CHAPTER V

CONCLUSION AND DISCUSSIONS

In this study comparisons of the results near the edges of the plate were not presented. This is because, by the use of the approximate boundary conditions, it is expected that theoretical results for the portion near the edges will not agree with the experimental behavior of the deflections and stress resultants.

In Case 1, the polynomial function of the approximate solution gives satisfactory results for the deflection as seen in the graphs. However, discrepancies increase as the load is increased. The maximum error in the deflection values between theory and experiment is 16%, but this is considered not serious. The portions near the center are in error by 6%. The bending moments obtained from theory are less than the experimental results. The maximum error in bending moments at the points near the center is about 22% as seen in Fig. 15 and 16. However, the bending moments for the diagonal lines of the plate have an error of only 8%. Figures 16 and 17 indicate that there are more deviations from experimental results at the outer portions.

In Case 2, the deflections obtained by the experiments are higher than the theoretical values. The maximum error is 20% for heavy load, but if a smaller load is applied at the same point the errors are reduced to 15%. The bending moments obtained from experiments are also higher than the theory, especially M_x. The maximum error of 56% in bending moment occurs near the

center of the plate. The approximate deflection function obtained in this study should be useful for estimating the maximum bending moments in practical design.

The causes of errors are believed to be the approximated boundary conditions, viz., the total bending moment and the total effective transverse shear force along the edges are equal to zero. Another reason for the discrepancies is the form of the deflection function used.

The method of solution presented herein is aimed at the simplicity of the solution for the practical purpose. This limitation confines further improvement of the theoretical results. Other methods of solution, such as the finite element method, could be employed in order to obtain better agreement between the theoretical and experimental results.