

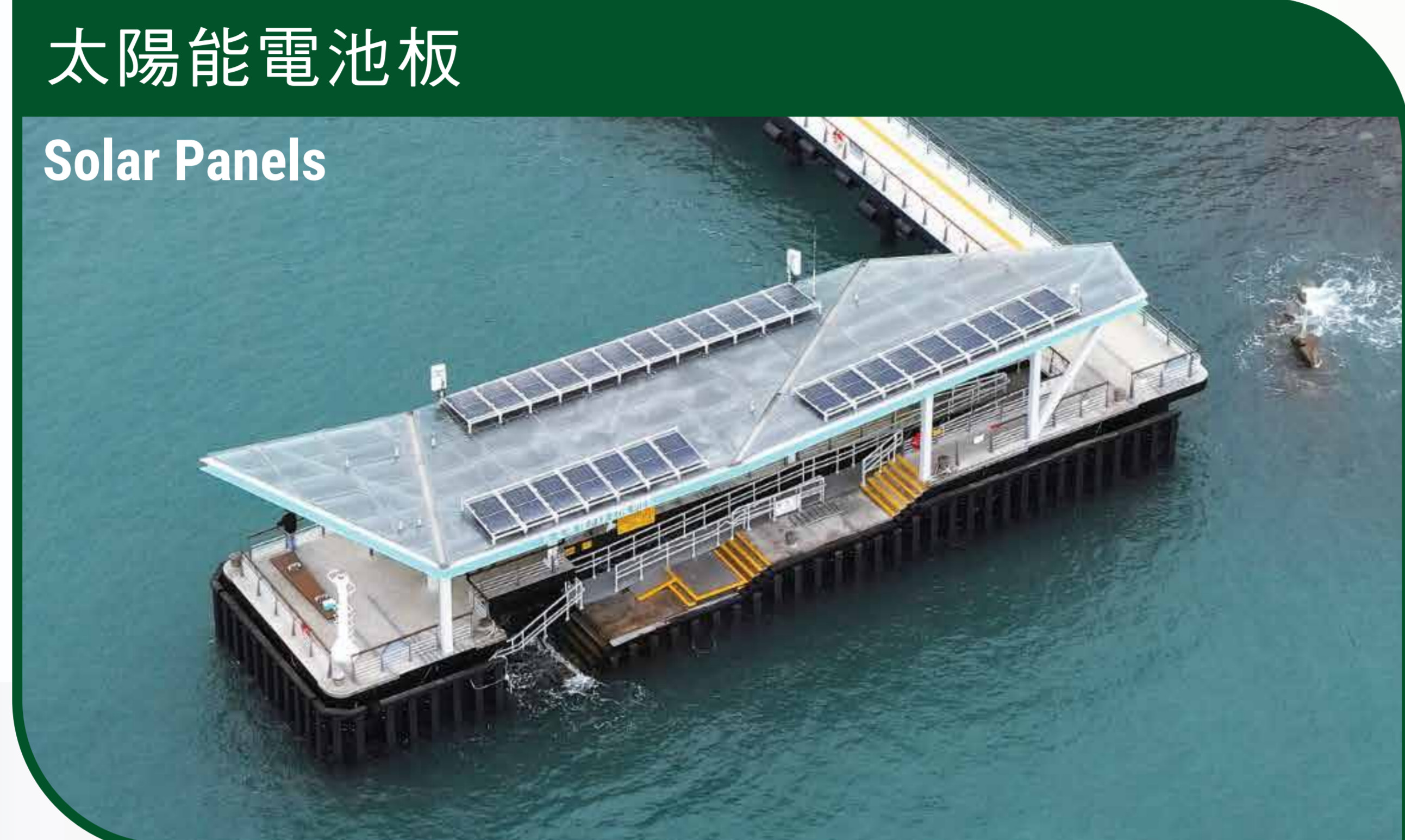
太陽能電池板 Solar Panels

「重建南丫島北角碼頭工程」為新碼頭新增配套設施，例如太陽能電池板和Wi-Fi。

Under the reconstruction of Pak Kok Pier on Lamma Island, ancillary facilities are provided in the new pier, such as solar panels and Wi-Fi.

太陽能電池板

Solar Panels



Wi-Fi 熱點 Wi-Fi Hotspot

新碼頭提供了 Wi-Fi 熱點供公眾使用。電子顯示板能透過互聯網取得當前溫度、天氣和渡輪班次等資訊。

Wi-Fi hotspot is available to the public at the new pier. With internet connection, the display panel can show other information, such as current temperature, weather and the ferry services schedule.

