

STRUCTURAL ENGINEERS

Mott, Hay & Anderson

STEELWORK CONTRACTOR

Redpath Dorman Long (Contracting) Ltd

Judges Comments

An attractive and efficient arrangement of composite steel bridgework, which provides a fitting complement to the visual characteristics of the environmental setting.

Although there appears to be no engineering reason for the heavy piers, the way the haunched beams of the main span relate to those piers and to the approach spans with their inset supports is very good.

The bridge carries the M27 Motorway across the River Hamble near Southampton. The river is tidal and is approximately 100m wide. Very weak organic silt overlies London Clay at about 12m depth in this area.

Spans giving a total length of 252m are 28, 33, 40, 50, 40, 33 and 28m, the width being 33.4m. Plan curvature to 1,000m radius occurs. The deck is continuous over all spans with expansion joints at each abutment. Longitudinal restraint is provided at one main pier. Ten composite welded steel plate girders form the deck at 3.5m centres, mainly grade 50 steel. The concrete deck slab is 220mm thick. The girders are generally 1.2m deep, but over the 2 main piers are curved to a depth of 2.5m. Site splices occur at contraflexure points using high strength friction grip bolts. Transverse bracings are provided between the girders. Plan curvature is provided by direction changes at the site splices. An unusual feature is the intermediate pier arrangement. These comprise 5 round reinforced concrete columns supporting a composite steel crosshead. PSC 'Tetron' spherical sliding bearings surmount the columns. The crosshead occurs within the main girder depth, the columns being positioned intermediate to the main girders. This reduced the number of bearings. The clean appearance has resulted and provides shelter from weather to the outer bearings at these piers. It has been possible to eliminate external bearing stiffeners to the main girders.

At the main piers the girders are supported directly on hollow reinforced concrete cutwater piers. Box section bearing stiffeners are provided to the external girders. All piers are supported on a total of 420 BSP steel cased piles 500mm diameter up to 24m long. Substantial steel sheet piled cofferdams were provided for constructing the main piers.

All steelwork has received a 5-coat painting system based on chlorinated rubber to suit the severe coastal environment. Extra stiffening has been provided for the bridge to conform with relevant aspects of the Merrison Rules for box girder bridges now being adopted for plate girder bridges.

A total of approximately 1,000 tonnes of structural steel occurs in the bridge (119kg per sq.m of deck area).

