

STAIRDESIGNER : for more information on StairDesigner and my StairFileservice please visit my blog at : www.stairdesignsoftware.net

What is a StairFile

My Stairfile service allows people who don't make stairs regularly to get the StairDesigner workshop documents without having to buy a full version.

The StairFile service is actually a 2 in 1 service :

1) I verify your stair design

Stair building can be a complicated and error prone job. To help you get the most out of your Stairfile and build your stairs easier and faster, I will look over your stair design and give you my own professional advice before you start cutting wood.

To get the most out of this service you will have to send me the following information:

- Your StairDesigner SDS file

- A plan or a sketch of your stair well and its surroundings. If you can send me some photos always helps too get a better picture of the project.

- The type of wood stock that you will be using and its finished thickness.

- If you would like an approximate cost price for the wood I'll need to know the cost per unit volume.

- A description of the types of joints that you are thinking of using for string and newel assembly

- A description of the type of joint you would like for the handrail and newel assembly.

- A description of the way you will be assembling steps and risers.

If you are not sure about how you should build your stairs don't hesitate to ask. Just send me an email at: ness.tillson@stairdesignsoftware.net

What files do you get from a Stairfile?

Once we have decided exactly how you should set up your stairs I'll get StairDesigner to write out all the workshop documents, and send you a compressed WINRAR file that contains the following files:

The SDS stair file

This is of course the most important file because all the other documents are calculated from this one. So keep this file safe until your stairs are built and installed.

The workshop manufacturing document

This is a PDF file that contains a general plan view of the stairs, a dimensioned drawing of each separate stair part, a cutting list with the total volume of wood used and eventually the weigh and cost price of the wood.

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Note that the volume of wood is calculated from finished sizes and doesn't count the waste and off cuts, so it will have to be multiplied by your estimated waste ratio. If you are using rough boards the waste ration will be around x1.8 to x2 according to the type of wood you're using, oak will have more waste than beech. If you are using finished laminated boards the waste will be far less, around x1.5. The cost price is also calculated from the net volume, so that will also have to be adjusted accordingly also.

A general 2D plan in DXF

This file contains all the parts assembled in one 2D plan. Be careful though, although the plan is 2D the steps are drawn with their real Z height, so before using the plan it's a good idea to select all the steps and put them down to Z=0.

The 2D plan enables you to check the coherence of the stairs. You can see if all the parts fit together properly and make any adjustments if necessary.

A 3D drawing in DXF

This drawing is mainly for presentation purposes. You can load it into an AutoCad project that includes walls, furniture and add stair parts that are not drawn with StairDesigner. In AutoCad you can add textures and lights and get some really good presentation images.

A folder that contains all the stair parts in separate DXF files

This folder contains all the stair parts in separate DXF files. These are the manufacturing files. You can use them to print out your full size templates, or drive your CNC machinery.

So these are the files that must be well drawn.

Modifying StairDesigner DXF files.

Although StairDesigner DXF files are very well drawn I still strongly advise you to verify and eventually modify these files before you use them for marking out your parts or driving your CNC router.

There are several reasons for modifying the files:

- Assembly details may not conform to your workshop practice
- The shapes drawn by StairDesigner can be improved aesthetically
- You want to add details that StairDesigner just doesn't draw

Note that the steps both in the 2D general plan and the 2D part by part plans are drawn with the real Z height of the step. It's a good idea before editing these drawings to select all the drawing and put the Z value to 0.

