



Location
Calais, France

Client/operator
City of Calais

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Acoustics
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EUR 7.02 million

BRIGHT CAULDRON

BASKETBALL ARENA “QUAI DE LA MOSELLE” IN CALAIS

Located in the city centre of Calais in a former industrial port, the 1,500 seat basketball arena is home of the local basketball team playing at level H3 in the French Basketball Federation. It is also used for the sports education of the surrounding colleges. The architects of ‘faceB’ transferred the loads of the roof to the inclined slabs of the stands to free the façade of any supporting element. The geometry of the building reflects the typical cauldron atmosphere of a basketball match.

The building is a six-sided polygon covered with a roof in the form of a taut sail, enclosed by high glass façades. While retaining its monumentality, transparency, varying heights, multiple facets and adhesion to the ground, the structure stands not as a barrier, but rather as a transition point between the Calais Nord and Saint Pierre districts. The geometry of the project also reflects the optimal organisation of the stands to favour this powerful cauldron effect on the evenings of big matches. The stands of 1,000 permanent seats are structuring elements even on non-game days.

The site has a vertical drop of 2.5 m, the quay edge forming the low point of the site. The structure connects two levels of ground, the

high level reserved for visitors, and the low level as the play area. The sports hall uses this topography to manage flows, separate players from spectators, and generate different levels of intimacy. The exterior and interior spaces are connected on every level by visible entrances.

Hyperbolic paraboloid roof

The structure of the building is shaped by the cross section: the steel roof is stretched between the two concrete shells (the stands) inclined at 45 degrees which discharge the loads in compression. The concrete posts supporting these balance the configuration.

The roof is a hyperbolic paraboloid. The main, concave curvature is formed by nine catenary



steel beams connecting the two concrete shells to the north and south. Transversely, an inverse curvature allows the rainwater to flow towards the curved façades to the east and west. A mesh formed of straight segments (the generating lines of the hyperbolic paraboloid) provides the bracing. Steel catenary beams work mainly in tension.

In the north, where the roof is at its highest, are the entrance hall, ticket office and public toilets. In the south are the club rooms and VIP foyer. The hull in the north is formed of three triangles, and in the south of two. They rise at their ends to connect public entrance areas with the sports hall. The glass façades enclose the structure. They are composed of 300 x 100 mm steel spines placed on a concrete wall and hinged at the edge of the roof.

The spaces under the bleachers house the foyer, toilets and club offices. They also act as an acoustic and thermal buffer between the sports hall and the outside.

Construction system and materials

The materials are chosen according to the loads they discharge; steel works mainly in tension and concrete in compression. They are left rough and bare but with a fine finish. The sandblasted concrete reveals the aggregates whose colour recalls the beaches of the seafront. The details of the joints are left visible and leave legible the direction of load discharge into the foundation.

The roof consists of a catenary structure suspended at the top of the stands on either side of the court along a north-west / south-east axis. These suspended beams with 6.06 m spacings have spans ranging from 39 m to



65 m. Tensile structural loads and the concave surface of the roof allow a strong accentuation of the metal profile sections and the discharge of the frame's loads. The steel supports for the roof cover are placed directly on these catenary beams. A secondary structure of supports is composed of standard profiles of squared tube with a spacing of 6.53 m. These beams give the building its horizontal strength. The roof is vertically stabilised by the dead weight of the primary and secondary structures as well as by the permanent loads of the roof.

The structure of the stands consists of slabs, posts and beams of reinforced cast-in-place concrete. Every six metres, a beam supported by reinforced concrete slabs and posts carries the staircase structure and discharges compressive loads into the reinforced concrete slabs of the -1 level and foundation system.

The curtain façade of steel cladding guarantees complete airtightness. The entire structure constituting the façade is suspended in the upper part which significantly reduces the visual impact of the curtain wall.

The filling is transparent and translucent double glazing interleaved with PVB acoustic film, with P3A lower down for burglary resistance or opaque aluminium sheeting in front of an insulation layer, depending on the location, vertically rebated and horizontally abutted.

Electricity, heating and ventilation

Since the architects wanted the structure to create the façades and structure the spaces, they confined the finish to the acoustics. In order not to interfere with the structural appearance, they opted for a principle of grouping technical elements. The two acoustic enclosures located on the east and west façades conceal at once the rainwater runoff, the sports hall area supply, the power supply of the radiating roof panels and the two sports billboards.

The lighting of the undersides of sloped slabs is provided by fluorescent tubes inserted into the spines of the façades. The sports hall is lit by a sheet of LED strips attached to the buttressing of the frame.

