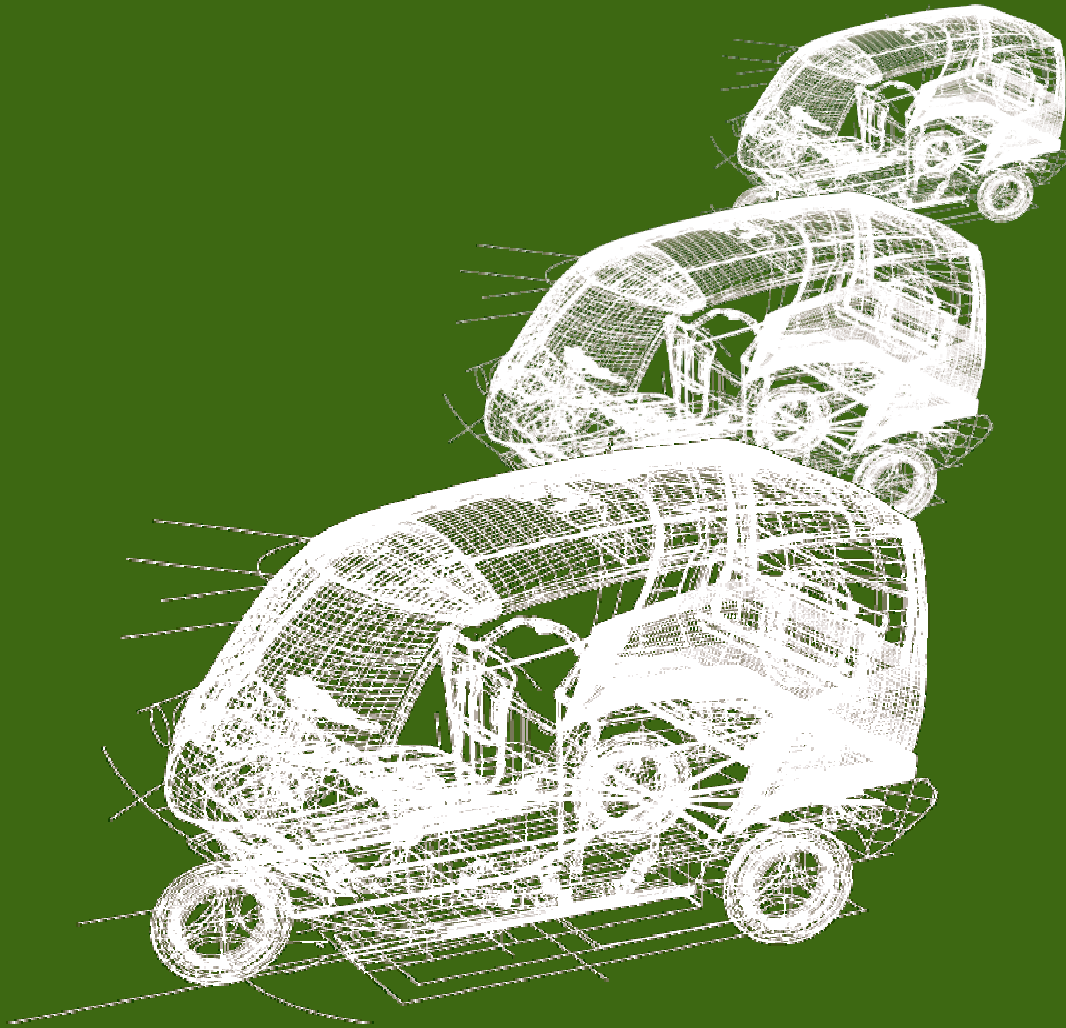


DESIGN OF A THREE PASSENGER AUTO RICKSHAW (The interiors)

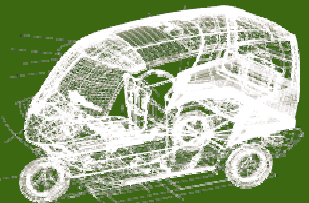


design of a three passenger auto rickshaw

Abhijeet Kumar
Guide : Prof. Ravi Hazra

Aim

To design a three passenger auto rickshaw that would compete with the best selling product in the market within that category “The Bajaj RE”



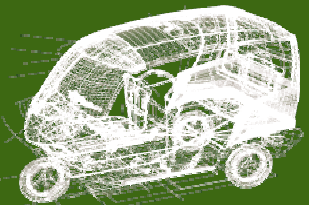
design of a three passenger auto rickshaw

Company's brief

To produce a trend setting vehicle

Create its own identity

A vehicle that would stand against the monopolized product in terms of superior styling and value addition



design of a three passenger auto rickshaw

Data collection

Data from the company

Exhibition

Product survey “Bajaj RE”

User survey

USERS

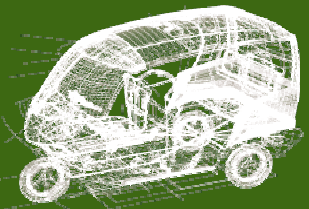
Primary users

drivers

passengers

Secondary users

owners

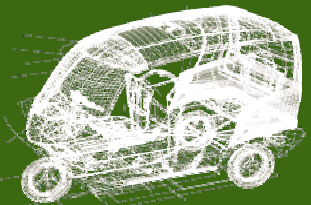


design of a three passenger auto rickshaw

Problems and improvements

through user survey and the product survey

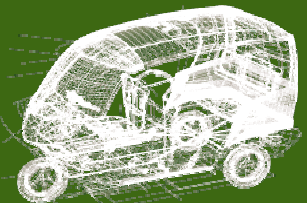
Understanding Auto rickshaw



design of a three passenger auto rickshaw

Typical characteristics of auto rickshaw

- Suitable for short distance travel say 10-15 minutes
- Fast ingress / egress
- Saves from direct sunlight and rain
- Like private taxi which will drop from any point to any point
- Cheaper than taxi
- Encloses the passenger from outsiders
- Excellent maneuverability through traffic
- Whole family can travel
- Cheaper as compared to taxi As costly as bus if shared with others



design of a three passenger auto rickshaw

Problems with the existing model

Visibility related



Front visibility through the windshield



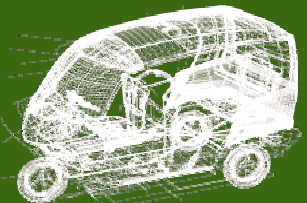
Side visibility along the roadside



Negligible rear window area, which doesn't give any view to the driver

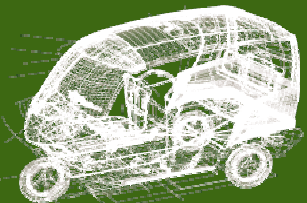
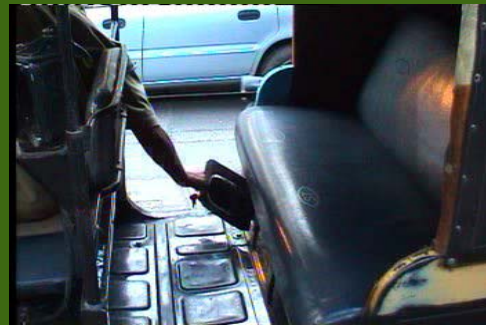


Sunshade reduces the visibility as well as increases air friction



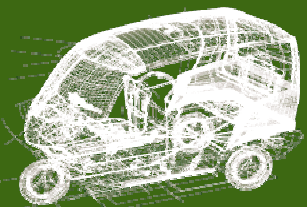
design of a three passenger auto rickshaw

Ergonomics, safety and function related



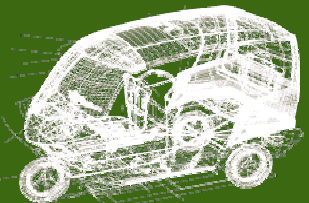
design of a three passenger auto rickshaw

Ergonomics, safety and function related



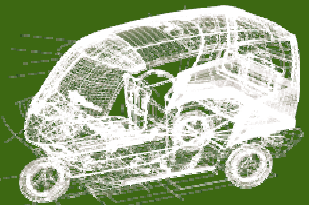
design of a three passenger auto rickshaw

Ergonomics, safety and function related



design of a three passenger auto rickshaw

Viewing possibilities for passenger seated on left , middle or right



design of a three passenger auto rickshaw

Some interesting observations

Parent holding the center bar or put his/her foot forward while traveling with their children - no child safety

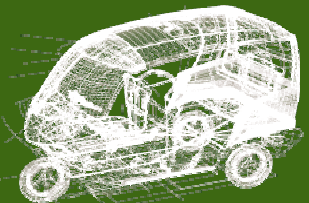
Returning change becomes very time consuming activity - bad coin organization

News papers tucked in the hood

Boring view of passenger's back

Passengers forgetting luggage is a common phenomena

People hold vegetable bags and other polythene bags in their hand only while traveling

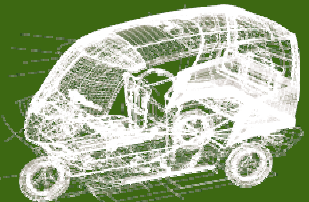


design of a three passenger auto rickshaw

Design brief

Inclusion of company's brief

Our interpretations / conclusions

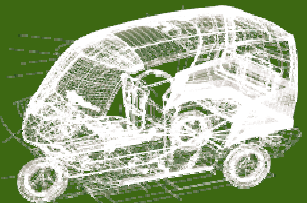


design of a three passenger auto rickshaw

Design brief

To design an interior which ...

- Improves the drivers interaction with the vehicle
- A proud riding posture to the driver
- Has lot of space for luggage, driver and passengers without increasing the exterior dimension.
- Offers better safety, utility and durability.
- Gives minimum discomfort to both passengers and the driver.
- Will create an identity in terms of technical and design superiority.
- To use the design constraints as opportunities which would help us in creating the identity we are looking for.



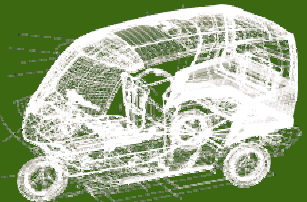
design of a three passenger auto rickshaw

Concept generation

study

Concept
generation

Final design refinement



design of a three passenger auto rickshaw

Basis of concept generation

needs emerged out of data collection

- Functional requirements
- Visual requirements
- Ergonomic requirements
- Psychological requirements

Knowledge of constraints

Hard points

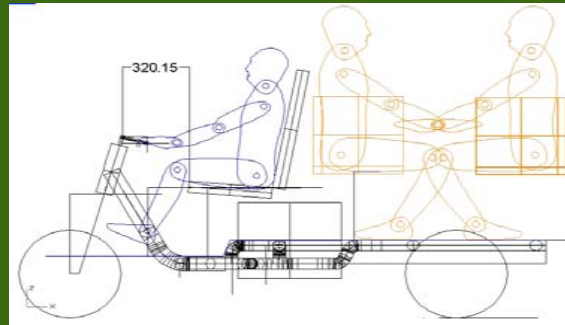
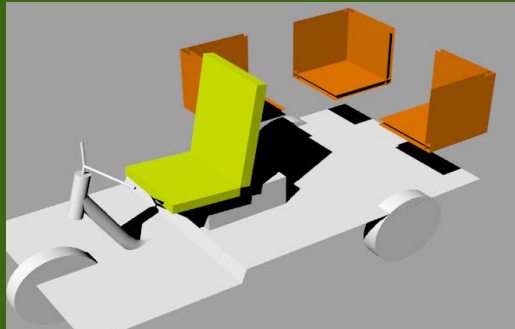
Space

