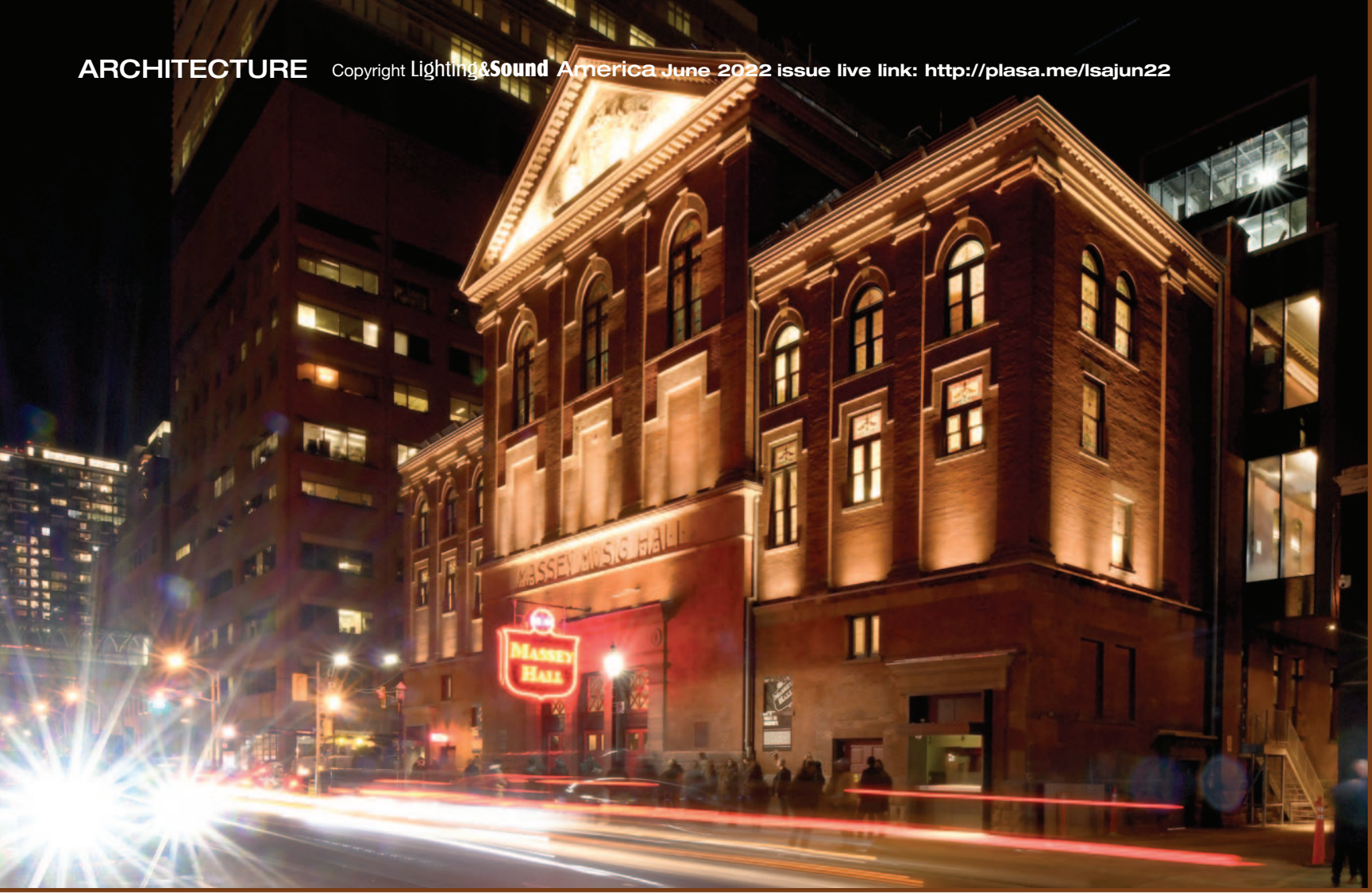




Restored to its original grandeur and endowed with innovative infrastructure and amenities, Massey Hall has been reborn for the 21st century.

