DESIGN AND DEVELOPMENT OF A FREE ENERGY GENERATION SYSTEM USING DISC & FLAT MAGNET AND A PULLEY-DRIVEN DC MOTOR

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ABSTRACT

This thesis presents a novel design for a free energy generation system incorporating magnetic interaction and mechanical motion. The purpose is to design and fabrication of different components for free energy generation. The system consists of a square frame housing a freely rotating plastic rotor. The rotor is equipped with 20 disc-shaped neodymium magnets arranged around its top periphery at an 18° angle. Additionally, 4 flat neodymium magnets are fixed to the inner sides of the square frame to enhance magnetic interaction. A DC motor is initially powered to rotate the rotor via a belt-pulley mechanism. Once the power supply is disconnected, the magnetic interaction is intended to sustain rotor motion, which in turn drives the DC motor to generate voltage. However, experimental observations revealed that the plastic rotor does not maintain continuous motion after disconnection external energy source, affecting consistent energy generation. The system produced an average voltage of 2.56V, with a measured power output of 47.49W. Despite its limitations, this study lays the foundation for further development of magnetically-assisted energy generation systems.

ACKNOWLEDGEMENT

First and foremost, we express our deepest gratitude to the Almighty of Allah for granting us the strength, patience, and perseverance to complete this thesis report titled “Free Energy Generation Using Disc & Flat Magnets, and a Pulley Driven DC Motor to Produce Voltage Supply.”

We are profoundly grateful to our honorable supervisor, **Prof. Md. MOSTOFA HOSSAIN**, **Head of Mechanical Engineering**, for their continuous guidance, constructive feedback, and valuable suggestions throughout every stage of our research. Their support played a pivotal role in shaping our work and helping us overcome challenges.

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We also extend our sincere thanks to the faculty members and staff of the Mechanical Engineering, Sonargaon University, for providing us with academic support and necessary resources.

DECLARATION

We solemnly affirm that the work presented in this project report is entirely our own and has not been previously submitted to any university or organization for the purpose of earning a degree or certification. We further confirm that the contents of this report do not infringe upon any existing copyright. Additionally, we accept full responsibility for indemnifying the university against any potential loss or damages that may arise due to a breach of this declaration.

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CERTIFICATION

This is to certify that this project entitled study, “Free Energy Generation Using Disc & Flat Magnets, and a Pulley Driven DC Motor to Produce Voltage Supply” is done by the following students under my direction supervision. This project work has been carried out by them in the laboratories of the Department of Mechanical Engineering under the Faculty of Engineering. Sonargaon University (SU) in partial fulfilment of the requirements for the degree of Bachelor of Science in Mechanical Engineering.

Supervisor

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LIST OF ABBREVIATIONS

Abbreviation	Full Form
DC	Direct Current
EMF	Electromotive Force
RPM	Revolutions Per Minute
V	Voltage
A	Ampere
PWM	Pulse Width Modulation
B	Magnetic Flux Density
N	Newton
mm	Millimeter
°C	Degree Celsius

MATHEMATICAL SYMBOLS

Symbol	Description	Unit
V	Voltage	Volts (V)
I	Current	Amperes (A)
R	Resistance	Ohms (Ω)
P	Power	Watts (W)
η	Efficiency	Percentage (%)
B	Magnetic flux density	Tesla (T)
ω	Angular velocity	rad/s
T	Torque	Newton-meter (Nm)
t	Time	Seconds (s)
E	Electromotive force (EMF)	Volts (V)

Chapter 1
INTRODUCTION

1.1 Background of the Study

The increasing global demand for sustainable and renewable energy sources has motivated extensive research into alternative methods of power generation. Traditional energy systems heavily rely on fossil fuels, which are non-renewable and environmentally detrimental. Consequently, there has been growing interest in exploring innovative ways to generate electricity using unconventional methods. One such concept is the generation of electricity using Neodymium magnets and motion-based mechanisms such as DC motors and pulleys. This thesis investigates a unique approach that integrates Disc Neodymium magnets, Flat Neodymium magnets (a novel term explored in this research), and a pulley-driven DC motor to produce voltage, aiming to explore the potential for low-cost, free energy systems.

