Mohr’s circle can be used to graphically determine:

a) the principle axes and principle moments of inertia of the area about O
b) the moment and product of inertia of the area with respect to any other pair of rectangular axes x’ and y’ through O

Graphical Solution Path

- On x-axis C=(I_x+I_y)/2
- R=\{[(I_x-I_y)/2]^2+I_{xy}^2\}^(1/2)
- I_{max}=A=C+R & I_{min}=B=C-R
- Plot points (I_x, I_{xy}) & (I_y, -I_{xy}), and draw a line to illustrate original moment of inertia.
- Proceed with analysis as in Mohr’s circle for stress to find I'_x, I'_y and I'_x'y' at different angles.

Algebraic Solution Equations

- I_x=Moment of inertia about x axis
- I_y=Moment of inertia about y axis
- I_{xy}=Product of inertia

I'_x = I_x \cos^2 \theta + I_y \sin^2 \theta - 2 I_{xy} \sin \theta \cos \theta
I'_y = I_x \sin^2 \theta + I_y \cos^2 \theta + 2 I_{xy} \sin \theta \cos \theta
I'_{xy} = I_x \cos^2 \theta + 0.5 (I_x-I_y) \sin 2\theta

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