Improve Everything,

An ingenious renovation guarantees new life for Toronto's historic Massey Hall

By: Alan Hardiman

Toronto's storied Massey Hall, which opened in 1894 as the first facility in Canada built specifically as a music performance venue, reopened last November following a multi-year $184-million revitalization project. Originally underwritten by the Methodist millionaire and farm equipment magnate Hart Massey at a cost of $152,000—about $3,000,000 today—the hall was a gift to the city intended for "musical entertainments of a moral and religious character, evangelical, educational, temperance, and benevolent work." Since then, it has hosted a wide variety of events and performers, including Enrico Caruso, Oscar Peterson, Glenn Gould, Gordon Lightfoot, and, in May 1953, what some call the jazz concert of the century, featuring Charlie Parker, Dizzy Gillespie, Bud Powell, Charles

Photos: Jag Photography/Massey Hall

Passerelles suspended from the sides of the building provide access to new lobby spaces with lounges, bars, and washrooms behind the stage.

Change Nothing

Mingus, and Max Roach, the only time that quintet shared a stage. It served as home to the Toronto Symphony Orchestra and Toronto Mendelssohn Choir until Roy Thomson Hall opened in 1982, a year after Massey Hall was designated a National Historic Site of Canada.

"Improve everything and change nothing," was the directive from Charlie Cutts, former president of the Corporation of Roy Thomson Hall and Massey Hall, who, many years earlier, witnessed one of Bob Dylan's first electric performances on the Massey Hall stage. "That rallying cry was exactly on target in terms of what we've tried to do," says Chris Couse, founding principal of KPMB Architects, whose partner-in-charge Marianne McKenna led the design. The firm's previous projects include Orchestra Hall in Minneapolis, the Goodman Theatre in Chicago, the Adams Center and Sprague Hall at Yale University, and Koerner Hall in Toronto. "Keep all the wonderful qualities of the room that people remember and improve it by reinstating a lot of the historic pieces, the heritage trim, and so on, and incorporate brand new systems into it. That was really the hardest part.

"A straight restoration is pretty straightforward," Couse says, "but integrating new mechanical, electrical, performance lighting, and AV systems into the room and concealing them is kind of the miracle. There's one moonshot thing that we did, and some really tricky stuff to improve the acoustics that almost no one will ever notice when they're in the room. I feel they were done really well and

New seating, including a parterre under the horseshoe-shaped balcony and gallery, maintains the hall's classic look and feel.

Photo: Phil Hampton/Charcoalblue

invisibly. The room looks and feels the same, but the acoustics are brand-new."

Improving everything also comprised new seating in the orchestra, balcony, and upper gallery; new lobbies; new front- and back-of-house amenities; new loading facilities; improved access; and the provision of new secondary performance spaces. Unsafe and unsightly exterior fire escapes, added in 1911, have been removed, returning the façade to its original appearance. That the project was completed successfully and to rave reviews is a testament not only to some uniquely ingenious solutions devised by teams of architects, consultants, and engineers, but also a more-than-usual amount of horse trading among them in realizing each team's individual goals while respecting the overall aim of the renovation.

The literal intent of the revitalization project should not be underestimated: Massey Hall desperately needed an injection of new life. "In the past, if we were lit 100 or 120 days, that was a pretty good year," says Doug McKendrick, vice-president of production. "The goal was to double our previous activity, but I think we'll probably be lit 365 days, not necessarily in Massey Hall proper, but within the building," which now includes a seven-story tower newly constructed to the south of the hall. Adjacent to its old upstage wall, the tower houses a 500-capacity club overlooking the city and a 100-seat theatre, in addition to a suite of 13 dressing rooms and offices in the basement levels.

