Our Ref: ECE/NC/6735

19th October 2010

By email

Darren Aylwin
St Thomas Centre
Ardwick Green North
Manchester
M12 6FZ

Dear Mr Aylwin,

Re: GMCVO – Rooms Acoustics of The main conference space.

At the request of GMCVO, we have reviewed the acoustic performance for the main conference hall at the St Thomas Centre.

1.0 Design Criteria

It is desirable that in rooms designed for speech the reverberation times are controlled. Long reverberation times will cause syllables to be prolonged so that they overlap with each other and in doing so reduce the intelligibility of the speech.

As early reflections off the ceiling will reinforce the direct sound we would recommend that the ceiling should be acoustically hard and the control of reverberation, where desirable, should be by absorbent materials on the walls.

The design criteria we have used for the spaces is detailed within Building Bulletin 93 "Acoustic Design of Schools". This standard has been utilised as it contains the most recent design criteria for reverberation times for clear communication of speech. The reverberation is quoted in terms of mid-frequency reverberation time, T_{mf}, the arithmetic average of the reverberation times in the 500Hz, 1kHz and 2kHz octave bands. These frequency bands are the most important frequency ranges that determine speech intelligibility.

We would therefore recommend that the reverberation times in large rooms such as this should not exceed 1.0 seconds T_{mf}

2.0 Measured Results

During our initial survey, we have undertaken an assessment of the reverberation time within the main conference space. This has been undertaken to determine what level of reverberation exists and to verify our acoustic model prior to implementation of remedial measures. The results of the assessment indicate that the current reverberation is 2.0 seconds T_{mf}

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3.0 Calculation Methodology

The room acoustic of the main conference space has been assessed using a computational ray tracing model (using CATT Acoustic software). The ray tracing model is a powerful means of deriving room acoustic properties, and can provide accurate and useful results for this type of room with high walls and unevenly distributed absorptive/diffusing surfaces. In contrast, simple desktop acoustic models can be highly inaccurate in these situations, and therefore have not been used.

Subsequently, the model has been used to select and optimise remedial acoustic treatments to control the acoustic environment to an acceptable standard.

4.0 Recommended Surface Finishes

Analysis of the existing space indicate that there is little acoustic absorption already present, as borne out by the long reverberation time measurements. We have been informed that as this is a converted church and has listed status we are unable to put a suspended ceilings within this space.

We have therefore utilised absorbent wall panels and hanging absorbers to reduce the reverberation time within the hall.

i) Wall Panels:

We would recommend utilising 50mm Hodgson & Hodgson Phonotrack Melatech or 50mm John C Wilkins Techmel Fabric wall absorbers (please refer to the manufacturers literature attached). Please note that alternative wall absorber would be suitable should their acoustic properties match those of the material specified

We would recommend that a minimum of 36m^2 of this absorber should be located on the walls within the lower section of the hall. Figure 1 attached to this report details a number of photographs taken of the walls of the conference space, we have highlighted on here the locations of the wall absorbers utilised within our calculations.

Please note that other location may also be suitable should any of locations detailed be unable to accomadate absorbent panels specified, however it must be ensured that the minimum surface area of 36m^2 of absorber be adhered to.

ii) Hanging Absorbers:

Our calculations indicate that wall absorbers in isolation will not provide the required reduction to the reverberation time, we have therefore calculated the impact of additional hanging absorbers.

We would recommend utilising a 50mm Hodgson & Hodgson HR Melatech Absorber or 50mm John C Wilkins Techmel FHA (please refer to the manufacturers literature attached). Please note that these are lightweight foam absorbers that can either be hung from fixings within the wall or from the ceiling. Alternative hanging absorber would be suitable should their acoustic properties match those of the material specified.

It should be noted that our calculations have utilised the absorbent finish on both sides of the absorber, therefore it must be ensured that it does not have a hard back surface.

We would recommend that a ring of this hanging absorber at first floor height, 1.25m wide is hung around the perimeter of the room. Please refer to Figure 2 attached to this report for details

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5.0 Calculated Results

The results of the calculations indicate that the reverberation time with remedial measures specified above is 1.04 secs. T_{mf}. This meets the criteria specified in section 1.0 and is an indication that the proposed recommendations above will achieve the required reduction in reverberation.

I hope this provides you with enough information for your current requirements. If you have any queries regarding this proposal, then please do not hesitate to contact me.

Best Regards

Edmund Evenden BSc (Hons) MIOA
Senior Acoustic Consultant