



Things That Make You Go Hum

By Marshall Chasin, AuD

Taos, New Mexico is the home to the Taos hum. It's not a sports team although that would be a great name. It is, however, the name of an indie band, but that's not the topic of this article. The Taos hum is a constant low frequency hum that many of its residents can hear, day or night.

It's not very loud so people can't typically hear it during rush hour. Generally it is better heard inside a house (or when it's very quiet), earplugs don't affect it, and some report that it's more of a "feeling" than an actual sound. Similar hums have been reported elsewhere around the world and have a name associated with their location – Auckland hum in New Zealand, Bristol hum in England, and the Kokomo hum in Indiana but, so far no humming in Canada. The interesting thing is nobody seems to be able to find the source.

When first popularized by the American media in the early 1990s, scientists tried to measure the sound and there are some published reports of the various spectra. It tends to have most of the energy around 55–60 Hz (near the bottom of the piano keyboard). The Taos hum was the subject of television shows such as *Unsolved Mysteries* and the *X-Files*.

Based on what is known about acoustics and about how our hearing mechanism works, it is possible that most of the energy of the Taos hum is below our range of hearing but that certain of its higher pitched harmonics (which are still very low frequency) are the ones that are being perceived. Such a low frequency sound would easily be masked by environmental city noise so that the

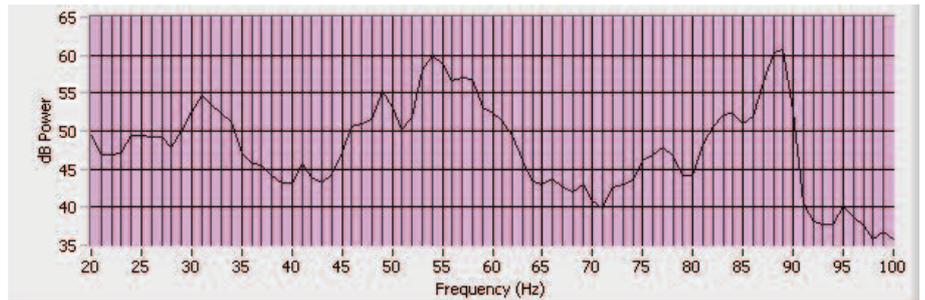


Figure 1. The power spectrum of the Auckland hum

comment that it is heard better inside houses or in quiet locations, makes sense. Also, since earplugs have minimal effect in the very low frequency region, it also makes sense that the Taos hum would not be affected by earplugs. All of this sounds strange, but its straight forward science and not really the subject of the *X-Files*. Low frequencies have long wavelengths and unless an obstruction such as a wall of a house or an earplug is about half of the wavelength, then it has minimal effect. The wavelength of 50 Hz is about 6 meters so obstructions less than 3 meters thick (such as earplugs) would have no real effect on the attenuation of sounds.

The power spectrum of the Auckland hum is shown in Figure 1. This is from Tom Moir of the Massey University in Auckland, New Zealand. There are two important features of this graphical display: (1) The first resonance (peak) is at about 30 Hz, the second at about 55 Hz and the third at about 88 Hz. The second and third resonances are roughly double and triple the values of the first peak at about 30 Hz. This suggests that these sounds are harmonics of a system that has a half wavelength characteristic. If it was just noise of a poorly designed measurement system, there would not be

any such regularities in the response. One criticism of these power spectrum measurements is that they are false, but the regularity in the pattern of peaks would suggest otherwise. (2.) Despite the fact that the power spectrum has peaks on the order of 60 dB SPL, these sounds are near our threshold of hearing, since the minimal audible field correction for such low frequencies are on the order of 40–50 dB, so these peaks are roughly 10 dB SL.

Some candidates for potential sources of the various hums include power lines, ocean currents, dynamic geological structures, or spontaneous otoacoustic emissions. The oceanic and geologic etiologies are possible as are spontaneous otoacoustic emissions. My personal favourite is space aliens. To date there is no real evidence to support the power line etiology since the hum is just as audible during power outages and the power spectrum has a peak at 30 Hz which is one half what would be expected from a "60 Hz buzz" power line (50 Hz in Europe and Australia). However, if space aliens use a 30 Hz alternating current in their equipment, this would be evidence of an extra-terrestrial source.

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