

Chapter 5

SURFACE LOADING OF A FINITE LAYER UNDERLAIN BY A RIGID BASE

5.1 Loading on an Infinite Strip

5.1.1 UNIFORM VERTICAL LOADING (Fig.5.1)

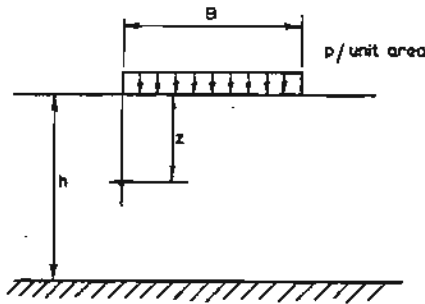


FIG.5.1

Influence factors for the vertical displacement ρ_z and the horizontal displacement ρ_x beneath the edge of the strip, obtained by Poulos (1967b), are shown in Figs. 5.2 and 5.3.

Influence factors for the vertical stress σ_z , bulk stress θ and shear stress τ_{xz} beneath the edge are shown in Figs. 5.4 and 5.5, for four values of ν . The interface between the layer and the base is rough ("adhesive").

The horizontal stresses σ_x and σ_y may be evaluated as follows:

$$\sigma_x = \frac{\theta}{1+\nu} - \sigma_z \quad \dots (5.1)$$

$$\sigma_y = \nu(\sigma_x + \sigma_z) \quad \dots (5.2)$$

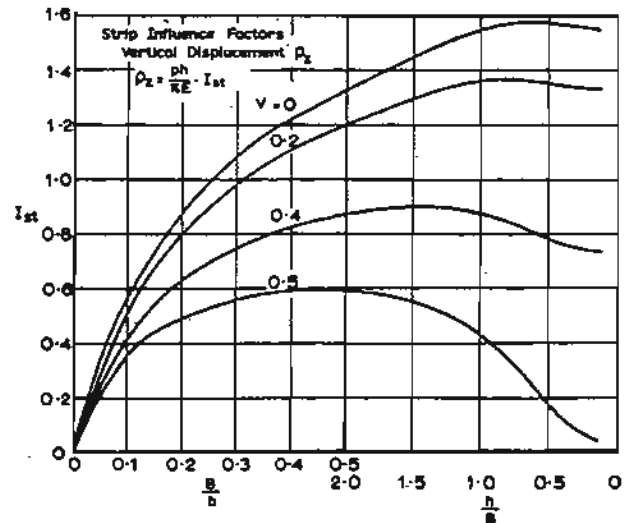


FIG.5.2 Strip curves for ρ_z .

