



## Temperature Filed Experimental Study of Longitudinally Connected Ballastless Track On Bridge in One Year Period

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## Summary

There are about 4500 kilometers CRTS II (longitudinal continuous slab ballastless track) in the operating high-speed railway in China now. The track plate surface cracks are easily caused on Longitudinal continuous track structure under the temperature load. To get the temperature distribution in this structure, a continuous observation of CRTS II (China Railway Track System II) by using temperature sensors was taken in China. Based on one year's observation the time-dependent deformations of vertical temperature gradient in different kind of season were discussed. Based on statistics and curve-fitting, raised temperature load models which was fit for the typical area in China. The analysis results showed that: The unballasted track temperature field is influenced by many environmental factors, and the temperature field is formed by collective coupling, and one of the main factors is the solar radiation. The changing of the temperature in the track structure is fast, the temperature changing value of surface was 16°C in maximum, 8°C in average, the temperature changing value became small, and the time of maximum temperature come late with the increase of distance to surface. Fitting curve of vertical temperature gradient in longitudinally connected ballastless track on connected bridge can be exponential curve, and the distribution law matched the provisions about the vertical temperature gradient of the code for design of railway bridge and culvert in China.

**Keywords:** Railway bridge, Railway engineering, Longitudinally connected ballastless track, Vertical temperature gradient, Experimental study

## 1. Introduction

High-speed railway is developing fast during recent time in China. By the end of 2014, the operating high-speed railway has reached 16000 kilometres [1], of which there are almost 5000 kilometre's CRTS II (longitudinal continuous slab ballastless track) [2]. Since 2005 in the Beijing-Tianjin passenger line for the first time using the CRTS II type longitudinal connected ballastless track, because of its good integrity, high smoothness, high degree of prefabrication, less maintenance in hole life cycle [1], this track structure has been widely used in China, Such as Beijing-Shanghai high speed railway, Shanghai-Hangzhou passenger line, Jing-Wu (Beijing-Wuhan) high speed railway, Hangzhou-Changsha passenger line, Jin-Qin(Tianjin-Qinhuangdao) passenger