

Ouse Bridge on the M62 over the River Ouse near Goole, Yorkshire, for the Department of Transport, North Eastern R.C.U.

STRUCTURAL ENGINEERS
Scott Wilson Kirkpatrick & Partners
STEELWORK CONTRACTOR
Redpath Dorman Long (Contracting) Limited

Judges Comments

This deceptively large bridge is a magnificent solution to the demanding criteria for a major road-over-river bridge within a strict budget. In the immense flat landscape it is visible from all directions as it rises gently to its mid-span. Being supported by pairs of R.Conc, double cantilever structures, and having long approaches, the silhouette changes constantly as the view varies – a characteristic of such bridges. In fact one does not fully appreciate its sculptural qualities until one is underneath the great steel soffits. The steel decks are splendidly organised and detailed and the whole has a monumental character dramatically emphasised by the carpet of rolled gravel provided as semi-hard access for maintenance equipment.

Tenders were invited for the Ouse Bridge on the basis of three schemes, one being a steel twin box girder, a second in prestressed concrete and a third being a combination of these having prestressed concrete approaches and steel box girder river spans. In common with several other medium span bridges which were tendered for in 1972 the contract was awarded for the construction of a plate girder alternative submitted by the contractor. The cost of constructing steel box girders to comply with the latest Merrison requirements had made the box girder uneconomical at that time.

In former times the River Ouse meandered over a wide area and extensive deposits of peat and soft clays required a total length of approximately 1,340 metres to be bridged.

For the approaches on either side of the river 39m spans are used.

The river is crossed by 3 spans of 90m with adjacent spans of 61m and 46m on either side.

Site conditions dictated a design employing a minimum construction depth over the river, because the surrounding terrain is flat and low lying whilst it is also necessary to provide

sufficient vertical clearance for shipping. Therefore the 90m spans are only 2m deep at the centre over the navigation channels, although they are haunched to 4m at the piers. All other spans are 2m deep without haunching. It is this shallow construction depth in the river spans which gives the bridge its pleasing slender appearance.

The superstructure consists of eight lines of steel plate girders acting compositely with a reinforced concrete deck slab. The keynote of the design is simplicity, hence a minimum of cross bracing is used and the deck slab alone provides transverse distribution of concentrated loads. An exception to this rule is the 90m spans where continuous cross bracing is provided at mid-span. Plan bracing was added in the support regions of the 90m spans as a variation to the contract, to satisfy the latest Department of Environment criteria regarding aerodynamic stability at critical wind speeds.

Design of the superstructure was generally conventional. A computer grillage analysis was used to investigate the transverse distribution of concentrated loads. Much time was spent

designing additional web stiffening required to satisfy the Merrison criteria although this work was also greatly assisted by discriminating use of a computer.

Fabrication of the girders, which were mainly in Grade 50C material was in general straightforward. Most of the approach span girders were produced in R.D.L.'s Autofab plant at Teesside before despatch to the various fabricators for fitting of stiffeners, etc. The major complication to fabrication procedures was the necessity of measuring and recording the deformations of web plate panels and web stiffeners in accordance with the Merrison criteria.

The bridge superstructure is supported on reinforced concrete portal type piers founded on piles. For the approach spans small diameter concrete piles were used, cast in-situ in thin corrugated steel driven casings. Large steel cylinder piles 1.5m diameter were employed for the river spans.

