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# DESIGN AND FABRICATION OF FRICTIONLESS ELECTRICITY GENERATOR USING DRIVE SHAFT OF ELECTRIC VEHICLE

**Ravichandran D*1, Prabakaran M*2, Pavitharan P*3, Sundaresan S*4, Sundhareshan E*5**

*1Assistant Professor, Department Of Mechanical Engineering, Nandha Engineering College, Erode 638 052, Tamilnadu, India.

*2,3,4,5UG Students - Final Year, Department Of Mechanical Engineering, Nandha Engineering College, Erode 638 052, Tamilnadu, India.

## ABSTRACT

One of the major global issues that require a high level of scientific reasoning and in-depth understanding of energy sources is the challenge of power generation. Using a driveshaft that generates electricity, a vehicle can power a hybrid engine or recharge its batteries. The driveshaft that produces electricity is made up of a magnetised driveshaft that serves as an electrical generator's rotor and coils of copper wire that surround the magnetic driveshaft. Due to the power from the hybrid engine, the magnetic driveshaft rotates, creating an electrical field that is caught by copper wire coils and utilised to power the hybrid engine or replenish a supercapacitor. According to Faraday's law of electromagnetic inductions, this rotational motion generates an EMF into the coil and a magnetic field.

## I. INTRODUCTION

For the preservation of fossil fuels and the reduction of pollution for a safe environment and sustainable transportation, electric and hybrid electric vehicles (EV/HEV) are promising solutions. Therefore, we will increase the electrical vehicle's efficiency by turning the drive shaft's mechanical energy into electrical energy, which will then be stored in a separate battery and available for use whenever needed. Over the years, a multitude of sources have been used to power vehicles. Animals, the wind, and human labour were used to power vehicles prior to the development of the internal combustion engine. Vehicles have been fuelled by gasoline, diesel oil, natural gas, ethanol, and mixtures of ethanol and gasoline ever since the internal combustion engine was created. These fuels are expensive to use, challenging to obtain and transport, and getting harder to find. In response to these issues with so-called "fossil fuels," automobiles are now driven entirely by electric motors or by hybrid engines that combine electric motors with gasoline or diesel engines. Batteries provide power for electric engines. The weight of the batteries, however, lowers the electric motor's effectiveness. The range of the vehicle powered by an electric motor is impacted by the batteries' limited storage capacity. Additionally, the number of battery-recharging facilities is limited, which reduces the utility of electric vehicles. In order to address these issues, a driveshaft that generates.

## II. LITERATURE SURVEY

Akhil Bhat et.al, an electromagnetic conduit is a wire that has been wound, looped, or coiled into one of these shapes. Either an attractive field is formed, or the electric flow through the loop's wire is surpassed. We also understood the concept of electromagnetism and how to generate electrical energy by only placing an equal number of magnets and coils on various discs without making contact with one another. Because the voltage generated by the assembly is totally reliant on the rpm of the wheels, a battery is utilised to provide a continuous source of power for charging.

L Dlair O Ramadan et.al, the driving shaft's cross section might be either solid or hollow. Hence, for this study, a hollow circular cross-section was employed. The shaft rotates at a constant speed along its longitudinal axis, has a circular cross-section, and is fully adjustable. Hook's law is relevant since the composite material's interaction between strain and push is linear and elastic. When compared to a traditional steel drive shaft, the usage of composite material has resulted in considerable weight savings and a reduction in total size. The procedure was developed to reduce fuel consumption in the specific machine and any other machinery that makes use of propeller shafts.

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Elisa Isotahdon et.al, without significantly changing their magnetic properties, neodymium, iron, and boron permanent magnets can partially replace pricey rare-earth components with more widely accessible cerium. In this study, we investigated the effect of cerium on the corrosion resistance of NdFeB magnets. This work aims to compare the corrosion behaviour of a new Ce-alloyed magnet grade with that of two existing commercial magnets using accelerated corrosion experiments, electrochemical measurements, and detailed magnet characterization. Alloying with Ce and Co enhances electrochemical stability at near-OCP potentials when compared to Ce and Co-free SG. Two hours of EIS experiments at OCP resulted in sporadic patches of GB phase breakup.

C. L. Faria et.al this work examines the design optimization of a linear electromagnetic generator (LEG) for a fully submerged wave energy harvesting device in order to provide long-term anchored oceanic sensors. The main objective of the work presented here is to maximise the power of the LEG design while taking into account the size, geometry, and location of the magnets in relation to the coils so that it can operate with the slight oscillations of water movement. When a test is performed, the magnetic core moves through the coils at a speed of 0 m/s from the LEG's left corner. Over time, the separation between the coils has an impact on the output power value and its signal shape.

Gokul B. Bhujbal et.al, after examining a number of materials, the best material will be recommended. Alloys made of common steel, stainless steel, and aluminium will all be considered in this study. Dynamic analysis will concentrate on determining natural frequencies to check for resonance and whirling while static analysis will concentrate on deflection and stresses under varying speed loading. For drive shafts, steel is a particularly brittle material. The effect on vehicle inertia and power transmission is frequently very large because of the heavy weight of the steel material and the majority of the fuel consumption of the vehicle. The weight of the steel material is too heavy, so alternative materials must be used to reduce the weight of the drive shaft. Resonance or the critical speed conditions are not an issue, and all materials.

