Ain Shams University
Faculty of Engineering
Department of Structural Engineering

Value Engineering Analysis in the Construction of Box-Girder Bridges

Thesis
Submitted in partial fulfillment of the requirements for the degree of
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STATEMENT

This thesis is submitted to Ain Shams University in partial fulfillment of the requirements for the degree of Master of Science in Civil Engineering (Structural).

No part of this thesis has been submitted for a degree or a qualification for any other university or institution.

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ABSTRACT

Value Engineering Analysis in the Construction of Box-Girder Bridges

Bridges construction are one of the most challenging construction projects around the world as it necessitates a lot of engineering, experience, equipment, and a huge deal of money. Consequently, it is indispensable to consider appropriately how to direct the monetary total spent on such projects. Currently the selection process of bridge's superstructure construction methods in Egypt mainly depends on the experts' knowledge and experience without performing or applying a systematic procedure. Thus, the decision might not be the most suitable one as some important considerations could be neglected.

Recently, box-girder bridges are considered as one of the most common systems of Nile bridges constructed in Egypt and it is also widely used all over the world. There are many methods of the construction of box-girder bridges. Therefore in order to select the most appropriate construction method many factors should be well considered as site conditions, technology used, construction method characteristics and bridge physical characteristics.

In this study, a machine learning model is developed to determine the most appropriate box-girder bridge construction method, applying the spirit of Value Engineering technique. Value Engineering is used for comparing the different construction methods for achieving the required

basic function after considering the main significant factors and without affecting the desired quality.

Keywords: Box-girder - value - construction methods - Value Engineering - Egypt - artificial intelligence – classification - machine learning - analysis.

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CHAPTER 1

INTRODUCTION