

## C215253 : MAJOR STRUCTURAL ENGINEERING  
KEY WORD: PARTIALLY PRESTRESSED CONCRETE

SUPASIT POOPONGPANISH : BEHAVIOURS OF PARTIALLY PRESTRESSED CONCRETE  
FLAT PLATES. THESIS ADVISOR : PROF.EKASIT LIMSUWAN, Ph.D.  
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Partially prestressed concrete flat plates are structural concrete member with combination reinforcement of prestressing steel and reinforcing bar. The behaviours would cover whole spectrum of fully prestressed concrete member or normal reinforced concrete slab to satisfy with ultimate limit states and serviceability limit states. This research has studied several parameters governing flexural behaviours; strength, ductility, crack width and deflection. Behaviours of partially prestressed concrete flat plates have analysed by means of strain compatibility method to determine moment-curvature relationship. By such method stress in each elements and strain at each portions can be evaluated. Crack width has determined in accordance with ACI, CEB, and Nawy and Chiang's formulae, respectively.

The results have indicated that the reinforcing index would affect flexural strength and ductility. The reinforcing index of SD-30 steel should be less than 0.25 and SD-50 steel should be less than 0.18 to attain sufficient ductility for inducing plastic hinge in the section. Crack width primarily controls by reinforcing indices, partial prestressing ratio, and bar dimeters. The research has presented the relationship among parameters to evaluate and control the crack width. However, member deflection has influenced by partial prestressing ratio and the slab thickness. The design chart with relationship of span to depth ratio and partial prestressing ratio, is presented to determine slab thickness as governed by permissible deflection of  $L/180$ ,  $L/360$  or  $L/480$ , respectively.