

Press release

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The Sage Gateshead 16 December 2004

Foster and Partners 70 million performing arts centre, The Sage Gateshead opened officially to the public on 17 December 2004. With its dramatic shell-like form, the glistening stainless steel clad building perches high above the River Tyne enjoying spectacular views towards Newcastle. It fulfils three demanding criteria: to create an international centre for musical performance and education, with acoustically excellent auditoria and unparalleled teaching facilities; a major public building that is fully inclusive and accessible for all; and a centrepiece for the regenerated Gateshead Quays area.

Appointed in 1997 after an international selection process, Foster and Partners lead a team of consultants including Arup Acoustics, Buro Happold, Davis Langdon, Mott MacDonald and Theatre Projects Consultants.

A single, flowing roof unifies three separate auditoria, back of house facilities, a Music Education Centre, entertainment rooms, offices for The Sage Gateshead and a public concourse. The roof soars above the concert halls, its shape inspired - in part - by the iconic arches of the Tyne Bridge. Under this dramatic form, the independent volumes of the three halls, each with its own particular shape, can be easily distinguished. Accessibility for all has been key to our design approach. For example the performance spaces of all three auditoria and the loading dock are on the same level allowing ease of access for people with mobility impairments and ensuring a high level of operational flexibility.

The covered concourse -with magnificent views across to the vibrant Newcastle quayside and cityscape beyond - is the public focus of the building. This is a major new internal public space, an urban room open sixteen hours a day with cafes, bars, shops, box office, Music Information Centre and most importantly, informal performance spaces. An atmosphere of informality is encouraged by the reduction of back-of-house hospitality so that performers can mix with their audiences, students and children alike. The concourse is also part of a major pedestrian route linking the low-level Swing Bridge to the West with the new Millennium Bridge to the East, the principal pedestrian routes between Gateshead and Newcastle.

This route is further strengthened by the principal artistic commission on the project - Kate Maestris colourful ribbon of glass that runs from the outside, through into the building and across the concourse, to reappear once again on the other side.

Four grand staircases rise from the concourse leading to the foyers, which wrap around the auditoria, the Northern Rock Foundation Hall and the entertainment rooms above.

An equally grand staircase descends to the Music Education Centre, nestled below the public concourse, taking advantage of the steeply inclined site. The Music Education Centre, a resource for

For further information
please contact Katy Harris at
Foster + Partners,
T +44 (0)20 7738 0455
F +44 (0)20 7738 1107
E press@fosterandpartners.com

the entire north-east region, has 26 music practice rooms and workshops arranged along a snaking mall with views across the river and up to the concourse above.

From the outside the shape of the roof, with its rippling wave-like form, whose cross-section can be likened to a sea-shell, alludes to the three different auditoria it houses. Its faceted, stainless steel panels reflect light in a multiplicity of ways to create an ever-changing, kinetic display.

Structure

The roof, engineered by Buro Happold, is an entirely independent structure supported by four structural steel arches spanning 80 metres from north to south with a secondary structure of single radii steel members. The 720 ton steel grid-shell is covered with 3000 linen finish stainless steel and 280 glass cladding panels. As the design evolved, using specialised parametric modelling software, the complex toroid geometry of the enclosure was rationalised to allow the repetition and standardisation of construction elements. All the stainless steel and glass cladding panels are flat and the 12,000m² surface area of the roof is kept to a minimum, helping to reduce construction costs. The roof encloses six concrete structures, three halls and three plant rooms, which are separated from one another to prevent noise transfer. The concrete slab concourse is the only contiguous structure joining all three halls. The roof structure springs from this slab thus removing the need for movement joints. The concrete structures, engineered by Mott MacDonald, are all either column, sheer wall or flat slab which are the most economical elements when dealing with curved plans. The thermal mass of the concrete is used as part of the passive heating and cooling strategy.

Performance Halls

To ensure the world class acoustic performance of the auditoria, Arup Acoustics, the acousticians for the project, brought together the relevant classical precedents for form, function and materials to achieve excellence for natural acoustics. Variable acoustics were an integral part of the design brief from the outset, allowing the Sage to accommodate a broad spectrum of events, including jazz, world music, spoken word, and amplified music.

The acoustic performance of each auditorium depends on a multitude of factors, including the fundamental room dimensions, shaping and modelling of the wall surfaces, material selections and construction methods. A range of techniques was employed to strike the perfect balance necessary to achieve a unique blend of classic and modern acoustics for the performance spaces, with a consistent approach to each space.

The design team worked extensively to ensure the acoustic performance of each auditorium is complimented by its interior design. A palette of curved and profiled solid ash, moulded plywood, and rich cloth is used throughout, with each auditorium distinguished by colour to complete a trio of interiors - golden yellow, deep red and dark blue - that are warm and inviting.

Hall One

Hall One is a classic "shoe-box" hall with the room shapes and finishes optimised in favour of 18th - end 19th Century orchestra repertoire. Essentially rectilinear in plan, the exposed side walls help promote lateral reflections. The fixed platform is designed to accommodate a classical/chamber orchestra for the primary use. A platform extension is incorporated for a larger symphony orchestra.

