

Project identification

HZMB Main Bridge - Review of Designs & Consultancy Services during Design and Construction Phases

Type of project
Consultancy Immersed tunnel/Artificial islands

2018



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Client

HZMB Advanced Work Coordination Group/HZMB Authority

In co-operation with

TY Lin International (1 & 2); Shanghai Municipal Engineering Design Institute, TY Lin International, Guangzhou Metro Design Institute (3)

Project assignment

(1) Review of the HZMB Special Standards; (2) Conceptual Design Review; (3) Review of the Preliminary and Detailed Design, Preparation of Tender documents, Consultancy during Design and Construction phase

Country

PR China

Location

Zhuhai

Project duration

2009 - 2018

Project phase

Feasibility Study, Conceptual Design, Preliminary & Detailed Design and Construction phase

Construction cost

Approx. 38 billion RMB
(Full marine section- tunnels, islands, bridges)

Consultancy fee

Approx. € 5.5 million
(TEC share)

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Project description

The Hong Kong – Zhuhai – Macau Bridge (HZMB) Fixed Link project provides for a fixed link between the two Chinese economic centres Hong Kong and Macau (both of which are Special Administrative Regions within PR China) and the mainland of China at Zhuhai. The whole link, which measures some 50 km in length, has been divided into several major sections. The Main Bridge section of the HZMB runs from the (marine) borderline of Hong Kong to the Border Crossing Facility (BCF) Island for the coast of Macau / Zhuhai. The Main Bridge section has a length of approximately 30 km and includes a 6 km immersed tunnel that is flanked by 2 artificial islands to accommodate the transition to the bridge part that run towards Hong Kong and Macau / Zhuhai. The bridge part of the Main Bridge section includes various box-girder and cable-stayed bridges. The Link will carry a three-lane dual carriageway with a design speed of 100 km/h and is designed for a 120 year design life. To accommodate the passing of 300,000 tonnes vessels, the tunnel will be approximately 40 m below the seabed.

Scope of work

During the feasibility phase, the TEC/TYLI JV performed a review of the HZMB project-specific Special Standards for the Design, the Construction, the Operation & Maintenance and the Quality of the Main Bridge part of the HZMB. The review had to ascertain that these Special Standards were not only in compliance with China, Macau and Hong Kong Codes and Standards but also state-of-the-art from an international perspective.

Under this assignment TEC covered all aspects related to the Tunnel (immersed and in-situ), the Artificial Islands including the Tunnel Technical Installations.

Following the Special Standard review, TEC/TYLI JV also provided for the review of the Conceptual Design, to ensure the accuracy and rationality of the design and related studies and research results. TEC again covered all (immersed and in-situ) tunnel and artificial island related aspects.

For the Preliminary design phase and subsequent phases, TEC and TYLI entered into a JV with the Chinese SMEDI and GMDI. The Scope of Work that was assigned to this JV included review of the preliminary and detailed designs as well as design variations during the construction phase, preparation of the Tender documents and project specific consultancy during the design and construction phases, which also included a training aspect.

Under this assignment, TEC was the leading member for the tunnel and islands related aspects and provided general consultancy on quality management, risk management, and other.

Some of the key issues of the HZMB Main Bridge tunnel and island include:

- Review of Preliminary, Final design to confirm before entering the tender and procurement stage. In this stage TEC prepared the technical specifications and assisted the Client in the compilation of the tender documentation for the first large D&B contract in China.
- Review of Detailed Design and Consultancy during Construction phase. TEC is supposed to bring in the specialist expertise regarding interaction between immersed tunnel design and construction and knowledge about critical details (ongoing).
- CPT-U special study to introduce in China the use of cone penetration tests as an economic way to explore ground conditions (study was performed for HZMB project).
- (detailed) parallel analyses (special studies) to confirm the detailed design on critical issues, such as the longitudinal design including joint design, seismic analyses and cross section structural analyses.