

THE CONCEPT OF SELF GENERATION OF ELECTRICITY BY KINETIC TILE

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Abstract:

Nowadays, clean, renewable and environmentally friendly energy generation has always been an issue that needs to be solved. Technologists have created various methods such as solar panels, wind turbine, hydroelectricity and so forth. Harvesting kinetic energies is a sustainable method for generating electricity without depleting natural resources. Furthermore, with the use of Self-Generation of Electricity is an innovative idea, which is to generate electricity from kinetic energy. These tiles use the kinetic energy of a footstep to strain a piezoelectric material. Besides, harvesting electricity these tiles are renewable energy which can light up basic appliances and will contribute to environmental awareness by promoting sustainability and green energy generation.

Keywords:

Kinetic energy; electricity; renewable; piezoelectric

1.0 INTRODUCTION

Nowadays, there are a lot of new innovation in flooring system that include science and technology such as kinetic energy that convert to electricity which it has the capability for a healthier and safer urban space. The flooring of the future by introducing a high technology tile that generates electricity from every step. As people walk down a street, these tiles can constantly generate kinetic energy through the footsteps. These new tiles technology is an innovative approach to sustainability by generating energy from something that most people do every day by walking. Moreover, this technology helps the community by providing an Eco-friendly source of energy that can be interactive with people. It provides enough energy for basic applications and prevents some of the fossil fuels that would be burned and some of the greenhouse gases that would have been released into the atmosphere that could lead to global warming. These tiles could become a great source of renewable energy. The purpose of this investigate is to gain insight on how this energy generating tile can be used as renewable energy and adopting this technology to prevent carbon dioxide entering the atmosphere.

2.0 LITERATURE REVIEW

The concept of self-generation electricity uses the kinetic energy of a footstep to strain a piezoelectric material. According to Beeby S. P, et al (2008), these piezoelectric will produce a voltage, which when integrated into a circuit can be used to produce green electricity.

2.1 Piezoelectric

According to Nia, E. M, et al (2017), the goal in energy harvesting is to enable self-powered electronic devices by scavenging ambient energy for various wireless electronic applications. The methods that are used in energy conversion for transforming mechanical that are mostly vibrational and kinetic energy into electrical energy are the piezoelectric, electromagnetic, electrostatic, magnetostrictive or magnetoelectric (Nia, E. M, et al, 2017). Several review articles stated that piezoelectric energy harvesting remains the most widely researched harvesting method due to its ease of application, high voltage output without requiring post-processing for voltage multiplication or bias input, high-power density that can be used for fabricating devices at different geometric scales.

2.1 Harvesting kinetic energy of body during waking

Recently the study of energy harvesting has gained attention by employing piezoelectric method. Walking is the main motion in normal human lives, hence, is considerable vibration energy for harvesting (Gorlatova, M., et al, 2014). Walking is an economical energy harvesting approach (Donelan, et al, 2009). The idea of harvesting energy from human motion is based on the fact that the amount of energy used by the body per day, is 1.07×10^7 J (Exercise, 2001), an amount equivalent to around 800 AA (2500 mAh) batteries (Riemer, et al, 2011). The main technologies used for harvesting kinetic energy of walking through the floor are based on piezoelectric and electrical induction generators, and electrostatic generators based on electroactive polymers (EAPs) (Riemer, et al, 2011).

The effort in harvesting kinetic energy from human steps in outdoor and indoor areas with high pedestrian traffic resulted in the development of the smart paver tile concept. The harvesting of mechanical vibration or motion energy for enabling self-powered small electronic components (e.g. wireless sensor nodes) has been heavily researched over the past two decades. (K. Cook-Chennault, et al, 2008). The most commonly employed vibration-to-electric energy conversion techniques are piezoelectric, electromagnetic, electrostatic/capacitive, and magnetostriction based methods, among other approaches such as the use of ionic and electronic polymers (N. Elvin & A. Erturk, 2013). Among these various techniques, piezoelectric transduction has received arguably the greatest attention due to the higher power density and ease of application of piezoelectric materials, as well as their mature fabrication techniques at various geometric scales (K. Cook-Chennault, et al, 2008).

3.0 METHODOLOGY

An extensive desk study will be conducted to gather information on project scientific concept. This concept that will be used to generate electricity from kinetic energy electric energy, materials for the tiles that are Eco-friendly and possible various features that can be added by reviewing and examining all the related articles and journal in order to gain in sight about the how self-generation of electricity by kinetic tile can be as one of renewable energy.

In order to gain details information on the innovation product, an experimental method will be conducted in this study. A test sample will be constructed and test to examine the potential materials that are suitable to produce an eco-friendly product. Furthermore, the test sample also will be tested to study how the process of converting from kinetic energy to electric energy in order to make it as a great green energy generation.

4.0 ANALYSIS AND FINDINGS

The analysis of finding will be conducted to compare the performance of the propose innovation product compare to the current product available in the market. The enhancement of propose innovation product will be highlighted in this analysis. As for the top surface of the tile will be mounted with a solar panel that will converts photons from the sun (solar light) into electricity complete with the laminated glass casing that will protect the solar panel from direct footstep while the frames of the tile are made up with recycled cars, bicycle and lorries tires. Furthermore, the materials use is environmentally friendly, as for the use or recycle tires will reduces a tremendous amount of waste in landfills. This innovation is a combination of two renewable energy which can be a great way in generating electricity without depleting natural resources.

5.0 CONCLUSION

“Self-Generation of Electricity by Kinetic Tile” is one of innovation project that could be benefit for all the community as it is use to reduce carbon footprint and to prevent the burned of fossil fuel which will produce harmful gasses that could lead to global warming. As the concept of this tile are using renewable energy which are by involvement of all community by harvesting human power to produce is best practice in order to fulfil the energy demand not only can increase the awareness of people in saving the electricity. Besides that, it can be used to light up all the basic appliances such as LED lighting. These tiles can be used indoors and outdoors in high traffic areas and generate electricity from pedestrian footfall. Moreover, this idea can be implemented in the floors of crowded place such as footpaths, railway platform and so on.

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