

## Simplicity in Motion











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#### Advertising & Publishing

Publication Manager: Damien de Roche International Advertising Sales: Oliver Taylor Managing Director: Graham Johnson CEO: Tony Robinson Editorial Director: Anthony James The views expressed in the articles and technical papers are those of the authors and are not endorsed by the publishers. While every care has been taken during production, the publisher does not accept any liability for errors that may have occurred.

Subscriptions £60 per annum

Published by UKIP Media & Events Ltd, Abinger House, Church Street, Dorking, Surrey, RH4 1DF, UK Tel: +44 1306 743744 • Fax: +44 1306

Tel: +44 1306 743744 • Fax: +44 1306 742525 • Email: auditoria@ukintpress.com



Printed by Nuffield Press, 21 Nuffield Way, Ashville Trading Estate, Abingdon, 0X14 1RL, UK

ISSN 1476-4105 Auditoria magazine This publication and its contents are protected by copyright ©2012

Cover image: Iwan Baan



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International Advertising Sales: Oliver Taylor
Managing Director: Graham Johnson
CEO: Tony Robinson
Editorial Director: Anthony James

The views expressed in the articles and technical papers are those of the authors and are not endorsed by the publishers. While every care has been taken during production, the publisher does not accept any liability for errors that may have occurred.

Subscriptions £60 per annum

Published by UKIP Media & Events Ltd, Abinger House, Church Street, Dorking, Surrey, RH4 1DF, UK Tel: +44 1306 743744 • Fax: +44 1306 742525 • Email: auditoria@ukintpress.com



Printed by: William Gibbons & Sons Ltd, 26 Planetary Road, Willenhall, West Midlands, WV13 3XT.UK

ISSN 1476-4105 Auditoria magazine This publication and its contents are protected by copyright © 2012

Cover image: Iwan Baar



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## foreword

ather fittingly for *Auditoria*, we've assembled a bit of an all-star cast for this 2012 edition, with arguably two of 2011's most talked-about architects, Zaha Hadid and Frank Gehry, interviewed about their latest project masterpieces – the Guangzhou Opera House in the Guangdong Province of Southern China and the New World Center in Miami.

They're disparate works or art, of course, but similarly intended to bring performance to life – and both are labelled portals by which audiences can escape their daily realities, albeit for a few hours. As a performance space, the Gaungzhou Opera House is quite simply unrivalled in its novelty, and has garnered overwhelming support and praise from critics worldwide. Unmistakeably Hadid in appearance, its



highlight is an 1,800-seat cathedral-esque auditorium that impossibly blends the grand opera houses of the past with a futurism that wouldn't feel out of place on Planet Tatooine. As Emma Pomfret's article on page 16 reveals, Hadid's inspiration came from the nearby Pearl River, the aim being to reflect smooth pebbles eroded in a fast-flowing stream. Here, though, function follows form, too. This new architectural focal point of Guangzhou officially opened earlier in 2011, yet its credentials as a superb venue for performers and audiences alike were confirmed as far back as May 2010, when US filmmaker Shahor Stroh directed the Opera House's first performance, Puccini's *Turandot* – the acoustics in particular received a standing ovation. Next on the schedule are Chinese versions of *Mamma Mia*! and *Cats*.

Home to Michael Tilson Thomas's New World Symphony, Gehry's New World Center is a triumph on many fronts – according to Brian Libby who interviewed the great man at his Los Angeles office – not least as a state-of-the-art breeding ground for tomorrow's orchestral maestros (see page 8). But another key goal for Tilson Thomas and Gehry when discussing plans for the New World Center was to invite audiences in new ways – an everpresent conundrum for many performing arts, classical music in particular. (Attracting younger audiences is a subject Libby investigates in his article starting on page 42.)

With this new educational facility on Miami Beach, Gehry and Tilson Thomas hope to achieve this in numerous ways. The latter insists traditional programming will still be on offer, although on other evenings they'll open the whole place up like a Saturday night gallery walk, with some more smaller-format experiences – US\$2.50 mini concerts, 60-minute 'discovery' concerts that include information about the music and conductor and, for the first time this season, 'gallery' concerts that position the musicians throughout the centre for patrons to browse as if in a museum perusing artifacts. And for those unlucky enough not to get tickets for the hot seats, the main event is simulcast on a massive screen outside on the wall of the building for people to experience the best the New World Symphony has to offer – gratis. Free is a common word in the NWS vocabulary, with 20% of programming coming in at no cost at all, including the 'Wallcast'.

In itself, that was too tempting for me recently, so following a business trip to Orlando in October, I rearranged my return flight from Miami in order to savour the atmosphere, but was rather weakly put off by the rainy weather. I read in the *Miami Herald* a few days after that many people took umbrellas – and had a great night regardless of the conditions. Shame on me... Enjoy the read!

Nick Bradley, Editor







The Ambassador Theatre Group's Nick Potter tells *Auditoria*'s Mark Shenton about the challenges of his job and some of the changes he is implementing



**Nick Potter** has been managing director of venues for the Ambassador Theatre Group (ATG) since April 2011. His previous background was in the fine dining and leisure industries, where he was MD for Restaurant Associates, which included

managing executive club lounges for British Airways, and operating restaurants such as Rhodes 24 and Roux on Parliament Square. Now he is responsible for the management of the largest theatre chain, in terms of number of venues and seats, in the UK.

#### How big is the ATG network, and how many staff in all are you responsible for?

We have 39 venues up and down the country, from some big venues in the West End including the Apollo Victoria, Savoy and Piccadilly Theatres, to venues from Torquay to Edinburgh and Glasgow. We have about 50,000 seats a night, so every week we are trying to fill around 400,000 seats. We have 2,500 people working in the venues.

## Given your restaurant and leisure background, what lessons can theatres learn from that? Are there plans to increase catering opportunities within theatres?

Broadly, I definitely think that our vision is to make going to the theatre magic, and for me that means from the moment you buy your ticket to the moment we say goodbye at the end of the show, and not just when the lights go down and the show starts. There is plenty we can do to make the whole experience more entertaining. We've got a lot of bars throughout our theatres,

and I want to make them be a really attractive, compelling offer, so that it makes our customers want to spend more time with us. While some theatres can offer a full dining offer, like our new theatre at Aylesbury that has a big kitchen so we can do functions and hospitality, too, we have some old, sometimes restrictive buildings where it is more difficult to deliver a full service. But we are testing some new ideas to improve the snack range and foods available.

#### What other improvements can and are being made to the venues?

We're introducing new seating throughout our venues, using ProBax ergonomic technology that provides more comfort and support. We've already got them in the Fortune Theatre, and they're going into the New Alexandra Theatre in Birmingham, London's Lyceum and Oxford's New Theatre next, as well as the Harold Pinter (formerly the Comedy) in the West End next year. We're getting some great positive customer feedback for them.





We've also got a rolling programme, spending a lot of money on constant refurbishment and upgrading. The West End's Piccadilly Theatre has had an impressive redecoration done to the auditorium, and we've put a piano bar into the royal circle. We're doing extensive external works to the Fortune Theatre in London, too, taking it back to its original designs. Lots of our theatres are beautiful listed heritage buildings, and I want to enhance as opposed to change them; we are guardians of some fantastic history, so whatever we do has to be in keeping with that history.

#### What other operational changes are being made?

My key focus is to look at the ways we can provide development and training for our staff to provide better customer service; how to make the buildings look better and sparkle; and what we can do around our bar and retail offers that is innovative, more exciting and more compelling.

We are rolling-out a good-quality cocktail menu across a number of our theatres, and introducing live music in some bars. We have a fairly diverse range of customers who come to the theatres, and they all want different things – historically, there's been a one-size-fits-all policy, but I'm working hard to introduce more diversity, from value products to more discerning offers.

## How best can theatres be run to maximise performance by visiting companies? What technologies are being introduced to help to deliver better conditions for touring shows?

We're working hard to find new ways of operating our regional theatres. We've just appointed a new technical manager, whose

job will be to look at how we can support our technical teams in all our theatres to bring in technological innovations and the ways of getting productions in. Shows are getting bigger and heavier all the time, and theatres need to be able to cope with that. We also need to speed up the process of how quickly we can turn productions around, to get them in and out.

### What are the particular challenges in taking a touring show like *South Pacific* on the touring road?

The real challenge with touring is that no two venues are ever the same. So you have to design for the most difficult one at the beginning, then you can fit the show everywhere else. A lot of planning and forward thinking has to happen. *South Pacific* has a wide and open set, and the big plantation house frontage is a challenge to fit in.

#### How are the venues helping to attract new, younger audiences?

We do quite a lot of audience development work at ATG, working on cheaper ticket offers and with producers to cast young actors that are attracting younger audiences, like Samantha Womack in *South Pacific*, or David Hasselhoff in our panto at Bristol.

Another fantastic initiative is Stage Experience, which we do across a range of our venues in which 200 local youngsters are trained up to do a full production of a show that they then put on in front of their families, friends and an audience. It is about having a programme of things that are widening and broadening the audience for the future, not just operating the theatres for today.





rank Gehry is perhaps the only living architect whose name, like that of Frank Lloyd Wright before him, is familiar even to many of those who don't follow modern architecture. He has appeared as a cartoon version of himself on TV's *The Simpsons* and been the subject of numerous documentary films. Over a Pritzker Prize-winning career spanning half a century, this Canadian-born but longtime Santa Monica, California-based architect has given birth to some of the most iconic buildings of the past 25 years: the Guggenheim Museum in Bilbao, Spain, and Walt

Disney Concert Hall in Los Angeles being the most revered. A poster child for a generation that rejected the notion that form must always follow function, Gehry can turn whole buildings into sculptures.

Yet for all his talents and experience, Gehry was something of a counterintuitive choice to design a concert hall for Miami's US\$160 million New World Symphony. It's not that he didn't have a track record - he was behind the Disney Concert Hall, as well as a number of other art and performance spaces such as the Experience Music Project in Seattle and the Cinematheque Français in Paris. Gehry is also a noted music lover. But his signature style - sometimes referred to as deconstructivist or 'blobitecture' - is one of billowing sculptural forms, often clad in metal panels of endlessly different computer-generated shapes. For this project, the symphony's leader, Michael Tilson Thomas, sought the opposite. He wanted to emphasise openness and transparency in relation to the outside. Could you have your blob and see through it, too?

New World Center (clockwise from top) the North façade; atrium detail; atrium view; rehearsal rooms

Sometimes, counterintuitive decisions lead to the best creations. Decades ago in Los Angeles, Tilson Thomas (now 67) was actually babysat by Gehry (now 82), and the two had kept in touch over the years. This personal connection led to Tilson Thomas and his team approaching Gehry about the design first. The ensuing building - which opened in the summer of 2011 - has received some of the best reviews of the venerable architect's career.

To his credit, Gehry did design an open, transparent building like Tilson Thomas and the New World Symphony sought. To the surprise of some critics, the resulting New World Center is simple and box-shaped on the outside, clad in the very Miami-appropriate white stucco and glass. The building's transparency reveals an array of musicians and spaces within, like a living, light-filled machine.

"In some ways this building is inside out from our usual approach," Gehry explains. "Most of the action is on the inside; the exterior form reflects what is going on inside. The concert hall itself is a rectangular box. Rather than trying to bury this shape in the massing of the building, we decided to express it. Taking that as a starting point and wanting to create a transparent and inviting building lobby, we book-ended the hall with a similar rectangular massing containing office space and small practice rooms." At the centre is an 756-seat arena designed in collaboration with the renowned acoustician Yasuhisa Toyota.

#### ATTENTION TO DETAIL

Although the New World Center is a boxier, more transparent design than has been previously associated with Frank Gehry (his DZ Bank building in Berlin notwithstanding), as one might expect from the world's most famous architect, much of its genius lies in the details, such as a slight tilt to the façade facing SoundScape Park. "One of the design elements he came up with was that we wanted to cant the walls slightly so it faced more of the park," New World Symphony president Howard Herring recalls. "But he kept the inside corner beneath an overhang that defines the rectangular roof. As the day goes by and shadows form, it sends this shadow line down across this wall. He understood what would happen as the shadow travelled like a sundial down the side of the building. What you get is exactly what we wanted for projection, and this wonderful but simple design element. It makes the building all the more intriguing at night."

New World Center is carefully calibrated as a symphonic performance, yet as with any good project, the whole is greater than the sum of its parts. The building is at once unapologetically in service of its occupants and their relationship with the community, yet soulful and inspiring as well. That's by design - on the part of the New World Symphony as much as the architect.

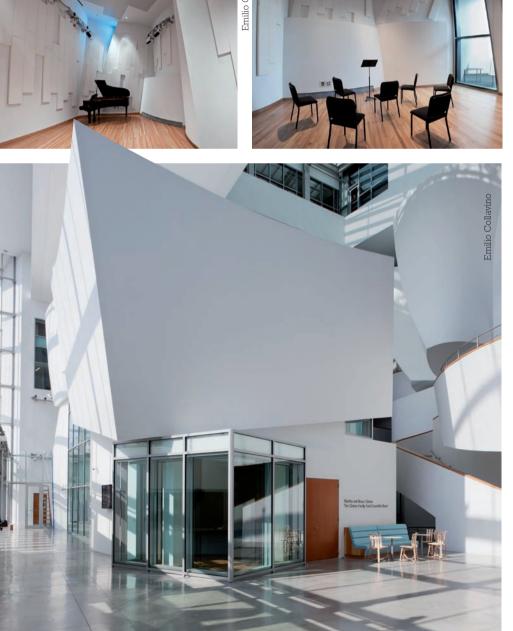
"When I arrived 10 years ago, there was a conversation beginning around Michael Tilson Thomas's vision for a facility that would be very different from the Lincoln Theater, and really would be part of the virtual world and connectivity," explains Howard Herring, president of the New World Symphony. "But the facility would also be right for engaging new audiences and being proactive about new formats for presentation. All this served the mission of the Symphony: to prepare our fellows to be leaders in the music world. We used that as the basis for discussion for more than two years. We would analyse it. Michael would come for meetings with us and we'd review it with him; we went through six or seven versions of the schedule. We wanted to really understand what we would do in a given morning, day, week, month. What would we actually do in this facility?

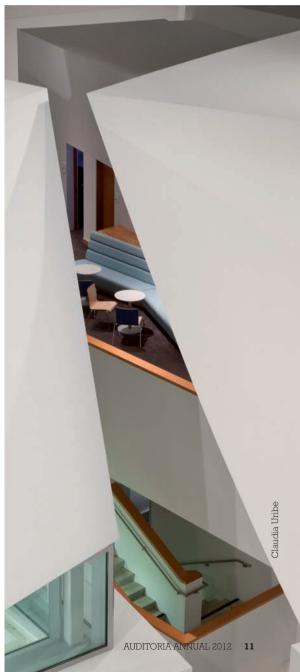
"In that very first meeting, in answer to a question from Frank [Gehry], Michael Tilson Thomas said, 'Let's talk about the front door: can you make it transparent – can you make it inviting? Can you let people who casually enter the [adjacent] park be surprised?' Herring continues. "It needed to be an architecture of invitation. All through that, Frank was telling us that the harder we pushed him, the better the building would be. It was a little tough at first to imagine pushing Frank Gehry, but we honoured his request and he kept coming up with solutions."

#### **Breaking down barriers**

Standing outside the 9,350m2 building, it's clear how the design seeks to involve and engage the public, including those not attending a performance. New World Center overlooks a new public green space called SoundScape Park, designed by the Dutch firm West 8. (The







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commission was initially set to be designed by Gehry's firm.) Many concert-hall performances will be projected by video onto a 650m2 wall facing the building, with speakers tucked away in a sculptural mixture of pipes, allowing park visitors to watch for free and, thus, help act as a marketing device: a point of entry to ticket buying.

"The idea of video projection on the outside of buildings is an idea that we have proposed many times," explains Gehry. "We first used it at the Hollywood Bowl many years ago to create a largescale setting for this huge venue. We proposed it at Disney but it has not been tried there, and we proposed it at the Pritzker Pavilion in Millennium Park in Chicago. In Miami, the idea really came of age. One of the New World Symphony's primary missions is to widen the audience for classical music and to lower the threshold to this art form. The best way to do this, they felt, was to show a live video of the performance for free in the park in front of the building. This has proven to be wildly successful and become a major cultural pastime in South Beach."

#### Glass fronting

In the same spirit of accessibility and openness that fostered the video screens outside, visitors are allowed to wander through the glass façade fronting SoundScape Park into the lobby, even during daytime when there's no performance taking place. When there is one, visitors can also enter through an adjacent parking garage. "The stage set of the practice rooms has one look facing the park and a completely different look facing the garage," Gehry continues, "so patrons entering from the garage cross a bridge and walk onto the set on the second level. We tried to make the experience of entry equal from both the park side and the garage side."

It's when you move inwards to the concourse - a large atrium - that the building offers more typically Gehry-esque sculptural forms. One is a tall figure, then a shorter figure and a flower behind, representing players on a stage. Here, too, visible through glass are a stacked series of larger practice rooms that act "like a stage set, piled up in a sculptural landscape", according to Gehry. "Musicians from the orchestra will practice here in full



view of the public. The glass walls are like large curtains, intended to be like a proscenium to be seen from the park and the parking garage. The patrons are invited to step on the stage and then enter the hall itself."

On two upstairs floors are more private practice rooms, equipped with interactive video screens. The building is wired with high-speed internet, allowing musicians to be coached by master musicians and composers anywhere in the world.

Similar to Walt Disney Concert Hall, the New World Center's seating is arranged in a surround or vineyard-style pattern: seats stepping down from three sides toward a semicircular stage. There are also small balconies around the perimeter of the hall, which allows individual musicians to be dispersed among the audience during a performance.

"We use the surround format because it creates the most intimate connection between audience and performer," Gehry says. "It does move the audience closer to the stage. They are (Above) Members of the public can watch performances on a giant video-projection screen on the outside of the building (Below) Symphony leader Michael Tilson Thomas (standing) and Frank Gehry



"The idea of video projection on the outside of buildings is an idea that we have proposed many times" Frank Gehry



The exterior of the six-storey
New World Symphony is
wrapped in glass and white
plaster, and has a boxy profile

seeing the orchestra up close but they are also seeing the faces of the audience on the other side of the room, not the backs of the heads of other audience members. It's a much more social room, a more face-to-face experience. It is the only type of room where it is possible for some audience members to see the conductor's face while he or she is working."

Gehry says the natural acoustics of the room were the principal driver of the design, particularly in preserving isolation from outside noise and shaping surfaces to achieve optimal acoustics. Convex panels finished in white acoustical plaster cover the walls and ceiling, which not only feel Gehry-esque in their organic, diverse forms, but also in their ornamental appearance, seemingly offering a stylistic nod

MUSICAL ROOTS

The auditorium's signature acoustic panels, covering 750m² of walls and ceiling, are curved in different shapes to maximise acoustic properties. "Some are curved more than others," explains New World Symphony president Howard Herring. "It had to function acoustically, and it had to fit into Frank's [Gehry] design.



They went back and forth, and of course Frank is an enormous music lover. He wanted to honour [acoustic designer] Yatsu Toyota's approach. And yet he wanted to make a statement."

Gehry's love of classical music is life-long. Born in Canada, his family emigrated to a cramped, one-bedroom apartment near downtown Los Angeles when he was a teenager. His mother would play classical music for the family every night following dinner to cheer them up after Gehry's father suffered a heart attack. It was, the architect later told *The New York Times'* Nicolai Ouroussof, "a way of binding them together as a family".

to the more Baroque classical concert halls of previous centuries. Video images can be projected onto the convex panels that frame the stage. For example, *Polaris*, a synthesis of music composed by Thomas Ades and video by Tal Rosner composed for the New World Center's opening week, were projected from 17 integrated high-definition video projectors. "The video projection creates an immersive setting to the music," Gehry suggests. "It is a full 360° environment."

#### Funding and revenue

The building is financed through a mix of private and public sources. "We think it's an advantageous balance," says symphony president Howard Herring. Funding began with a US\$90 million anonymous gift, while US\$15 million came from the City of Miami Beach, US\$30 from Dade County, and US\$20 million from the sale of the Lincoln Theater. The remainder came from individual contributions.

Going forward, the goal is to have the building active for between 330 and 340 days a year, including the New World Symphony's 35week season from Labor Day to May. "We're not there yet but we're going to get there," Herring states. Both the auditorium and rehearsal spaces are available for rental, even when the symphony is active there. The overall venue has enjoyed a stream of third-party rentals, often in tandem with nearby conventions and multivenue festivals such as Art Basel Miami Beach, or attracting corporate clients like Mercedes-Benz and Louis Vuitton. "We see product demonstration and client entertainment as a big aspect," Herring adds. The roof of this building is designed for entertainment. There's a spectacular view of the ocean."

#### Author

**Brian Libby** is a Portland, Oregon-based freelance journalist









The Guangzhou Opera House has wowed critics worldwide with its sleek, pebble-inspired architecture. Now the city's municipality hopes the arts in the region will blossom, too

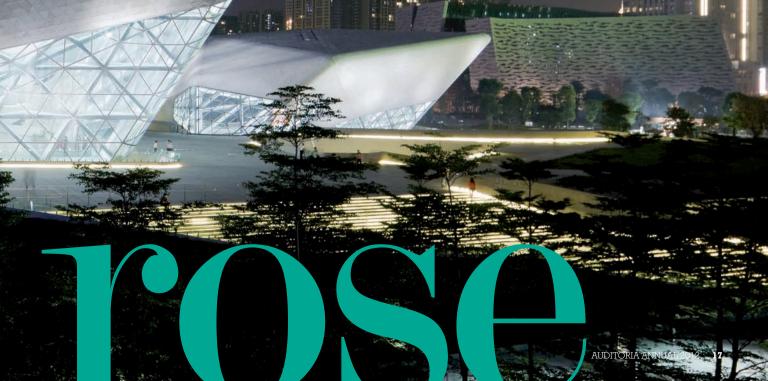
aha Hadid's first opera house, opened in Guangzhou, southern China in February 2011, had architecture critics reaching for superlatives. Behind the hypnotic angular exterior, its glowing interior has been likened to "a shark's mouth" and "the soft insides of an oyster". The New York Times was unequivocal: "This is the most alluring opera house in the world." The UK's Guardian newspaper was similarly effusive about Hadid's 1,800-seat auditorium: "The world's most spectacular opera house," it gushed. The Iraqborn, British architect has certainly created a mega-watt, scene-stealer.

Yet Hadid's £130 million (RMB1.38 billion) opera house hit headlines again months after its official opening for apparently sprouting cracks and leaking. The faults have been repaired but the episode raises questions about building quality in China – a money pot for western

star architects in the past two decades – and not least, questions about what is going to fill Guangzhou's newest star attraction. Is the opera house just another landmark building? Do the private and state owners have a programming plan for paying off that hefty price tag?

With a population of around 15 million, Guangzhou is the third largest city in China. It has been a trading hub since the silk trade more than 2,000 years ago and remains China's southern commercial gate, close to Hong Kong and situated on the Pearl River Delta. Trade is its game, not culture.

In 2002, the Guangzhou Municipal Office commissioned the opera house as the first piece in a new riverside cultural district, planned since 1993. The opera house would sit alongside the Guangdong Provincial Museum, Guangzhou Library and the Children's Palace, a rather communist-sounding school for artistically gifted youngsters.







For Guangzhou's municipal planners, this cultural hub was part of a much larger masterplan; a new central business district (CBD) for the city, to be ready in time for the Asian Games (November 2010). "Back in 2002, a lot of this was speculative development," remembers Simon Yu, Zaha Hadid's Guangzhou project leader. "We roughly knew what they had in mind in terms of vision but there was nothing specific in terms of the actual context."

So the opera house has played a starring role in urban regeneration. When construction began in 2005, it was one of the first projects on the 7km<sup>2</sup> site. Fast-forward six years and the CBD is almost complete: the Guangzhou International Finance Centre (designed by Wilkinson Eyre) stands at 440m, complete with a Four Seasons Hotel on the 70th floor; and work has begun on a 530m East Tower (designed by Kohn Pedersen Fox; estimated completion 2015).

In the competition to build Guangzhou's new opera house, Zaha Hadid saw off Dutch architect Rem Koolhaas and Austrian collective Coop Himmelb(l)au. The client asked for a 1,800-seat auditorium for Western and Chinese opera and a 400-seat multipurpose hall.

"The brief was quite specific; they wanted a world-class spec: stage sizes, configuration, stage machinery..." says Yu. Beijing's National Grand Theatre, designed by French architect Paul Andreu, is larger (2,400 seats in its opera hall). "But this was a house that had to qualify as a world-class building in south China." In fact, Gaungzhou Opera House is among the three largest theatres in China.

#### **Natural** world

Hadid's concept is inspired by nature and landscape; the opera house and performance hall represent two pebbles shaped by the Pearl River the river that flows through Guangzhou and which has generated so much of its commercial power. "We were not thinking so much of a metaphor when we designed the building," explains Zaha Hadid, "but more in terms of the landscape analogy where features of a natural landscape are expressed within the architecture."

The larger "boulder", clad in charcoalcoloured, rough-textured granite, houses the opera house while the white granite-clad

#### VITAL STATISTICS

Budget: RMB1.38 billion (US\$210 million) Client: Guangzhou Municipal Government Project management (for Guangzhou municipality): Guangzhou Municipal

Construction Group Co

Contractor: China State Construction Engineering Corporation Third Bureau Ltd Acoustics: Marshall Day Acoustics, Australia Theatre consultant: ENFI, Beijing, China Venue management: Guangzhou Opera

House Management Co

Timeline: July-November 2002 competition; January 2005 breaks ground; February 2011 official opening Award: Best cultural building, 2011 RIBA

International Awards Opera house: 1,804 seats Multipurpose hall: 443 seats

Levels: Four below ground; seven above

Main stage area: 300m<sup>2</sup> Rehearsal halls: Three Project area: 70,000m<sup>2</sup>

smaller boulder houses the multipurpose, black box hall. Outside, one gazes up through a canyon between the two buildings; inside, the airy lobbies, staircases and undulating walls evoke flowing riverbeds; swooping angles suck the visitor in like a current.

Hadid has also created a public park around the performance complex. You approach the main entry plaza up a ramp or grand staircase, past the smaller multipurpose hall; a second ramp spirals down to a smaller plaza and reflective pool, which offers shelter from Guangzhou's hot and wet seasons. Escalators descend from both hall lobbies to this under-plaza, where ticketing, cafes and shops, including opera retail, are found. "The plazas drive a degree of public monumentality, where the public can participate," says Yu.

The main lattice steel skeleton of the opera house is a construction "first". Every one of the 59 steel joints is different to ensure rigidity. Each was sand-cast - in a medieval bell foundry in Shanghai - and then assembled using GPS and laser positioning. "It is always exciting when architectural concepts can be delivered through a new construction technique," says Hadid.

However, a few months after the opera house opened, cracks had reportedly appeared, rain was leaking in and many of the 75,000 granite

#### **GUANGZHOU OPERA HOUSE**

panels were misaligned and needed replacing. Questions were raised about slapdash work and whether Chinese constructors could deliver the cutting-edge engineering. "The problem lies with the speed of the construction that was needed towards the end," continues Yu, who adds that glass panels never fell from the opera house exterior as reported. "The construction deadline was brought forward to meet a soft opening, a cultural festival in May 2010.

"We gave it another six months before we had a hard launch. By then, most of these superficial problems had been resolved." Zaha Hadid Architects have only ever issued a brief statement praising their Chinese contractor for realising the project "with dedication and diligence".

There has been nothing but acclaim, however, for Hadid's asymmetric auditorium, an interior of champagne-golden warmth, twinkling LED ceiling and silken fluidity. The asymmetry harks back to the Hadid opera house that never was: Cardiff Bay. She famously won the 1994 international competition only to have her design sunk by cautious government and budget fears.

"Cardiff initiated our belief that an asymmetric auditorium would work," Yu says. Hadid adds, "We wanted to achieve the ultimate fluid space to deal with the demanding acoustic engineering and complicated programming requirements."

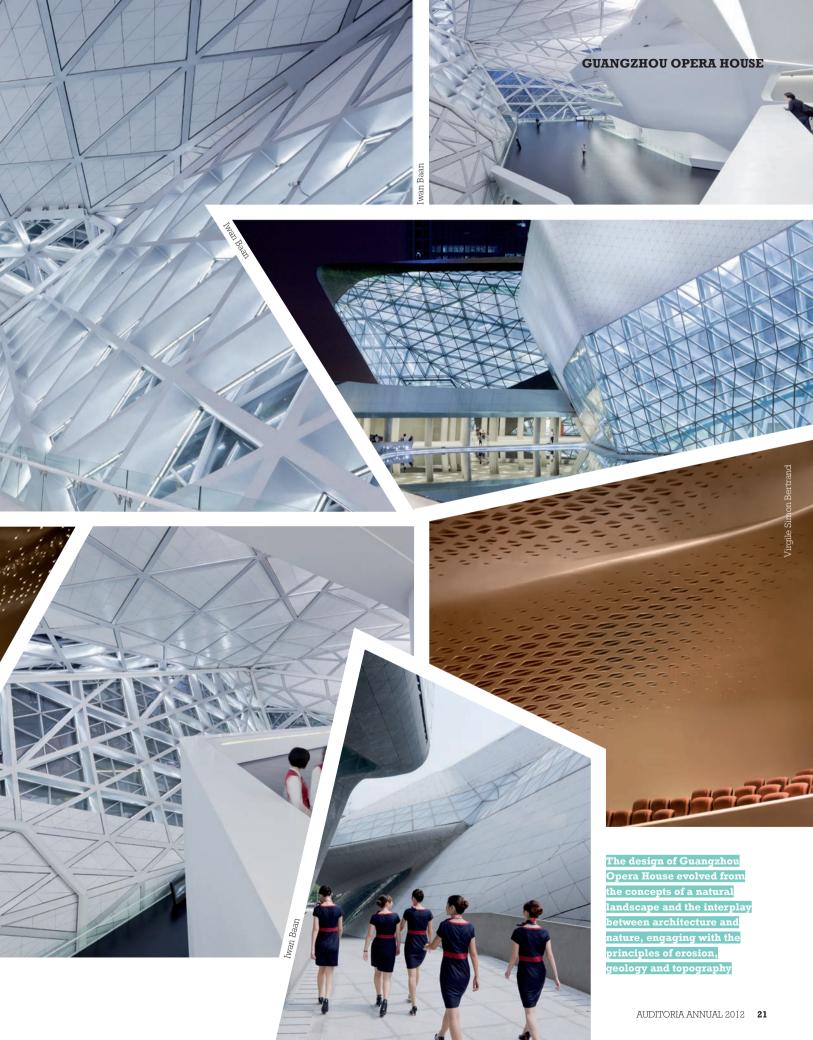
#### Sound principles

Western and Chinese opera today are mutually exclusive artforms; one depends on natural acoustics, the other requires banks of speakers and extravagant lighting effects. Remarkably, Hadid's team has created a space for both without aesthetic compromise. The auditorium sticks to its fluid lines and breaks new ground with a continuous flowing surface, in glass-fibre reinforced gypsum (GRG).

Much of this success is due to the collaboration with Marshall Day Acoustics. The Melbourne-based acousticians had two aims: blending acoustic function with Hadid's flowing design, and achieving full reverberation with high clarity, so that musical detail and diction can be heard. "Traditionally, people achieve the sense of clarity by removing the reverberation but we were keen not to do that," explains Peter Exton, senior consultant at Marshall Day.









Guangzhou has a longer reverberation time than many opera houses (1.6 seconds occupied compared to La Scala's 1.3 seconds).

In fact, the asymmetry created an ideal environment for the balance of reverberation and clarity. Larger wall surfaces reflect lower frequencies – which produce warmer sound – around the auditorium. "Because the balconies are staggered, the areas of wall surface are taller and we're able to use larger areas to generate these early reflections," Exton explains.

Marshall Day worked with Zaha Hadid Architects to achieve certain critical design changes. Side walls were originally vertical, but Exton says that a slight tilt was more effective in pushing the early reflected sound back down towards the audience (the team used Odeon 3D modelling software). Staggered balconies provide visual interest but the architect initially indicated tall walls, almost ceiling-height, to form a barrier between the seating sections. "We found this inhibited the flow of reverberant sound around the hall and we were getting less sound energy in the back of those seating areas, so we worked to lower the height of those walls."

Seats in the auditorium (supplied by Shenge Industrial) are of breathable fabric, so that sound passes through. At 50mm thick, the gypsum plaster walls do not absorb low-frequency sound. A stage shell can be installed for orchestral concerts. And the loud speakers (by L-Acoustics) and lighting required for Chinese opera can be deployed through ceiling openings. "They're like torpedo hatches," Yu suggests.

Anyone sitting in the front half of the auditorium will notice a pattern on the sidewalls nearer the proscenium arch. The triangular decoration is functional - it fans out higher-frequency sound reflections around the auditorium. "Finding a way to introduce geometry into the irregular curvaceous surfaces of the opera house was a challenge," recalls Exton. A regular texture (parallel lines, for instance) might have been easier but the triangular pattern echoes the opera house's exterior panels. "There are two hands on the pen that drew these lines," Exton says. "The project was very much a convergence between aesthetic and acoustics." Critics have cooed about the "intimate" and "superb"

#### PLAYING CATCH-UP?

In 2010, China consumed 55% of the world's cement and one-third of the world's steel. Although only around one-fifth of China's population lived in cities 20 years ago, by 2010 it was 45% – around 600 million people. New cities spring up in as little as five years.

Do buildings simply go up too quickly, too slapdash? "Speed is a consideration when you build in China," says Simon Yu, project leader on the Guangzhou Opera House. Historically, the quality of Chinese labour and construction has come under scrutiny. "It's on a par with a lot of rapid development, including India and Dubai during its heyday," he says.

Dominic Bettison, director at Wilkinson Eyre Architects (designer of Guangzhou International Finance Centre), agrees that Chinese construction has lagged. "A lot of key buildings have been designed by foreign firms with a level of knowledge and it has taken a while for contractors to catch up."

However, some detect a turning point for China, and Western experts won't be able to sneer for much longer. "These people are coming into their own," says Yu. acoustics of such a large auditorium, where architectural means are used to control reverberation and early reflections.

So will we see a swing towards asymmetric auditoria? La Philharmonie de Paris, Jean Novel's proposed new opera house, has an asymmetric interior. Exton is optimistic: "Hopefully this will free more architects from the shackles of treating things with more formality than is necessary."

Next door, the 400-seat, black box hall is designed for flexibility first. It has 12 independent seating wagons mounted on lifts for flat floor seating, single tier, thrust or cat walk setups. Acoustic banners can adjust the reverb between 1.4 and 1.5 seconds to suit a performance. Backstage, Hadid's opera house and hall boasts three rehearsal rooms (for opera, ballet and orchestra), again with acoustics by Marshall Day. There are 43 dressing rooms.

