



DI-MC: STEELS FOR CONSTRUCTIONAL STEELWORK

BRIDGES IN THE NETHERLANDS

DILLINGER HÜTTE GTS



The Ennëus Heerma Bridge



IJburg is the name of the major Dutch project for the creation of up to 18,000 residential units for 45,000 persons on seven artificial islands with a total area of some 450 hectare in the IJsselmeer (the former Zuiderzee) to the south-east of Amsterdam. Such a project naturally demands a particularly imposing approach route, a target which London's star architect Nicholas Grimshaw has most certainly achieved, in his Ennëus Heerma Bridge.

This unusual bowstring bridge which, with its

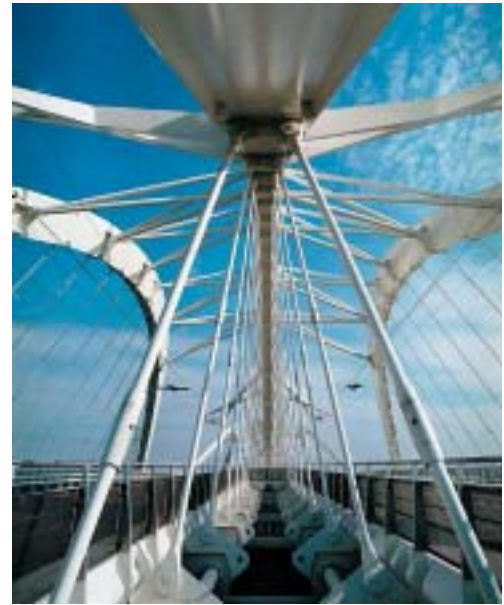
similarity to a fish skeleton, is intended as a reminder that this is land reclaimed from the sea, carries on its 230 m length and 38 m width a total of four motor-traffic carriageways, two tram lines, two cycle tracks and a pedestrian walkway. Its two main spans, each of 75 m, consist of a 20 m high centre-arch with two inclined side arches, which are linked to the centre-arch via bracings. The side arches are connected to form inverse arches for the 30 m central span.

Dillinger Hütte GTS supplied for this outstanding

structure, which has already won a number of architectural awards, some 1,700 t of heavy plate, a major portion of which consisted of thermomechanically rolled grades: more than 600 t DI-MC 460 B/T, high-strength TM-rolled fine-grained structural steel with specified minimum yield strengths of 460 MPa, in thicknesses of up to 100 mm were used for the cross-members of the composite carriageway deck and the central arches, in order to safely absorb the high stresses occurring in these zones of the bridge.



Thermomechanically rolled fine-grained structural steel was also used for elements consisting of grade S355, however. The excellent weldability of the around 900 t DI-MC 355 B/T supplied permitted the efficient and safe use of high-performance welding methods, such as the twin-wire submerged-arc process, for the majority of longitudinal welds.



The bridge over the Hollandsch Diep

It's already being called the "gateway to the Netherlands". In the near future, this new high-speed bridge over the

Hollandsch Diep, a 1,200 m wide stretch of estuary in the Rhine-Maas delta, will open up broad vistas of the Dutch

polderland to rail travelers crossing it – at speeds of 300 km/h and above – on the Brussels-to-Amsterdam line.





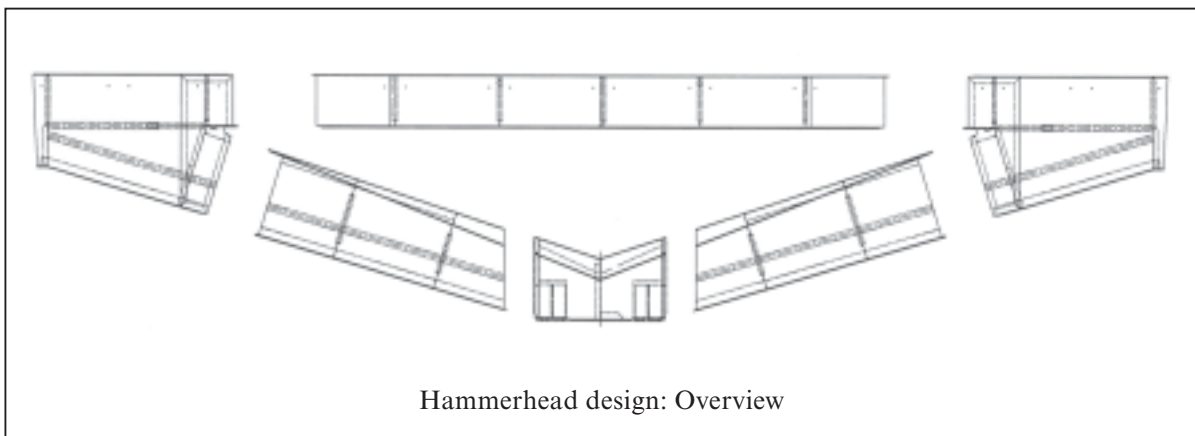
Even now, the dramatic bridge spanning this waterway is considered the identifying symbol of the Dutch region located between Dordrecht and Breda. A superstructure featuring a recurring hammerhead motif was selected from the many submissions in the international competition for this bridge design. In order to safeguard shipping, the spans, of 12 x 105 m, and 2 x 70 m

