THE NEW SYMPHONY HALL IN LAS PALMAS, GRAN CANARIA

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ABSTRACT

The symphony hall - Auditorio Alfredo Kraus - in Las Palmas, Gran Canaria, was inaugurated in 1997. Shortly after the opening the acoustics of the hall showed problems. A team of Spanish and Danish consultants were brought in to solve the problems. The solution included a number of measures: reduction of the reverberation time and an increase of the "projection" of sound to the audience. Also special measures for the members of the orchestras were designed in order to make them feel more comfortable on the (large) stage. In the autumn of 2001 the new acoustics were very favourably received both by the public, the owners, and the orchestras. Considerations and measurements will be presented.

INTRODUCTION

One of the world's most beautiful among the new symphony halls is the Auditorio Alfredo Kraus, placed in Las Palmas, Gran Canaria, designed by Oscar Tusquets, the brilliant Catalan architect, together with Lothar Cremer, the late, famous German acoustician. The most stunning detail in the hall is maybe the glass wall behind the stage, giving the audience the possibility of enjoying the calm, remote impression of the waves of the Atlantic Ocean.

Cremer did not see the completion of the hall, but died a couple of years before the project was finished. The hall was inaugurated in 1997, and the acoustics were soon found to be problematic. The most pronounced sign was a reverberation time much too long for the stated purpose of the hall, namely that of classical symphonic music. Another problem claimed was the lack of "projection" of sound from the stage to the audience.

A team of Spanish and Danish acoustical consultants was asked to analyze the situation and find adequate solutions in close collaboration with the architects. The solutions should not only take the acoustic perspective into account, but also the issue of making the musicians, both visiting artists and the members of the local orchestras, feel comfortable when performing on stage, enhancing their means of interacting as "symphonic" musicians, i.e. as "playing in an ensemble". To illustrate the problems, one famous opera singer claimed that her voice "did not reach beyond the edge (or rim) of the stage".

DESIGN GOALS
After interviews with the concert hall management, directors and musicians, the acoustical design goal was agreed upon to be triple:

- A new and reduced reverberation time just above 2 seconds independent of frequency or with a small increase towards low frequencies as in “classical” symphony concert halls
- Increased sound “transgression” from the stage to the audience
- Increased “response” or feedback to the musicians on the stage

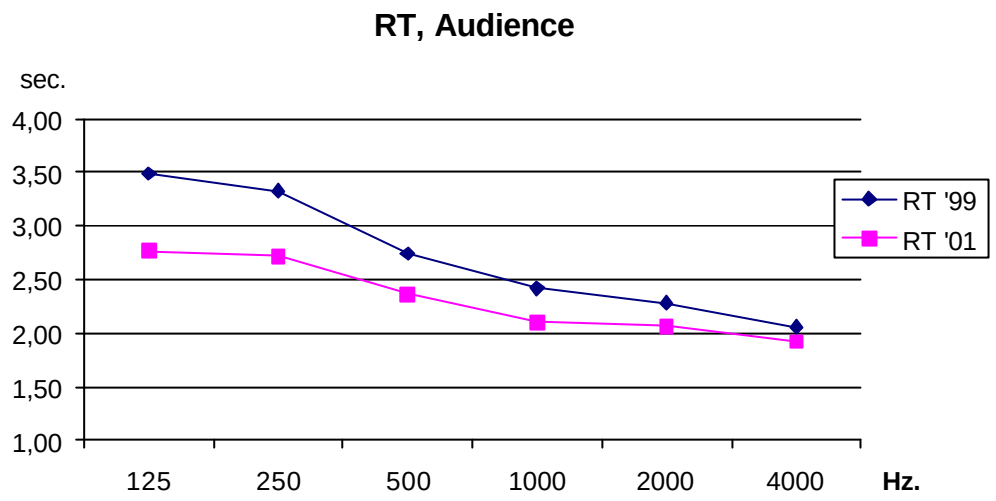

Fig. 1 Reverberation time in the hall before and after alterations (empty hall).

MEASUREMENTS
The first step in finding a proper solution was to determine the actual reverberation time in the hall. Measurements were made with impulse sound sources in the shape of firecrackers, and the room impulse response was recorded on DAT tape recorder for later analysis in the laboratory.

COMPUTER MODEL
By means of the Danish room-acoustic simulation program, ODEON, a computer model of the hall was built. In the model a number of room-acoustic parameters were studied, but most important, it was possible to study the effect of the original sound reflectors above the stage.

Lothar Cremer’s proposed ground-plan, the six-side rhombus, should be observed. According to him, this is the logical modernization of the classical “shoebox-shape” concert hall.

SOUND-ABSORBENT SURFACES
Based on the results of the measurements, a new and lower reverberation time was designed for the symphony hall. In close collaboration with the architect, surfaces in the ceiling, on the upper galleries, on the front and on the back walls were chosen for extra sound absorption.

Special, newly developed, acoustic batts with reduced high-frequency absorption properties were used in parts of the ceiling and at the upper galleries in a combination with more traditional, mid-frequency absorbents, perforated gypsumboards on the front and back walls.

By combining different kinds of absorbing materials and constructions, the reverberation time was reduced from 3.5 seconds (avg. 125-4000 Hz) to 2.2 seconds.

