

ACOUSTIC ENHANCEMENT SYSTEMS FOR CLASSICAL CONCERTS – EXAMPLES AND EXPERIENCES

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1 INTRODUCTION

This paper gives an overview of some recent projects, in which acoustic enhancement systems were used to improve the acoustic conditions for classical concerts. The existing natural acoustic conditions in these projects vary between 'only small refinements necessary' to 'no way to do without'.

2 ABU DHABI CLASSICS

Since 2008 the festival Abu Dhabi Classics has featured classical concerts with the most famous orchestras and soloists. Each year from October to May orchestras like the Vienna, Berlin and New York philharmonics play in 10-20 concerts, conducted by artists like Daniel Barenboim, Zubin Mehta and Sir Simon Rattle. Renowned musicians like Cecilia Bartoli, Lang Lang and Anne-Sophie Mutter play the solo parts and chamber music.

The main venue for the festival is the auditorium of the Emirates Palace Hotel. This hall hosts 1,200 seats and has a room volume of about 15,000 m³. The seats are very broad and upholstered, with a distance of about 1.3 m from row to row. Together with a thick carpet and absorbent wall claddings the hall delivers a very dry sound in spite of the large volume, which is perfect for a conference hall. The manager of the festival insisted on taking the acoustics to a high standard because 'let them play in this hall as it is would be like letting them play with pupils' instruments'.



Figure 1: Auditorium of the Emirates Palace Hotel, Abu Dhabi

To provide acoustic conditions which are adequate to the artists, and to give them the chance to exploit their artistic possibilities, Müller-BBM installed a Vivace enhancement system in the hall. The system uses the loudspeakers of the existing surround system. In the ceiling and in the front part of the sidewalls, additional loudspeakers had to be installed to provide the necessary uniformity of the generated sound field.

The stage of the hall is equipped with an orchestra shell which produces a homogeneous and well-balanced sound of the orchestra. With this a number of 2-4 microphones are exactly suited to get a perfect input signal into the system. They precisely record only the balanced sound which is radiated into the hall, and do not contain sound from the instruments which is naturally suppressed by the directivity of the instruments. To permit the reduction to these few microphones, the Vivace system uses a time variant algorithm which prevents the upcoming of any coloration before it could be perceived.

The setup of the system is optimized for each concert series. So the settings of the system and the resulting room acoustics are adjusted to the musicians and the program they play, like the seating of the orchestra. In most cases, the intensity of the resulting acoustics is limited to a modest level to assure, that the optical impression never gets in conflict with the auditory perception.

This way the audience gets really satisfying acoustic conditions which give the musicians a suitable basis to show their high arts. Especially these musicians, who have had the opportunity to hear what would be without an enhancement system, give a very positive even enthusiastic feedback. The reservation and even dismay of many musicians concerning acoustic enhancement systems, that could be observed even ten years ago seems to have disappeared. All of these famous musicians have perceived the system as a measure to support their art and to help them develop an impressive sound. It is very doubtful if this acceptance level would stay the same (regardless of the actually achieved sound), if you build a new concert hall or opera house, relying only on an enhancement system to save money.

3 SCHILLERTHEATER IN BERLIN AS A TEMPORARY VENUE FOR THE STAATSOPER

In the autumn 2010, the Staatsoper Berlin moved from their home venue, the *Oper unter den Linden*, to the Schillertheater, to give way for the renovation of the opera house. The Schillertheater which has been a classical drama theatre, had been renovated before. For this, substantial constructional work for the stage mechanics and numerous new rehearsal rooms were necessary. Müller-BBM provided a new acoustical treatment for the auditorium which improved the acoustics of the theatre to meet the demands of the big opera. This included a new and extended orchestra pit, a new ceiling for the front part of the hall and an adjustment of the sound absorbing surfaces at the side and back walls of the hall.

The volume of the auditorium perfectly matches the demands of a drama theatre. Since there was no possibility to increase the volume to create more reverberation and envelopment for the music, it was decided to use an acoustic enhancement system for this purpose.



Figure 2: Schillertheater, view from the stage

Since about in 1990 the Staatsoper very successfully used a LARES enhancement system to increase the existing reverberation time of about 1.0 s to 1.4 – 2.1 s. To reduce the costs for the temporary relocation not only the old LARES mainframe was reused in the Schillertheater but also the old amplifiers and most of the loudspeakers. The old components were replenished by new loudspeakers in positions which had to be near the audience seats. With this, the side and back walls as well as the ceiling beyond the balcony could be equipped with loudspeakers with broad and uniform directivity. The existing speakers were located in the ceiling of the auditorium, where the bigger distance to the audience compensated their stronger directivity.

The setup of the enhancement system was done in the last days and nights before the opening of the Schillertheater together with David Griesinger, the developer of the LARES system, and Albrecht Krieger, the chief sound engineer of the Staatsoper. The adjustments of the natural acoustics had been very successful, so the new Schillertheater already provided all necessary early reflections and a perceivable amount of integrating reverberation. The enhancement system was used to create the missing late and enveloping reverberation.

During the rehearsals of the first opera production, a passionate discussion started if this envelopment was to be used or if the additional sound energy distracts the attention from the early details of the instruments. The artistic department of the opera as well as the musicians were divided into two groups with different opinions. The decision was made by Daniel Barenboim, the chief conductor of the opera, who stated that he was very satisfied with the absolute clearness and transparency of the sound and that it would be a good exercise for the musicians during the few years of relocation to create a dense and thus pseudo reverberant orchestra sound. It remains to be seen if this decision will be the final one.

4 KLASSIK AM ODEONSPLATZ IN MUNICH

Klassik am Odeonsplatz is an open-air concert event which provides a stage in the centre of Munich for the two big classical orchestras of Munich, the Munich philharmonic and the Symphony Orchestra of the Bayrischer Rundfunk. They give two concerts for an audience of about 8,000 listeners each. The seats are arranged flat on the square Odeonsplatz and on the successional street which is blocked for the traffic during the rehearsal and the concerts. The maximum width of the seating is about 40 m, which results in a maximum distance between the last row and the stage of about 170 m.



Figure 3: Odeonsplatz Munich, view from the stage

The orchestra is placed in a historic monument which acts as a tolerable orchestra shell. The elaborate sound reinforcement is done by Neumann&Müller with a set of near field loudspeakers for the front part of the audience and line array speakers for the main part and the rear part. For the first part of the audience, the near field speakers together with the reflections at the walls and overhangs of the facades of the surrounding buildings deliver a reasonable enveloping sound impression. In the rear half of the audience, this impression is missing and the sound merely comes from the front.

To improve this situation additional speakers were used for the concerts 2010 which surrounded the rear part of the audience. With the help of a Vivace system, these speakers supplied the desired reflections and enveloping reverberation for this part of the audience. Since the line arrays produced a very clear and strong direct sound, it was possible to attach a strongly perceivable reverberation and envelopment, too. The congruence between optical and acoustical impression, which has to be observed in halls, is not of importance under these open-air conditions. The big difference between good and bad for this kind of classical concerts makes the principal natural possibility of the sound. It has to be ensured that the directional distribution of the surrounding sound comes close to the natural conditions of a concert hall and that the time distribution of the sound energy matches the sound of the reinforced direct sound. Taking into account these aspects, very impressive sound fields can be achieved.