

PRESENTS

Chapter 9 Overall discussion and conclusions

from the PhD thesis by Jens Jørgen Dammerud:

Stage Acoustics for Symphony Orchestras in Concert Halls

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Introduction to Chapter 9:

There were three major goals for this study: to establish the musicians' impressions of acoustic conditions, to investigate characteristics of occupied stage enclosures and to determine the acoustic characteristics of the main auditorium which are beneficial for performers on stage. The scope of the study has been wide, searching for the most important relations between objective and subjective conditions. In this chapter the conclusions from individual chapters above are brought together for a concluding discussion.

The most significant results from this project may be summarised as follows:

- Complex aural perceptions are involved for musicians on concert hall stages. Being able to hear all the other players clearly, well balanced with the sound from one's own instrument and acoustic response from the main auditorium was found to be the most important aspects of acoustic conditions among the players.
- The attenuation of sound within the orchestra itself has been investigated and quantified. The sound level within the orchestra has been denoted the 'within-orchestra sound level'. String players are found to experience the lowest within-orchestra sound levels for the most typical orchestra arrangement.
- Early reflections provided by a stage enclosure have been categorised as either 'compensating' or 'competing' for studying how low within-orchestra levels between certain instrument groups are being improved or made worse by the stage enclosure. The direction and delay of early reflections provided by the stage enclosure appears highly relevant. Early reflections from the sides with minimum delay are found to provide compensating reflections back to the string players most efficiently, compared to early reflections from above.
- Acoustic measures based on monophonic omnidirectional room acoustic responses on empty stages are found to correlate poorly with impressions of hearing others clearly and one's own instrument. Such measures are found most significant regarding assessment. [Go to thesis](#)

Chapter overview:

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5. The effect of reflected sound back towards a symphony orchestra
6. Computer modeling of stage enclosures including a full symphony orchestra
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