Lab report on measuring the speed of sound

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1 Introduction

In this lab project's objective, I'm going to measure the speed of sound. We need to find distance traveled, frequency and wavelength. The distance traveled is actually the distance per unit time that a sound wave propagated through an elastic medium. Furthermore, materials will be assuredly needed to complete this experiment such as measuring ruler, water, conical flask, f generator, a phone and graduated cylinder. Therefore, with these initial sources, we will be able to measure the speed of sound.

2 Materials

Measuring ruler, Water, Conical flask, F generator, Graduated cylinder, a phone

3 Method

At first, we need to fill the graduated cylinder with water and use ruler to measure the height of water contains in the cylinder.Secondly, we can use the F generator to track the highest resonance of sound. However, by doing this, it will eventually give you a result with error. Therefore, we will have to calculate the percentage error right after the final result. In order to calculate wavelength, we can use this formula: lambda/4. Lastly, we use another calculation to get the speed of sound which is v=f/lambda. After that, we repeat the same for other heights of water.

4 Data

Water(volume,mL): 800, 600, 500, 200
Length(m): 0.17, 0.23, 0.28, 0.38
Frequency(Hz): 485, 380, 305, 223
Wavelength(m): 0.68, 0.92, 1.12, 1.52

5 Calculations

For example, as we have data shown above, we now can use our data to apply on the formula to find wavelength and the speed of sound. This is the calculation for the speed of sound when the water level is at 600ml, length is at 0.23m, frequency is at 380Hz and wavelength is at 0.92m.

Therefore, we fill the equation with: lambda=4L= 4 x 0.23= 1.12m Once we have lambda, we use lambda x frequency to find the speed of sound: v= 308 x 1.12= 343.2 m/s. Then you can round it to 344 m/s since it's only 0.2 higher.

6 Percentage Error

As I've mentioned earlier, the calculations might include error so counting the percentage error would help us acknowledge how much error it would induce while doing the experiment. Percentage error calculation: (344-343.2)/343.2= 0.524 percent

7 Final results

Water(volume, ml): 800, 500, 200
Measured speed(m/s): 331, 343, 338
Percentage Error(percent): 3.95, 5.98, 1.32

8 Conclusion

After this experiment, I've acknowledged varied results from the speed of sound I calculated. In fact, the difference the water level, the difference result you would get as answers. As you can see in my calculations, the distance will increase if the water level increases.