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LIFETIME REGENARATIVE HYBRID VEHICLE

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ABSTRACT:

An emerging technology called electric vehicles (EVs) is drastically changing the automobile sector. Because these cars are fueled by electricity rather than conventional fossil fuels like gasoline or diesel, they produce fewer pollutants and have a smaller impact on the environment. Rechargeable batteries are used in electric vehicles (EVs) to store energy and send it to an electric motor, which drives the wheels. As a result, an increasing number of customers and companies are deciding to transition to electric vehicles for their transportation requirements. The automobile industry, the environment, and how we travel in the future are all predicted to be significantly impacted by this march towards electric vehicles.

INTRODUCTION:

Hybrid vehicles are a type of car that combines the power of a traditional gasoline engine with an electric motor to produce a more efficient and environmentally friendly driving experience. At higher speeds, the gasoline engine takes over, providing more power and extended range. The combination of the electric motor and gasoline engine provides a more efficient and cleaner driving experience than a traditional gasoline engine alone. In this report, we will explore the benefits and drawbacks of hybrid vehicles and the latest trends and innovations in the hybrid car industry. The electric motor helps to reduce the load on the gasoline engine, which can lead to better gas mileage and lower emissions.

Hybrid vehicles offer some advantages over electric vehicles (EVs) that make them a preferred choice for some drivers. Here are a few reasons why some people may choose a hybrid vehicle over an EV:

1. **Extended range**: While EVs have made significant strides in improving their range, they still can't match the range of a hybrid vehicle. Hybrid vehicles can travel further on a single tank of gas than an EV can on a single battery charge. This can be particularly advantageous for people who need to drive long distances or who live in areas with limited charging infrastructure.

2. **Faster refueling**: Filling up a hybrid vehicle with gasoline takes only a few minutes, whereas charging an EV can take several hours depending on the charging station and the battery's capacity. This

can be more convenient for people who need to get back on the road quickly and don't have the luxury of waiting for their car to charge.

3. **More affordable**: Hybrid vehicles are typically less expensive than electric vehicles, making them a more affordable option for some buyers. Additionally, hybrids don't require as much infrastructure investment as EVs, as they can be refueled at traditional gas station.

4. **Lower carbon footprint**: While EVs are often seen as the most environmentally friendly option, hybrid vehicles still offer a lower carbon footprint compared to traditional gasoline-powered vehicles. They produce fewer emissions and use less gasoline, making them a more environmentally responsible choice for many drivers.

HYBRID VEHICLE DESIGN:

The design of a hybrid vehicle typically involves a combination of a gasoline or diesel engine and an electric motor. The engine and motor are integrated with a battery pack, power electronics, and a control system that manages the flow of power between the engine and motor to optimize performance and fuel efficiency. The design of a hybrid vehicle also includes aerodynamic features, lightweight materials, and advanced engineering techniques to reduce weight, improve efficiency, and enhance safety.

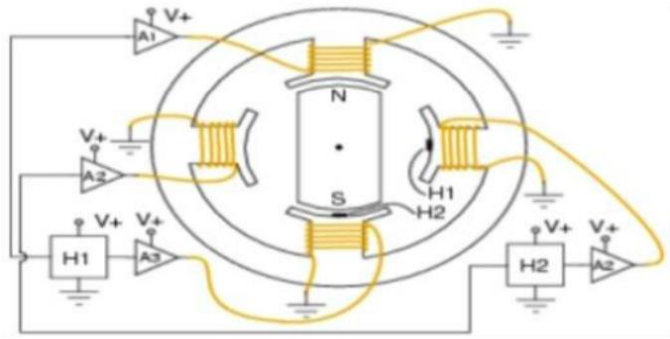

Fig. Hub Motor

The Hub-motor is mounted to the rear-wheel of the tyre without Disturbing the engine as shown in the figure.

Objectives :

The Upgradation of 100cc petrol engine to hybrid by designing the rear wheel chassis in such a way That the motor is mounted inside the rim itself. 5 We use a 3KWV geared Hub motor 60V 24Ah Li-ion Battery and a customized controller. As we are already using a geared motor we don't need to use any transmission to attain different speeds and also reverse mode.

DESIGN OF MAGNETIC GENERATOR:

A neodymium magnetic generator is a device that generates electricity using the principles of magnetic induction. The neodymium magnet is a type of rare-earth magnet that is highly magnetically efficient, and as a result, it can produce a strong magnetic field. When a magnetic field is moved through a coil of wire, it induces an electrical

current in the wire, which is known as magnetic induction.

