Poster presentation

Through-thickness increasing density panels: suspended application in a vocal rehearsal room

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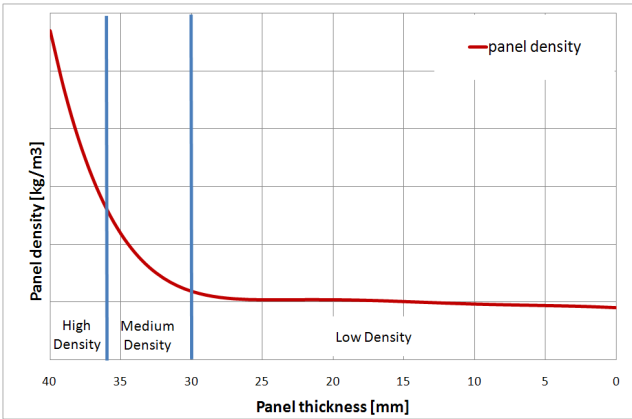
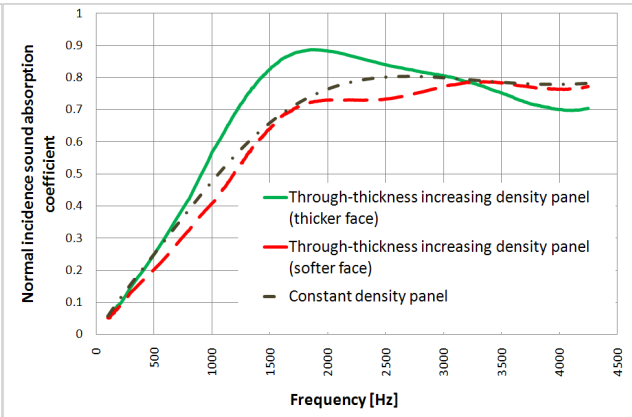
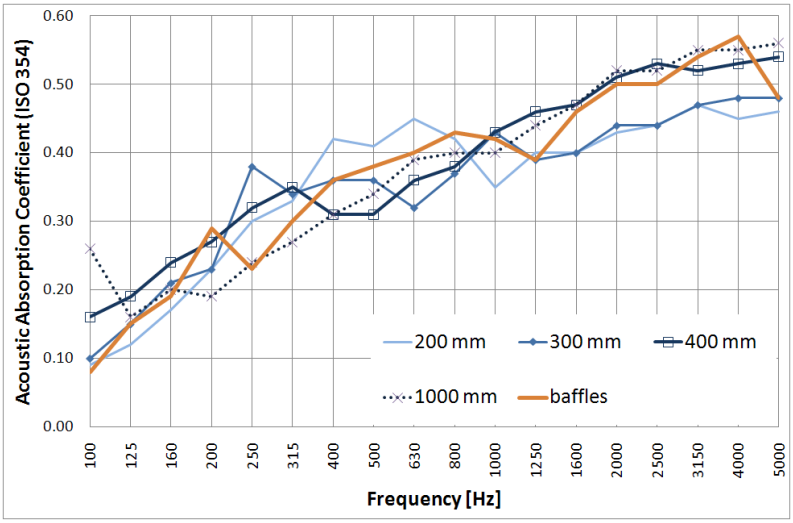
Sound-absorbing panels characterized by through-thickness density variation provide higher acoustic absorption in the middle frequencies thanks to their double behaviour: porous layer and vibrating panel. These panels can be suspended from ceilings or directly attached to walls. Sound absorption coefficient for attached panels was already measured and discussed in previous papers. Figure below shows density variation and main characteristics.





In this work, a comparison between two different measuring methods of estimating suspended panels sound absorption coefficient is presented. Two different laboratory configurations were tested: standard baffle (UNI EN ISO 354) and non standard suspended configuration at different distances from the ceiling (200, 300, 400, 1000 mm). In figure below, a comparison can be seen between standard baffle and non standard suspended.



A rehearsal room was then modeled applying UNI EN 12354-6, calibrated with T60 measurements performed before the acoustic correction.

The room was then treated with suspended panels (total surface 16,5 mq) and attached panels (total surface 28,4 mq). After that, UNI EN ISO 12354-6 was applied, using both alpha values (standard or baffles). New measurements were then performed and compared to calculation results.

