EFFECT OF MODELING METHODS ON THE STRUCTURAL BEHAVIOR OF CABLE-STAYED BRIDGES UNDER STATIC LOADS

By

KHALED GOMAA MOFADL ABDEL-MAGED

A Thesis Submitted to the
Faculty of Engineering at Cairo University
In Partial Fulfillment of the
Requirements for the Degree of
MASTER OF SCIENCE
In
STRUCTURAL ENGINEERING

FACULTY OF ENGINEERING, CAIRO UNIVERSITY
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Title of Thesis:

Effect of Modeling Methods On The Structural Behavior of Cable-stayed Bridges Under Static Loads

Key Words:
Cable-stayed bridges; Modeling; Finite Element.

Summary:

A parametric study was made to select the optimum way to model a cable-stayed bridge. With variable length of the main span, two bridges were selected as cases study "Al Salam bridge, Egypt and Tatara bridge, Japan". Based on the finite elements procedure, three modeling methods were used in this study" Fishbone, Shell, and Grillage models". The study showed that the three models are applicable and representable for the studied bridges. The study found that the shell element model is more detailed in simulation of the bridge elements. However, it is time consuming. As a result, the study recommends starting with the fishbone "Frame" model, and then making the shell element model depending on the complication of the bridge and availability of time. In addition, the non-linearity "Sag and p-Δ effects" should be considered especially for the very long span bridges.

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