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# STUDY ON POWER GENERATION BY USING SUSPENSIONSYSTEM

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**Abstract**

The primary goal of designing a controller for a car suspension system is to lessen passenger discomfort caused by road roughness while also improving ride handling associated with pitching and rolling movements. To achieve as many control objectives as feasible, an extremely fast and accurate controller is required. As a result, this work uses a Neuro-Fuzzy (NF) artificial intelligence technique to construct a robust controller that meets the control objectives. This controller has the advantage of being able to handle nonlinearities faster than other conventional controllers. When travelling on a bumpy road, the proposed controller's method is to send control forces to the suspension system to reduce vibrations on each corner of the vehicle.

**Keywords:** Suspension system, Neuro-Fuzzy (NF), Power generation, Vibrations

## INTRODUCTION

Fossil fuels are depleting at an alarming rate. In addition, the cost of gasoline is rapidly rising. As a result, someone needs to concentrate on reducing gasoline use. Our goal is to show how kinetic energy from a car's suspension may be used to achieve our goal of capturing maximum energy that would otherwise be wasted. We offer a design strategy for converting mechanical energy in automobiles to electrical energy that is far more efficient than previous methods. The electricity generated will be utilised to recharge the automobile battery, which will then be used to power the vehicle. There is a lot of room for energy regeneration, such as systematic energy regeneration. David Oxen reider of Boiling Springs, Pennsylvania, presented a design for a shock absorber that generates electricity in 2005. Bosch suspension systems have generated electricity in the lab. The devices were too big, too expensive, and inefficient at converting power, or they were merely bad shock absorbers since they didn't have a spring or had the appropriate damping qualities.

The generator of electricity An electromagnetic suspension system turns linear motion and vibration caused by vehicle bumps into electricity that can be utilised to charge batteries. Shock absorbers in general-purpose vehicles are used to absorb this energy without converting it to electricity. So here we propose a method for capturing this free energy and storing it for future requirements such as vehicle lighting, cooling, and indicator lights, among others. To accomplish this, we employ electromagnetic principles in order to generate electricity from motion. A metal shaft, spring, magnet, coils, base with screws, and joints make up our shock absorber. It employs a coil wound in a specific turning pattern over the part's inner beam. In our work, we use cylindrical supports.

## ELECTROMAGNETIC SUSPENSION SYSTEM

The first approach relies on Faraday's law of electromagnetic induction to function. A smaller magnetic tube slides into a bigger, hollow coil tube in the shock absorber, which is made up of two tube-like components. The magnetic component is made up of ring-shaped magnets separated by ring-shaped magnetically permeable spacers, while the coil component is made up of copper coils wound around a plastic tube.

## REGENERATIVE SUSPENSION SYSTEM

The second way involves the conversion of linear motion to circular motion. The rotational energy is stored in the flywheel, which rotates the dynamo, generating electricity. The speed breaker rack will reciprocate as the vehicles move. The rack is connected to a pinion that can only rotate in one direction.

The rack and pinion system transforms linear motion into circular motion. The rotating motion is amplified even further by the chain drive. The free wheel's output is connected to a flywheel, which stores kinetic energy before transferring it to a dynamo, which generates electricity.

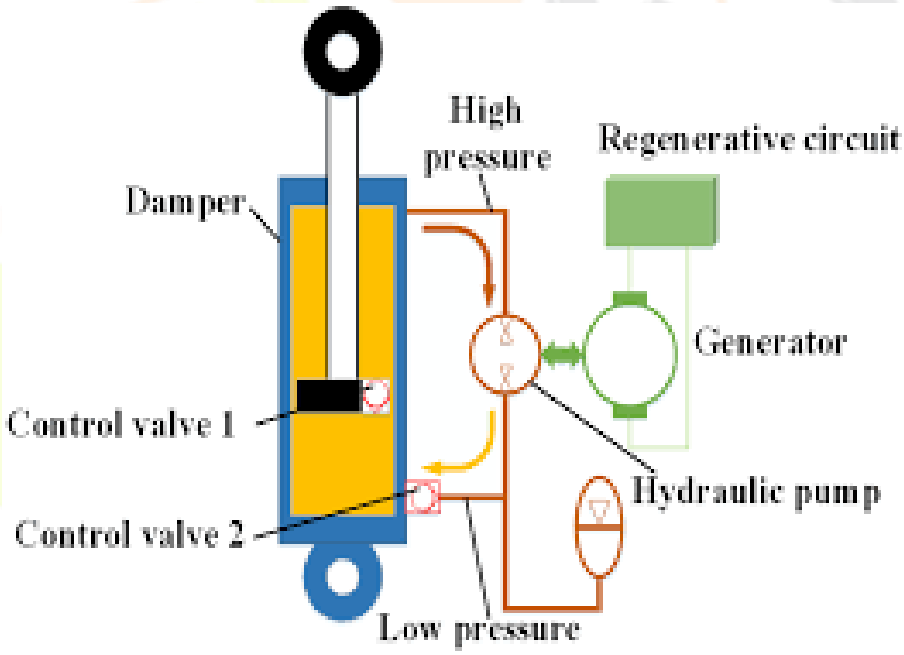
## CONSTRUCTION AND WORKING OF POWER GENERATION SUSPENSION SYSTEM

### Construction

It is made up of two plates of iron sheet, two plates of hardwood sheet (plywood), eight stud rods, and four motors. Iron sheet measuring 95mm x 95mm and 5mm thick is used to build the first and fourth horizontal plates. The second and third horizontal plates, each measuring 95mm × 95mm and having a thickness of 10mm, are made of plywood sheet. There are eight vertical stud rods with a diameter of 5mm and a length of 250mm.

