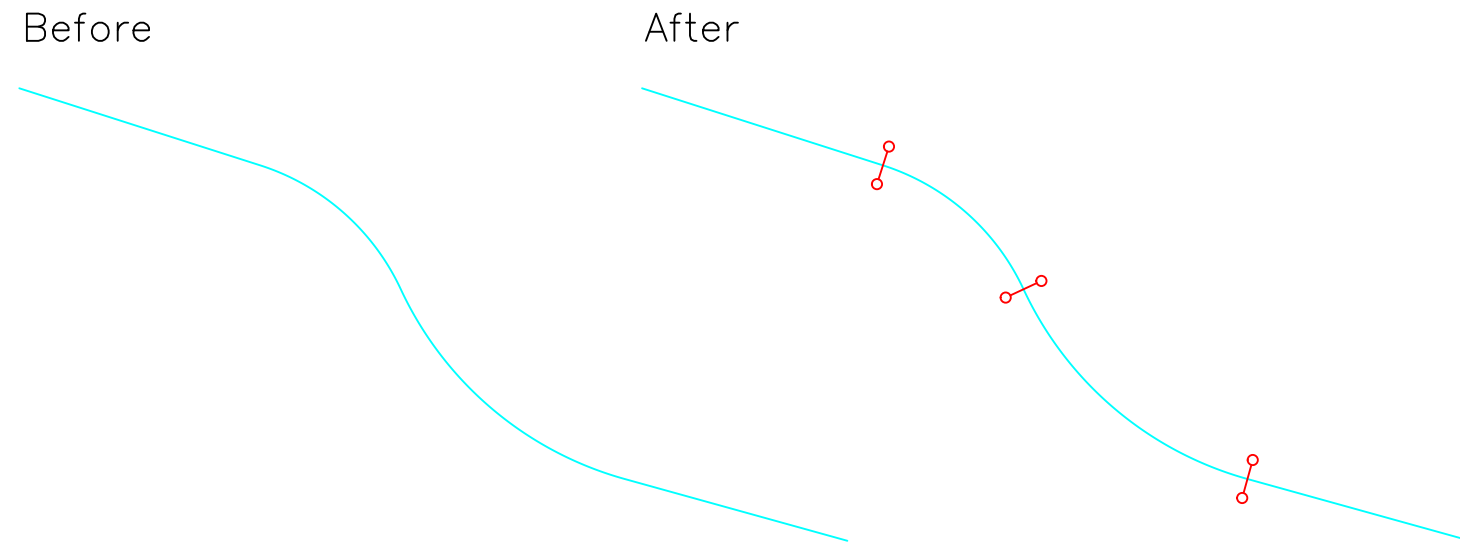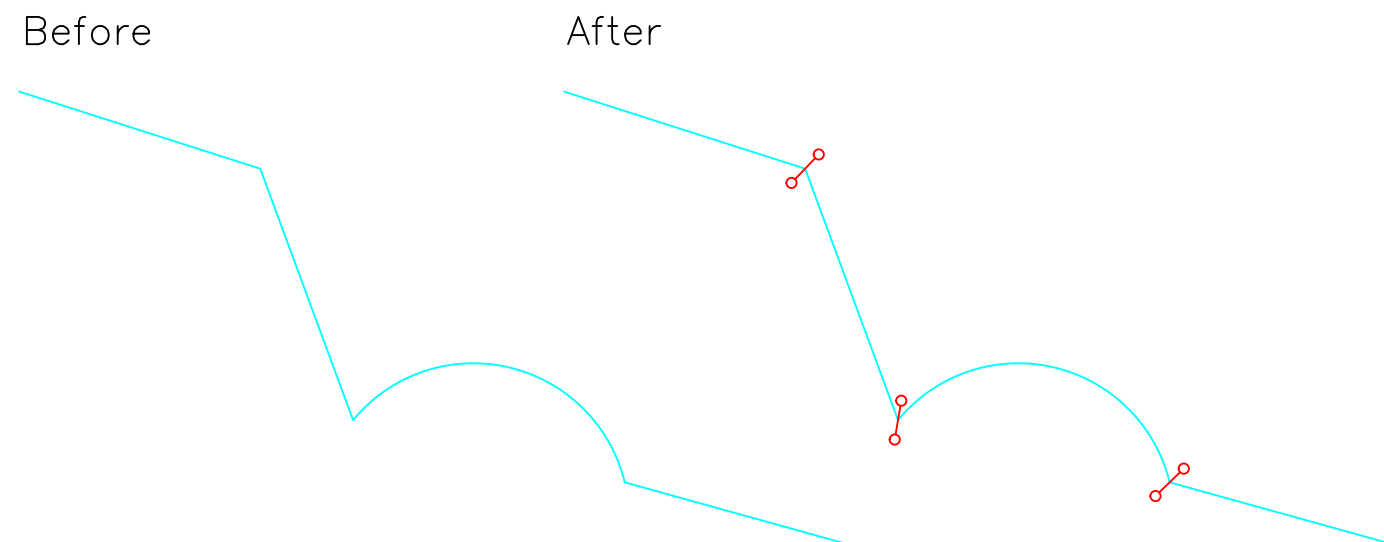# CHANGENT

