

** C215051 : MAJOR STRUCTURAL ENGINEERING
KEY WORD: PARTIALLY PRESTRESSED CONCRETE/ONE WAY

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WAY FLAT SLABS. THESIS ADVISOR : PROF.EKASIT LIMSUWAN, Ph.D.
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This research work has studied structural behavior of partially prestressed concrete flat slabs by means of static loading tests up to failure. Test specimens are rectangular section of 15×70 cm with total length of 630 cm. Five testing samples have been assigned the partially prestressing ratio to 0, 0.21, 0.51, 0.77 and 1.00, respectively. Prestressing tendons of all testing samples were unbonded system with percentage of reinforcement approximately 50% of the one at balanced condition. Test span was 600 cm, using two point loading and shear span was 200 cm. Analysis method for all test slabs was conformed to the strain compatibility method and the Siriaksorn method. Concrete stress-strain distributions according to the ACI and Nedderman were employed in the analyses.

The test results as compared to the analysis ones, the strain compatibility method have shown very good agreement on moment curvature relationship only when the partial prestressing ratio less than 0.51. This factor has been observed to be influenced by tendon slippage of unbonded system. The method proposed by Siriaksorn has proved to agree well only the case of bonded system. The prediction for test specimens always obtains upper bound for deflection or lower bound for strength. The stress distribution conformed to the ACI and the Nedderman, have shown very good agreement of all cases at the percentage reinforcement around 50% of the one at balanced condition.

Increase of Partial Prestressing Ratio would affect the deflection, it will reduce the ultimate deflection, in contradiction cracking moment can be expected higher. Crack width and crack spacing predicted by CEB-FIP formular have shown very good agreement for all tested slabs. It may be concluded that this formular can be accurately predicted for unbonded partially prestressing flat slabs.