# HUMAN INTERFACED AMBIENT LIGHTING SYSTEM FOR PEDESTRIAL WALK WAYS

**A MINI PROJECT REPORT**

***Submitted by***


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***In partial fulfillment for the award of the degree of***

**BACHELOR OF ENGINEERING**

***in***

**ELECTRICAL AND ELECTRONICS ENGINEERING**



**K. RAMAKRISHNAN COLLEGE OF ENGINEERING**

**TRICHY**

**(AUTONOMOUS)**


**ANNA UNIVERSITY: CHENNAI 600 025**

**JUNE 2022**

## INSTITUTE VISION AND MISSION

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"To achieve a prominent position among the top technical institutions"

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• To bestow standard technical education par excellence through state of the art infrastructure, competent faculty and high ethical standards.

• To nurture research and entrepreneurial skills among students in cutting−edge technologies.

• To provide education for developing high-quality professionals to transform the society.

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**PO10:** Communication: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.

**PO11:** Project management and finance: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.

**PO12:** Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

**COURSE OUTCOMES:**

| COURSE CODE | BLOOMS LEVEL | DESCRIPTION | PO(1..12) &PSO(1..2) MAPPING |
|---|---|---|---|
| C317.1 | K3 | To expose the students to apply knowledge to solve problems. | PO1 & PSO1, PSO2 |
| C317.2 | K3 | To expose the students to find solutions to complex problems, issues for public and environmental concerns. | PO3&PO7,PSO1, PSO 2 |
| C317.3 | K3 | To expose the students to give conclusion, analyses methods for various scenarios. | PO4 & PSO1, PSO 2 |
| C317.4 | K2 | To expose the students to communicate efficiently their technical knowledge and concepts. | PO9, PO10 & PSO2 |
| C317.5 | K2 | To expose the students to self-learning and long-term learning process | PO12&PSO1 |

**COURSE OUTCOMES VS POS MAPPING** ( DETAILED; HIGH:3; MEDIUM: 2; LOW: 1):

| COURSE CODE | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| C317.1 | 3 | - | - | - | - | - | - | - | - | - | - | - | 2 | 3 |
| C317.2 | - | - | 3 | - | - | - | 3 | - | - | - | - | - | 2 | 3 |
| C317.3 | - | - | - | 3 | - | - | - | - | - | - | - | - | 2 | 3 |
| C317.4 | - | - | - | - | - | - | - | - | 3 | 3 | - | - | - | 2 |
| C317.5 | - | - | - | - | - | - | - | - | - | - | - | 3 | 2 | - |

**For Entire Course, PO/PSO Mapping: 1(Low); 2(Medium); 3(High) Contribution to PO/PSO.*

**ANNA UNIVERSITY: CHENNAI 600 025**

**BONAFIDE CERTIFICATE**

Certified that this project report "**HUMAN INTERFACED AMBIENT LIGHTING SYSTEM FOR PEDESTRIAL WALK WAYS"** is the bona fide work of **R.S.ABINAYA (811519105001), V.AGALYA (811519105002), P.NELSHINI (811519105029), M. PRIYADHARSHINI (811519105038), R.RESHMA (811519105040), K.J. ROSHINI (811519105042)** who carried out this project work under my supervision. Certified further that to the best any knowledge the work reported herein does not form part of any other thesis or dissertation on the basis of which a degree or award was conferred on an earlier occasion on this or any other candidate.

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**This project report was submitted for the viva-voce held on ……..at K. Ramakrishnan College of Engineering, Trichy-621 112.**

**INTERNAL EXAMINER** **EXTERNAL EXAMINER**

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# ABSTRACT

Power is everything in this recent world, from beginning of science still people try to discover the sources, modify and develop many concepts and methods for a better future. The production of electric current in a huge amount is the need of today's world. To conserve energy we have developed a project titled as HUMAN INTERFACED AMBIENT LIGHTING SYSTEM FOR PEDESTRIAL WALK WAYS which is reliable, economical and efficient. The concept behind our project is to develop a system such that we are using an arrangement which creates a light source while walking. We have taken a square ply wood board of cross section which is placed on a climber consists of a spring arrangement and a rack and pinion arrangement. The rack is connected to the plate. Pinion is a circular gear which is engaged with the rack. The downward movement of plate results in rotation of the shaft of the generator fitted to the device, to produce electrical energy. This project includes how to utilize the energy which is wasted when humans walk through pedestrians. The proposed project has been designed with the help of rack and pinion mechanism of converting rotational energy into electrical energy, for proper utilization. This method provides an efficient way to generate electricity from kinetic energy. By using this method, we will have produced the energy to light up the bulb. The practical results show that the proposed project is highly promising for future renewable technology, which can be used as the eco-friendly power generation technology. 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 reliable, ecofriendly, does not pollute environment, inexpensive, simple in construction and no need of fuel input.

