Acoustical Society of America **December 2001**
Technical Committee on Architectural Acoustics
and
National Council of Acoustical Consultants

STUDENT DESIGN COMPETITION - 2002

GENERAL INFORMATION

The Technical Committee on Architectural Acoustics of the Acoustical Society of America and the National Council of Acoustical Consultants are sponsoring a Student Design Competition which will be professionally judged at the 143rd meeting of the Acoustical Society of America being held in Pittsburgh, Pennsylvania from June 3 through June 7, 2002.

The purpose of this design competition is to encourage students enrolled in Architecture, Architectural Engineering, and other University curriculums that involve building design and/or acoustics to express their knowledge of architectural acoustics and building noise control in the schematic design of a building where acoustical considerations are of primary importance.

The submitted designs will be displayed at the Pittsburgh ASA meeting, and they will be judged by a panel of professional architects and acoustical consultants. An award of $1,000 will be made to the submitter(s) of the entry judged "First Honors". Four awards of $500 each will be made to submitters of entries judged "Commendation".

Entries may be submitted by individual students or teams of students with a maximum of three team members. Building schematic designs and related information shall be presented on two poster or foam core boards each with maximum dimensions of 24 by 36 inches (60 by 90 cm). The boards shall be suitable for wall display. The names, addresses, phone numbers, e-mail addresses, and school affiliation along with the name of any sponsoring or advising faculty member shall be placed in a visually opaque envelope and attached to the back of each display board. Display boards shall be wrapped in opaque paper which will not be removed until the boards are delivered to the Pittsburgh ASA meeting and ready for display and judging. Entries must be received at the address that follows *no later than May 22, 2002.* Please package display boards securely and properly to prevent damage during shipment.

Prof. Robert C. Coffeen
School of Architecture and Urban Design
Marvin Hall
University of Kansas
Lawrence KS 66045

Additional information may be obtained by contacting Bob Coffeen, Lily Wang, or Robin Glosemeyer by phone, facsimile, or E-mail as follows:

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Information can also be found on the ASA web site: asa.aip.org

Students intending to enter this competition must make their intentions known by sending e-mail to Bob Coffeen on or before *April 12, 2002*. Please indicate your name(s), school, faculty advisor, and e-mail address.

Design competition entries should emphasize the general building acoustics design (room acoustics and architectural noise control) and it interaction with the overall interior architectural design, with such interior design included for the Opera Performance Hall, Rehearsal Hall, etc. It is not necessary to prepare

architectural exterior building elevations. The drawings should present comprehensive solutions to the acoustical design in schematic design format. In addition to plans and sections, the poster boards may display acoustical calculations, acoustical criteria, and details of construction relating to acoustics and noise control as necessary to describe and support the design. If a computer program(s) is used in the design, graphics and data from this program(s) may be displayed.

While the design of the building mechanical and electrical systems is very important to the acoustical success of a project of this type, it is not necessary for this particular design problem to indicate in detail the mechanical and electrical system noise control procedures that are required. However, the presenter(s) may wish to indicate noise criteria, and general noise and vibration control procedures relating to air handling, electrical power transformers, theatrical lighting dimmers, etc. And, for this particular design problem, it is not necessary to indicate special stage facilities for opera such as stage rigging, side and rear slip stages, traps, etc

Useful references for opera hall design include *Concert and Opera Halls, How They Sound by Leo Beranek*; and *Halls for Music Performance: Two Decades of Experience, 1962-1982*. These references are available from the Acoustical Society of America, 500 Sunnyside Blvd., Woodbury NY 11797 USA, Phone 516-576-2360, Fax 516-576-2377, e-mail elaine@aip.org.

DESIGN SCENARIO

A college of moderate size with a very strong music program intends to construct on their campus a performance hall primarily for opera. Although the main purpose of the hall is to support their opera program, the hall may be used occasionally for symphony orchestra, chamber music, chorus, and dance.

The site for the center is relatively flat and it is located approximately 200 feet from a major 6-lane highway. The campus is approximately 3 statute miles from the airport that serves the geographical area, and it is approximately in line with an extension of one runway, which is frequently used for departing commercial jet aircraft. Typically, the departing aircraft will be 5,500 feet overhead when passing over the building site. Departing aircraft have been found to create noise levels at the site that are higher than the levels created by arriving aircraft.

Following is the architectural program statement for the opera performance facility which defines the building (for the purposes of this design competition) desired by the college.

PROJECT REQUIREMENTS

Performance Hall

Audience Seating: Approximately 1,200 seats with approximately 40% of seating in two or three levels of side and rear balconies. Orchestra (main floor) seating arrangement may be traditional or continental.

Stage: Approximately 6,000 ft^2 (560 m^2) with depth of approximately 60 ft (18 m). Easy access to truck dock for scenery and other material load in and out.

Stage Proscenium: Minimum dimensions of 50 ft (15 m) wide and 30 ft (9 m) high.

Stage House: Height from stage floor to gridiron approximately 3 times height of proscenium.

Orchestra Pit: To accommodate orchestra of approximately 80 members. At least one pit lift with highest position at stage level.

Variable Acoustics: Since the hall is to be used occasionally for orchestra and choral stage performances, a portable stage enclosure (orchestra shell) is required. Also, consideration shall be given to providing variable sound absorption for the hall and for the orchestra pit.

Scene Shop

Approximately 3,200 ft^2 (300 m^2) with easy access to stage and to truck loading dock. One door for scenery entrance and exit with dimensions of approximately 18 ft (5.5 m) wide and 25 ft (7.6 m) high.

It is anticipated that the Scene Shop will be in use during rehearsals in the Performance Hall and occasionally during performances.

Dressing Rooms

Two chorus dressing rooms, approximately 600 ft^2 (56 m^2) each. Eight solo dressing rooms, approximately 70 ft^2 (6.5 m^2) each.

Dressing rooms may also be used as music practice rooms.

Green Room

One multipurpose Green Room, approximately 500 ft^2 (46.5 m^2).

This room may be used occasionally for meetings and perhaps as a music rehearsal room.

Lobby

To serve as the entrance space to the Performance Hall and to a ticket/house manager's office. In addition to serving as a typical lobby, it will be used on occasion for meetings, luncheons and dinners, and receptions.

Mechanical Equipment Room (MER)

The MER will primarily house air handlers. Chilled water and steam are available from a nearby college building. It is estimated that area required by the MER will be a minimum of 1,500 ft^2 (140 m^2).

SITE NOISE

Measured aircraft flyover and highway traffic noise levels in octave frequency bands are tabulated below:

	SOUND PRESSURE LEVEL - dB re 20μ Pa						
OCTAVE FREQ. BAND, CENTER FREQ. - Hz	63	125	250	500	1000	2000	4000
DEPARTING COMMERCIAL JET AIRCRAFT*	68/77	73/87	71/87	71/86	65/82	58/75	55/62
ROADWAY VEHICULAR TRAFFIC**	63/68	66/70	59/61	60/61	60/63	54/57	44

* Each set of levels represents the maximum levels observed in each octave frequency band for the loudest and the quietest flyovers during a one hour period when aircraft departures were frequent.
** Each set of levels represents the range of levels observed in each octave frequency band for a 20 minute period during heavy, late afternoon traffic.

Levels indicated are believed to represent realistic "worst case" environmental sound levels at the site. Measurements were made at the edge of the site that is closest to the highway.