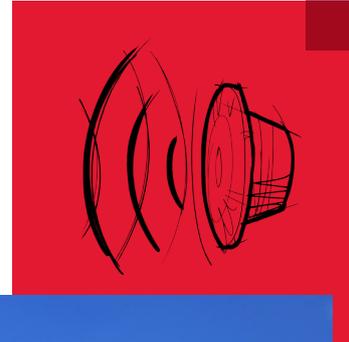


An Ephemeral Grand Palais

A soundproofing and protective envelope
Champ-de-Mars | Paris | France

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Aligned with the Eiffel Tower and the Trocadéro, opposite the Ecole Militaire, the ephemeral Grand Palais designed by the Wilmotte et associés architectural practice stands temporarily on the margins of the Champ-de-Mars in Paris's 7th arrondissement: imposing enough to project a strong image and be part of this historical perspective, modest enough not

to clash with its environment and the illustrious buildings that precede it. Moreover, a major imperative as well as a condition of its construction in this upmarket district of the capital, the ephemeral Grand Palais has a duty not to disturb the peace and therefore to offer all the assurances of noise-free use.

Rooted in history

The ephemeral Grand Palais is installed for four years, during which the Grand Palais will benefit from major rehabilitation works. With its location on the Joffre plateau, it reconnects with the history of a site that once housed other ephemeral buildings, those of the Universal Exhibitions of the 19th and early 20th centuries.

A temporary structure therefore, for three years it will accommodate the various prestigious Grand Palais exhibitions relating to art, fashion and sport, as well as cultural and artistic events organised by RMN-Grand Palais. For a further year, it will be used for the 2024 Olympic and Paralympic Games, hosting the wrestling and judo events. At the end of this period, the public land occupancy agreement will

come to an end and the building will be dismantled. The statue of Marshal Joffre and the two fountains on the site, temporarily incorporated into the building, will then return to the open air. Only the foundation micro-piles will remain, reinforcing ground consisting of disparate backfill materials.

Iconic and best-in-class architecture

While this building's architecture evokes the main hall of the Grand Palais, its cruciform plan derives above all from the land itself, states the architect, Jean-Michel Wilmotte. With a 140-metre long nave and a 145-metre transept, it provides an area of approximately 10,000 square metres free of any column and a height that tops out at 17 metres. The external volume reaches a height of 20 metres, some 16 metres lower than the highest point of the Ecole Militaire. Through the only fully-glazed north-west and south-east facades, the historic axis passes through the building, an effect accentuated by the closing of the tympanums accommodating two floors of offices.

10.000 m²

of sandwich panels with stone wool core on the roof and facade



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Forty-four arched portals in glulam timber, with spans ranging from 33 to 53 metres, constitute the dual vaults. The spruce for the internal frame and Douglas fir for the external canopies come from Europe. The structure's geometry enables optimisation of the useful volume such as the 12,000 square metre roof area. The choice of this structure was as much due to considerations of setting exemplary standards in terms of environmental impact as to those of limiting construction time, estimated at six months by virtue of prefabrication in the workshop and the preassembly of entire sections of the structure. In addition, its modular design makes it possible to envisage using them in an identical configuration or in other forms, in other locations, at the end of the four years, thus extending their life.

"Assembly commenced with the installation of the two 65-metre span hip rafters that form the keystone, resting at the connection point on a temporary shoring tower while awaiting assembly of the transverse wings. Then the arches were installed one by one," says Julie Jean, architect project manager from the Wilmotte practice, who is monitoring the works. These triangulated arches, 3 metres in height, rest on timber-clad steel columns, founded on micro-piles. Spaced at 4.50-metre intervals, they are connected by a concrete plinth. The entire building is covered with a PVC (polyvinyl chloride) skin on the roof and ETFE (ethylene tetrafluoroethylene) panels on the side walls that leave the framework visible from outside.

