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“LISTEN TO THE LISTED”

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1 Introduction

Statsbygg (Norwegian State, Directorate of Public Construction and Property) is in charge of many old buildings in Norway, most of them “listed” by the Directorate for Cultural Heritage (Riksantikvaren). In this paper we will look briefly at some of the many projects of maintaining such buildings, and we will look mostly at buildings that are interesting regarding acoustics, both as a possible problem of obtaining acoustic environments suitable for today’s use, and some example where the old acoustics itself should be regarded “listed” as a cultural heritage. Among others, we will look at the National Theatre, The Aula and the Festival Hall of the (old) University of Oslo, Norw. Prime Court, The University of Life Science (Ås), Oslo City Hall.

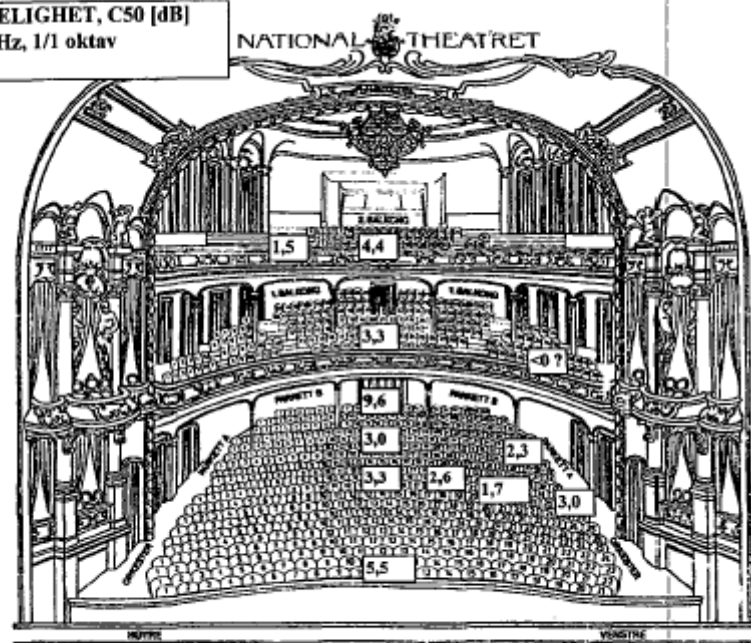
2 Some “listed” projects

2.1 Nationaltheatret, Oslo

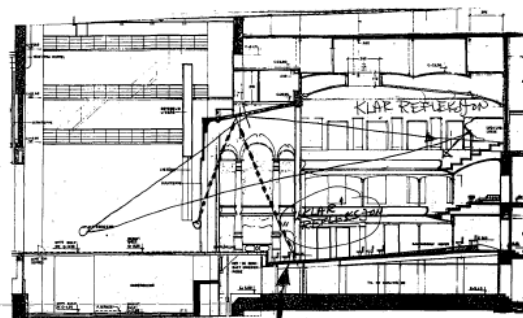
Nationaltheatret in Oslo was built around 1900, and is a traditional “baroque”/almost horseshoe shaped auditorium. In the beginning it had a good orchestra, and performed also ballet and opera. Kirsten Flagstad had her debut here.



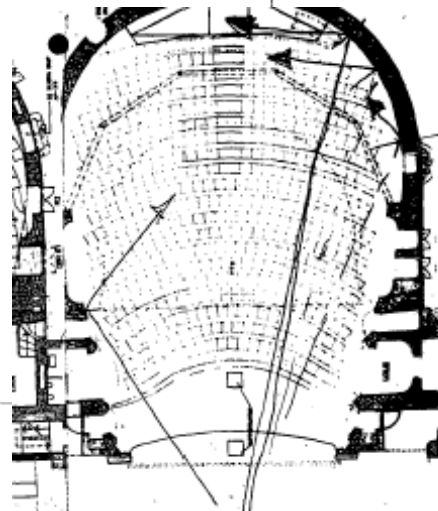
TYDELIGHET, C50 [dB]
1000 Hz, 1/1 oktav



Skuespiller 2/3 bak på scenen



Den stiplede refleksion kommer for sent i forhold til direkte den. Ikke helt ukke, men uskyldig/uklar refleksion.



After the fire in the late 80's Statsbygg made some adjustments that improved the acoustics for speech. The reflecting surface over/in front of the proscenium was "cleaned" by removing many temporary constructions, like the "Ingmar Bergman Bridge" which he demanded for a performance he set up in the 30's. A new lighting position was made at the rear of the upper balcony, with a tilted glass wall that gives very clear reflections to the seats here. Actually, these seats now have perhaps the best acoustics in the auditorium, but they are seldom sold, mostly due to access and limited leg room. The main floor was somewhat steeper, which was good for speech acoustics. Some focusing arrives from the now visible rear wall. The middle of the floor area, somewhat to the sides, is the most problematic in such theatres, as this area gets almost no reflections from the boxes and ornaments on the sidewalls. The volume is about 6000m³, and RT_{unocc}, 100-4000Hz=1,25s.