The first horizontal plate and third horizontal plates are connected to each other passing through second horizontal plate with the help of four stud rods and the forth horizontal plate and second horizontal plate are connected to each other passing through third horizontal plate with the help of other four stud rods.

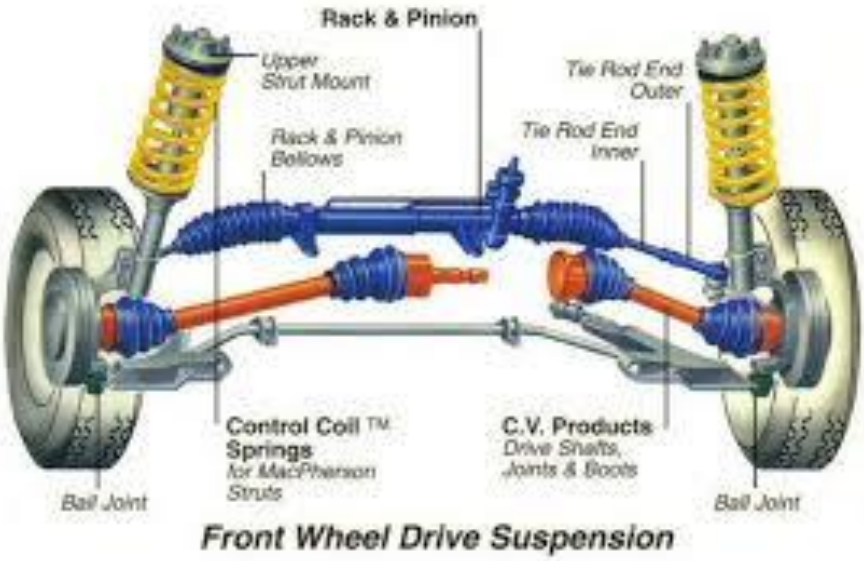
The rubber belt flat type is fixed on the second plate and forth plate with the help of nut and bolt. On the third horizontal plate two vertical plates are mounted of 95mm x 45mm having 10 mm thickness made up of plywood sheet. Four motors are mounted on the two vertical plywood plates. These motors are connected in series to each other with Full wave Rectifier Bridge.



**How it works**

The linear motion of the vehicle suspension causes friction between the pulleys and the belt as it functions. As a result, the pulley begins to rotate. The DC motors' shafts have pulleys installed on them. The shafts of the motors likewise revolve when the pulleys rotate, generating power. The project's implementation and operation are depicted in the diagram. Individual wheels move relative to one other while the car travels over an uneven road surface. As indicated, the linear motion of the wheels compresses the suspension, which causes the belt linked to the wheel assembly to move. As can be seen in the highlighted region, this causes the pulley to rotate.

The belt then sends the rotating motion to the DC motors through a pulley. The motors create power, which is sent to the vehicle's many auxiliaries. As a result, the project assembly consists of a single front wheel, suspension, and the developed parts that are attached to it.



**ADVANTAGES OF POWER GENERATION USING ELECTROMAGNETIC SUSPENSION**

- Shock absorbers have a great for performance, handling and stability.
- They are best choice for work and severe use vehicles.
- High pressure gas mono tube design- 360psi to prevent aeration and shock fade.
- Low pressure gas twin tube design- These units are good for average, everyday driving.

**DIS-ADVANTAGES OF POWER GENERATION USING ELECTROMAGNETIC SUSPENSION**

- Not applicable for all types of two wheelers.
- On smooth road power generation is less than 4 volt.
- Design of the suspension system not suitable for scooter.
- As whole system consist of electric wiring, so that chances of short circuits.

**Application**

These project main applicants use this project and use with lot of advantage.

1)Two wheeler vehicle such as motorcycle.

2)Automobile industry.

3) Devices were system is used.

## CONCLUSION & FUTURE SCOPE

**Conclusion**

The vibration energy of the vehicle suspension is traditionally absorbed as heat by the shock absorber, wasting a significant amount of resources. Shock Absorber-Generated Power offers hope for repurposing squandered energy. This study examines all sorts of Power Generating Shock Absorbers, including electromagnetic suspension, and their qualities. From the standpoint of overall performance, such as vibration control, regeneration efficiency, and application dependability. Power Generating Shock Absorber may become one of the most promising innovations in the car business as technology advances.

**Future scope**

The scope for this project is that it is simple in construction and design and has low in price. It is easily mounted on the chassis of the vehicle and it produced 2 to 3 volts in even road and 6 to 9 volts on uneven rod which is sufficient for charging the vehicle battery when the vehicle is in a running position. This increases the efficiency of electric vehicles up to 10%. Further improvement in the suspension design makes it suitable for any two wheelers (electric). By increasing the no. of DC motor generation of power get increases which are used to charge high voltage battery. This system can be used on to the mono suspension system by making suitable design. By modifying this system we can implement this on to the electric car

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