

PROJECT FEATURE

The Art of Acoustics at Royal Horticultural Halls

Visitors to next year's ABTT show won't have to go far to see an example of work by exhibitor Triple E. Standing in the gloriously art deco Lawrence Hall, they will be surrounded by one of the company's most prestigious projects to date.

The Royal Horticultural Halls, Westminster, have been the home of the annual ABTT (Association of British Theatre Technicians) show since 1992, and provided a ready list of potential suppliers for managing director René Dee when he was planning a major £1.2m refurbishment of the entire venue.

Lawrence Hall, the newer of the two halls, looks like a cross between a grand Victorian station and a cathedral - and has the acoustics to match. With its great transverse arches and the natural light that floods in through tiered side windows and domed roof lights as well as the end wall windows, the hall is also difficult to black out and it was this initially that led René to Triple E.

Roger Fox, organiser of the ABTT show, put René in touch with David Edelstein, managing director of Triple E, well known for its expertise in variable acoustic banners and curtains. René went to see the installation of variable acoustic banners at LSO St Lukes,

and says: "I realised that variable acoustic banners would enable our Lawrence Hall to be truly multi-functional. The acoustics had always precluded the hall from being used for events requiring amplified sound and we needed to be able to provide clients with a quick and easy blackout solution as well. I hoped that David would be able to solve both problems, and help with noise break-out as well."

When the hall was built in 1928, the surrounding area was commercial, so noise was never an issue. But the hall's proximity to the Houses of Parliament means it is now surrounded by expensive residential apartments. René continues: "We had a major problem with noise break-out and the local authority had told us that it could affect the renewal of our licence, so we knew we needed to do something."

Although confident enough of being able to dampen the reverberation in the hall,

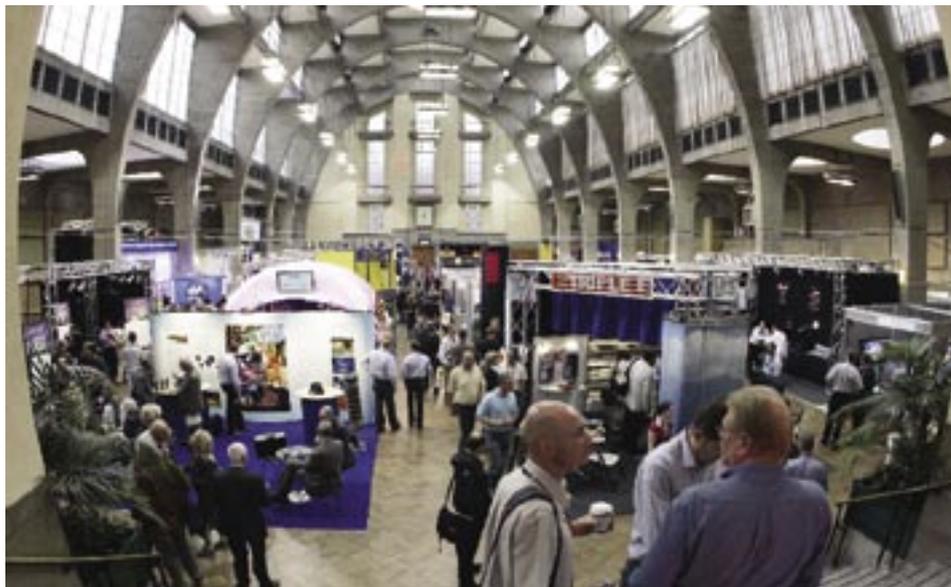
David was less sure about the noise break-out situation. He commissioned Arup Acoustics to carry out a survey of the hall, which showed a reverberation time of 7.5-8 seconds, and estimated that the proposed 1540 sq m of drapes would lower this to between two and three seconds.

The survey also highlighted one of the reasons for the noise break-out: regular ABTT attendees will not be surprised to learn that many of the 80-year old window frames in Lawrence Hall simply did not close properly. Additionally, inspection of the 14 domed roof lights in the side bays of the hall revealed ventilation gaps between the roof light glazing and the upright support, which contributed greatly to noise transmission. Work therefore had to be carried out to adjust the window frames and all gaps were sealed, including double glazing of the domes.

