Subject: influence of interior
Posted by JackBlue on Wed, 01 Sep 2004 19:46:48 GMT
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Hi all, first post here.I know that a speaker box acts to modify the woofer parms. This is part and parsel of speaker design, matching the box and speaker to act together. However, the front of the speaker is assumed to be open into infinite space. Now when the front of the speaker is enclosed as tightly as a car interior, it makes another cabinet that is only maybe 10x the size of the rear box. In some cases, the car cabin may be almost as large as the rear box. The fact is they are nearly the same volume or at least a near ratio, less than 10/1 or so. Not at all an infinite space. That brings me to the point. What happens to the speaker when the front firing space is closed like that? Are there programs that help calculate resonance and frequency response?Thx,JackBlue

Subject: Re: influence of interior
Posted by Bill Fitzmaurice on Thu, 02 Sep 2004 11:52:22 GMT
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Progams aren't necessary, it's not that complicated; what occurs is called room lift, and it boosts the response of the speaker at a 12dB/octave rate where the room's longest dimension is a half-wavelength. It is this phenomena that allows many car subs to work at all, since most have abysmal F3s that wouldn't function to sub frequencies outside of the confines of a car.

Subject: Re: influence of interior
Posted by JackBlue on Thu, 02 Sep 2004 14:33:25 GMT
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Hi Bill,Thanks but what I want to know is something else. I know about room/cabin gain. You're absolute right about that. What I mean is this. Lets say you have a speaker with unmounted fr of 25hz. Put it in a box and fr goes up. For sake of example, lets say the woofer goes to 45hz in a 5cuft box. That's what it does if the front is open to free air though. Now what happens to fr if the front space is also 5cuft? The fr must go up more, but how much? I want to know because that will change the frequency response. There is room gain, but there is also the q and that is what I am loking for here. How do you calculate damping when the front volume is small?Thx,JackBlue

Subject: Re: influence of interior
Posted by JackBlue on Thu, 02 Sep 2004 14:41:56 GMT

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I just thought of this. I wonder if cabin gain is partially caused by this phenomenon I'm thinking about and the interior 'pushes' the alignment. Maybe room gain is part standing wave modes, part 12db/oct lift and part from pushing the alignment. What do you think?

Subject: Re: influence of interior
Posted by Bill Fitzmaurice on Fri, 03 Sep 2004 18:10:20 GMT
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Actually the Fb will go down when you put the box into a car. The effect is similar to a dual chambered alignment, with the volume of the car interior being the second chamber, but the effect is dwarfed by cabin gain to the extent that it is rendered moot. Standing waves and room gain aren't the same, and you don't get both simultaneously, as one requires less than 1/2 wavelength room dimensions while the other requires at least 1/2 wavelength dimensions.

Subject: Re: influence of interior
Posted by JackBlue on Fri, 03 Sep 2004 19:46:29 GMT
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Why does fb go up if the box is behind the speaker but down if the box is in front?

Subject: Re: influence of interior
Posted by Bill Fitzmaurice on Sat, 04 Sep 2004 21:30:30 GMT
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Model a closed box speaker, then model it again as a 4th order bandpass, keeping the rear chamber volume constant. The Fb will drop. When you put a sealed box speaker into a car the car's interior serves as the front chamber, which you are sitting inside of. It's the mass of the air in the car that causes the Fb drop, as within a small room it adds to the mms of the driver via acoustic coupling that doesn't happen in larger rooms.

Subject: Re: influence of interior
Posted by JackBlue on Sun, 05 Sep 2004 16:13:39 GMT

Did one better, measured my woofer and it did as I expected. FRee air was 33hz, in rear box was 47hz, added front box raised again to 57hz. I could touch the cone and make resonance shift way up. Whatever I did that made the cone stiffer raised the fr. In car, I didn't see a shift so maybe its a mute point. Guess the volume is large enough that it didn't have any impact. Wonder if several high displacement woofers are used if the effects will show up though.