#### Commercial content

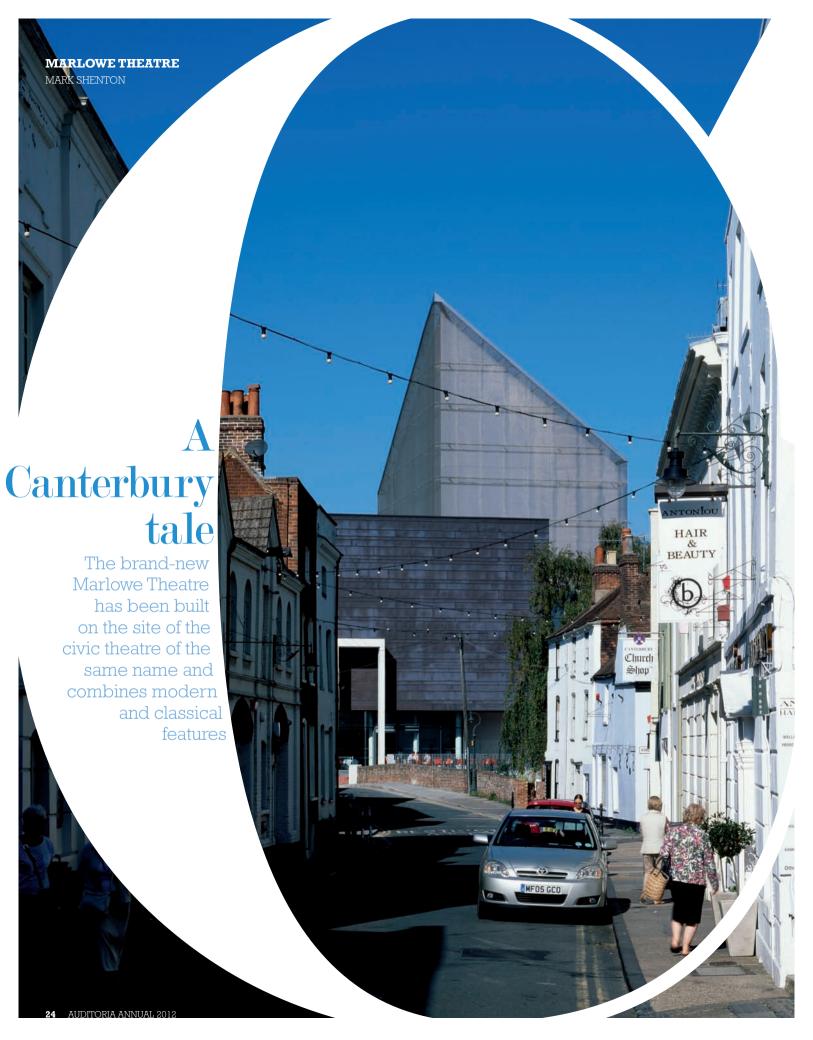
Without a doubt, Guangzhou has the world-class opera house it desired. But can it fill the space? With no resident opera company, the performance calendar is a mix of popular and classical fare: Chinese versions of *Cats* and *Mamma Mial*; *Tosca* and *Turandot*; Chinese opera and drama; visiting western ensembles. It's not all high brow. "They're driving these venues with commercial content bought in from abroad," Yu feels. To maximise revenue, the smaller hall hosts more commercial performances, including fashion, trade shows and alternative festivals (circus, for instance).

The Guangzhou Opera House has been a triumph for Zaha Hadid. Her practice now has site offices in Guangzhou and Beijing and is working on three further Chinese projects. "I first travelled to Guangzhou in 1981 at the beginning of my career, and the contrast we see today could not be greater," she remembers. Working in China certainly has its challenges but the attraction for the West's best architects is unlikely to fade any time soon. "There are few places in the world today where architects can find such forward looking, enthusiastic clients. They have such passion for innovation."

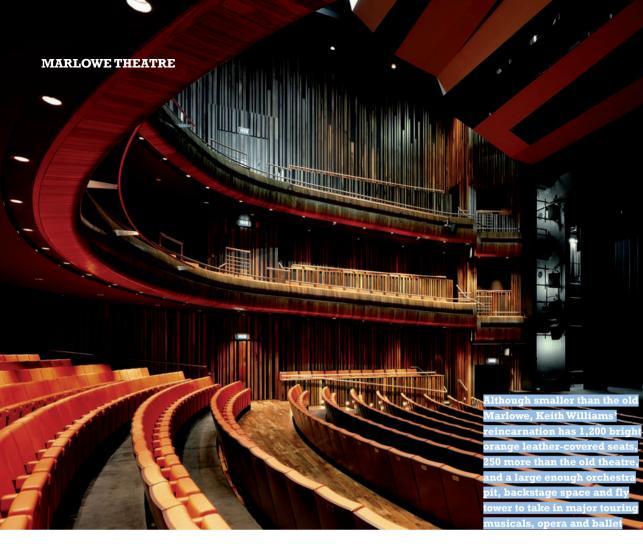
#### Author

**Emma Pomfret** is a contributor on the arts for The Times and The Guardian

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ome of London's leading playhouses are crumbling before our very eyes. The venerable, 120-year-old Comedy Theatre was earlier this year forced to cancel a performance of *The Children's Hour*, starring Keira Knightley, due to 'emergency building repairs', said to be above the stage rather than in the auditorium. But if it was a theatre in urgent need of remedial work, it seems greater urgency was attached to changing the signage: the self-same Comedy Theatre has recently rebranded as the Harold Pinter Theatre.

It's striking that the newest theatre to open in the regions, however, has done the exact opposite: kept its name but razed its former home and built a brand-new, purpose-built building in its place. Opened in October 2011, Canterbury's Marlowe Theatre – named after the Elizabethan playwright Christopher Marlowe who was born in the city – is, in the words of its architect Keith Williams, a very rare thing – "A new contemporary theatre within a magnificent historic cathedral city; its architecture is clearly contemporary, yet it's been conceived to fit comfortably within its historic surroundings".

Occupying a central site on the banks of the River Stour with Canterbury Cathedral nearby,

the re-build of the region's leading receiving house for major touring productions has been completed in just two-and-a-half years, at a cost of £25.6 million. The original theatre, a 1933 former Odeon cinema converted to theatrical use in 1984, closed in March 2009 and the demolition team moved in the month after, with only some backstage areas retained. Construction of the new building began in July 2009 and was completed in September 2011.

#### Thriving venue

The earlier theatre – owned and operated by the local council (unlike many regional theatrical receiving houses which are commercially run) – had long been a thriving resource, selling some 270,000 tickets annually for around 380 performances a year. But although it had resourcefully worked within the limitations of its converted building, the 950-seater auditorium meant that it was too small to attract the largest commercial touring shows. In 2001, the city failed in its bid to become the 2008 European Capital of Culture, although the idea of basing the city's regeneration strategy around cultural redevelopment took hold. In 2003, the council commissioned a study to consider redevelopment





usher seats; and non-fixed chairs.

The Marlowe seats and backrests are based on the design of the 'Ascolto' seat from the Gufram collection, which was designed for theatres by Studio Grogetti Associati. The seat's clean-cut and sturdy design ensures that it is ergonomically correct and comfortable for users. While the backrest is made from curved beech plywood, the sides and seat itself have a steel structure, with a custom-made steel flank and a leather upholstered top armrest. The seat and backrest are covered in Pelle Frau leather and an under-seat perforation has been especially developed to optimise acoustic absorption. Poltrona Frau has also produced a bespoke bright orange leather exclusively for this project.

options for Marlowe. Following another report in 2005, the proposal to create a 'new Marlowe' was formally approved, and a competition was launched to secure an architect. The London-based office of Keith Williams was appointed in February 2007, and its proposed design concepts were put on public display in November that year - and approved.

As lead funder, the city council committed around

£17 million to the project, with further funding coming from Kent County Council (£4 million), and the South East England Development Agency (£1.95 million). There was also a fundraising campaign for private and business donors, trusts and foundations which raised more than £4.2 million, with initiatives including a series of events provided by the Marlowe Friends (a membership loyalty scheme that offers priority access to tickets, and for which support continued even through the period of closure when there were no tickets to be had), and 'Name a Seat' and 'Sponsor a Spotlight' appeals.

The new theatre has increased seating capacity from the 950 seats to 1,200 yet has done so with a spacial volume that is actually smaller than the original theatre auditorium by some 2,000m<sup>3</sup>, and for the first time a completely flexible studio for audiences of up to 150 has been added. It is expected to double the economic impact of the old theatre on the city, contributing an estimated £22.6 million to the local economy and providing nearly 300 jobs, by increasing high-value cultural tourism as it drives a shift from lower-value, day-trip visits to longer stays in the area. It also aims to strengthen creative industries in the area, including fostering links with the four local universities and other colleges.

"We shouldn't assume that every city will benefit from the 'Guggenheim effect', where a parachuted arts venue went into Bilbao, an ailing industrial port that was on its knees," architect Williams points out. "Here, there was actually already a huge audience base in an existing theatre." Instead, the brief was to extend and expand what could be offered in a new building that is as welcoming as it is striking.

"Canterbury is an ancient Roman city but the oldest extant buildings tend to be medieval, with a lot of Georgian and Victorian architecture, too," Williams continues. "When I started off thinking about how to make a building in this city, I knew there would be a body of opinion that regards anything that looks like it was designed after 1820 very suspiciously. But what was remarkable here was the vision of the client and the city itself in recognising that it's a fantastic place that has an amazing past, but it also has got to have a future. So it has to make important buildings that in 50 or 100 years' time will be looked back on as important contributors to the continuum of the cultural and economic life of the city."

#### Modern meets classical

The new theatre, at once modern and classical, is approached via a colonnaded loggia in white cast Dolomite stone, forming a portal to a multilevel



glass-fronted fover that allows views both in and out. But if this is a decidedly modern building on the outside, it contains a beautiful, American black walnut-timbered, Italian leather-seated main house on three levels inside that is reassuringly traditional, although it has its own distinctive flourish of colour in the red of the main auditorium seats. "A modern orthodoxy in architecture suggests that from the outside you know what you're going to get on the inside: the outside must somehow grow directly from the interior and vice versa," Williams suggests. "That's a purist logic which in many senses I subscribe to, but with theatres I think there's a way of doing things where you can also surprise and create a sense where people go, 'Bloody hell, I didn't expect one of those inside!"

One of those, of course, is a theatre (or in this case, two, with the flexible studio) and while there's a transparency to the building - "the see and be seen", as Williams calls it - it's also designed to bring audiences into the "secret world of the theatre" as they enter it from the outside to be disconnected and taken to new places. You might, Williams continues, "find yourself in Venice, Chicago, or Never Never Land if it's panto time. As an architect, that gives you license to create an unexpected space internally. I like to play off the strengths of a traditional form but coat it in a kind of material that suggests a modernity and contemporariness". Hence the red seats and timber walls, and he also hopes to have achieved something else: "There's also room for joy occasionally in architecture."

The new Marlowe Theatre, which took shape in just over two years, includes a 1,200 seat auditorium, a community performance space, a riverside restaurant and several new bars







#### **Consultation process**

Williams has previously designed theatres such as the Wexford Opera House and London's Unicorn children's theatre near London Bridge. "Each is different," he admits, "although there are characteristics that run through, which is part of a personal signature, I guess." These include the provision of a central processional staircase in each that links the different levels, although there are of course unique features, such as the stunning views of the cathedral offered from the top level of the staircase.

Undertaking a long consultation process with the local community and other parties, including the cathedral, Williams says it was a very rigorous process. "But we were able to paint the picture and sell the vision to the many people involved," he says. And how close is the finished project to what he envisioned? "It's pretty close. The defining sketch of the building that we made at the competition stage is pretty much what we've built. The sketch set out a series of principles but allowed for considerable wriggleroom during development. What we have to do in the early stages is set up a strategy that can accommodate the negotiation that is necessary. It's a journey: you have an idea of where you want to go, but you take a number of scenic routes along the way that makes it fascinating."

In this case, it worked brilliantly. "You get the best buildings when you have a really good client who knows what questions to ask, and who rightly challenges you at every turn. That interaction, where there is an intelligent debate, usually results in a better solution. The city council here has been a very intelligent critic of the process. What I feel we've done is create a unique building in a unique place to carry out a very special role, which is to broaden the arts provision for Canterbury. And we've been fortunate the client has had the vision and breadth to recognise that a contemporary statement in architecture and design was actually part of reinventing culture - alongside what's now going to take place on its stage." ■

#### Author

Mark Shenton is theatre critic of the Sunday Express and writes a daily blog for The Stage. He can be followed on Twitter @ShentonStage



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# ISTOTY in the making

In creating St Petersburg's New Mariinsky Theatre, the architects have had to overcome a mountain of red tape to create a venue worthy of its rich heritage

#### NEW MARIINSKY THEATRE



ith two scrapped designs and the foundations of a third under construction as Jack Diamond sketched his own blueprint, it's no wonder the Diamond + Schmitt (D+S) principal architect describes St Petersburg's New Mariinsky Theatre as a "Kafkaesque" experience.

The world's favourite writer of angst would have made merry with the reams of Russian red tape surrounding the Mariinsky 2. "The history of the project is an opera on its own," Diamond suggests. "I'm the last architect standing!"

The €325 million, state-funded project to build Russia's first new opera house since the 1917 Revolution was an immense undertaking. Bureaucratic torment aside, Diamond's great challenge was to establish a firm identity for one of the world's most revered cultural institutions and fit it respectfully within one of the world's most architecturally consistent and admired cities. "You have two conflicting desires. On the one hand you want to calmly fit in, yet you want to establish the identity of this building."

#### Time sensitive

Diamond was also working against the clock. The monumental project began in 2003, yet after two false starts, D+S has had just three years to complete, from competition in 2009 to opening in 2012. Persistence is finally paying off, backed by the clout of the Mariinsky's artistic and general director and international super-maestro Valery Gergiev (also principal conductor of the London Symphony Orchestra).

Gergiev handpicked the Canadian architects after a visit to Toronto's Four Seasons Centre for the Performing Arts, designed by D+S and opened in 2006. "I was struck by its beauty, practicality and friendliness with neighbouring buildings and its superb acoustics," remembers Gergiev. Moreover, D+S had delivered the hall on time and on a modest budget (€110 million).

Back home in St Petersburg, Gergiev's pet project for a new opera house was ballooning out of control. Originally the maestro had called for an iconic building - a 'Guggenheim effect' to revitalise St Petersburg's ailing tourist centre. "We've got to be radical to attract attention," explained Gergiev, bemoaning a surfeit of

#### NEW MARIINSKY THEATRE

conservative design. "We need to invent, to develop, not just restore and preserve our existing architectural treasures."

#### **Opposites attract**

Yet Gergiev's intuition was the opposite of St Petersburg's conservative, municipal leanings. And two designs would bite the dust. Los Angeles architect Eric Owen Moss won the initial Mariinsky competition with a design of dark granite and a sideways 'explosion' of icelike glass. Deemed too radical, it was a nonstarter and a second competition in 2003 was won by French architect Dominique Perrault – a black marble façade enveloped in golden metal, which locals nicknamed 'the golden potato'.

Russia's Ministry of Culture signed off the Perrault project, but as the price swelled from €75 million to €180 million, there was a sharp about-turn: "Perrault is a renowned architect but he has no experience in designing theatres and I am against anyone using an acclaimed company such as ours as a training ground," Gergiev says, rather crushingly. By late 2008, Perrault was officially out and D+S officially in (having won yet another competition).

The maestro had plumped for experience and finely judged modesty over wild statement architecture. Diamond's design fits with St Petersburg's classical scale and consistency but also keeps to Tsar Peter's original vision of a forward-thinking European city.

St Petersburg's buildings are remarkably uniform: masonry base up to six storeys; portico detail; crowning metal roof. For his Mariinsky 2 design, Diamond gives this portico relief a contemporary twist with a huge structural bay window that provides views into and out of the lobbies of the new theatre. "I want it to be a compatible counterpart to the historic 150-year-old Mariinsky Theatre opposite – architectural authenticity but also an expression of our time."

Diamond's glass bay façade serves aesthetic and commercial purposes, breaking up the hulk of what is an enormous building: 70,000m<sup>2</sup>; eight storeys; seven stages; chorus, ballet and orchestral rehearsal rooms; production and dining facilities for 2,500 staff. It is also a vital invitation to the public to be part of what goes on inside – and with more than 550 opera, ballet





and concert performances a year to sell, renewing audiences is vital. "With the Four Seasons in Toronto, passers-by can look into the building and see the excitement of a crowd gathering for an event. It makes it accessible."

Those on the inside will also be able to gaze out at the city. The Mariinsky is famed for its White Nights Festival, held during St Petersburg's midnight sun summer season. D+S has created an amphitheatre for performances on the roof around the auditorium as it bulges out of the masonry base. There is a small stage projection for performers and a covered area for audiences.

In winter, this dome of the auditorium, enclosed in glass, is lit from behind and will glow like a lantern. It's a further contemporary echo of St Petersburg tradition: "The important institutional buildings, like the cathedrals, are all domed," explains Diamond.







#### MEET THE NEIGHBOURS

NEW MARIINSKY THEATRE

Diamond + Schmitt is designing a streetscape or precinct that will unite the new 1,800-seat Mariinsky 2 with its neighbours - the original 1860 Mariinsky Theatre (with seats for 1,600) situated opposite, and the 1,100-capacity Mariinsky Theatre Concert Hall, which opened just around the corner in 2007.

"Gergiev's ambition is to make this a rival to the best performing arts complexes in the world, be it New York's Lincoln Centre or London's Southbank," reveals Jack Diamond.

In Diamond's cultural precinct, the new Mariinsky 2 will play second fiddle to the original theatre. Situated on December Street, it is directly opposite the old Mariinsky Theatre. Streetscapes to the north, south and east complete the square. "I've made the old Mariinsky the kind of cathedral, standing free," he says. Playing off the surrounding streets, Mariinsky 2 works as a subtle backdrop enclosing the original Mariinsky and St Petersburg's State Conservatory of music in the cultural square. "To announce the area, there will be no pavement/street distinction, so you have a plain on which those two great buildings sit. As you come along December Street - the spine - I want to put two glass towers acting as gateways."

This precinct will be the final part of the Mariinsky project; it has been endorsed by the city architect and the Mariinsky, but awaits funding.

Although Gergiev had swung his support behind D+S – "I am glad we have moved on from gorgeous-looking or extravagant projects that turn out to be unrealisable in reality" – the truly Kafkaesque twist of Mariinsky 2 was yet to come. St Petersburg's municipal honchos were pursuing a parallel line, engaging St Petersburg firm TDM/ Theatre Works to adapt Perrault's scheme. "We



had to work fast as they'd begun to build another building; they'd got up to level-4 when we began to make the changes," Diamond continues.

Nevertheless, the New Mariinsky Theatre is distinctly D+S. Inside, the auditorium has a traditional horseshoe form, the prime driver being first-rate acoustics. "And the essential ingredient of good acoustics is good sightlines," Diamond adds. "Joshua Dachs of Fisher Dachs Associates (FDA), our theatre consultant on the project, always says you hear with your eyes."

Unusually – or "colossally unusually" as Joshua Dachs puts it – FDA did not work on the back-of-house at all; backstage technology, rehearsal stages and production facilities were all designed by TDM. FDA worked from the proscenium arch forwards, calculating the correct geometry to ensure that all 1,800 seats had the best possible sightlines.

The Müller-BBM acoustics also follow a traditional European model. Although D+S favoured a solid, vibration-free floor surface, the Munich firm pushed for a suspended, lightweight wooden floor, common in opera

houses around 250 years ago. "This detail is lost in a lot of old theatres during renovation," says acoustician Jürgen Reinhold. Müller-BBM installed a traditional floor in Venice's Teatro La Fenice, rebuilt in 2001. "You get airborne vibrations that run through the floor, which you feel in your legs – an additional information sensation, which is a wonderful feeling."

Essentially D+S and Müller-BBM have created a reverberant sound chamber; an inner sanctum of the auditorium, fly tower and stage is isolated from the surrounding lobbies. The aim is the best possible acoustic rating – N1. Müller-BBM also pressed for larger openings in the auditorium's tiers so that direct sound reaches every back row. The ceiling is shaped and its scalloped walls bulge and tilt slightly to guide sound reflections.

"It's absolutely an opera hall; that's Gergiev's demand," Reinhold says, adding that reverberation time will be 1.6 seconds (concert halls have a longer reverb). "Gergiev's not interested in big variability; he didn't want tuneable acoustics. He wants a hall that sounds great and the same every time."





### "Gergiev's not interested in big variability; he didn't want tuneable acoustics. He wants a hall that sounds great and the same every time'

An orchestral shell can be placed on stage for symphonic concerts. The orchestra pit can also be adapted to balance the orchestral-vocal demands of different operas (from mammoth Wagner to chamber-sized Britten). The open pit has two moveable platforms and, unusually, a third platform in the covered pit. "With a small orchestra, the pit is elevated to have better sound transmission from fewer musicians. If you have a Wagner opera you go down maybe 30 or 60cm deeper to have the perfect balance with the singers," Reinhold states. "We've installed a moveable wall so you can close the covered pit to have only the open pit for a smaller orchestra."

### Technology talk

Technical kit - conceived by TDM/Theatre Works with Kunkel Consulting International includes a wagon system with 16 stage wagons for moving sets mechanically, a technical proscenium with two movable towers, and

> lighting bridge, sound and video systems by Meyer Sound, USA, and Christie, Canada, After considering the renovation of the Royal Opera House, Covent Garden and Copenhagen's new Opera House, the backstage production facilities at Mariinsky 2 occupy two-thirds of the total building - six stages, rehearsal rooms, dressing rooms and workshops.

Workload can be split between these stages to allow a continuous cycle of successive productions, rehearsals and set-building. Automated storage allows sets for four productions to be kept around the main stage area. These facilities are a giant leap from the old Mariinsky, which was pushed for space and technologically lagging. Foreign directors frequently had to simplify bold set designs while set construction was slow.

"Sometimes we even had to keep stage scenery outside," Gergiev admits. "We have never envied anyone in terms of artistic talent. But we have looked very closely at the technical and technological side of the venues where we perform in Europe, Asia or America." Gergiev hopes the Mariinsky 2's world-class facilities will attract more world premieres and highprofile foreign companies to St Petersburg.

Opera and Gergiev are glitzy partners. Jack Diamond, however, is a self-confessed minimalist architect known for his subtle designs, so his Canadian reserve had to bow to Russian tastes on certain key features. "The lobbies are more elaborately clad than I'd do in North America," he says. "Their taste is for gilt and plush, which clearly I wouldn't do. What I've done is give the auditorium wall a gloss."

The wall is clad in onyx and lit from behind to achieve a patina. "The glamour is absolutely fitting," Diamond continues. The VIP box also has more importance in Russian society; Diamond's concession to see-and-be-seen demands is a contemporary chandelier that hangs above in the auditorium. Lobby-side, there is a VIP room, restaurants and, of course, the glass facade to create a sense of arrival and event.

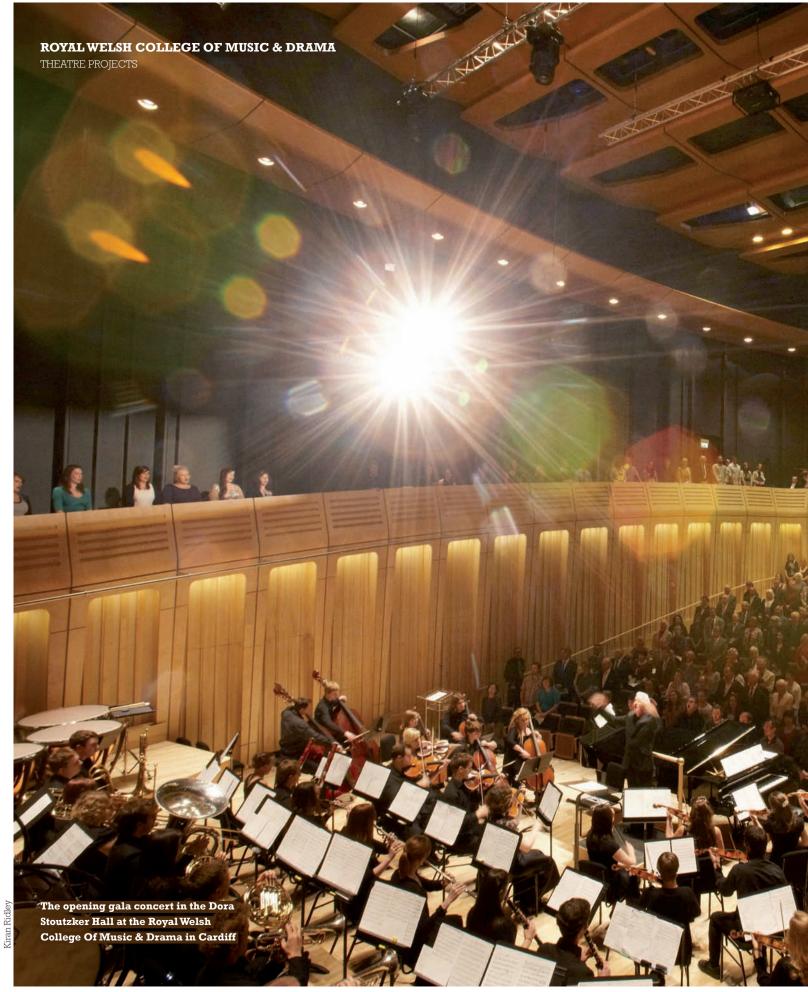
For Diamond, building the New Mariinsky Theatre has been a job like no other, wrapped in red tape and defined by a certain Russian character. Conversations with Valery Gergiev, the visionary behind the entire project, are snatched during the maestro's whirlwind performance schedule. "I sometimes get a call back from Valery at an odd hour," Diamond reveals. "How long do you need?' he asks. Not too long. 'Well don't take too long, Jack. It's the intermission."

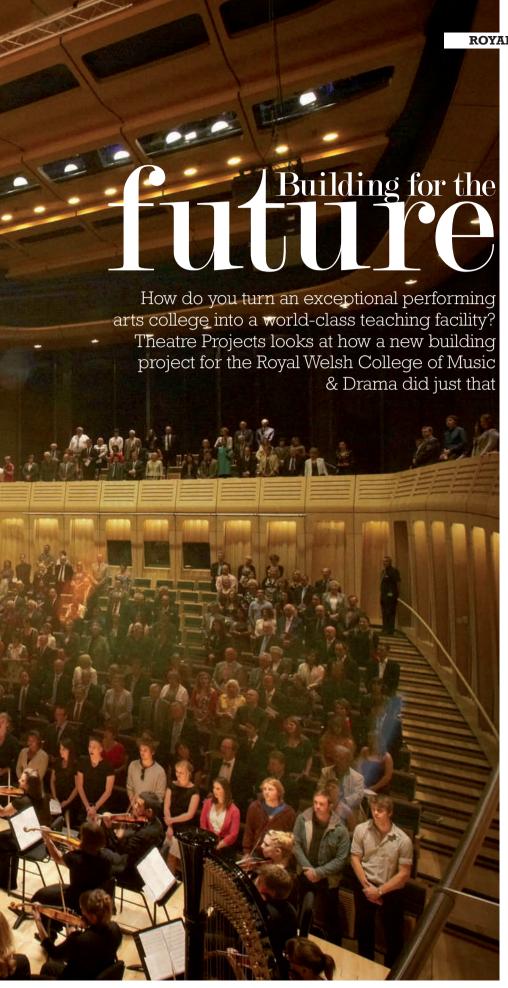
Paramount, however, is the sense of moving a historical icon into the future. "I'm very conscious of the Mariinsky's history; here is an institution of world cultural importance in a city that is exquisitely beautiful," says Diamond, reflecting on the weight of expectation surrounding D+S's most high-profile job to date. "It certainly gives you pause." ■

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he Royal Welsh College of Music & Drama (RWCMD), or to give it its official title Coleg Brenhinol Cerrd a Drama Cymru, has recently extended its facilities to include a world-class performing arts centre to rival some of the best facilities in the UK. The new centre adjoins and enhances the college's existing facilities, giving a nod to the illustrious past of the college, while adding two outstanding performance spaces, drama rehearsal studios and an exhibition gallery.

Drawing on the experience of international theatre consultants Theatre Projects, awardwinning BFLS Architects (formerly Hamiltons), and internationally-renowned acousticians Arup, the design project placed the needs of the users at the very heart of their creative process. The new centre carefully balances the primary requirements of the facility to teach students their craft, and the provision of a much-needed venue for the local community to enjoy. The spaces are designed with optimal functionality in mind and with the versatility to accommodate student learning as well as professional events. College principal Hilary Boulding outlined her hopes for the project as a venue that would "significantly enhance opportunities in the city and region of Cardiff, and the many professional and community groups that contribute to Cardiff's vibrant cultural life".

The college's ambitious brief was no easy task. The Welsh have become synonymous with great artistic talent, and designing a facility to contribute to such a culturally rich region needed to take the provision of other arts centres in the region into account, not least the nearby Sherman Theatre and St David's Hall, which have both served the college's performance needs in the past. The BFLS-led design team approached the design challenge pragmatically, designing the performance and rehearsal spaces for the college "from the inside out, for acoustic excellence and theatrical intimacy", as project director Jason Flanagan explains. To achieve this, the design team drew on their combined experience of creating other complex performing arts facilities, such as The Sage Gateshead, which Flanagan helped design while working at Foster + Partners, and which also involved a strong collaborative relationship with both Theatre Projects and Arup Acoustics.

### ROYAL WELSH COLLEGE OF MUSIC & DRAMA





But the importance of this £22.5 million project is best understood by looking at the college's humble beginnings. Established in 1949 as the Cardiff College of Music, the only facilities were two rented rooms in Cardiff Castle. The immediate post-war years saw other new performing arts schools springing up around the UK, including Bristol Old Vic School, Rose Bruford College and the Glasgow College of Dramatic Art (which later became the Royal Scottish Academy of Music and Drama). But it wasn't until 1977 that the Cardiff College of Music expanded to include drama training and relocated to purpose-built accommodation. It also changed its name to the Welsh College of Music & Drama to reflect its expanded curriculum.

Interestingly, the college still promotes the teaching of music above drama, with only a third of its 640 students studying theatre-related subjects. But the quality of its acting alumni is also world class, as demonstrated by notable luminaries such as Sir Anthony Hopkins, Keith Allen, Dougray Scott, Rob Brydon, and Eva Myles. The college's growing reputation as an institute of excellence was recognised in 2002, the year of the Queen's Golden Jubilee, when it received its Royal title.

### **Diverse offering**

It was clear at the turn of the millennium that the college's theatre spaces were no longer sufficient for their ever-growing need for modern performance training facilities. The college had



and top left) contrasts with the warmth of the Dora Stoutzker Concert Hall (centre)

followed the national trend in expanding undergraduate and postgraduate courses to offer more diverse subjects than the previously simple music, acting, or stage management training. This increased variety of courses, coupled with greater demand for places and competition with other international colleges, happily coincided with the boom in lottery-funded new performance buildings in the education sector. RADA and the Central School of Speech and Drama in London both benefited from major renovation or expansion projects, and RWCMD duly followed suit. The new facilities were opened on 23 June 2011 with a week-long residency of the Welsh National Opera.

### Performance spaces

The design of the building mimics the differences in the main performance spaces – the 450-seat Dora Stoutzker Concert Hall (the first purposebuilt chamber recital hall in Wales) and the 160seat Richard Burton Theatre. The building has formal rectangular, straight-walled sections that reflect the formal square shape of the proscenium-arch theatre, while the concert hall's more informal oval shape is emulated in the playful curved design at the back of the theatre, masking where the new facilities adjoin the original 1970s building. Each performance space also has its own aesthetic identity, with building materials sourced from around the UK -Portland Stone clads the theatre as a reference to the adjacent Cathays Park, and Western Red Cedar decorates the interior of the concert hall.

### ROYAL WELSH COLLEGE OF MUSIC & DRAMA





Meanwhile the bright and elegant foyer is a remarkably open and communal area, much like the park behind it. And despite its huge volume, it remains intimate and inviting. The timberclad concert hall and white-walled theatre face each other at opposite ends of the fover, their distinct façades suggesting the different performance environments within. Although strikingly different in design and purpose, the two spaces complement each other well.

From the outset of the project, it was clear the main performance spaces required careful consideration. The client's brief was to design a proscenium-style theatre to international performance standards, and a world-class recital hall. The specification for the latter was a critical factor of the project. Cardiff already had a large concert hall, but no venue for smaller, more intimate work. RWCMD's new concert hall was designed with this in mind. It would provide both a private training facility for students and a public venue to attract major professionals to play, thus increasing both revenue and status for the college. This is where Theatre Projects' extensive experience came into play, having designed similar educational facilities for RADA, the Guildhall School of Music and Drama, Cheltenham Ladies' College, and the Irish World Academy of Music and Dance.

Theatre Projects' project manager for RWCMD, Petrus Bertschinger, explains that the Richard Burton Theatre was designed to "provide students with the understanding and facilities of the most common venue type they'll encounter



The open foyer (top right) and the Richard Burton Theatre (above)

in their professional careers." Theatre Projects designed and specified the stage to be equivalent to a medium-sized repertory or touring house; it has a full-height grid with 28 counterweight lines, fly and loading galleries, adequate wing space, and a shallow forestage. It has an ample scenery dock, with doors opening onto the road, and generous production facilities - technical stores, scenery and prop making, wardrobe and wigs. These support spaces mainly remain in the original building and are moved to the theatre for fit-ups, mirroring the set-up in a professional scenario.

Theatre Projects also designed the lighting and sound technical infrastructure with both conventional dimming for lighting as well as plenty of data, DMX, and fibre lines throughout to manage the contemporary demand for intelligent lighting, digital sound and controllable special effects. Above the auditorium is a tension wire grid for rigging front (face) lighting and a motorised forestage truss bar for specialist sound, stage, or lighting provision. Bertschinger explains: "The auditorium is an ideal and very practical space that'll enable students to design and produce a range of theatrical styles in a conventional UK-style setting. It's large enough for students to learn essential performance techniques like voice projection or technical production in a realistic professional setting, while still being small enough to nurture their talent in an intimate environment."

While the proscenium theatre is a very functional space, the Dora Stoutzker Concert



The college is situated in leafy Bute Park

Hall is a stunningly beautiful room, shaped like a boat with an oval form on two levels, higher at the back than the stage end. The stalls seating gently slopes down to a raised stage with motorised platforms built within, able to form different levels for different orchestral settings. In addition, a pit elevator can replace the front two rows of seats and provide a forestage for larger orchestra rehearsals or musical performances.

Between the balcony and ceiling, the walls are indented with a series of black vertical timbers which Arup designed to break up reflective sound. The timbers contrast against the black-painted walls and also collectively focus attention on the audience and performers rather than the room itself.

### Functional design

BFLS, Theatre Projects, and Arup worked closely together to design this room so it's as functional as it is beautiful. The ceiling was designed as a series of undulating waves, painted in old-gold from front to back to reflect the warmth of the seating below and the acoustic requirements of the room. The waves of the ceiling discretely hide the platform lighting, mounted on bridges above the ceiling, and projected through glazed openings cut into it.

As Jason Osterman, production lighting consultant for Theatre Projects, explains, "what's special about this space is that we've managed to make it work where other venues don't quite get it right. The lighting positions are perfect without compromising the look of the room or its acoustic quality".

Ian Knowles, who led the Arup team, continues: "The occupied reverberation time is 1.7 seconds, perfect for strings and similar concerto performances. It sounds superb. This is

a world-class chamber music recital room – a room that does what it says on the tin."

Without doubt, the concert hall has been perfectly designed for acoustic music, but the college also needs it to work for amplified music or brass, which in turn required the room's acoustics to behave very differently. The ability to alter the reverberation time (RT) of a small concert hall has been a recent holy grail in performance design. This hall has gone far in that development.

