

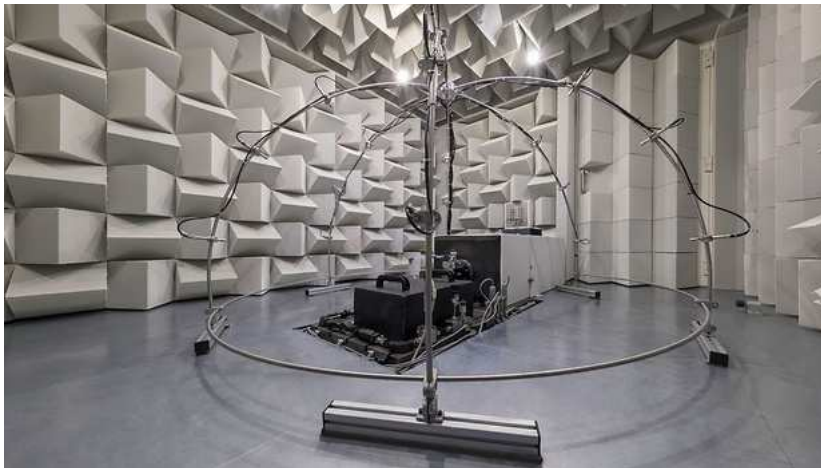
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The Master of Noise

Rainer Weber from Powertrain-BU Engine Systems is a man who can literally hear quality. When it comes to solving acoustics problems, the Principal Expert for NVH is in demand Continental-wide.

Further Information

Expert Career Program



Acoustic Chamber

Does he have a good ear? "Of course that wouldn't be a bad thing for an acoustics engineer," Rainer Weber laconically replied. Above all, his hearing is well conditioned. Weber's ears are his most important asset: the 49-year-old is a Principal Expert for Noise, Vibration, and Harshness (NVH) at Engine Systems (for the new expert nomenclature, see further information on the right side) - and therefore the main point of contact for the business unit when it comes to getting to the bottom of unpleasant noises or actively shaping acoustic in-vehicle phenomena.

Disturbing interior noises

"NVH was a marginal topic for years, but now it is becoming an important quality criterion and therefore a key sales argument," said Weber, an electrical engineer who specializes in psychoacoustics. He devotes much of his time to exploring how people feel sound when they are on the road. Electric drives are now virtually noiseless and combustion



Rainer Weber - Principal Expert for NVH

engines are becoming quieter, so other, previously masked, noises are becoming audible in vehicle interiors. People inside vehicles perceive noise from the brakes and engine components like injectors and fuel pumps, for example, as disturbing. According to Weber, in the search for a solution a balance must be struck between what is technically desirable and on the other hand, what is economically sensible.

He always begins by analyzing the "transfer path," the sound generation-transmission-recipient sequence. Several questions inevitably arise: Does the hardware need to be adjusted to minimize noise? Does the software contain options for adjustment? Or will we have to take secondary measures to decouple sound? "Acoustic phenomena cannot be handled on a blanket basis," said Weber, readily providing an example. "While sports car fans love a vibrant engine sound, limousine drivers generally prefer the opposite." Cultural differences must also be taken into account, he explains: "Different markets have different sound preferences. In Asia, for example, high-frequency noise is undesirable. Europeans are more technology-oriented, permitting us more freedom in terms of sounds."

Music to our ears

NVH is also gaining importance as a result of the upheavals in the automotive industry - above all, due to electrification. According to Weber, engine noise is no longer an issue. "However, electric drives do not generate dynamic sound because there is no switching or load changes. Their sound must be designed to protect pedestrians. This raises the issue of whether the targeted sound should imitate combustion engines or have a completely different sound that could be based on music, for example," he said. In joint projects with institutes of technology, researchers are trying to find out how people reacted to artificially generated noise. "Right now, it is essential to condition road users to appropriate sounds. After all, once large numbers of electric vehicles are on the road, it will be difficult to change the sounds they emit."

Weber is not only involved in product development; he has also investigated what acoustics can contribute to predictive maintenance, for example. "All moving structures vibrate, generating noises that accompany physical changes," explained Weber. As a result, the knock sensors that fine-tune the combustion process in conventional combustion engines could also be used for the acoustic monitoring of bearings or pumps. Acoustic measuring techniques could even be used to analyze material aging processes. Weber also wants to investigate the broad field of production technology to find out whether welding processes can be monitored more easily - and thus more cost-effectively - using acoustic measurements.