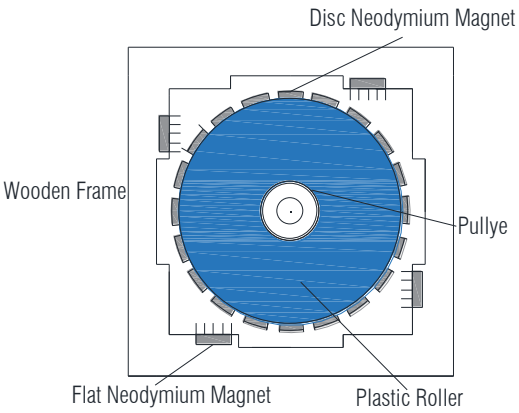


Figure 1.1 Basic concept of free energy generation system

1.2 Problem Statement

Despite significant advancements in energy technologies, many regions still face electricity shortages or high energy costs. There is a need to develop low-cost, accessible energy generation methods. However, most free energy concepts are either theoretical or lack practical implementation. This research addresses the gap by designing and testing a model that utilizes magnetic force and mechanical rotation to generate electricity.

1.3 Objectives of the Study

- To design and fabrication of different components for free energy generation.
- To analyze and measure the output voltage generated by the system.
- To compare energy efficiency with traditional small scale energy systems.

1.4 Significance of the Study

This research may contribute to the development of small-scale, cost-effective energy systems that could be used in remote or off-grid areas. If successful, it could offer an eco-friendly, maintenance-free solution for basic power needs, thereby supporting sustainable energy goals.

1.5 Scope and Limitations

The study focuses on a laboratory-scale model, and while the system aims to demonstrate the principle of energy generation, it does not account for large-scale applications at this stage. Limitations include limited torque output, experimental conditions, and material constraints.

Chapter 2

LITERATURE REVIEW

2.1 Introduction to Literature Review

This chapter presents a comprehensive review of past research, scientific theories, engineering concepts, and relevant technologies associated with magnetic energy, motion-based electricity generation, and low-cost renewable systems. The materials referred include peer-reviewed journals, conference proceedings, academic theses, patents, and online repositories. The purpose is to identify existing knowledge, gaps in the current research, and how this study fills those gaps.

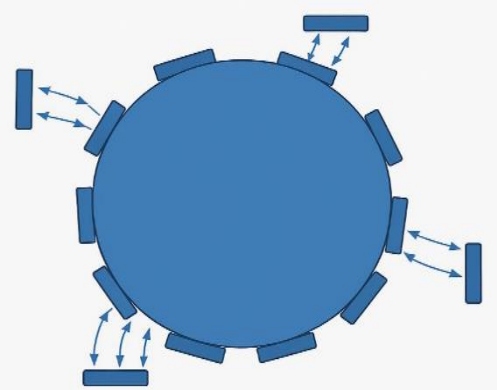


Figure 2.1: Interaction between flat and disc neodymium magnets

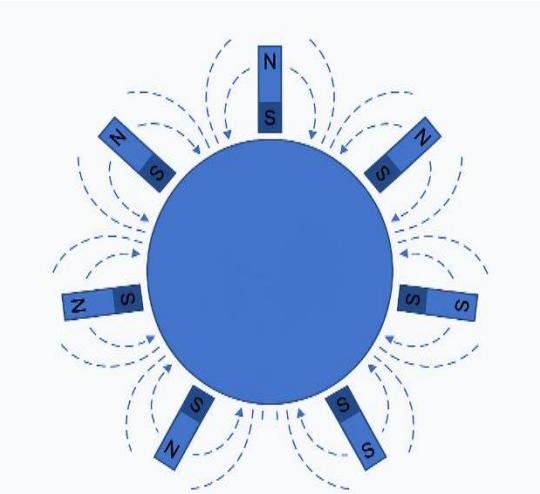


Figure 2.2: Basic Magnetic Field Structure Around a Circular Chocolate Magnet Arrangement

