DESIGN PROCEDURES AND CRITERIA FOR POSTTENSIONED PAVEMENTS

BY

ERNEST J. BARENBERG

CRITERIA TO BE MET

1. COMBINED LOAD AND ENVIRONMENTAL STRESSES MUST BE LESS THAT THE COMBINED CONCRETE STRENGTH AND EFFECTIVE PRESTRESS

2. REPEATED APPLICATIONS OF THE COMBINED STRESSES MUST NOT CAUSE THE CONCRETE TO FAIL IN FATIGUE.

3. MAXIMUM STRESS ON THE SUBGRADE MUST NOT EXCEED THE CAPACITY OF THE SUBGRADE

DESIGN CATEGORIES

1. FULLY PRESTRESSED Limiting tensile stress at full service load is equat to or less than zero

2. PARTIAL PRESTRESS Some tensile stress permitted at full service load.

3. UNDER PRESTRESSED Significant cracking of the concrete anticipated.

PARTIAL PRESTRESS USED FOR MOST PAVEMENT DESIGNS INCLUDING ROCKFORD AND O'HARE

EFFECTIVE PRESTRESS

Mean end prestress	558 psi
Effect of eccentricity	239 psi
Effective prestress at ends	797 psi
Prestress loss due to	
concrete shrinkage	- 11 psi
Concrete creep	-19 psi
Steel relaxation	-96 psi
Loss due to wobble	-180 psi
Effective prestress at center	491 psi

DESIGN VALUES FOR ROCKFORD AIRPORT

Allowable > Actual

Concrete strength + Prestress > Stressed due to load + cuirl + Friction

900 = 491 > 800 + 180 + 360

1391> 1340