Faber Maunsell - Winner of the 2005 British Construction Industry Award of the Year for International Projects

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Taiwan High Speed Rail Project Contract C270

LONDON (Dec. 14, 2005) — In October 2005, Faber Maunsell won the 2005 British Construction Industry Award of the Year for International projects for the Taiwan High Speed Rail Contract.

Faber Maunsell was commissioned by the joint venture Bilfinger+Berger/Continental Engineering Corporation to carry out the design and detailing of seismic resistant viaducts for the Contracts C260 & C270, which forms part of the 345km long Taiwan High Speed Rail Project. These contracts were varied and technically complex along this route, where the railway passes across several wide river plains of very weak soils and the bedrock is over 96m below ground level.

The railway crosses the river at some 28m above the foundation level, but the allowance for scouring lowers the design bed level a further 11m. The river piers are subject to forces resulting from hydrodynamic effects during a seismic event and subsequent mud slides.

Faber Maunsell developed the structural layout and dimensions through a value engineering exercise. Multi-modal response spectrum analysis was used to determine seismic demand. Adoption of Capacity Protected Design principles together with the non-linear soil-pile interaction analysis for foundations and non-linear time history analysis for deck track-structure interaction produced cost effective and realistic solutions.

Faber Maunsell also developed the design to suit the Full Span Launching Method which was chosen for deck erection on this contract due to the variable terrain and restricted site access. In this method, a launcher and a dedicated girder transporter makes use of the substructure and deck sections already completed to advance the deck erection.

The structure comprises 2.0m diameter bored cast in-situ concrete piles up to 65m long with variable pilecap. The columns varied in size up to 2.8m x 3.2m depending on the height of viaduct. Superstructure comprises post-tensioned concrete box girders, 3.25m deep, up to 35m long, weighing up to 780 tonnes.

Faber Maunsell established a co-ordination team in Taiwan to liaise with the JV and Employer on design matters and to obtain approval for the designs. Design work was undertaken in the UK and the time zone difference was utilised to ensure changes made during the day in Taiwan could be could be processed in the UK ready for the next morning's work on site.

Key Features

- Fast track design and build
- Value engineering in design
- Seismic design and detailing
- Multi-modal and time history analyses
- Precast post-tensioned concrete viaduct
- Production of over 9600 drawings and several hundred design reports