Wi-Fi 熱點和電子顯示板

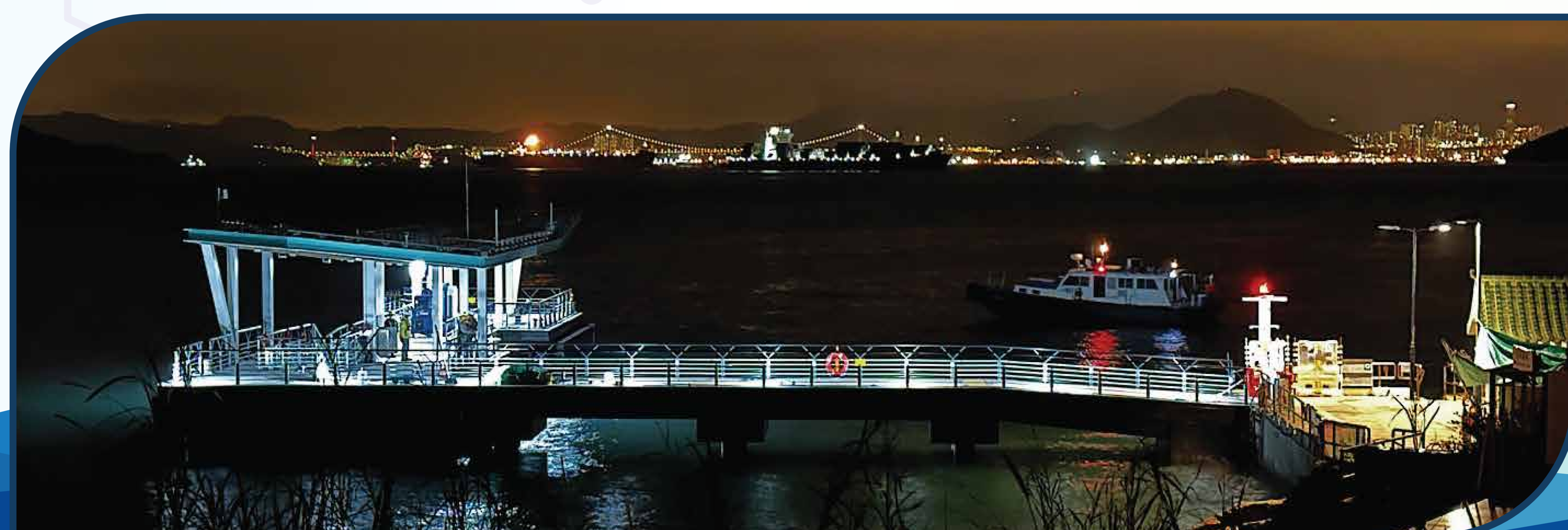
Wi-Fi hotspot and display panel



智能照明 Smart Lighting

部分公眾碼頭採用了智能照明系統，能夠監測照明系統的狀態。而南丫島北角碼頭的照明系統能根據當前的時間和周邊環境光線水平來自動切換不同的亮度。

Smart lighting system is adopted in some of the public piers for monitoring the status of the lighting system. The lighting system at the Pak Kok Pier on Lamma Island will automatically alter between different brightness, taking into account current time and ambient light level.



監察傳感系統 — 碼頭

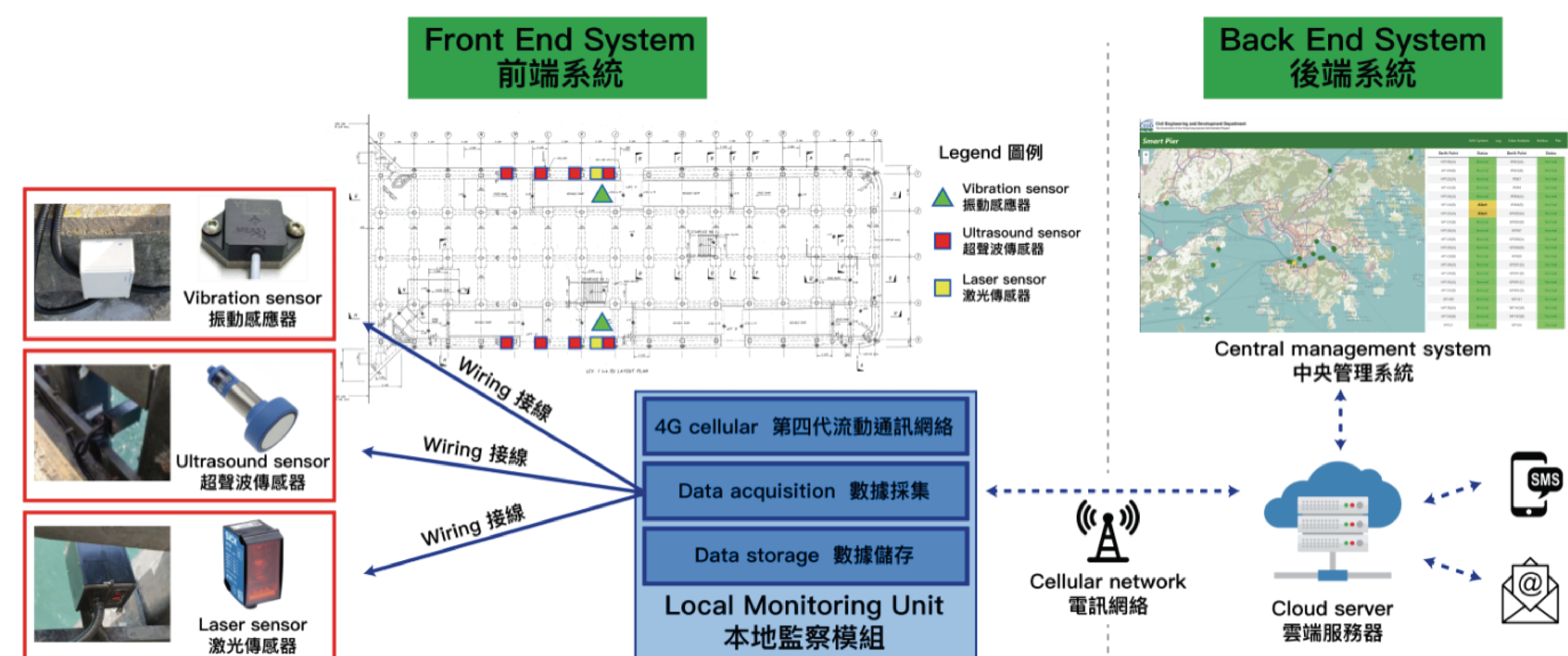
Sensor-based Monitoring System at Pier

我們與香港生產力促進局合作研發的碼頭傳感監察系統，可實時收集船隻泊岸時對碼頭產生的撞擊力數據，並即時上傳到中央管理系統進行數據分析。這套系統獲頒發2023年日內瓦國際發明展銅獎。

