

Smart Electric Eco Friendly Scooter with Combined Power Generator

Mr.Pranav Varpe^{*1}, Mr.Aniket Dighe^{*2}, Mr.Prathmesh Joshi^{*3},
Prof.N.B.Landge^{*4}

^{*1} Student, Mechanical Department, P.Dr.V.V.P.Institute of Tecnology & Engineering, Polytechnic, Loni,

^{*2} Student, Mechanical Department, P.Dr.V.V.P.Institute of Tecnology & Engineering, Polytechnic, Loni,

^{*3} Student, Mechanical Department, P.Dr.V.V.P.Institute of Tecnology & Engineering, Polytechnic, Loni,

^{*4} Lecturer, Mechanical Department P.Dr.V.V.P.Institute of Tecnology & Engineering, Polytechnic, Loni

Date of Submission: 18-02-2024

Date of Acceptance: 26-02-2024

ABSTRACT: In current usage E-scooter runs solely up to the battery capability once it's once totally charged. Then at that time we tend to cannot ready to run the E-scooter due tank of fixing stations like hydrocarbon bunk. thus we tend to area unit progressing to extend the space of the vehicle by generating power. Itself within the vehicle by mistreatment the rotating of wheels, which is able to be transferred by generator and remaining energy is stuffed by the electrical device .Stopping time and energy Recovery for varied ways for various running condition. The project began by analyzing the state of the electrical motorbikes together with the those with regeneration systems. There are a unit already variety of merchandise during this project. However there's still valuable analysis to perform during this space. many simulations and calculations were performed to valid energy availableness for regenerative braking. During this pursuit of planning the foremost economical system the team took blessings of the foremost advanced mechanical and electrical style methodology on the market. additionally that to it electrical thought determined the physical style of the motorcycle to account for part placement and weight distribution. the ultimate style of the electrical scooter is split into 2 disciplines, electrical and mechanical. All electrical scooters and motorcycles give for recharging by plugging into normal wall shops, sometimes taking concerning eight hours to recharge (i.e., overnight). Some makers have designed in, included, or provide as an adjunct, the high-energy l charger, which might charge the batteries up to ninety fifth in AN hour. the electrical scooter works on batteries, The electricity that's made within the battery is transmitted back to the motor through a network of wires.

KEYWORDS: Hub motor, battery, solar panel, dynamo.

I. INTRODUCTION

An electric scooter may be a battery-operated one-woman capability vehicle that's specially designed for individuals with low quality. it's usually utilized by those that have problem walking or standing for long periods of your time. Scooters ar obtainable in 3 common styles, those meant for indoor use, those for out of doors use, and people that ar used for each. an electrical scooter is completely different from a wheelchair, therein the chair is mostly meant for indoor use and typically prices a good deal a lot of an electrical scooter might have 3 wheels or four. Since it runs on battery power, it doesn't produce pollution. A typical electrical scooter needs a try of batteries, however the batteries are reversible. The length of your time an electrical scooter will run on every charge depends considerably on its battery's sort and capability. the foremost common batteries are publicized to endure regarding eight hours, and between20-30miles, before must be charged .Some individuals are touch cautious of buying an electrical scooter as a result of they concern it'll be troublesome to work. In fact, the management console makes it quite easy once someone gets the texture for it. electrical scooters are equipped with advanced brake systems, thus stopping is straightforward and cozy. The brake begins to interact as before long because the operator lets off the throttle, thus there's very little probability for abrupt or jarring stops. Most scooters even have a hand brake to stay the electrical scooter from rolling once place

