

Lighting & Sound America

Entertainment, Presentation, Communication

Copyright Lighting & Sound America January 2007
www.lightingandsoundamerica.com

ARCHITECTURE



ALL PHOTOS: ROBIN HILL

Above: The lobby is a light-filled, window-laddered space.

Commencing the Carnival

One of America's long-awaited performing arts centers finally comes to fruition

By: Judith Rubin

"The two theatres rise like artificial mountains on the flat Miami landscape," states architect Cesar Pelli, describing his work on the city's new \$461-million performing arts complex, the Carnival Center, which opened in October. The Carnival Center's halls are superbly designed and seamlessly integrated by some of the best in the business—including theatre planning and design consultants Fisher Dachs Associates, led by Josh Dachs; Artec Inc.; master acoustician Russell Johnson; the architects of Pelli Clarke Pelli; and riggers JR Clancy. Outside the complex, its inviting, sun-washed, tilting tiers, painted in warm "Miami White," and fine stone surfaces speak of whimsy and quality. Inside, the ascending, light-filled, window-laddered spaces are accessible to audiences, supportive of performers, and accommodating

to the needs of those who work behind the scenes.

The Carnival Center is branded for Carnival Cruise Lines, which contributed \$20 million for the naming rights. The complex occupies 570,000 sq. ft. on Biscayne Boulevard, on 5.9 acres of land donated by Sears, Roebuck & Co. and Knight Ridder. Its two main performance halls, the 2,480-seat Sanford and Dolores Ziff Ballet Opera House and the 2,200-seat John S. and James L. Knight Concert Hall, face one another across the Parker Thomson Plaza of the Arts, designed by Diana Balmori; the intervening boulevard traffic can occasionally be closed off. A pedestrian bridge also connects the two halls. The 200-seat Studio Theatre, a black box for community and small professional performances, is tucked into a corner of the Opera House building. The complex is



Above: A view of the stunning terrazzo work in the lobby.

replete with public art, integrated into the halls and outdoor plaza.

The tower of the old 1929 Sears building, now known as the Art Deco Tower, is incorporated into the design; preservationists helped save it during the center's long development process. "This was a difficult request," notes Pelli, "but we took it to heart and made the tower into a marker and pivot point on the plaza." The ground floor of the tower will soon open as a café; its upper portion was recruited to house HVAC equipment.

Miami-Dade County owns the Carnival Center, which was financed by tax revenues and private contributions. In 1990, the Performing Arts Center Foundation was formed out of the creative groups that would eventually call the Carnival Center home. The foundation created the

Performing Arts Center Trust to manage and operate the center in tandem with the county. The construction team of Odebrecht Construction Inc., The Haskell Company, and Ellis Don Corporation broke ground in fall 2001.

The process

Getting from concept to completion was a lengthy, arduous process. Fisher Dachs Associates and Artec's work began 20 years ago. Pelli Clarke Pelli's Miami architect, Roberto Espejo, spent 12 years on the project. JR Clancy provided budget figures in 1990 and signed a contract in 2001. "Construction delays and design changes made it very challenging," reports JR Clancy executive vice president Mike Murphy. "In addition to external engineering, we spent over 7,300 hours internally engineering this project, and over 5,400 hours project

managing. The duration was double any other project we have completed."

Fisher Dachs Associates and Artec were responsible for designing the functional and acoustic details of the theatres and other rooms, and also working out how they would relate to one another. Fisher Dachs produced the feasibility study (along with consultant AMS); took part in site selection studies, and wrote the building program, a narrative document that lists, diagrams, and describes every room, its measurements, critical adjacencies and all relevant design criteria. Working with Artec, conceptual designs for both halls were developed, along with a list of finish materials to achieve acoustic goals.

