

Engineering Surveying

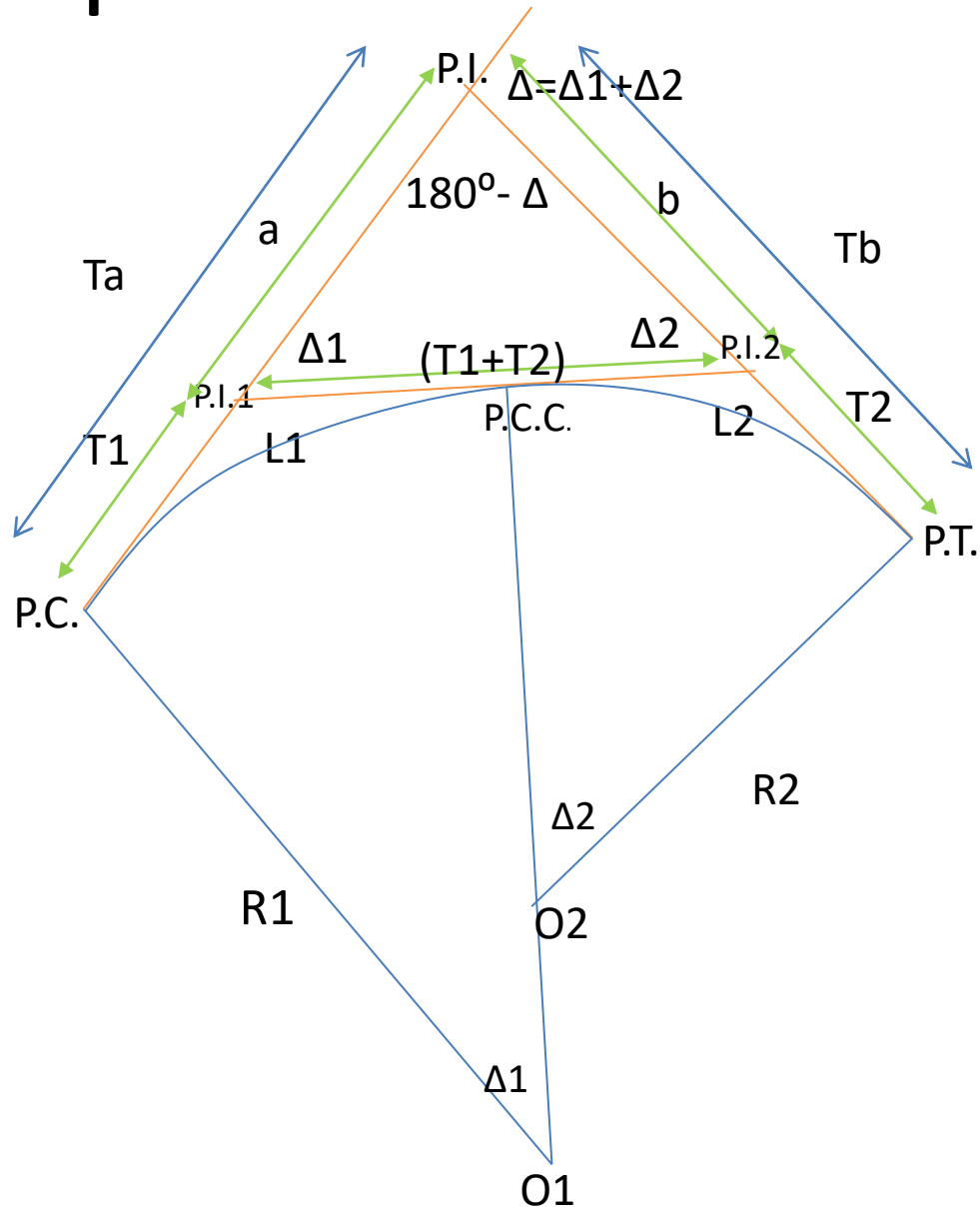
3rd Stage

Compound Circular Curves

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Compound Circular Curves



Symbols & Terms of Compound Circular Curves

- T_a = The first tangent
- T_b = The second tangent
- C.T = Common Tangent L = length of curve
- $\Delta = \Delta_1 + \Delta_2$ Total deflection angle of Compound
Circular Curves

Symbols & Terms of Compound Circular Curves

- $$\frac{(T_1 + T_2)}{\sin(180^\circ - \Delta)} = \frac{a}{\sin \Delta_2} = \frac{b}{\sin \Delta_1}$$

- $$a = \frac{(T_1 + T_2)}{\sin(180^\circ - \Delta)} * \sin \Delta_2$$

- $$b = \frac{(T_1 + T_2)}{\sin(180^\circ - \Delta)} * \sin \Delta_1$$

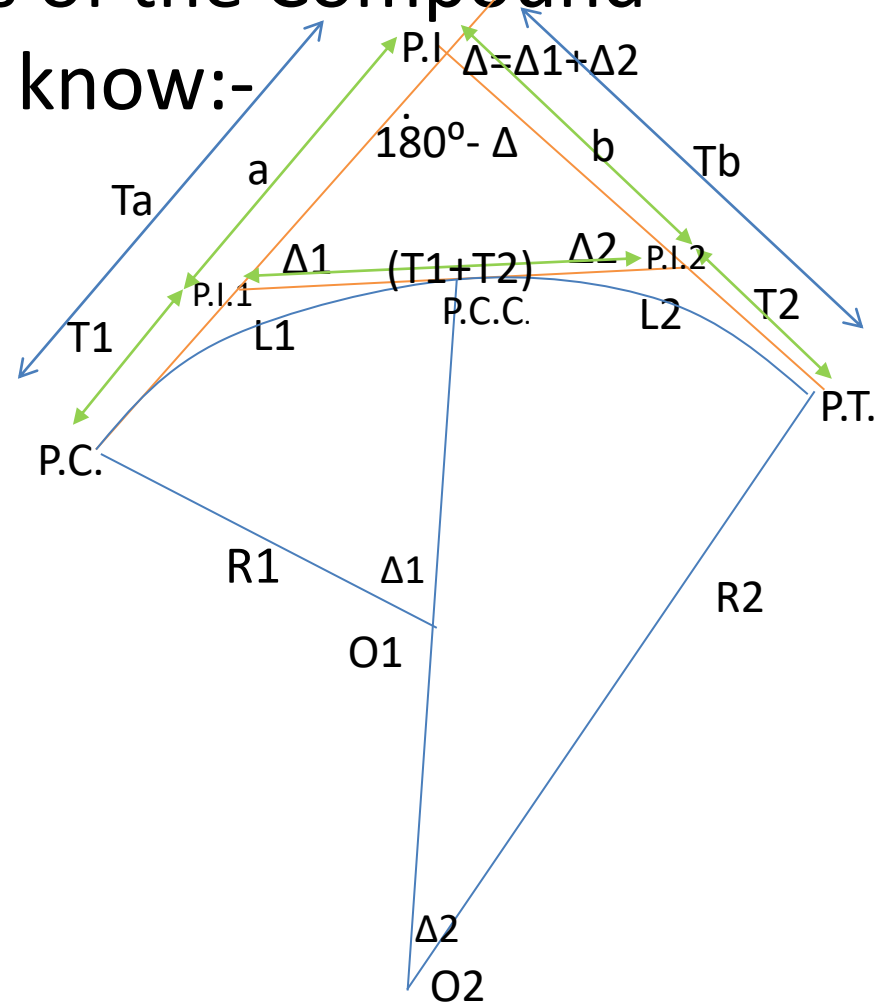
- $$T_a = T_1 + a, T_b = T_2 + b$$

Symbols & Terms of Compound Circular Curves

- Stat. P.C. = Stat. P.I. - T_a
- Stat. P.C.C. = Stat. P.C. + L_1
- Stat. P.T. = Stat. P.C.C. + L_2
- Stat. P.I.₁ = stat. P.C. + T_1
- Stat. P.I.₂ = stat. P.C.C. + T_2

Example

- Compute the Stations of the Compound Circular Curves if you know:-
- P.I.= 28+50
- $R_1 = 500$ m.
- $\Delta_1 = 38^\circ 20'$
- $R_2 = 750$ m.
- $\Delta_2 = 41^\circ 30'$



Solution

- $T_1 = 500 * \tan \frac{\Delta_1}{2} = 173.79 \text{ m}$
- $L_1 = \frac{\pi * 500 * \Delta_1^0}{180} = 334.52 \text{ m}$
- $T_2 = 750 * \tan \frac{\Delta_2}{2} = 284.15 \text{ m}$
- $L_2 = \frac{\pi * 750 * \Delta_2^0}{180} = 543.23 \text{ m}$
- $\frac{T_1 + T_2}{\sin(180 - \Delta)} = \frac{a}{\sin \Delta_2} = \frac{b}{\sin \Delta_1}$

Solution

- $\frac{173.79 + 284.15}{\sin(180 - 79^{\circ}50')} = \frac{a}{\sin 41^{\circ}30'} = \frac{b}{\sin 38^{\circ}20'}$
- $a = \frac{457.94 * \sin 41^{\circ}30'}{\sin 79^{\circ}50'} = 308.28 \text{ m}$
- $T_a = 173.79 + 308.28 = 482.07 \text{ m}$
- $b = \frac{457.94 * \sin 38^{\circ}20'}{\sin 79^{\circ}50'} = 288.56 \text{ m}$
- $T_b = 288.56 + 284.15 = 572.71 \text{ m}$

Solution

- Stat. P.C. = stat. P.I - T_a
- = $(28+50) - (4+82.07) = 23+67.93$
- Stat. P.I.1 = stat. P.C. + T_1
- = $(23+67.93)+(1+73.79)= 25+41.72$
- Stat. P.C.C = Stat. P.C. + L_1
- = $(23+67.93)+(3+34.52)=27+02.45$
- Stat. P.I.2 = Stat. P.C.C+ T_2
- = $(27+02.45)+(2+84.15)=29+86.60$
- Stat. P.T.= Stat. P.C.C+ L_2
- = $(27+02.45)+(5+43.23)=32 + 45.68$

Notes

- You must compute all the elements of the compound circular curve and then setting out it by the same methods that use to setting out the simple circular curve