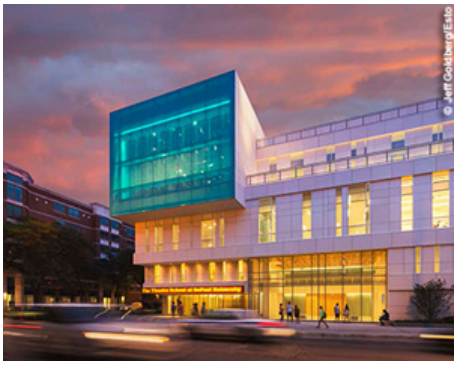
Curtain Opens on DePaul's New Theatre School

By Kevin Wilcox

Plentiful glass at the street level provides views into the inner workings of the school, connecting it to the community.



The new Theatre School at DePaul University includes a cantilevered performance space on the fourth floor with a double-skinned glass facade that minimizes noise from the busy street below. © Jeff Goldberg/Esto

October 1, 2013—DePaul University recently unveiled its new academic building, the Theatre School at DePaul University, at the high-profile corner of Fullerton and Racine avenues in Chicago. The building brings together more than 300 students and nearly 100 faculty members in a cantilevered structure that steps out over the sidewalk and uses plentiful glass at the ground level to engage passing pedestrians.

The design is the work of the architecture firm Pelli Clarke Pelli, of New Haven, Connecticut, which won a competition to secure the project. The building features a facade comprising ribbons of vertical glass and panels of light-colored limestone, and the windows provide passersby with a glimpse of the inner workings of the school. An interior grand staircase, painted bright yellow, boasts lighting and design cues evocative of a performance space and is visible from the exterior.

"We aspired to create an environment that would provide many specific learning opportunities for our students, while inviting others to come into the building to experience the creative work of our students," said John Culbert, the dean of the theatre school, in written comments to Civil Engineering online. "We wanted our audiences and even those just passing by the building to feel the creative energy and get a glimpse into some of the behind the scenes work that goes on in our day-to-day activities.

"Pelli Clarke Pelli's design emphasized an openness and transparency that celebrates the entire theatrical process," Culbert said, lauding the collaborative process of working with the firm. "Openness was important in the design of the building because we want to be able to share the process of making theatre, not just the final product. Many audiences never realize the work of our student designers, stage managers, technicians, and dramaturges. We think that it is important to showcase the work of our students. There are hundreds of theater options in Chicago on any given night. We want our audiences to understand that by attending a production at The Theatre School, they are an integral part to our students' training."

The design features abundant vertical glass on the ground level to engage passersby in the workings of the school. © Jeff Goldberg/Esto

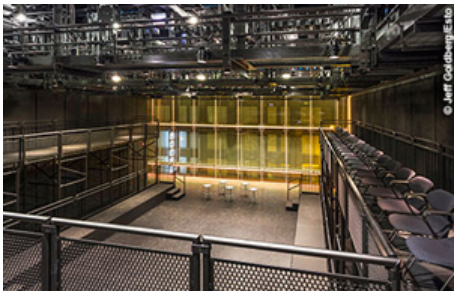
Pelli Clarke Pelli brought in the Chicago office of Thornton Tomasetti, Inc., to develop engineering solutions for the structure, which is on a tight site—280 by 120 ft—near downtown Chicago. The project was further constrained by regulations that strictly cap the height at five stories.

The building includes two large theater spaces for performances: the Fullerton Stage on the ground floor is a thrust stage performance space that can seat 250; the Sondra & Denis Healy Theatre on the fourth floor is a flexible space that can accommodate eight seating arrangements for an audience of up to 100. This theater cantilevers over the sidewalk and features a double-skinned glass facade facing Fullerton Avenue to insulate the space from street noise below.

The building brings together all of the diverse specialties within theater. Compared to the school's previous facilities, the new building greatly increases the space for the paint and scene shops, placing that work on display via tall vertical windows at the street level. There are rehearsal spaces and 14 dressing rooms, as well as two green rooms for performers. The building also includes a new costume design room, a large script library, and areas for design and technical programs—including lighting, sound, and drafting labs.

The structural engineering of the building presented challenges because the height of the structure was restricted, the site was constrained, and the Theatre School at DePaul University placed a high premium on maximizing the open spaces between floors and ceilings.

"In a design competition, it's all about the renderings and [making sure] that all of the program is showing up. But there's no real structure," says Carol Post, P.E., S.E., LEED-AP BD+C, a principal of Thornton Tomasetti. "When we got on board, we very quickly realized that they didn't have enough height in this building. This site is only so big by its footprint. You are capped at the top. And you are chock full of programming."



