Replica of an Acoustic Liner Simplified

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The purpose of this experiment is to be able to show a simplified replica of the complex systems inside of acoustic liners. This will demonstrate the destructive interference that an acoustic liner does to dampen the sound of the airplane engine. This was a simulated acoustic liner by using glass bottles which behave similar to quarter wavelength resonators. I was able to adjust the volume by increasing the water in each bottle every time. So all together I tested 4 different cavity depths and as expected found significant noise reduction for each different cavity depth. However, the noise reduction did not match the predicted frequencies of 1950 Hz with a depth of 44 mm, 2600 Hz with a depth of 33 mm, 3900 Hz with a depth of 22 mm, and 7800 Hz with a depth of 11 mm. My results followed the expected trend of higher frequencies being canceled as the cavity depth was decreased, for at a depth of 44 mm the frequency was 1050 Hz and then at a depth of 11 mm the frequency was 1320 Hz, but it was not canceling out the frequency that I had calculated.

Awards Won:

Lawrence Technological University: STEM Scholar Award, a tuition scholarship of $19,650 per year, renewable for up to four years and applicable to any major