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# LIST OF ABBREVIATIONS

| | |
|---|---|
| **PMDC** | PERMANENT MAGNET DC GENERATOR |
| **DC** | DIRECT CURRENT |
| **AC** | ALTERNATING CURRENT |
| **LED** | LIGHT-EMITTING DIODE |
| **USB** | UNIVERSAL SERIAL BUS |
| **RPM** | REVOLUTIONS PER MINUTE |

# CHAPTER - 1

# INTRODUCTION

Nowadays electricity is an important one for human population. The demand of electricity is increasing every day. Man has used remarkable amount of energy for his daily needs. Therefore, large amount of energy has been exhausted and wasted .Whether we realize it or not, energy is an important part of most aspects of daily life. The quantity of life and even its sustenance, depends on the availability of energy. Therefore, it is important to have a good understanding of the sources of energy, the conversion of energy from one form to another and the ramifications of these conversion. The expanded mindfulness that the world's energy assets are restricted has cause numerous nations to rethink their vitality strategies and take extraordinary measures in killing waste. It has likewise started interest for established researchers to investigate the energy change gadgets and to grow new strategies to more readily use the current restricted assets.

In India many of the people are facing with the problem of electricity. Of those who did their effort all find electricity supply intermittent and unreliable. In India there is lack of clean and reliable energy sources such as electricity. About 1000 million people in India are still using traditional biomass energy sources such as fuel wood, agricultural waste and livestock dung – for cooking and other domestic needs. This traditional fuel combustion in India causes air pollution which causes about 500,000 deaths per year and other chronic health diseases. Carbon dioxide produces from India ‘thermal power plant is about 50 to 120 percent more than that carbon dioxide is produce in European union countries from coal-fired, oil-fired and natural gas-fired thermal power plants. The largest problem of electricity in India was seen on July 2012.

In history in July 2012 India blackout was the largest power outage due to occurring of two events on 30 and 31 July 2012. This outage of power affected 700 million people which is about 9% population of the world or half of India's population, spread across 22 states in Northern, Eastern, and Northeast India. During this event of outage power approximately 32 giga watts of generating capacity was taken offline. According to an article given in The Wall Street Journal which stated that, 320 million initially had power, while the rest of the affected population lacked direct access of the total affected people.

The conventional sources of energy are generally non-renewable sources of energy, which are being used since a long time. To improve the power generation technologies and to make them more sustainable, non – conventional technologies have been discovered. Energy generated by using wind, tides, solar, geothermal heat, and biomass including farm and animal waste is known as nonconventional energy. The non-conventional sources of energy are abundant in nature. Most of the non – conventional sources have been boons at hand only to the well developed countries. With the vast development of the technologies and understanding them, many other creative techniques of power generation have been emerged.

The newly developed techniques are aimed at cost effectiveness. Thus, they become more affordable to the countries like India, where installation cost and space occupancy are serious issues. One such creative technique is power generation through speed breakers. The idea is to tap the potential energy that a vehicle would acquire when it is lifted over the speed breaker as it rolls over it. It is achieved in three possible ways. The ways are Use of lever mechanism Use of roller mechanism and Use of rack and pinion mechanism. The rack and pinion mechanism has advantages over the other two. This new technique work on the law of conservation of energy “energy neither created or nor destroyed its can changed its form”.

Foot step power generation system is designed to be very useful at public places like railway station, bus stand, shopping malls where lot of people keep walking through all day. This entire human vitality being squandered if can be made workable for usage it will incredible development and group vitality ranches will be extremely helpful vitality sources in packed nations. This paper portrayed about age electrical power as non-traditional strategy by essentially strolling or running on the stride. On-conventional system is very essential at this time to our nation. Non-ordinary vitality utilizing stride is changing over mechanical vitality into the electrical vitality. There is some method to generate electrical energy. This method works on the movement of gear rack or pinion and its mechanical parts are used because this is placed where there are so many people and the energy is produced by their movement on the floor. The power which is produced can be used as additional features like street light or light which is used at the place of pedestrians, so the pedestrians should give credit the energy which is produced by their movement.

In this project we are converting Mechanical energy into Electrical energy. We are trying to utilize the wasted energy in a useful way. By using Rack and Pinion arrangement we are converting to and fro motion of the steps into rotational motion of the dynamo. In first step we are using rack and pinion arrangement directly to rotate the dynamo. But in second step we are using gear mechanism to obtain better efficiency. Through Dynamo the rotational energy is converted into electrical energy. This electrical energy output will be divided for two, first ouput will be shown by Glowing the LEDs and second output will be using power module and can showing the output in a multimeter. The output power is expected to be 6V or slightly more in prototype. It can be also more than12V.For this purpose we have aimed to construct a prototype for mechanism by using rack and pinion motion.

# CHAPTER-2

# LITERATURE SURVEY

**1. Electricity Generation From Footsteps: A Regenerative Energy Resource" by Tom Josh V, Binoy Boban, Sijo MT – March 2013.**

In these research paper author manufactured a model made from stainless steel, recycled car tires and recycled aluminium, also includes a lamp embedded in the pavement that lights up every time a step is converted into energy (using only 5 percent of the generated energy). The average square of pavement produces about 2.1 watts of electricity. And according to author, any one square of pavement in a high-foot traffic area can see 50,000 steps a day. Based on this data, only five units of Pavegen pavement can be enough to keep the lights on at a bus stop all night.

**2. "Power Generation Footstep" by Shiraz Afzal, Farrukh hafeez – April 2014.**

This paper is all about generating electricity when people walk on the Floor 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 1 MegaWattAs a fact only 11% of renewable energy contributes to our primary energy. If this project is deployed, then not only we can overcome the energy crises problem but this also contributes to create a healthy global environmental change. In this project a gear system is attached with flywheel which causes to rotate the dynamo as the tile on the deck is pressed, the power that is created is saved in the batteries in addition we will be able to monitor and control the amount of electricity generated.

