DESIGN OF FOLDABLE ELECTRIC SCOOTER

[1]Tirumani V Dharmaraju, [2]Jagathani Rajasekhar, [3]B Kumar Venkatesh,[3]S Rajesh, [3]S Nagaraju Y.B.Naga Sai
[1]Assistant professor, [2]Associate professor, [3]U.G Student
[1]Department of Automobile Engineering
[1]Godavari Institute of Engineering & Technology (A), Rajahmundry, India

Abstract: In the market of Electric Vehicles, there are huge numbers of models of different variations in size, speed, shape, etc. At present Portable transportation is playing a prominent role in both internal and external usages. In the future there will not be Gasoline engines because of scarcity and availability of fuels. The compactness in driving is also difficult compared with the Electrical Vehicles. Therefore, the peoples are interested in Electrical Vehicles with rated Speed and Size. The Foldable Electric Scooter is easy to fold and unfold. This can be easily Rechargeable and is easily to transport in both internal and external usages. This Foldable type is easy to transport from one place to another place with less space occupancy. Foldable Electric Scooter which can be foldable, works effectively requires less maintenance, having more life and also with low price compared to any other product in the market.

***IndexTerms* – Electric Scooter, Foldable Bike, Battery Electric Vehicle (BEV), Catia.**

I. INTRODUCTION

In India, two-wheeler plays a vital role in fulfilling personal transportation especially in urban areas due to their 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) is a type of electric vehicle (EV) that uses Chemical energy stored in rechargeable battery packs. BEVs use electric motors and motor controllers instead of internal 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. BEVs include bicycles, scooters, rail cars, forklifts, buses, trucks and cars.

Since the introduction of the all-electric Nissan Leaf in December 2010, over 6,00000 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. The best-selling all-electric car ever, the Nissan Leaf, has sold over 150,000 units worldwide by November 2014. Vehicles using both electric motors and internal combustion engines are examples of 'Hybrid Electric Vehicles' and are not considered pure or all-electric vehicles because they cannot be externally charged (operate in charge-sustaining mode) and instead they are continually recharged with power from the internal combustion engine and regenerative braking. Hybrid vehicles with batteries that can be charged externally to displace some, or all their internal 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 electric vehicles that includes battery electric vehicles (BEVs), plug-in hybrid vehicles, (PHEVs), and electric vehicle conversions of hybrid electric vehicles and conventional internal combustion engine vehicles. In China, plug-in electric vehicles, together with hybrid electric vehicles are called New Energy Vehicles (NEVs).

However, in the United States, Neighbourhood Electric Vehicles (NEVs) are battery electric vehicles that are legally limited to roads with posted speed limits no higher than 45 miles per hour (72 km/h), are usually built to have a top speed of 30 miles per hour (48 km/h), and have a maximum loaded weight of 3,000 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.

At the beginning of the 21st century, interest in electric and other alternative fuel vehicles have increased due to growing concern over the problems associated with hydrocarbon-fuelled vehicles, including damage to the environment caused by their emissions, and the sustainability of the current hydrocarbon-based transportation infrastructure as well as improvements in

electric vehicle technology. Since 2010, combined sales of all-electric cars and utility vans achieved 1 million units delivered globally in September 2016. At present electric vehicle technology is gradually increasing.

