



'From goosebumps to tears of emotion'

Acoustics is often still overlooked by music lovers and audio aficionados. The 'set of the month' rubrics on websites and in magazines give disconcerting lists of everything that is wrong in the positioning of equipment and speakers, acoustics and system matching. And this while the music lovers who read them often own very high quality equipment. It is time to talk to AcousticMatters and learn more about acoustics.



Audio equipment is merely the channel through which to enjoy music. Yet, the first thing serious music lovers do is buy equipment. If they knew the impact that acoustics have on sound quality, and how immense acoustic distortions can be, they would first assess the acoustics of their listening room. The secret of good sound is to get the perfect match between the amplifier and the loudspeakers. The next step involves the acoustics and positioning of speakers. If this is done well, you can create electrifying, mind blowing and breath-taking sound for 3,000-4,000 US Dollars. Just sound? No, actually just Music. A set like this can make the music sound as it would in the studio, with all its space, resonance, dynamics, reality, detailing and beauty. If the space is optimized acoustically, high end equipment will enhance these dramatically. The space becomes the audio Nirvana where the music's emotions shine through and goosebumps turn into tears. Scientific research has shown that people do recognize and value this level of sound quality. A contradiction to the bizarrely poor quality of how many audio systems perform. If you want to reach audio Nirvana, you need to talk to Ben van Leliveld of AcousticMatters. This interview gives an impression of his unique work within the domain of acoustics.

You have a special way of working, don't you?

Before going to clients for the first time, I ask them to send me some photos of their listening room. I then visit them armed with music where I was present at the recording. The reason I do this is that I know the mix and mastering. The first thing

I do evaluate the sound quality and acoustics by listening to my reference tracks. The clients listen with me and I discuss my findings with them. Subjects like stereo imaging, tone, rhythm and various other elements. I can then determine in which frequency ranges any tonal problems are. When the listening evaluation is finalized, I do start measuring in the exact location where the music is listened to, using broadband pink noise. This is a flat measurement and is not affected by aural compensation. I then put the measurements and my subjective listening test side by side. In practice, these are almost always identical. My clients then know that they can trust me and that they can have confidence in my hearing. Hearing is important as there are some things that you simply cannot measure, imaging for example. I then do a reverb time measurement. I don't need special equipment – I simply use the very convenient hand clap. While opinions about the hand clap are divided, it is accepted scientifically and gives a good estimate of the reverb time in the specific room. Depending on the size of the room, I also check specific reverb times across the audio bandwidth.

Does the hand clap give all frequencies?

No, the hand clap contains frequencies above 200Hz, the lower level of the medium range, to 8 kilohertz, the highest note on the piano.

These are not the harmonics so you cover a lot and the most important element is that you have the flutter range. Many modern homes have problems with flutter. Flutter is an echo

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at the top of the mid-range and the bottom of the higher frequencies. It is very unpleasant and even makes speech intelligibility a challenge. In such a room, people start speaking louder and louder and become even more unintelligible. By increasing the hand-clap reverberation time by a factor of 1.6-1.8 for the bass range, one will get a pretty accurate outcome. By measuring the frequency, I can find any potential waves in the bass frequencies.

And the position of the loudspeakers?

I look at this too. Most acoustic specialists only do measurements and then draw conclusions. They are not experienced in listening music and optimization of speakers. I use both music and measurements and the type of speakers being used are critical for the final conclusions. I have been privileged to work for clients at the ultra high-end level and I know what top quality systems can do. I try to get the best out of every system. Many clients ask for a computer simulated acoustic blueprint. This is important as the computer simulation goes further than we are able to measure.

3D software?

The computer allows you to simulate the specific room very precisely. You can add any type of material in the space, such as double glass, woodwork, flooring, the room's shell or a floating parquet floor.

After the analysis, I can add acoustic materials to the 3D model and optimize the location of the loudspeakers. The results are

immediately visible in clear color diagrams. Clients can easily see the sound quality in the current situation and the sound quality after optimization.

So you do not need to go to the client anymore?

Indeed! I get many requests for the 3D service via the internet. My 3D work is very precise so if I don't go on-site, I want a lot of photos and exact dimensions. I offer this 3D service through my website.

Do you have clients around the world?