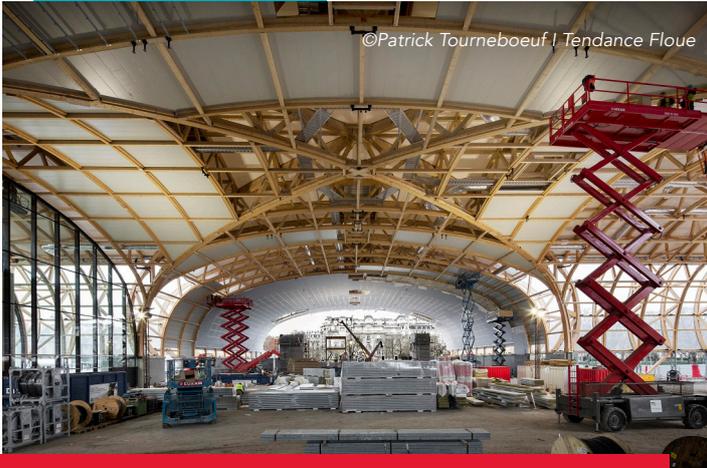


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CASE STUDY

A soundproofing and protective envelope

The envelope of the ephemeral Grand Palais was afforded particular attention given that the building's location required that noise pollution be limited and, given its various uses, that an ambient temperature of some twenty degrees be maintained. "It's the acoustics that dictated the dimensioning of the insulation system," explains Julie Jean. For such a facility, capable of accommodating more than 9,000 people, "the aim is to comply with the regulations for combatting neighbourhood noise and to control sound emissions with respect to the residual noise level*, while controlling the internal sound level, which required complete soundproofing of the volume," explains Alexandre Krieger, project manager of the Lamoureux consultancy. "The sound insulation was designed on the basis of the scale of the building as a whole. On the roof, the solution adopted to meet the desired acoustic performance but also the constraints of a temporary building with a timber structure (weight, construction time, etc.) was a system comprising sandwich panels made of sheet steel and stone wool from 100 to 150 millimetres thick, combined with a suspended plasterboard ceiling, damped by glass wool.



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By using stone wool insulated sandwich panels, the noise levels outside the building will be less than 5 dB(A) by day and 3 dB(A) at night.

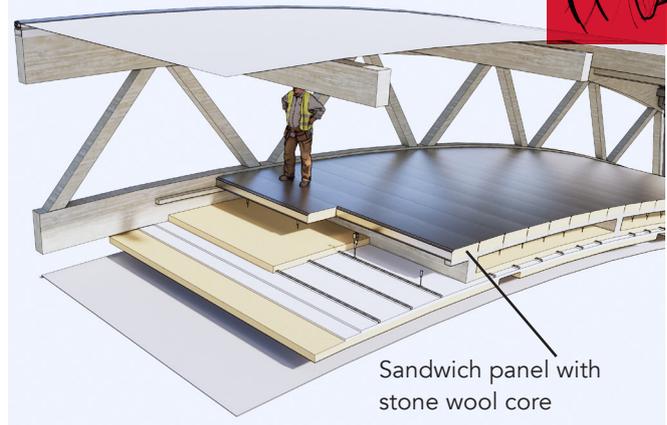


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This system was tested at the CSTB (Construction Industry Scientific and Technical Centre). Beneath this insulating envelope, in order to address the internal acoustics of the space, an absorbent system combines rock wool with a tensioned anechoic fabric." This fabric covers all the interior walls. Additionally, all apertures are subject to specific acoustic treatment: smoke extraction ducts, glazed double curtain wall at each end of the building creating acoustic and thermal airlocks, and airlocks for secondary apertures. The concrete plinth is also insulated. Thanks to these protective systems, the very diverse events planned to be held in this ephemeral Grand Palais will be able to take place while respecting the sound environment of the neighbourhood.

* The decree of 31 August 2006 relating to combatting neighbourhood noise imposes a requirement not to exceed a site's residual noise level by more than 5 dB(A) by day or 3 dB(A) at night.

Client: RMN-Grand Palais, Paris 2024 Organising Committee for the Olympic and Paralympic Games
Managing operator: GL Events
Architects: Wilmotte & associés architectes
Consultants: Chabanne engineering and energy (structure and services); Lamoureux (acoustics); CSD (safety, fire safety systems coordinator); Lisi (smoke extraction), Cronos (public safety); Socotec (project supervision).
Contractors: Mathis (framing), IASO (roofcovering, lining), Laporta (structural work), Sodimav (acoustic panels), Swal (interior fabric), SNEF (electricity), Andreu (HVAC), Medinger (Roads and services)...
Sandwich panel suppliers: Trimo for the roofcovering and ArcelorMittal for the northeast and southwest facades.
Surface area: approximately 10,000 m².