# 震災衝擊鏈量化模擬技術開發與應用

## The Application and Research for Seismic Impact Chain Evaluation

主管單位：科技部

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## 摘要

都會區之維生設施倘若遭受地震災害破壞，將衝擊都會機能正常運作，例如維生機能中斷、科技產業衝擊等。由地震災例顯示，災害發生時維生設施震後可能受到損壞，然設施相互關聯，效率日益提高，但也曝露服務中斷環節，單一系統故障時，可能引起鏈鎖性災害。電力、自來水系統為都會機能運作、產業發展、亦為防救災設施運作重要根基，災後確保維生設施正常供應為政府首要任務。本研究依據災害管理觀點，與系統相依特性，整合設施系統化分析與間接影響，建構出震災衝擊鏈分析方法。研究成果可具體掌握震後設施影響程度與相互影響性，協助災害應變於重要設施之情資研判，並快速評估重要設施外部維生系統的損失風險，可作設施查報、優先復原工作的參考。

**關鍵詞：維生設施、震災衝擊鏈、相依性分析**

## Abstract

Infrastructure is defined as an aggregation of numerous facilities that constitute the backbone of urban operations. Moderate-to-large earthquakes adversely affect infrastructure, severely impairing most urban functions. The lifelines systems have interdependencies; thus damage to one system can potentially cause a chain reaction, triggering failures in related and connected systems that then lead to a cascade of disasters or failures. Taiwan is located in the Circum-Pacific seismic zone, and earthquakes frequently occur. Therefore, understanding the effects of moderate-to-large earthquakes on the lifelines systems, as well as how those effects contribute to disaster scenarios in urban areas, is a critical issue for the Taiwanese government. This study considered the direct seismic damages and cascading effects to develop a method for impact chain assessment on lifeline system during earthquake, and we develop a method that can be used in the earthquake disaster response. Therefore, the result of this study assistant the authority to make an intelligent decision for life line facilities disaster or resource management.

**Keywords**：lifeline infrastructure, impact chain, interdependency.