We co-developed with the Hong Kong Productivity Council to develop Sensor-based Monitoring System to collect real-time data on vessel berthing forces on piers, and instantly upload the data to the central management system for data analysis. This innovative system received a Bronze Medal in the 2023 Geneva International Exhibition of Inventions.

碼頭監察系統的概要圖

Schematic Diagram of the Sensor-based Monitoring System at Pier



安裝在碼頭結構和護舷上的傳感器 Sensors Installed on Pier Structures and Fenders



2023年日內瓦國際發明展銅獎

Bronze Medal in the 2023 Geneva International Exhibition of Inventions



照明系統能自動切換不同的亮度

Lighting system will automatically alter between different brightness

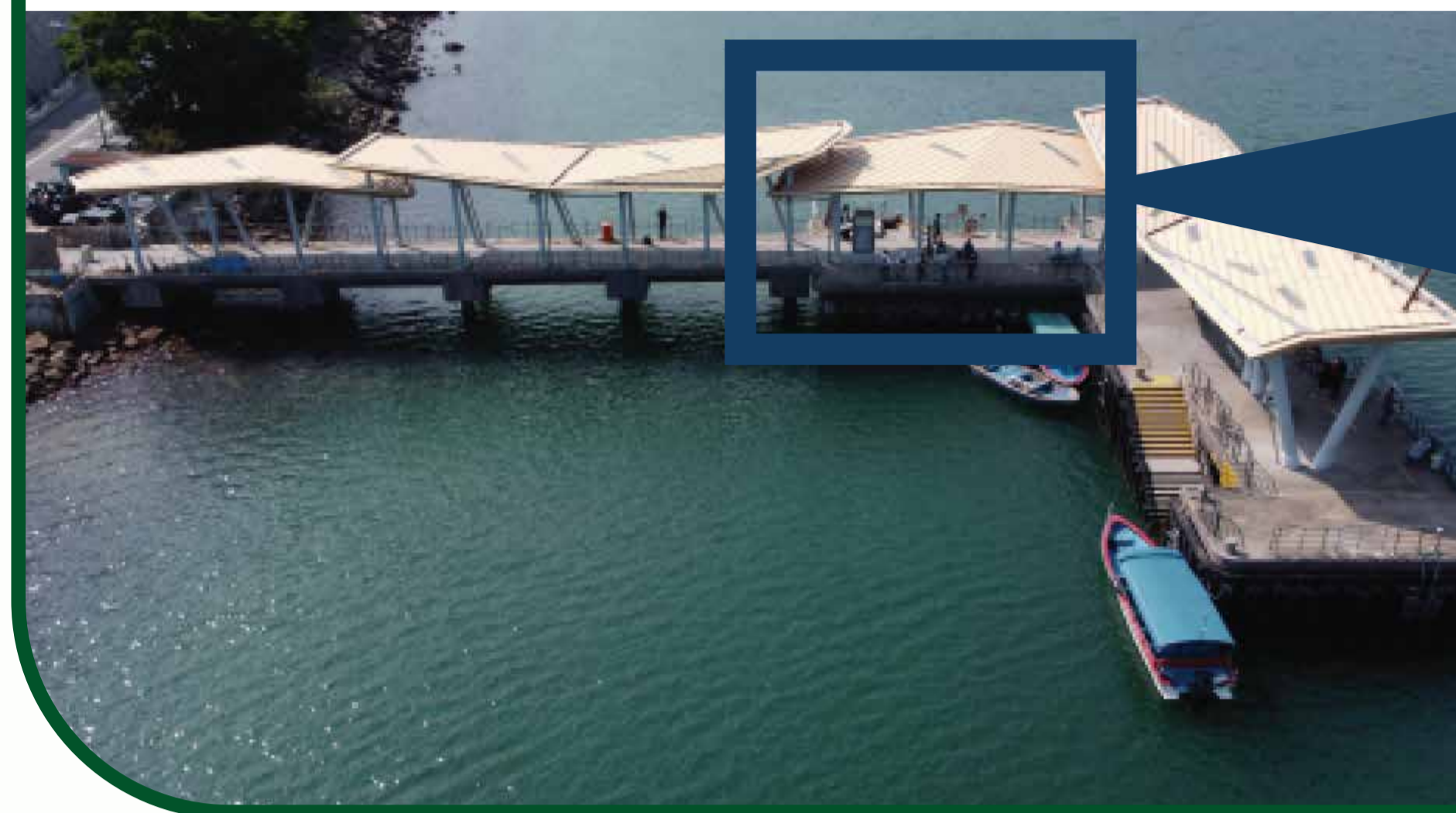


應用擴增實境技術於港口維修 Application of Augmented Reality (AR) in Port Maintenance

我們開發了一套流動應用程式，以便利工作人員在巡查及維修海事設施時收集資料。流動應用程式透過擴增實境技術，讓海事設施的建築信息模擬和實境，能同時顯示在流動裝置的畫面內。

We developed a new mobile APP for collection of maintenance data. By applying AR technology, the Building Information Modelling (BIM) of a marine asset can integrate with the actual site on the screen of mobile device.

