

# A breath of fresh air

Ageing air-con has led to a reinvigorating new audio system in Singapore, as **Richard Lawn** discovers

## THE RAPID GROWTH OF CHURCH

membership in Singapore has undoubtedly led to increased A/V requirements in recent years. The larger congregations cannot solely rely on their primary senses – their eyes and ears – to fully understand or appreciate the service they have travelled and queued to witness. Therefore, projection screens and intelligible PA systems are seen as vital rather than an ostentatious luxury. However, not all churches are blessed with deep pockets or a lack of building regulations. The Hakka Methodist Church near Thomson Road endured a diminishing quality of sound for many years but recently decided to take the plunge and invest in a new PA system while the second floor sanctuary was refurbished.

The 26m x 12m sanctuary has long glass panels built into the entire lengths of its walls and the slanted roof climbs to an apex of 15.3m, creating an acoustic nightmare with reverberation times in excess of 3.0s. Built during the same years that Singapore was becoming independent in the 1960s, the church is heritage listed and modifications are greatly restricted. When ceiling fans were replaced by air conditioning units in 1986, the acoustics deteriorated



Reverend Daniel Lee, Christopher Chang (WOW Media Resources), Robert Soo (Cogent Acoustics) and Huimin Koh (Sindo Exports)

further. 'We had column speakers then, only for speech, and the choir sounded natural within the cathedral-like space,' recalls Reverend Daniel Lee. 'But the addition of air conditioning exposed all the hard surfaces, as the fans had previously broken up the sound waves. Luckily, it was the deterioration of these old air conditioning units that led

loudspeakers had been with us since 1965 and had deteriorated during that time. We had grown accustomed to that, but we were accepting that they were too loud in some places and two soft in others. In addition to the poor dispersion characteristics, they were also prone to cancellation and microphone feedback.'

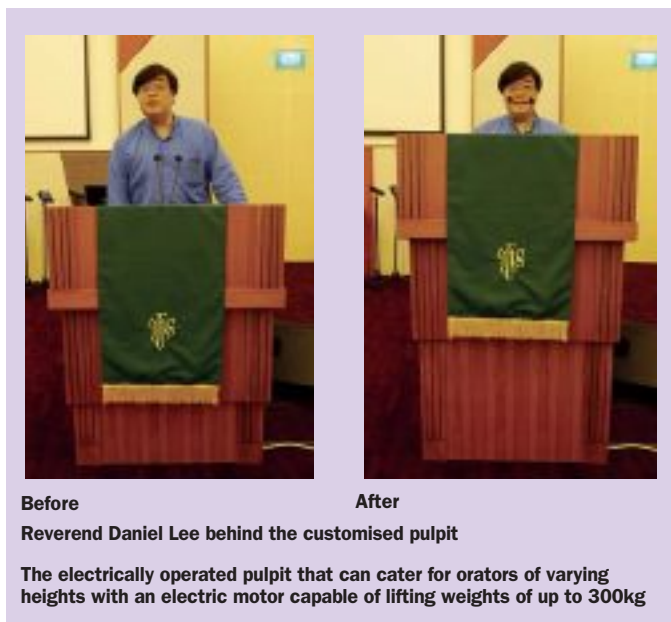
## Cogent advice

Ultimately Cogent Acoustics' Robert Soo was contracted to assist the church. He was no stranger to Hakka Methodist, as he had played on stage at a friend's wedding in the past and recalled the reverberation times. 'I knew this would be a challenge,' he reveals. 'We were constrained by the structure – namely the windows and the ceiling – so I knew there would be some sort of compromise in the end.'

After much negotiation with the conservation authorities, the church



The Hakka Methodist Church sanctuary as seen from the Allen & Heath mix position



to the complete refurbishment of the sanctuary.'

Significantly, Reverend Lee managed to convince the church committee to invest in the expertise of an acoustic consultant. 'Initially the committee had agreed to a restricted equipment upgrade, owing to budget limitations, but I felt this was a waste as we were a team of amateurs trying to cope with notoriously difficult acoustics,' he says. 'The previous wall mounted

was allowed to remove several glass panels at the front, adjacent to the left and right of the stage area, and a large glass window at the rear of the hall was also removed with the void replaced by acoustic panels. In addition to the acoustic treatment, padded seating, window blinds and specially selected carpet covering the previous wooden mosaic flooring all contributed to a new reverberation time of between 1.3s and 1.4s. 'Any lower would not

be conducive for worship singing, so we were all happy with the net result.' adds Mr Soo.

'This is a great benefit to myself,' offers Reverend Lee. 'I couldn't hear myself preach before and the band was continually asking the technician to turn their speakers up as they couldn't hear their mix. It was like a boom box!' But Mr Soo's work wasn't finished: he decided to isolate the drummer entirely with a Clearsonic booth so that the sound emitting from the percussion instruments couldn't make their way to the ceiling and then around the sanctuary. A myMix personal monitoring system was also installed as part of the upgrade to further reduce the stage spill. The control room had previously existed outside the sanctuary, and this was now relocated to the rear of the hall so that the audio crew could hear exactly what the congregation heard in the sanctuary and, therefore, mix more accurately.

