

CatCurve

Tools for drawing catenary or hyperbolic curves.

2DCat

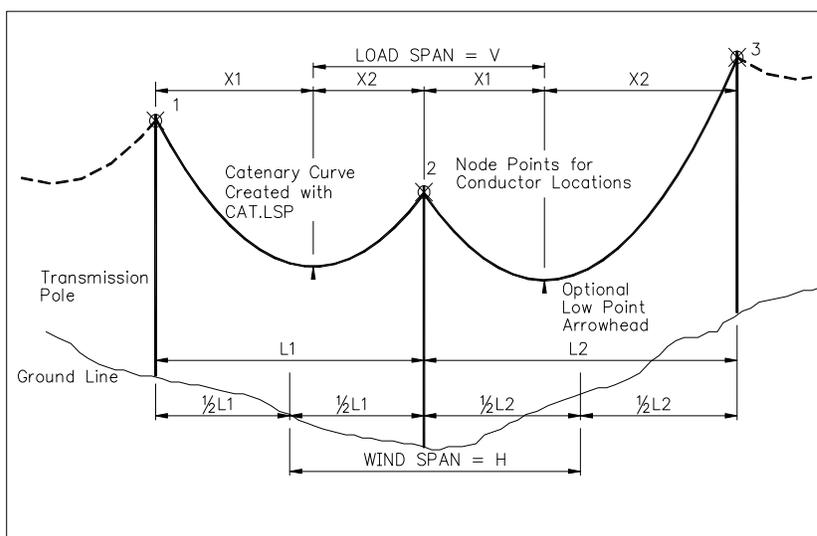


Catenary Sag Curves with 2DCAT

Transmission Catenary Sag templates like circle templates are usually made from plastic which the drafter would use to trace the curve between structures on the drafting media (linen, paper, mylar, etc.). Since transmission lines contain non-level spans and different span lengths, new templates are required for each ruling span. This was usually done by eye alignment. With the advent of CAD, drafters look for ways to duplicate these methods on the PC. The preferred method would be by drawing the curve selecting the end points of the span. Created specifically for 2D Plan and Profile drawings and Sag Template overlays, this newest version has the additional feature of the low point being included in the polyline vertices. An arrowhead can be included at the low point of sag in the polyline. A block called ARROW must exist in the drawing, to be inserted for you at the low point of the curve.

The value of "P" used in CAT.LSP defines the ratio between the STRINGING TENSION in pounds divided by the WEIGHT OF CONDUCTOR in pounds. Specify the "P" value for the particular conductor being used. If you don't know the "P" value, but have the conductor weight and tension, enter zero (0) for a "P" value and you will be prompted to supply those values and the "P" value will be calculated for you. The two scales and "P" value will be attached to the polyline as extended entity data along with the end point coordinates, the wind span, one half of the load span, and the length of conductor. These can be viewed using PSHOW (see Figure UT12, 13, 14). These values can be verified and/or retrieved later should the span change and the curve need to be replaced. 2DCAT asks for conductor attachment points in NODE point OSNAP mode. Any OSNAP setting can be added during the point selection process.

The curve is drawn using a precision hyperbolic method of calculation and will accommodate non-level spans. If the result is a straight line between the two selection points, verify the ratio of the two scales (H & V) specified for the curve. Span segments are calculated in 5 unit increments. Short spans may appear straight. A continuous program loop allows for consecutive spans to be drawn without retyping values. Attachment points can be specified from right to left or left to right.