The building program was a key document provided to the three candidates in the subsequent architectural competition: Rem Koolhaas' Office of Metropolitan Architecture, Architectonica, and Pelli Clarke Pelli. "It was a unique competition," says Alec Stoll, project manager for Fisher Dachs Associates. "The county rented suites at the Omni Hotel—which overlooks the site—stuck the design teams in them, and gave them seven days. This way, the county had access to the designers while they were competing, and vice versa—nothing was done in a vacuum. Because the teams had so much information to start from in the program and the room concept designs, they were able to develop very realistic schemes. Every day, Josh Dachs, Michael Spring (Miami Dade County Dept. of Cultural Affairs), and other foundation members would go in and give feedback."

The proximity paid off. "We were taken with the marvelous light and skies of Miami," says Pelli, "and we designed the buildings to be seen against deep blues and brilliant white clouds and to take advantage of the continuously changing light conditions. Miami has incredibly alive



Above: The James L. Knight Concert Hall.

weather that led us to design solid, faceted forms that are energized by the variation in the play of light and shadows.”

The outward tilt of the Opera House’s mostly glass façade isn’t just for looks—it facilitates the best use of passive solar energy. Even at the hottest part of the Miami day, one doesn’t broil under the glass, although there’s plenty of light. The surface of the glass was painted with a ceramic frit—little white dots—to filter the sun. The glass manufacturer was Vericon, and Baker Metals of Dallas provided custom manufacturing for the glass and metal window units.

The opera house

The new residence of the Florida Grand Opera and Miami City Ballet has a vertical orientation, and there isn’t a bad seat in the house. Even from the cheap seats in the last row of the third balcony, the view is special, because the perspective of the cylindrical hall becomes more fascinatingly Escher-esque the higher you go, and virtually no vantage point is obstructed. Also, the farthest balcony seat is only 145’ from the curtain, 20’ closer than in the Miami-Dade County Auditorium, the opera company’s previous digs.

The sound up top is good, too: Pelli’s Roberto Espejo points out that “when it reaches the third balcony, it is all blended.” Up there, you also get a good look at the plaster-coated, constellation-like ceiling dome with its large, raised, round spots. “Everyone thinks it’s a major acoustic element,” remarks Artec’s Todd Brooks, “but it’s more architectural. We needed a convex shape up there to diffuse sound, and the final look is the result of a collaboration between us and Cesar Pelli. The bumps were an

aesthetic decision, meeting our requirement for a broken-up surface there. It also doubles as a lighting position and an air plenum.”

During intermission, third-balcony patrons enjoy the largest bar in the house, and additional spectacular views. It’s an irresistible pleasure to rest against the José Bedia-designed engraved glass railings and gaze down into the main lobby at Bedia’s sparkling terrazzo floor murals far below, or to admire the sweeping panorama of city and bay through the generous windows.

To retain intimacy and sightlines while accommodating nearly 2,500 people, the opera house layout echoes some of the early great European houses, such as La Scala, in stacking the audience high in boxes and balconies that creep right around the edges of the stage. “Multiple balconies is a classic opera house kind of approach,” says Alec Stoll. “Our job is to provide intimacy. You have 2,450 people in the audience, all looking at one person on the stage. The hardest and most critical part of our job is to make it so that she’s the most important thing in the room.”

This is a populist house: the boxes are placed so that they don’t intrude on the sightlines of audience members in the balcony. Every set of stairs is matched by a ramp, and wheelchair users are accommodated in a way that gives them both dignity and a wide range of options. Espejo, who spent some of his college days in a wheelchair, is proud that the hall exceeds ADA standards for wheelchair users; he notes that a wheelchair-using student can take the elevator to the last balcony and sit in the back with friends rather than be segregated in another part of the auditorium. Aisle seats in both halls have flip-

up armrests convenient to those using wheelchairs, walkers, or crutches.

The live qualities of the opera house are important in returning sound back to the performers so that they can hear themselves and each other. That's not to say that all potential sound reinforcement in the room is acoustic. Concealed within the dark, fabric-covered columns on either side of the proscenium are Meyer self-powered loudspeakers, including a center cluster with three PSW-2s, three MSL-4s, three CQ-1s, three CQ-2s. Left and right clusters have one MSL-4, one CQ-1, one CQ-2. For front fill, there are nine UPM-1Ps in the platform edge, nine UPM-1Ps in the platform extension lift, and three UPM-1Ps providing fourth tier balcony fill. Adjustable fabric banners are activated by motorized controls to provide sound-dampening when a sound

system is in use.

