

# How Loud Is **TOO LOUD?**

By Cindy Atoji

**T**urn it up!! Who doesn't love a rocking loud concert? Here are some true online comments:

"I watched a soda can dance on the table, it was so spectacularly loud!"

"The bass was so loud, it made your entire body quiver, from your hair to your heart."

But how loud is too loud? Black Eyed Peas frontman will.i.am has reportedly revealed that he suffers from tinnitus after loud sound exposure at gigs and concerts, a condition in which there's a constant ringing in the ears.

There have even been lawsuits filed by audience members against bands, one of the latest being a claim this summer from a woman saying she suffered permanent hearing loss after a

Justin Bieber concert in Portland, Ore. And health experts say that any noise above 110 "decibels" — the same noise level as a chain saw — can lead to permanent hearing loss in as few as 30 minutes.

If you're an avid music listener, you've probably noticed that older songs such as "My Girl" by the Temptations are softer than current releases such as "Outta Your Mind" by Lil Jon. This is because of the "Loudness Wars," the competition to release records with increasing loudness. These "wars" began with the switch from analog to digital recording in the 1980s. Analog technologies record waveforms as they are, whereas digital technologies convert them into sets of numbers. Digital recording allowed producers to push the output levels of records to the ceiling without causing sound distortion. After all, the higher the volume, the more listeners pay attention, right?

In the live sound industry, blasting sound levels and blaring special effects loud enough to cause noise-induced hearing loss are often considered an essential, audience-pleasing ingredient. Rick Camp, a Las Vegas-based sound engineer whose credits include stints with Destiny's Child and Beyoncé, said he's had to amplify up to 110 decibels for a Chris Brown concert, just for the singer to be intelligible above the screaming crowds. With the help of a decibel meter at the front of the arena, Camp measures sound pressure to determine how intense sounds are. He measures them in decibels, a logarithmic scale based on the sensitivity of the human ear.

"Most arenas can stand 110 to 115 decibels before the sound becomes a blur," says Camp. Many things need to be considered for sound control, he adds, such as the low-frequency response of the room (the way the acoustics of a concert venue respond to the sound wavelengths); the stage configuration; the angling and positioning of speakers and amplifiers; and the type of console and other equipment being used. Even the temperature and humidity may affect sound distribution.

"Sound engineering is both a science and an art," says Camp.

Although noise levels at concerts can be controlled through a mix of acoustics and electrical and mechanical engineering — with some physics thrown in — sound engineers let their ears be the final judge of just how loud is too loud.

"It is important to control sound levels both to protect hearing as well as to limit annoyance," says Herb Singleton, managing partner of Cross-Spectrum Acoustics LLC, a company in Massachusetts.

And Camp has one final word of advice: "Bring earplugs to concerts." ■



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