2.2 Previous work and how they performed

Principles of Electromagnetic Induction:

Faraday's Law of Electromagnetic Induction (1831) is the foundation of electric power generation. It states that a changing magnetic field within a closed loop induces a voltage (EMF). Many modern generators and alternators rely on this principle to convert mechanical energy into electrical energy. In this project, motion caused by magnetic repulsion is used to spin a rotor, thereby generating EMF in a DC motor working as a generator. [1] [2]

Magnetic Propulsion and Magnetic Bearings:

Research shows that magnets can be arranged to generate repulsive or attractive forces that lead to motion, a concept used in maglev trains and certain experimental motors. Magnetic levitation and propulsion reduce friction and enhance motion efficiency. [3] [4]

Free Energy Concepts and Controversies:
The concept of "free energy" is debated. While energy cannot be created from nothing (per the laws of thermodynamics), systems that reuse or recover motion energy like regenerative braking in EVs—are sometimes misclassified as free energy. In practical terms, systems like yours fall into "low-input, self-sustaining for short-term" generation. [5]

Energy Generation Using DC Motors:
DC motors, when rotated by external mechanical energy, can work as efficient generators. The generated voltage is proportional to the RPM and field strength. Many DIY generators use such motors for small-scale power output (lighting LEDs, charging small batteries, etc.) [6] [7]

Similar Prototypes and Innovations:
Several projects have explored small systems with magnetically driven rotors. Most show temporary generation due to residual motion after disconnection from the power source. However, few explore angular positioning (like 18° gaps), Disc Neodymium magnets, or unique pulley layouts as in this research. [8]

2.3 Summary

The literature indicates significant interest in free energy systems using permanent magnets and innovative mechanical designs. While many experimental models demonstrate rotational motion and power generation, none have achieved truly continuous, self-sustaining energy output without external input. Limitations such as friction, imperfect alignment, and energy loss prevent the systems from functioning perpetually. Your proposed model—using chocolate-shaped magnets, neodymium discs, and a pulley-coupled DC motor—aims to improve upon previous designs by optimizing magnetic angles and mechanical efficiency. Although the challenge of continuous motion remains, the combination of unique magnet arrangements and low-resistance mechanisms offers potential for improved performance.

Chapter 3

RESEARCH AND EXPERIMENTAL DESIGN

3.1 System Overview

The experimental setup is designed to demonstrate a free energy generation concept using Disc & Flat Neodymium magnets, a pulley system, and a DC motor. The goal is to harness the reaction forces between strategically placed magnets to sustain rotor motion and generate electricity through mechanical to electrical energy conversion.

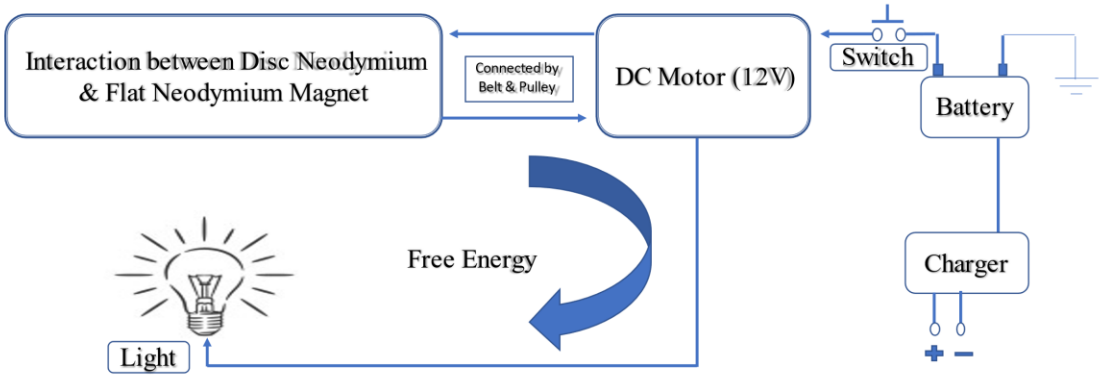
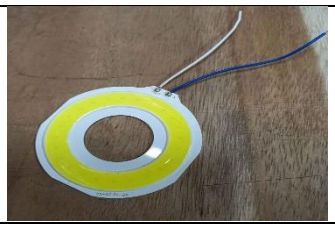
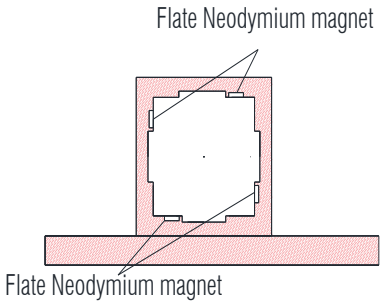


