CHAPTER 5

CONCLUSION

On the basis of experimental and analytical results the following conclusions can be drawn.

1. The flexural strength predicted by using Nedderman's stress distribution, triangular stress distrubution in concrete and 1977 ACI equivalent rectangular stress distribution gave good agreement with the test results. Using compressive stress distribution as proposed by Nedderman yielded the strength ratio of calculated moment to observed one was ranged from 0.919 to 1.219 and the average was 1.045 with a standard deviation of 11.390 %. For triangular stress distribution, the average strength ratio varied from 0.916 to 1.216 and the average was 1.042 with a standard deviation of 11.46 % while using 1977 ACI equivalent rectangular stress distribution yielded the strength ratio varied from 0.833 to 1.024 and the average was 0.944 with a standard deviation of 10.154 %.

2. The load-deflection response calculated by working stress method yielded good agreement with the test results of the test beams with low longitudinal reinforcements of which the value of reinforcement index varied from 0.041 to 0.061. Parabolic, triangular stress distribution, and effective moment of inertia, on the other hand, yielded good agreement with test results of the test beams with higher longitudinal reinforcements in the range of reinforcement index up to 0.121.

3. Effective moment of inertia was conformed to instantaneous moment of intertia obtained from strain measurements during the tests within the range of reinforcement index from 0.041 to 0.092.

4. All test beams failed in tension mode since the observed maximum longitudinal reinforcement strains of all test beams were more than 0.0082 and the relationship between reinforcement strain and reinforcement index may be expressed by empirical formula as

$$\varepsilon = 0.0317-0.150\ \omega$$

However the range of reinforcement index is between 0.041 and 0.121.

5. Ductility index, obtained from the ratio of ultimate to yield deflection at mid-span length, ranged from 1.73 to 2.91 and the average was about 2.26 which was less than that suggested by Furlong, 4.55 to 5.70 for ordinary reinforced concrete hence this type of structure may not develop fully plastic moment due to its low ductility.

6. The possible service load of test beams can be as high as 44 % of the ultimate load as the maximum mid-span deflection is controlled by $\ell/180$.