壓入式沉箱工法於潛盾工作井之應用

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摘　要

目前潛盾工作井深開挖之設計以連續壁配合架設型鋼內支撐工法最為常見，然隨著都會區迅速發展，潛盾工作井設置於侷限用地或緊鄰既有結構物旁之情況也愈顯普遍。工作井採用「壓入沉箱工法」之優勢，在於可減少施工用地及開挖對鄰近結構物之影響，並免除內支撐對潛盾施工之干擾，達成適度減體減量之目的。壓入式沉箱工法應用在台灣工程之案例越來越多，惟挖掘深度超過40m之大尺寸沉箱工作井案例仍為罕見，本文將以台灣電力股份有限公司「大林~高港345kV電纜線路第二工區潛盾洞道暨高港冷卻機房統包工程」之潛盾工作井為例，介紹大尺寸壓入式沉箱工法於規劃設計、施工管理之考量重點，以及藉由監測結果探討本工法對周遭地層之影響。

關鍵字：壓入式沉箱、潛盾工作井、砂礫石層。

Application of Caisson Method to Shafts for Shield Tunneling

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Abstract

To meet the tight schedule of construction, a caisson method that uses anchors to provide reaction forces can be introduced for the launching shaft in shield tunneling. The method does not require an interior bracing system to provide excavation stability that always becomes obstruction during assemblage and trial operation of shield machine. Compared to traditional one that uses dead weights to descend each caisson section, the method can reach higher criteria for verticality. The induced surface settlement can be significantly reduced, resulting in less effect on adjacent structures or facilities. This paper describes a case history in Kaohsiung City where a launching shaft with 18 m in diameter and 40 m in depth is constructed using the caisson method. Key consideration in planning, design, and construction management is illustrated. According to monitoring results, the method is proved to be time and cost effective for a tight-schedule project.

Key Words：anchor caisson , shaft for shield tunneling ,sandy gravel.

一、前　言

隨著都會區的迅速發展及地下工程的進步，潛盾工法已廣泛應用於各類工程，工作井設置於侷限用地或緊鄰既有結構物旁之情況也愈顯普遍；工作井採用「壓入沉箱工法」之優勢在於可減少施工用地及開挖對鄰近結構物之影響，其特徵為先利用油壓千斤頂之反作用力，使沉箱底端刃口強制貫入土壤足夠深度後，再挖掘沉箱內積土。如此即可減低傳統自重式沉箱超挖容易帶來之砂湧等問題，除可降低對週遭土壤之擾動外，整體施工精度亦大為提升。

本文將以台灣電力股份有限公司之「大林~高港345kV電纜線路第二工區潛盾洞道暨高