"The project was instigated in 2012 by the prospective gift from a developer on the adjacent site," Couse says. "MOD Developments was building a [60-story] condominium tower and, in putting together the land for the project,

they had bought the parking lot directly behind Massey Hall to provide grade-level access to the east side of the condominium, but the site was too small for them to develop as residential. As part of a Section 37 agreement—the section of the Ontario Planning Act that allows developers to negotiate for additional density and height beyond what's permitted by zoning bylaws—the developer offered the site to Massey Hall in a complex three-way agreement between the city, the developer, and Massey Hall."

The Corporation of Roy Thomson Hall and Massey Hall then approached KPMB to determine the best potential use of the 4,800-sq.-ft.-site. "The land was encumbered by a helicopter flight path overhead and an air ambulance corridor to St. Michael's Hospital just across the street," Couse says, "so there was a height restriction. We started cooking up some schemes to show them what was possible."

Massey Hall had never had a front lobby or loading dock. Originally designed by the church architect Sidney Badgley, the main entrance was little more than a simple vestibule with three sets of double doors opening onto the street. It was expected that patrons would attend a performance much in the manner of going to a church service, and then leave for home immediately after. A few washrooms were located downstairs in the basement, alcohol was strictly prohibited until 1994, and lobby space was deemed unnecessary. Due to the lack of a stage-side loading dock, load-in and load-out had always been via the main front doors and up the aisles to the stage.

Situating a loading dock directly behind the stage was an inevitable and necessary choice, but locating lobby space with lounges, bars, and washrooms backstage posed the logistical problem of how to get there from inside the hall. The solution was to add access to second- and third-floor lobbies via four fully conditioned glass-enclosed passerelles, corridors suspended on the exterior sides of the building.

"The idea of adding the passerelles on the east and west sides of the building had been around for at least a decade before we started working on the project," Couse says. "It was a very sensible, self-evident suggestion that the only way you can get to the back of the building around the stage and the egress stairs was to go outboard of the building. This entailed negotiation with the city for an encroachment agreement on Victoria Street to the east and over the laneway on the west side. Everybody understood that the project had to involve additional patron amenity space, and that it could only be at the balcony and gallery levels because we had limited space at grade, since we obviously had to provide loading facilities at grade."

Given that the roof was supported only by four 8-ton iron trusses, suspending the passerelles entailed major

Photo: Jag Photography/Massey Hall

Deployable orchestra seating permits transformation to a general admission configuration by a three-person crew in about two hours.

Content capture is available for all concerts and corporate events, including this sold-out holiday show, with a seated capacity of 2,482 on the orchestra level, parterre, balcony, and gallery. The venue's lighting gear was supplied by Christie Lites and its sound and video gear was supplied by Solotech.

revisions to the building's load-bearing infrastructure. "The great engineering challenge, to hang hundreds of tons of steel, glass, and concrete off the side of a 127-year-old building that is basically masonry, timber, and some structural steel in the attic, is not a small feat," Massey Hall's vice-president of operations Grant Troop says. "Our engineers devised a way to create another structural loading box within the original building in such a way that nobody can see it. This new frame is facilitated by four massive vertical columns, about 60' high, that rest essentially at each of the four corners of the building. Those columns were dropped by our tower crane into Massey Hall through very small openings in the roof about 1m-square through a prepared shaft that went all the way down through the building, and they are footed right down at the base of the building. Those columns are key, because then all the rest of the interior structure is bearing on those columns, and that's what gives the loading capacity to have added the passerelles on the exterior."

Deployable seating

In the hall itself, newly installed removable seating on the orchestra level allows conversion to a general admission configuration. "GA capability is really important for the viability of the venue, because it allows us to diversify our programming," McKendrick says. "There were a lot of shows that we didn't get because we lacked a standing floor. Certain genres of music prefer standing, such as hip-hop and electronic club-level stuff, and because we could only do seated shows, they would pass on us to go to a smaller place that offered standing."