Draws tangent marks (e.g. ⌐) at ends of lines and arcs that make up a 2D polyline

Example 1: Draws tangent marks perpendicular to the adjacent lines and arcs

Before

After

Example 2: Where the lines and arcs do not join tangentially, the tangent marks are drawn at the average perpendicular angle

Before

After

CHSEGMENT

Draws ST (for straight) next to lines, and radius values next to arcs that make up a 2D polyline. Radius values can be displayed next to arcs, or on arrows linking arc centre point to arc midpoint

Example 1: ST alongside lines and radius values alongside the arcs

Before

After

ST
R=30.000
R=45.000
ST
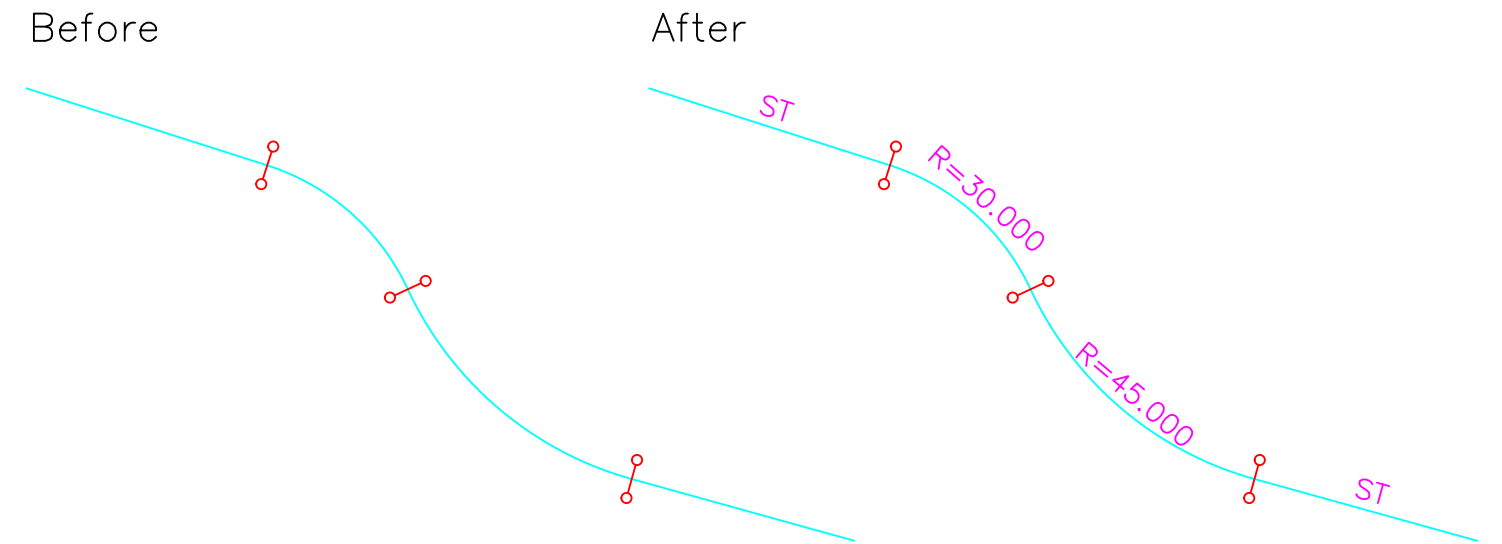
Example 2: ST alongside lines and radius values on arrows (2D polylines) from arc centre to arc midpoint

