

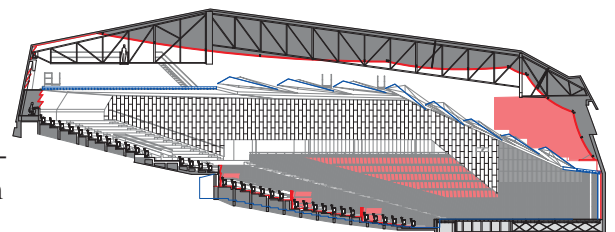
Acoustic Consultant:	Nagata Acoustics (for 2013 renovation)
Architect:	Zeev Rechter and Dov Karmi (1951, Mann Auditorium) Kolker Kolker Epstein Architects (2013 renovation)
User:	Israel Philharmonic Orchestra
Construction Cost:	165,000,000 Israeli New Sheqalim (approx. US\$38m)
Capacity:	2,432 seats (2013 renovation)

Plans were once in place to renovate Mann Auditorium, 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. 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. Our renovation design included four main changes to the auditorium interior and the stage:

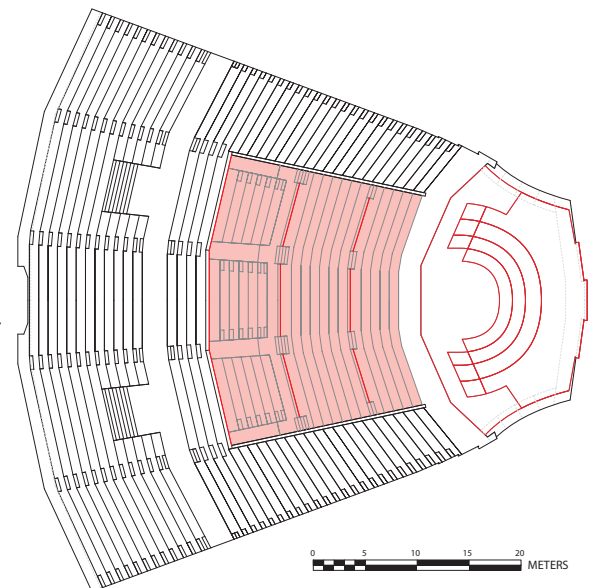
- The metal ceiling was replaced with an acoustically transparent, expanded metal ceiling to maintain the interior visual appearance, and a new acoustic ceiling was created high above the expanded metal ceiling. As a result, the ceiling height above the stage increased from 10 m to 15 - 16 m and substantially increased the overall spatial volume of the auditorium.
- Low walls in the auditorium's main floor seating area were added to achieve sound reflections from these additional surfaces.
- The angle of the auditorium's side walls were modified to obtain effective sound reflections.
- The stage was enlarged to accommodate larger ensembles, and mechanically operated risers were installed for flexibility and enhanced stage acoustics. Walls surrounding the stage were also modified.

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.

LONGITUDINAL SECTION



PLAN



Red indicates new shape
Blue indicates Original shape

BUILDING DETAILS AND ACOUSTICAL DATA

Location Habima Square, 2 Huberman St.
Tel Aviv, Israel

Seating Capacity: 2,432 After Renovation
2,715 Before Renovation

Reverberation Time (500Hz Octave Band)

Unoccupied: 2.2 seconds

Occupied: 1.9 seconds

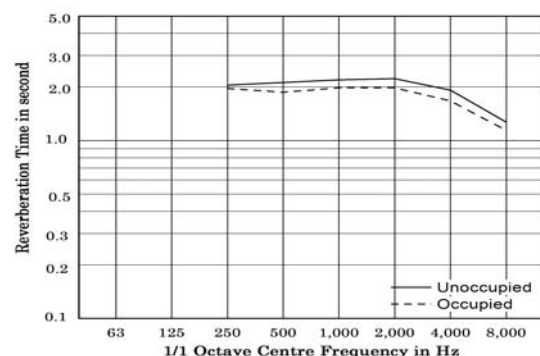
Finish Materials:

Ceiling: Concrete, Expanded Metal Mesh

Walls: Wood, Plaster

Audience Floor: Wood

Stage Floor: Alaskan Yellow Cedar



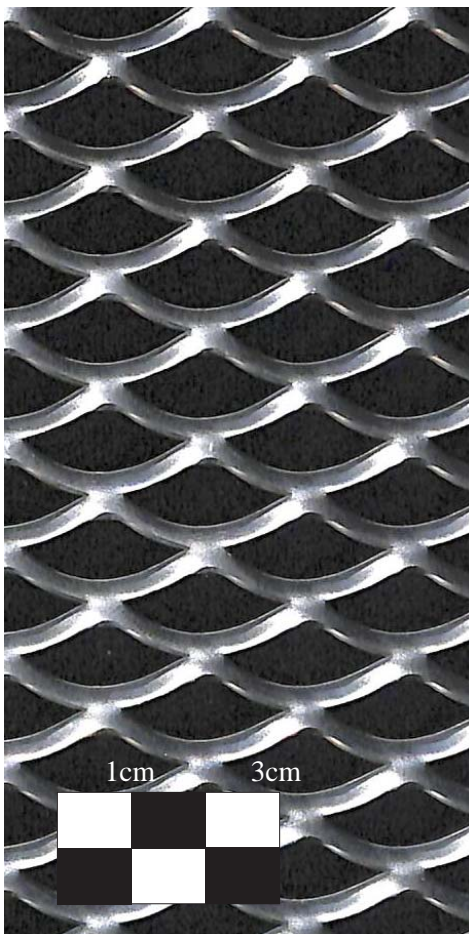
CHARLES BRONFMAN AUDITORIUM RENOVATION

TEL AVIV, ISRAEL
2013

NAGATA
ACOUSTICS



Note: Metal mesh panels not yet installed above stage



Clockwise from Top:

- Main View After Renovation
- Main View Before Renovation
- Side View After Renovation with modified Rake
- Detail of Acoustically Transparent Metal Mesh used for the Ceiling