**3. "Power Generation Through Step" by Vipin Kumar Yadav, Vivek Kumar Yadav, Rajat Kumar, and Ajay Yadav – May 2014.**

In these research paper authors used equipments with following specification: Motor Voltage:10 volt Type: D.C. Generator, RPM:1000 rpm, Gear 1 Mild Steel,No. of teeth:59(big gear), No. of teeth:36(small gear),Type: Spur Gear, No. of gear used:2 Spring 1- Load bearing capacity:60-90 kg, Mild Steel,Total displacement:5 inch, Bearing 1-Type: Ball bearing, Bearing no.N35,Shaft 1-Diameter: 15 mm- Material: Mild steel author concluded that with these method energy conversion is simple efficient and pollution free.

**4. "Power Generation In Automobile Suspension System", by C. , K. Gowtham, M.Manikandan, P. Bharath anna, T. Manoj Kumar – January2015.**

In this research paper author studied three methods of foot step power generation namely piezoelectric method, rack and pinion method and fuel piston method comparatively and found that the rack and pinion mechanism is more efficient with moderate cost of operation and maintenance.

**5. Generation Of Electrical Energy From Foot Step Using Rack And Pinion Mechanism" by Mazhar, Zi tender Raj purohit, Abdul Saiph, Nalla Abhinaya, Pisa Chandu – June 2017.**

In this research paper authors used regulated 5V power, 500mA power supply. Bridge type full wave rectifier is used to rectify the ac output of secondary of 230/12V step down transformer. A rack and pinion is a type of linear actuator

including a pair of gears which convert rotational motion into linear motion. The “pinion" engages teeth on the rack. In this paper, since the power generation using foot step get its energy requirements from Non-renewable source of energy. There is no need of power from external sources (mains) and there is less pollution in this source of energy. It is very useful to the places like all roads and as well as all kind of foot step which is used to generate the non-conventional energy like electricity.

**6. “Electrical Power Generation Using Foot Step For Urban Area Energy Applications” by Joydev Ghosh, Amit Saah, Samir Bask, Separatism Sen – January 2018.**

In this research paper authors used 80 volts and 40 mA from one coil have been generated from a prototype model as first invention. The second invention provides 95 volts and 50 mA from one coil and this generated power can be used to light LED array and to run DC fan after rectifying the AC or can charge batteries

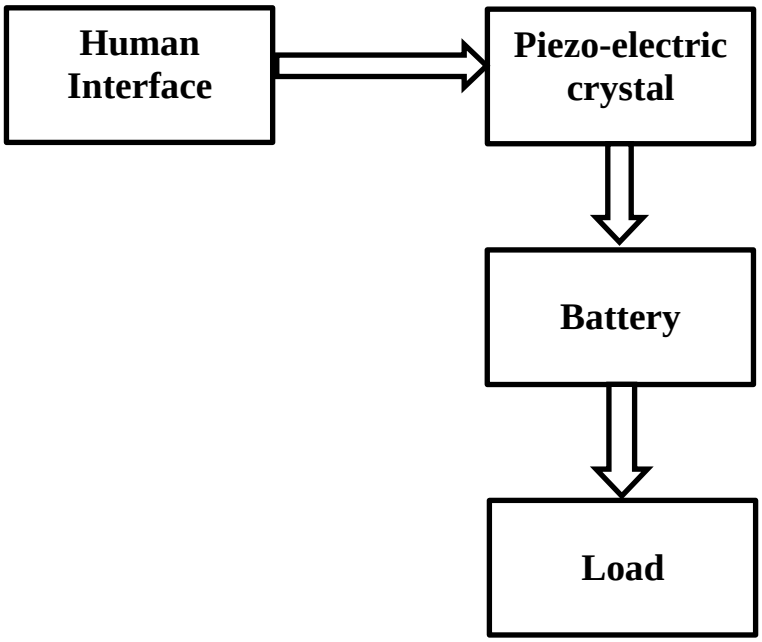
For high efficiency in the axel of the second gear, they fitted a strong magnet vertically, so that when the gear will rotate due to human body weight the magnet also rotate. The magnet is placed in a loop type copper coil. When the magnet start rotating according to the Faraday’s law of electromagnetic induction, there will be induced emf in the coil.

# CHAPTER-3

# CONVENTIONAL HUMAN INTERFACED LIGHTING SYSTEM & PROPOSED HUMAN INTERFACED LIGHTING SYSTEM

## 3.1. CONVENTIONAL HUMAN INTERFACED LIGHTING SYSTEM

Piezoelectric Sensor uses piezoelectric effect to measure pressure or mechanical energy by converting all of it to electrical energy signals. It is a substantial tool that could be used for the measurement of varying cause. It has very high modulus of elasticity compared to other metals and it goes up to 10e6 N/m2. Additionally, piezoelectric sensors are rugged, have high natural frequency. This phenomenon is not affected to Electromagnetic fields and other radiations.




It converts the mechanical stress to electrical voltage. When mechanical stress is applied onto the sensor, electrical charge is accumulated on the crystal that can be extracted using a wire.

When a piezoelectric material is subjected to stress T, it produces Polarization P which is linear function of T: P=dT (d: piezoelectric strain constant). For a dielectric substance, the relationships of electrical displacement D with electric field strength E is given by D=εE.

Basic Piezoelectric Effect equation:

Dn = dnjTj + ε T nm Em (m, n=1,2,3; I, j=1, 2, …., 6)

Piezoelectric sensor can be considered as a RC Network and an alternating current source I.

