S&V OBSERVER

Sala Sinfonica Pablo Casals Symphony Hall Acoustics

In October, Sala Sinfonica Pablo Casals, a new symphony hall within the Centro de Belles Artes complex in San Juan, Puerto Rico, held its grand opening. Designed by architect Rodolfo Fernández and named after the beloved Spanish Catalan cellist and conductor Pablo Casals, Sala Sinfonica Pablo Casals will be the new permanent home of the Orquesta Sinfónica de Puerto Rico (Symphony Orchestra of Puerto Rico). The new 1,300-seat Sala Sinfonica Pablo Casals will be dedicated to musical performances, serving a range of symphonic, chamber, and popular music styles.

For the new symphony hall, Cambridge, MA-based Acentech's Studio A determined the interior shaping and finishes of ceiling, wall and floor surfaces, and made design recommendations that were validated through the use of acoustical computer models that analyzed the acoustical properties of the design.

Acentech's Studio A provided architectural acoustics consulting, sound system design, mechanical system noise and vibration control consulting, and acoustical computer modeling for the highly anticipated project. Audiovisual specialists from Acentech's Studio A also designed the house sound system, which features a retractable main loudspeaker cluster that can be hoisted into the attic during symphony concerts when amplification is not required. They also consulted with the project mechanical engineer on the design of a quiet air conditioning system.

What is special about this hall? The new Sala Sinfónica is designed purely for music, especially unreinforced "classical" music, and not for other, lighter forms of musical entertainment, though if desired, it could be used for that also. The acoustical design is optimized for serious music. It is a true concert hall.

How many seats are there? Approximately 1300, divided between the Main Floor and the Balcony. Unlike in most concert halls, the balcony continues around the concert platform, offering a unique view of the musicians and when necessary, serving as chorus seating.

Is it big enough for a full symphony orchestra? It certainly is, from a space as well as an acoustical standpoint. Though perfectly usable for chamber music and other small-scale presentations, this is no chamber hall but a full-fledged concert hall, designed to handle a full orchestra and, when the occasion warrants, a chorus.

Why are the side balconies straight and not stepped like in some auditoriums? Again, because of acoustics. The straight balconies, in combination with the side walls, provide highly desirable lateral reflections that make one feel surrounded by the sound. The galleries farther up the walls serve much the same purpose.

What dictated the hall's shape? In a word, acoustics. The narrow 70 ft (21 m) and high 46 ft (14 m) so-called "shoebox" shape has long been associated with acoustical excellence. Some of the most famous old concert halls have it, though in their case, tradition – not acoustics – guided the design. Today, we know why they sound so good.

Why is the ceiling bowed and not flat? The ceiling is bowed (curved, with its center lower than its sides), in order to spread the sound sideways, for acoustical reasons. The large, convex shape on the upper rear wall serves much the same purpose.

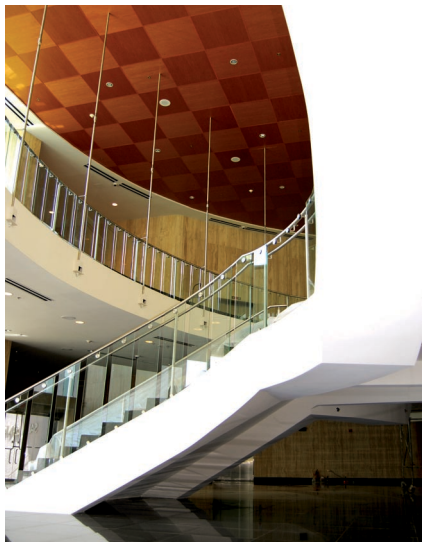
What governed the choice of materials? A combination of appearance, practicality, and acoustics. With few exceptions, the materials are acoustically reflective, to sustain the sound. To be reflective, they must be heavy. For this reason, the ceiling and the walls are made of multiple layers of drywall and wood, respectively.

With everything else reflective, why are the seats upholstered? For two reasons: for the patrons' comfort; and because upholstered seats, like people and their clothing, absorb sound and consequently, the hall's acoustics will not change much as the seats are filled with people.

There are curtains that can be drawn across the upper walls; what are they for? The curtains are used to vary the acoustics. They are exposed for programs requiring an acoustically less responsive, less reverberant environment, for example for amplified music or for speech. For most other uses, they remain hidden in their pockets.

High on the front wall, there is an empty recess; what is it for? The recess will, hopefully in the not too distant future, accommodate the pipes of a grand concert organ. With this addition, the hall will be truly complete.

What was done to isolate the hall from outside noise? The hall is surrounded by heavy, well-sealed constructions, mostly made of concrete. The roof, some distance above the multi-layer drywall ceiling, is also concrete. Doors opening into noisy areas are equipped with airtight seals.



The main lobby of Sala Sinfonica Pablo Casals in San Juan, Puerto Rico features a sweeping stairway to the upper level.

Where are the best seats? Subject to personal preference, everywhere. It depends on the view one wants to have of the performers: from straight ahead; from the balcony; from the side; or from behind the performers. Acoustically, with but minor differences, every seat offers an embracing listening experience.

Studio A is a specialized consulting group of Acentech Inc., dedicated to providing world-class acoustical, audiovisual systems design, and vibration control for the performing arts. With more than 60 years of consulting heritage, Studio A's integrated approach and multidisciplinary capabilities enable it to create the best acoustical conditions possible in support of the art of the performance – beautiful sound, state-of-the-art audiovisual systems, and a quiet backdrop unencumbered by noise or vibration from building systems or external sources.

For more information about Sala Sinfonica Pablo Casals symphony hall or the acoustical consulting services of Acentech, please visit www.Acentech-StudioA.com.

Better Noise Mapping with SoundPLAN Software

Braunstein + Berndt GmbH has released its newly developed Dynamic Search calculation method for noise mapping applications. Dynamic Search estimates the contribution for each receiver and ranks the influence of all sources. Only the sources important to the final result of a receiver are calculated; the rest are estimated. By dynamically selecting the sources that need to be calculated versus estimated, more data can be calculated more quickly than was ever thought possible.

This new method was used to successfully complete the world's largest noise map, the END noise mapping of the railways throughout Germany. Some 12,000 kilometers of railway were mapped, which included 11 GB of terrain information, 8 million buildings and 36 million receiver points. All of this was calculated on four personal computers in less than 30-days run time using 32-bit WindowsXP. Sample noise maps are shown in Figures 3 and 4.

The Dynamic Search method makes it possible to calculate huge noise maps with complex geometry and to simulate details previously not possible in noise control programs. This method was adapted not only for rail noise calculations but also for other noise source types. The Dynamic Search

Symphony Orchestra of Puerto Rico on stage at the new Sala Sinfonica Pablo Casals in San Juan.

method, unique to SoundPLAN noise and air pollution evaluation software, makes it practical for consultants to map any size project regardless of terrain, with any number of noise types (road, rail, aircraft, industry, leisure), and unlimited number of sources, in a timely, efficient manner as demonstrated with the noise mapping of the German railway system.

Public examination of the rail noise mapping project is possible. The mapping was conducted by PÖYRY. The database and viewer were supplied by Intergraph. View the noise maps at http://laermkartierung.eisenbahn-bundesamt.de.

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