II. METHODOLOGY

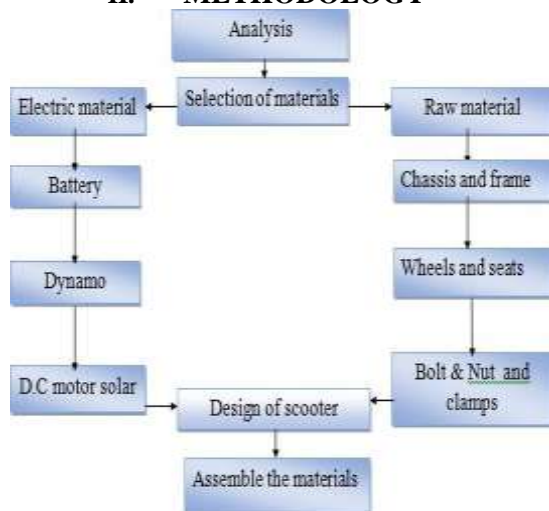


Fig no.1-Methodology

MATERIAL USED

Hub Motor



Fig no.2- Hub Motor

Hub motor operate Faraday's principle of electromagnetism that states that a current-carrying conductor experiences a force once placed in an exceedingly flux. Electric motor works on the principle of magnetic result of current i.e., once an oblong coil is placed in an exceedingly flux and current is well-versed it, a force acts on the coil that rotates it unceasingly.

A Hub motor is any of a category of rotary electrical motors that converts electricity current into energy. the foremost common sorts have confidence the forces made by magnetic fields. Understanding the operation of the hub motor is extremely straightforward from a basic diagram is shown below. hub motor primarily consists of 2 main components. The rotating half referred to as is

named is termed} the rotor and therefore the stationary half is additionally called the stator coil.

BATTERY



Fig no.3-Battery

A battery could be a device consisting of 1 or additional chemical science cells with external connections for powering electrical devices like flashlights, mobile phones, and electrical cars. Once electric battery is activity electrical power, its positive terminal is that the cathode and its negative terminal is that the anode.

Electric battery could be a device consisting of 1 or additional chemical science cells with external connections for powering electrical devices like flashlights, mobile phones, and electrical cars. Once electric battery is activity electrical power, its positive terminal is that the cathode and its negative terminal is that the anode. The terminal marked negative is that the supply of electrons that may flow through AN external circuit to the positive terminal. Once electric battery is connected to AN external electrical load, a chemical reaction converts high-energy reactants to lower-energy merchandise, and also the free-energy distinction is delivered to the external circuit as power. Traditionally the term "battery" specifically noted a tool composed of multiple cells, but the usage has evolved to incorporate devices composed of one cell.

Primary (single-use or "disposable") batteries area unit used once and discarded, because the conductor materials area unit irreversibly modified throughout discharge; a standard example is that the basic battery used for flashlights and a large number of transportable electronic devices. Secondary (rechargeable) batteries will be discharged and recharged multiple times victimization an applied electrical current; the initial composition of the electrodes will be restored by reverse current. Examples embody the lead-acid batteries employed in vehicles and

lithium-ion batteries used for transportable physical science like laptops and mobile phones.

Batteries are available several shapes and sizes, from miniature cells accustomed power hearing aids and wristwatches to tiny, skinny cells employed in smart phones, to massive lead acid batteries or lithium-ion batteries in vehicles, and at the most important extreme

DYNAMO



Fig no.4- Dynamo

The function of the dynamo is to change mechanical energy into electricity. The control gear associated with the dynamo regulates the current output according to the demands on the electric system and the state of the battery. A generator or a dynamo is a device which converts mechanical energy to electrical energy. Generator works on the principle of electromagnetic induction. Whenever the magnetic field linked with a coil changes, an induced EMF is setup in coil. An alternator is a device that generates AC power from the rotation of an axle (mechanical energy). They are a bit similar to dynamos, but differ in the fact that they make AC power, whereas dynamo's generate DC power. In addition, they also tend to be more efficient. A dynamo is an electrical generator that creates direct current using a commutate. Dynamos were the first electrical generators capable of delivering power for industry, and the foundation upon which many other later electric-power conversion devices were based, including the electric motor, the alternating-current alternator, and the rotary converter. The electric dynamo uses rotating coils of wire and magnetic fields to convert mechanical rotation into a pulsing direct electric current through Faraday's law of induction. A dynamo machine consists of a stationary structure, called the stator, which provides a constant magnetic field, and a set of rotating windings called the armature which turn within that field. Due to Faraday's law of induction, the motion of the wire within the magnetic field creates an electromotive

force, which pushes on the electrons in the metal, creating an electric current in the wire. On small machines, the constant magnetic field may be provided by one or more permanent magnets; larger machines have the constant magnetic field provided by one or more electromagnets, which are usually called field coils.

