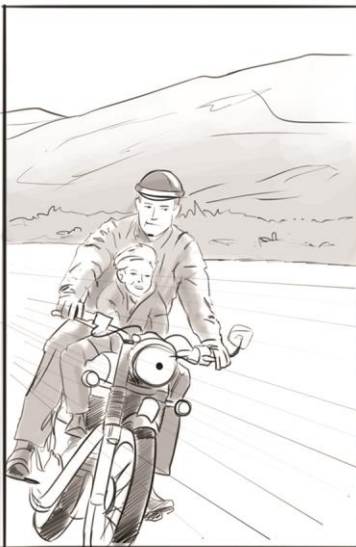
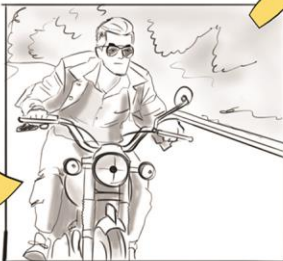
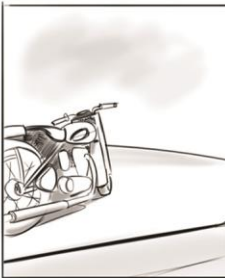
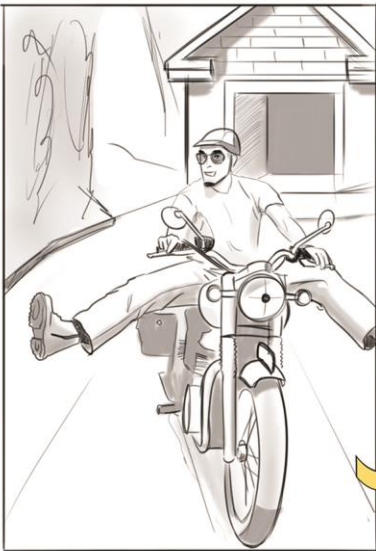


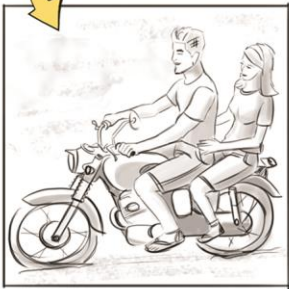
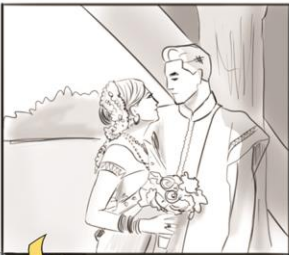
Styling of a three - wheeled motorcycle
for avid elderly riders

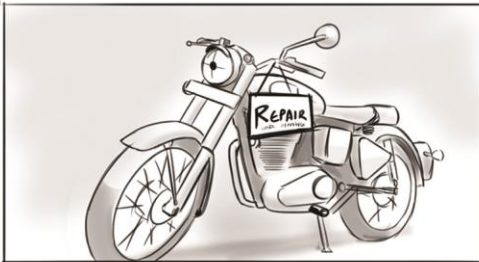
by - Abhishek Gogoi
Guided by - Dr. Sugandh Malhotra

MOTORCYCLIST









decades go by ...



one fine event ...

rekindles their early memories ...





Classis Reminisce - Motorcycles of the Yesteryears



Royal Enfield Bullet 350

1955

The *Enfield Cycle Company*, originally responsible for designing and producing the Royal Enfield Bullet, partnered with *Madras Company* to form Royal Enfield India.

The first lot of motorcycle brought purely for the use of Army and the Police was the Royal Enfield Bullet 350. A fleet of 800 were ordered by the government.



Jawa 250 Type 'A'

Jawa and Yezdi bikes, especially the ones with fuel tank paddings and ignition systems on the fuel tank are now collectors items.

*The catchphrase for the bikes sold by the firm was
"Forever bike, Forever value"*



Yezdi Roadking 250

Introduced in the late 1970s, the Roadking had a prominent tank and came in Jawa maroon color and black with gold stripes.



Yezdi OilKing

During the late 1970s, another model known as Oil King was also launched which featured an oil pump for the 2T mix with petrol but later production ceased



Rajdoot GTS (Bobby)

Rajdoot (Escorts Group) introduced a mini motorcycle which was a first for the Indian market, **GTS Bobby**.

It used the 175cc 2-stroke engine mated to a 3-speed gearbox.



Royal Enfield Crusader

Introduced in the market targetting the youth, was powered by a 173cc single cylinder engine.



Royal Enfield Mini Bullet 200

Launched in 1973, it was first named Enfield 200 but later the name was changed to Mini Bullet 200 as a marketing strategy. Mini bullet was developed as an advanced version of 173cc Villiers powered Crusader and was a first choice of racing enthusiasts.



Rajdoot 350 (Yamaha RD 350)

Escorts Groups, manufactured the **Rajdoot 350**, under license from **Yamaha Japan**, modified to suit Indian conditions.

It was launched in the year 1983.

It was primarily targeted at the Royal Enfield Bullet 350, the Yezdi 350 Twin was another competitor.

However, the Rajdoot 350 was not a commercial success due to its relatively high fuel consumption in a cost-conscious Indian market.

A short survey

Dear ones, answering this google form will help me establish my case! :D It is for my final semester Design Project. Thank you! :D

*Required

1. Please enter your name here! :)

2. Your age:

3. And your profession:

4. Do you ride motorcycles? Or do you used to ride motorcycles? *

(Mark only one oval)

☐ I used to [Skip to question 5](#)

☐ I still do [Skip to question 8](#)

Untitled section

5. Why have you stopped riding? *

Untitled section

When you look at these bikes; Picture 1



Royal Enfield Bullet



Royal Enfield Bullet

Picture 2



Royal Enfield Bullet

Picture 3



Royal Enfield Bullet

6. Which one reminds you of your best memories? *

(Mark only one oval)

- ☐ Royal Enfield Bullet
- ☐ Royal Enfield Bullet
- ☐ Royal Enfield Bullet
- ☐ Royal Enfield Bullet
- ☐ Royal Enfield Bullet
- ☐ Royal Enfield Bullet

7. Any specific reason as to why the chosen picture? Feel free to express your heart! :)

Picture 3



Royal Enfield Bullet

8. No restrictions, would you purchase a new motorcycle now? *

(Mark only one oval)

- ☐ Yes
- ☐ No
- ☐ Maybe

9. How do you envision your perfect motorcycle ride? *

(Mark only one oval)

☐ Long distance/Adventure trip with family

☐ Short distance

☐ Both

10. If there is a motorcycle that addresses most of your concerns, how would you use it? *

(Mark only one oval)

- ☐ Long distance/Adventure trip with family
- ☐ Short distance
- ☐ Both

A short survey

Dear ones, answering this google form will help me establish my case! :D It is for my final semester Design Project. Thank you! :D

*Required

1. Please enter your name here! :

2. Your age:

3. And your profession:

4. Do you ride motorcycles? Or do you used to ride motorcycles? *

Mark only one oval.

- ☐ I used to Skip to question 5.
☐ I still do Skip to question 6.

Untitled section

5. Why have you stopped riding? *

Untitled section

When you look at these bikes; Picture 1



Jawa 250 W Type



Royal Enfield Bullet

Picture 2



Yash Roadster

Picture 4



Rajput Bobby

6. Which one reminds you of your best memories? *

Mark only one oval.

- ☐ Jawa 250/Royal Enfield Bullet
☐ Yash Roadster 250
☐ Rajput Yamaha RD 250
☐ Rajput Bobby
☐ None of them.

7. Any specific reason on why the chosen picture? Feel free to express your heart! :)

Picture 3



Rajput Yamaha RD 250

8. No restrictions, would you own a new motorcycle now? *

Mark only one oval.

