

井式基礎於中壢台地之設計與施工案例探討

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摘要

本文簡述中壢台地之地質特性，以高架橋梁工程為例檢討基礎之研選原則。基於施工用地限制與載重條件之考量，採用井式基礎並探討井基設計流程與施工方式。然因中壢台地卵礫石層透水性高，其下方軟弱岩盤膠結不良，造成井基開挖時遭遇地下水掏刷地層及湧水之情形，本文案例採用灌漿改良、隔幕排樁、加強導水等改善對策以順利構築井基，相關處置經驗可供工程界參考。

關鍵字：井式基礎、卵礫石層、軟岩、地盤改良。

Case Study of Design and Construction of Well Foundation on Jhongli Terrace

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Abstract

In this article, the geological properties of Jhongli Terrace are reviewed and rule of selecting foundation type for bridges herein is proposed. Because of the limitation of construction area and high loading requirement of bridges, well foundation is recommended. Design and construction procedures of well foundation are also reviewed. Due to the high permeability of gravel layer and loose deposit of weak rock, scouring and gushing water occurred during excavation, engineer adopt measures such as grouting, cut-off pile, and drainage system to accomplish the construction of well foundation. The purpose for the article is to provide a helpful reference on similar ground condition.

Key Words : well foundation, gravel, weak rock, ground improvement.

一、工程概述

近年來許多大型交通建設如國道中山高速公路五楊高架路段、桃園機場捷運系統等皆沿林口、桃園及中壢台地闢建。由於長跨度橋梁荷重較大，加上山區地形起伏變化，基樁施工不易，用地亦受限等因素，井式基礎(well foundation，以下簡稱井基)乃被大量採用。井基屬於深基礎系統之一支，整體力學行為類似沉箱(caisson)基礎，主要差異在於基礎構築

方式之差異。依國內常引用之設計規範，如建築物基礎構造設計規範(2011)或公路橋梁設計規範(2009)等並無井基之明確定義，惟依上述規範之沉箱基礎章節條文-「沉箱基礎係以機械或人工方式分段挖掘地層，以預鑄或場鑄構件逐段構築之深基礎，其分段構築之預鑄或場鑄構件，可於孔內形成亦可於地上完成後以沉入方式施工」，故井基以沉箱基礎之設計流程應無疑義。井基施工之關鍵為如何在地質、用地、地下水、造價與工期等條件下規劃合適之擋土開挖措施，並於井內完成軀體構築。本