IJARSCT
ISSN (Online) 2581-9429
International Journal of Advanced Research in Science, Communication and Technology (IJARSCT)
Volume 2, Issue 8, June 2022
Impact Factor: 6.252

Electricity Generation Using Footstep

Prof. P. D. Gharge[1], Safal Dagade[2], Abhishek Chauthe[3], Fardin Khan[4], Akash Humbade[5]
Assistant Professor, Mechanical Engineering, NBNSSOE, Pune, India[1]
UG Student, Mechanical Engineering, NBNSSOE, Pune, India[2,3,4,5]

Abstract: *Energy is the primary need for survival of all organisms in the universe. Everything that happens in the surrounding is the expression of flow of energy in one of the forms. But in this fast-moving world, the population is increasing day by day and the conventional energy sources are lessening. The extensive usage of energy has resulted in an energy crisis over the last few years. Therefore, to overcome this problem we need to implement the techniques of optimal utilization of conventional sources for conservation of energy. This project includes how to utilize the energy when a person moves on the tiles. Energy is the main concern of the present day. The production of electric current in a huge amount is the need of today's world. There are different methods used for the production of energy like conventional and non-conventional methods. Here we have represented the non-conventional method for the production of electric current. This non-conventional method is "Footstep power generation Mechanism" where the energy is produced by moving the human on a moving plate in which rack and pinion gear are used to convert the physical energy into mechanical energy and further, they have converted into electric energy by using the dynamo. By using this method, we have produced the energy to light up the bulb. We also represent the simulation of the footstep power generator using the ansys 17.0 software. By the results it seems we produce the power. This project is cost effective and easy to install in a populated area like railway station, bus stands and in shopping malls. Our project is cost effective and easy to implement.*

Keywords: Energy, Footstep Power Generation Mechanism, ANSYS, etc.

I. INTRODUCTION

For an alternate method to generate electricity there are number of methods by which electricity can be produced, out if such methods footstep energy generation can be an effective method to generate electricity. Walking is the most common activity in human life. When a person walks, he loses energy to the road surface in the form of impact, vibration, sound etc., due to the transfer of his weight on the road surface, through foot falls on the ground during every step. This energy can be tapped and converted in the usable form such as in electrical form. This device, if embedded in the footpath, can convert foot impact energy into electrical form.

Human-powered transport has been in existence since time immemorial in the form of walking, running and swimming. However modern technology has led to machines to enhance the use of human-power in more efficient manner. In this context, pedal power is an excellent source of energy and has been in use since the nineteenth century making use of the most powerful muscles in the body. Ninety-five percent of the exertion put into pedal power is converted into energy.

Pedal power is converted into energy. Pedal power can be applied to a wide range of jobs and is a simple, cheap, and convenient source of energy. However, human kinetic energy can be useful in a number of ways but it can also be used to generate electricity based on different approaches and many organizations are already implementing human powered technologies to generate electricity to power small electronic appliances.

IJARSCT
ISSN (Online) 2581-9429
International Journal of Advanced Research in Science, Communication and Technology (IJARSCT)
Volume 2, Issue 8, June 2022
Impact Factor: 6.252

II. OBJECTIVES

- To produce electric energy from waste energy.
- Power generation from the mechanical energy.
- Converting the mechanical energy into electrical energy.
- To study the different type of material and its behaviour

III. LITERATURE REVIEW

a) Electric generation using footstep

Author Name: -*Iqbal Mahmud ZHANG*

This paper focuses on designing a setup that leads to the generation of electrical energy which is going to waste when humans are walking. Footsteps are an untapped natural resource. This generated energy is, however, cost effective and nonhazardous for human. Electrical energy can be produced by converting mechanical energy using footsteps. Generating the electric power through the fabrication of footstep arrangement by a prototype comprises of a pipe, nozzle, unidirectional valve, water reservoir, turbine, and DC motor. Whenever pressure is exerted on the reservoir, water flows through the nozzle into the turbine and generates electrical energy.

