

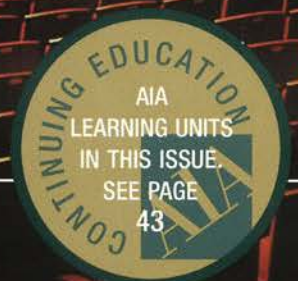
DESIGN SOLUTIONS

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Cello-Shaped Concert Hall A Spectacular Composition In Wood.

A new international landmark in three fields – performing arts, architecture and urbanism – the \$265 million Kimmel Center for the Performing Arts occupies an entire block (2.3 acres) of Center City Philadelphia.





Verizon Hall



CURVED "BUMPY WOOD" which is actually six patterns of solid South American Mahogany, line the walls and undersides of each balcony. These areas diffuse sound.

Serving as home to eight resident company performing arts organizations, including The Philadelphia Orchestra, Opera Company of Philadelphia, Pennsylvania Ballet, and Chamber Orchestra of Philadelphia, the Kimmel Center began to take shape in 1996 when two projects came together: The Philadelphia Orchestra's ongo-

ing plan to build a new home, and a plan of then-Mayor Edward Rendell to provide a much-needed venue for some of Philadelphia's most prominent performing arts companies and for touring presentations.

The Rafael Viñoly-designed Kimmel Center, which opened December 2001, evokes the image of two jewels in a spectacular glass-vaulted ceiling towering more than 150 feet above street level. The 2,500 seat Verizon Hall and the multi-form Perelman Theater, the center's principal programmatic com-

ponents, are treated as freestanding buildings. The former, with its polygonal Makore wood exterior, is centered at the far end of the site; the latter, with its curved façade of black granite, is placed off-axis.

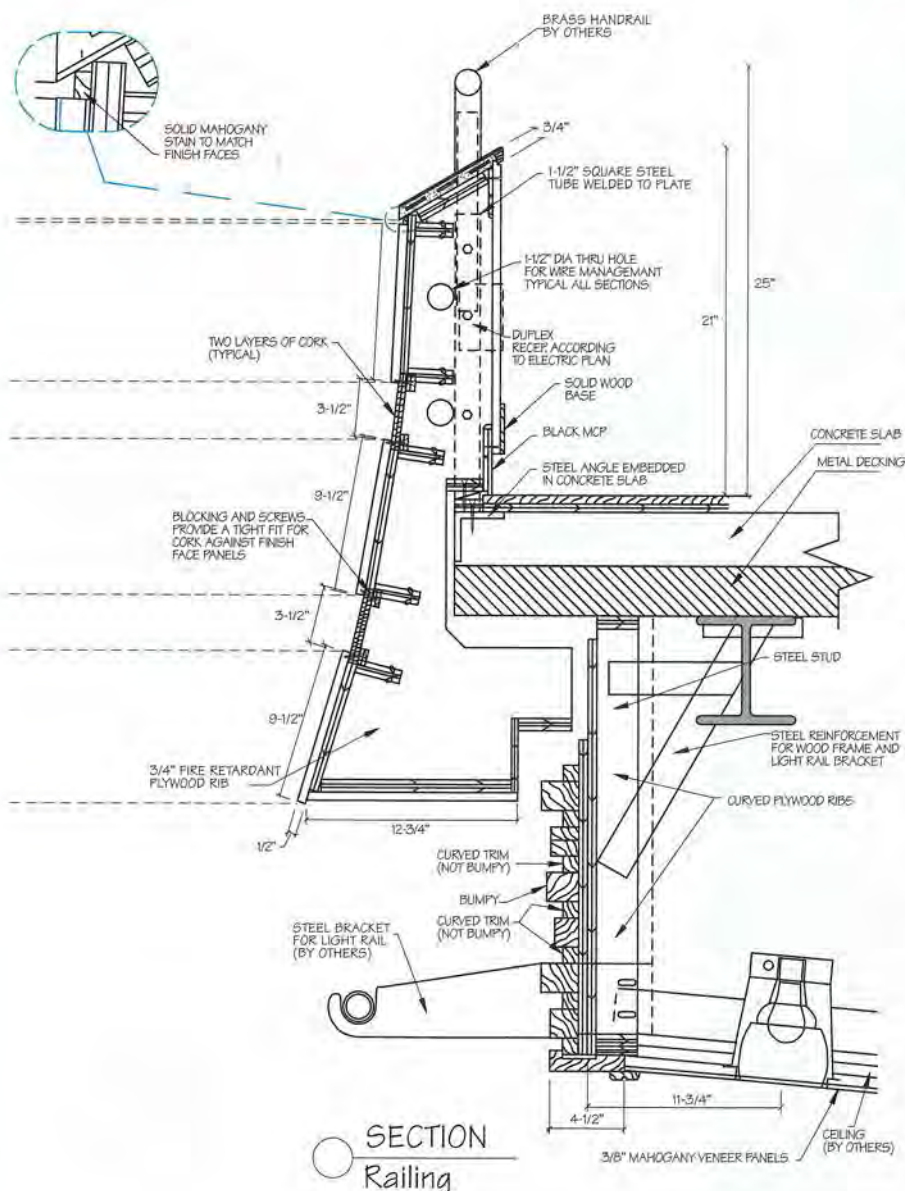
The perimeter building that encloses these venues is executed in brick, steel and concrete and contains administrative spaces, artists' dressing rooms, lounges, a restaurant and elevator cores. An immense barrel vault roof of steel and glass folded arches emerges from this perimeter structure and creates a feeling of unity. A pair of glass-encased elevators at the front allows access to a restaurant on the third floor and to a rooftop garden above the Perelman Theater.