黃石公眾碼頭
Wong Shek Public Pier

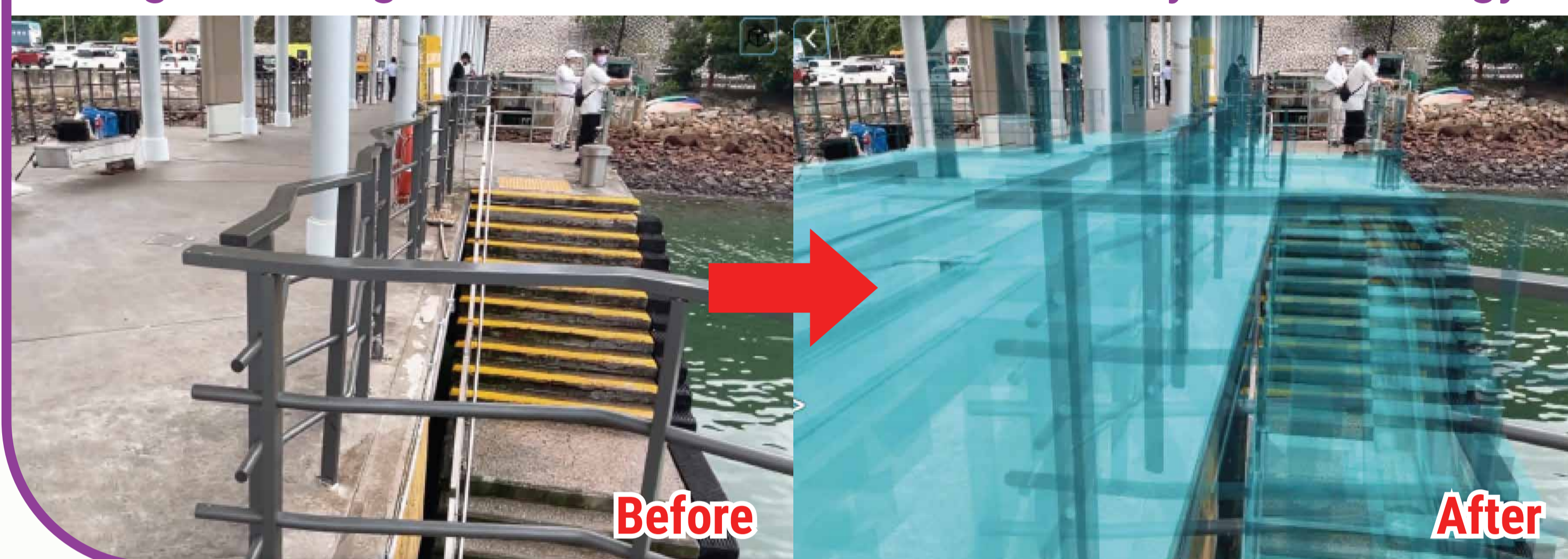


結合影象
Integrated Image



透過擴增實境技術結合建築信息模擬和實境

Integrated Image of Site Condition and BIM Model by AR Technology



工作人員可以即時紀錄和上載有關海事設施的最新維修狀況，翻閱以往的維修紀錄，並可以清楚及快捷地檢視建築信息模擬內的相關資料。

Inspection personnel can record and upload the latest condition of marine assets instantly. The past maintenance records and other information that stored in the BIM could also be retrieved and clearly displayed in the mobile APP.



無人駕駛飛機(無人機)的應用 Application of Unmanned Aerial Vehicle (UAV)

為節省搭建臨時工作平台的時間和成本，我們與無人機專門承造商合作研究，以利用無人機拍攝碼頭承台結構的高解像度影像。此舉有助檢查人員找出碼頭中間位置的結構狀況及損毀之處。

In order to save time and cost in erection of temporary working platform, we are working with a UAV specialist for using UAV to take high resolution images of pier sub-structures. This can assist inspection personnel in identifying the structural condition and the damages of the middle part of the piers.



