

ABSTRACT

Thesis: Transversal Tensile Force In The End Zone of Prestressed Concrete.

Key words: transversal tensile force, anchor plate, anchorage zone, local zone, global zone, transversal reinforcement, confining reinforcement.

xv + 138 pages.

Prestressed concrete in post-tension method, the prestressing force at anchorage zone creates high local compressive stresses and followed by high transversal tensile stresses which can exceed the modulus of rupture of concrete. Modes of failure causes by these stresses are brittle, explosive and must be designed properly.

In the series 1 experiment, transversal steel reinforcement were spreaded uniformly over global zone without confining reinforcement on the specimens with ratio of cross-sectional high (h) and anchor plate dimension (a) $h/a = 1.65 - 3.30$. The results show that cracking force (P_{cr}) cause by the prestressing force always below the factored prestressing force (P_{su}) presented by American Concrete Institute (ACI) 318M-08, although the maximum prestressing force (P_{max}) occured might be higher than P_{su} . In the series 2 experiment, the local zone is strengthened by confining the concrete with square reinforcement and spiral reinforcement separately. The results show that P_{max} obtained by spiral confining reinforcement are higher than P_{max} obtained by square confining reinforcement.

The series 3 experiment were continued with square specimens. Dimension of square confining reinforcement and spiral confining reinforcement were made with some variation separately. It shows that P_{max} decreases with the increase of square confining area. In contrary, P_{max} increases with the increase of spiral confining area.

The results of these experiment can be concluded: First, design of global zone for transversal tensile force is limited by the cracking of concrete with the design strength of transversal steel reinforcement $f_s = 200$ Mpa or strain of the transversal steel reinforcement is limited to 0.1% (IS:1343). Second, design of local zone with spiral confining reinforcement is more efficient and more effective than square confining reinforcement.