

Industry Practitioners Category

Construction Manager

Excellent Award

Brian HO Kwok-chee



Intermodal Transfer Terminal – Bonded Vehicular Bridge and Associated Roads (Contract No. C19W10)

The Project site is situated between the Hong Kong-Zhuhai-Macao Bridge Boundary Crossing Facilities (HKBCF) Island and the Hong Kong International Airport (HKIA). The project has designed Hong Kong's first marine-friendly hanging cofferdam for pile cap construction to avoid disturbance to the seabed. Alternative designs and methods for bridge deck construction have contributed to a significant carbon reduction, while total reuse of sediment avoided marine dumping and direct contamination to the marine environment.

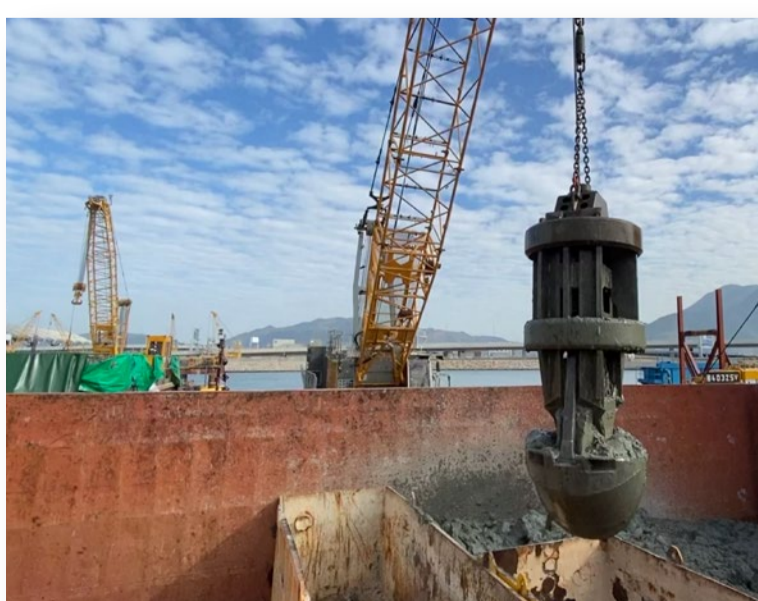
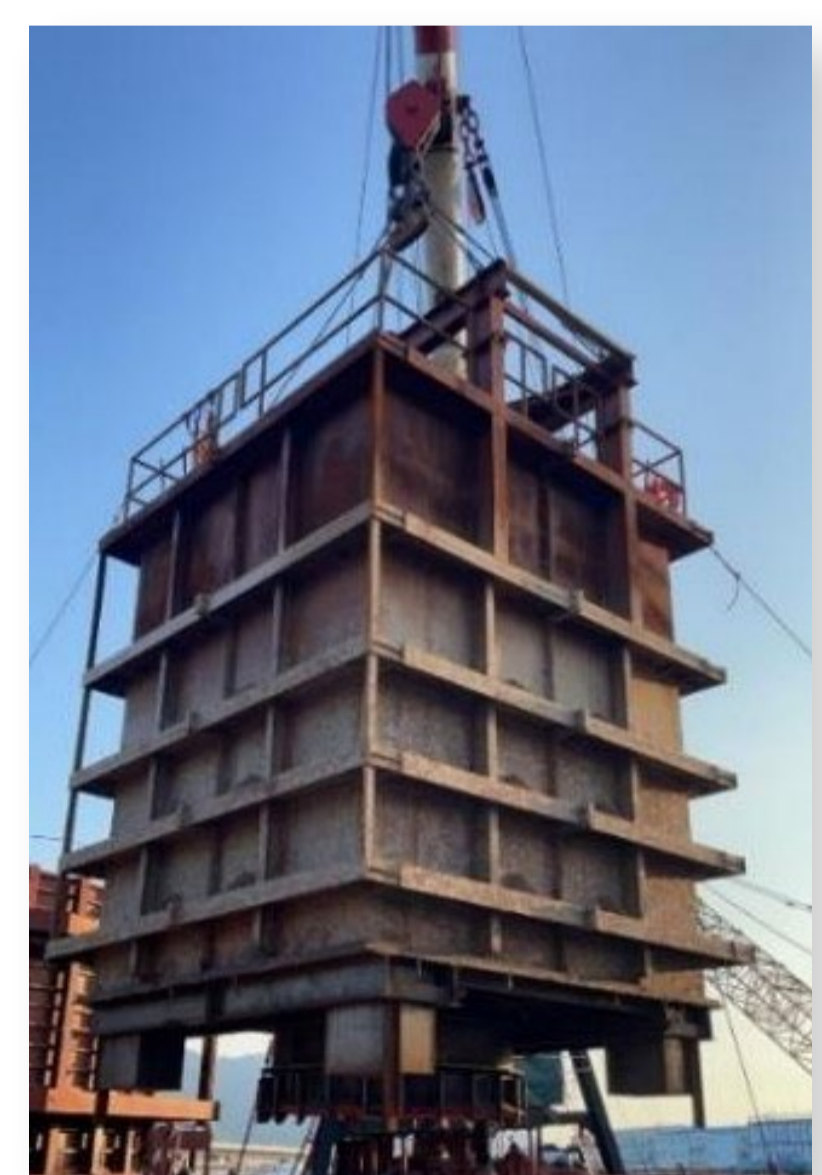