Discussions with Triple E began in February 2006, but it was not until the end of June that David received the final go-ahead and was able to commit to purchasing the necessary equipment. There was also no negotiation of the on-site dates of July 27 to September 8: the first use of the acoustic and blackout blinds was not until September 19, for a Paul Smith Fashion Show, but the first of the season's RHS Flower Shows was scheduled for September 12 and 13.

Working closely with specialist drape manufacture J&C Joel, who also supplied technical support and installation crew, David had proposed a system of 56 roller banners for the four tiers of clerestory windows on each side of the hall, together with three acoustic banners for the long vertical windows at the clock end, all of which would contribute to the blackout.

The fabric of choice for acoustic drapes and banners, developed specifically by J&C Joel, is wool serge which, constructed as a flat



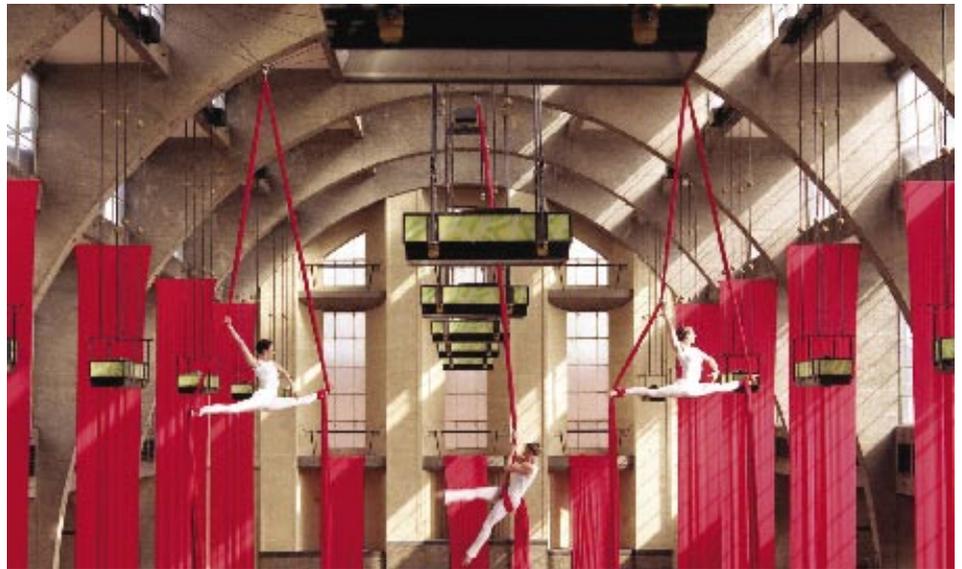
The Triple E Stand at a recent ABTT Theatreshow.



The Lawrence Hall before and after the installation.

Lighting the Lawrence Hall

The lighting system installed in the Lawrence Hall at the Royal Horticultural Halls by Stage Electrics has been set up for various purposes. It can be used to subtly light the architecture of the building, or by contrast add atmosphere and activity to the increasing range of live events now planned for the building. By column mounting the 12 custom coloured Martin MAC 250 Wash and Krypton moving lights Stage Electrics have been able to offer the Hall the choice to create a wide array of lighting states. Ten fixtures have also been installed in the nearby Linley Hall.



A BBC One ident was filmed in Lawrence Hall.

woven fabric, felts during the wet finishing process and so closes the natural air gaps created during the weaving. Tony Griffiths, contracts manager at J&C Joel, explains: "Wool serge has the ideal characteristics for use in acoustic areas, but we also have to be mindful of the aesthetic qualities when the equipment is deployed. For the Lawrence Hall, our design and manufacturing team specified the dying and weaving of over 2,500 sq m of acoustic fabric to ensure the hall both looked and sounded perfect."

Another vital element to ensuring all the acoustic fabric hangs correctly is the fact that all the fabric is cut by hand. Neal Cartwright, drapery manager at J&C Joel explains: "Although the bonded serge is inherently stable, cutting by machine stretches the fabric. The blinds and banners for the Lawrence Hall needed to be absolutely spot-on and hand cutting was the only way we could ensure that. We are fortunate in that we are probably the only company in Europe to have the space and facilities needed to fulfil this kind of project."

