

Development of Light Timber Frame Floor/Ceiling Systems with Good Low Frequency Performance

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In Australia and New Zealand the predominant form of construction for dwellings and low rise buildings is light timber frame, with plasterboard linings and particle board floors. A widely held perception is that light timber frame floors perform poorly for footfall noise at low frequencies below 100Hz and that concrete floor systems enjoy a unique technical and economic advantage, which is unassailable.

The Australian and New Zealand Building Codes are performance based but the subjectively troublesome frequencies below 100Hz are not included in the verification method. Consequently the subjectively poor footfall performance of light timber frame floors at low frequencies is not being addressed by regulation. Thus there are significant barriers to the expanded use of light timber frame floors in the construction market. To mitigate this problem the Forest & Wood Research & Development Corporation in Australia has initiated a one year programme with a consortium of industry partners and researchers. This paper introduces and sets out the framework of a multidisciplinary approach to develop practical light timber frame floors, which perform as well as 150mm concrete floors at frequencies below 100Hz. Firstly an overview of the mathematical modelling, which has been undertaken, secondly the selection of suitable floor systems, thirdly the construction of purpose built test rigs and lastly the measurement parameters to clarify the validity of the modelling. As the project progresses several practical floor systems will be constructed, which will be further assessed on site in respect of buildability, sound insulation performance and flanking at the wall/floor junctions.

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