**Piezo Sensor Array**

A Piezoelectric tile is a tile of dimension 25 cm x 30 cm. The thickness of the tile is 0.9 mm. To enforce and safeguard the piezoelectric sensors a double-tape is placed on each sensor. The thickness of the tape is 0.3 mm. On this tile 30 piezoelectric sensors are installed. The output power from a single piezo sensor is remarkably low therefore a combination of few Piezo sensors is used. The piezo sensors can be installed in two possible combinations:

• Series Connection

• Parallel Connection

When the sensors are connected in a series combination, it emanates an increased voltage output but that voltage is not on a linear scale. On the other hand, when a parallel combination is implemented it did not produce a satisfactory upsurge in the voltage output. If an amalgamation of both parallel and series connection is utilized for producing voltage output with high current density. Springs at the corners are placed on the second tile equivalent to the sensors at the centre of the tile in 5 x 6 pattern. A similar tile is placed on the former tile so that it can be pressed by the foot.

**Calculations and Outputs:**

Power generated varies with different steps in piezoelectric array that is used. Based on practical results voltages obtained are:

• Minimum voltage = 1V per step

• Maximum voltage = 8V per step

Considering average weight as of the person stepping on the system to be 53 Kg the average calculation is:

Steps are required to increase 1 V charge in battery = 700

To increase 12 V in battery: Total steps needed = (12 × 700) =8400 steps

Considering the implementation of this system in places like college biometrics where footsteps as source is easily available, if:

• Time required for 2 steps is 1 second

• Time required for 8400 steps = 8400/(60 × 2) = 70 minutes

**DRAWBACK OF PIEZOELECTRIC SENSOR**

• They cannot be used for truly static measurements.

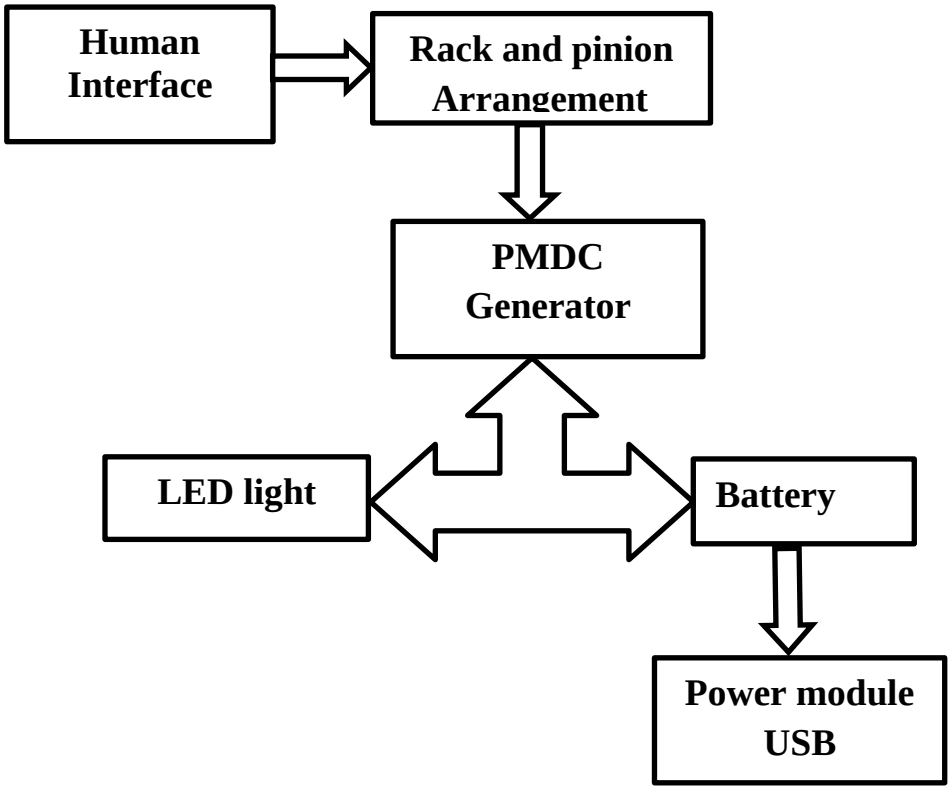
• Crystal is prone to crack if overstressed.

• The cost of the sensor is very expensive.

• May get affected by long use at high temperature

## 3.2. PROPOSED HUMAN INTERFACED LIGHTING SYSTEM

Proposal for the utilization of waste energy of human locomotion is very much relevant and important for highly populated countries like India and China where the parks, roads, railway stations, bus stands, temples, etc. are all over crowded and millions of people move around the clock.




The modified lighting system will be very helpful. Here, we are proposing a system in which the piezoelectric crystal is replaced by mechanical arrangement which is having a rack and pinion that is driven by human interface. The human interface is same as the existing system. Because of the weight of human interface the rack and pinion is move.Then generator will starts to generate energy which is divided into two outcomes. One is to glow the LED light and other is to store the energy in rechargeable battery and used for power bank module.

# CHAPTER-4

# COMPONENTS

## 4.1 .EXPLANATION OF COMPONENTS USED

This arrangement is used to generate the electric power. Now a day's power demand is increased, so this type of arrangement is used to generate the electrical power in order to compensate the electric power demand. In this arrangement the mechanical energy is converted into electrical energy.

