CEDD
古洞北 粉嶺北新發展區
Kwu Tung North | Fanling North New Development Area

通訊 Newsletter
二零二三年六月 June 2023

智能科技應用策略
構建更安全工地環境

Strategic Application of Smart Technology
To Achieve Safer Site Environment

簡介 Introduction

為配合發展局及建造業議會提出的建造業2.0提出倡議，土木工程拓展署積極於轄下工程項目推廣智能工地概念，及應用先進科技方案以構建更安全工地環境，其中在古洞北及粉嶺北新發展區(第一階段)工程，更全方位於規劃及設計、施工等各階段均推行數碼化策略。

本工程項目廣泛採用「智慧工地安全系統」，包括智能安全系統，以監察施工活動及識別安全隱患，用作傳輸智能安全系統收集的數據之通訊網絡；以及中央管理平台。系統能實時收集數據，並傳送到一個一站式管理平台，當發現有潛在安全隱患，系統會即時向前線安全管理人員發出警示。

To echo the Construction 2.0 initiatives promulgated by the Development Bureau and the Construction Industry Council, Civil Engineering and Development Department (CEDD) has been actively promoting the concept of smart site and use of advanced technology solutions for developing a safer site environment. Digitalization strategy has been implemented at all stages of planning, design and construction under the Kwu Tung North and Fanling North New Development Area (First Phase) Project.

The "Smart Site Safety System" has been widely adopted in this Project, which includes smart safety devices for monitoring site conditions and identifying safety hazards; a communication network for transmitting data collected from smart safety devices; and a centralized management platform. The system collects and transfers real-time data to a one-stop management platform. The system will immediately alert the frontline safety staff on site in case of potential hazards are detected.

一站式中央管理平台 All-in-one Centralized Management Platform

一站式中央管理平台

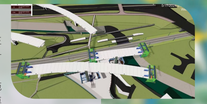
工程團隊設立了香港第一個中央管理平台，一站式採用了不同創新科技和數碼技術去監察整個項目的7個工程合約，串連多項先進科技包括物聯網感應器、數據分析、數碼工程監督系統，讓工程團隊更有效率地管理工程項目進度，監察和提升工地安全水平。

All-in-one Centralize Management Platform

The project team has set up the first centralized management platform in Hong Kong, which provides an all-in-one hub with the adoption of different innovative technologies and digital techniques to monitor the 7 works contracts under the Project. Advanced technologies, including Internet of Things sensors, data analytics and Digital Works Supervision System have been incorporated to enhance the efficiency of project management as well as monitoring and enhancing site safety.

建築信息模擬

- 通過4D模擬實際施工，工程團隊在施工前能預先進行針對性的安全計劃、施工流程，計劃場地設置等。
- 針對不同工程項目例如橋樑轉體施工，及臨時交通改道安排等，製作模擬施工動畫，當中加上每個工序的安全措施。有關技術適用於安全培訓中，有助提高前線管工和工人的安全意識，同時有助團隊向公眾人士講解施工安排。



4D Building Information Modelling

- Through the 4D simulation of construction sequence, the project team can develop specific safety plans, method statement, and site layout plans in advance before construction.
- Animation for specific works such as bridge rotations and implementation of temporary traffic arrangements are produced with the required safety measures incorporated. These techniques have been used in safety training to enhance safety awareness of frontline supervisors and workers, and facilitate the project team to explain the works arrangements to the public.

物聯網傳感器

- 利用以太陽能推動的傳感器，可實時監測噪音指數和空氣質素。
- 為工人提供配備不同的通信芯片的智能安全帽/智能手錶，實時監察工地人員的身體狀況，特別在炎熱天氣下，更有效保護工人的安全和健康。

Internet of things (IoT) Sensor

- By using solar-powered sensors, the noise level and air quality can be monitored in real time.
- Smart helmets/smart watches equipped with different communication chips are provided for workers to efficiently monitor their health condition in real time, especially under hot weather, in order to ensure their safety and health.

虛擬實景(VR)技術

- 透過電腦模擬產生虛擬工地環境，配合VR眼鏡，提供模擬工地環境的安全訓練，有助提升受訓者的安全意識。

Virtual Reality (VR) Technology

- Virtual construction site environment could be generated using VR technology. With the use of VR glasses, safety training that simulates the site environment could be carried out to raise the safety awareness of trainees.

