# Risk Assessment Study on Bridge Foundation in Deep Overlying Stratum

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## Summary

Based on the analysis about the hydrogeological conditions and engineering geological conditions, the paper has made the analysis on the possible risks of the deep overlying stratum foundation and established the risk evaluation index system during the foundation operating period. Such methods as AHP, Delphi method and fuzzy comprehensive evaluation method, etc. are adopted to make the quantitative analysis on the risk factors and establish the risk judgment model. According to the actual engineering of Taizhou Bridge, the paper has evaluated the risk of the foundation during the operating period at the condition of deep overlying stratum. The evaluation results can confirm the design of the bridge site is reasonable, and provide the reference for the risk management of the bridge foundation during the operating period.

**Keywords:** risk assessment, deep overlying stratum, suspension bridge, AHP (Analytic Hierarchy Process)

## 1. Introduction

In recent years, China has witnessed the rapid highway construction and urban renovation. Due to the demand of highway construction and urban development, the highway and municipal bridge construction is on the swift rise, and a number of world-class bridges, such as Sutong Bridge, Donghai Bridge, Hangzhou Bay Bridge and so on, have been finished in succession. Since the bridge is an important hub of transportation, great economic losses and the extremely serious consequences will be incurred in the event of accident. Therefore, more and more attention is paid to the risk assessment during the life cycle of modern bridges[1-4]. Nevertheless, little concentration had been made on the risk assessment of bridge foundation during the operation life cycle at home and abroad. Many uncertain factors arise in the operation process, particularly for the bridges located in the Quaternary deep overlying stratum, due to the complex geological and hydrogeological conditions, coupled with the internal changes of foundation caused by the external environment so it may be faced with a variety of risk factors[5].

The bridge foundation in the operation life cycle is faced with a variety of risk factors. It is necessary to make scientific risk assessment on the risk factors affecting the bridge safety during the life cycle to reduce risks and relevant losses , and make scientific management measures. This paper, firstly, identifies the risks during the life cycle of bridge foundation, and then selects the appropriate risk assessment methods and analysis models to make scientific and rational assessment on risk factors, with a purpose of providing a scientific basis for the risk management during the life cycle of bridge foundation.

## 2. Risk Assessment Index

### 2.1 Analysis of Risk Factors in Life Cycle of Bridge Foundation

Plenty of risk factors are involved for the risk assessment during the life cycle of bridge foundation,



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