**The Mysterious Ways of Sound**

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**Sounds behave in special ways depending on different circumstances.**

A sound is reflected when it meets an obstacle. At the same time, it will try to spread its vibrations to that obstacle. A hard wall reflects nearly all sound. A porous wall reflects little sound, because it “eats up” or absorbs the sound in its pores.

A heavy wall takes over little of the sound vibrations. As a result, very little of the sound continues on the other side. A light wall takes over many of the vibrations. Therefore, much of the sound continues on the other side. It is not surprising that heavy plasterboard is used when you don’t want those in the next room to hear what is said.

**A sound is better conducted along a surface than in a free space.**

Have you ever been in a bigger dome shaped building standing in the gallery high above the floor with the ceiling way higher up? In that case you may have tried to whisper along the wall to a person standing on the other side. And then you probably tried to talk directly to the other side. Which sound came over the best? The whispering along the wall or the talk across the room? The whispering along the wall functioned supremely best.

**Low frequency sounds will try to skip obstacles.**

A friend lives on the second floor by a noisy road. On day noise barriers were erected. It helped some. But the low frequency sounds did not get very much weaker. Coincidentally he moved to the first floor. Here was a much better attenuation of the low frequency sounds. But the high frequency sounds were exactly the same as on the second floor.

**High frequency sounds can´t be bothered to travel as far as the low frequency sounds.**

Maybe you´ve noticed that as you move away from a concert the treble will weaken faster than the bass. Even from far away you can hear the bass even though the treble is gone. High frequency sounds are fast vibrations, low frequency sounds are slow vibrations. When I was a child, I thought it was fun to bathe in a bathtub. When I moved my palm quickly back and forth in the water it was much heavier than to move my hand slowly. Vibrations meet more resistance the faster they vibrate. That is why high frequency sounds (fast vibrations) have a shorter reach than low frequency sounds.

**All things have favorite vibrations.**

All things like to vibrate with a certain special velocity (i.e. a special tone). And then they vibrate quite vehemently, that is with large movements. This favorite vibration is called resonance. Sometimes we call it natural fluctuations or own vibration. The velocity of the favorite vibrations is called resonance frequency. The frequency (vibration velocity) of the resonance is depending on a number of things, e.g. length, weight, volume (size).

Even air can come in resonance. Perhaps you have tried to make howling sounds from an empty bottle. It is the air in the bottle that comes in resonance. If you fill some water in the bottle or try with a smaller bottle, the howling sound will have a higher frequency. This is because the smaller amount of air has another resonance frequency, in other words another vibration velocity as its favorite.

The people who construct loudspeakers don´t like resonances very much, because they create imbalance in the sound. If the constructors don´t resort to tricks to counteract resonance, it can result in rather bad sound in the loudspeakers. Typically, you will recognize a resonance as a tone which is far too dominant in the total sound.

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