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Report : Getting KWH From Pascal and Hertz

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ABSTRACT: By applying some pressure or force, this power generator offers a free power source. The piezoelectric sensor is used by this gadget to produce power. The sensor converts changes in force, tension, acceleration, or pressure into an electrical charge. This piezoelectric For storage, the sensor must be converted to DC voltage. There are other places where pressure and vibration are produced (such as bus stations, platforms, and temples) where this gadget can be used. This is the next power generator that will be installed as scheduled.

KEYWORDS: (footstep, pressure, machine, vibration, piezoelectric sensor, electrical energy)

I. INTRODUCTION

Getting KWH from Pascal And Hertz is simply means that generating the electricity from Pressure applying on surface and waste vibration of machines by using the piezoelectric sensor's And using the generated electricity for battery charging purpose . We can also use Getting KWH From Pascal and Hertz as a energy harvesting method . In today's world everything became digital, any digital device requires dc power to work On. Some uses battery and some uses power supply. But there are some renewable resources. Available on this world like solar, wind, hydropower. In this way another power generator has Come, but not yet known to everyone. That is piezoelectric power generator. Man has needed and Used energy at an increasing rate for the sustenance and well-being since time immemorial. Due To this a lot of energy resources have been exhausted and wasted. Proposal for the utilization of Waste energy of foot power with human locomotion is very much relevant and important for Highly populated countries like India where the railway station, temples etc., are overcrowded all Round the clock. When the flooring is engineered with piezo electric technology, the electrical Energy produced by the pressure is captured by floor sensors and converted to an electrical Charge by piezo transducers, then stored and used as a power source. And this power source has Many applications as in agriculture, home application and street lighting and as energy source for Sensors in remote locations. This paper is all about generating electricity when people walk on The Floor. Think about the forces you exert which is wasted when a person walks. The idea is to Convert the weight energy to electrical energy The Power generating floor intends to trans- late The kinetic energy to the electrical power. Energy Crisis is the main issue of world these days. The motto of this research work is to face this crisis somehow. Though it won't meet the Requirement of electricity but as a matter of fact if we are able to design a power generating floor That can produce 100W on just 12 steps, then for 120 steps we can produce 1000 Watt and if we Install such type of 100 floors with this system then it can produce 1MegaWatt. Which itself is An achievement to make it significant. The proposed system works as a medium to generate power using force. This project is Very useful in public places. So, these systems are placed in public places where people walk and They have to travel on this system to get through the entrance or exists. Then, these systems may Generate voltage on each and every step of a foot

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II. LITERATURE REVIEW

1. **Haitong Lianga B , Guangbo Haoa. B, Oskar Z. Olszewski A. 2021**

By using the piezoelectric effect to collect energy from ambient vibrations and power electrical devices, piezoelectric energy harvesters (PEHs) contribute to the development of a smarter world. Piezoelectric materials are typically linked to mechanical structures (such as flexible beams) that can deform owing to mechanical vibration and cause strain in the piezoelectric material in order to permit the piezoelectric effect. Compliant Mechanisms (CM) are the mechanical framework used by natural systems to gather energy. Many different structural solutions have been put forth with the goal of increasing PEHs' operational frequency range and energy output. A thorough analysis of the materials and structural solutions currently in use is required to advance PEHs. According to structural characteristics of current PEHs From the aspect of CMs, designs in state of the art are Analysed and categorized into five configurations, Mono-stable, multi-stable, multi-degrees-of-freedom, frequency up-conversion and stress optimization. For each configuration, working principles and compatibilities with miniaturization to MEMS scale are Analysed and assessed. Additionally, several CMs are first proposed for PEHs in different configurations as Inspirations and references to prompt the development of PEHs. Piezoelectric materials are also important Factors in enhancing the energy harvesting performance. Characters of several widely adopted piezo materials are summarized and compared. The metric of Normalized Power Density (NPD) is introduced To compare and assess the energy generation capability of PEHs with several widely-used piezoelectric Materials and in different scales. A NPD-Volume graph is first presented based on the data collected in Literature.

