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Speed or Pressure

The purpose of this investigation was to determine how speed and pressure have an effect on the overall electrical output of a hydroelectric system. My project is based on Bernoulli's Principle which states that when velocity of a fluid increases, the pressure the fluid exerts decreases. I hypothesized that more speed would increase the overall electrical output because it would allow the water to spin the turbine faster. The experiment involved building three different systems of different sizes, a two inch diameter system, a three inch diameter system, and a four inch diameter system. Each system had a turbine that I designed and built myself, and I ensured that each turbine was identical. The design of each system was nearly identical; the only thing I changed was the diameter of the pipe I used. I pumped water through each system 5 different times to test my hypothesis. The data collected did support my original hypothesis. The 2" system, which was subjected to the most speed and the least pressure due to Bernoulli's principle, had an average output of 0.36mV, as opposed to 0.1mV by the 3" system, and 0mV by the 4" system. My findings led me to believe that speed is more important for a turbine than pressure. This is not to say that pressure is not important, however. Heavier turbines require more pressure to turn them, though when that pressure is reached, speed must be applied to maximize efficiency and harness the potential energy of the water.