Claire Tow Theater

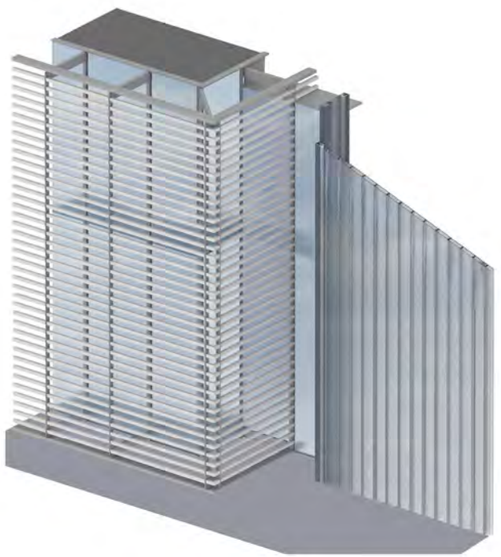
To bring downtown theatrical innovation onto Lincoln Center's dignified uptown campus, Hugh Hardy's H3 and Severud Associates executed a tricky high-wire act atop the roof of Eero Saarinen's iconic building. With a prominent framework of steel trusses and an elegant aluminum grille, the new Claire Tow Theater is riding high.

THE LINCOLN CENTER ARTS complex has done many things superbly over the decades, including upgrading its own form. But there's one thing it is not renowned for, at least not yet: developing fresh talent. Productions at Lincoln Center Theater (LCT), either the 1,080-seat Vivian Beaumont Theater or its downstairs neighbor, the 290-seat Mitzi E. Newhouse Theater, are generally works by playwrights and directors who have already arrived. For those on the way up, downtown's black boxes have been the traditional incubators. This uptown–downtown gap, LCT's artistic director André Bishop and executive producer Bernard Gersten have long realized, also separates older and younger audiences and raises the question of where tomorrow's subscribers will come from.

The 2008 launch of the organization's new-talent division, LCT3, addressed this problem, staging new works offsite at first until its permanent home was ready. That venue, a two-story, 23,000-square-foot addition housing the Claire Tow Theater and sited on the roof of LCT's respected 1965 building by Eero Saarinen, opened last year. Designed by H3 Hardy Collaboration Architecture with structural engineering by Severud Associates, the LCT3 facility represents a careful balancing act on multiple levels. "What we didn't want to do," says H3 principal Ariel Fausto, "was build something up here that would call so much attention to itself that it fought with the existing building."

LCT3 resides within Lincoln Center's 16 acres, yet it is not quite of Lincoln Center. In a sense, it is an outpost of downtown that expands Lincoln Center's definition, requiring a different aesthetic; yet it cannot be as overtly bohemian as its East Village or Williamsburg counterparts without creating untenable visual and social friction. It optimizes the campus's tight real estate footprint by occupying roof space, adding majestic and unprecedented views as well as sorely needed office space for LCT3's operations, yet it needed to avoid compromising the integrity of Saarinen's base building either structurally or aesthetically.

In addition, since that hybrid, multifunctional building—which includes not only the two older theaters but the book stacks for the New York Public Library for the Performing Arts and connects to Gordon Bunshaft's structure for that institution—needed to remain open, construction logistics had to include painstaking workarounds. Staging was impossible on the public plaza and was confined to the roof and the street, reports Severud principal Cawsie Jijina. "There were actually zero construction disruptions," he



notes. "Our charge was, 'You cannot interfere with the operations of the building.'"

Initially conceived as what Fausto calls "a packing-crate idea, a throwaway theater" that might have occupied concourse space, then planned for the rooftop when that option appeared more viable amid the wider renovations underway around the campus, LCT3 responds to the challenges of its site through fresh variations on some of the themes Saarinen had established. A chief reason Saarinen's building strikes such a memorable profile is structural: it avoids internal columns and load-bearing walls by relying on external columns for support. The 175-foot span from north to south relies on massive Vierendeel trusses: 18-foot-high I-shaped girders of cast-in-place concrete, transferring loads to the columns at pyramidal steel connection points and creating the impression that a large travertine-clad volume hovers above a light Miesian glass box. "There's a real structural authenticity and integrity to what happens here," says H3's Fausto. "Everything is exposed, the concrete, even the gymnastics they're playing with the little pin connections from the column up to the plinth: it's all very elegant."

In planning the new structure, Fausto and colleagues posited two key questions: "One, how are we going to do it up there? Second, what would be the relationship of that new construction to the existing?" Deciding that a complementary relationship between Saarinen's LCT and the new LCT3 would be preferable to an exaggerated contrast, H3 housed the 112-seat Claire Tow Theater, lobby, rehearsal room (with sprung floor for dance), dressing rooms, back-of-house offices, and technical space within a new glass box, caged by an aluminum brise-soleil and supported by its own system of steel trusses. The addition is set back enough to be unobtrusive from the plaza level, striking its own distinct profile with a contrasting presentation of visible structure.