The adjustable orchestra pit (full capacity, about 90 musicians) is an acoustic factor in maintaining the delicate balance between orchestra and singers on what Espejo claims is one of the three largest stages in the country. (Overall, the stage measures 200' wide and 140' deep. Its proscenium, 38' high and 50' wide, can be masked for different proportions.) Two Gala Spiralifts, can position musicians at various levels; they can also enlarge, reduce, or eliminate the pit; expand or retract the size of the stage; and remove or replace 200 audience seats.

Gala also provided three large compensating lifts to accommodate scenery wagons. (JR Clancy's lead engineer, Greg Dale, designed the massive, motorized wagons which were introduced late to the project.) Once a wagon is rolled into place, the lift can descend 6' below the

stage. Toward the rear of the hall is a section of removable seating at the floor level that can be removed to produce a depressed sound mix position. There is provision for another Gala lift that will automate this process in the future. Espejo waxes enthusiastic about this and other labor savers, such as the close proximity of the four loading docks to backstage, the elevator access in the 100' flyloft, and the wagons on which scenery, seating and equipment can be pre-assembled—pointing them out as well worth the front-end expense in order to streamline and economize load/unload and setup.

The backstage area can be acoustically isolated, quickly and totally, by closing the 30,000-lb. custom acoustic doors supplied by

Below: The Dolores Ziff Ballet Opera House, with a view of the Hibiscus curtain, built by I. Weiss.





The concert hall will host the Cleveland Symphony, New World Symphony, and Concert Association of Florida.

the Jamison Door Company, which fulfill their function by means of a perimeter air gasket. Sound isolation in the corridors outside the performance halls was accomplished by the use of 1', grout-filled concrete masonry double walls with air space between, and covered with acoustic material. And no door opens directly into a hall—all entrances include a light- and sound-lock vestibule. Sound isolation doesn't stop there: 2" isolation joints effectively seal off one room's vibrations from the next—and from building systems throughout the complex. Because the building sits under a flight path (Miami International Airport is close by) Artec's "noise police" building guidelines called for significant mass in the roof and attic areas.

The Hibiscus Grand Curtain, designed by Robert Zakanitch, is the

main opera house curtain and one of several public art installations that brighten the complex. Theatrical supplier I. Weiss implemented a digital printing process to transform Zakanitch's 9 by 20' painted velour original into the 60 x 40' curtain.

Seat widths (19-22") and leg room (36-38") in both the opera house and concert hall are appropriately generous for a population that is growing, on average, both taller and wider. This is, says Stoll, the same width range as two decades ago, but the 19-inchers are fewer. "As on every project, we spent time deciding how wide we could go and still hit the seat count," says Stoll. "Theatres of 80 or 90 years ago would have a lot of 18s and even 17s, with 32-34" legroom," he comments. "The only place you now see 32-33" legroom is in balconies on Broadway." The seating supplier was Series USA.

Richard Hoyes, of Fisher Dachs Associates, designed the stage

Pelli: "We designed the buildings to be seen against deep blues and brilliant white clouds, and to take advantage of continuously changing lighting conditions."