數碼學生技術

- 數碼學生技術結合各項工程數據，包括建築信息模擬、實境模擬、工程計劃，來自各種物聯網裝置的管運數據，以及檢測紀錄、巡查記錄等資料，透過雲端平台整合不同來源數據，工程團隊可隨時於平台上輕鬆擷取工地記錄，大大提升項目管理效率。

Digital Twin

- Digital twin technology incorporates various engineering data, including BIM model, reality model, contract programme; and other data such as test records and inspection records, etc. By integrating data from various sources through the cloud platform, the project team can easily retrieve site records for monitoring the site progress and quality control, and enhance efficiency of the project management.

數碼工程監督系統

- 透過此系統，工程團隊可透過網頁及手機遙距操作安全工地管理平台，管理多項日常記錄包括工地檢查、工地日誌，及安全巡查記錄等。

Digital Works Supervision System (DWSS)

- Through the system, the project team can operate a site safety management platform via web portal and mobile app to manage records, including site inspection forms, site logs and safety inspection records etc.

實時 5G 人工智能 (A.I.) 鏡頭

- 人工智能鏡頭有助24小時實時監察工地情況，配合人臉識別及電子鎖等技術，能有效管控合資格工友進出危險區域，例如在橋墩上進行高空工作。
- 用於監控工地潛在的不安全行為，例如可辨識未有佩戴合適的個人防護裝備的工友。
- 用作監察高速公路上的交通狀況，倘若有車輛與注水護欄發生碰撞或出現塞車情況，系統會即時以短訊通知工程團隊，以便盡快作出應變安排。

Realtime 5G AI Camera

- AI cameras can help monitoring site conditions in real time, 24 hours a day. With the adoption of face recognition and electronic locks technologies, only qualified workers are allowed to access hazardous areas, e.g. work at height on the bridge deck.
- The device is used to monitor potential unsafe behaviors at construction sites, such as identifying workers who are not wearing proper personal protective equipment (PPE).
- Traffic conditions on the highway can be monitored. In case of collision between vehicles and water-filled barriers or traffic congestion, the system will notify the project team by instant message so that emergency arrangements can be made as soon as possible.

聯繫社區 Community Connection

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夜探塱原濕地

20多名來自香海正覺蓮社佛教馬錦燦紀念英文中學的同學參加了2023年3月的「夜探塱原濕地」活動。他們先聽取工程團隊簡介古洞北及粉嶺北新發展區(第一階段)工程內容，以及塱原自然生態公園的保育工作，其後由長春社的生態導賞員帶領，近距離接觸濕地生境，實地了解生物多樣性對人類的重要性。

「夜探塱原濕地」活動為學生提供獨特的課外學習機會，觀察濕地中的夜行物種的習性。學生更成功藉著耳聽蛙類叫聲，尋獲黑眶蟾蜍和飾紋姬蛙的蹤影。

Long Valley Night Tour

In March 2023, the project team invited a group of 20-ish students from the HHCKLA Buddhist Ma Kam Chan Memorial English Secondary School to participate in the Long Valley Night Tour. The project team introduced the KTN FLN New Development Area (First Phase) project works and the conservation works at Long Valley Nature Park. Thereafter, led by the eco-guides from Conservancy Association, the students were able to learn about the wetlands' habitat in close proximity, as well as understanding the importance of biodiversity.

The Night Tour provided a unique opportunity for students to learn outside the classroom and observe the habitat of nocturnal species. By listening to the calling from different frogs, the students had successfully located various species including the Asian Common Toad and Ornate Pigmy Frog.

詳情請參閱短片：
Scan QR Code to view more:

參觀粉嶺北新發展區工地

粉嶺繞道(東段)工程正進行得如火如荼，工程團隊邀請了社區各界人士，包括北區中學校長會、區內非牟利組織、及北區青年商會等到訪粉嶺北新發展區(第一階段)工程工地進行實地視察，了解工程進度及建造構築的不同施工方法。

參加者有機會深入了解於本項目中廣泛應用的智慧工地設備，包括體驗呈現未來道路網絡的虛擬實境模擬器，以及於施工現場透過混合實境技術將建築資訊模型融合到實境中。

通過了解新發展區規劃內容，以及大型工程所提供的就業機會，有助師長協助提升學生對於投身工程相關行業的興趣。

The FLN NDA Site Visits

With the construction works of the Fanling Bypass Eastern Section in progress, members from the local community, including the North District Secondary School Headmasters Conference, representatives from non-governmental organizations, and the North District Junior Chamber International, were invited to visit the sites of Fanling North New Development Area (Phase 1) and appreciate the current works progress, as well as different methods of bridge construction.

Participants learnt about the smart site applications that are widely adopted in the Project. They were also introduced to the driving simulation of the future road network and on-site Mixed Reality (MR) that merges the BIM model into the physical site.

