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Subject: Horns in groups, radiating into constrained space and room modes

Posted by [Wayne Parham](#) on Mon, 20 Aug 2007 14:18:52 GMT

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You can certainly make horns smaller that will be used in groups or boundary loaded. Making them smaller on this assumption makes stand-alone use not an option though.

Have you played around with Hornresp yet? It looks a little bit intimidating at first, but once you've modeled a horn with it, it becomes very easy to use. You'll appreciate using it to test your ideas before making a prototype. Helps to narrow down your choices with it.

The difference between a folded horn placed in a trihedral corner and a direct radiator placed in a corner depends entirely on the characteristics of each. However, assuming both are placed within

Corner loading for basshorns acts something like a mouth extension. Response is made smoother and on-axis sensitivity is increased, at least at low frequencies. Horns usually provide directional control, but to what extent depends on the horn's size and shape. At low frequencies, the horn usually isn't big enough to provide any directional control but at higher frequencies, it is. So the corner provides directional control at the lowest frequencies where the basshorn can't.

The net result is on-axis sensitivity is increased 9dB at very low frequencies, but less as frequency rises. This is because the horn is acoustically small at deep bass frequencies but it becomes acoustically large at some point higher in frequency. At the lowest frequencies, the corner is providing directional control, narrowing the radiating angle and increasing on-axis sensitivity as a result. Higher up, the horn is providing directional control and the corner has less influence, if any at all.

corner raises its on-axis sensitivity. The alignment of the cabinet should be slightly overdamped because this will work best for corner loading. What you get is 9dB sensitivity increase. The corner provides directional control for the direct radiator the same way it does for the basshorn. At very low frequencies, the corner is probably the only feature acoustically large, so it is the only thing that has any effect.

Whether a horn or a direct radiator is corner loaded, the room has other features that setup standing waves inside of it. If the trihedral corner were open, you could expect it to provide perfect pattern control down to the deepest frequencies. But the opposing walls create reflections and standing waves are a result. This creates nodes of high and low energy spots within the room. No matter where you place a woofer, this is true. But the point I want to make is that radiating from a trihedral angle provides a specific coverage pattern but room modes modify that a great deal. You can use a program like CARA to model room modes.