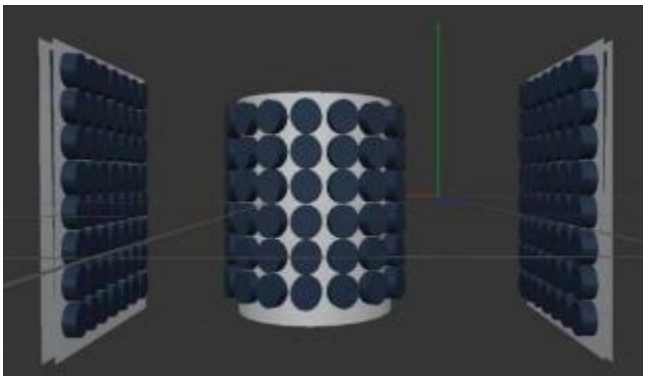

Fig. Neodymuim Magnets

In a neodymium magnetic generator, the neodymium magnet is typically placed inside a rotating drum, and the wire coil is wrapped around the drum. As the drum rotates, the magnetic field from the magnet passes through the coil, inducing an electrical current in the wire. This electrical current can be used to power various electrical devices. It's important to note that neodymium magnetic generators are not a widely accepted source of energy, and the efficiency of such generators is often disputed. They are often marketed as a way to generate free, clean energy, but there is no scientific evidence to support these claims. Additionally, the cost of producing electricity using a neodymium magnetic generator is typically much higher than other conventional methods of electricity generation.The design phase posed a challenge due to the small size of the magnets within the hub motor. Creating an intricate 3D design that incorporated these small magnets while maintaining structural integrity proved to be demanding. Precise calculations and meticulous engineering were required to ensure proper alignment and integration of the magnets within the hub motor design. Overcoming this challenge involved close collaboration between design engineers and experts in magnet technology.

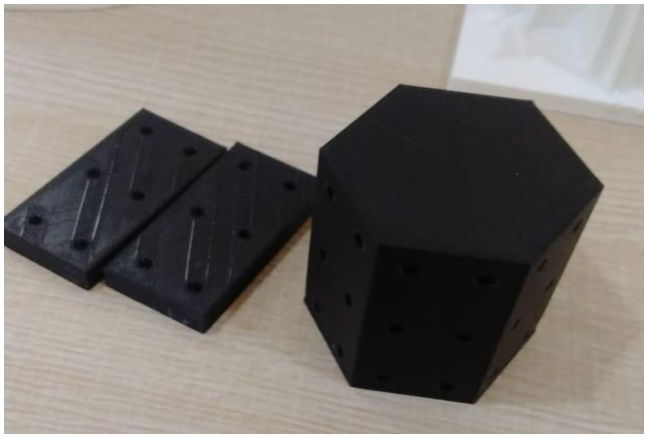

Fig. 3-D Model of Magnetic electricity Generator

DESIGN OF HYBRID VEHICLE :

The design of a hybrid vehicle combines elements of traditional gasoline-powered vehicles and electric vehicles to provide a more efficient and environmentally friendly mode of transportation.

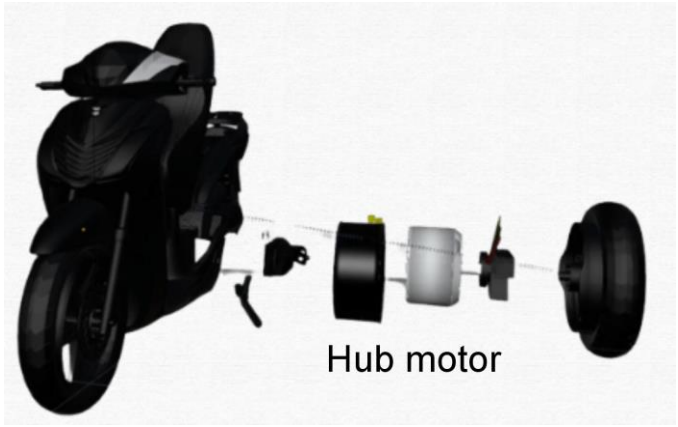

Fig., Hub motor.

