

# Sightline

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Warwick Arts Centre, Coventry

Polka Theatre, London

Painting the New Safety Curtain for The Theatre Royal Drury Lane

Theatres Trust Conference: Making Theatre Sustainable





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# Sightline

vol. 44 no. 4

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# Editorial

I'm writing this editorial as COP26 comes to an end, so the climate emergency is very much in the forefront of my mind. Like many, I've been quite frustrated by grand declarations which don't necessarily tie in with relevant, practical ways of making change. As a result, I was delighted to hear that the Theatre Green Book was on its way – three volumes packed with practical ways of making a difference within the theatre industry. Spearheaded by ABTT and the Theatres Trust, and contributed to by many individuals and companies, all of whom have given up masses of their time, the Theatre Green Book was the centre of the Theatres Trust's Conference: *Making Theatre Sustainable* in early November. I have to declare an interest at this point, in that I worked on the Conference. Sadly, this meant that I actually wasn't able to see many of the sessions – I was mainly to be found hurtling around the Lyric Hammersmith trying to identify masked speakers in a packed foyer – but several colleagues have reported back on the highlights of what seemed to be a positive and inspiring day. Further information on the Green Book can be found here – <https://theatregreenbook.com/> – it is very much a work in progress, as the Conference made clear. Anette Ollerearnshaw has also written on sustainability in Wigs, Hair & Makeup for performance (otherwise known as WHAM) in the latest of her pieces on Training and Education in the Performing Arts.

I was very sorry to hear a few weeks ago that Michael Hall had died. Michael had contributed several articles to *Sightline* in recent years, and he was always a joy to deal with. My most recent contact with him was when he'd popped in the post a beautifully produced Supplement to his Special Theatre Years book [reviewed in Summer *Sightline*] "in case you ever need to search for Heritage of Lighting Design" – which was a really kind thought of his, and entirely unprompted! We had agreed to run his article on the restoration of the Theatre Royal Drury Lane backcloth in this edition of *Sightline*, and I'm delighted to be able to include it. I'm only sorry that it will

be the last piece of his that we'll feature.

We report back on two contrasting theatre renovations in this edition. Margaret Shewring has had a long involvement with Warwick Arts Centre, and reports back on its major renovation – which will hopefully ensure that this major Arts Centre remains relevant for many years to come. Polka Theatre is one of the country's few specialist theatres for children – a fact that was central to its just-completed re-development. As well as asking Tim Foster, the architect behind the scheme, to write on the project, I asked a family to review their recent visit, and I am very grateful to Ben, Catherine and Theo for taking the time to do so! I'd love to be able to include other user feedback as part of more comprehensive reports in future editions of *Sightline* – so if you're seeing a show in a newly renovated/built theatre in future, and would like to report back, please get in touch.

As the theatre industry starts to get back on its feet, Alan Lynagh's occasional column "*An Inspector Calls*" can again focus on some of the many licensing issues he encounters in the West End. I particularly enjoyed reading about some of the implications of re-configuring the Playhouse Theatre.

Another sign of recovery was, of course, the ABTT/PLASA show back in September. As part of the event, the ABTT Awards for Technician of the Year and Emerging Excellence were awarded to Sorcha Steele and Jesse Caie respectively and the ABTT Stephen Joseph Award to Persis Jadé Maravala. Congratulations to them all, and I hope you find their achievements as inspiring as I did!

To those of you who I haven't run into at the ABTT Christmas Party – back in real life after last year's digital event – I'd like to wish you a Happy Christmas, and a wonderful New Year!

Rebecca Morland

Editor

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# Theatres Trust Conference 21: Making Theatre Sustainable

Nikki Scott  
Margaret Shewring  
Ben Stephen

This Conference was centred around the Theatre Green Book – a massive collaborative undertaking, and one which was described in the final session as “a gift to our industry”.

This sentiment and enthusiasm for the Theatre Green Book was clear from the very first session of the day “Green Renewal – Introducing the Theatre Green Book”, and was amplified by three sessions, one for each volume of the Green Book. Other sessions included “Historic and Green” addressing the challenges facing historic theatres.

Green Renewal set the scene for the day with Lisa Burger (Executive Director and Co-Chief Executive, National Theatre), describing the book as “a chance to reset how we work as a sector”. Reflecting on the particular effect the pandemic has had on our industry and the extraordinary efforts made by so many to restart since July 2020, she asked how we can set aside the concerns of the everyday and use the opportunity we now have for a larger reset. Theatre has the power to improve life chances and we can extend our thinking about sustainability, to all communities and enable us to improve life chances by asking even larger questions about how to make theatre sustainable, inclusive, fair, equitable and just.

## Green Productions

Chaired by Paul Handley (Production and Technical Director, National Theatre) this session asked how the Theatre Green Book can support theatre makers to maximise the opportunities for making productions more sustainable.

The large panel included producers, directors, and production and technical directors from across the UK, all of whom had practical experience of delivering productions using The Green Book. They all agreed that the arrival of the first volume of the Theatre Green Book had been a hugely galvanising experience. The panel agreed that every improvement which The Green Book encourages is a positive step forward and that there will be challenges as everyone learns to use the tool-kit.

They all agreed that the use of the Green Book for a production should be agreed at the very beginning of the process and that its use should be written in to all permanent and freelance contracts including for Directors and Designers. This will ensure that the Green Book is part of all conversations and everyone is bought in.

The overall feeling was that this had been a hugely galvanising experience, where teamwork and constant collaboration was

required to be adaptable. It is accessible for everyone and encourages us to plan ahead, to share with one another and to avoid using certain materials. Of course some sustainable materials are going to be more expensive, planning time is a big obstacle and the buying of the last minute bits that are needed out of the blue can be a sustainability nightmare.

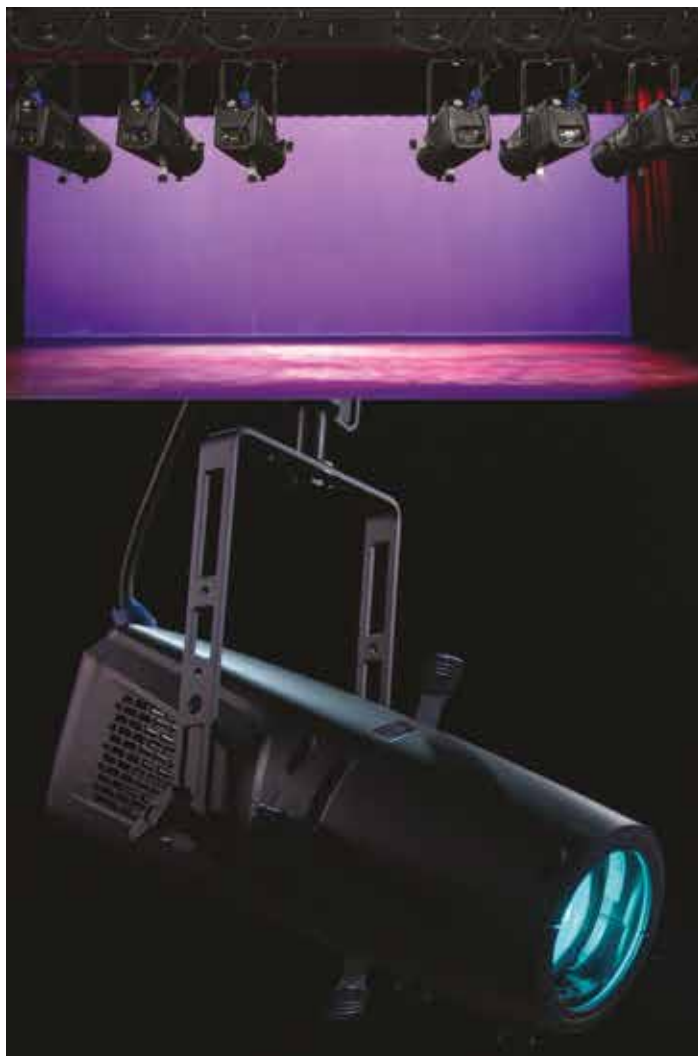
## Sustainable Buildings

Claire Appleby (Architecture Adviser at the Theatres Trust) ably led us through a quick summary of the freshly published volume 2 of the Theatre Green Book – Sustainable Buildings. Full of expert advice, guiding principles and tools, this new volume will aid theatre buildings in reaching a basic sustainability plan and timeline leading to a net-zero building by the end of any capital works. The call to arms of the day is that we have to start somewhere and that there are Easy Wins to be found in every building. This is underpinned by an online tool developed in association with Buro Happold – The Sustainable Buildings ‘Home Survey Kit’ which we were led through with a video demonstrating its simplicity to use and make a start with our own buildings.

The session then progressed to presentations of 4 case studies. The Mercury Theatre in Colchester has just completed a £11.3M refurbishment with sustainable decisions at the core of the brief. Most noticeable of the successes of the project are the partnership working with the local authority and the spending of 89% of the budget in North







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### The Green Operations Panel



Essex. All contracts had sustainability clauses and targets at their hearts and embedded sustainable design from the very beginning of the brief.

The second case study brought a genuine smile to the entire audience, as Pete from the Romiley Little Theatre gave us a colourfully described photo story of the construction of this 40-seat theatre through their members' DIY conversion from a former Builder's warehouse and yard. Every element of the construction was predicated on absolutely minimising running costs, which directly led to sustainability being essential with insulation and an air-source heat pump key to the project. Pete's wheeler-dealing cheered us all – members hand cleaning bricks removed from one part of the building to be used in another as well as trading use of the car-park with the neighbours' construction project to get the car park resurfaced in return – reminding us that it's the small things with which we can measure success, not just the budget.

Third, we met the team from Oxford Playhouse who have trialled the Home Survey Kit and told us of their successes in doing so – they found the kit accessible to use and that whilst it might be a daunting prospect that it's not OK to be in denial. They had found easy wins in altering timers for heating and entering conversations with their landlords regarding sustainability projects. They now reports on sustainability at every board meeting and have a sustainability champion on their board of trustees.

We finally heard from Hull Truck – a flagship

sustainable theatre building completed in 2009, and heard about their subsequent change, including solar panel installation and modifications to the BMS have all been made since opening. Along with a cautionary tale on the combined maintenance effect of new items having similar lifetimes all installed (and therefore needing replacement) at the same time.

### Theatre Green Book – Sustainable Operations

Feimatta Conteh (MIF) chaired this panel discussion centred on the third volume of the theatre green book which is scheduled for publication in the spring. At this very busy and in fact over-subscribed breakout session, Feimatta gave us a sneak preview of the 'at a glance principles' of the new volume, which splits operations into Front of House, Marketing – both digital and live audiences – Retail, Food & Beverage, Back of House, Waste, Travel, Building Management and Third Parties. Feimatta then introduced the panel and opened the conversation to successes and challenges in the operational field. Many easy wins were demonstrated from sustainable wood procurement at Cardiff Theatrical Services, to local food supplier procurement for menus across HQ venues and eliminating single use plastics at the Lyric Belfast.

Questions from the audience then opened the conversation up further with observations that not all organisations can support a full-time sustainability role and how are these skills and





*The Green Productions Panel*

agendas best shared amongst teams? Were there enough CEO's attending the conference today to influence major change? Who is accountable for operational sustainability? Can the theatre green book become the standard for accountability?

It was noted that websites and digital content are not carbon free and that the sustainability of websites and the power consumption of the devices accessing them varies wildly. We then entered into a discussion of scope 3 emissions like audience travel to theatres and our ongoing responsibility in this area. We heard of an evolving process at Chichester Festival Theatre where audiences are offered the opportunity to offset their travel carbon emissions as part of the booking process.

The final thoughts turned to outsourcing and being in control of our supply chains and decision making in order to be the best we can be as we look towards collective purchasing and the power of collective action. As an industry we can influence beyond our sector through things like active purchasing decisions, but also shouting to audiences about the provenance and welfare of our veg-led menus can make as much impact as the marketing of our shows.

### **Historic and Green.**

Historic theatres are bound to provide a challenge in the context of the Green Book, and this session was very well focused, concentrating on the opportunities and challenges for making historic theatres sustainable in the context of balancing conservation and sustainability. The

panel included architects, consultants and operators and was ably chaired by Katie Town, (Executive Director; Wakefield Theatre Royal).

Beyond the issue of conservation and the moral imperative of the climate emergency, historic theatres face a challenge in meeting the levels of flexibility and comfort that modern artists and audiences expect. Inevitably such considerations need to be contextualised alongside the balance between custodianship and there was a need to think about the bigger picture in terms of the reality of maintaining and operating buildings of national heritage significance.

There was a general agreement that despite such buildings having listed status, it is still possible to find ways to make them operational and successful based on a sound business plan and a viable model teased out by designers and clients to get the use of such buildings 'right'. There was a strong argument such theatres had been designed to work successfully in the past so that, the key to making them work successfully again is to understand the building itself before laying a finger on it. Once you genuinely understand a building, and can unpick its strengths and weaknesses, then you can develop a master plan for the vision of what you want to create.

The key remained sympathetic consideration of all the layered aspects of historic theatres, to understand and respect their survival and operation over time, and to seek for innovative solutions where appropriate.

*All photos by Sharron Wallace, courtesy of the Theatres Trust*



# Painting the New Safety Curtain for the Theatre Royal Drury Lane

Michael Hall

Part of the major restoration of Theatre Royal Drury Lane was the replacement of the front cloth for the fire safety curtain. It was to be a reinterpretation of the original painted by Joseph Harker in 1922, probably on the paint frame at Drury Lane, which was created in 1881. The designer for the painting is unknown, but Joseph Harker may have contributed.

There has been a long history of use of Scenic Art in the Theatre Royal since Garrick staged the pantomime "Harlequins Invasion" in 1813 and it became a long term venue for Pantomimes.

But scenery and actors weren't very visible, although at one time the theatre used 300 candles per night. In the early 1800s gas was introduced and visibility improved. From then there were often 12 backcloths for a single pantomime, and for one, a total of 21 were needed. A tradition grew for spectacular scenery with a transformation scene finale with traps and special effects.

In 1837 limelight was introduced to the theatre, with its high power and brightness. Compared to gas, it was an immediate success. Backcloths and scenery could be well lit and seen well by the audience, and soon there were 12 scenic artists employed at the theatre.

When it came to restoring this piece of theatrical history in Theatre Royal Drury Lane, the scenic artists, Chris Clark and his wife Liz, were commissioned to do the work. Together they have over 60 years experience, including Chris's apprenticeship at Harkers Studios in 1971.

It became clear from the start that a lot of preparation and planning would be required and there were some technicalities to overcome. Consultations between Lloyd Webber Theatres (LWT Theatres) – the owners of the building and client on this project – technicians and the engineers, Unusual Rigging, took place to establish a way forward. Samples were produced, painted in the proposed technique, so that Unusual Rigging and LW Theatres could be satisfied from the technical and artistic points of view.

The paint system selected by Chris Clark was the Rosco Supersaturated range, developed many years ago. This was well tried and tested for a high anti fade quality. In recent years there have been further advances from research on colour stability, ecological aspects and compliance with new European regulations.



There were no designs to work from so the original cloth was photographed in high resolution. As Chris Clark analysed the photograph, it became clear there were two quite separate images to be painted: the landscape and the decorative golden framework.

## THE LANDSCAPE

The old cloth had become tired and worn after nearly 100 years. The landscape was lacking interest and in many ways was too subordinate to the gilt fretwork.

Chris proposed a fresh new landscape, based on the original layout but given more life by a sense of enhanced light and shade that suggested an Italianate garden lay beyond the golden gates. A visit to the Theatre Royal, with a swatch of real paint samples, confirmed the intended colours would match the new auditorium decor. He painted a scaled design, in real scenic paints, to present to LWT for approval – which it was!

The cloth's new sky graded from pure Prussian Blue at the top, through to paler, Wedgewood Blues towards the horizon and with soft wisps of cloud; another effect not seen on the original. Furthermore, a soft 'vignette' was created by shading the scene to slightly darker tones at the sides to focus attention towards the central part.