In addition to the motorised platforms that can change the size and shape of the orchestra/band stage arrangement, Theatre Projects specified four over-stage NOMAD controlled flown truss bars for suspension of speakers, lighting, screens, or drapes for pop or rock shows. To help with the change in RT, lower timber wall panels behind the stage can be changed from hard to soft surfaces, while 48 acoustic blinds on the balcony walls can be remotely lowered between the timber verticals. This makes it possible to accurately tune the room to whatever RT rating is required.

RWCMD's new facilities have high expectations to live up to. They fill a gap in the cultural provision of the local community, but more importantly they're now an indispensable tool for many students to learn their craft. The real test of any design project is how it is received by its users and community – not just on opening night but for the years that follow. This stunning new centre is a fitting contribution to the college's philosophy of promoting a lifelong interest in the performing arts and supports the college's position as the National Conservatoire of Wales.

www.theatreprojects.com www.bfls-london.com













discovering that a
combination of
using the latest
technology
and
encouraging
social interaction
in and around theatres
can help draw in the crowds

t is an autumn evening in October 2009, and the classical music world is focused on the stage of Walt Disney Concert Hall in downtown Los Angeles. Tonight, with a live audience tuned in on public television, 28-year-young prodigy conductor Gustavo Dudamel is making his debut as conductor of the Los Angeles Philharmonic. A star of the order of Leonard Bernstein or Sir Neville Marriner is being born in America's finest concert hall of the early 21st century.

On this night, however briefly or in contrast with other venues and auditoria throughout the world, there is no difficulty attracting a young enthusiastic audience. The young Venezuelan maestro, fresh off an adoring 60 Minutes profile, has viewers at the iconic Frank Gehry-designed Disney Hall and millions of TV viewers enthralled as he whips the Philharmonic through a fervent rendition of a Mahler symphony, his black curls of hair quivering to the rhythm set by the baton.

tworking
ortunity

Yet for a host of auditoria, concert halls and theatres around North America and Europe, there is a growing sense that audience numbers are shrinking, particularly for the kind of high culture – classical music, opera, stage dramas – traditionally occupying them. And it's not as simple as the Baby Boom generation giving way to Gen X and Gen Y.

According to a report by the League of American Orchestras, Gen X members in their 30s are participating less in classical concertgoing than Boomers at the same age: 9% of their age group versus 11%. As a result, the League predicts that by 2018, the audience for live classical music could drop by another 14% – or 2.7 million people. It's not just because of difficult economic times that orchestras in Philadelphia, Detroit, Syracuse, Louisville, New Mexico, and Honolulu have all faced financial difficulties threatening their futures. Theatre companies, ballets and other performing arts venues and organisations have faced much the same.

### Social collaboration

Even so, many venues are finding the opportunity to reverse these trends through a combination of technology, social interaction and collaborations. If a venue seeks to be sold out on the night of a concert, dance or a play, the thinking increasingly goes, it's not just because of the performers on stage people have paid to see. It's also because of the venue's relationship with its audience: one that moves from casual to formal settings, with communications happening by a variety of technologies and methods, and at a variety of price points.

Even for the LA Philharmonic, with the twin towers of Disney Concert Hall and the charismatic talents of Dudamel, engaging with the community is a multi-tiered effort in which no avenue of engagement is ignored. "In our corner of the arts, we deal with a very complex, nuanced, intricate artform that is hard to put into bite-sized pieces when you want to talk about it," says Arvind Manocha, the Philharmonic's president. "But our task is to make sure people are spoken to in a way where they feel comfortable and engaged. It starts with that bedrock of engagement. How do we engage with people beyond the classical intelligensia? We

don't feel you have to dumb down the product to talk about it, but we live in a competitive landscape. We want to be speaking to them in relevant ways."

The very quality that makes many venues impressive to be in - their grand architecture - can actually sometimes be a deterrent to new patrons. "I believe that one of the biggest problems that theatres have is their ability to get young people to see beyond the exterior of the theatre itself," says Jake Orr, founder and editor of the UK-based advocacy group, A Younger Theater. "I can't help but think there is a distinct feeling among young people that the way these theatres are built becomes somewhat of a barrier. I have often referred to The Royal Opera House here as a fortress. It's an impenetrable building except for those who are in the know of what lies beyond. I think smaller theatres have it easier: they strip away the grandness of what theatre used to be, and bring forth the idea that the magic on the stage lies behind a thin wall, a curtain almost."

Architect Michael Tingley of Portland, Oregon firm BOORA has also grappled with the conundrum of how architectural form and materials can express reverence for cultural performances without seeming too formal for casual customers. "It's not that it shouldn't be seen as something special and meaningful and valued," explains, Tingley, whose firm has designed numerous arts spaces. "But I think it wants to feel like something that's accessible and something everyone has entrée to." In designing the Mesa Arts Center in Arizona, and the Collin County Center for the Arts in Texas, both venues a mix of performance and exhibit spaces designed to enliven their suburban surroundings, Tingley and BOORA sought glassy, open public areas and native materials like limestone and wood to symbolise formality with familiarity.

### Transparency in vogue

Even in the case of venues designed by famous architects like Frank Gehry, who is known for billowing, sculptural forms, there is an increased emphasis on transparency. At Disney Hall, the striking metal façade gives way to a ground floor is clad in glass. Gehry's design for the recently opened New World Center in Miami





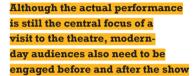
Increasingly, whether it's the tastes of ticket buyers or the tenants of a building, successful performance venues have a mix of uses and environments: a café or bar attached to an auditorium, for example, or additional spaces for exhibiting visual art and film. "One of my favourite spaces in London is the Barbican Centre, a multi-arts venue that has several cinemas, two theatres, a concert hall, a library, art gallery and more," says Jake Orr of A Younger Theatre. "It's the constant adventure that you find within the building. They also bring over a lot of European work that focuses on the use of images or visual theatre to tell its story."

Another venue in Arlington, Virginia, just across the Potomac River from Washington, DC, called Artisphere, combines a black-box theatre, three visual-art galleries, a planetarium theatre and a combination restaurantcafé. In one three-day period in August 2011, for example, a DJ-hosted salsa dance gave way to a documentary film on the open-source software movement the next day, then on the third night there was a live discussion between comedians and scientists - a collaboration between DC's Story League and New York.



### **NEW AUDIENCES**







(home to the New World Symphony) goes a step further, with a simple glass and stucco box providing numerous opportunities for visitors or even casual passers-by to get a sense of what's going on inside.

Many arts organisations have also found a simple in-house café can do a lot, not only to encourage social interaction before and after performances, but to keep venues active during daytime hours and other times when there isn't a performance. Or failing that, they at least have an array of comfy sofas - somewhere to congregate and linger. "One of the most successful buildings I know of is The Young Vic Theatre, which has been redesigned to have a café/bar within the heart of the building," Orr says. "The three theatre spaces sit off the bar and everyone, including big-name actors appearing in the show, has to walk through there to get backstage. Even during the weekday, the bar spills out from the building into the theatre audiences. It's great to see such a diverse audience because of the attraction of a bar in the heart of the building."

### Social networks

Beyond the physical venue itself, outreach efforts both electronic and in person have become a vital component of successful auditoria, theatres and concert halls. When Gustavo Dudamel made his much-anticipated LA Philharmonic debut, "we introduced a series of apps on all platforms," Manocha recalls. "There was a conducting app – a fun way to express what it's like to conduct music with your hands. We had

"Often, it's about who is going to be there as much as who's performing"



50,000 downloads from all over the world. We followed up with a venue app, one of the first for a classical organisation. It was about Disney Concert Hall and the orchestra – you get behind-the-scenes tours, ticket information, programme notes from the concerts you're about to hear and downloadable talks. There are maps of the orchestra: why are the instruments and players set up that way? When you click on individual instruments you can get bios on all the musicians."

Many arts organisations have begun providing webcasts of their plays and concerts following the performance. The footage can become a point of entry for those reticent about the financial and time investments of buying a ticket. It's not without difficulty to the organisations broadcasting them, from bandwidth and technical issues, to video production costs. Yet the ubiquity of video today means it's easier than ever to offer potential fans at least a taste of what they'll see onstage.

Facebook has also become, Manocha says, more powerful than any other advertising we do. Yet he also cautions against considering smartphone apps, social media or any other specific technological tool or web platform to be a magic bullet. "It all evolves at such a quick pace, I suspect there will always be new platforms we try to capitalise on."

It's also important to think of social media as tools in a larger effort: creating and nurturing a community, some of which happens online and some of which doesn't. Orchestras in Pittsburgh, and Miami, for example, have held cocktail parties before or after concerts, luring young professionals to the music with a networking opportunity. The Minnesota Orchestra's Crescendo Project, started in 2008, invites its 112





active members behind the scenes to deepen their understanding of music making.

Younger audiences have shown a preference for being with their friends rather than targeting particular arts events, but sometimes one is a means for the other. "Often, it's about who is going to be there as much as who's performing," Tingley says of Gen Y and Gen X attendees. "They like to make their decisions sort of lastminute. In a way, it's who they'll be sitting with and hanging out with that's as important as the performance they can see on the stage. I think that marketing departments for performing arts centres are trying to figure out how to use social media to connect with those audiences. But there are also some impacts in how you design the space that encourages maybe longer intermissions, so you create more space and time for that to happen. Or you do more things before or after performances that allow for more social time. There is also lots of back and forth discussion among performing arts leaders about allowing people to bring food or drink into the room."

### Smartphone usage

Similarly, Tingley adds, some venues have considered liberalising laws about using smart phones (at least for texting and emailing, if not talking) during performances. "For some, the idea of going two and a half hours without texting someone or getting on Facebook is a real imposition," he explains. "I've also heard discussions about designating parts of the auditorium where conversation might be allowed. If you want to go with a group of friends to see a performance, but you don't want to sit there with just rapt attention, there is a section where some level of technology and conversation

### NEW PLAYLISTS

Perhaps thanks to the commonality of having one's entire music collection accessible on the go with MP3 players and smartphones. particularly younger ticket-buyers have shown more widely eclectic and democratic tastes.

Not only does having your resident symphony team up with musicians from pop, jazz and international genres attract new audiences, but so does partnering between large and small venues. A jazz club or small theatre of hardcore enthusiasts can be seen not as a competitor with a larger auditorium, but as a feeder sharing overlapping audiences. In New York, the Chamber Music Society of Lincoln Center, has staged performances in a church. "You might come to the concert hall to hear a Mahler symphony, but also a great jazz concert, or [Brooklyn indie-rock band] Grizzly Bear," says Manocha. "You're getting all of those concerts from the LA Philharmonic in Walt Disney Concert Hall. But the Philharmonic has had events at the Knitting Factory club in Hollywood."

Several cities have also seen classical catch fire in or beyond the concert hall. In San Francisco, Davies Symphony Hall features a concert after the concert: orchestra members playing modern, eclectic fare, while another ensemble, Classical Revolution, regularly packs San Francisco's Revolution Café on Monday nights.

are allowed. I don't know where that's going. It also has to do with the relationship between the performers and the audience. It's distracting to see people using their iPhones, but if that's the difference between playing to a full room or one only two-thirds full, it's interesting what you value more. What's the right response?"

Even so, whether it's an iconic classical performance like Dudamel's debut at the Gehry, any number of other performances, be they musicals in Manchester to monster trucks rallies in Memphis, the brave new world of having the world in your phone but perhaps less in the retirement account only seems to makes certain age-old values more resonant, like the sound of a cello's bow lifting toward a vaulted ceiling. It's all about getting the word out about the performance. It's about establishing roots in the community. And it's about generating excitement, accessible and universal: mostly by what's performed, but also by where it takes place. ■





### IRVING CONVENTION CENTER

ith its angular copper-clad walls rising from the Texan ground like a sun-baked geological formation, the US\$133 million, 275,000ft²

Irving Convention Center (ICC) at Las Colinas
– midway between Dallas and Fort Worth
– is already changing the way meeting
planners look at convention centre space.

The project took 12 years from dream to opening, and was funded with a 2% hotel occupancy tax which started in January 2000 as well as with municipal bonds sold in January 2009. "Since our building opened in late January 2011, we've hosted more than 95,000 visitors at a broad variety of trade and community events through to August," reveals Maura Gast, executive director of the Irving Convention and Visitors Bureau, which owns the venue with the City of Irving. "We're setting a new standard and have created an environment made for business."

### Strategic approach

Designed as a multifunctional building, the centre includes a 50,000ft2, column-free exhibit hall, a 20,000ft2 ballroom and 20,000ft2 of breakout meeting space. Working with ICC operator SMG, Irving tourism officials are taking a targeted, strategic approach in attracting new business. "Rather than compete with the major convention facilities already available in North Texas, we're focusing strategically on small- and mid-sized groups, primarily targeting delegations of 800 to 1,200 people," Gast explains. "The centre can accommodate groups as large as 4,000 and offers the community a venue to host civic events previously held outside Las Colinas. Weekend business is another opportunity for us as our mid-week business is already so strong."

The vertical 'stacked' layout enables the centre to simultaneously host sporting events, corporate and trade meetings, galas and other civic functions, in doing so allowing each group to have its own distinct space and ambience. For larger groups, the vertical design means delegates can flow efficiently between events.

A DART (Dallas Area Rapid Transit) Light Rail Station will open in August 2012 to service the Convention Center and surrounding Las Colinas area, with connections to DFW Airport in December 2013 and also Dallas Love Field Airport. The elevated Las Colinas Area Personal Transit System and a multistorey car park that accommodates 850 cars are also available.

ICC project architect Barbara Hillier, a principal of RMJM Hillier Architecture, recalls that the firm had some name recognition in the area from a 10-year-old Dallas office, and was invited to bid for the project in early 2007. "We initially did the masterplan and then got the design contract in early 2008," she tells *Auditoria*.

"One of the key objectives was to host a variety of events simultaneously, so the stacked design developed out of an analysis of their specific needs and an interest in branding each venue separately," Hillier continues. "This meant that we had to make them discreet with back-up services independent of each other, with marketing criteria to differentiate the venue from area competition.

"From an architectural and environmental point of view, we had to assess a combination of regional and local factors, including the weather and resistance to natural conditions, which also influenced the selection of materials. When we took into account the behaviour of attendees confined to a meeting room or exhibit hall all day, we found they would want to go outside. We had the challenge of blastinghot weather in the area, yet we had to make it desirable for people to want to move around.

"The three program areas include the main-level exhibit hall with 50,000ft² of clear-span space; the conference centre, with 20,000ft² of breakout space in 20 rooms; and the top-level 20,000ft² ballroom, which is divisible into multiple areas. Connecting above and below is a spiralling series of stairways and ramps outside – open-air yet shaded roofscapes and escalators within.

"The copper-cladding exterior was the result of determining how the venue would appear," Hillier explains. "We looked for one material that could be monolithic for all surfaces – that could also function as a rainscreen and as a thermal envelope. It had to be lightweight and applicable to the building structure and some type of non-masonry panel. Taking a look at the area's natural landscape of red clay, and with too many white buildings, copper seemed apt. It requires virtually





### **AN ICON IN IRVING**

The iconic copper façade gives the Irving Convention Center a distinctive image. Designed by architect RMIM Hillier, it was fabricated by architectural metal and glass innovator A. Zahner Company from Kansas City.

'Up close, these walls look surprisingly delicate," principal Bill Zahner told the Architectural Fabrikator earlier this year. "To let light into the centre's expansive interiors and to avoid a conventional convention centre design, we worked with RMIM to design a skin of perforated copper that wraps the building's cantilevered forms. The façade reflects sunlight during the day and allows the facility's lights to shine through at night.

"The custom perforations and bumps on the building's 'skin'

were fabricated using our ZIRA (Zahner Interpretive Relational Algorithm) process, which we developed to expedite complex perforation and embossing projects. The architect envisioned the copper panels overlapping at several points on the façade, so we experimented with multiple layers of perforated material to understand how the cladding would layer to form new patterns. Once a digital map was drawn, we translated the image into bumps, dents, holes and shapes that were reproduced in our shop.

"Perforations in the copper cladding graduate from 50% to 100% opaque in 30ft, adjusted to create transparency in key parts of the ICC and reduce the visual and physical weight of the material. On another practical note, the panels help to shade the ICC and create a natural cushion of cooling air currents to reduce air-conditioning demand.

"The resulting pattern changes with light and vantage point. Because the copper bridges of the pattern are so slender, from close range its circular shapes appear to float. At night, the centre's lights penetrate some areas of the skin, making the shapes translucent. The mill-finish copper cladding will also let the building evolve over time as the bare surface undergoes gradual patination. The material has already begun to darken, its bright finish turning to brown umber since crews began installing the panels in 2010. This will eventually give way to deeper greens and blues, a patina that will protect the surface from further corrosion."



no maintenance and the natural patination protects it while weathering. We were fortunate to get A. Zahner (see An icon in Irving sidebar on previous page), a nationally known ornamental metals fabricator, to do the copper design and work, and the results were spectacular.

"The building has a lot of socially redeeming qualities," emphasises Hillier, "and an application for LEED Silver certification was decided early on, as sustainability is an important factor in getting business today."

On this note, the steel in the structure has been sourced locally, while among the other LEED-certification features is the use of non-potable water from nearby Lake Carolyn, which it's estimated will save 18.9 million gallons a year via an ozone-filtering system that cuts the cost of using domestic water by two-thirds. Around 86% of construction waste was also diverted/recycled, with some of

Officials at the Las Colinas **Irving Convention Center** hope its distinctive architecture will put it on the map in North Texas

the removed dirt used to fill in a portion of Lake Carolyn lakefront. Wrapping the garage around the building and covering the loading docks so they are shaded and sheltered, meanwhile, provides greater cooling efficiencies on load-in and load-out days. And in addition to 90% of light fixtures in the facility being dimmable and programmable, by year-end, 100% of building energy needs will come from renewable sources.

### Positive response

The Irving Convention Center is certainly an architectural triumph, but will it match up commercially? There's no doubt, according to Bob McClintock, senior vice president, convention centres for SMG, who is pleased with forward-bookings. "Irving has a first-tier market feel with its amenities and access to air service," he notes, "but is able to offer smaller groups the customer focus they would find in smaller markets. On weekends, we already see users shifting from corporate to consumer, with amateur and youth sporting events, events by social, military, educational, religious and fraternal organizations, and events that tap the local community.

"The centre has been given a character and a quality that is much more akin to a highcaliber conference facility than it is a convention centre" McClintock continues. "This isn't the quintessential 'box with docks.' It's not meant to be a utilitarian building. It was designed to be functional and flexible, and it's already proved to have that feel of a high-end facility, both in its architecture and its service. That's what customers expect and require."

"Feedback from clients to our aesthetic and service-oriented features has been very positive," Gast concludes. "They like the vertical stacking which makes it easier to access floor to floor, and we have received high ratings for food service and food quality by SMG/SAVOR, which was a high priority. Overall, the community is very pleased and proud, as civic events that had outgrown Irving have come home now. We see a lot more positive results in the future."  $\blacksquare$ 

### Author

Steve Traiman is a Florida-based freelance writer and a regular contributor to Billboard

### FAST FACTS

Name: Irving Convention Center (ICC) at Las Colinas

Location: Irving, Texas Cost: US\$133 million Opened: January 2011

Owner: City of Irving/Irving Convention and Visitors Bureau

Operator: SMG Worldwide Total space: 275,000ft<sup>2</sup>

Architect: RMJM Hillier Architecture

Construction manager: Austin Commercial

Project manager: The Beck Group Structural engineer: Datum Engineers MEP engineer: RG Vanderweil Engineering Civil engineer: Jacobs Carter Burgess

Copper cladding: A. Zahner F&B concessionaire: SMG/SAVOR

Food service consultant: Theodore Barber

Acoustics/AV/IT/security: Emmaco Prentiss & Moye Enterprises

Parking: Walter P Moore & Associates **Light/site lighting:** Illumination Arts Vertical circulation: Lerch Bates Irrigation: Texas Irrigation Design

Amenities: 50,000ft<sup>2</sup> exhibit hall; 20,000ft<sup>2</sup> ballroom; 20,000ft<sup>2</sup> breakout space; mezzanine café with terrace; full-service

commercial kitchen

Other building features: One-ticket office location, three permanent and six portable concession stand locations, one guest services location, one first aid/medical office, three ATM machines, two public elevators, two freight/food service elevators, nine-bay enclosed

loading dock, and an 850-car parking garage



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### Livin' the dream

Rodney J. Smith's passion for the arts was legendary and although he is no longer with us, his legacy will live on for many generations to come

n 27 March 2011, the universe of individuals engaged in the craft of performing arts facility creation and management became much smaller following the tragic death of Rodney J. Smith.

At the time of his passing, Rodney was serving as managing director of the Tobin Center for the Performing Arts in San Antonio, Texas. He had spent 27 months guiding the selection of a project team and providing oversight to the design phases leading up to the long-anticipated groundbreaking. That ceremony took place on 10 May, although an important face was missing. While the event was an expression of civic pride and accomplishment, Rodney's memory and his invaluable contributions were celebrated by all present.

He had a passion for the arts that began in high school and defined his career. He served for nearly 25 years at the Denver Performing Arts Complex (DPAC), and was instrumental in the launch of blockbuster national tours and in creating cultural amenities including the Performing Arts Festival, Actor's Alley, the Mayor's Jazz Festival, and Film on the Rocks. His vision shaped the renovations of the Temple Hovne Buell Theatre and the Denver Auditorium into the world-class Ellie Caulkins Opera House. In 1999, the City of Denver recognized him as 'Manager of the Year'.

Bud Franks, president, Franks & Associates/ interim managing director, Tobin Center for the Performing Arts, pays tribute: "Rodney truly understood and lived facilities and facility management - it was in his DNA. He brought that passion to the Tobin Center and the design process was shaped by his vision of an ultrafunctional facility with flexible spaces. In a very short time, he left an indelible mark on San

Antonio. He will also be remembered for his quick wit and off-the-cuff 'zingers' at IAVM's Town Hall meetings. His role in those meetings unquestionably helped build a stronger national community of performing arts facility managers. He was an important and generous force in our industry, and that infectious smile will be missed."

### Friends in high places

In 2006, Rodney became the division director of University Events and Conferencing at the University of Denver, hosting world-renowned visitors such as the Dalai Lama and then Senator Barack Obama. It was during this time that he started proclaiming his signature greeting: "I'm livin' the dream!"

Paul Beard, chief operating officer at the Smith Center for the Performing Arts, agrees with these sentiments: "Rodney truly 'lived the dream' and would have done spectacular things with the spaces and programming he envisioned for the Tobin Center. We co-conspired on these things and he was my invaluable counsel. I feel like I owe him a debt that can never be repaid. We live to serve and Rodney's generosity came from a deep and humble place. As Rodney himself would be forced to concede, we'll not see his like again."

As one of the industry's most accomplished creators and managers of performing arts facilities, Rodney was asked in 2009 to become the managing director of the Bexar County Performing Arts Center Foundation. The Foundation's charge was to create the new Tobin Center for the Performing Arts, a renovation of the San Antonio Municipal Auditorium into a world-class performing arts centre. Those who have experience with the development of these incredibly complex facilities know how intense the process is. And those who knew Rodney know how perfectly suited he was to shepherd the 'A' team, led by LMN Architects, in the design of a venue that will be the ultimate in functionality. Rodney's abundant passion and vision were instrumental in ensuring the future of this asset for the people of San Antonio and all of South Texas. His dream will live on. ■

### www.tobincenter.org



THA ARCHITECTURE







## Phoenix rising

The renovation of two academic theatre projects in the USA has reinvigorated the theatre art departments on their campuses

here is no more potent vehicle for discovering meaning about human consciousness than theatre. And there is no more important place to keep the study and practice of theatre alive than in our higher education institutions. Through the imagined and enacted world, students make discoveries about human truths that cannot be duplicated in any other intellectual discipline.

To support theatre arts education, higher education theatre departments must have facilities that nurture their programmes. And yet securing funding for new facilities has never



been more challenging. Many higher education institutions are faced with this dilemma – how do you refresh theatre facilities and strengthen theatre arts departments with limited budgets? And perhaps more importantly, how do we as a society work with what we have in order to preserve the earth's precious resources?

Two academic theatre projects that achieved extraordinary results working with a limited budget were the remodels of the Harper Joy Theatre at Whitman College in Walla Walla, Washington and the Miller Theatre Complex at University of Oregon in Eugene. Both projects were designed by THA Architecture, a Portland, Oregon-based studio practice renowned for academic and cultural projects.

Whitman College is a premier Northwest liberal arts college known for academic excellence and one of the best liberal arts theatre programmes in the West, providing theatre arts education and performance to the south-eastern Washington community of Walla Walla for more than a century. This past September, Whitman opened the doors to a remodelled Harper Joy Theatre – a striking beacon that bloomed from a dreary and out-of-date facility. The Harper Joy Theatre was originally built in 1958 over the foundations of the original Whitman Theatre, which was destroyed by fire earlier that same



year. The reconstructed theatre provided the college with a 300-seat auditorium, balcony, and stage with fly tower and was expanded in 1984 to include a scene shop, classroom, studio theatre, and additional lobby and office areas. But demand on the aging facility has increased with the growth of the theatre arts department, and it usually presents eight or nine fully-mounted productions and 15 student productions each year.

### Updating infrastructure

While the theatre arts programme is a strong and vibrant department, the outdated facilities that housed them were deficient in size, included aging infrastructure of rigging equipment and structural systems which led to safety concerns, and lacked a visual connection and identity through which to connect and welcome the campus community. The renovation and addition includes a new and larger black box studio theatre, expanded lobby and public support facilities, new faculty offices and expanded department office, and new costume shop wrapped in an addition that unifies and compliments the existing theatre facilities.

The new 218m2 studio theatre can accommodate up to 150 seats in various configurations and includes technical amenities such as a wire tension give over the performance

area that provides flexible and safe access for mounting lighting instruments and state-ofthe-art theatrical equipment. The costume shop, previously located in the basement with low ceilings and no natural light, was relocated to a new 140m<sup>2</sup> room filled with natural light, operable windows, high ceilings and views of a tree-filled campus quadrangle.

The existing 315-seat Alexander Theatre was outdated and required updating to improve safety. The audience seats and seat platform were replaced to provide better accessible seating locations and comfortable seating. The antiquated counterweight rigging system had surpassed its useful life, and its configuration limited stage access. By careful analysis of the heavy timber structure of the fly tower, it was determined that with a single piece of steel reinforcing, the stage could be equipped with a combination of new manual and computer controlled motorised rigging, thus giving the students experience in both.

The exterior materials were selected to be contemporary, but at the same time complement the existing theatre, and are low maintenance. Metal panels and composite wood sidings create a series of interlocking boxes to break up the mass of the new addition and relate to the pedestrian connections throughout the campus.

### Team:

Architecture: THA Architecture; Jane Barker, principal in charge/project manager; David Keltner, lead designer; Annie Mahoney, project architect; Jon Jorgensen, construction administrator.

Contractor: Opp and

Seibold

Theatre consultant:

The Shalleck Collaborative. Adam Shalleck, principal

**Acoustical engineer:** Altermatt Associates Mechanical and

electrical engineer: PAE Consulting

Engineers

Structural engineers: Equilibrium Engineers,

LLC

Civil engineer: Anderson Perry & **Associates** 

Landscape architect: Berger Partnership

THA ARCHITECTURE

### UNIVERSITY OF OREGON MILLER THEATRE COMPLEX

Client: University of Oregon Location: Eugene, Oregon

Size: 1,765m² (new construction)/575m² renovation/4,645m² total project size Architecture: THA Architecture; Thomas Hacker, lead designer; Jonah Cohen, principal-in-charge; Jane Barker, project manager; Annie Mahoney, project architect; Nicholas Hemmer, construction administrator.

Contractor: Fortis Construction.

Theatre consultant: The Shalleck Collaborative. Adam Shalleck, principal

Acoustical engineer: Dohn & Associates

Mechanical and electrical engineer: PAE Consulting Engineers

Structural engineer: Catena Consulting Engineers Civil engineer: Harper Houf Peterson Righellis.

Landscape architect: Cameron McCarthy Gilbert & Scheibe

**Interiors**: Deca



Flexible 'black box' Hope
Theatre at the Miller
Theatre Complex

A new entry and expanded lobby provides a warm, day-lit space that welcomes the Whitman community and gives the theatre arts department a strong physical presence on the Whitman campus. Furthermore, the entire building is accessible to all people for the first time. Through the creative transformation of a previously bland facility, the remodelled and refreshed Harper Joy Theatre has blossomed into a beautiful facility worthy of the excellence of Whitman's theatre arts department.

Christopher J. Petit, associate professor of theatre at Whitman College sums up: "It's all very exciting. The students are walking around with a bounce in their step, strangers are coming in to peak around, and the new facility is teeming with life. We are currently in the process of a faculty search and the new facility has helped us attract the very best candidates. Our enrolment numbers have already gone up, and we anticipate an increased interest in our programme. It has allowed us to function more safety and efficiently, and greatly increased our production possibilities. In short we are delighted."

### **University of Oregon**

Three hundred and fifty miles southwest of Walla Walla, the University of Oregon in Eugene was faced with similar challenges as Whitman with its aging theatre facility. In 2008, the remodel of the James F. Miller Theatre Complex was complete. This project was the first major expansion of theatre facilities at the University of Oregon since the 1949 addition of the Robinson Theatre. The goal was to accommodate growth, improve the theatre arts department, and



mitigate the negative impacts of the severe and inappropriately scaled addition to the ornate Second Empire Style Villard Hall of 1886. The end result is an exciting new building that enhances the fabric of the university and strengthens connections to the campus and the community of Eugene.

The new Miller Complex provides a welcoming destination by wrapping needed programme spaces around Robinson Hall to engage the campus and reduce the building scale. The proportions of the exterior stucco panels and window openings create a rhythm that relates to the adjacent historic Villard and Deady Halls.

The expanded lobby receives the community to the new Hope Theatre and existing Robinson Theatre and provides a strong connection between both performance spaces. The openness and transparency of the lobby space creates an active, light-filled beacon, replacing the original windowless and inflexible lobby, and can accommodate a range of events. The exterior plaza serves as an extension of the lobby in warmer weather.

The biggest programmatic improvement is the new Hope Theatre, an extremely flexible, flat floor, studio theatre. The design provides a fluid theatre space where the performance area, seating configuration and lighting can quickly, easily, and safely be reconfigured. Another dramatic change included renovation of the existing Robinson Theatre, which required reraking the theatre seating to improve sightlines and accessibility. The addition of a naturally lit costume shop and acoustically isolated scene shop add to the success of the project.







The goals of the project were successfully achieved in spite of an extremely challenging budget and limited site availability. The result is a beautiful and efficient building that expresses the power and immediacy of theatre at the University of Oregon.

John B. Schmor, department head at Theatre Arts was delighted with the outcome: "With patient and diligent work from our architect's team and technical consultants, we successfully met every major hope of our vision, even with budget cuts when material costs were skyrocketing. Our new facilities are a major element of increased recruitment. In every way imaginable, this project has changed the life of my department; for faculty and students it has been such a deep improvement of our programmes and aspirations I can hardly recall how we managed to make anything work before."

### New lease of life

The Harper Joy Theatre and Miller Theatre Complex are both exceptional examples of how theatres at academic instuitions can be revitalised on modest budgets. While a new theatre building can easily cost an institution US\$50 million dollars, the Harper Joy Theatre and Miller Theatre Complex both had budgets around US\$6 million dollars. And as we try to minimise the impact that the built world has on our fragile environment, it is imperative that we re-use our existing buildings and breathe new life into them by making them safe, functional, healthy and beautiful.

www.thaarchitecture.com

LMN ARCHITECTS

## Everyone in mind

The vision for the Tobin Center for the Performing Arts in San Antonio embraces both history and change

ontemporary urban thinkers have made a compelling case for the importance of the arts to the social, cultural and economic prosperity of our cities. Given the severe demographic and financial challenges that arts institutions face today – along with growing competition from new forms of popular entertainment – performing arts facilities must continuously evolve in order to remain relevant and economically viable. They must adapt to expectations of younger generations, changing forms of artistic expression and evolving urban conditions to thrive as essential and enduring civic institutions.

Prosperous cities manage to engage change, while at the same time respecting their history. LMN Architects' design for the Tobin Center for the Performing Arts in Texas embodies this cultural duality in a single project by preserving historical architecture in combination with a bold, contemporary expression of the performing arts that is uniquely San Antonio.

The Tobin Center is situated at the nexus of San Antonio's historic downtown district and the more recently developed River Walk, a popular scene of entertainment and nightlife that has recently been extended north. It includes a major addition and renovation to the historic Municipal Auditorium, constructed in 1926 as a memorial to World War I veterans. Although the building provides an iconic presence within the city core, it has outlived its ability to meet the needs of the symphony, opera, ballet and virtually all other civic arts groups. And as it predates development of the River Walk, the existing building bears no meaningful

connection to the most active and vibrant social place in the city – located right behind its stage-house and loading dock.

Since the project's inception, a central goal has been to engage broad community participation and capture the essence of San Antonio's culture of arts and public celebration. To meet this aspiration, the new facility must support and nourish a wide range of artistic interests and forms of expression while delivering powerful performance experiences that fulfil the specific technical requirements for each type of event.

### Achieving the dream

Under the passionate leadership of Rodney J. Smith (see *Livin' the Dream*, *p*50), strategies to achieve this aspiration were clearly defined. The vision of a 'performing arts centre for everyone' became the underpinning of all facility planning and design objectives – encompassing multi-purpose functionality, system flexibility and architectural expression. Smith's determination to embrace both contemporary and traditional forms of performance art produced a bold agenda for achieving a new level of adaptability.

Primary programme spaces include a 1,750-seat multipurpose hall, 230-seat studio theatre and 600-seat outdoor performance venue. The main hall and studio theatre are inserted within the geometry of the existing façade and public spaces on a 15° skew to make a strong connection to the river. The development of programme spaces, systems and building components support highly flexible functionality, adapting to programme uses and various forms of community activities along the River Walk.







### **Project snapshot**

- 1,750-seat multipurpose performance hall
- 29 luxury boxes plus parterre and balcony seating
- 230-seat studio theatre
- 600-seat capacity outdoor performing arts plaza
- Targeting LEED Silver certification

### **Design team**

Akustiks, LLC

Architect: LMN
Associate architect:
Marmon Mok
Theatre planning and
design: Fisher Dachs
Associates
Acoustical consultant:

The main hall is designed to allow for the transformation of room elements – seating/stage geometry, lighting, colour and acoustics – to suit the unique qualities and objectives of each performance, allowing for virtually endless possibilities in room configuration and visual expression. The underlying technical systems are easily operated by a single individual to produce rapid changeover, enabling visual effects to change during the course of a single performance.

The fascias of the three balcony tiers, which define the inner volume of the hall, are composed of a layered assembly of perforated wood, dense polycarbonate resin and changeable LED lighting. In addition to achieving necessary acoustical properties, these elements provide the ability to change the mood of the room through variation in light intensity and colour saturation.

The moveable floor system is one of the most technically advanced systems of its kind in the USA. Each seating row is individually moveable with integral seats that deploy automatically, controlled by a remote-control device.

