隧道口
Tunnel portal

裝嵌矩形隧道鑽挖機鑽頭
RTBM Head Assembly

預製組件搖控自動翻身架
Remote automatic turning device for the turning of prefabricated segments

嶄新技術應用

行人隧道 SB-01工程

為方便鄰近各區居民往來啟德發展區，土木工程拓展署正興建行人隧道SB-01。項目採用矩形隧道鑽挖機技術，以全機械操作，免除人手挖掘，有效減低挖掘工程對公眾、區內交通及周邊設施的影響。

行人隧道SB-01總長約86米，為「啟德發展計劃 — 前北面停機坪第5B期的基礎設施工程」的一部分，橫跨太子道東，連接九龍城沙浦道一帶及未來啟德發展區內的地下購物街。

隧道配合現有道路設施及地底管線分布，深度約為14米。工程引入矩形隧道鑽挖機這項嶄新技術，務求提高施工安全，有效管理與控制風險，以及提升建造質量。整條行人隧道由53件預製組件組成，每件組件重約78公噸，全部組件在工地外預製，有助提升組件質量和製作效率。

矩形隧道鑽挖機每日推進一件組件，配合電腦化隧道建造系統，有助減省工序，加快工程進度及提高效率。

對工程團隊來說，矩形隧道鑽挖工程的最大挑戰，是要盡量減少對周圍環境造成影響，包括樓宇和橋樑結構、路面、地下設施，以及交通情況等，故此工程人員必須密切監察系統，以確保工程順利推展。

土木工程拓展署東拓展處處長梁中立（左三）、建造業議會主席何安誠（右四）、香港工程師學會會長卜國明（右三）、英國土木工程師學會香港分會主席王展滔（左二），以及參與項目的工程顧問公司及承建商代表一同出席早前舉行的矩形隧道鑽挖機啟動典禮。

The launching ceremony of the RTBM held earlier was jointly attended by the Project Manager of the Civil Engineering and Development Department's East Development Office, Mr Michael Leung (third left); the Chairman of the Construction Industry Council, Mr Thomas Ho (fourth right); the President of The Hong Kong Institution of Engineers, Mr Aaron Bok (third right); the Chairman of the Institution of Civil Engineers Hong Kong Association, Mr Louis Wong (second left); and representatives of the project's consultants and contractors involved in the project.

Application of Cutting-edge Technology

Construction of Pedestrian Subway SB-01

The Civil Engineering and Development Department is constructing the pedestrian subway SB-01 to facilitate the access of residents in the neighbouring districts to and from the KTD. The project adopts the Rectangular Tunnel Boring Machine (RTBM) technology, which is wholly operated by mechanical means to eliminate manual excavation, thereby effectively minimising the impact of excavation works on the public, traffic in the district and surrounding facilities.

The pedestrian subway SB-01 has a total length of approximately 86 metres and is part of "Kai Tak Development – Stage 5B Infrastructure Works at the Former North Apron Area". It spans Prince Edward Road East, connecting the Sa Po Road area in Kowloon City and the future underground shopping street in the KTD.

The subway is about 14 metres deep to match the existing road facilities and the distribution of underground utilities. The project adopts the cutting-edge RTBM technology to enhance works safety, facilitate effective management and control of construction risks, and improve construction quality. The subway is composed of 53 prefabricated segments, each weighing approximately 78 tonnes. All segments are prefabricated off-site, which helps improve the quality and production efficiency. The RTBM, which pushes in one segment per day, together with the computerised subway construction system, helps streamline work processes, accelerate project progress and improve efficiency.

For the project team, the biggest challenge of the RTBM project is to minimise the impact on the surroundings, including building and bridge structures, road surfaces, underground facilities, and traffic conditions, etc. Therefore, the project team must closely monitor the system to ensure the smooth progress of the project.

矩形隧道鑽挖機 冷知識
Rectangular Tunnel Boring Machine Trivia

1 本次工程的矩形隧道鑽挖機前方配備6個刀盤鑽挖，能增加挖掘面積，覆蓋至整個隧道。

RTBM of this project is composed of 6 cutterheads in the front to increase the excavation area and cover the whole section of subway.

2 矩形隧道鑽挖機比傳統圓形的隧道鑽挖機佔用更少的空間，能配合隧道的形狀，減低所需挖掘量。

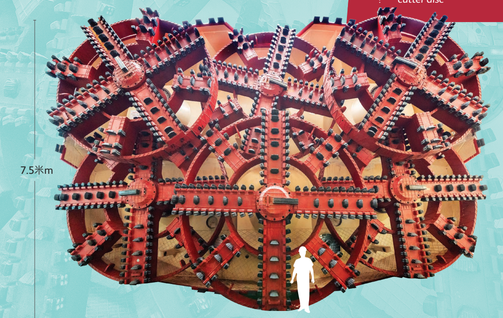
Compared with traditional circular tunnel boring machine, RTBM has better space utilisation and to minimize the excavation volume.

3 隧道鑽挖與隧道結構預製件的推進結合為單一工序，大大減低隧道挖掘對周邊地面及設施的潛在影響。

Tunnel excavation combined with the jacking of prefabricated tunnel structural segments as a single operation, greatly reducing the potential impacts of tunnelling on the surrounding ground and facilities.

