

How do Civil 3D Styles and Objects Use AutoCAD Layers

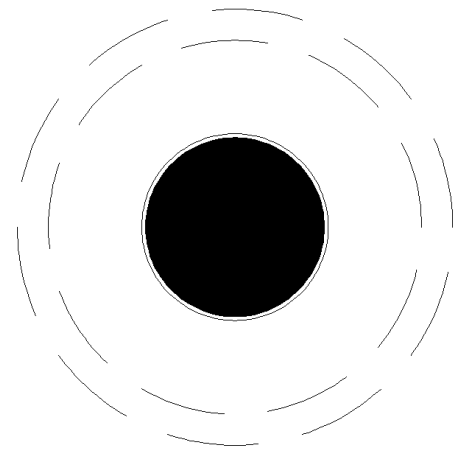
AN ILLUSTRATION

When working with objects and their layers, I like to make the comparison to how blocks and their subentity layers work. When defining a block you have to think about not only the layer that the lines and circles are on that make up the block but what layer the block is going to be on. Let's look at an example of a manhole. A manhole could be made up of 5 objects.

Blocks

- A circle representing the lid
- A solid hatch representing the lid
- A circle representing the edge of the frame
- Two polylines representing the inner and outer diameter of the manhole

We can place each object (all five in this example) that makes up a block in its definition on its own layer. However, if we place them on layer 0 then that special layer will tell the objects to get their properties and settings from the reference, or the block's layer as a whole. Thus, layer 0 is actually a special layer which will cause objects that are nested to read their parent layer's properties.



Block Reference (Layer C-STRM-STRC)

Lid Circle
(Layer 0)

Lid Hatch
(Layer 0)

Frame Circle
(Layer 0)

Inner
Diameter
(Layer 0)

Outer
Diameter
(Layer 0)

Another Approach

However, there may be situations where I want to be able to control the manhole diameter polylines separate from the rest of the pieces that make up a manhole. I can place those pieces on their own layer inside the block definition.

Block Reference (Layer C-STRM-STRC)

Lid Circle
(Layer 0)

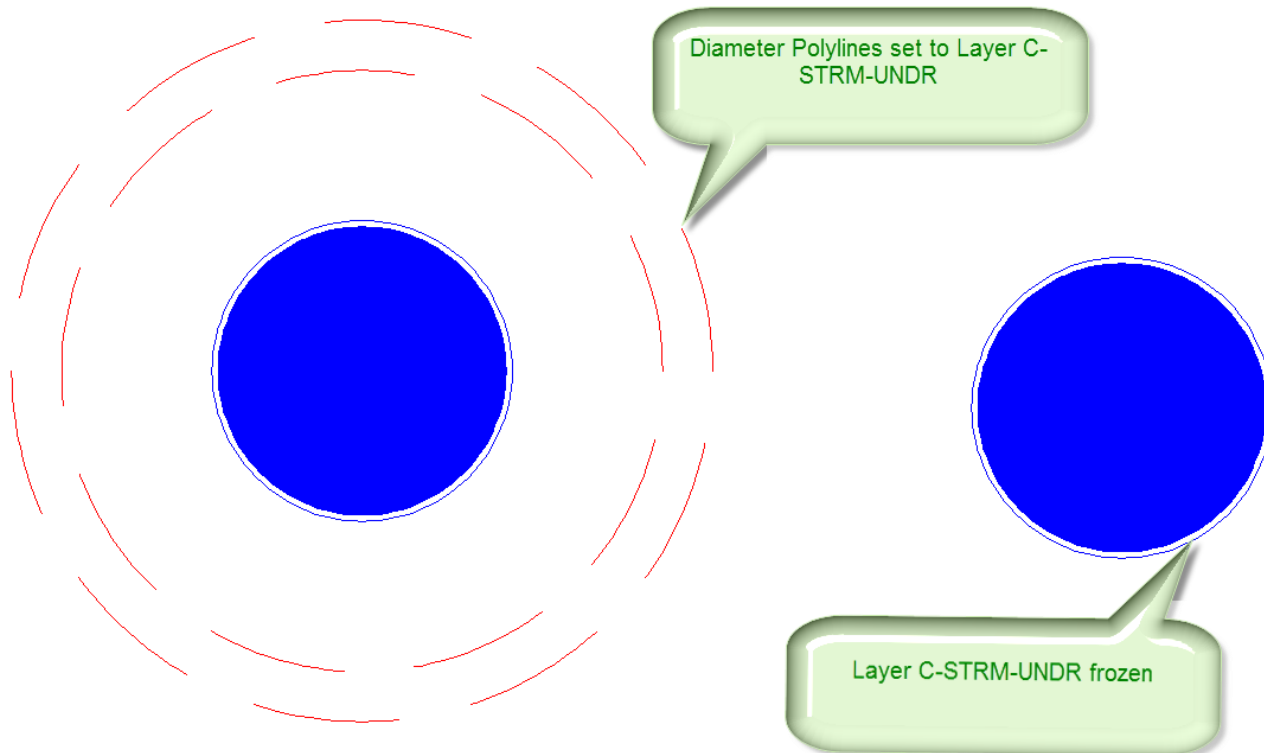
Lid Hatch
(Layer 0)