Although moveable floor systems have existed for decades, the combination of new building technologies with the expanding social, cultural and artistic diversity of our cities has created new fertile ground for its application. What distinguishes the Tobin Center's system is that it is completely integral to the institutional vision, operational mission and architectural concept. It is not merely a vehicle for increasing revenues by offering events on what would otherwise be quiet days; it provides a means to attract both residents

and visitors who may not otherwise seek out performances. The system's extraordinary flexibility will provide the Tobin Center with abundant programming options at its fingertips – poised to build on the community's passionate attachment to the historic facility and festive community spirit.

### Veiled expression

A system of metal panel grillwork, known as the veil, enwraps the functional volumes of the new performance halls, simplifying the building form and providing a consistent backdrop to iconic, historic building elements. The veil begins low at the river and sweeps up to the new stagehouse. Porous in texture and animated by interaction with daylight, the veil engages the expression of the building with the unique sensibilities and landscape of the River Walk.

At night, visual presence of the veil dissolves into the night sky and is replaced by the luminous sparkle of integrated LED lights. Indirect LED lighting provides numerous possible combinations of patterns and colours to create a theatrical, mysterious expression – similar to the character of the tree-lighting along the River Walk at night. In keeping with a facility capable of transforming itself, the veil lighting may be choreographed to further engage the experience of the venue with the life of the community.

Construction of the Tobin Center will be complete in spring 2014. ■

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### **DESIGN**

HGA ARCHITECTS AND ENGINEERS

he history of Los Angeles' San Fernando Valley (the Valley) is one of optimism, resilience and tenacity. As recently as 1935, a new mountain pass spurred development among rural farms and orange groves. After World War II, the Valley became the nation's fastest-growing region. Today, almost two million people and half the land area of Los Angeles are within the Valley.

The story of the Valley Performing Arts Center (VPAC) at California State University Northridge (CSUN) shares these same qualities – for more than 30 years Valley residents dreamed of having a major performing arts venue. Persevering through the 6.7-magnitude Northridge earthquake in 1994 and statewide budget cuts in 2008, the venue opened in January 2011.

In 2002, HGA Architects and Engineers, along with acoustician McKay Conant Hoover, and theatre consultant Auerbach Pollock Friedlander, developed a feasibility study and project brief for CSUN. Design work began several years later. "HGA immediately recognised the challenge of designing the first large performance venue in the Valley," says Jamie Milne Rojek, project manager for HGA. "With inevitable comparisons to the Kodak Theatre and Disney Concert Hall, the VPAC would be an important venue in Los Angeles. But it needed to exceed expectations and respect the Valley context."

The stunning new VPAC is a five-level, U-shaped building with central courtyard designed as an integrated facility supporting academic and cultural programmes, regional, national and international performers, and entertainment including the film industry. The VPAC includes space for the Theatre Department - a 178-seat experimental theatre with dressing rooms, light lab, costume shop, design studio, and scenery/props shop. It also houses a 230seat lecture hall, rehearsal and events spaces, and KCSN Radio. Throughout the facility, the architectural and engineering systems are designed to meet the most stringent acoustic and technical requirements for learning, teaching, performance and live broadcast.

At the heart of VPAC is the 1,700-seat Great Hall – a multipurpose performance hall for



## Valley of dreams

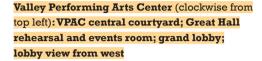
It's been a long-time coming, but the Valley Performing Arts Center in California was certainly worth the wait











orchestra, opera, contemporary music and dance, film, and the spoken word. Few halls are programmed for everything from classical music to cinema with the expectation of great acoustics, but VPAC has achieved that goal without compromise to acoustics, ambiance or aesthetics of the space.

The concert hall features sinuous wood ribbons wrapping the front of auditorium walls and balconies, while a ripple effect is created at the ceiling. These unique design elements are carefully integrated to accommodate acoustic, audio, lighting and technical adjustments to successfully host a wide range of performances. Stainless steel mesh panels line the side and back walls and conceal the acoustic absorption when deployed in the room. Through this innovative design, the hall accommodates fine-tuning, yet retains its dramatic appearance regardless of acoustical transformations, allowing for an acoustic environment that is second-tonone in Southern California.

### **Acoustic levels**

Before opening night, the acousticians tested the limits of tuning during several beta-test performances including orchestra, jazz, strings, piano, chorus and solo voice. This resulted in nine primary variable-acoustic settings for the owner to start with. Deploying all absorption creates a low 1.25-second reverberation time for film and other heavily amplified works. When all absorption is stored, the reverb time becomes 1.8 seconds with a full audience, like many of the world's finest concert halls. This tuning capacity is garnering high marks from top sound mixers, performers and music critics. The digitally controlled sound-reinforcement system has three loudspeaker line arrays, eight subwoofers, surround sound speakers and an entirely unobtrusive system to facilitate addressing the audience during unamplified concerts.

The VPAC can support any touring productions. Moveable screen-wall gates hide the trash and loading dock space for two



semi-trucks. The stage, 35m-wide and 15m-deep, has an adjustable proscenium frame and 60 manually controlled line sets for stage scenery, draperies and lighting. An easily accessible grid iron is 23m above the stage and the sprung wood floor has a  $4 \times 8m$  modular structurally framed trap. The 636 theatrical lighting circuits can be individually controlled by computer or remote touchscreen panels.

A custom orchestra shell complements the audience chamber and provides the necessary acoustic performance, while the 8m modular tower units along with ceiling reflector panels can be set up in less than an hour. The orchestra pit lift can be raised for audience seating or to create a stage extension. The house 'sound-mix' lift allows the console to be lowered into a storage area under the auditorium and replaced by removable seats. Pre-opening testing was also conducted by the theatre consultants to ensure success on opening day.

Architecturally, a compelling aesthetic composition was created by marrying the modern aesthetic sensibilities of the campus and community with a contemporary sculpting of space. Prominent placement on the south campus edge presented a new public face for the university. From the drop off, a curved stone wall and a reflecting pool wrap the entry. Glazed lobby spaces with their stepped balconies

Great Hall view from Parterre towards stage with orchestra shell in place – sinuous wood ribbons wrap the audience; (bottom) Great Hall with orchestra shell towers spaced apart



make the audience the stars, while offering crowdpleasing views of the surrounding mountain ranges. A roof terrace also allows for spectacular views.

Patrons in the lobbies, art gallery and founders' room can view the VPAC central courtyard below, where the theatre rehearsal studio can spill out by raising a glass panel door. The large rehearsal and events room, meanwhile, overlooks one of the last remaining orange groves in the Valley.

KCSN Radio surveys the site's 170 new trees, and the campus mall from its prow on the arts walk, which connects to parking via a botanical garden. The thoughtful convergence of plazas, balconies, and stairs weaving in and out of the building create unique gathering spaces and surprising vantage points.

### How green is my Valley?

When setting sustainability goals, the university was not motivated by certification possibilities but rather by doing the right thing. HGA architects' and engineers' commitment to sustainability resulted in an environmentally sensitive and resource-efficient building and site, and ultimately LEED Gold. On top of that Los Angeles now has a new icon in the Valley.

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# Youth Dolcy

The recently completed School of the Arts in Singapore provides an exceptional performing arts facility for 12 to 18-year-old students

nown as an international centre for commerce and technology, in recent years Singapore has made significant investments in the arts and culture. One high-profile symbol of this new focus is the recently opened School of the Arts (SOTA). Located in a popular downtown entertainment district, the striking 53,000m² building houses the nation's first dedicated public arts school for 12 to 18-year-old students.

From the outset, SOTA was envisioned as a world–class performance facility capable of nurturing young artists. After selecting Singapore architect WOHA in a blind design competition, the school commissioned Arup to provide acoustics and theatre consulting, the latter in collaboration with UK-based Theatreplan.

"The first step was refining the design brief and WOHA's competition entry from an acoustical and theatrical perspective," explains Andrew Nicol, a principal at Arup and leader of the firm's Australian acoustics and theatre consulting team. The team and client toured comparable facilities, "paying particular attention to the scale of the performance spaces to meet the needs of young people".

The finished building, which opened in June 2011, houses a 708-seat concert hall, 423-seat drama theatre and 200-seat flexible studio

theatre. Additional facilities include rehearsal rooms, recording studios, dance studios and a multipurpose hall. The project was recently awarded the prestigious 'Royal Institute of British Architects' International Award'.

### High performance and flexibility

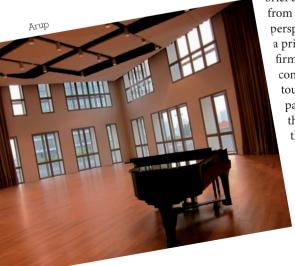
In the concert hall, to accommodate everything from full symphony orchestras to chamber music, the team incorporated variable acoustic and theatrical systems into the design. The hall's shape, form, volume and materials were designed for large-scale performances, with adjustable sound-absorbing banners placed in the upper volume to optimise sound quality for smaller shows.

The narrow stall width and seats that wrap around the sides of the auditorium on a single small balcony aid sound clarity. The primary building material, specially shaped convex precast concrete, improves sound diffusion. An orchestral reflector above the stage can be adjusted based on repertoire to help musicians hear and play more accurately.

The final acoustic performance meets SOTA's goal of a long, warm, rich reverberation with very high clarity. A measured change in reverberation time (mid-frequency) of between 0.6 sec and 0.8 sec and unoccupied reverberation time of about 2.2 sec to 2.3 sec offer great versatility. Very low background noise levels (PNC 15) permit recordings with high dynamic range.

To alter the stage size as needed, a motorised choir stall can be set flush against the back wall or moved forward in space. When fully retracted, it connects with the side loggia balconies, allowing concert-in-the-round performances. A full stock of lighting fixtures, including moving heads for amplified performances, serves a wide variety of events. Lighting bridges above the seating area provide easy access to front-of-house positions. Motorised lighting bars supply illumination over the concert platform.

"The drama theatre is much more intimate than you'd typically find either in the USA or in the Far East," says Theatreplan's Neil Morton. "It's far more like something you'd find in Europe, which in a teaching situation is quite important." The room's contemporary modified horseshoe plan and curved balcony heighten connectivity









**Project team** 

Client: Ministry
of Information,
Communications
and the Arts
Architect: WOHA
Acoustic consultant:
Arup Singapore
Theatre consultant:
Arup Singapore with
Theatreplan LLP (sub
consultant, design stage)
Main contractor:
Tiong Aik Construction

Singapore School of the Arts exterior (above left); drama theatre (above right); studio theatre (below)



between audiences and performers. Dividing the stalls into two levels provides a sense of fullness and energy even when the theatre is not fully occupied.

To accommodate varied performances, the proscenium features adjustable fullheight panels. When fully

open, they expose the proscenium walls to the audience and create slots for side lighting onto the forestage. When closed, they create a continuous curve from the walls to the proscenium arch, complimenting the theatre's wraparound feel. Proscenium width can be adjusted via a second pair of flat masking panels mounted on the side stage. A multifunction orchestra pit elevator allows for varied orchestra pit sizes, while forestage seating can be removed to create additional space.

Two front-of-house lighting bridges, a continuous technical gallery, a pair of box boom bars, balcony lighting bars, proscenium wall vertical lighting bars (both auditorium and stage-side), and portable dance booms provide extensive illumination options. A comprehensive onstage cable system feeds electrical cables from wall boxes to the dance booms without creating tripping hazards.

The room acoustics promote early reflections for speech from the stage. Convex sound-diffusing surfaces hidden behind a sound-transparent architectural screen distribute sound to the audience. The low background noise level and closely controlled reverberation time optimise speech intelligibility and clarity and add dramatic tension.

For the studio theatre, retractable seating and flexible lighting permit a wide variety of uses. A customisable tension wire grid allows scenery, projection screens and lights to be easily and safely suspended anywhere over the performance

area. Curtain tracks run along the perimeter for swift reconfiguration of the space. Additional lighting positions beneath the technical and mezzanine balconies facilitate theatre-in-the-round productions.

Sound-diffusing surfaces embedded within the architectural concrete finish help achieve the desired acoustic. Moving theatrical drapes and varied seating arrangements change the sound quality for different uses.

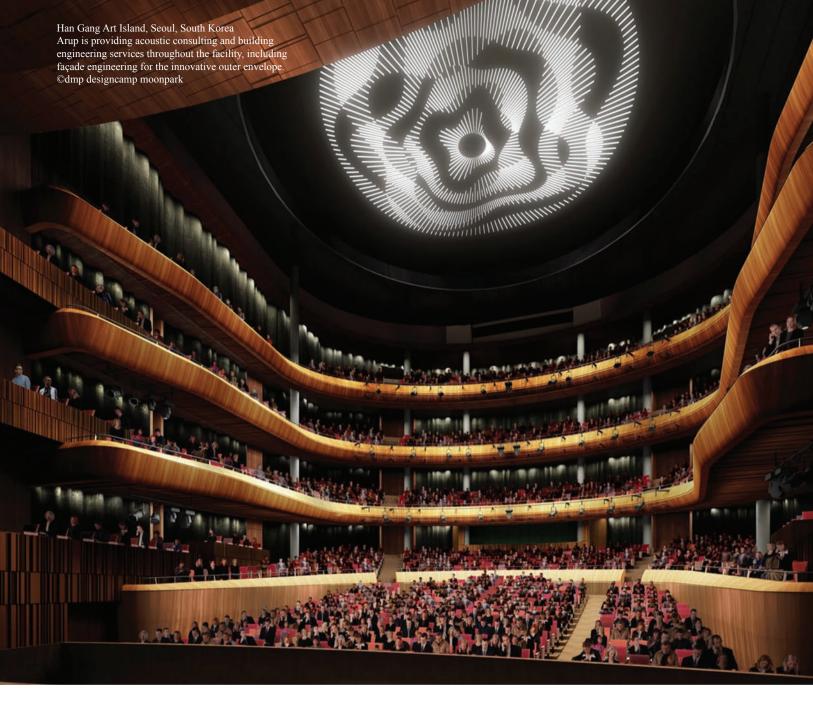
Age-appropriate technical training

To meet the school's need for both professional-grade technical equipment and age-appropriate learning opportunities, the design team specified the same equipment for each performance space, but added new levels of complexity as the room size increased. "That way you're not overwhelming 12-year-old kids with overly complicated technology," says Arup theatre consultant Christopher Dales, "but neither are you selling 18-year-old graduates short on their end training."

Arup was intimately involved throughout construction to ensure that the design intent was realised. "In the concert hall, where the integrity of the finishes was very important for sound quality, we could check that the wood was properly constructed, handled and installed so that the finished product would perform acoustically," Dales adds. The team then trained SOTA's staff to use the systems.

The performance spaces have been well received since their May 2011 debut. "What a pleasure it is to attend a concert at the new concert hall of the School of the Arts," wrote music critic Chan Tou Liang in Singapore's *Straits Times*. "It is an intimate space with an illusion of a vast expanse, where the sound of instruments fills (the hall) with a gratifying glow and vividness."

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### DESIGN

ARTEC

mong the new performing arts facilities designed by Artec and opened in 2011, two of them in particular shared a unique approach to procurement that was adopted by the future owners of the buildings.

The first is the Harpa – Reykjavik Concert Hall and Conference Centre in Iceland, designed with Henning Larsen Architects, which features a 1,600-seat concert hall, a 450-seat recital hall, a 750-seat divisible conference hall, and a 195seat flexible performance venue, along with a range of conference and meeting rooms. The Iceland Symphony Orchestra and the Iceland Opera are resident in the facility, with the Portus Company being the operator. The venue first opened for performances in May 2011, and had its official opening in August.

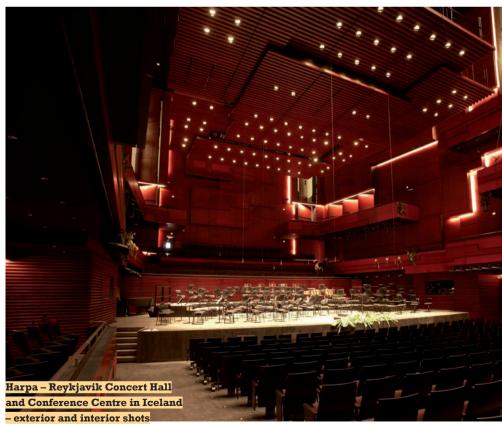
The second venue is La Maison Symphonique, designed with Diamond + Schmitt Architects, which features a 2,100-seat concert hall, and which is the new home of the Orchestre symphonique de Montréal in Canada. The venue - which opened in September 2011will also be used widely by the other musical ensembles in the city and beyond.

## **Early engagement**

Artec provided specialist design and planning services in auditorium design, comprehensive acoustics, (technical) facility planning and specialised performance equipment systems for both facilities. Artec was engaged by the building owners to ensure that the projects achieved world-class acoustics, performance environments and operational functionality. As with most of its projects, Artec was engaged by the client early - in these cases two or more years before the architect and contractors were even selected - with a mandate that stretches to one season after opening.

In both instances, Artec assisted the client in the development of a concert hall within the framework of a Public Private Partnership (PPP) approach to procurement and financing. Both venues were to be undertaken as a Design Build Finance Operate-type of PPP in which the public partner makes a deal with a private partner that develops the venue and provides building











operations over a period of time, after which the building reverts to the public partner.

This type of procurement is attractive to governments for the advantages it provides in mitigating risk while deferring pubic investment over time, while the 'operate' portion of DBFO ensures that the private partner has a stake in ensuring that sufficient attention and resources are invested in achieving a quality venue – at least in terms of those aspects that have a direct impact on maintenance cost or venue viability.

### Risk factors

However, acoustics, sightlines and other subtle aspects of theatre planning that impact audience experience in performing arts venues are particularly sensitive to loss of quality during design and construction, and therefore represent a key risk factor for the development of a successful performing arts venue.

In order to mitigate this risk in these projects, Artec proposed an atypical PPP process in which the public partner - the East Harbour Company (jointly founded by the Icelandic State and the City of Reykjavik) in the case of Harpa, and the Ministry of Culture, Communication and Woman's Affairs in the case of La Maison Symphonique - retained responsibility for acoustics and theatre design, while otherwise proceeding to pass on the risk for architectural design, construction, budget, timeline, delivery and cost-effective operations to the private partner.

## Risk management

Although simple in concept, it was recognised that a prescriptive brief was insufficient. It was deemed vital to develop a specific process and materials that simultaneously ensured that the detailed requirements for acoustics, theatre planning and the specification and accommodation of specialist performance equipment systems would be provided early enough that the budget framework of the project incorporated into the prospective private partners in their proposals would be sufficient to achieve the quality goals of the project.

There would be sufficient interaction between Artec and the rest of the design team to ensure that the size, shape, finishes and geometries of



the auditorium interior (which must by nature be developed so that architecture, acoustics, sightlines and operational functionality are all fully integrated) and the building systems that serve them achieve the quality goals of the project. All of this happened without compromising the line of responsibility between the public and private partners.

To achieve these complex goals, Artec developed a package that started from a basic design – a set of drawings that define the performance area size and geometry, and seating layout, as well as the concept and spatial accommodations for the specialised equipment systems, that then forms the starting point for the collaborative work with the architects. Comprehensive requirements both in result and strategy were provided for structural and mechanical engineering and – in the case of Montreal – tender-level documentation for equipment systems based on the basic design.

Also in Montreal – where strict controls were maintained for the delineation of risk – Artec worked in parallel with each competing developer and their designers (Diamond + Schmitt Architects elected to have Sound Space Design and Fisher Dachs Associates assist them) as the basic design evolved into an architectural design and strategies for engineering developed. However, by the time the developer for that project – a consortium led by SNC Lavalin – was contracted, the auditorium had been formalised to a schematic design level of detail through this process.

In both of the projects, Artec continued to work iteratively and regularly with the private partners to ensure that the detailed proposals



The interior of La Maison Symphonique in Montreal, Canada, which opened in September 2011



would meet not only the prescribed requirements but also the acoustics and theatre design goals that were not possible to define in detail early on in the collaborative development process with the design architect and engineers.

## Comparison with traditional processes

From Artec's point of view, the process resembled a more traditional process than expected. Although there was far more paperwork and more sense of restriction to open communication than with some projects, it was primarily more constraining for the architects as a result. As with other projects, there were regular site visits to ensure that work was being undertaken and issues resolved so that the acoustics and functional goals would be met.

As Artec has remained completely responsible for not only the original concepts and requirements but also for the end result in room acoustics, the theatre planning elements of audience experience, operational functionality, and the specialised performance equipment systems, the company worked within the parameters of the legal relationship to undertake every aspect of the work as it would be carried out on a traditional project.

Technically, due to changes in ownership structure, Harpa was no longer a Public Private Partnership by the time the facility opened earlier this year. La Maison Symphonique is therefore the first such facility to be delivered through this hybrid PPP process. However, the dynamics of approach and the rigid demarcation of responsibility and risk remain common to both projects. ■

www.artecconsultants.com

**11** The sound is really beautiful . . . I think it could be one of the best houses in Europe. - Sigrún Eðvaldsdóttir The Principal Violinist in the Iceland Symphony Orchestra **Auditorium Design** HARPA - Concert Hall and Conference Centre, Reykjavík, Iceland **Acoustics** Theatre Planning La Maison Symphonique de Montréal, Montréal, Québec, Canada www.ArtecConsultants.com **▲▲** La Maison has mellowness and warmth... ,,,, - Anthony Tommasini, The New York Times

### **SEATING**

POLTRONA FRAU

# Science and art

Working with some of the most famous architects in the world, the high-tech, customisable seating solutions from Poltrona Frau add a touch of finesse to any auditoria

acked by more than a century of expertise in the field of quality seating design and manufacture, Italy's Poltrona Frau can lay claim to working with some of the world's greatest and influential architects over the years. These include the creator of Milan's Pirelli Tower, Gio Ponti; the Pritzker Prize-winning Renzo Piano, whose Shard skyscraper next to London Bridge is now nearing completion; New York's Richard Meier, designer of the Getty Center in Los Angeles; and even Sir Norman Foster, responsible for The Sage Gateshead among numerous projects.

Working with such legends is nothing new for Poltrona Frau, however. As far back as the early 1930s, the company was commissioned to design, build and install seating and furnishings for the famous 'Blue Riband' ocean liner SS Rex, marking its initial foray into contract furniture. In 1962, the company joined forces with a leading manufacturer of fine leather, in effect merging the finest Italian seating craftsmanship with the highest possible quality of leather materials available. The products speak for themselves, and might explain why in addition to the previously mentioned bastions of architecture, Poltrona Frau has the likes of Santiago Calatrava, Oscar Niemeyer, Herzog & de Meuron among its project cast, as well as I. M. Pei, Jean Nouvel, Snøhetta and the great Frank Gehry on its impressive CV.

## A new seat for New World Symphony

On the subject of Gehry, Poltrona Frau worked closely with the expressionist architect on the New World Symphony (NWS) in Miami Beach.

The newly opened home of founder and artistic director Michael Tilson Thomas, the NWS is a state-of-the-art educational facility – a breeding ground for the great American conductor and composer to prepare talented young musicians for leadership positions within the orchestral world. Although the soaring sky-lit atrium of the box-like New World Symphony is very un-Gehry-esque from the exterior, step inside and you're immediately filled with a jumble of his signature sculptural forms. A further collection of his daring shapes await inside the auditorium.

An off-the-shelf seat simply wouldn't befit such a project, so Poltrona Frau modified and customised the first generation Frank Gehry chair initially designed for Walt Disney Concert Hall in 2003 for aesthetic and technical reasons; the metal sides replaced by light wood veneer, the thickness reduced in order to meet the space requirements in the auditorium. It showcases the lengths to which Poltrona Frau will go in order to satisfy its clientele – and evidences why the company's expertise is so much in demand..

In fact, for the NWS project, an entirely new design of chair was developed, which is foldable and retractable to offer more flexibility within the auditorium. Gehry himself designed the fabrics in tones of blues with light-coloured arm and backrests, complemented by a polished aluminium base. Such tweaks were necessary. The flexible seating configuration within the NWS offer a range of possibilities for bringing an exhilarating sense of immediacy and intimacy to the concert experience, and called for Poltrona Frau to think outside of the box – something that Gehry would have no doubt applauded. The armchair combines a wealth of new features





and materials: with three different types of row spacing and three distinct reclining angles, designers at Poltrona Frau had to develop an entirely new range to meet the various aesthetic, technical and acoustic requirements.

The thin steel sheet sides are among the notable features, although the structure itself (seat and back) is wooden, with curved multi-layered arms. The design also boasts non-deformable polyurethane padding, while the back features wood and scale board. The seat can be reclined via a gravity mechanism (which includes noise-damping nylon joints), while springing is achieved with elastic strips. Upholstered with wither Pelle Frau Leather Colour System, fabric or velvet and applied with a traditional upholstery system, a cylindrical metal base allows them to be installed within the rows, which is coated with anti-scratch shock-resistant epoxy powders.

In addition to the auditorium seating elements, Poltrona Frau also supplied custom-designed freestanding armchairs for the theatre's entrance, which Gehry also had a hand in.

## **Appliance of science**

Despite the emphasis on artistic form, Poltrona Frau offers the whole engineering consultation service; its engineers as well as its R&D team work within an ISO-certified test laboratory, in order to conduct tests relating to strength, structural integrity, acoustics, and heating and cooling capacity. Such in-depth scientific analyses ensure safety as well as ideal acoustic quality.



The Flair auditorium seat designed by Monica Förster in 2006 for the interior of Palacio De Congresos Badajoz in Spain

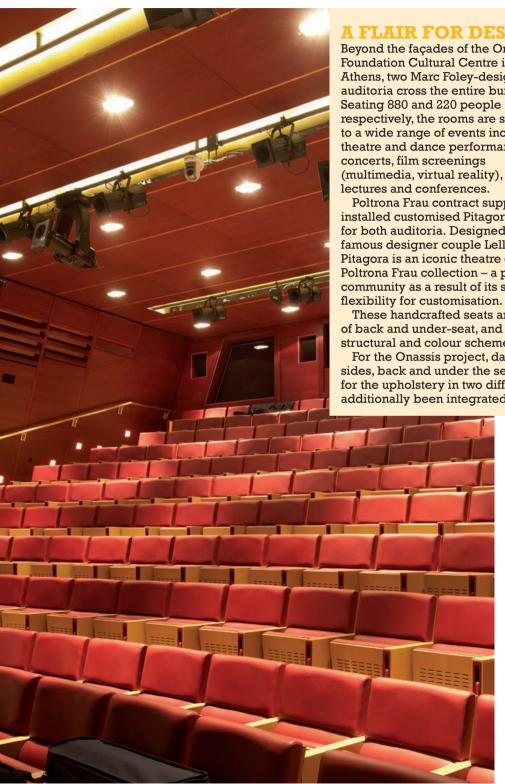
The company's design specialists, meanwhile, will create a layout of the space within an auditorium and integrate the specifications of the engineering team to achieve the archetype in respect of seating symmetry and proportion. Shop drawings are then created for the production of the seat product, before a structural prototype is produced based on the exact specifications. Every single product meets the highest quality demands for design, comfort, stability, acoustics and fire protection. Once the prototype has been signed off, series production can take start, before professional installation of the final seating product. And even beyond installation, an aftersales service programme will preserve the integrity of the seating which helps Poltrona Frau maintain its highest quality demands.

The exact same exhaustive, diligent process that led to the development of the Frank Gehry chair also led to the creation of an entirely different concept for the Royal Shakespeare Theatre (RST) in the UK's Stratford-upon-Avon. The auditorium was developed in collaboration with theatre consultant Charcoalblue as well as the Royal Shakespeare Company (RSC). Evolving over many versions both in model and mock-up form, arguably the most significant step was the construction of the 1,000-seat Courtyard Theatre in Stratford-upon-Avon as a transition space to house the company during the RST's rebuild.

The courtyard was effectively a full-sized prototype for the new RST and lessons learned were critical to developing the concept. Thruststage auditoria bring with them significant acoustic and sightline challenges due to the multidirectional nature of the performance. The RST, however, was developed with slightly smaller overall dimensions than the Courtyard for improved acoustics, sightlines and a greater sense of intimacy. A faceted geometry was introduced and far greater technical capability with full flying and a deep basement serving the thrust stage. In fact, new RST auditorium sees the distance from the furthest seat to the stage reduced to 15m, which is around half the distance than in the 1932 auditorium.

The initial concept for the RST seat was developed between Bennetts Associates, the Poltrona Frau project team, the RSC, and





## A FLAIR FOR DESIGN

Beyond the façades of the Onassis Foundation Cultural Centre in Athens, two Marc Foley-designed auditoria cross the entire building. respectively, the rooms are suited to a wide range of events including theatre and dance performances,

Poltrona Frau contract supplied and installed customised Pitagora armchairs for both auditoria. Designed by world-

famous designer couple Lella & Massimo Vignelli in 1995, the Pitagora is an iconic theatre chair from the standard bespoke Poltrona Frau collection – a preferred chair in the architectural community as a result of its simplicity of form, but also for its

These handcrafted seats are also available with wooden surfacing of back and under-seat, and with a foldaway writing top. Customised structural and colour scheme solutions are also available.

For the Onassis project, dark wood veneer was used for the chair sides, back and under the seat, while the client preferred Pelle Frau for the upholstery in two different colours. An air diffuser has additionally been integrated into the metal support of the chair.

> Charcoalblue and incorporated lessons learned at the Courtyard Theatre. Although the thruststage format dictated that there would be many variants in width, height and back angle, it was agreed early on that these variations should be achieved with only slight changes to a simple basic concept. The raw construction of the chair is expressed with laser-cut steel leg frames and exposed, flat plywood seat and back panels finished with upholstered cushions and arms. The design and detailing of the chair were developed closely with Poltrona Frau, which manufactured a series of prototypes for testing and consultation in Stratford-upon-Avon.

As with the Frank Gehry chair, the process of developing the RST seat was an excellent example of collaboration between client, designers and manufacturer each bringing their experience and expertise to the process a seat Mr Shakespeare himself would have been proud to sit on.

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WENGER CORP

## Unsung heroes

Flexible stage and seating arrangements have proved their worth at two busy performing arts venues in the USA

erforming arts facilities never give top billing to their staging platforms and audience seating, but as two facilities in the USA illustrate, this unsung equipment can play vital roles in supporting flexible programming and memorable performances.

"Around 50% of our interior structure is mobile," explains Tom Hamilton, technical operations director at Cerritos Center for the Performing Arts (CCPA), which is located in Cerritos, California, 20 miles southwest of Los Angeles. "It's like a puzzle we can assemble in different ways, including arena, theatre-in-the-round, and cabaret configurations," he adds.

Designed by architect Barton Myers and planned by Theatre Projects Consultants, CCPA is one of the most flexible theatres in the world, following in the traditions of the changeable theatres of the 18<sup>th</sup> and 19<sup>th</sup> centuries.

Hydraulic lifts and air casters allow the auditorium to take on five different configurations. Balcony seating is fixed, but floor seating consists of movable wagons that can be raised, lowered or removed completely. Large towers containing the box seats can be angled to face the stage in a number of positions. Overhead ceiling panels are also movable to suit different acoustical requirements.

The stage can be transformed into various sizes, either manually or by electronic controls. This unique flexibility is supported by an extensive inventory of Wenger staging – approximately 100 staging decks, both 1.2 x

2.5m and 1.2 x 1.2m in size, with interchangeable legs ranging from 20cm to 100cm.

"The largest setup is our arena configuration, where we build a  $15 \times 10 \text{m}$  stage 100 cm high," Hamilton reveals. "We also build band risers for pop and country shows."

Even when in the arena setup, CCPA still owns enough additional platforms to simultaneously serve other areas of the facility. "Because it's so flexible, we also use these platforms in our lobby for banquet head tables or podiums, in our conference room and theatre, or even outdoors in our garden and fountain courts," says Hamilton, adding that the platforms are easy for two people to handle.

Versatile architecture and flexible equipment have enabled CCPA to adapt to changing market and client needs, re-inventing itself more easily and targeting a wider variety of events than would be possible with a fixed configuration.

Most of the performing arts programming is during the autumn, winter and early spring. "Given the realities of our programming budget, we decided to start our summer season a little earlier in order to get bigger pop music acts that are touring," continues Hamilton. Some cabaretstyle concerts are held in the more intimate Sierra Room on a 6 x 7m stage.

CCPA is also targeting more rental business, particularly during the spring months. The facility has become popular for high school proms as a result of the flexible configuration options and layout, including large banquet space and dance floor. Twelve proms are already booked during a six-week period in 2012.









Performing Arts in California interior and exterior shots



Leon Memorial Recital Hall in Colorado has opted for light tan upholstery with orange accent colours

In the past, CCPA's proximity to Los Angeles made it a popular location for TV specials, commercials and Hollywood movie sets. "I don't know of any other facility our size - less than 2,000 seats - with such flexible configuration options," notes Hamilton. "We've been extremely pleased with our staging and have increased our inventory over the years, which is a compliment in itself. We'll continue choosing Wenger."

## **Adams State College**

"Uncomfortable seating was everyone's biggest complaint - the old seats in Leon Memorial Recital Hall were terrible," recalls Dr Tracy Doyle, music department chair at Adams State College in Alamosa, Colorado. At this campus venue for recitals by students, faculty and guest artists, along with concerts by local bands, the seating was original from the 1960s.

During a week-long selection process, a team of college personnel sat in sample seats from five manufacturers. Doyle says comfort was the main issue, followed by attractiveness. "Wenger was our favourite from day one and that did not change - it was unanimous," she explains, adding that she believes the higher seat back contributes to the comfort. "We also liked the sophisticated look – different to a lot of the traditional auditorium seating." They selected light tan upholstery with orange accent colours.

Other finish upgrades in the hall's renovation included new paint, carpets and tiles, along with new lighting and a recording booth. Davis Partnership Architects was the architecture firm.

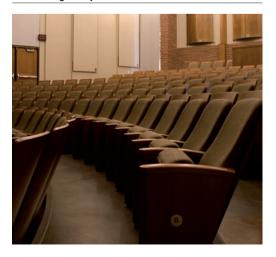
Testing ensured the new seating would not alter the hall's acoustics; after a recent piano recital, the consensus opinion was that the acoustics had actually improved.

To minimise noisy distractions, seats feature a proprietary lifting mechanism that ensures extremely quiet operation.

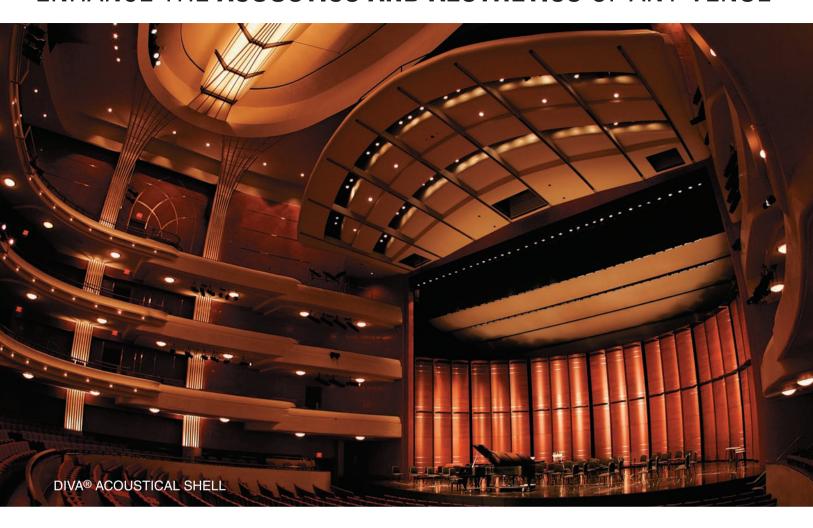
"The response to our new seating has been overwhelmingly positive," concludes Doyle. "Everyone's raved about them - both the comfort level and attractiveness."

