

SAVONLINNA OPERA AWNING AND CONCERT HALL

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ABSTRACT

This is a presentation of two cultural arenas in Savonlinna, Finland. The use of those arenas are very different, but there is some similarities in design stage.



Figure 1. Savonlinna opera awning.

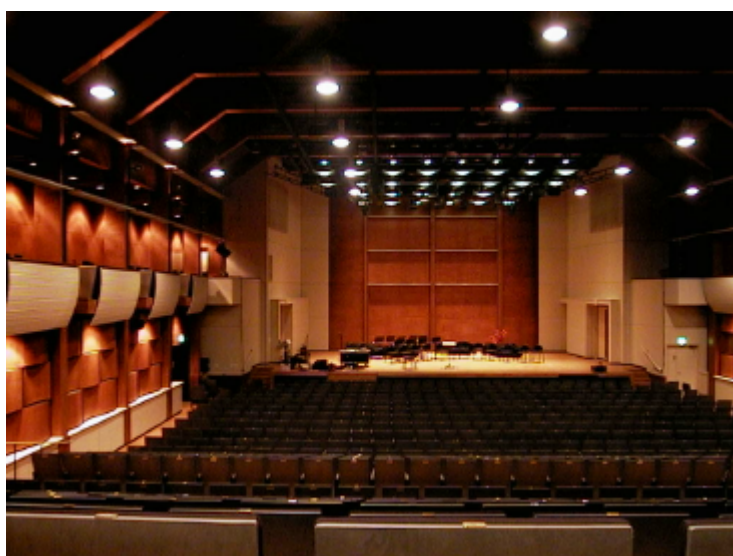


Figure 2. Savonlinnasali concert hall.

1. SAVONLINNNA OPERA AWNING

1.1. History

In 1910 Aino Ackte used Olavinlinna castle (made in 1500 century) as the setting for her first opera festival. They have opera there for 5 summers.

Opera festivals begin again in 1967. The opera festival has extended from one week event to one month international festival with 60 000 spectator. In 1970 they build rain awning and auditorium for Savonlinna opera festival. In 1998 those had come technically and visually out of date. [1]

1.2. New awning

There was architectural competition in summer 1998. The competition was won by architects Markku Erholtz's and Heikki Paakkinen's "Sound Waves", which basically proposed a simple fabric awning attached to concrete slabs on the top of the walls. The whole textile tent (1800 m²) is supported from above and there is no pillar below to block out the scene of the stage.



Figure 3. Tent structures.

1.3. Design coal

- rising auditorium
- there must be at least 2250 seats (result 2257+3 seats)
- there must be at least 10 cm more space between rows of seats
- the whole structure must be removed after festifal
- it wasn't allowed to make any visible modification on the castle structures
- the acoustics must be at least as good as in the old awning

1.4. Acoustical design

The acoustical design was very challenging.

- The absorption coefficient of the textile must be measure
- RT60 – 1,6 s
- the design was made in ODEON software
- difficulties in design:
 - estrade was too wide (30 m)
 - the only surface where you can get fast reflection (the roof) will be moved away.
 - all the textile surfaces are saddle surfaces
 - there were only few fixed points, where the horizontal forces can be mounted. This limits the where we can put the top or lowest point of the textile

1.5. Acoustical solutions

The acoustical solutions were:

- The shape of the textile is optimized to the audience
- We increase the number of crosswise ridges. The awning is divided up by five crosswise ridges, each with two peaks. The blue lining is water-tight and will not vibrate in the wind.
- We change the crosswise ridges to asymmetric
- Calculated RT60 was 1,7 s.



Figure 4. Asymmetric roof structures.



Figure 5. Roof structures.

2. SAVONLINNASALI CONCERT HALL

2.1. History

In the end of 18 century Savonlinna was famous spa place where people came from Russia. Near the spa was Old Casino with ballroom for 500 persons. All buildings were made of wood. In 1928 the ballroom burnt to the ground but they succeed to save Old Casino building. In 1964 the spa burnt to the ground. Later they build new spa out of concrete.



Figure 6. Architect Riitta Ojala and Concert hall

2.2. Design coal

- architects Riitta and Kari Ojala
- the acoustical requirements were: classical concert hall, opera stage, room for lectures, rock music and ballroom.
- the new concert hall in the same place as old ballroom
- seats for 800 people
- classical shoe box shape
- concert hall must be made of the wood, as old ballroom
- in early stage, design team decide to have all the supporting structures in view
- wall structure was same as in Sibelius hall in Lahti: that is sand filled kertowood elements.

2.3. Room acoustics

- RT60 1,7-2 s
- variable acoustics (RT60 1,2 -1,7 s)
- Odeon computer model
- Acoustical solutions
 - acoustical clouds
 - glass shelving on the estrade wall and on the side walls
 - curved balcony railing
 - curved walls under balcony
 - RT variation with curtains in estrade and side walls



Figure 7. Inside concert hall



Figure 8. Acoustical clouds



Figure 9. Side wall



Figure 10. Concert Hall in short RT mode

2.4. Sound insulation and difficulties with wood structures

One side of the concert hall is spa hotel and the busses drive 5 m distance from estrade back wall. on the other side is lake and railway. Sound insulation was made with prefabricated sand filled kerto-wood elements, which were even coated beforehand. And in the back of the concert hall there is big windows with large cavity.

Vibration insulations on the technical installation were tricky with wood structures. And the big movements with wood structures are difficult to keep tight.

3. REFERENCES

- [1] Savonlinna opera festival July 1-30,2000 in Finland.
- [2] Pertti Mutka, Satavuotias Savonlinnan Kylpylaitos.