

Report No. 14

Job No. 20C

ACOUSTIC ANALYSIS OF CHAPEL
SOUTHERN BAPTIST THEOLOGICAL SEMINARY
LOUISVILLE, KENTUCKY

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Submitted to:

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We have studied the drawings and other material submitted to us on the new Chapel for the Southern Baptist Theological Seminary. The drawings, which have been marked to show the location for sound absorbing materials, are returned herewith as part of this report.

In the study of the acoustic design for a church, consideration must be given to the provision of good hearing conditions for both speech and music. It has been found, on the basis of observations by many discriminating listeners, that the acoustic environment considered best for speech is slightly less reverberant than the ideal for music. It is necessary, therefore, to arrive at a compromise in which the reverberation time is adjusted to give good listening conditions for both speech and music.

In addition to attaining an optimum reverberation time, there are other controls which must be used on the sound in a room. Long delayed echoes must be avoided, and sound absorbing materials must be so located as not to interfere with the useful reflection of sound to the seating areas.

We are in general agreement with the recommendations made by Mr. M.A. Smith of the United States Gypsum Company for the treatment of this auditorium. On a few points we differ, and we should like to be more specific about exactly

which surfaces are to receive treatment. The optimum reverberation time at 512 cycles per second for an auditorium of this size is about 1.5 seconds. To achieve this there will need to be added to the auditorium about 2500 sabins of sound absorbing material. This assumes that the aisles are carpeted and that an audience of 700 is present.

We wish to urge, that if it is planned to use one of United States Gypsum's acoustic materials, Acoustone F, 13/16 inch thick be selected. This has rather good absorption characteristics especially when used as a hung ceiling without backup. The Auditone, while less expensive, is not quite as efficient acoustically and it is not as good looking as the Acoustone. We deprecate the use of any acoustic plaster. It has very little absorption at the low frequencies and is often excessively absorptive at the high frequencies. It is virtually impossible to refinish an acoustic plaster after it has become blackened, without considerable detriment to its sound absorbing efficiency. Acoustone and Auditone can be painted several times without detriment.

We recommend the treatment of all the areas shown cross-hatched on the drawings. These include:

- 1) The rear wall above chair height on front and sides of the projection booth, on wall at each side of projection booth and on the wall above the doors leading to the stair hall at each side of the balcony. (Sheet R-2.)
- 2) The vertical surface at the end of the main barrel ceiling. (Sheet R-2.)

- 3) The soffits of the ceiling coffers over each of the side balconies. (Sheet 2.)
- 4) The soffits of the ceiling coffers in the back three bays of the main barrel ceiling. (Sheet 8.)
- 5) The panels in the ceiling under the balcony at the rear of the church. (Sheet 2.)
- 6) The wall surfaces above the dado between the doors at the back of the auditorium. (Sheet R-2.)
- 7) The entire ceiling of the vestibule.

All other surfaces will remain hard plaster.

The panel areas in the rail of the rear balcony should be made absorptive by some means. This might be accomplished with an acoustic material or with heavy curtains. An echo will result if this balcony rail is left entirely hard.

Additional benefit can be derived from the use of draperies at the windows. As Mr. Smith has pointed out, the exact evaluation of the sound absorption afforded by curtains is difficult.

We feel that hearing conditions in and under the balcony will not be difficult with the proposed treatment. Fortunately, there are no deep under balcony spaces. The treatment of vestibule and rear under balcony ceilings will do much to reduce noise from these areas during services.

We see no indication on the drawings that a public address system is to be used. If such a system is to be added later, its selection and location should be given careful study.