Motion Powered Battery

ESE 205

Members: Katherine Laue, Steven Schlau and Henry Roberts
TA: John Fordice Professor: Dennis Mell

Washington University in St. Louis

Overview

We sought out to create an efficient, “green” device that would compensate for the short battery life of new personal technological devices. This device could be stored in a backpack and would create power throughout the day. With further refinement, we hope to create a generator compact enough to fit easily on one’s person.

Prior to this class, we did not have a lot of experience with magnetic fields, Arduino coding, implementation, circuitry, and 3D printing. From this class, we have built a basic foundation in all of these areas, with a much better understanding of electrical engineering.

Use Arduino to measure voltage

Cost

Total cost for product development: $103.47

Objectives

1) Generate voltage using changing magnetic fields from the movement of neodymium magnets.

2) Rectify the current and store the outputted voltage.

3) Encapsulate design using 3D printed pieces for more efficient power generation.

Challenges:

1) Not producing enough voltage to charge a battery in a reasonable amount of time

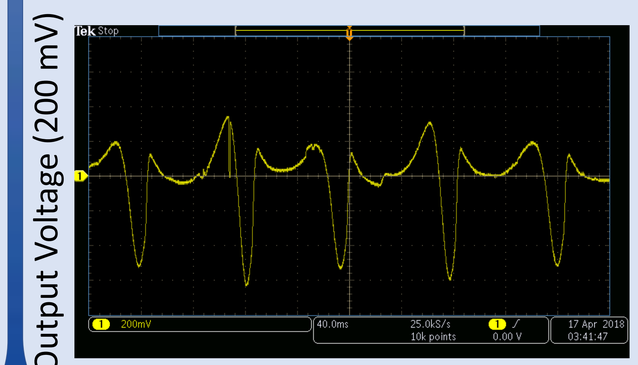
2) Measuring total AC output from tubes to determine how to make bridge rectifier circuit

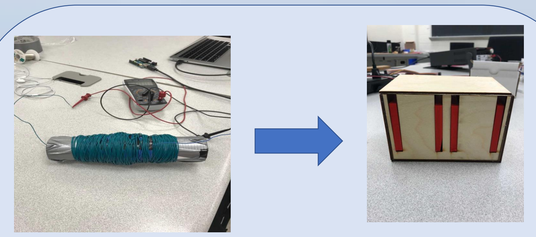
3) Converting the AC current to a DC current

4) Magnets close to each other causes interference and attraction

5) Need four 3D printed shelves, each of which takes at least two hours to print

6) General lack of experience in necessary skill sets





Solutions

1) Use multiple small tubes in series instead of one large tube

2) 3D print four shelves to hold the tubes

3) Only use six of the twelve holes in the shelves allotted for tubes to prevent attraction

4) Slide shelves into slits of wooden box to stabilize for more vigorous shaking

5) Use uninsulated copper wire for smaller coil sizes but same amount of voltage

6) Wrap each tube with 250 coils for total voltage calculations

7) Use a bridge rectifier circuit to stabilize current so it mimics a DC path