Along with staging and seating solutions, Wenger fits out performing arts facilities across the USA and around the world with a wide range of other equipment, including acoustical shells, choral risers, storage cabinets, music stands, and a full line of music posture chairs.

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Design's fasttracked auditorium
renovation in
Nashville

ennessee-based architect Matt Taylor from Studio Eight Design can afford a smile as he reflects on a recently completed corporate auditorium renovation in Nashville - not least because he and his project team managed to complete the job from start to finish in just three-and-a-half months. "The auditorium was originally constructed in 1980 and neither the finishing touches nor the audio-visual equipment had been updated in all that time," he says. "We first learned about this project at the end of January and were only too pleased to take it on, but the client wanted the whole job completed for an awards presentation at the start of May, which being staged at the same time every year, couldn't therefore be rescheduled."

Admitting that the timescale was the biggest challenge, Taylor is grateful for the effective teamwork between all involved parties, including interior design (Casella Interiors),

AV supplier (Logan Media Services), electrical and mechanical engineering (Empower Electric and Lee Company respectively), seating specialist Dauphin North America and the general contractor Harvest Construction. "Due to the fast turnaround, we suggested Harvest Construction as a result of their familiarity with the client, the existing building, and their ability to help fast-track the project by ordering long lead-time items and manage the budget while we developed the design," Taylor continues. "They were masterful; it was a perfectly orchestrated operation that involved getting all the various subcontractors in and out without losing time, which really was of the essence in this case."

The auditorium itself is primarily used as a classroom space for seminars and continuing education, although Taylor's client wanted to have some flexibility in the design so that it could be transformed into a more dramatic environment for other presentations, awards ceremonies and even the occasional musical performance, if required. "It's always been a very busy space, regularly booked for eight hours a day and for five days a week or more sometimes, which was evident in the wear and tear from 30 years of use – worn fabrics on the seats, the carpet and so on," he says. "As soon as we got the go-ahead, we knew the first items we had to order were those with the longest lead times - the carpet and the seating."

## A COMPLETE TRANSFORMATION

Although the seating from Dauphin adds the finesse that Studio Eight Design was hoping to achieve for the auditorium, there are new finishes from top to bottom. Heather Robers, Studio Eight's project manager, created the vision for the new look, building upon her previous experience with historic theater renovations. "The lighting both on the stage and in the audience was a critical issue. Not only were the levels insufficient, but due to the height of the ceiling lighting and the slope of the floor, it was difficult to change the incandescent bulbs," she reveals. The project team therefore replaced all ceiling lighting with LED fixtures and added several new wall-washing fixtures to offer the room more lighting options. "The wood wall panels, meanwhile, not only create a warm and formal feel but also have acoustic properties that improve voice projection from the stage. To complement the wood finishes, fabrics in warm tones were selected for the Dauphin Eidos seating and the acoustic wall panels. We also integrated a new audio-visual HD and surround sound system, with a projector screen that retracts into the ceiling so it's not a permanent fixture visually. It's all controlled via touchpad: you hit a button for a certain type of presentation and the screen comes down, the lights dim and the projector comes on. It's a lot simpler for whoever is running the presentations."

## **Interior motives**

"We guided the client through design selections and implemented the renovation in about 14 weeks," explains Laret Casella of Casella Interiors, another Nashville-based firm. This included new flooring, lighting, wall treatments, A/V equipment, casework for the auditorium, the balconies and control room, and of course the all-new seating. "There were a lot of 'Plain Jane' seating options out there, but we were after something with a little more style – more









Dauphin's Eidos seats are both stylish and functional

contemporary and professional, something timeless that wouldn't date within five, 10 or 15 years," she says. "Functionally, the client needed a flip-top tablet arm, too, upon which those people in the auditorium could work, as well as hardshell seatbacks to mitigate the effect of people in the seats behind perhaps accidentally kicking the seats in front. The extremely high levels of use in this particular auditorium demanded a seat that was extremely durable. Also, the sloping floor was a particular challenge, although it actually meant we could rule out a lot of potential suppliers very quickly, while the strict timeframes allowed us to weed out even more that simply couldn't deliver to our schedule and to our specification in terms of fabric and design quality. Matt [Taylor] didn't want a chemical lab classroom-type seat; he wanted more of a theatre feel as the auditorium might be used for performances. The Eidos seat from Dauphin really ticked all of the boxes and they delivered on all of their promises in terms of the deadline. They were really wonderful to work with."

"In our research, we found many of the available seating solutions to be very institutional-looking but the Dauphin Eidos seat was visually very appealing and complemented our design concept," Taylor explains. "Although an off-the-shelf seat, we picked a custom fabric – the one the client liked the most – and it worked out great." In total, 243 seats were supplied for the 3,000ft² space, both for the main floor as well as for the two side balconies. Dauphin's 'Rocket' pattern was selected in a taupe Nanotex finish.

## **Perfect partners**

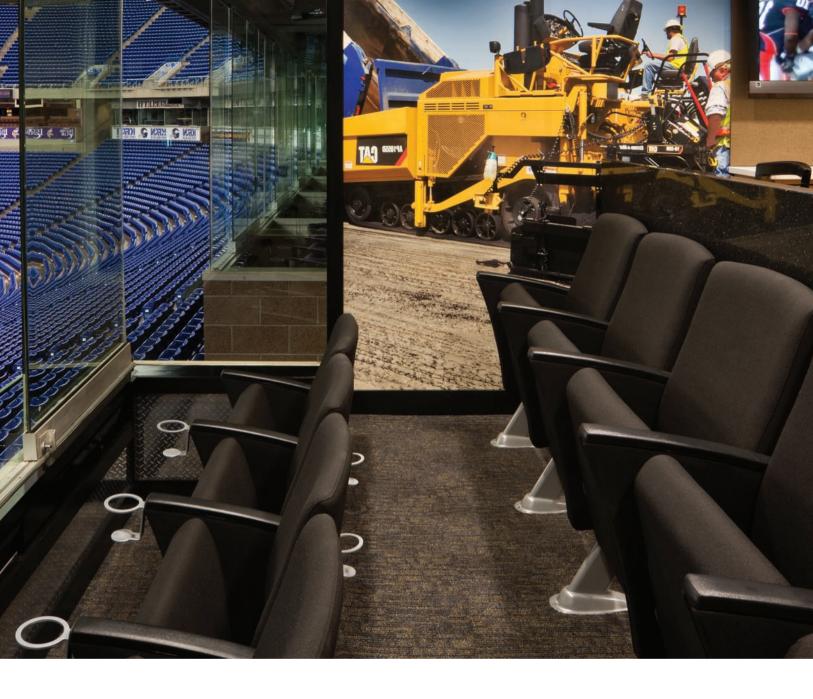
"Dauphin was very co-operative in working with us on layout and CAD files so we could share files back and forth to keep the design evolution going while getting the seats ordered, which was great knowing that we wouldn't be backing ourselves into a corner," Taylor adds. "And because of the physical dimensions of the seat, the spacing is a little more generous between the aisles and rows so that people can now get to their seats while the tablets are up. When it came to installation, they did a great job at getting the seats in – they were meticulous and we watched them diligently adjusting the seats to line up accurately on the aisle, ensuring the very best sightlines, fine-tuning for the sloping floor etc."

It's all in a day's work for Stuart Rogers-Brown, the COO of Dauphin North America, who was not at all concerned about meeting the deadline, reporting that this wasn't the first – nor would it be the last – project to move at such a pace. "It wasn't really a challenge for us," he says. "The only thing you need to bear in mind is that when projects do move this quickly, it means there's no room for error. But we're quite used to having to deliver seating solutions for the start of a school term, for instance, or for the opening night of an event that cannot be moved.

"We try to immerse ourselves in a project as deeply as possible in order to share some of our experience and knowledge, so we'll work with the architects, the designers and the clients to make sure that they end up with what they're looking for," Rogers-Brown explains. "It just so happens that our Eidos product was exactly what they were looking for in this case. A lot of clients come to us because they are looking for a quality product that's not going to break down, yet they're also looking for a certain aesthetic appeal – not just a functional piece of furniture, but something to enhance an image as well. This is where I feel Dauphin stands out."

"I'm really proud of the transformation," concludes Matt Taylor from Studio Eight Design. "The auditorium doesn't just look better, it feels better and functions better. The client cannot believe it's the same room!"

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GLOBAL DESIGN SOLUTIONS

## Light fantastic

The ARC LED house light system was used to replace an incandescent auditorium installation at the UK's Hall for Cornwall in Truro with outstanding results

he ARC System is a new range of LED auditorium lighting fixtures that are dimmable from 0% to 100% using wireless ARC Mesh protocol for control, meaning the system can be fitted without having to rewire your auditorium.

Developed by Bristol, UK-based Global Design Solutions (GDS), the ARC System comes in a range of options for both recessed and surface-mounting, single cell to multicell, including one, four and eight cells. The optics are available in a range of beam angles, including 19°, 24° and 37°. Using high-efficiency optics and LEDs, the system is able to produce a colour rendering index (CRI) in excess of 92 with a range of colour temperatures.

## Case study: Hall for Cornwall

Hall for Cornwall in Truro, south-west England, approached GDS to design a setup to replace its existing incandescent auditorium lighting system with the ARC LED system without altering the aesthetics of the building or the overall effect of the existing house lights.

To achieve this, GDS needed to use the brackets that housed the existing fittings, including a PAR 56 300W lamp and an HQI 150W used by the venue's cleaners. Using eight-cell electronics and optics, GDS was able to redesign the layout to fit exactly into the existing brackets, replacing only approximately half of the old light boxes to achieve not only the dimmable house light system but also – when at 100% – the lux level required by the cleaners.

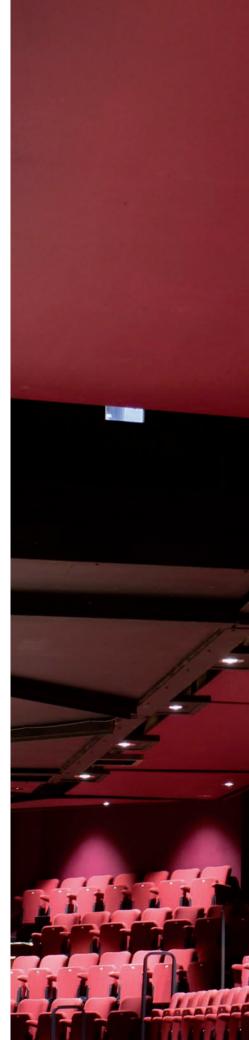
This was achieved using eight 20W LEDs in a single custom housing.

"From the beginning, it was apparent that working with GDS would be a different experience," says Simon Crick, head of operations at Hall for Cornwall. "There is an understanding that all customers' needs are not the same; GDS was willing to take on board our requirements and ensure the product it developed was adapted to meet those requirements.

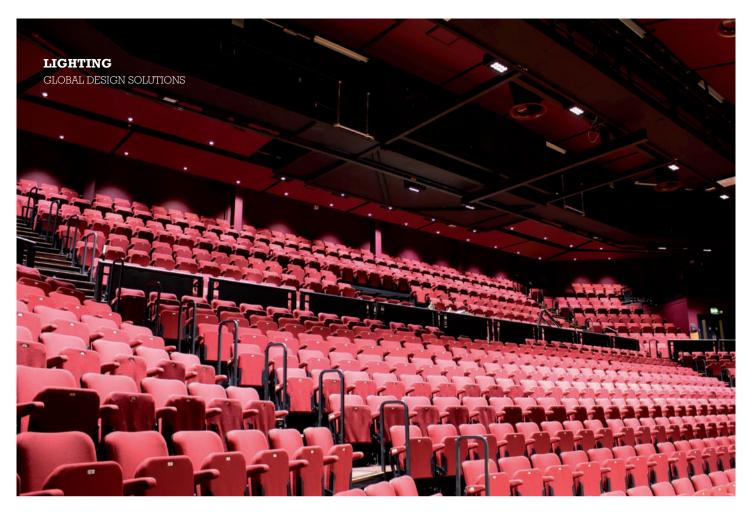
"Throughout the process, attention to detail has been excellent, including that of the installation team on site. It is obvious that the whole team at GDS involved with this project believes in the product and is proud to be a part of the company – and that is reflected in the workmanship.

"The product itself has met and surpassed my expectations," Crick continues. "Only after the installation did the level of scepticism among some of the venue's technicians become apparent – with doubts that the LED technology would be capable of dimming properly, or of providing enough light output. But all of the installation feedback from staff at the venue – technical or otherwise – has been extremely positive.

"Housekeeping immediately appreciated how much better they could see; front-of-house are pleased with the colour temperature and even coverage; and the technicians are impressed with the flexibility and dimming. It was developed with ease of installation in mind, which meant we were able to confidently schedule the work for an already planned maintenance week.







Audiences at Hall for Cornwall will now benefit from its sophisticated lighting system

"Flexibility in use was a critical factor for us to be able to cater for all needs, including achieving a significant energy reduction. We now have a house lighting system with an

## Technical information

- 19 x 150W GDS eight-cell fittings
- 12 x 75W GDS four-cell fittings
- 51 x 20W GDS one-cell downlight
- Custom metalwork to retrofit into existing fittings
- Software written for custom AMX interface
- No addition or modification to existing wiring
- Integration of light control
- Low-glare reflector system
- 19°/24°/37° beam options
- 8 x 20W Bridgelux LED array
- More than 92 CRI
- 10,000 lm output per eight cell
- 2,700/3,000/4,100/5,700K colour temperature
- 80-230V AC
- Convection-cooled
- ARC mesh control protocol
- GDS dimming curve used in conjunction with ARCnode for: dimming; patching; auto recovery; minimum light level set; group selection recall; analogue/DMX/Artnet/network control; web server configuration; fault monitoring; temperature monitoring; power fail/recovery option set; and 24 preset recall

energy consumption of 5kW, replacing a combined house and working light system with an energy consumption of 21kW, and it has delivered brighter and better light output, with greater flexibility into the bargain. For our installation, after taking into account all factors, including relamping costs, annual savings are predicted to be around £8,000.

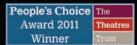
"The new houselights have supported our aims of an improved auditorium and reduced energy consumption. Hall for Cornwall is delighted to have had the opportunity to work with GDS in the final stages of development of this product, culminating in the first installation anywhere in the world," Crick concludes.

The system can be interfaced with a multitude of standard control systems, such as DMX and AMX, or even standalone.

The GDS ARC System is a viable alternative to existing tungsten or halogen lighting installations and can create the same ambience for half the input power, combined with a long running life in excess of 50,000 hours. This reduces running costs, maintenance and thermal output, bringing viable energy saving benefits when compared with existing halogen lighting solutions. ■

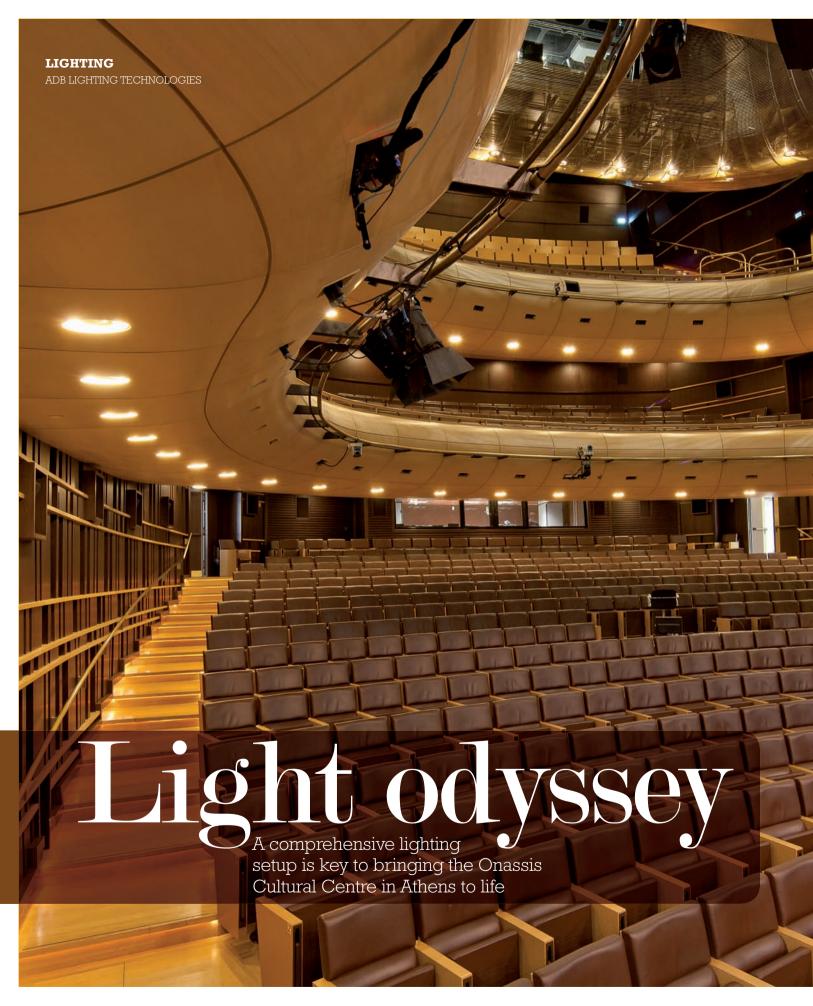
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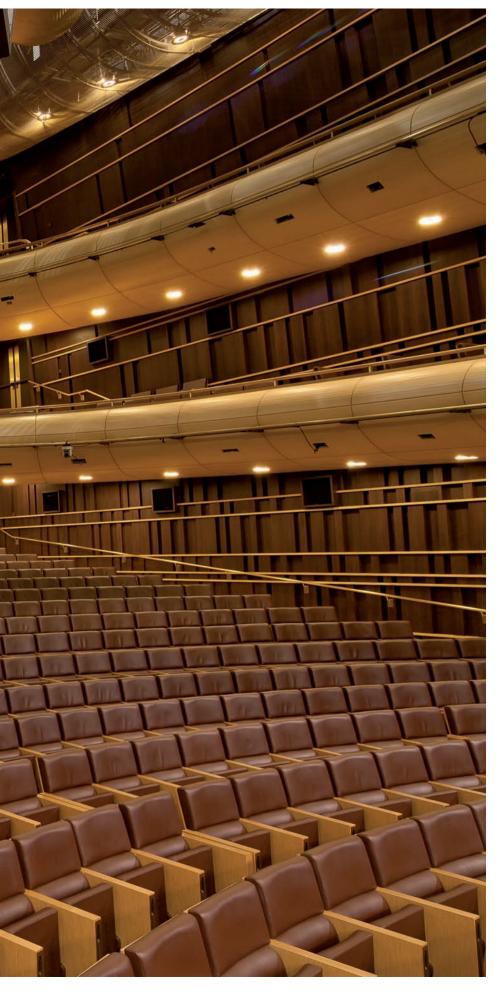












thens-based systems integrator Telmaco has completed a major lighting, sound and video installation in two auditoria at the new Onassis Cultural Centre in central Athens. Featuring ADB Lighting's own Eurodim Twin Tech dimming, a large quantity of ADB Warp Motorised zoom-spot luminaires, PCs and fresnels, and ADB Phoenix/XT and Mentor/XT control consoles, the fully networked system is one of the country's largest entertainment lighting systems.

The Onassis Cultural Centre was inaugurated in December 2010 as a new cultural site accessible to all. Its mission is the promotion of modern cultural expression, the support of new Greek artists, the cultivation of international collaborations, the education and lifelong learning, as well as the co-existence and interaction of sciences, innovation and arts.

During the centre's architectural study, 66 candidates from all over the world were evaluated, with the French architectural firm Architecture Studio winning the contract. The building's construction began in 2000, with the exclusive funding and supervision of the Onassis Foundation. The result is an excellent example of contemporary architecture, with the simplicity of the building's volume and plainness of form offering a powerfully monumental character. The interior of the building extends to a total of 18,000m<sup>2</sup> over seven floors and nine underground levels.

## **Design brief**

The architectural design of both theatres was assigned to architect Mark Foley, while the specialised theatre lighting was the work of James Morse, with architectural lighting designed by Eleftheria Deko & Associates. The ground-level bar area was designed as an overall work of art by the artist Aemilia Papaphilippou. Overall technical project manager for the theatre was George Papadimitriou.

Telmaco's installation - which also includes a control system for the building's LED exterior lighting, as well as communications systems, show relay systems and house lighting control - centres on the Aristotle Onassis 880-seat main auditorium. This hall, with a 24 x 76m stage, is designed for theatrical, symphonic orchestra, opera and dance performances, digital cinema, lectures and conferences. The 220-seat



Christina Onassis Hall alongside it is designed for theatrical, musical or dance productions, lectures and special cinematic features including multimedia and virtual reality. The building also houses the 600m² Alexander Onassis Exhibition Hall – an open-air theatre, a restaurant with an open-air section, bar and underground car park.

Central to the fully networked lighting system are six ADB Eurodim Twin Tech universal dimmer cabinets for stage lighting, and two more for house lighting dimming. All are networked over Art-Net.

The dimmer installation makes full use of the Eurodim Twin Tech's ability for plug-in modules of any type or rating to be freely mixed and moved in any configuration within the universal cabinet, modules being automatically recognised by the instant automatic module identification in the central electronics.

The stage lighting dimming component includes 508 channels in 127 4 x  $3kW/400\mu$  rise time thyristor dimmer modules, 21 channels in seven modules of 4 x 5kW thyristor dimming, 128 channels in 32 modules of 4 x 3kW solid state relay modules and 18 channels in six 3 x 5kW solid-state relay modules.

The house and work light dimming system, housed in one universal cabinet, is designed to give flexibility to the theatre's technicians to control house lighting and auditorium lights from Production Lighting Boxes – which also provide breakouts for Ethernet and DMX – at 167 separate locations around the auditorium, with a Cue Systems control network to enable the lighting zones. Further touch buttons give the stage manager and lighting console operator more access to the bridges, as specified by Theatre Project Consultants. The Eurodim Twin Tech cabinet houses 44 channels in 11 4 x 3kW solid-state relay modules and 76 channels in 19 4 x 3kW thyristor modules.

The theatre can be set in four modes: daytime, in which every fixture can be switched on;

The Onassis Cultural Centre's lighting setup gives the technicians the flexibility to bring productions to life



rehearsal, in which some of the lighting functions are restricted to prevent uncontrolled lights during rehearsal; performance mode, in which the system is 'locked out' to all but front-of-house lighting control; and night mode, where some of the panels are illuminated to allow cleaning staff to select house and work lighting.

The ADB lighting inventory is headed by a total of 22 Warp/M Motorised zoomprofile spotlights – a mixture of Tungsten and Daylight versions – together with 136 zoomprofile spotlights of various specifications, and 102 fresnel and PC spotlights, and 24 ADB ACP Cyclorama lights. "The Warp Motorised spotlights were chosen for their silent operation, flexibility and high light output," says Constantinos Vonofakidis, Telmaco's project manager. "There's nothing on the market that offers similar performance."

The 1.2 and 2k profiles are in the stage rig; fresnels, with the PCs flown from 60 fly bars, via pre-cabled lighting bars that are fed by spring-driven cable reelers located on the upper galleries. Three galleries are used for side lighting, along with side bars on the front of the house and two bridges. "It's pretty flexible," Vonofakidis adds.

## Moveable panels

In the smaller, 220-seat Christina Onassis Hall, which is fitted with moveable side wall panels to enable the acoustics to be varied to suit the performance, are more noiseless motorised halogen Warp/M luminaires, some with a 12-30° zoom, another six with the 22-50° to suit the shorter distance to stage. In command are an ADB Mentor XT 1024 console and a Phoenix/XT 1024 and two ADB Eurodim Twin Tech Universal Cabinets housing 152 channels in 38 4 x 3kW thyristor dimmer modules with 400µs rise time modules, and 64 channels in 16 4 x 3kW solid state relay modules. The second cabinet also houses 24 channels into six 4 x 3kW Thyristor dimmers for the house and work lights control.

"The Onassis Cultural Centre brings to Athens a world-class facility that sets new standards for the country," concludes Vonofakidis. ■

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## Simplicity in motion

Despite its move into the area of theatre automation, Prolyte's core company values remain the same

aving already built a solid reputation as a truss manufacturer, Prolyte Group may not be the first name that comes to mind when you think of theatre automation. However, following the formation of the company's new division, ProLyft – one of four independent brands to operate within Prolyte Group – theatre automation is

now very much on the agenda.

And the new division will, of course, operate according to its parent company's core philosophy: to combine top-quality products with a close relationship with its working partners.

"Our team of product experts and engineers have extensive experience within the theatre and installation market. so we are able to translate any idea into a suitable installation, using the latest technology, out-of-the-box solutions and up-to-date regulations and standards," explains ProLyft's brand manager Michiel van der Zijde. "Our close bond with winch and control manufacturer STS guarantees that the latest technologies are adapted and that products are tested intensively out in the

field. Feedback from temporary installations all over the world is used to improve products and software on a continuous basis."

Prolyte Group focuses on manufacturing and marketing high-quality products, and leaves the installation of these products to its partners. By concentrating on creating outstanding, durable and user-friendly products for users worldwide, the company is able to meet and surpass its customers' expectations. Operating on a global scale, while letting local partners take care of the requirements of the local market, also means Prolyte's products can be made more affordable.

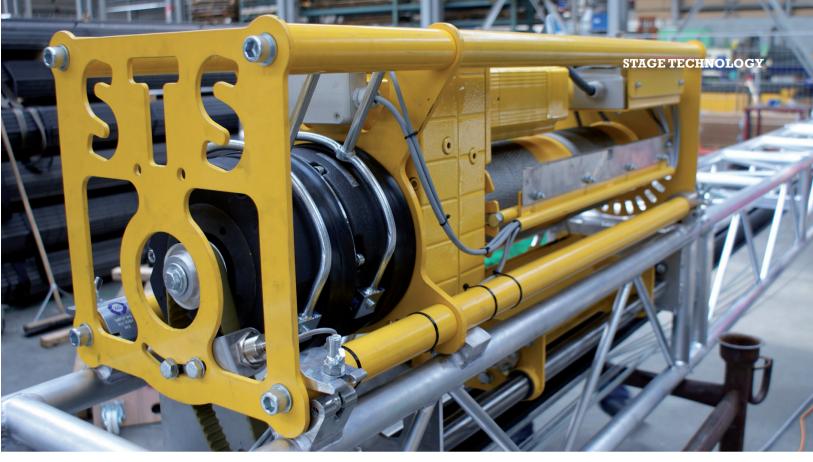
The Bolshoi installation, recently carried out by Bosch Rexroth, is a good example of this partnering. Bosch Rexroth asked Prolyte to supply a performer flying system for its theatre installation project at the Bolshoi Theatre in Moscow. "Prolyte's technical know-how of products and software applications is unsurpassed and it made it possible to run its winches on our own control system," a spokesperson for the installer said. "Tests were performed in the factory before the system was shipped to Moscow, and it operated without any problems.

## Intuitive approach

ProLyft's systems offer a fresh and intuitive approach and are designed on a plug-and-play basis, whether it be winches, control systems or integrated performance fly systems.

The Parkstad Theatre in Heerlen, the Netherlands, contacted Prolyte, working in







The Bolshoi performer fly system under test procedure in the factory













(Above) ProLyft's brand manager Michiel van der Zijde (left) with Denis Bramhall, operations manager at Unusual Rigging (Left) A Prolyte winch installation (Bottom left) New generation control desks

partnership with STS, to revamp the entire automation system of the venue's two theatres. The project involved a complete overhaul of the drive automation as technical problems with this installation had forced the Parkstad Theatre to cancel a number of performances following a serious incident late in 2010. The renovation project included the supply of a new control desk and rebuilding of the drivers and control system. Three new desks and two new Wagner Composer winches were also included in the installation.

## Partner philosophy

Prolyte Group's partners operate independently and locally, and are able to carry out construction and installation, in addition to acting as intermediaries for product feedback and customer demands. By investing in training and lasting business relationships, Prolyte has created associations with valued partners that provide excellent service to these customers. These installation partners can also broaden their operations with this access to the wide range of products in Prolyte's portfolio.

"Prolyte's range of winches allows me to address markets I can't look at independently," says Denis Bramhall, operations manager at rigging and stage engineering provider Unusual Rigging. "We can't invest the amount of research and development that it takes to make new products. The extra know-how we have access to by working with Prolyte opens up new markets for us. It is a true partnership; we bring in the practical experience, mutually engaging in product development and testing, before getting the products on the market."

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IR CLANCY

## The wow factor

Twelve years in the making, the Kauffman Center for the Performing Arts has united the arts in Kansas City



The Muriel Kauffman Theatre, inside and out; the backstage area (opposite page)

Anyone close to me when the orchestra played the first chord ever heard in Helzberg Hall, the opening of Beethoven's First

Symphony, heard what I whispered a moment later: 'Wow! I wouldn't have believed it, but my expectations were exceeded." This is high praise indeed from the *soundandglass.org* blog of Kansas City Symphony principal trombonist Roger Oyster, for the 1,600-seat Concert Hall in the new Kauffman Center for the Performing Arts in Kansas City, Missouri, USA.

The extraordinary acoustics in Helzberg Hall, coupled with the flexible functionality of the 1,800-seat Muriel Kauffman Theatre, are the culmination of 12 years of planning this new home for the Kansas City Ballet, the Lyric Opera of Kansas City, and the Kansas City Symphony. Architect Moshe Safdie designed the centre's marble, steel, and glass expanse and joining him were a team of theatre design professionals from Theatre Projects Consultants, led by Michael Ferguson.

When it came time to choose a rigging supplier, the proposal from JR Clancy won the bid. "I could tell early on that Clancy was serious about this job and very knowledgeable," reveals Kevin McPartland of JE Dunn, the project's general contractor.

"What has always been characteristic of Clancy's bids is a completeness, a confidence they give the general contractors based on their experience and understanding of the project," adds Michael Nishball, director of Theatre Projects, and the senior rigging designer.

The challenge of equipping two performance halls simultaneously allowed Clancy to put all of its technical and organisational skills to work. "Most contractors do not build many projects like this one in a lifetime," continues Murphy. "Kevin and his team at JE Dunn did a terrific job, providing leadership and keeping everyone on track."

Big projects demand the highest levels of collaboration and knowledge-sharing, Murphy feels: "There were enough co-ordination issues that we needed a full-time, experienced project manager on site. We brought in Brett Cooper to work with JE Dunn and the other subcontractors to make sure our equipment went in the way the design team intended."

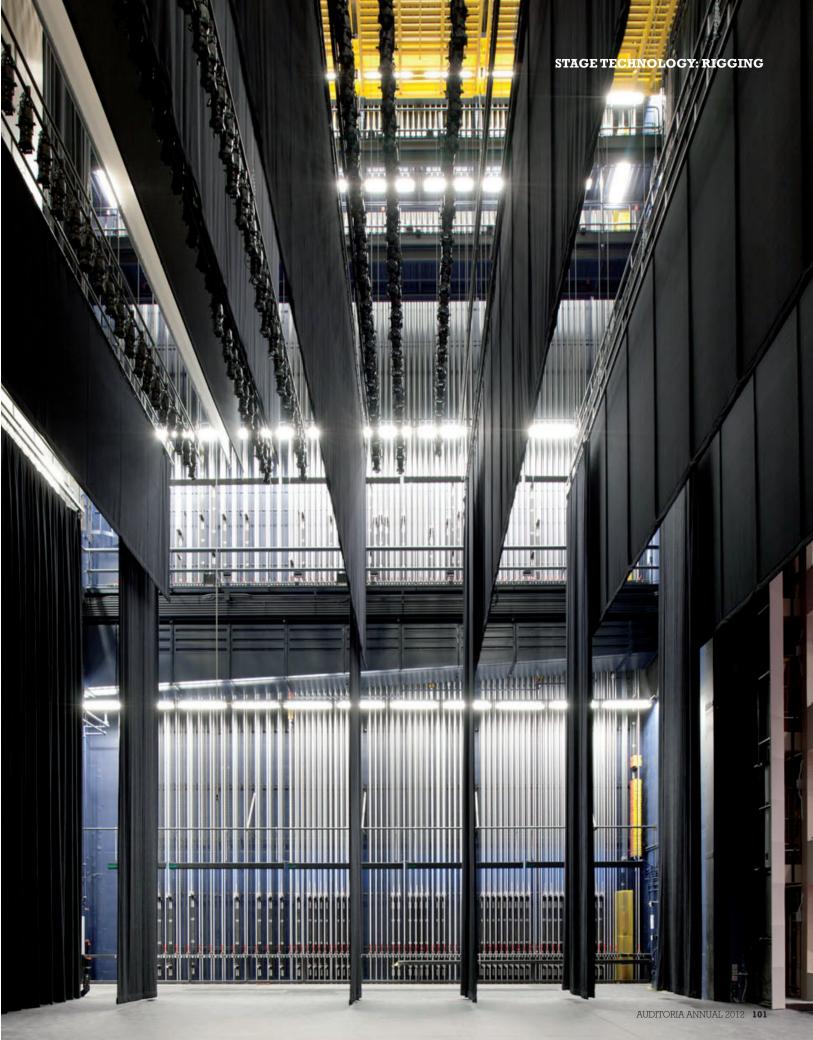
Cooper took on the project full-time in October 2008. "JE Dunn used NavisWorks, a computer modelling system, and brought all the elements together before anything went into the building," Cooper says. "The 3D modelling helped us avoid quite a bit. Then it's a matter of working with people on site, talking with the foremen, and watching as it goes in."

The first challenge in Helzberg Hall was the 45,000kg suspended acoustical canopy that had to be installed as early as the building would allow. "It required assembly of all the framing steel and formed reflector surfaces at the floor level," Nishball says.

"We had to get the concert hall built before we could contemplate bringing in the canopy and hanging it," says McPartland. "But the structure was designed so that there was no easy way to do it. We had to work over and under each other. This went on concurrently for several months."

When the time was right, Clancy's team worked swiftly to bring the canopy into the hall. To position the structure, Clancy provided seven chain motors, each with a capacity of 10 tonnes. A Skjonberg 48-channel system with load-readout controls provides the motorised controls for the chain-hoist system.







The Muriel Kauffman Theatre will host ballet, opera and touring Broadway productions (left); the hoist system above the canopy in Helzberg Hall (right)

"The canopy actually came in at 50 tonnes," Cooper says, "so we had plenty of capacity. Then we've got seven more hoists on top of the canopy, which lower three outriggers to the ground with all the lighting and some of the speakers. At the floor, stagehands can add more lights or speakers or make necessary adjustments."

"To achieve the acoustic 'tuneability' that Yasu and Nagata required, the canopy - which is 15m above the stage - adjusts up and down 1m," says Ferguson. "We still had to access the VariLite VL1000s hung around it, so we needed to lower the lighting outriggers to the ground. We control those outriggers and all of the adjustable acoustics from a touchscreen remote."

"There are 75 holes in the hall's ceiling and 36 chain motor potential pick points - each with a receptacle box - where we can move all the motors around in the tech attic," says Cooper. "They can fly banners, flags, whatever they need."

Clancy equipment also completes the acoustic system. "Through the sides walls, we have a retractable roller banner system with 10 acoustical banners - five on each side," he says.