Figure 3.1 Block diagram of the experimental setup

Table 3.1: Components and specifications used in the system

Plastic Rotor		Diameter : 160 mm Thickness: 7 cm

Bearing		Bore Diameter (d) : 9 mm Outside Diameter (D): 26 mm Width : 8 mm Retainer Type: Punching Seals : 2RS or ZZ Material : Steel
DC Motor		Diameter : 42 mm12V DC Motor Brush : 2000 hrs RPM : 1200 -2000 rpm Working Voltage 5V-12V DC
Disc Neodymium Magnet		Diameter : 20 mm Thickness: 5 mm Pull force :7.3 kg Max. Operating Temp.: 80°C Magnet grade: N35 Coating : Nickel, Copper, Nickle
Flat Neodymium Magnet		Length : 30 mm Width : 30 mm Thickness: 5 mm Pull force :15.81 kg Max. Operating Temp.: 120°C Magnet grade: N52 Coating : Nickel, Copper, Nickle
Pulley		Wheel Pulley Diameter : 50 mm Motor Pulley Diameter : 40 mm Material : Aluminium
Belt		Size : 13 inch Belt Type : Timing Belt Brand : Cutex Material : Plastic

LED Light		Voltage : 6 Volt Diameter : 45 mm Power : 5 W LED Type: 2C6B
Wooden Frame		Length : 230 mm Width: 230 mm Thickness: 30 mm

3.2 Design Description

The system consists of the following key components:
Plastic Rotor: A circular rotor mounted on a horizontal axis, fitted with multiple Disc Neodymium magnets placed at 18° intervals.
Magnet Arrangement: Four Flat Neodymium magnets are fixed on a square frame—two in horizontal alignment and two vertically—positioned to interact continuously with the Disc Neodymium magnets during rotation.

DC Motor: A brushed DC motor connected to the rotor via a belt and pulley system. Initially powered by an external battery to start rotation.

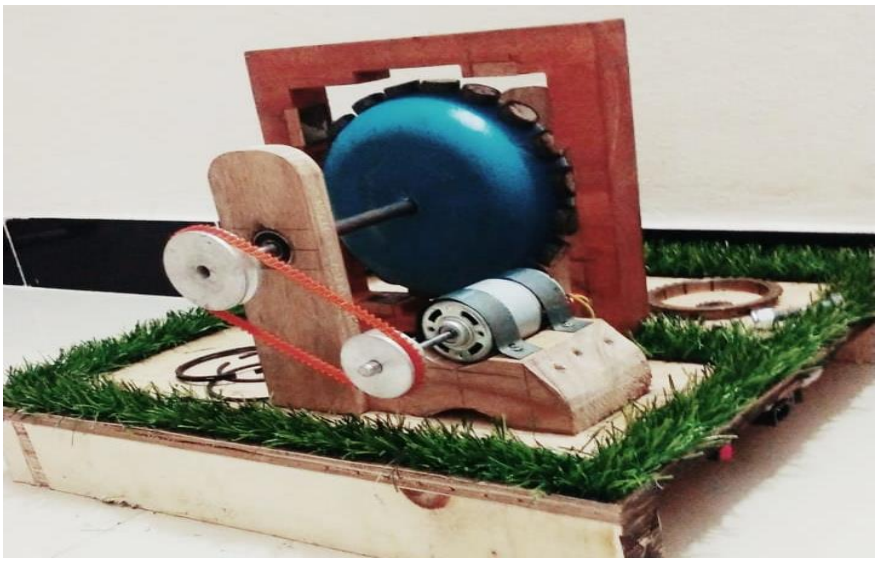


Figure 3.2 Pulley and belt arrangement with DC motor

Pulley-Belt Mechanism: Transfers mechanical energy from the rotating plastic rotor to the shaft of the DC motor.