- ☐ Yes
☐ No
☐ Maybe

9. How do you explain your perfect motorcycle ride? *

10. If there is a motorcycle that addresses most of your concerns, how would you use it? *

Mark only one oval.

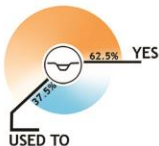
- ☐ Long distance/Adventure trips with spouse
☐ Solo riding
☐ Both

QUANTITATIVE USER ANALYSIS

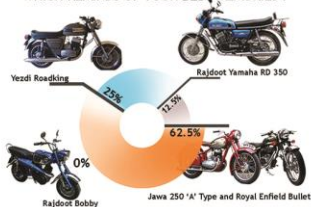


- Age: 55-63 years
- Occupation:
 - Navy Officer (1)
 - Pawan Hans Pilot (2)
 - Indian Armed Force (2)
 - Indian Armed Force Retd. (2)
 - IOCL (1)
 - OIL Retd. (1)
 - Service (1)
 - Service in PSU (1)
 - Tea Taster and Auction buyer (2)
 - Teaching (1)
 - Creative/Art/Director (1)

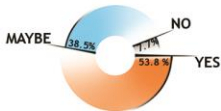
DO YOU RIDE MOTORCYCLES ?



WHICH REMINDS OF YOUR BEST MEMORIES ?



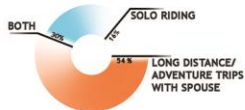
WOULD YOU BUY A MOTORCYCLE NOW ?



IF ALL THE CONCERNS ARE ADDRESSED
WOULD YOU BUY A NEW MOTORCYCLE ?



HOW WOULD YOU LIKE TO USE IT ?



QUALITATIVE USER ANALYSIS



Ravi Malhotra, 59Y

Pilot, PAWAN HANS Co. Guwahati

"I use the regiment's Classic 500. Couple of times during weekends, me and my wife, have gone on trips to Shillong, Tezpur and Nagaon from Guwahati. It was one of the few things we look forward to."



Debajit Phookan, 60Y

Teaching, Guwahati

"Jawa was the bike on which I learned to ride back when I was in class 6 and Enfield was my first bike. I still ride motorcycle. It is a style statement. Currently I own an Enfield Classic 350."



Col. R. K. Talukdar, 62Y

Retd. Army Officer, Delhi

"Being mediocre in height and prevailing style among middle class bachelor I chose Yezdi. It was very reliable, easy handling and affordable then. Style and usefulness are factors generally considered after forty plus."



Nitin Poddar, 63Y

Retd. IOCL Officer, Mumbai

"I learned riding motorcycle on my father's bullet. It will always remain a special one for me. I stopped riding after me and my wife had our first child as we decided to upgrade to a car."



Rupjyoti Baruah, 59Y

Oil India Limited Officer, Duliajan

"RD 350 was the rocket of our time. Even though I have just recently bought myself an Avenger, I only wish I was young enough to get a RD 350. Of course, given the fact that it would be comfier, I would definitely go for a new one."



Dr. A V K Mohan, 60Y

Management at Hospital Administration, Hyderabad

"I enjoy riding both motorcycle as well cycling. I am highly passionate for running as well. I have recently done a trek from Kanyakumari to Kashmir. Regarding motorcycling, I owned a TVS Fiero in which I had done my North-East expedition in 2014."



KJ Singh, 59Y

Indian Armed Service.

"I love Royal Enfield. I have the Thunderbird 500 with me currently. I am quite passionate about riding. I have been to Leh, Ladakh and also riding in Siachen is beyond words to express."



Satyajeet Chaudhury, 56Y

Tea Taster and Auction buyer, Guwahati

"More sturdy and heavier. Therefore good to balance. I used to ride motorcycle, but that was long ago. Now, thinking of buying a motorcycle won't occur to my mind, because I am more comfortable with four wheelers now."

WHAT MAKES A TRIKE ?

A vehicle with three wheels is called a Trike. It can be motorized and can be classified as automobiles or motorcycles or autorickshaws. While others are known as tricycles without motor, which are human powered vehicles.



Exotic Trike



Trike Car



Trike Motorcycle



Trike Auto

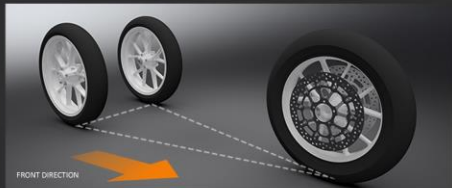


Side Car



HPV Trike

CLASSIFICATION - DELTA & TADPOLE



DELTA TRIKE CONFIGURATION

Having a trike configuration of one wheel at front and two wheels at the back, forms a Delta Trike configuration. The name comes from the 'Delta Δ ' like formation of its footprint.



TADPOLE TRIKE CONFIGURATION

A configuration of having two wheels at the front and one wheel at the back, forms a Tadpole Trike configuration. The name comes from a 'Tadpole' like formation of its footprint.

ADVANTAGES OF DELTA TRIKE

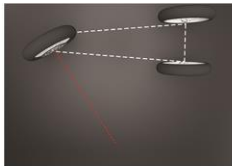
SAFER BRAKING



Although, diagrammatically, Delta trike having one wheel at front, thereby, having a single point of frontal contact with the ground gives a uni-force of braking. But due to a heavier rear end, there is almost negligible chance of the vehicle getting 'stopied', i.e., rear of the wheel getting lifted at hard braking.

Hence, Delta trikes are safer in braking.

SIMPLICITY OF DESIGN



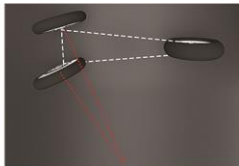
Delta trike having a conventional setup for front steering mechanism, provides a much more simpler design. Any regular upside-down or telescopic front suspension is sufficient for it to do its function.

TADPOLE BRAKING



Tadpole although offers twice as much brake-surface area and twice as much power to stop compared to Delta trike, but due to its relatively light weight distribution at the rear, the tendency for the vehicle to get lifted off from the back is higher and this can cause unsafe outcome.

COMPLEX FRONT SUSPENSION



Tadpole trike needs special consideration to prevent wheel slippage. Additional incorporation of linkages to approximate Ackermann Steering geometry to avoid slip results in a very complex steering mechanism for the tadpole trike to do its function.

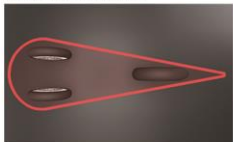
ADVANTAGES OF TADPOLE TRIKE

BETTER DYNAMICS



Tadpole trikes score high when it comes to turning dynamism. Having independent front suspension enables it to lean at angles comparable to a traditional two-wheelers. This results in a much better dynamics and feedback. Also it can travel on uneven tractions pretty much being unphased.

BETTER AERODYNAMICS



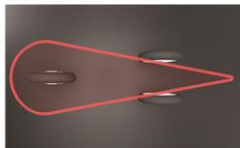
The ideal teardrop i.e., width/length ratio is 0.255. Tadpole design adheres to this ratio more easily and offers better aerodynamics.

NO LEANING DYNAMICS



A traditional delta setup offers no leaning ability. The rear axle being a single shaft connecting both the wheels, it needs differential even to require it to turn without wheel slippage. However, if provided with independent rear axles, it can result in better dynamics.

AERODYNAMICS GETS A HIT



Compared to tadpole, delta trikes have much wider rear track and this hampers it in the area of aerodynamics.