2. **A D Rincon-Quintero, C L Sandoval-Rodriguez, N D Zanabria-Ortigoza1, C G Cardenas-Arias, J G Ascanio-Villabona and M A Durán-Sarmiento. 2020**

Piezoelectricity comes as a principle of transformation of mechanical energy into electrical Energy, it is limited in terms of investment, time and research, due to this fact, the need arises to be Able to innovate with data collection on the most used models to collect and generate electrical Energy. In this research, the literature regarding the generation and collection of electrical energy Using piezoelectric materials was analyzed, from this analysis, fifty innovative articles were Determined in the last three years, which were reflected in a data matrix, in which It presents the Generation and collection element, the applications, and shows the performance in terms of power or Voltage that the prototypes supply. With the results of the table, a condensed panorama of current Data is obtained, about the most used and outstanding of this form of little-used energy, but which is A competent and efficient alternative for the generation of electricity.

3. **Anwesa Mohanty, Suraj Parida, Rabindra Kumar Behera and Tarapada Roy 2019**

This study is based on energy harvesting from vibration and deals with the comparison of different techniques. In the present Scenario, energy harvesting has drawn the attention of researchers due to a rapid increase in the use of wireless and small-scale Devices. So, there is a huge thirst among scientists to develop permanent portable power sources. In the surroundings, a lot of Unutilized energy is wasted which can be collected and used for power generation. Research works have been extensively carried Out to develop energy harvesting devices catering to the increasing needs of being efficient and economical. Effective energy Harvesting mainly depends on the design of the transducer. Different types of design techniques, material properties, and availability Of energy harvesters are reviewed in this paper. The paper aims to explore the advantages and limitations of different energy Harvesting principles, advances, and findings of the recent past. This study also discusses some of the key ideas for the enhancement Of power output. This paper provides a broad view of the energy harvesting system to the learners, which will facilitate them to Design more efficient energy harvesting device.

4. **Lumbumba Taty-Etienne Nyamayoka, Lijun Zhang and Xiaohua Xia . 2018**

Utilising the movement of automobiles to generate clean, sustainable electrical energy that may be utilised to power street lighting is an appealing application of energy harvesting technology. The viability of producing electricity using piezoelectric materials placed in a highway's asphalt layer is examined in this work. Due to its heavy traffic, the Pumulani Plaza tollgate station on the N1 highway in Pretoria was chosen for this investigation. The results are shown numerically. The anticipated daily energy output is 1.576587613 kWh, which is sufficient to power 250 Watt high pressure sodium street lights

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5. **Lumbumba Taty- Etienne Nyamayoka , Gloria Adedayo Adewumi , Freddie Liswaniso Inambao. 2017**

The need for low-power electronics that don't require an external power source and wireless sensing devices has sparked a lot of interest in the idea of energy harvesting in the surrounding environment. It is possible to transform mechanical energy into electrical energy that may be stored and utilised to power other devices by harvesting energy through vibration using piezoelectric materials. The use of piezoelectric materials to convert mechanical energy from vibrations into electrical energy is an interesting and quickly expanding field of study, with a growing number of applications becoming available on a regular basis. This paper's objective is to create a complete prototype generator that can capture vibration energy and use power output to convert it to electrical energy without the need for tip mass. The outcomes of the trial led to a power optimisation from vibration and pressure.

6. **Raghu Chandra Garimella, Dr. V. R. Sastry, Mohammad Shoeb Mohiuddin . 2015**

These days, the generation of electrical energy is becoming an increasingly important component of the power system due to the increasing demands placed on the Electrical Distribution System by the growing population. As a result, everyone was aware that there are numerous ways to generate power utilising various strategies. Different technologies for electrical energy generation were invented by many electrical professionals; these devices are often fuel-consuming devices. Here is a novel method for producing electricity from undesired ground vibrations that could harm surrounding structures or result in noise pollution: piezo sensors. Here, the frequency of various needless vibrations will be translated into Alternating Supply with the aid of several vibratory plates, also known as piezo sensors;. Thus, without any Economic Fuel consumption the Electrical Power simply can be generated by utilizing the unwanted vibrations.

❖ OBJECTIVE:-

- Generation of electrical energy using sound and vibration energy.
- To develop a piezoelectric energy harvesting system from sound and vibration using piezoelectric sensors.
- Store and forwarding electrical energy for efficient usage of noise using storage batteries.
- To perform the experiment for collecting data of vibrations produced at different places on road.
- To collect data of electricity consumption by the street light per day.
- To study the sources and amount of electricity used for street lights and traffic signal
- To work on making the piezoelectric model economical than that of the solar model.

