

TECH NOTE #102 Sound dispersion

Ever wonder why your cabinet sounds better when you stand off to the side? Did you consider why the pros mic a speaker from the edge instead of in the center? Ever have people in the audience tell you your guitar tone is really loud and shrill but it sounds great to you onstage? This is a result of the “directionality of loudspeakers”. Speakers inherently do not project all frequencies equally. As the frequency increases, the dispersion decreases. In non-technical terms, this means the higher you play on your guitar neck, the more directional your sound will be. By nature, speakers tend to be somewhat non-directional at lower frequencies. This means you can stand off to the side of your cabinet and you will hear basically the same bass and lower mids as your audience is hearing right in front of your speakers. On the other hand, and this is where the trouble starts, higher frequencies tend to “beam” from the speaker. While you are standing off axis from your cabinet (not directly in front of it) you are hearing an even balance of lows, mids and highs and feeling pretty pumped about your awesome tone. Unfortunately, unbeknownst to you, the listeners directly in front of your cabinets are being killed by the high end that is “beaming”. FYI, contrary to what one might deduce, having more speakers in a 2 by 2 arrangement, as in a 4x12 cabinet compounds the problem and makes the beaming worse by narrowing the dispersion even more. Next time you play take a moment to walk from side to side and squat down in front of your speakers. You will be amazed at the difference between listening off axis (to the side) and listening on axis (directly in front). Have you ever seen a band in a small place where you are hearing the stage volume and wonder why the guitars sound so bright? Doesn't that guitar player hear that obnoxious high end? That knucklehead must be deaf!?!? More likely he is standing close to his cabinets and all that high end is just blowing past his/her legs so he/she doesn't even hear it. OK..so now I've pointed out how we've all been playing for years believing everyone in the crowd thinks our tone is as awesome as we think.....or is it? Great, so what can you do about it? The key is to place your speakers so you are hearing the same thing as everyone else. If you can get the cabinets far enough behind you, you probably will pretty much hear everything just fine. If that is not possible, try placing the cabinets pointing across the stage sideways instead of forward at the audience. At least then you will only be killing your other band members instead of the audience. Chances are you often want to kill the drummer or bass player anyway, right? The best thing you can do is to tilt your cabinets so that they are pointed at your head. I guarantee you will set your controls way different from what you normally do. There are a number of possible options to combat the beaming problem. A few companies make a solid disc that you install in front of the speakers to help disperse or attenuate the high end. These discs have met with some success though they do introduce some phasing issues. Also, because there is a solid piece in front of the speaker, if one places a microphone in front of the disc (which happens quite often at shows), it can sound weird because the disc is altering the sound into the mic. There are some other smart people attempting to address the problem. Most involve using some form of foam piece in front of the speakers. The method we find works best for both live, and when placing a mic in front of the speakers, utilizes a sound absorbing 4" x 1" foam disc placed on the back side of the grill cloth directly in front of the speaker. One brand is “tone Bra”. The discs are made of an acoustical foam material that attenuates the beaming highs instead of blocking them. I'm always surprised whenever this subject is discussed and many guitar players make the statement “I hate the way my guitar sounds when I stand in front of my speakers”. The answer is not to simply stand off to the side so it only sounds good to you because everyone else is still hearing the sound that you hate. Remember why we play music? It is for others to enjoy. We should always make a conscious effort to think about what the audience is hearing, too.