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OO2804 A FOOTBRIDGE OVER THE WATERSPORTBAAN IN GHENT

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Summary

This 'tell a story' text is based on the proposal we submitted in a competition for a pedestrian bridge over the Watersportbaan in Ghent, Belgium. The Watersportbaan is a 2,5 km rowing-course on the outskirts of the city. In our proposal we explained how we achieved an architectural design. We won the competition out of an 80+ candidates pool.

'We' is a team made up of two architects, Pieter D'haeseleer and Kristoffel Boghaert, Ghent, Belgium, three consulting engineering offices, namely engineers Haskins, Robinson, and Waters, now incorporating Jane Wernick Associates, London, UK, LIME, Ghent, Belgium, and the Faculty of Engineering Technology, KUL, Ghent, Belgium, as well as the Dutch landscape architect OMNA, Eede, the Netherlands.

Keywords: cable-stay bridge; urban design; architecture; portal frame; asymmetric deck girder; damping

HISTORICAL AND GEOGRAPHICAL CONTEXT OF THE LOCATION

A natural depression, the so-called 'Kuip', in the oldest part of Ghent, marks the confluence of two rivers, the Leie and the Scheldt. The Leie flows in from the south, turns around the Blandijn Hill and joins the Scheldt, leaving the city in the north. The geographical difference in height is the main reason why the city of Ghent developed in an atypical and asymmetrical way, unlike cities such as Bruges or Louvain, which originated in the same period and which spread evenly in a circular way.

In 1953, city councillor Georges Nachez decided that Ghent was going to organize the 1955 International Rowing Regatta! Obviously, this required the necessary venue, and the vast and empty lower marshes of the Leie appeared to be ideal for a 2,5 km long rowing-course. Only after the rowing event did the city become aware of the potential of the area. To summarize: the asymmetry and a close relation to water are part and parcel of the DNA of Ghent and this is reflected in the natural dichotomy of the Watersportbaan.

PRESENT-DAY CONTEXT

Councillor Nachez's bold visionary realisations were the last of their kind in Ghent. Between the eighties and nineties, the former marshes turned into a number of jumbled pieces of a jigsaw puzzle.

The current public infrastructure and organization of mobility of this recreational area is everything their Dutch or Scandinavian counterparts are not: the Watersportbaan is squeezed in by long straight roads and roundabouts, and large parking spaces paying tribute to King Car.

The bridge we proposed can be considered an excellent opportunity to give the Watersportbaan back its alluring character, reflecting on Ghent and spreading a vision reaching even further beyond that city.

We create urban scenes along the banks, an empty space where the nature is near, no longer serving as a barrier, but as a connecting element in the planned area. The public use of the banks attracts new activities and ensures a relative autonomy of the area. The water becomes the carrier of a continuous public domain, with the bridge acting as a connecting element.

THE BRIDGE OVER THE WATERSPORTBAAN

The bridge is an asymmetric cable-stayed structure, with a slender deck supported via cables from a single, back-stayed mast.

BRIDGE DECK

The bridge deck is a closed metal girder, incorporating diaphragms and stiffeners to ensure load transfer at the cable attachment points and prevent local buckling of the girder plates. Continuous internal webs within the girder help transfer the axial compression in the deck which balances the tension in the cables. The internal webs can also provide stiff support lines if the bridge deck is installed via a launching process. The total height of the deck is 60cm, with 30cm at the sides. The deck passes between the two legs of the mast. It spans up to 30.5m between cable supports and the bearings at the ends of the deck. It is designed as a shallow steel box girder, asymmetric in section to accommodate the difference in deck level between cycle and pedestrian paths.

MAST

The mast is an asymmetrical portal frame, consisting of two legs linked by a top section. The mast as a whole acts in compression and bending, to resist the forces from the cables which support the deck. The north (forward) leg acts primarily in compression, and so can be a more slender element. The south (rear) leg acts mostly in bending, acting as a cantilever, and so is a deeper element, tapering towards the top as the bending reduces. The mast is further stabilised by the presence of the back-stay cable, acting in tension.

The mast legs are fabricated steel box sections, trapezoidal in section, tapering from their bases. The linking top beam allows the two legs to act together as a frame, and provides the location for the cable anchorages.

At the west end the deck is supported at the abutment, which transfers the axial load as well as taking the vertical load. At the east end it is supported on sliding guided bearings which allow thermal expansion and contraction of the deck along its axis, so that high forces are not developed under temperature cases.

The mast is supported on piled foundations with a shared pile cap. Tension piles are provided to the back-stay cable anchorage.

RAILING

The railing of the bridge exists of a stainless steel woven net with a wooden finishing. Wind can pass through and the slope of the railing directs to the deck in order to be unpleasant when standing or sitting on it. The wooden handrail is wide and made for daydreaming (staying) while bicycles pass under the rhythm of cables.

Fig. 1. A rendered night view, Render by G.Collaro