Extra Widening of Pavement on Horizontal Curves

Mechanical widening for off-tracking of vehicles and psychological widening for speed on a horizontal curve, from lanes, wheelbase, radius and design speed.

Method: Off-tracking and psychological widening

Input parameters

Unit system: SI

Parameter	Value	Unit
Number of lanes	2.0000	
Wheelbase of design vehicle	6.0000	m
Curve radius	150.00	m
Design speed	60.000	km/h

Calculated results

Parameter	Value	Unit
Mechanical widening	240.00	mm
Psychological widening	515.68	mm
Total extra widening	755.68	mm

Notes for this case

• W_m = nl²/(2R) from rear wheels tracking inside the front wheels; W_ps = V/(9.5√R) (V in km/h, R in m) for drivers keeping away from the edge at speed. Widening is applied on the inside of the curve and run out over the transition length; above radii of about 300 m it is usually not needed.

Formula and method

$$W_e = \frac{nl^2}{2R} + \frac{V}{9.5\sqrt{R}}$$

Variables

n	Number of lanes	-
l	Wheelbase of design vehicle	m
R	Curve radius	m
V	Design speed	m/s
W_m	Mechanical widening	m
W_{ps}	Psychological widening	m
W_e	Total extra widening	m

Method and standards

Curve widening.

Assumptions and limits

- Rigid vehicle; empirical psychological term with V in km/h.

References

Off-tracking and psychological widening

Report details

Report reference	FCC-CTG7-B82C (the same inputs always give the same reference)
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Release checks	3 reference cases of this calculator, computed independently, are checked on every release

Results are for engineering estimation. Verify critical designs against the referenced standards and your own data.

This calculator online

https://calc.firecad.com/civil/roads/curve-extra-widening

Open this case on calc.firecad.com →

Reopens the calculator with the inputs of this report.