

DESIGN AND FABRICATION OF HYDRAULIC COMPACT MANHOLE CLEANING MACHINE

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Keywords:

sound wave, fire extinguisher, 360° rotating vehicle

Introduction:

This project is about “Design and fabrication of Automated 360⁰ machine with a sound wave-based fire extinguisher”. This machine moves in all directions and this design provides us to extinguish the fire using sound waves. With a fire extinguisher we need to hold it, the point in the direction of fire, then put it out and it requires time and human involvement, So we will design a 360⁰ wheel rotating vehicle to reduce and eliminate problems when a fire is caused. The primary purpose of a sound wave-based fire extinguisher is its easy operation, easy to handle, and leaves no residue after usage, and doesn't harm the environment. A sound wave extinguisher will extinguish the flame of all types and the frequency range can be measured between 40Hz to 60Hz

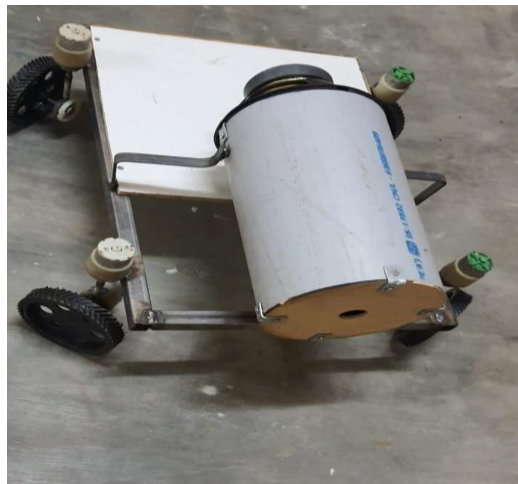


Fig 1: 360° Rotating Machine With Sound Wave Based Fire Extinguisher

Objectives:

1. To extinguish fire using sound wave
2. To check the frequency range used to extinguish flame and to identify the frequency range that will be able to suppress an open flame.
3. To identify an optimal range of frequencies in which to achieve the minimum sound energy when extinguishing fire and to identify an optimal range of frequencies.
4. Reduce in revolving time
5. To turn the machine with no leaving its centre of gravity.

Methodology:

A schematic of the experimental set-up used for testing the performance of extinguishing fire using sound wave is shown in the below figure. The sound and flame interaction are monitored using the android camera. A range of frequencies are produced through the cannon and interaction of the flame is recorded respectively. Then the time to extinguish the flame, the frequency and the distance at which the flame is placed from the cannon is measured and noted down. Then the optimal frequency to extinguish the flame is noted.

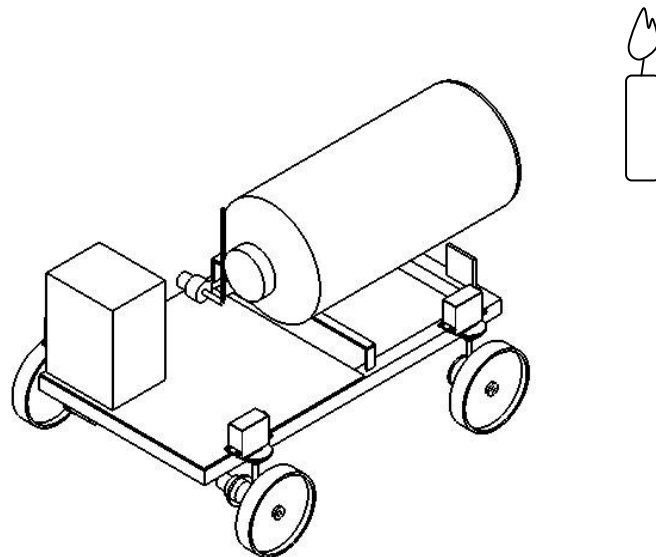


Fig:2 Schematic Diagram Of Experimental Set-Up

Conclusion:

In the present research an attempt has been made to investigate the effect of the geometry of the vortex to optimize the critical parameter such as frequency, length and time. The whole system is automated controlled by android phone using blynk app. It is found that the optimal frequency to extinguish fire is 53hz at a distance of 700mm and time taken is around 0.7-1 sec. The range of optimal frequency is 55-60kHz. The distance of the flame placed from cannon is around 700-1000mm at which the fire is extinguished beyond that is not possible with our prototype.

Scope for future work:

The machine can be mounted with a thermal camera so that auto detecting of heat areas is made possible and live images of the incident can be seen through a wireless camera. This device specially uses new ways of tackling fires in enclosed spaces such as aircraft cockpits and ship hold, kitchen, hospital, shopping malls, industry and railways where fires are obviously devastating and incredibly difficult to control. Generally in an electrical panel circuit, using water is not possible as water conducts electricity, thus using sound waves to extinguish fire is one of its main application