

ENERGY HARVESTING THROUGH SPEED BREAKER USING PIEZOELECTRIC MATERIALS

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ABSTRACT: In the method proposed technique, the energy crisis caused by renewable resources as energy sources. As the population grows and the daily energy resources increase, we need a solution to solve this problem. Renewable unconventional energy source using piezoelectric technology. High-speed breakers are one of the most popular tools to slow down oncoming vehicles. In this way, we will describe how energy renewable energy can be collected as a source in vehicle through a high-speed breaker made of piezoelectric material. The use of speed breakers in generating energy lies in the concept of piezoelectricity, which is lost every day. The kinetic energy introduced into the vehicle causes mechanical deformation of the piezoelectric material in the speed breaker, thereby generating electricity. Therefore, this configuration can generate enough energy to various daily needs. The current method centers around the vitality produced from the speed electrical switch through the source association. To make the framework increasingly proficient, pressure transducers, piezoelectric precious stones can be utilized to change over the weight of the vehicle into electrical source of energy.

KEYWORDS: Speed breakers, Piezoelectric material.

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I. INTRODUCTION

Electric vitality produced by piezoelectric materials. It contains essential hypothetical models for power plant and framework streamlining. The outcomes show that with the correct setup, a solitary battery-powered battery can store adequate force thickness for some time in the future. Piezoelectricity is a charge put away in some strong, contingent upon the mechanical vitality utilized. The term piezoelectric component alludes to the old wellspring of electric charge, golden, to produce power from the press or press electronic or electronic or pressure gadgets. The privately produced charge from the applied motor yield is known as the direct piezoelectric impact. The mechanical strain that causes the electric field utilized is known as the backwards piezoelectric impact.

This considers the force source produced by the vitality put away in the battery or alternator as in regular strategies is for the most part determined by the suspension arrangement of the vehicle, just the vehicle. The most effective method to produce capacity to the vehicle suspension framework portrayed in this strategy is less. These vibrations are created as the vehicle knocks out and about. The active vitality created from the suspension framework is changed over into power by utilizing different instruments. The emphasis is on certain generators for vehicle suspension frameworks.

New instrument for power from speed breakers. This technique utilizes a blend of pressure driven component, piezoelectric sensor, and electromagnetic acceptance. Traffic signals and tollgates are furnished with speed guards to control the speed of vehicles.

At the point when the vehicle passes the spring electrical switch, it has a spring cylinder gadget, and afterward the pressure power of the primary cylinder bar completes two things. The magnet moves until the cylinder, and its oil is pushed through it. The development of the second cylinder toward a path that is affected by the piezoelectric plate and the electromagnetic heading of the subsequent gathering. Here we can constrain us to utilize piezoelectric and this component in the guard, where electrical vitality is changed over into electrical vitality by moving the heap mechanical vitality.

II. LITERATURE REVIEW

In this strategy, a framework is proposed in which the framework is arranged to improve the force created under states of neighborhood vibration. Along these lines, the piezoelectric framework is masterminded as a full cross-associate (DCT) association. This technique diminishes the impact of specific vibrations in the framework, in this way expanding the force produced by it [1]. A piezoelectric vitality recuperation framework that utilizes elevated level chambers to change over high vibration vitality into electrical vitality was concentrated to assess its adequacy in water. Chambers are normally used to trigger turns. Rounded bodies with breaks and curved back surfaces make amazing and ordinary cycles along these lines [2]. The vitality collecting interface, called cut off charge extraction, is a headway of the interface for profoundly coupled piezoelectric generators. The interface depends on cut off with two change boundaries. One alludes to the stage between as far as possible and the vitality collecting occasion. Edge distinction between the beginning and end of the subsequent short out stage [3]. The piezoelectric vibration assortment of vitality has pulled in numerous analysts since it doesn't give perfect, self-ruling answers for power gadgets. Likewise, it assists with making keen urban areas. The focal point of this technique is to utilize conventional rectifier circuits to store low-recurrence vibrations from urban flyovers and research center test estimations to recoup vitality from low-recurrence vibration spans, including little vibrations [4]. It depicts the structure and investigation of piezoelectric detecting of a transformer that creates high voltage utilizing beat voltage decrease strategies. A significant commitment is to execute the beat drop mode in the changing instrument of the inverter to diminish the warmth of the piezoelectric transformer during high voltage age.

