

Appendix D Equations for Continuously Reinforced Concrete Pavement

The following equations for selecting the design reinforcement for continuously reinforced highway and airfield paving were taken from TM 5-825-3, Chapter 5.

$$P_1 = (1.3 - 0.2F) \frac{100f_t}{f_s} \quad (D-1)$$

$$P_1 = \frac{100f_t}{2(f_s - \nabla T n_c E_s)} \quad (D-2)$$

$$P_1 = \frac{100f_t}{f_s} \quad (D-3)$$

where

P_1 = percent of reinforcing steel required in the longitudinal direction

F = friction factor of the supporting soil (1.5 is suggested unless value is known)

f_t = the 7-day tensile strength of the concrete using the splitting tensile strength; for concrete strengths of 25 MPa (3,000 psi) at 28 days, the value of f_t may be taken as 2 MPa (230 psi)

$$f_t' = 0.45(6.5)(1.5) \sqrt{3,500} = 230 \text{ psi}$$

f_s = working stress of reinforcing steel, 75 percent of the tensile yield strength of the steel. This produces a safety factor of 1.33

∇T = seasonal temperature variation

n_c = thermal coefficient of expansion of the concrete

E_s = modulus of elasticity of steel