

CHAPTER OVERVIEW

15: Acoustics

The study of what happens to sound in an enclosed space or as the result of interactions with large objects such as buildings is called **acoustics**. Humans have been trying to improve the acoustics of auditoriums and other public spaces since the time of the ancient Romans. [Marcus Vitruvius Pollio](#) worked as an architect and engineer in the first century BCE and is credited with installing resonating cavities called [Echea](#) in Roman amphitheaters. These were made of brass or clay and placed under the seats of the auditorium to enhance the voices of actors on stage. None of these devices still exist and it is not clear if they actually worked or not.

The rules presented previously (Chapter 7) of how waves interact with objects, such as reflection, refraction, path difference, diffraction and interference, govern how sound will behave inside rooms and auditoriums as well as outdoor concert pavilions. Although much is known about the topic, it is still difficult to know exactly what a given band or orchestra will sound like in a newly designed auditorium.

Key Terms:

Acoustics, reverberation, comb effect, echo, direct sound, reverberation time, absorptivity, standing waves, dead spot, feedback, binaural hearing, reflection (specular and diffuse), exponential decay, attenuation, infrasound, matching room acoustics to type of music.

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