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Design And Fabrication of Electric Motorcycle: A Report

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Abstract: The paper is concerned about the developing interest in energy from one side of the planet to the other, which motivated me to switch over the sustainable asset of energy. There is a wide range of ways by which energy could be saved in various areas. The fundamental focus of the manuscript is on the vehicle area where changing is done from old petrol bicycles to an electric bicycle. In electric bicycles, an electrical engine (BLDC engine) is used rather than a burning motor as there is less contamination, low support cost, and diminished noise. These bicycles use substance energy put away in the battery-powered battery packs. This paper manages the plan and advancement of the electric bicycle which utilizes electric energy as an essential source. There is a dispersion for charging the battery radiating it from the fundamental framework.

***Index Terms* - Electrical engine, electric bicycles, battery, BLDC engine, E-bike**

I. INTRODUCTION

The fundamental motivation to recognize the need of finding and modifying E-Bike is to defeat the issue of the pollution of vehicles in metro towns and metropolitan zones which is increasing uninterruptedly. In April 2012 Indian government planned to guide, the improvement of the homegrown electric vehicle in the country. Electric vehicles incorporate electric vehicles, electric trains, electric boats, electric airplane, and so forth Electric bikes, as shows themselves, is electricity-powered bikes. A battery pack and an engine are introduced to store and change the power. User control is normally connected to the handlebar to slow down and change the speed. Battery worked Vehicle (Two-Wheeler) implies a vehicle adjusted for use upon streets and controlled only by an electric engine whose footing energy is provided only by the footing battery introduced in the vehicle. An electric vehicle additionally referred to as an electric drive vehicle, involves one electric engine for delivering the power. Three primary kinds of electric vehicles exist those straightforwardly fueled from an outside power station and those that are fueled by putting away power initially from an outer power source. The Electric motorcycle is a motorcycle that is driven with the assistance of a battery that is coupled to the electric motor.

1.1 COMPONENTS OF E-BIKE

The e-bike is made with the following components: -

1.1.1 ELECTRIC MOTOR

From a fundamental perspective, the motor on an electric bike translates electrical energy into mechanical energy. The motor on our E-Bikes is located in the rear wheel. It generates torque and subsequently propels the rider forward when they pedal. Our powerful 500W brushless rear hub motor ensures high performance, efficiency, and a smooth ride.

1.1.2 LITHIUM-ION BATTERY

Flyer electric bikes are powered by our 48V Flight Speed™ Lithium-Ion Battery. These rechargeable batteries are efficient and long-lasting for years of fun riding. Lightweight and easy to recharge, the batteries are also designed to fit seamlessly into the aesthetic of the bike thanks to the down tube design. Enjoy an impressive 48 voltage battery capacity of 15Ah (720Wh) with state-of-the-art Samsung 50E 21700 Cells. Travel up to 50+ miles with our Flight Speed™ Lithium-Ion technology.

1.1.3 BRAKE SYSTEM

Our electric bikes feature a mechanical disc brake system delivering powerful braking on demand. Located on the handlebars, the aluminum alloy levers are easily accessible for quick stopping. Both models also have an automatic motor cutoff switch which safely stops the electric bicycle when you brake.

1.2 ADVANTAGES OF ELECTRIC BIKE:

- **They are rechargeable:** Either lithium-ion or nickel-metal hydride batteries power electric bikes and motorcycles. Charging the batteries is easy as you can plug them in at any wall outlet. On average, they take eight hours to recharge completely.
- **Low Maintenance:** Electric bikes require less maintenance in comparison to standard bikes. While standard bikes need a regular check on lubricating and adjusting, an electric bike saves you from all the fuss. However, you still have to be aware of the brake pads, tyres, and fluid flush.
- **Low Fuel Cost:** Electric bikes also enjoy the advantage of a low fuel cost. Around 250 watts of power is used for 20 minutes of driving. The cost of electricity per unit is Rs 5, which makes electric bikes quite affordable.
- **Does not add to the Noise:** Indian roads are perennially noisy. With the unnecessary honks and endless squabble of people, the roads are always in a state of pandemonium. Electric bikes breeze through the streets with surprising silence. Some bikes have now come up with an artificial noise device to warm the commuters of the approaching vehicle.

