Recent Trends on Renewable Energy (Piezoelectricity)

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Abstract- *Energy harvesting is fascinating area of research now when the whole world is looking for green energy as an Alternative source. This paper describes the design of energy Harvester prototype and the power conditioning circuit. The Optimization of extracted power out of the piezoelectric tile has been presented. The generation of electric energy when some load Is applied on the sensors either in the form of direct strain or Ambient vibration depends upon various factors such as number Of piezoelectric transducers, electromechanical coupling Coefficient of the piezoelectric sensors, amount of load applied, And also on the scheme of arrangement. Energy harvester floor Tile has been designed with very inferior quality piezoelectric Diaphragms which are used in buzzers. An efficient way has been*

Presented to capture the generated energy via dedicated IC and Boost it by a converter to get regulated output for charging the Batteries of smart phones. The complete charge cycle has been studied for the developed system. The simulation and Experimental studies have been successfully carried out. The Model design and testing was purely for studying the energy Generation and capturing phenomenon in an efficient manner. It can be implemented to generate large power by suitably considering the several factors mentioned above and implementing it on the large scale.

Keywords- Energy harvesting, piezoelectric sensors, power Conditioning, Storage device, Boost converter.

I. INTRODUCTION

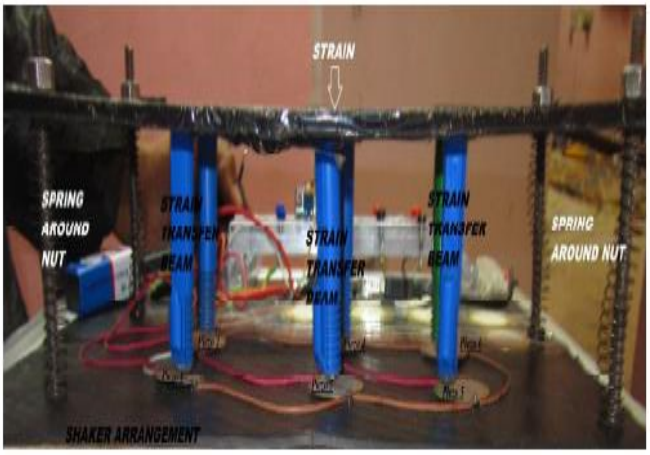
Piezoelectricity was discovered by curie brothers in 1880in short piezoelectric energy is nothing but .It is the electric field generation from applied pressure.It is observed in crystalline materials with no inversion symmetry.The materials exhibiting the direct piezoelectricity. Now a days we all know the market of electrical and electronic appliances is increased. We invented the electrical vehicles because there is increasing in import fossil fuels from other countries like Iraq and Iran. But the ores of fossil fuels are getting decreasing day by day because of excess use of it These fossil fuels are nonrenewable that's why the prices of fuels like petrol and diesel are touching sky now days. And one more thing about using vehicles or appliances running on fossil fuels is pollution it emits CARBON MONOXIDE OR NITROUS OXIDE gaseous which are hazardous for human being, plants as well as animal and one more important thing is pollution makes Ozone layer very thin. Because of it One day we will face to excess heat getting from sun. These things will be directly effect on skin of every living things. That's why we are finding ways of using renewable energy resources like solar energy, windmill. But every energy creation has some limitations. But we are making project on the technology having no limits for energy creation that is limitless thing. That energy named is piezoelectric energy. We all knows one thing ENERGY NEITHER CREATED NOR DISTROYED ITS JUST TRANFERRED ONE FORM TO ANOTHER**.**

So piezoelectric energy is a phenomenon which means that, there is a coupling between electrical and mechanical state of material. When a piece of piezoelectric material is mechanically deformed for example compressed, a current will flow and charge its faces. Here the main work is about piezoelectric crystal because it get deformed by pressure. And the mechanical stress get produced and then electric energy produced in it, and that electricity we store in generator. And this type of electric energy known as piezoelectric energy. Lithium sulphate, Zinc oxide, Lead titanate, Sodium tungstate, Barium titanate

II. METHODOLOGY

We are introducing this project of piezoelectric energy creation and its real life application for getting rid of convenient type of energy creation and its great disadvantage of polluting our environment.

Hydroelectric power production plants:



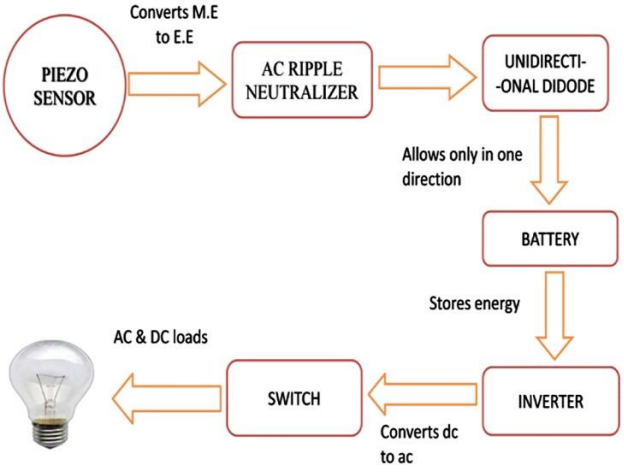
Piezoelectric energy production model

By using this project or circuit we are going to create piezoelectric energy by using the unwanted vibrations in floor. Produced energy is 100% green energy.

III. ARCHITECTURE OF THE DEVICE

Piezoelectric materialsare capable of Transforming one form of mechanical stress to useful electric energy. This property allows opportunities for implementing renewable and sustainable energy through power harvesting and self-sustained smart sensing in building.

