

THE REDESIGN OF BAJAJ STUDY CASE FOR THE OLD BAJAJ IN JAKARTA

Indra Gunara Rochyat¹, Andre Hambali²

Esa Unggul University
indragunara@esaunggul.ac.id, hambali.andre@gmail.com

ABSTRACT

Bajaj was introduced at the Jakarta transportation to replace Becaks in in the 1970s, these vehicles uses a two-stroke engines which is a modified of Bajaj the scooter brands made in India. Technically, bajaj structure of derived from two-wheel motorcycle vespa, but modified into a three-wheel, and have enclosed passenger space.

Since its emergence in 1977, of Bajaj has become part of the lives of people in Jakarta as one transportation modes. As a transportation modes, of course of Bajaj also be supporting the economy for the propulsion elements, ranging from businessmen, artisans and mechanics of Bajaj. Holistically, of Bajaj save a structure of of practical knowledge possessed by an of Bajaj. The structure of practical knowledge that is the sociological aspect of of Bajaj owned. Historically, the early emergence of of Bajaj at the Jakarta marked by an obsession that Jakarta provincial government when it wants to develop a motorized public transport modes.

Keywords: redesign, ergonomic, aesthetic.

1. INTRODUCTION

1.1. Introduce Bajaj

The shape is quite unique , because it meets all the provisions to form a four-wheeled vehicle , with four lights in front and behind . The front of the driver there is a glass that can be equipped with wipers when it 's raining . The vehicle is being imported and entered in Jakarta in 1975 , in 2004 the price reached USD 15-22 million Euro in used condition . Transaction system between the driver and the passenger is the bargain - bargain fare , based on the distance traveled , the weight load of the innate and traffic levels that occurred at that time .

Since its emergence in 1977 , Bajaj has become part of the lives of people in Jakarta as one mode of transportation . As a mode of transportation , of course Bajaj also be supporting the economy for the propulsion elements , ranging from entrepreneurs , Bajaj mechanic . Bajaj save a structure of practical knowledge possessed by an auto-rickshaw . The structure of practical knowledge that is the sociological aspect of which is owned by Bajaj . Historically , the early emergence of Bajaj in Jakarta marked by an obsession that Jakarta provincial government when it wants to develop a rapid public transport modes .

Of course, these policies have an impact on the abolition of rickshaws , which at the time became a popular mode of transportation in Jakarta since 1930 . Along the way, Bajaj has contributed significantly to the citizens of Jakarta . Bajaj has a role as one of the means of transport in the city . Bajaj has an important role in the transport of passengers in Jakarta . In other parts , Bajaj has also become an integral part of the transportation system in Jakarta .

In current conditions , the shift of public passenger vehicles to private vehicles , Bajaj has been difficult for builders to get the passengers , and the impact on the increasing competition between public transport modes in terms of searching for passengers . future , will be the elimination of the discourse as a mode of public transport Bajaj Jakarta

2. THEORETICAL BACKGROUND

2.1 Sociology Theory

Sociology is derived from the Latin meaning Socius colleagues, while Logos means science. This expression revealed the first time published in a book entitled "Cours de Philosophie Positive" by August Comte (1798-1857). Although many definitions of

sociology but sociology commonly known as the science of society.

Society is a group of individuals who have a relationship, have a common interest, and have a culture. Sociology study of society, people's behavior, and human social behavior by observing the behavior of the group that built. As a science, sociology was social science that is composed of the results - the results of scientific thought and can be controlled critically by others or the public. They include families, tribes, nations, and political organizations, economic, social.

2.2 Aesthetic Theory

The term aesthetics comes from the Latin "aestheticus" or Greek "aestheticos" which comes from the word "aithē" which means feeling. Aesthetics can be defined as the arrangement part of something that contains the pattern.

Which includes theories about the merger between the forms that can be developed, the color corresponding to the styling design, as well as the appropriate material as well so that it becomes an attractive and accepted by society at large.