MOTORCYCLE TRIKE GLOBAL SCENE



HARLEY DAVIDSON TRI-GLIDE



CAN-AM SPYDER F3



PIAGGIO MP3 SERIES



YAMAHA TRICITY



YAMAHA MTW-9 CONCEPT



YAMAHA 03-GEN F CONCEPT



YAMAHA 03-GEN X CONCEPT



HONDA NEOWING



"I would prefer my bike to have a low seating, because I like to have my feet placed firmly on the ground ..."

"The handlebar should not be too wide, it should just be around my reach, so I know what I am controlling ..."

User Interviews



"As we just discussed, one with two wheels at the back, then one with two wheels at the front, I would want one that is better balanced and safer, as I cannot afford to take a fall at this age now..."

"I'd like to add that sound is something that I really fancy. I still remember the sound of en-field 350 ..."

Col. S P Aggarwala, 63Y
Army Officer (Retd.)



*"Essentially, I am quite a motorcycle freak, but I owned only one motorcycle ... **unfortunately I had to sell it as I bought myself a car ...**"*

*"I really should have ridden more, **I regret I didn't ride as much as I should have ...**"*



*"I am a fan of heavier motorcycles, I am biased towards it, it is more stable, for my style, **I like some power ... essentially more like a cruiser ...**"*

*"Interestingly my son has the Yamaha R15, **I find it really hard to climb on it, let alone ask my wife to sit on the rearseat ...**"*

Parag Dutta, 57Y
Tea Estate Sector



*" I would prefer my bike to have a low seating, because **I like to have my feet placed firmly on the ground ...**"*

*" The handlebar should not be too wide, **it should just be around my reach**, so i know what I am controlling ..."*



*" As we just discussed, one with two wheels at the back, then one with two wheels at the front, **I would want one that is better balanced and safer**, as I cannot afford to take a fall at this age now... "*

*" I'd like to add that **sound is something that I really fancy**, i still remember the sound of en-field 350 ... "*

Col. S P Aggarwala, 63Y
Army Officer (Retd.)



" I like the idea of a three wheeler, it is like the perfect get-away kind of thing ..."



" I would want my handlebars to be in such a way, that my back is always straight ... at this age, I really do not need to bend on the tank and ride ..."

" the current bikes that we see, they are impressive, nibby, good pick up ... but my interest still lies in bullets, jawa, the classic looks and the stance ..."

" the getting on the bike and out should be easier, I don't want it (seat) to be in a position that I have to jump on and off ..."

Debajit Phookan, 60Y
Teaching/Businessman



*" I have always **preferred a scooter more than a motorcycle**, as it is easier for me to climb on the seat ..."*

*" One very annoying thing that keeps happening is when someone is sitting at the back, for instance; when I am in a traffic situation and I **have to put down my feet to ride slow**, my daughter's foot keeps hitting my leg ..."*



*" Also, the rear footrest are not good, I really **have to stretch and twist my legs to have a grip on it ..."***

*" considering my back issue, **an upright seating position is a must**, so my back and hands don't feel stressed ..."*

Madhumita Dutta & Raj Dutta, 57Y. 58Y
Service in Government



*" The new style that we see, having mo-no-shocks and stuff, it doesn't fascinate me. For me, it **has to be the classical look, that's where I've grown up** ... ofcourse I know the new thing is the trend but **I like the iron** ... "*



*" It should be heavy, I like the feel that an enfield gives. It is stable, on straight roads, you don't feel phased out ... **again for me the design has to be classic** ... "*

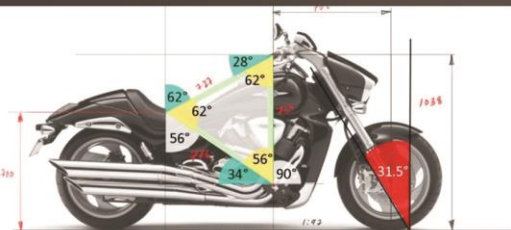
*" ... three of my friends just came from South Dakota, international riders hub, many of the families came on harley trikes ... **it's a different feel, riding with family** ... "*

D'Com Bhuyan, 57Y
Film & Theatre Director



What makes a cruiser ?

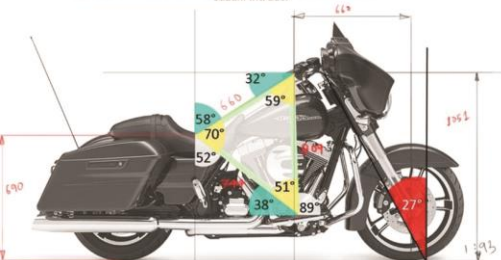
CRUISER MOTORCYCLES



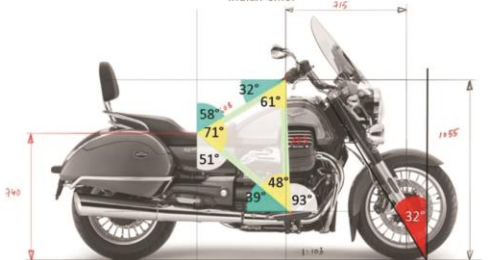
Suzuki Intruder



Indian Chief



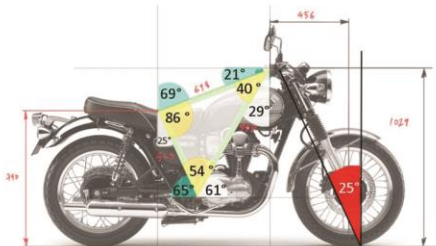
Harley Davidson Glide



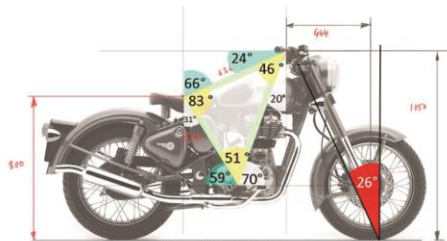
Moto Guzzi California

All dimensions are in millimeters

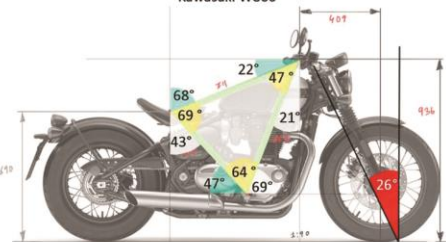
Classic City Motorcycles



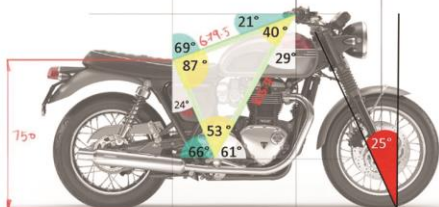
Kawasaki W800



Royal Enfield Bullet

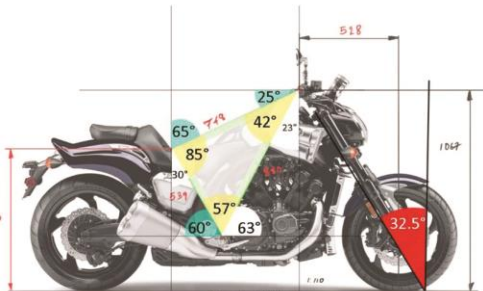


Triumph Bonneville Bobber

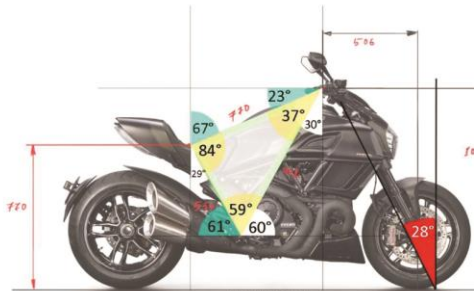


Triumph Bonneville T120

POWER CRUISER



Yamaha V-Max

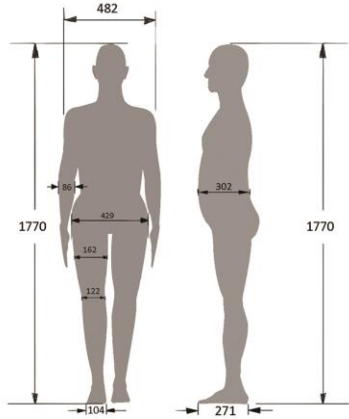


Ducati Diavel

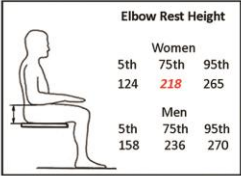
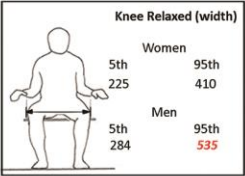
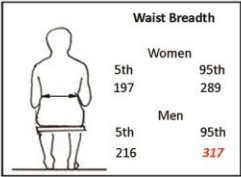
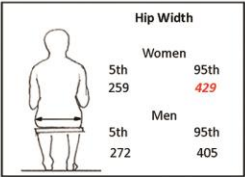
Benchmarking - Dimensional Analysis

