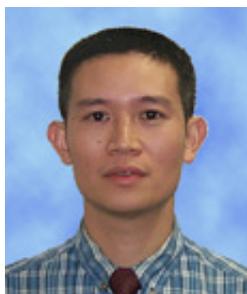




Innovative Technique for the Construction of Luntou Tunnel – Casting IMT on Submersible Barge

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Summary

The Guangzhou government has decided to build a new university city and academic campus on a rural island surrounded by the Pearl River for further progressing higher education and economic developments. A number of fixed links crossing the River are urgently needed as part of the trunk roads towards the university city. The preference of tunnel options to the bridges is for avoiding large-scale relocations of facilities and to protect the scenery of the river banks. Luntou tunnel being constructed by immersed tube method becomes the second tunnel crossing the Pearl River. As the area required for casting basin would be quite large and such land space is not available near the site of built-up area, fabrication of tunnel units on submersible barges is adopted. This innovative technique is discussed in this paper.

Keywords: immersed tube; concrete; dry-dock; casting basin; submersible barge.

1. Introduction

China has been establishing extensive immersed tube tunnel experience since the first steel immersed tunnel was placed across the Victoria Harbour in Hong Kong in 1972. There are ten river/sea crossing tunnels constructed in China by using the immersed tube techniques. Except the Cross Harbour Tunnel and MTR Harbour Tunnel in Hong Kong adopted binocular sections in 1970s, the multi-cell box sections of reinforced or prestressed concrete are used in the other immersed tunnels. Among them, the Eastern Harbour Crossing Tunnel in Hong Kong is the longest one of 1.86km immersed tube section, whilst the Waihuan Tunnel in Shanghai has the largest one of 43m wide section. To date, maximum water depth of tunnel immersion has reached 30m in China. Table 1 summarizes key parameters of immersed tunnels built in China.

Conventionally, the concrete tunnel units are cast in batches in a dry dock casting basin near or off the tunnel site. For example, a dry dock at the existing Shek O quarry on the southeast coast of Hong Kong Island has been used as an off-site casting yard and a concrete batching plant for the construction of Eastern Harbour Crossing Tunnel, Western Harbour Crossing Tunnel and the Airport Railway Immersed tube tunnel. In mainland China, all three immersed tunnels (Zhujiang