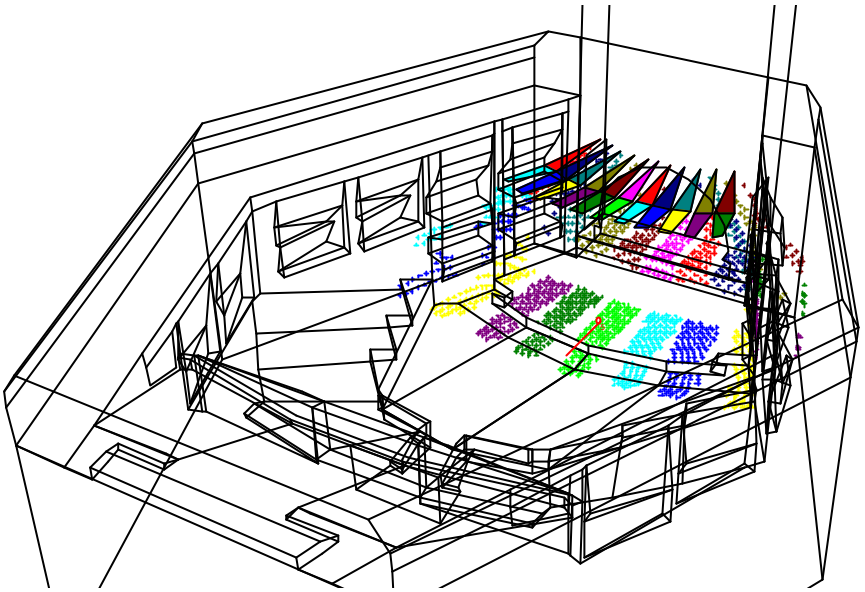

Fig. 2 Coverage by reflectors *before* alterations.

REFLECTOR ARRAY

New acoustical theories were applied, and a large reflector array was designed and optimised. Under the guidance of the acousticians, the architects made a visually impressing design of the single reflector in the array without any compromises regarding the acoustical quality of the total array. The ODEON computer model was used for adjusting the reflectors and investigating the pattern of reflections.

ACOUSTIC / PSYCHOLOGICAL MEASURES

An important part of the considerations regarding the improvement of the acoustics of the hall was the intention of making the musicians feel more comfortable on the stage. The stage is very large, and especially minor ensembles talked about feeling a little uneasy. This, of course, is an unacceptable situation as the musicians are then unable to give their best. Several measures were introduced in order to counteract this situation.

- The reflector array was enlarged to cover also the stage area.

- Movable diffusing elements were developed, so that musicians and conductor could adjust the acoustical environment on the stage and receive early reflection in order to enhance ensemble playing, especially in small musical groups.

- A movable, visually transparent, micro-perforated curtain in front of the glass wall behind the stage was proposed. The curtain can be moved up and hidden in a narrow kind of off-stage tower, which holds other types of curtains (velour, etc.). In this way the “hard” reflections from the back wall can be controlled and adjusted to the actual performance.

RESULTS, PERCEIVED QUALITY

After the re-opening of the symphony hall in the autumn of 2001, the acoustical improvements were received very favourably by the public, the critics and the musicians. Of course, the evaluation of a concert hall will take place over a considerable span of time when more and performances have taken place, and more orchestras and audience have met each other.

There is no such thing as a single quality measure in such a case. The general acoustical impression will be developed, expressed and modified over time and by people.

THE ACOUSTICAL FUTURE OF THE HALL

The team of acousticians is now working on plans to introduce variable acoustics in the hall so that it can be used also for modern kinds of music, including that of electronic amplified. Also in this case, both aesthetic and acoustical requirements must be met. Movable, smooth looking, multi-layer textile solutions with high flow resistance are being considered.

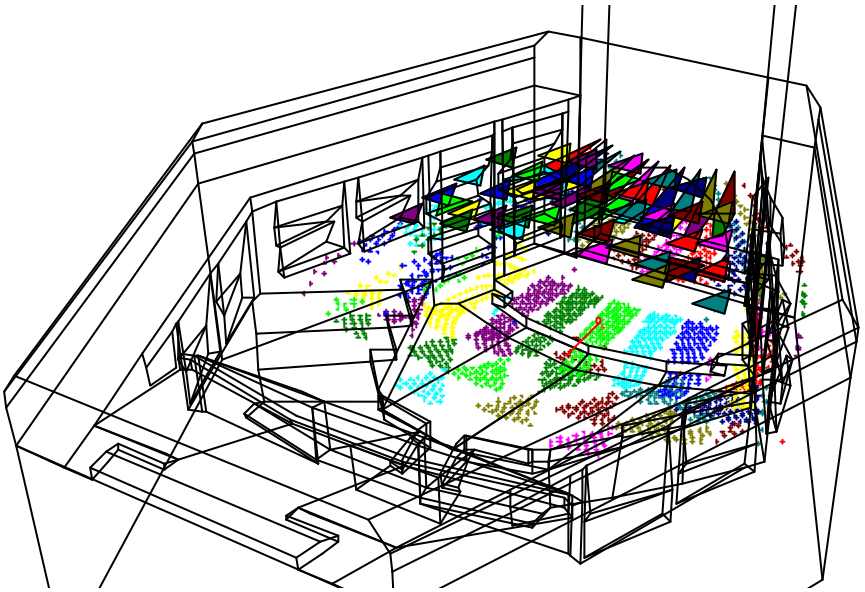

Fig. 3 Coverage by reflectors *after* alterations.