

Highway Engineering

DESIGN OF HORIZONTAL CURVE

Minimum Radius of Curvature

$$r = \frac{v^2}{g(e + f)}$$

r = min. radius of curvature

e = superelevation in m/m

f = coefficient of side friction or skid resistance

v = design speed in m/s

$g = 9.81 \text{ m/sec}^2$



Centrifugal Ratio (CR) or Impact Factor (IF)

$$CR \text{ or } IF = \frac{v^2}{gr}$$

$$CR \text{ or } IF = e + f$$

$$CR \text{ or } IF = \frac{F}{W}$$

Centrifugal Force (CF)

$$CF = W \times CR = \frac{Wv^2}{gr}$$

Problem

A car having a weight of 40 KN is moving at a certain speed around the curve. Assuming no lateral pressure between the tire and pavement and considering a centrifugal ratio of 0.30 .

a. Compute the force that will tend to pull the car away from the center of the curve.

b. If the degree of curve is 40° determine the maximum

$$CR = \frac{v^2}{gr}; \quad 0.30 = \frac{v^2}{(9.81)(286.479)}$$

$$v = 29.04 \text{ m/s}^2$$

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