Base and Frame: A wooden and plastic support structure holds the system components in proper alignment and reduces external vibration.

3.3 Working Principle

1. Initial Power Input: An external battery powers the DC motor briefly to initiate rotation of the plastic rotor.
2. Magnetic Repulsion & Attraction: Once in motion, the Disc Neodymium magnets embedded in the rotor interact with the stationary Flat Neodymium magnets positioned in the frame. Due to magnetic repulsion and attraction, a continuous push-pull effect is established, sustaining motion temporarily.

3. Power Generation: As the rotor continues to spin, it drives the DC motor through the belt system, causing the motor to function as a generator and produce DC voltage.

4. Output: The generated electricity is sufficient to light up an LED for a few seconds while the rotor coasts freely before coming to a halt due to friction and air resistance.

3.4 CAD Design & Prototype

A 2D CAD drawing (Figure 3.3) illustrates the top view of the rotor and magnet arrangement. The physical prototype (Figure 3.4) confirms the functionality of the design. The setup uses artificial grass to simulate an eco-friendly presentation base and offers clear visibility of the pulley mechanism.

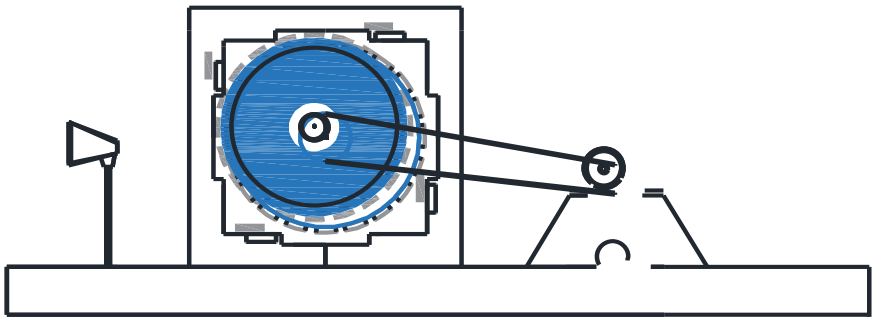


Figure 3.3: CAD Model of Free Energy Setup

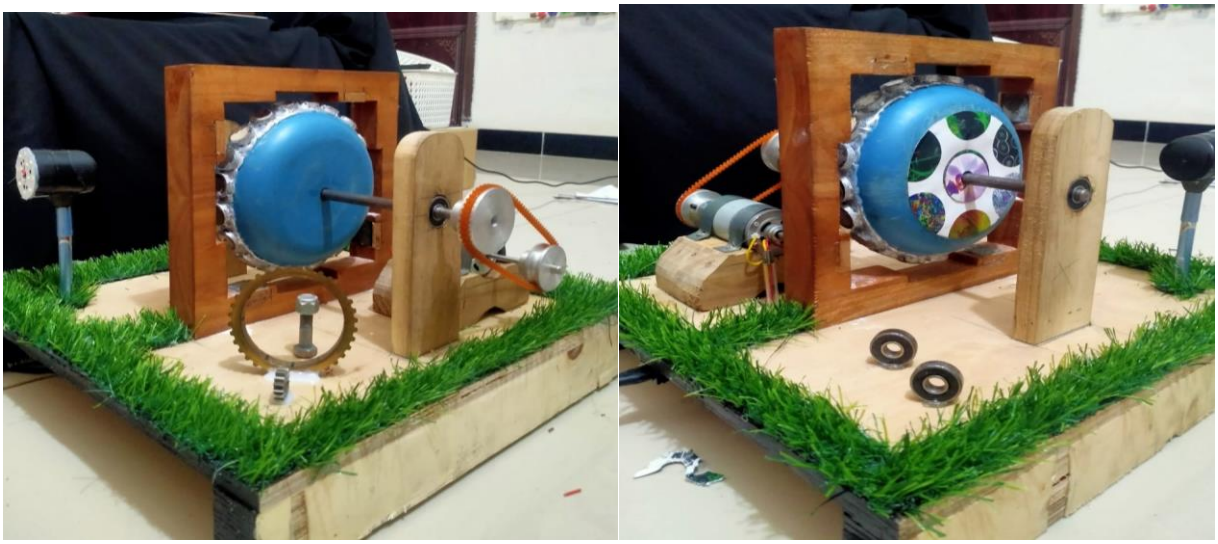


Figure 3.4: Experimental Prototype of the Energy Generation System

3.5 Innovative Aspects

Use of “Disc Neodymium Magnets” for smooth interaction and reduced friction.
Magnetic placement at specific angular intervals to sustain motion through minimal energy input.

Simple, low-cost, and manually constructed prototype demonstrating the principle of motion-based energy recovery.

Chapter 4

DATA GENERATION, COLLECTION, ANALYSIS AND DISCUSSION

4.1 Introduction

This chapter presents the experimental data collected from the designed prototype system that uses Disc & Flat Neodymium magnets, and a pulley-driven DC motor to generate electricity. The process of data collection, data relevance checks, analysis using basic engineering methods, and discussion on the findings are detailed in this section.

4.2 Data Collection

Description of the Prototype:

The prototype developed for this study aims to demonstrate the feasibility of generating free energy using Disc & Flat Neodymium magnets, and a DC motor with a pulley system. It consists of several key components:

1. Base Structure:
The prototype is mounted on a square base measuring 15 inches in length, 15 inches in width, and 2 inches in height.