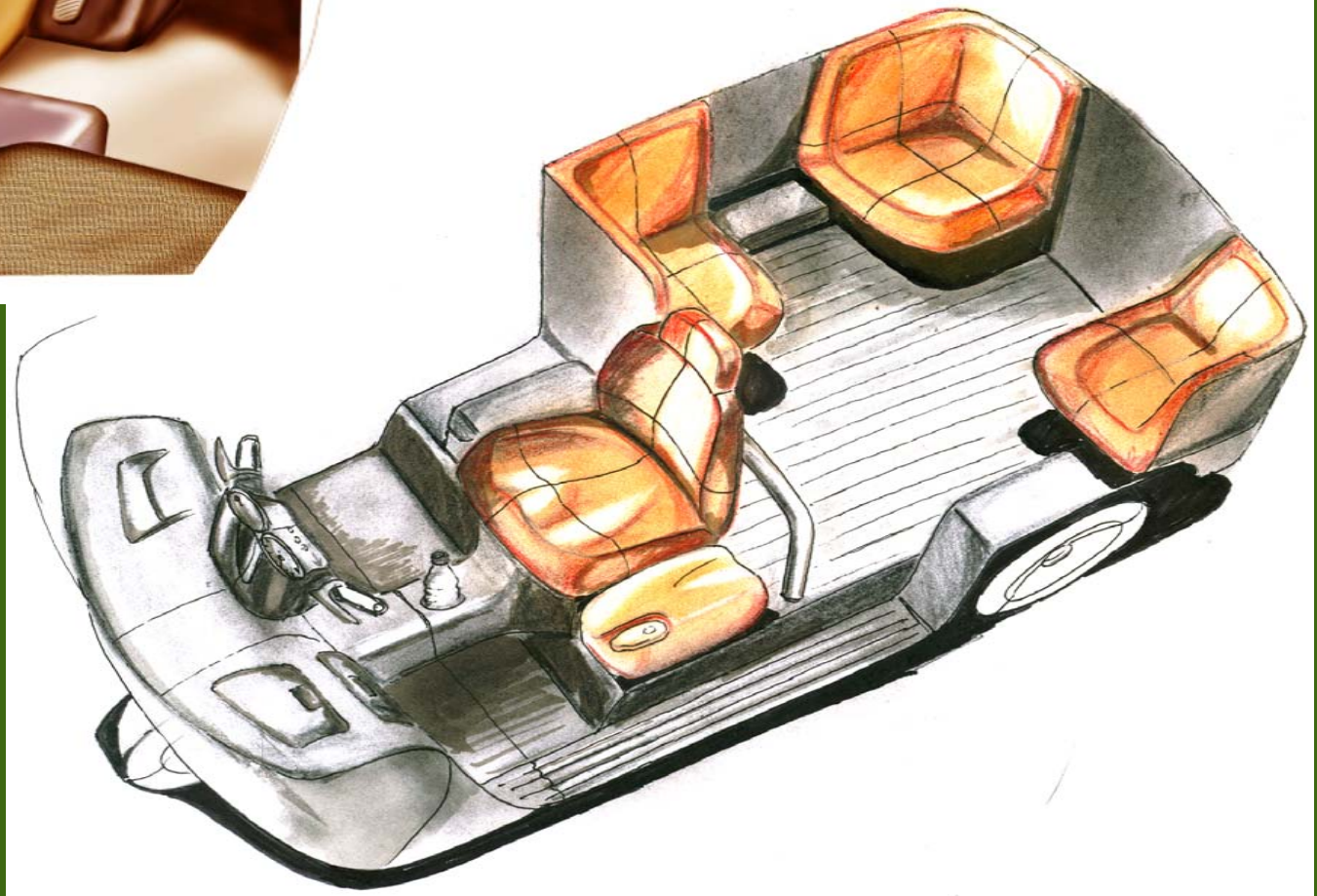
Traffic norms

Technical flaws

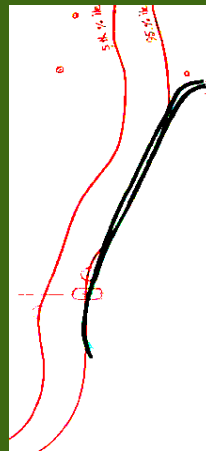
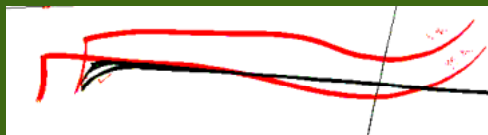
anthropometrical studies done with the current model and our platform

Concept 1





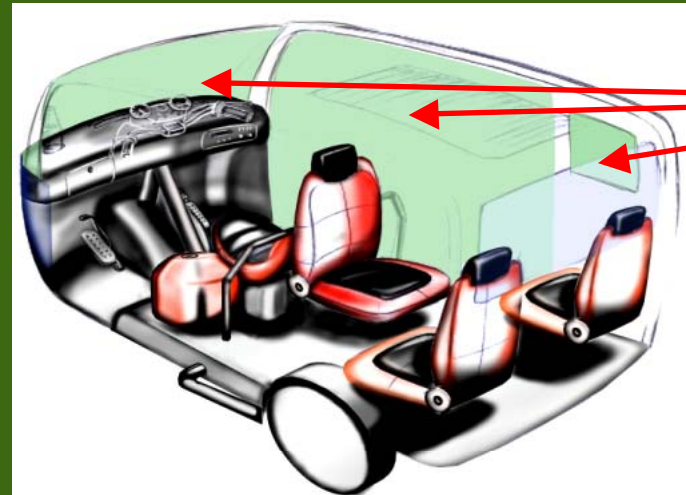
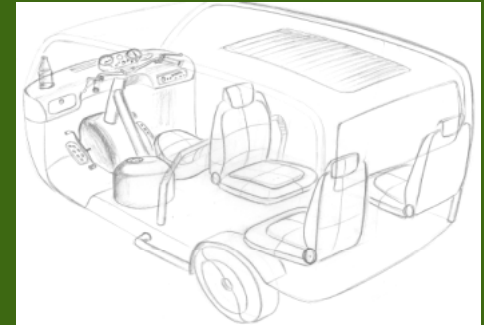
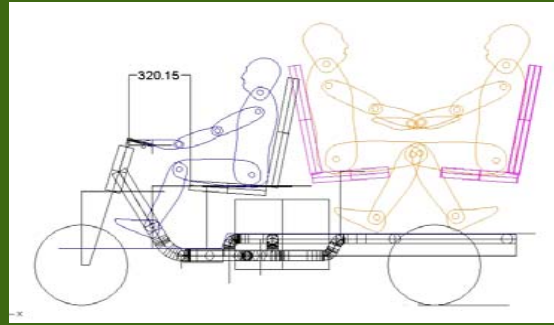
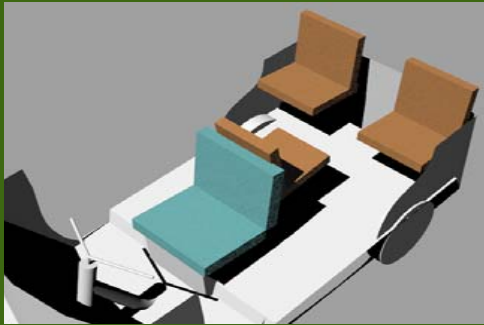
design of a three passenger auto rickshaw



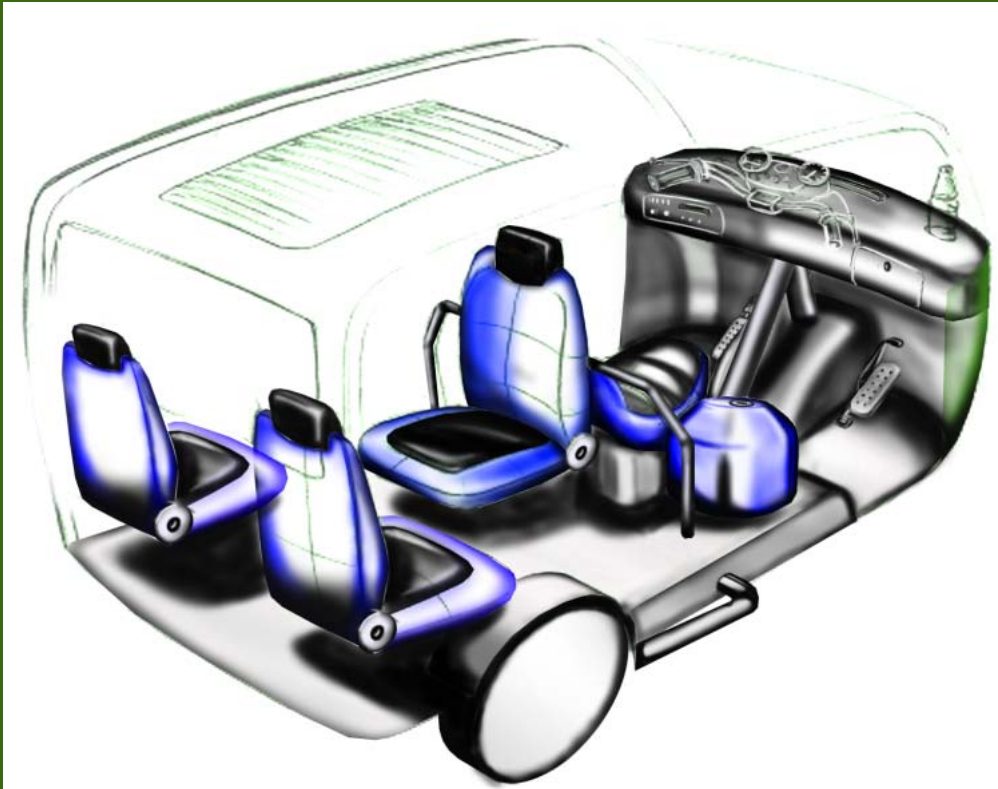
FEATURES

- Bucket seat for driver to improve his posture and reduce his discomfort
- Flexible seating for the passengers in terms of direction of seating.
- Meter and display cluster brought to handle bar made of moulded ABS.
- Exposed petrol tank treated as aesthetic element
- ABS moulded dash board with a coin collector, glove boxes
- Bottle holder, flat foot rest to improve the riding posture
- Battery cover integrated with engine cover.

Concept 2



Visible area

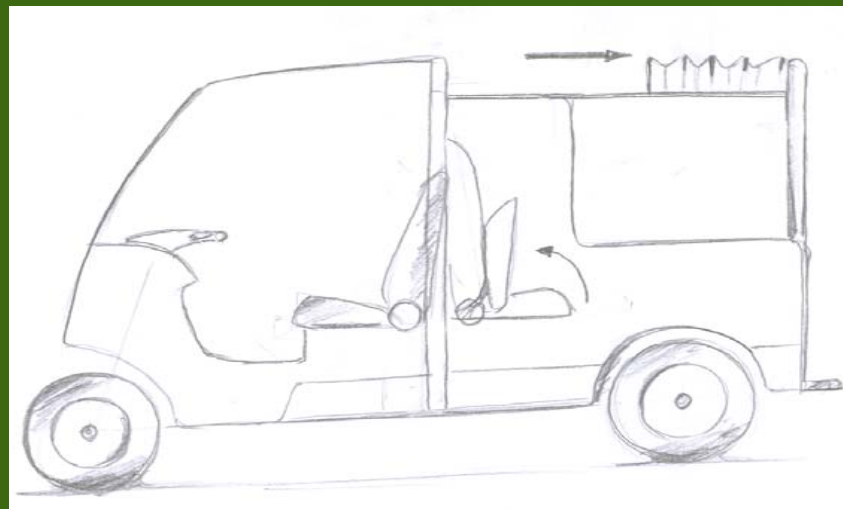
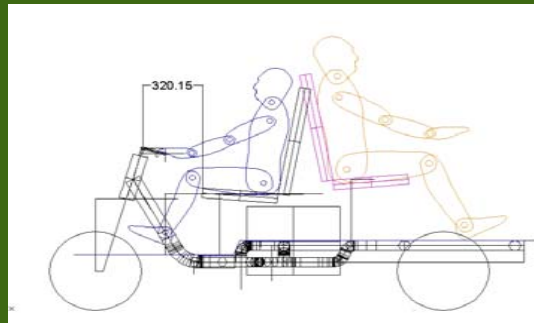
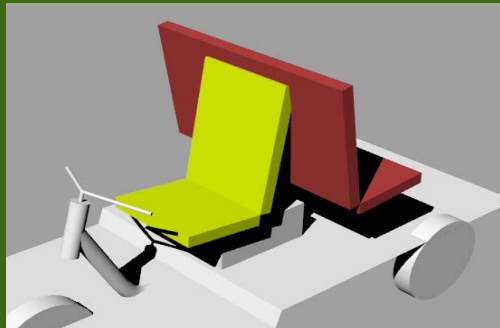


design of a three passenger auto rickshaw

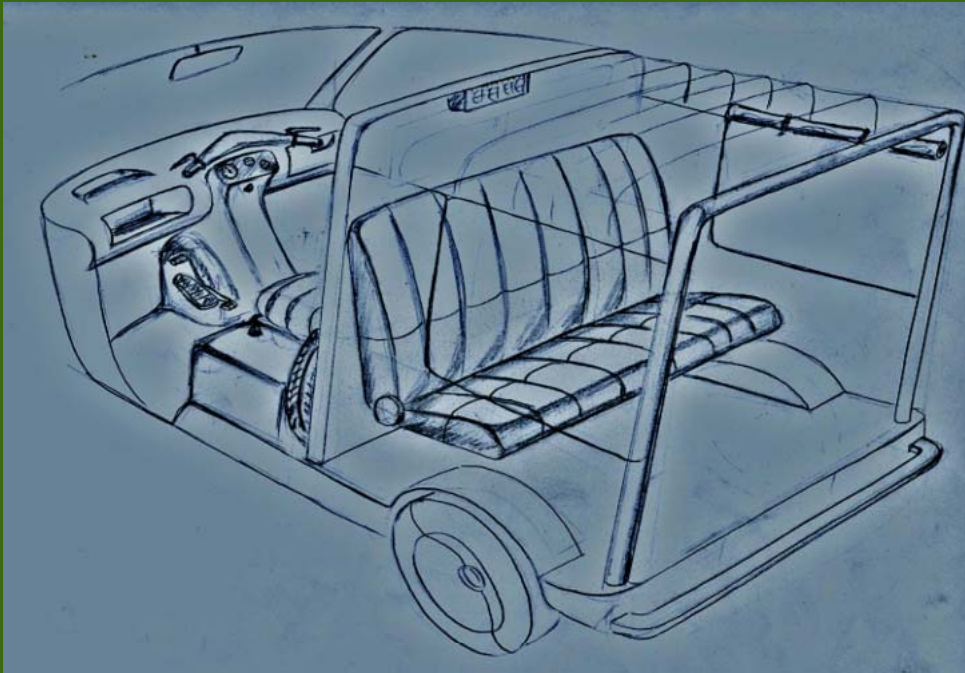
FEATURES

- Individual passenger seats with head rest so that three stout people can sit comfortably.
- Saddle kind of seat for driver for cruiser kind of seating posture
- Ingress/egress would be easier if entry is from both sides
- No skin contact between passengers and better interaction among them
- Common head rest for the driver and the passenger behind him
- Grab rail visually separates driver's and passenger's cabin
- exposed chassis member in the front to cut cost and also to visually look stronger
- Lot of visibility through sides and rear to avoid motion sickness for the person sitting in the opposite direction
- Blinds used in the top to control light
- exposed cylindrical petrol tank painted gives a feel of owning a superior rickshaw

Concept 3



design of a three passenger auto rickshaw

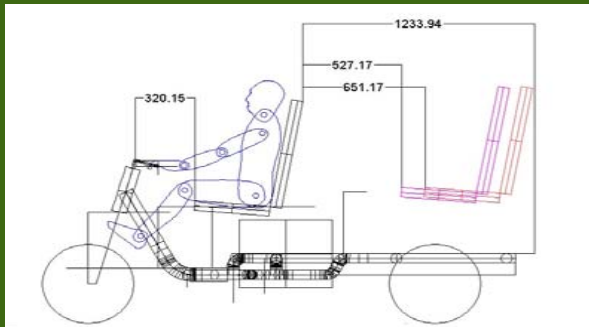
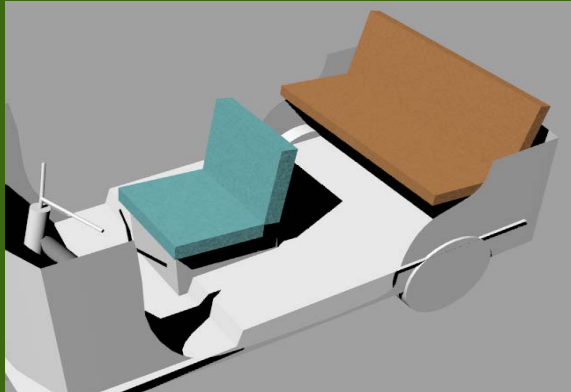


FEATURES

Concept was originated from tanga which used to be very common a couple of decades back. To retain its essence we tried to give a feel of tanga ride to the passenger and the driver.