This section is constructed by the combination of plywood and aluminium sheet which is placed within the surface areas. This section is mainly placed in the crowed areas. This arrangement is attached with spring section. This section consists of:

- Aluminium along with Plywood surface
- Rack and Pinion section.
- PMDC Generator along with gear box.
- Multimeter.
- LED strip
- Power Bank Module
- Rechargeable battery

In structural terms, plywood can be used for partitions, floors, ceilings and sheathing. It is also used for decorative purposes both in exterior positions, such as cladding and doors, and internally as cabinets, shelves and furniture.

The rack and pinion gear set has two main functions: Conversion of the steering wheel's rotational motion into the linear motion needed for the vehicle's wheels to turn. Reduction of gears, which makes it easier for the steering wheel to turn the wheels.

A spring is an elastic object that stores mechanical energy and releases it when the opposing force is removed. If you need to apply force to create movement or hold something in place without the use of engines or other powered means, springs could be the answer.

As its name implies, a Permanent Magnet DC (PMDC) generator is a continuous current machine. A DC machine, called a Generator, has a commutator generating a continuous DC supply. Whereas an AC machine, called an Alternator, has slip-rings generating a sinusoidal supply.

| | | |
|---|---|---|
| 1. | Upper plate | Aluminium along with plywood surface . L×B: (515×300) mm. |
| 2. | Springs | Iron wire,Height:75mm |
| 3. | Moving Solid Pipes | Hard Chrome Steel |
| 4. | L Angle frame | Height- 300mm<br>Side-435mm |
| 5. | Rack | Fiber plastic,Rack Height:243 mm. |
| 6. | Pinion | Small pinion:Teeth-25 no.s, Diameter-2.2cm<br>Large pinion:Teeth-38 no.s, Diameter-3cm |
| 7. | PMDC Generator | 12 volt,500 rpm |
| 8. | Battery | Sealed lead Acid Rechargeable Battery -4 V , 500 MAH |
| 9. | LED Strip | Approx. 12 volts, 1 watts |
| 10. | Power Bank module | 5V Lithium Battery USB |

# CHAPTER-5

# HARDWARE ARRANGEMENT OF HUMAN INTERFACED LIGHTING SYSTEM

## 5.1. DESCRIPTION OF HARDWARE COMPONENTS

The complete fabricated model picture of prototype is shown above. The upper plate is mounted on two springs; the weight impact is converted into electrical power with proper control unit. The spring and rack & pinion arrangement is fixed. Spring system is used for return mechanism of upper plate after release of load. A generator along with gear box is used to produce electric power. The generator capacity used here is12V. From the generator the wires are taken. These wires are connected to LEDs, to show the output power. The generator is used here is 12Volt permanent magnet DC generator. The terminal of DC generator is connected to lightning LEDs and power module.

### 5.1.1.PLYWOOD

In the upper part of plywood along with aluminium plate, the force is applied.

**Figure 5.1-Plywood**

## 5.1.2.RACK AND PINION

In this project where while giving force on the top of the plywood the following things will happen .A rack and pinion is a type of linear actuator that comprises a circular gear (the pinion) engaging a linear gear (the rack), which operate to translate rotational motion into linear motion. Driving the pinion into rotation causes the rack to be driven linearly. Driving the rack linearly will cause the pinion to be driven into a rotation. A rack and pinion drive can use both straight and spur gears. Though some suggest spur gears are noted for “quieter” operation, there is no science to support this theory. Straight racks require a lower driving force and offer increased torque and speed per percentage of gear ratio which allows lower operating temperature and lessens viscal friction and energy use. The maximum force that can be transmitted in a rack and pinion mechanism is determined by the tooth pitch and the size of the pinion as well as the gear ratio.