Clancy also provided five 450kg cyclorama point hoists, with a speed of 0-60m per minute. These, as well as the lighting, banner, and speaker hoists, are controlled using a SceneControl pendant. Six Gala lifts, installed by Clancy, create three half-ring risers from the stage floor for the optimal configuration of a full orchestra or choir.

"There's a lot of flexibility in this room," Ferguson says. "It is specifically designed for symphonic music, but we also know that a lot of use will be for other things - from a film, to a corporate event, to an amplified concert. The flexibility allows them to make these changes quickly. It also future-proofs the room."

The Muriel Kauffman Theatre demanded the same kind of adaptability between ballet, opera, and touring productions. With a 23mhigh fly tower, the theatre has the capacity to accommodate the largest touring shows.



JR Clancy provided 70 counterweight sets with a loading gallery – scalable to 90 sets as required - and a computer-controlled house curtain. Clancy also provided a 450kg, steelframed fire curtain, and a house curtain on a custom hoist, with a speed of 0-115m per minute.

Twenty-eight variable-acoustic banners on custom-chain drivers are stored behind the wall, where they can be lowered behind the seat backs using a SceneControl pendant.

"Clancy also installed two Gala lifts with full seating wagons, which can extend the stage floor, provide more auditorium seating, or create two sizes of orchestra pits," says Ferguson. "There's a sound cockpit lift as well. We can go from seating to sound mix in five minutes."

## **Unifying elements**

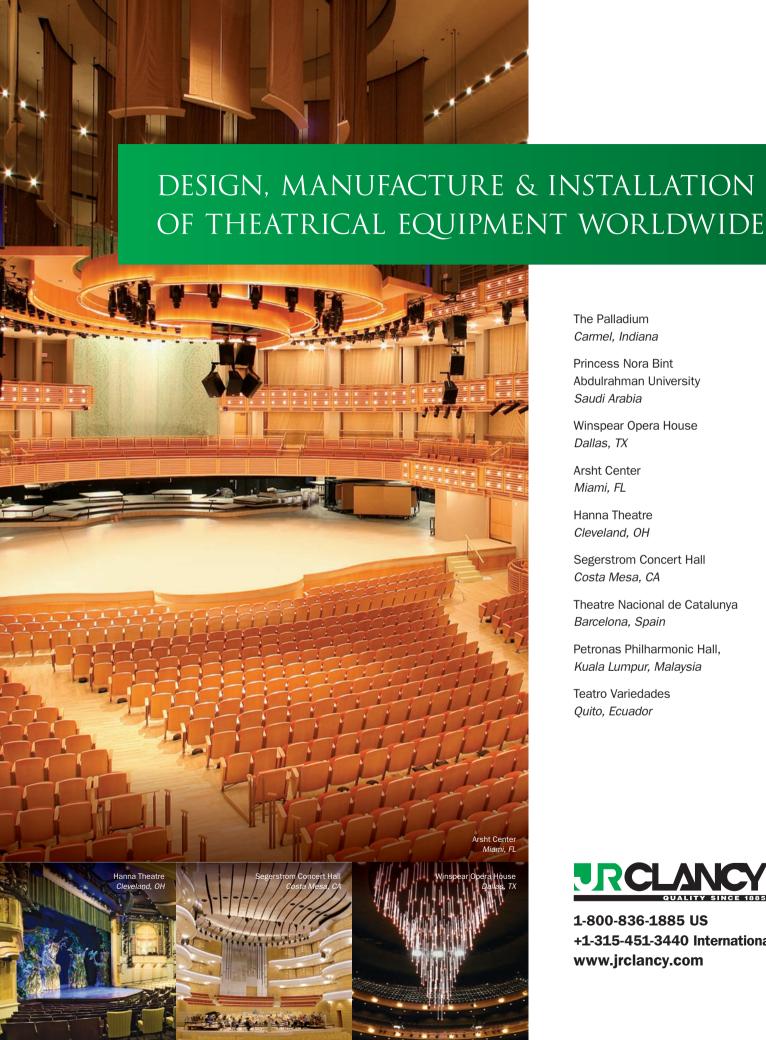
To bring all of these elements together and deliver on time, complete, and correct shipments of the equipment, Clancy put its Project Quality Assurance Plan (PQAP) to work - one of many tools Clancy developed to qualify for the rigorous ISO 9001:2008 international standards certification.

PQAP gets the whole team - including lead engineer Greg Dale, controls designer Tom Zorn, and production heads - on the same page from the job's first day. "All of the equipment had to be scheduled through the shop in the mix with other projects, and everything has to be tested," says Marilyn Larsen, JR Clancy project co-ordinator. "It's the culture of the business that quality matters - nothing goes out of here unless it's right."

The real testament to Clancy's quality processes comes when the curtains rise on the first performances in each hall. "Clancy kept to a demanding schedule," says Nishball. "Honest and concise communication has always been their style."

"Mike and Brett were very good about participating in co-ordination meetings, talking about the issues and identifying obstacles," concludes McPartland. "We rely on the expertise of our subcontractors, and we are always pleased when they are proactive. It was a pleasure working with Clancy overall." ■

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TÜCHLER



Whether it be temporary venues, cutting-edge floor technology or hi-tech curtains, Tüchler has solutions that can be adapted to any auditorium

A Tüchler flooring installation in a marquee at Deutsches Theater in Münich (above); counter-weight fly bars being set up (opposite)

hen the Deutsches Theater in Münich, Germany, needed to move into a temporary venue, they decided on a tent construction that could be disassembled again. Stage and textile technology specialist Tüchler was given the task of installing the overhead machinery for a theatre inside a tent.

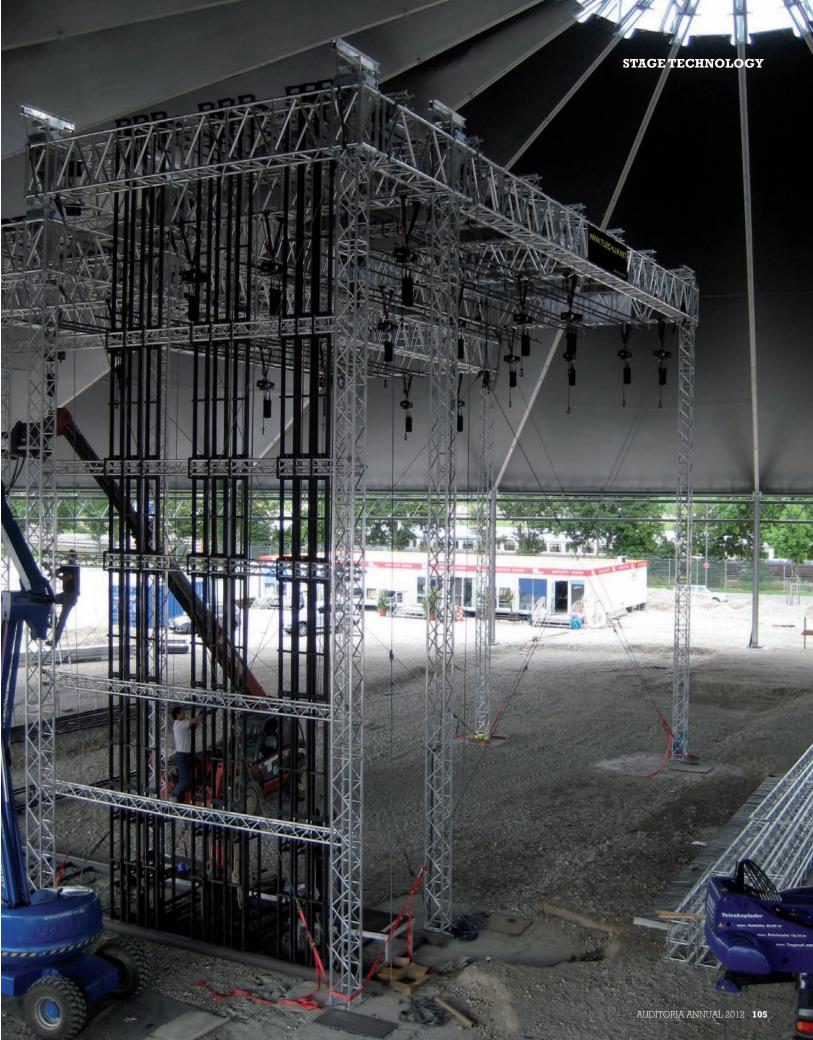
The core of the concept was a nine-tower ground support built from trussing systems. Tüchler's engineers developed a two-level structure that makes optimal use of the interior of the sloping roof tent. Designed to support up to 30 tonnes, the front tower section is 15m high, while the rear tower section is 13m high. The span of the entire tent is 16m, with a visible portal opening of 14m.

The structure supports 15 250kg manual counter hoists, six 1,500kg lighting hoists, two 2,000kg PA mounts, as well as two lighting bridges, the main curtain, the fire curtain and a sprinkler system. Although it just looks like a tent from the outside, the interior of the Deutsches Theater offers theatre-goers a perfect ambience ideal for performances.

## Floor technology

Tüchler prioritises safety, ease of use and contemporary functionality when developing its stage technology. Floorings in auditoria require different surfaces for various performances. For dance productions, a perfectly sprung floor is essential, and Tüchler's Manero Classic technology offers exactly this. Whether it be for fixed or portable use, this sprung-floor system for stage and ballet studios is available in three distinct cushioning levels: 65%, 60% and 50%. Depending on the surface elasticity and cushioning or spring-back requirements, three separate cushioning systems are available made from high-chem foam, and especially designed for ballet. At only 34mm high, Manero Classic can transform any room with a hard floor into a comfortable ballet hall, even when installed directly onto an existing concrete floor. A tongue-and-groove connection system, meanwhile, results in quick and easy installation.

Tüchler's Manero Ultra-Light foam flooring was especially developed for dance performances where there is a lot of body contact with the floor. This space-saving product is light  $(7kg/m^2)$  and can be installed quickly without the need





for glues or adhesive tapes. The interlocking connection system ensures stability, while its light weight makes assembly and disassembly very easy, saving both time and money. Manero Ultra Light offers dancers 37% cushioning, has 100% ball reflection, and as a high-end subfloor, it meets even the highest mechanical standards. The flooring's spring functions are not affected by heavy or bolted-down scenery on or around the stage.

Marlon Wallen, founder and choreographer of UK street dance troupe Flawless, is a fan: "In 60 performances during our last UK tour, we could feel the incredible difference Manero Ultra-Light made and truly believe it helped improve the quality of our shows. With its unique composition of stability and flexibility, it provides comfortable, low-impact protection for our joints during all the jumps, flips and somersaults we do," he says.

#### Hall-dividing curtains

When Tüchler's engineers were asked to build chain-hoist-gathering curtain for the O2 Arena in Prague, it was the first time they'd tackled such a project. They were asked to create a curtain that could be lifted and gathered using chain hoists and trusses that could also be used for other applications. Ten chain hoists were installed to lift the 32 x 18m curtain in a synchronised gathering motion up to a height of 30m within one minute.



A multipurpose hall in Graz, Austria, with portable and self-climbing gathering curtains, which also improve the room's acoustics

At the Queen Elizabeth Hall at London's South Bank Centre, Tüchler's compact stage winches are used to operate the fly bars

Tüchler also installed 9,000m<sup>2</sup> of dividing curtains with a gathering system made from Sun Block Soft WP, a flame-retardant material with high tear resistance and rapid crease recovery, even after long storage periods. These curtain systems consist of a self-supporting base structure made from either aluminium or steel, which integrates all the components such as driveshaft, bobbins, ropes, drive and curtain hangers. Tüchler gathering systems are compact and can be quickly installed on-site as they are pre-assembled. They are also very quiet and are suitable for portable or fixed applications, as they can be expanded modularly upon request for portable use. Designed in either cylindrical or polygonal shapes, they are fireproof, and can be tailored to suit individual requirements such as type of curtain, curtain height, lifting speed, etc.

#### Black projection screens

Friedrichtstadtpalast in Berlin, the largest revue theatre in Europe, relies on Tüchler's projection foil Black Pearl for its biggest shows. This offers a deep black, neutral background, from which both front and rear projections appear as if out of thin air. As well as these special-effects foils, Tüchler's projection screen department offers a wide range of screens for cinemas and 3D projections and its in-house team can make the screens in any shape and size depending on clients' requirements.

#### Compact fly-bar systems

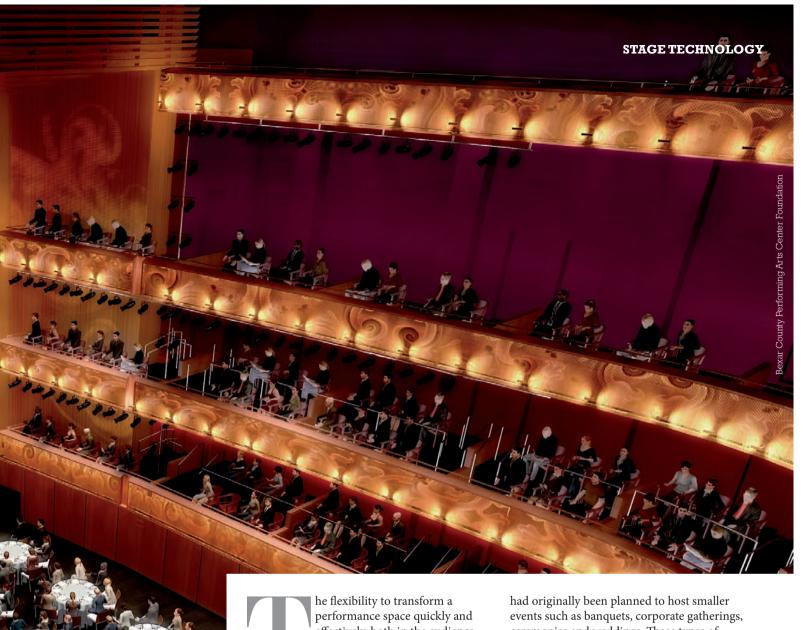
Tüchler's stage technology department has developed the fly-bar system Lift-It PW 300, which has been used successfully on stage in auditoria for many years. The system is built around three main criteria: it complies with German BGV-C1 safety standards; it is compact and does not have a wide cable drum; and it is cost-efficient.

The carrying capacity of the standard model is 300kg, although this can be increased to 600kg if required. As well as being used in many small theatres throughout Europe, Lift-It 300 has been used successfully for many years at venues such as the Opera House in Helsinki and the Queen Elizabeth Hall in London. 🗖

www.tuechler.at







effectively, both in the audience as well as on stage, is critical to multipurpose halls.

In 2008, The Bexar County Performing Arts Center Foundation was created to undertake the renovation of the historic San Antonio Municipal Auditorium and convert it into a world-class multi-use performing arts centre. The result will be a state-of-the-art facility for San Antonio's cultural arts groups - The Tobin Center for the Performing Arts.

It was the Bexar County Performing Arts Center Foundation's vision to host large touring shows, the San Antonio Symphony, the San Antonio Opera and other performances within the Tobin multipurpose auditorium. They were determined, however, to also provide a space for local theatre and performance groups. For this purpose, a small, less ornate multipurpose studio theatre, adjacent to the main auditorium, ceremonies and weddings. These types of events often need to be held on a flat floor or a variable-raked floor, so cannot be held within a fixed-rake theatre. To solve this conundrum, it was proposed to develop a highly flexible space within the main auditorium, making it accessible to either large or small events or performances, without the need to segregate events into two separate and unequal spaces.

To achieve this goal, the auditorium needed to be outfitted with a reconfiguration system that could convert the traditional raked seating to a tiered configuration, a flat floor, a tiered cabaret, or to any number of varied configurations depending on specific event/ performance requirements.

Initially, a traditional lift/wagon system was studied. However, early in the design process, it became evident that there would be significant costs involved in building the storage spaces



The Kauffman Center for the Performing Arts (above); the Tobin Center for the Performing Arts (right)

required for the lifts and wagons under the audience floor level as the water tables are high because the Tobin Center is located next to a river walk canal. Also, and most importantly, the number of configurations was limited and the time required for transformation was significant.

FDA, the theatre consultant, proposed that an alternate solution - an automated floorriser/transformable-seat system - be studied. The versatility of this type of individual-row, seat-riser system provides the diversity and speed of changeover required to suit the various event requirements. Given that quick overnight or midday conversions were possible with this system, it would be possible for the venue to be filled to near-capacity all year round. It was also brought forward that in many other multipurpose venues, many events required alternate seating plans, flat-floor or variablefloor configurations rather than an Italian raked-seat auditorium.

Ultimately, the Gala Venue system, provided by Gala Systems, was selected by the foundation because it is a proven system (deployed in a number of multipurpose venues around the world) and permits every row of seats to be quickly stored or deployed individually and automatically, without the need to dig a deep pit area.

The inherent features of the Gala Venue system allow for a larger variety of configurations within the allotted space than a lift/wagon system, without sacrificing audience comfort and accessibility. The high speed of transformation - about 15 minutes - enables quick overnight or midday conversion of the space. The extra flexibility and speed of conversion, as well as the confidence of having multiple venues integrated with the Gala Venue, convinced the Tobin Center Foundation to choose this system.



Mark Reddington, a principal of LMN Architects, speaking to Scott Andrews of the San Antonio Current newspaper, comments that this is "a terrific amenity for the community".

#### **Kauffman Center**

Opened on 16 September 2011 with a grand opening gala to inaugurate its two new performance halls, the Kauffman Center for the Performing Arts in Kansas City, Missouri is now a centre for music, opera, theatre and dance. Built at a cost of US\$415 million, the 26,500m<sup>2</sup> facility is one of the most technically advanced performing arts centres in the country, allowing the staging of elaborate works and encouraging interdisciplinary collaboration. The Kansas City Lyric Theatre, the Kansas City Ballet and the Kansas City Symphony will all be moving to the new Kauffman Center. The programming will include pop music, film, pop concerts, ballet, opera, plus Symphony and Broadway type shows.

For the 1,600-seat Helzberg Hall, the transformable challenge was really to find a balance between the acoustic and technical performance requirements. Nagata Acoustics wanted the shapes of the lifts to mimic a musical instrument so that the concert hall could be 'tuned' for different types of performances. To address this, Gala Systems' Spiralift lift system was deployed enabling the lifts to be automated in conjunction with an overhead canopy, so that the layout of the stage could be quickly and easily altered to accommodate the acoustical requirements of solo concerts, chamber music or even full orchestras.

For the 1,800-seat Muriel Kauffman Theatre's expanded facilities, Gala System's Spiralift system was deployed to support a flexible proscenium opening and sound mix lifts reconfigurable for both intimate and larger-scale productions.

These projects illustrate perfectly how venue flexibility can be enhanced with space reconfiguration technology.

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HOAC

# Three of a kind

A trio of new arts centre projects in South Korea are using similar technologies to create venues worthy of a world stage

The D-cube Art Center in Seoul, South Korea – interior and exterior shots

n recent years, Asia has seen tremendous growth in the number of multifunctional performance venues in its larger cities. Musical, drama, concert and movie events are all presented in one location served by the surrounding infrastructure and these huge facilities play a major role in projecting a city's image to the outside world. Alongside the innovative exterior designs of these complexes, the technical interior solutions demonstrate a commitment to innovation and modernity. always following the best cost-benefit-ratio, as defined by the owners. Three newly completed arts centres, using a new multifunctional stage deck system for theatres, demonstrate South Korea's advancements in arts technology.

The D-cube Art Center in Seoul, South Korea, has been designed by Sergio Zeballos from Jerde architects, and aims to attract art-lovers both at home and from overseas. The complex features an arts centre, amphitheatre and department store, as well as office and apartment buildings. Owned by Daesung Industrial Corp, the complex is due to open in September 2011, showcasing the premiere of the musical *Mama Mia*.

Another of South Korea's new arts projects is the Busan Cinema Centre, owned by the Busan City government and designed by the Austrian architectural firm Coop Himmelblau. The complex is the firm's second largest to date, offering impressive features such as an 85m cantilevered roof over a public space based around a 4,000-seat outdoor cinema. The interior will house studios, offices, three movie theatres, and a multifunctional 833-seat theatre designed to accommodate the popular Busan International

Film Festival. The venue offers an important community space, with four of the screens inside the theatre available for commercial use. Also planning to open its doors in September 2011, the project's completion is scheduled to coincide with the Busan Film Festival.

The Hannam Dong Musical and Art Center is the third of the region's new arts projects – the renamed venue in Blue Square was designed by the Korean architect Won Yang. Harbouring a 1,400-seat musical arts centre, a 1,200-seat concert hall and apartment buildings, the project rivals both the D-cube and Busan in scale. The opening will stage the premiere of the musical *Zorro* in November 2011.

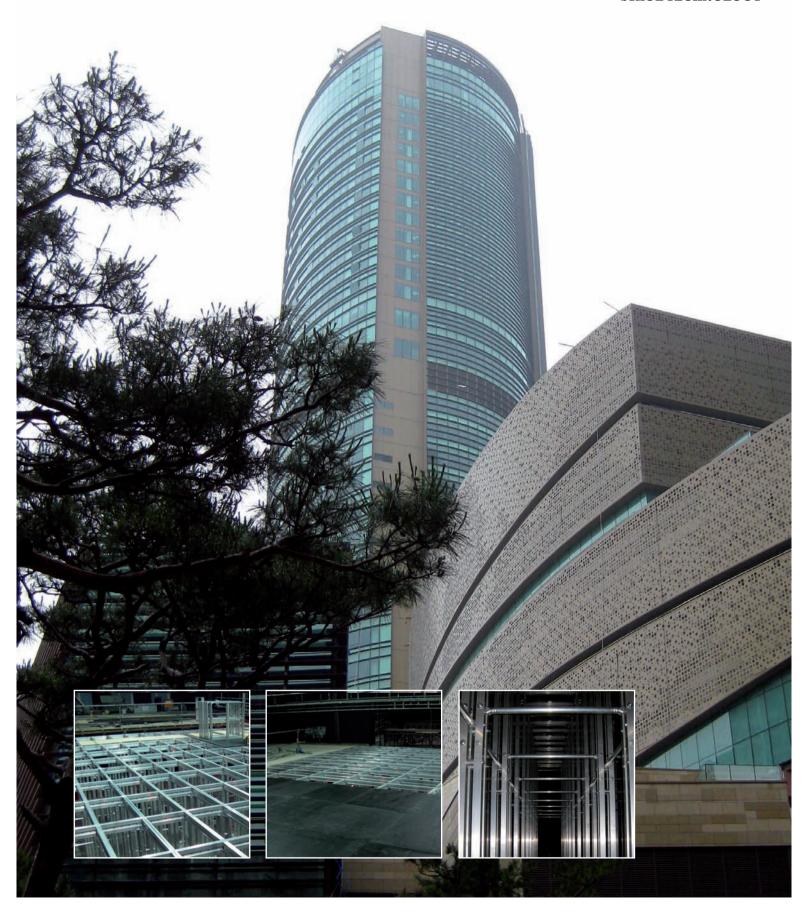
#### Stage deck technology

When using musical or concert stages over a set period of time, it is not essential to use expensive stage technologies such as hydraulic or electromotive drives. A mobile and flexible stage deck system that is variable in height can fulfil the technical requirements for such stages just as effectively.

A number of venues have opted to use HOAC Staging, a unique aluminium stage deck system that offers flexibility without using hydraulic or electromotive forces. Once the stage's frame sizes have been determined, the deck system is designed for a load capacity of 500kg/m² and, if necessary, this can be increased in specified areas.

The columns of the stage deck substructure, located in each corner of the system's frame, are designed with both aesthetics and functionality in mind. Each column consists of four single legs, at a maximum height of 6m above ground

#### **STAGE TECHNOLOGY**





The Busan Cinema Centre

- interior and exterior shots;
work in progress at the D-cube
Art Center (below)

level, and is able to support 1,700kg. There is no diagonal bracing needed underneath the stage, providing the system frames are installed at ground level and surrounded by the outside structure of the stage pit.

There is also the option of lowering the stage by 5 or 10cm at a time, up to a maximum of 60cm, without changing the type of leg. In Busan, for example, the frame size is 1.2 x 1.2m, so the opening height can be the same or multiples of this. When the stage floor is lowered and its outer edges are not supported by the edges of the pit, bracing has to be added to accommodate the horizontal forces. Whenever either the composite parts or the whole stage



are free-standing, bracing is necessary. The area underneath the stage can be used for storage.

Besides changing the height of the floor, it is also possible to make openings in the floor, by utilising one system frame, its deck and the four corner legs. These openings can be used for stairs or motorised trap lifts to bring actors up from under the stage during the performance.

The new mobile HOAC trap lift is designed specifically for this system and allows the smooth vertical movement of actors at speeds of 0-0.85m/sec and 250kg/m<sup>2</sup>. There are a number advantages to this system. As well as its ease of use and handling, it eliminates the need for fixed installation and also complies with European safety standards. As durable aluminium has been used instead of steel, the stage does not require any protective coating, and due to the lower weight, the setup time and manpower required are reduced, which effectively lowers costs. As an example, for a total stage deck size of 15.5 x 13.6m with a height of 4.2m, approximately four stage workers would require as little as two to three hours installation time.

Such advancements in stage deck systems are just one of the ways South Korea is progressing in its desire to create state-of-the-art entertainment venues for its major cities.

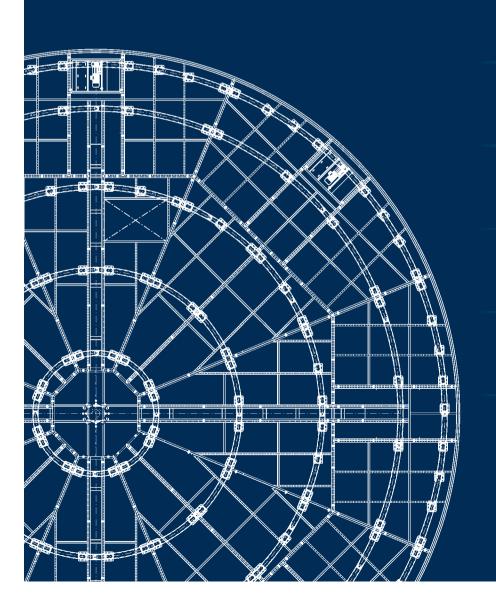
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# The stage is our world

Two projects – one recently completed and another in the making – showcase Waagner-Biro's global standing in the field of stage system technology

(Pictures opposite) To ensure perfect acoustics, a special surface was developed for the walls and ceiling of the Grand Hall; 10,000 gypsum fibre panels reflect the sound in each corner of the hall and guarantee an optimal listening experience from every seat

here are countless auditoria around the world where the acoustics play second fiddle to grandiose spectacle. But not the Harpa Concert Hall in Reykjavik. When Iceland's Symphony Orchestra had its first practice session in the Henning Larsen-designed building, the rich sounds infiltrated everything in the 1,800-capacity Great Hall, so warm and deep that many of the musicians were reportedly reduced to tears.

"The flexibility in the acoustic performance in the concert hall is exceptional," agrees Wolfgang Staufer, CEO of the Vienna-based stage systems specialist Waagner-Biro. Staufer has more reason than most to be proud of the rave reviews that Reykjavik's new concert hall on the city's harbour-front is receiving. In addition to stage lifts and upper machinery, the company supplied acoustic banners, doors and canopies. In fact, a total of 185 acoustic roller banners were integrated and according to the Austrian were a particular challenge as specific controls had to be developed for a maximum control length of 18m. The task was made even more complex as bespoke door-hinge units also had to be created to cater for the precise positioning accuracy required, as well as for the local geological conditions - i.e. potential for earthquakes.

#### Positive feedback

Such components are just parts of the overall sum, of course, but it's nevertheless satisfying for Staufer that Waagner-Biro has played a part in Harpa's success. "It is especially impressive to experience the room acoustic elements in

operation and to feel the change in the acoustic surrounding when the hall is adjusted to various styles of musical performance – from classical to modern," he continues. "We have received very positive feedback from Harpa relating to the quality of the equipment we supplied."

This will no doubt be music to the ears of the Elbphilharmonie, a Herzog & de Meuron creation that is presently rising above Hamburg's harbour like a gargantuan glass iceberg. "The Elbphilharmonie is definitely one of today's landmarks in the cultural landscape of Europe and we're proud to be part of this project," Staufer states. The Swiss architects' design is seeing a new glass structure installed atop the red brick warehouse built in 1963 by the late Hamburg architect Werner Kallmorgen. The building will comprise three concert halls, a hotel, apartments, and a public square elevated 37m above the river. It's an ambitious project, but one where all of the ingredients have been included for it to become one of the finest music venues in the world.

With Herzog & de Meuron as the design lead, ReGe Hamburg, a project development company owned by the city, was brought in for overall co-ordination, while Hochtief Solutions oversaw the actual construction work in its role as general contractor for all project implementation activities. The acoustics designer, Nagata Acoustics, and the theatre planners, GCA Ingenieure, are the contact points for the technical design aspects; the latter is especially having deep involvement into all details of the stage machinery.

Waagner-Biro scooped the implementation of stage machinery for the Grand Hall and the











#### **OPINION OF DIFFERENCES**

With a successful track record spanning more than 100 years in the field, the Waagner-Biro Stage Systems Group is among the world's most experienced companies in stage machinery and controls – aptly shown by the Harpa in Iceland (above) and surely to continue at the Elbphilharmonie in Hamburg. Although they're two very different projects, Waagner-Biro's CEO Wolfgang Staufer says there are similarities in the systems deployed. "In terms of the type of stage machinery supplied, the Harpa is comparable: the acoustic roller banners supplied for the Recital Hall in the Elbphilharmonie, for instance, were originally developed for and deployed in the Harpa, albeit in considerably bigger numbers and dimensions."

Wherever Waagner-Biro stage systems are deployed, though, the emphasis on safety and reliability is a constant. "This is a key issue throughout the entire lifecycle of the performance venue," Staufer insists. "We currently provide regular 24/7 services to more than 180 venues worldwide, which range from remote support through data lines up to complete maintenance and operation of the equipment supplied by us. We're planning to further extend this range of services into the future."

Recital Hall of the Elbphilharmonie against international competition. The project started in mid-November 2010 and completion of the stage machinery is scheduled for mid-2013. "Right now, the first stage of the project, the Recital Hall, is in the installation and commissioning phase," Staufer reveals. "The stage equipment for the Grand Hall is in the engineering and manufacturing phase and will be delivered to site from the start of 2012 onwards."

#### Sound engineered

According to Staufer, the design for the Grand Hall and the Recital Hall by Yasuhisa Toyota of Nagata Acoustics aims to create a perfect acoustic environment for performing arts, with the stage machinery forming an integral part of the overall acoustic system. This led to the development of a construction of supporting beams and decks for the orchestra lifts in the Grand Hall and the lifts in the Recital Hall, which followed a specific wood composition scheme that was acoustically isolated from the exceptionally rigid scissor-type lifting elements.

In the Recital Hall, meanwhile, acoustically optimised telescopic seating stands provide

flexibility in terms of audience configuration. For optimum airflow and patron convenience, a bespoke sealing system had to be developed for airproofing the bleachers in extended mode against the acoustically sculptured walls. In combination with laser-guided control of the telescopic seating movement, the sealing system protects the delicate wooden surface of the walls.

Similar to Harpa, acoustic roller banners with position control sited in various locations on the walls allow the reflection and absorption characteristics of the Recital Hall to be adapted to various requirements.

"Apart from the acoustic optimisation of various components to the high requirements of the acoustic designer, small but important innovative details included fixing elements of the upper stage machinery to the supporting steel structure," Staufer says. "As a result of the impressive architectonic design of the ceiling landscape, the connections had to be individually adjusted to complex geometrical scenarios and adjustable to compensate for inevitable tolerances of the steel structure and linings."

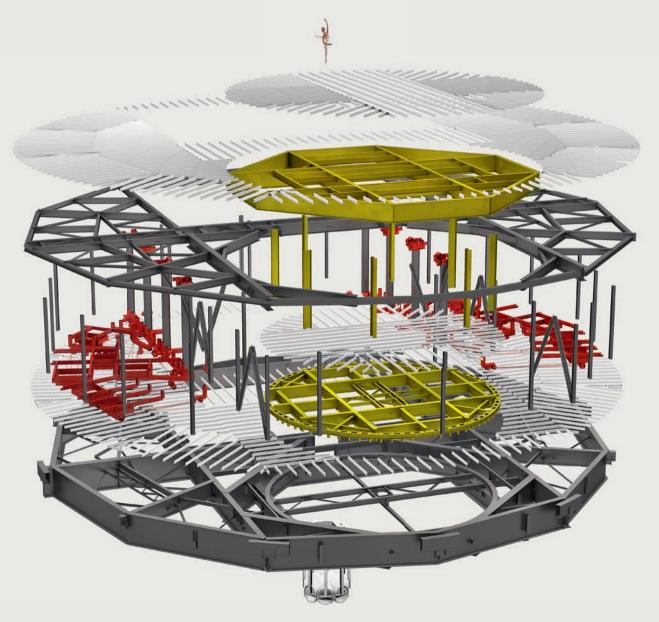
Herzog & de Meuron opted for a 'vineyard' design for the 2,150-seat Grand Hall. Here, the orchestra takes its place in the middle of the hall with the audience seated around on all sides, which affords unobstructed sightlines of the stage from every seat. The renowned NDR Symphony Orchestra will be the Elbphilharmonie's orchestra-in-residence once constructed, although the Hamburg Philharmonic Orchestra will also perform at the new concert hall.

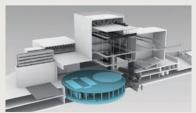
The Recital Hall retains the classic 'shoebox' layout with a 550-seat capacity designed with chamber music particularly in mind. Equipped with flexible seating, it is versatile for other events such as balls or conferences.

"In the field of premium concert halls, we see banners and canopy systems for adjusting the natural acoustic parameters of the venue as an area of growing importance," concludes Staufer. "The necessity for flexibility in utilisation of such halls is a driving factor in the further development of this technology and motivates Waagner-Biro for further optimisation of our product range in this field."

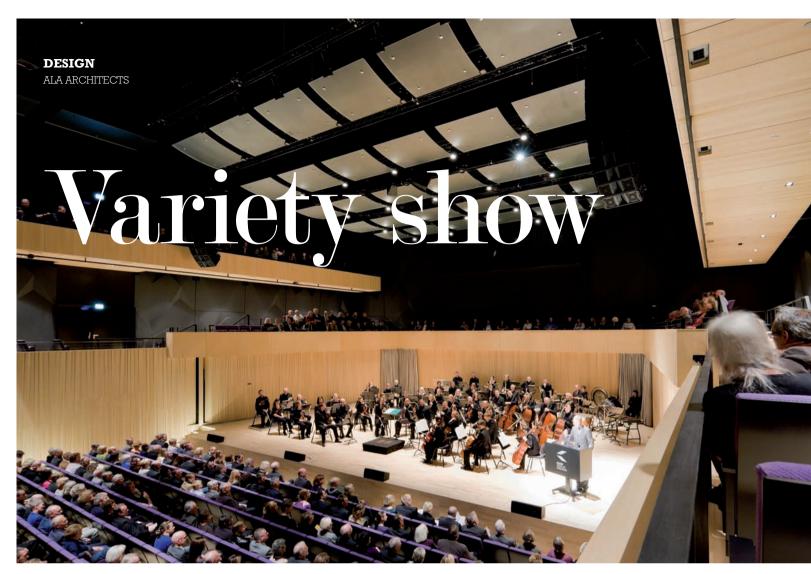
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# REVOLVES AROUND YOUR PERFORMANCE.—





When emotions run high on the leading stages of the world, the background technology must play its role perfectly: In the Music Theatre Linz the 32 metre diameter revolving stage currently being installed is one of the largest and technologically most demanding in the world.



rchitecture plays a key role at Kilden Performing Arts Centre in Kristiansand, Norway, where striking exterior designs help to attract both audiences and performers. Just a glimpse of the curving foyer wall will stick in the minds of those who see it: the building invites attention and makes people want to find out what is happening inside. In fact, Kilden's exterior has been designed to create a high-quality public space with a partglass façade that allows those outside to see what is happening inside the building.