When Liz and Chris came to paint the landscape on the actual cloth, a recollection of Leonardo da Vinci's smoky vistas suggested itself. This 'sfumato' technique led to another pleasing effect and, without prompting, was later recognised by Dr Simon Thurley, the chair of the restoration Steering Committee and former head of English Heritage, when he came to see the work in progress.

All this had to be satisfactorily completed before the highly intricate golden fretwork was imposed upon the scene.

## THE GOLDEN GATES

In the months leading up to painting the real cloth, a lot of other preparation and planning took place.

Chris made scaled drawings at 1:25 from the archive photo for marking out the skeleton framework on the cloth. Then this layout was broken down into smaller panels which were mirrored in symmetry but invariably with slight changes, as indeed the original artists must have relished in 1922.

Prior to the painting period, Liz and Chris prepared full size, detailed paper cartoons of every panel. This was done in their own studio to save precious time on the paint frame.

During work on the paint frame, some were placed directly on the canvas and transferred using soft charcoal before being flipped to mirror on the opposite side.

Some were made into pounces (i.e. designs on stout paper with holes pricked through to allow multiple transfers by rubbing charcoal through – a technique derived from the Early Italian Masters of fresco painting).

Patterns drawn onto gauzed panels (known as 'Mouse traps') were used for some of the larger areas. All manner of tricks and techniques were employed to ensure swift and accurate image transfers and there were adjustments and refinements along the way, throughout the entire painting.

LW Theatres had hoped the Drury Lane's historic paint frame would be used for the cloth's painting. However, as the Theatre Royal had become a dusty building site during refurbishment, they hired the Royal Opera House paint frame in Purfleet. This first class facility proved to be supportive for Liz and Chris and enabled them to produce their best quality work.

Armed with all the prepared information, Liz and Chris began work on the cloth in January 2020 and painting took place over 12 weeks with an interruption of 7 months, enforced by the Covid-19 lockdown.

*Many thanks to Chris Clark for his contribution to this piece*



photos: © Andy Paradise

# Michael Hall

Roger Fox  
Val Hall

*Michael Hall (far right) with Roger Fox and Jane Thornton at the ABTT Historical Research Committee stand, celebrating one of his publications. Photo by Chris Taylor Photography*



Michael Hall was born in 1934, and after working on airborne radar during National Service, entered the lighting business in 1954 as a management trainee involved with cold cathode colour and photometric physics. He became a senior lighting engineer at Osram GEC and in 1975, while researching studio lamp design in Hollywood, Michael met Stan Miller who ran Rosco, then a gel supplier to the film industry.

This meeting was pivotal in Michael's career. In 1976 Michael and Stan opened Rosco in London. With a minimal staff it grew swiftly from just a gel company into a major supplier of dance floors, gobos and scenic paints. The range of colour filters became extensive and helped a revolution in lighting design. Rosco were exhibitors at the first ABTT Trade Show in 1976 and remained constant supporters for nearly the next forty years.

When the company moved from the South Bank to Sydenham he built a paint frame for hire in their new warehouse, filling a gap in the market and ensuring that scenic artists always had a ready supply of paint!

Michael was a Kentish man and retained a keen interest in bird watching throughout his life. On his retirement he and his wife converted a 500 year old barn as a home. Here, Michael had an extensive library and his collection of Magic Lanterns and slides.

The lure of lighting and colour kept Michael involved as a consultant to Rosco. He was a keen supporter of the ABTT and he became an active member of its Historical Research Committee. He wrote and published a number of personal memoirs on colour, painting and lighting, as well as producing articles for Sightline.

Michael never wavered in his love and support for the technical theatre industry. He died aged 87 on 25 September 2021



# Warwick Arts Centre, Coventry

## Early Years

Warwick Arts Centre first opened in 1974 at the heart of the University of Warwick's main campus, providing a cultural focal point as well as a daily thoroughfare for students and staff walking across the campus, playing an important role in the life of the University, its students' experiences and in the wider life of the local and regional community. Originally designed by Renton Howard Wood Levin, with Peter Hall, John Bury and Michael Holden among the performance space consultants, the Arts Centre was part of the pattern emerging in regional theatres for the establishment of a studio performance space as well as a main auditorium. It has had several extensions over the years including the Butterworth Hall, a large concert and events venue which opened in 1981, although little renovation of the original performance spaces had been undertaken.

## Forming the brief

Conversations about the development of the Arts Centre began in 2011/2012, not just in terms of a much-needed refurbishment of some of the earliest parts of the existing building but with a clear eye on what was needed to enable the Arts Centre and its team to respond to changes in the performing arts, in screen-based media and in new digital forms, including gaming. The resulting radical transformation is the largest in the Arts Centre's forty-seven-year history. Robert Freeman and Dominic Williams of Ellis Williams Architects worked with the University and the Arts Centre as conception architects to develop the brief. This was formulated with extensive consultation with students and staff as well as with a local arts business consultant, David Clarke of DCA. Funding bids formed an essential part of this process.

The project was split into two phases: the refurbishment of the theatre, the studio theatre, backstage and administrative facilities, the music centre and the original foyer (Phase 1), followed by a process of demolition and new build (Phase 2) and the wrapping of the separate parts a unified whole.

The architectural challenges included the importance of not being too intrusive in the original theatre and studio spaces while carrying out essential replacement and refurbishment to facilitate ventilation, artistic devices and theatrical equipment. It was an important priority to maintain the intimacy of the theatre and the flexibility of the studio as well as to ensure acoustic separation between

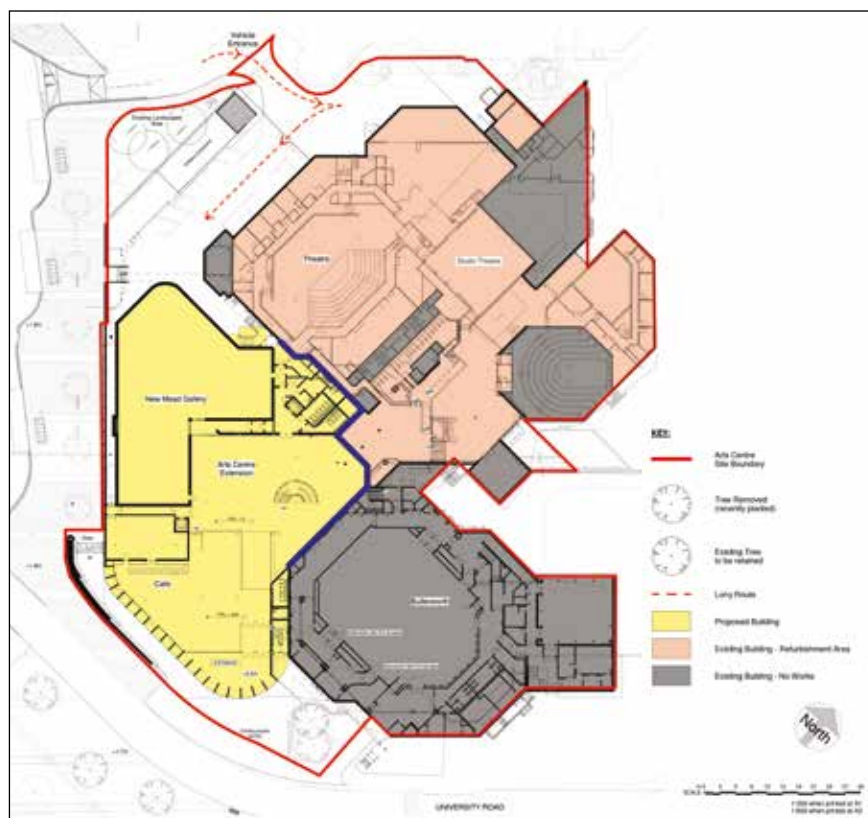
these spaces. The design challenges were more extensive in the demolition and new build. These included the creation of three accessible digital auditoria on the first floor extending the Arts Centre's screen offering (replacing the former ground-floor cinema) and the decision to improve the visibility and visitor attraction of the Mead Gallery by relocating it on the ground floor on the main axis from a new main entrance. Large double doors now open from the newly built foyer extension drawing the visitors' attention into the extensive gallery space (600sq metres approximately). The large daylit space had been loved by artists – reacting to the quality of the light (and weather) outside while maintaining all the necessary controls for an art showing and installation space and having its own distinctive character. It was important to retain and enhance these features as part of a sympathetic new build.

## The current refurbishment and new-build process

The intention was to keep the Arts Centre open throughout the project. Once described by its former director Alan Rivett as 'a library without rules', Warwick Arts Centre has been an integral part of the educational and cultural development at the heart of the University's life and outreach. Some continuity of its vital role was essential throughout the process.

Margaret Shewring

*Drawing of the ground-floor site plan indicating areas to be refurbished in beige, the new-build spaces in yellow and the areas to remain untouched in grey. The red line indicates the full extent of the Arts Centre site. Courtesy of Ellis Williams Architects.*



*The new façade to the front and side of Warwick Arts Centre. Courtesy of Bond Bryan / Phil Grayston Photography.*



When the theatre and studio spaces were being refurbished and closed temporarily in 2017 the remainder of the existing building, including the gallery, the Butterworth Hall with its recording studio, the Helen Martin Studio and the Woods-Scawen Room, as well as the Creative Learning Centre, café and bookshop, remained open, while live performance continued in a temporary 280-seat space, outside the main building, named by students (in a ballot) as the Goose Nest.

Constructed in just nine weeks by a festival venue developer, Acorn Event Structures, the Goose Nest's attraction was its sense of impermanence, with minimal performance facilities, staging both professional and student performances.

### **Phase 1**

Working with Theatre Projects as theatre consultants, the theatre and studio underwent detailed structural analysis leading to rewiring, upgraded ventilation and replacement seating, in consultation with Howard Potts and the Arts Centre's technical team. Rob Harris worked with Theatre Projects on an initial acoustic survey, looking at noise bleed and noise transmission between the two performance spaces as the acoustic quality had been compromised over time. Holes in the building fabric around pipes and door frames were plugged as unobtrusively as possible to ensure acoustic separation. With the help of structural engineers Techniker, and Makers Construction, the roof of the old building was strengthened and made watertight. The original wiring had been maintained but never replaced. Phase 1 included rewiring both performance spaces as part of the change to LED lighting throughout

the renovated and new-built complex. In the theatre, while the original structure was maintained, a full technical refurbishment was carried out allowing the lighting bars to be rigged in safety at ground level and the use of hand- or drill-driven winches to increase versatility alongside a doubling of lighting positions overhead. Refurbishment of dressing rooms and toilet/shower facilities backstage, along with redecoration throughout, formed part of the light-touch renovation work.

Lighting Bridge 1 was maintained and updated with a new powered hoist to make its operation safer at height, in line with current guidelines and legislation. Its operation is linked to the orchestra pit elevator which was replaced and is now raised and lowered using an electrically powered linklift system. In terms of stage engineering, the stage and its traps have been divided into 1.2m squares able to be manually removed and rearranged individually to make changes easier for each new show.

### **Phase 2**

Phase 2 was, of course, impacted to some extent by the Covid-19 pandemic which prevented normal access to the campus, but Willmott Dixon Construction managed to continue with minimal interruption following careful risk assessment and Covid compliance measures. Ellis Williams Architects remained guardians of the overall design concept and Willmott Dixon worked with Jon Rigby of Bond Bryan as delivery architects.

The superstructure of the new build consists of 2,664 individual pieces of steel. To connect onto the existing building, the structure required a complex form as there were very few simple angles. The process was facilitated

with the help of a point cloud survey (a laser scan of the site) to enable the precise positioning of the existing structure drum with the new structure to fit at the demolition line, with mechanical and engineering work on the structure enabling the project. The complex superstructure was then wrapped into the fabric of the building to create one whole.

This process was not without its challenges. The control room of the Butterworth Hall overflies the foyer and is cantilevered at the rear of the hall, so needed additional support (temporary propping) to hold the old frame in place and then to put in the new fabric to connect the parts of the building.

A curtain wall, similar in form to a zoetrope, wraps around the whole building. It is solid at the service yard at the rear, becoming more and more transparent towards the new front entrance (located facing the Student Union), and is backlit to offer a welcoming approach. Above the curtain wall the forms of the new facilities are expressed, indicating the location of each from the outside in a similar language of forms to those used for the facilities of the original building, clad with polycarbonate and, again, backlit. Twenty-four different roof levels are visible, designed for future-proofing the complex while extending the sculptural organic architecture of the space, creating a sense of continuity and linking parts of the finished structure while creating a distinct new identity.

An outer colonnade, constructed out of aluminium with a distinctive paint finish,

encloses glass walls set back under a roof overhang (supporting the overhang and casting shadows on the glass with its sliding, solar protection from UV). It is possible to see inside, particularly at night, revealing some of the activities inside including along a balcony running between the largest and smallest digital auditoria as a social gathering place.

The reimagined Mead Gallery, too, uses daylight in its vibrant, welcoming space with advice from Light4, daylighting consultants and gallery lighting specialists.

### **The newly built digital auditoria**

Three digital auditoria have been built on the first floor of the enlarged building. Each has been developed with attention to detail and high technical specifications to enable not just cinema capabilities but live performance and conferencing. All three have lighting boxes and trusses as well as performance panels. All three have Barco laser projectors. In the largest digital auditorium the sound is ceiling mounted and can be positioned precisely to create a dynamic, surround-sound experience. The middle and smaller spaces (Screens 2 and 3) have Dolby 7.1 sound capability with loudspeakers wall mounted around the perimeter while the largest (Screen 1) has Dolby Atmos and is able to take big-release films. All the infrastructure has been installed for large scale gaming, complementing the e-sports provision on campus in the Junction (the old sports building).



*The refurbished theatre from the stage into the auditorium. Courtesy of Ellis Williams Architects.*





work on a principle of natural convection, while the new build is efficiently sealed.

The Mead Gallery, newly located on the ground floor, has its own system of air and humidity control in keeping with the requirements of artworks, in line with the Government Indemnity Insurance Scheme for the security of artworks from national and international collections.

Throughout the process the contractors monitored waste – with zero waste going to landfill. Willmott Dixon helped with the embedded carbon of the new build construction, selecting the most efficient materials and concrete mixes as well as monitoring the transportation of materials to the site, with an overall holistic approach to energy consumption.

### Access

There is increased access throughout the building for wheelchairs as well as ensuring excellent sightlines for wheelchair users in all the performance venues. The largest digital auditorium has a choice of wheelchair positions at the front and, unusually, at the rear of the auditorium to allow comfortable viewing angles for the large screen.

In addition to a sweeping, curved staircase, two lifts facilitate access between floors. These have been designed in consultation with Arup (Solihull) to serve as evacuation lifts for use, in conjunction with two refuge areas, in the case of fire for dignified egress. The building control operation has been designed in collaboration with West Midlands Fire and Rescue Services.

Changing place facilities, as well as increased provision of gender neutral and gender specific toilets, are located for ease of access.

### Additional flexible space capabilities

The generous foyer spaces are enabled for 'pop-up' performances, with sound and lighting connections to the building's control room.

The Gallery has performance panels concealed in floor traps and above the ceiling to enable performance-based installations and immersive events. Its original L-shaped structure has been preserved, allowing for the space to be used in a flexible range of configurations. It also has the capability to extend the L-shape by opening it out into the adjacent foyer, itself with generous AV connections, to enable larger art displays, installations, public receptions and conferencing as well as large University occasions in the Butterworth Hall (including graduation days).