2.3 Ergonomics Theory

Ergonomics is a branch of science that systematically utilize information about the nature, human capabilities and limitations in designing a working system so that people can live and work on the system well, reaching the desired goal that through the work, with an effective, safe, healthy, comfortable and efficient (Sultalaksana, 1979: 61). Not only in the instrument, ergonomics assessment also covers human interaction with the elements of another working system, namely materials and the environment. Even methods and organization. The goal of ergonomics (human factors) there are :

2.4. Ergonomics In The Design

Ergonomics in the design process of design is, as early as possible to try to think of the interest of every man to be accommodated in creativity and innovation a "man made project" focus attention on the study of ergonomics will lead to the achievement of a design of a product design that meets the requirements of "fitting the task to the man ". So that any design must always think of the

design of human interests, namely regarding safety, health, safety, and comfort (Rosmani Ginting, 2010: 238)

2.5. Anthropometric Theory

Anthropometry is a study concerned with the measurement of the dimensions of the human body. Meanwhile, according Nurmianto (1991) anthropometry is a collection of numerical data relating to the physical characteristics of the human body, the size, shape and strength as well as the application of such data to the handling of design issues. Anthropometry is widely used as an ergonomic considerations in the planning process (design) products and systems of work that will require human interaction.

2.6. Color theory

Color is considered by many psychologists can affect a person's psyche and character because it is very dependent on the factors subyekif, then everyone in choosing colors based on different perspectives.

2.7. Definition of Transportation

Transportation was as old as mankind. In society it is a simple matter to occupy an important place in the lives of its members. The difference with the modern society is located on the equipment used, in other words there are technological differences. The equation needs to move from one place to another can be said as one of the necessities of life. (Warpani, Suwardjoko. Perangkutan System Plan. Bandung: ITB, 1990).

2.8. Vehicle

Perhaps the most spacious forms of transportation use is a land vehicle. Almost all use wheels which facilitate movement, and body parts that are designed to be able to place and used to protect the payload. Designed so that the vehicle is able to move with the terrain (Warpani, Suwardjoko. Transportation System Plan. Bandung: ITB, 1990; 8). Of course there are economic objectives so that the vehicle can move more smoothly, faster and more energy-efficient.

2.9. Highway Transportation

Two elements are perangkutan infrastructure. In road transporting, the element is a highway and vehicles. Type in transporting becomes increasingly important after the industrial revolution. Animal-drawn vehicles in general has been replaced with a motor vehicles carrying capacity and double the home range. Increasing the power lead to two and broader road network and improve the quality of the highway in accordance with the technical demands of a motor vehicle.

2.10. The classification based on road function.

Public roads in Indonesia are grouped according to function into the arterial roads, the collector roads, the local roads, and the road environmental. Functional class like these appointed from the classification at the the United States and Canada. Above the road classes is still there Freeway and Highway.

2.11. The classification based on public administration.

Grouping way intended to achieve legal certainty in accordance with the road management authority and local government. Public roads are classified according to the status of national roads, provincial roads, county roads, city streets and village roads.

2.12. The classification based on load axis

For the purposes of regulation on the use and meeting the needs of transport, roads are divided into several classes based on the needs of transport, modal choice appropriately by considering the advantages of the characteristics of each mode, motor vehicle technology development, the axis of heaviest load of motor vehicles and road construction. Grouping according to the load axis road which is also called classes road.

2.13. Jakarta transportation

environmental circumstances and situations of public transportation at the Jakarta itself into consideration when people will use public transport services are concerned. Jakarta Traffic Police record number of vehicles at the Jakarta there are 3,842,661 units (1997). While the number of people

who do not have motor vehicles is expected to many million people. They were disadvantaged by the city planning oriented private motor vehicles, so are often times the public transport network planning becomes a priority.

2.14. Definition of Hybrid Technology

Hybrid is a technology that uses multiple energy sources. While the hybrid vehicles is a type that has multiple sources of propulsion, gasoline engines (Internal Combustion Engine) and gas-fueled engines. Source of energy is derived from fossil fuels (petrol) or substitute fuel gas and energy stored at the gas cylinders. Gasoline engine and engines fuel gas has a distinctive character of each, and the character can be complementary rather than replacing it completely.

2.15. Fuel Gas (CNG)

The main composition of the BBG is the element of methane (CH_4) of 95.03 % ; ethane (C_2H_6) by 2.23 %, carbon dioxide (CO_2) of 1.75 % ; Nitrogen (N_2) 0.68 % , and propane (C_3H_8) at 0 , 29 % . From this it appears that the composition of the main components of the CNG is methane gas . BBG density is smaller than the density of air , so if there is a leak either in the storage tank and fuel lines will soon rise to the top . CNG because of the form of gas , no need to first be evaporated as the fuel (gasoline) , so that the problems at the start at low temperatures and excessive emissions because the fuel mixture is too rich - at the start of air can be minimized .