The piezoelectric transformer gave by the inverter is expected to make high voltage at high repeat [5]. Single-selection twofold information twofold yield direct current to direct current converters are proposed for photovoltaic and piezoelectric imperativeness procuring structures. The DC-DC converter uses a buck-booster topography. Another system is proposed to empower a common trigger between all sources of info and yields inside an exchanging cycle [6]. A remote sensor organize is a system used to gather different information, for example, natural weight, temperature, sedimentation, air quality, backwoods fire observing, and mugginess handheld sensor gadgets. In this model, the vitality reaping framework centers on controlling the emanation of vitality to play out the essential elements of every sensor gadget. [7]. Exploration instruments for power age and for improving railroad vitality the executives.

Traveler rail/stockpiling subsystem dependent on sun based or sustainable power source is embedded into the train power framework [8]. Hypothetical investigation and morphological boundaries of uniform plate transformers have incredible change rate and productivity test check. The info zone is enraptured by thickness and the yield zone is outspread [9]. This article examines the utilization of uninvolved gadgets to improve the yield attributes of vibration generators. Suggest circuit resonators and detached rectifiers. The proposed resonator has an inductor to an oscillator and a capacitor in equal. Vibrations are equivalent, decreasing the inward capacitance of the piezoelectric component [10].

In this report, a permeable span resonator is proposed to conquer the above constraints by all the while giving generally minimal parts high abundance and huge warmth dispersal zone. This technique portrays how to plan a MOR, resonator, and measure its order swaying through analysis [11]. In the course of recent decades, research on vitality gathering in the plan and production of self-fueled microelectronic gadgets has been consistently expanding. Remote sensor systems have a wide scope of utilizations, including mechanization, auxiliary wellbeing observing, military applications, and robot groups [12].

III. PROPOSED METHOD

Moving vehicles have a certain amount of kinetic energy, which is wasteful. This kinetic energy can be used with the energy generated by a particular power plant. It uses mechanical technology and energy generation and energy storage technology.

In the proposed strategy, the active vitality in the moving vehicle can be changed over into the mechanical vitality of the bar by means of the capacity battery. As each vehicle on it slides, the cover spring is attached to the dome,

moves in the reciprocating dome, and time is attached to the lower frame. The power produced can be put away utilizing diverse electrical gear, for example, batteries.

So as to improve the activity of the whole framework, the piezoelectric crystal generates mechanical energy and is added to the energy of the entire production, and can be installed. The output of this system depends on the number of vehicles crossing speed breakers. Its main purpose is to make the use of speed circuit breakers for electricity, everyone now has a car easily.

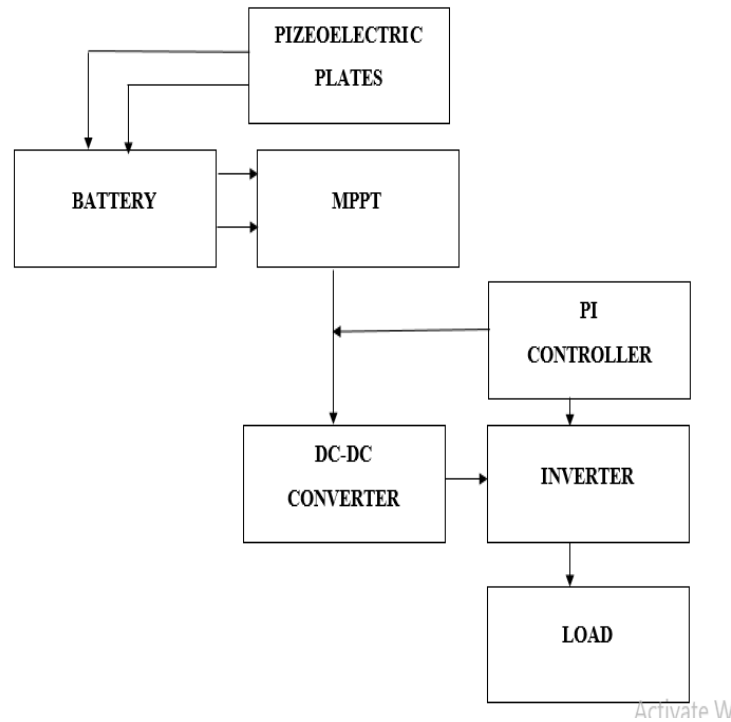


Figure 1: Proposed Block Diagram

3.1 Block diagram explanation

The method uses a piezoelectric transducer as input power to store it and store it in the battery. The output of the converter is provided to the battery as a 12V battery, and its output is provided to the inverter. An independent system that outputs power or a device that converts DC power to AC or supplies power. The mechanical weight of the vehicle is applied to the piezoelectric precious stone, which has the trademark that the weight is changed over into AC electrical yield. Finally, the inverter converts to the voltage on the consumer's load. In addition, compensation is based on data analysis. The system effectively transmits high-performance power without any loss.