at the ends, imitate the pattern of the existing parallel lattice-girder railway bridge.

Unusual use of structural steel

The steel structure consists of hammer-head-shaped elements above the piers, with connecting box-girder sections. The box structure is topped by a concrete carriageway deck.

Dillinger Hütte GTS supplied for this imposing structure some 9,700 t of Grade S355J2G3 and S460N plate in thicknesses of 210 mm and up to 100 mm; fabrication and installation was performed by the three Dutch structural steel contractors Lubbers Hollandia, HBG Steel Structures and Mercon. Exceptionally broad plates, with widths of up to 4,550 mm, and a high percentage of shot blasted and primed plate, made it possible to significantly reduce workshop fabrication input. The bridge elements were subsequently transported to the site by ship and lifted into position using a 500 t floating crane, permitting minimization of complex and costly on-site welding.





The Prince Claus Bridge



The Prince Claus Bridge, in Utrecht, was officially opened by Princess Máxima of the Netherlands in late June, 2003. This bridge, spanning the Amsterdam-Rhine Canal between the Kanalen-eiland and the new Papendorp business quarter, carries regional tramway rail routes,

road traffic, cyclists and pedestrians.

The US\$ 28 million bridge project, with its length of 300 m and width of 35 m, consists of a 150 m cable-stayed span with an elegant, asymmetrically positioned 91.7 m high steel pylon.

Dillinger Hütte GTS supplied around 4,200 t heavy plate for this bridge structure, approx. 1,300 t in the form of high strength DI-MC 460 weldable fine-grained structural steel in thicknesses ranging from 20 to 100 mm, which was used for the heavily stressed pylon elements, in particular.

DI-MC

Our DI-MC thermo-mechanically rolled fine-grained structural steels are available in strength classes of up

to 460 MPa rated yield strength.

They are notable for their reduced carbon and alloying-element contents, and for their high reserves of toughness.

The results are excellent fabrication properties and, in particular, good weldability compared to conventional structural steels used in bridge engineering.



Ennéus Heerma Bridge

Owner: Gemeentelijk Grondbedrijf Amsterdam
Architect/Design: Nicolas Grimshaw & Partners
Engineering: Ingenieursbureau Amsterdam IBA
General contractor: Hollandsche Beton Group
Constructional Steelwork: HBG Schiedam
Heavy plate deliveries: Dillinger Hütte GTS



Bridge over the Hollandsch Diep



Owner: Bouwcombinatie HSL Drechtse Steden
Design: Ove Arup & Partners
Architect: Benthem Crouwel
Construction consortium: Ballast Nedam, CFE, HBG Steel Structures, Maasdiep VOF, Strukton Betonbouw, TBI Beton- en Waterbouw Voormolen B.V., Van Hattum en Blankevoort, Van Oord ACZ, Vinci Construction Grands Projets, Waterbouw
Constructional Steelwork: Lubbers Hollandia, HBG Steel Structures, Mercon
Heavy plate deliveries: Dillinger Hütte GTS

Prince Claus Bridge

Owner: Town of Utrecht, Projectbureau Leidsche Rijn
Design: Ben van Berkel & Bos, Holland Rail-consult, Tremblet S.A., WTP
Engineering: Combinatie Leidsche Rijn Bruggen, UN Studio, Halcrow & Partners, DHV (Dwars, Heederik en Verhey)
Structural design: Wüst Rellstab Schmid AG
Constructional Steelwork: Viktor Buyck Steel Construction
Heavy plate deliveries: Dillinger Hütte GTS



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