

TECHNICAL SOURCE GUIDE

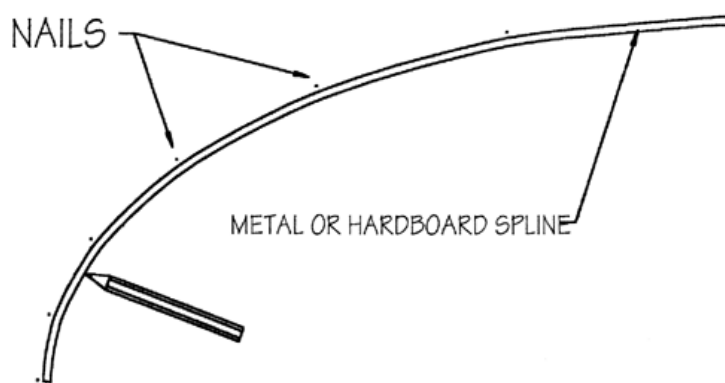
CREATING THE ELLIPSE – PART 1

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Techniques for Laying Out Large Ellipses

Ellipses are everywhere--just look at a circle obliquely--so a draftsman or designer cannot go for long before having to draw one. This two-part article provides several methods for drawing ellipses, all suitable for the drafting table or large-scale layout. Which method is best depends on the size of the ellipse, degree of accuracy and the circumstances under which the ellipse is to be drawn.

There are two basic methods of drawing ellipses: plotting points geometrically and drawing directly with mechanical assistance. In the first method--the one covered in this article--points on an elliptical path are plotted and then the points are joined with a French curve (for small drawings) or a spline (for larger formats). A spline may be any flexible material that bends gracefully. For curves under eight feet, a strip of tempered hardboard works well; for longer curves, (1/8" or 1/4") flat steel or aluminum is better. For large ellipses, if the surface allows, nails may be driven at the plotted points and the spline bent into them (Figure 1). When plotting point, allow for the thickness of the spline.



An ellipse is a symmetrical object, so it's not necessary to plot the entire curve. Once you have one-quarter of it accurately drawn, that oblique pie-slice can be cut out of a piece of cardboard, or plywood, and then flipped and traced to produce the remaining three quarters. Or, if you are laying out the ellipse on a piece of vellum, draw the quarter-ellipse on a separate scrap of paper which can be slipped under the vellum and traced.

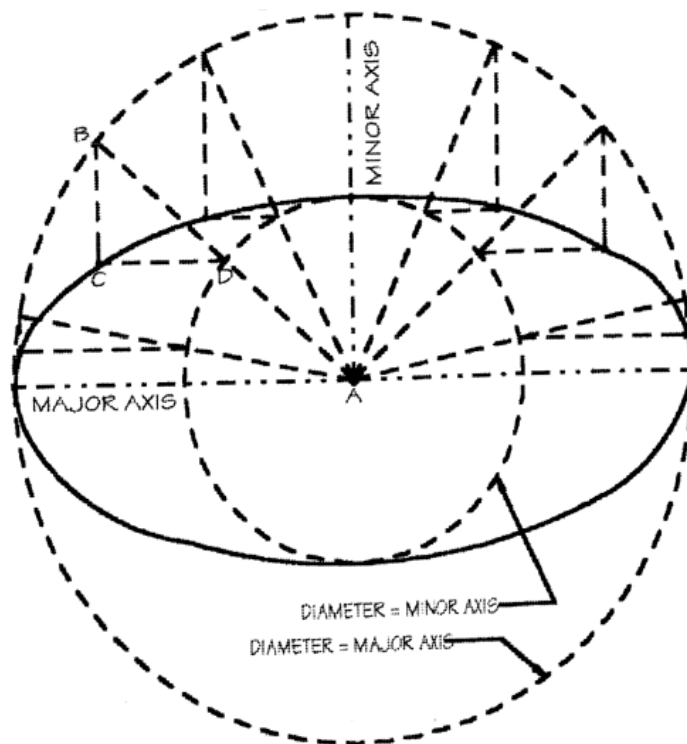
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Point Methods:

1. Concentric Circles Method (Figure 2)

This method is probably popular at CBS studios. Establish a point at the intersection of the major and minor axes of the intended ellipse and draw two circles, one the diameter of the minor axis and one the diameter of the major axis, around the point. Extend a ray (A, B) from the center point, through the inner circle, to the outer circle. From the intersection of this ray with the outer circle, drop a line (B, C) parallel to the minor axis. From the intersection of the ray with the inner circle, draw a line (C, D) parallel to the major axis. The point where these two lines meet (C) is on the ellipse. Repeat as necessary, plotting enough points to define the ellipse, then use a French curve or spline to connect the points.

This method requires considerable space around the ellipse for the circles and true parallels to the axes. A drafting machine, or a parallel rule and a right triangle, are the best tools for this method. Hence, it is better suited to the drafting table than shop floor layout. One drawback to this method is that it leaves numerous extra lines on the page. It is often best to draft the ellipse separately and then trace over it for the final drawing.