Through deeper understanding of the construction of the planning details of new development areas and the working opportunities provided in mega projects, teachers will be more at ease in inspiring students to discover their interests in construction industry.

詳情請參閱短片：
Scan QR Code to view more:

捐血救人活動

工程團隊為響應每年6月14日的世界捐血者日，聯同香港紅十字會輸血服務中心安排流動捐血車到臨工地辦公室，向團隊提供捐血服務。活動當日有近30位來自土拓署、工程顧問及承建商人員參與，身體力行捐血救人。部份參加者更是首次參與捐血活動，別具意義！

Give Blood, Save Lives

To support the World Blood Donor Day on 14 June each year, the project team cooperated with the Hong Kong Red Cross Blood Transfusion Service to provide blood donation service at our site office. Project team members from CEDD, consultant as well as contractors joined the event to give blood and save lives. A few of the participants embarked on their life-saving journey to become a blood donor!

詳情請參閱短片：
Scan QR Code to view more:

臨時交通改道措施 Temporary Traffic Arrangement

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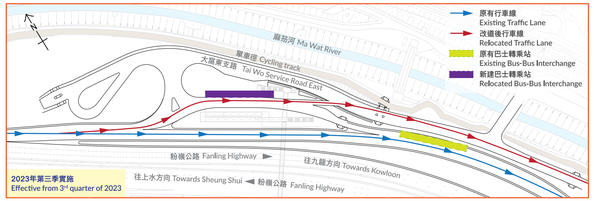
遷移現有粉嶺公路巴士轉乘站

為配合粉嶺繞道（東段）高架橋建造工程，現時位於粉嶺公路南行(往九龍方向)的巴士轉乘站將於2023年第三季遷移至大窩東支路。

與工程相關的臨時交通管理措施亦會在大窩東支路及附近的的一段粉嶺公路實施。行車道、巴士線及行人道將改道至新建的巴士轉乘站位置。上述安排已獲包括運輸署及警務處交通部所組成的交通管理聯絡小組認可。改道期間，附近一帶相連路段將加設臨時標誌及道路標記，指示道路使用者改道路線。

Relocation of existing Bus-Bus Interchange at Fanling Highway

To facilitate the construction of viaduct of the Fanling Bypass (Eastern Section), the Bus-Bus Interchange located at the southern bound (Kowloon bound) of Fanling Highway is currently scheduled to be relocated to Tai Wo Service Road East in the 3rd quarter of 2023. Temporary traffic arrangement (TTA) will be implemented at a section of Fanling Highway near Tai Wo Service Road East. Traffic lane, including the bus routes, and pedestrian walkway will be diverted to the new interchange. The said TTA has been reviewed by Traffic Management Liaison Group, which comprises Transport Department and Hong Kong Police Force. Temporary signs and road markings will be set up along the concerned road section to direct the road users along the diversion route.



工程小知識 Engineering Knowledge

甚麼是「組裝合成」建築法?

「組裝合成」建築法是一種創新的建築方法。透過「先裝後嵌」的概念，將現場建築工序轉移至較易控制的廠房進行，在廠房中製造獨立的「組裝合成」組件（包括裝飾工程、固定裝置和屋宇設施），樓宇在組件送達工地前已大致上完成，減省現場施工工序。

此方法的優點是可有效減少建築過程受天氣條件、勞動力資源和施工場地限制影響，同時有利管理施工質素、提升建造業的生產力、安全性及可持續性。

本工程項目亦有採用「組裝合成」建築法，例如古洞北工地辦公室和塱原自然生態公園農戶留宿設施。

What is Modular Integrated Construction (MiC)?

MiC is an innovative construction method. By adopting the concept of "factory assembly followed by on-site installation", free-standing integrated modules (completed with finishes, fixtures and fittings) are manufactured and assembled in a factory. By transferring on-site construction processes to a controlled factory environment, buildings can be substantially completed off-site.

The adverse impacts of weather conditions, scarce labour resources and site constraints can all be substantially reduced. MiC provides a great degree of production quality control, and can improve construction productivity, safety and sustainability.

MiC has been adopted in our project, such as Kwu Tung North Site Office and lodging facilities for farmers at Long Valley Nature Park.

AECOM

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查詢詳情，請與古洞北及粉嶺北新發展區辦事處聯絡。
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瀏覽古洞北及粉嶺北新發展區(第一階段)網頁，了解更多最新工程資訊！
Visit Kwu Tung North and Fanling North New Development (Phase 1) webpage for more latest project information!

工程進度 Works Progress （截至2023年6月 as at June 2023）

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