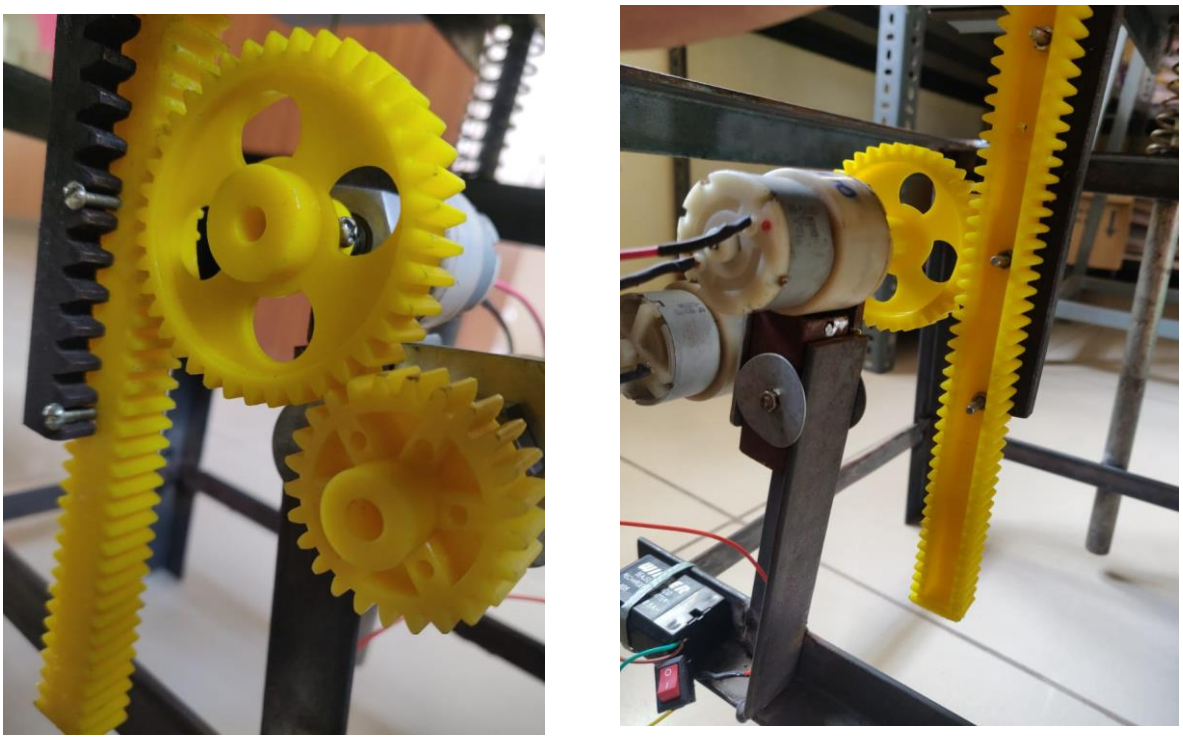


**Figure 5.2- Rack and Pinion**

## 5.1.3. PMDC GENERATOR

As its name implies, a Permanent Magnet DC (PMDC) generator is a continuous current machine. A DC machine, called a Generator, has a commutator generating a continuous DC supply. Permanent-magnet generators are simple in that they require no system for the provision of field current. They are highly reliable. They do not, however, contain any means for controlling the output voltage.

Permanent-magnet generators are simple in that they require no system for the provision of field current. They are highly reliable; however they do not, contain any means for controlling the output voltage.. Advantages of PMDC are do not require field winding, .no field circuit copper losses, increased efficiency overall. Multiple application use.

They are smaller in size. For smaller rating Permanent Magnet reduces the manufacturing cost and thus PMDC motor are cheaper. As these motors do not require field windings, they do not have field circuit copper losses. This increases their efficiency.

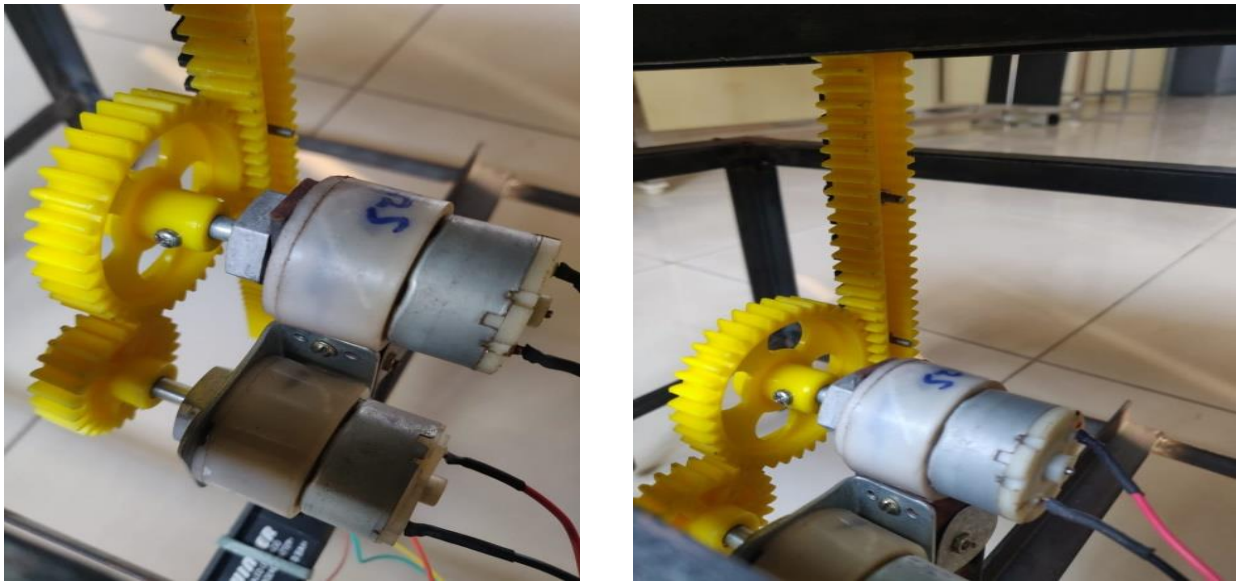
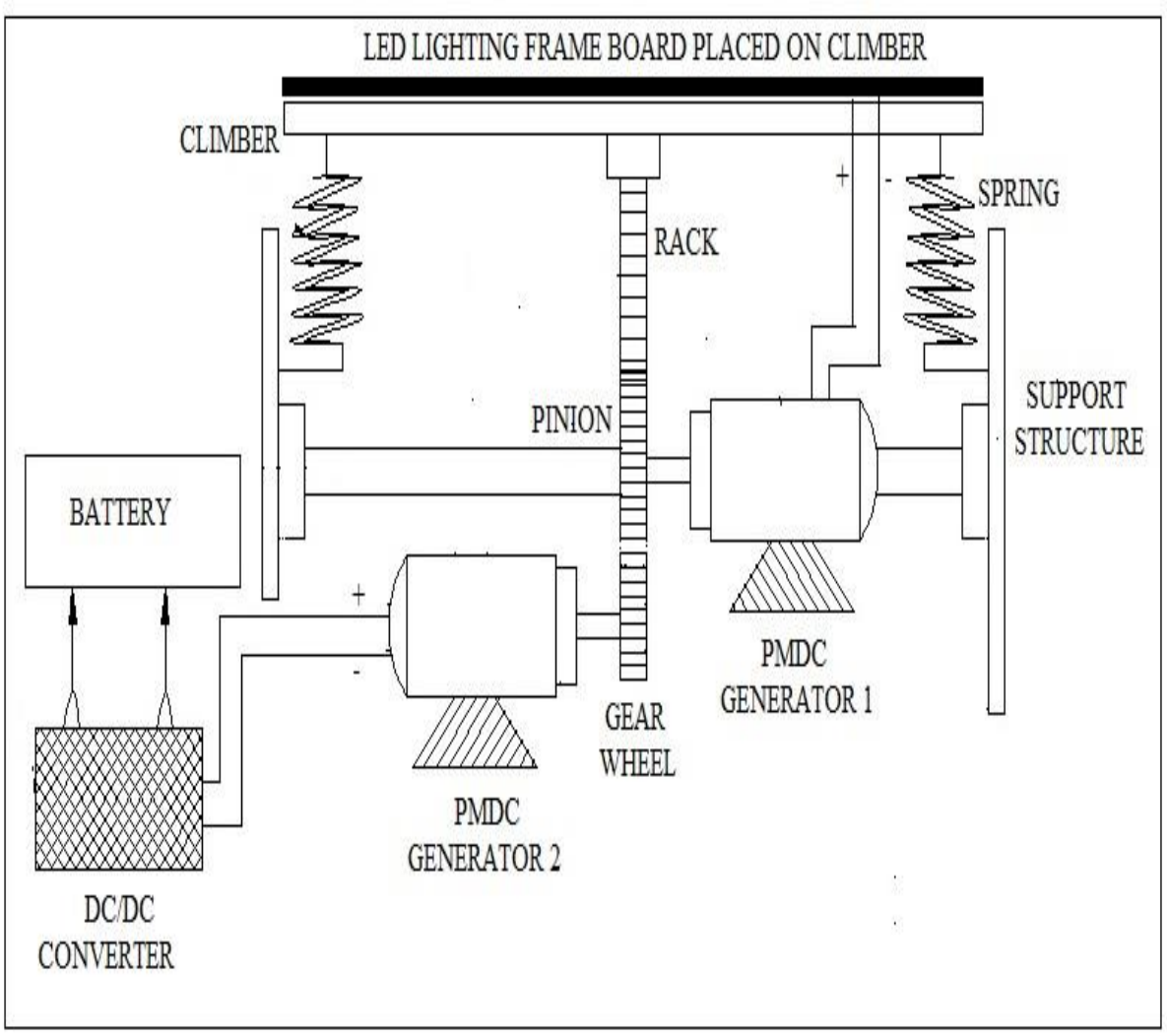