IV.INVERTER

Inverter can be worked as an independent gadget for applications, for example, photovoltaic or reinforcement power sources with discrete battery-powered batteries. There are various sorts of inverters dependent on the state of the exchanging waveform. These have diverse execution geographies, focal points and weaknesses. The inverter will be provided with AC voltage from a DC power gracefully, and it is valuable for electronic and electrical hardware with an evaluated AC power flexibly voltage.

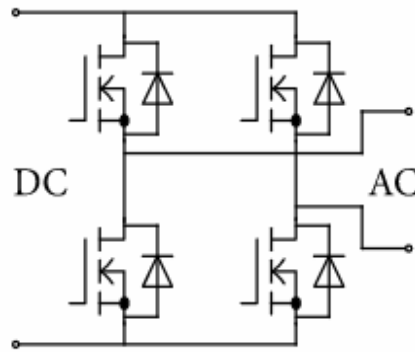


Figure 2: Basic H – Bridge Inverter

DC-DC converter

Combination of the DC/DC converter and the AC/DC converter allows us to use transmission line that can transmit power is more efficiently than the AC output power in the grid. Someone has done.

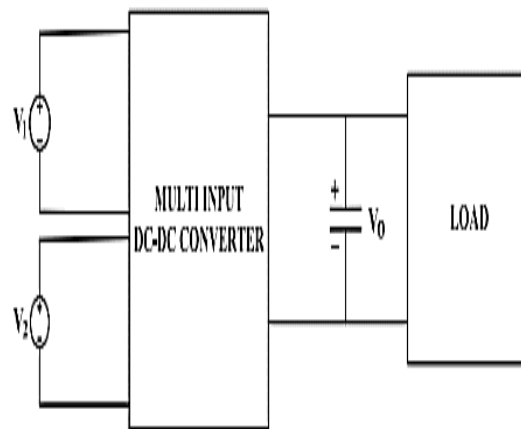


Figure 3: Multiple DC-DC Converters

Circuit diagram

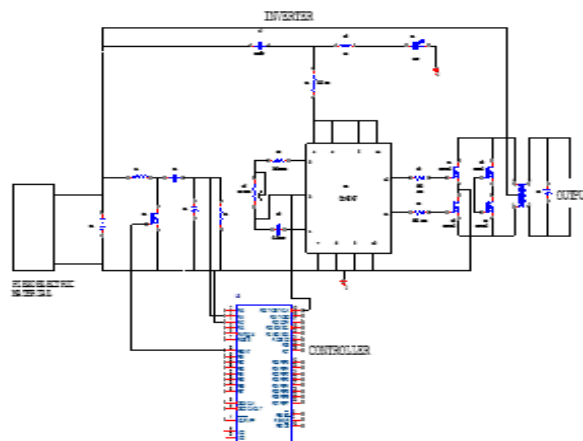


Figure 4: Circuit Diagram

- The application of mechanical energy to the crystal is called the positive piezoelectric effect, in this *recommended* way of working.
- The *piezoelectric* crystal is placed between two metal plates. Mechanical pressure is then applied to the material by the metal plate
- The inverter circuit obtains the alternating current (AC) output from the battery power supply, but since the battery *requires* a constant DC power source to obtain charge, all inverter circuits have a rectifier and charger section. Set.
- In this way to provide AC input power to these circuits, then only the AC we can output from the inverter circuit.
- Current high-speed speed breaker technology adopts any spring technology or piezoelectric material that converts mechanical *power* into electrical energy. These two concepts of our technology application.