Frame Circle
(Layer 0)

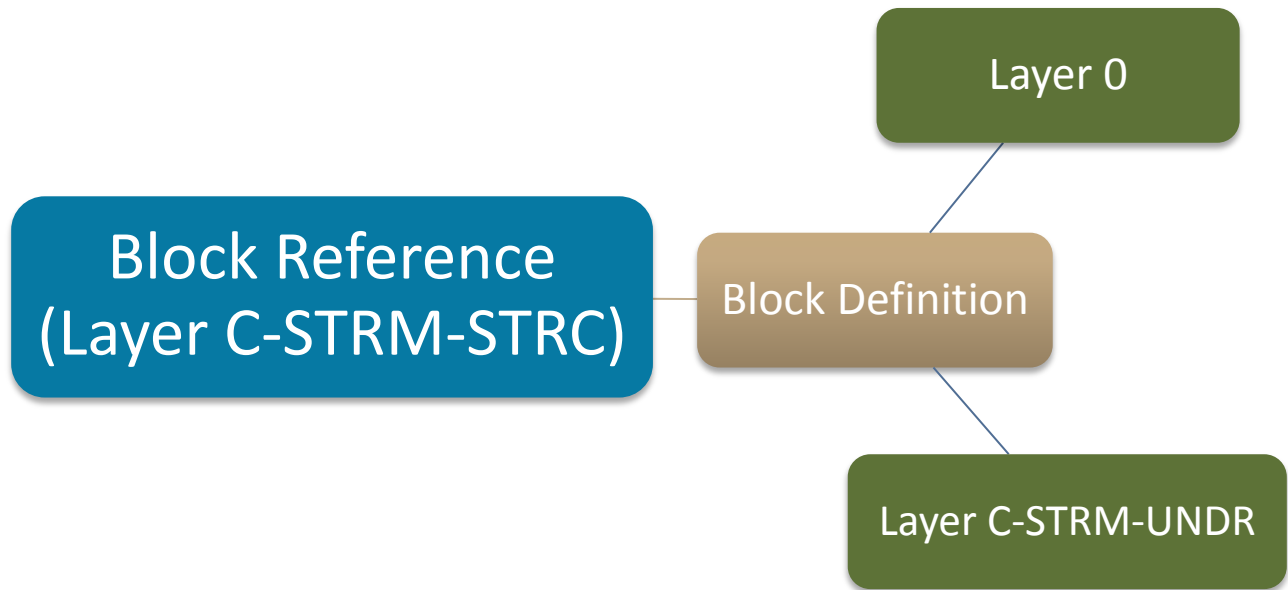
Inner Diameter
(C-STRM-UNDR)

Outer Diameter
(C-STRM-UNDR)

This gives me a little more control but also adds a level of complexity to the block. If I freeze layer C-STRM-UNDR the diameter polylines of my block reference will disappear even though the block reference layer (C-STRM-STRC) is still thawed. (In the example, layer C-STRM-STRC is color blue and layer C-STRM-UNDR is color red.)



If you wanted to freeze the entire block, you would freeze C-STRM-STRC. Thus you have a layer hierarchy that exists due to the block definition versus the block reference.



Styles

Objects within Civil 3D (i.e., Alignments, Surfaces, Profiles, etc.) are like fancy blocks. You have the object which corresponds to the block reference and the components that make up the object (i.e., Lines, Curves, and Spirals for an alignment or Major and minor contours for a surface) correspond to the pieces that make up the block definition (i.e., the circles, hatch, and polylines that defined the manhole block above). So let's use the same concept that we had with the first block definition by placing all the components in my alignment style on layer 0. (In this example, layer C-ROAD-CNTR is color red with linetype centerline.)

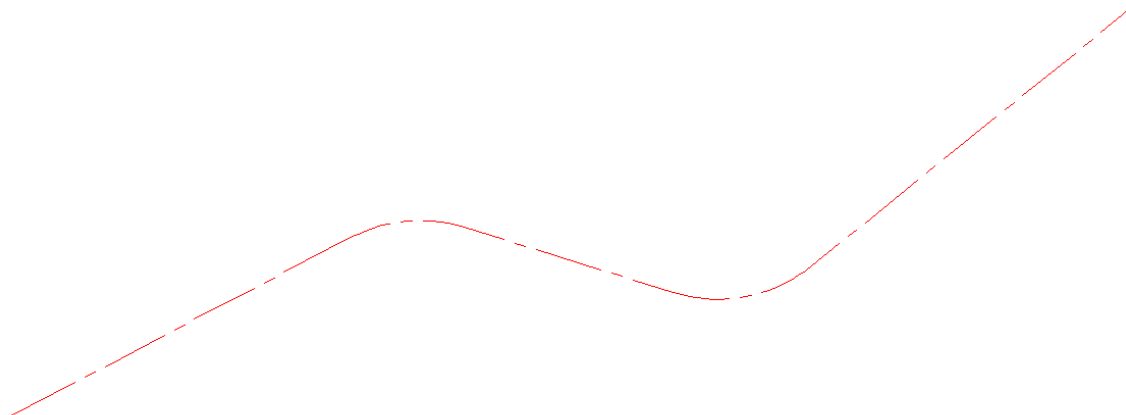
Alignment Object (Layer C-ROAD-CNTR)