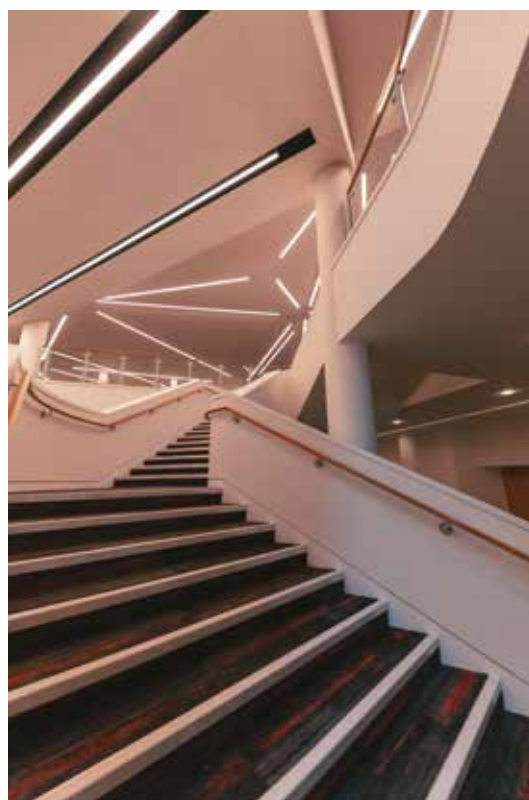
The iconic White Koan, by artist Liliane Lijn, originally installed outside the Arts Centre in 1972 after standing on the roof of the Hayward Gallery in London, has been moved to different sites on campus during the Warwick Arts Centre project. It will return to a plinth outside the Arts Centre once the cabling has been put in place for it.

The renovation and building process lasted for the past four years, with the building being handed back in June 2021 to complete preparations for its opening season, Autumn 2021. The catering concession, Benugo Bar and Grill, is currently being fitted out in the large foyer close to the Mead Gallery for an early 2022 opening, meanwhile there is food and drink available in the Arts Centre café opposite the music centre as well as pop-up bars on busy nights. Writing on the Arts Centre website in October 2021, the Centre's Director Doreen Foster heralds its new era: 'Our mission is to be a space where more people from across our communities can meet and engage with the arts. And we're on a mission to reach out beyond our walls, to people who are looking to find their voice in art'.

### Funding

Capital Spend for Phase 1 was £10.3 million and for Phase 2 was £26 million to the point at which the building was handed back.

The Warwick 20:20 Project was made possible by: University of Warwick, Arts



*A helical stair connects the new foyer to the first floor. Courtesy of Willmott Dixon.*



Council England, Coventry and Warwickshire Local Enterprise Partnership (CWLEP), Garfield Weston Foundation, 29<sup>th</sup> May 1961 Charitable Trust and HS2 Community and Environment Fund (CEF).

### Acknowledgements

I am most grateful to the following for taking time to talk to me about the Arts Centre project and for sending me so much material

to work with: Robert Freeman (Director, Ellis Williams Architects), Andrea Pulford (Director of Operations, Warwick Arts Centre), John Riddell (Principal, Theatre Projects), Dave Agnew (Senior Consultant, Theatre Projects), Alasdair MacIntosh (Project Manager, Capital Programme Team, Warwick University Estates), Jon Rigby (Bond Bryan Architects), Katie Anderson, Marketing Director, Warwick Arts Centre, Paul Roberts (Operations Manager, Warwick Arts Centre).

### Project Team

Director of Planning and Operations, Warwick Arts Centre:

Client (Phase 1):

Client (Phase 2):

Project Manager:

Design Architects:

Business Consultant:

Theatre Consultants (Phases 1 and 2):

Construction (Phase 1):

Construction (Phase 2):

Delivery Architect (Phase 2):

Project and Cost Management and contract administrator (Phase 2):

Fire consultant:

Director, Warwick Arts Centre:

Former Director of Warwick Arts Centre (initial phases of project):

Technical Director, Warwick Arts Centre:

Curator, University of Warwick:

Andrea Pulford

University of Warwick

Warwick Arts Centre, University of Warwick

University of Warwick's Capital Programme Team, Estates: Alasdair MacIntosh

Ellis Williams Architects

David Clarke Associates (DCA), Birmingham Theatre Projects

Wates Construction

Willmott Dixon Construction

Bond Bryan (for Willmott Dixon)

Turner and Townsend

Arup (Solihull, Birmingham)

Doreen Foster

Alan Rivett

Howard Potts

Sarah Shalgosky



*Exterior view of Warwick Arts Centre at night.  
Courtesy of Bond Bryan /  
Phil Grayston Photography.*



# Polka Theatre, London

Tim Foster



*Right: Frontage of the re-modelled Polka Theatre*

*Below: Ground floor plan*

A major re-working of this much-loved theatre for children in Wimbledon was finally completed in the summer of 2021. Originally created from a church hall in 1979, this is the first major upgrade to the building in over 40 years. Foster Wilson Size were originally appointed via a two stage competition in 2009, so it has been a long and sometimes frustrating 12 year journey to reach this major milestone in the life of a unique theatre. As just one of a handful of dedicated children's venues in the UK, the remodelling signifies an important moment for the theatre, putting it back on the map as a world-class venue that continues to facilitate developments in children's theatre, nurture artistic talent in the sector, and maintain an international reputation while serving local communities.

The time taken from inception to completion is a symptom of the challenges many smaller arts organisations have faced in the post 2008 years to arrive at proposals, which both meet their needs and can be realistically funded. Early unsuccessful funding bids led to reductions in the budget, while at the same time the theatre's ambitions grew. As a result, the design went through several iterations in its 12 year life, in a constant endeavour to balance ambition with affordability.

The original building was a two storey church hall dating from the 1920s, which in 1979 was combined with an adjoining shop to create the



*New café*

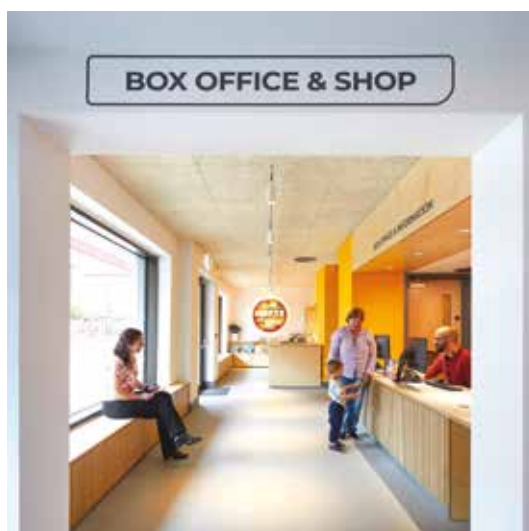
original theatre. In the backlands an annexe was built, in the form of an asbestos clad shed, which housed the theatre's creative learning studio and was separated from the main building by a playground. When we first got involved, the annexe was in unsatisfactory condition and its separation from the main building was inconvenient. At the front of the building there was little sense of engagement with the street. The original Adventure theatre, for early years children, was too small and had poor acoustic separation from the noisy foyer and in addition the theatre were determined to create a new rehearsal studio, which would allow new work to be developed on site, as well as providing valuable income as a lettable space.

The remodelled building combines new construction with a re-working of the existing buildings to create a more rational layout, which allows all the main spaces to operate independently or as one. The old annexe

was demolished and the full width of the site is utilised by a new building at the back of the site, housing a new Adventure theatre on the ground floor with an acoustically isolated rehearsal studio above it. This is linked to a new entrance between the church hall and the adjoining shop by a central circulation spine running through the centre of the site, with facilities arranged on either side of it.

Central to the design approach was the aspiration to create a more welcoming and stimulating destination for children and their guardians. The main building has been opened and extended by expanding sideways into an adjoining former retail unit. A new glazed entrance transforms visibility from the street and welcomes visitors into a central spine corridor, leading into a new box office and shop on one side and a large and airy café on the other. By placing all public areas at the front of the site, they can operate independently when the main building is closed, generating further revenue for the theatre. A new bright red canopy, taking the form of a 'flying carpet', extends the full width of the frontage, unifying the disparate existing buildings and providing shelter and shade. Its upturned end, crowned with golden tassels, provides a location for signage facing west up the Broadway. New free-standing signage sits above the canopy and the original Polka clock has been refurbished. At first floor level a new meeting room projects between the buildings, above the entrance, with a large window covered by a playful 'magic forest' fretwork screen, providing solar shading on this south facing façade.

Stimulating outdoor play space has always been an important part of Polka's 'place to play' ethos. The original garden on the church side



*Below left: New box office and shop*





has been beautifully re-landscaped by Patrick Collins and a new play area on the east side, between the new extension and the café, contains a purpose-built play house created by play specialists The Space to Play. More 'magic forest' fretwork screening, first glimpsed on the street façade, provides decorative solar shading to the high level windows. Connections to the indoor foyer spaces have been greatly improved by lowering the sills of the existing window openings, providing views and daylight. Unlike most theatres, Polka is largely open in the daytime and outdoor space and good daylight are particularly important.

The main foyer space located at the heart

of the building has been opened up to the link corridor and the gardens both sides and a new creative learning studio has been created in the old Adventure theatre space, with large sliding doors allowing it to be opened up to the foyer. We have worked closely with stage designer Laura McEwen, who has created the playful and engaging interiors, which bring a unique character to these spaces, with designated corners for reading, storytelling and dressing up, a seascape scene in the link corridor and a river motif in the carpet design, which leads you through the building.

The new Adventure Theatre is located at the back of the site. It is a 9x9 metre square room with shallow technical galleries on three sides, which give the space character and direction. There is no fixed seating as the early years children mostly sit on the floor, while seating is provided around the walls for accompanying adults. This makes the space highly flexible with the form determined by the position of the acting area. A curtain track on the leading edge of the gallery allows an actors' run-around to be created and there is a dedicated entrance for actors, enabling them to arrive without passing through the foyer. An external door opens out onto the mews at the rear of the building, providing access for the delivery of longer items.

The Nest; a new dedicated rehearsal and development studio, equipped with storage and catering facilities, is located directly above the Adventure Theatre. Separating the two is

*Church side garden*

*New foyer*







Link Corridor



Adventure Theatre

All images courtesy of  
Foster Wilson Size  
Photos by Hufton + Crow

a double acoustic floor that provides sound separation between the two spaces. The space is accessed via a pair of scissor stairs, which allow a larger occupancy than a single stair would permit, to enable it to be hired out for events for over 60 people.

The main 300 seat theatre, which is located on the first floor of the original church hall building, is a characterful space with its exposed steel roof trusses. While more ambitious plans for its improvement had to be shelved to contain costs, it has been redecorated and re-seated in a separate project managed by the theatre.

An important objective of the project was

to improve access to all parts of the building for both visitors and performers. A new strategically placed lift provides level access to the main stage for the first time and also serves the staff offices.

Sustainability was also a high priority and the new build elements of the project have achieved a BREEAM 'Excellent' rating. New MEP services throughout, combined with a modern control system, low energy lighting and photovoltaic panels on the roof will ensure that running costs are kept to a minimum.

Following a 12-year journey we are delighted that the building is now open at a time when access to the arts for young people is so important and are delighted that the building is now open to the public again, as theatres generally start to re-open, and we sincerely hope that Polka's young audience and their parents will enjoy it for years to come. Our saga is over for now but a new chapter for the theatre is just beginning.

**Credits**

Client	Polka Theatre
Architects	Foster Wilson Size
Project Management	Cragg Management
Quantity Surveyor/Principal Designer	Beadmans
Services Design	Skelly & Couch
Structural Design	Price & Myers
Theatre Consultants	Charcoalblue
Acoustic Design	Arup
Lighting Design	18 Degrees
Interior Design of public spaces	Laura McEwen
Outdoor Play Frame	The Space to Play
Landscape Architect	Patrick Collins Design
Main Contractor	ITC Concepts

# Our Visit to Polka

We visited Polka as a family for a lunchtime performance of their opening show Red. Arriving in the pouring rain we were very glad of the new theatre cafe with built in play area which allowed us to dry off and have an entertained and restorative snack before the performance. The rain cleared up as we drank our coffee and this meant that Theo was able to explore the outdoor play area front of house complete with a beautiful new tree house. Technical difficulties delayed the house opening by nearly 30 minutes and the treehouse and beautifully detailed carpet in the front of house area allowed us to create games and stories whilst we waited; successfully filling the extra time we had.

The foyer in the front of house area was quite limited in footprint for our visit it transpired when the house opened. The main part of the beautiful and engaging foyer had been converted into an intimate auditorium for the first part of the show which was played in a promenade style, moving us from space to space as the scenes unfolded. The opening scenes of this non-verbal show with integrated BSL for audiences aged 6+ showed off this brightly decorated space nicely but as I glanced up at all manner of inventive temporary LX rigging I was reminded that no matter how well the project team had planned for the use of the building – the moment it was released to the theatre makers #FreelancersMakeTheatre the theatre was instantly used in a different configuration from any originally conceived.

The middle scenes were played in the Clore Learning Studio a well-proportioned and brilliant white rehearsal studio in which we were enveloped in a fantastic wide format, edge-blended, HD projected landscape. This enormous projected backdrop (covering two whole walls of the studio) really helped the story and the room come to life as we explored the forest of red riding hood.

We then progressed to sit in the Adventure Theatre for the conclusion of the Red story. This auditorium is a beautifully intimate studio theatre, expertly proportioned with a gallery on three sides. The space was our favourite used in the production and it transported us magically to the Wolf's lair. The technical provision seemed spot-on in this flexible studio, the relationship between audience and performer is wonderful and perfect for a small company of players to captivate an audience of young theatre goers. This was noticeable in Theo, at 4 and a quarter, being spell-bound with the end of the show despite it being targeted at ages 6 plus.



*Theo in the Tree House*

In all the refurbishment of the Polka seems a fantastic success and all of us are looking forwards to seeing a show in the Main Theatre later in the year. Theo in particular will be looking forward to revisiting the tree house.

*Ben, Catherine & Theo Stephen.*

# Training and Education in the Performing Arts – Sustainability in Wigs, Hair & Make-up for Performance

Anette  
Ollerearnshaw

As I settle down to write this article, the United Nations' COP26 Climate Change Summit is about to commence in Glasgow with global leaders congregating to discuss and agree on their plans that outline and accelerate sustainability solutions to the climate crisis.

Whilst nations are committing to climate positive action, theatre is a space where we tell stories that reflect on culture and society. As a mirror to the world, and as agents of change we must identify how we can adapt our creative, making and staging practices and join in.

I have taken this opportunity to look at environmental concerns through the lens of technical production within performance and higher education, and more specifically have explored sustainability approaches and possibilities within the world of Wigs, Hair & Make-up (WHAM).

I believe that by tapping into the diversity, connections, expertise, and vision of our global WHAM community, we can work on implementing some practical changes with a view to accelerating these with pace and agility. Firstly we need to collectively understand how we might be able to embrace the life cycle of materials coherently and effectively in parallel with maintaining artistic excellence.

## 1. Consulting with Industry and Education

Having founded the Association of British Theatre Technicians' (ABTT) WHAM Committee in April 2021, I have made a personal and professional commitment to bringing together and representing my peers on subjects that are centred around health, safety and well-being as well as setting standards of best practice.

Much of the industry is currently run off its feet getting productions back to audiences following the easing of months of dark stages enforced by national Covid-19 restrictions. Whilst the various pressure groups that were born out of the lockdown situation talked about the opportunity to reset industry practices within the concept of a new normal, indications are that the old challenges are still dominant and easy to fall back into.

To inform my thinking I sought insights from colleagues across industry and academia; I have held interviews with some generous contributors who shared with me their knowledge and experience within their practice and research.

I would herewith like to express my deepest

thanks to Giuseppe Cannas (National Theatre's Head of Department WHAM), Dr Kate Goldsworthy (co-Director at University of the Arts London Centre for Circular Design), Sanne Visser (UAL PhD Researcher) Cecilia Pritchard (UAL's London College of Fashion BA Hons Hair, Make-up and Prosthetics Course Leader), Tanya Noor (ex-Head of Department Phantom of the Opera, LCF Senior Lecturer) and Carole Hancock (Designer and Owner HUM Studio) for provoking and inspiring.

