

SOUND AND ARCHITECTURE IN HARMONY

BEST SPEECH INTELLIGIBILITY FOR
BERLIN'S MUSEUM ISLAND

COLUMN SPEAKERS FROM PAN ACOUSTICS IN BERLIN'S JAMES-SIMON-GALERIE



PROJECT REQUIREMENTS

The new entrance building and visitor centre of the Museum Island Berlin, also known as the James-Simon-Galerie, was officially opened in 2019 after long conversion work.

The construction and redesign of the Museum Island took some time. Now the visitors can come. As its entrance building, the gallery – named after James Simon, the greatest patron of the National Museums in Berlin to date – serves to welcome visitors to the museum complex, provide them with admission tickets and allow them to enter the Pergamonmuseum and the Neues Museum. In addition to a restaurant and café, the James-Simon-Galerie features a 650-square-metre space for special exhibitions as well as an inviting auditorium.

Demanding architecture

From a room acoustics point of view, the architecture of the new entrance hall brings some challenges. Large glass surfaces, stately ceiling heights and sound-reflecting exposed concrete surfaces in the majority of the rooms characterise this modern building. These conditions result in long reverberation times. What is appealing and modern for the eyes is a real challenge for the ears, and hence acoustics. A building of this size is also subject to certain regulations resulting from the various requirements that it has to meet. In addition to fire protection and smoke extraction regulations, this also includes regulations for evacuation and voice alarms. The acoustic planning for this building already took place in 2010. A first idea was to use ceiling loudspeakers.



ACOUSTIC SOLUTION

An acoustic simulation by an acoustics company showed that the requirements of DIN VDE 0833-4 could only have been met in a few rooms with this solution, provided that additional room acoustics measures were taken. According to the requirements of DIN VDE 0833-4, a speech transmission index (STI, a measure of the quality of speech intelligibility) of approx. $0.60 \geq 0.50$ has to be achieved.

Speech intelligibility is key

An alternative PA solution had to be developed for the other rooms, which are characterised by large room volumes – and thus long reverberation times – and which merge into one another. The resulting concept, which provided for the use of digitally controlled column speakers, finally produced the required simulation results for direct sound pressure levels of the alarm system and compliance with the STI values required by the standard. Another eight years passed from the development of this PA concept to the realisation of the voice alarm system. In the meantime, the technology of digitally controlled column speakers, so-called beam steering or beam forming loudspeakers, has been further developed.

Column speakers – safe and in matching design

When the voice alarm system was to be installed in 2018, the product preferred in 2010 was already no longer readily available. This presented a challenge to David Chipperfield Architects and the company entrusted with installation of the system, Bosch Sicherheitssysteme Berlin. Another PA system that would meet the form factor and the technical requirements had to be found. The system had to be discreet and match the colour of the exposed concrete. The signal was to be fed via a 100V system and 2-wire cabling was to be used for both control and monitoring. This technical solution permitted to satisfy the requirements of DIN VDE 0833-4. The connection panels on site were already predetermined by the planning and due to the advanced stage of the construction process. These had to be used.

Simulation speaks for beam steering

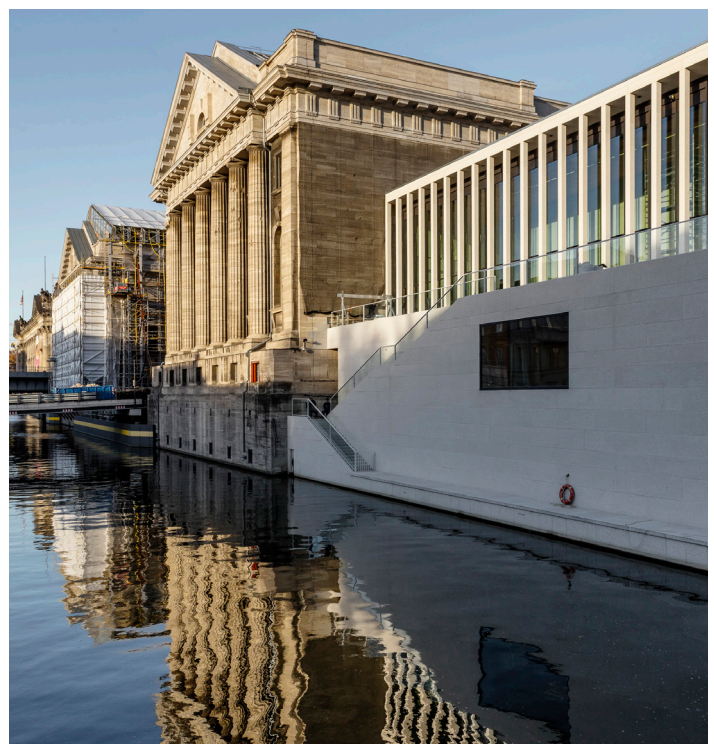
After an evaluation process conducted by the installer of the voice alarm system, Bosch Sicherheitssysteme Berlin, in cooperation with David Chipperfield Architects, a solution was found in Wolfenbüttel, Lower Saxony: the manufacturer Pan Acoustics was able to deliver the required systems, comprising Pan Beam line array loudspeakers and customised accessories, on time.



In addition, Pan Acoustics provided a new acoustic simulation to demonstrate the equivalence of the chosen Pan Beam loudspeakers of the PB 08, PB 16 and PB 24 series to the loudspeakers selected in 2010.

IMPRESSIVE OVERALL RESULT

Besides the sound quality, which is not only suited for voice announcements but also for music playback, the architects were particularly impressed by the slim, unobtrusive design of the column speakers. The geometric shape, the filigree design and the matching colour of the loudspeakers blend harmoniously into the James-Simon-Galerie.



Images: © Ute Zscharnt for David Chipperfield Architects

KEY DATA	
Architectural features	Sound-reflecting materials (glass, concrete)
Product series used	Pan Beam
Architects	David Chipperfield Architects
Installer of the VA system	Bosch Sicherheitssysteme Berlin

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