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## MUSICAL MASTERPIECE

Harbin's world-class performance venue

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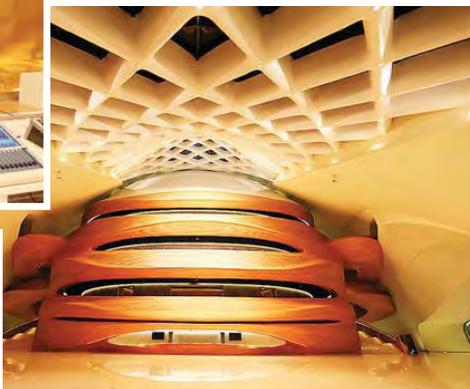
The city of Harbin has long been in need of a world-class performance venue. **Simon Luckhurst** discovers whether the HGT has truly made Harbin the City of Music

**IF YOU'RE THE CITY OF MUSIC**

then you better be able to back up that claim. Fortunately, Harbin – in the north of China – has plenty to justify the nickname. Traditionally, the city was the entry point for European music arriving in the country, and generations of musicians have since been raised there, only serving to further cement its heritage. Indeed, Harbin is the home of the concert hall in China, yet up until recently it was still lacking a truly world-class venue. This all changed a couple of years ago with the opening of the Harbin Grand Theatre (HGT).

The brainchild of Beijing architects, MAD Studio, the building is simply stunning. Like others the group has worked on, the HGT is so futuristically-designed it bears little resemblance to anything else of its kind. Natural light fills the cavernous interior spaces for the first time in an opera theatre, providing direct illumination and expanding both its flexibility and environmental credentials. The engrossing interior also includes hallways and a viewing platform allowing tourists to view the area's natural wetland surroundings. In recognition of its unique design, it was this year named the ArchDaily Building of the Year in the Cultural Architecture category.

Set across 72,000 sq-m of land on the Songbei Culture Centre island, the entire project encompasses a 1,600-seat opera house and a smaller 400-seat theatre. Tasked with providing 'top-class' sound reinforcement throughout both recital spaces was Shanghai's MYC Technology. In a classic case of form over function, the elaborate interior of the theatre in particular brought with it a hefty set of acoustic challenges. MYC's 'feet on the ground'



(From top): A Salzbrenner Polaris Touch overlooks the theatre from the rear control room; Sequenza arrays hang either side of the stage; A Cadac S-Type is used as the backup console

approach to tackling these issues, however, ultimately helped to secure the contract. 'The architectural and electroacoustic design was led by Yang Zhigang from the Acoustic and Theatre Design Laboratory of the East China Architectural Design & Research Institute. Our task was to keep our feet on the ground when designing, using Rhino 3D to model and simulate the environment and EASE to calculate and optimise the system design,' recalls Lang Jun, MYC's technical director. 'We also took sound quality and safety into consideration and designed a backup system. If something goes wrong with the digital network, the system will switch to the analogue lines

automatically. We believe that this down-to-earth manner when designing was the key to us winning the project.'

This considered approach during the design phase also paid dividends later on, as the MYC team was able to identify several issues related to the construction and feed them back to the other involved parties. 'The most interesting and challenging part of the project was probably the BIM (Building Information Modelling) technology in the modern theatre,' muses Huang Rong, MYC's project manager for HGT. 'At the beginning of the project, all the teams involved used their own model to simulate the implementation. We found

some problems with the simulations and the original structure design also had a very bad influence on the acoustics,' he recalls. 'We reported the situation to the design institute and decoration company to revise the model. Performing such simulations at this early stage was vital, and allowed us to discover and avoid many problems later on. Another challenging part was that there are many curved surfaces, which made the accurate positioning of the equipment very difficult. We had to make many choices and trade-offs between the early design, installation and overhaul.'

'Harbin Grand Theatre has a very large, complex audio system,' furthers Mr Huang. 'At the very beginning of the design phase we were confronted with a number of challenges due to the curved wall surfaces and extremely tricky acoustic architecture. For example, how to ideally control the coverage, how to configure the line array system, setting fixed points for the hidden installation of the fill and sound effects speakers, independent operation between the fixed-install and portable systems in one theatre, and further, how to make a hot-swappable backup for two systems at the same time! All of this was tricky. As a result, we had to be even more cautious and scientific when selecting the right speakers.'

