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IRC investigates new method for evaluating floor toppings

by Alf Warnock

In the last issue of Solplan Review (No. 93, July 2000) Alf Warnock reported some results of IRC research on the control of impact noise through floors in residential buildings. This issue we report on new developments in testing procedures for impact noise.

As a result of the efforts of IRC's Acoustics group, it looks as if there will be a new standard test method for evaluating the ability of floor coverings or toppings to reduce the transmission of impact sound from one floor to another in multi-family dwellings. At the moment, the only way to test a floor covering is as part of a complete floor assembly. Without additional testing, it is not possible to separate the properties of the covering from the properties of the rest of the floor assembly on which it rests.

Presented with test results for one floor covering tested on a 150-mm concrete slab and another product that may have been tested in a different laboratory on a joist floor with a plywood or oriented strand board subfloor, users find it impossible to make informed choices of coverings. The situation has become more urgent with the increased popularity of hardwood, wood laminate and ceramic floor finishes. When hard floor surfaces are used, additional materials or measures are often required to control impact sound.

Some new products combine a hard surface layer with a resilient (flexible) supporting layer that is intended to reduce impact sound transmission. These underlayments include shredded or foam rubber, plastic foams, cork and fibrous materials. Testing the many possible combinations of

floor topping and resilient material as part of full-size, complete floors would be very expensive, but the proposed new test method changes this situation.

A small, industry-supported project at IRC looked at ways of adapting an ISO test method developed primarily for concrete slab floors and making it suitable for the broader range of floors typically used in North America. The ISO method focuses on measuring the reduc-

tion in impact sound that can be directly attributed to the floor covering. Sound levels from a standard tapping machine are measured twice — once on a bare concrete slab and once with the covering in place on the slab. The difference between the two measurements is used to rate the impact sound attenuation of the covering.

One benefit of this approach is that variations among the results for the bare slabs found in different laboratories are negligible — the same improvement in the attenuation of impact sound is obtained whether the slab is 100 mm or 200 mm thick.

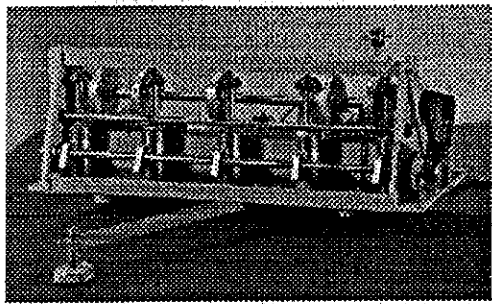
Furthermore, small specimens that do not completely cover the slab still give reliable measures of the impact noise reduction. This finding will reduce testing costs considerably for manufacturers developing new products.

The measured data showed that many floor toppings significantly improve the attenuation of impact sound when they are placed on a concrete slab. The topping cushions the hammer blows and turns the sharp "clacking" sounds into thuds. However, many of these same toppings have little effect when placed on a joist floor with a plywood or OSB subfloor. The surface of the subfloor, which is much softer than the surface of the concrete slab, often provides enough cushioning so that there is little added benefit from the topping — the rating for the floor is determined by the rest of the floor assembly.

The draft of a new test method is proceeding through the ASTM balloting process — most agree that such a test method is sorely needed. For the moment, the test method is limited to testing toppings on concrete slabs. However, more work is planned to develop a standard wood-joist floor that can be used to measure improvements in impact sound attenuation for this type of floor.

The partners in this project were:
Dura Undercushions
Kinetics Noise Control
Mason Industries
Vibro-Acoustics
The Noble Company

Specific questions can be directed to Dr. Alf Warnock at (613) 993-9370, fax (613) 954-1495, or e-mail alf.warnock@nrc.ca.



A tapping machine used in tests to evaluate the ability of floor coverings to reduce the transmission of impact sound from one floor to another in multi-family dwellings