**Figure 5.3-PMDC Generator**

## 5.2. EXPLANATION OF CONVENTIONAL SYSTEM

The downward movement of the plate results in rotation of the shaft of an electrical generator fitted in the device, to produce electrical energy. The top plate reverts back to its original position due to negating springs provided in the device. The upper plate is mounted on two springs; the weight impact is converted into electrical power with proper control unit.

The spring and rack & pinion arrangement is fixed below the plate which is mounted on base. Spring system is used for return mechanism of upper plate after release of load. The dc generator is rotated with the help of the arrangement of rack & pinion. The terminal of PMDC generator is divided into two, one is connected to lightning LEDs and other is connected to power module.



# CHAPTER-6

# STEP BY STEP WORKING PROCEDURE OF LIGHTNING SYSTEM

With the help of flow chart, the working procedure is explained in step by step manner as follows:

**Step 1:** When force is applied on the top of the plywood surface the spring gets compressed by the force.

**Step 2:** Due to this compression the rack moves vertically down.

**Step 3:** The pinion meshed with the rack gear results in circular motion of the pinion gear.

**Step 4:** For one full compression the pinion Moves one semicircle, when the force applied on the plywood surface is released the pinion reverses and moves another semi- circle.

**Step 5:** The intermediate gear with more number of teeth will rotate as a result of motion of pinion.

**Step 6:** The generator attached to the intermediate will obtain the rotating motion, hence results in the production of the electricity

**Step 7:** The obtained power generation is used to glow the led strip.

**Step 8:** Also where the power generated is stored in the battery which is used in the power bank module to charge the mobile.

## 6.1. OUTPUT POWER CALCULATION

Let us consider,

| | | |
|---|---|---|
| The mass of a body | = | 60 Kg (Approximately) |
| The Number of steps For foot step arrangement | = | 1 |
| Height of step | = | 2 cm (Approximately) |
| ∴Work done | = | Force x Distance |
| Here, Force | = | Weight of the Body |
| | = | 60 Kg x 9.81 |
| | = | 588.6 N |
| Distance traveled by the body | = | Height of the foot step |
| | = | 2 cm |
| | = | 0.02 m |
| ∴Output power | = | Work done/Sec |
| | = | (588.6 x 0.02)/60 |
| | = | 0.19 Watts |

However, this much power produced, it cannot be tapped fully. From the above purpose we have select to generate electricity by permanent magnet type D.C generator and store it by 4V lead acid rechargeable battery.