- Can be used as a pick up if the passenger's seat is folded up
- Retractable roof
- Easy ingress/egress
- Safe from rain as it won't hit the passengers directly
- Lot of leg room, luggage room
- Safer for passengers in case of an accident, because they won't be thrown outside and the cushion will absorb some shock.
- More than utility of the vehicle experience is given priority

Concept 4



FEATURES

Straight ahead sitting layout pushed backward a little bit to increase legroom

Foldable rear seat in 65:35 ratio, so that it can be used to carry bigger luggage in situational cases

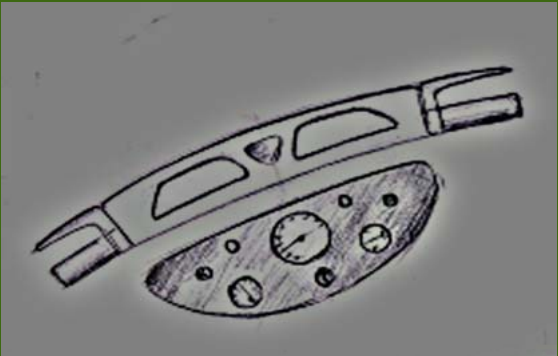
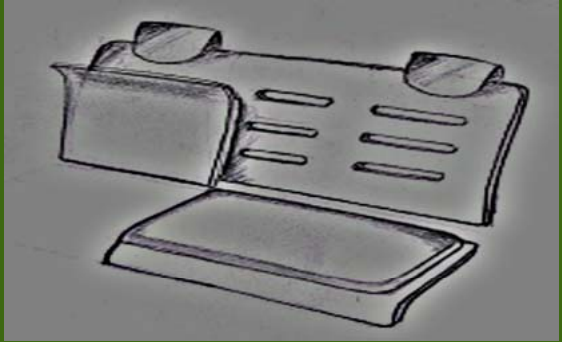
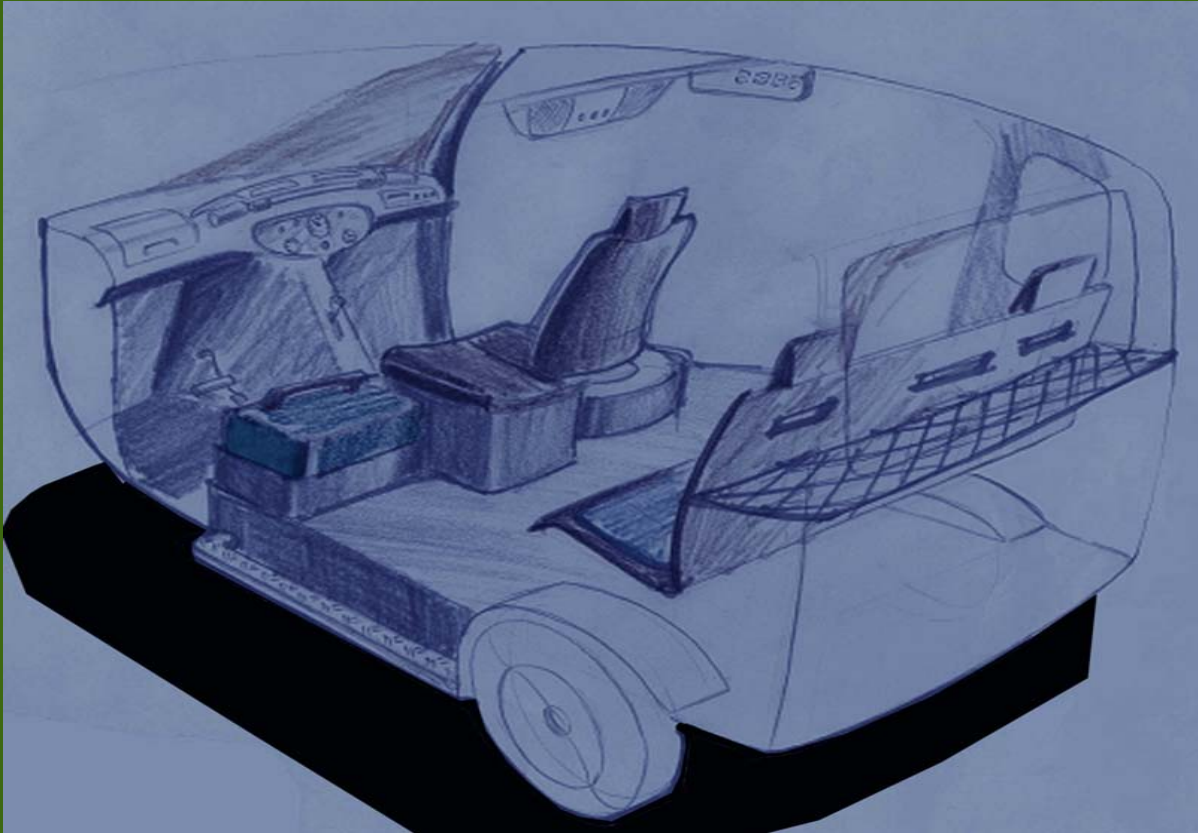
Nylon net behind the rear seat to put soft and lighter luggage

Display console in the dashboard but near to the driver with a smoothly curved aluminium handle bar

Speakers just behind the head of driver and in front of passengers

Flat floor pan to accommodate luggage under the seat to be accessed from inside

Steam pressed backrest with proper contour and slits for ventilation. No cushioning in the backrest.



design of a three passenger auto rickshaw

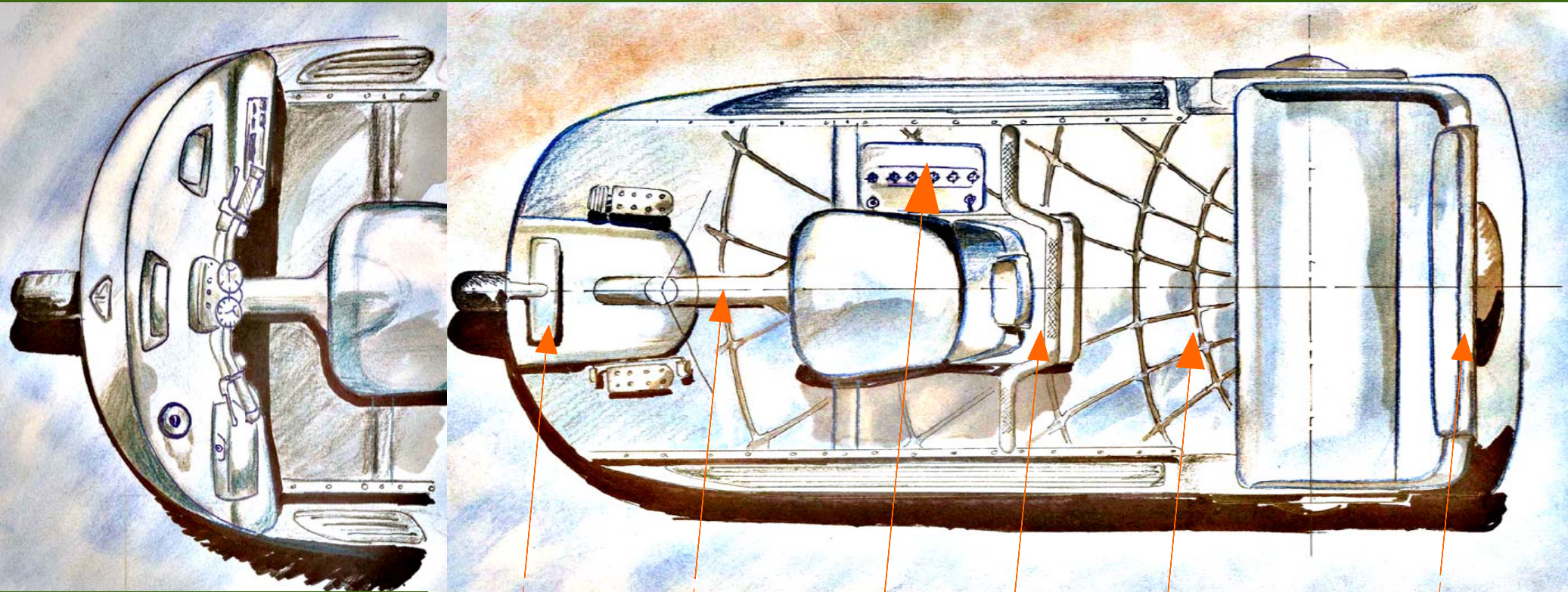
CRITERIA FOR CONCEPT SELECTION

practicality,
Utility and
feasibility of the product.

CONCEPT SELECTION

Amalgamation of all the potential concepts and borrowing design ideas from each other

FINAL CONCEPT (rough layout)



Petrol tank

Exposed chassis member

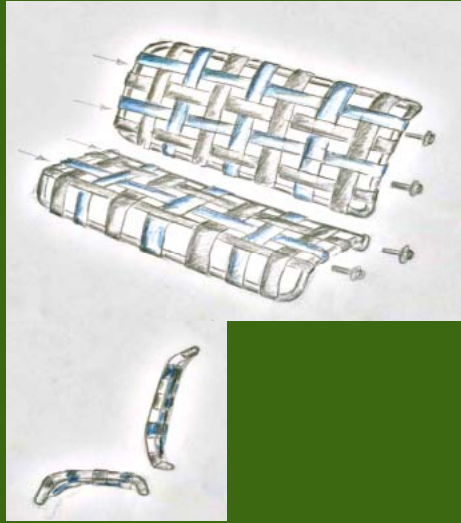
battery

Space behind the driver's seat and engine top

Ribbed floor pan for strength

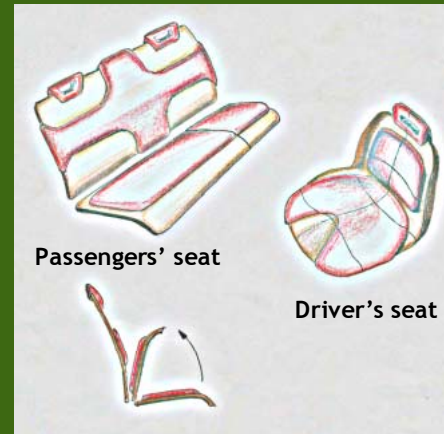
Spare tire mounted in the backrest of passenger seat