❖ ADVANTAGES :-

- No requirement of fuel
- Pollution free
- Eco-friendly
- Save energy
- No maintenance required
- Low cost
- Portable
- Constant output

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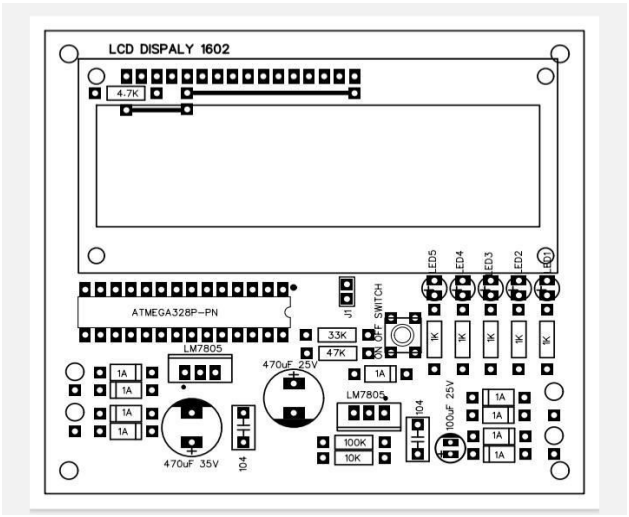
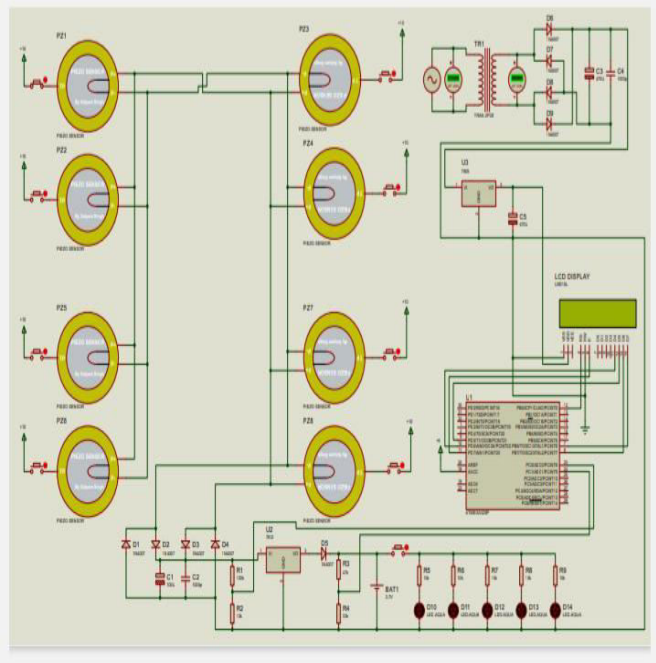
❖ **PCB DIAGRAM :-**



❖ **CIRCUIT DIAGRAM:-**



❖ **DESIGNATION:-**

For getting energy from a pressure of feet steps and a waste vibration of a electrical machine i.e. transformers, stone crushers, and also the vibration from railway tracks and railway engine the technology used is known as piezoelectric sensor and assembly.

The technology consist of no of piezoelectric sensor connected in series a electronic circuit with voltage stabilizing unit, voltage dividing unit, a power storage device to store the energy generated, battery potential measurement device, display for indication and a auxiliary power to run the electronic circuit .

Firstly select the highly populated area where there is a continuous movement of people or a availability of machines that are vibrating most so that the much more energy will save as an output.

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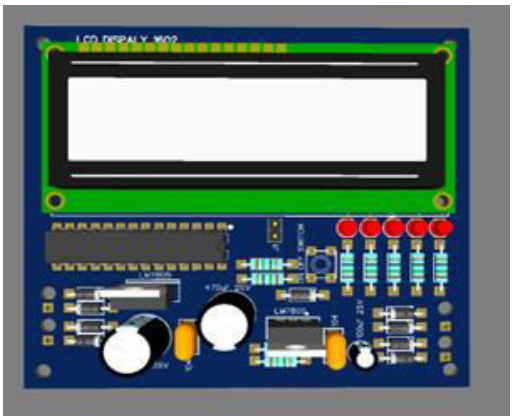
Spread the piezoelectric sensors over a floor or at the bottom of the vibrating machine such that the pressure is sensed by the piezo sensors.
As soon as the pressure or vibration is applied on a sensor, the sencor converts the physical pressure applied into equivalent electric potential (AC).
The equivalent potential generated by sencors is then fed to a rectifier unit for the conversion because a battery needs DC voltage for charging .
A rectifier unit converts AC into DC then the DC output from rectifier is forwarded by two ways .
In first way it is given to the voltage stabilizing unit through capacitor for constant and pure DC voltage. And then send to the power storage device that is battery which stores the energy
In second way the output from rectifier is given to the voltage sencors for measurement purpose
The voltage sencors is coupled with the 16×2 LCD display so the current position of battery can be easily observed by observer .
The charging time of battery is depends upon the output generated by the sencors .And the output generated by sencors is proportional to the steps or the pressure applying on it . So we can say that as more the pressure lower the battery charging time and more the energy secured .

