

大面積基地開挖引致明顯變位成因之探討

張瑞仁 楊炯聖
大域工程顧問有限公司

王建智
正修科技大學

摘 要

深開挖分析設計需防止壁體變位或地表沉陷過大，近年來深開挖案例累積之經驗，可在設計時納入土層補強或提高系統勁度，以減少對基地與鄰近區域之影響。本文討論高雄市某一開挖案例開挖深度20.2m，開挖形狀近似正方形，開挖寬度約73m。施工期間，連續壁變位持續增大至近14cm，鄰近地表最大沉陷達13.94cm。本案例變位與沉陷數據較之相關文獻所歸納數值，屬於變化較大的狀況。初步推測明顯變位成因與土層特性有關，且受開挖造成局部潛在破壞區影響；開挖區寬幅亦為可能成因。文中另就此類案例開挖分析時提出可採用之建議。

關鍵字：深開挖、地表沉陷、壁體變位。

Causes of Deep Excavation Induced Significant Settlement – Case Study in a Large Excavation Site

Jui-Jen Chang Johnson Yang
Geofield Engineering Consultants Co.

Chien Chih Wang
Cheng Shiu University

Abstract

The main design criterion of deep excavation is to minimize the influence to the nearby building. From recent experiences, engineers could adopt soil improvement or increase the supporting system stiffness to reduce ground deformation and settlement. This paper introduces case study of a deep excavation site in Kaohsiung. The site is near a square shape with a dimension of about 73m. The maximum excavation depth is 20.2m. There are no adjacent buildings. During the excavation, the maximum accumulated deflection of slurry wall is about 14.0cm, and the maximum settlement is 13.94cm. Referred to other deep excavation cases, the amounts of the deflection and settlement measured in this site are very large. The loosely packed silty fine sands behind the slurry wall may be one of the main causes of the measured large deformation. Significant local failure zone was developed during excavation. Accordingly, the strength and stiffness of soil reduced within the local failure zone. Besides, the large excavation width may be another important cause of the measured large deformation. Based on this valuable case history, suggestions for analysis and design of deep excavation were proposed.

Key Words : deep excavation , settlement, slurry wall deflection.

一、前 言

為了維護深開挖工程鄰近區域建物或設施的安全，控制開挖對鄰地的影響是設計或施工時必然要審慎考量的重點。隨著設計者對於分析工具越加熟悉，各地區開挖案例增多，國

內在管理開挖設計、施工上，已有許多豐富的經驗，以及良好的工法應用案例。

若欲降低工區附近鄰房或設施沉陷、傾斜現象，首要設法減少擋土壁體在施工階段產生的側向位移。因為壁體側向位移與開挖區地表沉陷間密切相關。當開挖基地鄰近設施或建物時，規劃時即會慎選擋土壁型式、厚度，計算