BBG octane rating higher than that of gasoline , which is between 120 to 130 . With the high octane value is then at a higher compression ratio will not happen knocking on the motor . BBG excellence in terms of the combustion process in the combustion chamber is because CNG has the atomic ratio of carbon to hydrogen atoms is low, so it becomes more perfect combustion . Given BBG already in the gas phase , it can easily be mixed with air in the combustion chamber , so that oxygen can easily join the formation of carbon and CO_2 react instead of CO . Besides, because the number of molecules of carbon atoms less than the CNG fuel, the CO is formed from the combustion process is also much less .

3. RESEARCH METHOD

3.1. City Concept Survey

Performed by asking a few questions or interviews directly or through an email to the related department, such as the South Jakarta mayor PR on management, philosophy, concept, character design and character of its people.

3.2. field survey

Studies conducted directly on the location of some point in Jakarta to enter and learn the location of road conditions and of congestion sources who have circumstances and different problems.

3.3. Observation

Performed by observing the atmosphere, situation, character design area, starting from architecture, interior, and other forms of supporting products, and also observe the activities of people who use the road.



Figure 2. buliding concept

3.4. Population and Sample Population

Represents the total number of objects / subjects examined in this study came from:

- a) 2 area of the city and its characteristics.
- b) Search engines, via the Google website, Flickr, Deviantart, Wikipedia, Blogs in finding the data written and the pictures support.
- c) Those who through the the road.

Sample

It is the most number of objects / subjects examined in this study came from:

- a) The point of congestion in Jakarta (quota)
- b) 5 motorists (random) which passes through the point of jams in Jakarta.

3.5. Research Instruments

Research instrument obtained through the variables that have been defined and studied, which is based on the moderator and intervening variables, in which the two variables are directly and indirectly affect the

dependent variable. The following research instruments are:

3.5.1. The character of Jakarta

In the design method the authors raised the city's design the character of Modern, Contemporary, Naturalist, and Elegant.

3.5.2. Lifestyle

It is a way for the individual to run activities and spend their leisure time. Various individuals also vary their lifestyles to live their daily lives.



Figure 2. lifestyle

3.6. Collecting Data

The Questionnaire

This data collection is used as an addition to related data through the questions given to the individual and will be concluded answer results most. The questions posed relate to interests within the scope designing new bajaj

Interview

Conducted interviews occur directly or indirectly but comes from conversations that led to the object under study with people who know well the condition of Jakarta, such as population, people who used to pass through the road, using the facilities, or the traffic police stationed in the area .

Other literature network

Performed to get some valid examples and a reference standard in design. For example, to locate size, vehicle specifications, and others.

4. RESULT AND DISCUSSION

4.1. Frameworks

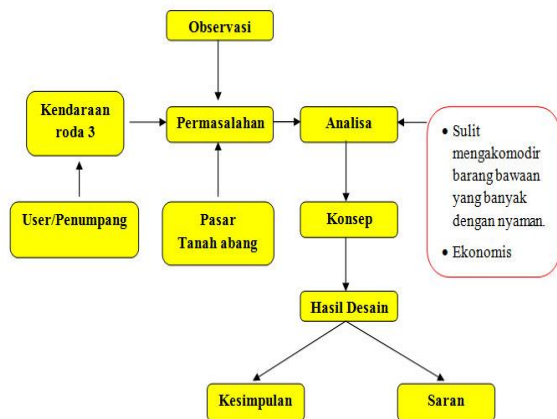


Figure 3. frameworks

4.2. User analysis

Here are the sample of existing users and regular use of the three-wheeler as an economical transportation options.



Figure 4. users images (google sources)

Users of the the medium-high:

1. businessman
2. foreign tourists
3. Housewife
4. And others.

The reason they use public transport (bajaj):

- a) Curiosity
- b) Avoid congestion
- c) Avoiding the difficulty of finding parking in certain areas
- d) The need for narrow transport time
- e) And so on.

Users of the low-the medium:

1. employee
2. merchant
3. Housewife
4. student
5. And others.

The reason they use public transport (bajaj):

- a) The need of transportation
- b) Transporting the merchandise or grocery
- c) Fun
- d) Pursue time

e) And so on.

