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This firm is a member of the Association of Australian Acoustical Consultants.

The work reported herein has been carried out in accordance with the terms of membership. We stress that the advice given herein is for acoustic purposes only, and that the relevant authorities should be consulted with regard to compliance with regulations governing areas other than acoustics.

1 INTRODUCTION

This report provides the results of free field testing of the sound reflection pattern from 2 different types of sound diffusing panels. The tests were carried out in open air conditions using a sound source to beam pink noise at 45 degrees to each of the diffuser panels. The results were compared to the sound reflection from a 2400 x 2400 panel of 25mm thick MDF.

The reflected sound pattern coming from the diffuser under test was measured at 15 degree intervals. This gave readings at 15, 30, 45, 60, 75 and 90 degrees to the diffuser panel under test.

2 DIFFUSER PANELS

The panels tested were DecorTone which is 100mm wide, 25mm deep, comprising 6 slots in pairs of varying depths. The panels are normally installed side by side to achieve the required area for sound diffusion. This panel operates basically as a minor quadratic diffuser.

The second panel tested was a PKA progressive slot design based on the diffuser battens used for the Aotea Centre in Auckland, New Zealand. The panels were 1200 x 2400 slotted in repetitive blocks of basically prime series slots in terms of depth and width. This system could also be based on a 200mm wide module for easier handling on site.

3 PURPOSE OF DIFFUSER PANELS

The intention of either the DecorTone or the PKA progressive panels was as high frequency diffusers to reduce acoustic glare from large plain reflective surfaces. Acoustic glare results in a harsh quality of the reflected sound. Another important use of diffuser panels is to quickly control flutter echo between large expanses of parallel walls.

4 SUMMARY OF RESULTS

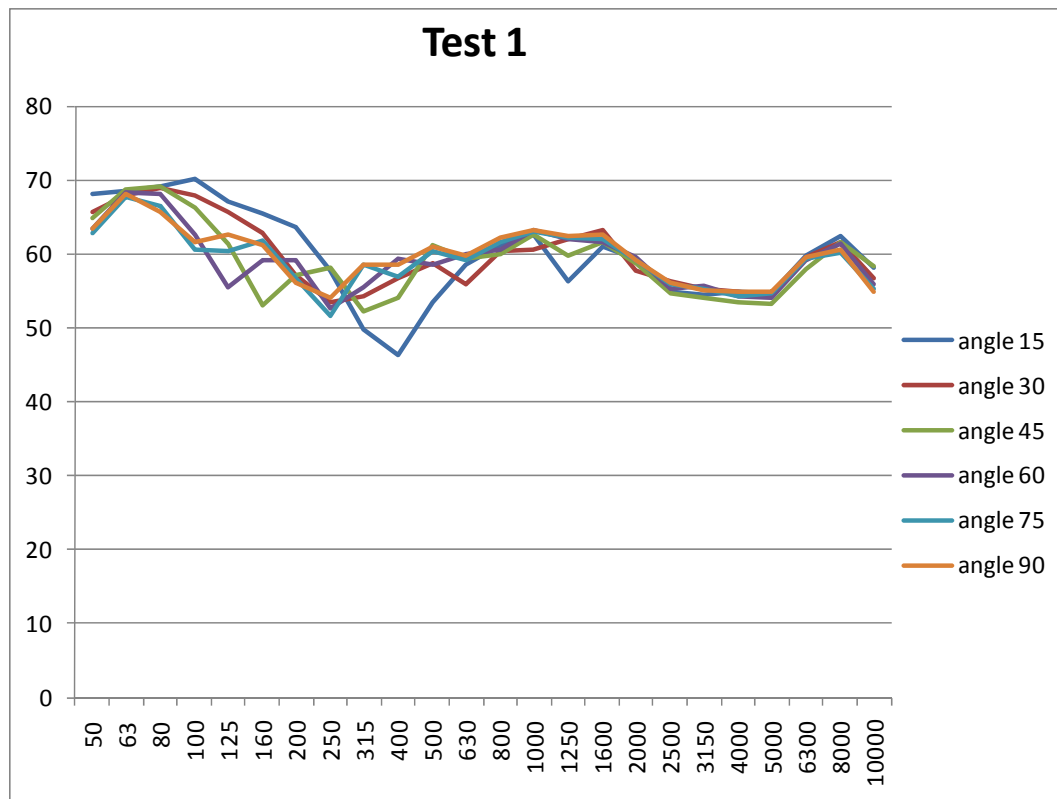
The panel treatment which gave the best results was a 1200mm wide section of DecorTone on a 2400 wide plain MDF panel. Surprisingly, this panel had more influence in the region between 100Hz and 1000Hz than in the normally anticipated high frequency range above 2000Hz, which would normally be anticipated. The tests also showed that the panel smoothed out the reflections between 25Hz and 50Hz, however this phenomenon cannot be explained, theoretically this should not happen.

