

混凝土為建築結構物最常用之材料，然而亦是最複雜的材料。自1115地震以後，顯示混凝土品控的潛在問題，本研究即針對建築結構混凝土品質作一探討，以瞭解目前建築結構物混凝土可能問題，作為未來提升品質水準之參考。

本研究以文獻整理、腦力激盪、問卷調查、現場訪問調查、模擬試驗及抽樣調查等方法來進行，基本上包括(一)蒐集相關文獻資料，以確立理論依據及分析可能影響混凝土品質之因素；(二)調查現場施工狀況，以探討目前施工技術之問題及提供未來技術改良之依據；(三)進行模擬試驗並將預拌廠送技術學院檢驗之試體抗壓強度作統計分析，以評估北區預拌混凝土品質可能產生之問題。

根據所抽樣之六家預拌廠顯示，其所供應之混凝土品質，依ACI 214-77規定，有四家預拌廠(66.7%)可能供應不良(Poor)等級之混凝土；若考慮施工偏差(如現場加水)可能造成混凝土品質損失的話，則有五家預拌廠(83%)供應之混凝土將對建築物構成危害。另依ACI 318-83之規定評估各預拌廠供應混凝土之品質，則有50%之混凝土將被判定為“不合格”材料，此等材料經證實由於品管不當所導致，而合格之材料中有38.9%之預拌混凝土配比設計不當，造成預拌廠之成本負擔過重，僅有11.1%之預拌混凝土於產製過程中兼顧成本與品質兩大原則。就目前預拌混凝土品質而言，業主實施品質管制訂定施工規範時，將取樣誤差定在5%以下，其檢驗費用相當大，若考慮其經濟效益，則定在10%左右較具可行性。

關鍵字：混凝土／品質管制／常態分佈／標準差

ABSTRACT

Concrete is the most commonly and widely used material in building structure, however it is the most complicated one. The earthquake of Nov. 15, 1986 in Taipei revealed the potential problem of concrete quality of building structure. The objective of this study was to investigate the possible problems of building structures by means of statistic analysis technology. First, literature review, brain-storming and questionnaire survey were employed to gather the relative data in order to analyze the possible factors that affected concrete quality. Next, the construction field was observed to realize the present problems of construction technology and to improve it. Finally, the simulating test was done and data of compressive strength of specimens from National Taiwan Institute of Technology were analyzed to evaluate the quality of ready-mixed concrete in northern Taiwan. Six ready-mixed concrete factories were selected for this study. According to ACI 214, there were at least four factories that supplied poor grade concrete. If the situation of poor construction technology was concerned, there were five factories those products might endanger buildings. The other job was to evaluate the concrete quality of each factor in accordance with ACI 318 code. The result indicated that there were about 50 percent concrete judged as improper concrete material because of bad quality. Among the qualified material, there were approximate 39 percent products with unsuitable mix proportion and that would give rise to overrun cost of manufactory. Only 11 percent products corresponded to the reasonable cost and suitable quality. On the quality of present ready-mixed concrete, manufacturers implement the quality-control process of concrete, and fix the specification of construction to the sampling error under 5 percent. However, it is suggested that 10 percent of sampling error will be better from economic view point.

Keywords: Concrete/ Quality Control/ Normal Distribution/
Standard Deviation