DESIGN AND CONSTRUCTION OF A SELF-CHARGING AND PLUG-IN E-SCOOTER

Design Project

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ABSTRACT

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A study was conducted to design and construct a self-charging and plug-in electric scooter which can be use as a patrol vehicle for the University guards. The design of the scooter was plotted using auto computer aided design (Auto CAD) software indicating the proper positioning of the materials. The materials used in making e-scooter includes one motor, one generator, four 12-V lithium-ion batteries, connecting wires, twist throttle, charge controller, belt, pulleys, and gearbox.

The size of the battery was based on the voltage specification of the motor. The battery was evaluated by computing the time required to the charge and discharge of the battery. The generator specification was determined by computing the power output of the generator.

A 14Ah with a depth of discharge of 20 percent of battery can supply 350 watts of motor. The 2300 rpm speed of generator is enough to generate electricity to the battery when the scooter was at the speed of 10kph.

Test and evaluation of e-scooter were done in stationary position and while travelling with resistance of ground. A Cateye Velo9 (speedometer) was used to determine the distance travelled by the rider and the speed of the scooter.

The total cost of the study was P42,860.00.

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INTRODUCTION

Electric Vehicle (EV) or electric drive vehicle uses one or more electric motors or traction motors for propulsion. Types of EV are characterized through which power source it relies in --- those that are directly powered from an external power station, those that are powered by the stored electricity originally from an external power source, and those that are powered by an on-board electrical generator, such as an internal combustion engine (a hybrid electric vehicle) or a hydrogen fuel cell.

Electric scooters (e-scooters) first came into existence and were used extensively in the early 1990s. It is preferable methods of motor propulsion since it provides a level of comfort and ease of operation that cannot be obtained in a gasoline powered vehicles. The use just reduced due to the increasing popularity and long run capability of using fossil fuel. Environmental impact of the petroleum-based transportation medium and the sudden increase of oil prices on the market led to the revival of electric vehicle (EV).