DIE BROMMY-KREUZUNG

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Figure 1: Bridge design "Die Brommy-Kreuzung". rendering by Eick & Aas, 2017.

LOCATION

The crossing between the Berlin downtown districts of Kreuzberg and Friedrichshain over the river Spree. The width of the river is approximately 110 m.

PURPOSE

With the planned development of the previous industrial area to the north and south of the old river-crossing, a bridge connecting the two areas is attractive. Situated with the old bridge-pier in the south-end and the remainings of the Berlin Wall near the north-end, the bridge will benefit tourists taking in the views of the area as well. In crossing the bridge, pedestrians will pass and see the remaining pier as a monument of the old Brommybrücke which was destroyed during the war.

APPROACH

As the design of the bridge is part of a master thesis concerning conceptual design in genereal and parametric design in particular, it was largely conceived with the software Grasshopper and assorted plug-ins to make changes to the design quick and easily assesed. The main focus was on accentuating the remains of the old Brommybrücke for pedestrians in addition to giving a good view of the old berlin wall, as well as getting cyclists from one side to the other separately from the pedestrians.

THE LOAD BEARING SYSTEM

To give the sensation of openness to each side in addition to not disturbing already established routes of travel on the river, decks suspended on one side from an arch were chosen, necessating a very prominent arch and very torsionally stiff decks.

THE ONE-SIDED BEARING OF THE DECKS

The idea of having cables attached on one side of the deck is inspired by reference bridges such as Jiak Kim Bridge in Singapore and Gateshead Milenium Bridge in Newcastle. The idea is to give the sense of a more open space both when using the bridge and when viewing it from either riverbed. It also enables the use of different directions for the two decks using one arch, as connecting cables on the outsides of the decks would have physically obstructed the path.

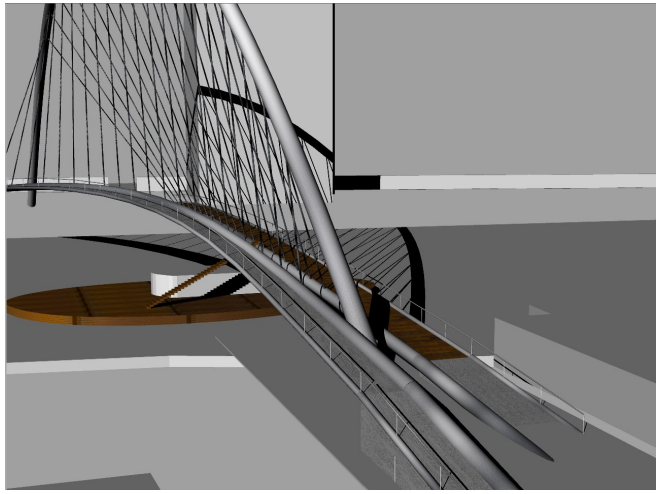

Figure 2: Bridge design ”Die Brommy-Kreuzung”. Rendering by Eick & Aas, 2017.

THE TWO SEPERATE DECKS

The idea of the curved deck sprung from wanting to highlight the remaining abutment of the old Brommybrücke as a monument for those using the bridge as well as leading cyclists smoothly from crossing the river to cycling along it. To prevent larger groups of pedestrians pausing to view the pylon from interferring with bicycle traffic, two decks are used. The pedestiran deck spans the Spree in a straight line, giving a walking distance of ~134 m, while the deck for cycling, with both more vertical and lateral curvature, has a total length of ~162 m. Staircases leading down to the existing pier with a platform provide a place to enjoy the afternoon sun along the river. Structurally the two decks work together as a seesaw, as in cases with high loading on one deck the other deck’s stiffness counteracts the loaded deck’s deflection.