A key element of acoustic banners is an air gap of at least 80mm between two layers of fabric. To achieve this, the acoustic roller blinds are similar to a domestic blind, except that the fabric doubles back on itself, weighted

by a travelling roller, to provide that double layer. In this instance, a double thickness of J&C Joel's bonded wool serge was used, to give both excellent acoustic values and total blackout. "Normally we don't have to worry about light leakage," says David. "So in order to meet the additional blackout requirements, we had to come up with a way of sealing the banners in the window recesses. To achieve this, we fitted an aluminium guide channel to the side of each window bay, together with a masking tray at the base. When we surveyed the site, we discovered that tiers 2, 3 and 4 are angled at 5°, but the guide channels have to be vertical to prevent the blinds 'ballooning' when in use."

To maintain the look of the hall, the fabric for both the blinds and the banners was dyed the same colour as the walls, with the guide channels and masking trays for the roller blinds being powder coated to match. "One of our challenges was to install a system that did not detract from the look of the hall. Lawrence Hall is a wonderful building and I wanted the finished project to look as if it had been there for ever," comments David.

At the clock end of the hall, Triple E has installed three of its Venetian acoustic banners, the longest being 15m, which are raised and lowered concertina fashion, necessary over

such a long drop. Horizontal aluminium slats are enclosed in each banner at 16cm intervals and a flat stainless steel band, which is fixed to the bottom tray of each banner, passes through the slats and is pile wound onto drums contained in the wall mounted frames. There is also provision for the later installation of a further four banners.

As David explains: "There are two control panels, one for the roller blinds, which can be deployed either simultaneously or by individual tiers, and another for the banners. Because Venetian banners are not accessible without major access equipment, a system was devised for setting top and bottom limit positions from the control panel. We designed and built both panels which because of space limitations had to be very compact. All of the cabling for the systems had to be laid outside the building to minimise the effects on the interior look."

At the opposite end of the hall is a dais area the width of the hall. To complete the blackout, Triple E has installed its discreet 3Way curtain track across the bay, complete with J&C Joel black wool serge drapes, which store behind existing pillars when not in use. Additionally, Triple E's Unirail



Hardly noticeable when not in use (left), the blinds were specially dyed to be as unobtrusive as possible.

Sound by Design

The new sound system installed by Sound by Design Ltd has been specifically designed to provide high speech intelligibility in several orientations to cater for the wide range of events accommodated at the Lawrence Hall. The centre section of the venue utilises Duran Audio's self powered Axys DS-500 & DS-280 speakers with EM Acoustics I2's covering the Dias. A further 12 RCF Monitor 44's cover the side sections. At the heart of the control is a BIAMP Audia system that switches the system via two wall-mounted control panels. The system can be augmented with additional mixing consoles, front fill and sub bass for more demanding conference and showcase events.



René Dee, managing director of the Royal Horticultural Halls with David Edelstein of Triple E and Tony Griffiths of J & C Joel pictured on-site on the final day of installation.

is curved across the two doorways leading from the foyer and hung with black wool serge to prevent light entering through the glazed entrance doors.

In addition to the acoustic and blackout part of the project, Triple E has also provided a system of flexible partitioning, which will

enable the Hall to be divided into almost any configuration that a client may require. For the side bays, semi-permanent partitions, which can be stored in flight cases, are of reversible bonded wool serge, one side having been dyed to match the acoustic banners. There are also temporary floor stand partitions

that will enable the creation of a black box environment.

René Dee is delighted with the result: "Lawrence Hall gained a RIBA Award for its unique architecture and is a Grade II listed building, so we were keen to ensure that we did as little as possible to alter the look and feel of the space and I think we have achieved that. Anyone coming in here who had not visited the hall before would never realise this system was not original."

Summary of Equipment Installed

56 Triple E roller blinds for the North and South tiered windows

3 Triple E Venetian acoustic banners for the clock wall with facilities for a further 4 banners

17 sets of reversible drapes, which store in flight cases, for the side bays

1 Triple E 3Way track, plus J&C Joel drapes, across the gallery wall behind the pillars

2 Triple E Unirail track, plus J&C Joel drapes, across the entrance doors from the foyer

Triple E / J&C Joel pipe and drape hall divider system

Total of 4,517 sq m of fabric supplied by J&C Joel: 2,535 sqm of acoustic fabric and 1,982 sqm of other drapes.

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With a reputation for providing innovative and creative engineering solutions to the entertainment, presentation and exhibition industries, Triple E is also the acknowledged leader in the field of variable acoustic solutions.

Completed projects include London's Royal Opera House, Cirque du Soleil in Las Vegas, Flagey in Brussels, LSD St Lukes in the City of London, The Sage Gateshead and the Royal Horticultural Halls, London.