

# Study And Development Of Iot Based Electricity Generation Through Speed Breaker

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## ABSTRACT

The economy of any country depends on its ability to conserve and regenerate energy. Therefore, it is a key element for the development of any country. Every second its supply is rapidly becoming exhausted in this fast and busy moving world. The continuous and dynamic rise in the world's population has a great impact on energy crisis. Due to this, an optimal method of utilising energy needs to be developed. For instance, eco-friendly solutions for vehicles. An effective generation of power can be obtained with three steps, one as linear motion to rotary and again rotary motion to produce electricity. Owing to this concept, energy can be preserved, and its implementation is essential for current situation considering a high rate of world's population.

This paper developed a simple mechanized arrangement for speed breaker and by using rack and pinion electricity is generated.

**Keywords:** Speed breaker, Voltage, Rechargeable battery, Foot Step Platform.

## INTRODUCTION

Due to population growth and surge in industrial activities the demand of electric power increasing rapidly. Energy is an important requirement to all the sectors, so there is huge scarcity electricity. As there is a shortage of non-renewable resources, such as petroleum, coal etc., and energy may be recovered by appropriate utilization of vehicles' mechanism i.e. speed breaker. This is excellent solution for recovery of energy in forms of light. The objective of this study is to generate electricity by speed breaker and provide clear information through IOT cloud system administrators for fast information. Prototype model must developed for appropriate solutions to get clear information. The energy generated using speed breaker mechanism can be used to store in a batteries and can be used apart for various purposes[1]. The work basically aims to produce free electricity with no fuel cost, no pollution and with minimum requirement of space. In this paper is all about generating electricity when people walk on the Floor [2]. 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 [3]. 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 1Mega-Watt. Which itself is an achievement to make it signify-cant [4].

The main aim of this project is to develop much cleaner cost effective way of power generation method, which in turns helps to bring down the global warming as well as reduce the power shortages. In this project the conversion of the force energy in to electrical energy by using electromagnetic induction. In this project the force energy is converted into electrical energy. The control mechanism carries the copper coil and bar magnetic which is used to generate voltage, a rechargeable battery is used to store this generated voltage [5].

**DESIGN SPECIFICATION**

**1. Function :** IOT based electricity generation.

**2. Specification :**

- i. Type : IOT based.
- ii. Media: - Speed Breaker.
- iii. Overall prototype dimensions (Tentative): 1.5feet x 2feet x 4feet height. approx
- v. Mechanical system- Rack and pinion.

vi. General Information :

The machine consists of a turing pair and linkages.

3. Analysis of different critical parts of mechanism

4. Selection of materials and drives.

**Design of Drive Shaft**

P = Load due to seed carrier

T = Max Torque generated due to bevel gear / Due to rotating wheel (whichever is max)

RA and RB = Support reactions.

Fig 1 Drive shaft loading condition

The deflection of stair is considered = 50mm

The weight maximum considered = 1000N

So Maximum Torque T = Effort x Radius of rotating member

To calculate the torque the radius is considered 15mm

$$\begin{aligned} \text{Torque on drive shaft } T &= 1000 * 15 \\ &= 15000 \text{ N-mm} \end{aligned}$$

$$\sum F_Y = 0$$

$$RA + RB = P$$

As per load condition and farm condition the total load on wheel is considered

$$P = 100\text{kg} = 1000\text{N}$$

$$RA + RB = 1000 \dots\dots\dots I$$

The distance we have considered as per component fitment

$$L1 = 300\text{mm}$$

$$L2 = 300\text{mm}$$

Taking moment about point A

$$P \times 150 - RB \times 300 = 0 \dots\dots\dots II$$

From equation I & II,

$$RB = 500 \text{ N}$$

RA = 500N

Calculation of bending moment at loading point P,

BM at MA = 500 x 150 = 75000 N-mm ..... (A)

B,

Te = 76485 N-mm

**As per Design data book shaft material is selected Carbon steel C40**

$\sigma = 145 \text{ N/mm}^2$

As per ASME code

0.3 X Yield strength N/mm<sup>2</sup>

0.18 X ultimate strength N/mm<sup>2</sup> } whichever is smaller

0.3 x 330 = 99 N/mm<sup>2</sup> .....(a)

0.18 x 580 = 104 N/mm<sup>2</sup> .....(b)

From equation (a) & (b)

Allowable stress value will be 99 N/mm<sup>2</sup>

If key ways will provide to shaft then

$\tau = 99 \times 0.75 = 74.25 \text{ N/mm}^2$

By using above equation drive shaft dia. d = 17.40mm

By using above equation drive shaft dia d = 10.10mm

## CONCLUSION

Non-conventional way of energy generation can satisfy the requirements of applications, such as supplying power to cameras and lighten city streets. Easy installation and very reliable system with promising sign for its performance. It is effective for power crises; the above mechanism can contribute to the development of the country by enriching utilisation in a useful and proficient manner. It is high time to think of energy generation from an unconventional energy sources and this energy can be stored or used as back up for other.

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