利用無人機拍攝碼頭承台結構的高解像度影像

Inspection of pier-substructures by using UAV for taking high resolution images



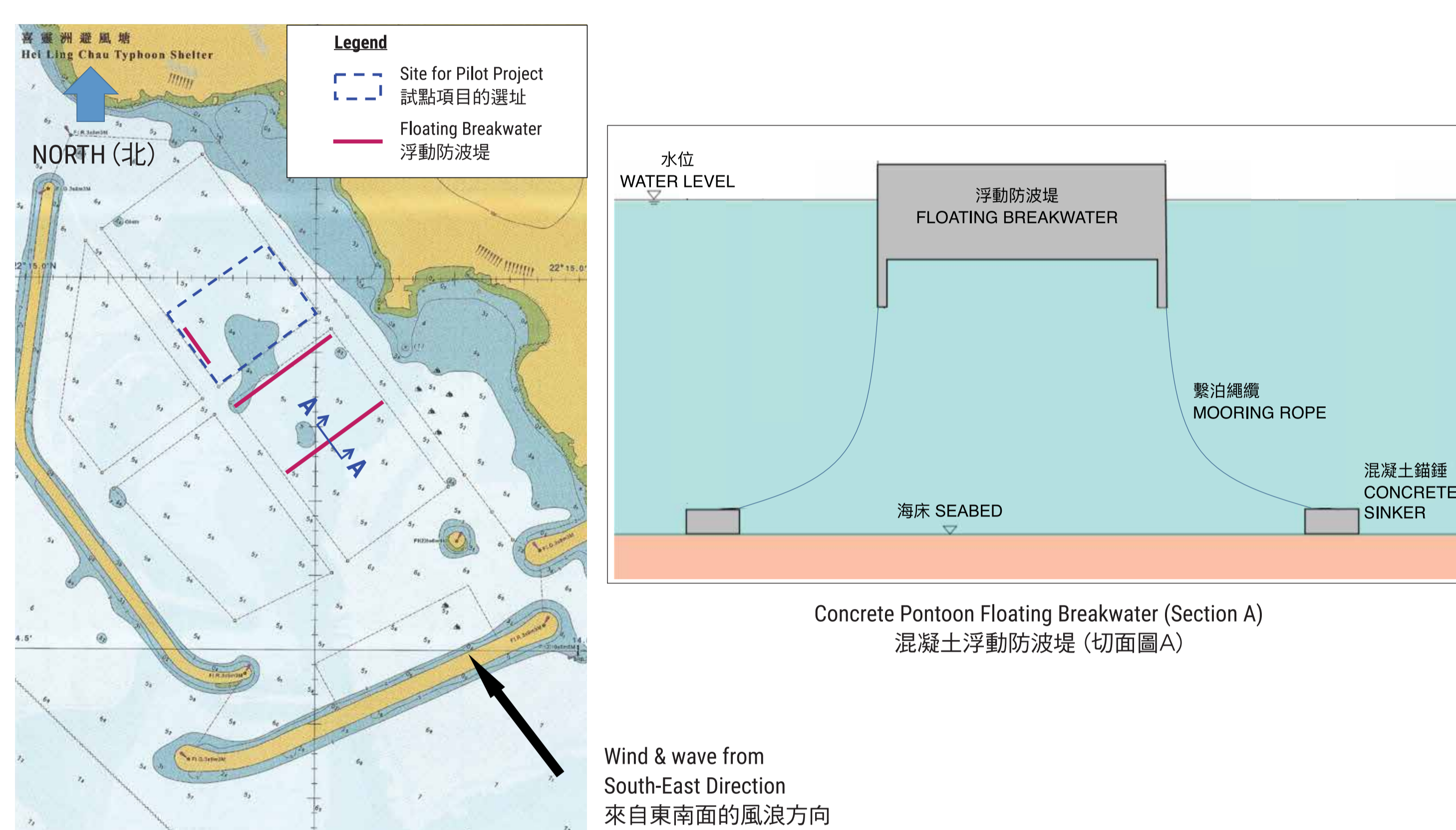
浮動防波堤 Floating Breakwater

為了緩減喜靈洲避風塘內的波浪到可接受的水平，在喜靈洲避風塘現有的繫泊區域，安裝了總長約700米混凝土浮動防波堤作為試點項目，以評估其在極端天氣情況下的對消減波浪的表現。

In order to mitigate the wave climate inside Hei Ling Chau Typhoon Shelter (HLCTS) under extreme conditions to an acceptable level, concrete floating breakwater with a total length of about 700m is installed at the existing mooring areas in HLCTS as a pilot project to assess their wave attenuation performance.

