

# IMPROVING ACOUSTIC PERFORMANCE BY RESHAPING INDOOR SPACES

When volumes cannot be changed, the indoor configuration of a space can be modified with radical improvements to the quality of sound. This case study shows how a space initially designed for the liturgy was turned into a venue that is also exceptionally good for chamber music and concerts.



The Beth Shalom Reform Synagogue was opened in 2015 and is the first permanent synagogue of the Cambridge Reform Jewish Community. The project by Cowper Griffith Architects is, at the same time, a wonderful, modern religious building in Cambridge downtown and a great example of holistic acoustic architecture.

**The Main Room of Beth Shalom Reform Synagogue in Cambridge, UK**



Vertical sections of the room before (left) and after (right) the intervention. The new geometry of the lateral walls and ceiling allowed for a significant improvement in the diffusion of sound waves.

The design of the main room and the constraints of the site raised some acoustic issues that were identified, analysed and solved during the development of the project thanks to the continuous, fruitful collaboration between Cowper Griffith Architects, architect Laura Montanini and acoustic consultant Francesco Pellisari.

The main room presented two acoustic challenges to solve (see pictures on the left): low ceilings with a high level of acoustic resonance and the peculiar geometric configuration of the space that was affecting the intelligibility of spoken words.

The constraints of the building site made it impossible to increase the volume of the room, so a different approach was used: the inclination of the lateral walls was modified to make them divergent, the curvature of the ceiling was changed by the means of custom-designed wood panels, and the front and back walls were covered with long, vertical wooden elements.

The new configuration brought a dramatic improvement to the acoustic quality. The resonance was greatly reduced, thanks to the better diffusion of sound waves in the room: the sound is more uniform around the room and can be perceived clearly, thanks to the natural vibration of the wood (that enhances the reflected sound waves with new harmonics). As an added bonus, the lighting of the room also improved, spreading better, in a more diffused way.

The sound configuration was completed by two powerful omni-directional speakers with a terracotta body, positioned along the main axis of the room.

Thanks to its great acoustic performance, the main room of the Beth Shalom Synagogue is today not only a special place for the liturgy of the local religious community but also a renowned musical venue for live concerts.



The acoustic intervention included two omni-directional speakers by NACSound

**“Exceptional result: a wide and deep unexpected sound for a place of this size. Perfect for voice and chamber music.”**

**– ADRIAN TUCHEL,  
THE NEW EUROPE SOCIETY**

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Learn more about NACSound and Francesco Pellisari: [www.nacsound.com](http://www.nacsound.com) // [www.francescopellisari.com](http://www.francescopellisari.com)

Learn more about Cowper Griffith Architects: [www.cowpergriffith.co.uk](http://www.cowpergriffith.co.uk)

Learn more about the Beth Shalom Reform Synagogue in Cambridge, UK: [www.beth-shalom.org.uk](http://www.beth-shalom.org.uk)

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