The solutions devised by H3 and Severud not only bridge the project's disparate needs metaphorically but employ a literal bridge. Severud's engineers, reports Jijina, determined that a steel frame with lightweight concrete on a composite metal deck would be preferable to any loading on the roof. The existing concrete girders lacked the capacity to support a standard column layout without risky de-

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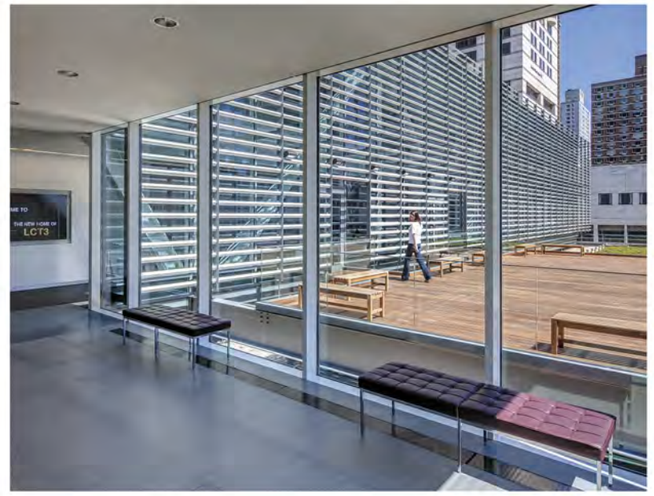
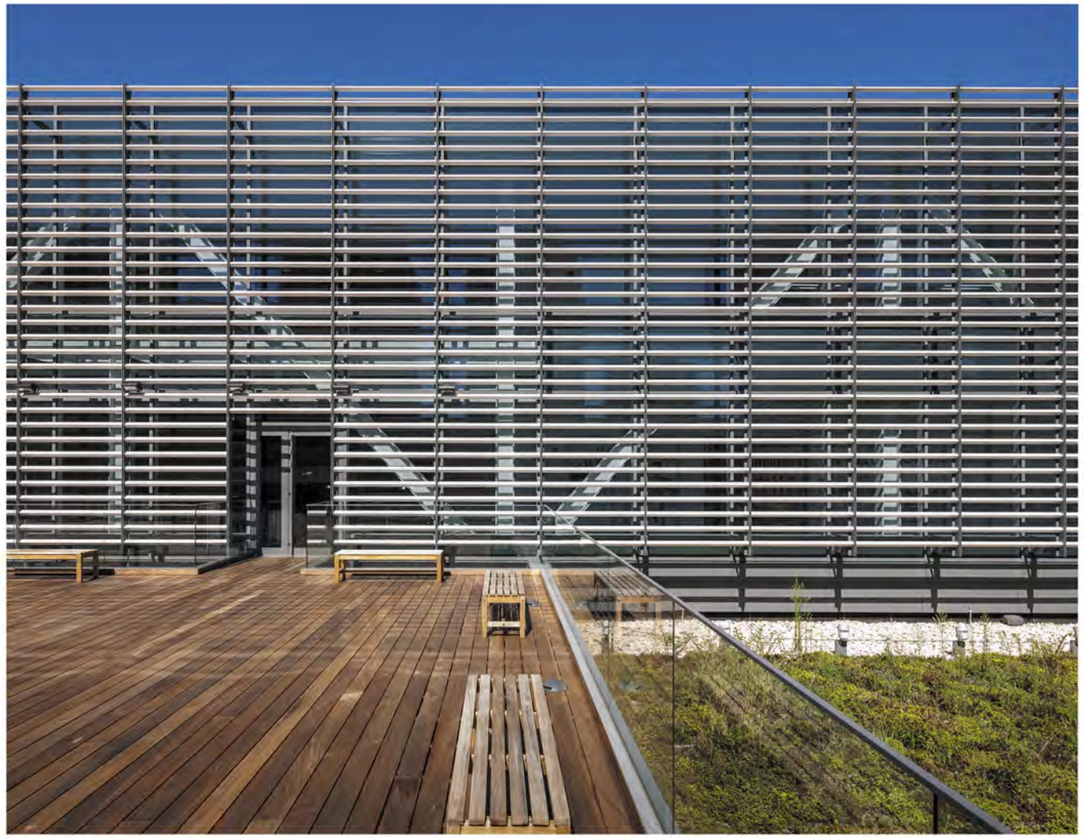
Ariel Fausto, H3 Hardy Collaboration Architecture



This page and facing top A brise-soleil of square aluminum bars shields the theater's north, east, and south sides, contributing to its LEED Silver rating and helping it blend with the Saarinen-designed structure below.

