

ALL JE / AE Exams



शुरुआत selection की

CIVIL ENGINEERING

Concept of Superelevation

ZERO TO HERO

SERIES



By Pramod sir

LIVE! 5:00 PM

4

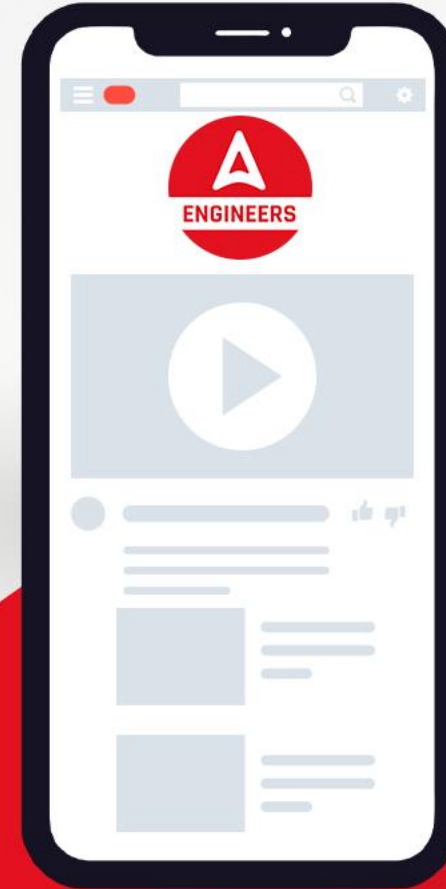
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Superelevation

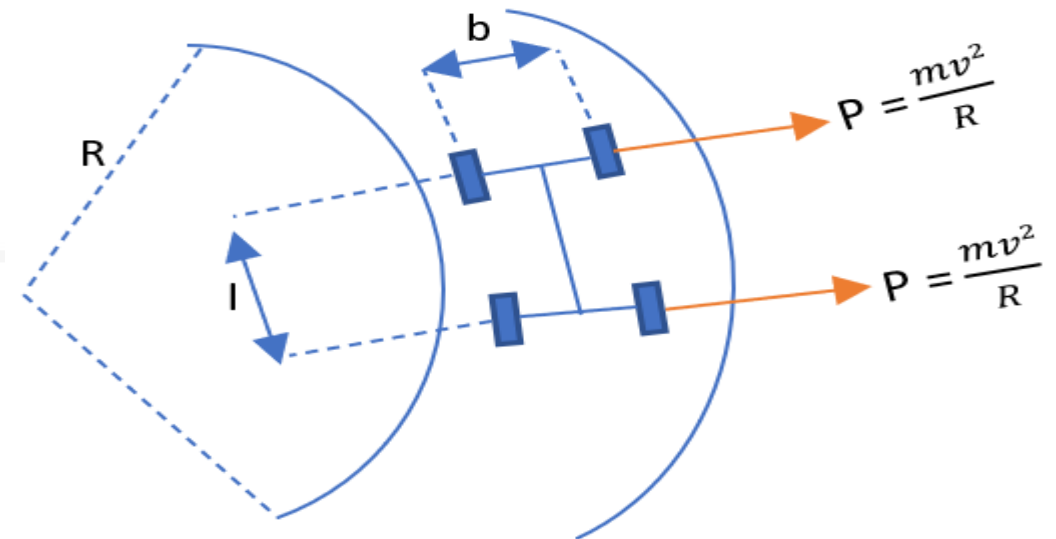
Superelevation is the transverse slope along the width of the road provided by rising the outer edge of the road with respect to the inner edge, throughout the length of the horizontal curve. It is provided to facilitate the safe passage of the vehicle in a horizontal curve. The concept and formula for superelevation are discussed further.



Why Superelevation is Needed!

At every horizontal section of a road, the radius of the horizontal curve (R) becomes low as a result of which centrifugal force increases and acts outwards (i.e., away from the center) in the horizontal direction on the outer wheel.

Due to high speed and low radius at the horizontal curve, large centrifugal force develops which could lead to "overturning of the vehicle" or "skidding of the vehicle".

