

CHAPTER I



INTRODUCTION

Several problems of the bending of thin plates of various shapes were solved in closed form. The equilateral triangular plate simply supported on all sides and subjected to a uniformly distributed transverse load was solved by Woinowsky - Krieger.⁽¹⁾ The problem of bending due to moment uniformly distributed along the boundary of a simply supported equilateral triangular plate was discussed in the text by Timoshenko and Woinowsky Krieger.⁽²⁾

Lee and Ballesteros⁽³⁾ obtained an approximate closed form solution of a uniformly loaded isotropic rectangular plate supported on columns at the corners. Their deflection function was assumed in the form of polynomials as first suggested by Girkmann.⁽⁴⁾

Vijakkhana, Karasudhi and Lee⁽⁵⁾ obtained an approximate expression for the deflection and bending moment of a uniformly loaded equilateral triangular plate supported on columns at the corners.

Poonchainavaskuen⁽⁶⁾ also obtained an approximate closed-form solution of a corner supported equilateral triangular plate subjected to a concentrated and partially distributed loads.

In this study, the problem of a hexagonal plate supported on columns at the corners is to be investigated for two kinds of load:

CASE 1 : Uniformly distributed load

CASE 2 : A concentrated load at the center

The deflection function is assumed in the form of polynomials for Case 1 and some term of logarithmic function was employed for Case 2. To facilitate a closed form solution, approximate boundary conditions on bending moment and effective transverse shear force on the free edges were adopted, viz. the total bending moment and the total effective transverse shear force along the edges vanished. Energy method is employed to obtain the final results of the approximate deflection function for the Case 2. The theoretical results of the two cases would then be compared with experimental measurement on a hexagonal steel plate model. The proposed approximate solutions yield reasonable agreement with the experimental results.