lighting and control systems. The stage lighting dimming system features 967 Strand Lighting CD80SV 800ms "high-rise" stage dimmers, 68 house dimmers and 88 non-dims for worklights, runlight fixtures, and non-dim circuits. Lighting positions in the house include the circumference of the center ceiling dome, along the front balconies on two levels, and from pipes under side boxes. The near side boxes that hug the stage edge are also filled with lighting that can be removed for patron seating. There are four followspots at the rear of the house. All stage lighting is controlled by an extensive Ethernet network, with all major control components tied together with a fiber-optic backbone system. A portable stage manager's rack on wheels can be used to position controls in a variety of locations onstage. Its AMX touch screen controls house lights, work lights, and run lights; separate cue lights controls are also provided. Touring

shows that bring their own equipment have eight 400A company switches to plug into for power, as well as Ethernet nodes for control console and other DMX devices. During rehearsals, when a company will typically bring the main console (a Strand Lighting 550i) out of the lighting control booth at the rear of the house, a floor box beneath one of the seats is available to plug it in. A laptop running Strand software provides an additional, portable console. A wireless hand-held remote (WRFU) allows the stage crew to work untethered throughout the theatre. Lighting gears includes 650

ETC Source Fours ellipsoidals and PARs, four Lycian 1293 and two Lycian StarkLite II followspots, four Martin MAC 2000 Profiles, and four Martin Mac 2000 Wash units.

The concert hall

Taking up residencies at the Knight Concert Hall are the Cleveland Symphony, the New World Symphony, and the Concert Association of Florida. The hall was designed to furnish an ideal setting for acoustic classical and choral music, and to be a showcase for other types of performance, including pop and jazz music. The five tools that provide acoustic

flexibility are 1) the adjustable acoustic canopy, 2) the acoustics control chamber. 3) the loudspeaker system, 4) retractable fabric panels on the walls, and 5) the room itself.

The massive, three-part acoustic canopy (weight: about 130,000 lbs.) forms a spiral-within-a-spiral seashell kind of shape that, like the opera house dome, blends the acoustic with the aesthetic. "There's nothing acoustically magical about the spiral shape. Cesar Pelli, understanding the general idea, came up with it," says Brooks, explaining that Artec's guidelines for the canopy dictated a certain proportion of horizontal-to-vertical surface, with minimal design repetition, to do the job. Each of the canopy's three segments can be raised or lowered individually to alter sound reflection within the hall, in effect making the room smaller or larger. In amped situations, where it's not needed, the canopy can retract up close to the ceiling. As in the opera house, movable cloth panels furnish sound dampening as needed. A translucent curtain designed by Zakanitch hangs in front of the organ alcove, awaiting the donation of an organ.

The canopy is made of veneered wood on a steel frame, attached by cables to a radial grid, and doubles as a primary lighting position. Its location made it impossible to install lighting instruments in customary theatrical positions in the ceiling. "Since the height of the canopy is adjustable, fixed focused fixtures were not an desirable option," explains Richard Hoyes of FDA, "and that's why we chose to use automated luminaires." Hoyes specified 160 Vari*Lite VL1000 Tungsten and 12 VL500 Tungsten luminaires. "This gave us ultimate versatility: a warm white light system for a symphony orchestra to which you can add colors and patterns for pop events, as well as rock concert-style lighting." The canopy also bears a set



Left: The view from the stage of the opera house.

ARCHITECTURE

of rehearsal lights: 48 recess-mounted Edison Price Darklite 1,000W PAR 64 fixtures. Other instruments include 56 ETC Source Fours, 24 Strand Bambino 650 Fresnels, and two Lycian SuperStar 1.2 followspots. All stage lighting is controlled by a High End Systems Wholehog 3 console. The dimming system consists of 300 Strand CD80SV 800ms “high-rise” stage dimmers, 148 house dimmers and 70 non-dims for worklight, runlight fixtures and non-dim circuits.

“Sixty percent of the programs in this hall will have some level of reinforcement,” notes Geoff Zink, “ranging from simple narration or announcements up to pops events with an orchestra that is reinforced, and usually accompanied by vocals.” The in-house sound system’s main points are three clusters of Meyer loudspeakers at left, right, and center, consisting of one CQ-2, four MSL-4, four CQ-1, four 650Ps, plus, for front fill, nine UPM-1Ps in the stage edge, nine UPM-1Ps in the orchestra pit lift, and three UPA-1Ps for four tier balcony fill. “The center covers the entire front-of-house area and is a very important element for circumstances with a vocalist, while left and right support the center and give something of a stereo mix,” he adds. The setup allows vocals to be confined to the center cluster, which is supplemented by time-aligned, delay-fill loudspeakers at the front edge of the concert platform and under the balcony. Zink emphasizes that the goal of this in-house system is to be as transparent as possible, “to bring the truest representation of what you’re actually hearing.” Many kinds of music will need



further augmentation than the in-house system supplies, and pop performers will typically bring in equipment. For such situations, the room’s acoustic curtains can absorb excess reverb. The main mixing console is a Yamaha PM5D.