喜靈洲避風塘浮動防波堤的佈局

Layout of Floating Breakwater at Hei Ling Chau Typhoon Shelter



浮動防波堤消減波浪效果

Floating Breakwater Wave Attenuation Effect



建築信息模擬

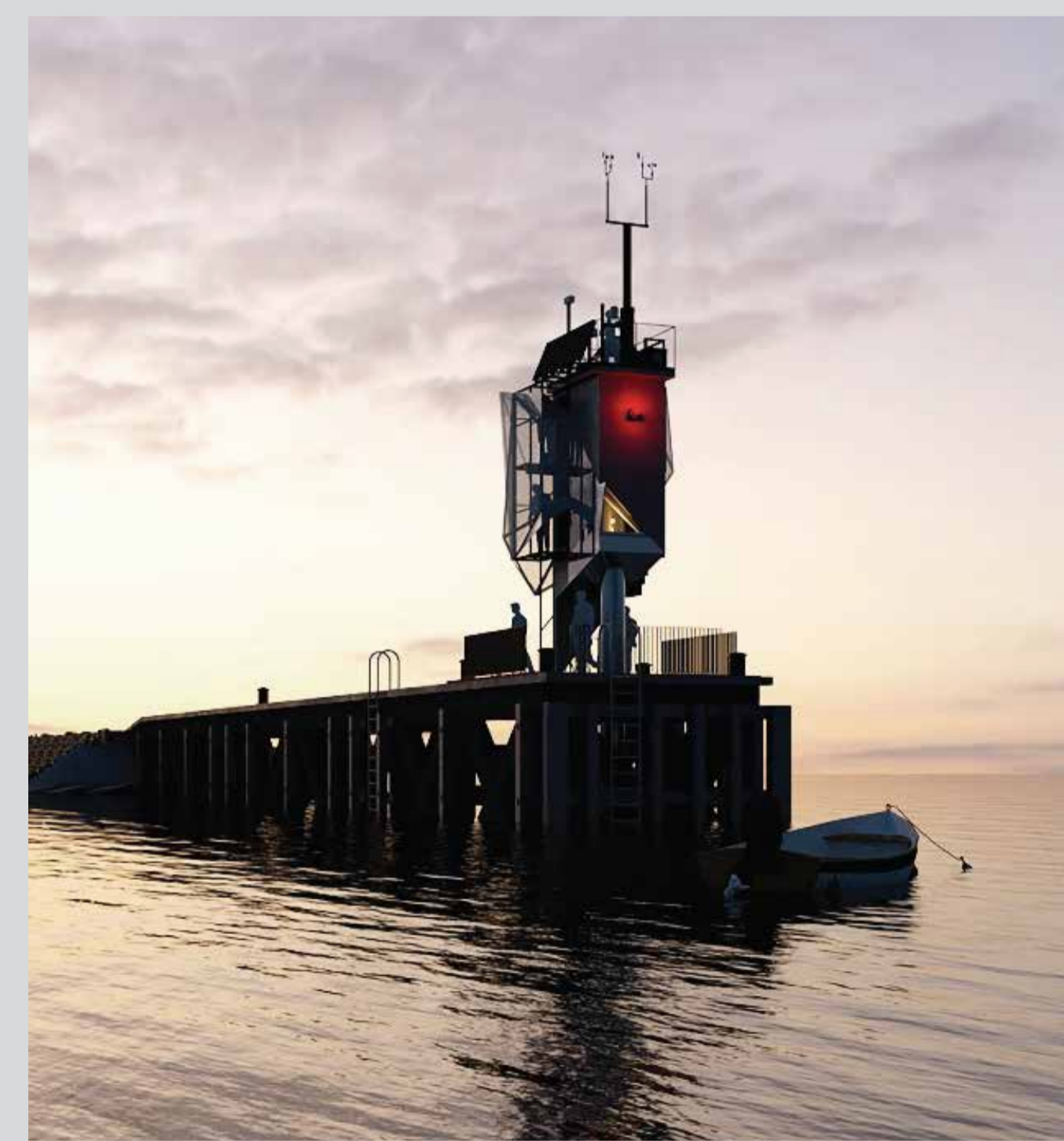
Building Information Modelling (BIM)

建築信息模擬能幫助資產管理，例如讓海事設施能以立體形象呈現，令我們快捷有效地獲得個別部件的資料及維修數據。

BIM facilitates asset management, such as enabling 3D visualization of the asset, allowing us to obtain information and maintenance data of specific component easily and efficiently.

