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Generator Wire Gauge Efficiency

The world is running out of fossil fuels. Compact generators could be used to collect energy that is being wasted. For example, generators could be placed into automotive shock absorbers to capture energy lost due to bouncing. This project changed wire gauge to see if gauge affected generator efficiency. It was predicted that the smaller gauge (larger diameter) would yield greater voltage output. To test this, two simple electric generators were built using two different copper wire gauges. The voltage output from these competing generators was compared to see which gauge was most efficient. Two different measuring methods were used, AC voltmeter and oscilloscope, to get the most accurate data. Measured results showed that the generator built with the larger gauge wire (smaller diameter) produced a small amount more voltage on average. These unexpected results sparked an additional investigation on generator operation. The efficiency was not affected by wire gauge. Rather it was affected by the number of wraps of wire which varied due to the wire gauge. The larger diameter wire (smaller gauge) built up more quickly and consequently had a larger wrapped circumference, reducing the number of turns. The smaller diameter wire (larger gauge) had a smaller circumference with a smaller amount of build-up allowing a few more turns resulting in slightly more voltage. The implications of this finding show that a future wire gauge efficiency experiment should control the number of turns of wire instead of wire length to ensure more accurate results.