The hybrid vehicle typically has two power sources: a gasoline engine and an electric motor. The gasoline engine provides the majority of the power needed to move the vehicle, while the electric motor provides additional power when needed, such as during acceleration. The two power sources work together to provide a smooth and efficient driving experience.

The design of a hybrid vehicle also includes a high-voltage battery pack that stores energy generated by the gasoline engine and the regenerative braking system. The regenerative braking system captures energy that is normally lost during braking and stores it in the battery pack to be used later.

In addition to the powertrain components, the design of a hybrid vehicle may also include weight-saving technologies, aerodynamic features, and efficient systems for controlling the climate inside the vehicle. The goal of the design of a hybrid vehicle is to achieve a balance between the performance and efficiency of a traditional gasoline-powered vehicle and the environmental benefits of an electric vehicle. By combining the best features of both types of vehicles, hybrid vehicles provide a more sustainable and cost-effective mode of transportation.

FINAL OUTPUTS OBTAINED:

The objective of this conversion was to incorporate electric power into the vehicle, thereby improving fuel efficiency and reducing emissions. The report focuses on the performance of the electric version, specifically the achieved maximum speed of 55 km/hr.

The conversion process involved retrofitting the vehicle with a hub motor, which was integrated into the drivetrain. The hub motor was selected based on its power and torque ratings, ensuring compatibility with the vehicle's weight and performance requirements. The motor was connected to a battery pack, which provided the necessary electrical energy for the electric mode. Careful attention was given to weight distribution, safety standards, and legal regulations throughout the modification process.

Fig. Hybrid Vehicle

ADVANTAGES:

1. The Hybrid two wheelers are low maintenance, requiring only that the lead-acid

batteries of the boot can be plugged into an array of chargers after each run. Since they are pollution-free and emit no smoke, the racetracks can be indoors in controlled environments. Most fully charged electric scooters powered by lead-acid batteries can run a maximum of 30 minutes before the performance is affected. An alternative is lithium polymer or lithium-ion batteries, which last longer and offer higher performance.

2. The major solutions like cost efficiency and emission can be easily controlled. Reduce metal scrap of vehicles by converting them into a hybrid. Cutting the maintenance cost by 30%. A total of around 296 million 2-wheeler users can be benefitable from this invention.Fuel economy: Hybrid vehicles are typically more fuel-efficient than conventional gasoline-powered vehicles. This can result in lower fuel costs and reduced greenhouse gas emissions.

3. Performance: Hybrid vehicles can offer better performance than EVs in certain situations. For example, hybrid vehicles can provide more torque for faster acceleration, and they may be better suited for off-road driving or towing heavy loads.

References:

[1] "A review of hybrid electric bicycle charging infrastructure" by S.Singh and R. Agarwal, published in the Journal of Cleaner Production in 2017.

[2] "Modeling and control of hybrid electric bicycles" by X. Gao and D. G. Lu, published in the IEEE Transactions on Vehicular Technology in 2018.

[3] Sanketh Shivanna, "Design & Fabrication of Two Wheeler Hybrid Vehicle", International Journal of Science and Research (IJSR), Jan-2015.

[4] D.J. Bhattacharya and S.Tewari, "Transformation of on-road automobiles to electric vehicles in India - Regularly prespective", KPMG, Mar- 2018.

[5] "A review of hybrid electric vehicle technologies" by G. N. Su and X. Wang, published in the Journal of Power Sources in 2009.

[6] "Modeling and control of hybrid electric vehicles" by X. Gao and D. G. Lu, published in the IEEE Transactions on Vehicular Technology in 2009.

[7] "Battery management strategies for hybrid electric vehicles" by P. Jain and R. Agarwal, published in the Journal of Energy Storage in 2016.

[8] "A review of hybrid electric vehicle charging infrastructure" by S. Singh and R. Agarwal, published in the Journal of Cleaner Production in 2017.

[9] "Optimal control strategies for hybrid electric vehicles" by X. Wu and J.

M. Guerrero, published in the International Journal of Electrical Power & Energy Systems in 2013.

[10] "A review of power management strategies for hybrid electric vehicles" by Q. Ma and J. Wu, published in the Journal of Energy Conversion

and Management in 2013.

[11] "A review of energy management strategies for hybrid electric vehicles" by Y. Liu and J. Dong, published in the Journal of Energy Storage in 2018.

[12] "A review of thermal management strategies for hybrid electric vehicles" by L. Wang.