4.3. Environmental analysis

The number of elite residential area in Jakarta making it more exclusive. some elite housing in it like, beautiful cottage, Kemang, and tebet. Not only that, there are some golden triangle area which is in the area, namely, brass, sudirman, and clover. Not to mention the western region is used as a place of trade and the entrance of the harbor, as well as other parts into a shopping mall.



Figure 5. buildings design

The number of regional offices located in the center of Jakarta, making a link to the current heading and the area around it becomes very jammed during hours of depart home and office.



Figure 6. jam hour

4.4. Material analysis

Bajaj as public transport that has long been in the Jakarta, has a variety of materials in the body, such as iron, steel, canvas tarpaulin, acrylic, fiberglass, rubber and others.

The material used in interior design includes materials contained in the elements forming the space or areas resulting in the formation

of space materials that will be applied to the complementary elements of space (furniture). The material selection is the basic concept of resistance (durability), maintenance (maintenance), comfort (confortability), and beauty (aesthetic).

From the above description it may be concluded that, the Jakarta has:

1. Character of the town: Business area
2. Architecture : Modern, Urban
3. Styling Design : Modern
4. Culture : Urban
5. Material : Glass, chrome, elegant matte
6. Color : Colourful

4.5. Design solutions

In making the design of three-wheeled vehicle with cargo like this, not only designing vehicles only, but designed the cargo section, which is divided into several parts - parts that are useful to put the luggage of passengers that can lead to comfort and safety, such as the following:

- a. Wheelhouse, aimed at the driver and tudak be boarded by passengers.
- b. Passenger area, the passenger seat with width 1300mm and enough room for 2 adults peumpang.
- c. Cargo area, intended for additional rear luggage if needed for transport of goods, groceries or anything that does not allow for laps or next to the lounge.
- d. Roof, to cover up from the sun and rain.

styling

studying and doing research on the character and the character of Architectural Design User, as well as state of the city, the authors chose the design styling of the most dominating in the city, by bringing together modern styling and elegant design has a clean element.

modern design

The modern design is essentially a form of problem solving that is rooted in logic and rationality that takes into account the spirit of the times. The birth of modern design is not for the penetration of technology in design, but it is a unification of efforts of various backgrounds in science and technology that is sustainable.

There are some special features modern design in buildings,are :

- The orientation of the horizontal pattern.
- Flat Roofs
- There is no roof profile
- Form box
- Smooth
- Appearance of efficient
- Rounded corners
- The window glass
- Ornaments stailless steel and aluminum doors and windows
- glossy panel
- Rows of windows or stripes
- Little or no decoration



Figure 7. Modern and Tropical Design



Figure 8. Modern and Tropical Design



Figure 9. Ideas

4.6. Image Boards



Figure 9. Image board idea 1



Figure 10. Image board idea 2



Figure 11. Image board idea 3



Figure 12. Image board idea 4

4.7. Keywords : COMPACT

The pictures above is a reference to the author in designing the three-wheeled vehicle with a cargo bag, with the keyword: the compact design of later writers is proposed a simple but solid shape in the

curve, and the functional form of the exterior design which will have elements in common on the pictures above.

4.8. Quantified Structures

Design three-wheeled vehicle with a cargo there are some parts in it for storage of some items, such as:

- driver
- passenger space
- As well as container cargo behind to carry the luggage of passengers if needed.