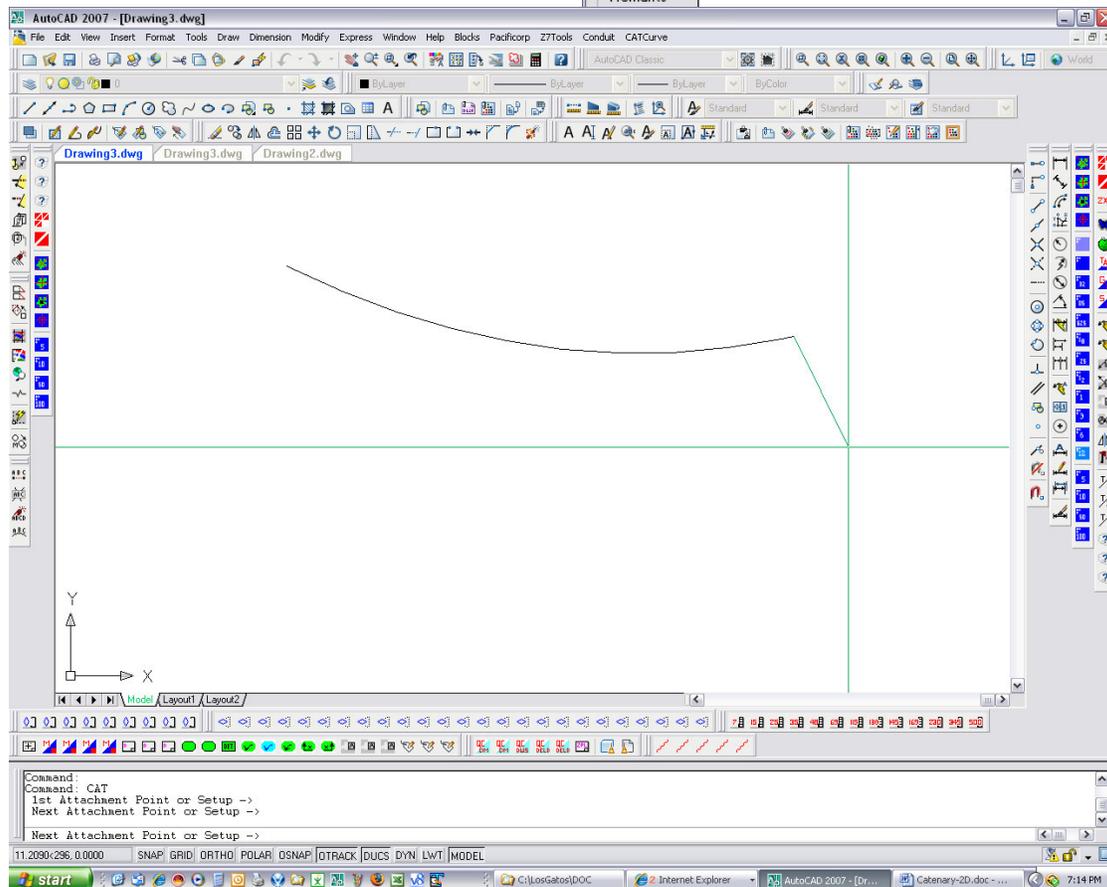
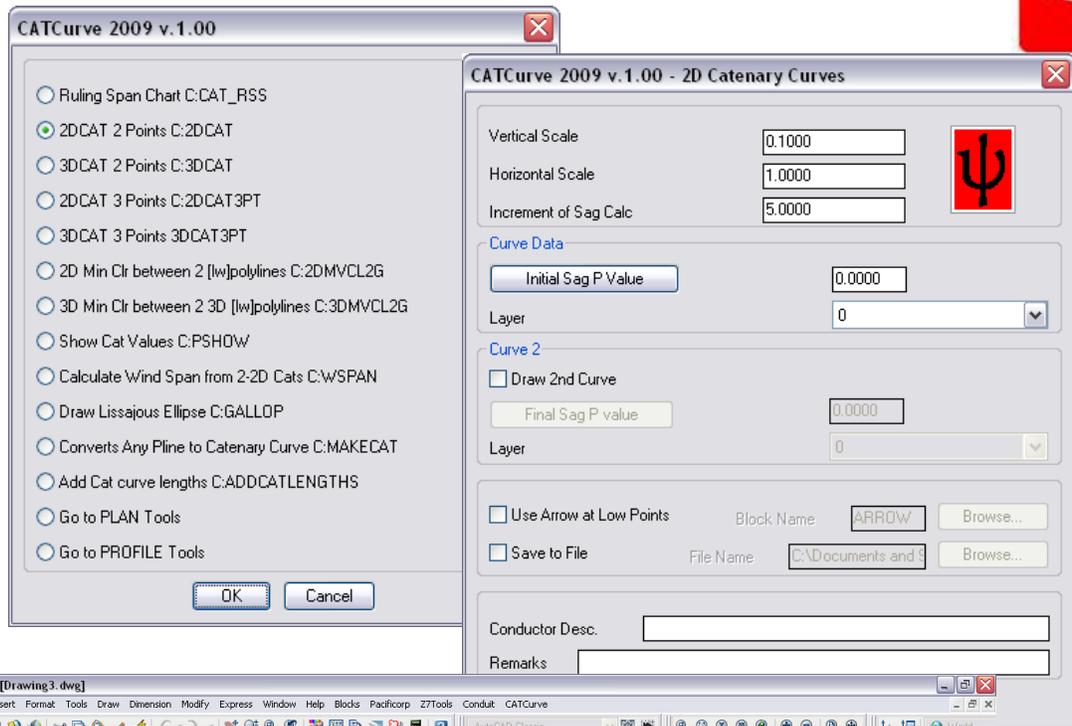
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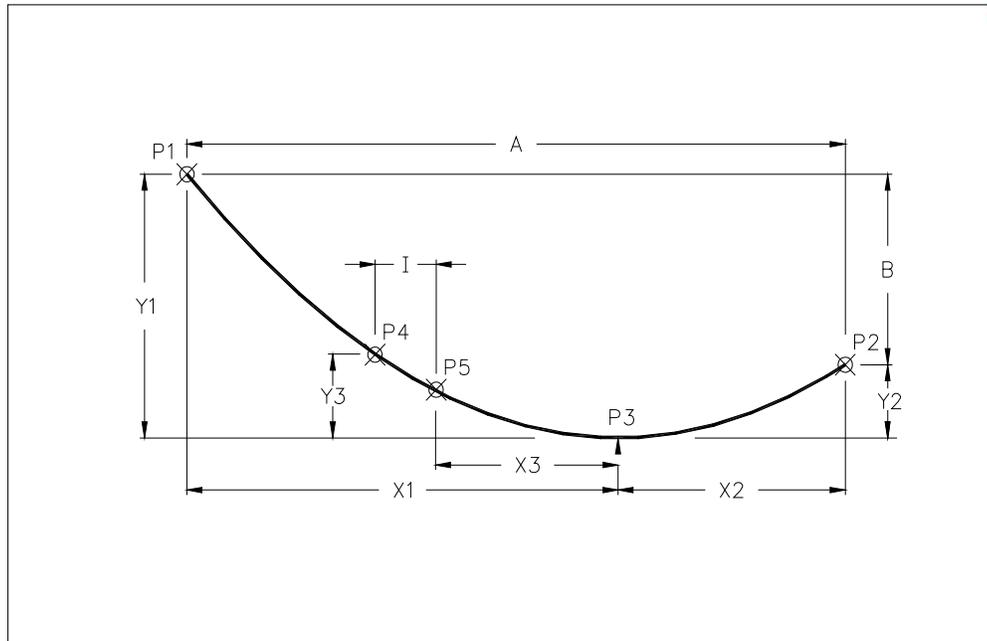
Command Structure

Command: 2DCAT



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PSHOW Displays List of Extended Entity Data Values

The use of Extended Entity Data attached to an AutoCAD polyline was a result of the need to verify correct use of the Catenary Generators by the drafter. The drafter must satisfy the Engineer that all conditions have been met before he accepts the validity of the electronic data. Output to screen and to text file provides substantiating evidence of conformance to Engineering parameters.

1. (H/W) P Value
2. Vertical Scale
3. Horizontal Scale
4. Point P1a
5. Point P2a
6. Point P3 (Low Point of Catenary)
7. Sag at Point P3
8. Span A length
9. Conductor Length
10. Back Load Span X1
11. Ahead Load Span X2
12. Increment of change

The screenshot shows a dialog box titled "CATCurve 2009 v.1.00 PSHOW 2D/3DCat -3 EData". It is divided into two sections: "Selected Catenary Curve Adjustable Values" and "Selected Catenary Curve Calculated Values".

Adjustable Values:

- P (H/W) Value: 95.0000
- Vertical Scale: 1.0000
- Horizontal Scale: 1.0000
- Increment: 1.0000
- Conductor Desc.: 795 MCM ACSR - DRAKE
- Remarks: 31,500 LBS MAX TENSION

Buttons: 1st Point P1S, 3rd Point P3S, 2nd Point P2S

Calculated Values:

- Low Point P3SAG: 50.1683
- Span Length: 195.7789
- Conductor Length: 246.9194
- Back Load Span X1: 64.3715
- Ahead Load Span X2: 131.4075

Buttons: Update Curve, Info..., Cancel

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Warning about UNITS and Calculations when Loading

When loading CAT.LSP a warning is displayed if the Units setting is other than Decimal [2] because the formulas used assume whole units as equal to 1 foot. Otherwise curves may not match your original template.

OUTPUT to screen

Display of variables on-screen of several Autolisp variable names and their set values after running 2DCAT is available by typing (VALUES) at the Drawing Editors Command: prompt.

OUTPUT to ASCII file

Output to ASCII file in 2DCAT is accomplished by selecting "Y" when prompted to save to File.

2DCAT Catenary Curve Values

Extended Entity Application ID: 2DCAT

Horizontal Span A: 264.49

Vertical Offset B: 0.00

Conductor Tension P: 1500.00

Attach Point P1: 838.8756,0.9407

Attach Point P2: 1103.3615,0.9407

Low Point P3: 971.1186,-4.8925

X1: 132.24

X2: 132.24

Y1: 5.83

Y2: 5.83

Segment Lengths: 5.00

Y3 Seg1: 3.84

Y3 Seg2: 2.26