Basic CAD Drawing

by Leon Cole

CAD drawing packages have opened the world of complex computer generated design and modern cutting processes to aeromodellers. However, these packages are generally necessarily complex and require practice to use efficiently. Quite often we may only need to draw basic components quickly and simply, not requiring the full tool palette offered in these packages.

This is where Corel Draw can be very helpful. Corel is a powerful drawing package, but one that allows you to use familiar pen and paper drafting techniques to quickly draw model airplane parts.

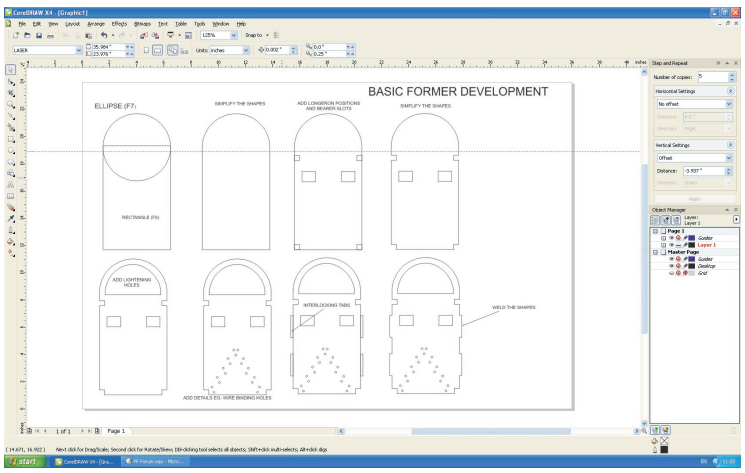
There are various ways of drawing parts. Often we wish to develop our own parts, experiment and check their fit relative to other components for new designs. Frequently, all we want to do is produce a set of parts from an existing design. All this can be easily achieved in Corel and the data can be used by kit cutters to produce a set of cut parts or used as a template for workshop use.

Creating original parts

Corel features a simplified palette of drawing tools, yet is capable of creating very complex parts. To assist us in drawing, guidelines and grids can be setup from within the working page. Lines, rectangles, ellipse tools allow the user to create all the parts required in model construction. By using additional commands such as Weld and Simplify we are able to create spar slots, alignment tabs, lightening holes.

Formers

The rectangle tool (F6) is the tool we generally use to create formers. Corel allows the user to work in inch or metric units and the position and size of the part can be seen on screen as you draw. By combining circles (F7) or other shapes with the basic rectangle all former shapes can be created. Lightening holes, bearer slots, landing gear binding holes can all be added in a similar way.



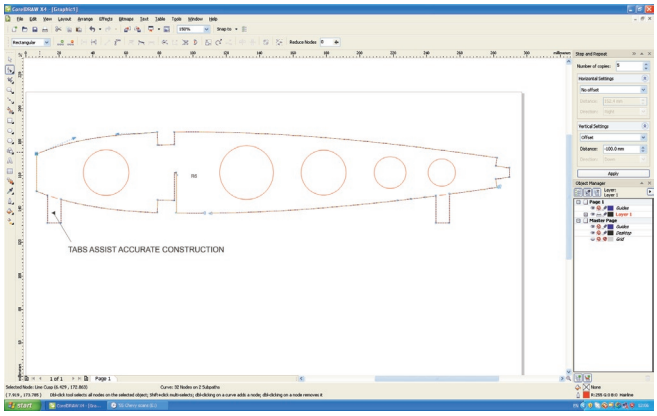
Accuracy of parts can be checked by generating a datum line using the drag down guides.

To assist accurate construction, it is common to use interlocking tabs. These again are easily achieved by using the weld function.

Ribs

Generally ribs and similar shapes such as wing tip outlines etc are created using the versatile Bezier Line tool. By generating nodes and manipulating them by dragging using the Shape Tool (F10) very complex accurate parts can be created.

We are all familiar with having to using scrap strip to pack up symmetrical section ribs. Using Corel we can easily add tabs to the bottom of the ribs, allowing them to be placed flat on the building board. Wash in/out can be added by varying the height of the rear tab.



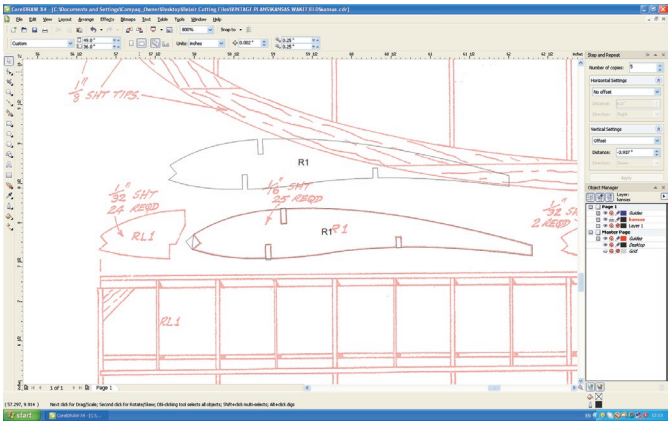
Parts for published plans

As aeromodellers we often build from published plans and like the convenience of a cut set of parts. Rather than try to generate a new set of parts, it is much easier to use a scanned image of the plan and using the tools detailed before to trace our parts out. This method will also quickly allow you to see how accurately the plan has been drawn!

The process

Using the layer function, we can place the scanned image on a base layer, and then work on other layers without affecting the lower layer. Before locking the layer, ensure the image is not skewed using the guidelines.

Formers are generally created using the Rectangle and Ellipse tools. However the most powerful tool is the Bezier Line. By placing nodes around the outline of the part and then dragging the lines, using the Shape tool accurate, complex parts are created.



Once the basic shape is created we now need to add details, such as spars, longeron slots, and provision for other parts. These are generated using the standard drawing tools in conjunction with the dimension tool and positioned as shown on the plan. Once positioned these parts are then merged into the base shape using the Weld and Trim commands. There is no need to trace round these sections separately on the plan. By dropping in individual shapes we can ensure accuracy of these slots etc.

Tapered wing ribs can be created using the Interactive Blend Tool. Just as when using the sandwich method a root and tip ribs is created, positioned in their position on the plan and by using the Blend Tool the tapered rib set is created.

Generally when drawing with a computer, we only create one side of a part and use the mirror tools to produce the other side of the component. Other useful tools are the Step and Repeat Function. More complicated parts generated from co-ordinates do need to be drawn in a dedicated CAD package, but can be incorporated into Corel and developed into existing plans.

In summary, using a program such as Corel Draw, aero modellers can easily experiment with their own design or generate a set of precut parts from existing plans quickly and accurately at home without having to use complex CAD packages.