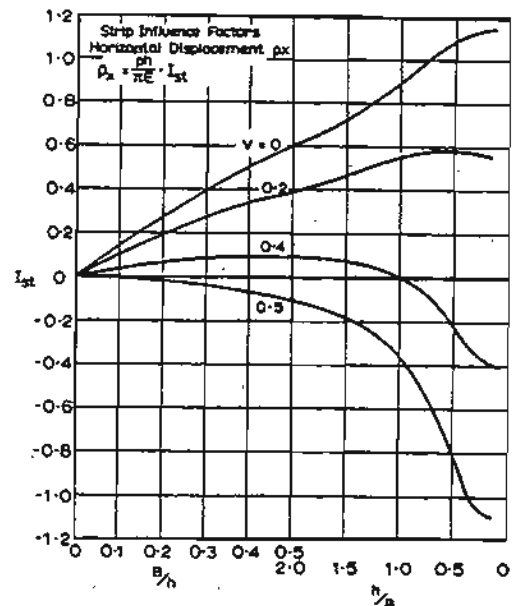
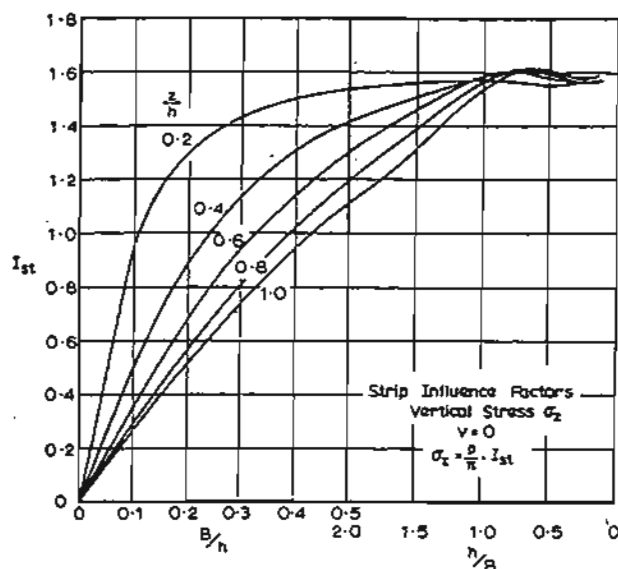
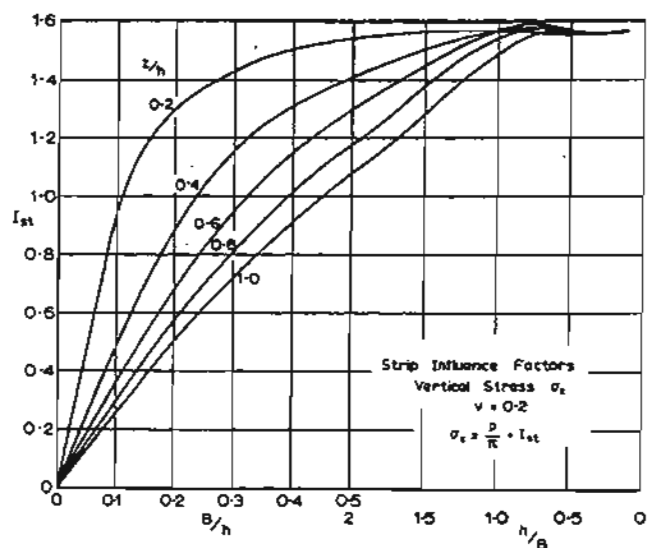
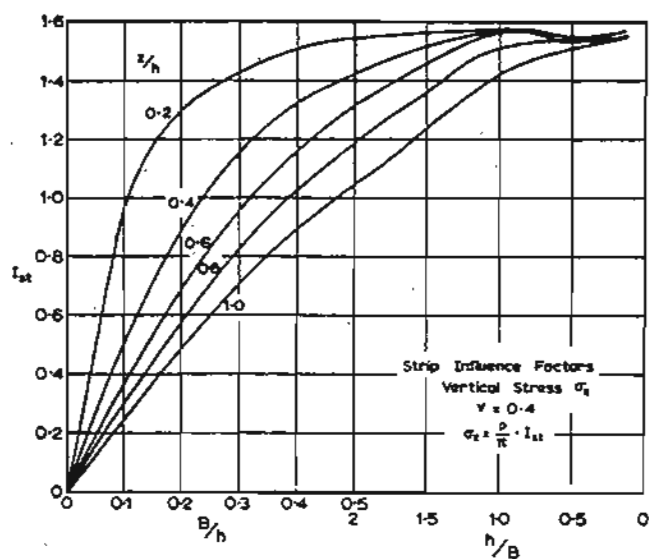
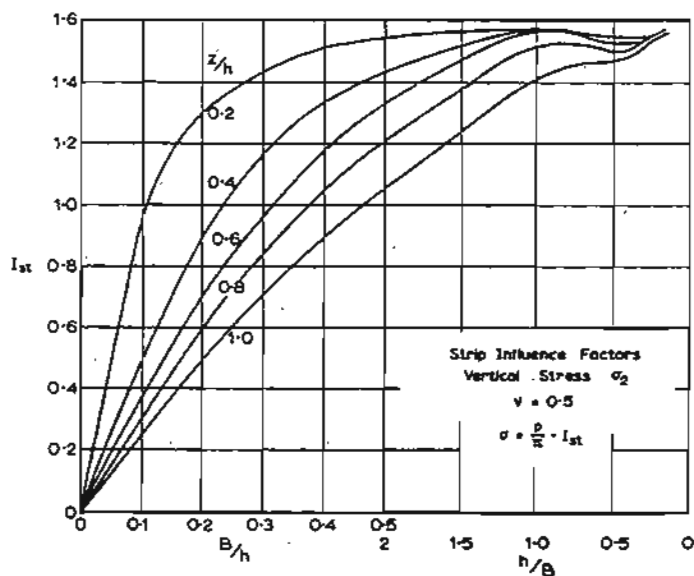
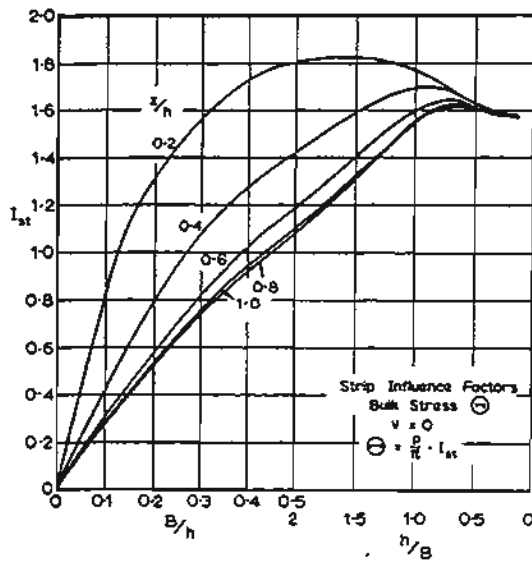
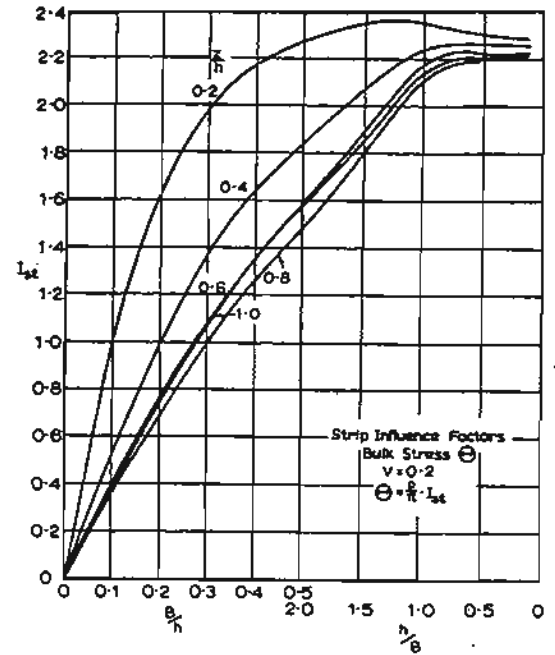
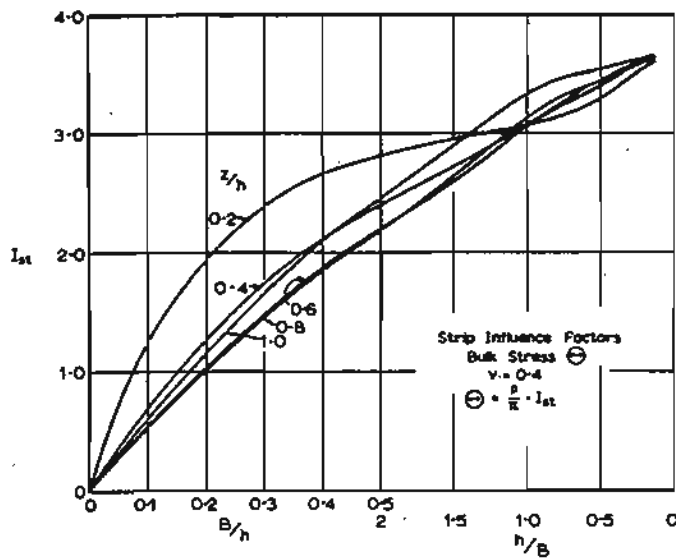
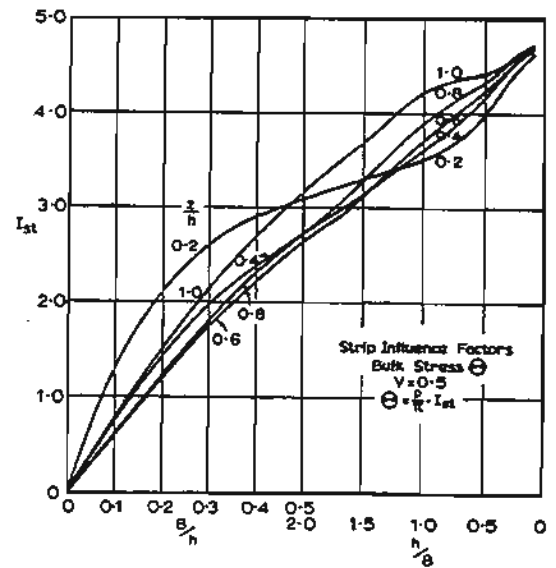
