

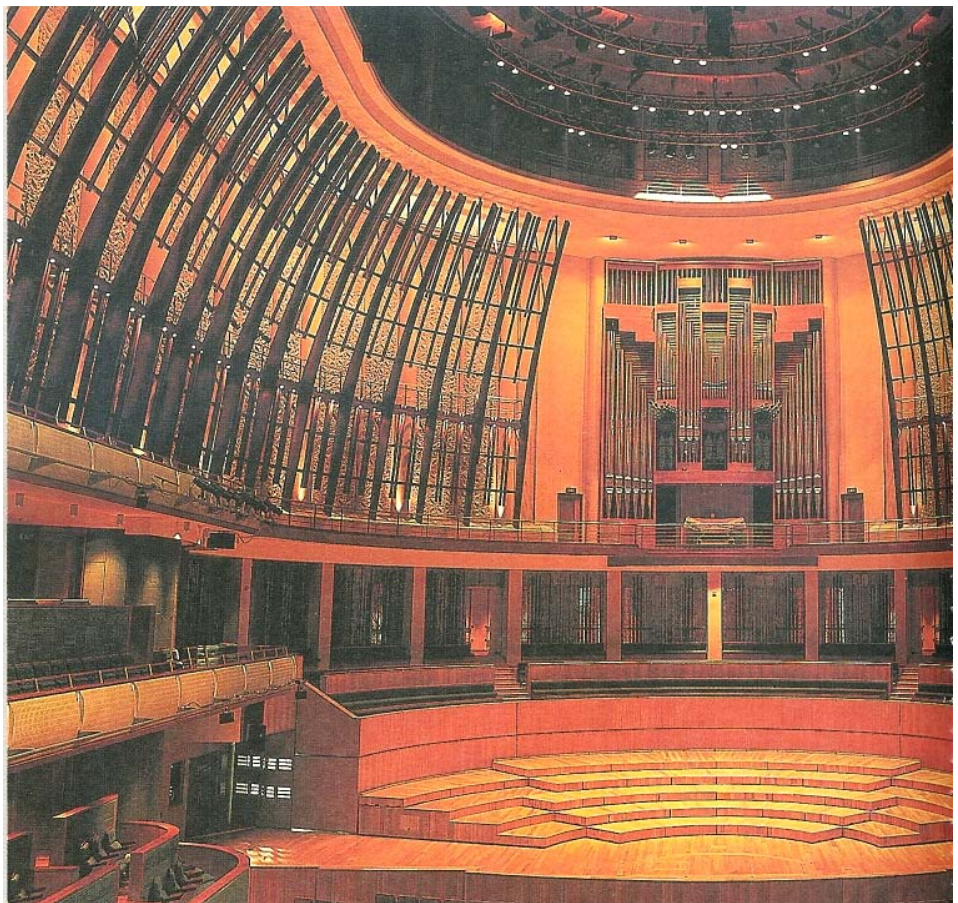
*The feedback expressed by the community was taken into consideration by the design team. A consultative and collaborative approach to designing the building was adopted. The team also sought the views of various experts and members of the local and international cultural communities. Three advisory groups were set up to guide the planning of the project: the Users' Advisory Group, Design and Aesthetics Advisory Group, and Commercial Advisory Group. Members of the design team made study trips to other Asian countries to understand Asian arts and architecture. The three key members DP/MWP TPC and Artec worked closely together through continuous and intensive dialogue, and regular meetings.*

*The initial design comprised five performance spaces: Theatre, Concert Hall, Adaptable Theatre, Medium Theatre and Developmental Studio. Later other factors came into play, such as the decision to build the two large halls first, instead of the Concert Hall and the three smaller venues. The present design was finalised in 1997.*



**Russell Johnson, founder and chairman of Artec Consultants which was responsible for all the acoustics of the arts centre and took the lead in the design of the Concert Hall, believes that good acoustics transcends cultures:**