The recent loss of many such facilities in Toronto due to pandemic-related closures and citywide redevelopment of their premises will doubtless be Massey Hall's gain, as producers now find themselves short of alternative venues.

The "moonshot thing" Couse referred to above is a novel solution to the problem of storing 476 orchestra-level seats under the 1m-high stage, "an incredibly compact area without a working ceiling height," says the theatre consultant Clemeth Abercrombie, studio principal at Charcoalblue. "Traditional deployable seating solutions,

Photos: Jag Photography/Massey Hall

such as seats on rails or on wagons, or even old-school stadium-style stacking chairs, wouldn't have worked because there just isn't anywhere to put them. The challenges were how to store the seats and how to automate the process, because Massey Hall is a roadhouse and needs single-day turnaround."

Firms that had delivered automated seating systems in the past declined to bid, so the team looked farther afield to Minneapolis-based Uni-Systems Engineering to develop a custom solution based on the company's experience in designing retractable stadium roofs, aircraft assembly and maintenance systems, astronomical telescope enclosure mechanization and amusement rides. Uni-Systems Engineering devised a semi-automated tractor-based system that lifts sections of seating one at a time and drives them into an under-stage garage for storage. The tractors ride in trenches that are otherwise covered by sections of flooring, with the seat-back heights optimized for under-stage clearance.

"We built trenches into the floor, somewhere between 4" –6" deep," says Mark Silvera, president and owner of Uni-Systems Engineering. "A trench provides the guide for each wheeled tractor, which drives within the trench to the different seating locations. The trench has lips on the edge of it—the same type of construction used for a demountable stage or platform, with an aluminum frame around it, and heavy-duty plywood with a laminate coating over it. Those are built in roughly 4'-long sections that are laid down to provide infill over the trenches."

