

# Radio days

David Edelstein, Triple E, UK

**Creating variable acoustics for a historic broadcasting venue required careful engineering. The painstaking renovation includes motorised banners to ensure perfect reverberation times whatever the performance**



**V**ariable acoustics are now a key part of modern performance space design, with the acoustic solution having great bearing on the architectural design. Opera, symphony and chamber music, plus amplified sound, all require very different environments, yet today many venues are expected to be multipurpose. In order to provide the different acoustic qualities needed by each type of performance, variable acoustics, in the form of banners, curtains or panels, are being utilised more and more.

Designed to enhance the listening experience of an audience in large venues such as concert halls, acoustic banners are raised and lowered vertically to affect the reflection of the sound waves. A key element is the air gap between the layers of fabric. Also available are acoustic panels, which are made of a hard, sound-reflecting surface – usually wood – and which move horizontally or vertically. There are also acoustic curtains, which travel horizontally on tracks in a similar way to curtains used on stage, except that they stack into non-acoustic storage pockets.

Banners, panels and curtains are mostly used in auditoria or rehearsal spaces and which to use is an acoustic decision, depending on what needs to be achieved and taking into consideration concerns such as the shape of the room, style of the building and the aesthetics of the interior design. For example, if the wall has a soft (that is, absorbent) surface, then variable acoustics will be achieved by raising and lowering a hard panel. The choice between curtains and banners can be a practical or aesthetic decision. Unlike a panel, a curtain or banner can be easily stacked and stored away into a relatively small space. A curtain can be tracked off into a wall pocket, while it is likely that a banner will not be entirely concealed.

All these considerations are particularly important when the building concerned is historically significant, which was the case with the famous former National Institute for Radio Broadcasting on Place Flagey in Brussels, Belgium. Three years after a partial preservation order was made in 1994, a working group of key figures from the private sector and the Belgian arts world set to work to

With greater amplification entering the concert stage, the room would have to serve both acoustic and amplified sound

save the Art Deco building. Looking to preserve the building's listed classification and its history, as well as its recognised cultural and acoustic assets, in 1998 a new company, Maison de la Radio Flagey, took ownership of the unique piece of Belgium's architectural heritage and rallied 30 major firms to renovate the endangered landmark.

## Broadcasting explosion

The National Institute for Radio Broadcasting was established in 1930, and in 1938 Maison





[Previous page top] A beautiful Art Deco building, the renovated Radio Broadcasting building in Brussels is now simply known as Flagey

[Previous page bottom] Studio 4 at Flagey has gained international recognition and attracted prestigious musicians

[Left] Eighteen adjustable acoustic banners were created to enable the City of Birmingham Symphony Orchestra's rehearsal room to 'tune' the available space

de la Radio was built in response to the tremendous explosion in radio broadcasting being experienced in Belgium. One of Europe's first radio homes, the beautiful building was designed to comply with stringent technical and acoustic constraints to create a venue for broadcasting that could also welcome and accommodate members of the general public.

The intrinsic qualities of the studios, in particular Studio 4, gained immediate international recognition, attracting the most prestigious musicians of the 20th century for concerts, festivals and recordings. In the 1950s, with the rapid development of television, the building became a centre for audio-visual excellence and the years following 1974, when the original proprietors left, saw the building become home to a number of cultural institutions before its closure in 1995.

The renovation project has resulted in the building being used for various purposes: cultural activities, incorporating exceptional facilities for performers, technicians and the public, as well as office space spread over five floors and shops on the ground floor. Having been built specifically for radio broadcasting, the use of the various spaces had to be completely re-thought in order to allow the development of a cultural infrastructure, while also working around the limitations imposed by the listed classification.

Combining old and new – high-tech with

respect for the past – the newly renovated building, now known simply as Flagey, opened to the public at the beginning of October 2002. The ambition behind the opening was to create a unique audiovisual centre, a sound and picture factory that is alive day and night. The new venue not only provides a forum for the exploration of various styles of music, but also aims to promote an ongoing dialogue between sound, images and other art forms, including film, literature, fine arts, design and architecture.

The cultural space, in the centre of the building, comprises five newly renovated studios located between the basement and the sixth floor, each one soundproofed to enable them to be used simultaneously. With multi-functionality at the forefront, all features have been designed for speed and flexibility, the majority of equipment being removable.