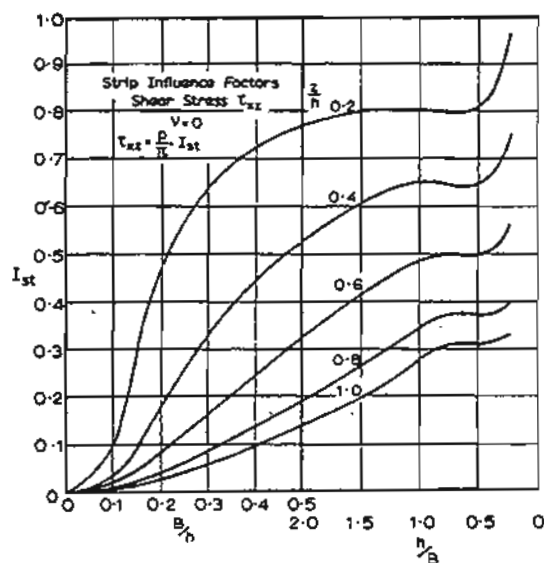
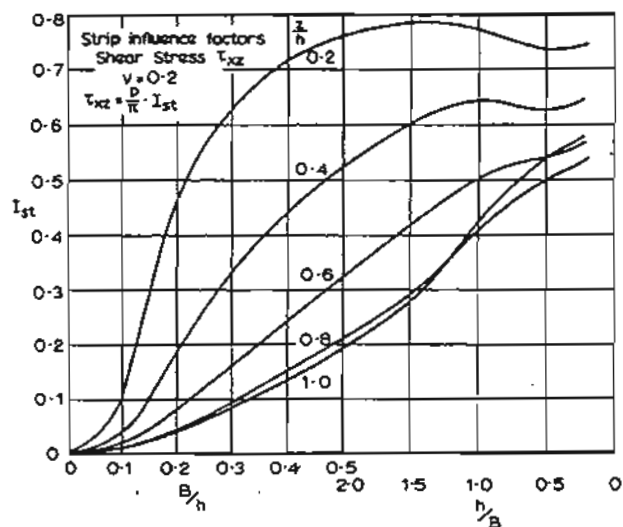
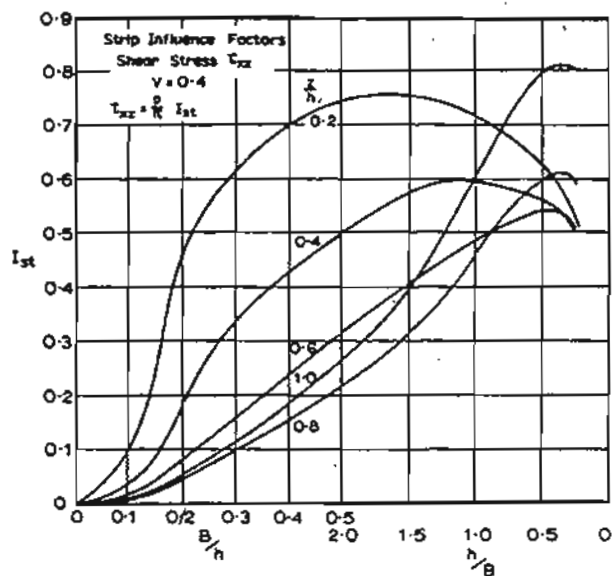
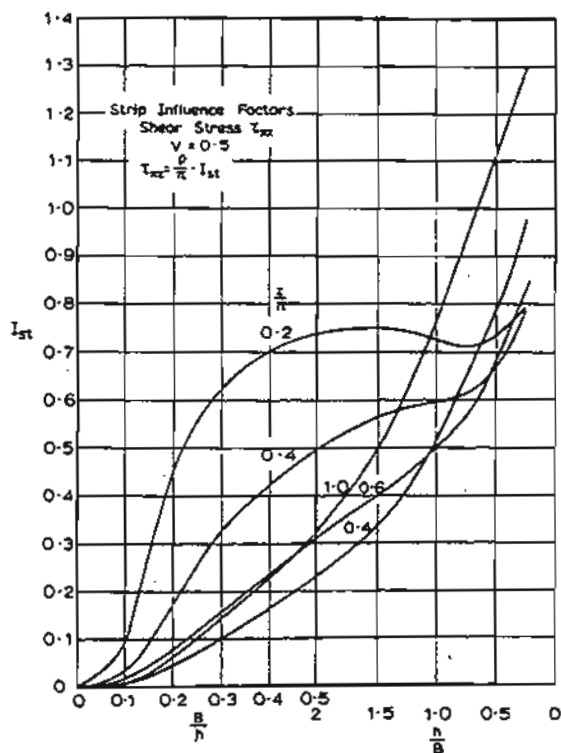


FIG.5.3 Strip curves for ρ_x .

FIG.5.4 Strip curves for σ_z . $v=0$.FIG.5.5 Strip curves for σ_z . $v=0.2$.FIG.5.6 Strip curves for σ_z . $v=0.4$.FIG.5.7 Strip curves for σ_z . $v=0.5$.

FIG. 5.8 Strip curves for θ , $v=0$.FIG. 5.9 Strip curves for θ , $v=0.2$ FIG. 5.10 Strip curves for θ , $v=0.4$.FIG. 5.11 Strip curves for θ , $v=0.5$.

FIG.5.12 Strip curves for τ_{xz} . $v=0$.FIG.5.13 Strip curves for τ_{xz} . $v=0.2$.FIG.5.14 Strip curves for τ_{xz} . $v=0.4$.FIG.5.15 Strip curves for τ_{xz} . $v=0.5$.