SUMMARY

This dissertation is motivated by the importance of sound transmission loss (STL) of party walls in multi-dwelling living in Singapore. At present, there is no sound insulation standard nor recommended materials design for party walls with respect to sound insulation among residential buildings in Singapore.

Field measurements on sound insulation performance of party walls have been conducted for sixteen condominium apartments, five semi-detached houses, and four terrace houses in Singapore. The major findings are:

a. Brick party wall is found to be the most common construction material used in residential developments. Some reinforced concrete party walls are used for tall buildings exceeding 16 floors. At present aerated concrete is rarely used for party walls construction for residential buildings in Singapore.

b. The mean Field Sound Transmission Class (FSTC) of full brick party walls and 200mm reinforced concrete party walls are found to be in the range of 52dB to 56dB. Aerated concrete party walls have the FSTC of 44 dB.

c. The additional building services components on the party walls do not affect the overall STL performance of party walls. The flanking paths can be minimized with the proper architectural layout of windows and doors in the dwelling units.

The prediction models have some limitations. For masonry party walls with surface density of more than 200 kg/m² (full brick and 200mm reinforced concrete party walls), both the mass law extension and thick panel predictions give good agreements with the measured results. Predictions for moderately lightweight party walls less than 150 mm thickness (half brick and aerated concrete party walls) require correction. The mass law extension is less accurate at the frequency region where the coincidence transmission occurs.

The study has resulted in the following recommendations:

a. Full brick and 200 mm reinforced concrete are recommended as materials for party walls between dwelling units, while half brick walls are recommended for internal party wall within dwelling units.

b. Lightweight materials like aerated concrete block can be used for party walls in lower grade of residential buildings.

c. The mass law extension is useful as a quick estimate of sound transmission loss.