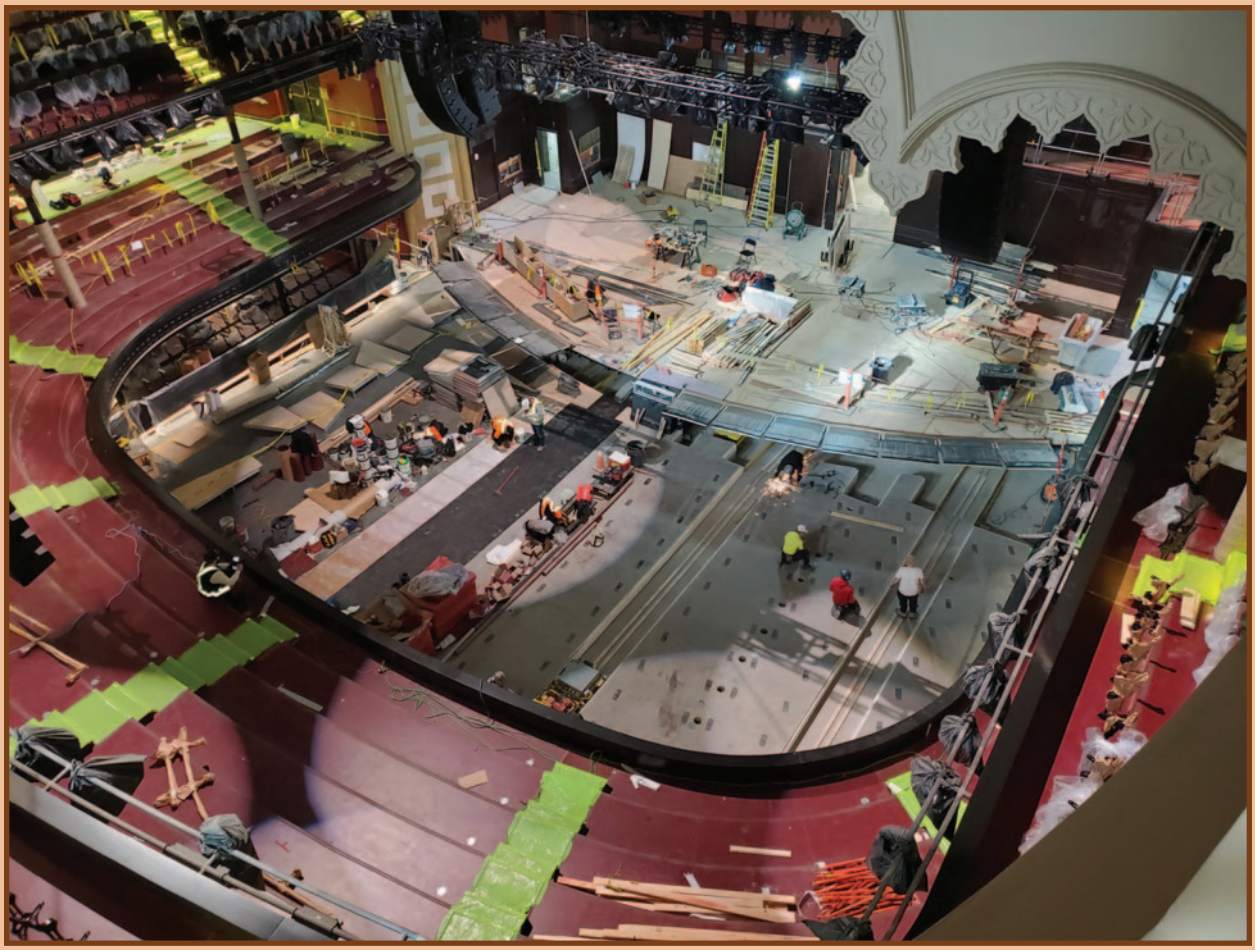
A center aisle separates each of the 13 rows of orchestra-level seats into two sections, mostly of 19 seats each, which are then split roughly in half, yielding quarter rows of multiple seats mounted to a beam, each handled as a single unit by one of four tractors. "There are four rows of trenches," Silvera says. "Each trench has its own tractor, and each tractor services one-quarter of the event floor."

To move the seats, the flooring sections are removed manually, and each quarter row of seats is unlocked manually. "We developed a proprietary locking system to lock down the seat bases because there was nothing we could find commercially that would hold the loads or the overturning moments of a fully loaded seat section," Silvera says. The locking mechanism is installed flush with the floor, presenting no interference to foot or wheelchair traffic. In removing a section of seats, the tractor drives up, raises the unlocked seating section with a small scissor lift, drives it down underneath the stage and sets it in a cradle. This process is repeated until all seats are parked under the stage, and all floor panels are replaced over the trenches.

"Our basis of design was that there would be a three-person crew turning it over in a goal of roughly two hours," Silvera says, "with two in charge of locking down or decoupling the seat bases, and one operator operating the tractor using industrial automation technology similar to what would be used in an automated factory. While position information is intended to be preprogrammed, a fully automated system would add more complexity and cost."

Abercrombie adds, "This meant that we could lay the seats out in a way that was respectful of the heritage of the hall, in that we didn't need to have straight rows of seats on a straight incline. We could keep the existing bowl and vibe of Massey Hall in the seating layout."

The remaining ring of 339 orchestra-level seats under the horseshoe-shaped balcony was reconfigured as a parterre. "Columns surrounding the orchestra level support the balcony and gallery above, and those columns weren't going away—we weren't talking about tearing down the balconies!" Abercrombie says. "It would have been really tricky to work any automated seating solution around those columns. The parterre ring was an idea to introduce a new type of seating that would not be flexible and would delineate the line between flexible seating in the middle of the orchestra versus that ring of columns. Introducing new seating outside that ring of columns also improved the sightlines. Seats that used to face forward into the front walls are now rotated to be facing the middle of the stage



Four tractors ride in under-floor trenches to remove and store rows of orchestra level seats under the 1m-high stage in the conversion from seated to general admission configuration.

and elevated a little so you're getting a sightline over the fray of the GA configuration, as well as a more elevated experience in the seated configuration, while using the geometry taken directly from the balcony and gallery above."