A single central loudspeaker cluster solution was ruled out, as it would have restricted the view of the cross at the front of the hall. Instead, Mr Soo opted for a simple, two-way L-R system. Six suppliers took up invitations to demonstrate their loudspeakers to the committee, which voted the KV2 Audio ES1.0 and ES1.8 system as the preferred choice. 'It was as smooth as it was impressive,' he reports. 'By properly positioning and angling the ES1.0 mains and ESD10 downfills, we only lost about 3dB to 4dB at the mix position, which is 24m away. The sound projects well and throws itself correctly with KV2.' The contract was awarded to WOW! Media Resources to supply and commission the entire A/V system, including the personal monitoring system, while the KV2 inventory was provided by Sindo Exports.

## Worth the weight

Before the L-R single ES1.0 and ESD10 downfills could be suspended onto the rising beams above the stage, a structural engineer was required to approve the weight safety loads. Such documentation wasn't required or provided in 1965 but, luckily, the engineer acknowledged that the combined weight of the four loudspeakers was within safety tolerances. The clusters were then positioned 11m above the stage by four crew on a scaffold tower, headed by WOW! Media Resources' founder and MD Christopher Chang. 'We had to perform acrobatics up there on the scaffolding,' he grins. 'When drilling the holes at impossible angles it was a case of getting one right having got



**KV2 and QSC amplifiers racked with Furman FS-Pro E series II power conditioners**

the previous five wrong, as we didn't know what material we were drilling in to.' Belden and Canare loudspeaker and microphone cable runs were then installed, out of sight above the air conditioning units.

The new sound system also revealed the quality of the musicianship on stage, as Reverend Lee confirms. 'You can no longer hide if you're playing badly!' he smiles. 'It was so obvious – totally unforgiving and revealing. I laughed at them and told them that it was time to rehearse more.' The worshippers have also noticed the difference. 'They can now hear my sermons properly for the first time, and I receive much more feedback from the congregation following a service.' Reverend Lee also asked a computer engineer from the congregation, nicknamed 'the transformer man', to assist him in designing an electrically operated pulpit that would cater for the varying heights of the speakers behind it. 'It's basically a 300kg motor with a frame of wooden cladding built around it,' he explains, 'but it adjusts itself according to the height of the person behind it at the flick of a switch.'

The flown KV2 ES 1.0 tops are supplemented by two floor-standing



**The drummer is served by Shure SM microphones and is monitored on a myMix unit**



**Hakka Methodist church is now served by L-R arrays comprising KV2 ES1.0 speakers with ESD10 downfills**

ES1.8 subwoofers, while two EPAK2500R amplifiers power the entire system. A two-channel SAC2 (Super Analog Controller) provides loudspeaker management of the KV2 system for which each channel features a switchable crossover with adjustable HPF / LPF and two independent notch filters, for left and right channels, for quick and effective reduction of room resonances and resolution of feedback issues.



**Clearsonic panelling almost completely isolates the drum kit**

The ESD10 downfills are powered by QSC RMX2450 amplifiers. Also added to the equipment inventory are Shure Beta98AMP/C, Beta91 and SM81 drum microphones. Other equipment includes a Shure PSM200 system, Countryman DI85 DI boxes, Ashly Audio CLX-52 compressor-limiters, MQX-2310 graphic equalisers, Yamaha REV100 digital reverbs and a Furman PS-Pro E Series II power conditioner and sequencers. However, as Hakka Methodist's budget was limited, the previously existing Shure SM58 vocal microphones, together with the Allen & Heath ZED 428 24-channel analogue console, have had their lives extended.

## Projection

The visual requirements of Hakka Methodist are relatively simple, consisting of PowerPoint presentations and the occasional video playback. As a new projector was required, the problem facing Mr Soo was to source one that could project the full 23m from the back wall to the screen on the rear wall. A Sanyo PLC-XF1000 12,000-ASI lumens, two-lamp projector – fitted with a long throw lens – was selected, and beams its images onto a 4m x 2.2m screen. An Extron VSC 500 high resolution, computer-to-video scan converter accepts computer video signals and simultaneously outputs a scan-converted video signal as NTSC or PAL composite video, S-video or component video, or RGB video. Similarly, the CVEQ 100 is a one-input, one-output line driver for composite video and stereo audio capable of driving video and audio signals up to 300m on high resolution video and STP series audio cables.

Reverend Lee, the musicians, the choir and the worshippers all appear very grateful to the ageing air conditioning that precipitated the audio system upgrade. Over a quarter of a century, ears became accustomed to the decreasing sound quality and collective senses were seemingly numbed. The net affects following the upgrade have been profound, in that they have raised the standards of the musicianship and improved the worship experience of the congregation. Air conditioning and amplified audio systems may have been surplus to requirements a generation ago in Singapore but, as Hakka Methodist Church will now testify, these are electrical components that are ignored at your peril.

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