Comparative field test evaluation of the Impact Insulation Class (IIC) of roofs

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ABSTRACT
Most building structures are excellent transmitters of noise and vibration. Noise generated on the roof due to mechanical units, maintenance personnel and amenity uses is usually under estimated. This is of great importance particularly when the roof is supported by a light weight structure. The tests for this project were performed in a conventional light weight roof with 2 ply modified bitumen and two green roofs in the same building. Some additional elements regularly used on roofs were evaluated as well, in order to understand their effect in the impact sound transmission.

METHODOLOGY
The tests were performed at BCIT Green Roof Research Centre on one conventional roof consisting of 2”x12”x16” O.C. wooden deck, insulation and two layers of torch-on modified bitumen, two green roofs -75mm and 150 mm depth- with a fully established sedum communities. In the same edification, as per ASTM standard E1007 ”Field Measurement of tapping machine impact sound transmission through floor-ceiling assemblies and associated support structures”. A standard tapping machine is placed in operation at four prescribed positions on the roof. Sound pressure levels are measured. Four measurements are averaged to get the average sound pressure level in the room.

RESULTS
The Impact Insulation Class (IIC) is a single figure rating scheme intended to rate the effectiveness on roof-ceiling assemblies at preventing the transmission of impact sound from the standard tapping machine. The higher the value of the rating, the better the roof performance.

CONCLUSIONS
International Building Codes requires a minimum IIC of 45 for Field test in new constructions for floor-ceiling assemblies. Under this parameter, the SBS roof over wooden deck and the same roof with concrete pavers do not comply with the requirement.

REFERENCES
- Estimation of sound transmission class and Impact insulation class ratings for steel framed assemblies. American Iron & Steel Institute. NRC-CNRC.

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