DESIGNS IDEAS AND ALTERNATIVES FOR INDIVIDUAL PARTS

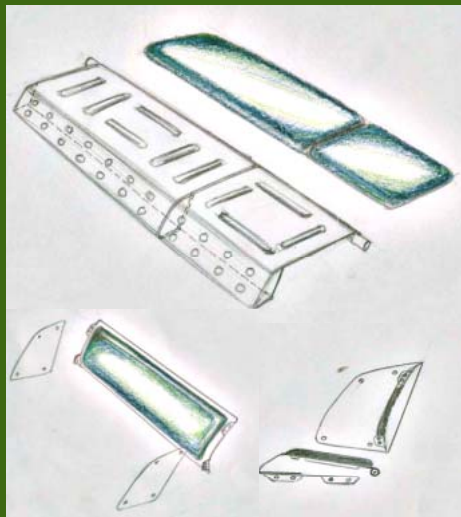


Weaved seats made of nylon ribbons

Seats



Steam pressed plywood seats-slim and optimised cushions in bright colours

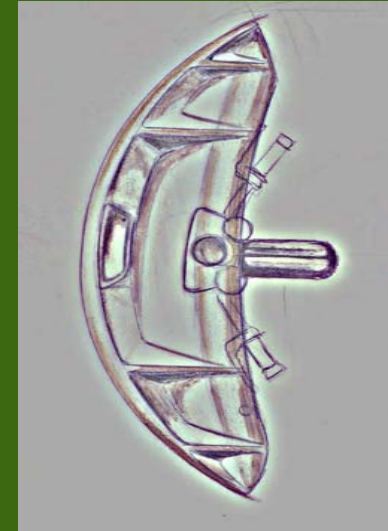


Pressed sheet metal base with normal cushioning with rexin cover



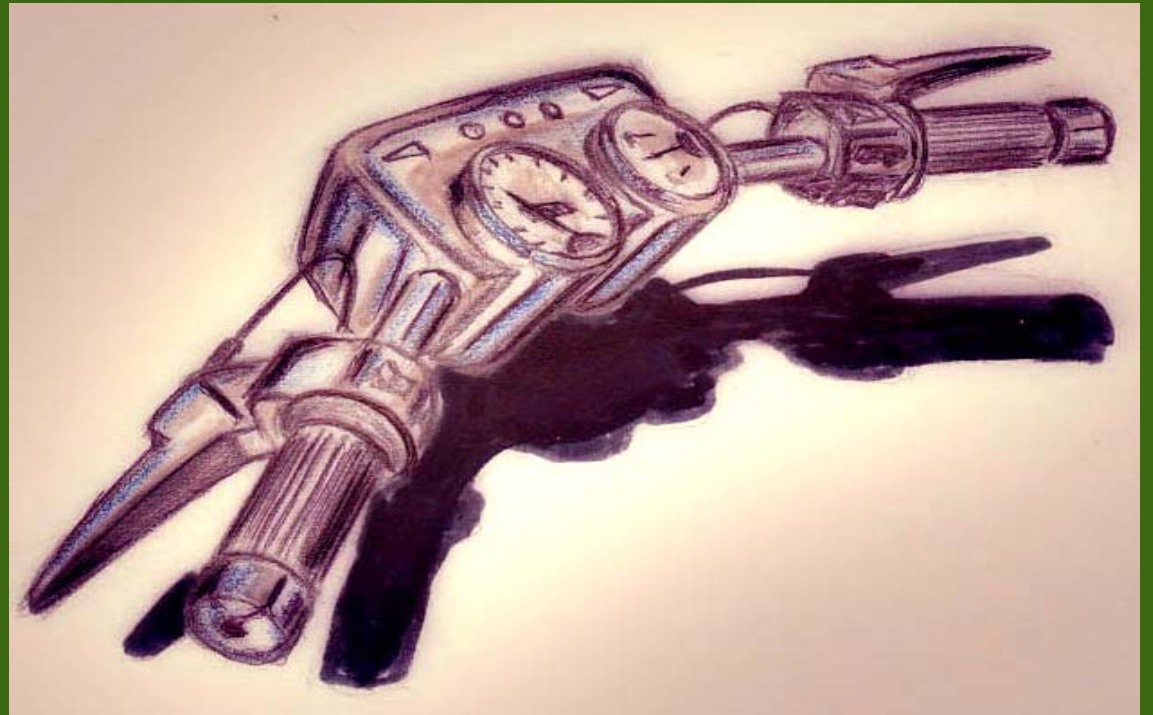
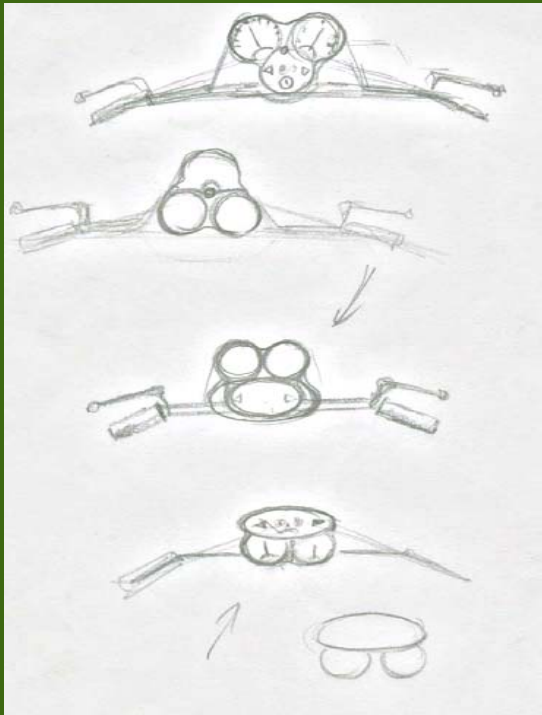
Plywood seats and with integrated shoulder pads

Dash board

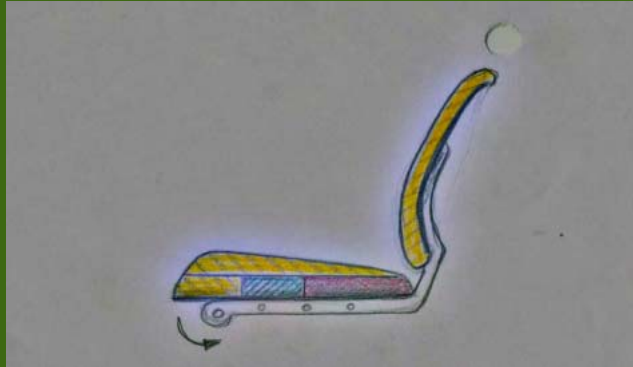


Variation of Slotted dashboard for keeping coins, news papers, matchbox, agarbattis etc

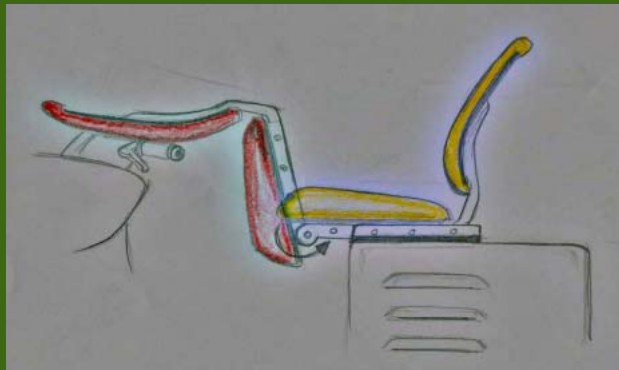
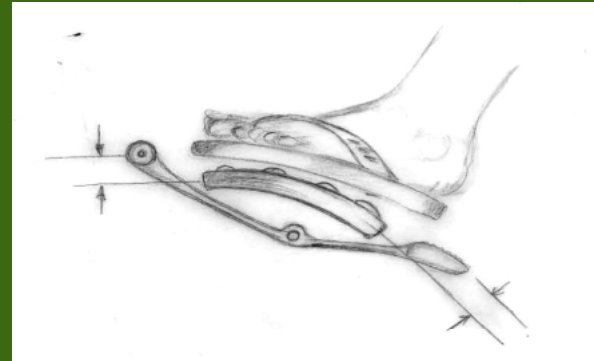
Handle bar