ERGONOMIC CONSIDERATIONS

Based on Indian Anthropometric Data

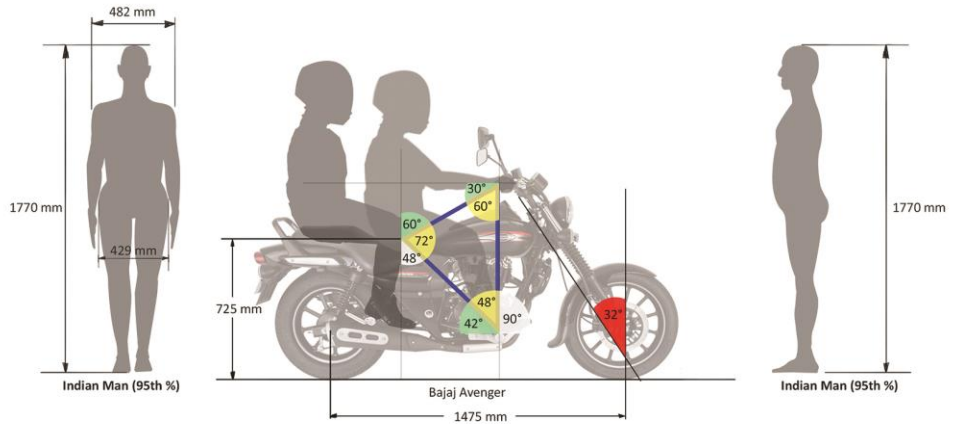


Indian Man (95th percentile)

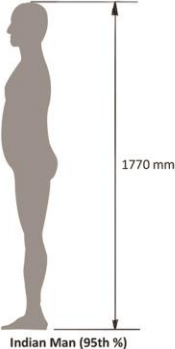
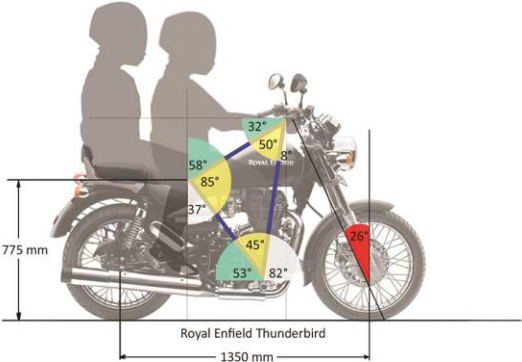
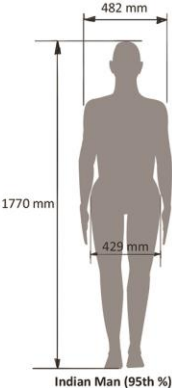


* all dimensions are in millimetre

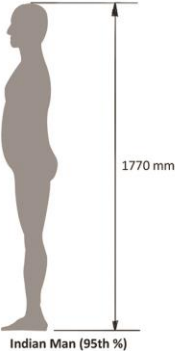
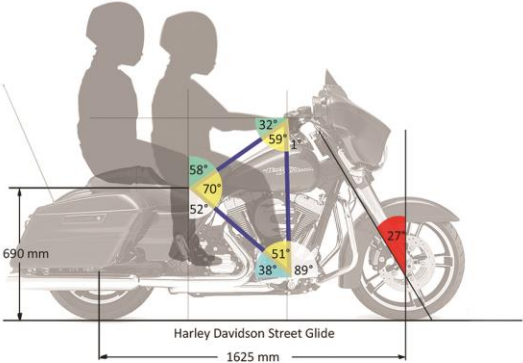
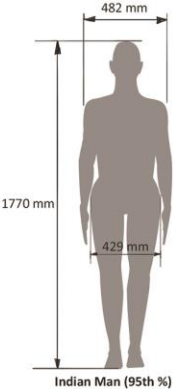
BENCHMARKING



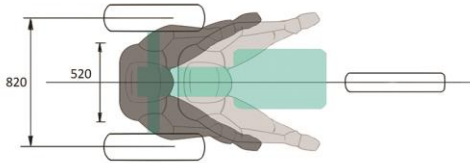
BENCHMARKING



BENCHMARKING



2.5. BRAINSTORMING CHASSIS LAYOUT

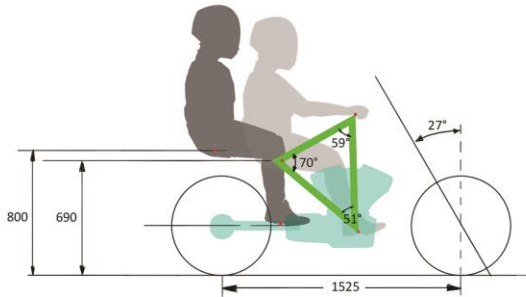


INSIGHTS

Taking a traditional trike chassis style as along with harley Davidson Street Glide's ergonomics.

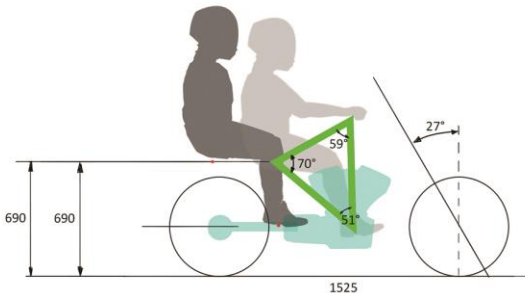
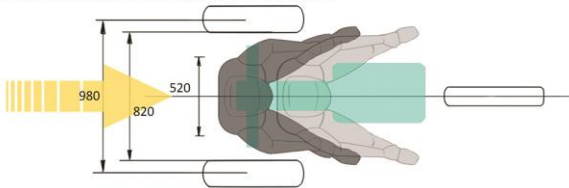
It was found that, there is a lot of space getting wasted between the seat and the wheels, and not really resulting anything special.

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* all dimensions are in millimetre

BRAINSTORMING CHASSIS LAYOUT



INSIGHTS

Widening the rear track outside further.

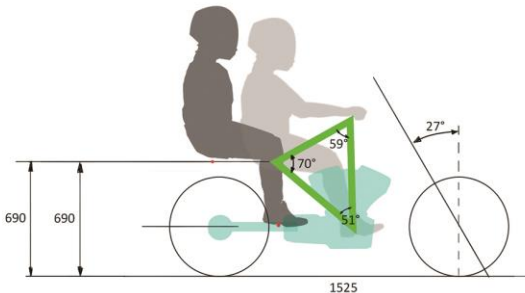
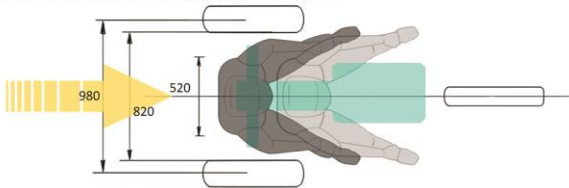
This idea would facilitate bringing the rear seat lower, thus ease of access.