Block Diagram



IV. DESCRIPTION OF HARDWARE

1. Piezoelectric crystals:

The important thing about piezoelectric crystal is every piezoelectric crystals are elastic in nature. If piezo electric crystal get deflected only by 10% by its physical state then after relaxing it start to emitting electricity.

And this type of electric energy known as piezoelectric energy. And these crystal also known as piezo electric crystals. We can get naturally and artificially piezoelectric crystals, here I have some examples.

Natural piezo electric crystals:

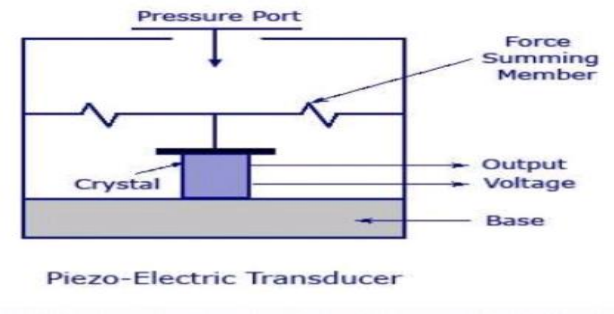
Silk, Dentin, Enamel, Quartz, Tourmaline

Artificial piezo electric crystals:

Lithiumsulphate, Zinc oxide, Leadtitanate, Sodium tungstate, Barium titanate.

2.**Piezoelectric transducer:**

Wecan't use directly piezo electric crystals as charging pad under the footpaths we have to situate the crystals into that device named piezoelectric transducer. Here the faces of piezoelectric material coated with quartzsthin layer of conducting material such as silver. When stress has applied ions in the material movetowards one of the conducting surface while moving away from each other.



3. Battery

Lithium ion battery for storing the piezoelectric energy.

4. Inverter

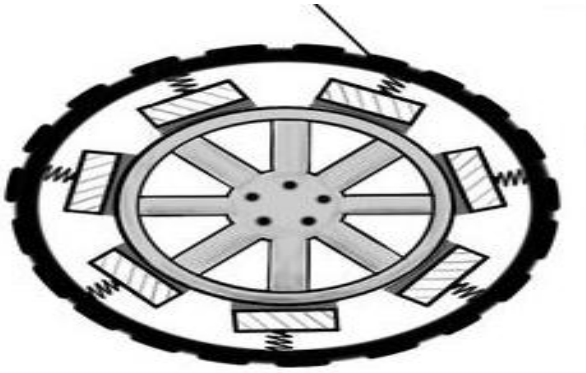
It supply the electric energy when the power supply get cut off or when we need. Inverter takes DC charge from battery and changes into AC current and supply to required appliances.it works correct inversely as rectifier.

V. APPLICATIONS

1. Cars:

: Wecan use that technology in car tyres also from that we will get the vibration and its make energy and directly supply to cars battery

footpath

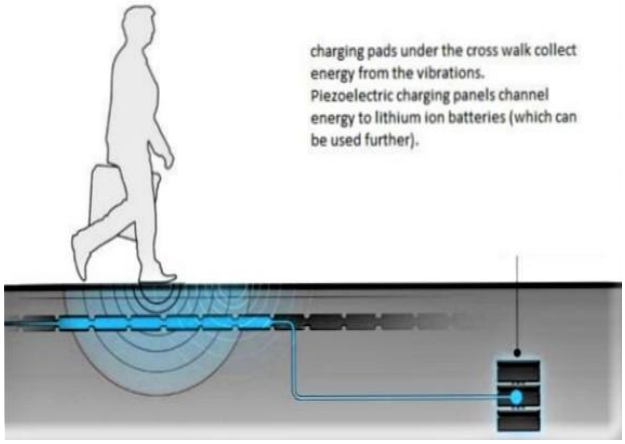


2. Gyms:

We know that 70%of youthjoin gyms for fitness maintaining.so there are too much amount of vibrations and stresses produce on floor or machines like trade mill.We can fix that circuit under the gym floor instead of vibration it will provide us useful energy.

3. Prime application / main moto

We can situate circuit under footpath and upstairs it will use the vibration and stress energy of footsteps to produce energy.



Energy producing footpath .

Energy producing upstairs in public places

VI. REAL LIFE WORKING APPLICATIONS IN DIFFERENT COUNTRIES

This energy making footpath application is still working in USA Washington DC. USA is working on making all footpath electricity generating.

Washington D.C Richland

In japan 70% people are using piezo energy making door mattress. Because they believe charity began from home. Then they are going to use this technology by industrial level.

Tokyo funchu

VII. ADVANTAGE

1. This technology is pollution free technology.
2. Very easy
3. For replacement of equipment.
4. There is no need of maintenance or we can say it need negligible maintenance.
5. This circuit is unaffected by external electromagnetic fields.
6. Hence there is no eddy get created.

VIII. CONCLUSION

It can be concluded from the above information that piezo electric energy is a special kind of energy which which creates electric energy with using unwanted vibrations and strains. And in this paper, we demonstrated how the home piezo electric energy is made, discussed about methodology and what its application can be. And in the future, on the new technology can be included which reduces pollution by convenienttype of energy production, which is being researched, we also talked about it. And we've created a model of piezoelectric energy creator (footpath) which is device which is compact in size, low cost, more capacity, long lifethe need of this research paper is to create a device which creates the electricity and stores in generatorsfree a cost

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