

## Design and Fabrication of Electric Bike

Garapati Naveen<sup>1</sup>, Ch. BabuRao<sup>2</sup>, G. VamsiPavan<sup>2</sup>, P. Manikanta<sup>2</sup>, S. Durga  
Dinesh<sup>2</sup>

<sup>1</sup>Assistant professor, <sup>2</sup>U. G. Student

Department of Automobile Engineering

Godavari Institute of Engineering & Technology (A), Rajahmundry, India

**Abstract:** Our In the market of Electric Vehicles, there are huge number of models of different variations in size, speed, shape, etc. In the future there will not be Gasoline engines because of scarcity of availability. The compactness in driving is also difficult compared with the Electrical Vehicles. Therefore, the peoples are interested in Electrical Vehicles with rated Speeds and Size. The Motto of this project is to build a 'ELECTRIC BIKE' which can work effectively, requires less maintenance, having more life and also with low price compared to any other product in the market. The title of this Project is to "Design and Fabrication of Electric Bike". It contains two parts, first one is designing the bike and the second one is fabricating the necessary components. Initially designing of the expected view of Bike is completed. Then the collection of the parts and the fabrication process is started. After completion of the fabrication, inspection is done by test driving it and had succeeded in achieving the motto of the project.

**Keywords:** Electric Bike, Battery Electric Vehicle (BEV), Catia.

### 1. Introduction

In India, two-wheeler plays a vital role in fulfilling personal transportation especially in urban areas due to their manoeuvring and affordability. They contribute nearly two-third of the vehicle population in India. The high fuel consumption and emission contribution of two-wheeler in urban areas needs to receive more attention in order to improve the near-term sustainability of energy and urban air quality in the future. Therefore, the implementation of plug-in hybrid technology for two-wheeler will result in reduction of greenhouse gas emission and petroleum oil in-dependency to a large extent. The plug-in concept is implemented in certain concept car and two-wheeler in the market in a limited way.

#### 1.1 Battery Electric Vehicle (BEV)

A Battery electric vehicle (BEV) may be a sort of electric vehicle (EV) that uses energy stored in rechargeable battery packs. BEVs use electric motors and motor controllers rather than combustion engines (ICEs) for propulsion. Electric vehicles derive all its power from its battery packs and have no internal combustion engine, fuel cell or fuel tank. Since the introduction of the all-electric Nissan Leaf in December 2010, over 6,00,000 highway legal plug-in electric vehicles have been sold worldwide by September 2014, of which more than 3,56,000 are all-electric passenger cars and light-duty trucks. Vehicles using both electric motors and combustion engines are samples of 'Hybrid Electric Vehicles' and aren't considered pure or all-electric vehicles because they can't be externally charged (operate in charge-sustaining mode) and instead they're continually recharged with power

from the interior combustion engine and regenerative braking. Hybrid vehicles with batteries which will be charged externally to displace some, or all their combustion engine power and gasoline fuel are called 'Plug-in Hybrid Electric Vehicles' (PHEV) and run as BEVs during their charge-depleting mode. PHEVs with a series power train are also called 'Range-Extended Electric Vehicles' (REEVs), such as the Chevrolet Volt and Frisker Karma. Plug-in electric vehicles (PEVs) are a subcategory of electrical vehicles that has battery electric vehicles (BEVs), plug-in hybrid vehicles, (PHEVs), and electric vehicle conversions of hybrid electric vehicles and traditional internal combustion engine vehicles. In China, plug-in electric vehicles, along a side hybrid- electric vehicles are called New Energy Vehicles (NEVs).

However, within the us , Neighbourhood Electric Vehicles (NEVs) are battery electric vehicles that are legally limited to roads with posted speed limits no above 45 miles per hour (72 km/h), are usually built to possess a top speed of 30 miles per hour (48 km/h), and have a maximum loaded weight of three thousand lbs.

## 1.2. HISTORY OF ELECTRIC VEHICLES

Electric vehicles first appeared in the mid-19th century. An electric vehicle held the vehicular land speed record until around 1900. The high cost, low top speed, and short range of battery electric vehicles, compared to later internal combustion engine vehicles, led to a worldwide decline in their use; although electric vehicles have continued to be used in the form of electric trains and another niche uses.

