



Bridge Design Details 2F June 2025

Tangent Offset for Circular Curves

Radius	Distance from EC or BC (Along Tangents)												
	50'	100'	150'	200'	250'	300'	400'	500'	600'	700'	800'	900'	1,000'
20,000'	0.06	0.25	0.56	1.00	1.56	2.25	4.00	6.25	9.00	12.25	16.01	20.26	25.02
15,000'	0.08	0.33	0.75	1.33	2.08	3.00	5.33	8.34	12.01	16.34	21.35	27.02	33.37
10,000'	0.13	0.50	1.13	2.00	3.13	4.50	8.00	12.51	18.02	24.53	32.05	40.58	50.13
9,000'	0.14	0.56	1.25	2.22	3.47	5.00	8.89	13.90	20.02	27.26	35.62	45.11	55.73
8,000'	0.16	0.63	1.41	2.50	3.91	5.63	10.01	15.64	22.53	30.68	40.10	50.79	62.75
7,000'	0.18	0.71	1.61	2.86	4.47	6.43	11.44	17.88	25.76	35.09	45.87	58.10	71.80
6,000'	0.21	0.83	1.88	3.33	5.21	7.51	13.35	20.87	30.08	40.97	53.57	67.88	83.92
5,000'	0.25	1.00	2.25	4.00	6.25	9.01	16.03	25.06	36.13	49.24	64.42	81.67	101.02
4,500'	0.28	1.11	2.50	4.45	6.95	10.01	17.81	27.86	40.18	54.78	71.68	90.92	112.52
4,000'	0.31	1.25	2.81	5.00	7.82	11.27	20.05	31.37	45.26	61.73	80.82	102.57	127.02
3,500'	0.36	1.43	3.22	5.72	8.94	12.88	22.93	35.90	51.81	70.71	92.66	117.69	145.90
3,000'	0.42	1.67	3.75	6.67	10.44	15.04	26.79	41.96	60.61	82.81	108.63	138.18	171.57
2,500'	0.50	2.00	4.50	8.01	12.53	18.07	32.20	50.51	73.07	100.00	131.46	167.62	208.71
2,000'	0.63	2.50	5.63	10.03	15.69	22.63	40.41	63.51	92.12	126.50	166.97	213.94	267.95
1,800'	0.70	2.78	6.26	11.15	17.45	25.18	45.01	70.84	102.94	141.69	187.55	241.15	303.34
1,700'	0.74	2.94	6.63	11.81	18.48	26.68	47.73	75.19	109.40	150.81	200.00	257.78	325.23

Table 2A.F.1 Distance from Beginning or End of Curve Along Tangents



Radius	Distance from EC or BC (Along Tangents)												
	50'	100'	150'	200'	250'	300'	400'	500'	600'	700'	800'	900'	1,000'
1,600'	0.78	3.12	7.05	12.55	19.65	28.38	50.81	80.13	116.76	161.25	214.36	277.12	351.00
1,500'	0.83	3.34	7.52	13.39	20.98	30.31	54.32	85.79	125.23	173.35	231.14	300.00	
1,400'	0.89	3.58	8.06	14.36	22.50	32.52	58.36	92.33	135.09	187.56	251.09	327.61	
1,300'	0.96	3.85	8.68	15.48	24.27	35.09	63.07	100.00	146.74	204.56	275.31		
1,250'	1.00	4.01	9.03	16.10	25.26	36.53	65.73	104.36	153.41	214.38	289.53		
1,200'	1.04	4.17	9.41	16.78	26.33	38.11	68.63	109.13	160.77	225.32	305.57		
1,100'	1.14	4.56	10.28	18.34	28.79	41.70	75.31	120.20	178.05	251.47			
1,000'	1.25	5.01	11.31	20.20	31.75	46.06	83.49	133.96	200.00	285.86			
900'	1.39	5.57	12.59	22.50	35.42	51.47	93.77						
800'	1.56	6.28	14.19	25.40	40.07	58.38	107.18						
750'	1.67	6.70	15.15	27.16	42.89	62.61							
700'	1.79	7.18	16.26	29.18	46.17	67.54							
650'	1.93	7.74	17.54	31.53	50.00	73.37							
600'	2.09	8.39	19.05	34.32	54.56	80.39							
550'	2.28	9.17	20.85	37.65	60.10								
500'	2.51	10.10	23.03	41.74	66.99								
450'	2.79	11.25	25.74	46.89									
400'	3.14	12.70	29.19	53.59									
300'	4.20	17.16	67.71										
200'	6.35	26.80	67.71										
100'	13.40												

Table 2A.F.1 Distance from Beginning or End of Curve Along Tangents (continued)



Derivation of Table

Given: Radius and X, Find: Offset Y

$$(1) R \sin \Delta = X \Rightarrow \sin \Delta = \frac{X}{R}$$

$$(2) Y = R - R \cos \Delta = R(1 - \cos \Delta)$$

Given: Y and X, Find: Radius

$$(1) \tan \frac{\Delta}{2} = \frac{Y}{X}$$

$$(2) R = \frac{X}{\sin \Delta}$$

Note:

For approximate results, the following simpler formula can be used.

(The error is $\leq 1\%$ when $X \leq 0.2R$)

$$\left(Y = \frac{X^2}{2R} \right)$$

Example:

Given Radius = 900'.

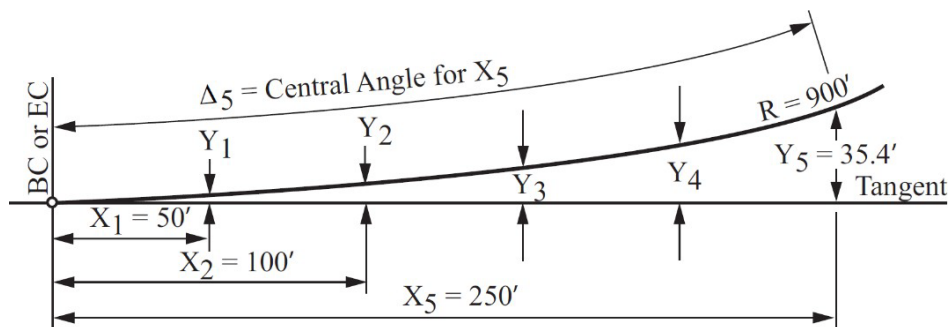


Figure 2A.F.1 Example of Distances along Tangent from Curve