Also, possibility of rear passenger entering from the back of the motorcycle.

Although this seemed interesting, but it makes the motorcycle too wide, crossing a metre in width. Add to it, luggage racks, for Indian road conditions, it does not seem to be a good proposal.

** all dimensions are in millimetre*

BRAINSTORMING CHASSIS LAYOUT



INSIGHTS

Widening the rear track outside further.

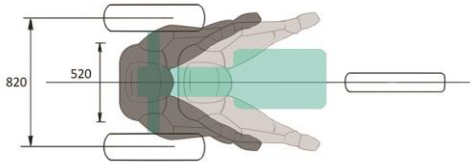
This idea would facilitate bringing the rear seat lower, thus ease of access.

Also, possibility of rear passenger entering from the back of the motorcycle.

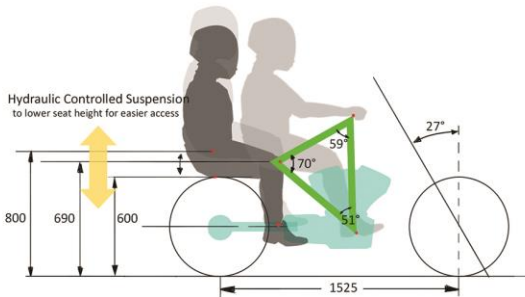
Although this seemed interesting, but it makes the motorcycle too wide, crossing a metre in width. Add to it, luggage racks, for Indian road conditions, it does not seem to be a good proposal.

** all dimensions are in millimetre*

BRAINSTORMING CHASSIS LAYOUT



L
A
Y
O
U
T .3



INSIGHTS

This was an improvisation on the first idea.

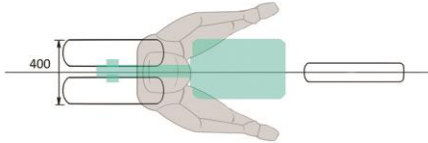
By having a Hydraulically controlled rear suspension, during ingress, the seat height can be brought lower for easier access.

It seemed interesting as a conceptual ideation. However, users do not prefer technical gadgets, this proposal could get dicey.

Also, this still does not deal with the width issue.

** all dimensions are in millimetre*

BRAINSTORMING CHASSIS LAYOUT



INSIGHTS

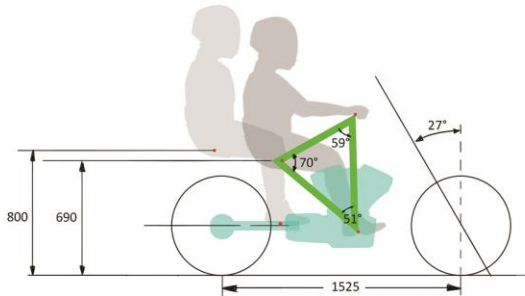
By bringing the rear wheels closer, it still provides trike stance and advantages. Also, gives it a different identity.

Addition of luggage also does not seem to hamper.

However, ingress-egress issue seems to be pretty much same to that of traditional cruisers. Does not give any advantages.

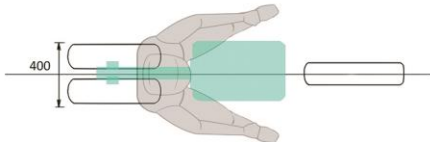
Lastly, it needs to have independent rear swingarms, to aid better stability during cornerings.

L
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.4



** all dimensions are in millimetre*

BRAINSTORMING CHASSIS LAYOUT



INSIGHTS

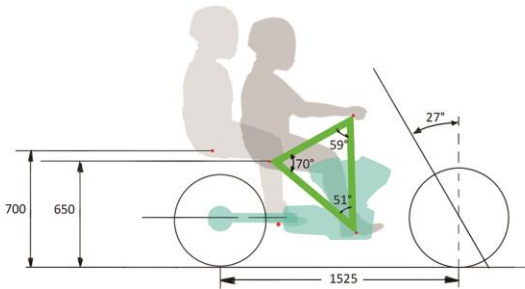
Improvising on the Layout 4, by making the rear wheels adequately smaller, seat height could be brought lower at 650 mm and pillion at 700mm.

Independent rear swingarms with hydraulic suspensions on each, to aid stability while turning and cornering.

Wheels have sufficient gap, for transmission to be powered to one of the wheels from the centre.

This layout was chosen as the best suited. It stands out, it doesn't lose on trike's advantages as well as not being overly wide unlike traditional trikes.

L
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Y
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.5



** all dimensions are in millimetre*

DESIGN BRIEF

To design a three-wheeled lifestyle motorcycle targeted at elderly riders (near or post retirement age)

The motorcycle should fulfil the following requirements:

Packaging:

- o It should have comfortable seating for both the rider and the pillion.
- o It should have easy ingress and egress.
- o It should have comfortable well-angled footrest.
- o It should have compartments for carrying luggage for long distance riding mode.
- o It must have back support and arm rest.
- o It should have wind protection screen for comfortable ride.
- o It should have seat belts for comfortable ride in case of bumpy roads.

Specification:

- o It should have a cruising riding stance, but should not have outright long wheelbase, considering Indian landscape.
- o 500 cc engine (Benchmark).

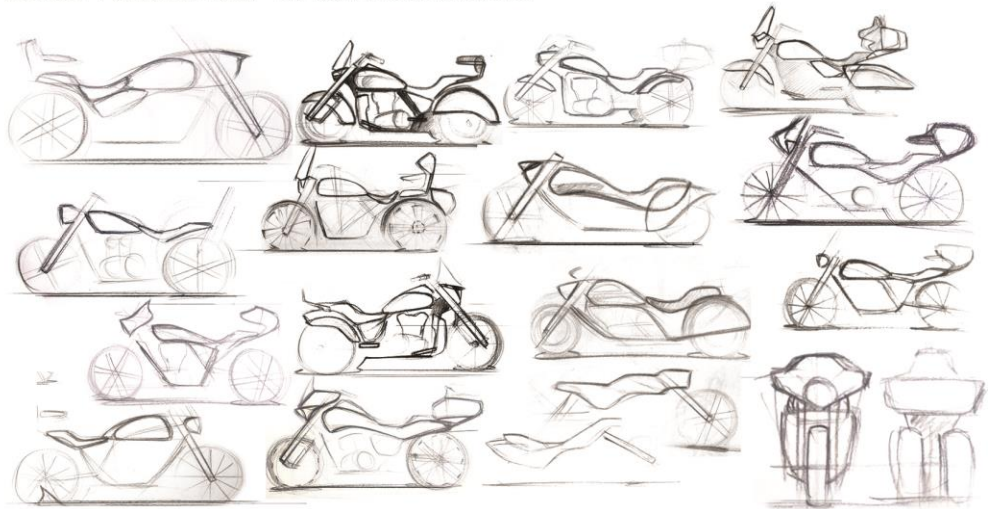
Aesthetics:

- o It should have an emotional connect to the targeted consumers.
- o It should evoke classic, vintage aura.
- o It should speak with grand, a sense of pride.