II. DESIGN OF FOLDABLE E-SCOOTER

2.1 Rough Sketches

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

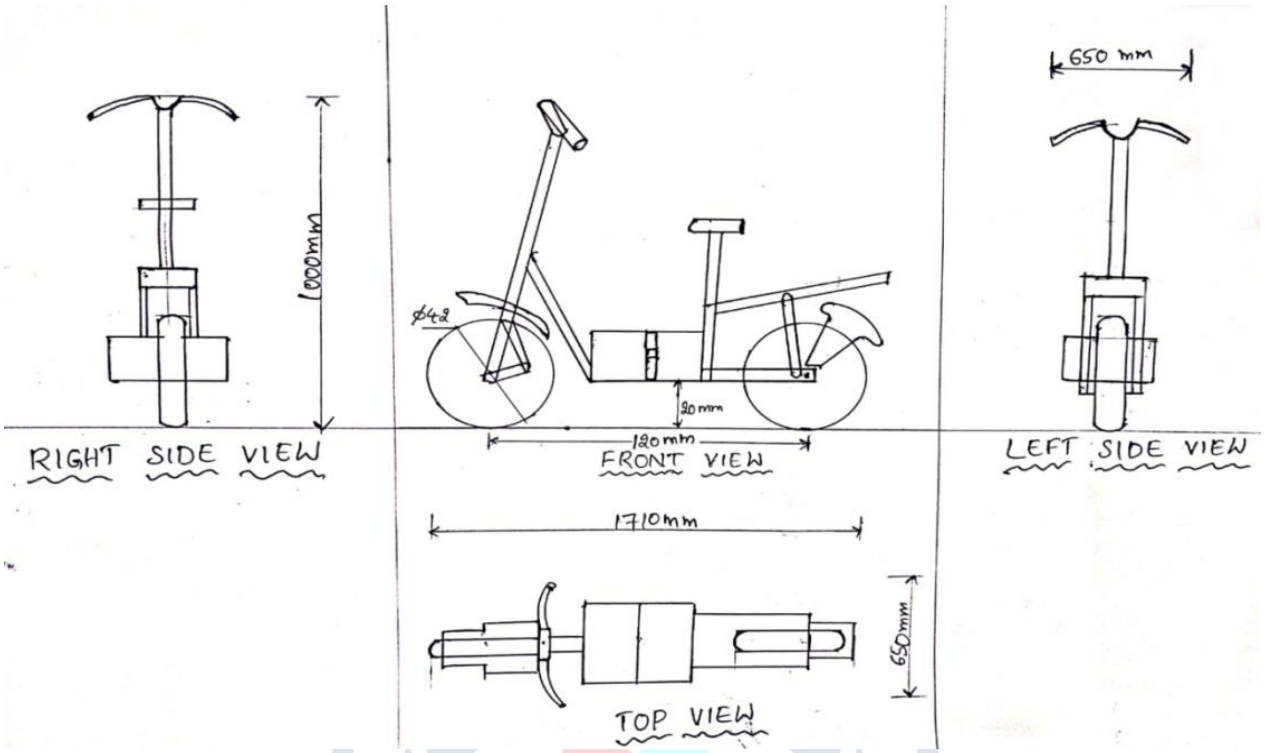

Fig.1 Rough Sketches of E-Scooter

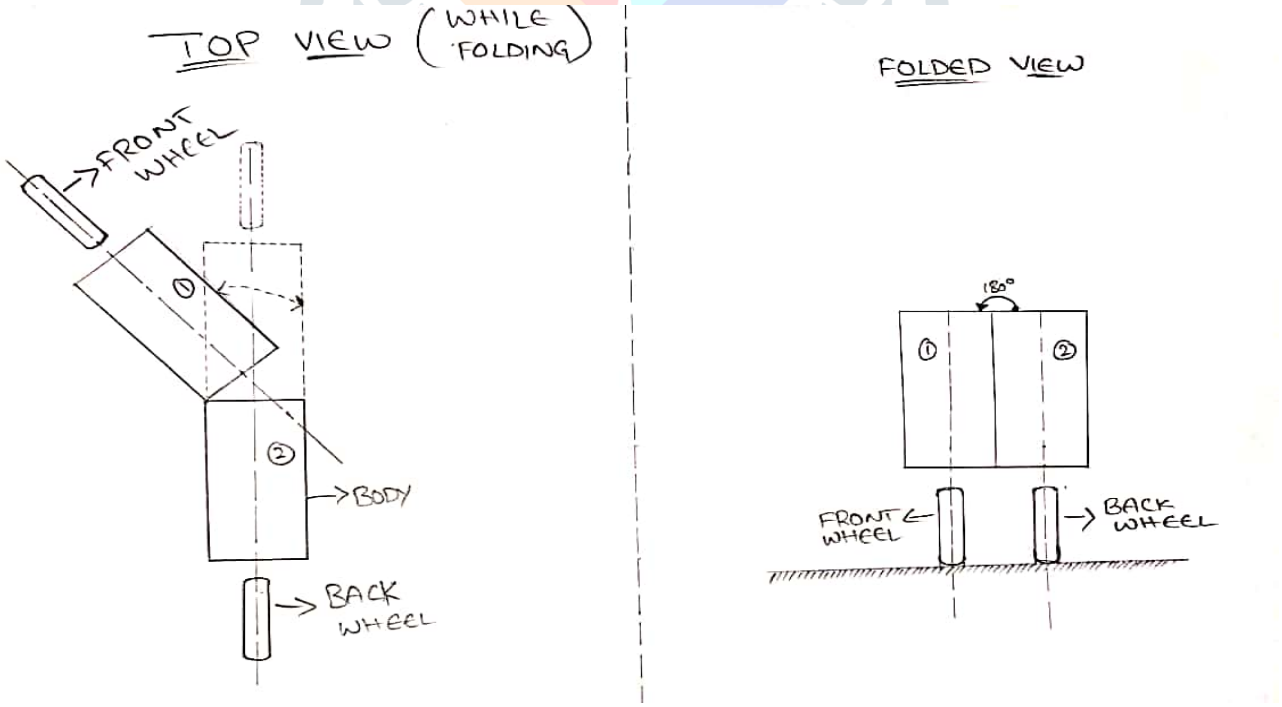

Fig. 2 Rough Sketches of Foldable E-Scooter

DIMENSIONS:

Height: 1000 mm - Width: 650 mm - Length: 1710 mm - Wheel Base: 1240 mm- Ground Clearance: 200 mm

SUSPENSION:

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

TYRES:

Front: 16*3”- 42P/4PR - Rear: 16*3”- 48P/6PR

BRAKES:

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

SIGNAL LIGHTS:

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

HORN:

Auto-fit Horn12 v

MUDGUARDS:

Front: Royal Enfield Electra Front Mud Guard (customized) - Back: Back mud guard of Bajaj Pulsar Tyre pad

GI SHEET:

Thickness: 2mm

HINGES:

Height: 7cm - Width: 8cm

LOCKING BOLT: Full Threaded Bolt

Head size: 22mm - Length: 17cm

T-FORK, HANDLE BAR:

Taken from Bajaj Sunny scooter

BATTERIES:

- 12v 7A Lead acid battery

HUB MOTOR:

Capacity: 48v 350 watts - R.P.M: 260 to 350 - Mileage: 10km - Charging time: 2 Hours

FRAME STRUCTURE:

MS Angle Bars - MS Round Pipes - MS Flat Bars (3/4inch, 1 inch)

