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Fabrication of a Power Generation System for a Two Wheeler Suspension System

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Abstract:- The primary goal of this project is to fabricate a power generating system for a two-wheeler suspension system, which is a novel and inventive endeavor targeted at harvesting energy from suspension system motion to generate electrical power. This initiative addresses the increased demand for environmentally friendly energy sources in the transportation sector. To transform mechanical vibrations generated during vehicle motion into electrical energy, the system incorporates piezoelectric materials strategically incorporated inside the suspension components. This abstract describes the creation of a sustainable energy solution that offers great potential for the future of two-wheeler transportation by making it more environmentally friendly and energy-efficient.

I. INDRODUCTION

The evolution of transportation has witnessed incredible advancements throughout the years, with a rising emphasis on sustainability and energy efficiency. Due to their cost and convenience, two-wheelers such as motorbikes and scooters have become an essential aspect of urban mobility. However, as the globe grapples with environmental concerns and the depletion of fossil fuels, there has never been a greater need for inventive solutions to improve the efficiency and sustainability of two-wheelers. One possible approach is to integrate power generation systems inside two-wheelers, namely within their suspension systems. This introduction introduces the notion and significance of building a power generation system for a two-wheeler suspension, emphasizing the possible benefits and reasons behind this novel technique. The world's energy consumption is increasing, and the automotive industry is a major contribution to this increase. Traditional internal combustion engine vehicles dominate the market, but they are renowned for their high levels of carbon emissions and reliance on limited fossil fuel resources. To address these challenges, alternate types of power generation and energy harvesting have been a focus of transportation research and development. Two-wheelers, which are intrinsically more fuel-efficient and space-efficient, have grown in favor, particularly in densely crowded urban areas. They provide an effective means of transportation for daily commutes and short journeys, cutting traffic congestion and fuel usage dramatically. As a result, enhancing the energy efficiency of two-wheelers can have a significant impact on lowering overall energy consumption and emissions in urban areas. Suspension systems in two-wheelers are critical in improving rider comfort and safety. These systems are in charge of dampening road vibrations and ensuring ride stability. The idea behind collecting energy from the suspension system is that it is continually in cyclic motion owing to road disturbances. We can make two-wheelers more energy-efficient without compromising their core functions by transforming some of their kinetic energy into electrical power.

II. WORKING PRINCIPLE

A power generation system for a two-wheeler suspension system can be designed and built in a variety of ways. A linear generator is a popular technique. A linear generator is a type of electrical generator that turns linear motion into electrical energy. The generator might be attached to the motorcycle's swingarm. The linkage system might be attached to the motorcycle's swingarm and frame. The generator moves up and down as the suspension compresses and stretches. The generator would transform this movement into electrical energy. The generated electricity might be stored in a battery and utilized to power the motorcycle's electrical system, such as the headlights, taillights, and turn signals. The technique might also be used to charge a battery pack. The battery pack might then be utilized to power additional devices like a phone or a laptop computer. The power generation system might also be used to power a small electric motor or a lighting system, among other things.

III. PROBLEM IDENTIFICATION

Several major issues confront the power generation system integrated into a two-wheeler suspension system. To begin with, the limited available space limits the size and capacity of the power producing components. Traditional power generators, such as alternators, may struggle to fit inside the compact design of a two-wheeler, necessitating the exploration of novel and space-efficient solutions. Furthermore, the vibrations and constant movement associated with the suspension system pose an engineering difficulty in assuring the stability and durability of the power generation mechanism. The system must be robust enough to survive varying road conditions while efficiently converting mechanical energy into electrical power.

IV. PROBLEM RECTIFICATION

Identifying and correcting fundamental flaws in a two-wheeler suspension system demands a systematic approach. To begin, evaluate the efficiency of the current power generation components, such as the alternator or dynamo included into the suspension system. Check that these components are correctly connected and working properly. If power generation continues to be insufficient, consider upgrading these elements to higher-capacity units to meet the vehicle's energy requirement.

V. METHODOLOGY

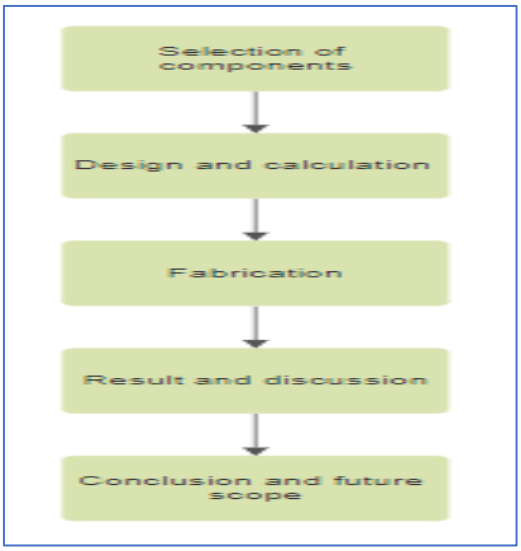

Fig. 1: Photography

Fig. 2: Frontview

Fig. 3: Top View

Fig. 4: Left Side View

VI. COMPENENTS USED

A. *FRAME*

Fig. 5: Frame

➢ *Specification*
Frame 1inch x 1 inch square MS pipe

B. *RACK AND PINON*

Fig. 6: Rack and Pinon

➢ *Specification*
Rectangular gear of Length = 220 mm.
Thickness =9 mm.Bought side of gears teeth.

C. *MOTOR*

Fig. 7: Motor

➢ *Specification*

G- Tec Ro Booster Pump

Motor Phase	: Single Phase
Voltage	: 12V - 24 V DC
Frequency	: 50/60 HZ
Material	: Matel

D. LED

Fig. 8: LED

➢ *Specification*

Light Source	:TypeLED
Power Source	: Battery Powered
Light Colour	: Rose
Material	: Plastic
Voltage	: 12 Volts (DC)

VII. CONCLUSION

The development of a power generation system for a two-wheeler suspension is an encouraging step toward more sustainable transportation. The prototype clearly turns lost vibrational energy into useful electricity, while more tuning is required. This makes it possible for electric two-wheelers to have longer battery lives, to use fewer fossil fuels, and maybe to power more onboard amenities. There are still issues with striking a balance between energy production, preserving the best suspension performance, and guaranteeing system longevity. Subsequent studies ought to concentrate on enhancing effectiveness, optimizing suitability for diverse car models, and guaranteeing a smooth amalgamation with current electrical frameworks. Even with these continuous efforts, this fabrication's accomplishment represents a major step forward in the use of waste energy for cleaner and more effective transportation in the future.

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