# CHAPTER-7

# OUTCOMES OF HUMAN INTERFACED LIGHTING SYSTEM

## 7.1.LED STRIPS:

LED strip lights most commonly operate on 12 or 24 volts of direct current from a power supply, sometimes referred to as a driver. USB strip lights operate on the standard 5-volt direct current used by USB devices. These have the advantages of being usable in much longer single runs without a brightness drop along the length, but are less flexible and heavier due to higher voltage and current ratings and thick coatings for shock safety and high IP ratings in their intended outdoor positions, with limited cut points. The force which is given in plywood makes the spring to move and rack moves downwards and upwards which makes pinion to move, where generator generates electric power which makes LED glow.

**Figure 7.1-LED Strips**

## 7.2. POWER MODULE WITH USB:

A power module or power electronic module provides the physical containment for several power components, usually power semiconductor devices. In this power module, Zener diode is used to maintain voltage fluctuation i.e., voltage is reduce to 12V to 6V in order to use the power module for USB , capacitor is used to reduce harmonics. Battery is used to store the electricity received from generator. With the use of power module, mobile can be charged


**Figure 7.2-Rechargeable Battery**

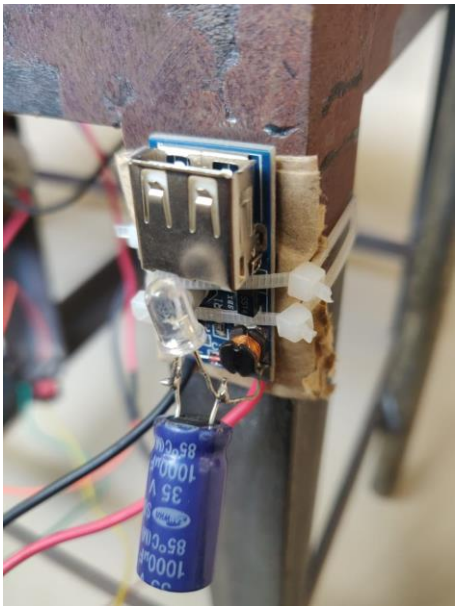


**Figure 7.3-Power Bank Module**

## 7.3. NEED OF THIS TYPE OF SYSTEM

- 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 and China where the roads, railway station, bus depots etc. are always over crowded and millions of people move around the clock.
- Growth and increase in the standard of living which is directly proportional to energy consumption.
- Using of wasted kinetic energy of a human population into useful electrical energy.
- Reducing use of non - renewable resources which are in a place to get extinct soon.
- Simplifying technology that can be use even by common peoples.
- Maintaining and developing a continous provision for productivity.

# CHAPTER-8

# CONCLUSION

The project work “HUMAN INTERFACED AMBIENT LIGHTING SYSTEM FOR PEDESTRIAL WALK WAYS” is designed and developed successfully, for the demonstration purpose a proto type m odule is constructed with lower ratings of devices, & results are found to be satisfactory. As it is a demo module it cannot be used for real applications, but the concept is near to the real working system, to make it more realistic, higher rating power generator with suitable gear mechanism is essential to produce more energy.

This concept falls under the subject of non-conventional energy resources, out of the many alternative energy resources one dependable source is solar energy, but it is quite costliest affair. Therefore alternative cheapest source is to generate electricity from foot step. This technology proven here is the ultimate inexpensive source of all known forms of energy. When it is implemented practically, depending up on the size and traffic flow, each foot step produce tens of kilowatts power every day, this power can be utiliz ed for many applications.

If we are used this project at very busy stairs palace then we produce efficient useful electrical for large purposes. One important advantage of producing energy through this technology is that it does not pollute the environment.. Hence these foot step can be altered with this technology, there by all the street lights belongs to a particular city can be energized.

## 8.1.FUTURE SCOPES

- Small changes in construction and design of the power generation set up can help to make the following future applications.

- 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 and China where the roads, railway stations, bus stands, temples, etc .are all over crowded and millions of people move around the clock.

- This whole human/bioenergy being wasted if can be made possible for utilization it will be great invention and crowd energy farms will be very useful energy sources in crowded countries.

- Walking across a "Crowd Farm," floor, then, will be a fun for idle people who can improve their health by exercising in such farms with earning. The electrical energy generated at such farms will be useful for nearby applications.

- Electricity generation for streetlights through speed breaker. Security check in platform converted into in this mechanism at various places working of x – ray machines conventionally.

- A particular model could be sell to common people for using it at home as well the company making these models can help in employment of various officials.

## 8.2.ADVANTAGES

- Produces electricity efficiently.
- It is an inexpensive source of all known forms of energy.
- It does not pollute the environment.
- Automatically operates the street light when the sun falls.
- It can be easily maintained.
- Simple construction, mature technology.
- No manual work necessary during generation.
- Energy available all year round.
- No fuel transportation problem.
- No consumption of any fossil fuel which is nonrenewable source of energy.
- Reliable, Economical, Eco-Friendly.
- No need of fuel input.
- This is a non-conventional system.

## 8.3.APPLICATIONS

Power generation by footstep can be used in most of the place such as

- Parks
- Colleges
- Schools
- Cinema theatres
- Shopping complex
- Metro and airport security check in
- Speed breakers
- Railway stations
- Bus depots

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# PHOTOGRAPH OF COMPLETED PROTOTYPE