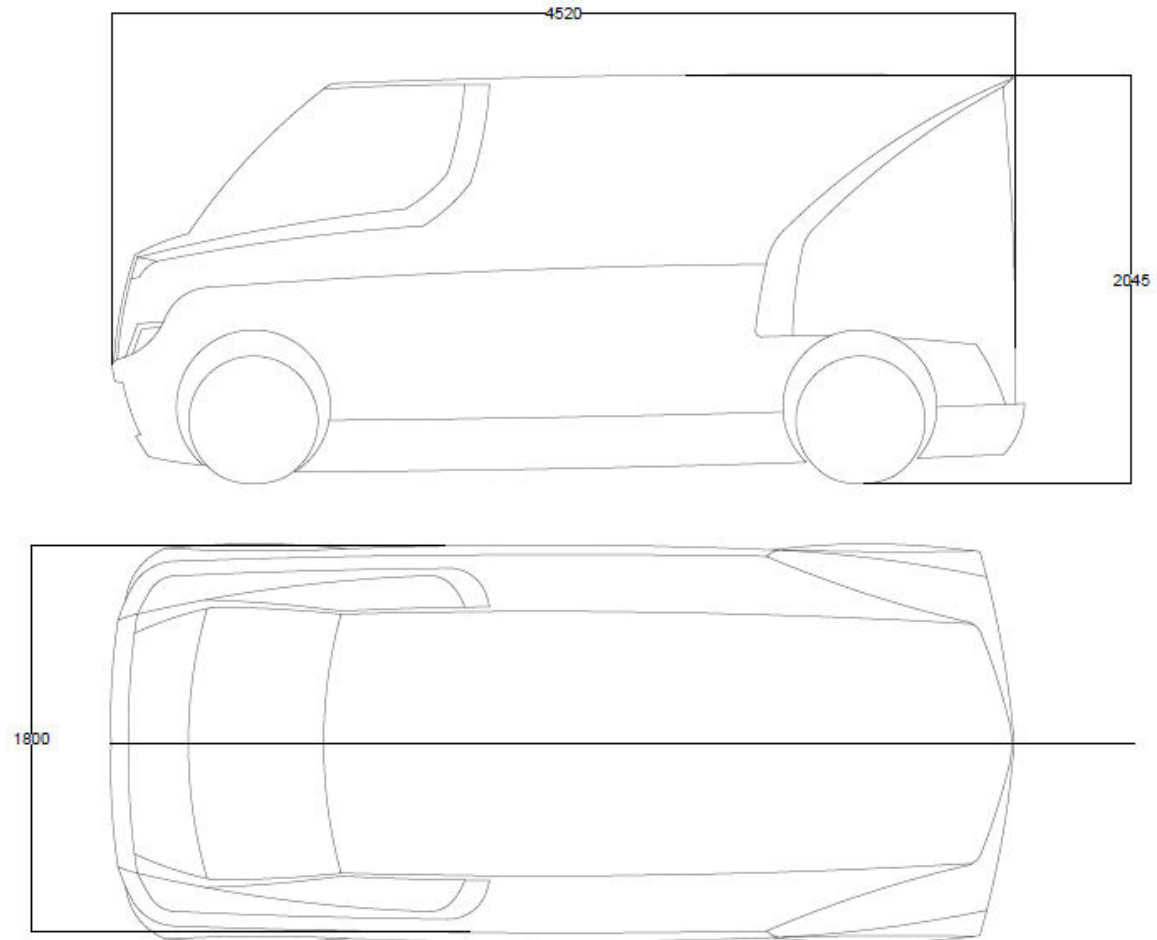
Physical Modelling

Reference

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3D MODEL

Drawings



3D MODEL

WIP



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