Driver's seat

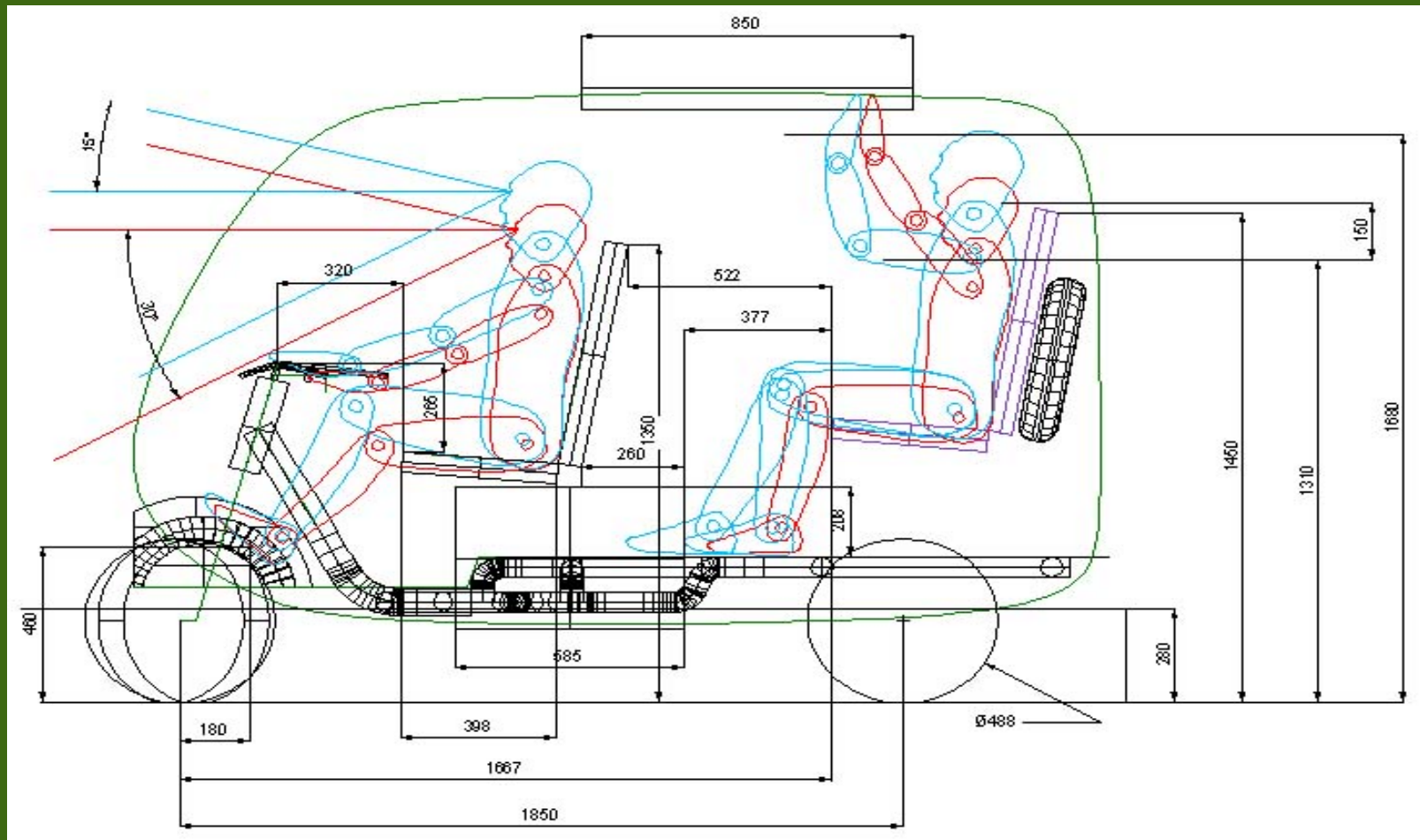


Gear Lever And Brake Pedal With Footrest



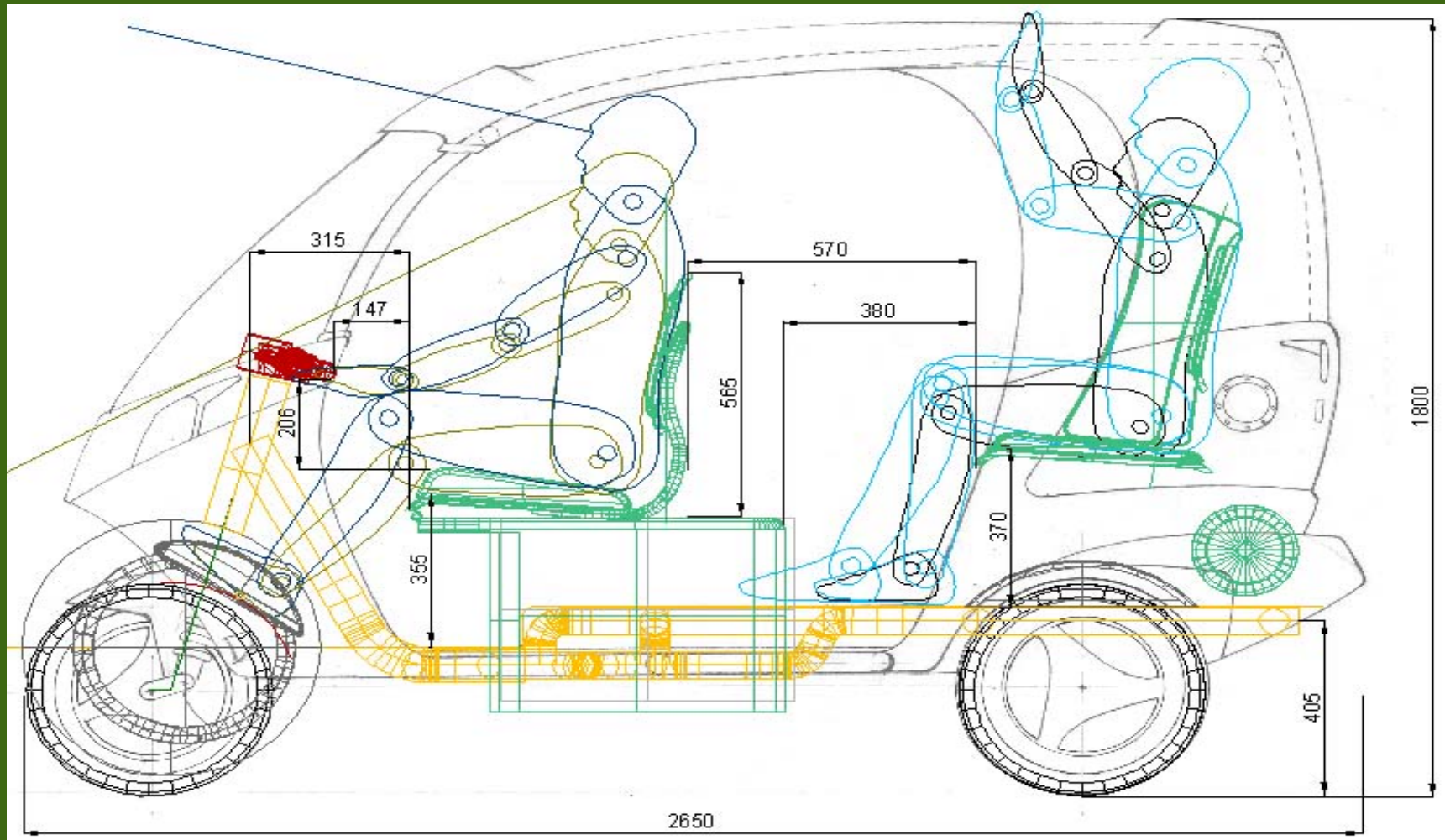
FIRST STAGE REFINEMENT

Required Dimension For Interiors

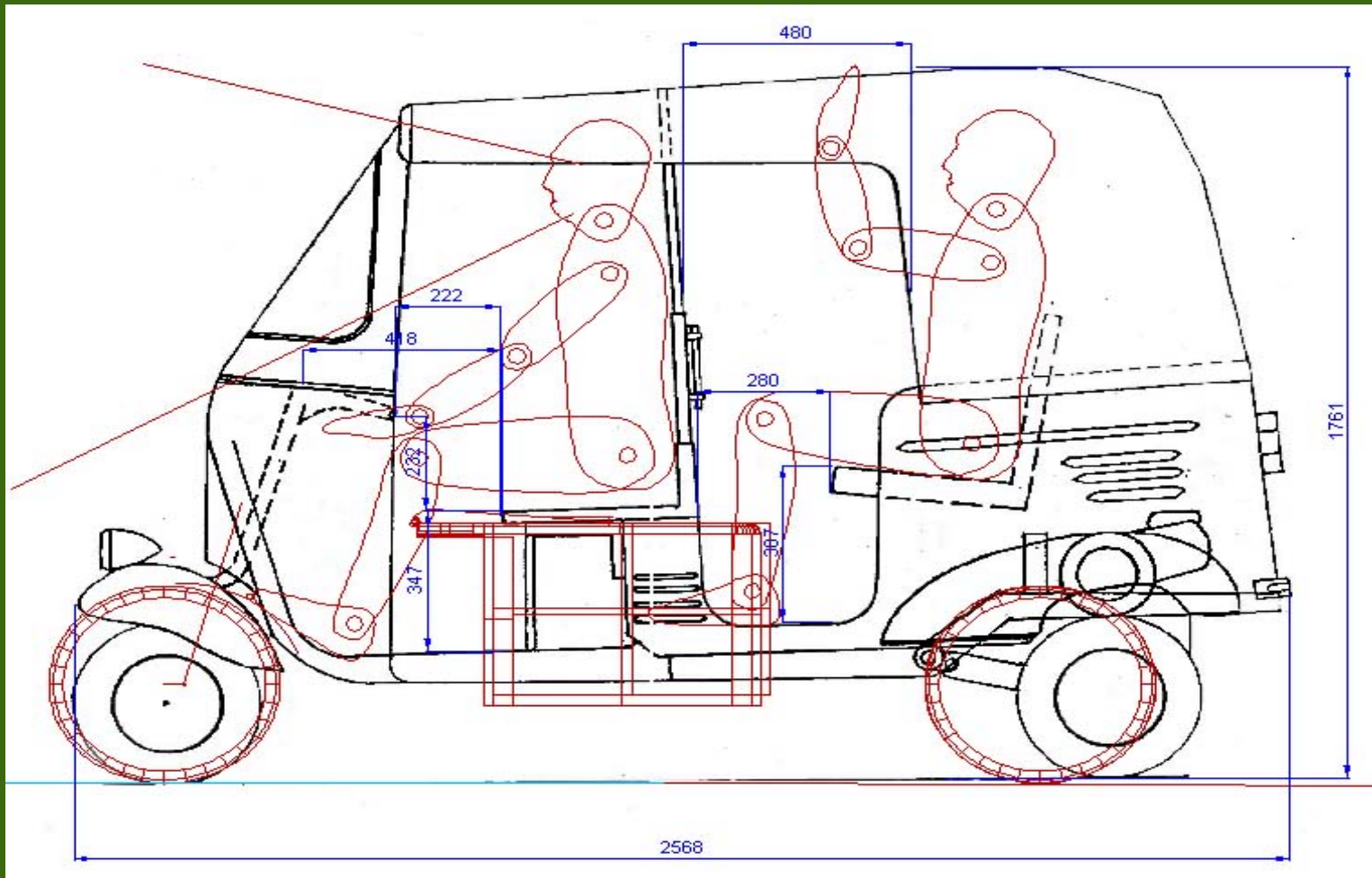


design of a three passenger auto rickshaw

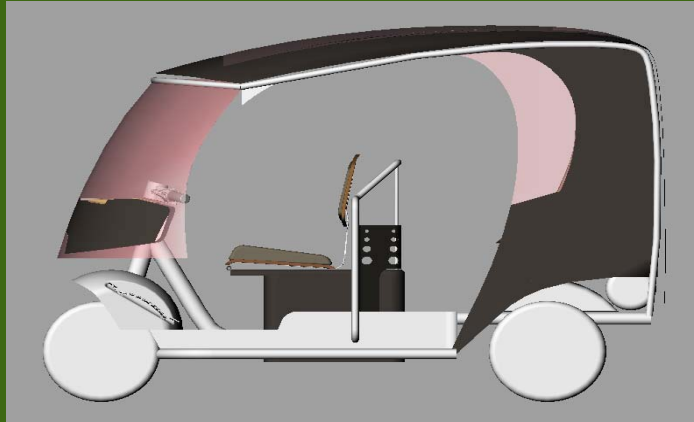
Exterior Layout With Internal Requirement



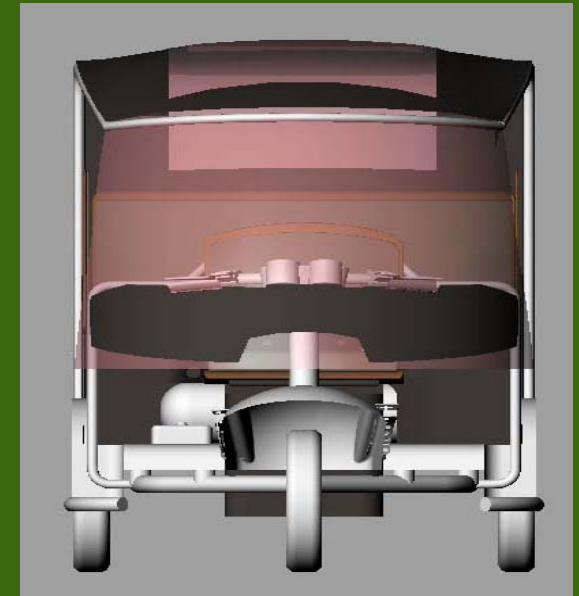
Bajaj RE Seating



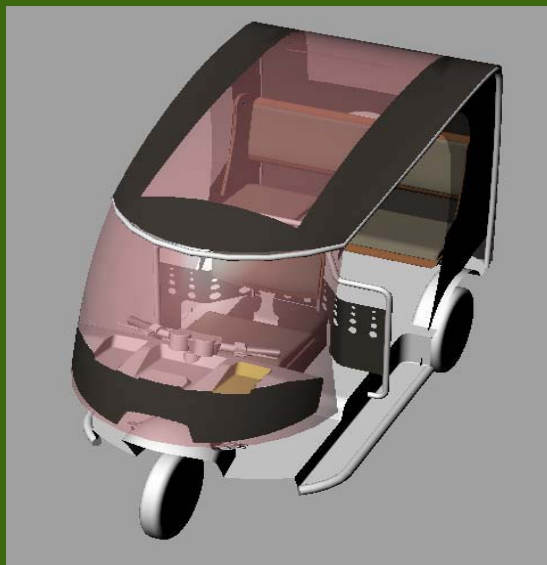
CAD Model



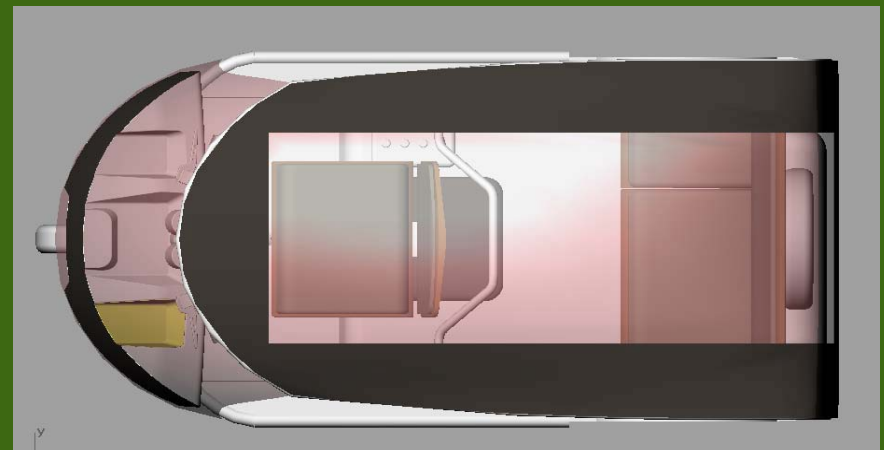
SIDE ELEVATION



FRONT VIEW



FRONT 3/4 VIEW



PLAN

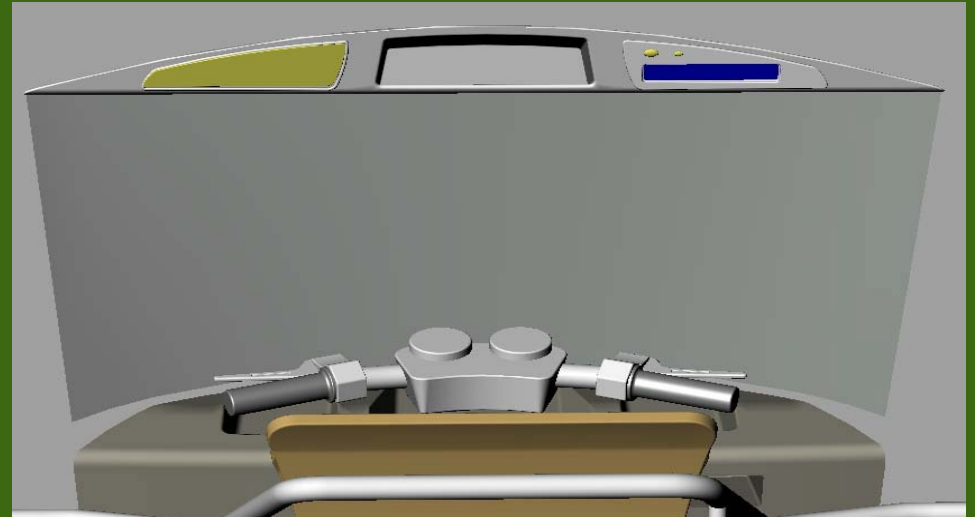
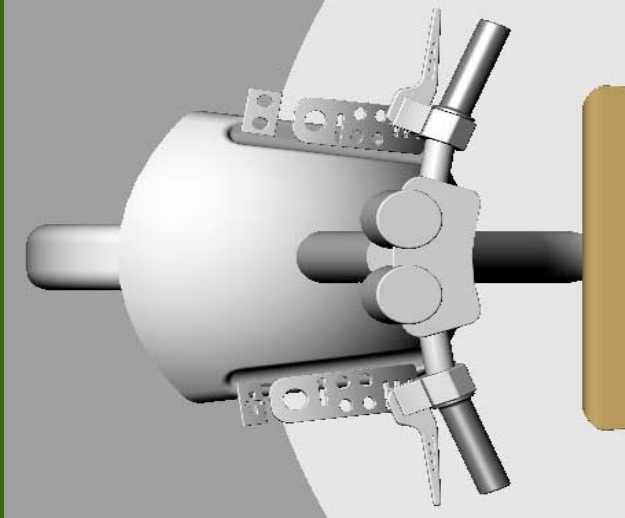
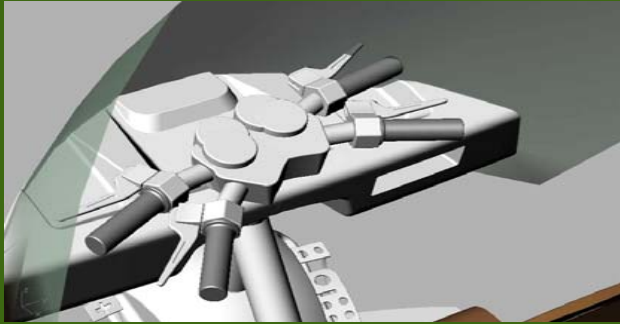
design of a three passenger auto rickshaw