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E press@fosterandpartners.com

The hall incorporates six moving ceiling panels, each weighing 14 tonnes allowing room height variation between 10m and 21m. The ceiling is adjusted to suit the type of music being played and the optimum sound reflections for that music. Each panel can be individually positioned at a different height, varying the natural acoustics of the room and specifically achieving the acoustical support required for the performers on stage.

Motorised sound absorbing curtains can be deployed to cover 90% of the wall area. These are deployed as necessary for different event types that either require a "dry" acoustic or require sound reinforcement or amplification.

Every surface material and texture is there for a reason. All the timber surfaces in the room are shaped to provide optimum sound diffusion. The timber is either very thick and/or directly bonded to the concrete structure to prevent unwanted low-frequency sound absorption. Wall surfaces incorporate a convex curvature (for low frequency diffusion) and the timber battens diffuse the middle and high frequency sounds. All other surfaces including the balcony fronts and ceilings also incorporate curvature and shaping to help promote sound diffusion.

Flexibility of use was also an important consideration for two main reasons: Economic -which means that concerts with amplified music, conferences, semi staged events and even dance will help the hall pay its way - and social in that the hall must serve the whole community and thereby encourage audience cross-over from popular into more demanding classical music. Theatre Projects Consultants, the theatre consultants, recommended features such as: computer controlled lighting trusses; remotely controlled lighting; variable area platform; mobile orchestra and chorus riser platforms; stage suspensions from the attic and loudspeaker cluster hoists.

Hall Two

The brief for Hall Two was unique. As well as providing a setting for classical quartets, as part of the repertoire of Northern Sinfonia, this is to be the home of the other principle brand of The Sage Gateshead, Folkworks, which is Britains leading folk music organization, rooted in the Northumbrian pipes, fiddles and accordion music of the region. The music repertoire also extends into jazz in all its many forms. As the project developed the users envisaged for Hall Two were extended beyond these primary purposes. The innovative design for this galleried space for 450 on three levels consists of a five-sided form at stage level breaking into ten sides above. The minimal technical installation can be expanded since this space will encourage artists to experiment with music and with music theatre.

It has a pure symmetrical form with but with specific directionality when musicians are not performing in the centre. At the lowest level of the hall, the concept was to be able to clear the space of seats and platform keeping audiences tiered up on all sides of the space. A flexible platform allows performers to play on an end platform, in the round, from the balconies, or a combination of all three.

The decagon form of the hall achieves the acoustical requirements for close wall surfaces for early sound reflections, narrow balconies, exposed side walls and upper room for excellent natural acoustics, in an intimate setting. The convex wall curvature is essential to the room design to encourage sound diffusion and avoid focussing. Sound absorbing banners drop from the ceiling, behind the balconies to stalls level and are introduced to control loudness as required depending on the event.

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Northern Rock Foundation Hall

A smaller shoe-box hall, with a high degree of flexibility, this room is designed as the primary rehearsal space for Northern Sinfonia. It is designed so that the natural acoustic is closely matched to the platform of Hall One, ensuring minimum change when the musicians move from one to the other. The natural acoustic is also outstanding for small groups of performers and can accommodate an audience of between 200-300 people seated on a flat floor. Motorised curtains can cover 100% of the wall area, adjustable by the conductor, to make the sound more analytical for the purpose of rehearsal.

Music Education Centre

Consisting of 26 spaces the rooms are designed with non parallel walls in order to ensure even distribution of sound reflections and avoiding room modes. A high level of sound insulation is achieved between rooms using box-in-box constructions to avoid mutual disturbance.

Environmental Design

The comprehensive environmental strategy of the Sage is an example of Foster and Partners dedication to ecologically responsible design. working closely with environmental engineer Mott MacDonald. The auditoria are the only spaces that are artificially air-conditioned, without making any compromises to the acoustic quality. Because of the need for absolute silence in these areas, the mechanical plant rooms are housed separately and cooled air is fed through large ducts, which are lined in acoustic insulation to further reduce noise within the airflow. The air is delivered to the auditoria through the seating pedestals at 1/2m per sec - the lowest possible airflow - and drawn upward through a vertical stack effect generated by the accumulated body heat of the audience. The used air is then drawn-off at ceiling level and recycled through the system.

The Sages aerodynamic form channels the predominant south-westerly wind, providing natural ventilation to the concourse and Education Centre. Due to the buildings north-facing orientation, there is no significant solar gain and no artificial cooling is required in the large concourse. The thermal conditions of these public areas are regulated by a mixed-mode heating and ventilation system, which uses under-floor radiant heating to only heat and cool spaces where necessary. In addition, the solid brick and masonry block-forms of the auditoria act as thermal storage: slowly releasing heat overnight, and heating up again during the day to provide radiant heating to the concourse space.

A full audio, video, and communications infrastructure, both analogue and digital, for recording and broadcast infrastructure extends throughout the building. This allows every point in the building to every other for audio and video. This can be used in many ways, e.g. to broadcast video and audio of the orchestra in Hall One into the music education centre rooms for master class sessions. The system also allows the building to be connected via the internet to the outside world for learning, sharing or interaction with similar organisations.

Rigorous acoustic testing was carried out in the lead-up to the launch to ensure all members of the design team were satisfied with the sound quality achieved. A combination of benchmarking with key world-class venues through visiting and listening and computer models formed the basis for comparison.

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