

## Charles Bronfman Auditorium (Mann Auditorium) Reopens in Tel Aviv, Israel

By Yasuhisa Toyota

Tel Aviv's Mann Auditorium, home to the world famous Israel Philharmonic Orchestra, reopened on May 25, 2013 after the completion of a renovation project aimed at improving the venue's acoustics. Plans to improve the Mann Auditorium's acoustics began more than a decade ago and made progress for a while, but the effort was stopped when UNESCO declared central Tel Aviv -including Mann Auditorium- a World Heritage Site in 2003. The UNESCO declaration required preservation of the building's exterior and interior, precluding changes to the look of the hall.



Figure 1: Mann Auditorium (Interior View)

Given these constraints, the challenge posed to us by this project was how to improve the hall's acoustics without altering the building exterior and without fundamentally changing the interior's design. We received the request to work on this project in October, 2007 and developed a renovation plan that readers can see in the April, 2009 issue of the Nagata Acoustics Newsletter.

Our renovation design included three main changes to the auditorium interior:

1. We replaced the metal ceiling with an acoustically transparent, expanded metal ceiling and created a higher, new acoustic ceiling above the expanded metal ceiling. Figure 2 shows the expanded metal ceiling under construction above the stage and Figure 3 shows a longitudinal-section of the renovated room shape. As a result of our changes to the ceiling, we increased the ceiling height above the stage from 10 m (33 ft) to 15 - 16 m (49 - 52 ft) and substantially increased the overall spatial volume of the auditorium.
2. We added low, partial walls in the auditorium's main floor seating area to achieve sound reflections from these additional surfaces.
3. We modified the angle of the auditorium's side walls to obtain effective sound reflections.

We timed the start of construction to coincide with the beginning of the orchestra's off season in August, 2011. We initially anticipated a project schedule of 14 months' duration and a planned completion date of October, 2012, at the start of a new concert season. However, the construction period encountered some delays and, as a result, the orchestra's first test rehearsal in the renovated auditorium took place in March, 2013 and the gala opening on May 25, 2013. Even at the gala opening, the portion of the new, acoustically transparent ceiling above the stage was not 100% complete, as shown in Figure 2. The orchestra had made plans to hold its 2011 - 2012 subscription

concerts at an alternate location and had not planned for the unexpected, but unavoidable extension of its temporary home into a second season. However, when this need became a reality, the orchestra managed to adapt and make arrangements to extend its temporary venue.

The renovated Charles Bronfman Auditorium gala opening concert took place in the middle of the Israel Philharmonic's concert season. The program featured Beethoven's Violin Concerto with violinist Itzhak Perlman as soloist, and Mahler's Fifth Symphony performed by the Israel Philharmonic Orchestra under the baton of lifetime Music Director Maestro Zubin Mehta.

Prior to the renovations, the hall's acoustics could be described in one word as "dry" and the audience seating felt distant from the stage acoustically. The renovation project totally transformed the hall's acoustics. Now the orchestra's presence on stage feels close to the audience and the entire interior of the hall gives the impression of having strong acoustics. Instead of being a "dry" space it has become a "lively" space.

Maestro Mehta and numerous of the orchestra's players commented that the hall's on-stage acoustics dramatically improved, and it is much easier for them to play in the hall. As the orchestra becomes accustomed to its renovated and improved home, we can look forward to further polished performances by this accomplished orchestra.

When the orchestra performed its test rehearsal in March, 2013 we measured the hall's reverberation time and found that we had achieved a reverberation time of 2.2 seconds at mid-range octaves (500 Hz - 2,000 Hz) in an empty hall. Based on this measurement, we calculated the reverberation time in a fully occupied hall to be 1.9 seconds. Prior to the renovation, the auditorium was reported to have a reverberation time of 1.55 seconds under fully occupied conditions (according to Leo Beranek's *Concert Halls and Opera Houses: Music, Acoustics, and Architecture*). These measurements validate the sense of more lively acoustics that we can hear experientially in the hall.

Philanthropist Charles Bronfman donated a large portion of the funds that enabled this project to be realized. In recognition of his contribution, the hall was renamed Charles Bronfman Auditorium.



Figure 2: Mann Auditorium (Interior View)

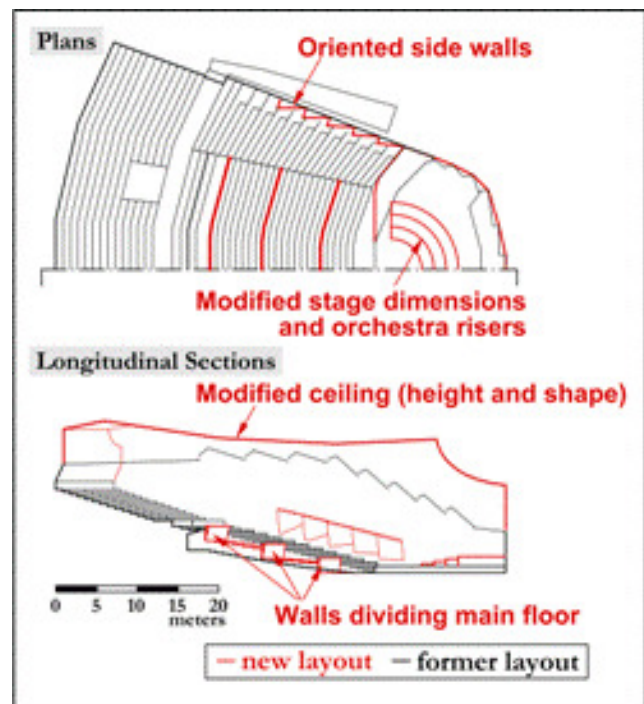


Figure 3: Room Shape (Before and After the Renovations)