HIGHER TECHNICAL INSTITUTE

CIVIL ENGINEERING DEPARTMENT

DIPLOMA PROJECT

ANALYSIS AND DESIGN OF A SUSPENDED BRIDGE IN STRUCTURAL STEEL

C/987

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STYLIANOU NATASA

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Project Report
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CHAPTERI: Introduction

A civil engineering project generated for the plan and construction of highways, buildings, bridges requires estimate of construction costs, decision making of the specific materials to be used and drawing.

In 1971 the use of computers was relatively rare in civil engineering firms. Specialized civil engineering software was scarce and computing was an expensive application. Thirty three years later computer became an essential tool for every engineer, manager and administrator in a firm. The growing use of advanced technologies such as software packages gives the opportunity to the engineer to handle difficult and time consuming tasks in easier way. Such software packages give you the opportunity not only to design the layout of a construction but also to give you its numerical analysis.

A number of software packages are now available for planning, analysis and design estimation and project management of civil engineering projects.

After experiencing the advantages and great capabilities of the known Stadd software it became the main tool of our project. Stadd is based on the analysis and design of structures and is considered to be one of the best software in its category. Also Stadd nowadays is considered to be the right hand of every civil engineer. During the implementation of Stadd we experienced several problems due to our inexperience with the software navigation. This was overcome during the implementation of our project and gave as the opportunity to implement and extent the knowledge obtained during our attendance in the course of civil engineering in HTI.

We were assigned by our project supervisor to design a suspended bridge. Suspended bridges are divided into two categories, the suspension bridges and the cable stayed ones. Choosing between the two available options we ended up with the cable stayed bridge. The decision was made after considering the complexity of the

analysis needed for each case as well as our current knowledge on that field. The cable stayed bridge requires easier numerical analysis according to the Stadd software in opposition to the suspension bridges which need more complex computer analysis and design. Also our knowledge in the field of numerical analysis of suspension bridges did not allow us to design a suspension bridge.

A typical cable stayed bridge is a continuous girder with one or more towers erected above piers in the middle of the span. From these towers, cables stretch down diagonally usually to both sides and support the girder. Steel cables are extremely strong but very flexible. The typical span length of a cable stayed bridge varies between 110 to 480 meters. Generally the dimensions of the bridge designed in our project were chosen after studying several existing bridges of this type.

During the design of our project we encountered numerous difficulties. Without the contribution of the Stadd software we would need much more effort and time as the several changes required during the procedure would enforce us to re-calculate everything from the beginning if we used a hand design method.

In conclusion, this project revealed to be a very challenging experience. It extended our knowledge and gave us an ignition for further studies in the future.

Acknowledgement

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