German speaker manufacturer Kling & Freitag was the chosen brand for MYC and the opera theatre is now home for more than 150 K&F cabinets, with both fixed and portable configurations on hand. An LCR setup of 18 K&F Access T5 enclosures, eight B10 subwoofers and a further four B5 subs is permanently embedded into the theatre's surround. However, to meet requirements of various types of performances, a portable system consisting of hangs of 12 per-side Sequenza 10N line arrays and two per-side

Sequenza 10B subwoofers can also be erected to flank the stage. In addition, five Sona 5, 11 CA106, eight CA1515-9, 36 CA1001, 20 CA1215 and three SW-118E cabinets together are used for surround sound, effects, front-fill and stage monitor duties in the main theatre.

Similar but scaled down versions of these systems can also be found in the smaller theatre, where four Access T5 cabinets and two Access B10 subs provide primary reinforcement with support from CA, Sona and Scena series speakers for fills, surround and effects.

'Kling & Freitag is a renowned brand in Germany and has many references in theatres and concert halls,' says the technical director, Mr Lang, on his reasons for selecting the models. 'After taking every aspect into account, we opted for the Access series as the coverage angle can be controlled well and the cabinets provide sufficient power and clear sound. The portable system needs to facilitate rock and pop music performances and so on. Considering fast installation and sound quality, Sequenza 10 was our definite choice.'

Equally as important for the two performance spaces was the choice of console. Both theatres utilise a digital audio network allowing signals of all kinds to be shared between them with maximum flexibility. Salzbrenner Polaris Touch consoles act as the brain in both areas, with support in the opera house from a Cadac S-Type analogue surface.

'We selected the Polaris Touch as the main project console and built a whole audio system based on Dante. This enables the theatre sound system to adapt to various performance

types. Since installation, the venue has hosted more than 60 shows using this setup. The whole system has been split and combined many times in order to meet the high standards of different shows and ensembles from all around the world to great success. The console's modular touchscreen makes the system clearer and easier to share.

'Cadac's S-Type analogue console is also an important part of the system,' continues Mr Lang. 'It plays a vital role as the backup console, and because of its high quality and ease of use, it's also used in some shows as the main console. The S-Type's classical four-band equaliser meets the requirements of most sound engineers, and additionally, every channel has an independent modular design and fully supports hot-swapping, adding another level of safety and redundancy to the system.'

Connecting the consoles with the K&F speaker system in the opera house are 45 Lab.gruppen PLM 10000Q and five PLM 20000Q amplifiers, while the smaller theatre draws upon six PLM 10000Q and two PLM 14000 units. The Polaris Touch in each space is connected to the DSP amps via Dante and AES/EBU, while the Cadac S-Type is connected via an analogue line. The DSP amps support multi-signal input simultaneously as well as priority settings, so if the Dante connection fails, the AES and analogue feeds are automatically switched, ensuring a non-stop, real-time audio signal output to the amplifiers and no interruption to the audio output.

Despite this simple description, the installation for MYC was no small undertaking, taking almost a year and half to

complete the main structure and a further three months to iron out any initial teething problems.

'There were many new problems that occurred in the project and all were big challenges to the companies involved,' reflects Mr Huang. 'However, probably the biggest challenge of the project overall was logistical, as different companies all had their own timeframes for construction and implementation. There were also some unexpected problems that arose such as the arrangement of wires and equipment, so we needed to maintain very good communication and supervision to keep these problems to a minimum.'

'The owner thinks that what we installed is a very good sound system and has a lot of future-proofing benefits, for example the multitouch Dante digital consoles, the configuration of the line array speakers and conventional speakers and the layout of multi-sound sources,' he continues. 'Since opening, the venue has been very highly-praised, so ultimately the client is very happy with the work carried out.'

But the hard work has paid off and Harbin Grand Theatre doesn't just house an enviable sound system but rather one truly worthy of the pedigree the building imposes. One thing is for sure – Harbin can now host performances befitting of its title of the City of Music, and that's all thanks to the Harbin Grand Theatre.

[www.cadac-sound.com](http://www.cadac-sound.com)

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