Gearin' Up

Stoner, Haven (School: Burlington Public School)

The purpose of this experiment was to test the strength of 3D-printed gears with different infill levels. Infill refers to how much material is used for the inner portion of an item. This idea came about because of gear breakage over time of the robot my robotics team built this past year. When testing the strength of a gear, the tooth is the most important part because a tooth is the portion that is most likely to break due to contact stress. The hypothesis was that the higher the infill level, the more force a gear could withstand. The procedure was to clamp each gear to a table and add weight to one tooth at a time using a vice grip with a bucket hanging off, then to add weight to the bucket after the tooth break, and to repeat for a total of three trials per gear. After all the data was recorded in pounds, it was converted into kilograms, then newtons, and made into a bar graph. The hypothesis was supported; the higher the infill level, the more force a gear could withstand.

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