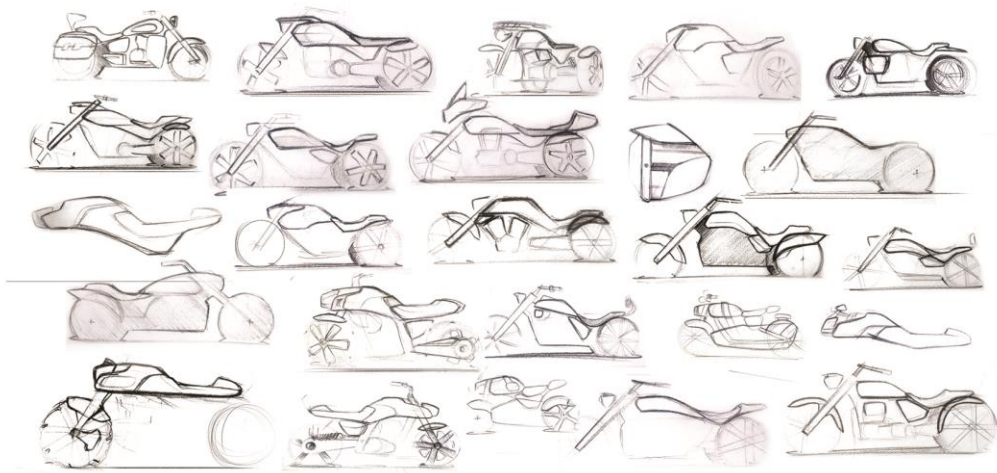
Technical consideration for the motorcycle:

- o Wheelbase : 1525 mm
- o Rake Angle : 27 deg.
- o Approximate Ground Clearance : 160 mm
- o Seat Height : 600-650 mm
- o Approximate Seat width : 400 mm
- o Front tyre size : 130/60 x 18
- o Rear tyre size : 130/85 x 13

CONCEPT GENERATION - EXPLORATION SKETCHES



CONCEPT GENERATION - EXPLORATION SKETCHES



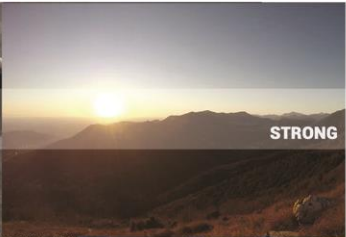
MOODBOARD 1 - DIRECTION SKETCHES



A close-up photograph of a motorcycle's instrument cluster, featuring several circular gauges with white faces and black markings. The cluster is mounted on a dark, metallic frame.

AUTHORITY

POWER

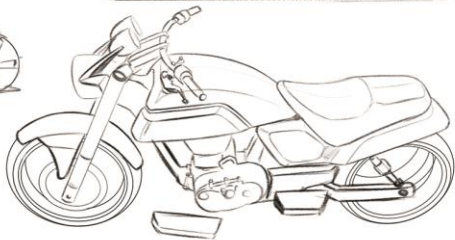
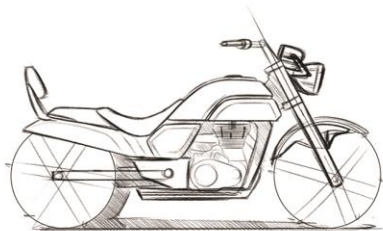
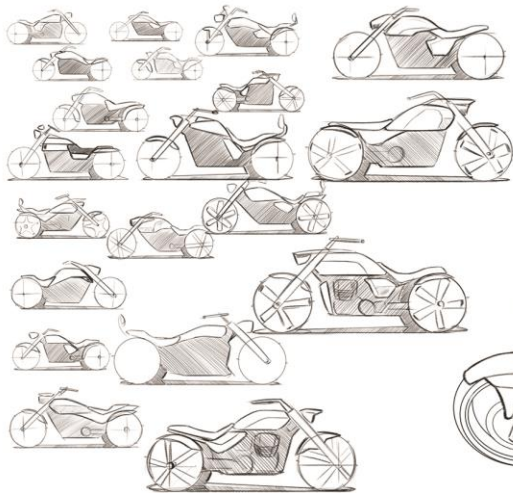


A landscape photograph showing a sunset or sunrise over a range of mountains. The sun is a bright, glowing orb on the horizon, casting a warm, golden light across the sky and the silhouetted peaks of the mountains.

STRONG



MOODBOARD 1 - DIRECTION SKETCHES



CONCEPT 1



CONCEPT 1



MOODBOARD 2 – VINTAGE EXPRESSION



Vintage
expression

MOODBOARD 2 - DIRECTION SKETCHES



Harley Davidson JDH (1924)



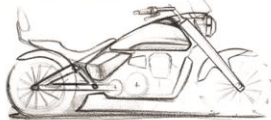
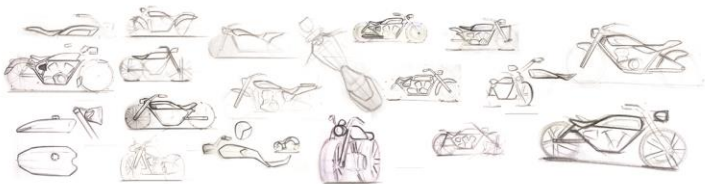
BMW R16 (1930)



Indian Scout (1930)



Royal Enfield 500 (1924)



CONCEPT 2

Vintage Expression

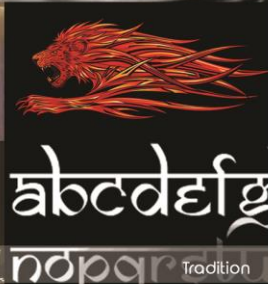
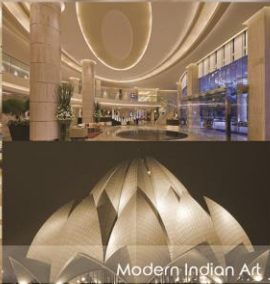