## 2. What is WHAM

WHAM is the abbreviation for Wigs, Hair & Make-up that is predominantly used in the context of theatre, whilst the film and TV industries refers to us as HMU (short for Hair & Make-up).

WHAM is a Live Art and has as much to do with backstage technical theatre practices as it does with on-stage performance activities; our contribution to theatre-making is creative and technical in equal measure.

As practitioners we collaborate with designers, performers and directors to translate and realise the creative vision in the run up to opening night and then continue to employ artistic agency and technical competence for each performance and the production throughout its run or tour.

Our disciplinary competence, with hair and make-up practices at its core, covers a wide range of specialisms including hair colourists, period and modern hair stylists, dermatologists, opticians, prosthetists, beauticians, make-up artists, wig makers, body painters, nail artists, denture makers, special effects experts, hairdressers, and barbers/groomers.

## 3. Size isn't Everything

Within our sector WHAM has a proportionately lower consumption in terms of budgets and materials when compared to all other performance technology disciplines. This could be due to volumetric use alone with our work being small in scale, fleeting and precious in output; but fundamentally is also due to being lodged in historical organisational hierarchies that always place us last in line for budget allocations and decision making.

Designers of our creative output on stage are generally from associated disciplines, i.e. stage and/or costume design. Only on big budget productions with emphasis on characterisation such as Lion King, Cats or Harry Potter for example does the position



of the WHAM Designer/Supervisor hold a more central and elevated role. Because of this, often our lived experience backstage is wanting in terms of agency, value and respect that is afforded to us, and simply having our specialist needs met requires resilience and determination. I feel it is important to mention, because the complexity of this also affects our position to influence and effect impact in relation to urgent issues of change such as sustainability, diversity and accessibility.

#### 4. Challenges and Opportunities

With the industry working through the wake of the Covid-19 pandemic, in most cases the situation has resulted in lower staffing numbers, as well as pressure on time and tighter budgets. In terms of sustainability, views are divided with some stating that the restrictions placed on us through the crisis have forced us to realise our ability to produce work with fewer resources, others noted that even at the best of times, many colleagues feel that incorporating sustainability presents an extra burden of complexity that demands precious time, more complex logistics and valuable resources.

Conscious reduction of waste, choosing to make our material practices more eco-friendly and sourcing ethically is lacking; whilst some personal and individual efforts have been made over the decades, sustainability is still not at the forefront of wider decision making or conversations at industry level.

A well-balanced stock of wigs and hair pieces can be a great way to work more sustainably, as it can be infinitely restyled and with a limited amount of time and resources, alterations can be carried out that allow reusing and reimagining. This however will for now remain the privilege of a big houses such as the NT, ENO, ROH, WNO etc; small and rural theatres simply cannot 'afford' to make ethical choices as it is perceived to enforce compromise on artistic and creative ambitions.

Human hair is the highest value material we purchase and as a raw material comes with enormous questions around social, economic and sustainability ethics. Globally or nationally, we do not have a system that demands or certificates a formal identification of origin. Hair merchants as we know can be creative in their responses when asked about the origin of their product, whilst some openly declare the offer of hair sourced from children in poorer countries for example.

Research into the possibilities of human

hair waste repurposed as a protein-based material is being conducted by Sanne Visser. Investigations have led her to explore what can be intelligently done with hair as a waste material that she sourced from hairdressers. It strikes me that as hair specialists we can collaborate on increasing the insights of how or why hair ends up in landfill and to seek cross-disciplinary partnerships for material innovations in a holistic sense.

The social, ethical and economic questions we are faced with across all of our disciplines, are made harder by the absence of policy frameworks and laws, demanding each individual practitioner accept the role of philosophers, researcher, scientist and politician. This inevitably exposes our decisions to being rooted in personal privileges, limited knowledge and biases; consequently, we may simply think we have 'done the right thing' and yet could have had more negative impact elsewhere despite our good intentions.

Make-up and related products for budgetary purposes are classed as consumables and can generally be divided in two sub-sections: Fashion or beauty and professional brands.

Health & Safety considerations impact WHAM practitioners as product users, but also for the performers that are our canvas; with each person having a unique set of physical needs, with skin sensitivity and hygiene considerations as fundamental drivers for our choices. For example, we need to review products' use-by-dates, sensitivity, compatibility and a person's ethical relationship with ingredients. Often 'just-in-time' shopping, rather than bulk buying stock is preferable for freshness and pressing deadlines, this however may contribute to increased product mileage and packaging waste.

Fashion and beauty make-up brands generally place more emphasis on eye-catching trendy branding and have more elaborate packaging for presentation and marketability purposes. However, some brands have started to embrace the sustainability and ethical preferences driven by consumer choices and the products they develop can start to present some solutions for us. These can come at higher cost and for those working on low budgets such as students and small productions, the more sustainable decision is simply not affordable.

Professional make-up brands such as Kryolan, Ben Nye, Screenface and Skin Illustrator for example, design their products as refillable and sell in larger sizes that can be decanted. This is a simple way of working

that creates less packaging waste and very simply ensures a more sustainable choice. However, some of the ingredients have not been produced ethically or are simply not available as a more environmentally friendly version. Developing new products takes time and funds and with our discipline often outside of research and development interests, we have been left behind.

Prosthetic make-up creation and application has the most problematic position in terms of sustainability, as materials are neither recyclable or reusable nor are many products that form part of the process replaceable with a more environmentally friendly version. At best we can reduce waste by working efficiently and practise safety to protect our health.

Digital technologies such as 3D scanning and printing is starting to provide some process shortcuts, but even when using digital versus analogue we are not in the position to automatically presume digital equals more environmentally friendly choices.

## 5. Hierarchy of Needs

The hierarchy of needs we are faced with is the weighing up of technical and creative demands



balanced against questions of sustainability. Our processes and material choices can be driven by many elements of material performance including speed, strength, texture, colour, effectiveness, hygiene, and compatibility.

We as the consumers will only purchase and use products and equipment that works well and enables us to do our job with continued artistic and technical excellence. As the experts in our field, it is important that those leading concept, design, and budgeting processes seek and welcome our input so that we can help to steer ideas towards more sustainably engineered solutions.

## 6. Effectiveness and Efficiencies

More environmentally friendly and ethically produced versions of frequently used consumables such as wet wipes, cotton buds, pads and tissues are available on the market, with some colleagues already having replaced the use of wet wipes with the use of flannels and warm water or coconut oil.

Whilst we make judgement calls on where, within the complexity of carbon calculations the break-even point lies, it is quite likely that academic and scientific research has been conducted to measure and calculate whether purchasing disposable biodegradable bamboo wipes or hygienically hot washing flannels is more sustainable. For busy crew who are under pressure to get things done quickly to meet deadlines, ensuring the better decision has been made can be an unreachable ambition.

Researchers at UAL's Centre for Circular Design have been thinking about how Fashion affects eco-systems for many years and in 2010 published a pack of 10 cards that could act as a design tool to overcome: barriers THE TEN- <https://circulardesign.org.uk/tools/>

Each card when used during the creative and production process could help to identify sustainability opportunities within design thinking and provide inspiration to seek innovations in materials and practical processes. Strategies such as Design to Minimise Waste, Design to Reduce Chemical Impacts, Design for Ethical Production and Design Activism can be utilised to generate flow and encourage conversation.

## 7. Inclusion in the Theatre Green Book

The Theatre Green Book (TGB) spearheaded by the ABTT and Theatres Trust is helping to create a common standard for making theatre

greener and has brought together theatre-makers and sustainability experts to create a common standard for making and producing theatre, as well as theatre buildings and theatre operation.

The ABTT WHAM's contribution to the TGB is soon to be published. Having previously been sub-grouped to Costume & Wardrobe, the first task was to clarify why WHAM fundamentally needs to be recognised as a stand-alone discipline that requires equal status and independence.

Identifying WHAM as a distinct discipline acknowledges specialist contribution, technological advances, and unique needs. I believe the recognition of WHAM assures our community of practitioners that they are heard and that their contribution is properly valued. Without this recognition it would be so easy to leave the heavy lifting of change making to others.

The TGB is designed as a live document and ABTT WHAM has been assigned as the designated Custodian for WHAM guidance. This will entail reviewing and updating the WHAM TGB contributions as an evolving cycle. We will be meeting bi-annually and would love to hear from anyone who wants to become an active part of this community, please email: [office@abtt.org.uk](mailto:office@abtt.org.uk)

## 8. In Closing

Whilst the nature of our work allows us to be immediately responsive with design adaptations during the pre-production and rehearsal processes, designers need to collaborate effectively and consult with us before making decisions. In most cases we can advise on what technique or material choice would have an impact on sustainability and suggest better alternatives.

The obvious choices that are in our control are to increase collaborative conversations that forefront sustainability at each stage and at all levels of the creative and production process, to reduce our carbon footprint through working effectively and conscientiously within our practice and to strive to limit waste and transport / travel through the purchasing choices we make.

To progress in our duty towards a healthier planet we must prioritise better collaboration as a mindful and inclusive community, liaising across departments and functions with fluency whilst gradually utilising and embracing the concepts and practical tips presented in the **THE TEN Pack of Cards** and the **TGB Toolboxes**.

# THE THEATRE GREEN BOOK

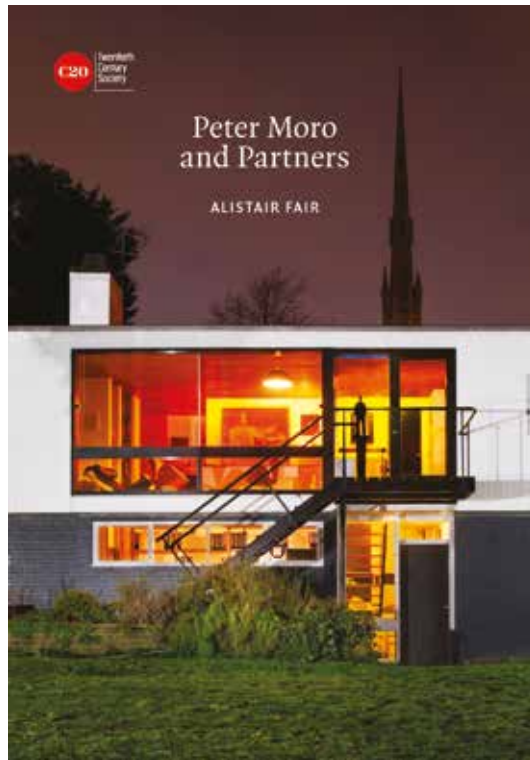
**1 : Sustainable Productions**  
(version beta.3 for trialling)



# Peter Moro and Partners

Review by  
Christopher Daniel

**Alistair Fair**  
Liverpool University Press  
ISBN: 9781800856516  
Price: £30.00



In 1969, following a meeting with the ABTT Theatre Architecture and Planning Committee, Geoffrey Axworthy of University College Cardiff remarked in a letter to his architect that *"Moro and the chap with the beard were good value, and one would have been happier to have talked to them alone."*

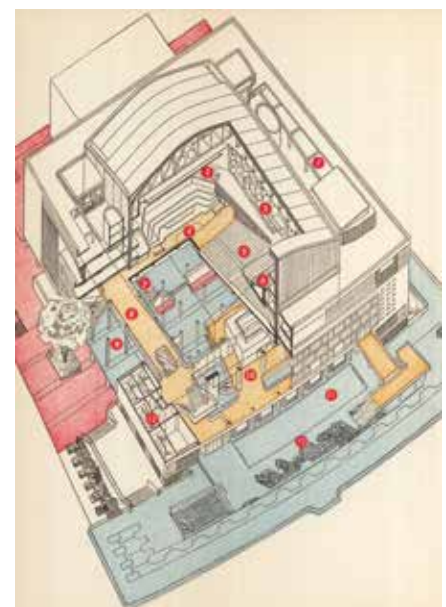
This quotation appears in *'Modern Playhouses'* (2018), the first book by historian Alastair Fair. Subtitled *'An Architectural History of Britain's New Theatres, 1945-1985'*, it will be of interest to any reader of Sightline with even a passing interest in the history of theatre. That quotation serves as some indication as to why Fair has dedicated his third book to the work of Peter Moro, a founding member of the ABTT and leader of an architecture practice said to have designed more theatres than any other in the post-war decades. This latter book is titled *'Peter Moro and Partners'* (2021), reflecting Moro's view that his office was *"a team of complementary abilities who were able to tackle anything"*.

Peter Moro arrived from Germany in 1936 and initially worked for Berthold Lubetkin at the modernist practice Tecton. Following internment in the early part of World War II, he then designed exhibitions and taught in architecture schools. On the invitation of Leslie Martin he joined the architecture department of the London County

Council (LCC) specifically to work on the Royal Festival Hall. It was his role as a design team leader on this project that began what became a lifelong involvement in the creation of performance places.

The most significant new theatres by the practice were Nottingham Playhouse (1956); the Plymouth Theatre Royal (1982) and three venues for university drama departments: the Gulbenkian Centre for the University of Hull (1969), the Riverside theatre at the University of Ulster, Coleraine (1975) and the Taliesin Arts Centre at University College, Swansea (1984). Other projects included a partial reconstruction of the auditorium at the Royal Opera House (1963) and various alterations and extensions to the Bristol Old Vic (1973), the latter largely removed in the 2018 works by Haworth Tompkins. As is often the way for architects, the practice was engaged on many projects for extended periods of time that were never actually built. Painstaking research by the author tells the story of all of these projects and shows the evolution of their ideas and approach over the decades.

It is worth noting that this book is very much an architectural one. It is the latest in a series on individual practices published by the 20<sup>th</sup> Century Society. While Moro is best known for his well-considered and carefully planned theatre buildings, it is the author's expressed intent that this book gives equal attention to other building types. Chapters are arranged thematically and while discussion of theatre projects accounts for roughly a third of the book, slightly more than half of it is dedicated to housing, exhibition design and commercial buildings. As such this book works well as a companion piece to the essential *'Modern Playhouses'*.



Sectional drawing of Royal Festival Hall

# ABTT Stephen Joseph Award 2021

To mark the centenary of Stephen Joseph's birth and the 60th anniversary of the founding of the ABTT, the Stephen Joseph Committee has launched an Award to commemorate the life and work of this maverick theatrical genius.



The award was presented to Persis Jadé Maravala. The Artistic Director of ZU-UK Company, a performer and teacher, she received the Award in recognition of her ground-breaking work that widens the scope and imaginative possibilities of live & multi-media performance, her experiments with audience engagement, and her exploration of topics of direct relevance to diverse audiences in contemporary Britain. The Award celebrates that on so many levels her work embodies the spirit of Stephen's wide-ranging legacy. The original nomination summarised her achievements as follows:

'Persis Jadé Maravala is Artistic Director of internationally acclaimed interactive and digital arts company ZU-UK, often cited as pioneers of the UK's early, grassroots immersive theatre movement – using found spaces and public spaces to create temporary communities of audiences in extraordinary experiences. Ethnically Iranian-Yemeni-Indian and raised in East London, Maravala's work epitomises her belief in a need for shared rituals and the use of unusual locations as an invitation to those who do not ordinarily engage with theatre. Her work creates playful, challenging relationships with audiences in public spaces that foster intimacy and disrupt class and political divides with a humorous lightness of touch to form rebellious, indelible shared moments.

