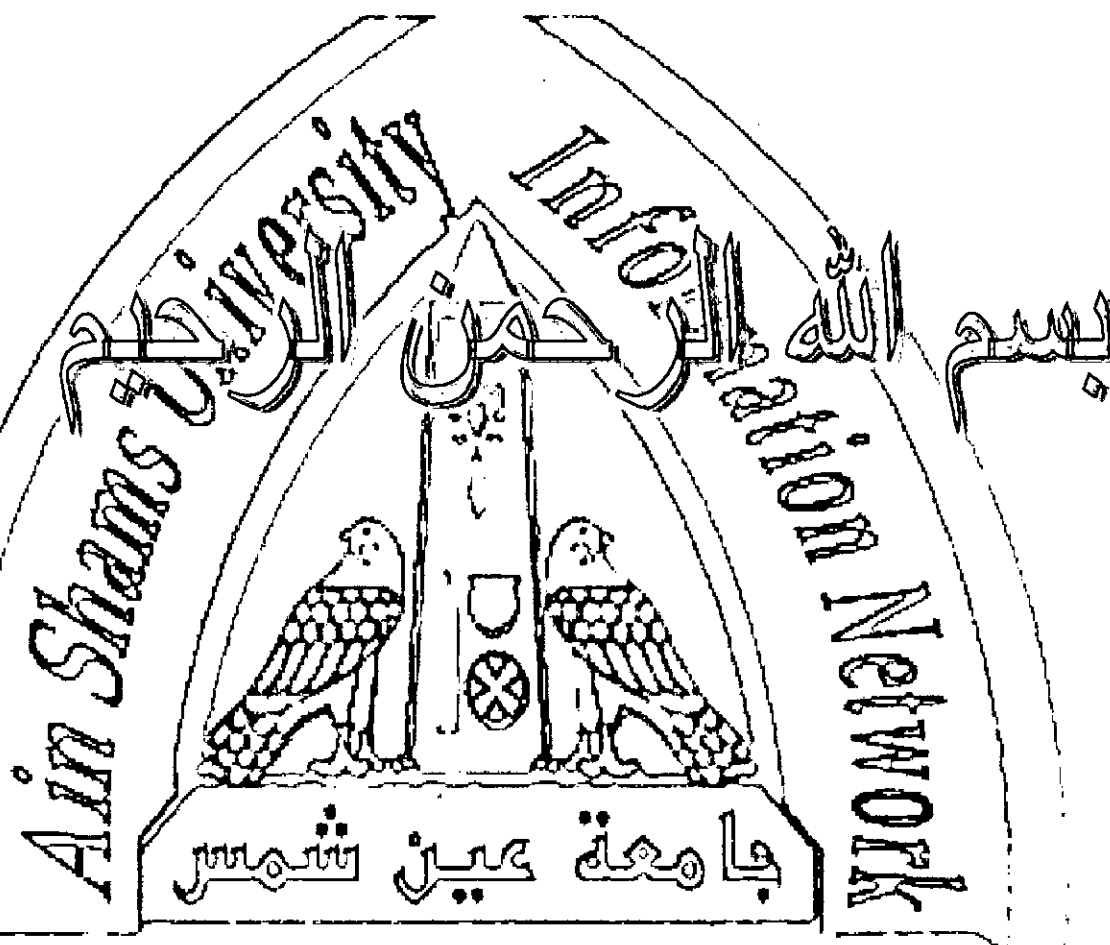




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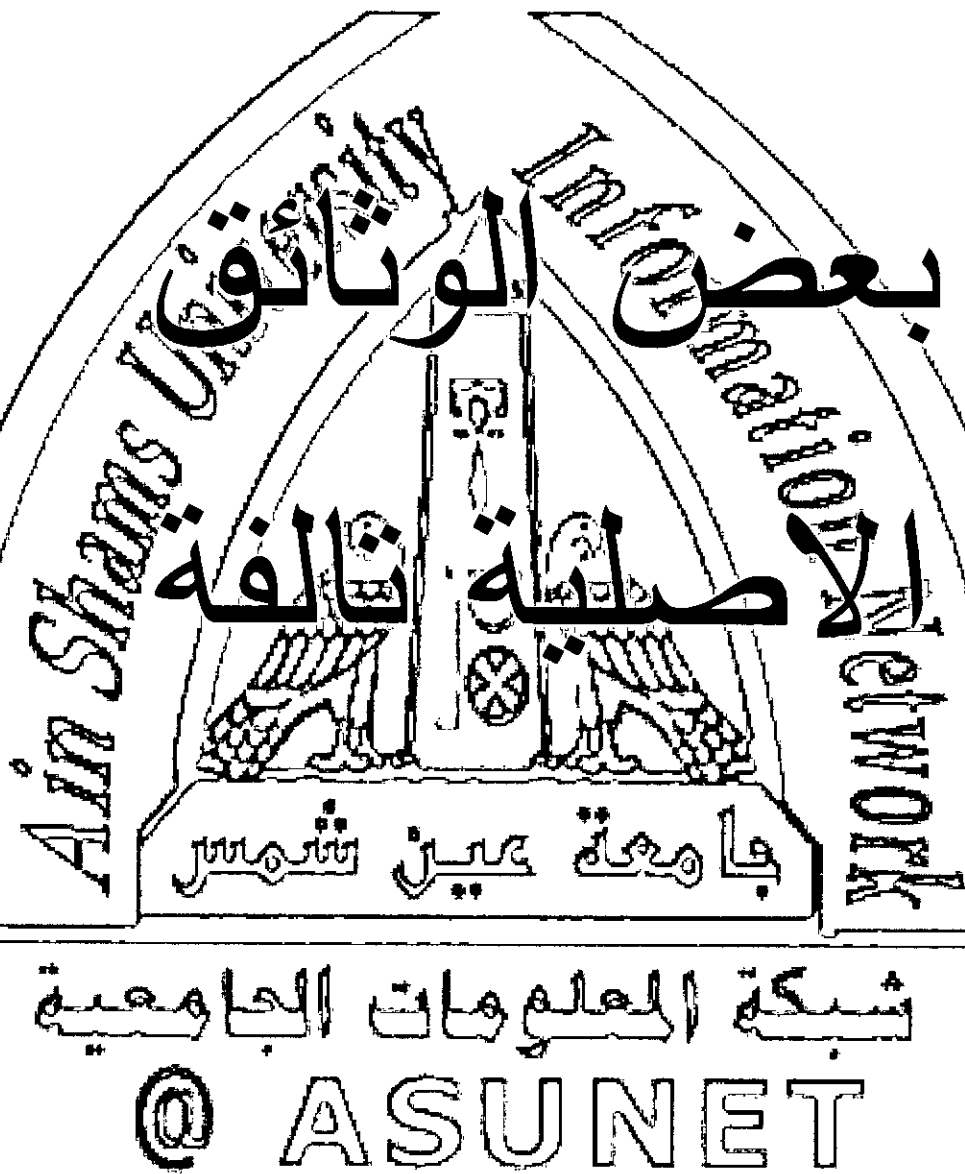
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BEHAVIOR OF SPACE FOLDED PLATE STRUCTURES SUPPORTED BY FLEXIBLE SUPPORTS

By

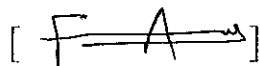
Eng. / **Ramy Ibrahim Shahin**

B.Sc., Civil Engineering Department
Menoufiya University, 2000

A Thesis submitted in partial fulfillment of the requirements for the
degree of Master of Science in Civil Engineering
(Structural Engineering)

Under the Supervisor of

Prof. Dr. / **Fakhry A. Aboul-ella**

[]

Prof. of Structural Engineering
Civil Engineering Department.
Faculty of Engineering
Menoufiya University

Prof. Dr. / **Kamel S. Kandil**

[]

Prof. of Steel structures
Civil Engineering Department.
Faculty of Engineering
Menoufiya University

Dr. / **Mohsen A. Mousa**

[]

Lecturer
Civil Engineering Department.
Faculty of Engineering
Menoufiya University

M. El-Nemr
M. El-Nemr
26/12/2005



2005

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BEHAVIOR OF SPACE FOLDED PLATE STRUCTURES SUPPORTED BY FLEXIBLE SUPPORTS

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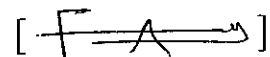
Examiner committee

Prof. Dr. / **Fahmy A. Fathelbab**



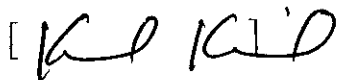
Prof. of Structural Engineering
Structural Engineering Department.
Faculty of Engineering
Alexandria University

Prof. Dr. / **Fakhry A. Aboul-ella**



Prof. of Structural Engineering
Civil Engineering Department.
Faculty of Engineering
Menoufiya University

Prof. Dr. / **Kamel S. Kandil**



Prof. of Steel structures
Civil Engineering Department.
Faculty of Engineering
Menoufiya University

Dr. / **Mostafa M. El-shami**



Assistant Professor
Civil Engineering Department
Faculty of Engineering
Menoufiya University

2005

Ⓢ YUKI

Abstract

Folded plate structures such as roofs and curtain walls are flexible structures, and supported by flexible supports. The behavior of such structures under dynamic and static loads, especially earthquake loads, is affected by their flexible supports and joints.

In the first part of this thesis, a new finite element model based on theories used in SAP2000 program is presented, this model is extended to include flexible joints between plates. Results from this model agree well with experimental and theoretical work done by earlier investigator.

In the second part of this thesis, the above model was used to study the behavior of glass curtain wall structures. In these structures, a special member was introduced to act as "a spring" with nonlinear properties to transfer loads to the ground. The degrees of freedom of this member were defined. The behavior of real glass curtain wall structure was studied. The static and dynamic response of this structure were introduced. The internal forces and stresses for this structure were calculated and studied. Design recommendations were also introduced.

In the third part of this thesis, concrete folded plate structures supported by flexible supports are studied. In this part, different types of flexible connections are presented, and the effect of using flexible supports is studied. The static and dynamic behavior of these structures under their own weight, wind, and earthquake loads were

studied. General conclusions and recommendations for the safe design of such structures are also presented.

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