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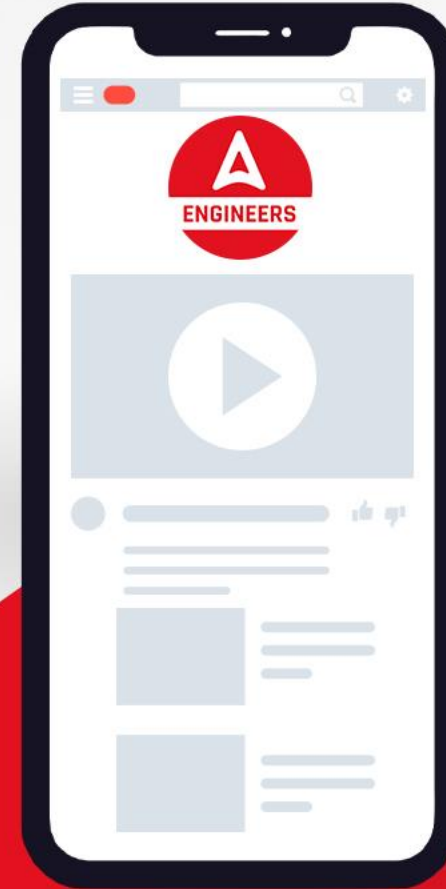


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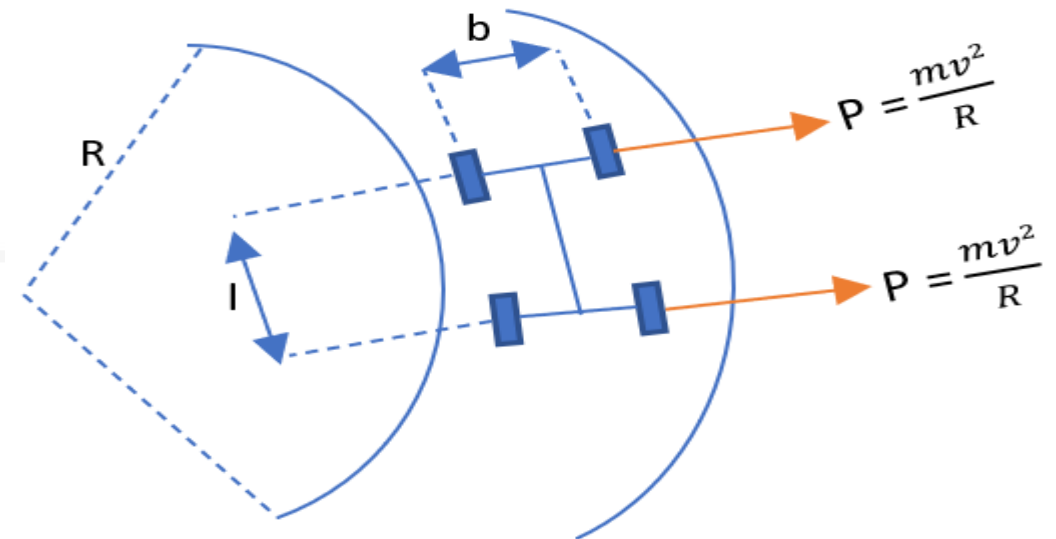
## Superelevation

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".

