

Leaflet Master Class Room Acoustics for the Performing Arts

Contents

This Master Class by Dr. E. Kahle will focus on some of the most important questions when designing a room for the performing arts: *what is room acoustic quality, how can it be defined and how can it be obtained?*

Room acoustic quality is not a single parameter, but a multi-dimensional phenomenon linked to our perception of complex acoustic environments. In addition, room acoustic quality depends on the type and style of performance. We will start with an overview of the results from laboratory experiments and studies in real performance environments that allow identifying the different aspects that govern our perception of room acoustics. Objective criteria defined to measure room acoustic quality and the correlation between these objective criteria and the perceptual factors will then be discussed in detail. Equally interesting – yet less known in the acoustic community – are the relationships between room acoustic quality (perceptual factors and objective criteria) and architectural criteria: what are the implications of room design on the resulting acoustic quality, and how can a room design be optimized in order to obtain a desired acoustic quality?

Several examples from the real world of acoustic consulting will be given and different tools and software – adapted to the different stages of the design process from conceptual to detailed design will be presented.

What will be presented?

- Perceptual factors of room acoustic quality: laboratory experiments and listening tests in real rooms. A structured listening test during a classical music concert will be an integral part of the master class.
- Objective parameters for measuring room acoustic quality. Correlation between perceptual factors and objective parameters.
- Requirements for room acoustic quality as a function of usage. Acoustic brief for rooms for the performing arts.
- Architectural criteria for room acoustic quality. Correlation between perceptual factors and architectural elements that influence room acoustic quality.
- Optimization of room acoustic design during different stages of the design process, from conceptual design to detailed design. This will be illustrated using several practical examples. Various tools and software – adapted to the different stages of the design process – will be presented. The topic of interaction between the acoustician and the architect will equally be addressed in this context.
- Variable acoustics and optimization of the acoustic settings for rooms with variable acoustics.
- Coupled volumes. One interesting means of both optimizing room acoustic quality and integrating variable acoustics is to use coupled rooms or coupled volumes. How can this be used to optimize room acoustic quality, and what can we learn from this approach in order to equally optimize more classical room designs?

For whom?

The master class is primarily intended for acoustic consultants with several years of experience. The participants are expected to have considerable knowledge and experience in the field of room acoustics. Also, this Master Class can be suitable/interesting for PhD students and post-doctoral research fellows. The maximum size of the group is 12 persons.

The master

The class will be given by Dr. E. Kahle, who is director of Kahle Acoustics. Eckhard Kahle trained both as an acoustician and as a professional musician, and obtained his PhD for research on an objective model of the perception of acoustical quality in concert halls, opera houses, and recital halls, undertaken at Ircam in Paris, including a series of extensive objective acoustical measurements and subjective listening tests in several European facilities for music performance.

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From 1995 – 2001, he worked for Artec Consultants Inc in New York, amongst other projects, as project manager for the new concert hall at the KKL in Lucerne, Switzerland. In 2001, he founded his own acoustic consulting firm Kahle Acoustics, located in Brussels and specializing in room acoustic design for the performing arts.

Guest speaker

During the master class, a guest presentation will be given by Thomas Wulfrank of Kahle Acoustics, focusing on curved surfaces. It will be shown that curved surfaces (even concave surfaces) are not always detrimental to acoustic quality, but - contrary to common thinking - have the potential to be a versatile design tool to enhance acoustic quality, when used thoughtfully. In addition to the theoretical background, practical examples of both historic and new rooms with curved surfaces will be presented, as well as tools to analyze and optimize curved surfaces.

Dates

The Master Class will take place from Monday 12 April through Wednesday 14 April 2010.

Location

Laboratorium voor Akoestiek (Level Acoustics BV), de Rondom 10, 5612 AP, Eindhoven, the Netherlands.

The laboratory is located at the campus of Eindhoven University of Technology in the Netherlands.

Costs

The cost for attending the Master Class is € 3.275,- (VAT excluded); this includes:

- A reader with literature and presentation sheets;
- A four night's stay in a hotel, including breakfast, lunch and diner.

Registration

You can register for the Master Class by filling in the paper registration form thoroughly and sending it to Level Acoustics by mail or email. Registrations will be accepted in the order in which they are received, up to a maximum of 12 participants. After receiving the registration form, we will send a confirmation and an invoice. The payment must be fulfilled within 30 days after receipt of the invoice. Your registration for the Master Class is confirmed after we receive the course fee. The final registration date is the 15th of March 2010.

Cancellation

If you cancel more than four weeks before the Master Class starts, the course fee will be refunded, less € 327,50 for administration costs. If you cancel within one to four weeks before the Master Class starts, a refund of 50% of the course fee is given. Cancelling within the last week before the Master Class starts, implies no refund of the course fee. However, it is possible to send a substitute to follow the class, provided he or she has considerable knowledge and experience in the field of room acoustics. If there are not enough participants, Level Acoustics has the right to cancel the Master Class, up to one week before the start of the Master Class. In that case, the total course fee will be refunded.

Information and registration

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Download the registration form here:

<http://www.levelacoustics.nl/education/masterclasses/info/regformRA10.doc>



Program

Master Class Room Acoustics for the Performing Arts

Dates: April 12 – 14, 2010

Monday 12 April

- 10.00-10.30 Reception with coffee
- 10.30-13.00 Introduction: The Concert Hall – a Machine for Music?
The requirements of music and the interaction between architect and acoustician
- 13.00-14.00 Lunch
- 14.00-15.00 Perceptual Factors for room acoustic quality – laboratory experiments, listening tests, objective criteria
- 15.00-15.30 Break
- 15.30-17.30 Perceptual Factors for room acoustic quality – correlation between objective criteria and perceptual factors
- 17.30-19.30 Dinner
- 19.30-20.30 Workshop part 1: Preparation of structured listening test on 13 April
- 20.30-21.00 Conclusions on perceptual factors and room acoustic quality

Tuesday 13 April

- 09.00-10.30 Architectural criteria: Correlation between perceptual factors, objective criteria and architectural factors that influence room acoustic quality
- 10.30-11.00 Break
- 11.00-12.00 Optimization of architectural criteria and room acoustic design
- 12.00-13.00 Lunch
- 13.00-14.30 Guest lecture by Thomas Wulfrank: Curved Surfaces in acoustic design
- 14.30-15.00 Break
- 15.00-16.30 Acoustic design and optimization using Rhino (3D architectural software) and BEM (boundary element method)
- 16.30-17.30 Case studies participants
- 17.30-19.30 Dinner
- 20.00-22.00 Workshop part 2: Concert in Muziekcentrum Eindhoven, with structured listening test

Wednesday 14 April

- 09.00-10.30 Variable Acoustics: what, why and how?
- 10.30-11.00 Break
- 11.00-12.30 Acoustic briefs/programs
- 12.30-13.30 Lunch
- 13.30-15.00 Workshop part 3: Analysis of listening tests from concert
- 15.00-15.30 Break
- 15.30-16.30 Outlook on the future of room acoustics design
- 16.30-17.30 Case studies participants
- 17.30-19.30 Dinner

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