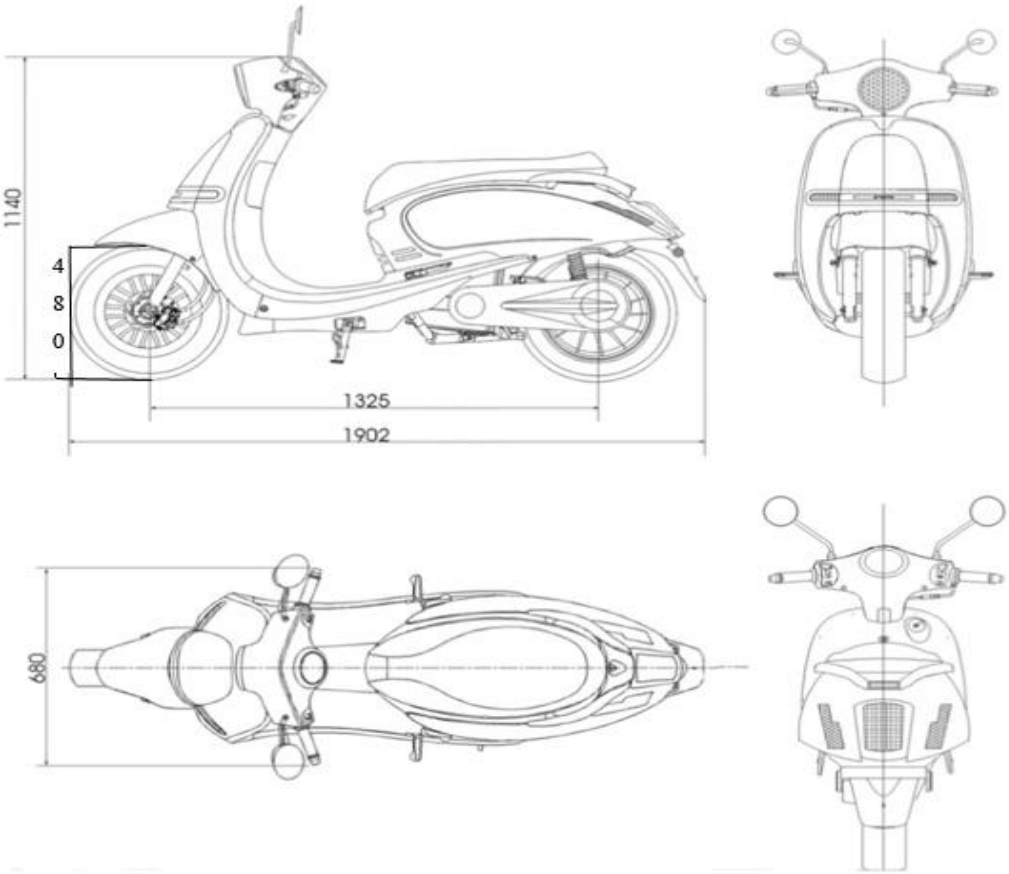

Figure 1 Pictorial view of design parameter

Table 1 Design Parameter

Vehicle Length	1902.00 mm
Vehicle Height	1140.00 mm
Vehicle Width	680.00 mm
Wheel Base	1325.00 mm
Wheel Diameter	480.00 mm
Ground Clearance	135.00 mm

1.3 DISADVANTAGES OF ELECTRIC BIKE:

- **Battery Life:** Electric batteries need to be replaced once they are damaged or once they no longer give a good range.
- **Power:** When electric vehicles is being first introduced in India, they has very low power and could not be driven at high speeds. Eventually, faster e-bikes and e-scooters have been introduced but they are still no match for fuel-powered two-wheelers. Low driving speed is one of the major disadvantages of an electric scooter.
- **Lack of Infrastructure:** In many developed countries where electric vehicles are mainstream, charging stations can be found every few kilometers. People can stop and charge their e-cars or e-bikes at the charging stations. However, India barely has any such infrastructure, so taking your electric vehicle for a long ride becomes next to impossible.

II. LITERATURE REVIEW

The electric bicycle will be simple in assembling with minimal expense in contrast to other vehicles with very low pollution, thereby stepping towards minimizing the global warming and saving the environmentalism system.

− KUNJAN SHINDE (2017)[1] said that these days utilization of the normal resource of petroleum and diesel will be incremented ceaselessly so it will be expected to see as an option asset like electric bicycles, sun based vehicles.it will be similarly simple to the Manufacturing of electric vehicles than ICE vehicles. The electric vehicle will likewise be less expensive and simple to support. It's likewise a contamination-free vehicle so no impact on a worldwide admonition and silent vehicle. This sort of vehicle gets accused of alternating current. Rate/km is exceptionally low in contrast with the ICE vehicle. By utilizing a lithium-particle battery we can support the warm and substance solidness of the battery.

− SIMON WASHINGTON, NARELLE HAWORTH (2014) [2] expressed that there are at this point more than 700 metropolitan networks working on bike-share programs. Shown benefits of bike share integrate versatile flexibility, actual development, transmissions, and fuel use. Certain or express in the figuring of program benefits are assumptions as for the techniques for development replaced by bike-share adventures. A discretionary and wonderful normal and backing. These two sections are then solidified to check the bike deal's overall obligation to changes in vehicle kilometers journeyed.