Before

After

ST
R=30.000
R=45.000
ST
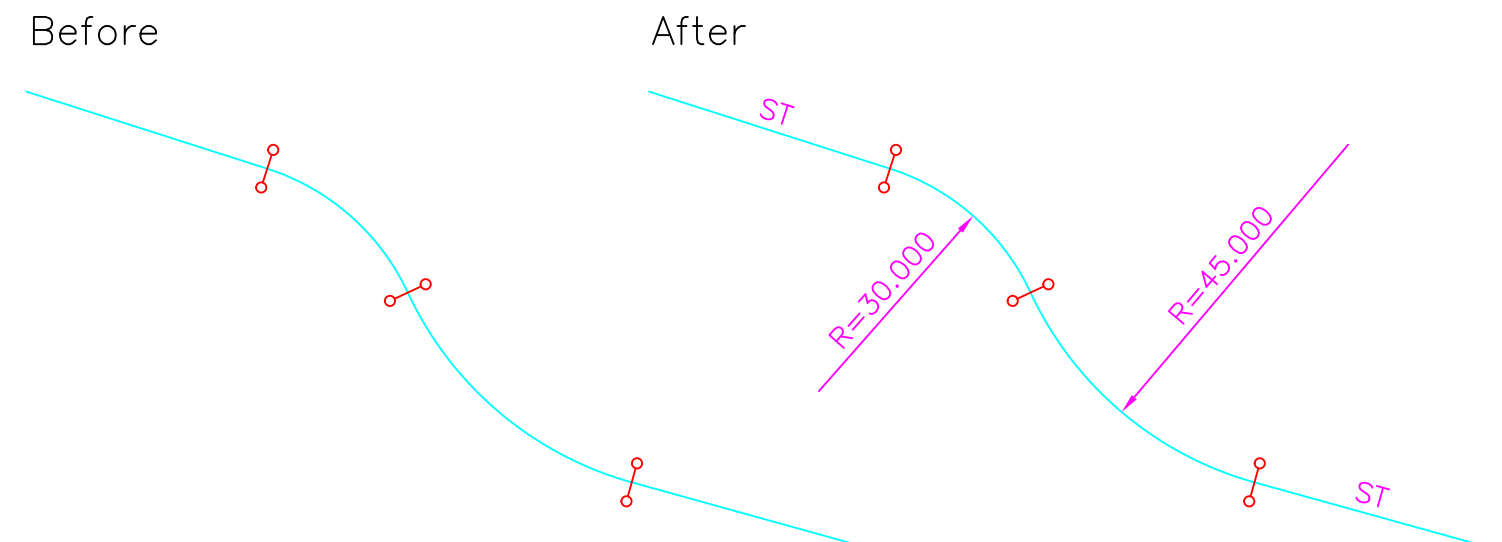
CHMARK

Draws chainage marks (a line and a text label) at user selected points along a 2D polyline. There are three different chainage mark styles to choose from
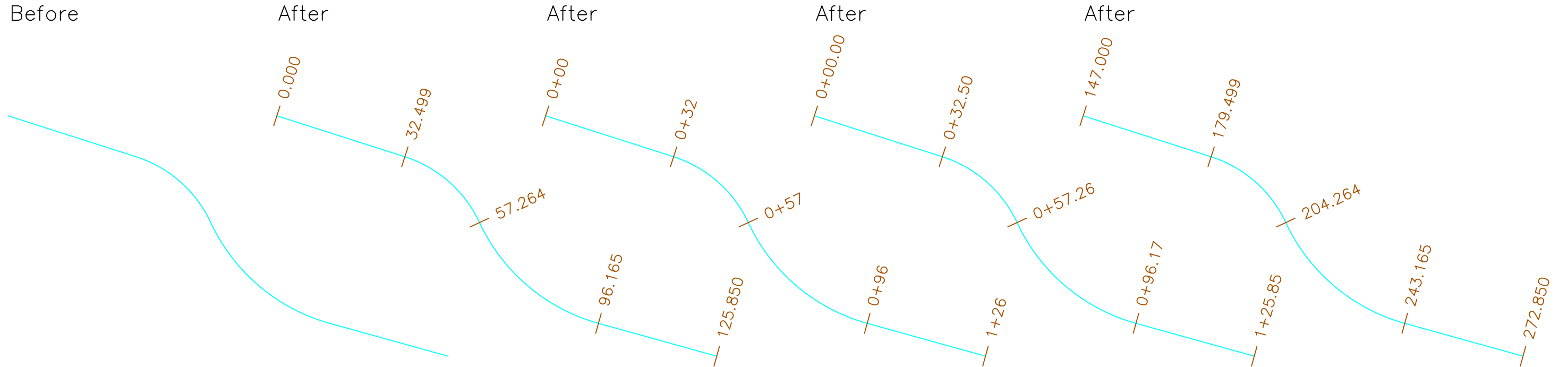
Example 1: Chainage marks (style 1) at the start/end of each line and arc that make up the 2D polyline

Example 2: Chainage marks (style 2) at the start/end of each line and arc that make up the 2D polyline

