



Risk management system for pylon Construction of a Long Span Cable-Stayed Bridge

Ai-rong CHEN
Professor
Tongji University
Shanghai, CHINA
A.chen@mail.tongji.edu.cn

Xin RUAN
Dr. Lectuer
Tongji University
Shanghai, CHINA
Ruanxin@mail.tongji.edu.cn

Xiao-yong OUYANG
Senior Engineer
SEBCRBC
Xi'an, CHINA
Ouyxiong@163.com

Jianjun ZHANG
Engineer
SEBCRBC
Xi'an, CHINA
Egjyc@126.com

Summary

With the increasing span of cable-stayed bridges, the height of pylons are also reaching their new records. Constructions of pylons become challenges during the whole construction process of long span cable-stayed bridges. In this paper, a systematic risk management method for pylon construction is proposed, which is applied to Sutong Bridge. Sutong Bridge is a cable-stayed bridge over Yangzi River in China, with a main span of 1088m, and its pylons are 306m high. Two cranes are used for each pylon during the construction process. Construction schedule, worker safety and construction cost increasing are set as targets which are considered in the risk management system. There are three main components in the proposed methods, which are general risk events assessment, remarkable risk events analysis and risk management handbook compile. The paper gives a detail introduction of the whole assessment process and main conclusion that obtained by its application in Sutong Bridge. With the successful finish of pylon construction in 2006, it is proved that the method is effective for the similar bridges and structures.

Keywords: Risk management; risk assessment; cable-stayed bridge; pylon; construction.

1. Introduction

Sutong Bridge is a Cable-stayed bridge with a main span of 1088m, which will be the record span of its kind of bridges in the world. The bridge is located in the estuary of the Yangzi River in China, thus the environment for the construction is highly tough, especially for the construction of the 306m height pylon.

The construction of pylons of Sutong Bridge begins once after the basement is done, and lasts until the pylon is finished and the steel box girders are ready to be erected. The 306 height concrete pylon is divided into 60 segments to cast on site. An automatic sliding formwork system is employed for the cast of the pylon and the formwork system is from DOKA Company. Crossbeam of the pylon will be casted on the temporary support system. Seven temporary transverse bracings are placed for the construction of the mid-pylon part. Two large-scale pylon cranes are needed before the closure of two pylon legs, which is POTIAN MD 3600 and QTZ315. The QTZ315 will be disassembled immediately after the closure of two legs of the pylon, while the POTIAN MD 3600 won't be disassembled until the end of the construction of the whole pylon. A brief illustrate of the whole process is given in Fig. 1, and Fig.2 is the site photo taken on July 19th, 2006.