

St. Andrew Presbyterian Church
2003 Sound Study
Consultant: Douglass Communications, Ottumwa, IA

Definition of Acoustics:

Function: *noun plural*

1 singular in construction: a science that deals with the production, control, transmission, reception, and effects of sound

2 also **acoustic :** the qualities that determine the ability of an enclosure (as an auditorium) to reflect sound waves in such a way as to produce distinct hearing

Basically speaking, when we speak of acoustics, it is the effects of how sounds (whether spoken, sung, or musical) are heard and experienced. All spaces are created for a variety of functions. A worship space is created for a variety of actions including the spoken and sung word. For example, a worship space differs greatly from a concert hall where the assembled people (in this case, the audience) are passive. A worship space's assembly (the congregation) is a body of people who are active in their response – both sung and spoken. This is different from amplified acoustics (sound that is produced through a sound system) that is used for primarily for speaking. As Carl Schalk states in the accompanying article, A Lament for Resounding Praise, "The building itself is an instrument which must be designed so that the praise of God-whether spoken or sung, whether with voices or instruments-is a thing a beauty, lifting the spirits, bringing God's people together in a unified whole, encouraging and reinforcing their song, rather than draining its vocal energy as it attempts its praise and prayer."

Summary of St. Andrew's acoustics:

In 2003 a sound study was completed in conjunction for the search of a new sound system for the Sanctuary. What was discovered were some technical reasons for challenges felt with the current Sanctuary's natural acoustics including reverberation time, ensemble blend (including how congregation members hear themselves and those singing around them) and sound distribution. The attached documents include:

1. Test results showing the general reverberation time in the Sanctuary in a variety of settings. The reverberation time in any circumstances does not meet the standard of 2.0 seconds, as explained in the accompanying article, *Fundamentals of Church Acoustics*.
2. Letter of recommendation from sound consultant Douglass Communications of Ottumwa, IA.
3. *Fundamentals of Church Acoustics* by Scott Riedel of Scott R. Riedel & Associates, Ltd. of Wauwatosa, WI. This article states, as it is titled, fundamentals in good acoustics for worship spaces. The points made here were helpful in identifying and articulating probable reasons for the problems we are facing.
4. "Recommended Reverberation Times" from *Finding the Parish's Voice: The Acoustics Crawl* by Dennis Fleisher, prominent acoustician of the firm MuSonics in Golden, Colorado. This graph shows recommended reverberation times for a variety of spaces. He notes that the larger the room, the longer the expected reverberation time is. For instance, as stated in his article, a 200-seat room will require a 2 second reverberation period to create an environment suitable for all aspects in worship.
5. *A Lament for Resounding Praise* by Carl Schalk, prominent church musician and theologian. This article's purpose is to lift up the importance of congregational singing within worship and, with that, the importance of a good acoustical environment.

DOUGLASS COMMUNICATIONS

722 North Court Street, Ottumwa, IA 52501

Toll-free: (800) 650-3114 Ph/fax: (641) 683-3114 e-mail: douglass_comm@pcsia.net

March 9, 2004

Mr. Matthew Penning
Director of Music Ministries
St. Andrew Presbyterian Church
1300 Melrose Ave.
Iowa City, IA 52246

RE: Summary of Acoustical Analysis

Mr. Penning,

In November, a three dimensional computer model of the sanctuary, using EASE 4.1 acoustical software, was completed to provide acoustical information necessary to design a new sound system. Using this model, a comparison of the reverberation time at a listener's seat was done to determine whether or not congregational singing would be enhanced by removing the carpet under the pews.

As I reported to you, the results showed that, although there wasn't a noticeable acoustical change in the sanctuary as a whole, there was a significant difference in the seating areas. The removal of carpeting under the pews will enhance congregational singing by increasing the reflection of sound waves between a hard floor surface and the ceiling; without creating "echo" in the sanctuary that is detrimental to speech clarity.

It would also be my recommendation that there be a reflective floor surface in areas where small ensembles play acoustical instruments and/or sing; making it easier for them to hear each other.

Leaving the carpet in the aisles and other walking areas is recommended for two reasons: 1) to absorb sound coming from the speakers above the canopy; 2) to avoid any distraction during the service from church members coming in and out of the sanctuary.

Given the architectural shape of the sanctuary, the carpet on the platform (stage) helps to reduce feedback from sound waves that are reflected from the back walls; back to the canopy; and into the microphones. If you desire to remove the carpet from the platform, additional diffusive or absorptive material on the rear walls will be necessary.

More detailed information will be provided to you upon your request.

Regards,

Douglas Schuck, owner
Douglass Communications