CASTER WHEELS:

Made of Kolkata rubber

Hook and Eye Shed Latch,

DC Controller,

Throttle,

Charge-In,

Plastic sheet,

Electric cables

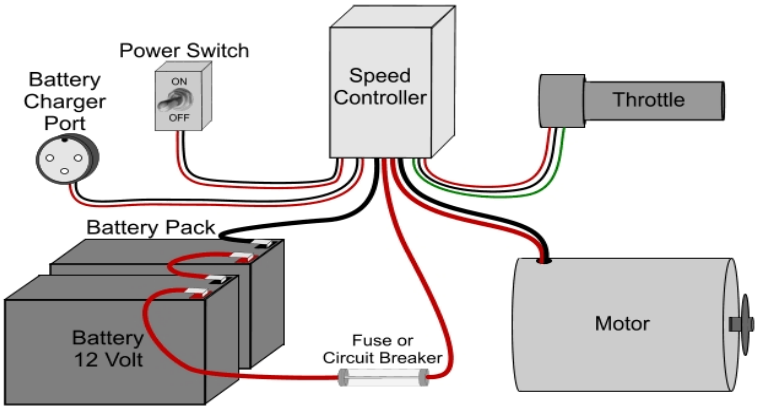

Fig 3 Block Diagram of E-Scooter

Specification of Electric Devices:

The Type of Battery, the type of Traction motor and the Motor controller design vary according to the size, power and proposed application, which can be as small as a motorized shopping or wheel chair, through pedicels, electric motorcycles and scooters, neighbourhood electric vehicles, industrial forklift trucks and including many hybrid vehicles. The Following are the specifications of the Electric Devices which are selected to build 'Foldable E-Scooter.

Hub Motor: Brush less DC Hub Motor, 250 Watts
Load Capacity : 180 Kg

Top Speed : 35 Km/h

Battery : Lead acid Dry Battery, 12Amph

Specifications : 12 V × 4 = 48V

Charger : InputVoltage-AC110V220V50/60Hz

Rated Input Power: 80VA90VA

Rated Exporting : DC36V48V

Charging Time : 2 Hours (To Full Charge)

III. RESULTS & DISCUSSION

This FOLDABLE type is easy to transport the vehicle from place to place. Hence, the Design of the Project is completed and has fulfilled all the requirements.