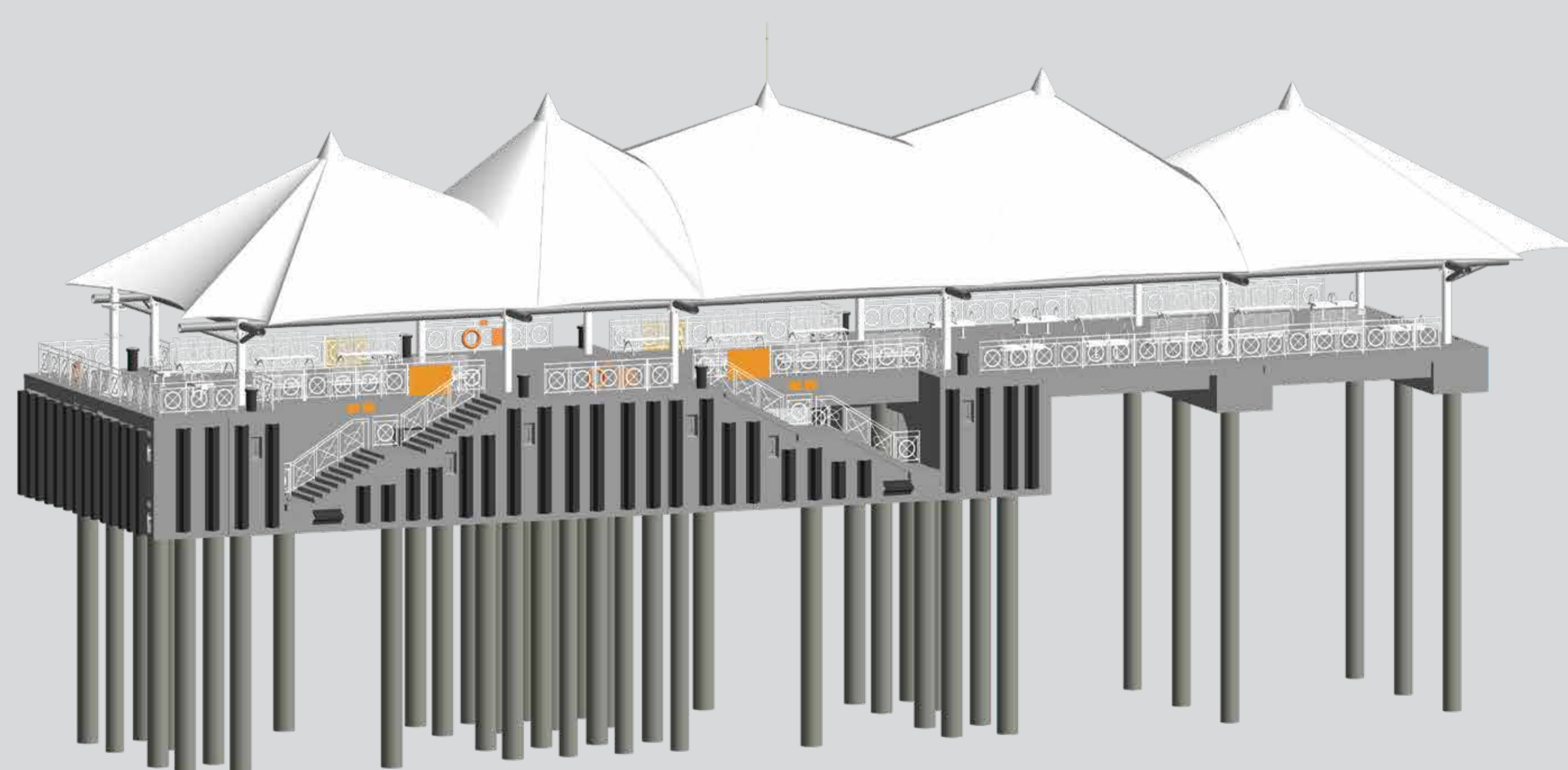
擬重建的大埔滘潮汐測量站的建築信息模擬

BIM Model for Proposed Reconstruction of Tai Po Kau Tide Gauge Station



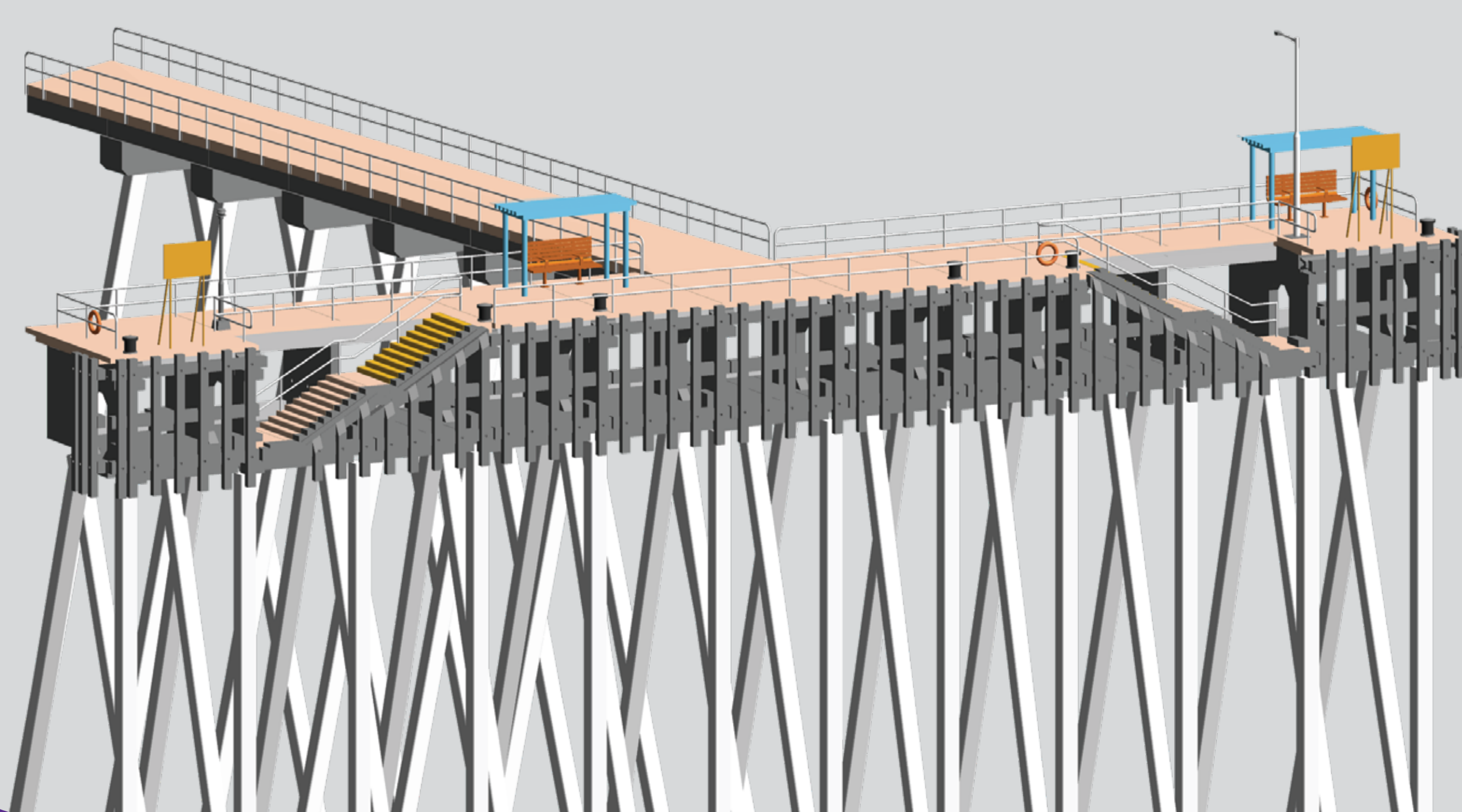
長洲公眾碼頭的建築信息模擬

BIM Model of Cheung Chau Public Pier



糖水道公眾碼頭的建築信息模擬

BIM Model of Tong Shui Road Public Pier



玻璃纖維增強複材(GFRP) Glass Fiber Reinforced Polymer (GFRP)