Regarding accessibility, the renovation provided "more than a dozen wheelchair seating positions on each level. Removable seating areas are accessible on both sides of the parterre right up to the front, as are positions in the seated configuration of the GA area," Abercrombie says. The 833-seat balcony and 834-seat gallery "both have accessible positions now, where previously there was no access because there was no elevator up to those levels. Now there is access via entry through the new tower with an elevator up to the passerelles, leading to accessible positions on each level. It's night and day versus what was there previously."

New seats in various widths were provided by Ducharme, replacing seats in the orchestra and balcony dating to the 1940s. "Up in the gallery, we've put in a seat that is essentially a recreation of the existing 1894 plywood seat, with added padding that didn't previously exist," Abercrombie says. The current seated capacity of the hall is 2,482. While this is slightly lower than the previous 2,753, a higher capacity at general admission events is expected to offset any losses and keep the venue sustainable.

Acoustics

Regarding the acoustical quality of the seats, the acoustician Bob Essert, founding director of Sound Space Vision, says, "We wanted to get a bit more absorption than was there, but we also had to deal with the capacity and squeezing people in, so there wasn't a matter of making the padding thicker than there was. The main seats are comfortable, modern, with a bit more padding in the right places. In the gallery, we thought it was important to have more upholstery on the seats, because those were never upholstered at all, just plywood. But we were not re-raking that level so there's already no knee room at all. There wasn't room to get much in the way of upholstery in, so they're still going to be harder than we would like up

Photo: Phil Hampton/Charcoalblue

there. With an audience, the seats aren't the issue; it's during the sound check or a lightly occupied event when the gallery is empty that the PA rattles around a bit more than people like."

Slapback from the gold shell above the 73'-wide stage had long vexed performers; one observer noted a flutter echo on the stage with 13 discrete repeats. "We rebuilt that in the same form and color," Essert says, "but the parts that are key to the focusing are of acoustic plaster, which is somewhat sound-absorbing. It's not rock-hard; it's a bit soft and squishy, very thin porous plaster over a mineral fiber board. The heritage acoustic plaster is something that we hadn't done before in a performance venue, and it was a key driver of the heritage look and feel, and a lot of R&D went into it with various vendors and suppliers. The shell was reformed with certain areas of it made of that material, and the whole thing painted gold again."

The hall's signature Moorish scalloped ceiling arches, which also reflected sound back to the stage, were resurfaced as well. "We applied acoustic plaster on the sides of those arches that face the stage and the PA," Essert says. "What the PA system sees in those arches now will be somewhat sound-absorbing. The direct reflection right back to the stage and to the front of the stalls will be reduced in loudness because of the material change, but it still looks the same. Between the arches, the ceiling has a convex form that spreads the sound, which is helpful in that it distributes the sound a bit," he says. Since the 1950s when part of it fell, the crumbling plaster ceiling had been held up with chicken wire. "The first task was to remove the screws and chicken wire, which took months. Only then could we proceed with the very careful plaster restoration."

Left Photo: Phil Hampton/Charcoalblue; Right Photo: Jag Photography/Massey Hall

Massey Hall's 93 original stained glass windows and signature Moorish arches were completely restored and acoustically treated.

In the attic, newly installed structural beams with trolleys permit chain motors to ride out over the house, providing lighting positions previously unavailable.

The arches themselves are hollow, affording some low-frequency absorption. "I think that's one reason why the hall wasn't particularly boomy," Essert says. "It had a controlled bass. There was lots of plaster work, and the plaster was all just typical plaster thickness, about ¾" on wood lath, so a bit flexible. But it was reflective at high frequencies."