Yes, I do. That's why my website is in English. Send me a drawing of the room and a description of the building materials and I can start work. I will produce very reliable acoustic blueprints. I use software made by a German engineering firm for the loudspeaker industry. It has been audited and approved by two universities. It has minimal margins of error, so that there are almost exact similarities between the real loudspeakers and the simulated loudspeakers that have been added to the package.

Does the 3D software include all loudspeaker models?

It contains several brands and models. New loudspeaker models can be added but this can make it challenging to find the right cross-over/filter as many loudspeaker manufacturers do not give this information. Fortunately, loudspeakers are tested everywhere so I can either add the information to the database or design the loudspeakers to the specifications.

The 3D tool has all the driver types in the database, even ribbons and electro stats. The simulation can be in simple stereo and can go up to a 9.1 set up.

A consultancy business, but no supplying of materials?

Yes, it's important to be independent and this gains clients' confidence. I am often called to situations where the acoustics have gone haywire, where listening spaces are completely filled with the wrong, often expensive, acoustic devices. Apparently, clients were led to believe that it was important to buy lots of products rather than being helped to create the best possible sound experience. This is why we consider it important to give independent, expert advice.

I know which products are needed. I know where clients can buy them and while I make a list for them, I do not earn anything on products. I do not have contracts with producers. My job is to make sure that the right acoustic materials are used in each space, just like an architect. This independence, coupled with positive references, means that I am reaching more and more clients in the professional sound industry.

I will stick to consultancy. It may mean billing for time spent, but I do have a fixed price for the 3D simulation. Clients get a cost estimate in advance and this amount is rarely exceeded.

People do not seem to think about acoustics. Why is it so important?

Audiophiles always focus on the audio equipment. The set sounds to sharp, too harsh, there is too little stereo depth. They then look for another CD player, another streamer or different cables to make it sound different. While all these are valid steps, the sound differences and margins are minimal. People do not realize this. What makes the audio different is the amplifier loudspeaker matching. These must be complementary. Once this criterion is met, you can work on the acoustics. Audiophiles and music lovers want to be transported to the studio when they listen to music. They want a reproduction of what happens and what is produced in the studio.

The reality is that amplifiers have a distortion factor of 0.1%, and in the ultra high-end segment, this is often one thousandth

percent and is not audible. The differences between equipment is then negligible. But acoustically it does matter. The distortion figures range from 20% to 400%. This makes or breaks the set. Great gains can be made with acoustics. The gain now in the design of audio equipment is in the design of loudspeakers as these are still the cause of most distortion. Much ground can be gained here.

Does this mean 4,000 US dollars for the system and 6,000 US dollars for the acoustics?

Yes, it does. Imagine that the 4,000 dollar guy is my cheapest client in terms of equipment. The acoustics won't be that expensive. If someone buys an audio interconnect for 5,000 dollars, they could have spent half that money on the room's acoustics and had a thousand times better sound.

Speaker Placement?

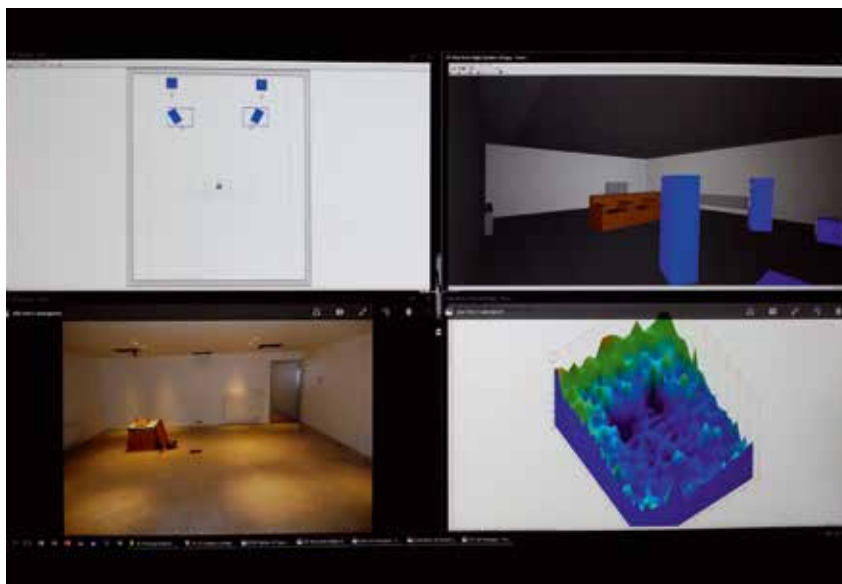
I have worked with all sorts of loudspeakers and you then see that loudspeakers are never placed in accordance with their design. Some loudspeakers need the wall to have good bass amplification. Typical horn speakers are designed to cross the tweeter signals in front of your face, but they are often placed facing straight ahead. Other people place very small bookshelf speakers free standing in the room. This will not work either. Do not underestimate that the secret is in the very last millimeter and final degree of toe-in. Much of my work consists of finding the right place. Finding the perfect place for a stereo pair to produce the best audio can take up to six hours.

