

Avonmouth Bridge

The Avonmouth Bridge is an essential section of the M5 Motorway carrying road traffic to and from Somerset, Devon and Cornwall. Situated 7.2km NW of Bristol and 12.8km south of the M4-M5

Almondsbury Interchange, the bridge links the South-West with the Midlands, London and South Wales.

The bridge has three main spans, one of 173.7m over the River Avon itself and two side or anchor spans of 112.8m. Clearance over high water is 30m thus permitting ships to continue up river to Bristol. Appreciable lengths of approach span give access from the flat flood-plain of the Avon to this relatively high structure. On the north side of the river ten approach spans carry the motorway over a housing estate, a main road, industrial buildings and a railway. On the south side there are seven approach spans. The approach spans on both sides of the river vary in length between 30m and 73m. Twin continuous welded steel box girders run the total length of the bridge, 1387m, interrupted only by a single expansion joint located just north of the main spans.

The bridge carries dual three-lane carriageways plus a median and two hard shoulders, a cycle track and a footpath, giving an overall deck width of 40.4m. The entire deck area has been designed to carry vehicular traffic.

In the superstructure of the approach spans the twin welded box girders are each 5.94m wide and have a constant depth of about 2.74m. The box girders are transversely connected by welded single-web plate cross-girders at 3m centres which continue through the boxes to form cantilevers supporting the cycle track and footway. The highway deck is a reinforced concrete slab 220mm thick acting compositely with the steelwork. Deck

waterproofing is provided by two layers of hand-laid mastic asphalt having a total thickness of 20mm and surfacing consists of hot-rolled asphalt 40mm thick laid over the mastic.

In the main spans, the welded boxes are also 5.94m wide as in the approach spans but vary in depth from about 3m over the anchor arm piers and at mid-span over the river to 7.62m over the main river piers. The boxes are connected transversely at 3.66m centres by welded single-web plate cross-girders which extend beyond the boxes as in the approaches. The main-span deck is a steel plate or battled deck 13mm thick stiffened with Vee-shaped stringers at 0.6m centres, the deck acting integrally with both the cross-girders and the main boxes. The wearing surface is a single course of hand-laid waterproof mastic asphalt 40mm thick.

STRUCTURAL ENGINEERS
Freeman Fox & Partners

STEELWORK CONTRACTOR
Fairfield-Mabey Ltd

CONSULTANT ARCHITECT
R. E. Slater

Judges Comments

The bridge crosses a major estuary and exploits the strength, lightness and versatility of steel to the utmost. The innovation of balancing the loads in the web during construction and using the battle deck to act compositely with the longitudinal boxes together with the well balanced proportions of substructure and superstructure lead to an economical and aesthetically pleasing result.