The base provides stability and support for the rest of the components.

2. Disc & Flat Neodymium Magnets:
Disc Neodymium magnets are arranged on top of a rotating roller, which serves as the mechanism for the generation of motion. These magnets are strategically placed to interact with the Flat Neodymium magnets.
The interaction between the Disc & Flat Neodymium magnets creates the necessary force for initiating the movement.

3. Roller System:
The rotating roller is driven by a pulley system that is connected to a DC motor. The rotation of the roller, induced by the interaction of magnets, facilitates the movement required to generate electricity.
The roller is positioned at a height of 230 mm from the base, ensuring proper alignment and clearance for the magnets.

4. DC Motor and Pulley System:
A DC motor is attached to the pulley system, which is responsible for transferring mechanical motion to the roller. The motor is powered by the generated voltage from the system.
The pulley system amplifies the mechanical advantage, enabling the roller to rotate efficiently.

5. Voltage Output Measurement:
The system includes a setup for measuring the voltage generated by the motion of the magnets. This voltage is then used to power various small devices or contribute to an energy storage system.

6. Safety Features:
The prototype includes safety mechanisms to prevent overheating, ensure stable rotation, and protect the components from damage during the test phase.

This prototype serves as a proof of concept for free energy generation through the interaction of magnets and mechanical components. Its design allows for the testing and evaluation of efficiency and potential real-world applications.

4.3 Data Collection Method

Data were collected through direct observation and measurement using a multimeter (for voltage and current), stopwatch (for duration), and a tachometer (for RPM). The process was repeated in multiple cycles to ensure consistency.



Figure 4.1 Data Collection Moment

Table 4.1: Raw Data Table

Trial	Initial RPM	Voltage Generated (V)	Time LED Stayed On (sec)
1	600	2.7	3
2	590	2.6	3
3	605	2.6	3
4	580	2.4	2
5	600	2.5	3

4.4 Data Screening

Data collected were checked for accuracy, consistency, and relevance to the objective of evaluating the viability of free energy generation. Redundant data or unclear readings (e.g., voltage drop during hand interference) were discarded. The data shown are filtered and averaged for clarity and reliability.

