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The effect of bridge piers distance on the optimum piles group in elevated expressways

(Case study: sadr elevated expressway)

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Abstract

Elevated expressways are the newest type of bridges. Recently using of elevated expressways is more common due to increase urban traffic. In many cases, the bridges piers are based on pile group foundation. This research attempts to optimize the pile foundations in its case study. Optimum pile group foundation has minimum volume in whole project. The case of this study is Tehran's Sadr elevated expressway. Sadr elevated expressway is the first elevated bridge with unique pier in Iran. Sadr bridge project is a highway bridge over the Sadr highway and It consists of two parallel bridges. This thesis is based on static analysis. Numerical analysis used to analyze data in this research. The software that is used for simulating in this research uses the finite element method. Loading case type and material model in this thesis is linear. Numerical analysis of the bridge have done in SAP 2000 and reaction load on foundation was recorded. Ten bridges with different spans length selected for this research. Afterward reaction load was calculating and loaded on pile foundation with four, six, eight and ten piles in Plaxis 3D Foundation and depicting "load- settlement diagram" for each foundation. This research did with the aim of evaluating the optimum pile group in main bridge of Sadr elevated expressway with respect to the distance from first pier to end pier.

Key words: Elevated expressways, Optimum pile group, Tehran's Sadr elevated expressway, Span length.

2. Introduction

This thesis is based on stationary method [1] and computer software are utilize for analyze and analogy. In this research bridge is simulated in SAP2000 and vertical loads has constrained on foundation are calculated in varied situation then foundation than beneath bridge load and soil condition has been simulated in PLAXIS 3D FONDATION. Vertical movement in top of the cap piles are beneficial output for engineering judgment. Safety factor in this research is 1.

Data in this research is from sadr elevated expressway [2].