DESIGN STRATEGY

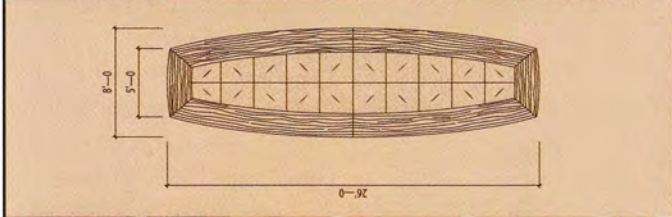
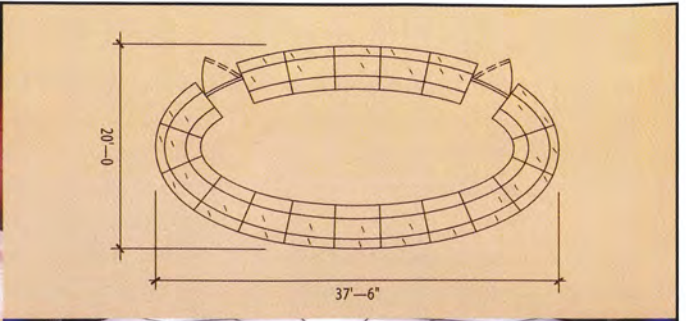
From its earliest conception Verizon Hall was envisioned as a finely crafted instrument that would produce beautiful music. The sinuous form of the hall is based on the shape of a cello. It was very important that every surface be covered in wood, yet function as the acoustic chamber for the orchestra as well as meet the practical requirements of a working theater. The interior surfaces are covered in Mahogany, including the ceiling of each tier, reinforcing the image of a finely crafted musical instrument.

Verizon Hall was designed by Rafael Vinoly Architects PC, New York, New York. Woodwork fabrication and installation was handled by AWI member firm Imperial Woodworking Company, Palatine, Illinois, while Architectural Woodwork Industries, Philadelphia, did engineering and project management.

According to Rafael Vinoly, "the team worked very closely and the woodworkers' input allowed development of the details that enhanced the design ideas, but were still efficient uses of the specified woods. The acousticians set strict criteria. The wood had



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EXTERIOR BRIDGES, BALCONIES, WALLS AND RAILINGS are of rich Mahogany. The three bridges connect the circulation area along the exterior with the freestanding concert hall.

to act as a diffuser of sound as well as an absorber. The diffusion was handled with a series of randomly placed patterned solid wood curving forms.

The absorption was achieved by using cork, which allowed the sound to pass through the thin cork material to acoustic insulation placed behind it."

The woodworking team went so far as to arrange for the architects to visit a violin-making shop to look at types of wood that could be used. The interior of Verizon Hall is finished in African Mahogany veneer, blueprint matched for grain and color, and the exterior

in Makore. Mahogany was selected for its richness in figuring and color; the Makore for its durability and strength against UV fading.

Of special interest is the collaboration between the design team and woodworkers in creating the three-dimensional models first used to develop templates for the concrete slabs, ceiling shapes and door placement. The model was then refined and used to define the shape of each panel and component, and assure that the prefabricated pieces fit the space.

WOOD ELEMENTS

Verizon Hall accommodates patrons in four levels of seating. All seats have full views of the stage, with 250 located at the back of the stage facing the conductor. The stage floor is stained Beech with a six-inch airspace on resilient pads.

Three large moveable canopies hang over the stage and are covered partially with ceiling panels and partially with open-grained cork. In the center of the canopy is a set of large doors that when opened permit the speaker cluster to be lowered. This floating element, which also contains theatrical and concert lighting provisions for a cyclorama, creates an acoustical reflector for the musicians.

Ceilings required 1,456 pieces of 3/8" thick fire-rated panel, applied to 3" thick plaster or three layers of high density drywall with a continuous urethane glue bond. Wooden grounds embedded in the plaster ceilings permitted the use of screws for fastening. Though curved, each panel was installed so there was no void between the panel back and the plaster.

Wall panels, 705, were 1/2" thick applied to 3/4" fire-rated plywood which also were glued continuously to 10" filled cement block walls. Two hundred and six curved balcony rail sections, incorporating a plywood inner frame, cork reveals and finished panels, caps and soffits were installed throughout the hall.