### Programming flexibility

The viability of the renovation project itself depended to a certain extent on the provision of variable acoustic facilities in Studio 4. The refurbishment took place based on the principles of reversibility, enabling the studio to meet the numerous requirements of producers and performers alike. Scenographer and designer Jim Clayburgh explains: "Flagey is renowned for its acoustics. However, with greater amplification entering the concert

stage, it became clear that the room would have to serve both acoustic and amplified sound. To allow for greater programming flexibility, the reverberation tuning offered by acoustic banners was the ideal solution." Engineering specialists in track, control and acoustic solutions, Triple E, was recommended to Clayburgh by acoustic consultants Artec.

Acoustic banners are designed for large venues to enhance the listening experience of an audience and are raised and lowered to affect the reflection of the sound waves. First manufactured by Triple E in 1998 for the City of Birmingham Symphony Orchestra, UK, acoustic banners can be moved individually or together.

To enable the acoustics of Studio 4 to be modulated for different uses, Triple E supplied 10 acoustic banners, complete with motorised control, to fit into existing recesses, or alcoves, along the hall walls. The reverberation time of the hall can thus be varied between 1.7 and 2.3 seconds; additional curtains can also be suspended at the rear of the stage, should the reverberation time need more variation. Working within the limitations imposed by the building's listed status, the banners are mounted in the attic space above the concert room and pass through slots in the ceiling to descend within existing alcoves in the walls.

The banners themselves, which were dyed specially to complement the colour scheme of

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the auditorium, are constructed of two layers of flame-retardant wool serge separated by an 80mm air gap. The alcoves are just 160mm deep and the banners, which have a total travel distance of approximately 11m, hang close to and parallel with the back wall. With such little room for error, Triple E installed two small wheels on the wall side of each banner to

prevent them rubbing as they travel. "We also had to ensure that the banners did not protrude beyond the recess," explains Triple E's managing director David Edelstein. "But the main difficulty with this particular installation was that the base of each banner had to slot into existing timber mouldings at the bottom of the travel. The sides of the banners also needed to appear vertical and parallel with the existing lines of the recess walls, which themselves are not exactly straight, with a worst-case difference of 13mm."

The banners are raised and lowered concertina fashion. Horizontal aluminium slats are enclosed in each banner at 16cm intervals and a flat stainless-steel band, which is fixed to the base of each banner, passes through the aluminium slats and is pile wound on to drums in the attic space. The drums are mounted on shafts powered by braked Lenze motors with in-built inverters and Stegmann limit switches driven at motor speed. Triple E also produced the control system for the banners with controls at stage level that enable the banners to be operated either individually or in groups. A central control cabinet, housing the control equipment, programmable logic controllers and switchgear, is located in the attic. Wall-mounted isolators next to each motor and an additional control pendant in the attic allow for ease of maintenance.

### Ready for anything

Having been scrupulously restored to meet current needs, the 900-seat Studio 4 will

essentially now be used for concerts, projections, recording, rehearsals and conferences – a true concert hall for chamber and symphonic orchestras. For amplified performances or film projections, the sound equipment has been specifically designed using line arrays and surround speakers. What's more, rendering the studio truly multi-functional is a

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stage that can vary in size from 100m<sup>2</sup> to 350m<sup>2</sup> according to requirements.