The venue's curved wooden outer wall is shaped by the four performance venues that lie within: the auditoria and the upper foyers are covered by a smooth complex curvature built from the wood of local oak trees. The four halls are linked by the continuous public foyer on one side, and the shared support spaces and performer facilities on the other side.

Kilden's four halls complement each other in terms of capacities, technical and acoustic capabilities, and visitor facilities, while the architectural approach rejects repetition and Kilden Performing Arts Centre contains four venues of different sizes, meaning it is able to host a wide variety of events



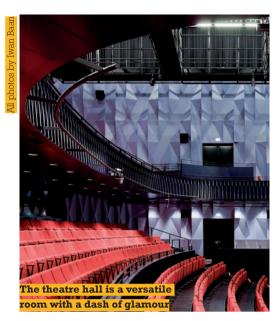
The main foyer feels like an outside public space

encourages bold juxtapositions and variety. The potential of this combination of spaces is evident as Kristiansand's Punkt Festival music event has already booked Brian Eno as its curator in 2012.

#### Visual and audio integration

The designs within the halls have been created by an integrated team aiming to connect both visual and audio experiences. The 1,200-seat concert hall is a variation on the shoebox-type venue with two distinctive layers. This rectangular room is clad with dark concrete panels with large triangulated modulations to help create a low-frequency sound. Inside this dramatic space, both musicians and audience are on light wooden platforms, stalls and balconies, while delicate glass reflectors boost the acoustics.

The theatre hall's design is built around adaptability of use, capacity and atmosphere. The bold use of colour and contrast in the upper foyers and the hall itself sets the mood for performances – a warmth often lacking in municipal theatres. The hall is also suitable for opera and has a high ceiling to generate impressive reverberation.



The multipurpose hall has multiple configurations and can be used as an extension of the public space in the foyer or as a medium-sized flat-floor hall with retractable bleacher seating. This calm, stylish room with flexible acoustics and cutting-edge stage technology is suitable for a wide range of events. Meanwhile, the fourth hall is a small theatre stage used for training and rehearsals.

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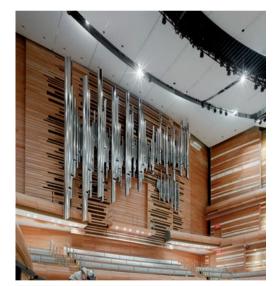
# A sense of occasion

Montreal's new symphonic home has pushed the boundaries of design to create a fantastic experience for its audiences

ontreal has a new symphonic concert hall designed by Diamond and Schmitt Architects/Ædifica Architects. La Maison Symphonique de Montréal provides Place des Arts – the cultural hub of the city – with a beacon to warm the long winter nights and welcome audiences into the home of the Montreal Symphony Orchestra.

"This is very much an inclusive hall that works on many levels to create a sense of occasion," says lead architect Jack Diamond, whose performance space designs include the Four Seasons Centre for the Performing Arts in Toronto, Sidney Harman Hall in Washington DC, and the New Mariinsky Theatre under way in St Petersburg, Russia.

Diamond and Schmitt wanted the 1,900-seat auditorium (plus 200 seats for choir or audience behind the stage) to go beyond the traditional shoebox hall configuration and designed a modern, more articulated form of that basic volume. Lined with Quebec beech wood and graced with gently curved walls and balconies, the room serves the demands of acoustics and sight, creating a calm, cohesive and intimate environment for natural, unamplified performance. This beautiful and functional shape is carried through to the outside of the hall, legible from the lobbies and from the exterior where the scalloped wooden form of the auditorium rises above the roofline. "There is nothing arbitrary about the design; it is a true display of the architecture of sound," Diamond adds.



The inside walls of La Maison Symphonique de Montréal are lined with beech wood, which helps create a warm, intimate environment

The challenges of a narrow site, a subway below grade and the desire to reveal as much of the public space as possible – while isolating the auditorium from street and subway noise - were overcome through intensive study and collaboration with acousticians Sound Space Design (SSD) and theatre consultant Fisher Dachs Associates. The Cultural Ministry's acoustics and theatre planning advisor Artec Consultants created the initial acoustics and theatre concept, reviewed the competition process and worked with the design team.

"The judicious selection of glass assemblies, careful regard for airspaces, details and absorbent material allowed us to replace a significant amount of masonry with glazing and open the façade to the city," explains project architect Matthew Lella. "As the concert hall terminates the vista of a major thoroughfare, we wanted to reveal the life within to the city and let the city see the activity inside."

A further design innovation permitted the loading dock to be level with the stage – a

desirable configuration. Using steel and 180 rubber pad isolators in combination with a box-within-a-box separation of auditorium from the rest of the building impedes structure-borne vibrations from entering the hall. This meant the space between underground parking and the stage could be considerably reduced. It also allowed for parterre seating to be level with the outdoor plaza, which provides for a seamless transition to and from the hall.

In collaboration with artisanal Québec organ manufacturer Cassavant Fréres, Diamond designed the striking array of organ pipes that grace the stage wall. The result is a bold,

DESIGN

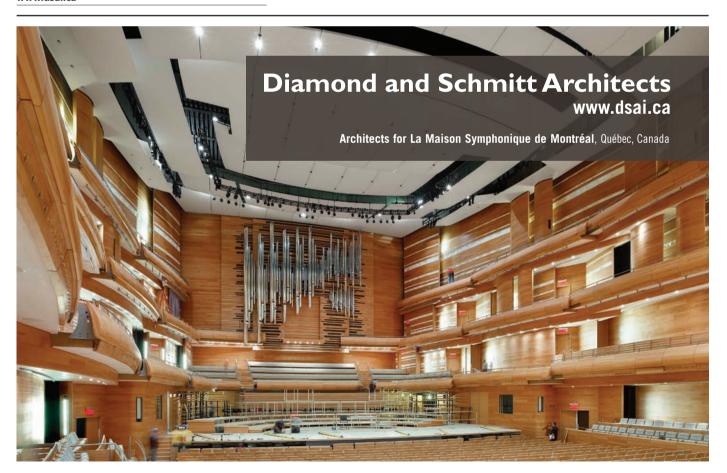
The title state that the sta

confident composition, an asymmetry of exuberant diagonals, which – like the concert hall itself – is a contemporary expression of the fundamental forms that have served the best concert halls the world over.

La Maison represents a welcome commitment to symphonic music in times of economic uncertainty. The renowned orchestra finally has a home worthy of its reputation and leaves behind the 3,000-seat roadhouse where it performed for decades.

The new hall design can accommodate a wide repertoire for orchestras, as well as jazz and lightly amplified music. Critics and musicians have been praising the hall since it opened in September 2011. "One of the greatest halls I've played in," MSO concertmaster Richard Roberts told the *Montreal Gazette*.

#### www.dsai.ca





Despite its 15,000 capacity, the theatre at Brigham Young University still offers its audience an intimate experience

View to stage from the first lighting catwalk (above); view from Digico console at house mix to stage and IMAG screens (below); slots in the gridiron floor allow architectural ceiling elements to be flown out and stored above rigging for events (far right)



our years after the project began in 2006, the BYU-Idaho Center was completed, making Brigham Young University-Idaho home to one of the largest production theatres in North America. The new 15,000-seat venue recalls the Church of Jesus Christ of Latter-day Saints' 21,000-seat Conference Center in Salt Lake City (*Auditoria*, 2001), but does so in a setting appropriate to the church's expanding education system.

As part of the design team led by Salt Lake City-based FFKR Architects and DL Adams Associates acoustical consultants, Auerbach Pollock Friedlander, Performing Arts/Media Facilities Planning and Design provided programming, planning and full scope of theatre and audio-video consulting and design services for the new auditorium and broadcast centre, which includes live event support spaces, pre-/post-production HDTV facilities and a 186m² shooting studio.

The new state-of-the-art venue can seat the entire student body and community guests at regular weekly devotionals, as well as events featuring guest speakers, performing arts programming or commencement exercises. The auditorium's provisions for live broadcast and recording include a large central

control/mix position with two automated camera pylons, as well as balcony rail and side caliper camera locations and a flexible front cross aisle to accommodate rail-mounted camera dollies. Programming from the BYU-Idaho Center airs on the BYUtv network, available from many leading cable and satellite service providers worldwide.

"Our goal was to create a warm and inviting atmosphere for visitors to the BYU-Idaho facility," says Steve Pollock, principal in charge for Auerbach Pollock Friedlander. "The space has a surprisingly intimate quality and after a few moments, no matter where you are sitting, you're likely to forget you are attending an event with 14,999 other audience members. Seating, sightlines, audio reinforcement and massive image-magnification (IMAG) systems make seeing and hearing effortless for audiences."

The BYU-Idaho Center's auditorium has simple, clean finishes, a 'black-out ceiling' with exposed catwalks, a forestage grid and a gridiron with more than 60 motorised computer-controlled hoists from Scenic Technologies. It is a prime example of working theatre with technology and infrastructure representative of the latest cutting-edge systems.

With the hall's focus on amplified speech, compensation for long viewing distances and





visual references to scripture are accommodated by flanking 65m<sup>2</sup> rear-projection IMAG screens which present live camera feeds of the speaker, as well as pre-recorded imagery of text and pastoral scenes. Auerbach Glasow French - which also provided the architectural lighting design for the Salt Lake City Conference Center applied certain lighting elements from that facility to the BYU-Center as well, recognising the importance of unifying the two with visual iconography and illumination appropriate for BYU's important lecture functions.

Nearly half of the BYU-Idaho Center's 700m<sup>2</sup> stage is comprised of variable height Stage Right platforms, providing greater flexibility in configuration. This arrangement

accommodates architectural, lighting and theatrical requirements for a variety of events, ranging from a basic production stage to an architectural surround with demountable orchestra shell walls, risers and ceilings elements - the stage set for devotionals.

"Meeting the requirements of such a large space with so many functions and broadcast requirements creates unusual demands that push technology and building codes to the limit," says Pollock. "We experienced this at the Conference Center and at BYU. We are most comfortable addressing these functions in a leadership role and these kinds of challenges are a great match for our very best skill sets." ■

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# eginning

A new-build concert hall in Stavanger and a refurbished theatre in Kristiansund are giving Norway's performing arts scene a boost

tavanger Concert Hall is just a year away from completion. Situated only five minutes' walk from the historical centre of Stavanger in Norway with its medieval stone cathedral and old warehouses converted to busy restaurants and pubs, the new concert hall, designed by Ratio Architects, is slowly but surely rising above its building site fences.

The south façade is already finished, creating a large rectangle divided by a single slanted border between the clear glass of the foyer and the silk-screened glass wrapped around the multipurpose hall. Behind this, the red polished concrete façade surrounding the orchestra hall rises 30m above the ground and is capped by a translucent attic, which will glow in the night



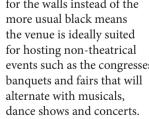
(Above) Work in progress at Stavanger Concert Hall (Opposite) The south façade (Below) Festiviteten's newly refurbished hall

and become a beacon signalling to the town that performances are taking place.

After more than a year filled with scaffolding, the surfaces of the concert hall are now being slowly uncovered, revealing the scale of the venue. For a hall with 1,500 seats, it is surprisingly intimate, and the reflective side balconies have been drawn into the hall, creating a large space behind them. A movable ceiling helps to give the space a high and imposing feel. Much of the oiled maple on the balconies is in place and the natural glow of the wooden surfaces imparts warmth and atmosphere.

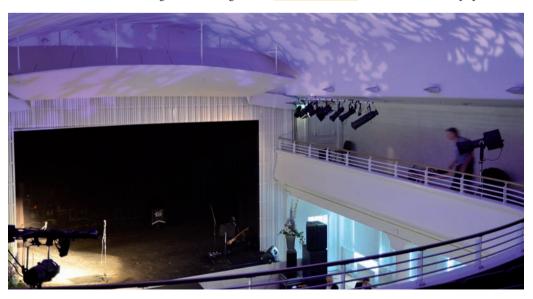
Most of the metal grilles have been fitted onto the balcony fronts, creating an intimate feel despite the enormous amount of technical equipment concealed behind them.

> The choice of a dark blue for the walls instead of the more usual black means the venue is ideally suited for hosting non-theatrical events such as the congresses, banquets and fairs that will alternate with musicals. dance shows and concerts.



#### **Festiviteten reopens**

Recently, the Festiviteten venue in Kristiansund on the northwest coast of Norway was reopened after an extensive refurbishment carried out by Ratio Architects. The hall has been the home of the oldest opera company outside



Norway's capital for many years and has hosted operas by renowned artists from both Norway and abroad, as well as many amateur productions put on by the town's thriving musical and theatrical community.

The original building dated from the 1920s. It was rebuilt in 1950 after sustaining bomb damage during the Second World War and urgently needed upgrading to improve access, escape routes, sightlines and the overall design. Now the venue's sightlines have been perfected and wheelchair users and visually impaired people can access and use all parts of the building.

The original theatre was a classic example of art nouveau architecture and the refurbished venue incorporates many elements of this style, combining its ionic columns with modern architectural elements.



#### www.ratioark.no





The impressive La Maison Symphonique in Montréal is the result of a creative public-private partnership he new symphony hall in Montreal

– La Maison Symphonique

– was born from a public-private
partnership (PPP), and is the
new home of the Orchestre

Symphonique de Montréal (OSM). London-based
acoustician Sound Space Design (SSD) was asked
by Diamond + Schmitt/Ædifica Architects and
engineer-contractor SNC-Lavalin to join the
team in a design competition in 2008.

SSD had previously worked with Diamond + Schmitt and theatre consultant Fisher Dachs Associates on the successful Four Seasons Centre in Toronto for the Canadian Opera Company. The team collaborated with the Ministry's acoustics and theatre designer to achieve a design that met the Ministry's acoustical objectives. After a year of collaboration, the resulting design was chosen as the winner, bringing the best quality at the best price to the public of Quebec.

A particular challenge of this PPP process was that the architect's design team and the construction team were not allowed to communicate directly with the user [the orchestra]. Having an experienced, creative expert in concert hall acoustics within the architect's design team was essential to win the competition and to make a project of which the designers, the OSM and Montreal could be proud. Relationships between clients and their design teams are key to

success, and this team had to find new ways of working under difficult constraints.

The Cultural Ministry, which retained responsibility for acoustics and theatre planning, prepared a comprehensive set of guidelines, including a basic design and equipment specification. The Ministry's acoustics and theatre planning advisor Artec then reviewed the progress of the design and construction. SSD's director Robert Essert brought his 30-plus years of experience (16 years with Artec in the 1980s and 1990s) to the design table, integrating acoustical aesthetics into the architectural design in collaboration with DSAI/Ædifica, sculpting the form of the space from the multiple perspectives of music performance, physics, design, hearing and listening.

This new 2,100-seat concert hall is tall and narrow with multiple balconies in order to sustain resonance and involve the audience in the sound. In this way, it owes some of its heritage to the successful 'shoebox' geometry – although it is definitely not a shoebox. The auditorium design is a layering of curves of varying size, yet with architectural unity. This creative approach brings a richness of sound and of architecture.

Audience seating wraps around the performance platform, which helps to balance the loudness and timbre of the orchestra, as well as providing the audience behind it with a great

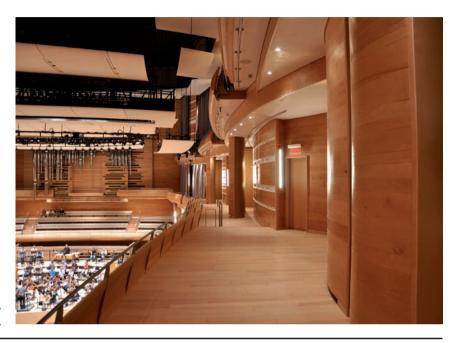
A childrens' concert takes
place at Montreal's La Maison
Symphonique (above); the
venue's side tier (opposite)

insight into the music-making and tying the performers and audience together in a unified, intimate experience.

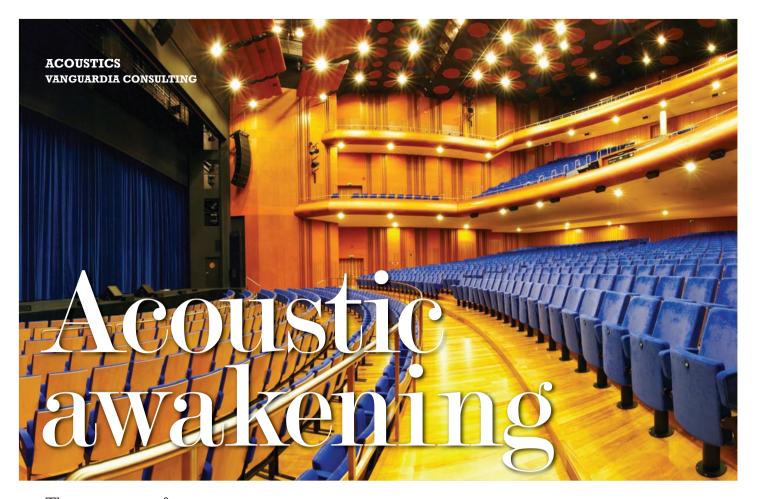
The ceiling panels are shaped in pillow forms to spread and smooth the sound with simultaneous clarity and resonance. At the acclaimed Sage Gateshead (England), Essert created coupled volume above a multipart moving ceiling using no additional room volume. The Sage Gateshead has been a great success, and became a key reference for the architectural team's design of La Maison Symphonique.

Through science, design and experience in the service of music, La Maison Symphonique now allows the OSM to show its true colours - timbres heard on OSM tour concerts to great halls around the world, but previously not heard in Montreal. ■

www.soundspacedesign.co.uk







The synergy of technology and architecture puts Estonia's Nokia Concert Hall at the forefront of performing arts

(Above) The distance from stage to audience has been kept low to create an intimate experience; Numerous architectural and electro acoustic elements have been integrated to create an active acoustic environment (opposite)

allinn, 2011's European Capital of Culture, has a rich history in music including the Estonian Song Festival dating back to 1869 with performances by a 15,000 strong choir. The Nokia Concert Hall opened in late 2009 and has become an important venue in the city, demonstrating the continued passion for the arts within this Baltic nation.

The hall is the centrepiece of the Solaris Centre – a development of restaurants, cafes, shopping, offices and a multiplex cinema in the same building as the concert hall. The hall itself has a capacity of 1,829 people on three levels and a stage area of 252m<sup>2</sup>.

Successfully hosting a wide variety of events, the Nokia Concert Hall has received praise from performers and audiences. The aim for the venue to host multimedia, classical and amplified events has already been fulfilled with performances from the Russian State Philharmonic Orchestra, Francis Goya, Rufus Wainwright, Marcus Miller and the European Film Awards 2010.

At the heart of this success is collaboration, says Mark Murphy of Vanguardia Consulting: "There is a new mentality emerging in acoustics made possible by advances in technology and an acknowledgment that complexity can be successfully incorporated. This allows us to work in teams and bring the benefits of specialisms

together, producing results that would not have been possible just a decade ago. We understand that the subjective success of the venue is the ultimate goal. The maturity of technology is allowing engineers to work as craftsmen, putting their energy into creative expression rather than just getting systems operational."

A Meyer Sound Constellation System, comprising 274 loudspeakers and 74 microphones, has been installed throughout the auditorium and stage. Its distribution is inherent to the success of the venue and the creation of an holistic acoustic environment. Constellation provides a range of adjustable acoustic parameters, such as early reflections, balance and reverberation times between 1.0 and 2.5 seconds in this case. Subtle incremental changes to specific parameters are made until the acoustic response of the room has been finely honed.

The integration of the electro-acoustic elements with the passive acoustics of the hall requires specific architectural solutions. This is especially important around the stage house and the front of the hall as the propagation of early reflections from this area influences the perceived sound and the ability of the system to convincingly change it. Vanguardia collaborated with project acoustician Linda Madalik and Constellation designer John Pellowe, providing the acoustic modelling

ACOUSTICS "The key to the successful integration of

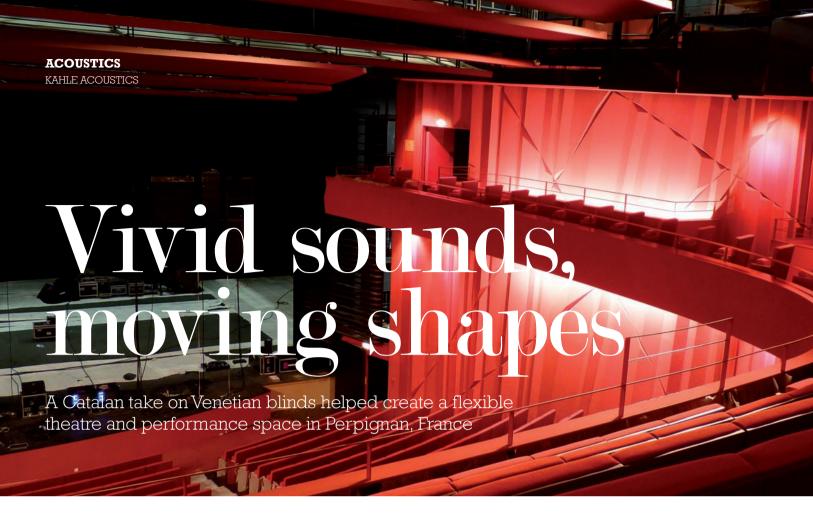
of the auditorium and detailed design of the architectural panelling to create the ideal acoustic environment for the electro-acoustic system.

an electro-acoustic system is understanding the architectural requirements that allow the system the opportunity to shine," Murphy continues. "The quality of the architecture provides the input data to the system. When this is good, the output can be amazing. The architectural requirements for a successful electro-acoustic installation are different to a passive hall, but are equally important."

The maturity of this technology allows high-quality acoustic environments to be created for the range of musical performance that is being embraced and enjoyed by conductors, musicians and audiences.

www.vanguardiaconsulting.co.uk

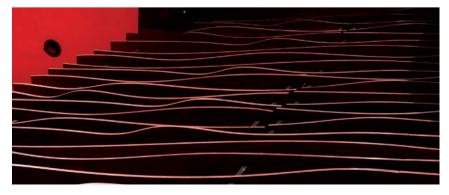




The Théâtre de l'Archipel's curtains are designed to improve the venue's acoustics he brief for the new Théâtre de l'Archipel in Perpignan in Southern France asked for a theatre designed as a house for high-profile drama productions (being part of the national network of Drama Theatres), as well as a performing arts centre for Catalan culture. From the onset of the project, one of the key questions therefore was how to combine the acoustic requirements for an intimate drama theatre for non-amplified speech with those – both in terms of audience capacity and acoustic volume – for larger events (music, traditional dance, etc).

The acoustic concept, developed in close collaboration with Ateliers Jean Nouvel and Brigitte Metra Architects from Paris, as well as theatre planners Ducks Scéno, features a sound-reflective acoustic curtain as a 'room divider', allowing a significant reduction of the size of the room both spatially and acoustically. In its largest configurations, the room has a total seating capacity of 1,099 distributed over a main floor parterre and a single balcony (both rear and side balconies). In order to reduce the size of the room and create an acoustic quality suited to non-amplified speech, a system of two independent 'screens' can be lowered from the ceiling, closing off the balcony as well as all seats located under the balcony, resulting in a single-level classical proscenium theatre with 636 seats.

One of the screens consists of PVC-coated fabric, sufficiently heavy enough to reflect the required mid- and high-frequency components for good speech intelligibility and to create an intimate acoustic environment for drama. The other screen consists of precisely shaped wooden slats that can be lowered in front of the soundreflective acoustic screen, following the principle of a Venetian blind. The horizontal wood slats provide an architectural room boundary and create acoustic reflections back down to the audience, enhancing early acoustic energy in the smaller configuration. The screen is designed to avoid excessive absorption or resonance. The wood slats can also be lowered with no reflective curtain behind, creating a visually intimate







environment within the larger acoustic volume. In addition, to adapt the acoustic quality for amplified events, variable acoustic curtains can be deployed on the entire side walls (through openings between the side balconies and the walls), and in front of the rear walls on both levels. For large unamplified events, all absorptive and reflective curtains are stored above the ceiling of the auditorium. The curved outer walls become visible and acoustically active. Their pseudorandom sculpted shapes are designed to reflect sound in a diffuse manner and suppress unwanted focusing.

During the construction phase, the artistic direction took advantage of the possibilities offered by the design - being more versatile than required by the original brief - to assign a stronger importance to the programming of concerts (both amplified and unamplified) and opera productions.

The new Théâtre de l'Archipel also houses a 400-seat black box, a rehearsal room, workshops, storage spaces, dressing rooms and offices. The various spaces are housed within five separate buildings connected by two glass foyers. The theatre opened on 10 October 2011 with a specifically commissioned show, followed by a full season of varied performances taking full advantage of the flexibility and potential of the space.

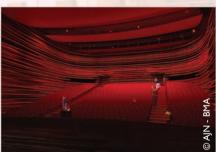
www.kahle.be

### **OPENINGS 2011**



House - Wuxi China





Théâtre de l'Archipel - Perpignan France

# aneAcoustics

Fine acoustics is not there to be seen, it should blend with the architecture

www.kahle.be



## Hidden treasures

Source-oriented sound and optimised room acoustics can offer venues options that are both innovative and subtle

The main hall of the New
Opera House in Oslo (above);
the Folkteatern in Gothenburg
(opposite, left); the new
chorus hall at the Royal
Opera House in Stockholm
(opposite, right)

he science of designing room acoustics and sound systems for performing arts venues requires special attention to detail. Swedish acoustic consultant Artifon has made this its priority, having spent the past 10 years planning and designing source-oriented reinforcement (SOR) sound systems for three theatres across Scandinavia.

SOR technology makes it possible to reinforce sound while preserving the correct localisation. Effectively, this allows sounds from the actor on stage to be perceived as coming from the actor rather than the loudspeakers. For the opening performance at the Folkteatern in Gothenburg, Sweden in 2010, the SOR system ensured it was possible to localise the actors speaking despite the challenge of having the audience occupy either side of a 30m-long stage. Alf Berntson, chief consultant at Artifon,

says such technology provides a "giant leap" towards perfecting sound in theatres.

In 2002, Artifon was responsible for an SOR system for the Stadsteater in Gothenburg. The system featured a delay matrix that was dynamically controlled by the position of the actors on stage. More recently, systems with automatic control – using radio tracking of the actors' positions – were designed for the New Opera House in Oslo and for the Folkteatern in Gothenburg.

In the Oslo Opera House, great effort was taken to make the loudspeakers invisible in order to enhance the illusion of natural sound. The main hall is fitted with 70 loudspeakers, but only one – the central cluster – is visible. Both sides of the stage opening are equipped with movable loudspeaker towers with sound-transparent cloth hiding the speakers. In the front edge of the stage, loudspeakers are hidden behind perforated steel, while fill and surround speakers are hidden in the balcony ceilings. "In musicals and in operettas where sound reinforcement is used, the illusion of totally natural sound is striking," Berntson adds.

The new chorus rehearsal hall in the Royal Opera House in Stockholm has been designed to accommodate the acoustic needs of the singers. Features such as the conic reflector, the absorbing and diffusing walls, the seating layout and the motorised absorbing curtains are important design details for creating the optimum sound



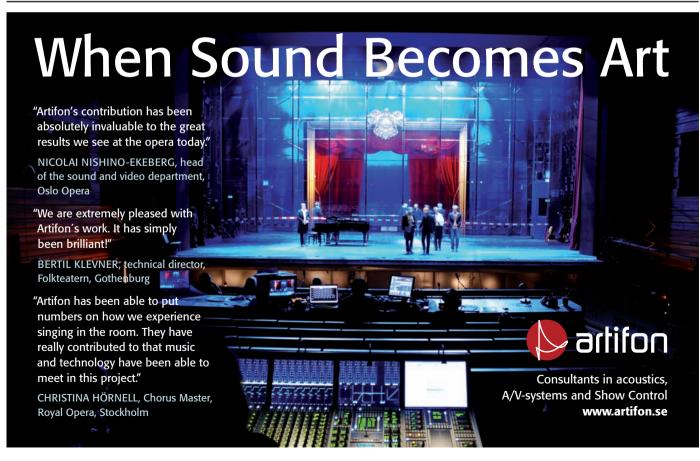
balance, as well as enabling adjustments in reverberation. Improvements to stage acoustics have also been made at the De Geer concert hall in Norrköping, as well as through a research project focusing on measures for reducing high sound levels in live rock clubs.

Many of Artifon's projects are focused on performer acoustics. As many of the company's employees have acting and performing experience, clients can be confident that these consultants understand the specific requirements of the performers on stage.

"The company is particularly proud of the Swedish Design Award and the Good Practice Award from the European Agency for Safety and Health at Work for our work with high levels at live music clubs," concludes Berntson. ■

wwww.artifon.se







flying system, the auditorium is a highly versatile space. The inviting gold-toned Tasmanian blackwood-clad auditorium seats 405 patrons in the stalls, and 170 patrons in the circle, with excellent sightlines to stage throughout. Detailed computer modelling was conducted and resulted in excellent visibility from all seats, ensuring the venue's suitability for a wide range of performance styles including dance.

To maximise the inner-city site, the theatres are stacked on top of each other, two stories underground. A 234-seat black-box studio theatre, aptly named Studio Underground, has a flat-floor performance area and retractable seating, and is ideally suited to music, theatre and dance performances of a more intimate nature. The flexible subterranean studio features a tensioned wire grid spanning 60% of the space – the first to be installed in an Australian

The team put together to create the State Theatre Centre in Perth was picked on the basis of its excellent track record on other similar projects

The State Theatre Centre has put Perth well and truly on the performing arts map

ailed as an iconic landmark for the city of Perth, the State Theatre Centre of Western Australia, designed by Kerry Hill Architects, is an innovative building that delivers highly functional and inspiring venues for performers and their audiences.

International acoustician Marshall Day Acoustics and theatre design consultant Marshall Day Entertech were selected for the complex project for their expertise and collaborative approach in designing world-class performance venues.

The heart of the AUS\$100 million facility is The Heath Ledger Theatre, an intimate 575-seat proscenium arch theatre, named in honour of the late Academy Award winning Perth-born actor. Featuring sprung timber floor, orchestra pit lift, and fly tower complete with 58-axis power

venue. In addition to spacious foyers, bars and rehearsal rooms, an outdoor area called The Courtyard is a multipurpose open-air performance space, taking advantage of Perth's Mediterranean climate. Marshall Day Entertech worked collaboratively with the architect and end-users to plan all aspects of each performance space, and designed a comprehensive technical specification to equip the venues for a diverse array of productions.

Responsible for the overall acoustic design, Marshall Day Acoustics devised sound insulation and vibration isolation solutions, as well as ensuring superior room acoustics for each performance venue.

In designing room acoustics for The Heath Ledger Theatre, Marshall Day undertook extensive 3D computer modelling using ODEON acoustic prediction software to position a series of timber acoustic sails over the stage. The sails

### ACOUSTICS THEATRE DESIGN



reinforce sound back to the audience in both the circle and stalls seating areas.

Since opening in early 2011, the theatres have received flattering reviews from performers and audiences alike. Celebrated Perth jazz trumpeter Mat Jodrell, currently studying at The Juilliard School in New York, commented on his experience performing in The Heath Ledger Theatre: "The theatre is incredible, it is possibly the perfect concert jazz venue... not too small, not too big. It's all wood, so the sound is very warm but very balanced throughout the venue. The sound on stage is great too − I was standing quite a way away from the big band and could still hear everything perfectly, including myself without foldback. I can't say enough great things about it." ■

marshallday.com







Marshall Day is an acoustics, theatre planning and noise control company providing specialised professional services for architects, engineers and designers involved in creating performing arts facilities.

#### **Guangzhou Opera House**



**State Theatre Centre Perth WA** 



Philharmonie de Paris



**Xian Concert Hall** 



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ustralia New Zealand

China

United Kingdom

Ireland

Bahrain

## Take your seats

The Montreal Symphony Orchestra's new home boasts world-class design, excellent acoustics and a customised seating arrangement

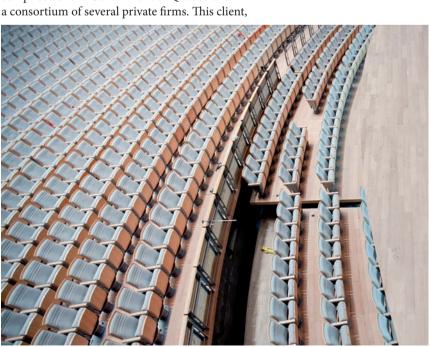
he Montreal Symphony Orchestra is a world-class institution that never had a proper home; it has been performing for years in the Salle Wilfrid Pelletier, a dated multipurpose concert hall. As of September 2011, this changed with the opening of a stunning new concert hall designed specifically for the orchestra.

Located on the plaza of Place des Arts at St Urbain Street and designed by world-renowned architects Diamond and Schmitt of Toronto along with Ædifica of Montreal and Fisher Dachs Associates, their theatre planners and design consultants, the Montreal Symphony Orchestra Concert Hall is an improvement in every possible way.

A glass façade allows the public to see into the building, an important signal of welcome and accessibility, and particularly appropriate for this client – a public-private partnership comprised of the Government of Quebec and a consortium of several private firms. This client



The new theatre has 1,714 customised fixed seats (below) the seating in retracted position



unsurprisingly, set several mandates for the hall, among them design to LEED-certified criteria, and sourcing materials, as much as possible, from Quebec. They requested the creation of a new cultural icon for Montreal audiences with world-class architectural design, excellent acoustics, maximised sightlines, perfect thermal control and comfortable seating.

Tateo Nakajima, whose firm Artec was the acoustics and theatre designer responsible for the project, explains that "all of the designers and consultants on the project care deeply about the audience's experience; it has to look good, feel good and perform well". He suggests that in selecting the seating, the team's roles converged: "Everything comes together in the seating; the seat has to meet everyone's criteria because this is where the audience connects, directly and physically, with the hall."

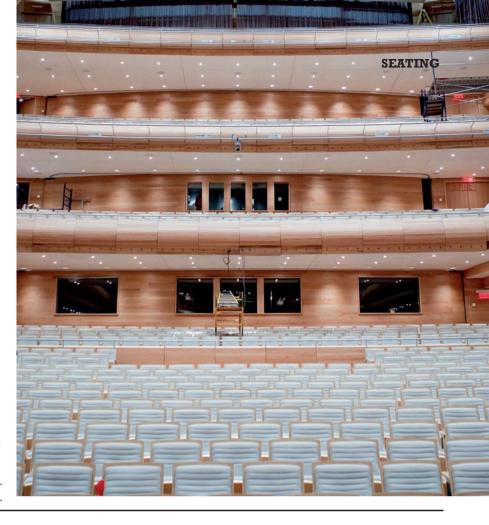
Ducharme, based in Montreal, supplied the seating. The company is well known for its many lines of auditorium seating, but as Nakajima explains, "The seating contractor doesn't deliver a ready-made product. Seats are a proprietary solution, even if you start with a standard model. Ultimately you get a customised product." Matthew Lella, the project architect at Diamond and Schmitt, says: "Ducharme's willingness to work with us as designers, to patiently resolve all our requirements - acoustics, aesthetics, comfort, durability – are what make the product so valuable, at any price. This relationship has allowed us to install a top-tier product – one that we have shaped – with no compromise and with great efficiency."

