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The central distance two shaft is 4m having two pulleys ....

Question:
The central distance two shaft is 4m having two pulleys with diameter having 500mm and 700mm respectively find the length of belt required -

(1) for open belt drive

(2) for cross belt drive

Answer:

Central distance between two shafts; C = 4 Meters; = 4000 mm.

Smaller pulley diameter = d = 500 mm; Smaller pulley radius = r= 250 mm;

Larger pulley diameter = d = 700 mm; lager pulley radius = r= 350 mm;

Angle subtended by each tangent β

a) Length of open belt drive

Angle subtended by each tangent $\beta = \sin^{-1}$ (R-r /C) = $\sin^{-1}$((350-250)/4000)

B = 0.025 radians

$L_O = \pi (R + r) 2x \beta (R\text{-}r) + 2 C x \cos\beta = 9.889$ m $\boxed{L_O = 9.889 \text{ m}}$

b) Length of cross belt drive

Angle subtended by each tangent $\beta = \sin^{-1}$ (R+ r/C) = $\sin^{-1}$((350+250)/4000)

β = 0. 01575 radians

$L_C = \pi (R + r) 2x \beta (R\text{-}r) + 2 C x \cos\beta = 9.903$ m $\boxed{L_C = 9.903 \text{ m}}$