

# 2009高雄世運主場館樁筏共構之數值分析

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## 摘要

2009高雄世運會主場館位於高雄市左營區中海路及軍校路交叉口，基地地層深度0~20m主要為粉土質砂，20m~46m為粉土質黏土，深度>46m為岩盤。世運館原設計為採用筏式基礎，但因考量結構荷重不均分佈、場外回填土、場內降挖2m及地表下存在厚約26m之粉土質黏土可能產生過大之差異沉陷進而造成結構體損壞，故變更基礎設計為樁筏共構。為了解各種不同因素對基礎沉陷影響程度，所以採用有限元素程式進行分析，結果顯示世運館樁筏共構之基礎最大可沉陷量約在6cm左右，最大角變量約為1/567，基本上可符合使用需求。

**關鍵字：**樁筏共構、基礎設計、數值分析、土壤模式。

## Numerical Analysis on the Pile-Raft Foundation of the Main Stadium of 2009 World Game

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## Abstract

The main stadium of 2009 World Game is located in Tzou-ying District of Kaohsiung City. The project site is overlain by a 20m thick silty sand layer, followed by a thick silty clay layer of about 26m in thickness. Bedrock is found beneath GL.-46m. The original foundation design calls for the use of raft foundation alone. However, there was great concerns about the detrimental differential settlement that could be induced by factors such as non-uniformly distributed structural loadings, backfills around the stadium, and a 2m excavation within the stadium. It was later concluded by the design team that a pile-raft foundation system is required. Numerical analyses were carried out to study the possible settlement of the main stadium. It was found that the maximum settlement of the pile-raft foundation is about 6cm, while the angular distortion is about 1/567, both satisfied the structural needs.

**KEY WORDS :** Pile-raft foundation, foundation design, numerical analysis, soil model.

## 一、前言

工程技術的日益精進，讓人們對建築物的要

求不再只是以安全為優先考量的四四方方建物，而是除了安全考量之外，還需兼顧藝術美學的外觀及能滿足人們使用需求。然而為達到上述之目的，往往使得建物呈現不對稱，荷重不均勻