The starting point was a standard chair called 'Mississauga'. Immediately upon receiving the order, Ducharme began obtaining FSC-certified Quebec Natural Maple, working with the Forest Stewardship Council, to meet LEED materials requirements. The fabric, Maharam Steelcut, supplied by Kvadrat, is a heavy-duty, chemical-free cloth that is 90% wool – a rapidly renewable material – and 10% nylon.

A functional aspect of the seating is that each of the 1,714 fixed chairs contributes to the heating and cooling of the auditorium. The chairs sit on pedestals of perforated steel that interact with the air under the floor in a lowvelocity system; it's an ingenious supplement to traditional HVAC structures of large, insulated ducts that can produce noise. The team's goal, to create a silent space so that audiences hear the music's tonality, consistency and clarity, is helped by delivering air very slowly, which is quiet and provides a consistent environment for every seat.

In the end, the Montreal audience wins, according to Michel Languedoc of Ædifica: "People coming for the first time will respond to the intimacy of the room. They will listen to music, they will feel warm and comfortable. They will have excellent listening conditions." ■

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## Classic performer

The new seating at Newcastle's Theatre Royal complements the venue's classic Edwardian design without compromising the audience's comfort

Work in progress: the refurbishment of the Theatre Royal, Newcastle

he Theatre Royal in Newcastle is one of only nine Grade 1-listed theatres in England and in the 173 years since it was first built, it has been renovated many times. Indeed, following a major fire in 1899, the entire auditorium was redesigned by world-renowned theatre architect Frank Matcham.

As part of the latest upgrade works at the venue, Jezet Seating has been awarded the contract to install its Acanthus seats, which are designed for theatres of outstanding architectural heritage and will introduce the highest modern standards of comfort without compromising design, as well as complimenting Matcham's classic Edwardian look.

The seat used for the upper levels is a specifically designed tier seat using cast stanchions with a fixed squab and back, but at the same time complementing the design of the standard tip-up Acanthus Seat that is being installed in the stalls and grand circle. The theatre has numerous possible configurations in the front stalls area, and a system has been specifically designed by Jezet to accommodate this.

The client required tip-up seats that are hinged to fold down into storage boxes beneath the floor - sometimes referred to as 'coffinstyle' boxes. There are seven storage boxes, each capable of storing a double or triple seat unit.

Using aluminium stanchions for these seats reduces the overall weight. The storage boxes are mounted into the structure of the new orchestra pit on the original elevator and each box contains a mechanism that allows the change from 'seat row' to 'flat floor' to be carried out fairly quickly by just one person.

The flat-floor arrangement is designed to support a uniformly distributed load of 7.5kN/m<sup>2</sup> and a point loading of 4.5kN over a square with

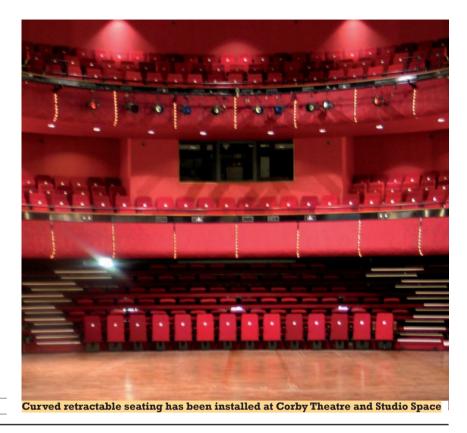


300mm sides. The seat row arrangement is required to support a distributed load of 4kN/m², while the bottom of the box is capable of supporting 1.5kN/m².

#### Corby's curve

Jezet Seating has also recently installed seating at the Corby Theatre and Studio Space in Northamptonshire, UK. The theatre now boasts the first complete curved retractable seating system in the country, using 350 of Jezet's Granada seats for both the curved retractable and the fixed seating on the balconies. This is an intimate venue designed using rich traditional colours, but with modern high-tech facilities, both front of house and behind the scenes.

www.jezet.com





STEELDECK

# Delivering the goods

Steeldeck's roots in scenery building have paved the way for a platform solution that offers both flexibility and reliability

Steeldeck in action (clockwise from top) Seating and stage at the theatre, film and TV building, University of York; Unicorn Theatre for Children, London; Abbey Theatre, Dublin It's often difficult to get good pictures that really show our work," says Philip Parsons, the softly spoken owner and founder of Steeldeck. "If structures or seating do their job, you shouldn't be thinking about it, or even really be aware of it!"

Parsons and his group of companies have lived with this particular issue for the 25 years they have been making the Steeldeck platform, which has developed over time into the present line of products. This has been highlighted precisely because the company's work has gained a reputation for performing exactly as intended. But while this might make finding pictures hard, Parsons is delighted when the end-users of a venue - actors, crew members, audience, management - are unaware of any complexity involved. It means the product has passed the test, meeting its brief. The considerable effort Steeldeck's designers may have expended with the architects and consultants in realising each unique design remains unseen.

"Not possible" is not in the Steeldeck vocabulary - perhaps because the company's roots were in scenery building, making real the worlds conjured up by the imaginations of scenic designers. Show-makers tend to have an 'anything is possible' attitude; scenery builders acquire that identity. That was what led Parsons to create the first Steeldeck platform in 1985: the practical design that gave the platform its enormous strength with the pragmatic choice of 8 x 4ft as the standard size and the use of standard scaffold tube to allow the decking to be built to whatever height or rake a production required, anywhere in the world. It remains a de facto standard to this day, found everywhere from theatres to corporate events to film sets.

At the same time, each custom project benefits from the high-quality construction techniques

that have given the Steeldeck platform itself such a strong reputation for reliability. The company's designers form the link between the challenge posed by the client or architect and a workable, practical design – bringing to the project careful planning, CAD modelling, plus a splash of real-world experience and a dash of set-builder's inspiration.

All of the elements are then manufactured to Steeldeck's high standards. "My roots are in the theatre, I've seen how our products get handled out in the real world. We take care to ensure they can survive that," says Parsons.

Steeldeck also distributes the AirStage and other NIVOflex aluminium products. "These are really interesting," Parsons notes. "The Steeldeck platform offers incredible versatility and strength, but for many venues the possibility not just of flexibility, but also quick and easy changeover using a very small crew, is enormously appealing. No storage, no handling..."

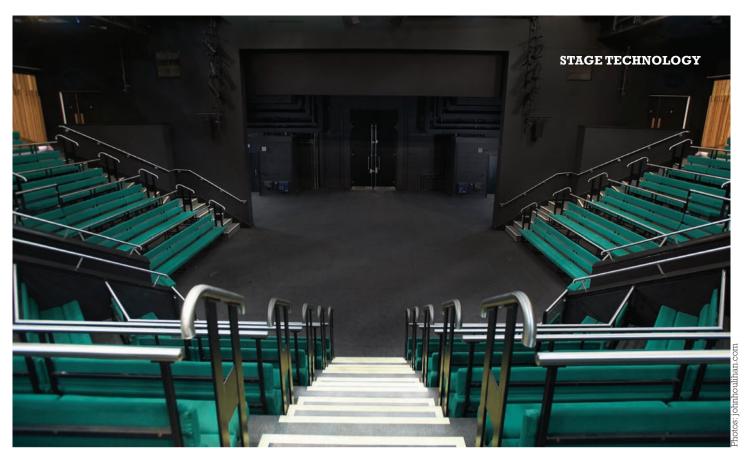
#### **Satisfied clients**

This combination clearly satisfies the demands of many clients near and far. In the past year, Steeldeck has created a new reconfigurable retractable for the Tremough campus of Exeter University (Dartington's new home), where just seven small seating units allow the venue to switch from end stage to in-the-round or a half a dozen other configurations.

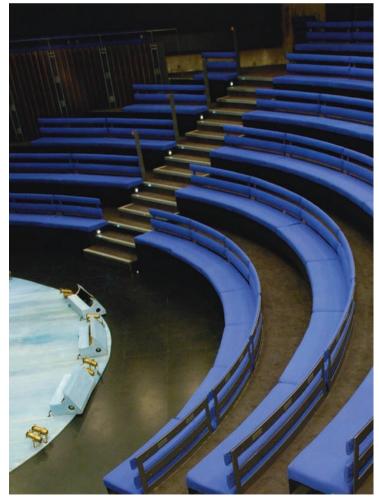
The company has also created choir risers with multiple curves for the Parkside campus of the University of Wisconsin; it has created a curved, motorised retractable seating system for Hampton School in London; and an AirStage installation in Lafayette, Louisiana. Steeldeck is currently creating the complex curved seating structure for the new Scottish Arena, designed by Foster+Partners, which will be the largest entertainment venue in Scotland when it opens in 2013.

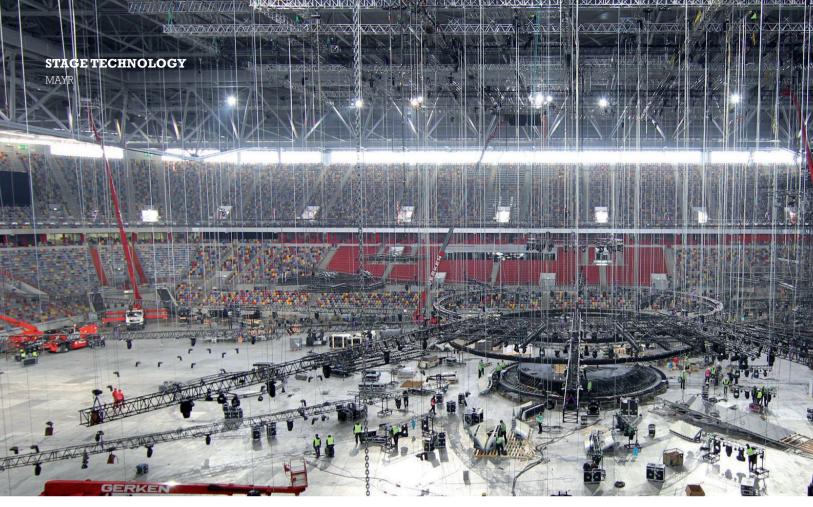
Parsons says he feels privileged "to have worked with remarkable people on fascinating projects, from as far west as San Francisco to as far east as Tokyo", and to have achieved solutions that meet his exacting standards for sound performance and a long working life. ■

www.steeldeck.co.uk









Chain hoists with safety brakes by Mayr power transmission were installed for the complex changes of stage scenery during the Eurovision Song Contest

## On song for Eurovision



Chain hoist with double brake from the ROBA-secustop series

Getting the Esprit Arena in Düsseldorf ready to host the Eurovision Song Contest was a huge task for all involved

lmost 14 million people in Germany tuned in to watch the Eurovision Song Contest final. The event was widely recognised by the trade press as the event of the year, and the task of transforming the Esprit Arena in Düsseldorf into a giant television studio required extensive planning to ensure the safety of all involved.

According to North German Broadcasting information, more than 40 trucks with 38-tonne capacities were required to transport the stage alone. Around 120 similar-sized trucks were needed to transport the hall lighting, LED

technology, rigging and aggregates for power supplies, while 35km of installed high-voltage current ensured that the show could be produced independently of the general electricity network.

For the complex changes of scenery during the show, stage elements weighing over a tonne had to be suspended over both the audience and performers. To ensure maximum safety, chain hoists fitted with Mayr power transmission safety brakes were used, enabling successful manoeuvring of the loads while spectators enjoyed the show.

The ROBA-secustop stage brake from Mayr power transmission is specifically designed to

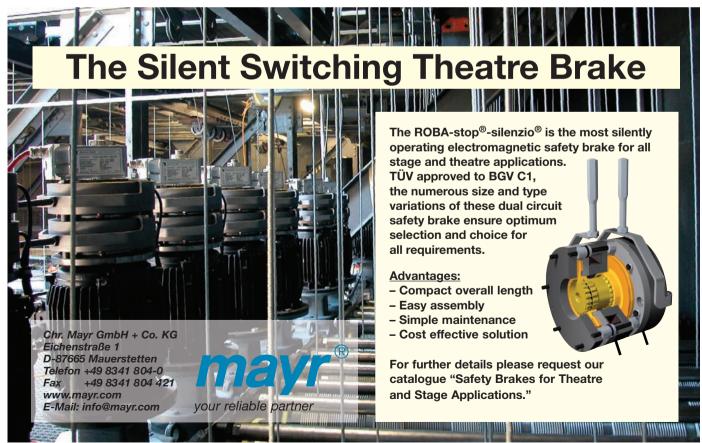


meet the safety standards of BGV-D8 Plus and BGV-C1, and every brake is examined prior to delivery to ensure maximum reliability. The compact and enclosed design allows for simple handling and installation, while the integrated damping system reduces switching noises during manoeuvring. Furthermore, as the working air gap is pre-set, the brake does not require re-adjustment, eliminating malfunctions due to operating errors.

Maintenance of the brake is limited to inspection of the friction linings, which are highly wear-resistant and ensure extended product life, making the ROBA-secustop an economical choice for electric chain hoists and lifting gear. On the night, Mayr's stage brakes allowed technical operations during the show to run smoothly and safely.

**ROBA-secustop** is the perfect safety brake for electric chain hoists in event and stage technology

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The renovation of the Museum of the Moving Image was set off with a spectacular finishing touch he Museum of the Moving Image in New York completed a spectacular US\$67 million renovation in 2011, updating and expanding the space it had originally moved into in 1988. Paramount Studios had initially constructed it in the 1920s at the end of the silent film era.

The renovation nearly doubled the museum's size to 9,080m². Among other aspects, the project included work on a 267-seat theatre, 68-seat screening room, a video-screening amphitheatre, and an education centre with classroom facilities to accommodate 60,000 students a year.

Rose Brand provided soft goods and installation services for this magnificent project,

including the new main curtain in the new 267-seat theatre. Designed by Cindy Sirko, the 6 x 15m uniquely vibrant and colourful curtain is itself a work of art, with its eye-catching, printed fabric having been described as a three-dimensional explosion of colour. The printed curtain captures the essence of the building design, which fuses the building's architectural elements with the visual imagery of the museum's exhibits.

Rose Brand consulted with Sirko on curtain printing techniques and materials before the final selection of direct dye on Lightbox fabric. Rose Brand then developed several iterations of full-scale, printed, fabric mock-ups to demonstrate how the curtain would look prior to production.



The company also developed and installed a double-sided curtain for the museum's Anne R and Andrew H Tisch Education Center, which acts as a divider to transform a grand seminar room into two separate classrooms. While the curtain fabric and printing technique were identical to that used for the main theatre curtain above, the design was more reserved in keeping with the seminar room's functional intent. The fabric specialist installed the curtain on its ADC 140 Series Track, which is ideal for medium weight drapery within a studio, office or exhibition hall setting.

This successful project demonstrates how Rose Brand's experienced digital printing and custom sewing departments have worked effectively with designers to help turn their brilliant concepts into reality. ■

The digitally printed stage curtain in the main theatre

www.rosebrand.com



## Hlying machines

ZFX has a 'Dojo' studio, which is dedicated to teaching both dancers and operators to get the best out of flying effects

ZFX's workshops teach participants to use flying effects safely and effectively

he term 'Dojo' is often associated with martial arts studios and is a Japanese word that literally means 'place of the way' - or a place dedicated to the learning of art or philosophy.

Flying effects provider ZFX has created its very own Dojo - a 50 x 14m indoor space where practice and training for its products can take place. Successful use of flying effects in theatre productions requires both partners rehearsing and working together to create a fluid routine and in the case of ZFX's Dojo, these partners are the flying performer and the ZFX Flying Director. Getting these partners working together is what a Flying Director does, acting as part choreographer, part rigger, part teacher.

ZFX is constantly refining its craft, and having this permanent 6,500m<sup>3</sup> space to work in allows all manner of possibilities to be explored.

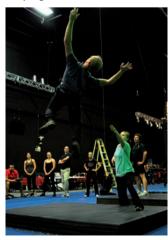
Choreographers and directors are able to see if their ideas look as good in practice as they did in their heads.

As well as these individual workshops, ZFX also offers more general flying workshops. Whether you are a performer, a technician, a choreographer, a director, a stage manager, or even a costume designer, you can gain valuable knowledge and experience on the workings of these flying effects and how they relate to your particular role in a production.

The workshops foster an enthusiastic, creative and open-minded atmosphere. They start with the basics of aerial movement and operation techniques, and then progress into more advanced ideas as the participants' confidence grows. The sessions aim to make sure that each attendee really grasps the concept of the Dojo and leaves with their head full of new ideas. Although the ZFX Flying Director makes







flying look easy, it takes a lot of hard work. It doesn't matter what level of dance experience participants have, as even veterans will have to learn new forms of body control.

ZFX also works with the often overlooked equipment operators - who are effectively the dancers' partners. Their timing and knowledge of the flight sequences are crucial and once both sides have learned the basics, ZFX works hard to create a strong bond between performer and operator. Like real dance partners, they must be able to anticipate the other's movement and if a mis-step occurs, and adjust the choreography as necessary.

ZFX hopes that each attendee will leave the Dojo with a better understanding of flying effects, and will be able to use this specialist training to get the most out of them in the future.

www.frontline-rigging.nl







Oasis of the Seas Royal
Caribbean cruise ship (above);
Arc Casino in Macau (below);
Shanghai Cultural Center
(opposite page)



lthough originally supplying mainly stage and orchestra lifts when it began working with the theatre industry more than 12 years ago, Serapid is now seeing increased demand for its systems in architectural applications, ranging from feature lifts, moving bars, and moving rooms. These concepts of kinetic architecture allow the LinkLift and Rigid Chain push-pull systems to open up new possibilities for dynamic building features and increased venue flexibility.

Recent applications include the large circular lift at the Shanghai Cultural Center and the sale of the first QSX (quick seating exchange)

flexible venue system for Louis Vuitton in Paris. The Shanghai Cultural Plaza lift has a diameter of 18m and lifts up to 264 tonnes at speeds up to 250mm per second over 6m of travel. The incorporation of the lift allows the switch between ballet floor, ice skating rink and a 5m-deep swimming pool. The LinkLifts and drive system were supplied to SBS Dresden together with the design for the scissor guides, and SBS designed and installed the lift package as a whole. The Serapid LinkLift system was selected as a result of the high levels of control and stability it offers, as well as its low-operational noise levels.

The first QSX flexible venue system for Louis Vuitton in Paris will be installed later this year and will allow the venue to benefit from rapid format changes, enabling it to be transformed from an exhibition space into a conventional theatre – all at the touch of a button.

The Serapid QSX system consists of beams that have a plain floor on one surface and seating on the opposite one, and when the beam is rotated these can be interchanged. The beams are mounted on self-guided LinkLift lifting columns, which allow flat, variable raked and cabaret formats to be configured at the press of a button. Further benefits of the system are that it can be used to make curved rows, it allows cool air to be fed directly under each seat, and clients can choose what type of seat they want.

These concepts build on a number of successful projects already carried out by Serapid, such as the get-in and instrument elevators at the Copenhagen Opera House, which were the first Serapid powered lifts certified to

Clever kinetic architectural applications allow venues to switch between different configurations at the push of a button

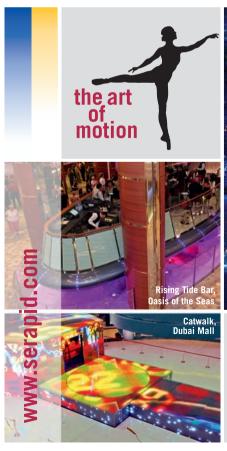
# Ring the changes

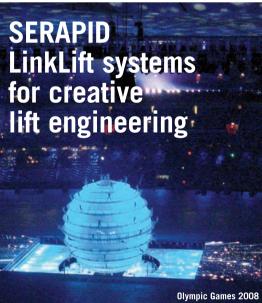
STAGE TECHNOLOGY

the EN81 lift regulations; the truck lift at the Gorki Theatre Berlin, which forms part of the roadway when in the 'down' position; the unique Rising Tides bar, which provides a spectacular feature in the atriums of Royal Caribbean's Oasis of the Seas and Allure of the Seas cruise ships; a glass performance lift in the Arc Casino in Macau, China; and a bridal lift being installed in the banqueting suite of a seven-star hotel in Shanghai. As well as these lift applications, the company also makes horizontal systems, which enable roof segments to be retracted to allow natural light and fresh air into venues.

Serapid's horizontal and vertical rigid chain systems enable venues to adopt a wide range of dynamic architectural features that go a long way to improving the experiences of both venue operators and audiences.

#### www.serapid.com







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Singapore's award-winning School of the Arts successfully combines an inner-city school with a top-class performing arts facilty

n recent times, Asia has seen the creation of a number of aesthetic and revolutionary structures. The Singapore-based architecture firm WOHA won the Jørn Utzon Award for International Architecture in 2010 and this year the firm received the Royal Institute of British Architects International Award for the outstanding architectural design of the School of the Arts (SOTA). The school houses three performance venues, including a Daktronics rigging-equipped drama theatre, a recital hall and a smaller studio theatre, plus various studios and rehearsal rooms.

"When I initially visited Singapore's first independent, pre-tertiary arts school for ages 12-18, I knew this was no typical high school," reveals Mike Hyde, Daktronics rigging sales, Asia region. "They were looking for a sophisticated multipurpose system accommodating performances of all levels."

SOTA is in the midst of Singapore's arts and heritage district and next to The Cathay, a 17-storey cinema, shopping mall and apartment building. Vines cover sections of the US\$121 million structure and the steps lead to an open, airy mix of urban plaza space under the shade of lush trees. Inside, small gardens line the spacious breezeway with inlaid geometric floors – truly an inspirational backdrop for spontaneous or rehearsed performances.

SOTA integrates arts and academic curricula and blends an inner-city school with a professional performance facility. Chris Dales of the Singapore Arup office (in collaboration Singapore's School of the Art has three different venues to accommodate a diverse range of performances



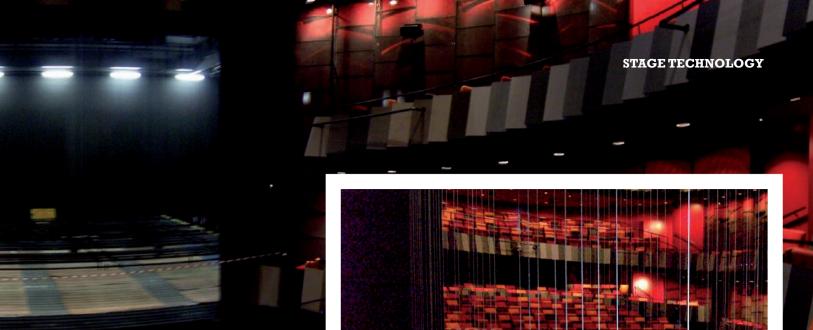
with Theatreplan, UK) provided the acoustics and theatre consulting services. "For the powered flying system in the drama theatre, we were looking for an affordable powered hoisting solution that could meet the needs of both an educational establishment, and the technical requirements of a venue supporting professional artists for a ticketed audience," recalls Dales.

Local dealer, Siong Ann Engineering, secured 44 over-stage line-sets and four lateral stage line-sets (two each side) for the 499-seat drama theatre. The Vortek Classic hoists are operated by one Daktronics VAC controller and remote pendant with six points of access.

"Creating an environment where visiting professionals interact with the student body is core to the school's ethos, and this is reflected in the building's architecture. It was therefore important that the theatre fit-out contained technical systems that could be used by both students and professional technicians alike," Dales says. "The VAC controller is a relatively simple, intuitive device to use, which is important given that it will be used by students.

"Although Singapore is a long way from the Daktronics manufacturing facility in the USA, we have found the Daktronics engineers to be extremely accommodating during their visits, especially in supporting the local installer and in preparing the systems for commissioning," Dales continues.

SOTA's technical manager Alan Loh is in agreement: "The system's capabilities have served us well from the start since the commissioning. The in-depth training is



helping us maximise the functionality and capabilities of the entire system."

The SOTA drama theatre design is a feast for the senses and it's only right that it is well equipped. "The Daktronics rigging system was exactly what this demanding theatre needed," says Hyde. ■

www.daktronics.com/rigging



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A multi-skilled team was on hand to make sure the Kilden Performing Arts Centre in Norway lived up to expectations

The Kilden Performing Arts Centre is situated on the edge of Kristiansand harbour; (below) Trekwerk's Fleet **Angle Compensation System** 

he town of Kristiansand, in the south of Norway, is best known for its cultural festivals, dynamic harbours and wooden houses. But now it has a new attraction: the Kilden Performing Arts Centre, which will officially open on 6 January 2012.

The new venue is unique in terms of both its functionality and its technical setup. The complete building and its surroundings cover an area of approximately 16,000m<sup>2</sup> and contains 128,000m3 divided across four stages. The

> Concert Hall is the largest room with nearly 1,200 seats; the Theatre Hall has 700 seats; the Multipurpose Hall has 230 seats; and the Intimate Hall accommodates 150. In total, 2,200 spectators will be able to see performances by three independent institutions: Agder Regional

> > Theater, Kristiansand Symphony Orchestra, and Opera Sør.

The engineering and construction phases of the project saw a new and innovative approach to the building process. The awarding of contracts in the design period resulted in a team of several companies specialising in different disciplines being selected. This co-operative team built the entire building and installed all of its technical features. During the construction phase, it became clear that many of the problems usually

faced during a new-build project were avoided as a result of the multitude and variety of skills available on site.

As a member of this team, Trekwerk designed and installed the under- and overstage areas of the four halls - both the Concert Hall and the Theatre Hall are TNM-controlled. Installed in the Concert Hall are a fly-bar system, a chainhoist system equipped with frequency inverters, an orchestra pit lift, seating wagons and an innovative sound cockpit lift system.

The Theatre Hall is fitted with a fly-bar system with 42 SynchroDisks; eight SynchroPoints forming a point-hoist system; a chain-hoist system with frequency inverters; and mobile spring-drum wagons, placed on a typical lamel floor. The fly bars can be extended from 15.5 to 18m. The theatre's house curtain and the lighting bridge and its header frame are controlled by the TNM. At stage level, the two auditorium towers can be moved using an air cushion system, and there is also a loudspeaker winch. The stage has a trappable 130m² floor (with two removable areas of 1 x 1m on removable frames of 1 x 2m), the orchestra pit can be lifted in three parts, and there are also seating wagons with three angled wheels.

The Multipurpose Hall has, among other features, a 300m2 tension wired grid, while the Intimate Hall also has a chain hoist system equipped with frequency inverters.

Innovation is key to Trekwerk's strategy, and the company is continuously developing new



custom-made products. One of the newest of these is an addition to the SynchroDisk, the so-called FACS (Fleet Angle Compensation System). In most theatres or concert halls, wires are directed onto pulleys, from where they are split up to several droplines. At the National Theatre in London, space is limited and this required a solution that would guide the steel wires directly from the SynchroDisk through the grid. To avoid the three wires becoming displaced, Trekwerk developed a system that moves along the disk while it is rolling. London's National Theatre uses more than 30 SynchroPoints and is now fitting the powerflying system in one of its three theatres. The venue will remain open while work is carried out, with the installation expected to be completed by the end of 2011. ■

www.trekwerk.com





Motorised track systems enable theatres to integrate a whole host of performance enhancing features

ong established as a supplier of textiles, projection screens, and technical systems in the international architecture, theatre, and event markets, Gerriets has now made its mark as a manufacturer of specially designed motorised track systems for a wide range of applications.

In the field of architecture, Gerriets' track profiles, motors and control options – often used in combination with the company's specialty textiles – offer innovative, complete solutions for defining or subdividing spaces and controlling light and/or sound. Working with architects, acoustical consultants and a variety of contractors, Gerriets has now carried out a large number of complex projects.

At the Danish Radio Concert Hall in Copenhagen, for instance, Gerriets created a system for altering the concert hall's acoustics, using its Woolserge 500 drapery on a Joker 95 track system with Friction-Drive motors. To ensure a precision fit along curved architectural elements, custom manufacturing of the track was carried out using CNC bending.

At the Musée du quai Branly in Paris, a variety of elegant curtains were designed and installed throughout the museum, all with specially adapted technical systems to enable spaces to be separated and acoustics to be controlled as necessary.

In the Eitihad Airways First and Business Class Lounges at Abu Dhabi International Airport, room-dividing curtains created visual and acoustic enclosures; while at the Mercedes-Benz Museum in Stuttgart, Gerriets used its Studio track system with Friction-Drive motors to create precision movement of video monitors and custom-made decorative room-dividing curtains. And at the Orchestre Symphonique de Montréal, 56 individual, motorised Trumpf 95 track systems are currently being installed for acoustic draperies.

Some of Gerriets' most innovative new track system developments are designed to be used in conjunction with theatre equipment. The company has served the world's theatres and opera houses for more than 50 years, supplying textiles, other soft goods and sophisticated scissor-track systems to such premier venues as Amsterdam's Music Theatre, Beijing's National Grand Theatre and the Opera Garnier in Paris, as well as a complete scissor-track system for Moscow's Bolshoi Theater.

Now Gerriets is creating an extensive new range of track systems, including curved-rail

The Danish Radio Concert
Hall in Copenhagen (main
picture); the Mercedes-Benz
Museum in Stuttgart (middle)



and heavy-duty systems Cargo that can handle loads up to 1200kg, yet can operate safely, quietly and reliably throughout performances. At the O.T. Theater in Rotterdam, for example, the Trumpf 95 curtain track system was combined with a light muslin textile in a complex, curved configuration to maximise the versatility of this small performance space.

The company's Absorber CS sound-absorbing textile can be rolled down from the ceiling to alter room acoustics, then retracted from view when not in use, and this system will be installed shortly at the Elbphilharmonie Hall in Hamburg, Germany. ■

Opera O.T. in Rotterdam (above); Musée du quai **Branly in Paris** (left)

www.gerriets.com

#### **Gerriets at a Glance**



Gerriets was founded in 1946 and has earned a worldwide reputation as a supplier of innovative scenic equipment and entertainment technology as well as a world leader in the manufacturing of large format projection screens. A diverse product offering includes theatrical fabrics, dance floor, track systems, scenic equipment and projection screens. Projects range from theatre and opera houses, performing arts centers, cinema, cruise ships, exhibition halls, civic centers, music halls, churches and houses of worship to permanent architectural installations.

With a comprehensive approach, Gerriets can offer overall project management from the "on paper" design phase to engineering through to installation. Highly skilled technicians ensure competent and professional results.

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www.gerriets.com





Venues can use creative packaging and social media to increase customer satisfaction and encourage loyalty

ive entertainment has always had the power to connect venues with audiences. And now, in this era of online commerce and digital media, performing arts venues are implementing new ways to better serve their patrons. A customer's overall experience with a venue goes beyond the show itself – it starts from the moment of learning about a show, continues through the ticket-buying process, and includes follow-up afterwards – and many organisations are implementing creative solutions to ensure that this experience is a positive one.

Tessitura Software, a constituent management system for relationship management, ticketing, marketing, philanthropy and data mining, offers a flexible platform that allows arts and cultural facilities to tailor the online buying experience and maximise each point of contact a customer has with the organisation. "By offering patrons a tailored and targeted experience throughout the entire process, venues are building customer loyalty and helping to ensure that people will return again and again," notes Jack Rubin, president of the Tessitura Network. "Membership and loyalty programme benefits can also be applied as desired."

#### Creative packaging

Research on audience behaviour has found that when visiting a venue for the first time, customers are most concerned with where they are going to park and nearby dining options. Tessitura-powered organisations are taking advantage of the flexible online platform to offer customers the ease of making these decisions beforehand, reducing their stress on the night of the show and ensuring a smooth experience. The new AT&T Performing Arts Center in Dallas, Texas, for example, offers 'Make a Night Of It' packages, allowing visitors to select ticketing, parking and dining preferences in a single online transaction.

"By offering a total experience for our patrons, we have seen our parking sales double online and we sell an average of 20-25 dining reservations per week," says Teresa Dean, Tessitura Systems director. And because the Tessitura database is tied directly to the organisation's website, customers' experience online is seamless – a convenience that Dean says customers love.

The Grange Park Opera, a seasonal opera festival, also offers several dining options for patrons attending performances, held in an historic mansion in Hampshire, UK. The venue's dining system is linked to the Tessitura-powered box office, which allows staff to produce a daily list of ticket holders that includes contribution history and any other relevant information. It also allows the organisation to create lists of visitors who are attending a performance but haven't yet made dining arrangements, in order to easily send information or targeted e-messaging.



Performance at 92<sup>nd</sup> Street Y (main picture); The Margot and Bill Winspear Opera House (below) is one of four venues in the AT&T Performing Arts Center in Dallas. Texas



#### Connecting via social media

Venues are using social media websites to continue the dialogue outside of the performance space and build lasting relationships with their patrons. By using Facebook, Twitter, YouTube and other online services, they can help patrons learn more about performances and provide outlets to share experiences.

Howard Levine, director of internet and creative strategy at New York-based cultural and community centre 92<sup>nd</sup> Street Y, says the next step is to connect these social media outlets with Tessitura. "With our launch of Tessitura, we have also formed a customer relationship management department to leverage patron data that we are now easily able to track and analyse," he says. "Our goal is to better connect with our patrons and have our patrons better connect with us."

www.tessituranetwork.com



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#### How did Newcastle's Theatre Royal project come about?

The focus of the project was on improving comfort and ergonomics for the audience, while simultaneously refurbishing the theatre in time for its 175<sup>th</sup> anniversary year. We won the commission with Sansome Hall Architects and historical consultant Dr David Wilmore in 2008. Our role included creating new seating layouts with improved sightlines which relate more closely to Frank Matcham's original designs, as well as expanding and improving the technical facilities and increasing the flexibility of the stage and orchestra pit. The work was completed in a little over six months to ensure minimal 'dark time' for the theatre, and was completed on time prior to the opening night on 12 September 2011.

#### What was the biggest challenge with this particular project?

The greatest challenge was balancing the preservation and protection of a 175-year-old Grade I-listed theatre with the need to develop and expand the technical capabilities. Many hours were spent exploring the building and its history in order to develop design solutions that are sensitive to the building, while providing the highest level of technical functionality.

#### What techniques did you employ?

One requirement of this project was to ensure that positions for technical equipment in the auditorium blended seamlessly with the aesthetics of the building, while still providing the essential flexibility. The design process included 'mock-ups' of brushed

steel curved lighting bars and the provision of a flown lighting bridge above the rear of the auditorium. This approach to design detail encompassed all elements – even down to the cabling and containment routes within the auditorium balconies and the detail of the brass orchestra pit rail.

#### What advice would you have for other theatres wanting to do similar?

There needs to be a clear vision from the start of what the project is setting out to achieve – and this may mean a more radical assessment of what might be 'allowed' than appears achievable at first glance. Ultimately, projects such as these rely on collaboration: team input from each specialist, and a strongly committed client group who are able to make decisions quickly and firmly. A lot of research is essential to understand the building's history, both in a physical sense and also in terms of the productions and people it was built for. ■



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