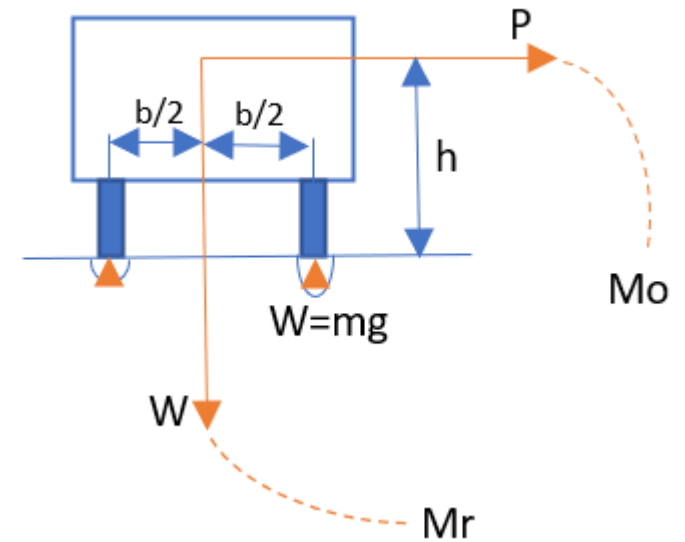


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Overtuning of the vehicle



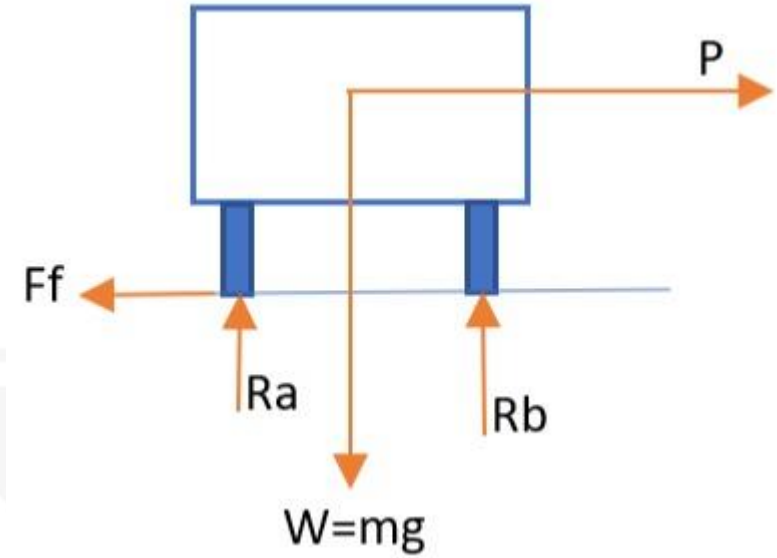
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Skidding of the vehicle



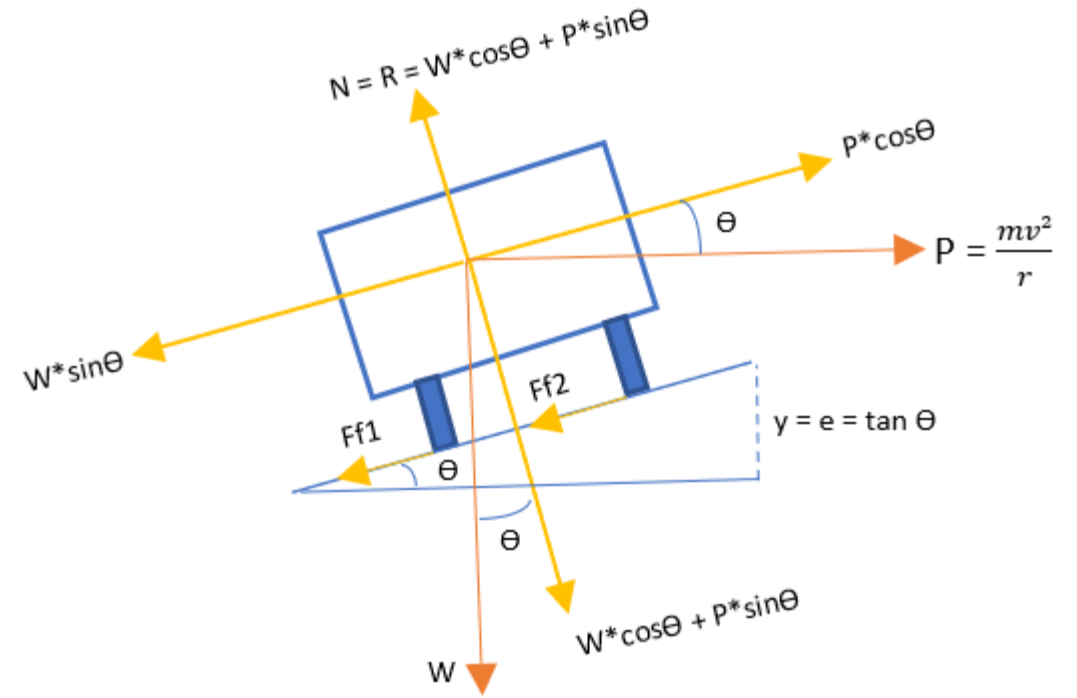
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Superelevation Derivation

As said earlier, superelevation is the transverse slope along the width of the road, provided to develop centripetal force to counteract the centrifugal force. It is achieved by raising the outer edge with respect to the inner edge in a transverse direction for the total length of the curved section. The below figure could be referred for derivation.



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Superelevation in Mixed Traffic Flow Condition

Vehicles do not have the same speed on a horizontal curve, therefore in such a case, only mixed traffic flow condition is present. For superelevation calculation in mixed traffic flow conditions, the speed shall be taken as 75% of design speed i.e., $0.75v$, and the lateral friction 'f' shall be neglected for safe conditions. Superelevation formula now becomes,



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The radius of horizontal circular curve is 100 m. the design speed is 50 km/h and the design coefficient of lateral friction is 0.15. determine the rate of superclavation to be provided, if full lateral friction is assumed to develop.