CONCEPT 2

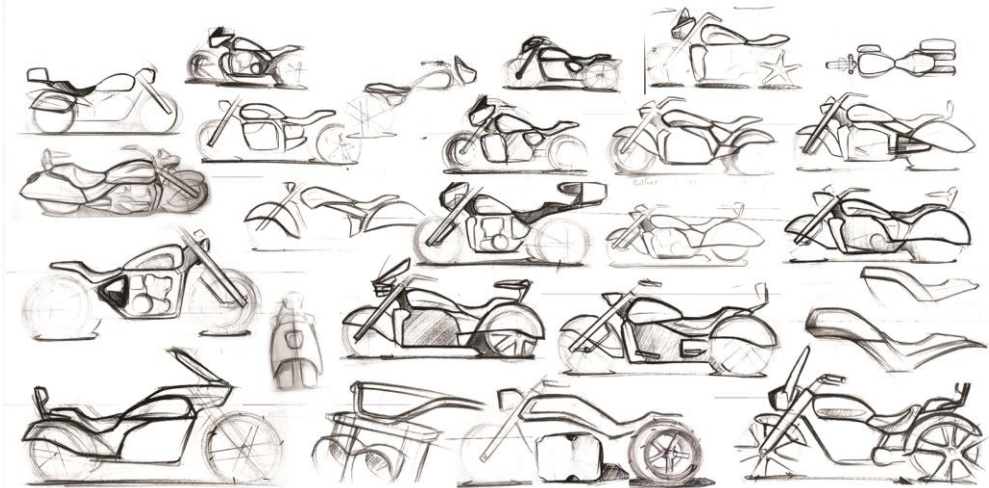
Vintage Expression



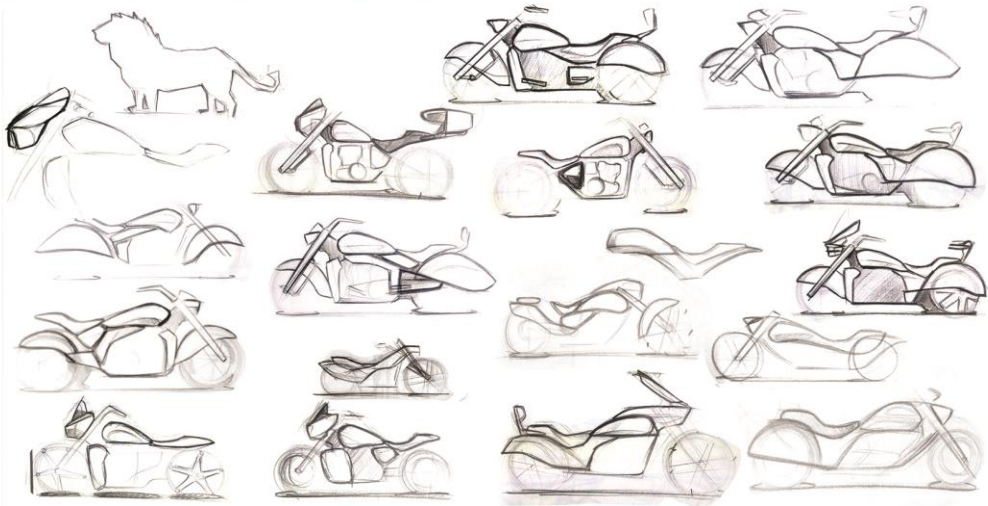
MOODBOARD 3 - DIRECTIONAL SKETCHES



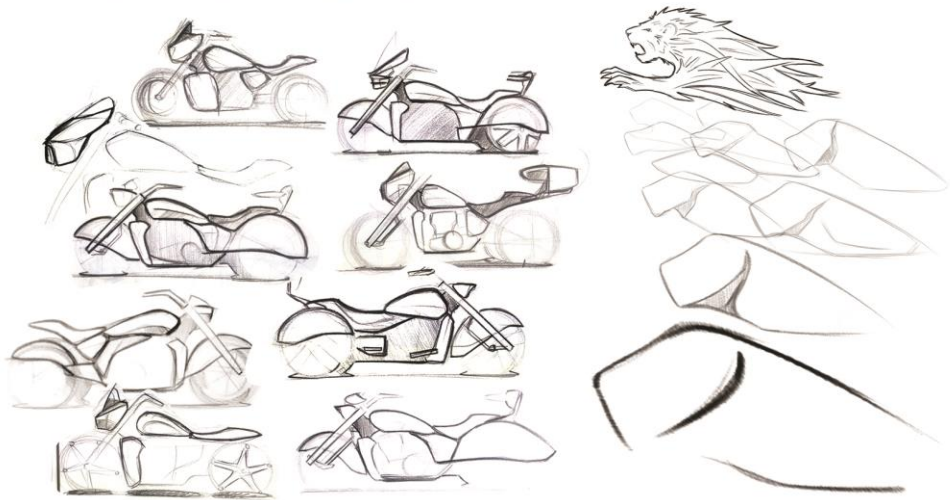
MOODBOARD 3 - DIRECTIONAL SKETCHES



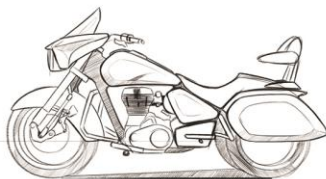
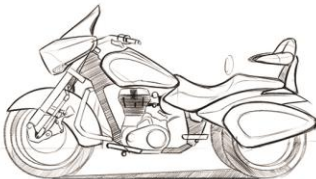
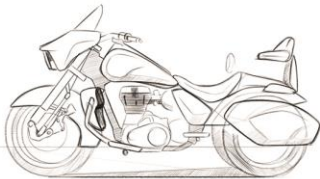
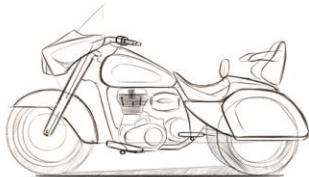
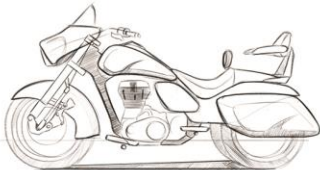
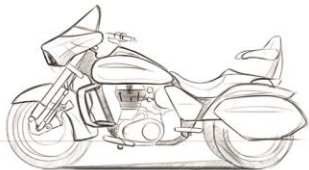
MOODBOARD 3 - DIRECTIONAL SKETCHES



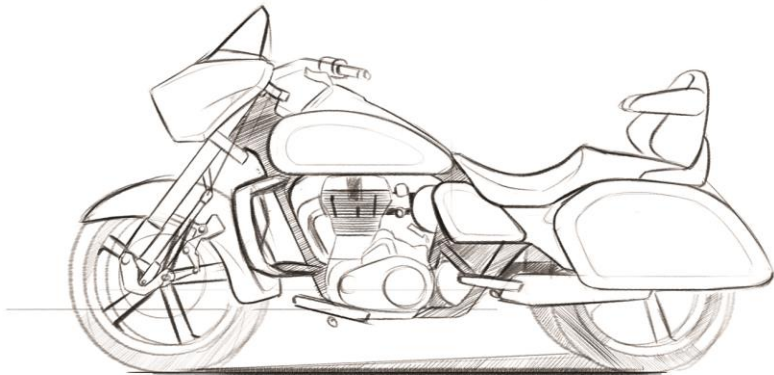
MOODBOARD 3 - DIRECTIONAL SKETCHES



MOODBOARD 3 - DIRECTIONAL SKETCHES



MOODBOARD 3 - FINAL SKETCH





CONCEPT FEEDBACK

Concept #1



Even though, ergonomically this concept is sorted, it somehow looks as if the rider is a bit far stretched from the handlebars.

The muscular tank shrouds and similar themed luggage bags give it more raw appeal and certain unfinished character, which doesn't go well according to the target groups character.

Concept #2



This concept conveys the vintage aura, with the sweeping triangle form visible right from the suspension all the way to the rear side bags.

It emotes the feel of motorcycles such as classic motorcycles such as Rajdoot-Yezdi's chiselled lines and surface. But the downside is, to compare with current motorcycles, it doesn't really stand out especially in the Indian region.

Concept #3



The keywords; 'Grand', 'Classic', 'Pure' and 'Modern-Tradition', defines this concept. The side luggage is complimented by the front fairing. The subtle curves in the surface treatments give it a very classical-grand emotions.

Along with this, it stands out in the Indian market and suits the ideal solution for long-distance cruising for the target consumers' needs.

Hence, this concept was chosen to be the final, although with more refinement.

CHASSIS DESIGN



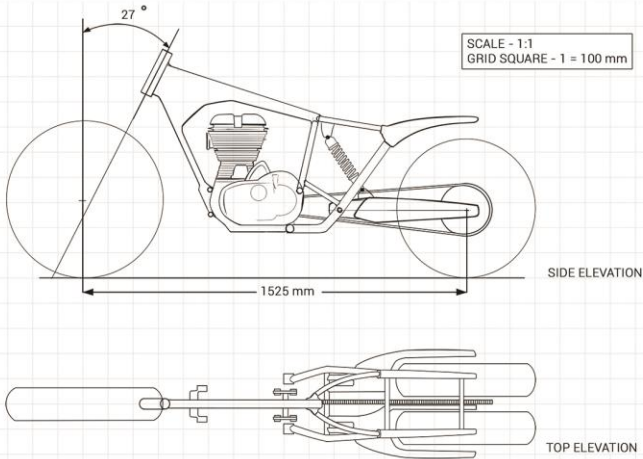
Royal Enfield 500 cc engine

CHASSIS DESIGN CONSIDERATION

Royal Enfield 500 cc Engine taken as the base. The chassis is designed considering the mounting points of the engine.