Ninety-three Art Nouveau-style stained-glass windows, covered with plywood in the 1950s to shut out light and street noise, were completely restored, including 12 with hand-painted portraits of famous composers. "To the interior of the windows, we put in new hinged casement windows, some with thermal glazing units where the windows face the exterior, all of them with some kind of acoustic glazing panels in them," Couse says. "The thermal glazing units include laminated glass light, regular glass light, and then on the exterior there's a protective glass light to ensure the stained glass is never damaged, vandalized, or accidentally broken. It's gone from being single-glazed to multiple layers of glass, so the acoustical performance of all those openings is radically improved, and the amount of street noise that gets in is a fraction of what it was before. We also integrated an automated blackout blind into the assembly of each window, controlled from the lighting control system."

Rigging and lighting

Regarding rigging and lighting positions, Abercrombie says, "We tried to embrace the 'improve everything, change nothing' concept. The primary limitations were trying to rig in a 19th-century building, well exceeding what it was designed to do. All the truss work and structure overhead were original, so there was a strong deficiency in rigging capacity over the stage and hall for lighting rigs and PA. We took the roof off that end of the building and inserted all new structure and put it back together in service of creating 21st-century rigging capabilities. Part of that was to enable hanging the house PA simultaneously with a touring PA. No one will ever see any of that unless you're an IATSE stagehand, but it's a dramatic change in the production capability of Massey Hall, and a complete transformation of the working conditions up in the attic for rigging.

"House chain motors and all the existing rigging had to be accessed via a little stairway to a ladder onto planks over insulation, like in an attic," Abercrombie continues. "That had all been jury-rigged together over the years. We cleared it out, created walking surfaces across almost the entire thing so, rather than having to worry about stepping through a hole in the ceiling, now there's safely supported plywood everywhere. We installed structural steel in the attic from which chain hoists suspend a truss grid over the stage for lighting and new rigging beams over the house. Previously, there was no opportunity to do advanced positions over the house in any significant form; now we have new structural beams with trolleys to move chain motors out there, and there are two beams that flip up and down to raise and lower the PA."

"We've increased weight capacity by almost 100 times what it was, and we have a tremendous amount of house motors, so it should be very simple for shows to come in," McKendrick adds. "They can leave their motors in the truck and we can put motors pretty much where they want them and get their show up quickly. In the past, we never had rigging capacity beyond about 10' upstage of the downstage edge, so we never had lighting out front. Now we can rig all the way to the back of the hall." All rigging weights are monitored via Broadweigh wireless load cells.

Four permanent Prolyte S36PRF Fixed PreRigTruss house lighting trusses, each comprised of 10' sections, provide rigging points with permanent chain motors on encoders with cable reelers. Upstage and midstage trusses are 50' long, while the downstage and front-of-house trusses each measure 40'.

Flown instruments include 11 Martin by Harman MAC Viper Performances, 14 Martin MAC Viper Profiles, 28 Martin MAC Aura XBs, and 14 Claypaky Sharpys. Thirty-two 575W ETC Source Four Lekos provide a front wash from positions around the gallery rail. Twelve Martin Atomic 3000 LED strobes are mounted on the downstage chords of the stage trusses, along with 40 ETC Arcsystem Pro four-cell squares for orchestral concert lighting.

Four Lycian 1274 Superstar 1.2 compact, short-throw followspots are located, two in each spot booth, at house left and right, each with an 80' throw. Two DMX-controlled Look Solutions Unique 2.1 water-based hazers with integrated fan and haze density control system are also available.

Lighting control is via a MA Lighting grandMA2 full-size console. Backup is achieved via a dedicated grandMA2 onPC system with a fader wing located at the front-of-house stage-right position.

For added flexibility, a portable ETC 4XSL1210 SmartPack Touring System featuring forty-eight 10A dimming is located at stage-right custom-mounted in a road case, and four Leprecon ULD 340 HP four-channel DMX-controllable dimmer packs are distributed among the house trusses.