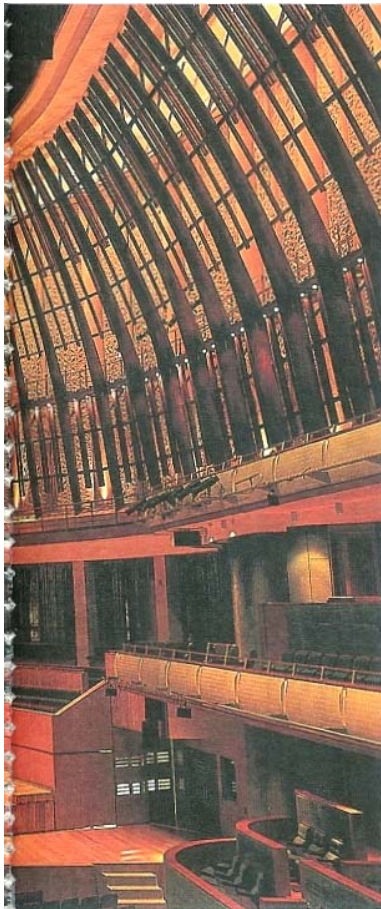
"When one of the goals is to provide a place for symphony orchestras to make music, to build one of the four or six best concert halls in the world, there are basic requirements which must be fulfilled. Good acoustics for Western music are good acoustics for other genres including traditional Chinese music. Therefore, a great new concert hall in Seoul must achieve the same acoustic qualities as a new great concert hall in Liverpool, Munich, Denver, Singapore, Adelaide or Palermo.



Often we are asked "What have you done that is acoustically specific to Singapore?" or "What have you done specific for this part of Asia?" There seems to be an idea that traditional Chinese music must be housed only in a hall specifically designed for Chinese music. Artec believes that during the next few years this new hall at Esplanade will prove to music lovers to be an excellent home for Chinese music, world music, ethnic music, and classical Western music. A great concert hall is a great concert hall.

Artec studies the plan shaping and the finished materials of the great concert halls that were designed and built before 1905. Then, all important public buildings were built of concrete, heavy clay

tiles, masonry or brick - usually surfaced with plaster directly onto the masonry wall structures. Heavy, solid construction techniques like these are essential to conserve the low frequencies produced by musical instruments. The heavy construction finished with plaster reflects the sound evenly at all frequencies. Because these boundary surfaces are heavy and solid, a very high percentage of the energy of the music created on stage is conserved and transmitted with relatively little loss to the ears of the concert-goers.



We usually design our concert halls relatively narrow, relatively long, and relatively high. The upper ceiling is usually horizontal. The side walls are parallel or very close to being parallel. We frequently incorporate a main floor plus three or four balconies with seating ledges all along the side walls. The combination of vertical side walls with the horizontal soffits of the side ledges redirects the sound energy down into the seating area of the main floor, which enhances clarity and articulation.

For best performance conditions for opera, symphony and choral works, the smaller the seat count, the better the acoustical result. Building owners setting out to build a new facility should seriously consider designing a room in the 1,600 to 1,800-seat range. In the 1950s and 1960s, Artec was working primarily in North America and most building committees in those years were selecting seat counts that were definitely too large. The seat counts were ranging anywhere from 2,500 to 3,400 or more. So we "invented" three very useful modifications to the design formula of the pre-1900 traditional concert halls. Firstly, there is a doublelayer system of sound absorbing fabric that is capable of controlling the power of the sound and also the reverberance of the sound. Second, we sometimes incorporate in the design, a system of acoustic control chambers. These can also be used to increase or decrease the loudness dynamics of the acoustics and/or the reverberance of the hall. Artec also usually incorporates a sound-reflecting canopy system above the concert platform. This baldocchino is counter-weighted, and is deployed at any position from 9 metres above the heads of the musicians to 22 metres. This canopy has a massive influence on the acoustics of the hall, but also is crucial in assisting the musicians on stage to adequately hear each other during rehearsals and performances."