The rehearsal room was commissioned by CET choir: a male vocal ensemble which performs traditional Italian folk songs completely “a cappella”. Their vocal range extends from D2 to D5 and

the essential requisite is a room with a reverberation time lower than 1 second between 250 and 4000 Hz.
The chosen location was once a classroom with ceramic floor and very high plastered ceiling. During the measurement session it was empty. The figure below shows the measured T60.

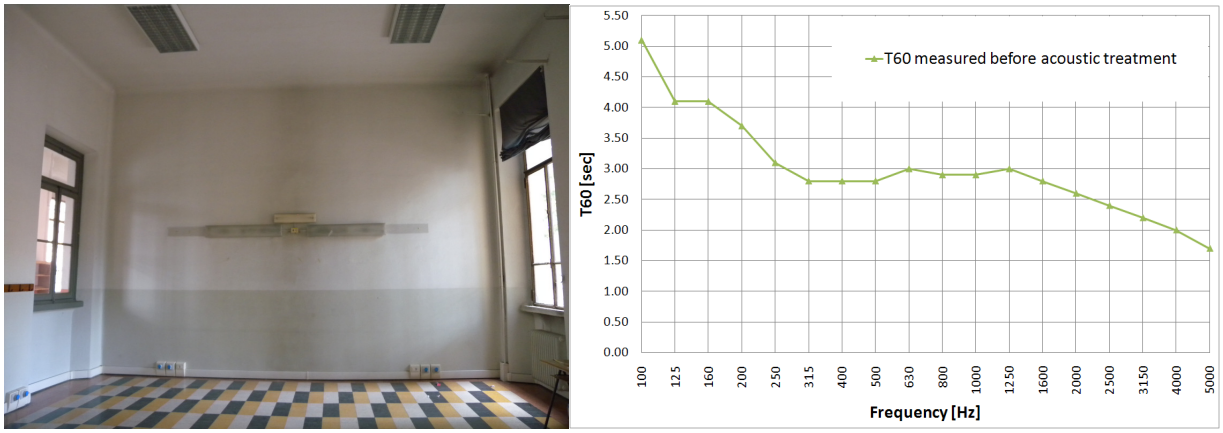
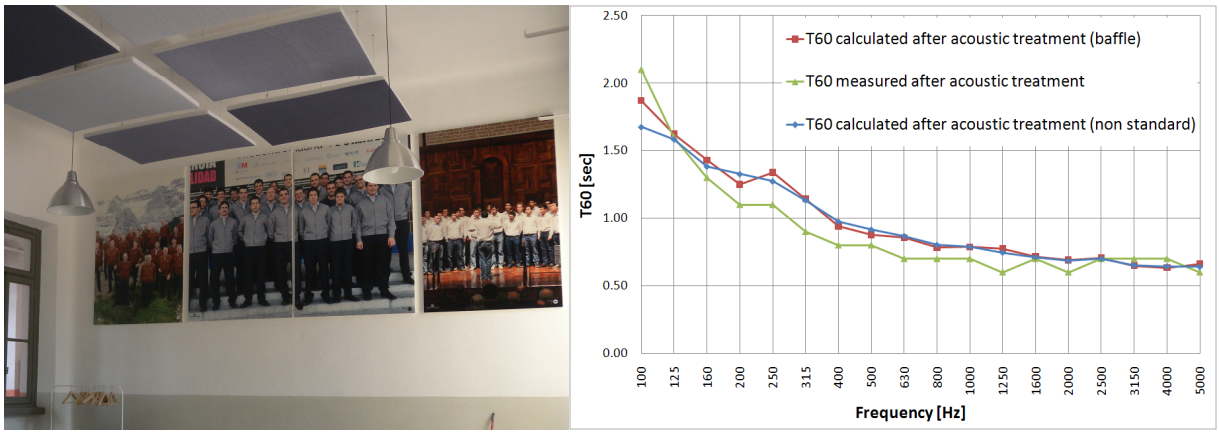


Figure below shows the comparison between calculated and estimated values. On the thicker face, the panels are printed with pictures, like the specimens used in laboratory tests.



It can be seen that both configurations overestimate T60 values, except for higher frequencies. New measurements campaigns will be soon performed in order to increase the modeling accuracy.

Bibliography

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