Six different patterns of solid South American Mahogany assembled in groups of three in six configurations line the walls and underside of each balcony. These "bumpy wood" areas diffuse the sound, and due to the cavities and varied patterns, reflect and disperse sound. The wood's pores were purposely left semi-open and the finish selected to have "HB" hardness.

The rear of the stage is made of solid Mahogany horizontal curved louvers, in-filled with a brown acous-

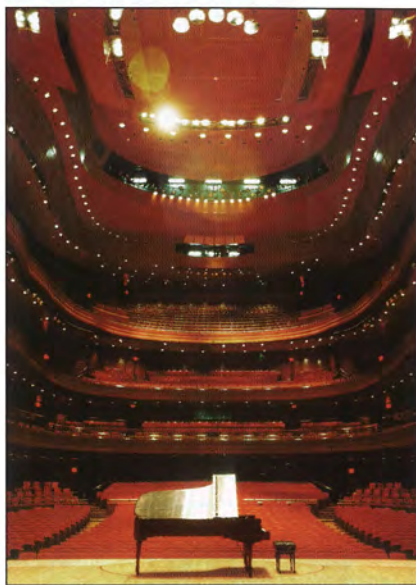
tically transparent fabric. Two concealed doors at the back and a series of moving panels and walls on the sides allow the stage to expand in size. Curtains behind the louvered wall can be employed to absorb sound when needed.

A reverberation chamber is formed of 100 moveable doors composed of a steel frame, fiberboard and gypsum board. Ranging in size from seven to 18 feet high, the doors operate electrically. All edges have neoprene sound seals so that there is no leakage when the doors are shut. When opened, the volume of the concert hall's interior is increased from 885,000 cubic feet to 1,062,520 cubic feet.

Hidden from view under the stage are five large choral seat wagons, each with matching balcony fronts and curved louvered walls. Each must fit through a stage opening with only ¼" clearance. Extensive use of plywood templates was made in order to create the stage lift openings.

Three choral seat lifts, a piano lift, a sound cockpit lift and a forestage lift are used to vary the size and shape of the stage and move equipment. The lifts required matching aprons of Mahogany, curved to fit the shape.

The project required 62 solid core room doors with sound seals and covered with the same wall panels and battens from the main entries into the concert hall. Tall narrow solid core doors, 32 in all, conceal curtain pockets from which the special acoustical curtains deploy. A raised curtain pocket separates the tier ceilings from the



walls, and conceals the return air ducting and curtain tracks.

MONUMENTAL WORK


Imperial Woodworking Co. and Architectural Woodwork Industries combined talents and resources, and came together as one company to deliver the Kimmel Center project.

"On Verizon Hall we were able to do our best work by collaborating early on in the process with the architects and the contractors on the interior and exterior woodwork," explains Richard Herskovitz, principal of Architectural Woodwork Industries. "Using 3-D modeling programs we computed all of the sizes and shapes for templates used for concrete forming and ceiling layout, allowing us to accurately cut every one of 4,000 flat and curved panels. Our layout guided other trades in positioning the hundreds of electrical, fire protection and sound equip-

ment in the ceilings and walls."

According to Frank Huschitt, Sr., Chairman of Imperial Woodworking, who served as the senior project manager and orchestrated the project, Verizon Hall was the most complex project the company ever worked on and had an extremely difficult construction schedule. "We delivered the most exacting and complex woodwork, on time and within schedule for a building with over 150,000 square feet of paneling, requiring monumental veneer matching and lay-up, curved balconies, and radiused solid wood in 11 months from mock-up approval to opening night."

The interior of the hall presented literally hundreds of challenges for the team – diffusion blocks, moveable wall panels, acoustically transparent hand rails, each one requiring careful detailing, summarizes Vinoly. "It was a wonderful relationship; the first of what we hope will be many collaborations," he says. "The woodworkers' knowledge of wood detailing and construction was invaluable in meeting our tight schedule. They were never willing to compromise the design."

The great indoor plaza, which flows between and around Verizon Hall and Perelman Theater; the dramatic views of the city from spaces such as a year-round roof garden; the glass arch of the roof, establishing a new urban icon: these and other features make The Kimmel Center the centerpiece of Philadelphia's Avenue of the Arts, and a singular innovation in civic gathering places. 

Project:	Verizon Hall	Philadelphia, PA
Project Owner:	Kimmel Center for the Performing Arts	Philadelphia, PA
Woodworkers:	Imperial Woodworking Company	Palatine, IL
	Architectural Woodwork Industries	Philadelphia, PA
Architect:	Rafael Vinoly Architects, PC	New York, NY
Acoustical Designer:	Artec Consultants Inc.	New York, NY
Theater Designer:	Theatre Projects Consultants	Norwalk, CT
Contractors:	L.F. Driscoll/Artis T. Ore	Philadelphia, PA