Example 3: Chainage marks (style 3) at the start/end of each line and arc that make up the 2D polyline

Example 4: Chainage marks as example 1, but with a different chainage (147.0) at the start of the 2D polyline

Before

After

After

After

After

Example 1 marks: 0.000, 32.499, 57.264, 96.165, 125.850

Example 2 marks: 0+00, 0+32, 0+57, 96.165, 125.850

Example 3 marks: 0+00.00, 0+32.50, 0+57.26, 0+96, 1+26

Example 3 (style 3) marks: 0+00.00, 0+32.50, 0+57.26, 0+96.17, 1+25.85

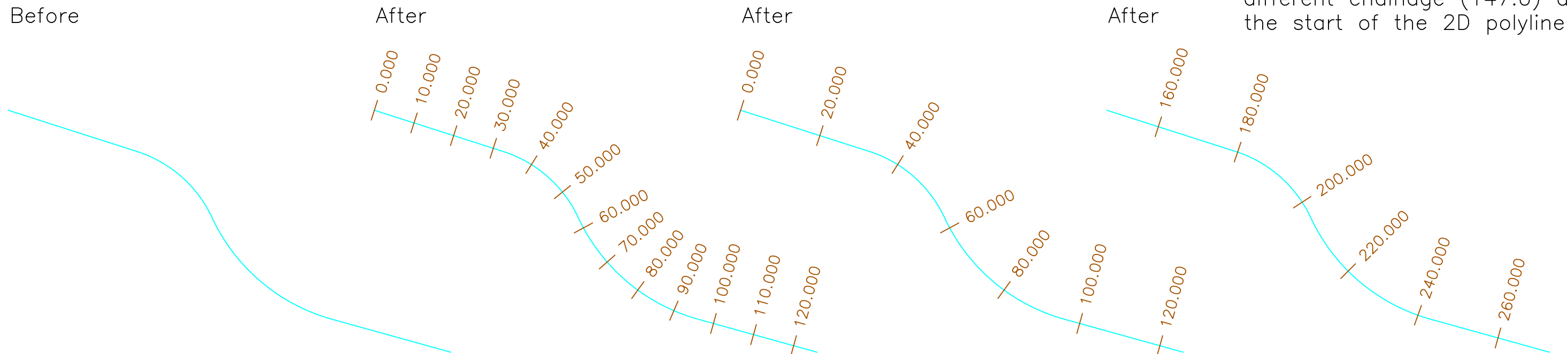Example 4 marks: 147.000, 179.499, 204.264, 243.165, 272.850