SSC JE 25-09-2019 (morning)

- (a) 26.4 in 1
- (b) 17 in 1
- (c) 21.2 in 1
- (d) 10.5 in 1

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What is the maximum superelevation that is fixed by Indian Road Congress (IRC) for road in plain and rolling terrains and in snowbound areas, taking mixed traffic into consideration?

SSC JE 25-09-2019 (morning)

- (a) 7.0%
- (b) 4.0%
- (c) 5.5%
- (d) 10.0%

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The superelevation 'e' is expressed as- (Where V = Speed of vehicle, g = Acceleration due to gravity, R = radius of the horizontal curve, W = weight of the vehicle, G = Universal gravitational constant)

RRB JE CBT-II 29-08-2019 (evening)

(a) $e = V^3/gR$

(b) $e = h/GR$

(c) $e = W/GR$

(d) $e = v^2/gR$

Use
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What is the superelevation for a horizontal highway curve of radius 500m and speed 100 kmph in mixed traffic condition?

RRB JE CBT-II 29-08-2019 (evening)

- (a) 6.2%
- (b) 8.9%
- (c) 0%
- (d) 7%

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As per IRC standards, the maximum super elevation that can be provided on hill road not bound by snow is –

UPRVUNL JE 2019

- (a) 10%
- (b) 4%
- (c) 7%
- (d) 8%

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For a road with camber of 3% and the design speed of 80 km/hr, the minimum radius of the curve beyond which no super-elevation is needed is-

(Rajasthan PSC 2018) (ESE 2013)

- (a) 1680 m
- (b) 944 m
- (c) 406 m
- (d) 280 m

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The width of carriageway for multi-lane pavements as recommended by the Indian Roads Congress is:

(LMRC AE 2017 I-Shift)

- (a) 3.5 m per lane
- (b) 3.75 m per lane
- (c) 2.5 m per lane
- (d) 3.65 m per lane

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The vertical distance between the centre of the lantern and the carriage way is

[MP VYAPM Sub Engineer 9 July 2017]

- (a) Overhang height
- (b) Outreach height
- (c) Roof height
- (d) Mounting height

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Full amount of super-elevation on a horizontal curve is provided at the

(SSB Himachal Pradesh 18-11-2018)

- (a) Beginning of the transition curve
- (b) Centre of the transition curve
- (c) End of the transition curve
- (d) Centre of the transition curve

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If V is the speed of a vehicle, r is the radius of the curve, g is the acceleration due to gravity, W is the width of the carriageway, the super elevation is

[Uttarakhand Combined State AE Paper II 2007]

(a) $\frac{WV}{gr}$

(b) $\frac{W - V}{gr}$

(c) $\frac{WV^2}{gr}$

(d) $\frac{WV}{gr^2}$

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Assuming the safe stopping sight distance to be 80 m on a flat highway section and with a setback distance of 10 m. what would be the radius of the negotiable horizontal curve?

(M.P. Vyapam Draftman 2016/HP SSS JE 3.0.2016)

- (a) 800 m.
- (b) 160 m.
- (c) 80 m.
- (d) 70 m.

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Calculate the extra widening necessary on a four lane pavement for a radius of curve of 150 m.

Given: wheel base of design vehicle to be 5m, design speed of 55 KmPH

(M.P. Vyapam Draftman 2016)

- (a) 0.92 m
- (b) 0.93 m
- (c) 0.94 m
- (d) 0.95 m

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Which type of gradient is normally adopted in the design of roads?

(M.P. Sub Engineering 2016)

- (a) Exception gradient
- (b) Floating gradient
- (c) Average gradient
- (d) Ruling gradient

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It is defined as the total rise or fall between any two points chosen on the alignment divided by the horizontal distance between two points

(M.P. Sub Engineering 2016)

- (a) Ruling gradient
- (b) Variable gradient
- (c) Exceptional gradient
- (d) Average gradient

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Centre of the road is elevated with respect to edges. What is this:

(D.M.R.C 2015/MP sum Engg. 2016)

- (a) Super elevation
- (b) Camber
- (c) Height of pavement
- (d) None of these

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Horizontal curves on highways are provided

(HPSSSB JE 03-07-2016)

- (a) To break monotony of driving
- (b) To discourage the tendency to increase the speed
- (c) To decrease the mental strain on drivers
- (d) All the above

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On the concrete road camber generally provided is

(HPSSSB JE 03-07-2016)

- (a) 1 IN 20 to 1 IN 24
- (b) 1 IN 60 to 1 IN 72
- (c) 1 IN 30 to 1 IN 48
- (d) 1 IN 36 to 1 IN 46

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4:00 PM



PRAMOD SIR

CE

5:00 PM



SHIVAM SIR

ME

5:00 PM



ABHINESH SIR

EE

6:00 PM



RK SIR

ME

6:30 PM



RK SIR

CE

7:15 PM



Rajat Sir

CE

8:00 PM