玻璃纖維增強複材(GFRP)是一種由玻璃纖維和樹脂合成的複合材料，其特性為：

- 高耐腐蝕性
- 高耐久性
- 高環境效益

Glass Fiber Reinforced Polymer (GFRP) is a composite material composed of glass fibers embedded in polymeric resin matrix. Its characteristics are as follows: -

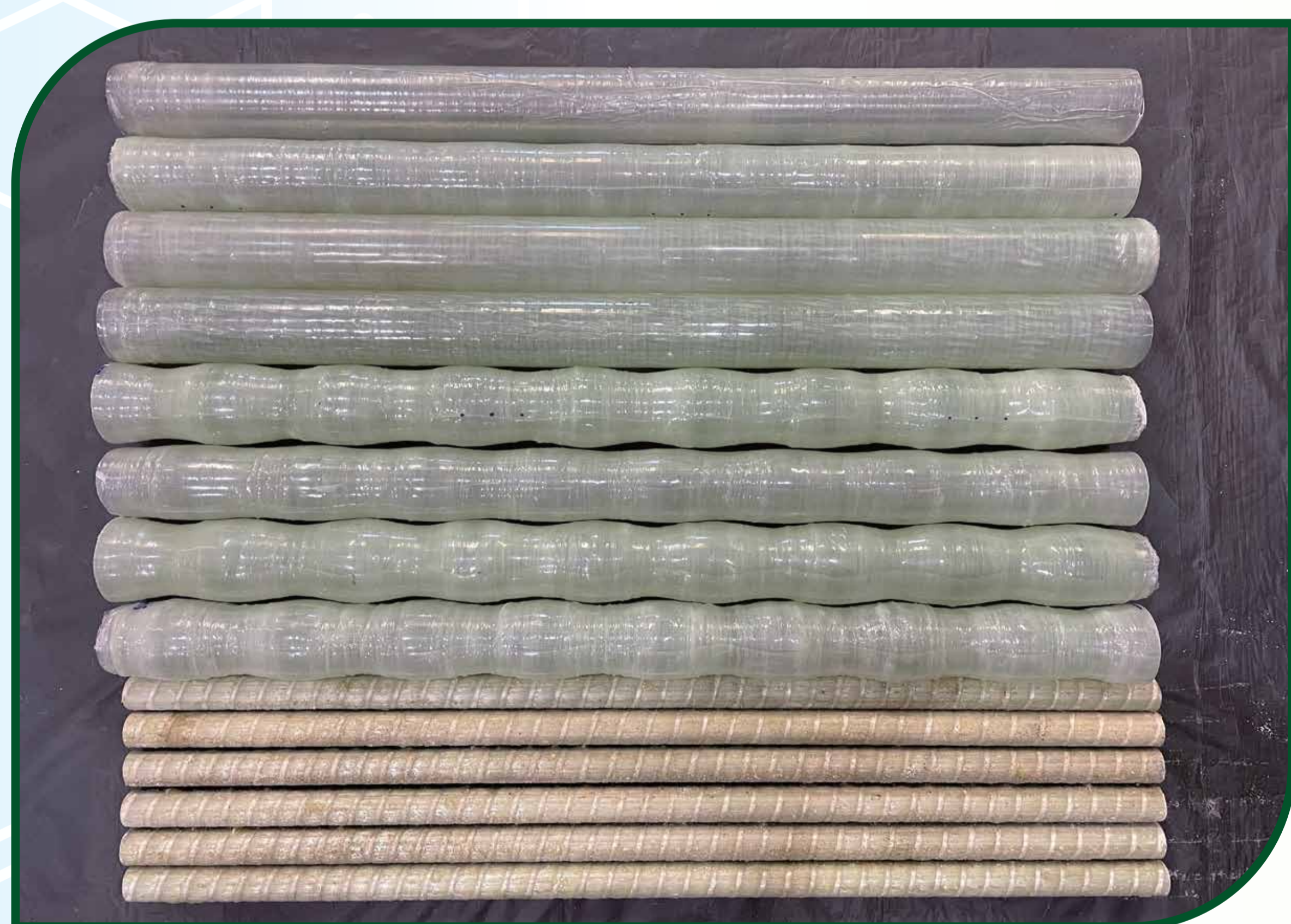
- high corrosion resistance
- high durability
- more environmentally friendly and sustainable



製造玻璃纖維增強複材
Fabrication of GFRP



測試含玻璃纖維增強複材的混凝土樑結構
Test for GFRP Compositing Concrete Beam



玻璃纖維筋
GFRP Rebar



南丫島北角碼頭混凝土層板結構中的
玻璃纖維筋
GFRP Rebar in Concrete Slab of the Pak Kok Pier
on Lamma Island

鑑於GFRP對海事設施的好處，我們已開始在南丫島北角碼頭、大埔鐵路碼頭、荔枝莊碼頭、鯉魚門擋浪牆工程中，開始試用玻璃纖維筋。

In view of the benefits of GFRP for marine facilities, we have started the trial use of GFRP in the construction of Pak Kok Pier on Lamma Island, Tai Po Railway Pier, Lai Chi Chong Pier and Lei Yue Mun were walls.