Facing bottom A corner detail of the facade's glass curtain wall and aluminum brise-soleil.



Top and opening spread: Francis Dzikowski/ESTO; left: H3 Hardy Collaboration Architecture

This page: Francis Dzikowski/ESTO

flection under additional loading. Instead, four of the LCT's exterior columns support the LCT3's two main wide-flange steel longitudinal trusses, weighing about 65 tons each, 175 feet long and 30 feet deep with 75-foot cross trusses, cantilevered an additional 15 feet at each end.

Thorough structural studies and nondestructive material-strength tests determined that the existing columns' reserve capacity would support the load delivered by the truss system, which forms an independent bridge by passing the existing roof structure entirely. The steel assembly, too large for trucking as a whole, was fabricated off-site at Capco Steel, cut into parts, craned into place, laid out on the roof, reassembled, and hoisted into place. Exposed trusses were welded with complete joint penetration welds, according to Severud associate Alvaro I. Castaño; interior trusses were all bolted. ("We were trying to minimize the welding, because it's an occupied building," Jijjina recalls; fire marshals had to stand guard during welding, "an expensive proposition.")

The three main trusses are composed of W14 shapes, ranging from W14x61 to W14x211; top and bottom truss chords are W27 and W30, the heaviest being W30x261. The two short trusses are composed of W10x54 diagonal elements with W24x55 top and bottom chords. Filler beams are W14x22, W16x26, W18x40, W18x40, W21x44, W24x55, and W30x90; girders are W30, W33, and W36, with heavy W33 beams used to bring the load path from the end of the truss to the centerline of support. The floor spanning between the trusses is picked up by girders and filler beams, ranging from a high of W36 to a low of W18. The top and bottom chords, Jijina reports, weigh about 300 pounds per linear foot, with about 250 pounds per linear foot for the diagonals.

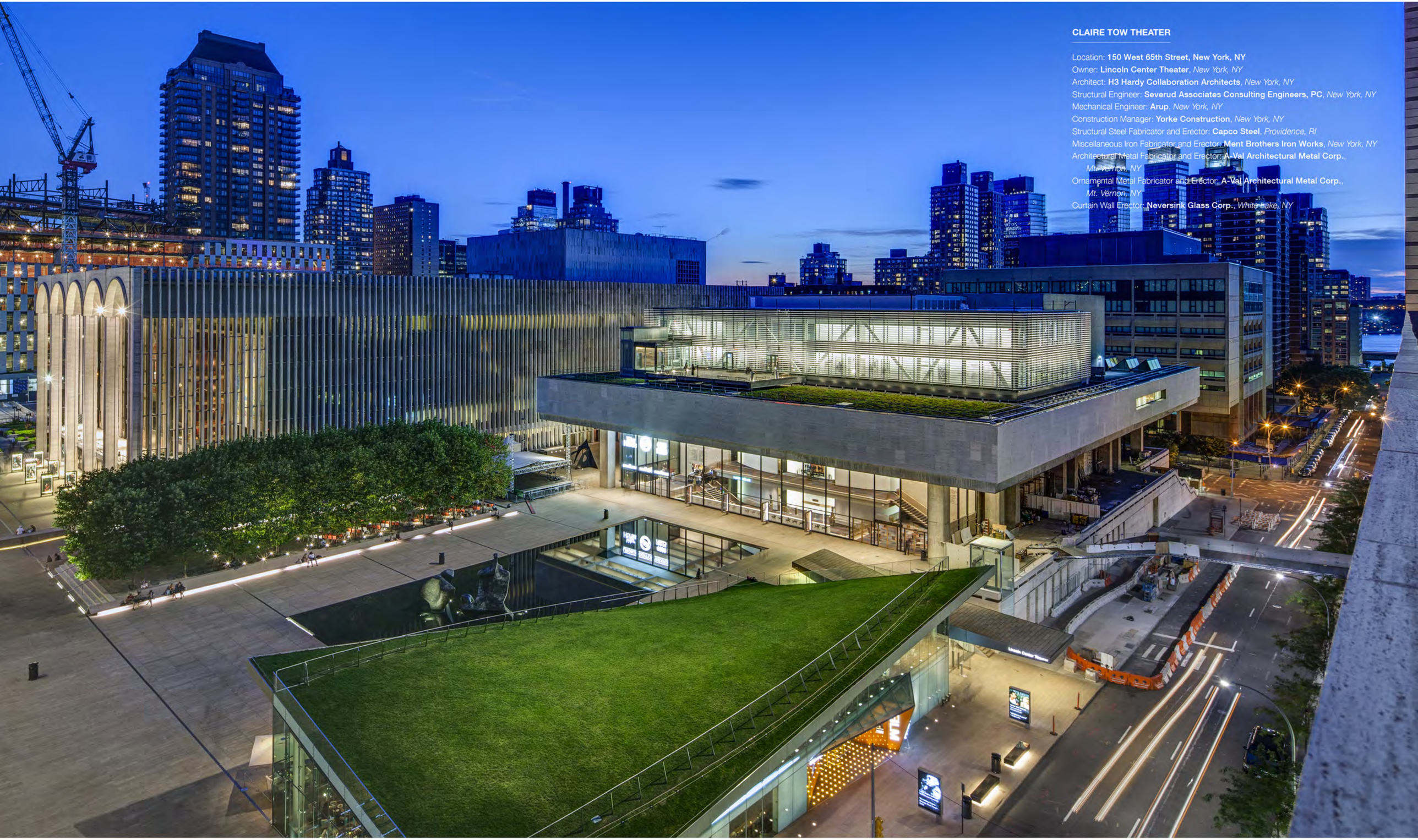
With headroom clearance requirements calling for the use of Vierendeel panels, concealing the trusses was impossible; the architects turned necessity into a purposeful design strategy and made the steel members a signature element of the building, painting them bright white. This is one of several features that organize appearances and visitors' movements around proudly foregrounded structural components. Access to LCT3 is exclusively by elevator; fortunately, in the coffered ceiling of the original LCT's exterior above the plaza, three coffers perfectly fit two passenger elevators, making it possible to knock out these coffers to accommodate the elevator bank without compromising the structure. The elevator chamber of translucent Bendheim channel glass is the only element deviating from the symmetry of Saarinen's building. Visitors emerge from the elevators into the upper glass box to see a small patch of green roof to the right, a dramatic rooftop terrace straight ahead (overlooking the Paul Milstein Pool and Terrace and parallel with the top floor of Avery Fisher Hall), the café area to the left (with Kiki Smith's sculpture *Overture*, a nest of silvered planks occupied by birds, overhead), and the theater entrances on either side of the bar. A larger green-roof area appears beyond the terrace; the sections of green roofing, the low-maintenance extensive variety using 2-foot-square trays of sedum, create continuity with Diller Scofidio & Renfro's tilted patch of lawn atop the Hypar Pavilion and Lincoln restaurant.