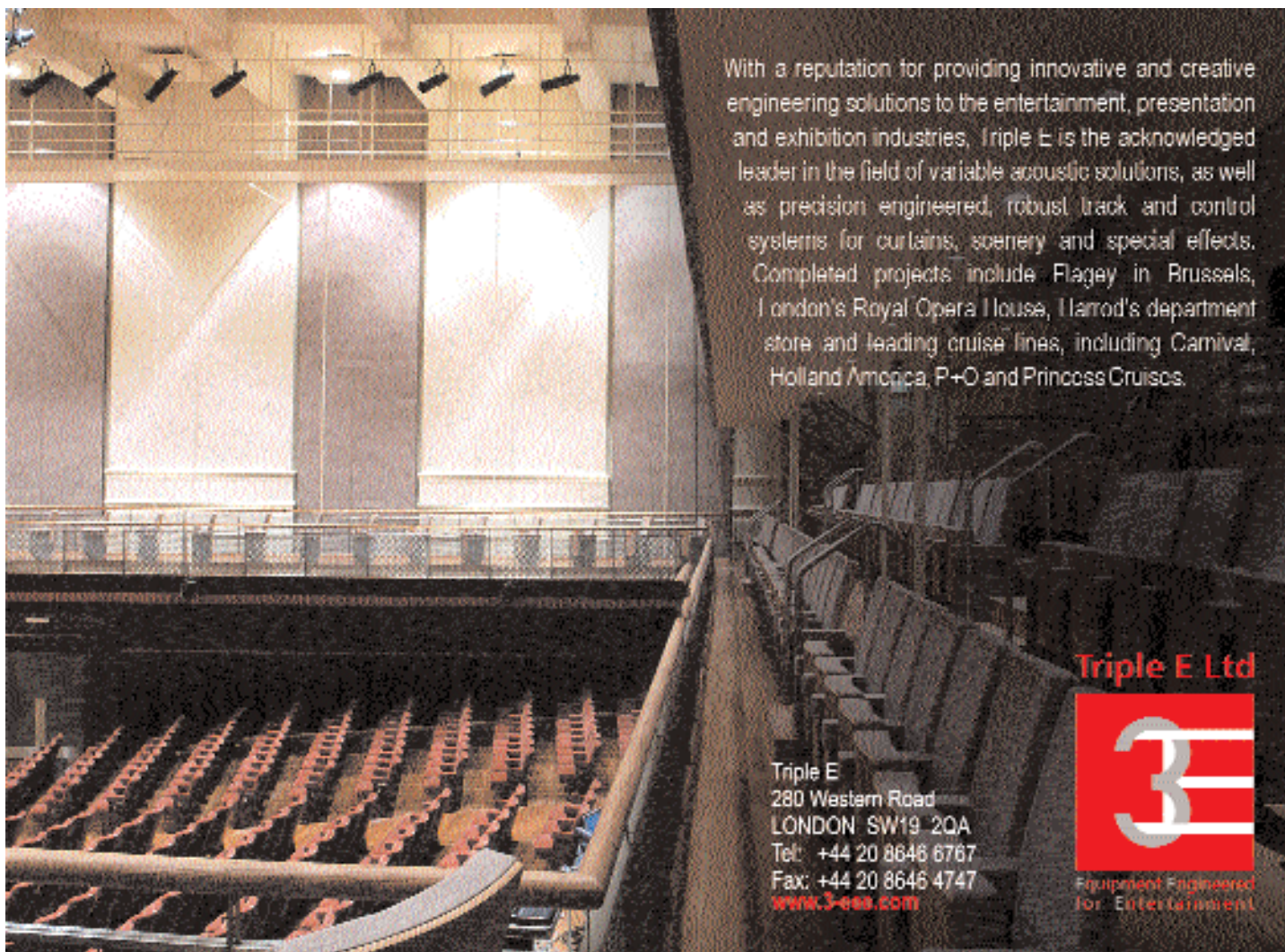
Along with new audio and lighting installations, plus fixed equipment for projection, Studio 1, which seats 240 people,

also has adjustable acoustics thanks to 46 motorised acoustic columns. Having been totally renovated, the original hexagonal columns rotate between three reflective or three absorbent sides, which make the reverberation time variable between 1.1 and 1.9 seconds. Studios 2 and 3 have been designed specifically for educational workshops, meetings and small rehearsals, as well as audio/visual installations and Studio 5 has been transformed into a permanent film and video studio, which can also be used for conferences as necessary.

Breaking down the barriers between artists and the public, Flagey is intended to reduce the distance that has traditionally stood between stage and auditorium. The different production stages preceding a performance, be it music or film, or even the release of a CD/DVD, have been made accessible to the public by opening up rehearsals, presenting concerts with commentaries and making processes such as behind-the-scenes support visible.

The support and creativity of the solution offered to Flagey by Triple E is typical of this company, which has established a reputation for providing an unrivalled engineering service to the entertainment, presentation and exhibition industries. Offering products with reliability, versatility and strength, Triple E is focused on offering a solutions service, working alongside the likes of architects and specifiers to develop simple engineering solutions in complex situations. ●

*David Edelstein is managing director of Triple E*



With a reputation for providing innovative and creative engineering solutions to the entertainment, presentation and exhibition industries, Triple E is the acknowledged leader in the field of variable acoustic solutions, as well as precision engineered, robust track and control systems for curtains, scenery and special effects. Completed projects include Flagey in Brussels, London's Royal Opera House, Harrod's department store and leading cruise lines, including Carnival, Holland America, P+O and Princess Cruises.

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