- **CIRCUIT PHOTO :-**



- **APPLICATIONS**

1.To Light The Street Lights On The Roads
This can be accomplished by incorporating tiny piezoelectric material crystals into the roadways. when such crystals are passed over by cars. These crystals detect the vibrations they produce, which causes them to distort and then transform into electricity.

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2. Using On Dance Floors

Many countries have started using piezoelectric crystals on The dance floors. The vibrations caused by the dancer's foot Produces mechanical strain and thereby producing Electricity.

3.Airport Runways :-

Airport runways can be coated with specific materials that, when swift aircraft fly over them, detect the movement and adjust their shape to generate electrical energy.

4.Embedding It Under The Floors

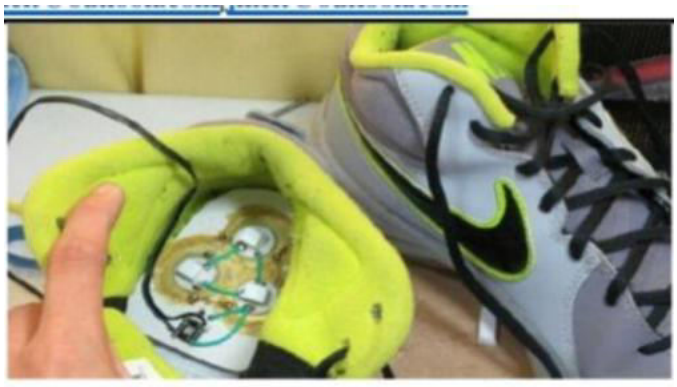
In order to capture and transform the vibrations caused by people walking about in busy places like airports, train stations, and shopping centres, piezoelectric crystals can be placed beneath the flooring of these establishments. Japan has already initiated trials of the use of piezoelectric effect for energy generation at its two busiest stations in the capital by installing special flooring tiles. In front of ticket turnstiles, tiles are laid. Consequently, each time a passenger treads on a mat, a tiny vibration is produced that can be stored as energy.

5.At Railway Tracks :-

Piezoelectricity has its application in the railway tracks. When a train passes over the track the vibrations produced by the moving train can be sensed and the material produces voltage.

6.Using It inside the footwear

In order to monitor vibrations during walking, running, or jumping and turn them into electricity, piezoelectric crystals can be incorporated into our footwear. We can therefore produce enough energy to run devices like MP3 players and cell phones.



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III. RESULTS

A piezoelectric generator usually produces small amounts of power, which vary according to the frequency and amplitude of the mechanical vibrations. Furthermore, the lifespan of piezoelectric generators is limited, and their efficiency may decrease with time. In order to comprehend how the output of the piezoelectric material under discussion relates to the different pressures and strains applied to it, they were researched. The voltages created across the piezoelectric materials and the current flowing through them are measured, respectively, by voltage metres and current metres. Different voltage readings were recorded in relation to the various observed pressure and strain on the piezoelectric material when these were tested. If this Project is implemented, we will not only be able to solve the energy crisis, but we will also be Weight contributing to the creation of a healthy global environmental change.

IV. CONCLUSIONS

One such cutting-edge technique, which transforms the vibration energy generated by human activity on Earth into useful electrical energy, has the potential to significantly advance the development of traditional energy sources. It is practically always usable, as the circuitry needed is simple and reasonably priced. This method allows the converted electrical energy to be used simultaneously at the energy generation site. Even if there are currently insufficient abilities and knowledge to fully utilise vibrational energy, over time, more and more techniques will be created to extract the most energy possible from this endless source and transform it into electrical Energy harvesting from the embedded piezoelectric generator is an attractive technology that can harness the excess Energy wasted on the highway caused by moving vehicles. From the information collected on the N1 highway at the Pumulani Plaza tollgate station in Pretoria, the potential electrical energy generation was demonstrated and the Numerical results were presented. The energy output of the embedded piezoelectric generator was 1.576587613 kWh Per day, which is quite enough to light 6 high-pressure sodium (HPS) street lights of 250 W. The result of this paper Is a useful guideline for future simulation and for the physical implementation of the system

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