Problems With The Design

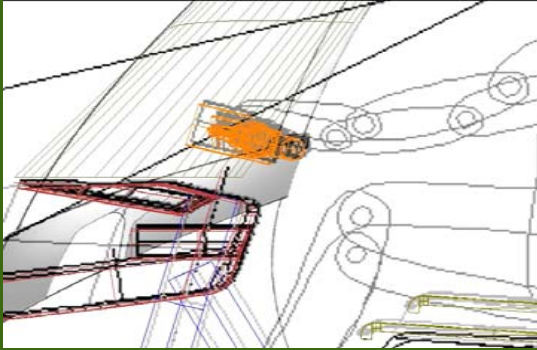
Handle bar

Footrest

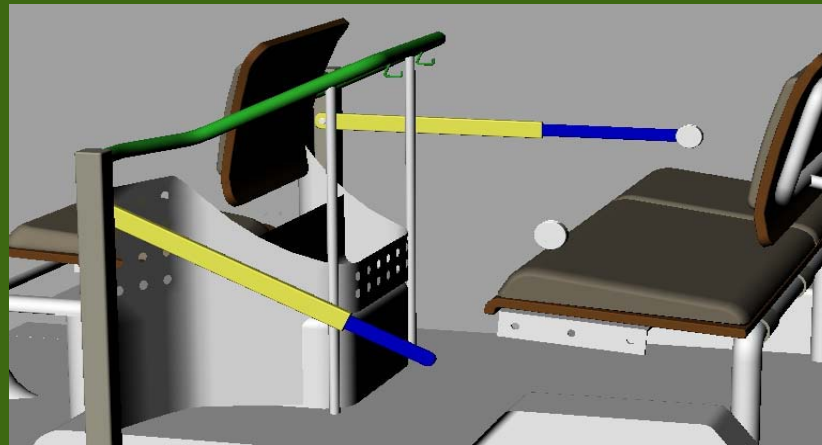
Fare meter panel-rear view mirror



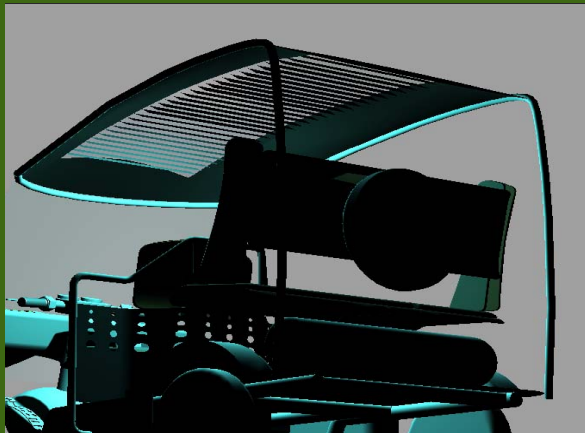
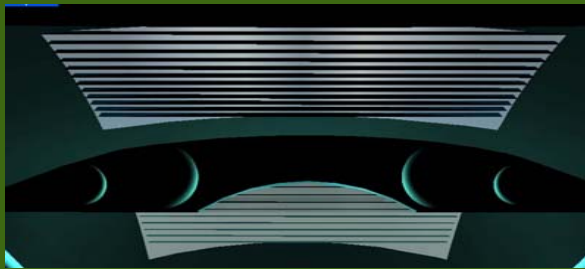
Problems With The Design



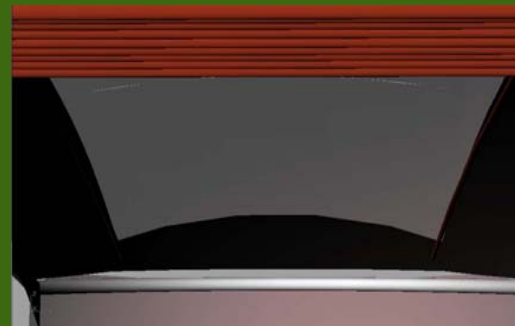
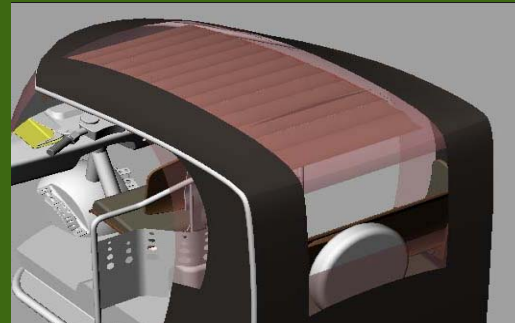
Handle bar clearance
Grab rail
Child safety



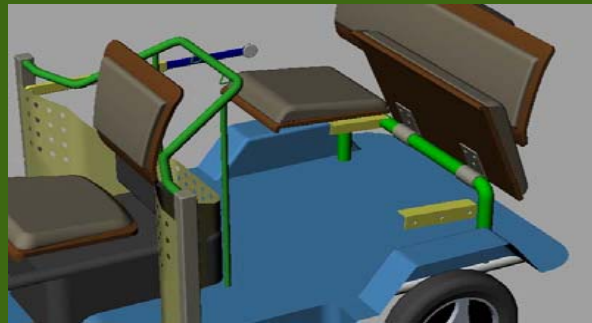
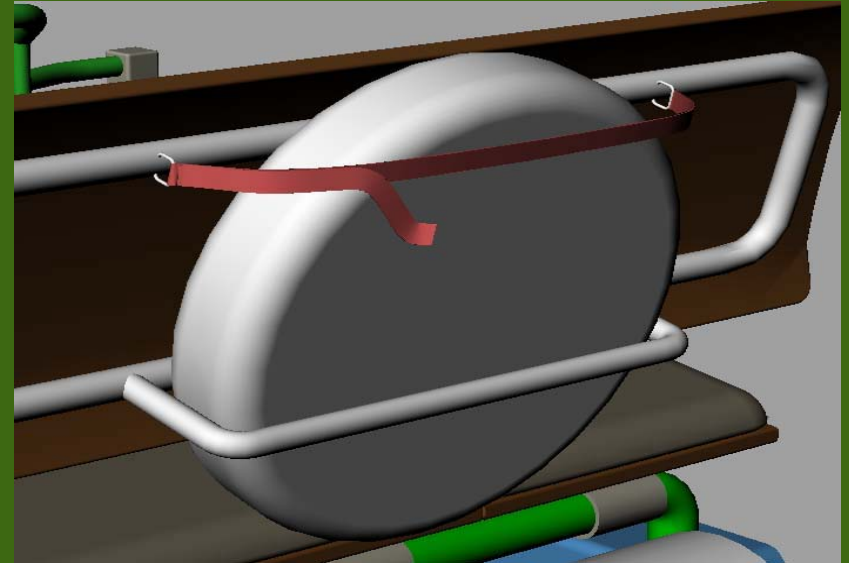
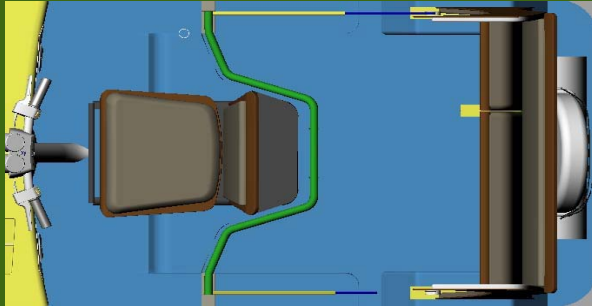
Blinds



Retractable curtains



Some good features to be taken forward



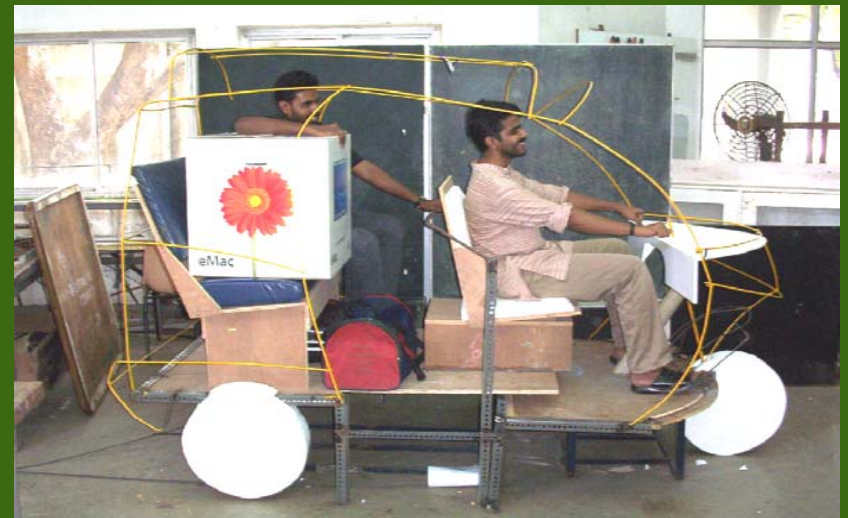
design of a three passenger auto rickshaw



Full scale mock up rig for study purpose and finer refinement



design of a three passenger auto rickshaw

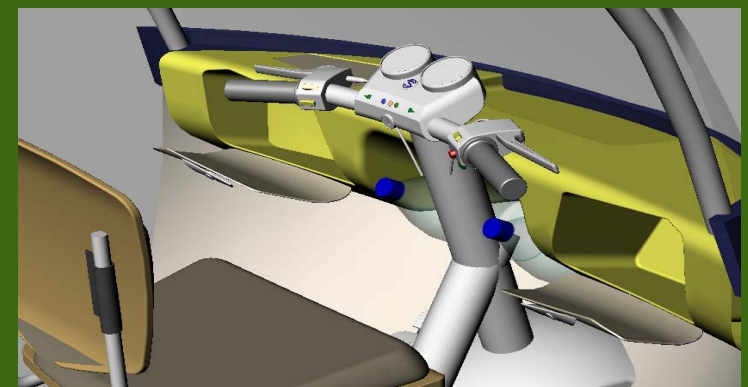
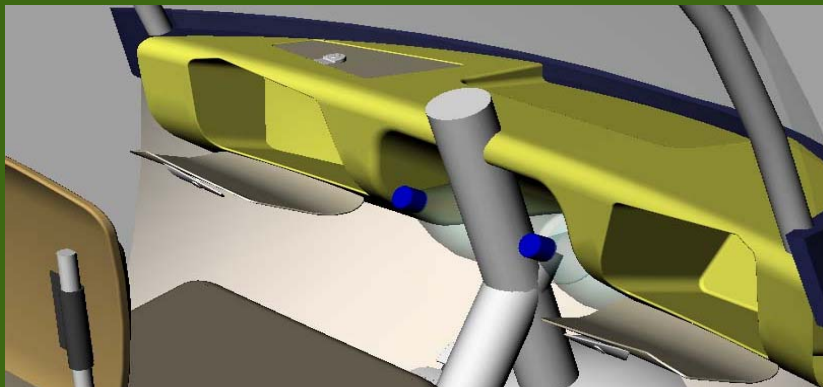
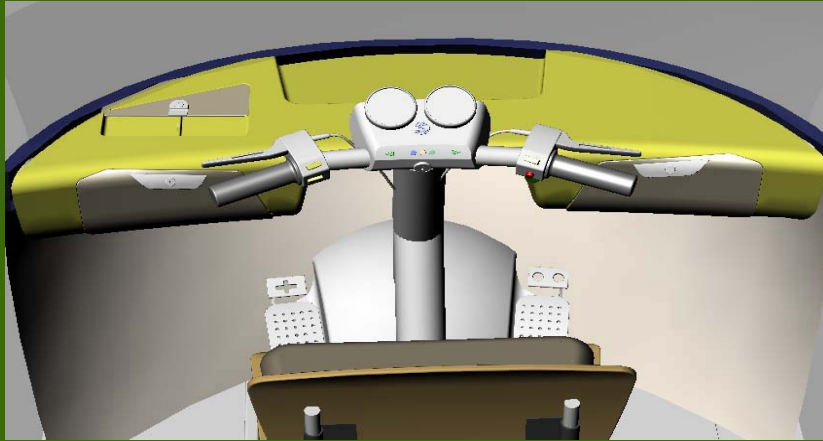


design of a three passenger auto rickshaw

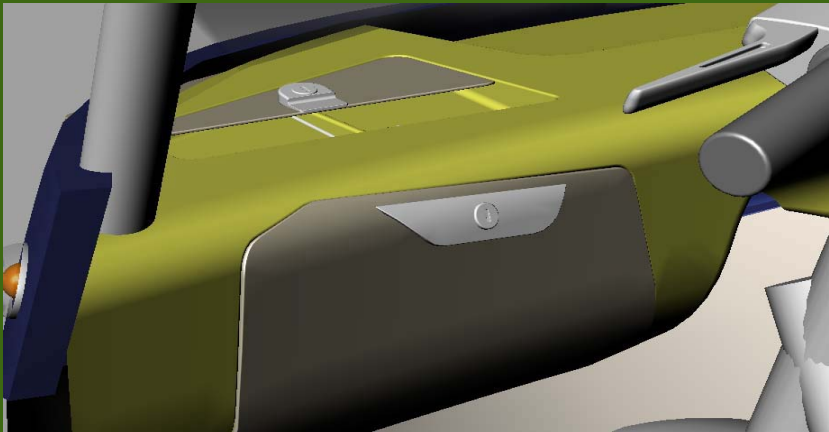
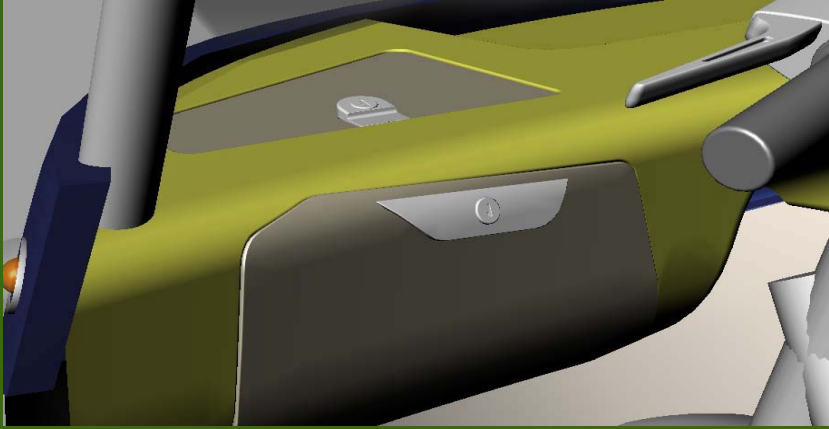


