China's New Shenzhen Concert Hall

By Dr. Keiji Oguchi

In China's Shenzhen City, where the city's status as a Special Economic Zone has been a catalyst of rapid and remarkable growth, the new Shenzhen Concert Hall complex opened on October 12, 2007. In 1979, then CCP Chairman Deng Xiaoping established Shenzhen City's status as one of China's first Special Economic Zones, a fitting selection given the city's proximity to Hong Kong. The year that the city became a Special Economic Zone, Shenzhen's population numbered 300,000. Now, 27 years later, the city is home to 12 million people, an indicator of how the mesmerizing speed of growth has transformed the city. Each time I visit the city, I see new skyscrapers added to the skyline.

Most international visitors to Shenzhen travel to the city via Hong Kong, taking the eastern rail route, the western ferry route or a bus route that uses a road in-between the railway and ferry options. Regardless of which means of transportation chosen, from Hong Kong, the trip lasts not more than an hour.

The new concert hall is located in Shenzhen City's central Futian District among other municipal, public-use buildings that include the city's new public library and a youth center. When traveling to Shenzhen via the bus route, visitors will find this area to be relatively close to the Huanggang border. The concert hall faces the new library, which opened one year ago. Together, the two buildings comprise the new Culture Center complex, creating a municipally-sponsored cultural hub and leisure destination for Shenzhen's burgeoning population. The concert hall completes the set of projects commissioned by the city's Cultural Affairs Bureau and realized over a period of 10 years under the direction of the city's Project Construction Headquarters Office.

An international competition selection process awarded the architectural firm of Arata Isozaki Atelier the honor of designing the library and concert hall buildings. Nagata Acoustics participated on the concert hall project as the Acoustical Consultant, providing a full range of acoustical design and acoustical construction management services.

Figure 1: Exterior of Shenzhen Concert Hall

Architectural Overview: Using Color to Balance the "Five Elements"

The Shenzhen Culture Center complex has a long, 300 m. (984 ft) footprint in the north-south direction. A boulevard runs east-west through the center of the site, bifurcating the complex into north and south halves. The concert hall occupies the northern half and the library the southern half of the location. The exterior of the complex incorporates the traditional Chinese concept of balancing the "Wuxing, five elements," by including yellow, red,

blue, white and black in its color scheme.

Shenzhen Concert Hall's gold-colored entrance and the library's similar silver-colored entrance, as well as the red and white interior of the large Symphony Hall all exude the splendid colorings that are hallmarks of Chinese decor. My amateur photography would not do justice to the expansive scale of the new buildings, so I will refer the reader to the computer-graphics assisted movie on the Shenzhen Concert Hall website for a panoramic tour of the buildings' exteriors and surrounding environs.

Shenzhen Concert Hall's Symphony Hall

Shenzhen Concert Hall's Symphony Hall has a vineyard configuration that surrounds the stage and a seat count of 1,800. At the widest point of the audience seating, the room spans 45 m. (148 ft), 60m. (197 ft) long and has a ceiling height of 25 m. (82 ft). In keeping with the basic approach of the vineyard configuration, the hall has blocks of seating areas positioned step-by step in the hall. By taking a relatively large height among each seating block, we achieved a broad area of surfaces that generate effective sound reflections. When viewed from the stage, the blocks of seats give a very dynamic appearance to the hall. The Shenzhen Concert Hall's website describes the hall as having a "canyon terrace" in recognition of dramatic impression created by the rising blocks of audience seating.

Figure 2: Shenzhen Concert Hall's Symphony Hall

Above the stage, at a height of 15 m. (49 ft), we suspended 30 mm. (1 in.) polycarbonate sound reflection panels. The undersides of these panels, which are the sides that face towards the audience, are finished with a layer of matte, metal mesh that renders the panels virtually invisible to the audience. In addition, we attached the stage lighting and sound system equipment to the frames of the sound reflection panels, further camouflaging their purpose as sound reflection panels.

We began the process of refining the basic configuration of Symphony Hall using computer simulations, then built a 1/10 scale model for additional detailed testing, after which we finalized the hall's acoustical room design. During the year 2000, we borrowed a room on the Shenzhen University campus, so that we could build the 1/10 model and do our scale-model testing. As I recall the administrative work done to obtain our visas and import permits for the equipment we needed for the model test, I realize that the various steps and pitfalls that caused us consternation at the time have now become nostalgic anecdotes about the project.

In the interior of Symphony Hall, all of the wall surfaces are sound reflecting, with the exception of the rear wall behind the audience at the very back of the hall. During the 1/10 model testing, we discovered that this section of wall would cause a long-path echo if finished with a sound-reflecting material. We specified concrete as the

material for the hall's large ceiling, a decision driven by the acoustical need to obtain sufficient mass for this element of our design. On the ceiling's surface, we created a fine, three-dimensional pattern of protrusions and indentations for having a sound scattering effect at high frequency. For the walls surrounding the audience seating area, we created a surface that effectively promotes sound scattering by combining the use of light concrete panels with random-width pieces of timber milled to a triangle pole and placed horizontally along the concrete walls. On the stage, we initially proposed the use of a conifer wood for the stage floor and, eventually, decided to import Japanese "Hinoki" cypress for this purpose.

The Theater Studio Small Hall

Shenzhen Concert Hall's small hall, officially named the Theater Studio, has the same type of configuration as Akiyoshidai International Art Village Concert Hall, with a flat main floor and two levels of "Flying" configurable seating. The stage floor is comprised of 20 sections that can each be raised independently to create a multitude of stage configurations. Depending on the stage configuration, the Theater Studio accommodates between 400 and 580 audience seats.

Figure 4: Theater Studio

During the design phase of the project, the planned intention for this space was a recital hall. During the construction phase of the project, the stage mechanisms, stage lighting and a sound system were added and "Theater Studio" became the official name given to the room. Because the basic shape of the room retains its original recital hall dimensions, including a ceiling 14 m. (50 ft) high and a rather long reverberation time characteristic, the Theater Studio may be used equally successfully for music recitals as for experimental theater performances.

Shenzhen Concert Hall's Inauguration

On October 12, 2007, I returned to Shenzhen for the hall's opening night, after what seemed like a long absence from the city. The internationally acclaimed pianist Lang Lang performed as concerto soloist, bringing world class virtuosity to this first gala event in the concert hall's history. We have not yet conducted the final acoustical measurements on the hall, but during the opening program's rehearsals I was able to sit in a number of different seats and confirm the sound's clarity as well as its richly balanced acoustics. Lang Lang told us that the hall makes him feel as if he is dancing in mid-air and that it reminds him of the Berlin Philharmonic Hall.

I hope to return to Shenzhen in the near future to enjoy other performances and complete the hall's acoustical measuring. When I have had that opportunity, I will share more about Shenzhen Concert Hall with our readers.