4.5 Data Analysis

Average Voltage Output = (2.7 + 2.6 + 2.6 + 2.4+ 2.5) / 5 = 2.56 V

Average LED Duration = (3+ 3 + 3 + 2+ 3) / 5 = 2.8 seconds

Load: Using LED 6V 5W;

V = 5V, P = 5W

$P = V\ I = \frac{V^2}{R}$

$R = \frac{5}{6^2} = \mathbf{0.138\ \Omega}$

Output Power $(P) = \frac{V^2}{R} = \frac{(2.56)^2}{0.138} = \mathbf{47.49\ Watt}$

By analyzing data we get:

Load Resistance (R) = **0.138 Ω**
Estimated Output Power = **47.49 W**

4.6 Presentation

Graph 1: Voltage Output per Trial

Trial →	1	2	3	4	5
Voltage (V) →	2.7	2.6	2.6	2.4	2.5

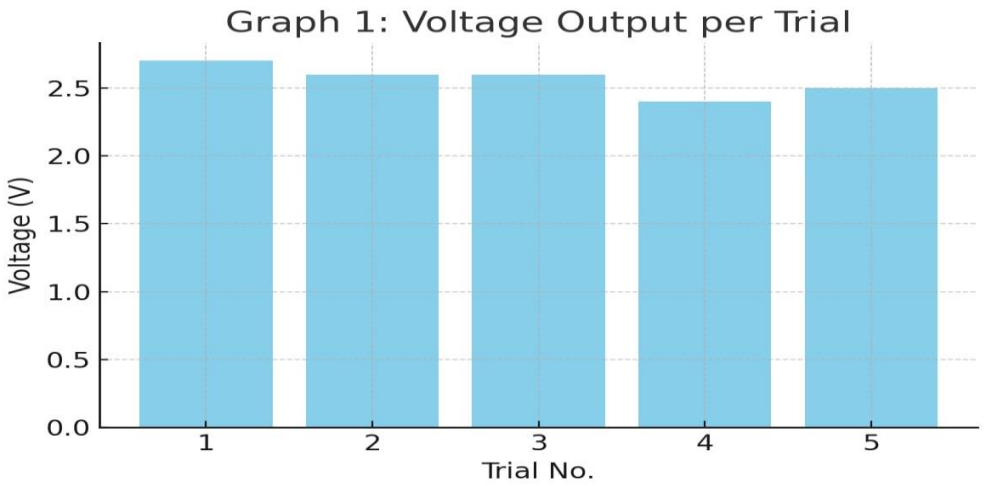


Figure 4.2: Voltage Generation Duration per Trial

Trial →	1	2	3	4	5
Time (seconds) →	3	3	3	2	3

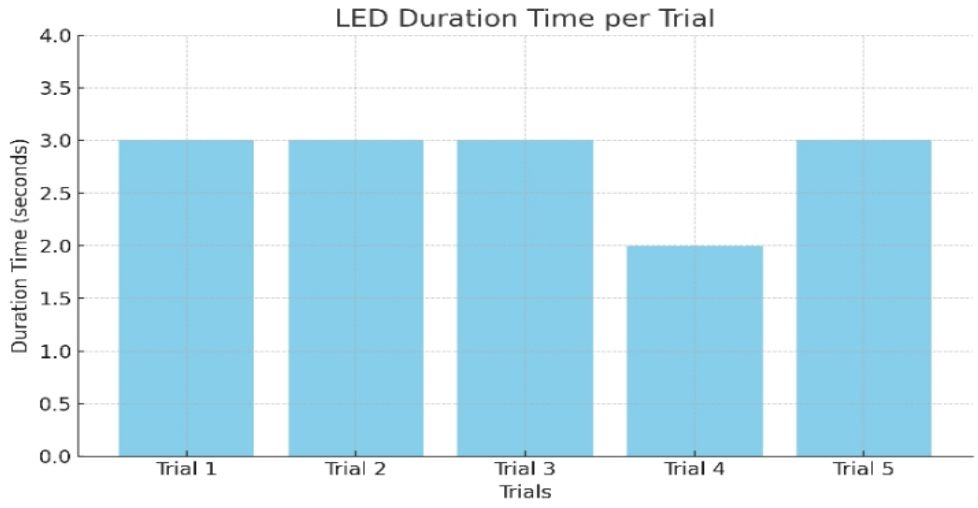


Figure 4.3: Graph of LED Light Duration per Trial

4.7 Discussion on Findings

The experiment validates the principle that a reactive magnetic system can temporarily sustain motion and generate measurable voltage. Although not continuous, the setup could generate 2.56V average output and keep a small LED powered for nearly 3 seconds after external power is cut off.

