ج

« مقاومة المواد »

Force per unit area :- (Length)

1 k/f = 14.594 kN/m

1 P/f = 14.594 N/m

Force per unit area :-

1 psf = 47.880 Pa

1 PSI = 6.89476 kpa

kpa = kN/m²

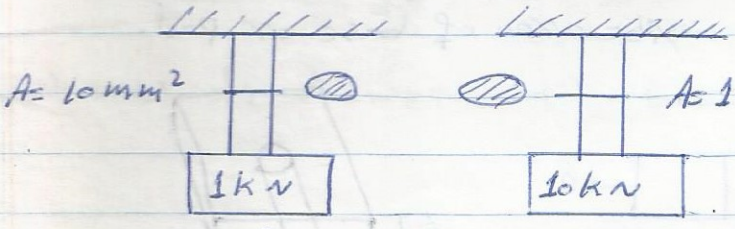
Pa = N/m²

1 kSI = 6.89476 MPa

MPa = MN/m²

1 meg = 10^6

المحاضرة الرابعة



«simple normal stress».

A = cross section area.

$$\sigma = \frac{P}{A} = \frac{1*10^3}{10} = 100 MPa \qquad \sigma = \frac{P}{A} = \frac{10*10^3}{1000} = 10 MPa$$

* the force per unit area, acting normal to the small area ΔA. It is denoted by Greek (يوناني) symbal (σ, sigma) :- This may be : a) Tensile stress (pull) (+ ve) (سحب)

b) Compressive stress (push) (- ve) (دفع)

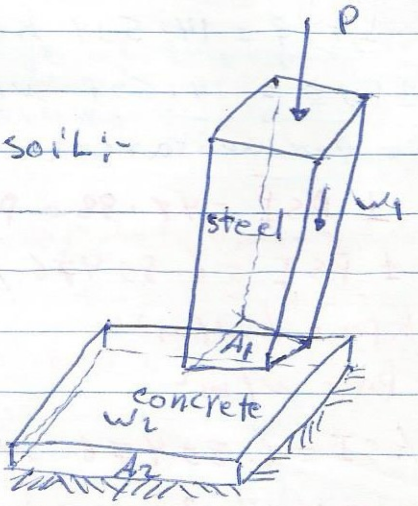
∴ Material of left bar is stronger (أقوى) than material of right ber (see previous (السابق) fig (الشكل)).

* Bearing stress : can be defined as the reaction force between two contact bodies divided by the bearing area of these two bodies (ie. it is a contact pressure between two seperate bodies.

مقاومة المواد

Bearing stress between steel and concrete:

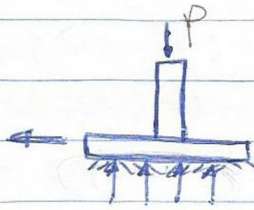
$$\sigma_{b_1} = \frac{P + w_1}{A_1}$$

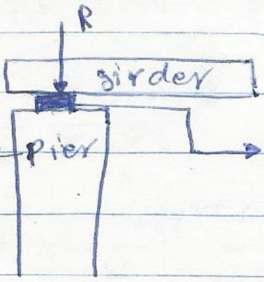


Bearing stress between concrete and soil:-

$$\sigma_{b_2} = \frac{P + w_1 + w_2}{A_2}$$

أساس
تأسيس
foundation.



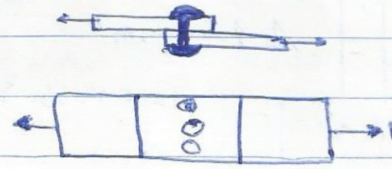


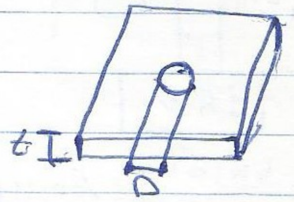
دعامة

قاعدة / سند
Base plate or pad

$$\sigma_b = \frac{R}{A_b}$$

A_b = area of base or pad.





$$\sigma_b = \frac{P}{Dt}$$

في حالة وجود (برشام) واحدة فقط

$$\sigma_b = \frac{P}{nDt}$$

t = thickness of plate

D = diameter of rivet

n = number of rivet

Allowable stress:- In design (تصميم) of a structural members or mechanical elements must restrict (يحدد - يقيد) the stress in the material to a level (مستوى) That will be safe (مأمون). This limit (حد) of stress is called (يدعى) allowable stress.