## 2. Design Of Electric Bike:

### 2.1 Rough Sketches:

Initially rough sketches were prepared and a model is finalized which is as shown in the fig

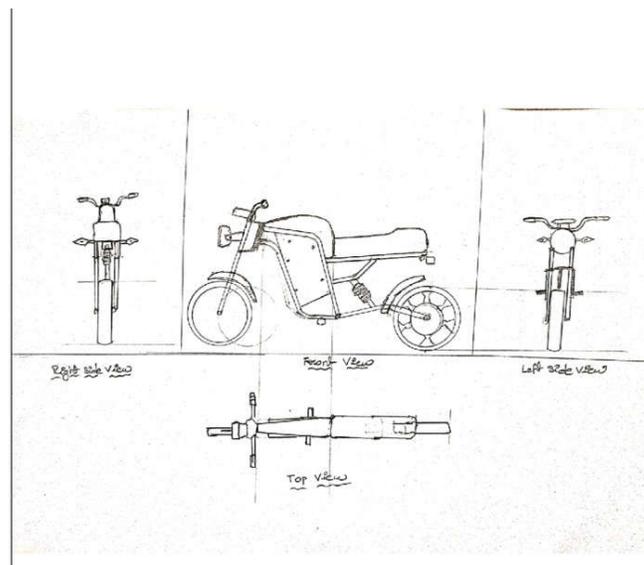


Figure 1. Rough Sketches of Electric Bike

**Dimensions:**

Height: 1200mm  
 Width: 750mm  
 Length: 1950mm  
 Wheel Base: 1260mm  
 Ground Clearance: 250mm

**Suspension:**

Front: Leading link with coil springs  
 Rear: Spring loaded Hydraulic shock absorber (Mono tube)

**Tyres:**

Front: 2.75 R18 INCH  
 Rear: 2.75 R18 INCH

**Brakes:**

Front: Drum type internal expanding brakes (130mm)  
 Rear: Disc Brake

**Signal lights:**

Left: Handle bar signal lights - Capacity 12v  
 Right: Handle bar signal lights - Capacity 12v

**Horn:**

Auto-fit Horn 12 v

**Mudguards:**

Front: TVS XL50 (customized)  
 Back: TVS XL50 (customized)

**GI sheet:**

Thickness: 2mm

**T-Fork, Handle bar:**

Taken from Yamaha Crux

**Batteries:**

12v 14A Lead acid battery

**Hub Motor:**

Capacity: 48v 1000 watts

R.P.M: 600

Mileage: 20km

Charging time: 5 Hours

Load Capacity: 300kg

**Frame Structure:**

MS Round Pipes

MS Flat Bars (3/4inch, 1 inch)

DC Controller,

Throttle,

Charge-In,

Electric cables

**3. Electric Drive**

The lack of electronic control technology limited the speed so electric vehicles to 60milesperhour. Along with a poor recharging infrastructure, the convenience of gasoline powered vehicles prompted car owners to abandon the electric vehicle. However, technological advances such as the brushless DC motor (BLDC Motor) have made the energy efficient automobiles more viable. The components of electric drive are Hub Motor, Motor Controller, Battery