CHMARKS

Draws chainage marks at user specified regular chainages along a 2D polyline. There are three different chainage mark styles to choose from (refer to CHMARK for examples of each style)

Example 1: Chainage marks every 10 units

Example 2: Chainage marks every 20 units

Example 3: Chainage marks every 20 units with a different chainage (147.0) at the start of the 2D polyline

Before

After

After

After

Example 1 marks: 0.000, 10.000, 20.000, 30.000, 40.000, 50.000, 60.000, 70.000, 80.000, 90.000, 100.000, 110.000, 120.000

Example 2 marks: 0.000, 20.000, 40.000, 60.000, 80.000, 100.000, 120.000

Example 3 marks: 160.000, 180.000, 200.000, 220.000, 240.000, 260.000

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CHXSECT

Draws section lines (2D lines) at user selected points along a 2D polyline. The lines are drawn perpendicular to the polyline. The user can also specify the length of the section lines

Example 1: Shorter section lines (length of 20 units) at the start/end of each line and arc that make up the 2D polyline

Example 2: Longer section lines (length of 40 units) at the start/end of each line and arc that make up the 2D polyline

Before

After

After
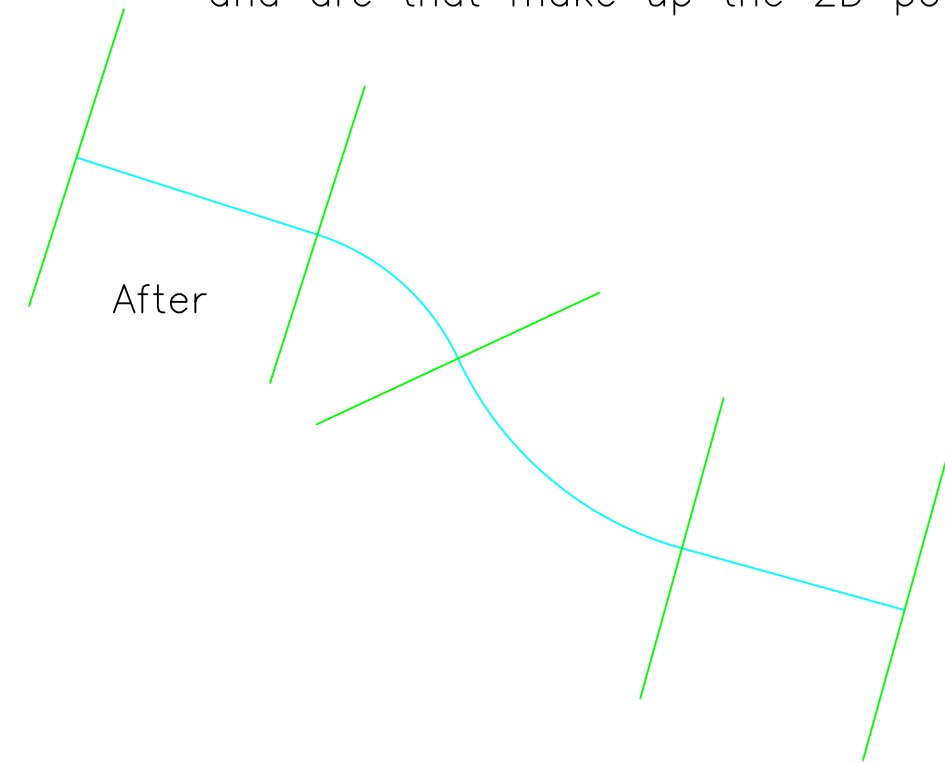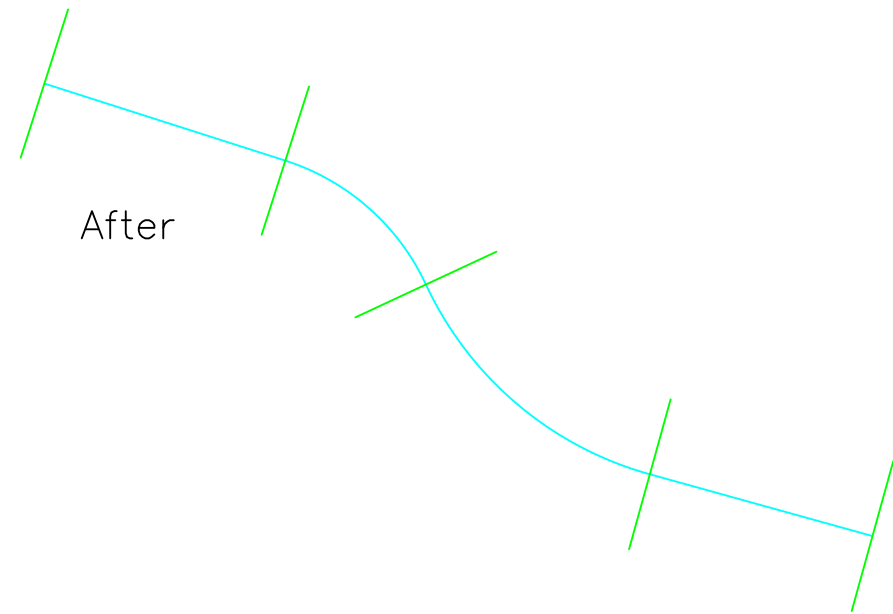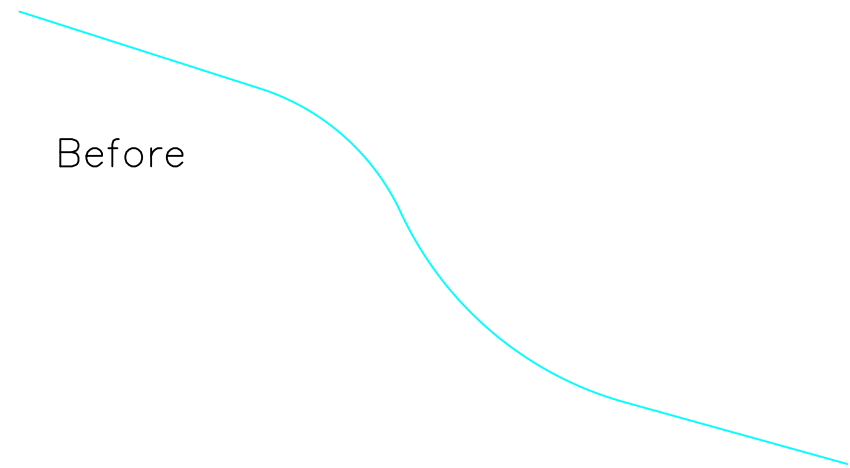
CHXSECTS

