DESIGN PROCEDURES AND CRITERIA FOR POSTTENSIONED PAVEMENTS

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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 equal 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 + curl + Friction

900 = 491 > 800 + 180 + 360

1391 > 1340