4. Cad Designs

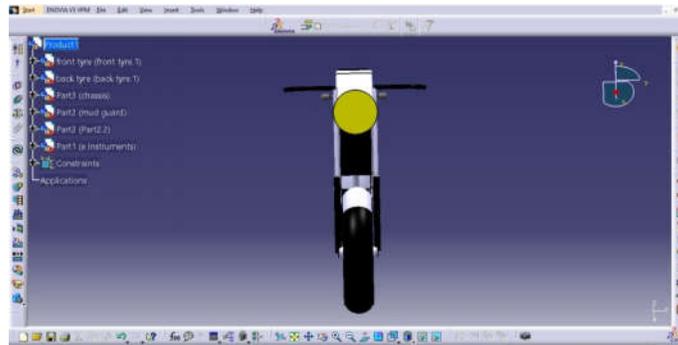


Figure 2. left Side View

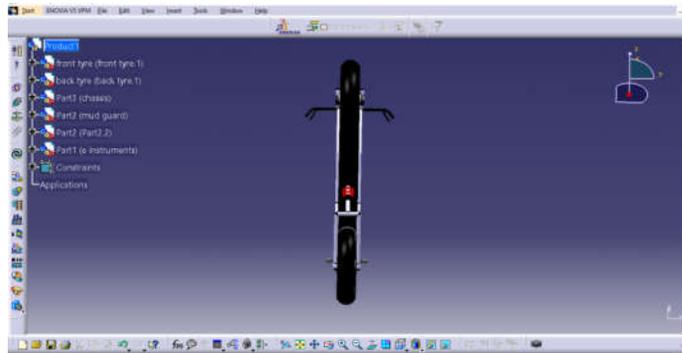


Figure 3. Bottom View

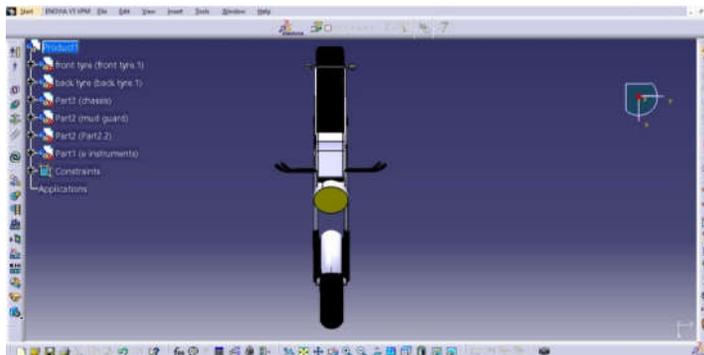


Figure 4. Top View

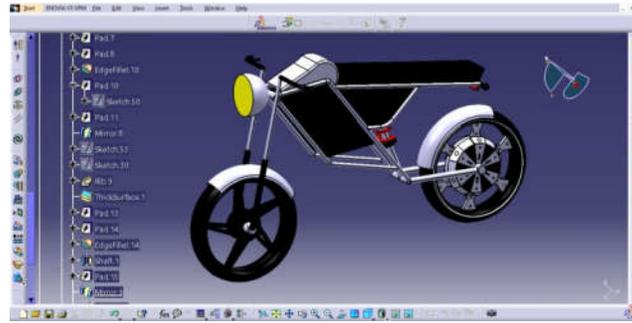


Figure 5. Isometric View

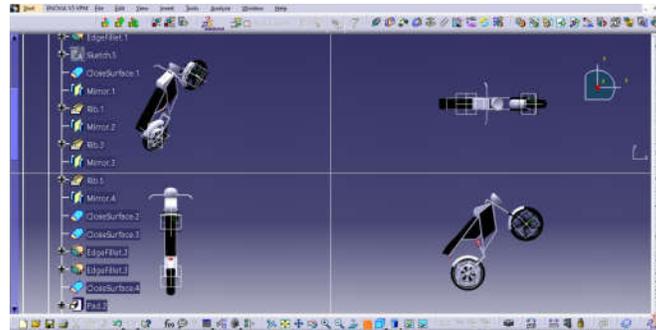


Figure6. Multi View

#### 4. Result and Discussion

Hence, the Complete Product is obtained after doing all the above processes. The following are the different views of the project arranged in a Gallery.

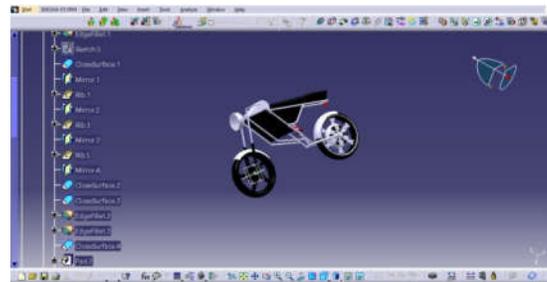


Figure 7. complete view of project

#### 7. Acknowledgment

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