Draws section lines at user specified regular chainages along a 2D polyline. The user can specify the length of the section (refer to CHXSECT examples), and also a different chainage at the start of the polyline

Example 1: Section lines every 10 units

Example 2: Section lines every 20 units

Example 3: Section lines every 20 units with a different chainage (147.0) at the start of the 2D polyline

Before

After

After

After

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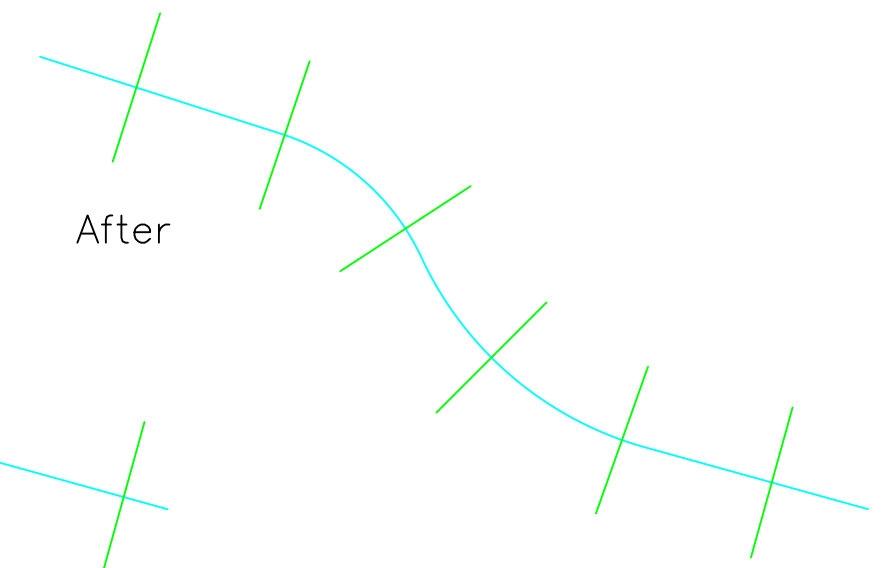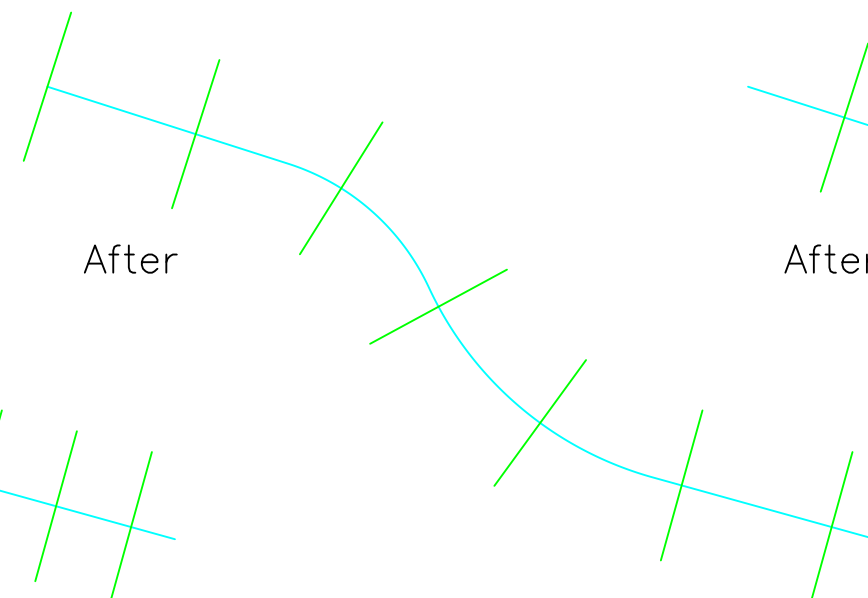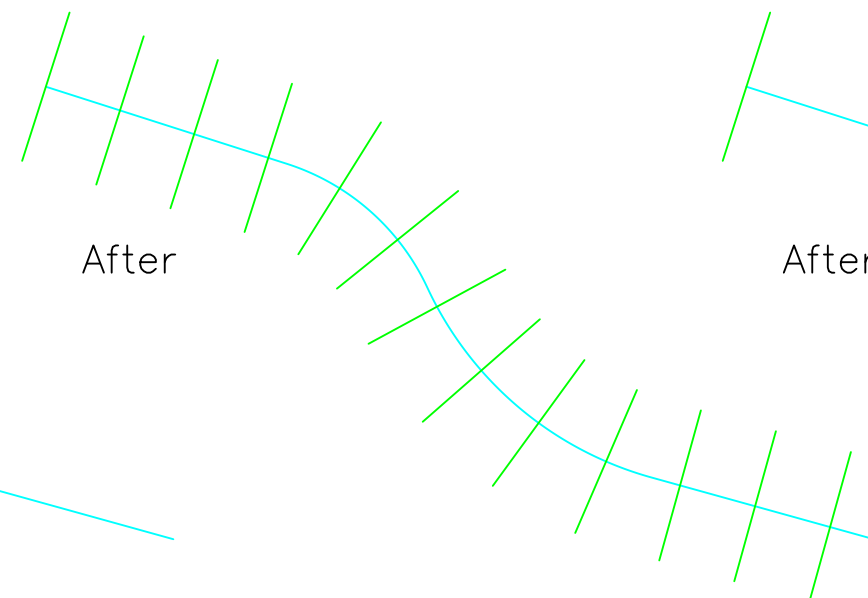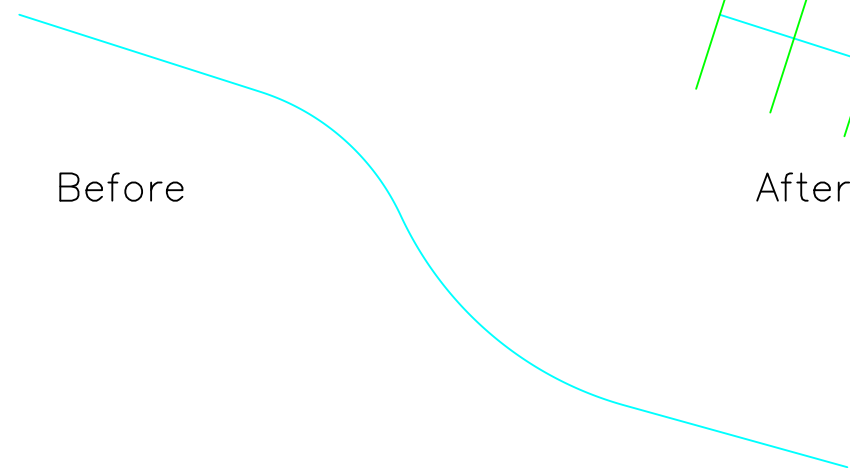
CHOFFSET