Another issue is the sweet spot, so the chair or sofa where you listen to the music. People often listen to music while positioned close to or against a wall. This creates too much boom in the bass and poor imaging. It also affects the rhythm and the speed of the music. Furthermore, you will never get stereo depth. The reverberations from the back wall will interfere with the signal that reaches your ears. Reflected sounds reaching your ears within the 20 milliseconds time-frame, will blur the imaging and will take away the stereo depth.

But I have an attic room of ten by twelf feet with a sloped ceiling ...

Don't worry, I can still help get the most out of your room.





There is a minimum size though. You can get good sound from 15 square meters and upwards, and preferably not in a square space. But I love a challenge and enjoy working with the room dimensions available. A small attic room can sound surprisingly good. It's often better than a big space. In general, you can get better sound from a room of 13 x 16 feet than one of 20 x 20. The secret of acoustics is to overcome the room limitations. By removing the unwanted influence of speaker interaction with the walls and other objects in the room. You then listen only to the loudspeaker signals and the space and room that was intended in the original mix. After that, the loudspeakers virtually disappear in the sound scape. If the recording was done on a stage of 60 feet wide and 15 feet deep, you will experience that 60 x 15 feet stage in your 13 x 16 feet room.

So the disappearing trick does not work with omnidirectional speakers?

These are more challenging because of the wall reflections. You need several acoustical wall panels and this is best calculated using a 3D simulation.

So you do not work with hundreds of meters of curtains, carpets, egg cups and styrofoam?

Not anymore! Twenty years ago, when I started there was not that much in the area of acoustics. I did indeed work with styrofoam and that was a disaster. At the time, we all worked through trial and error, and some things went well and others went very badly. Now I try to get the right sound balance throughout a audio band, which ensures the right harmonics. This requires very special acoustical materials and, often, less is more. Depending on the room, you can use minimal materials to get good results. You then do not need to rebuild most living rooms. A room with floor tiles, lots of glass and concrete of course needs more work. But complete sound proofing, as is often done in home cinemas, is totally undesirable. The mid-high range then disappears and kills the music.

Are there any other important considerations?

Yes, a passion for music. My clients have good equipment. The only thing we want to do is get the best out of it. The clients' goosebumps need to turn into tears of emotion.

The proof is in the pudding

To experience and 'hear' his acoustic work for ourselves, we visited Ben's own listening room and that of a client, Benno Hoogenboom. Benno has a moderate sized listening room in the attic which he has insulated, fitting the sub floor layer with rubber for sound absorption. Also the walls are insulated. The loudspeakers and the listening seat are in the right places. For the rest, this room is an example of Ben's less-is-more touch. He has created the best results possible with very little acoustical devices. You just need to listen for a short while to hear that everything is right. The tonal balance remains unchanged at very low volumes and the extremely low bottom-end remains. The imaging is phenomenal and the dynamics stretches to the noise floor.

Ben has of course optimized his own listening demo room, a modest room of 12 x 15 feet that he designed acoustically – naturally – using the 3D simulation. It is fascinating to see how the 3D simulation software works. He uses a customized very powerful digital workstation as the calculations require intensive processing. If you move a sofa or a loudspeaker in the simulation, the program immediately re-calculates the results which are visible as curves and 3D models.

Ben's audio set too sounds unbelievably good.

Optimizing the acoustics is often the fastest and most economical way to push the boundaries of your sound system beyond good.

Text: Ruud Jonker

Photos: MKB Fotografie

ACOUSTICMATTERS
TEL: +31(0)6-53354337
E-MAIL: INFO@ACOUSTICMATTERS.NL
WWW.ACOUSTICMATTERS.NL