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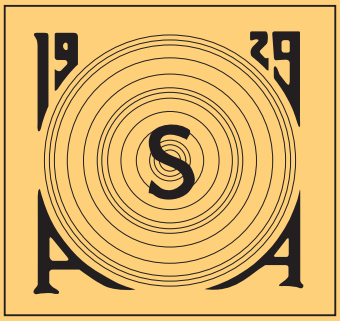

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Table of Contents on p. A5

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expected to define what part of the room is adequately anechoic. This paper will describe the results obtained when following each of these standards.

3:55

4pNS9. Improvement of the measurement of the sound absorption using the reverberation chamber method. Martijn Vercammen (Peutz, Lindenlaan 41, Mook 6585 ZH, Netherlands, m.vercammen@peutz.nl) and Margriet Lautenbach (Peutz, Zoetermeer, Netherlands)

The random incidence absorption coefficient is measured in a reverberation room according to ISO 354 or ASTM C423-09a. It is known that the inter laboratory accuracy under Reproducibility conditions of these results is still not very well. It is generally assumed that the limited diffusion properties of reverberation rooms, especially with a strongly sound absorbing sample, are the main reason for the bad reproducibility values for the sound absorption between laboratories. Reverberation rooms should be made much more diffuse to reduce the interlaboratory differences. However there are practical limitations in quantifying and improving the diffuse field conditions. The measured sound absorption still seems to be the most sensitive descriptor of the diffuse field conditions. A way to further reduce the interlaboratory differences is the use of a reference absorber to qualify a room and to calibrate the results of a sound absorption measurement. In the presentation an overview will be given of the research performed and some suggestions for the new version of ISO 354 will be given.

4:10

4pNS10. When acoustically rated doors fail to perform as rated, who is responsible—Manufacturer or installer? Marlund E. Hale (Adv. Eng. Acoust., 663 Bristol Ave., Simi Valley, CA 93065, mehale@aol.com)

Acoustical doors are designed, manufactured, and sold by several companies in the United States. They are available in multiple styles and acoustical performance ratings. The doors are specified, selected, and purchased based on the published performance ratings provided by the manufacturers, which often have had their doors tested by NAVLAP accredited acoustical testing laboratories. Of course, it should be understood by the acoustical door specifier that lab-rated doors will rarely, if ever, perform as rated after field installation. This paper presents field performance test results for numerous acoustical doors that significantly failed even the lower expected field performance criteria. The acoustical doors were all tested in-situ after they were installed in several different venues by the manufacturer's or vendor's trained and/or certified acoustical door installers. Reasons for certain field-performance failures are discussed and specific remedies are recommended.

4:25

4pNS11. Sound absorption of parallel arrangement of multiple micro-perforated panel absorbers at oblique incidence. Chunqi Wang, Lixi Huang, Yumin Zhang (Lab of AeroDynam, and Acoust., Zhejiang Inst. of Res. and Innovation and Dept of Mech. Eng., The Univ. of Hong Kong , Pokfulam Rd., Hong Kong, lixi@hku.hk)

Many efforts have been made to enhance the sound absorption performance of micro-perforated panel (MPP) absorbers. Among them, one straightforward approach is to arrange multiple MPP absorbers of different frequency characteristics in parallel so as to combine different frequency bands together, hence an MPP absorber array. In previous study, the parallel absorption mechanism is identified to be contributed by three factors: (i) the strong local resonance absorption, (ii) the supplementary absorption by non-resonating absorbers, and (iii) the change of environmental impedance conditions; and the local resonance absorption mechanism accounts for the increased equivalent acoustic resistance of the MPP. This study seeks to examine how the MPP absorber array performs at oblique incidence and in diffuse field. One major concern here is how the incidence angle of the sound waves affects the parallel absorption mechanism. In this study, a finite element model is developed to simulate the acoustic performance of an infinitely large MPP absorber array. Numerical results show that the sound absorption coefficients of the MPP absorber array may change noticeably as the incidence angle varies. The diffuse field sound absorption coefficients of a prototype specimen are measured in a reverberation room and compared with the numerical predictions.

4:40

4pNS12. Reverberation time in ordinary rooms of typical residences in Southern Brazil. Michael Ã. Klein, Andriele da Silva Panosso, and Stephan Paul (DECC-CT-UFSM, UFSM, Av. Roraima 1000, Camobi, Santa Maria 97105-900, Brazil, michaelklein92@hotmail.com)

In order to develop a subjective evaluation to assess the annoyance related to impact noise, it is necessary to record samples of sounds in an impact chamber that is acoustically representative for ordinary rooms, especially with respect to reverberation time. To define the target reverberation time measurements were carried out in 30 typical residences in Southern Brazil. This study presents the characteristic reverberation times of 30 furnished living rooms and 30 furnished bedrooms in buildings and houses with an average age of 34 years, 40% of them with wooden floor coverings, not as usual in modern constructions. The median T30 at 1 kHz for living rooms with an average volume of 63.60m^3 (std dev: 18.27m^3) was 0.68 s (std dev: 0.14 s), thus higher than the reference TR = 0.5 s according to EN ISO 140 parts 4, 5, and 7. The median T30 at 1 kHz for bedrooms with average volume of 33.76m^3 (std dev: 8.38m^3) was 0.49 s (std dev: 0.13 s), nearly exact the reference TR according to EN ISO 140 parts 4, 5, and 7. Data will also be compared to studies from other countries.

4:55

4pNS13. Research on the flow resistance of acoustic materials—Takes Concert Hall at Gulangyu Music School in Xiamen as an Example. Peng Wang, Xiang Yan, Lu W. Shuai, Gang Song, and Yan Liang (Acoust. Lab., School of Architecture, Tsinghua Univ., Beijng, China, 29580150@qq.com)

Different kinds of acoustic materials are used in a concert hall design, which has different functions such as diffusing, reflecting, or absorbing. The cushion of chairs in concert halls usually uses porous sound-absorbing material, whose absorbing attributes are mainly determined by its flow resistance. In the design of Concert Hall at Gulangyu Music School in Xiamen, we measured the flow resistance of materials, trying to acquire the best sound-absorbing attributes by adjusting the flow resistance, and also tested the material samples' absorbing coefficients in reverberation room. In a nutshell, measuring and analyzing flow resistance is an advanced method in acoustic design, which could help acousticians decide the most suitable absorbing attributes of chairs, and acquire the best sound quality.