

## Material, Strength and Sound Correlation Abstract

With a growing amount of manufacturing utilizing 3D printing, there is a correlation between strength and material which can affect sound produced by sirens. An air raid siren that has been downloaded from Thingiverse.com spins with a 49:1 gear ratio to produce 2 tone sounds and with that large number of revolutions comes friction, and in order to create a 3D printed air raid siren, the siren must be made out of a material that can withstand high temperatures without melting and quick rotations without delaminating. There are many materials that can be printed to withstand those forces, but it comes at a cost. In order to maximize sound at the cheapest price there will be different materials for different components depending on the need for heat resistance or strength. With the combination of five materials: PLA, ABS, PETG, PC ISO and ULTEM 9085, the 3D printed air raid siren will be able to maximize sound output without melting or breaking from the extreme forces.