



Parameterized Analysis of Guide Beam in the Incremental Launching Construction of Five-span Steel Box Girder Bridge

Jinrui Hu, Chao Liu

Tongji University, Shanghai, China

Contact: 2032425@tongji.edu.cn

Abstract

The parameters of the guide beam have a great influence on the structural behavior of the incremental launching construction bridge. Based on an incremental launching construction engineering of a five-span steel box girder bridge, this paper established the finite element model. The influence of the length, stiffness, and weight of the guide beam on the behavior of the main beam was analyzed, and the original design scheme was optimized and compared. Finally, some suggestions were put forward for the design and parametric analysis of the incremental launching guide beam.

Keywords: the incremental launching construction; guide beam; analysis of the parameters.

1 Introduction

The incremental launching construction is a common method in modern bridge construction. Due to its early origin, the modern incremental launching construction technology is advanced, the construction accuracy and the launching ability have been significantly improved, and the applicability has been expanded. The incremental launching construction can be used for various bridge types such as continuous girder bridges, cable-stayed bridges, suspension bridges, rigid frame bridges, and arch bridges. It is not only suitable for constant-height beams but also variable-height beams; Suitable for curved and inclined bridges. The incremental launching construction method has many advantages, such as simple construction equipment, without large lifting equipment, fewer temporary supports, a small construction site, high construction efficiency, and does not affect the traffic under the bridge. Therefore, the incremental launching method is ideal for valley bridges or overpass bridges.

In the incremental launching construction stage, the boundary conditions of the beam will change many times, and the structural behavior of the beam is also quite different from the post-construction stage. The analysis of the incremental launching construction process is very important. As assistant equipment, the guide beam plays a key role in the structural behavior during the construction stage. Optimized guide beam parameters (length, stiffness, weight, etc.) can make the performance of the main beam in the construction stage close to the post-construction stage, but unsuitable guide beam parameters will lead to the increase of negative bending moment and support reaction force. With the development of new construction methods such as intelligent construction, modern construction technology has gradually become intelligent and digital. The parametric analysis of guide beams is the general trend of modern bridge construction technology.

About the calculation and optimization of the guide beam parameters in the incremental launching