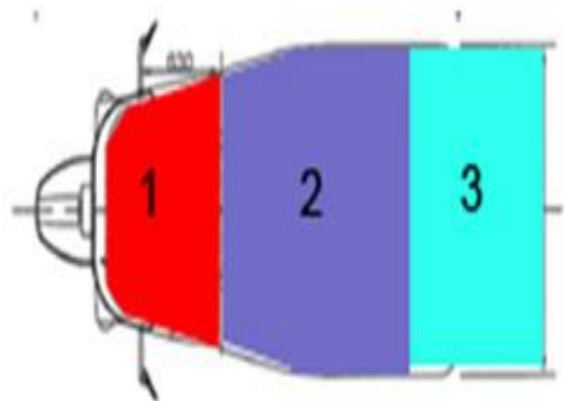


Figure 13. alternative #1

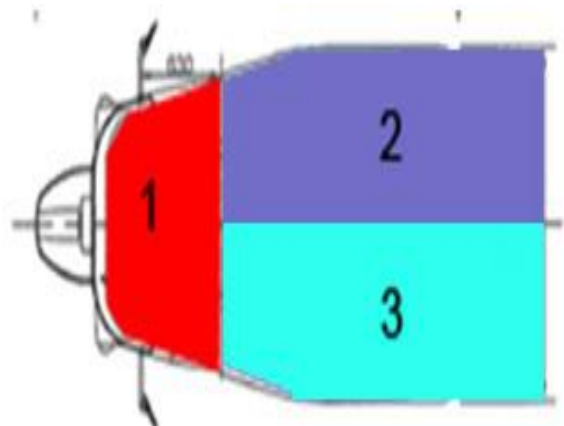


Figure 14. alternative #2

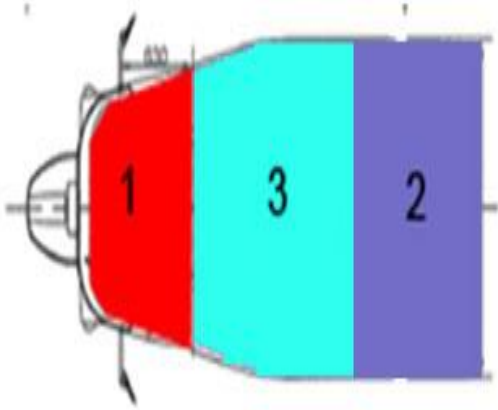


Figure 15. alternative #2

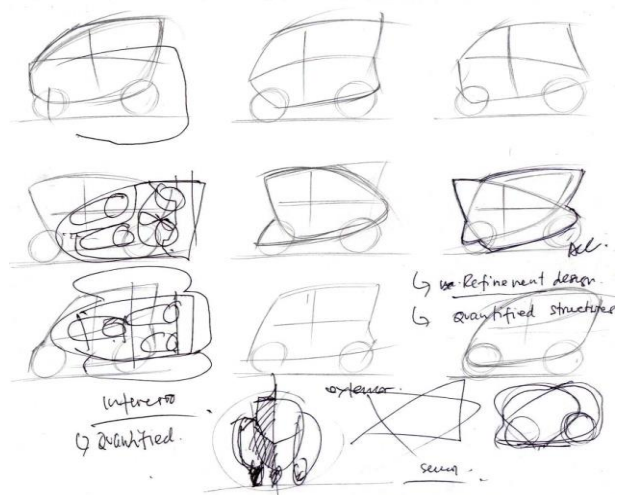


Figure 19. brainstorming #3

4.9. Design

Sketching and Brainstorming

At this stage, the authors begin by making Brainstorming Idea as early in the design process to obtain the final design.