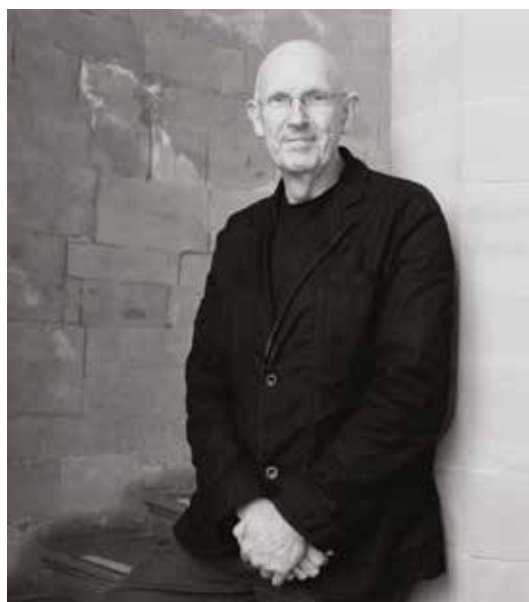
With *Pick Me Up (and hold me tight)* she rung every pay-phone in the UK at 11am on the 1st January 2021, to mark the peak of suicides every year – audiences engaged in a new large-scale piece about listening. Maravala is

internationally recognised as a leading figure in ground-breaking work into participation, interactivity, and technology as a tool for intimacy in performance, enabling audiences to genuinely share spaces with each other.

After the international success of all-night participatory piece, *Hotel Medea*, seminal in the entry of immersive theatre and the ethics of audience care into public consciousness, Maravala distilled the strategies developed in making the performance into a 'dramaturgy of participation'. This training and making methodology for the new generations of diverse theatre makers, has been written about extensively by journalists and academics, and is taught as an MA in Contemporary Performance by Maravala and ZU-UK at the University of Greenwich.'

The range and strength of nominations that were received exceeded all expectations, so the Ajudication Panel made an additional commendation.

Mike Pearson is presented with a Lifetime Commendation in recognition of a storied career as a freelance practitioner and teacher, as founder-director of Brith Gof and as director of various site-specific productions for National Theatre Wales, all within the spirit of innovation and audience engagement that was the hallmark of Stephen Joseph's practice.





# ABTT Awards 2021

## ABTT TECHNICIAN OF THE YEAR AWARD

### Sorcha Steele

Sorcha began her career in 2005 working with various Am Dram groups in Ireland and gaining enough knowledge to move into professional work, honing her craft through working in a variety of different environments.

She moved to the Royal Exchange Theatre in 2012 as Senior Sound Technician. She very quickly revealed herself to be an invaluable part of the team and was asked to step up to Deputy Head in 2013 after the tragic death of Steve Brown, Head of Sound. Within two years she impressed enough to be appointed Head of Sound, a position she has held since then.

Sorcha's leadership and thinking within her specialism has consistently displayed innovation, excellence and passion. She always strives to push the Sound Department in its practice, while supporting her colleagues and freelance designers. By continually researching and championing new ways of working that reflect innovation within the industry, and responding to advances in technology and the expectations of sound designers, she has consistently encouraged and enabled the advancement of her own craft, that of her colleagues, and the quality of the Theatre's artistic output and sector reputation.

During her time at the Royal Exchange she has delivered a full front of house upgrade from analogue to digital systems, and has

identified access requirements and updated systems based on the needs of the audience. She has always understood the significance of training next generation Sound practitioners and regularly develops casual technicians in their skills and confidence and by providing opportunities for them to access that support. Her nurturing has developed several people's careers and enhanced many professional lives.

Sorcha's reputation amongst freelance Sound Designers is second to none. Her extensive specialist expertise of 'in the round' sound and her open and supportive demeanour means that designers are fully supported to realise their ideas and deliver work that pushes both their boundaries and ours. Her enthusiasm for her specialism is infectious, her attitude is always positive and proactive, and coupled with her keen sense of responsibility and nurturing leadership she has made the Royal Exchange's Sound Department a coveted place to work within the sector.

As an individual, Sorcha is inspiring. She has constantly pushed herself to grow as a specialist and now heads a Sound Department in an Industry that is still predominantly male. Now with a young family, she is even more determined to break down barriers, set an example and show the sector that people with children can continue a career in technical theatre and flourish.





## ABTT EMERGING EXCELLENCE AWARD

### Jesse Caie

Jesse was nominated by Sally Garner-Gibbons, Technical Theatre Apprenticeship Programme Coordinator at Chichester College:

“Jesse is an exceptional technician who is currently Number 1 Automation Operator at Chichester Festival Theatre working on South Pacific just 2.5 years after graduating from his apprenticeship – This is his role while waiting to return as Number 2 Auto for Dear Evan Hansen where he was before the pandemic.

“Jesse made his way to these roles through determination, self-development and total commitment to his learning journey. I first met him at age 14 when he joined an after school tech club I run at the CFT. He struck me then as an ambitious theatre lover. He then went on to join my vocational training course where he very quickly became the college theatre general technician and committed himself to the training. He achieved the highest grades possible.

“He then applied to CFT (against a strong contingent) to be their Technical Apprentice where he excelled and quickly made a name for himself with the team there. He achieved well on that course and the role whilst developing all round technical skills at CFT. He was taken under the wings of the lighting team who saw his potential and he became a valued member of their team very quickly. Often being given responsibility for projects.

“He impressed a number of touring production managers and was taken out on tours as a result. He always had an eye for Automation and he committed himself to learning as much as he could whilst training and when working on professional shows. He is a grafter and he works so hard. He is always determined to learn more and do his best and the quality of his work, level of skill and expression of his knowledge is nothing short of exceptional. He is a very special talent.”

Jesse’s nomination was supported by a number of people who had worked with him throughout his career to date, including the following: “Jesse has made a huge impact at CFT, first as a technical apprentice and returning two years later to join us as Automation no. 1 for South Pacific this summer – we were delighted to welcome him back!

“Not only is Jesse a brilliant and creative technician – he is collaborative, adaptable and wholly reliable – he is also a huge asset to the wider theatre. He has an infectious positive energy, is praised and valued by



creative teams and colleagues and this year championed CFT finding ways to recycle Covid test to reduce our environmental impact. He should be proud of how his professional career has developed.”

*Daniel Evans Artistic Director of Chichester Festival Theatre*

“Jesse Caie is a bright star in the next generation of Theatre Technicians. Initially meeting Jesse on numerous overnight fit up and get outs at Theatre Royal Drury Lane, his continuous hard work and joyful personality were infectious.

“His progression to Automation Technician on the ‘King and I’ in Tokyo demonstrated his broad knowledge and ability. With a wonderfully inclusive approach to all technical departments, his confidence developed.

“Jesse then deservedly took the position of Auto 3 on the London Premier of ‘Dear Evan Hansen’. This fed his constant hunger for more knowledge and skills. His return in Sep 2021 gains him a promotion to Auto 2.

“Without doubt, Jesse is an invaluable addition to any production fortunate to secure his talent. His future success in Technical Theatre is guaranteed.”

*Graham Harrison Stage Manager for Dear Evan Hansen*

# An Inspector Calls

Alan Lynagh

## Back to Normalish

It is as always, a pleasure to contribute to this wonderful publication and while I am not wanting to tempt fate in anyway, having to try and find a narrative thread to my head of chaotic thoughts to present to you has felt like a return to some sort of normal...ish.

At Westminster we have been busier than ever trying to decipher guidance, interpret statistics and resource a wealth of premises coming back online at the same time. In the first couple of weeks of November we have had *Cabaret*, *Moulin Rouge* and *Life of Pi* set inspections alone.

With regard to all three productions there were changes to the auditorium layout that required formal variation applications to be made under the Licensing Act. This is because the plans, which form a condition of the licence, had been altered to the point

where the existing plans would no longer reflect the layout and hence the new proposed layout needs to form an application so any impact of the changes can be commented on.

What may appear a slight change on plan can sometimes have potentially wider implications. The relocation of the main entrance of a venue to another door on the building facade may on the surface not seem a major change but if the new entrance point is closer to your nearest sound sensitive residents this potentially can then have a major impact, hence the process in place to deal with such changes.

In the case of the Playhouse Theatre (*Cabaret*) where the stage door has become a main entrance route for patrons, this became a concern for local residents and representations were made forcing the application to a license hearing. At this point it is worth considering the timeframes that this then involves, the statutory consultation period is 28 days and if objections are raised you can then wait another 28 days for a license hearing to take place. So all in all any variation application could take up to 56 days to complete therefore getting the application in early is critical as otherwise you may end up in a situation where you have no valid licence in place to cover your proposed activities.

The condition that was agreed for the Playhouse was that the stage door would only be used for access up until 19:30 and not beyond, which allowed the show to have the incoming patrons access through the stage door as required but meant there would be no potential impact on residents beyond that time. In addition egress would be via the normal routes, again limiting any further impact as patrons leave after the show.

Some other key points for consideration from the *Cabaret* production are detailed below:

All technical equipment and apparatus in the back of house corridor that now forms the public entrance route needed to be suitably caged to protect against any inappropriate fiddling from public.

Front of house performer positions (raised platforms) had been constructed and these needed to be suitably guarded for performer safety (all over 380mm high) but also managed to avoid any unauthorised access from patrons when not occupied.

Fire stopping throughout was needed to maintain the fire compartmentation between plant rooms, store rooms and exit corridors





within the venue to facilitate the various new cable runs installed for additional power.

A number of these cables were being secured with plastic cable ties at high level and these were switched for robust fixings (steel). While not a life safety issue for patrons this will protect fire fighters fighting any fire from cables dropping down and potentially causing entanglement. See Shirley Towers fire in Southampton 2010 for tragic consequences of this.

Fire shutters were put in to separate newly constructed bar/servery locations and we advised that the line of descent of the shutters should be highlighted on the counter top to ensure this is not blocked by equipment (same principle as maintaining the Iron Curtain line on stage).

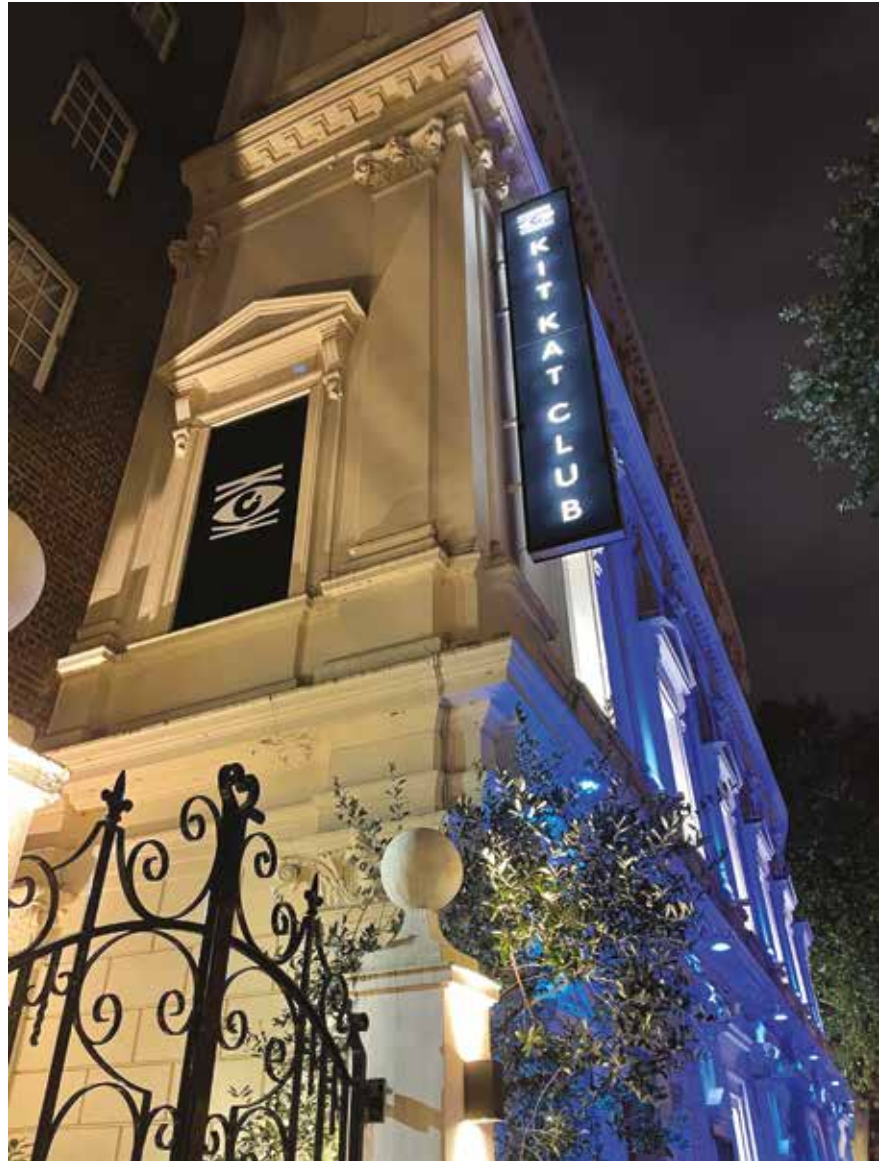
Creation of on stage multi levelled seating area that required additional emergency lighting to be provided to cover the new aisles and gangways. In addition the required seatway dimensions, gangway widths and travel distances to protected exit routes all had to be factored into the design of this installation.

Doughnut revolve used on stage with safe edge installed to shearing edges and a large number of E-Stops were also included to various locations on the stage and at control positions.

As with any theatre production that features an experiential element the idea is to create that feeling of freedom of movement while at the same time very carefully managing the patron experience and ensuring that safety is not compromised while doing so Gary Beestone Associates – Project Director and Production Management – have done a wonderful job in this respect..

What is wonderful is to see the level of investment being directed into the industry again by way of these three productions and the various others that have opened in Westminster recently, Frozen, Back to the Future and Pride and Prejudice (sort of) to name but a few. I have also been lucky enough to have sneak previews of Nimax's new Soho Place Theatre, which looks wonderful, and I am sure will feature in future articles.

A final point on Covid, I had our Public Health colleagues state concerns that certain theatre venues were showing a number of cases (40) over a calendar month via their track and trace statistics. However, when we went through the actual visitor numbers in that



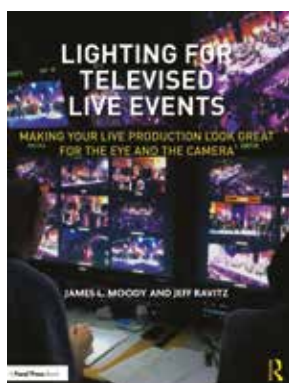
time the number of cases linked back to those venues were actually substantially lower than the actual background rates for infection in Westminster (190 for every 100,000 at time of writing). So hopefully that is a positive point to end on as it appears attending the Theatre doesn't place you at any higher risk than doing any other (normal) activity.

As always I am on [alynagh@westminster.gov.uk](mailto:alynagh@westminster.gov.uk) and happy to chew over any compliance issues or problems if you feel it may be of use.



# Lighting for Televised Live Events

Review by  
Matt Maller



***Lighting for Televised Live Events***  
***Making your live production look great for the eye and the camera***

James L. Moody and Jeff Ravitz

Routledge

ISBN: 9780367256661

Paperback £29.99

Many informational books exist on lighting for live events, as they do on lighting for camera but few attempt to cover the niche of lighting for both a live audience and camera. *Lighting for Televised Live Events* by James L. Moody and Jeff Ravitz focuses on making live entertainment look its best for both for the audience viewing it live and for those viewing on their televisions or smart devices across the world. Professional partners Moody and Ravitz have a wealth of experience of lighting many genres from concerts and theatre to corporate events, music videos and television and not only do they draw on each other's knowledge and experience but have contributions throughout from a range of industry professionals, the most articulate of which are eminent lighting designers and TV lighting directors, from the UK. I, myself have a theatre background and am currently working in television. Lighting designer- historian James Laws and I sat down to discuss 'Lighting for Televised Events' and this short review is a summary of that conversation.

Firstly, I would suggest flicking to the back of the book and reading the conclusion. We found it sets out the aims of the book in a much more concise way than the real introduction and the reader would benefit from slightly more direction upon opening the book on such a rarely covered topic. Lighting for camera is an enormous subject, hard to summarise due to the number of variables in every situation lighting is required; we think this book proves exactly that. The contents show it is very much an introduction to putting your live event on camera. To cover all these subjects in sufficient depth would be a book of vast scale, but what

it does do very well is give an overview of the subjects an aspiring lighting director should be researching.

