Lab Sound Speed

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1 Introduction

The wave of speed: A wave is a disturbance that moves along a medium from one end to the other.

$$v = \lambda f$$

Velocity (v) - the speed at which a wave travels. Wave speed is related to wavelength, frequency, and period. The most commonly used wave speed is the speed of visible light, an electromagnetic wave.
Frequency (f) - the number of crests of a wave that move past a given point in a given unit of time. The most common unit of frequency is the hertz (Hz), corresponding to one crest per second.
Wavelength (λ) - the distance between consecutive corresponding points of the same phase, such as crests, troughs, or zero crossings and is a characteristic of both traveling waves and standing waves, as well as other spatial wave patterns.
Standing wave – is a wave in a medium in which each point on the axis of the wave has an associated constant amplitude. The locations at which the amplitude is minimum are called nodes, and the locations where the amplitude is maximum are called anti-nodes.
Resonance - is a phenomenon that occurs when a vibrating system or external force drives another system to oscillate with greater amplitude at a specific preferential frequency.

2 Materials

Water
Chamber
Fork

3 Methods

First, we calculated the predict λ for each forks from the formula $v = \lambda f$.
Second, we put the water at the predict distance from the forks.
Last, we measured the distance of the loudest sound from water to fork.

4 Data

First fork $f = 512$Hz
Second fork $f = 384$Hz
Third fork $f = 256$Hz
v for all $= 340 \frac{m}{s}$

5 Prediction

1.
f=512Hz $\lambda = \frac{340\frac{m}{s}}{512Hz} = 0.664m$
$L = \frac{\lambda}{4} = \frac{0.664m}{4} = 0.166m = 16.6cm$
2.
f= $384Hz \lambda = \frac{340\frac{m}{s}}{384Hz} = 0.888m$
$L = \frac{\lambda}{4} = \frac{0.888m}{4} = 0.166m = 22.2cm$
3.
f= $256Hz \lambda = \frac{340\frac{m}{s}}{256Hz} = 1.332m$
$L = \frac{\lambda}{4} = \frac{1.332m}{4} = 0.333m = 0.333cm$

6 Results

1.
L = 16.5cm
$v = 4 \times L \times f = 4 \times 0.165m \times 512Hz = 388\frac{m}{s}$
2.
$L = 21.5cm$
v= $4 \times L \times f = 4 \times 0.215m \times 384Hz = 330\frac{m}{s}$
3.
$L = 32.0cm$
v= $4 \times L \times f = 4 \times 0.320m \times 256Hz = 327\frac{m}{s}$

7 Conclusion

After the experiment, I could figure out the way that can proof the speed of
sound wave is 340 m/s. However, there are still some errors in the results, but

they are close enough to say the speed of sound wave is 340 m/s.