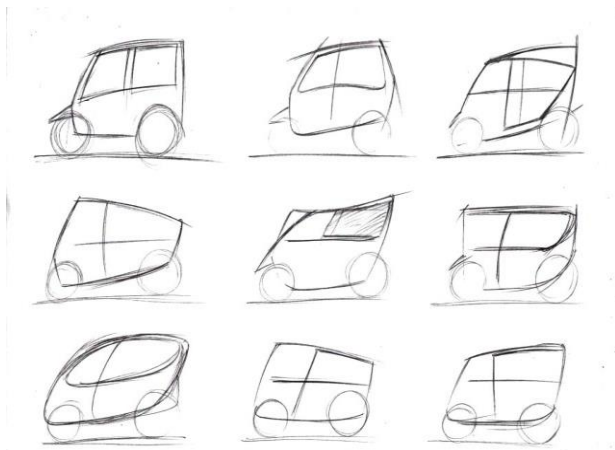


Figure 16. brainstorming #1

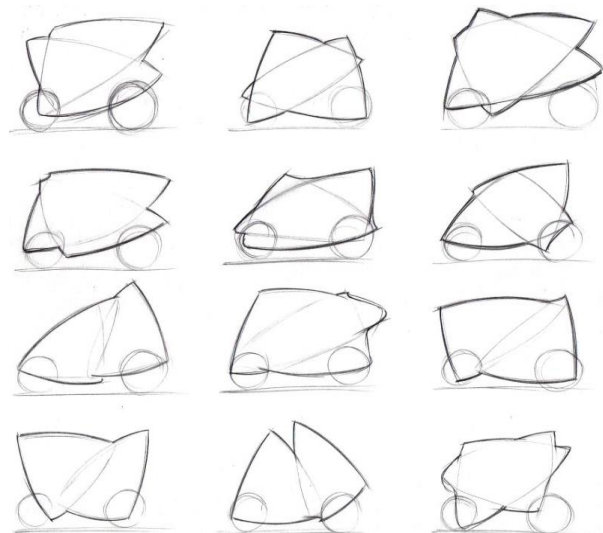


Figure 20. brainstorming #4

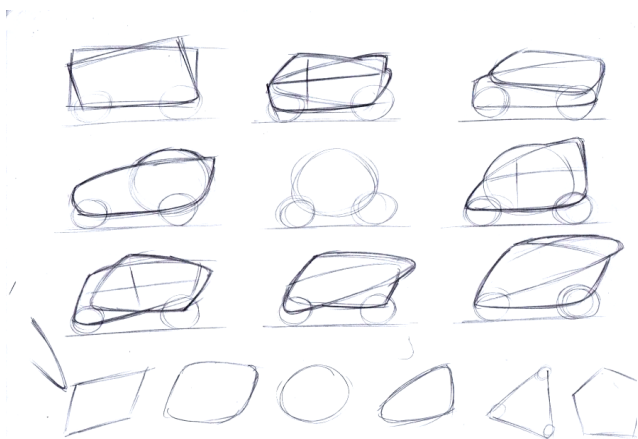


Figure 17. brainstorming #2

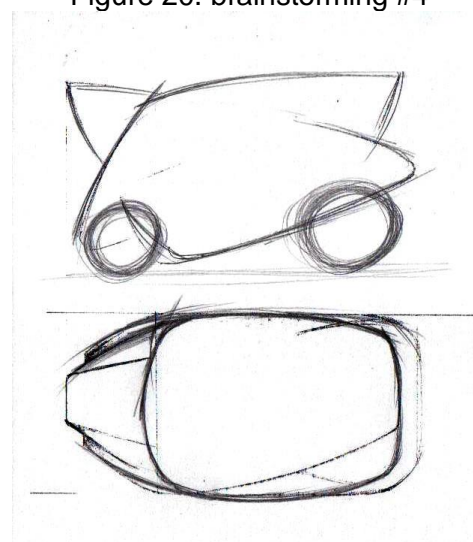


Figure 21. final #1

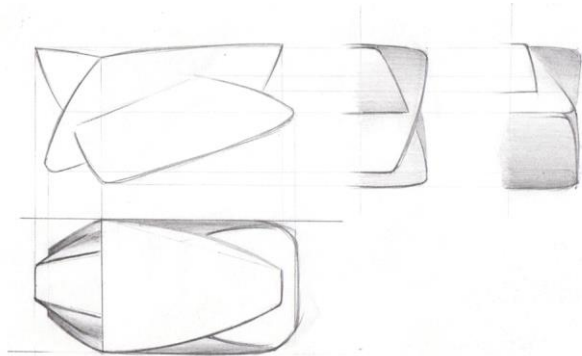


Figure 22. final #2

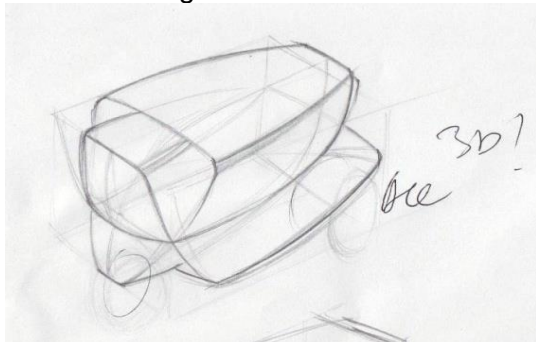


Figure 23. final #3

4.10. 3D CAD Modeling

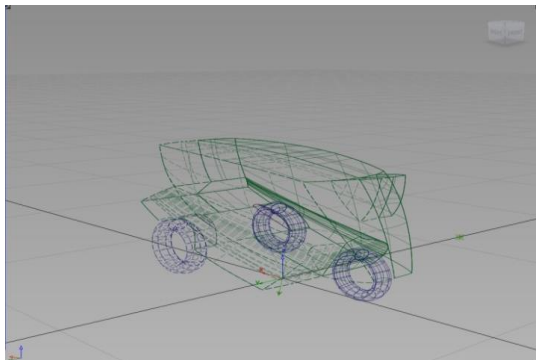


Figure 24. Modeling

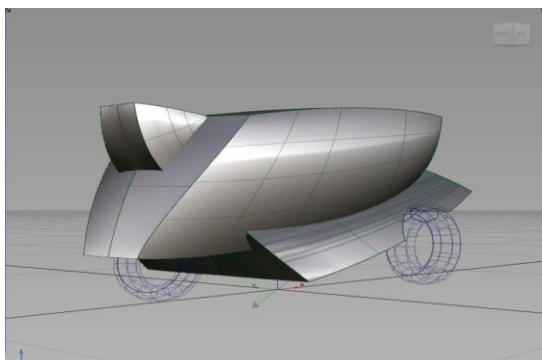


Figure 25. Modeling

4.11. Illustration



Figure 26. illustration #1

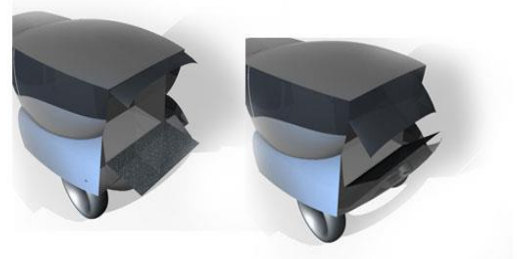


Figure 27. illustration #2



Figure 28. illustration #3



Figure 28. illustration #4

4.12. MockUp

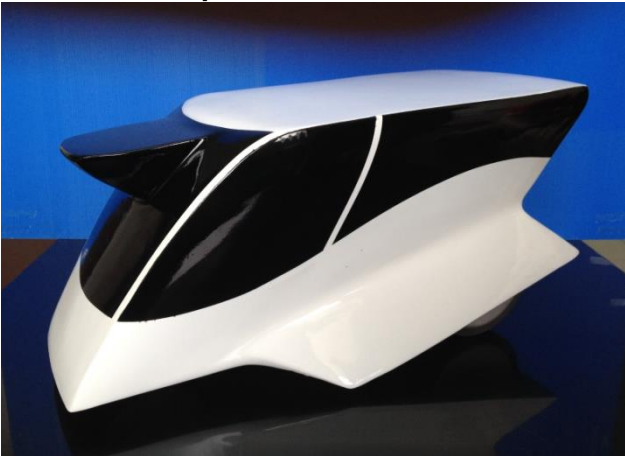


Figure 29. Mock Up



Figure 30. Mock Up

5. CONCLUSIONS

- In the process of concept formation and deepening of ideas takes considerable time to obtain maximum results.

- The process of time management is critical and plays an important role in the design process.
- Product Design is a vast world, where many products that we can re-design or a new design so no need to get hung up on the same type of product only.

6. REFERENCES

- (a) Koentjaraningrat. (1997). *Kebudayaan, Mentalitas, dan Pembangunan*. PT Gramedia Pustaka Umum. Jakarta,