Audibly sound reflections from the DecorTone panel sounded more balanced.

5 EXPLANATION OF RESULTS

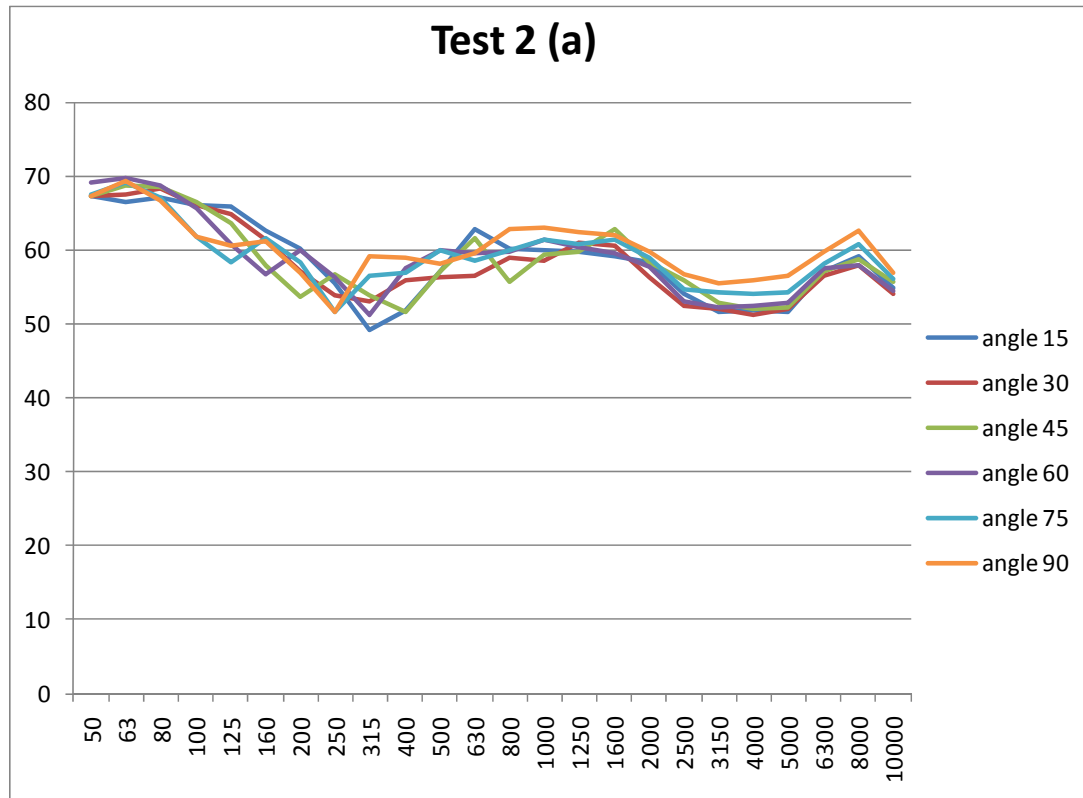
5.1 Plain Panel

The sound reflections from the plain 2400 x 2400 25mm thick MDF panel is shown below as Test 1. The graph clearly shows the comb filter effect occurring between 125Hz and 1250Hz. Surprisingly, the sound reflections of the frequencies above 1600Hz were well balanced between 15 degrees to 90 degrees reflection. This result was not anticipated.