On three sides of LCT3 (all but the west face, which borders on the upper stage tower), the horizontal screen dominates the exterior view. This brise-soleil of square aluminum bars, rotated 45 degrees and painted matte white (standing out from the gray mullions), performs multiple functions. Along with shading the interior against heat gain, it gives the structure what Fausto calls "a homogeneous veil" that contrasts purposefully with Saarinen's ground-level glass box and harmonizes with the white steel beams, softening their starkness and bringing order to the facade. By night, lit from within but with the screen also up-lit, "the screen wins" and serves as the chief visual feature, contributing to a clean, non-flashy industrial aesthetic suiting the adventurous programming. (Ironically, Jijina notes, aluminum was a second choice here when the engineers decided the initial idea, terra cotta, would be too heavy. "Sometimes when you force the issue, you think more out of the box, and it comes out to be better.")

The Claire Tow is one of the city's only LEED-certified theaters, with a full complement of energy-conserving technologies: an enthalpy economizer, variable-air-volume HVAC, variable-frequency drives for hot water pumps, daylight and lighting-occupancy sensors, and other features expected to earn a Silver ranking. Severud won a 2012 Diamond Engineering Excellence Award in Structural Systems from the American Council of Engineering Companies of New York for the LCT3 project. "I've never had a more cooperative building process than this one in 30 years," Jijina says. "Everybody set aside their egos, and it was like a team for the first time." In the long run, the winners also include the leading edge of the performing-arts community and all of New York's diverse theatergoers who are open to experimentation, even when it takes place on—or above—hallowed ground.

This spread A system of steel trusses creates column-free space in the black-box theater, rehearsal space, and public areas.

This spread and following spread: Francis Dzikowski/ESTO



CLAIRE TOW THEATER

Location: **150 West 65th Street, New York, NY**
Owner: **Lincoln Center Theater**, *New York, NY*
Architect: **H3 Hardy Collaboration Architects**, *New York, NY*
Structural Engineer: **Severud Associates Consulting Engineers, PC**, *New York, NY*
Mechanical Engineer: **Arup**, *New York, NY*
Construction Manager: **Yorke Construction**, *New York, NY*
Structural Steel Fabricator and Erector: **Capco Steel**, *Providence, RI*
Miscellaneous Iron Fabricator and Erector: **Ment Brothers Iron Works**, *New York, NY*
Architectural Metal Fabricator and Erector: **A-Val Architectural Metal Corp.**, *Mt. Vernon, NY*
Ornamental Metal Fabricator and Erector: **A-Val Architectural Metal Corp.**, *Mt. Vernon, NY*
Curtain Wall Erector: **Neversink Glass Corp.**, *White Lake, NY*