Returns the easting, northing (x and y coordinates), chainage, offset and level (z coordinate) of user specified individual points relative to a 2D polyline. The results can be added to the drawing as a series of multiline text objects (MTEXT)
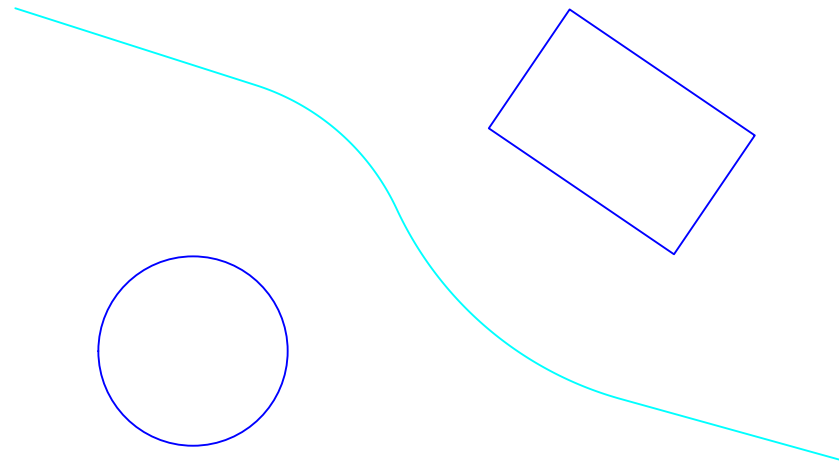
Example 1: Text data for the corners of the rectangle and centre of the circle relative to the 2D polyline
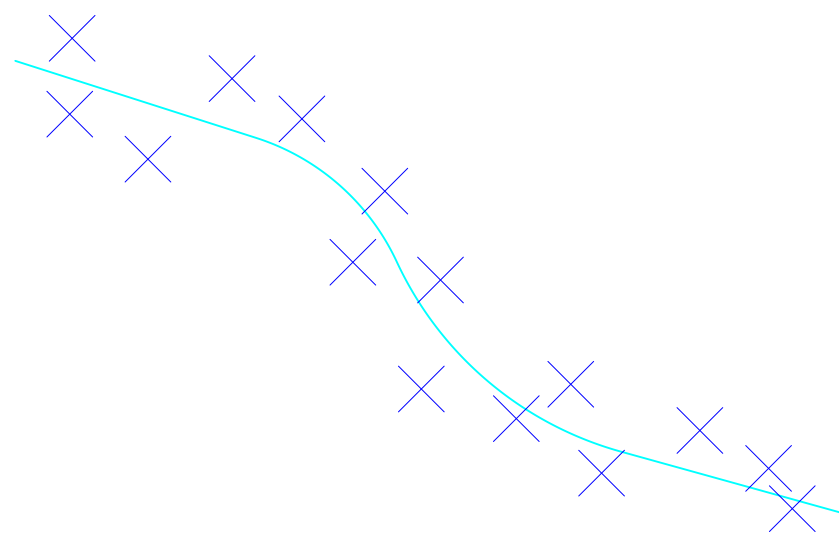
Easting	Northing	Chainage	Offset	Level
89.420	239.668	50.543	−32.520	7.400
79.038	224.400	54.326	−15.318	5.500
41.039	195.795	60.476	31.616	1.200
102.827	208.224	97.792	−19.736	4.900
113.210	223.491	103.715	−37.223	7.300

Example 2: Text data as example 1, but with a different chainage (147.0) at the start of the 2D polyline

Easting	Northing	Chainage	Offset	Level
89.420	239.668	197.543	−32.520	7.400
79.038	224.400	201.326	−15.318	5.500
41.039	195.795	207.476	31.616	1.200
102.827	208.224	244.792	−19.736	4.900
113.210	223.491	250.715	−37.223	7.300

CHOFFSETS

Returns the easting, northing (x and y coordinates), chainage, offset and level (z coordinate) of selected 3D points relative to a 2D polyline. The results can be added to the drawing as a series of multiline text objects (MTEXT)

Example 1: Text data for a group of 3D points relative to the 2D polyline

Easting	Northing	Chainage	Offset	Level
25.513	110.615	6.078	−4.982	7.700
25.208	100.877	8.754	4.386	6.300
35.251	95.095	20.081	6.834	5.825
46.054	105.441	27.219	−6.311	7.050
55.031	100.268	36.732	−4.461	5.968
65.682	90.987	49.250	−3.631	8.014
61.574	81.857	54.455	5.030	5.774
72.833	79.575	62.181	−3.859	10.208
70.369	65.577	71.570	6.625	5.375
82.571	61.773	82.399	1.675	6.046
89.570	66.185	86.367	−5.687	6.233
93.526	54.773	94.648	3.352	6.840
106.155	60.251	105.241	−5.330	7.113
114.980	55.382	115.046	−2.997	8.942
118.023	50.209	119.361	1.174	10.202

Example 2: Text data as example 1, but with a different chainage (147.0) at the start of the 2D polyline

Easting	Northing	Chainage	Offset	Level
25.513	110.615	153.078	−4.982	7.700
25.208	100.877	155.754	4.386	6.300
35.251	95.095	167.081	6.834	5.825
46.054	105.441	174.219	−6.311	7.050
55.031	100.268	183.732	−4.461	5.968
65.682	90.987	196.250	−3.631	8.014
61.574	81.857	201.455	5.030	5.774
72.833	79.575	209.181	−3.859	10.208
70.369	65.577	218.570	6.625	5.375
82.571	61.773	229.399	1.675	6.046
89.570	66.185	233.367	−5.687	6.233
93.526	54.773	241.648	3.352	6.840
106.155	60.251	252.241	−5.330	7.113
114.980	55.382	262.046	−2.997	8.942
118.023	50.209	266.361	1.174	10.202

CHSETOUT

Returns setting out data (chainage, easting, northing, arc centre and radius) as a series of multiline text objects (MTEXT), for a 2D polyline. It also includes setting out points at regular user specified chainages

Example 2: Text setting out data for the 2D polyline, with regular chainages every 20 units