− K.J.ASTROM, R.E.KLEIN (2005) [3] said that the components of bicycles are analyzed according to the perspective of control. Models of different multi-layered nature are displayed, starting with clear ones and concluding with logically down-to-earth models made from multimode programming. Models that get basic direct, for the model, self-change similarly as models that show inconveniences with back wheel controlling are thought of. Experiences using bicycles in control guidance close by suggestions for diversion and provocative assessments with showed student interest are presented. Finally, bicycles and clinical projects expected for youngsters with inadequacies are portrayed.

− THE GERMAN NATURALISTIC CYCLING STUDY [4] said that the Objective of this paper to was to investigate the speed increase and speed of conventional and electrically fueled bikes under honest situations. Creators recognized between electric motorcycles which convey arrangement up to 45 km/h (as known as-sells) and 25 km/h (speed of hawks). Also, as speed cutoff points of 30 km/h could impact particularly on the execution of speedier cyclists (for example Sped Elec rider), the potential mean speed maybe even cutting-edge under different circumstances. Creators likewise tracked down essential fluctuations in various measures among sales and customary bikes, albeit less perceptible. This could be deciphered as a side effect that, while speeding up from a stop, the help given by the engine utilized by the accelerated riders to come to their favored speed simpler, not prior. Creators additionally given the fluctuation in the client populace, it isn't nonsensical to concede that as of now, e-bicycles cause no unrest in cycling to mean speed by any stretch of the imagination. The development of e-bicycles in more youthful cyclists is still there. It has even been embraced that the e-bike is going from being a "recuperation vehicle" to an up-to-date lace. Through these creators gave the vision that this will change two-wheeled movement and road security in the middle and significant length.

- SHLOK DESAI, KAVAN MEHTA, ZINAL KHENI, NAITIK BHATT, RAHUL PATEL (2019) [5] From this research paper we found that after designing and modeling analysis of pr electric bikes we found that it will help manufacturers of the electrical

bike to reach their goal with low cost, lighter in weight and an electric bike that can operate rough roads. Due to the exponential increment in pollution and population, electric bikes will help to reduce pollution and also, will become a more convenient mode of transport. Nowadays problems like fuel and traffic problems can be solved. In addition, it will help to solve global problems and will able to help people to improve their lifestyle easily.

- JAYESH S. RENGE, RONAK P. RATHORE, SHUBHAM V. BAKADE, SUPRIT P. BARDEKAR (2017) [6] In this research paper it is about to design and build a coaxial, lightweight vehicle, which will consume less space for parking and can be carried along anywhere.

- DEEP R PRAJAPATI, KUNJAN SHINDE, ABHISHEK MHASKE, ANIKET PRABHU (2017)[7]In this presented piece of a research paper, due to the exponential increment in population and pollution consumption of natural resources of petrol, diesel is necessary to shift our way towards alternate resources like the Electric bike and others because it is necessary to identify a new way of transport. E-bike is a modified version of the pedal cycle by uses green energy like electric energy and solar energy.it is energy efficient and cheaper and is also affordable to everyone. It is more convenient for traveling shorter distances by people of any age group.

III. FUTURE SCOPE

The Indian government has set focuses to speed up the reception of electric vehicles.−By 2023 it believes each the three-wheeler vehicle should run on batteries this standard is additionally appropriate for the bike−Motivations are additionally being proposed to cause carmakers to create new EV models and assemble parts, for example, lithium Ion batteries and electric engines.

III. CONCLUSION

From the extensive review, it is found that they are focused on the improvement of efficiency of E-bike. Generally, the maximum speed of an E-Bike is in the range of 40-45 km/hr. So, to speed up the speed of E-bike and plan to design streamlined shape so that the effectiveness of E-bike is improved. For the expanding in that they found four power transmission frameworks. Because of application out of four, any one of the power transmission frameworks is utilized in E-bike. Generally, the chain drive is utilized for transmitting the power. Alongside that, there are three more kinds of engines that can be used, Gear hub engines, Crank drive engines, and direct drive engines. So later finishing the exploratory review it very well may be found that due to the specifications like lightweight, cheap, compact offering non-slip the chain drive is more productive as compared to belts or gear. The development of electric vehicles in India is inevitable and numerous researches are undergoing in upcoming years the growth will be very high and the acceptance of electric motorcycles and cars will be unbelievable however people ignore EV due to their high cost, low speed, challenges in battery manufacturing make it difficult to prefer over oil-based vehicles but encouragement by the government such as new mission plans such as 100% EV nation by 2030 and schemes such as fame to provide subsidies on electric and hybrid cars will encourage the manufacturers to introduce more EV's models in the Indian market.

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