- (b) De Chiara, Joseph. (2001). *Time Saver Standard for Building Types* (fourth edition), Mc Graw-Hill, Singapore
- (c) Madanipour, A, (1996), *Design of Urban Space, an inquiry into socio – spatial process*, Wiley, New York
- (d) James, R, Benya. (2007), *Dasar-Dasar Desain Pencahayaan*, Erlangga, Jakarta
- (e) Ching, Francis D.K. (1996). *Architecture : Form, Space And Order*. Van Nostrand Reinhold Company. New York.
- (f) Nugroho, Eko. (2008). *Pengenalan Teori Warna*. C.V ANDI OFFSET. Jakarta
- (g) Tarwaka, HA. Bakri, Solichul. And Sudiajeng, Lilik. (2004). *Ergonomi untuk Keselamatan, Kesehatan Kerja dan produktivitas*. UNIBA PRESS. Surakarta
- (h) Zahnd, Markus. (1999). *Perancangan Kota Secara Terpadu: Teori Perancangan Kota Dan Penerapannya*. Penerbit Kanisius. Yogyakarta

AUTHOR BIOGRAPHIES

Indra Gunara Rochyat is a lecturer in Department of Product Design, Faculty of Design and Creative Industry, Esa Unggul University, Jakarta. He received his Master of Art and Art Hystory from Senior University International - Canada in 1999. His research interests are in the area of Product Design & Planning. He is a member of Esa Unggul Design Center, as a Head Officer. His email address is <indragunara@esaunggul.ac.id>