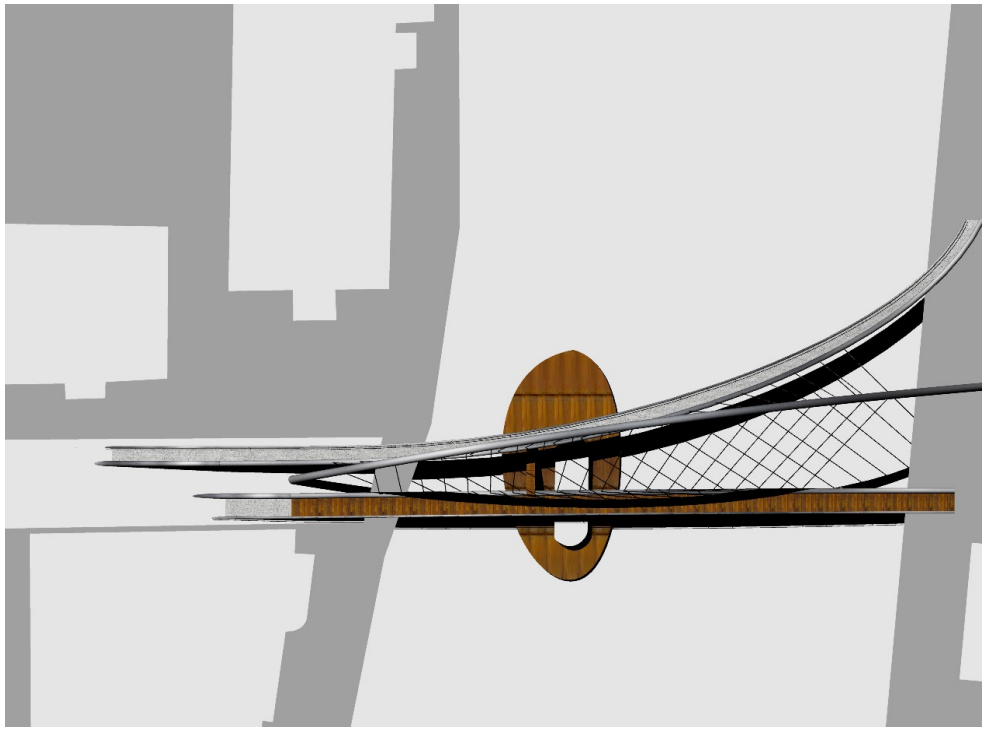

Figure 3: Bridge design ”Die Brommy-Kreuzung”. Rendering by Eick & Aas, 2017.

ABUTMENTS

On each end of the bridge there are concrete abutments, giving the bridge solid anchoring as well as separation of pedestrians and cyclists. On the south side of the river a ramp, through which pedestrians can walk, leads up to the elevated cycling deck, thereby giving access to the pedestrian deck from all sides.

SUGGESTIONS FOR ADDITIONAL RAMPS

To gain access to the old pier, stairs descending from the pedestrian deck to a platform around the pier suspended from the decks is suggested. Additional stairs ascending up to the cyclist deck is another element that will provide a place to rest, party, eat or enjoy the view from the river.

THE LOAD BEARING ARCH

Tasked with being the load-bearer for both decks, initial analysis indicates that a circular hollow cross-section 150 cm in diameter required. A total height of ~42 meters makes it a big feature in the landscape.

TORSIONAL STIFFNESS OF DECKS

One-sided sagging of the decks is prevented by pipes spanning along the decks. They take the brunt of the torsion experienced by the decks and thusly end up at a size big enough to become a dominating part of the design.