The acoustics control chamber is often referred to as a reverberation chamber, because it can impart a cathedral-like sound quality. But, says Brooks, the company has re-labeled it. “because they increase volume and reverb, but also can be used in reverse: By extending the cloth banners in the chamber and opening the doors, you

Top: The Hibiscus Curtain was digitally printed on fabric rolls, then sewn together by I. Weiss staff. Below: The exterior.

relieve sound pressure and make the room dryer. Their most tangible audible effect is extending the ‘tail’ of the room—the time it takes sound to decay after the orchestra stops.”

Physically, the acoustics control chamber is a 70’ high room that encircles three quarters of the hall, with heavy concrete walls and doors. It has a special visual punch due to its deep, blue-lit back walls, visible from the auditorium in appealing contrast to the maple-wood interior of the auditorium.

Its 84 concrete reverberation doors, some of which weigh 16,000 lbs., were installed by JR Clancy under challenging conditions. “Due to scheduling and delivery conflicts,” notes Mike Murphy, “the doors had to be installed after the roof was in place and not as originally intended with a crane prior to the roof being installed. The doors had to be brought in on their side on specially built moving carts and lifted into place at different elevations.” To do this, project manager Kent Newbold worked with a subcontractor to customize a special crane that could be brought into the building to lift the doors in place.

“Because we had to take this route,” continues Murphy, “shoring had to be added to the building to support the loads. Kent designed this with TDK, a local engineering firm.”

Staging flexibility includes removable seat banks behind the stage, a Gala piano lift that rises up from basement level, and Gala’s custom orchestra riser pallet. An alternative to individual platforms set up by stagehands, this 65,000lb. three-tiered element can quickly slide on and offstage on air casters.

JR Clancy had seven individual control systems on the project to operate all of the intricate variable acoustics systems in both halls. Tom Zorn worked on the design, manufacture, and installation of these systems, including coordination with the electrical contractor, testing, and final acoustic tuning with the design team. “Some of them used similar components,” Zorn relates, “but each used custom software, tailored to the number of motors and characteristics of that system. Four of these systems use plug-in pendants for control—two were push-button pendants, and two were touch-screens.” During the design process, Zorn and his team made sure that the push-button pendants were pin-compatible, so that either pendant could be plugged into either system. “We also made the touchscreen pendants pin-compatible,

Right: The Art Deco tower is left over from the 1929 Sears Building on the site.

for ease of manufacture and testing,” he added. “Since each touch-screen pendant would have different software to drive the screens, we used keying pins in the plugs and sockets, so that, for instance, the acoustic canopy pendant couldn’t be plugged into the reverb doors’ control receptacle, and vice versa.”

Based on discussion with Fisher Dachs about the provision of spare pendants, and which software should be loaded into a spare, Zorn came up with a solution that involved putting software for both systems into each pendant, and having the control system direct the pendant to use the appropriate set of screens. “This allowed them to

use either pendant with either system, avoiding considerable confusion to the users.”

Construction lasted more than five years, and Carnival Center arrived \$102 million over budget and two years behind schedule. But arrive it did, and its future looks promising. Besides providing a brilliant showcase, it has helped fuel an urban transformation, and the current pace of condo-building in the surrounding area is dizzying. “Performing arts centers can gentrify a neighborhood all by themselves,” notes Stoll. Look for the Carnival Center to help pace the development of downtown Miami and lead the way in its burgeoning international arts scene. 📍

