Magnetic Mayhem

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In this project, we tested to see how coil size affects the firing capabilities of a coil gun. To begin with, a coil gun is a device that uses the electromagnetic properties of a solenoid (coil) to accelerate a projectile. Our gun used a simple control box, power supply, and capacitor bank to achieve this. We also had a small connection plate that allowed us to switch out our coils. The coils themselves were constructed from magnet wire wrapped around pen ink tubes. The projectile was a small nail with its head cut off. Once the coil gun was constructed, we decided to test the coil capabilities by spotting distance. We chose this due to the limitations of the circuit. We projected that the largest coil in terms of both turns of the wire and length of turns would create the largest magnetic pull and correspondingly produce the furthest distance. The testing setup was as follows: we placed a row of paper sheets on the ground with a measuring tape lying alongside. We fired the coil gun and spotted where the projectile landed. We then measured this point against the measuring tape and recorded the data. Our data ended up supporting our hypothesis that the largest coil would produce the furthest distance. Apart from the general theme that a bigger coil produced a better result, something interesting also occurred. We noticed that the shorter coils with more turns were more successful than the longer coils with less turns. For example, the two centimeter coil with four turns performed better than the three centimeter coil with two turns. This implied that the number of turns is more important than the length of the coil, but overall coil size was the most important factor.

Awards Won: