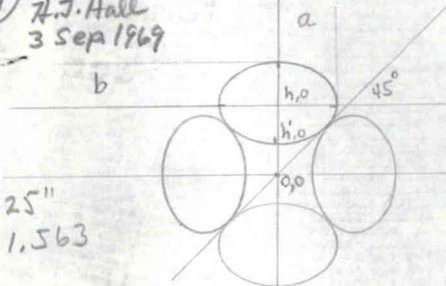


① Cubic Press
H.J. Hall
3 Sep 1969

$h' \sim .65''$
expt.



Tie-Bar ends
projected in base
nearest approach

$$a = 1.25''$$

$$a^2 = 1.563$$

$$b = .884''$$

$$b^2 = .782''$$

$$\frac{(x-h)^2}{a^2} + \frac{y^2}{b^2} = 1$$

$$y = x$$

$$\frac{dy}{dx} = 1$$

$$b^2(x-h)^2 + a^2y^2 = a^2b^2$$

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$$\frac{d^2y}{dx^2} = 0$$

$$b^2(x^2 - 2hx + h^2) + a^2x^2 = a^2b^2$$

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$$b^2x^2 - 2b^2hx + b^2h^2 + a^2x^2 = a^2b^2$$

$$(a^2 + b^2)x^2 - 2b^2hx = b^2(a^2 - h^2)$$

$$2(a^2 + b^2)x \frac{dx}{dx} - 2b^2h \frac{dx}{dx} = 0$$

$$2(a^2 + b^2)x = 2b^2h ; x = \left(\frac{b^2h}{a^2 + b^2} \right) = y$$

Stroke is 1.9" on 200ton Cubic Press with
Rodgers Rams.

(2)

$$\frac{\left(\frac{b^2 h}{a^2 + b^2} - h\right)^2}{a^2} + \frac{\left(\frac{b^2 h}{a^2 + b^2}\right)^2}{b^2} = 1$$

$$h^2 \left[b^2 \left(\frac{b^2}{a^2 + b^2} - 1 \right)^2 + a^2 \left(\frac{b^2}{a^2 + b^2} \right)^2 \right] = a^2 b^2$$

$$h^2 \left[b^2 (b^2 - a^2 - b^2)^2 + a^2 (b^2)^2 \right] = a^2 b^2 (a^2 + b^2)$$

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$$h^2 [b^2 a^4 + a^2 b^4] = a^2 b^2 [a^2 + b^2]$$

$$h^2 [(a^2 b^2)(a^2 + b^2)] = a^2 b^2 [a^2 + b^2]$$

$$h^2 = a^2 + b^2 = 1.563 + .782 = 2.345$$

$$h = 1.531$$

$$h' = 1.531 - b = 1.531 - .884 = .647''$$

for 2 1/2" D tie-bars

this checks with experiment

Cubic Press

H.J.H 3 Sep 1969