2.2 Supreme Court, Oslo

When the Supreme Court was OPPUSSET in the beginning of the 1990's, it was shabby, but fortunately for the discussion with the RIKSANTIKVAR, a rather large amount of common perforated gypsum was installed several years ago, clearly showing the need of acoustic treatment



Parts of the walls were covered with mineral wool, and a rather modern textile. These elements are easy to remove without leaving any scars in the building, a fact that the RIKSANTIKAVAR likes. Note also the position of the golden painted loudspeakers in the chandelier, not noticed by many.

2.3 Oslo City Hall

Oslo City Hall is actually world known, because it is the localization for the Nobel Peace Prize award ceremony every year. Some time ago, the Committee wanted to investigate the possibility of arranging also the Nobel peace Concerts in the same hall. The hall is very nice decorated, and has an extremely long reverberation time. $RT_{mid, unocc.} = 4.2 \text{ s}$, $RT_{125 \text{ Hz}} = 4.2$

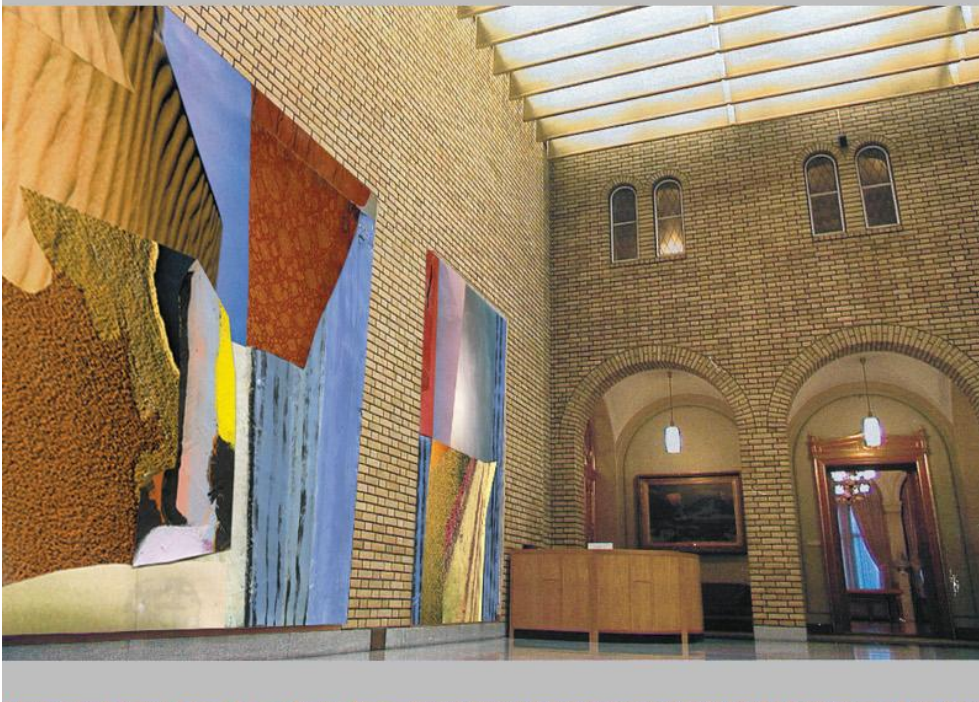


This hall is an example where “the eyes won”, and it was decided to give the Nobel Concerts in another hall, but the long reverberation is heard on TV-sets around the world, and probably makes the talker speak even slower and more distinct.

2.4 Norwegian Government, Foyer

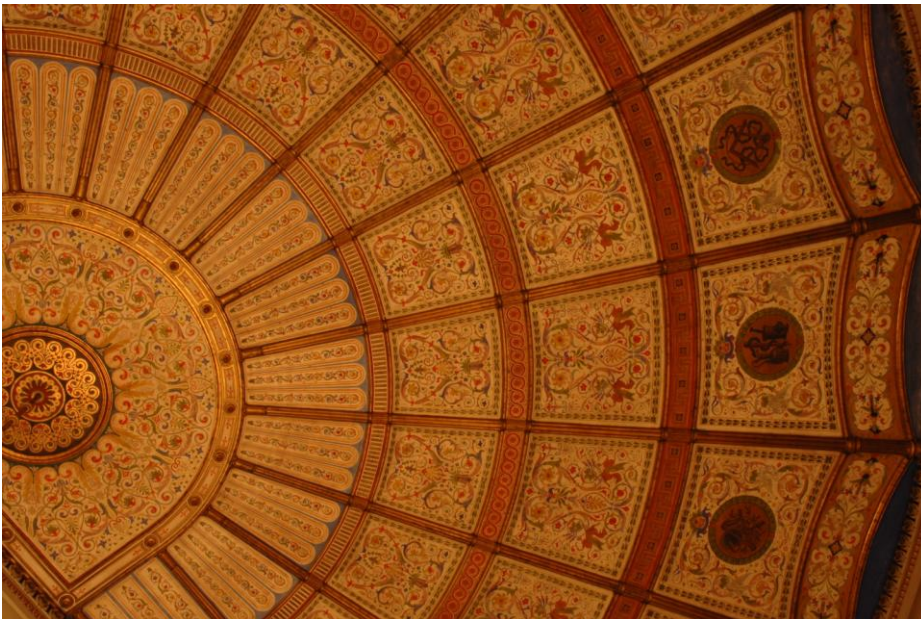
The big, rather new foyer around the main hall of the Norwegian Government is much in use for informal radio and TV interviews, and even the important panel discussion following the results of the votes

The Foyer is nice, in rather new brick stone, and the reverberation is long. For a refurbishment and competition for artworks for the all, it was included that the art should have an acoustic absorbing effect. The competition winner was Sissel Blystad, a norwegian textile artist residential in Stockholm. The result is very good.