Significance:

- Demonstrates short-term self-sustaining generation from magnetic motion.
- Uses inexpensive materials, promoting low-cost renewable experimentation.

Limitations:

- Not a continuous power source.
- Friction and magnetic drag reduce efficiency over time.
- External trigger (battery or manual rotation) still required initially.

Impact:

- Could be used in educational kits, low-energy backup systems, or emergency lights in remote areas.
- Inspires further study into improving output through optimization of angle, material, or rotor-magnet ratio.

Chapter 5
CONCLUSION AND RECOMMENDATION

5.1 Summary of the work

This project aimed to explore the feasibility of generating free energy using a hybrid magnetic system composed of Disc & Flat Neodymium magnets, and a pulley-connected DC motor. The primary tasks included the design and fabrication of a rotor with angularly placed Disc Neodymium magnets, integration of fixed Flat Neodymium magnets to enhance magnetic interaction, and coupling of a pulley system with a DC motor to generate voltage. Data collection and analysis confirmed that this setup can generate measurable electricity capable of lighting a small LED for a short duration, even after disconnection from an external power source.

5.2 Conclusion

The following conclusions can be drawn from the work conducted:

- The system successfully generated an average of 2.56 V using the magnetic interactions and mechanical motion, without a continuous power source.
- The LED light remained on for an average of 2.8 seconds post-power cutoff, indicating brief self-sustained energy generation.
- The angular positioning of Disc Neodymium magnets (18°) and the use of both horizontal and vertical fixed Flat Neodymium magnets contributed to an enhanced magnetic thrust and sustained rotor motion.
- The system is a demonstration of reactive force utilization in electromagnetic systems, and offers insights for small-scale free energy models.

- This project fulfills its primary objective: to show the possibility of generating small-scale free energy using low-cost, easily available materials and magnetic principles.
- The findings may have practical merit in low-power emergency lighting, science education, and conceptual models for energy innovation.

5.3 Recommendation

Based on the results and observations, the following suggestions are proposed:

- System Improvement:
    - Use stronger neodymium magnets in place of small disc neodymium magnets to increase magnetic force and sustain rotation for a longer period.

- Reduce rotational friction by employing better bearings and low-friction materials for the shaft and rotor housing.
- Optimize rotor weight and balance to reduce energy loss due to wobbling or imbalance during rotation.
- Replace the DC motor with a dedicated generator coil system for better energy conversion efficiency.

- Recommendations for Future Studies:

  - Future studies should investigate advanced magnetic arrangements, such as Halbach arrays or multi-polar configurations, to intensify magnetic flux interaction and improve energy conversion efficiency.
  - Conduct experiments with different angular settings of magnets to find the most efficient alignment.
  - Replacing small Disc Neodymium magnets with high-grade neodymium magnets or hybrid composites may significantly increase magnetic field strength and system stability.
  - Employing computer-aided design (CAD) and simulation tools (e.g., ANSYS, COMSOL) can help optimize rotor and pulley geometry for minimal friction and maximum rotational efficiency.
  - Integrate capacitor storage to harness the generated energy for reuse or delayed discharge.
  - Analyze the thermal and magnetic losses in the system and design ways to minimize them.
  - Explore the use of magnetic shielding or flux concentrators to direct magnetic force more effectively.
  - Investigating magnetic levitation or low-friction bearings may reduce mechanical losses and improve system longevity.
  - Combining this magnet-based system with other renewable sources, such as piezoelectric or solar, might create a hybrid setup that improves overall reliability and efficiency.

Chapter 6

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