The first section of chapters, under the heading 'The Science', skirts over vital subjects from exposure and colour temperature to dynamic range; some subjects are covered in more detail than others, but there is enough information to stimulate further reading. If you are after a book that tells you exactly how to light a theatre show for camera, this isn't the one, there isn't enough information to put it into practice.

The book is written in a very approachable informal way, attractive to aspiring lighting practitioners not after a lecture but literature that can be dipped in and out of. On a language note, this book mostly reads well for those outside of America, apart from some measurement conversions and naming conventions, but it is noticeable that some of the science elements come across as rules not to be broken, rather than the science being the backbone of practice that could change according to the constraints, genre, location, etc. of the production. This illustrates the more academic American approach, normally backed up in the book by professors and lecturers. Having said that, the chapters discussing LED screens, displays and projectors displaying media on stage are again brief but very useful, a subject hard to find literature on even more so in relation to a performance both for audience and camera and the related problems of contrast ratios, viewing angles etc. There are a few images throughout attached to paragraphs to demonstrate contrast in lighting design for example, but they do not translate particularly well in print, particularly the Bruce Springsteen illustrations. I sought out the digital version of the book and they do come across moderately better, but it is a shame they are quite so dark in print, particularly when used to illustrate a point on lighting.

We concluded our discussion by agreeing that Moody and Ravitz have started physical research into lighting for both camera and audience, and that this feels like the first version at getting this niche world onto paper. This book is a valuable resource and learning institutions should acquire it for their libraries. Albeit a brief overview with an American bias, it does show the vastness of a cross over world with a great deal of developing technical complexity to think about. It serves a purpose as an introduction illustrating what goes into lighting a live production on camera, a book to read and then research subjects onwards from it, and it serves this purpose very well.

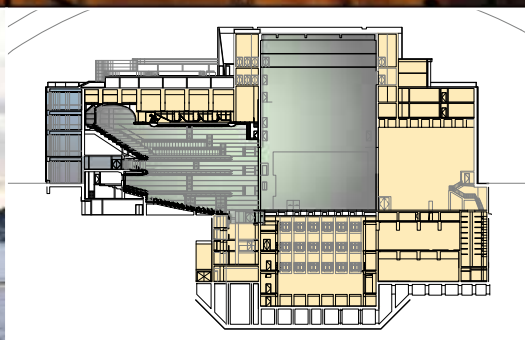


# MODERN THEATRES 1950 – 2020

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# Young Associates

Welcome to the fifteenth edition of the Sightline Young Members Page! In this edition, we talk about stage automation, discuss where you can find job listings and look at how you can apply to become a Young Associate Representative. Be sure to keep an eye on the ABTT website and social media (@TheABTT on Facebook, Twitter and Instagram), as well as on your emails for monthly members' newsletters, for details of opportunities and resources. If you are a young associate or early career member and have a story, opinion or experience you wish to share – we want to hear from you! Submit content to [sightline@abtt.org.uk](mailto:sightline@abtt.org.uk) (FAO: Matthew Freeman).

## What is Stage Automation?

Stage automation is now a common sight on large commercial productions. Elphaba flying in *Wicked*, the revolving stage in *Hamilton* and *Pride Rock* rising out the stage in *The Lion King* are all examples of stage automation. Simply put, stage automation is the use of mechanical and electrical technology, generally alongside computer control, to precisely move scenery, parts of venues or performers. Examples of the types of machines used to create these effects include winches, lifts, revolves, floor tracks, chainhoists, hydraulics and pneumatics, amongst many others. Stage automation is not only used on the West End and large theatre tours - you can also find these systems in use on cruise ships, installed in venues and on arena tours across the world. If you are at college, university or are doing an apprenticeship then it is quite likely you won't have seen much stage automation technology yet. Stage automation is a discipline where many different skillsets can be utilised, these include electrical, mechanical, carpentry, rigging, programming and networking. There are an equally wide range of roles available within the field, these include working as a technician on productions maintaining and operating systems; as a commissioning engineer setting up systems; as a project manager overseeing the supply of systems. Stage automation is a discipline which has grown very quickly over recent years and so there are lots of opportunities available for those wishing to pursue a career in the field. However, with such a large topic, it can be daunting to know where to start and how to learn more. The ABTT Automation Committee (ABTTAC) was founded to encourage discussion about stage automation and to provide a resource for the industry – this includes facilitating networking between experienced industry professionals and those wishing to learn more about stage

automation. ABTTAC is open to anyone with an interest in stage automation. If this has peaked your interest and you would like to learn more, be sure to join ABTTAC. You can join by filling out the form on this page: [www.abttac.org/join](http://www.abttac.org/join)

## Become an ABTT Young Associate Representative

The ABTT is always keen to hear from those wishing to get more involved with the activities of the association. One of the ways young people can do this is to become a Young Associate Representative. In this role you are invited to a variety of different meetings where you will represent the interests of young technical practitioners. It is up to you how you get involved. There are a wide range of projects and a lot of these can be worked on around other commitments. Why is it important that the ABTT has this role? The young membership of the ABTT is the future of technical theatre in the United Kingdom, as such, it is crucially important that the views and opinions of this demographic are acknowledged. The young membership will also eventually govern the ABTT in years to come and so the more young members, the stronger a foundation for the ABTT to continue its vital work in the future. Any young or early career associate can apply to become a Young Associate Representative. You will need to submit a current CV with the names of two referees and a 250-word personal statement explaining why you would like to be a Young Associate Representative. If you would like more information then take a look at [www.abtt.org.uk/get-involved/become-a-young-representative](http://www.abtt.org.uk/get-involved/become-a-young-representative). If you would like to speak to someone about making an application then email [office@abtt.org.uk](mailto:office@abtt.org.uk) and a chat with a current Young Associate Representative can be arranged.

## Industry Jobs on the ABTT Website

Did you know that the ABTT runs a jobs board? It can be found at [www.abtt.org.uk/industry-jobs](http://www.abtt.org.uk/industry-jobs). As the sector reopens there are a lot of organisations recruiting for a wide variety of roles. Employers send these jobs through to be advertised on the ABTT website. If you're looking for a new role then this is a great place to check, be sure to check back regularly as it gets updated as new jobs are submitted. If you are looking for an apprenticeship then these also get listed here. Affiliated organisations and industry supporters of the ABTT can advertise roles for free.





# Technical Standards

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Winter 2021

## UPDATES, AMENDMENTS AND CORRECTIONS

The current edition of *Technical Standards for Places of Entertainment* was published in 2015 and has the year 2015 printed on the top righthand corner of the cover. However, there have been six reprints with revisions to this edition published on 29 April 2016; 1 February 2017; 1 April 2017; 1 September 2018; 1 April 2019 and 1 July 2020. Key revisions captured in the sixth reprint dated 1 July 2020 to

Section B9 Conservation of Energy; to Section F1 Electrical Installations and some to Section F2 Lighting including Emergency Lighting have already been published in this column. Below are further revisions to Section F2 Lighting including Emergency Lighting. There were a number of other revisions in this reprint including more to sections F2 Lighting including Emergency Lighting and M12 Electrical installation and permanent electrical equipment.

New copies of *Technical Standards* may be purchased from the ABTT website or Office.

### REVISIONS & AMENDMENTS 1 JULY 2020: Section F2 (parts thereof)

Section	Part	Reference	Change																												
F2	<b>Lighting for energy efficiency</b>	COMMENTARY	<b>Change</b> “AD L2 Conservation of fuel and power (other than dwellings) also requires...” to “AD L2 Conservation of fuel and power in new buildings other than dwellings and L2B Conservation of fuel and power in existing buildings other than dwellings and Non-Domestic Building Services Compliance Guide also requires...”																												
F2	<b>Lighting for energy efficiency</b>	COMMENTARY	<b>Delete</b> “It is necessary to understand the light output from commercially available light sources before selecting appropriate luminaires. Light spill can prove to be a nuisance or distraction and is wasteful of energy. Table 16 shows the relative energy efficiencies for different commercially available light sources in 2013. Developing technologies mean that the efficiencies of some sources may improve in the near future. Whilst most lamp types generally have a small range of efficiencies, there is some variation and often manufacturers will offer high efficiency and long-life lamps which for a cost premium have significantly improved energy efficiency.”																												
F2	<b>Lighting for energy efficiency</b>	COMMENTARY	<b>Delete the whole of Table 16.</b> <table><tr><th colspan="2"><b>Table 16. Comparison of the system luminous efficacies of different white light sources supplied at 230V ac</b> (Information believed correct at May 2015)</th></tr><tr><th>Lamp source</th><th>Luminous efficacy in Lumens/watt of electrical input</th></tr><tr><td>Incandescent (GLS)</td><td>11 - 18</td></tr><tr><td>Incandescent (halogen)</td><td>15 - 36</td></tr><tr><td>Fluorescent – phosphor</td><td>20 - 55</td></tr><tr><td>Fluorescent – tri-phosphor</td><td>45 - 60</td></tr><tr><td>LEDs – multi-chips</td><td>25 - 50</td></tr><tr><td>LEDs – phosphor</td><td>30 - 65</td></tr><tr><td>Cold cathode - phosphor</td><td>40 - 60</td></tr><tr><td>Fluorescent (compact)</td><td>50 - 60</td></tr><tr><td>Fluorescent (linear)</td><td>70 - 95</td></tr><tr><td>Plasma lamps</td><td>75 - 85</td></tr><tr><td>Induction lamps</td><td>90 - 70</td></tr><tr><td>Metal halide (white)</td><td>90 - 110</td></tr></table>	<b>Table 16. Comparison of the system luminous efficacies of different white light sources supplied at 230V ac</b> (Information believed correct at May 2015)		Lamp source	Luminous efficacy in Lumens/watt of electrical input	Incandescent (GLS)	11 - 18	Incandescent (halogen)	15 - 36	Fluorescent – phosphor	20 - 55	Fluorescent – tri-phosphor	45 - 60	LEDs – multi-chips	25 - 50	LEDs – phosphor	30 - 65	Cold cathode - phosphor	40 - 60	Fluorescent (compact)	50 - 60	Fluorescent (linear)	70 - 95	Plasma lamps	75 - 85	Induction lamps	90 - 70	Metal halide (white)	90 - 110
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F2	<b>Lighting for energy efficiency</b>	COMMENTARY	<b>Change</b> “...quality of their (CRI/CQS) color rendering.” to “...quality of their colour rendering. Higher efficiency variants may have reduced light quality as represented by IES TM-30-18 or colour temperature. Care should be taken to ensure that light quality remains appropriate, particularly when used for audience or performers. With LED lighting there is a balance to be achieved between artistic requirements, energy efficiency and functional requirements: e.g. backstage work lighting, dressing room lighting, practicals or performance lighting. “																												
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F2	<b>Lighting for energy efficiency</b>	COMMENTARY	<b>Change</b> "...or lamps blowing; selecting luminaires with lens, guards or covers usually protects against this risk." <b>to</b> "...or lamps or lenses exploding; selecting luminaires with lens guards or covers usually protects against this risk."																										
F2	<b>Dimming and controls</b>	COMMENTARY	<b>Change</b> "Incandescent lamps can be easily and smoothly dimmed from close to zero output to full brightness, without much noise or time delay, by varying the current input. For this reason, tungsten lamps have been the choice for most forms of performance lighting to date." <b>to</b> "LED luminaires have become the preferred source for many new installations. Incandescent lamps can be easily and smoothly dimmed from close to zero output to full brightness, without much noise or time delay, and are supported by many existing installations with centralised dimming. For this reason, tungsten lamps have been the choice for most forms of performance lighting until recently and incandescent lamp based fixtures in existing lighting stocks will continue to be used but over time this will be in reduced quantities."																										
F2	<b>Dimming and controls</b>	COMMENTARY	<b>Delete the whole of Table 17.</b> <table border="1"><tr><th colspan="2">Table 17. Lamp life for different white sources</th></tr><tr><th>Lamp type</th><th>Lamp life (manufacturers' ratings)</th></tr><tr><td>Incandescent – GLS</td><td>1,000-2,500</td></tr><tr><td>Incandescent – halogen</td><td>400-1,500</td></tr><tr><td>Fluorescent – compact (1)</td><td>8,000-12,000</td></tr><tr><td>Fluorescent – linear (1)</td><td>8,000-20,000</td></tr><tr><td>LED (2)</td><td>10,000-50,000</td></tr><tr><td>Cold cathode</td><td>20,000-50,000+</td></tr><tr><td>Discharge – metal halide</td><td>8,000-15,000</td></tr><tr><td>Discharge – sodium</td><td>20,000-32,000</td></tr><tr><td>Discharge – mercury vapour</td><td>16,000-20,000</td></tr><tr><td>Induction lamps</td><td>60,000+</td></tr><tr><td>Sulphur plasma lamp (3)</td><td>60,000</td></tr></table> <p>(1) The lifetime of fluorescent lamps is sensitive to the number of times the lamps are started</p> <p>(2) The lifetime of LED lamps is very sensitive to how hard they are driven, at low outputs they last much longer. LEDs require sophisticated electronic drivers that may fail well before the LED chip(s)</p> <p>(3) The necessary magnetron lasts approximately 20,000 hours.</p> <p>The information for commercially available lamps as understood at February 2013."</p>	Table 17. Lamp life for different white sources		Lamp type	Lamp life (manufacturers' ratings)	Incandescent – GLS	1,000-2,500	Incandescent – halogen	400-1,500	Fluorescent – compact (1)	8,000-12,000	Fluorescent – linear (1)	8,000-20,000	LED (2)	10,000-50,000	Cold cathode	20,000-50,000+	Discharge – metal halide	8,000-15,000	Discharge – sodium	20,000-32,000	Discharge – mercury vapour	16,000-20,000	Induction lamps	60,000+	Sulphur plasma lamp (3)	60,000
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Incandescent – GLS	1,000-2,500																												
Incandescent – halogen	400-1,500																												
Fluorescent – compact (1)	8,000-12,000																												
Fluorescent – linear (1)	8,000-20,000																												
LED (2)	10,000-50,000																												
Cold cathode	20,000-50,000+																												
Discharge – metal halide	8,000-15,000																												
Discharge – sodium	20,000-32,000																												
Discharge – mercury vapour	16,000-20,000																												
Induction lamps	60,000+																												
Sulphur plasma lamp (3)	60,000																												
F2	<b>Dimming and controls</b>	COMMENTARY	<b>Change</b> "...ballasts, which..." <b>to</b> "...ballasts or drivers, which..."																										
F2	<b>Dimming and controls</b>	COMMENTARY	<b>Delete</b> "Technology has improved a great deal in recent years and research and development continues to improve the bottom end of the dimming curve. It is now possible to dim LEDs, cold cathode tubes and linear fluorescents with very little noise; using both digital control signals (LED, cold cathode and fluorescent) or with leading or trailing edge current dimming (LED)." <b>and add new paragraph to read</b> " Where lighting is used for audience or performers, care should be taken to select luminaires with control gear that is controllable smoothly and without stepping to and from zero output."																										
F2	<b>Dimming and controls</b>	COMMENTARY	<b>Change</b> " <b>Table 18.</b> " <b>to</b> " <b>Table 15</b> "																										
F2	<b>Dimming and controls</b>	COMMENTARY	<b>Change</b> "...dimming equipment and especially thyristor dimmers, can cause..." <b>to</b> "...dimming equipment and luminaires with switched-mode power supplies can cause..."																										
F2	<b>Dimming and controls</b>	COMMENTARY	<b>Change</b> "The emission spectra provide detailed information on the colour properties of different sources of light. Some fluorescent and LED lamps can give a greenish tint (spiky spectra), whilst tungsten lamps give out a warm light and metal halides a cool light, but both reproduce the full colour spectrum well." <b>to</b> "The emission spectra of different sources reveal colours in different ways. LED sources vary greatly with very different spectra based on mix of emitters or phosphor coatings which should be considered during selection for their intended use."																										

