SECTION 13 – SUPERELEVATION

0312. The centrifugal force acting on a vehicle rounding a curve can cause skidding, or even overturning, particularly when there is an adverse camber on the outside of the bend. These tendencies are counteracted by banking the curves, especially those of small radius. The banking, or inward tilt, of the carriageway is correctly called superelevation. Superelevation may seem to be a sophisticated standard for some military roads but, when it is necessary and can be provided, surface maintenance is reduced considerably, particularly on poorly-bound surfaces.

0314. Superelevation is usually expressed as a gradient: the degree required is affected by the speed of the vehicle, as well as the radius of the curve. On military roads superelevation should, whenever possible, be provided on curves of 120 m radius or less, and it is desirable on curves up to 600 m radius if used by fast traffic. The degree normally applied is given in Table 10.

0315. Adverse camber on the outside of a curve should always be eliminated by changing from camber to crossfall on bends. Superelevation should always be provided on curves of 400 ft radius or less and it is desirable on curves up to 2,000 ft radius if used fast traffic. The degree of superelevation normally applied on military roads is given in Table 3.9. On unsurfaced roads used by mixed military traffic superelevation exceeding 1 in 24 may call for considerable maintenance.

TABLE 3.9 – SUPERELEVATION ON CURVES– MILITARY ROADS

Radius of curve (ft)	Degree of superelevation
(a)	(b)
60 to 1,000	1 in 14 ½
1,000 to 1,500	1 in 18
1,500 to 2,000	1 in 24

0316. Rules for applying superelevation:-

a. When a transition curve is introduced between the straight (tangent) and the circular curve, start the elimination of adverse camber at the end of the straight and build up the superelevation at a uniform rate throughout the transition curve, so as to reach the full amount at the beginning of the circular curve.

b. If there is no transition curve, the elimination of adverse camber should, if possible start at least 100 ft before the circular curve is reached, the full super elevation being applied at the tangent point.

c. In hasty work, for curves of 400 ft radius or less, start the lift about 50 ft before the tangent point, applying half the required super elevation at the tangent point, and reaching the full amount at about 50 ft along the curve, or in any case before the mid-point of curve is reached.

SUPERELEVATION OF EXISTING CURVES

0317. Road improvement work will often involve super elevating "flat" curves on hastily constructed roads. Two methods are shown diagrammatically in Figure 3.1. The method adopted will depend upon:-

a. Drainage conditions.
b. The nature of the existing road pavement.
c. Material, plant and labor available.
d. Time available.

0318. On any steeper cross fall heavy loads on slow transport tend to shift sideways.

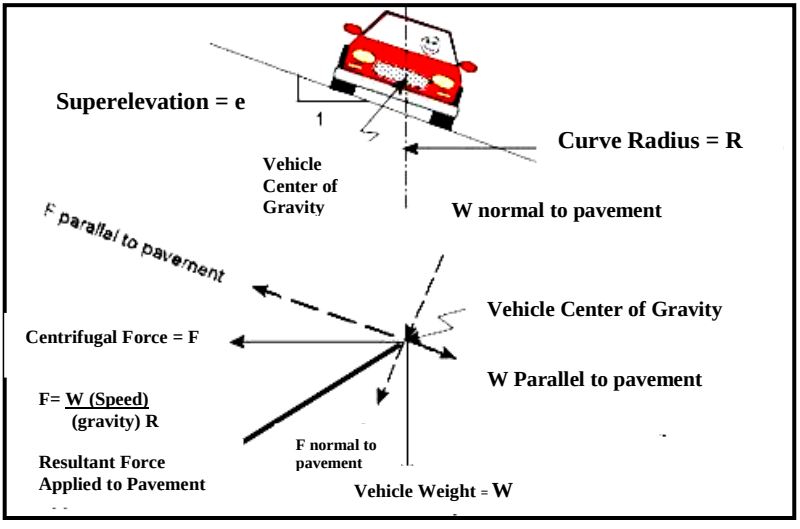

Figure 3-1 (a): Methods of Applying Super elevation on Existing Roads

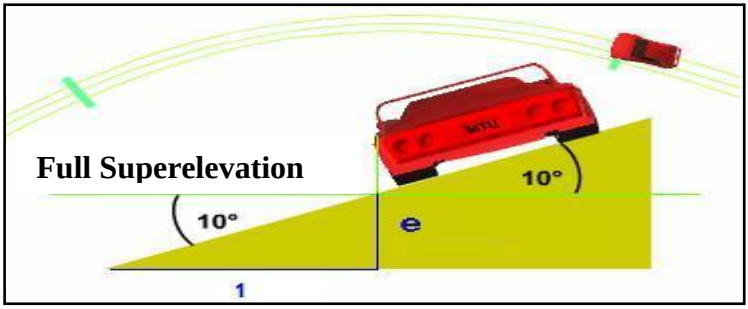

Figure 3-1(b): Methods of Applying Super Elevation on Existing Roads

0319. A quick method of determining the amount of superelevation required for a traffic speed of 30 mph, per 20 ft width of carriage-way, on an existing curve is as follows:-

a. Set out a 60 ft chord to the center line of the road-way.

b. Measure the offset (x) from the center of the chord to the curve (see Figure 3.2(a)).

c. Set up the measurement of the offset (x) as the super-elevation required across a 20ft width of roadway and bone in points for the actual width, W (see Figure 3.2(b)).

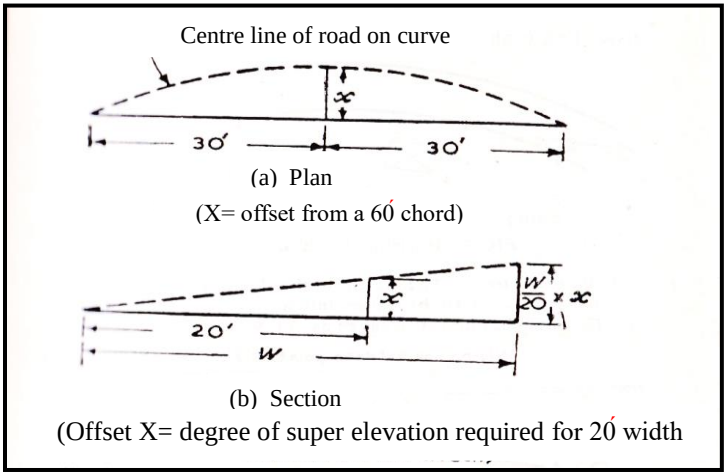

Figure 3.2: Determining Superelevation Required on an Existing Curve (for traffic speed 30 mph)