Subject: Re: That's funny
Posted by Wayne Parham on Fri, 04 Aug 2006 16:23:47 GMT
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I don't know quite how to say this because I don't want to offend anyone. There are some acoustical engineers that I have a great deal of respect for. But in general, I think acoustical engineers and sound technicians work in a sort of "soft science" way. There is a tendency to misunderstand common physics, and to talk about audio as if it were in a mystical ether that isn't fully understood. Others seem to want to argue minutia, like theology or philosophy students. It's counter-productive. In my opinion, analysis and evaluations done by physicists and mechanical and electrical engineers are much more reliable.As an example, I've been having a discussion with some guys about heat transfer in loudspeaker motors. These are guys that work in prosound, where power levels are pretty high. But a lot of them have a complete lack of understanding on how heat transfer works. They have an almost sophomoric outlook, even those with some standing in the prosound field. Any mechanical engineer immediately grasps the issues, but the prosound guys talk from a seat-of-the-pants perspective, one that is almost completely wrong. They couldn't find the truth because they weren't willing to look. They reminded me of guys running flathead Fords at the racetrack even after overhead valve engines started cleaning their clocks. They had horse and buggys, and by God, they were going to stick by them, no newfangled motor carriages for them, no sir!Another example, I was talking to an acoustical engineer a little while back that boasted proudly about his programming skills. He was going to write a script to do some analysis, and he was confident that his way was the only way. I couldn't help but think how arrogant he was, and frankly, undeservedly arrogant. He is a published author, and a very bright guy. That part I can respect. But the largest, most complex things he ever did were things that could be described with a month of mathematical analysis, tops. Most were just a few days work, at best. So to discount what others had done was offputting, to say the least. It made me realize that everything he said was from the perspective of a very narrow (and strongly biased) view and almost completely worthless. He wanted to promote his pet ideas from an ego-driven perspective more than he wanted to discover the truth.A large software project is sometimes the result of tens, sometimes hundreds of man-years of work. We're getting to the point where some computing systems have thousands of man-years of work in tens of thousands of files. The complexity is mind-numbing and no one person can get their hands around the whole project. So specialization is required. You can see the system from a holistic view, sort of a top-down, birds-eye view. Or you can see it reductionistically, looking at machine level device drivers and code modules. But to see the whole thing is impossible; It would be like memorizing every book ever written and being expert in them all. In this environment, no one would ever get locked in a stubborn narrow-minded view, because then they would be completely lost, out of touch, and always embarrassed by their lack of understanding, being so isolated and out of the loop. This kind of complexity is a whole other level than the hardest problems in acoustics.All that to say I agree with Martin about loudspeakers, and about acoustics in general. Loudspeakers are very simple machines having three or four moving parts, and that's it. They are very much like mass-spring systems. Sure, things like summing multiple point sources, reflections and diffraction are involved, but those aren't terribly difficult. Cone flex becomes chaotic and the motor becomes non-linear at some points. But mass-spring system have non-linearities too, the metal is elastic at some levels and then goes plastic at other levels. A speaker cabinet is a Helmholtz resonator or it is a tuned pipe or a horn, or a hybrid having some of each property. The crossover is reactive. Each has very simple, predictable behaviors for the

most part. Then there is an element of non-linear behavior, but even that can be expressed to some degree, certainly it isn't hard to understand. More complex systems have these same behaviours, and they have more parts too.So while I enjoy audio and making things as best as I can, I don't think even the most complex audio projects I've done come anywhere close to the complexity of say an large-scale integrated circuit, an operating system, a jet airplane or a nuclear reactor. I find the best acoustical engineers are usually physicists or mechanical or electrical engineers with a keen interest in audio. There are some very smart guys with acoustical engineering degrees too, some good talent working in sound fields. But I'd have to say that I think the best acoustical engineer is actually someone converted from another field, someone used to dealing with things of greater complexity. He isn't as likely to bullshit himself or try to bullshit others.