Ketan Mane et.al, Flywheel energy storage (FES) technology works by accelerating a flywheel to an exceptionally high speed and maintaining the energy in the system as rotational energy. In most FES systems, the flywheel is propelled by electricity. For this work, we use mechanical energy. To achieve our objective in this study, we use a DC generator to convert rotational energy into DC electrical output. The analysis of this study shows that FES is an effective strategy for addressing the energy storage issue. Riding a bike, charging my phone, lights, and many other things often created through the use of non-renewable resources, such as petroleum.

P Karthikeyan et.al, in this work an improved alternative to a typical steel drive shaft was attempted using a composite material made of glass, epoxy, and kevlar. The two steel driving shaft components are combined into a single shaft with better power transfer. Due to their flexibility, which reduces stress, they work best as shock absorbers when the torque is higher. Moreover, due to its durability, Kevlar/Epoxy and Glass/Epoxy show reduced deformation under impact stress.

Lin Li et.al, accurate speed prediction has a huge impact on how well energy management functions in hybrid vehicles. In the existing energy management efforts, vehicle dynamics and vehicle stability control are not given enough consideration. This necessitates the use of an all-inclusive or integrated controller that incorporates both an energy management system and a vehicle dynamic controller. The vehicle's maximum energy efficiency can be attained in this way without jeopardising its safety. This study offers a method for predicting vehicle speed that is based on the lateral dynamics of the vehicle. A frequent problem concerning the lateral dynamics of a hybrid electric vehicle and its energy management system. The essay's usage of the HEV's powertrain design. There are several power flow paths with this design. However, we just consider the hybrid mode in this essay. It's vital to remember that the comparable factor's change will keep the battery SoC from rising too high during regular use.

Lemma Eticha Feyye et.al, the driveshaft also needs to be big enough to shift a moving torque. Composite materials, which have better qualities than separate parts, are created using a variety of joining materials. These chemicals are incompatible because of their tiny connections. To replace the metal drive shaft in a car, high-strength composite material (carbon/epoxy) drive shafts were developed. Also, the design and evaluation

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of the drive shaft as well as the transformation of a two-piece metal drive shaft into a single piece of carbon/epoxy composite material were all covered by the work that was delivered.

Muhammad Sulman Kamboh et.al, an analysis of a case study that switched out standard steel driveshafts (Ti-6Al-7Nb) for lighter, more resistant titanium alloys He is putting together a thorough examination of numerous high performance, lightweight materials. He defines "steel" as "high-strength steel with resistance" before using the word for the first time. This study also examines the fundamental reasons of shaft failure, fatigue, and fracture using scientific techniques like fractography, metallurgy, chemical composition, and SEM micromorphology. Because the inner layer of the hollow shaft experiences a more uniform distribution of stress than the solid shaft, it is chosen over the solid shaft. It is advised to employ lightweight materials rather than customary steel.

CH. Manideep et.al, reducing rotational mass can minimise energy waste. To save weight and meet vibration criteria, a single composite shaft can be produced. The available power is transmitted more efficiently by a smaller rotating weight. In recent years, laminate composites have grown in use in lightweight, high-strength structures such ground transportation vehicles, aeroplanes, and space structures. Yet, composite materials can have some serious drawbacks. Strength and rigidity are increased, and the thermal expansion coefficient is controlled via reinforcement. It also aids in the development of directional abilities. The reinforced fibre can be formed entirely of glass fibre or aramid fibre and the matrix resin when the rotational speed is low or the required qualities, such as torsional strength, heat resistance, and moisture resistance, are modest.

Ramchandra D Patil et.al, the drive shaft transmits force from the engine to the differential gear in a vehicle with rear-wheel drive. It's the and then and then and then and then and then and then and then and then and then and then and then and then and then The two-piece steel drive shaft, which consists of three universal joints, a bearing in the middle, and a bracket, increases the weight of an automobile overall and decreases fuel economy. A close approach to a changeable attracting field is necessary to ignite a voltage in a wire. The size of the field thickness and the loop region both influence the suggested voltage.

Rajaram M. Shinde et.al, the square of the drive shaft's length and its inherent frequency are inversely correlated. The driving shaft is divided into two pieces so that the required frequency can be achieved. Steel's poor corrosion resistance and low damping properties reduce drive shaft life. We built and investigated the glass-epoxy composite drive shaft for the light motor vehicle's torsional strength, natural frequency, and critical speed. The inner and outer diameters of the composite drive shaft Glass epoxy composite serves as a lightweight alternative to steel in the automotive drive shaft.

G. Suresh et.al, in this study, the E-glass fibre is strengthened using IPN resins. The fibre was bought with the intention of adding E-glass fibre to it. Two of the many resins used to make IPN include vinyl ester and polyurethane. It was discovered that increasing the volume of CSM in the IPN matrix also increases the static torque capacity of the composite tube in accordance with the construction and testing procedures of the torque testing machine, which follow the predetermined dimensions of the shafts' length and diameter.

Sebastian Vettera et.al, finding low-error experimental values for fatigue strength involves a lot of time and money. A human factor was present in the experimental tests because of the different mountings and unrecorded damage to the shafts. During experimental tests, load scatter as a result of external factors and control mistakes.

## III. CONCLUSION

Any machine that uses a drive shaft, whether it is an automobile particularly or any other machine will have its fuel consumption reduced as a result of the current study. Because the engine and gearbox are in direct touch with the alternating current, there will be some resistance while the battery is charged by the car's alternator. Because to this, we changed the drive shaft's design so that it would no longer require engine power while still transmitting driving force from the engine to the differential and producing electricity to charge the batteries. As a result, the resistance was reduced and engine performance was enhanced. The engine's efficiency will consequently increase.

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