Research on two Parameters Control of Walking-Type Incremental Launching Box Girder

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Abstract

In order to ensure the safe implementation of walking-type incremental launching steel box girder. Taking a simply supported wide steel box girder bridge as an example, this paper analyzes the local stress of the wide steel box girder with four supporting points of walking pusher, and quantitatively determines the three single parameter related control thresholds of lateral deflection, longitudinal pusher asynchrony and vertical lifting asynchrony that are concerned in the construction. Based on the single parameter control research, the two parameters dynamic control threshold range is proposed. The calculation results show that two parameters analysis provides a more reliable means for walking-type incremental launching construction and is a necessary supplement to the conventional single parameter control.

Keywords: walking-type incremental launching construction; wide steel box girder; local stress; multi-parameter control.

1 Introduction

In recent years, the walking jacking construction method has developed rapidly in China [1]. This method has the characteristics of less interference under the bridge, safety and economy, and is widely used in the construction of bridges spanning railways, highways, and rivers [2-4]. In the process of pushing the steel box girder on foot, the beam body needs to bear the huge support and reaction force caused by its own weight. Under the action of this force, the web and the bottom plate of the beam body are prone to buckling instability. For safe implementation, construction control must be carried out on multiple parameters in the construction process [5-6].

At present, the risk control of walking jacking is to assess the risk of the main girder through a single early warning value of the monitoring data. The risk control of steel box girder by parameters lacks the relationship between the mechanical deformation characteristics of steel box girder, ignores a large number of mechanical relationships between monitoring data, and has relatively weak ability to analyze the local force of steel box girder, so it often occurs that the monitoring data fully meet the Specification or design requirements, but pushes the fact that a risk accident has occurred. For example, the vertical jacking of the same pier meets the 4 mm control threshold specified in "Technical Specifications for Construction of Highway Bridges and Culverts"(JTG/T 3650-2020) [7], and the lateral offset also meets the design requirements, but when the lateral offset and vertical jacking do not When the synchronous combination is applied to the steel box girder, the local stress of the steel box girder may have exceeded the limit, which leads to the case of local buckling of the steel box girder.

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