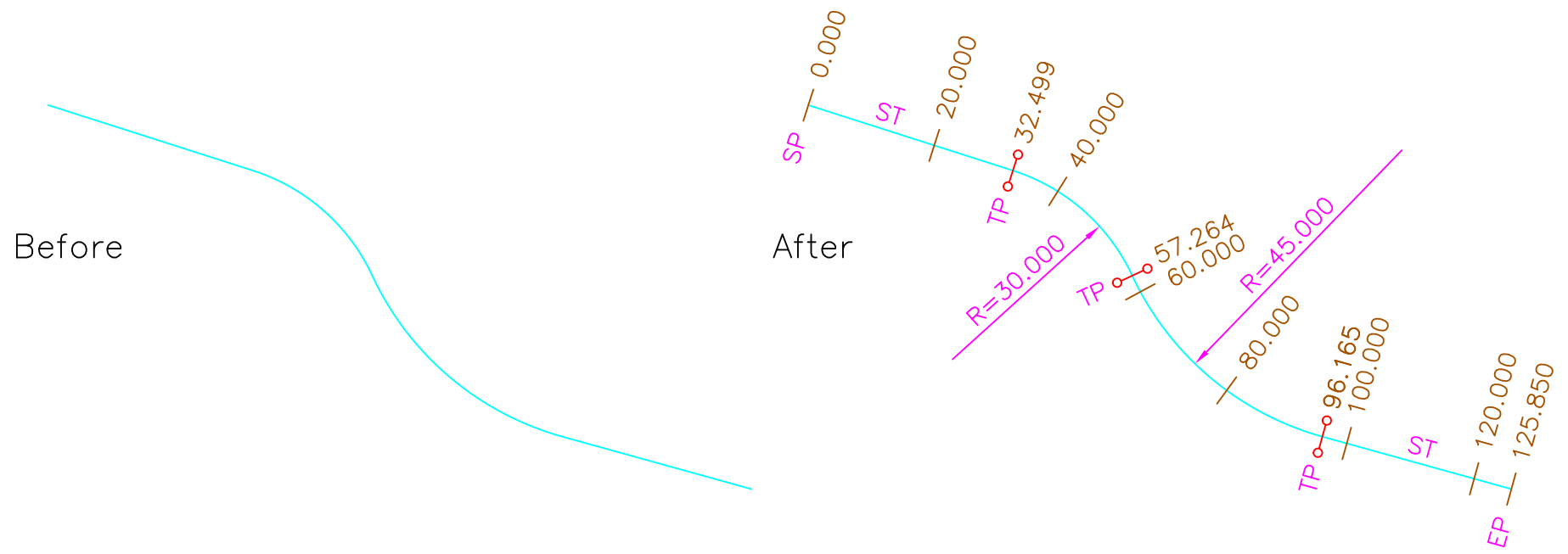| Point	Chainage	Easting	Northing	Radius
SP	0.000	438.206	239.821	
	20.000	457.255	233.728	
TP	32.499	469.160	229.921	
	40.000	475.946	226.771	
CP		460.022	201.347	30.000
TP	57.264	487.218	214.009	
	60.000	488.448	211.566	
CP		528.013	233.003	45.000
	80.000	501.508	196.637	
TP	96.165	515.985	189.641	
	100.000	519.680	188.616	
	120.000	538.952	183.269	
EP	125.850	544.590	181.706	

Example 3: Text setting out data for the 2D polyline, with regular chainages every 20 units and a different chainage (147.0) at the start of the polyline

Point	Chainage	Easting	Northing	Radius
SP	147.000	438.206	239.821	
	160.000	450.588	235.861	
TP	179.499	469.160	229.921	
	180.000	469.636	229.765	
CP		460.022	201.347	30.000
	200.000	485.150	217.735	
TP	204.264	487.218	214.009	
	220.000	496.194	201.183	
CP		528.013	233.003	45.000
	240.000	512.967	190.593	
TP	243.165	515.985	189.641	
	260.000	532.207	185.141	
EP	272.850	544.590	181.706	

Example 1: Text setting out data for the 2D polyline, with regular chainages every 10 units

Point	Chainage	Easting	Northing	Radius
SP	0.000	438.206	239.821	
	10.000	447.730	236.775	
	20.000	457.255	233.728	
	30.000	466.780	230.682	
TP	32.499	469.160	229.921	
	40.000	475.946	226.771	
CP		460.022	201.347	30.000
	50.000	483.389	220.161	
TP	57.264	487.218	214.009	
	60.000	488.448	211.566	
	70.000	494.145	203.373	
CP		528.013	233.003	45.000
	80.000	501.508	196.637	
	90.000	510.175	191.690	
TP	96.165	515.985	189.641	
	100.000	519.680	188.616	
	110.000	529.316	185.943	
	120.000	538.952	183.269	
EP	125.850	544.590	181.706	

SP = start point, TP = tangent point,
CP = centre point, EP = end point

Final combined example of using CHANGENT, CHSEGMENT, CHMARK and CHMARKS (with some text rotated, moved, and added) to annotate a 2D polyline as a highway (or similar) channel line, centre line, or setting out line

Before

After