CHAPTER IV

DISCUSSION AND CONCLUSION

Although the comparison of the results between various thickness shows virtually no influence on the stress resultants, it should be noted that all forces are in force per unit length, the difference of the results can be seen clearly when these forces under consideration are viewed in terms of force per unit area. Increasing the depth gives a significant reduction of the results especially the critical values, such as bending moments in the horizontal plate, membrane shearing forces in the vertical and horizontal plates and longitudinal normal force in the vertical plate, which, when the depth is doubled, are reduced by about a half to four-fifth of the former values. The economical reinforced concrete sections can then be designed by keeping the thickness at the minimum, dictated by the criteria for protection of the reinforcement, and varying the depth to obtained the appropriated stresses and deflections within the required limits.

The results from the simple bending theory, when compare to the proposed method, can be used very effectively for small width-thickness ratios. When the width-thickness ratio increases, the discrepancy is greater. According to the code of practice for conventional flexural analysis, the distance between the centers of the vertical plates or 12 times of the thickness whichever is smaller is normally recommended as effective width. It can be seen, in Figs.9 and 10, that the stress resultants obtained from this criteria are higher than the proposed method and more higher as the

width is increased. It is evident that this criteria for effective width is not accurate for greater width-thickness ratio, but it is safe for the design purposes. On the other hand, the deflection obtain from this criteria is less than the proposed method which is unsafe. As the results, it is necessary to establish some readjusted basis for simple bending theory calculation. Such a basis of calculation could be the equality of the maximum deflection, as calculated from some rigorous theory with that calculated from the simple bending theory using an effective moment of inertia. An alternative could possibly be the equality of the maximum stress. If the effective width can be calculated for a few values of the geometric parameters describing the structure, then the design curves could be drawn from which interpolated widths could be read for other values of the geometric parameters. It should be noted that the usefulness of the effective width concept lies in the assumption that it is constant along the span and of such a magnitude as to satisfy some condition, laid down for its calculation, at possibly only one point along the span.

The need for such a concept has been felt because the amount of computation required in the rigorous analysis such as the proposed one was otherwise prohibitive. However, when the digital computer program is available, the amount of time taken in computaion become negligible and an accurate evaluation of stress resultants and deflections can be made without resorting to the simple bending theory. Moreover, it becomes possible for the designer to modify the size of the section and to observe, almost immediately, what effect his modifications will have on the stress resultants and deflections.