## MAKING CONTRIBUTIONS TO TECHNICAL STANDARDS

If you wish to contact the Standing Committee about any matter to do with *Technical Standards*, you may email [standards@abtt.org.uk](mailto:standards@abtt.org.uk) You may wish to suggest an

amendment, clarification, new reference or explanation. The Standing Committee would be interested to consider any recommendation. Please do get in touch.

Previous editions of this *Technical Standards* column may be found on the ABTT website.

## Latest Titles

**West End in Watercolour by John Higgins – A Portrait of London Theatre**  
260pp £28.95 ISBN: 9781904031925

Today London is widely regarded as the theatrical epicentre of the English-speaking world, its 'West End' closely rivalled by New York's Broadway, and provides a rich array of theatres, opera houses, concert halls and cinemas which, alongside the delights of restaurants, cafes, pubs, bars, nightclubs and shops, create a glitteringly exciting playground for the would-be theatregoer.

While John Higgins considers the West End and its fashionable rise from earlier beginnings, he also looks closely at the concurrent vigorous entertainment scene around the East End and neighbouring working-class suburbs, and their subsequent metamorphosis into the prolific operation that has today become the trendy Off-West-End London Fringe.

And so as the typical famous grand 'Up West' houses are paraded in their glittering surroundings of glamour and razzamatazz, their fascinating 'Off-West' counterparts have their own exciting tales to tell ... and John says one thing is for sure: they have all been delicious to paint!

**The National Theatre: A Place for Plays by ABTT 130pp £11.95** ISBN: 9781904031932

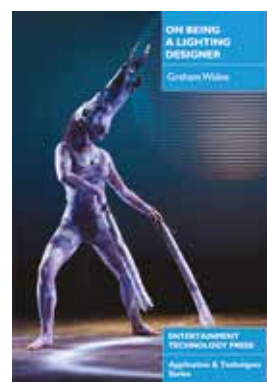
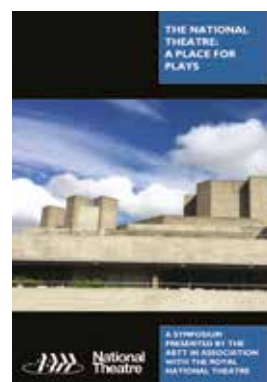
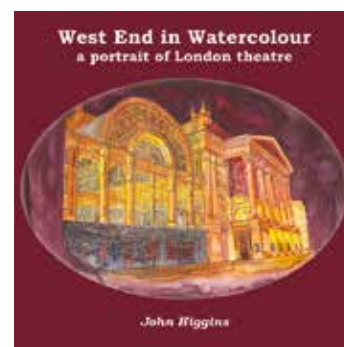
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This book contains a transcription of the discourse, debate and dissent that took place on the day.

**On Being a Lighting Designer by Graham Walne 116pp £12.75** ISBN: 9781904031949

Graham Walne's latest book chronicles the processes which a lighting designer goes through to deliver a design. The book covers engagement, relationships, discipline, skill, knowledge and deliverables, and includes anecdotes from the author's own considerable experience as a lighting designer across three continents.

Available now, along with all of ETP's titles at: [www.etbooks.co.uk](http://www.etbooks.co.uk)



## TECHNICAL STANDARDS FOR PLACES OF ENTERTAINMENT

Revised in July 2020

Available now from [www.etbooks.co.uk](http://www.etbooks.co.uk)

2015

TECHNICAL STANDARDS  
FOR  
PLACES OF  
ENTERTAINMENT

The Association of British Theatre Technicians  
The Chartered Institute of Environmental Health  
The District Surveyors Association  
The Institute of Licensing



# Members News

## MEMBERSHIP RENEWAL FOR 2022:

With the New Year around the corner, it is time to renew your Subscription. We understand the uncertainties facing our industry, so we have made renewing membership with the ABTT as easy and cost-effective as possible.

You are now able to pay for membership via monthly instalments over 10 months or 4 consecutive months with no difference in benefits compared to a one-time payment. By renewing your membership, you will be assisting us in achieving our charitable aims and in continuing to support you during this trying time. Your ABTT membership also qualifies for Gift Aid increasing the value by 25%. We thank all who have made a Gift Aid declaration: if eligible, please do consider doing so.

Existing minimum subscriptions remain unchanged for 2022. *Members & Associates: £80; Early Career (26-30): £50; Young (under 25): £25; Retired: £35; Affiliated Organisations: £250 and Large Affiliated Organisations £500.* Overseas renewals should add £7.50 for postage. As always, should you have any questions do contact the office.

The ABTT continue to work in setting and upholding standards in technical excellence, safety and compliance for live performance and assisting technicians, releasing various Guidance, resources and information alongside developing new tools, most recently the Theatre Green Book in collaboration with the Theatres Trust and Buro Happold.

ABTT membership enhances your ability to develop and maintain your professional networks, at meetings, online events, the ABTT Theatre Show and at conferences. Membership also gives you the opportunity to shape the future of your Industry through participation on the ABTT Committees, and for those with FULL Membership – voting privileges in Board of Trustee elections. The ABTT is committed to producing new and innovative online seminars and webinars. Access to the archive of recordings is a Membership only benefit and there are currently more than 50 hours of online content available.

## ISG MEMBERS:

The ABTT is extremely grateful to the Industry Supporters who have supported them throughout 2021. A full list of these benefactors is to be found on our website and on the first three pages of this edition of *Sightline*. New members may now join for 2022. It is never too late to join this “go to”

list of theatre and live performance expert suppliers, service providers and supporters.

## New Members

We would like to welcome ABTT Associates Mark Ager, Steve Barber, Beatrice Banionyte, Oliver Brown, Adam Burns, Martin Chisnall, David Evans, Donald Hayward, Barry Hudson, Alistair Kleissner, Matthew Noddings, Martin Radmall, and Brian Warrens, who have all been admitted as Full MEMBERS of the ABTT by the Council of Trustee-Directors. Congratulations to them all.

It is heartening that the number of Full MEMBERS and therefore the Electoral College is larger than at any time in the last ten years. To be admitted as a full MEMBER of the Association costs nothing and acknowledges that you have gained relevant experience and demonstrate a manifest commitment to the technical subjects of the art of theatre. All you need do is submit a CV and contact details for two referees.

## In the loop:

Big news items will always be included within *Sightline* or the ABTT Newsletter BUT for the latest news, follow us on social media, Facebook, Instagram, Linked-In and Twitter now. If you are looking for a new role, also remember the ABTT Website lists a huge range of technical and production job opportunities.

## TRAINING SUCCESS:

Congratulations to everyone who has completed their Bronze Award.

**Bronze Award at Mountview, London:** Sam Caffrey, Amauri Crepaldi, Ryan Davidson, Anaya Hammond, Ollie Renouf Donaldson, Nathan Robinson, Jacob Scoble and Sam Quinn.

**Bronze Award at RCSSD, London:** Lewis Blair, Matthew Currie, Phyllis Egharevba, Zoe Lyndon-Smith, Claire Marchant, Malachy Orozco, Lauren Taylor and Emily Williamson.

**Bronze Award at Warwick Arts Centre, Warwick:** Aaron Batley, Arber Binjaku, Lee Bowman, Ellie Cleaver, Naomi Green, Kirk Jackson, Thomas Repton and Adam Rice.

**CPD: Bespoke Knots Training:** Daniel Anderson, Tracey Booth, Kayleigh Cooper, Steve Hall, Ashleigh German, Christopher Haworth, Melissa McCann, Kate Wilcock,

ABTT Training is available throughout the United Kingdom. We are taking expressions of interest for courses for 2022 with our first course in January at Greenwich already fully booked. If you are

interested in courses, including in-venue training, or if you have a venue to offer for future courses, please do get in touch with us at office @abtt.org.uk.

## ABTT TRAINING: Book now!

**Online Course: AutoCAD Online Training for Theatre Technicians:** If you are on the technical drawing side of set or theatre design, this course is for you – it is specifically tailored to the needs of users in a theatrical environment. It consists of six parts and is structured so you can create simple drawings after Part 1. The course provides you with a foundation of skills, allowing you to use either AutoCAD or Vectorworks straight away and build your knowledge as you draw.

## NEW ABTT CO-CHAIRS:

The ABTT Council consists of 11 elected Trustee-Directors, ex officio members and co-opted members. The elected Trustee-Directors are responsible for electing a person or persons to Chair the Council. We are very pleased to announce the election of Co-Chairs Mig Burgess Walsh and David Evans. The current Trustee-Directors: Louise Burchill, Oliver Brown, Alexander Cann, Andy Franks, Peter Maccoby, Caroline Rouse, Nikki Scott, Ben Stephen, Emma Wilson and Anton Woodward. We extend a special welcome to Oliver and Ben who were newly elected this year.

## COLLEGE LICENCE FOR TECHNICAL STANDARDS AVAILABLE

The ABTT College Licence of Technical Standards provides universities and colleges with access to Technical Standards for Places of Entertainment for up to 20 students for 12 months.

Further Licences for blocks of up to 20 students may be purchased as required. Check the ABTT Online shop or email office@abtt.org.uk for more information.

## ABTT EVENTS:

**ABTT Christmas Party:** We are pleased to report that the Christmas Party, jointly hosted with ETC and supported by Prevue and LW Theatres took place at the Gillian Lynne Theatre, Drury Lane London on Friday 3rd December.

**ABTT Theatre Show:** The ABTT Theatre Show is planned to return to Alexandra Palace on the 22nd and 23rd June 2022. Please contact the ABTT Office for information about exhibiting or holding an event at this essential industry event.



# Safety Matters

**Association of British Theatre Technicians**  
55 Farringdon Road, London EC1M 3JB

**Tel: 020 7242 9200**

**Email: [office@abtt.org.uk](mailto:office@abtt.org.uk)**

**Winter 2021**

The UK was the first country in the world to pass legislation aimed at protecting people whilst at work.

In 1802 the first type of health and safety act passed by a British parliament sought to protect the welfare of apprentices working in the textiles industries. This act, 'The Factory Health and Morals Act', was applied principally to the apprentices in cotton and woollen mills. In brief it served to ensure that male and female apprentices had separate sleeping accommodation and they received two complete suits of clothing, instruction on reading, writing and arithmetic, a working day of not more than twelve hours and instruction in Christian religion on Sundays.

In 1833 the Government passed the first Factory Act, along with the appointment of four government-appointed 'factory inspectors' – direct forerunners of today's Health and Safety Executive (HSE) to enforce the act.

The first non-industrial legislation came some years later in 1886 with the Shop Hours Regulations Act. The Factories Act continued to be revised at regular intervals right up until the most recent in 1961.

In 1992 legislative revision by the then Labour government led to a royal commission headed by Lord Robens, the retired chairman of the National Coal Board, to conduct a thorough investigation into safety in British Industry. The Robens Committee's recommendations was that the Health and Safety at Work etc. Act 1974 (HASWA) should be introduced. This is the principal UK health and safety legislation and it has hardly changed since inception.

Breaching a statutory duty can lead to prosecution under health and safety legislation with many cases being heard in the magistrate's court where maximum fines of £20,000 could be imposed. However, the sentencing guidelines of February 2016 has risen the penalties for health and safety offences up to a massive £10m and for £20m for corporate manslaughter.

Any charge in a criminal prosecution must be proven beyond reasonable doubt while breaching an employer's 'civil duty of care' can rise to a damage claim and must be proved on the balance of probability in so far that 'duty' was breached and any injuries were reasonably foreseeable consequences of that breach.

As we approach this fiftieth year of the Robens Committee's work, let's remember the duty to risk assess. Steps taken based on that assessment could determine the duties owed by the employer. Kevin Bridges from law firm Pinsent Masons, writing in IOSH's magazine comments; 'clear evidence that an employer did not conduct appropriate risk assessments or ignored warning signs, which form part of a criminal conviction, will assist in demonstrating the required negligence in a civil claim'.

## FALLS FROM HEIGHT?

A manufacturer of electronic components has been fined after an employee suffered serious injuries when he fell from height. Chelmsford Magistrates' Court heard how an employee was cutting wooden boards for a mezzanine floor at the company's building, when he slipped between

the joists and fell four metres onto the concrete below. He fractured his cheek bone and both wrists, permanently restricting their movement.

An investigation by the Health and Safety Executive (HSE) into the incident found that the company failed to properly plan the work, failed to ensure there was safe access to the area and that measures were taken to prevent and/or mitigate a fall from height.

The company pleaded guilty to breaching Regulation 6(3) of Work at Height Regulations 2005 and have been fined £34,000 and ordered to pay costs of £4,657. The court found the culpability to be high and determined a harm category of 2 based upon a medium likelihood of harm and seriousness of harm risked being level A (these conditions being computed from the 2016 sentencing guidelines).

Speaking after the hearing an HSE Inspector commented: "This incident was easily preventable and the risks could have been clearly identified and appropriately addressed by following the work at height hierarchy. HSE will not hesitate to prosecute companies that fail to implement safe systems of work."

In another incident a company was fined after a worker became paralysed after falling 11 metres down a stairwell at a football stadium when the concrete floor that he was working on collapsed.

Peterborough Magistrates' Court heard that workers were constructing a new hospitality and seating stand at the stadium. The concrete floor and associated formwork collapsed, causing a number of workers to fall. Most of the workers were able to cling to the structure to escape serious injury. However, one worker fell approximately 11 metres down the mouth of a stairwell to the basement below sustaining multiple injuries including spinal damage, which caused permanent paralysis from the waist down.

An investigation by Health & Safety Executive (HSE) found that the company's temporary works management system was lacking. The contractor should have had a suitable design for the temporary works, which are part of a construction project needed to enable the permanent structure to be built, taking proper account of the vertical load and the need for horizontal stability. There should also have been a robust system to check the temporary works were properly installed and thoroughly assessed before starting to load it with the wet concrete to form the floor slab.

The company pleaded guilty to breaching Regulations 19 (1), 19(2) and 19(3) of the Construction (Design and Management) Regulations 2015. The company was fined £40,000 and ordered to pay costs of £14,505.

ABTT members should remember that some theatre productions are considered to be under 'temporary' construction while being built under Construction Design Management Regulations.

## TWO SERIOUS INJURIES DURING LIFTING OPERATIONS

A luxury motor yacht manufacturer has been fined after a worker suffered serious crush injuries to his right hand

during a lifting operation. Leicester Magistrates' Court heard how an employee suffered serious crush injuries to his right hand during the lifting of a storage cage at the yachts manufacturing facility. As there was no goods lift in the manufacturing unit, an overhead crane was used. As the cage was lifted it began to tip and fall in the direction of the employee. The cage trapped his hand against a boat trolley causing serious crush injuries to the employee's dominant right hand.

An investigation by the Health and Safety Executive (HSE) into the incident found that the lifting operation was not properly planned by a competent person, appropriately supervised or carried out in a safe manner.

The yachting company pleaded guilty to breaching Section 2(1) of the Health and Safety at Work etc. Act 1974. The company was fined £230,000 and ordered to pay costs of £7,410. Speaking after the hearing, HSE inspector commented "When undertaking lifting operations involving lifting equipment companies should ensure that they are always properly planned by a competent person, appropriately supervised and carried out in a safe manner.

## And

A car manufacturing company has been fined after an employee became trapped and suffered crush injuries whilst unloading a chassis from a delivery vehicle. Kidderminster Magistrates' Court heard that the employee became trapped between the trolley holding the chassis and a parked vehicle when the delivery vehicle moved.

An investigation by the Health and Safety Executive (HSE) into the incident found that the company did not have a safe system of work for unloading chassis. The risks should have been controlled by offloading the chassis using a forklift truck or implementing a formalised system of work to safely unload them by hand.

The manufacturing company pleaded guilty to breaching Section 2 (1) of the Health and Safety at Work etc. Act 1974. The company has been fined £60,000.

