

Zeitschrift: IABSE structures = Constructions AIPC = IVBH Bauwerke
Band: 12 (1988)
Heft: C-44: Structures in Finland

Artikel: Standard steel girder bridge (Finland)
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DOI: <https://doi.org/10.5169/seals-20906>

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6. Standard Steel Girder Bridge (Finland)

Bridge

Development by: Finnish Roads and Waterways Administration (RWA)
Rautaruukki Oy

Construction: Standard application by RWA district organization

The superstructure consists of two steel girders and of a reinforced concrete deck slab, connected to the girders by headed studs. The structure acts as a composite structure for traffic load and for the weight of surfacings. Cross girders are located at the supports. One or two cross girders are also placed in the midspan area. The deck slab can be cast in situ or assembled of precast units.

General Description

A standard single span steel girder bridge has been developed to span small rivers. In order to rationalize the design of this bridge type, a series of standard drawings has been made. This series consists of structural drawings of the steel girders and the reinforced concrete deck slab, and model drawings for producing the general drawing of the bridge.

The series of standard drawings have been made using the following main dimensions:

- Spans: 15.45 . . . 37.45, increment 2 m
- Horizontal clearance: 4.5, 6.5, 7.5, 8.5 and 10.5 m

The ratio depth of superstructure to span is 1/15. The weight of the steelwork is given in table 1.

The series of standard drawings consist of complete sets of structural drawings for fabrication of the bridge.

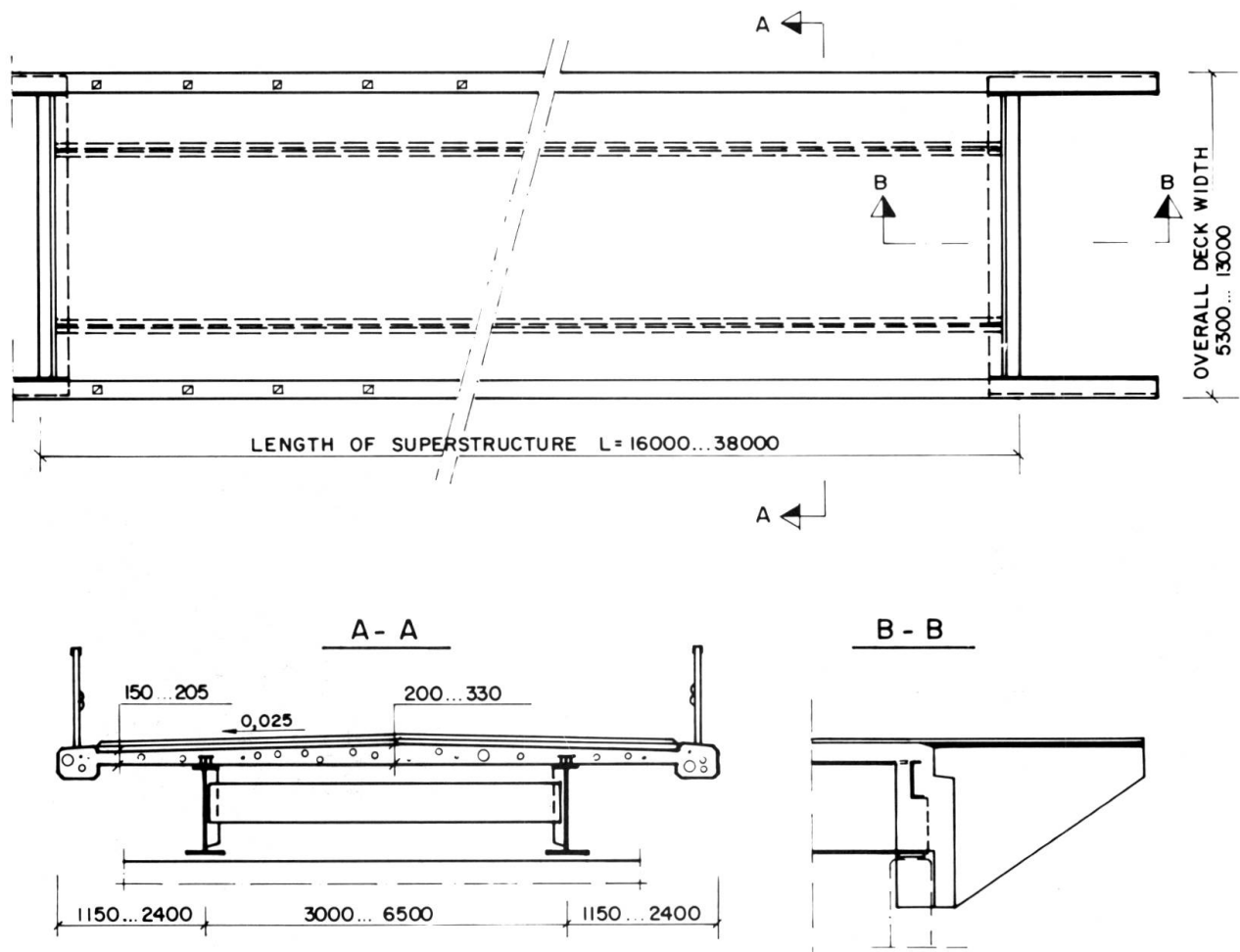


Fig. 1 Standard steel girder bridge. Main dimensions. In situ deck slab.

Table 1. Weight of steelwork kg/m² per area of carriageway

B (m) \ L (m)	6.5	7.5	8.5	10.5
16	86	77	—	—
20	95	93	98	—
24	109	108	111	109
30	136	132	135	128
34	161	151	145	138
38	177	169	164	154

L = Length of deck

B = Horizontal clearance of deck

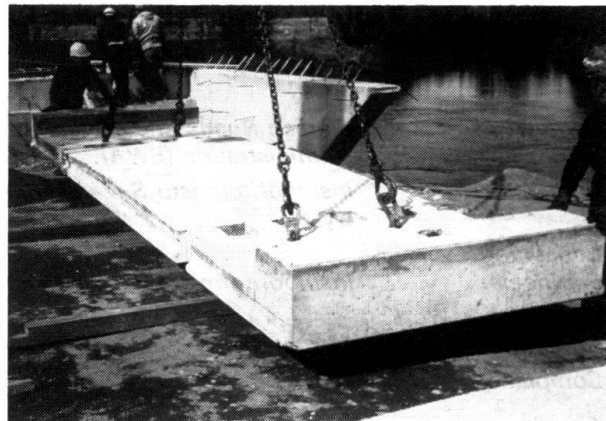


Fig. 2 Deck slab unit

Fabrication and Erection

The structure is designed using weathering steel COR-TEN B. In the design, for the steel girders, a 0.25 mm corrosion allowance for each steel surface has been taken into account. The bridge can also be painted.

The steel structure is fabricated in a workshop and transported to the bridge site either assembled, or with main girders and cross girders as separate units.

In addition to cranes, two skilled workmen are needed for the erection work. Steelwork erection time, when main and cross girders are delivered to the site unassembled, is 1 – 2 days/bridge.

For the deck slab wooden or galvanized corrugated metal sheet formwork may be used. The formwork may be supported by the main girders. The deck may also be assembled using precast 2 m long reinforced concrete deck slab units. Recesses are left in the units to fit the shear connectors welded to the main girders. The recesses and the joints between the precast units are later filled with concrete.

The superstructure rests on rubber bearings. Two pin bolts hold one end of each girder to the abutment, and prevent longitudinal movement of the superstructure.

(M. Kuusivaara)



Fig. 3 Assembly in progress