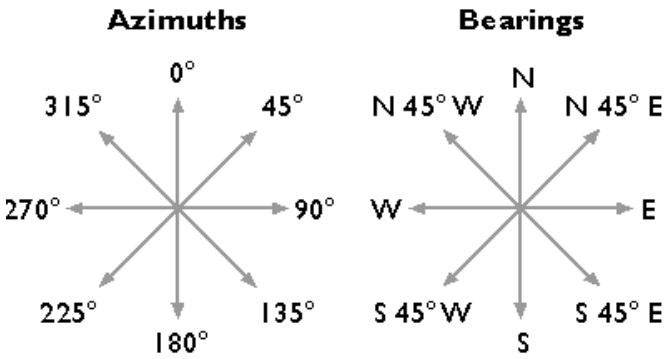
Definiton of Tangents in Civil 3D



Horizontal curves used in Civil 3D

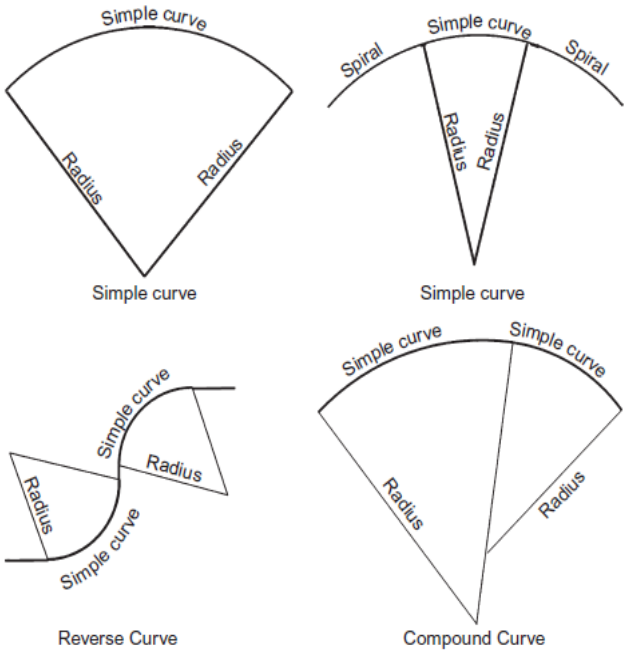


Figure 2.18: Different types of horizontal curves.

Simple Civruclar Curve

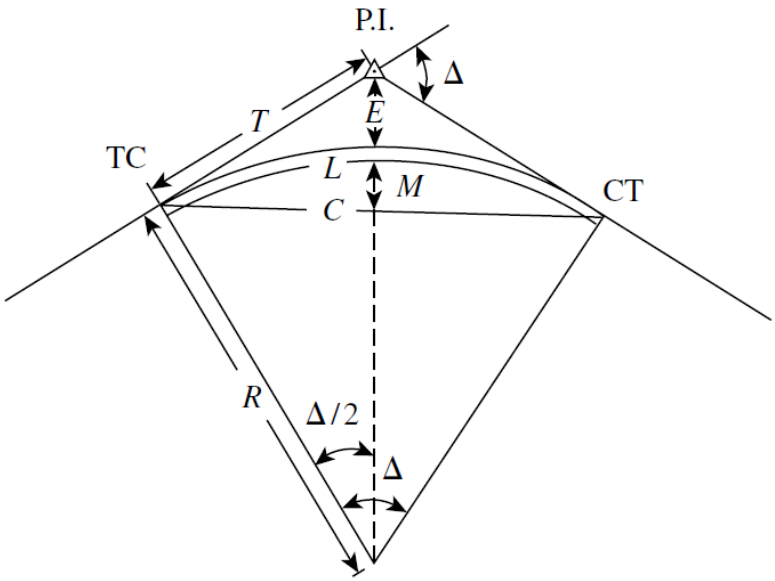


Figure 2.19: Elements of simple circular curve.

