Cairo University

BEHAVIOR AND FLUTTER STABILITY OF LONG-SPAN CABLE-STAYED BRIDGES WITH CABLE NET

By

Eng. Amin Abdel-Monem Kotb Abdel-Motaleb

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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Under the Supervision of

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Title of Thesis:

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Key Words:

Cable-stayed bridges; Cable Net; Large Deformation; Flutter Critical Wind Velocity; Selberg; SAP2000; Cable Pre-stressing Force; Girder Internal Forces; Deflection; Pre-stressing Force; Distribution of Live Load.

Summary:

The long-span cable-stayed bridges considered as a modern form of bridges which is both economical and aesthetic considerations. However, this kind of bridge is characterized by high inhabitant flexibility due to its main girder low depth to span ratio. Since the well-known collapse of Tacoma Narrows Bridge in 1940, great attention has been given to the aero-elastic instability. Especially the problems arising for flutter instability which have a great effect on the safety of this kind of bridges. Many researches have been conducted to improve the flutter instability of bridges by increasing the critical wind velocity. In this research, different arrangement of additional cable net has been adapted as a solution for increasing critical coupled flutter wind velocity and improving the overall behavior of the bridge.

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