4.1 Hardware model

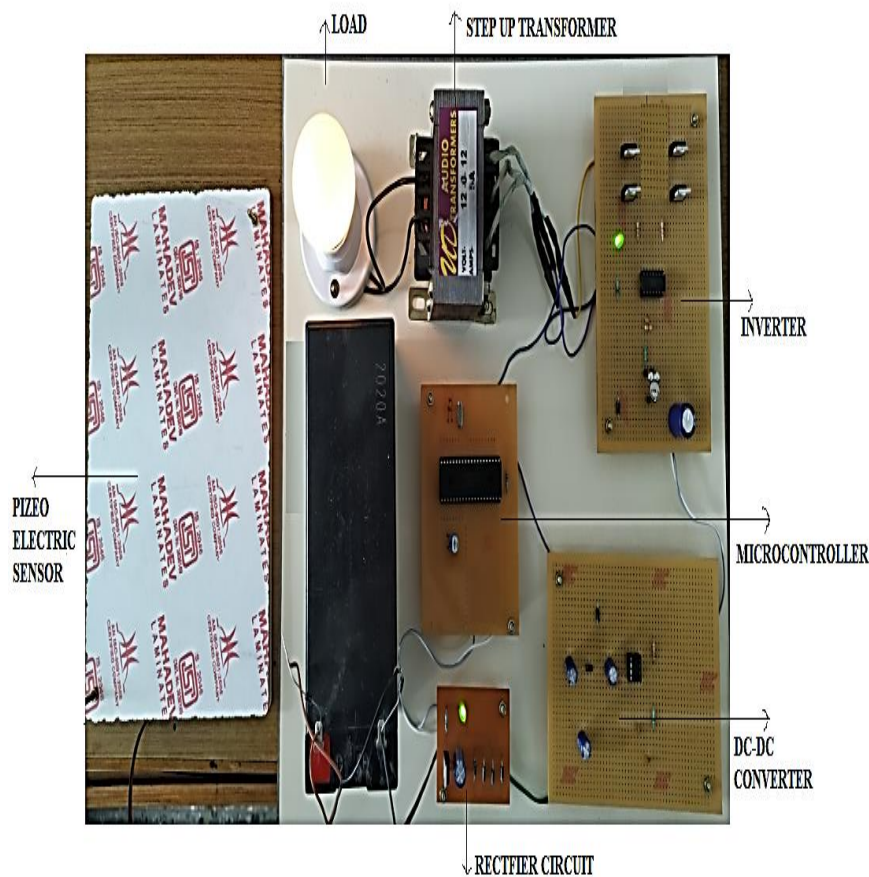


Figure 5: Hardware Model for the Proposed System

- Piezoelectric materials convert the pressure applied to electrical energy. The source of pressure is the weight of moving vehicles or pedestrians.
- The output of piezoelectric products is not stable. Therefore, the bridge circuit is used to convert the variable voltage into a linear voltage.
- AC ripple filter with more ripples Reuse output filter. The output power of a single piezoelectric sensor is very low, so many combinations.
- We tested two possible connection methods: parallel and continuous. Parallel display shows no significant increase in voltage output.
- By containing series, the additional piezoelectric film will cause voltage output, which is not a linearly proportional increase.

- Therefore, the two parallel and series methods are used here to generate voltage output at high current density.
- The inverter is associated with the battery to give the capacity of the associated AC load. Use a crystal oscillator for microcontroller operation.

4.2 Hardware specification

HARDWARE	SPECIFICATION	INPUT RANGES	OUTPUT RANGES
Piezoelectric Sensor	Input power	Impedance: $\leq 500\Omega$	Voltage: $\leq 30V_{p-p}$
Microcontroller	PIC (16F877A)	5V DC	5V DC
Battery	Input power	12V DC	12V DC
DC-DC converter	Input power	12V DC	24V DC
Inverter	Output power	24V DC	24V AC
Transformer	step-up	24V AC	230V AC
Load	Load	230V	2A

V. RESULT AND DISCUSSION

The voltage generated at different load Conditions are observed and readings are tabulated as shown below, these are the results under different loads and speeds, testing is allowed. This When it comes to capacity efficiency can reach significant in addition, the project's capabilities. Power generation frequent increase when load or car More than pass it. Considering the steps of a 1 Kg weighted the average calculation and so to increase 12 V in battery total steps needed. As in this method will implement our method in a power generating source.

5.1 Tabulation of load value with converting voltage

S.NO	Load(Kg)	VOLTAGE
1	1 Kg	4.4 V
2	2 Kg	6 V
3	5 Kg	12V

5.2 Advantages

- High efficiency techniques.
- Free from all types of pollutions.
- It is economical and easy to install.
- The maintenance cost is low.

5.3 Application

- The vitality created utilizing a speed breaker system can be utilized to store in batteries and can be utilized separated for different purposes.
- The work fundamentally means to create free power with no fuel cost, no contamination and with a base prerequisite of space.

VI. CONCLUSION

The system is an echo-type and traditional power generation and practical technology. High-speed circuit breakers should not use a lot of kinetic energy in their high-speed circuit breakers. The lost constant energy, lost on a constant basis, can now be felt through greening and energy. The stored electricity can be used for other purposes. It is best to save some useful work and completely waste energy and other energy resources. This application can help the Industrial and renewable sources and purposes and use wasted energy for other purposes. After some changes in the design scheme, the efficiency can be improved by increasing the overall system efficiency of the generator.

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