This energy is stored in the battery. This project will reduce the global warming and load shedding in a much cleaner cost-effective way. Since this project is related directly to the human movement, the weight of the setup is a crucial factor.

b) Foot Step Power generation:

Author Name: Rajeev Ranjan Tiwari, Rahul Bansal, Quamruzzaman, Pushyamitra Gupta, Dr. Sarnendu Paul

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 by. The idea is to convert the weight energy to electrical energy The Power generating floor intends to translate 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.

c) Design and fabrication of mechanical footstep power generator:

Author Name: - *Shivendra Nandan and Rishikesh Trivedi*

Nowadays energy and power are the one of the basic needs in this modern world. Energy demand is increasing day by day. On the other hand, the many energy resources are getting exhausted and wasted. Proposal for utilization of waste energy of foot power with human locomotion is very relevant in populated countries like India where roads, railway stations, bus stands, temples, etc. are overcrowded and millions of people move around. This whole energy is wasted. If this energy made possible for utilization it will be a great invention. In this project we are converting non-conventional from just walking foot step into electrical energy. This project uses simple drive mechanism such as rack and pinion assembly. The control mechanism carries the rack & pinion, and D.C generator to output.

In this project we are generating electrical power as nonconventional method by simply walking or running on the footsteps. Non-conventional energy system is very essential at this time to our nation. Non-conventional energy using foot step needs no fuel input power to generate the electrical power. In this project the simple drive mechanism such as rack and pinion assembly and chain drive mechanism are used for generating power by utilization of force which is obtained during the walking on steps is converted in to electrical energy with the help of mechanical L9systems.

IJARSCT
ISSN (Online) 2581-9429
International Journal of Advanced Research in Science, Communication and Technology (IJARSCT)
Volume 2, Issue 8, June 2022
Impact Factor: 6.252

The generated power is stored by means of battery and this is used for activating the connected loads. This is one of the compact and efficient systems for generating electricity which can be easily installed in many regions.

d) Design and Analysis of Power Generating Tiles Design and Dynamic

Author Name: -*Siddesh Siddappa D, Shaikh Aatif Ahmed*
T. Raja Santhosh Kumar, Suresh Babu Koppula, Cr. Prakash, D.V.Srikanth

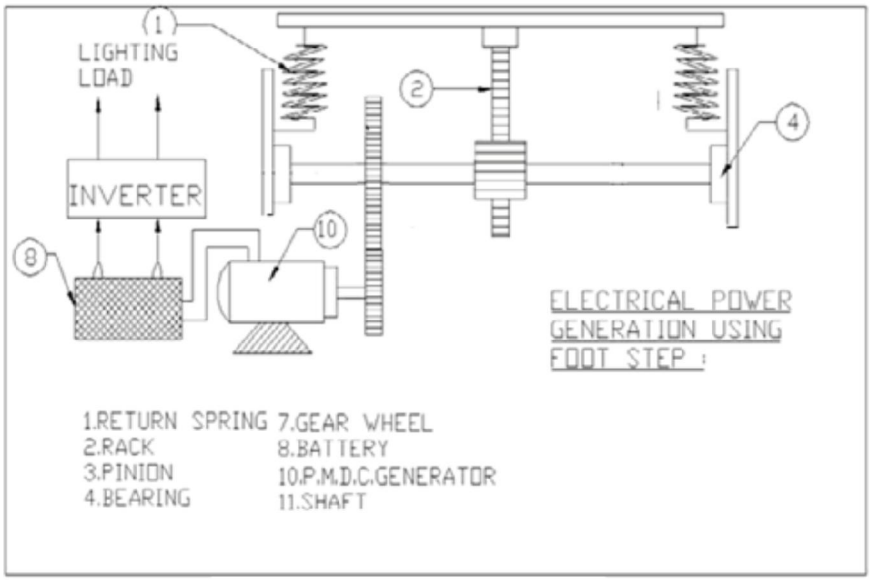
A flywheel is an inertial energy-storage device. In this paper totally all dimensions have found theoretically for required power 20 KW and it is rotating from 400 RPM to 410 RPM. Fly wheel are modelled in PRO/E 5.0 software and this is analyzed with considering at different time interval and different loading conditions have found from theoretically. Countering the requirement of smoothing out the large oscillations in velocity during the cycle of a mechanism system, a flywheel is designed and analyzed. In that four-time intervals are considered like motion less, starting position, changing speed and constant speed.

e) Tactile Sensor from Self-Chargeable Piezoelectric Supercapacitor

Author Name: -Ning Wang, Wei Dou, Chao Jiang, Saifei Haoc, Dan Zhoua, Xiaomin Huang, Xia Cao

Tactile sensors that can simultaneously detect temperature and force are highly desirable for applications in health monitoring and human-machine interface. Rendering such devices, the ability to harness energy from ambient environment would make them more sustainable wearable, and even implantable. Herein, a self-powered flexible tactile sensor is developed on the base of piezoelectrically active solid supercapacitors. By conformally intercalating solid electrolyte into the piezoelectric separator, the as-designed flexible piezoelectrical supercapacitor can not only convert environmental mechanical energy into electricity and charge itself, but also detect static pressure, dynamic pressure, acceleration and even temperature with high sensitivity and wide linear range. These concomitant intelligences make the piezoelectric supercapacitor ideal platform for developing self-powered multifunctional wearable devices.