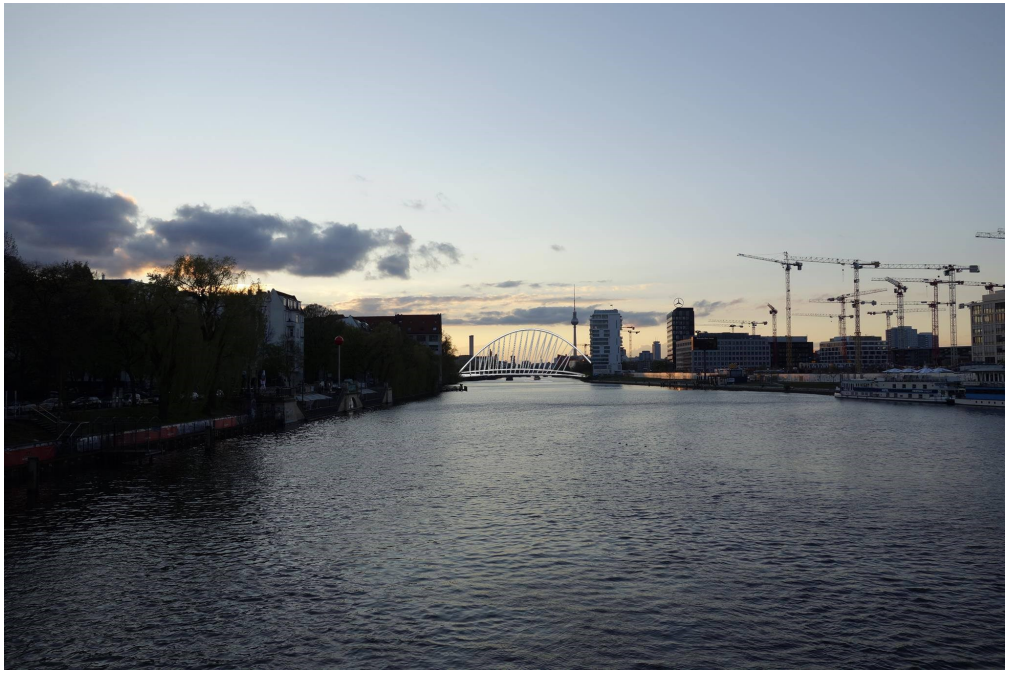

Figure 4: Bridge design "Die Brommy-Kreuzung". rendering by Eick & Aas, 2017.

MEASUREMENTS

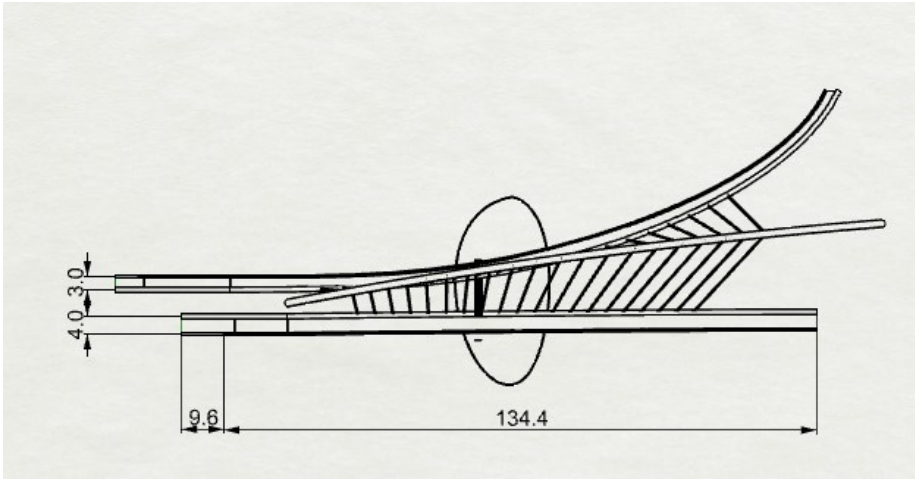

Figure 5: Bridge design "Die Brommy-Kreuzung". Model sketch by Eick & Aas, 2017.

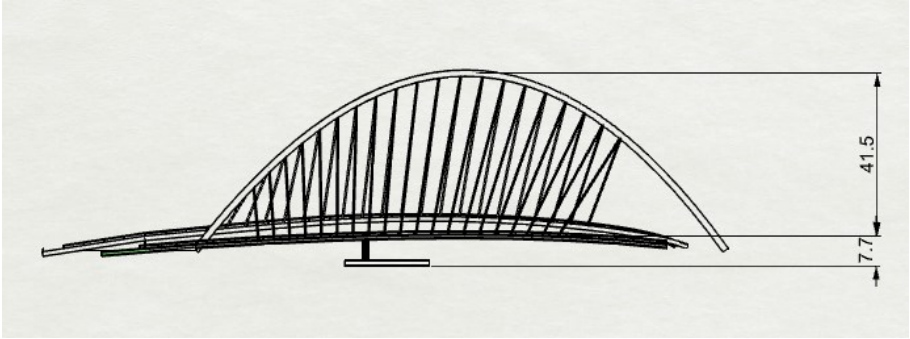

Figure 6: Bridge design "Die Brommy-Kreuzung". Model sketch by Eick & Aas, 2017.

Dimensions of circular hollow cross-sections	Diameter [cm]	Wall thickness [cm]
(Deck: Outer sections)	40	5
Deck: Suspended inner sections	100	10
Arch	150	15

Table 1: Dimensions of the circular cross-sections used in the model.