TESTING FORUM

AWARD

The Concrete Society's 1982 award for civil engineering was given for the Thames Barrier Civil Engineering Works.

- Consulting Engineers: Rendel, Palmer, and Tritton
- Architects: Department of Architecture and Civic Design, Greater London Council
- Main contractors: Costain-Tarmac-HBM Joint Venture
- Concrete pumping: Albills Concrete Limited
- Prestressing of sills: PSC Equipment Limited

Completion of the in situ concrete piers and massive precast concrete gate sills in 1981 allows the gates and machinery for the Thames Barrier to be installed for the scheduled operability date of Nov. 1982.

This unique project, which in conjunction with downriver bank-raising work is being constructed to protect London and the riverside communities from flooding by surge tides, has demanded high standards of design, ingenuity, and contractor's expertise in using concrete. Twenty-five different approved mixes were used, demonstrating concrete's versatility in both structural and architectural applications.

The piers are designed to accept massive loads from the gates and machinery and transmit them to the sub-strata and to cater for the possibility of ship collision. They were constructed in individual cofferdams excavated to foundation level and sealed with tremie concrete before dewatering. The largest base contained 6670 m^3 of 150-mm concrete with a set-retardation of 36 h, poured continuously over a period of 76 h at an average rate of 88 m^3/h.

The concave riverbed sills in which the gates are housed during normal tide conditions span from pier to pier to accommodate relative settlement and were constructed in a dry dock on the north bank of the river to limit obstruction of the river during construction of the barrier. The 60-m long units were post-tensioned to relieve tensile flange stresses.

The sills are cellular to provide the buoyancy essential to the operations of floating them into position and lowering them onto prepared seatings on the piers; submerged weight, governed by wall and slab thickness and concrete density, was critical to these operations. Multiuse steel formwork was used for the walls and timber boarding for the soffits. The units were cast on a 1-mm steel plate on a bed of no-fines concrete to assist "float-up" when the dock was flooded. The special finish to the convex invert, designed to accommodate high-velocity water flow under the gates during operation, was obtained by using a powered beam screed followed by hand trowelling of a cement-rich low workability no-fines mix to a maximum unshuttered angle of 26°.

Judges' Comment

This whole flood protection scheme is a milestone in civil engineering. In particular, attention is drawn to the deep profiled precast sill units that link with the mechanical components and demonstrate a superb example of concrete engineering.

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ASTM Committee C-1 on Cement

Scope

The development of specifications, methods of test, recommended practices, and definitions of terms for hydraulic-cements, including portland, natural, pozzolanic, masonry and slag cements, and modifications of the foregoing, and combinations during manufacture thereof; the investigation of the properties of hydraulic cements and the promotion of improvement and uniformity of testing and these materials; joint sponsorship, with ASTM Committee C-9 on Concrete and Concrete Aggregates, of the Cement and Concrete Reference Laboratory, a cooperative project of the Government and ASTM.

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ASTM Committee C-9 on Concrete and Concrete Aggregates

Scope

The assembling and study of data pertaining to the properties of portland cement concrete and its constituent materials, including the study of effect of characteristics of materials and mixtures upon the properties of concrete; the development of methods of test for concrete and for the constituent materials of concrete (except cement), as well as for certain related materials, such as materials used in curing; the formulation of standard specifications for the constituent materials of concrete (except cement) and for concrete itself (subject to suitable interpretation of the term "concrete"). The scope of Committee C-9 does not include the field of design and construction of concrete structures except insofar as references need to be made to construction methods in special cases of concrete as "over-the-counter" materials.

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