CALIFORNIA STATE SCIENCE FAIR
2017 PROJECT SUMMARY

Name(s)

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Project Number

J1807

Project Title

Fighting Fire with Sound

Abstract

Objectives/Goals

Viet Tran and Seth Robertson built the first handheld fire extinguisher that uses sound instead of the toxic chemicals of a typical extinguisher. Yet, prior research in this field has not yet specified a certain frequency that excels above others. The purpose of this experiment is to find the most effective frequency of sound for extinguishing fire in the least amount of time with my own customized, sound-powered fire extinguisher based on Viet Tran and Seth Robertson#s model.

Methods/Materials

-BASIC MATERIALS

Lighter fuel (rubbing alcohol), A timer, steel pan

-SOUND-POWERED FIRE EXTINGUISHER

computer (sound generator), Appropriate cords to connect to the subwoofer, 12 inch or 30.5 cm cardboard collimator (cylinder around the subwoofer) with a whole at the end with a diameter of 13 cm, 12 inch subwoofer, 100 Watt Amplifier (power for subwoofer).

Tested the time (sec) that it took for each frequency to extinguish fire.

Results

The results concluded that 60 Hz, with an average extinguish time of 0.447 seconds, is the most effective frequency for extinguishing fire. Out of the frequency range of 20 Hz through 60 Hz that successfully extinguished fire, 60 Hz had the fastest extinguish time, 0.126 seconds faster than its follow up frequency, 40 Hz.

Conclusions/Discussion

60 Hz was the most effective frequency of sound for extinguishing fire. Current fire suppression techniques release toxic chemicals or simply create a larger mess of some sort, but sound only sends energy through what already exists to stop a fire. This information may be applied to future work with sound and its fire extinguishing capabilities that may prove to be better than our current techniques.

Summary Statement

I found that 60 Hz was the most effective frequency of sound for extinguishing fire in the least amount time, using a homemade sound generator system.

Help Received

Research Forester David R. Weiss, Ph.D. gave me tips on how to design my experiment and I built and performed the experiment myself.