2.5 University of Oslo, Old Festival Hall (“Gamle Festsal”)

Gamle Festsal was very nicely renovated some years ago. It is mainly used for “doctor-forelesninger” and festive occasions. Some very ugly mineral wool absorbers had been added, clearly showing the need for acoustic absorbers, both for lowering the reverberation time, and for suppressing the focusing echo from the curved front wall.

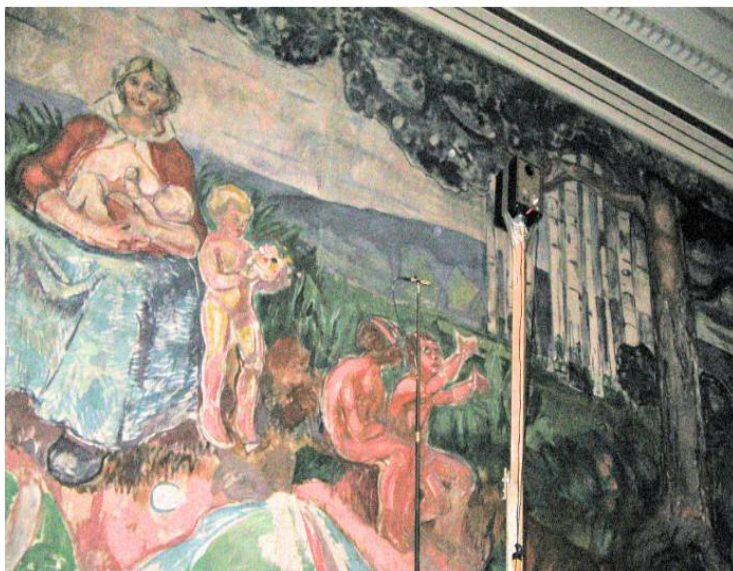


For unoccupied hall, after refurbishment, $RT_{mid} = 1,44s$.

2.6 University of Oslo, Aula

The Aula at Oslo University is a very nice hall, with painting of Edvard Munch on the sidewalls and “the Sun” over the podium. These paintings were removed and hidden during World War II. The hall is known for the very good acoustics, and was the home of the Oslo Philharmonic until Oslo Concert Hall was built. $RT_{mid, unocc} = 1,65s$, $RT_{125Hz} = 1,46$. (4.200m³, 560m², depending on how gallery and rear floor is included). The acoustics of the Aula is perhaps ranked higher than other halls in Norway, especially for chamber orchestra and recitals. It is often compared with Wigmore Hall in London. The hall needed total refurbishment. Due to both the architecture and the Munch paintings, the hall is

listed. In the programming Statsbygg Acoustics introduced that also the acoustics should be “listed”, meaning that no work should be done that changed the acoustics, even if “all” acousticians of today meant that the changes would be beneficial for the acoustics. The absorption of the old chairs and the glass ceiling were measured, also the absorption of the “dusty” Munch paintings. The paintings are so big that by today’s standard for safety, they could not be removed through the doors. A small gap was made in the stage outer wall, and the paintings taken away in a very secret van to a very secret workshop for cleaning. When the paintings are back in the hall, and chairs, stage etc. mounted, we will see if the project succeeded in keeping the “listed” acoustics.



2.7 Other projects

Old buildings

The University of Life Science (Ås)



In the staircase shown above, there are no doors or openings to other rooms, so this will be kept as it is, with the long reverberation. For the main corridors, Acoustic Plaster will be used and ordinary mineral fibre ceilings in secondary rooms.

New Buildings like the building for several state ministries (already listed) can also be challenging regarding acoustic. Luckily the architect followed the acoustic need for all windows to be opening in such directions that a “whispering gallery” effect is eliminated, The user now want to move the cantina out in the courtyard, even if we strongly forbid such a solution when programming the building.



3 Acknowledgements

For some of the projects presented in this paper, we thank our acoustic consultants (b-s akustikk, Norconsult, Multiconsult). Most of the measurements and analysis were, however, done by Statsbygg acoustics

4 Summary

In this paper we have described some of the many “listed” buildings that Statsbygg is responsible for, both the common problem of long reverberation times for today use of the rooms, and rooms where the refurbishment has improved the acoustics, and an example of a hall with so good acoustic reputation that the acoustics itself was ranked as “listed”.