The Sondra & Denis Healy Theatre on the fourth floor can accommodate eight seating arrangements for an audience of up to 100. Its glass wall provides views of the campus. © Jeff Goldberg/Esto

Post says the design team began referring to the building as a Swiss watch, because balancing the structural engineering, mechanical engineering, and acoustical requirements required such a high level of precision.

"We had to sit down with the mechanical engineer—and this rarely happens on a job—and work out every single location for every bit of their mechanical, whether it's sprinklers, whether it's water, whether it's air ducts, and exactly point out where it was going to penetrate our beams."

This work, with the Chicago-based mechanical engineering firm WMA Consulting Engineers, was so exacting that the finished models were practically of design/build caliber, says Nate Sosin, P.E., S.E., LEED-AP BD+C, a senior project engineer for Thornton Tomasetti.

"It was almost 'this is the way you are going to have to do it.' The contractors had a little bit of latitude, but at the end of the day, if you don't follow what we've shown, all bets are off," Sosin says. "Structurally, we dimensioned every beam penetration exactly where it needed to be, and we helped the mechanical engineer track which beam penetrations were for which discipline. And ultimately that information went on their drawings." Sosin says the structural engineers had to essentially tell the other team members, "You can't use any penetration that isn't listed as yours because it belongs to someone else."

"This is very unusual," Post adds. "I've been doing this for 30 years. I've never done this before. It just had to be done this way on this job to achieve the right ceilings. It was really on us to run this and have the foresight not to have this pop up out in the field, to suddenly realize, 'Oh, wait a minute, this isn't working at all.' "

The team worked with Joseph Myers, the principal acoustic consultant for Kirkegaard Associates, in Chicago, on the exacting acoustic requirements for the project. The tight envelope of the structure and the need for acoustic separation between spaces in the building created additional challenges on the project.

The grand staircase, painted bright yellow, boasts lighting and design cues evocative of a performance space. © Jeff Goldberg/Esto

"You could have a movement and voice room where they are doing rehearsals for a musical and then right next door someone is doing a Shakespeare soliloquy where you need absolute silence," Sosin says. "We had all of these different occupancies mixed with one another that really needed to be their own space. That led to thick walls, thick ceiling finishes, [and] heavy loads that changed from one room to the next."

Some of the walls in the structure are highly specialized, incorporating as many as nine layers of gypsum board, several rows of studs, and air gaps. As the walls grew thicker, their weight increased and the team had to determine when it was advantageous to switch to fully grouted concrete masonry units (CMU).

For the largest performance space, the Fullerton Stage, the design team specified 20 in. thick cast-in-place concrete walls, 57 ft high. Studies revealed that a steel structure with CMU infill would result in thicker walls inside the tight building envelope. And concrete walls were deemed to acoustically outperform CMU walls.

"It was much more acoustically efficient to go to a concrete box, and resulted in simpler detailing and reduced square footage," Sosin says.

To keep the performance space box as isolated as possible from the rest of the structure, the engineers developed a system by which the steel beams are anchored into the concrete walls, but the floor slabs are separated by a joint.

"It was a compromise" based on the desired level of acoustic performance, Sosin notes. "The slab is free from the walls, so any sound would have to travel from the slab into the beam and then into the wall."

Three 80 ft long transfer trusses top the performance space, supporting the two floors and the roof above. Placing these heavy trusses on top of the concrete theater box created some challenges in the construction sequencing and staging for the project.

"We are built right up on the lot line," Sosin explains. "The contractor has to put this big, tall concrete box right in the middle of the site, and then come back later and erect steel—both around the box and inside the box. There were some concerns from erectors, both prebid and after bid, about getting a crane that could get steel inside this box with the tight lift requirements."

The construction team and the erector, Chicago Steel, were able to devise a strategy to deploy an exceptionally large crane for the project that could then be placed at a single location on the site throughout the project.

"It was something they were all very nervous about," Sosin recalls. "They have to build this giant concrete element and finesse all the steel around and inside it, which creates some very difficult picks. But I think once they sat down and thought it through and found a good solution, it didn't wind up being a deal breaker."

The school opened September 12 to positive reviews, both from the university and the city. "We are extremely proud of our new facilities," Culbert said. "We feel an invigorating responsibility to create excellent work that will engage DePaul University, our neighbors, and the Chicago theatre community."