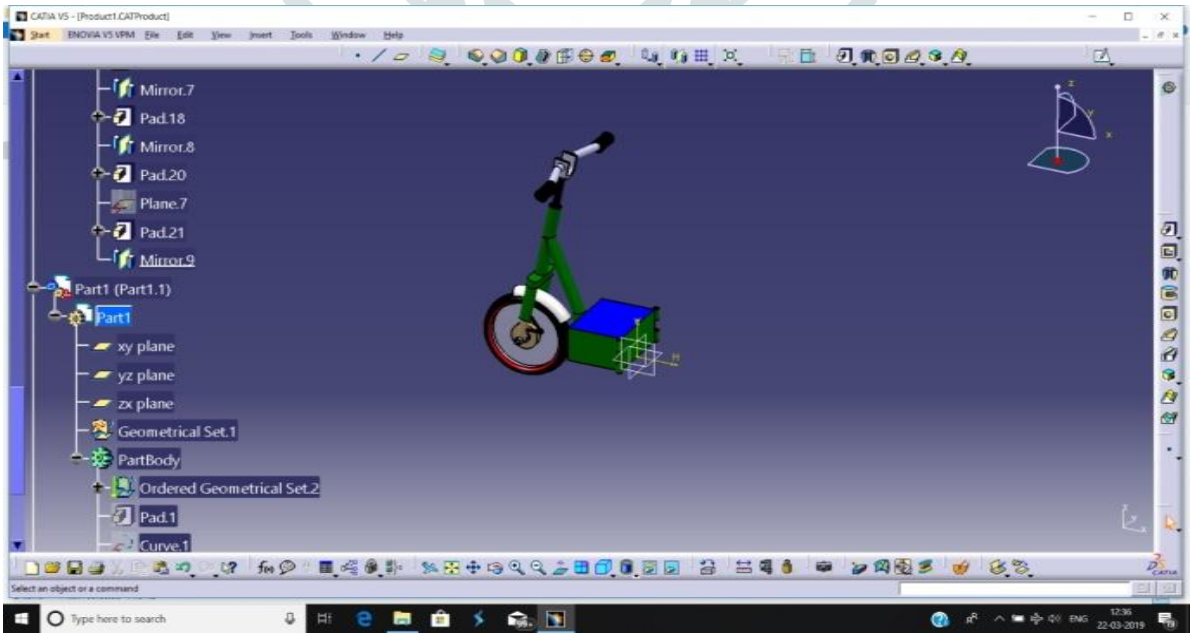

Fig 4 Designing of T-Fork and Box

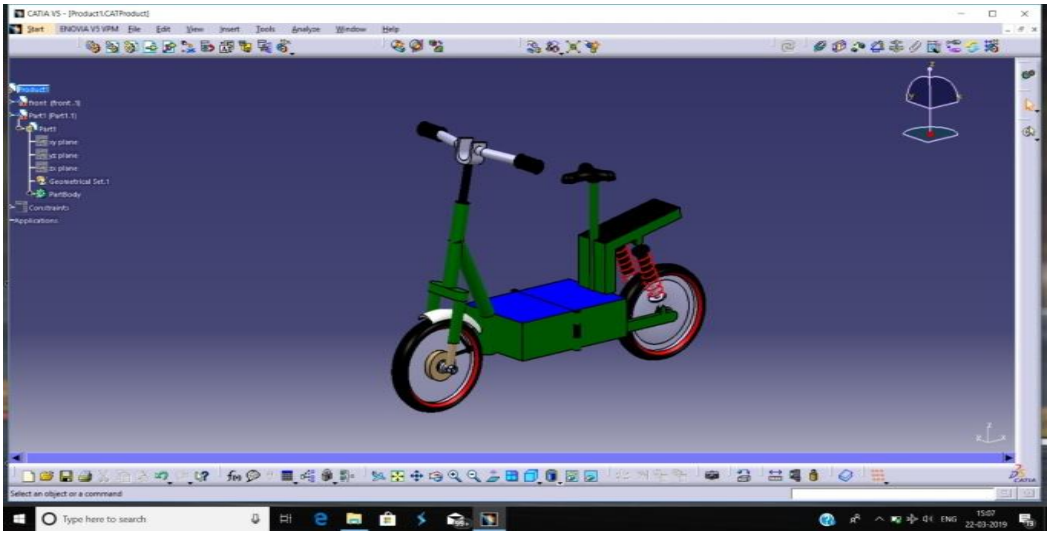

Fig 5. Designing of Scooter

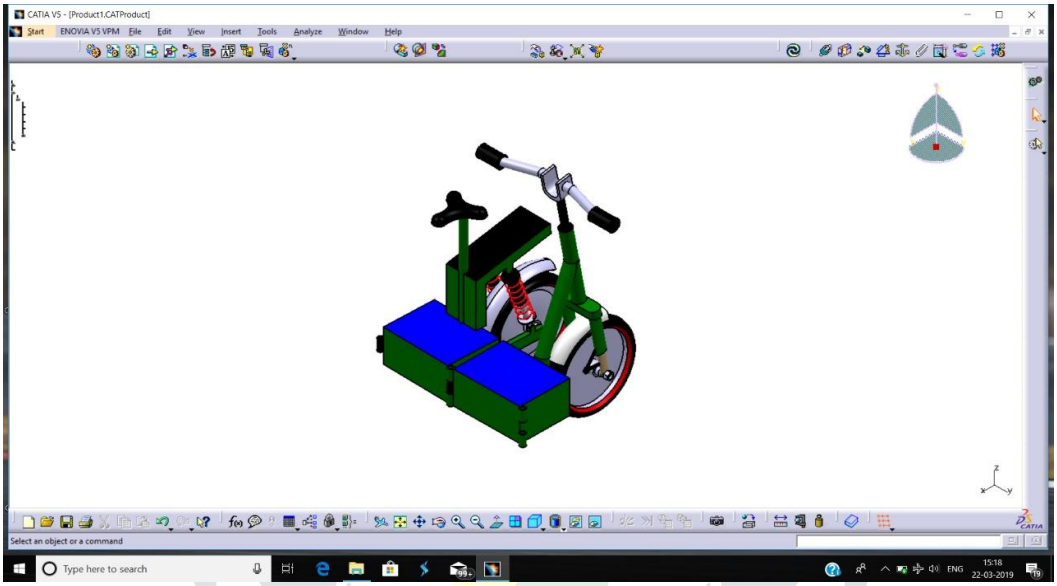

Fig 6. Designing of Foldable View

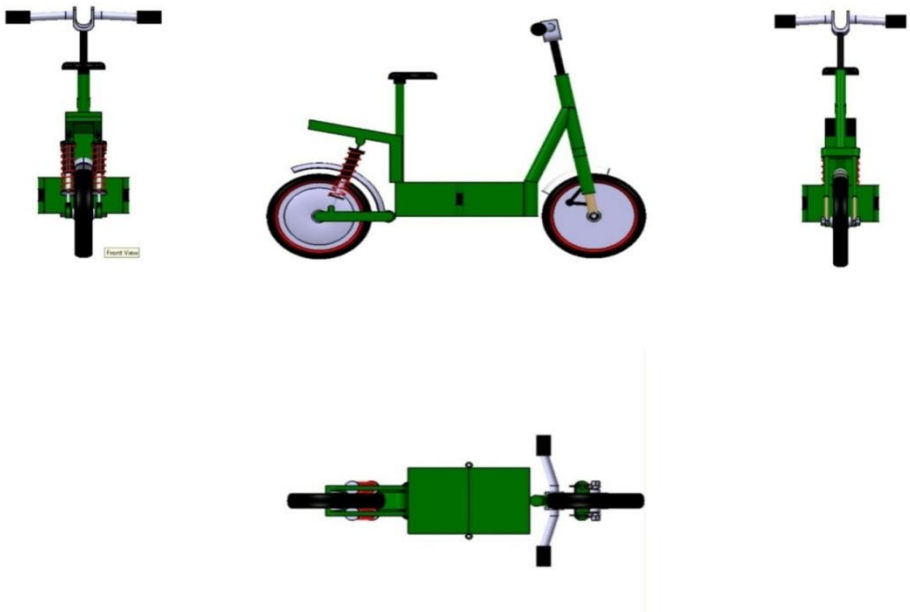

Fig 7 Orthographic Views of Scooter

IV. CONCLUSIONS

It is beneficiary to go for electrical energy than any other non-renewable resources of energy. Foldable E-Scooter plays a vital role in the system of Portable transportation to reach short distances. The project design is the coolest and the most efficient in present E-vehicles. This is the most economical and maintenance free compared to other vehicles presently being used for portable transportation.

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