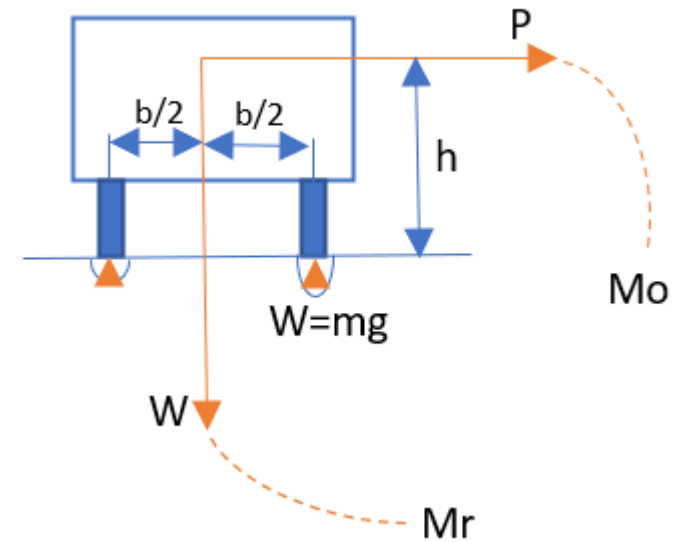


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Overtuning of the vehicle



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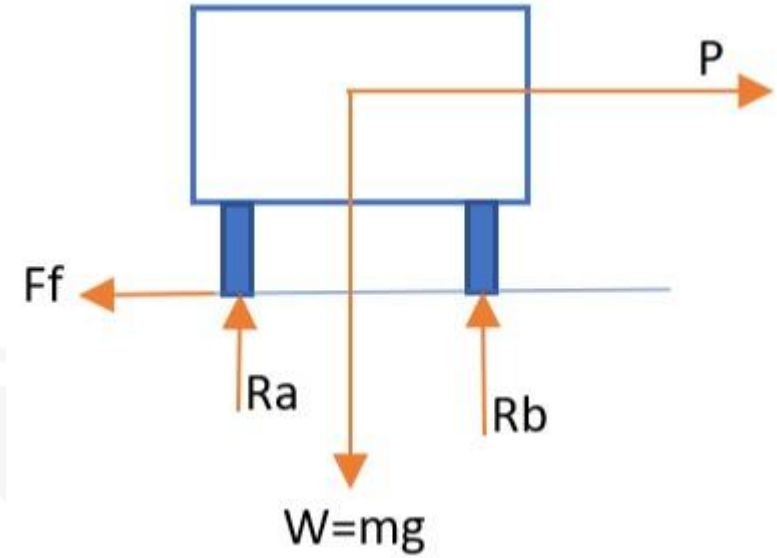


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Skidding of the vehicle



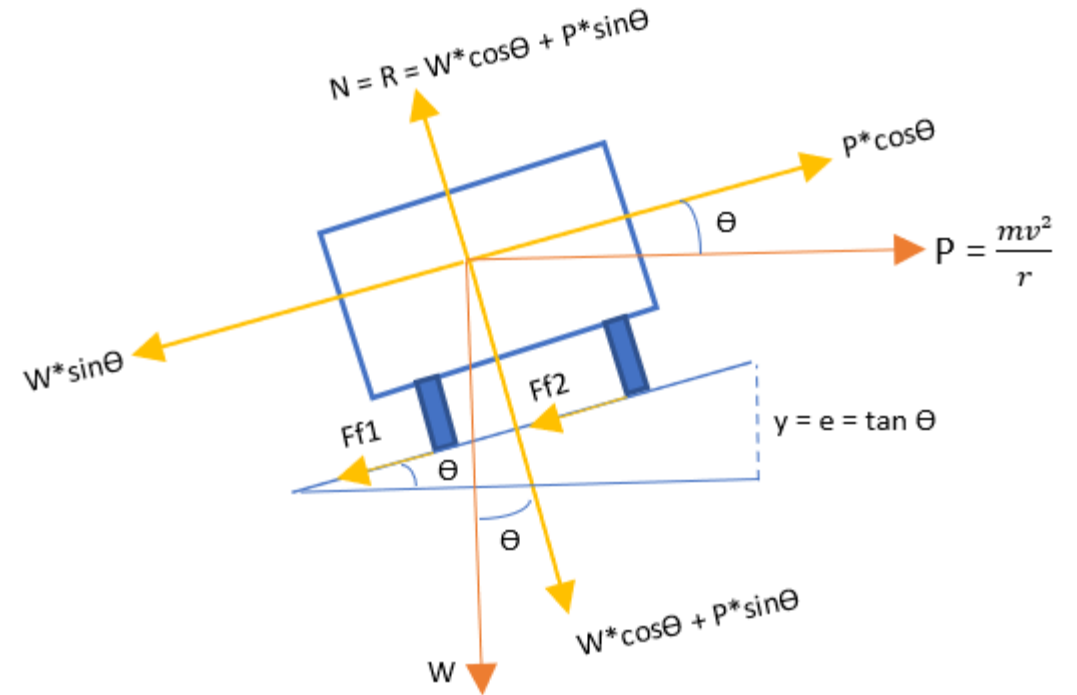
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## Superelevation Derivation

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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