矩形隧道鑽挖機刀盤
- 10.8 米寬 x 7.5米高
- 4個直徑4.2米刀盤
- 2個直徑4.0米刀盤

RTBM Cutterhead
- 10.8m (w) x 7.5m (h)
- 4 nos. of 4.2m diameter cutter disc
- 2 nos. of 4.0m diameter cutter disc



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CEDD 香港特別行政區政府 土木工程拓展署
Civil Engineering and Development Department
The Government of the Hong Kong Special Administrative Region

查詢詳情，請與啟德辦事處聯絡：
地址：香港九龍油麻地海庭道11號西九龍政府合署南座8樓
For further information, please contact the Kai Tak Office.
Address: 8/F, South Tower, West Kowloon Government Offices, 11 Hoi Ting Road, Yau Ma Tei, Kowloon, Hong Kong

電話 Tel (852) 3106 3432
傳真 Fax (852) 2739 0076
電郵 e-mail ktd@cedd.gov.hk

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行人連接網絡 覆蓋鄰近地區

Pedestrian Network Covering Adjacent Neighbourhoods

土木工程拓展署一直致力優化啟德發展區的對外連繫，提升暢達度，讓市民往來更便捷。橫過太子道東以連接九龍城石鼓壟道遊樂場與世運道的行人隧道於今年6月開通後，啟德的行人通道連接點數目已增至17個。

The Civil Engineering and Development Department has been striving to improve the connectivity of the Kai Tak Development (KTD) to enhance accessibility and convenience for the public. With the opening of the pedestrian subway crossing Prince Edward Road East, connecting Shek Ku Lung Road Playground in Kowloon City with Olympic Avenue in June this year, the number of pedestrian connections in Kai Tak has increased to 17.

通往獨特氛圍的道路

行人隧道 SW6

新開通的行人隧道SW6是「啟德發展計劃 — 前北面停機坪第5A期基礎設施工程」的一部分。行人隧道全長約120米，橫跨交通繁忙的太子道東，連接啟德發展區與九龍城區，方便行人穿梭往來，加強啟德與鄰近地區的連繫。

行人隧道SW6的一端接駁正在興建中的龍津石橋保育長廊，另一端則連接九龍城石鼓壟道遊樂場，形成一條跨區漫遊路線，引領市民遊走於獨特的文化及休閒氛圍之中。隧道的兩端入口均設有升降機，為市民提供無障礙通道。

A Path towards Unique Atmosphere

Pedestrian Subway SW6

The newly opened pedestrian subway SW6 is part of "Kai Tak Development – Stage 5A Infrastructure Works at the Former North Apron Area". With a total length of about 120 metres and crossing the busy Prince Edward Road East, the subway connects the KTD and Kowloon City, facilitating pedestrian movement to and from Kowloon City while strengthening Kai Tak's connection with its neighbouring areas.

One end of the subway connects to the Lung Tsun Stone Bridge Preservation Corridor under construction, while the other end connects to Shek Ku Lung Road Playground in Kowloon City, forming a cross-district leisurely walking route to guide the public through a unique cultural and leisure atmosphere. Moreover, both entrances of the subway are equipped with lifts to provide barrier-free access for the public.

珍貴本土文物

龍津石橋

Precious Local Cultural Relic

Lung Tsun Stone Bridge

龍津石橋始建於1873至1875年，全長約200米，用以便利居民登岸，前往九龍寨城。石橋後來加建延伸部分，成為九龍城碼頭。經過1920年代的啟德濱發展計劃、1942年第二次世界大戰期間興建軍用機場，以及發展和擴建前啟德機場後，龍津石橋最終被埋在地下。

龍津石橋遺蹟具有獨特的歷史價值，它於2008年在啟德發展區首次被發現。其後進行的考古調查及挖掘出土了原建於該地的接官亭、石橋實心、橋墩、登岸碼頭、前九龍城碼頭、海堤、堤道及啟德機場地基的遺蹟。

根據古物古蹟辦事處訂定的保育管理計劃，遺蹟北面的接官亭基石，以及南面的石橋橋面、橋墩、石橋末端等屬當時的重要地標，均獲評為高等級歷史古蹟。


石橋橋面
Bridge deck


石橋向海末端和海堤
Seaward end of the Bridge and seawall


橋墩
Bridge pillar

LTSB was built between 1873 and 1875, with a total length of about 200 metres, to facilitate resident's disembarkation and access to Kowloon Walled City. The bridge was later extended to become the Kowloon City Pier. After the implementation of Kai Tak Bund Development in the 1920s, the building of a military airfield in 1942 during the Second World War, and the development and expansion of the former Kai Tak Airport, LTSB was eventually buried underground.

The relics of LTSB, which are of unique historical value, were first discovered in 2008 inside the KTD. Subsequent archaeological investigations and excavations unearthed the relics of LTSB, including the Pavilion for Greeting Officials, solid mass, supporting pillars, landing platform, the former Kowloon City Pier, seawalls, causeways and foundation structures of Kai Tak Airport.

According to the Conservation Management Plan formulated by the Antiquities and Monuments Office, the foundation stone of the Pavilion for Greeting Officials in the north of the relics, and the bridge deck, supporting pillars and the landward end of the bridge in the south, which were important landmarks of the time, have been classified as high grade historical monuments.

1891
龍津石橋附近的淺灘
Surrounding beach around Lung Tsun Stone Bridge

1899
龍津石橋的加建造（木橋）部份
Timber Extension of Lung Tsun Stone Bridge

1900
接官亭
Pavilion of Greeting Officials

1903
1903年龍津石橋的位置圖
Location of Lung Tsun Stone Bridge during 1903

1932
從龍津石橋遠眺九龍寨城
Kowloon Walled City Viewing from Lung Tsun Stone Bridge

2008
2008年龍津石橋遺址
Remanent of Lung Tsun Stone Bridge during 2008