design of a three passenger auto rickshaw

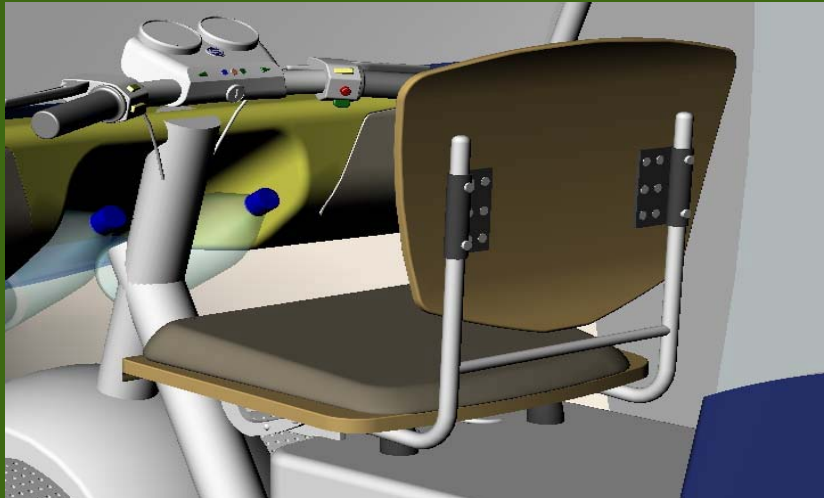
FINAL DESIGN AFTER REFINEMENT



design of a three passenger auto rickshaw



design of a three passenger auto rickshaw

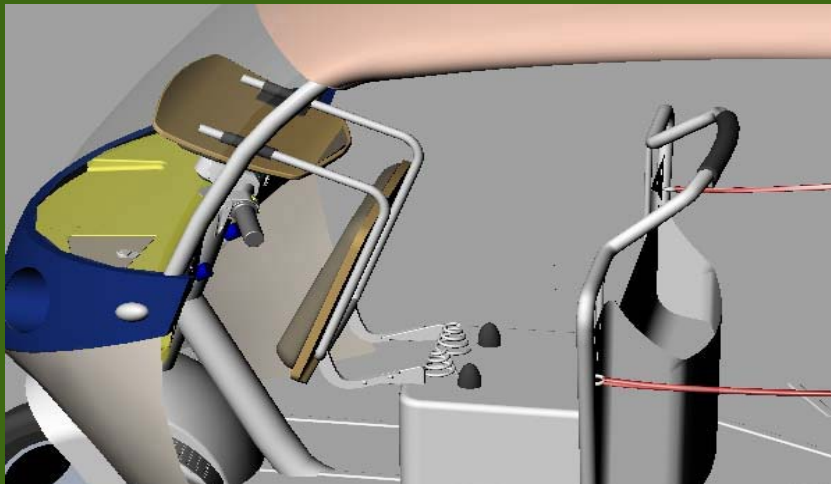


DRIVER SEAT ADJUSTABILITY



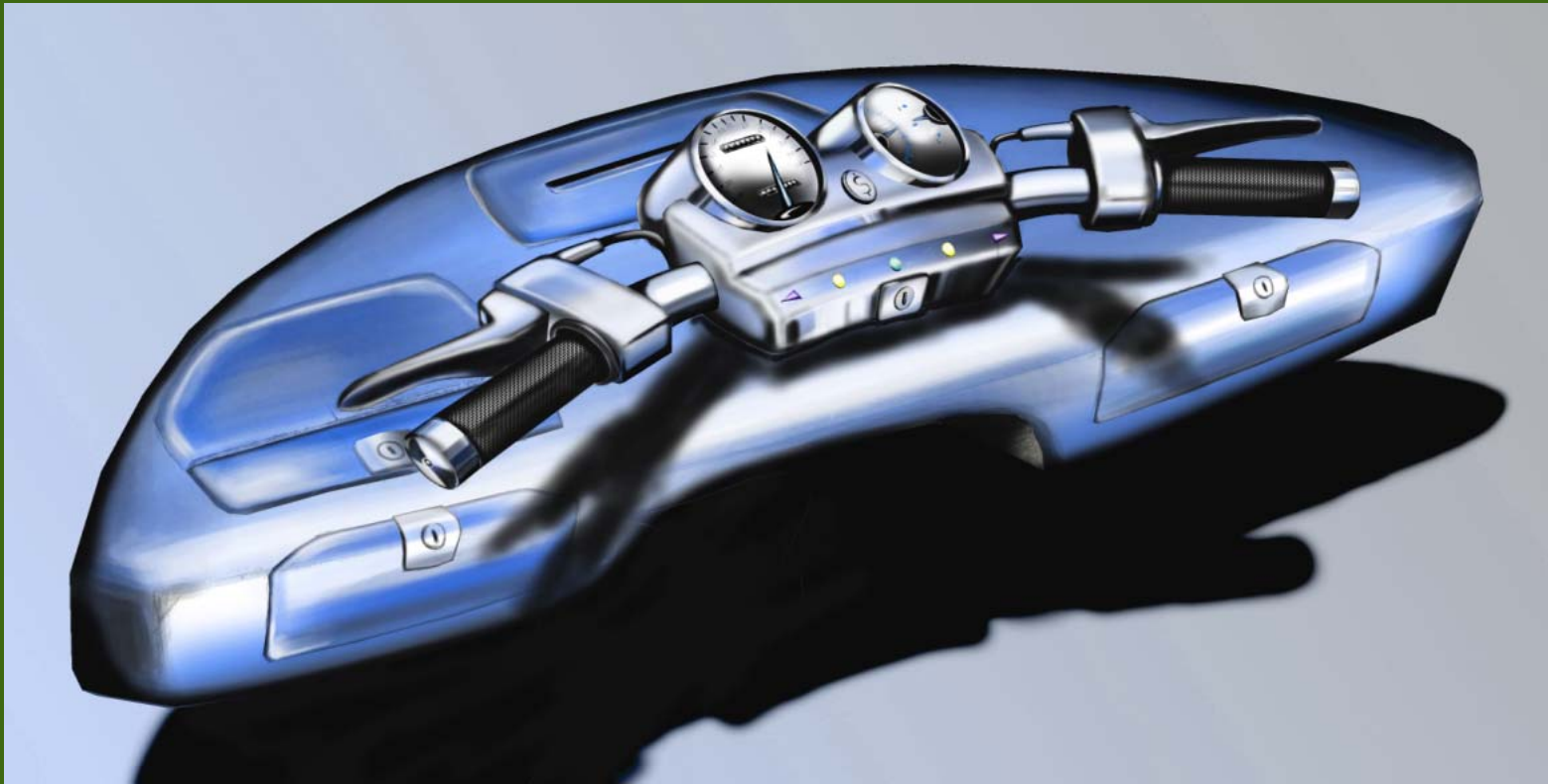


ENGINE ACCESS

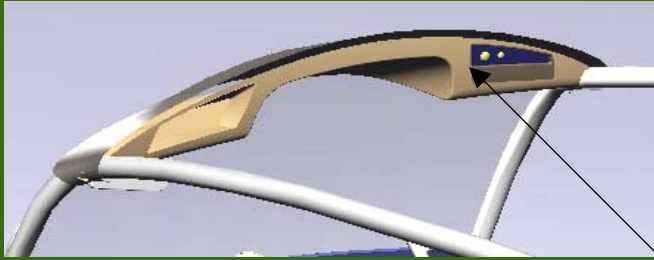


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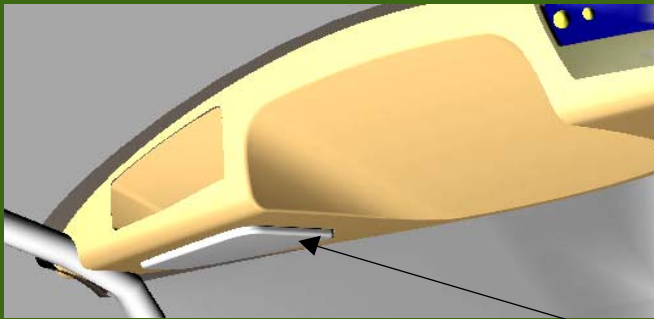
Handle bar



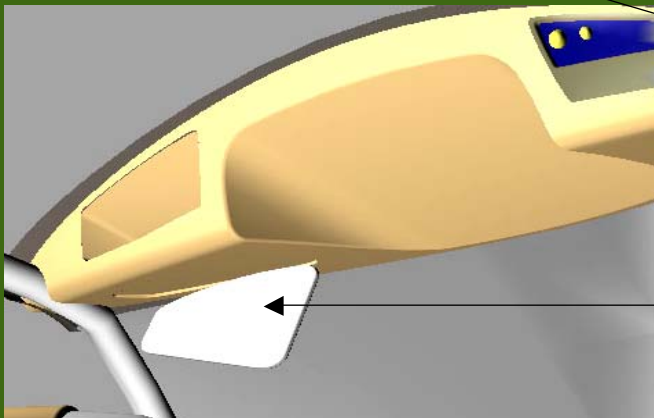
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Digital fare meter with set
reset buttons