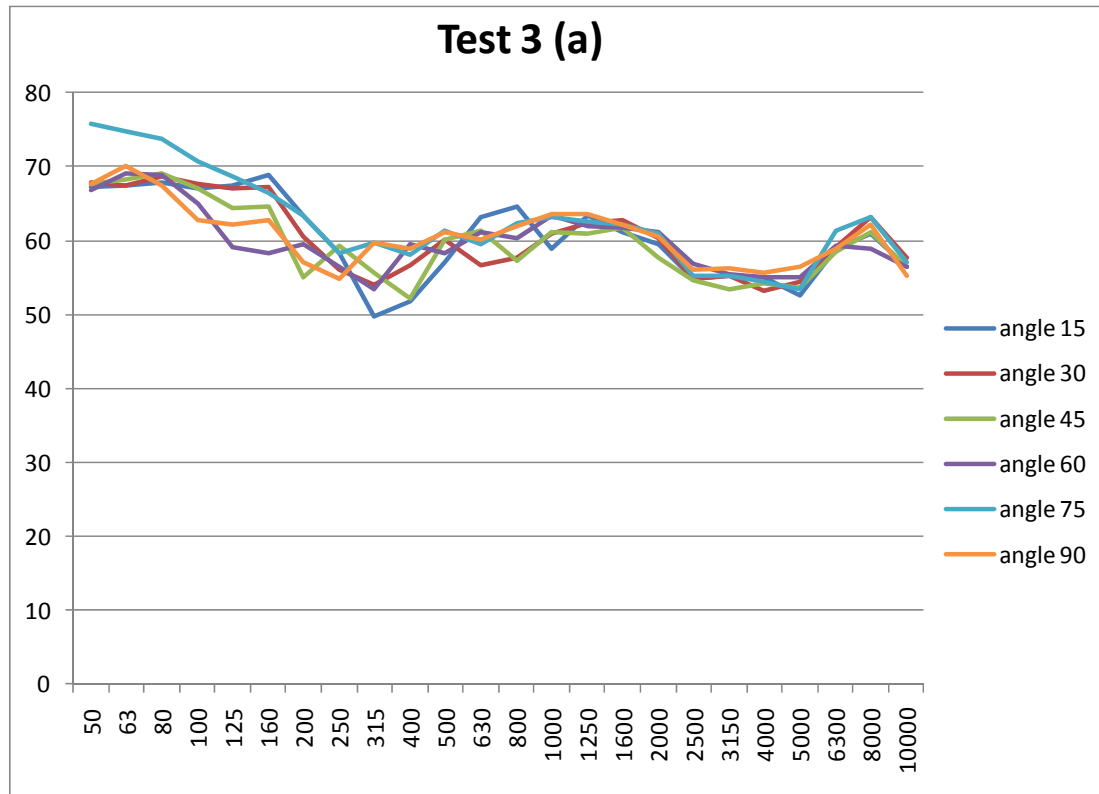
5.2 DecorTone Panel

The reflection pattern for the frequencies of 80Hz through to 630Hz was smoothed out. There was some evidence of comb filter effect; however it was much better controlled than the case with the bare panel. Surprisingly, the higher frequencies above 2500Hz were not as uniform however it was considered an acceptable reflection panel.



5.3 PKA Progressive Panel

This was a 2400 x 2400 panel. In this configuration it provided a slight improvement between 80Hz and 800Hz, however the DecorTone panel gave a more diffused reflection for this frequency range. In the high frequency range above 1000Hz the reflection pattern was slightly more uniform than the DecorTone panel however most people would not audibly perceive the difference.



6 APPLICATION

The DecorTone panel appears to have a reasonably uniform reflection pattern for the frequency range of 80Hz to 2500Hz. The panel appears to operate better as a 1200 wide element on a plain wall. The ideal layout may be to have 1200 of DecorTone panel at 600 spacing between the panels.

The panel would be suited to use in music practice rooms, large rehearsal studios, auditoriums and in home cinema installations. The main purpose would be to achieve a more diffused sound field which is critically important in the performance of music.