



Risk Assessment of A Long Span Unsymmetrical Extroversion Arch Bridge

Xin RUAN

Dr., Lecture
Tongji University
Shanghai, CHINA
Ruanxin@mail.tongji.edu.cn

Xin RUAN, born 1977, received his doctor degree in civil engineering degree from Tongji Univ. Now he is a lecture in Dept. of Bridge Engineering



Ai-Rong CHEN

Professor
Tongji University
Shanghai, CHINA
A.chen@mail.tongji.edu.cn

Ai-Rong CHEN, born 1963, received his doctor degree in civil engineering from Tongji Univ. Now he is the vice dean of collage of civil engineering of TJU.



Summary

Nanning Bridge is the first long span unsymmetrical extroversion arch bridge with a curve steel gird in the world. The main span of the bridge is 300m, and the incline angles of two main arch ribs are 69.7° and 66.5° . Construction technology, nature hazards and some accidents which may happen during the construction process have to be considered. A two stages risk assessment method is proposed. At the first stage, an expert investigation which is based on analytical hierarchy process (AHP) is carried out, cable supported construction scheme and hybrid supported construction scheme are compared, and cable supported schemes is recommended due to its low risks. At the second stage, 21 main risk events which may occur in the cable supported construction scheme are assessed in detail, based on a qualitative and quantitative combined assessment method, and appropriate countermeasures for those risk factors are also recommended. The risk assessment method proposed in the paper can be applied in similar bridges.

Keywords: risk assessment; construction process; analytical hierarchy process; risk matrix.

1. Introduction

Nanning Bridge is the first long span unsymmetrical extroversion arch bridge with a curve steel gird in the world (Fig.1). Construction process is a big challenge due to its special structure properties. A safe, economy, convenience, and reasonable construction scheme is very important for the whole project. Based some risk analysis and risk management researches for large scale bridges and structures ([1] ~ [6]), a two stage risk assessment method is proposed to solve the problem.



Fig. 1 *Nanning Bridge*