

Development of Slotted Acoustic Absorbers

Michael Latimer, Latimer Acoustics, email mikelat@acoustop.com

Development carried out in conjunction with the University of Canterbury, Mechanical Engineering Department, funded by Technology New Zealand in the form of a Technology for Industry Fellowship (TIF) grant.

Project Manager/Mentor: Michael Latimer

Academic Supervisor: Dr John Pearse

Undergraduate: Aaron Grey

Background

Slotted or perforated (peg board) panels have long been used in conjunction with absorbent backings to control reverberation in a number of applications.

These panels are normally manufactured from substrates such as painted wood, plywood, perforated metal etc. In certain combinations these finishes can look appealing, for example with natural wood veneer facings. However, this type of product is widely considered to look institutional and outdated.

Initial product development

The concept behind the range of **EchoHush Metro** panels was to develop a product that would become a key feature of an interior design.

Initial design concepts were developed by engaging a graphic artist whose brief was to develop artistic themes that related to areas where reverberation control was likely to be required. Out of twelve conceptual designs, six were chosen for further development.

Product prototypes

The original designs were hand-

drawn to scale for ease of use during the first stages of the project.

These hand-drawn design concepts were digitised, and the digitised images were then enlarged to full size to assess the visual appeal of the panels. Minor changes were made to improve the aesthetics and structural integrity of some panels.

The panels were then transferred into a 3-D modelling program, and the total open area of the panels was calculated. This was to assess the likely acoustic performance of the individual panels, before machine prototyping took place.

Further adjustments were made at this point to increase the open area in some designs.

Initial machining trials were then carried out. The machined panels were tested for mechanical strength, as it was a concern that they were likely to be installed into areas such as schools, where the potential existed for unintentional damage through boisterous behaviour.

More changes were made to two of the panel designs that were considered weak in some areas.

Painting trials were also carried out at this stage to ensure that an acceptable level of finish could be obtained.

Acoustic testing

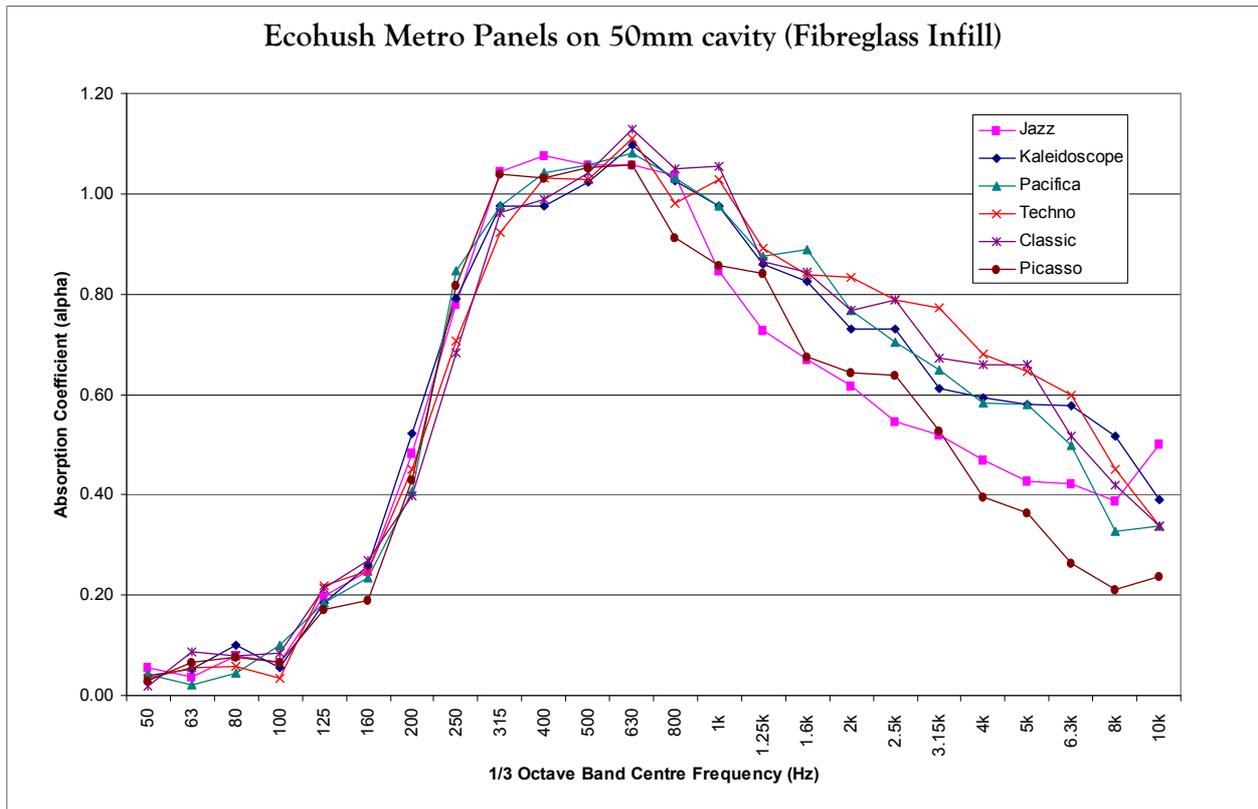
From an early stage it was determined that 50mm and 90mm cavities should be used to match standard wall stud sizes and cavity spaces. Glass fibre insulation was used as the cavity absorber to provide good fire performance. As the standard sizes for glass fibre board are 50mm and 100mm, the 90mm cavity size used 100mm glass fibre compressed in the cavity space.

The basic outline of the project was as follows:

- Undertake a survey of relevant work done on slotted absorbers
- Identify a range of attachment systems, sizes and shapes for slotted absorbers
- Test the acoustic properties of the slotted absorbers in the reverberation room.
- Report results

Summary

The design process utilised the results of a detailed literature survey. This provided useful information on the influence of open area and slot size on a panel's acoustic performance. This information was carefully considered during the design to provide some certainty that good acoustic performance would be achieved.



The product development process was extremely successful. The six tested designs have been developed into products suitable for commercialisation, with promising sales potential.

All six designs have been registered

to protect the research and development work undertaken by Latimer Acoustics.

EchoHush Metro panels will have a long product life, as the complex design process has resulted in changing the fundamental concept

of slotted panels from merely an acoustic solution, to a design solution with excellent acoustic benefits. □