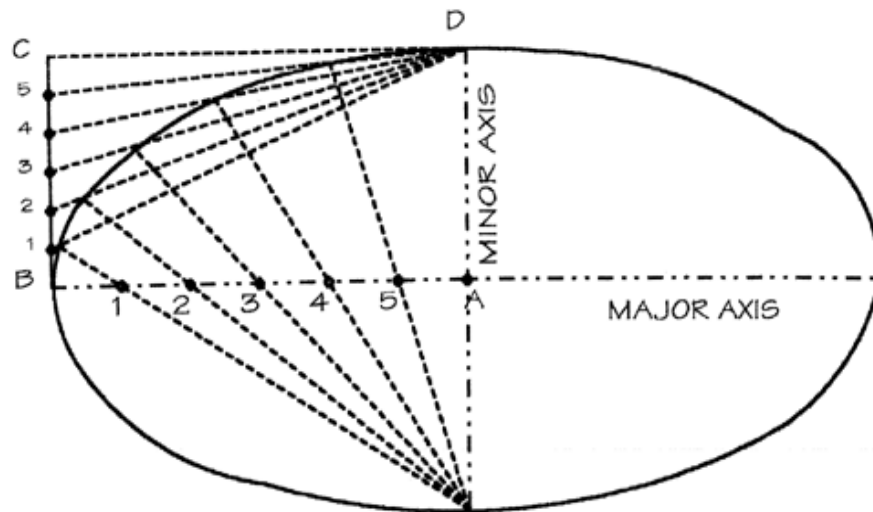


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2. Rectangle Method (Figure 3)

Establish the major and minor axes of the ellipse. Draw the rectangle A, B, C, D using half of each axis as two of the sides. Divide the short side of the rectangle (B, C), opposite the minor axis, into several equal parts. Divide the long side of the rectangle that is on the major axis into the same number of parts. From the corner of the rectangle (D), draw a line to each of the division marks on the short side of the rectangle. From the opposite end of the minor axis, draw lines through each of the division marks on the major axis to the corresponding lines drawn previously--1 to 1, 2 to 2, and so on. The points where these lines intersect are on the ellipse. Join the points, as before, with a French curve or spline. To increase the accuracy of the lineal ellipse, increase the number of divisions.

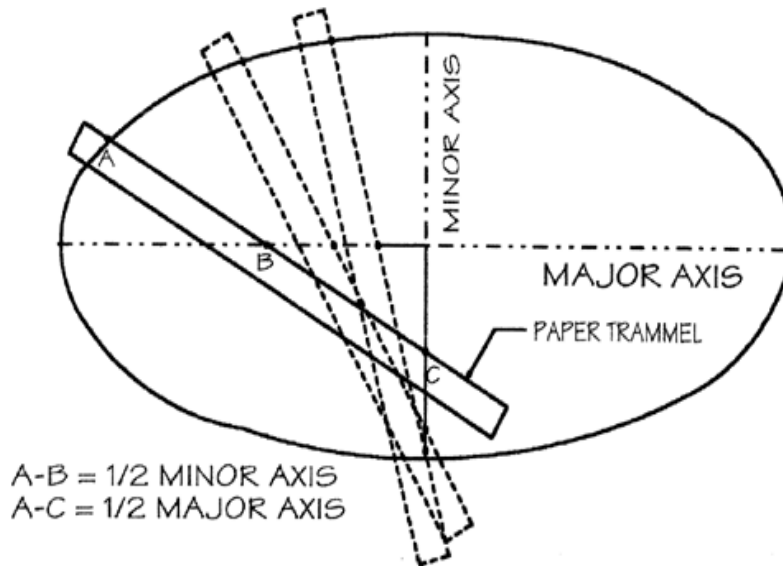
This method is ideal for layout with a chalk line and tape measure, and is suitable for large-scale layouts. Also, it requires less space and fewer tools than the concentric circles method. As with the previous method, the drawback is the number of lines left on the page.



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3. The Paper Trammel Method (Figure 4)

Establish the major and minor axes of the ellipse. On a piece of stiff paper or even a board, mark the three points A, B and C. B is one-half the length of the minor axis from A, and C is one-half the length of the major axis from A. Place point B somewhere on the major axis and point C somewhere on the minor axis. Point A will be on the ellipse. Slide points B and C along their respective axes, plotting points at A, until enough points have been established to define the ellipse.



This method is preferred for drafting, since it leaves no additional marks on the page. It is an excellent means of laying out large ellipses as well and, in fact, forms the basis of one of the direct-drawing methods which will be discussed in Part Two of "Creating the Ellipse" in the next Technical Source Guide.

Thank you for taking time to read this "classic" Technical Source Guide! Because it has been published a relatively long time ago, addresses (physical & web) and any phone numbers, might not be current!

Technical Source Guide #21 – CREATING THE ELLIPSE-PART 1

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