CHAPTER V

CONCLUSION & DISCUSSION

In the theoretical analysis presented in chapter II, the general case was considered, as for example the area of flux density with any size or shape. There may be more than one area, each with its own density. The calculation will be rather confuse, they must operate under certain conditions, such as the disk resistance effect being large compared to the disk reactance effect. As to the braking fluxes, the method is limited to cases in which the disk is thin enough, or the velocity low enough, (or both) so that the eddy currents are not strong enough to have much effect in the redistribution of the flux.

The brake used in the present test was constructed in a simple manner. The pole faces of the magnet were rectangular, the disk was round, and the speed of the disk can be low or high. Therefore the calibrations in the experiment were solved by the theory of C.V. Drysdale and A.C. Jolley in "Electrical Measurement Instrument".

The experiments shown in Fig. 4.3 and 4.4 in which the exciting currents were 1 and 0.8 amp., it was not possible to show the complete curves, because the motor could not run more than speeds about of 264 and 420 rpm. respectively. In Fig. 4.5, 4.6, 4.7 and 4.8, it was possible to show the curves completely. Therefore this brake should not be used for exciting currents above 0.6 amp.

Fig. 4.9 shows the torque as function of angular velocity w and exciting current, the maximum torques of the four curves were obtained at motor speed about of 600 to 1,000 rpm. The different points on these curves in which the applied voltages are the same were joined together, therefore the equivalent lines of voltage were obtained at various voltage. They were seen that at the higher voltage, the curve was flatter than that of the lower voltage.

The "eddy current brake" are especially suitable for testing the small motors where the heat generated by the retarding power can be dissipated without endangering the insulation of the excitation winding. The advantage of this type of loading compared with other methods (such as the dc generator dynamometer) is marked for high speed motors. The "eddy current brake" is both simple and robust.

The problems which are basically magnetic field problems are nearly always more difficult than circuit problems, mainly because they are in three dimensions. Their solutions generally be come possible only if they can be reduced to two dimensions, then the field can be plotted, and an approximate solution obtained.

This neccessary approximation limits the accuracy and usefulness of such a method. Heretofore, it generally has been considered simpler and more accurate to construct. Samples to investigate the effects of the various factors, rather than to depend on a lengthy and involved mathematical solution.

The method in this thesis uses analogy to field problems ;which has been solved, and the superposition idea was applied to obtain the results by a relatively simple method.

The results which were obtained from the investigation of the "eddy current brake" was rather satisfactory. If the brake can be improved by reducing some of the troubles, such as the position of the brake in the coupling with the machine, and the friction of the disk while it is rotating, the auther is sure that this brake can be used in the laboratory for the determination of the characteristic of machines instead of the other instruments.