Horizontal Curves

Minimum radius on a bend, and why.

Civil Engineering

On a bend, superelevation and side friction together supply the sideways force a vehicle needs.

$$R_{min} = V^2/(127(e + f)) \cdot V \text{ in km/h}$$

V 100, e 0.06, f 0.12 — **Rmin ≈ 437 m**

V in km/h.

Halve the design speed — **Radius falls 4 times**

R goes with V^2.

Flat bend, e = 0 — **Friction alone holds it**

Poor when wet.

THE COMMON MISTAKE

× **Using maximum e with maximum f**

✓ **Take both from the standard**

Design side friction is a comfort limit well below skidding, and maximum superelevation is capped by slow and stationary vehicles.

Educational reference. Curve values are set by the road authority's geometric design standard, not by a bare formula.