

Design & Construction of the Trapezoidal Hanging Basket

Guang Song GUO

Professor
CRBC International Co.,LTD
BeiJing, China
lujianguoguangsong@163.com

Guang Song GUO, born 1965, received his civil engineering degree from Huazhong University of Science and Technology.

Guo Ming LI

Senior Engineer
ChongQing FengFu Expressway
Development of CRBC
International Co.,LTD
ChongQing, China
lujianliguoming@163.com

Guo Ming LI, born 1967, received his civil engineering project management degree from Tsinghua University.

Zheng Zhi XIA

Engineer
ChongQing FengFu
Expressway Development of
CRBC International Co.,LTD
ChongQing, China
001xiazhengzhi@163.com

Zheng Zhi XIA, born 1983, received his civil engineering degree from ChangSha University of Science & Technology.

Summary

Based on the construction of Lan Chaiwa Bridge, the paper introduces the load analysis, structure design, structure space finite element analysis calculation of the trapezoidal hanging basket applied on the main bridge cantilever concreting, and the practical application of the hanging basket. The analysis and design experience can provide reference for other similar structures.

Keywords: *Trapezoidal hanging basket, Structure analysis, Space finite element analysis*

1. Introduction

At present, the bridge construction is under rapid development in China, so is the bridge structure as well as the bridge construction technique. With the unceasing innovation of computer technique, the calculation of bridge structure and bridge construction structure is developing sufficiently as well.

In the past, due to the complexity of constitutional detail, the uncertainty of mechanical characteristic, and the intricacy of calculation induced by too many degrees of statically indeterminacy, the design of temporary structures tending to simplified structures, explicit mechanical properties and simplified calculation, is still difficult to achieve, the design of hanging basket is also no exception.

The main forms of hanging basket adopted in construction of conventional prestressed concrete continuous girder bridge are: triangle hanging basket, rhombic hanging basket and bailey truss hanging basket, etc, and each type has the respective feature. In this paper, based on Lan Chaiwan Bridge, the design and construction application of the trapezoidal hanging basket is introduced for common reference.

1.1 Bridge Structure

The spans of Lan Chaiwan Bridge are: 45m (simply supported box girder) + (70+3×120+70) m (continuous rigid frame) +45m (simply supported box girder) =590m.

The 2nd to 6th spans of superstructure are variable cross-section prestressed concrete box girder with single cell box profile, and the spans are 70+3×120+70m; Longitudinal-transverse-vertical prestress is applied to the concrete structure. The transverse slope of upper slab on box girder is consistent with that of route, and upper slab is 12m wide, bottom slab is 6m wide and cantilever slab is 3m long. The central height of box girder in closure segment is 2.8m, with a 0.3m thick bottom slab; the box girder in No.0 segment is 7.5m central height, its bottom slab is 1m thick. The height of box girder is in 1.8-degree parabola distribution, and the bottom thickness changes according to the second-degree parabola. The main girder is constructed follows hanging basket cantilever erection. The No.0 segment is 7m long, closure segment is 2m long, and the other segments are all 3.5m, and 4.5m long, respectively.