Zeitschrift: IABSE structures = Constructions AIPC = IVBH Bauwerke

Band: 5 (1981)

Heft: C-19: Eastern Sheldt Strom Surge Barrier (the Netherlands)

Artikel: Bridge to working island: a temporary work

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DOI: https://doi.org/10.5169/seals-16999

8. Bridge to working island: a temporary work

Within a period of about four years, approximately half a million cubic meters of prestressed concrete for the piers, abutments and Noordland lock will have to be made on the "working island" in midstream (Fig. 1). Allowing for other work which also has to proceed on this island, the concrete construction program is estimated to require a total of about 5 million man-hours. On the assumption of an 8-hour day, this is equivalent to 625,000 man-days and, including the starting-up and running-down periods, a maximum job manning level over a period of 3¼ years amounting to 625,000/(200×3¼) = approx. 960 men. The total demand upon the labour market to recruit 960 men (allowing some margin for illness, etc.) is about 1,050 men. A survey of the registered available manpower resources showed that a considerable proportion of the requires labour force would have to come from relatively long distances away, involving much travelling time. Tests also showed that if fast boats are used to ferry commuting personnel to and from the working island, the daily travelling time is half an hour longer than if the island is accessible by means of a bridge.

In view of the rules laid down in the collective employment agreement for the construction industry with regard to maximum working, resting and travelling times per day, this means that, in the absence of a bridge the effective working day will be less than 8 hours. Apart from organization problems this restriction gives rise to substantial additional wage costs. Working days of less than 8 hours' effective length would involve higher manning levels which in turn affects average hourly wage costs. The provision of living quarters for personnel who can thus reside near the site and merely travel home at week-ends provides only a partial solution to the problem. The snag is that only a relatively small proportion of the employees concerned are willing to accept this arrangement.

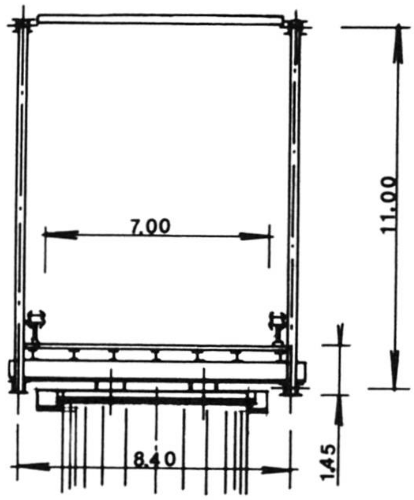

Fig. 1 Cross-section of temporary bridge

These and other considerations prompted a detailed study in which various alternative solutions for getting the men to and from the island were investigated. They included:

- the cost of ferries for personnel;
- the cost of ferries for plant and equipment;
- the cost of berthing accomodation for the ferries;
- the cost of dredging a navigation channel to enable the ferries to come alongside the berths even at low water;
- the so-called loss hours, i.e. idle time which has to be paid for at normal rates in the various alternative solutions;
- the difference in the cost of supplying fresh water to the island, more particularly for making concrete;
- the cost of extra plant and equipment arising from a working day of less than 8 hours;
- the cost of building a bridge.

The study showed that in terms of overall cost there was not a great deal to choose between fast ferry boats and a temporary bridge. Chiefly for organizational reasons the latter solution was eventually adopted.

The bridge connecting the working island is situated seaward of the future storm surge barrier. It comprises 20 spans, each 145 m in length, and is 7 m wide (Figs. 1 and 2). Under normal circumstances it is suitable for carrying "class 30" highway traffic on two lanes.

If traffic is temporarily restricted to one lane only, a wheel load system of 4×14 tons can be allowed on the bridge. (Heavy loads on the bridge are subject to special regulations.)

The piers for this bridge are partly the existing ones originally intended for the overhead cable-way which would have been used for dumping rubble in the earlier scheme for completely damming the Eastern Scheldt. The other piers are new. Their dimensions are as follows: length ranging from 33 to 53 m, external diameter from 4,100 to 4,800 mm, wall thickness 47 mm, weight from 135 to 270 tons. They consist of tubular steel piles which are installed in the sea bed by boring to a depth of 16 m (average), followed by driving with a piledriver type MRB 2500.

The overall length of the bridge is 2,870 m; the underside of the superstructure is at a level of + 11 m AOD. Installing the tubular piles that form the piers of this bridge started in April 1978 and was completed in October of the same year.

(J.W. Dorresteijn and J. H. Wernsen)

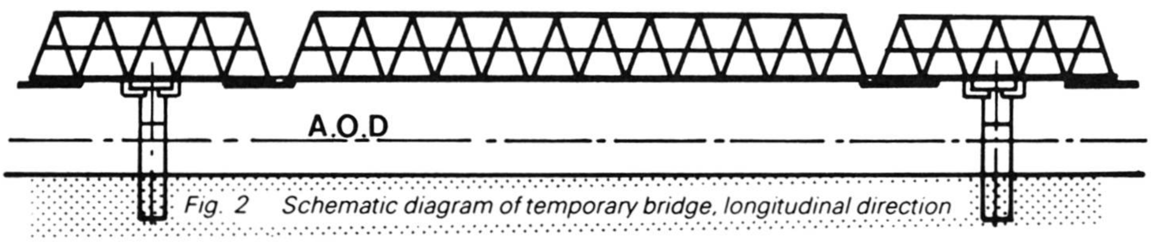

Fig. 2 Schematic diagram of temporary bridge, longitudinal direction