Speaking after the hearing, HSE said: "A safe system of work should have been in place and this shows that even large, well-established companies can get things wrong".

## FIRE APPRAISAL

Your correspondent writes this after a visit to a restaurant with candles burning on each table...when a paper serviette engulfed an adjacent table in flames!

For a fire to start, three things are needed, namely a source of ignition, fuel and oxygen.

Typical sources of ignition include: heating appliances and equipment; plant and equipment involving the use or production of heat; flames or sparks from a work process (such as welding, cutting or grinding); sources of frictional heat; electrical faults; cooking appliances; and in this case...a candle.

Typical sources of fuel include: solvent-based products; paints and thinners; foamed plastics; large quantities of paper; chemicals which themselves are flammable or which may react with other materials to cause a fire; petroleum-based products; quantities of flammable fabrics or clothing; and in this case, a well-used (greased) paper serviette.

The main source of oxygen for a fire is in the air around us. In many theatre buildings there will be a combination of systems, which will be capable of introducing/extracting air to and from the building.

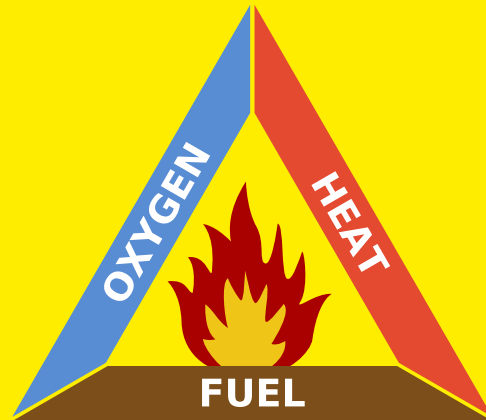
Hazards can also arise through other sources, such as: the inappropriate storage, handling and use of flammable materials; failure to use permit procedures for hot work; poor maintenance and repair work.

Emergency Procedures: each theatre will have an emergency plan, which all employees and visitors must be made aware of. The plan should include:

- What to do on discovering a fire;
- What to do on hearing the fire alarm;
- How to summon the fire brigade.

You should ensure that you are familiar with these three elements at your theatre – they are normally combined into a "Fire Action Notice" which should be prominently displayed.

In this case there was no fire blanket! I now have a scorched jacket after dousing the flames!





New From ETP

# THE SOUND OF THEATRE



## From the Ancient Greeks to the Digital Age

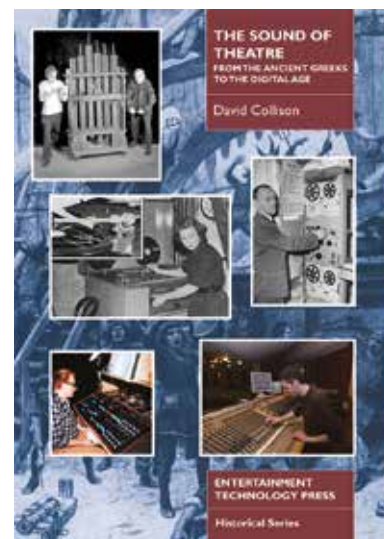
by **David Collison**

402pp £24.95 ISBN: 9781904031956

David Collison traces the history of theatre sound from Ancient Greece to the 20th century. Medieval sound effects are described, along with sound in Shakespeare's plays, and mechanical effects in the 18th and 19th centuries, including wind machines, thunder runs and battle effects. The sound for the famous 1925 play "The Ghost Train" is also explained.

A chronology of key inventions follows developments from cylinder and disc recording, tape machines and cassette recorders, through to audio systems in the digital age. Sound design for Broadway and West End musicals is extensively covered with anecdotes and personal recollections from many of the pioneers, including the author's 30 years as a leading sound designer.

Available from [www.etbooks.co.uk](http://www.etbooks.co.uk) and [www.amazon.co.uk](http://www.amazon.co.uk)



A SYMPOSIUM PRESENTED BY THE ABTT IN ASSOCIATION  
WITH THE ROYAL NATIONAL THEATRE

## THE NATIONAL THEATRE: A PLACE FOR PLAYS

AVAILABLE NOW

ORDINARILY: £11.95

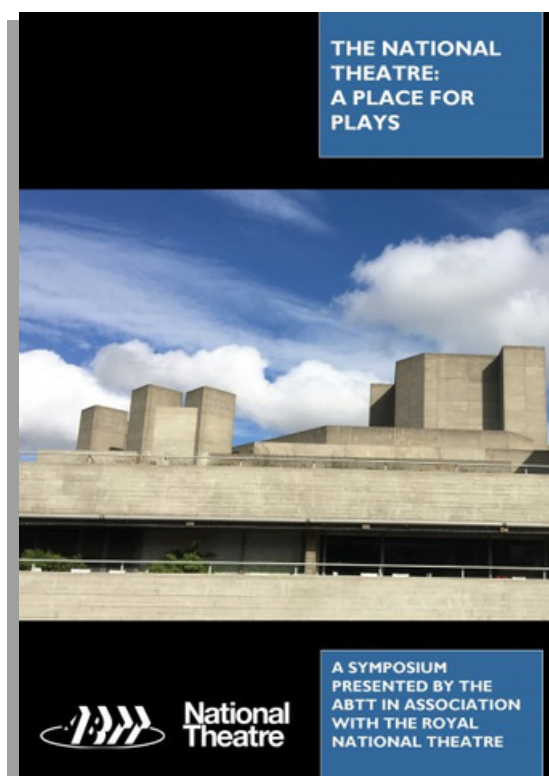
ABTT MEMBERSHIP PRICE: £8.95

[www.abtt.org.uk](http://www.abtt.org.uk)

### About the Book:

Paule Constable and Richard Pilbrow hosted a one-day Symposium on 30th October 2016 to celebrate the 40th Anniversary of the opening by Her Majesty the Queen of the National Theatre designed by Sir Denys Lasdun. The National Theatre: A Place for Plays, presented by the Association of British Theatre Technicians in association with the National Theatre, was about Theatre and Architecture: a discussion, a confrontation, a misunderstanding or a collaboration?

This book contains a transcription of the discourse, debate and dissent that took place on the day.





## COLLECTIVE STRENGTH

### Organisations Affiliated to the ABTT

*Are you listed?*

Any non-profit organisation is qualified to be affiliated to the Association of British Theatre Technicians. Please contact the Office to enquire about benefits and affiliation:  
020 7242 9200 or [office@abtt.org.uk](mailto:office@abtt.org.uk)



[www.abtt.org.uk](http://www.abtt.org.uk)

Large Affiliate



ORGANISATION	LOCATION
Abbey Theatre Trust Ltd	St Albans
Aberystwyth Arts Centre	Aberystwyth
Alhambra Theatre	Bradford
Alleyns School	London
Arts Educational Schools	London
Arts University Bournemouth	Poole
Attenborough Arts Centre	Leicester
Barbican Centre	London
Barn Theatre Trust Ltd	Welwyn Garden City
Bath Spa University	Bath
Battersea Arts Centre	London
Bedales Olivier Theatre	Petersfield
Belgrade Theatre	Coventry
Bibliothèque Nationale de France	France
Birmingham Hippodrome	Birmingham
Birmingham Repertory Theatre	Birmingham
Birmingham Royal Ballet	Birmingham
Blackpool Grand Theatre	Blackpool
Blackwood Miners Institute	Blackwood
Bloomsbury Theatre and Studio	London
Bristol Old Vic Theatre	Bristol
Bristol Old Vic Theatre School	Bristol
Bryanston School	Blandford
Buxton Opera House	Buxton
Byre Theatre	St Andrews
Cambridge Arts Theatre	Cambridge
Cambridge Junction	Cambridge
CAST	Doncaster
Central and Brook Theatres	Chatham
Central Saint Martins UAL	London
Century Theatre	Markfield
Chapter	Cardiff
Cheshire College (South & West)	Ellesmere Port
Chichester College	Chichester
Chichester Festival Theatre	Chichester
Citizens Theatre	Glasgow
City College Norwich	Norwich
Civic Centre Craigavon	Craigavon, N Ireland
Civic Theatre Chelmsford	Chelmsford
Clwyd Theatr Cymru	N Wales
Concordia Theatre	Hinckley
Connaught Theatre	Worthing
Contact Theatre	Manchester
Cork Opera House	Cork, Ireland
Corn Exchange Newbury	Newbury

Coventry City of Culture Trust	Coventry
Cranleigh School	Cranleigh
Curve Theatre	Leicester
Darlington Hippodrome	Darlington
De Montfort Hall	Leicester
Derby Theatre	Derby
East 15 Acting School	Loughton
Eden Court Theatre	Inverness
English National Ballet	London
Entertainment Technology New Zealand (ETNZ)	Wellington, New Zealand
Epsom Playhouse	Epsom
Equity	London
Everyman Theatre -Cheltenham	Cheltenham
Fife College	Kircaldy, Scotland
Giggleswick School	Settle
Glyndebourne Productions Limited	Lewes
Goldsmiths, University of London	London
Grand Opera House	Belfast, N Ireland
Greenwood Theatre	London
Grove Theatre	Dunstable
Guildford School of Acting	Guildford
Guildhall School of Music & Drama	London
Harlow Playhouse	Essex
Harrogate Convention Centre	Harrogate
Harrogate Theatre	Harrogate
Huddersfield University	Huddersfield
Hull College	Hull
Hull New Theatre	Hull
Hull Truck Theatre	Hull
Island Arts Centre	Lisburn
Kenneth More Theatre	Ilford
Kiln Theatre	Kilburn
Kings College School	London
Kings Lynn Corn Exchange	Kings Lynn
Korea Testing Laboratory	Seoul, South Korea
Lakeside Arts Centre	Nottingham
Lakeside Theatre	Colchester
LAMDA	London
Leeds Playhouse	Leeds
Leisure and Cultural Service Dept	Tsim Sha Tsui, Hong Kong
Lighthouse Theatre	Kettering
Lighthouse, Poole's Centre for the Arts	Poole
Lincoln Performing Arts Centre	Lincoln
Little Angel Theatre Company	London
Live Theatre	Newcastle Upon Tyne
Liverpool Everyman & Playhouse	Liverpool
Liverpool Institute for Performing Arts	Liverpool
Loughborough Town Hall	Loughborough
LSO Production Ltd	London
Lyric Theatre	Belfast
Lyric Theatre Hammersmith	London
Malvern Theatres Trust Ltd	Malvern
Manchester Grammar School	Manchester
Manchester Metropolitan University	Crewe
Marina Theatre	Lowestoft
Market Harborough Drama Society	Market Harborough
Mercury Theatre	Colchester
Millfield Arts Centre	London
Mountview Academy of Theatre Arts	London
National Dance Company Wales	Cardiff
National Theatre of Scotland	Glasgow
National Theatre Wales	Cardiff
New Victoria Theatre	Newcastle Under Lyme
New Wolsey Theatre	Ipswich
North East Scotland College	Aberdeen
Northbrook Metropolitan College	Worthing

Northern Ballet Ltd	Leeds
Northern Stage	Newcastle Upon Tyne
Northumberland Theatre Company	Amble, Northumberland
Northumbria University	Newcastle Upon Tyne
Nottingham Playhouse	Nottingham
Nottingham Trent University	Nottingham
Octagon Theatre - Bolton	Bolton
Old Vic Theatre Company	London
Oldham Coliseum Theatre	Oldham
Oldham College	Oldham
Opera North	Leeds
Palace Theatre Mansfield	Mansfield
Palace Theatre Watford	Watford
Perth College UHI	Scotland
Perth Concert Hall & Perth Theatre	Scotland
Petersfield Town Council	Petersfield
Pontio	Bangor
Queen Mary University of London	London
Queen's Theatre	Barnstable
Queen's Theatre Hornchurch	Hornchurch
Queensland University of Technology	Kelvin Gore, Australia
RADA	London
Rambert School	Twickenham
Redbridge Drama Centre	London
Regents College	London
Riverside Studios	London
Roedean School	Brighton
Roehampton University	London
Rose Bruford College	Sidcup
Rotherham College	Rotherham
Royal Albert Hall	London
Royal & Derngate Theatres	Northampton
Royal Birmingham Conservatoire	Birmingham
Royal Conservatoire of Scotland	Glasgow
Royal Holloway University of London	Egham
Royal Lyceum Theatre	Edinburgh
Royal National Theatre	London
Royal Northern College of Music	Manchester
Royal Opera House	London
Royal Shakespeare Company	Stratford Upon Avon
Rugby Theatre	Rugby
RWCMD	Cardiff
Saffron Hall Trust	Saffron Walden, UK
Sage Gateshead	Gateshead
Salisbury Playhouse	Salisbury
Scottish Opera	Glasgow
Sharjah Performing Arts Academy	Sharjah
Sheffield Theatres	Sheffield
Sheringham Little Theatre	Sheringham
Sherman Theatre	Cardiff
Southport Dramatic Club	Southport
Snape Maltings	Saxmundham
Soho Theatre	London
Stafford Gatehouse Theatre	Stafford
Stephen Joseph Theatre	Scarborough
St Mary's University	Twickenham
Stockton Riverside College	Stockton-On-Tees
The Abbey Theatre	Dublin, Ireland
The Albany	London
The Albany Theatre	Coventry
The Almeida Theatre	London
The Anvil Arts	Basingstoke
The Backstage Centre	Purfleet
The BRIT School for Performing Arts & Technology	Croydon
The Cockpit	London
The Corn Hall	Diss

The Courtyard	Hereford
The Electric Theatre	Guildford
The Elgiva Theatre	Chesham
The English Stage Co Ltd	London
The Exchange	Sturminster Newton
The Forum	Barrow-in-Furness
The Green A Team	Petersfield
The Hexagon	Reading
The Kings School	Worcester
The Kings Theatre	Southsea
The Leys School	Cambridge
The Lowry	Salford
The MAC	Belfast
The Market Place Theatre and Arts Centre	Armagh, N Ireland
The Marlowe	Canterbury
The Northern School of Art	Hartlepool
The Nutshell	Winchester
The Performance Centre	Penryn
The Perse School	Cambridge
The Point Theatre	Eastleigh
The Riverfront	Newport
The Roundhouse	London
The Royal Central School of Speech & Drama	London
The Royal Exchange Theatre	Manchester
The Ryan Theatre	Harrow
The South Bank Centre	London
The Stahl Theatre	Peterborough
The Town Hall	Hamilton
The Winter Gardens	Margate
The Woodville	Gravesend
The Yard Theatre Limited	London
Theatr Genedlaethol Cymru	Carmarthen
Theatr Hafren	Newtown
Theatre by the Lake	Keswick
Theatre Peckham	London
Theatre Royal and Royal Concert Hall	Nottingham
Theatre Royal Bath	Bath
Theatre Royal Dumfries	Dumfries
Theatre Royal Norwich	Norwich
Theatre Royal Stratford East	London
Theatre Royal Wakefield	Wakefield
Theatre Severn	Shrewsbury
Trinity Laban Conservatoire of Music and Dance	London
Trinity Theatre	Tunbridge Wells
Unicorn Theatre/Caryl Jenner Productions Ltd	London
University of Central Lancashire	Preston
University of Derby	Derby
University of Hertfordshire	Hatfield
University of Hull	Hull
University of Wales, Trinity St David	Carmarthen
Venue Cymru	Llandudno
Vivacity Key Theatre	Peterborough
Wales Millennium Centre	Cardiff
Warwick Arts Centre	Coventry
Wellington College	Crowthorne
Welsh National Opera	Cardiff
West Kowloon Cultural District Authority	Kowloon, Hong Kong
Whitchurch Civic Centre	Whitchurch
Wokingham Theatre	Wokingham
Woolwich Works	London
Wycombe Arts Management	High Wycombe
York St John University	York
York Theatre Royal	York
Young Vic Theatre	London
Zuni Icosahedron	Happy Valley, Hong Kong



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