A key feature of this chassis design is the Dual single-sided independent rear swing-arms. In order to keep the track width narrower than the traditional trikes, rear wheels are closer.

This design also aids a certain amount of leaning while turning, as each swingarm has its own independently mounted shock absorbers, both the wheels remain planted to the ground.



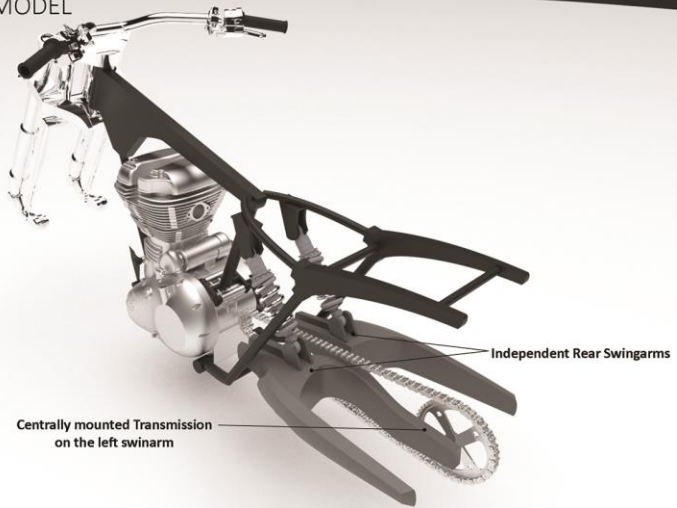


CHASSIS DESIGN CAD MODEL

Trailing Link Front Suspension



CHASSIS DESIGN CAD MODEL



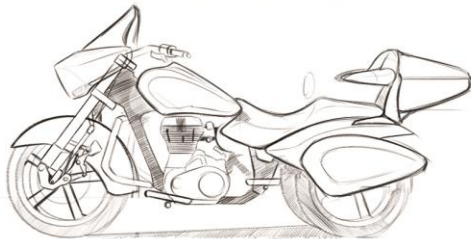
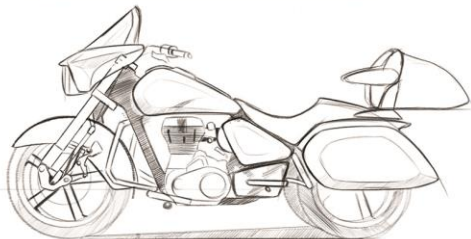
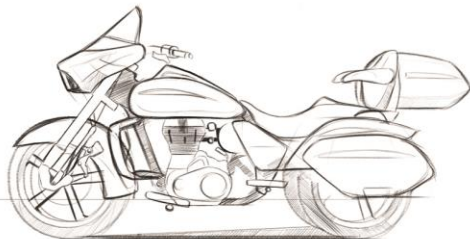
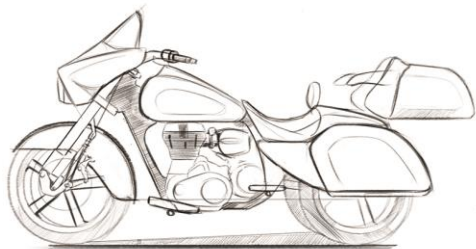
CHASSIS DESIGN CAD MODEL



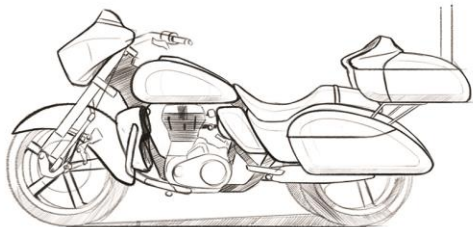
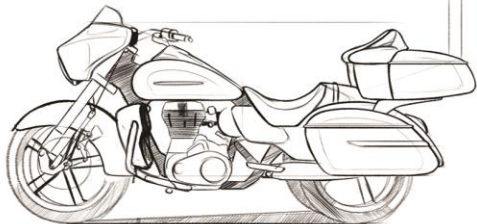
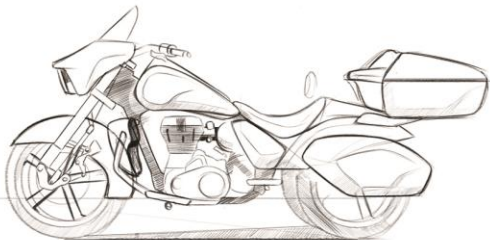
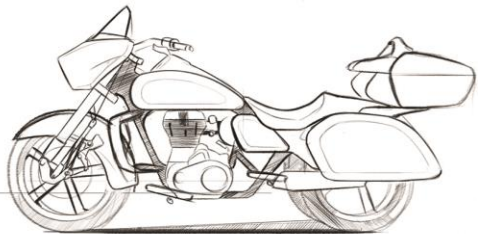
CHASSIS DESIGN CAD MODEL



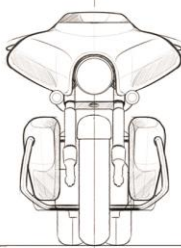
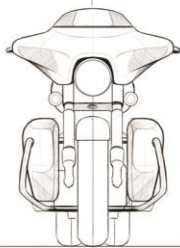
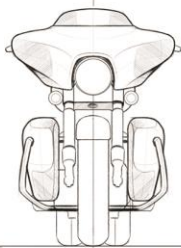
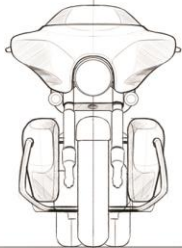
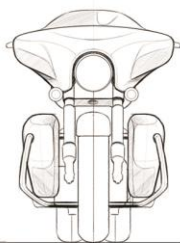
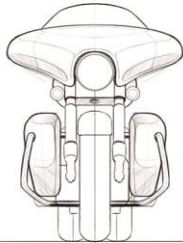
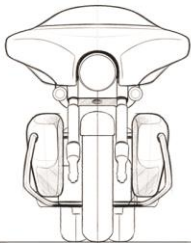
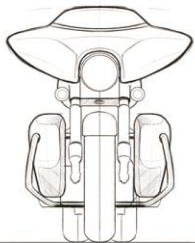
FINAL DIRECTION SKETCHES



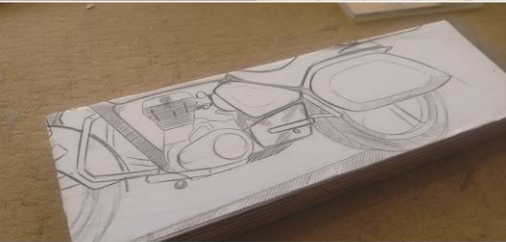
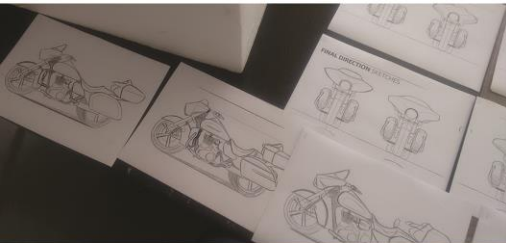
FINAL DIRECTION SKETCHES



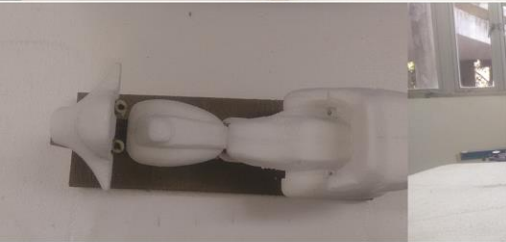
FINAL DIRECTION SKETCHES



MOCK UP GENERATION



MOCK UP GENERATION



MOCK UP GENERATION



FINAL CONCEPT

Grandeur Classic



Final Concept



Final Concept



Final Concept



Final Concept



Final Concept