SOLAR PANEL



Fig no.5- Solar panel

Solar panels area unit those devices that area unit wont to absorb the sun's rays and convert them into electricity or heat. A solar array is truly a group of star (or photovoltaic) cells, which may be wont to generate electricity through electrical phenomenon impact. These cells area unit organized in a very grid-like pattern on the surface of star panels. Solar panels (also referred to as "PV panels") area unit wont to convert lightweight from the sun, that consists of particles of energy known as "photons", into electricity which will be wont to power electrical load. cell is that the smallest purposeful unit or building block of electrical generator that utilizes solar power as its input energy that's capable of changing solar power to electricity whereas solar array is that the assortment of star cells that generate current. Solar power is employed these days in a very variety of ways: As heat for creating quandary, heating buildings and change of state. to come up with electricity with star cells or heat engines. to require the salt off from ocean water. The sun helps all life on earth. Sunlight, or solar power, may be used specifically for residential and enterprise heating and lighting, for power generation, for warm water heating, for star cooling, and for a spread of different business and industrial applications. A cell may be a device that directly converts the energy of sunshine into current through the electrical phenomenon impact. star cells or electrical phenomenon cells area unit created supported the principle of the electrical phenomenon impact. They convert daylight into electrical energy (DC) electricity. solar array

systems area unit implausibly sturdy and need very little to no maintenance over their productive period – which may span twenty five years or additional. Within the event that one thing will fail, your star PV system parts have terribly long warranties that will cowl replacement and repair prices..

REGULATOR



Fig no.6-Regulator

The purpose of a transformer is to stay the voltage during a circuit comparatively on the brink of a desired price. Transformers are one in every of the foremost common electronic parts, since an influence provide oft produces raw current that may otherwise harm one in every of the parts within the circuit. Voltage regulator, any electrical or device that maintains the voltage of an influence supply among acceptable limits

The transformer is required to stay voltages among the prescribed vary that may be tolerated by the electrical instrumentation victimization that voltage. There are 2 varieties of Linear voltage regulators: Series and Shunt. There are 3 varieties of shift voltage regulator, Step up, Step down, and electrical converter voltage regulators. The transformer is typically found within or on the rear of the generator case. More and more, though, late- model vehicle have the engine management module (ECM) control generator voltage output through a special circuit. someone or a corporation that checks whether or not a business is functioning in step with official rules or laws: The money regulator has some restricted powers to fine administrators or firms.

III. WORKING

A vehicle frame, additionally referred to as its chassis, is that the main structure of a automobile to that all alternative parts are connected, akin to the skeleton of Associate in Nursing organism. till the one just about each automobile had a structural frame become independent from its body. This construction style

is thought as body-on-frame. The supporting frame of a structure leaf springs ar connected to the scooter chassis, additionally the frame and dealing elements (as of Associate in Nursinging automobile or electronic device) exclusive of the body or housing.

The terminal marked negative is that the supply of electrons which will flow through Associate in Nursinging external circuit to the positive terminal. once battery is connected to Associate in Nursinging external electrical load, a oxidoreduction reaction converts high-energy reactants to lower-energy product, and therefore the free- energy distinction is delivered to the external circuit as current. traditionally the term "battery" specifically said a tool composed of multiple cells, but the usage has evolved to incorporate devices composed of one cell. The operate of the generator is to alter energy into electricity. The management gear related to the generator regulates the present output in step with the stress on the electrical system and therefore the state of the battery.

A generator is Associate in Nursinging electrical generator that makes electricity employing a switch. Dynamos were the primary electrical generators capable of delivering power for business, and therefore the foundation upon that several alternative later electric-power conversion devices were primarily based, as well as the electrical motor, the alternating-current generator, and therefore the rotary. battery may be a device consisting of 1 or a lot of chemical science cells with external connections for powering electrical devices like flashlights, mobile phones, and electrical cars. once battery is supply electrical power, its positive terminal is that the cathode and its negative terminal is that the anode.

The terminal marked negative is that the supply of electrons which will flow through Associate in Nursinging external circuit to the positive terminal. once battery is connected to Associate in Nursinging external electrical load, a oxidoreduction reaction converts high-energy reactants to lower-energy product, and therefore the free- energy distinction is delivered to the external circuit as current. traditionally the term "battery" specifically said a tool composed of multiple cells, but the usage has evolved to incorporate devices composed of one cell. The operate of the generator is to alter energy into electricity. The management gear related to the generator regulates the present output in step with the stress on the electrical system and therefore the state of the battery.