Curve paramters and their terminology

$$D = \frac{36{,}000}{2\pi R} = \frac{5729.58}{R}$$

$$L = \frac{2\pi R\Delta}{360^\circ} = R\Delta_{\text{rad}}$$

$$T = R \tan\frac{\Delta}{2}$$

$$M = R - R\cos\left(\frac{\Delta}{2}\right)$$

$$E = \frac{R}{\cos(\Delta/2)} - R$$

$$C = 2R\sin\left(\frac{\Delta}{2}\right)$$

TC station = PI station – T

CT station= = TC station + L

where

R= radius of curve

L= length of curve

T= tangent length/distance

M= middle ordinate

Delta= central angle (deflection angle)

D= degree of curvature

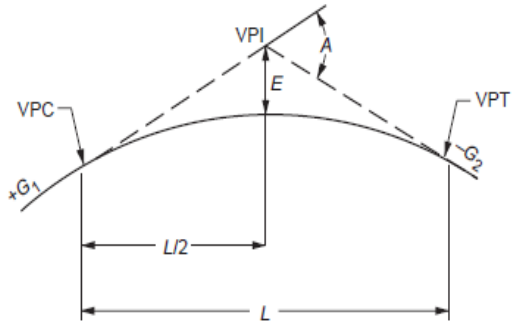
C=chord length.

PI=point of intersection

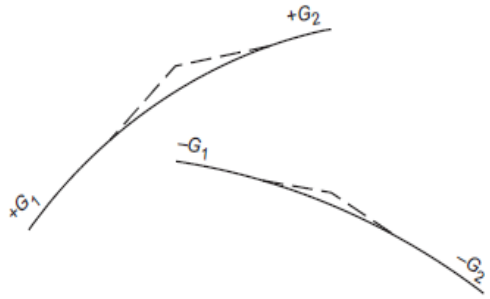
TC= tangent to curve point (or PC, point of curvature)

CT =curve to tangent point (or PT, point of tangency)

Vertical curves and their termonology

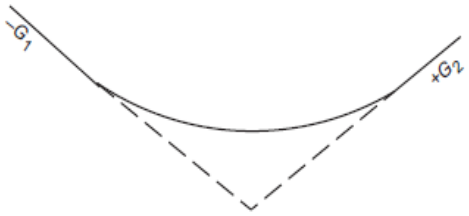


Type I

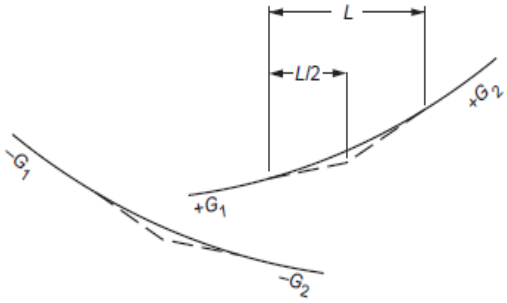


Type II

Crest Vertical Curves

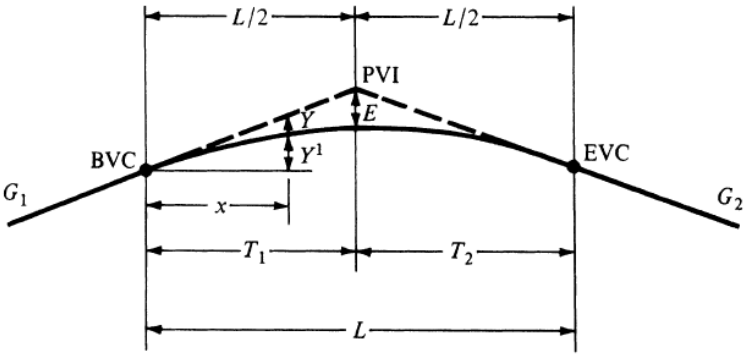


Type III



Type IV

Sag Vertical Curves



PVI = point of vertical intersection
BVC = beginning of vertical curve (same point as PVC)
EVC = end of vertical curve (same point as PVT)
E = external distance
G_1, G_2 = grades of tangents (%)
L = length of curve
A = algebraic difference of grades, $G_1 - G_2$