Sound

Prior to the restoration, Massey Hall had acquired a new d&b audiotechnik sound reinforcement system, now augmented with some new loudspeakers. The system has been configured into main left, center, and right line arrays, together with front and side fills and delay systems to serve the farther reaches of the hall. Each of the left and right line arrays consists of eight J8 and three J12 cabinets, with six V-SUBs flown in arrays directly behind the main arrays. The center cluster, which may be preferable in reinforcing a solo performer or small ensemble, consists of eight J12 and three J8 cabinets.

A smaller line array of six Vi12 units provides delayed reinforcement to the center of the gallery with the topmost seating. Fills include two J12s stacked on two J-SUBs at each side of the stage; eight Y7Ps (front fill for GA events); two Vi10Ps (outfill); six Yi7Ps (proscenium fill); eight E6 cabinets (under-balcony fill); four E8s and two 10S-Ds (balcony fill); ten E6s (balcony delay fill); along with four Yi7P and two 10S-D cabinets (gallery fill). d&b Array Processing is used for all arrays; amplification is provided by d&b 30D, 10D, and D80 Class D amplifiers. A Meyer Sound Galileo Galaxy network audio processor is available for touring productions to tweak the system without reconfiguring the array processing. Additionally, eight Clair Brothers FF2-HP passive two-way systems have been built into the front of the stage to provide front fill for seated events.

The house system was selected partly to obviate the need to load in a touring system. "We really wanted to make sure the new system was as universally acceptable as possible," McKendrick says. "The higher profile artists that played here with their own systems frequently brought in d&b J-Series."

An Avid VENUE S6L-24D mixing console with E6L-144 engine and MADI-192 card occupies the mix position just right of center about 60' from the stage, which is equipped with an Avid Stage 64 I/O rack loaded with a complement

A seven-story tower behind the stage houses a new loading dock, dressing rooms, offices, recording control room, fourth-floor club, and sixth-floor theatre. The tower will also see an artists' lab, lounge, and dedicated spaces for artist development when construction is completed later this year.

Photo: Jag Photography/Massey Hall

of digital input cards and analog I/O cards. A similarly equipped S6L-24C console is available for mixing monitors through up to sixteen d&b M6 passive monitors and two 18S subwoofers. Four D20 amplifiers are available to power monitors. House microphones are from Shure, Audio-Technica, Sennheiser, AKG, and Neumann; a selection of Radial DIs is also available.

Martin Van Dijk, systems designer and partner with consultants Engineering Harmonics, adds, "Since the early days of amplified performance, a lot of the touring acts that visited had typical systems—left-right mains, and in the last couple of decades maybe a bit of front fill, but nothing that could address the unique acoustics of the venue. Before I became a consultant, I was a sound engineer myself, so it's a venue I have known as a user and consultant for decades. My ambition as a sound guy was to see Massey have a system of its own. In particular, the fill system as designed and installed is a set of tools that allows the system to respond to a variety of performance types. Not only is the current experience improved, but we can also respond to other performance styles that the hall intends to present in the future."

An Optocore fiber-optic network serves as the system backbone, providing interconnectivity between all facilities in the hall and tower, including a new recording control room to be completed later this year along with the fourth-floor club and sixth-floor theatre. The tower will also see an artists' lab, dedicated spaces for artist development and music education, and a lounge. The Basement Bar, formerly known as Centuries, a 350-capacity bar and club directly beneath the main hall, is available for gatherings and more intimate performances following shows and at other times when the hall is not in use.

Regarding naming rights, Massey Hall's main room has been named the Allan Slaight Auditorium in honor of the legendary Toronto broadcaster, following a grant of $10 million from the Slaight Family Foundation. The overall complex is known as the Allied Music Centre in recognition of an undisclosed "landmark contribution" from Allied Properties, a Canadian provider of creative urban workspace.