A generator or a generator may be a device that converts energy to current. Generator works on the principle of magnetic attraction induction. Whenever the field joined with a coil

changes, Associate in Nursing induced electromotive force is setup in coil. Associate in Nursing generator may be a device that generates AC power from the rotation of Associate in Nursing shaft (mechanical energy). They're a small amount almost like dynamos, however dissent within the undeniable fact that they create AC power, whereas dynamo's generate DC power. Additionally, they additionally tend to be a lot of economical.

An electrical scooter could have 3 wheels or four. Since it runs on battery power, it doesn't produce pollution. A typical electrical scooter needs a try of batteries, however the batteries are reversible. The length of your time an electrical scooter will run on every charge depends considerably on its battery's sort and capability. The foremost common batteries are publicized to run regarding eight hours, and between 20-30miles, before has to be charged.

Some folks are a touch cautious of buying an electrical scooter as a result of they concern it'll be tough to control. In fact, the management console makes it quite straightforward once someone gets the texture for it. Electrical scooters are equipped with advanced brake systems, therefore stopping is easy and cozy. The brake begins to interact as before long because the operator lets off the throttle, therefore there's very little probability for abrupt or jarring stops. Most scooters even have a brake to stay the electrical scooter from rolling once set. The aim of a transformer is to stay the voltage in an exceedingly circuit comparatively getting ready to a desired worth. Transformers are one amongst the foremost common electronic parts, since an influence offer oftentimes produces raw current that might otherwise injury one amongst the parts within the circuit. Voltage regulator, any electrical or device that maintains the voltage of an influence supply among acceptable limits the transformer is required to stay voltages among the prescribed vary that may be tolerated by the electrical instrumentality victimization that voltage. There are 2 kinds of Linear voltage regulators: Series and Shunt. There are 3 kinds of shift voltage regulators, Step up, Step down, and electrical converter voltage regulators.

The transformer is sometimes found within or on the rear of the generator case. More and more, though, late-model vehicle have the engine management module (ECM) control generator voltage output through a special circuit. Someone or a company that checks whether or not a business is functioning in step with official rules or laws: The monetary regulator has some restricted powers to fine administrators or

corporations. A DC transformer may be a device that maintains the output voltage of a normal power offer constant regardless of load variations or changes in input A.C voltage. Generally, electronic circuits victimization tubes or transistors need a supply of D.C. power. For this a dc transformer is employed. A shift regulator isn't 100% economical.



Fig no.7- Model of Smart ecofriendly electric scooter

IV. RESULT

As a results of our project we have a tendency to expect higher performance of the E vehicle will be obtained by providing the energy from the vehicle it's self, then the wastage of energy will be recollected and potency is maximized.

As finally we organized a en- scooter which will break its beyond limits of an ordinary E-vehicle in the point of efficiency .By constructing a improved version of E-scooter to satisfy our expected output has been resulted on our project.

This result will may tends to make a revaluation in E-vehicle sector

POPULAR ELECTRIC BIKES

Bajaj Chetak. 1 - 1.15 Lakh*

Revolt RV400. 1.03 - 1.18 Lakh*

The Asian nation E-Bike market was valued at USD one.02 million in 2020, and it's expected to succeed in USD two.08 million by 2026, protruding CAGR of twelve.69 that in the forecast amount. (2021-2026). Recent COVID- 19 has resulted in reduced sales of e-bikes in Asian nation.

V. CONCLUSION

- With such a large amount of edges to owning an electrical scooter, its no marvel why such a large amount of folks are mistreatment them.
- As long as there's a requirement for such product, you'll be able to additionally expect quality and technology to incessantly improve.
- In larger cities, electrical scooters have already become the popular thanks to get around.
- Whether or not you've got a desire for adding to your existing transportation resources, or exchange current varieties of transportation, an electrical scooter may well be the solution.

REFERENCES

- [1]. D.B Jani , Shri N.J prajapati ,The study of ,”battery charging system in electric scooters”.
- [2]. Pooja Ayer .M ,The study of, “Design and fabrication of electric scooter”.
- [3]. Najmuddin Jamadar, The study of, “Retrofitting of existing scooter into hybrid electric scooter”.