Sustainable Best Practice 1

Brian Ho has proposed a low carbon method for bridge deck construction during the engineering consultation stage. After consultation and collaboration with a third-party environmental and engineering consultant, Brian led the team to propose an Environmental Review and engaged EPD and our client AAHK, to adopt the alternative approach. Changing the construction method for the bridge deck from pre-cast segment erection to cast-in-situ method by Form Traveller. Compared to the conforming design, 120 tonnes of re-bar and 330m³ of concrete (equivalent to reduction of 747 tonnes carbon emission) can be saved due to the slimmer structure of cast-in-situ bridge deck, 1,253 tCO₂-e embodied carbon has also been avoided by use of green concrete. Avoided 45 trips of cross-border travelling trips to minimise impact to marine ecology and marine park in the vicinity, including Sha Chau and Lung Kwu Chau Marine Park (SCLKCMP) and The Brothers Marine Park (BMP).

Sustainable Best Practice 2

During the design stage of the cofferdam for marine pile cap construction, Brian initiated a discussion with the diving subcontractor, Gammon's in-house temporary works designer, and operation team to brainstorm an enhanced design to eliminate underwater works and minimise environmental impact. The First marine-friendly hanging cofferdam in Hong Kong was designed for pile cap construction. Compared with the typical design of a temporary cofferdam structure that requires insertion of steel shell to the seabed which causes unavoidable sediment displacement of the seabed, its design not only reduced material usage which can eliminate embodied carbon emissions to achieve decarbonization, but also minimised the disturbance to 264m² seabed and marine habitats, providing a sustainable and innovative nature-based solution to our marine construction.



Sustainable Best Practice 3

Since project commencement, a Zero Waste plan was established by Brian to suggest "Zero Waste to Sea". Avoiding marine dumping operation to prevent direct contamination of the marine environment, "Zero Waste to Sea" was achieved by reusing additional 1,510 m³ marine-based sediment that beyond EIA and the contractual recommendation target of 1150 m³. Marine dumping operation was avoided to prevent direct contamination of the marine environment. Hence marine traffic route was shortened significantly from 42.5km to 5km, for transporting marine sediment for further treatment before reuse which eliminated 3 tonnes of carbon emission. 1,140 tonnes of cement use in Cement Stabilisation and 1,150 tonnes of carbon emissions were eliminated by optimising treatment processes. Testing determined the optimum mixing ratio with a minimum use of carbon-intensive Portland cement - 0.5%, a huge improvement compared with the 5-20% typically used in Hong Kong.