



Stability of Temporary Railway Trestle Crossing Deep Excavation

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Abstract

Ningbo high speed rail station located in the Southeast coastal area of China is one of the newest comprehensive transportation hub that integrates railway station, subway station and other transfer transportation tool. The foundation pit of the project stretches an area of 265m×124m and a depth of 24m. Soil in this area has unfavorable characteristics such as compressibility, sensitivity. A series of precautionary measures were adopted in design and construction which facilitated the unprecedented in China the non-phased massive excavation and building of the station house by temporarily adding a trestle spanning over the foundation pit. This creative technique not only saved nearly 1/3 of the construction period compared to the traditional way but also the project cost. In this article the impact on deformation, dynamic characteristic and the vehicle-bridge coupling vibration of the temporary trestle from soil upheaval due to unloading during excavation is studied.

Key Words: Soft Soil; Excavation; Trestle; Train; Stability

1 Synopsis

With China's rapid construction development, a great number of integrated transportation hub combining rail, subway and other transportation tool come into existence. Very often the interchange spot is located beneath the central exit passage way of the railway station to minimize the hustle of transfer between the two.

When such projects are located in China's south east coastal soft soil area where saturated clay, silts and sand are stratifiedly distributed, unfavorable geological characteristics such as high water content, porosity, sensitivity, compressibility and low strength are common.

Therefore, it is quite challenging when foundation pits with extensive size and depth need to be excavated, which raises safety and stability concerns. In addition, usually national railway station project has very tight schedule. To save construction time and cost scientifically without interfering the existing railway line in operation seems rather important.



Fig. 1: Integrated Excavation of Subway Station and Ningbo Railway Station