Line
(Layer 0)

Curve
(Layer 0)

Spiral
(Layer 0)

With the parameters above, we would have our centerline looking like below.



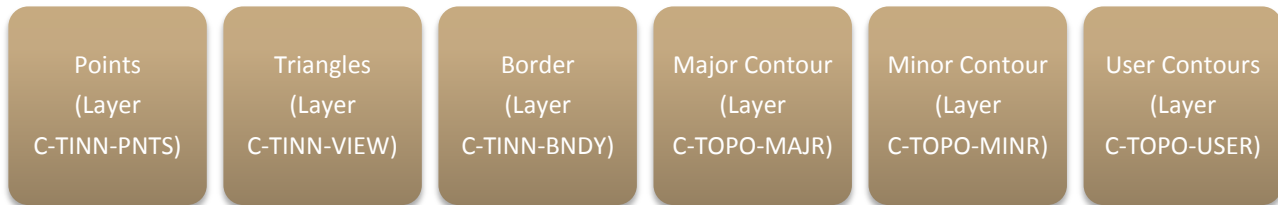
This is great!! This means we can use one alignment style for roads, walls, offsets, railway and the like. The only thing you would change is the alignment object's style.

Another Approach

This works great on simple objects such as alignments and labels but what about more complex objects such as surfaces where you want the major contours to be on a different layer from the minor contours which are on a different layer then your triangle lines and so on?

This is where the different approach we used with our manhole diameter polylines comes into play. The surface as a whole is on a parent layer yet the components each are controlled individually.

Surface Object (Layer C-TINN)



Thus what happens more resembles how we treat an xref. The xref object may belong on an xref layer but all the objects within that xref reside on their own layers and we control each object's layers individually. One point of note here is if you assign a unique layer to each component in a style, you leave the visibility on. There is no reason to have additional layers in a drawing because a component has that layer assigned but really isn't using it. This also allows for greater versatility with fewer styles. For example, with the one style above I can use it while in design mode where I need to see my points, triangles, and/or border and can use it for plot mode where I just want to see my contours. I simply control the display with the layers.

A Complex Example

Now that we have a basic grasp of how layers within a style work, let's look at one of the greatest examples of how we can use both the power of Layer 0 and assigned layers.

A Civil 3D point uses two styles for display - a point style and a point label style. Within a point style, you have the ability to control the layer for the label, and within the label style is another control for the layer of that label.

Point Object (Layer V-NODE)

Point Style

Point Display (Layer 0)

Point Label Display (Layer 0)

Point Label Style (Layer 0)

Thus we see a bit of a cascading affect with Layer 0. If we set our label style to layer 0 (which by default all my label styles are set to Layer 0) then the point label will pick up its properties from the point style. If the point style's point label display layer is set to 0 this cascades up so that now the point label gets its properties from the point object itself. The point label is like a block WITHIN another block.

Let's say that we have a fire hydrant point. We want to show a fire hydrant in ALL drawings. Nevertheless, we want control over the label SEPARATE from the fire hydrant. We would still leave our point label style layer set to 0. We don't need more label styles just to handle fire hydrants versus iron pins versus who knows what. Rather we set our point style's point label display layer to something different as illustrated below.

Point Object (Layer V-WATR-STRC)

Point Style

Point Display
(Layer 0)

Point Label Display (Layer
V-WATR-ANNO)

Point Label Style (Layer 0)

Thus the cascade power of Layer 0 gives us less styles and more power. You were already going to have a different point style for your fire hydrant versus your iron pin. By setting the point style's point label display layer to V-WATR-ANNO we can turn off the label separate from the fire hydrant. If you don't want to see the fire hydrant you freeze the V-WATR-STRC layer and both the point and the label disappear. If you don't want to see the fire hydrant text, freeze the V-WATR-ANNO layer and just the label disappears.

CONCLUSION

So when setting up your styles which option is better - all the style component's to layer 0 or set all the component layers and not care so much about the overall object layer? From just the few examples, I think you would agree that they both have their benefits. My personal opinion is to use a mixture of both to accomplish the least amount of styles, the greatest versatility, and the smallest learning curve.

What is your conclusion?