Second vocation: HiFi developer

Weber's knowledge is in demand across BU, divisional, and group boundaries, so the resident of Regensburg has around 35,000 kilometers per year on the clock. To promote an exchange on NVH-related topics at Continental, he organized the first group-wide NVH conference in 2016. That is the nucleus of the steadily growing "NVH family" that now meets annually for exchange and workshops. This year's NVH event will be held at C&S in Frankfurt. Weber believes that networking is important, especially in view of the increasingly important need to think holistically and in system solutions in automotive engineering. The acoustics expert is animated by the constant challenges he is faced with in his special field.

And nothing proves his passion better than his “second vocation.” When Weber isn’t working to solve acoustic problems for Continental, he is designing premium hi-fi equipment and loudspeakers.

Sebastian Holzwarth
2018-03-14, 12:31 Uhr

Kommentare: 14 Likes: 46

Aktuelle Kommentare



Ihre Nachricht

**Weber,
Rainer02**

Kommentar veröffentlichen

14 Kommentare

2018-03-25, 10:53 Uhr Kommentare: 1 Likes: 3



Van-Est, Jeroen

Knock Sensors are indeed suitable for Predictive Maintenance and Road Quality detection. Although Continental is the largest knock sensor supplier worldwide, we have always the ambition to go beyond our application. The development of this new need for predictive maintenance and road quality has been already started with cross-BU approach.

2018-04-03, 08:55 Uhr Likes: 1



**Weber,
Rainer02**

Hi Jeroen, completely agreed. I am sure that with an additional sensor (which means then more than one) we can make a kind of event location with correlation analysis and knowing the propagation speed of the structure borne wave. Additionally These sensors could have a energy harvesting (Vibration energy) and communicate by RF so that we are independend from any cable harness.

2018-03-19, 14:44 Uhr Kommentare: 1 Likes: 4



New methode coming from experienced person which can be used as a quick loop analyse for checking if the product has the maturity expected before going ahead in validation. I remember my old grand father who was abble to fix the right setup of Engine by using his ear.... Sounds good!

**Arnaud,
Philippe**

2018-03-19, 22:13 Uhr Likes: 4



**Weber,
Rainer02**

Dear Arnaud, I think that with the proper methodology we can develop Systems for predictive diagnosis by the means of analysing their NVH behavior. Machine diagnostics for bearings is already established in the market. We will expect much smarter systems in the future taking into account the new possibilities for big data analysis and artificial intelligence. Let us look forward and shape the future! And let us bring new products to the markets..

2018-03-19, 11:40 Uhr Kommentare: 1 Likes: 3



Morut, Adrian

It would be nice to have the same rigorous and scientific approach used for evaluating and fixing office noise inside the company as well, not just for the products we're selling.

2018-03-19, 22:17 Uhr Likes: 4



**Weber,
Rainer02**

.I completely agree that we have to fight and manage noise in our daily working environment as well. We Need to address proper and cost effective room acoustics measures to ensure that our employees can work and deliver their results without struggling from this environmental noise. Environmental noise is stress!!! And of course where room acoustics can not be optimized due to several reasons a noise cancellation headphone could be a solution.

2018-03-19, 07:38 Uhr Kommentare: 1 Likes: 4



Kumar, Kishor

Hello , really great work . Please share the details of workshop , so that we will be updated to the new techniques related to NVH.

2018-03-19, 22:19 Uhr Likes: 4



**Weber,
Rainer02**

*,Here you find our connext community where we will report regarding the Workshops and where we will upload interesting Topics. Feel free to participate!
<http://connext.conti.de/communities/service/html/communitystart?communityUuid=cf886451-5678-4cc7-91fc-0fcd435b9bb6>*

2018-03-15, 02:24 Uhr Kommentare: 1 Likes: 5



**Wang,
Yuanwen**

I wish he can give us a EPB noise topic. That'll be very helpful !!!

2018-03-19, 22:21 Uhr Likes: 4



**Weber,
Rainer02**

,Please share and describe more from your EPB problem. We will find someone which will support and help you

Weitere Kommentare anzeigen