CALIFORNIA STATE SCIENCE FAIR
2003 PROJECT SUMMARY

Name(s)

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Project Number

23127

Project Title

A New Generation of Efficency

Abstract

Objectives/Goals

The goal of our final project (this science fair spurred a number of experiments, many of which failed)is to determine the efficiency of a hand-built AC generator in relation to the angular velocity of the magnets.

Methods/Materials

My procedure is 5k over limit, short version:
1 Drill holes in baby bottle
2 Wrap the wire around bottle
3 Sandpaper the ends of the wires and wrap each around of the plugs of the DC micro-amp meter
4 fashion magnet structure using tape and toothpick bracers
5 put magnets on nail and run nail through holes
6 get drill, grip the point of the nail as you would a drill bit
7 #1 turns drill crank, counting exact rotations; #2 records the number of needle fluxuations.
9) Repeat step 8 as many times as necessary using different speeds.

Results

Assuming that our instruments are accurate, our data showed amazing irregularities and loss in efficiency at higher rates of spin. When the speed of the magnet is lower, the gap between perfection (a 1:1 ratio between a single rotation of the magnet and a single transition from + to - and back) and the actual measurement of the fluxuations is much smaller. When the magnet speeds up, the flux per 10 seconds goes up with it, but the gap (difference between perfection and actual flux) grows much larger. Based off this data, we calculated the inefficiency coefficient ([Cranks per 10 seconds x magnet rotations per crank] - flux per 10 seconds, or Cr-a). The greater the value of inefficiency, the more alternations missed (basically the bigger the "gap" that appears in the graphs).

Conclusions/Discussion

Things we could have fixed in the experiment:
Firstly, we could have had more control of the experiment equipment in general. We should have had a more sensitive or more accurate meter to read the flux#s in the AC current (speaking with some of the professionals at the science fair, we were led to realize our data came from flawed instruments). We should have also had another person to read the stop watch while the magnets were spinning. Third, we could have made a better generator that would have put out a more powerful current that would have been easier to read and make better calculations on the project.

Summary Statement

Calculating the inefficiency of a handmade generator in relation to the angular velocity of the magnets.

Help Received

My father bought the materials that we listed; Sean's father provided us with the AC/DC, amp/volt meter; my grandpa helped me understand the units of measurements for electricity