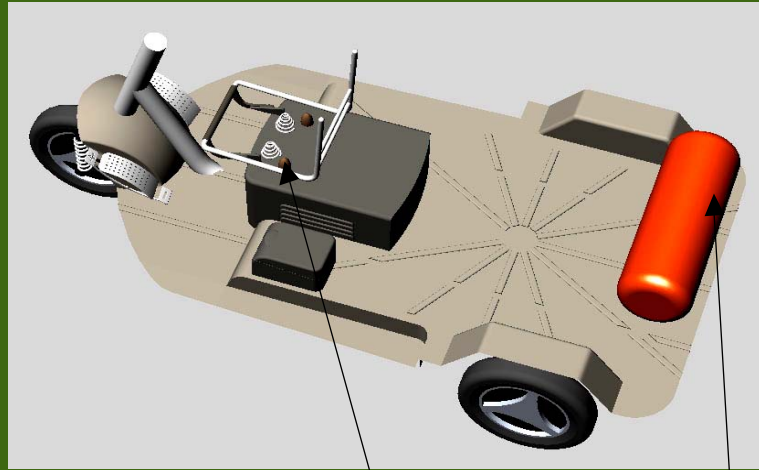


Rear view
mirror in
closed position



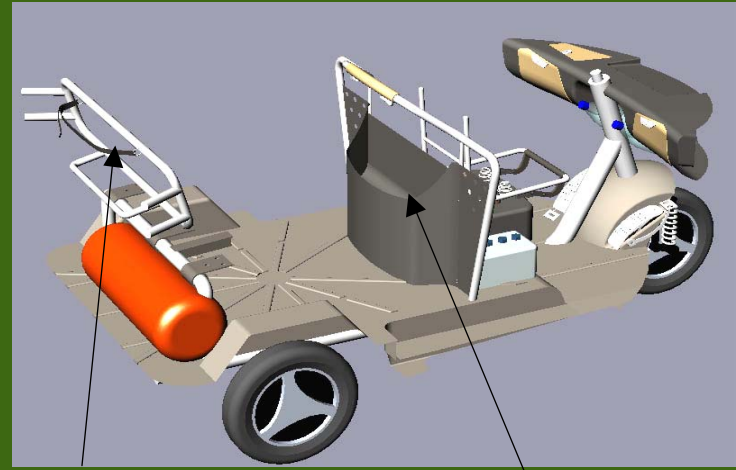
Rear view
mirror in open
position

Layer by layer representation of the CAD model



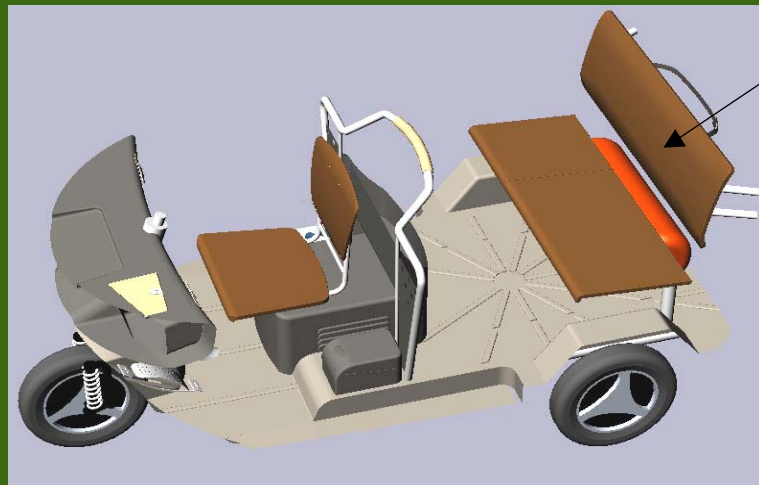
Engine with seat mounting mechanism

CNG Cylinder

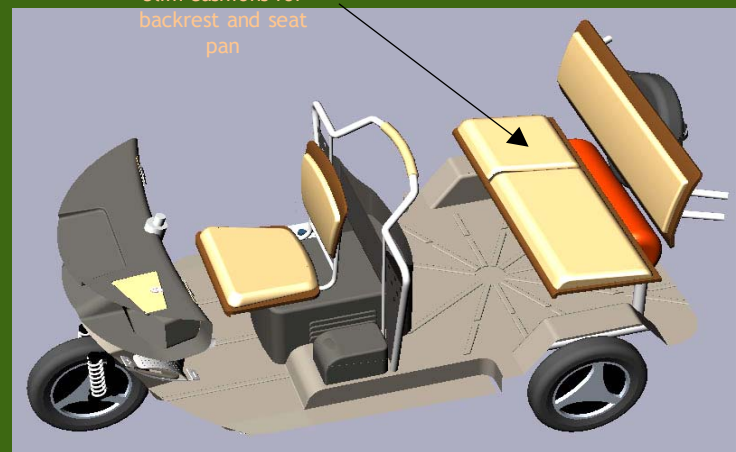


Mounting details of the rear seat

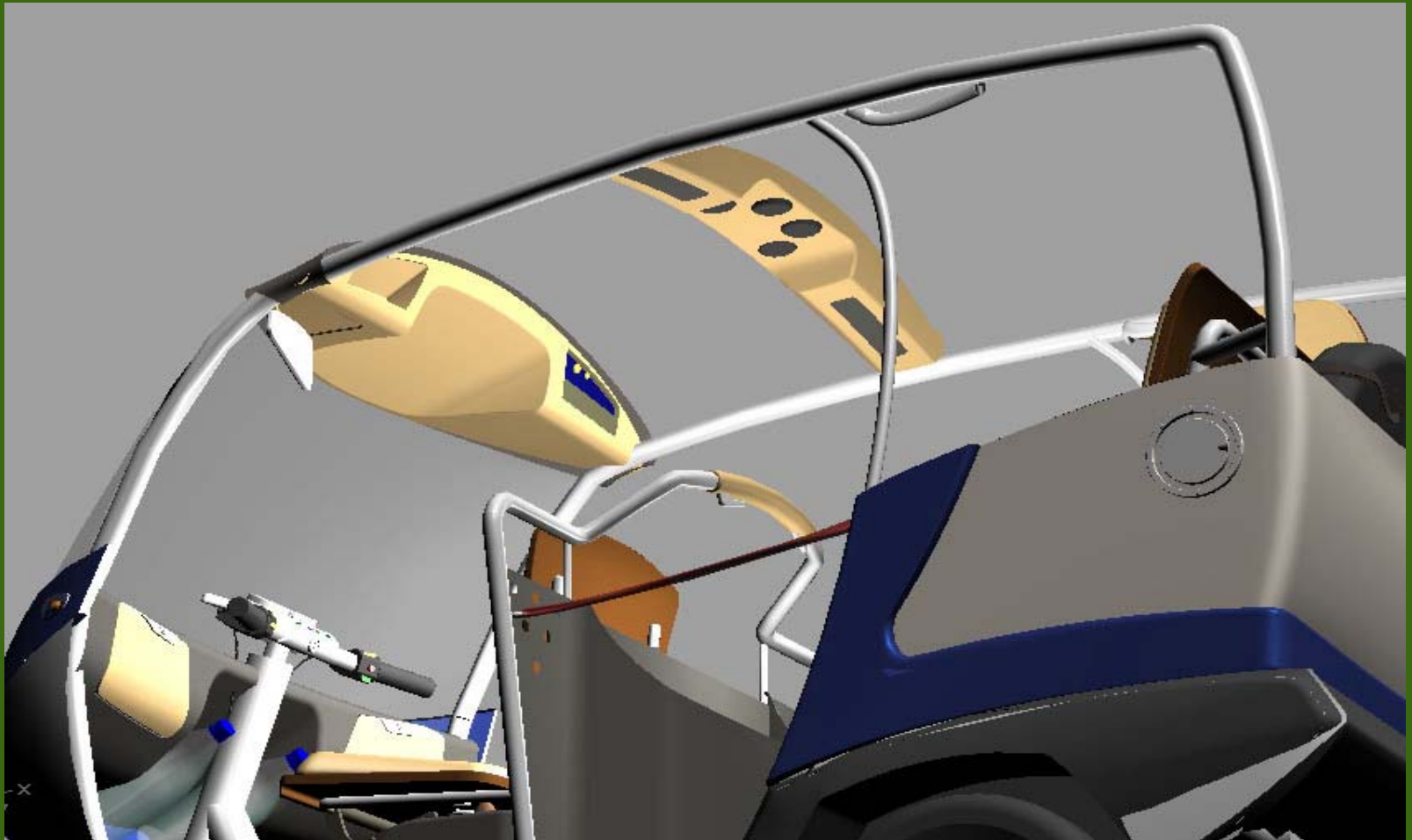
Storage area behind the driver seat



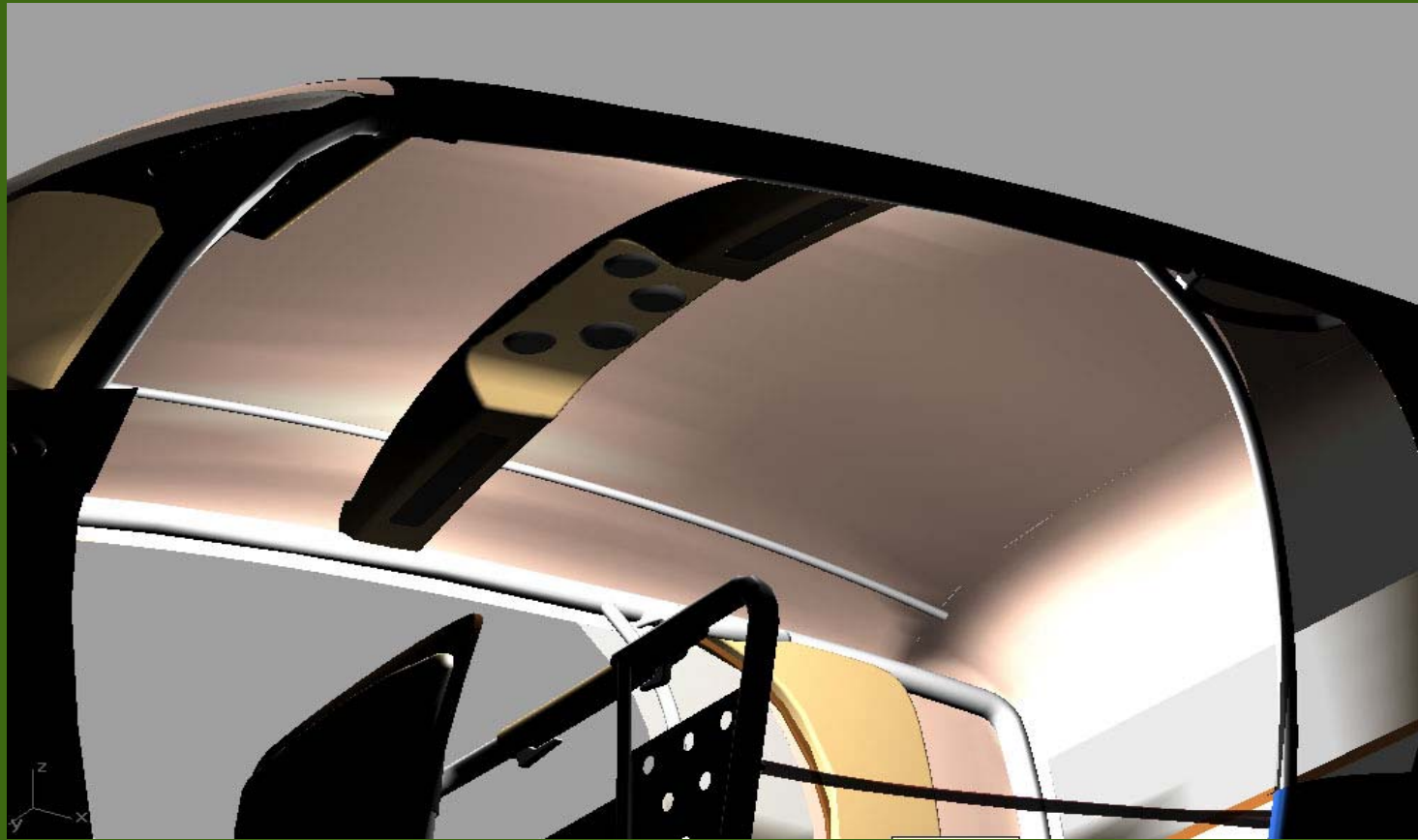
Steam pressed plywood seats



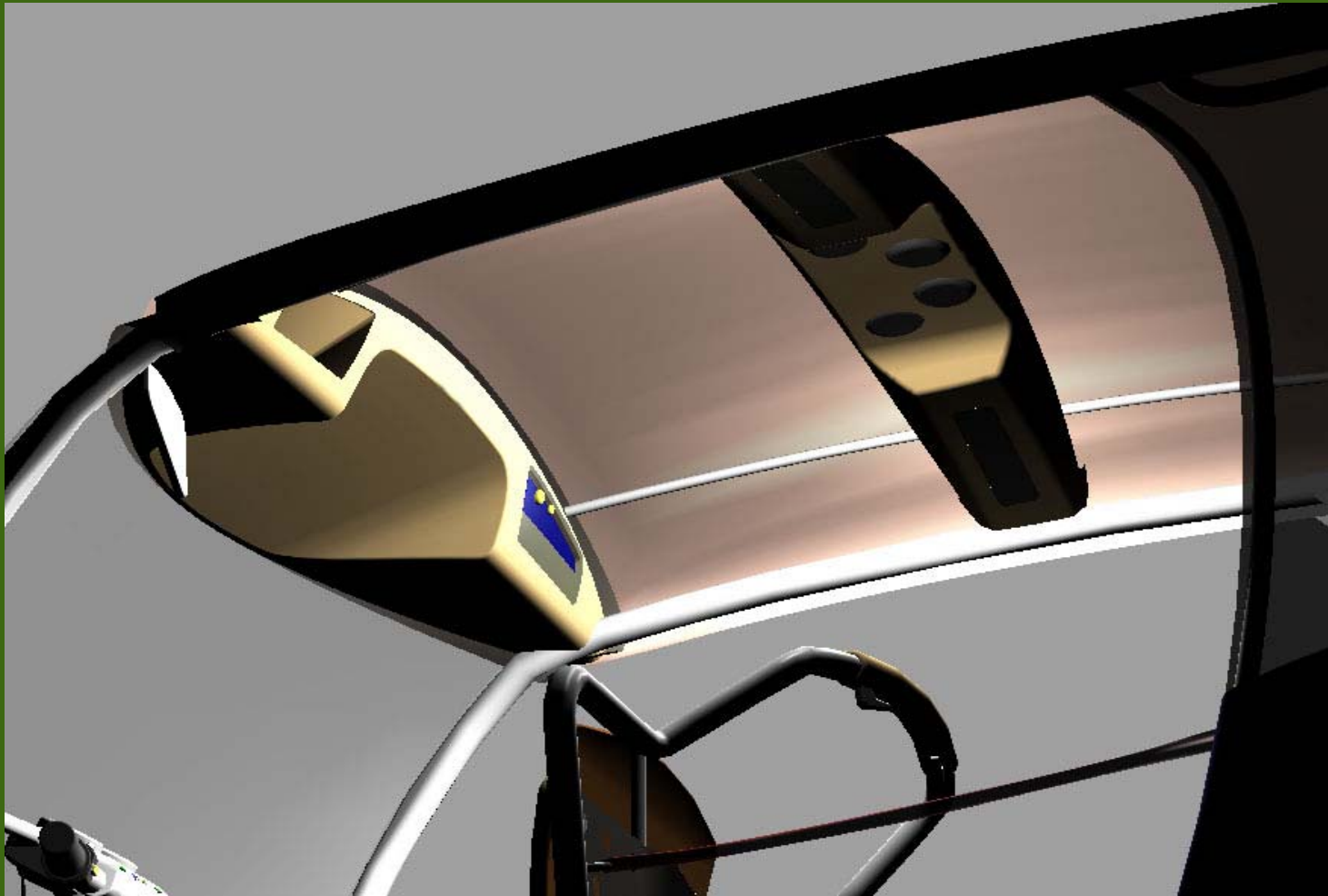
Slim cushions for backrest and seat pan



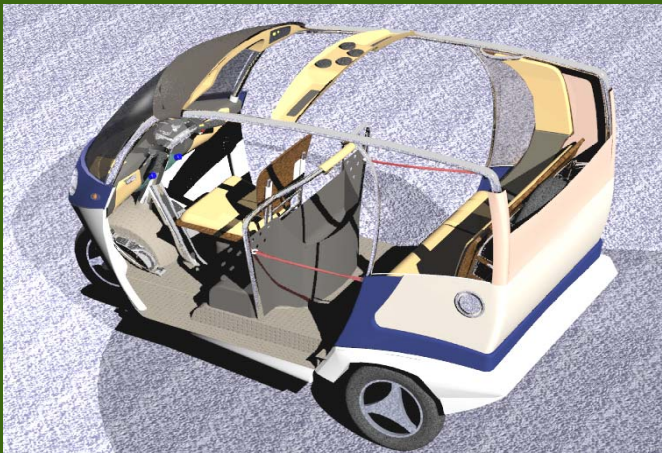
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