IV. SYSTEM ARCHITECTURE



BLOCK DIAGRAM

IJARSCT
ISSN (Online) 2581-9429
International Journal of Advanced Research in Science, Communication and Technology (IJARSCT)
Volume 2, Issue 8, June 2022
Impact Factor: 6.252

V. CONCLUSION

We have successfully designed and done the material selection for this project. For that purpose, we have used the CATIA V5 R20 software. As total deformation and directional deformation (in vertical direction) is very minimal, the design for Electricity Generation Footstep (Rack and pinion) for Power Generation Unit is safe when 6 steps to generate 1 V of current.

ACKNOWLEDGMENT

It is indeed a great pleasure and moment of immense satisfaction for we to present a project report on "Power Generation Using Foot Step" amongst a wide panorama that provided us inspiring guidance and encouragement, we take the opportunity to thanks to thanks those who gave us their indebted assistance.

REFERENCES

[1] Ravikant K. Nanwatkar, Dr. Deepak S. Watvisave, "Analysis and Simulation of Hybrid Energy Storage System for Electric Vehicle" in July 2021| IJIRT | Volume 8 Issue 2 | ISSN: 2349-6002.
[2] "Electrical Power Generation Using Footsteps" by Iqbal Mahmud.
[3] "Foot Step Power Generation" By Rajeev Ranjan Tiwari, Rahul Bansal, Quamruzzaman, Pushyamitra Gupta, Dr. Sarnendu Paul.
[4] "DESIGN AND FABRICATION OF MECHANICAL FOOTSTEP POWER GENERATOR" by Shivendra Nandan and Rishikesh Trivedi.
[5] "Design and Analysis of Power Generating Tiles" by Siddesh Siddappa D, Shaikh Aatif Ahmed; Thakur College of Engineering and Technology, Kandivali Mumbai, 400101
[6] "Tactile Sensor from Self-Chargeable Piezoelectric Supercapacitor" by Ning Wang, a, Wei Dou, Chao Jiang, Saifei Haoc, Dan Zhoua, Xiaomin Huang a, Xia Cao; Center for Green Innovation, School of Mathematics and Physics, University of Science and Technology Beijing, Beijing 100083, China.
[7] "Design and Analysis of Power Generating Tiles" by Siddesh Siddappa D, Shaikh Aatif Ahmed; Thakur College of Engineering and Technology, Kandivali Mumbai, 400101
[8] Electricity Generation from Speed Breakers. International Journal of Electrical and Electronics Research, 135-139. Abhishek Gupta, N. M. (2016).
[9] Using speed bump for power generation –Experimental study. Mohamad Ramadan, M. K. (2015).
[10] International Journal of Engineering Applied Sciences and Technology, Muhammad Asad Saeed, Muhammad Hamza Tahir, Nouman Zaffar, Arslan Malik (2019)
[11] Bhosale, P. P. A. et al. (2017), Design of Foot Step Power Energy Generation Machine, 4(June), pp. 943–948.
[12] Dhanalakshmi, G. et al. (2017), Footstep Power Generation System, International Journal of Engineering and Computer Science. doi:10.18535/ijecs/v6i4.38.
[13] Gothane, A. V and Gosavi, A. R. (2018) „Foot step power generation", pp. 1582–1584.
[14] Janugade, S. V, Yadav, G. A. and Mahadik, O. R. (2017), Foot Steps Power Generation using Mechanical System, 4(1), pp. 55–59. doi:10.17148/IARJSET/NCDMETE.2017.15.
[15] Journal, D. et al. (2017) „Footstep Power Generation", 2(7), pp. 8–13.
[16] Journal, I., Technology, E. R. and Volume, S. (2016) „Power Generation by Foot Steps Using Rack", International Journal of Engineering.