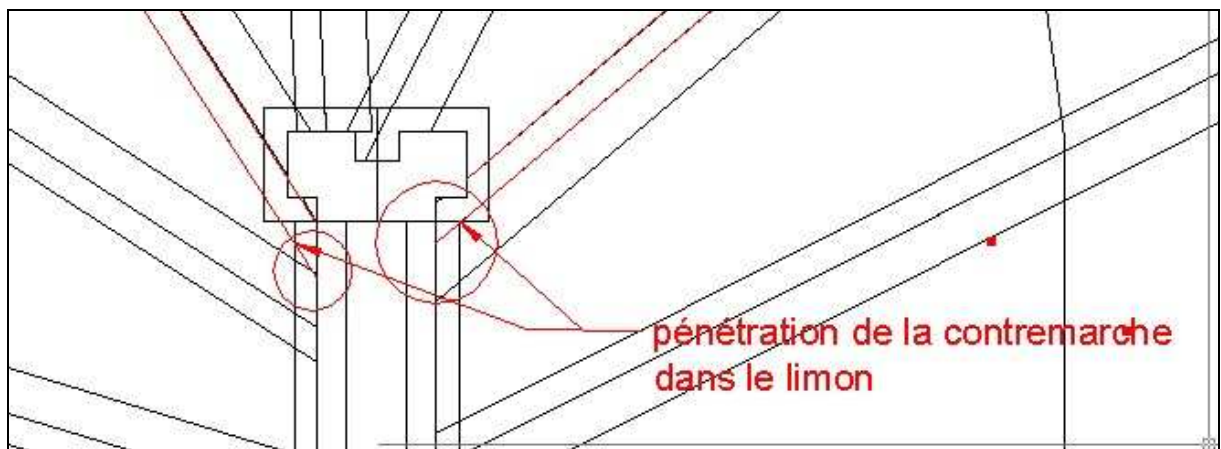
Assembly details.

Assembly of step around newels

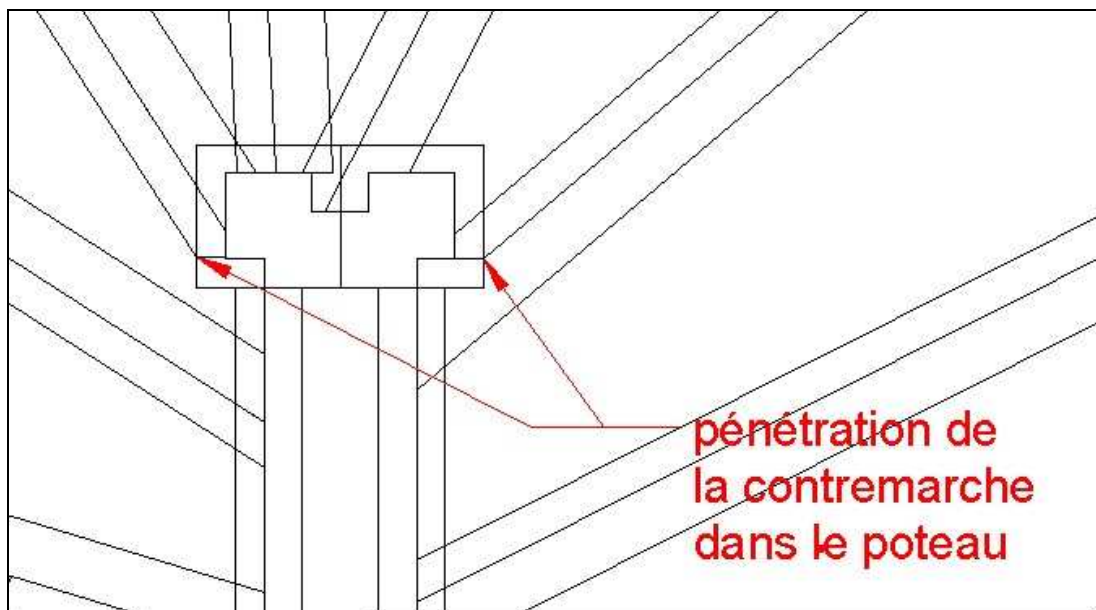
You define the depth of penetration of the steps and riser into the string with the « string board parameters » dialog box and the depth of penetration into the newel post is set in the “step parameters” box.

In the case of winders moving around a newel post StairDesigner will sometimes project the risers or the step nosing onto the string when it would be better to stop them at the newel post.

The drawing below shows 2 risers (in red) around a newel post that would be better stopped at their intersection with the newel post.



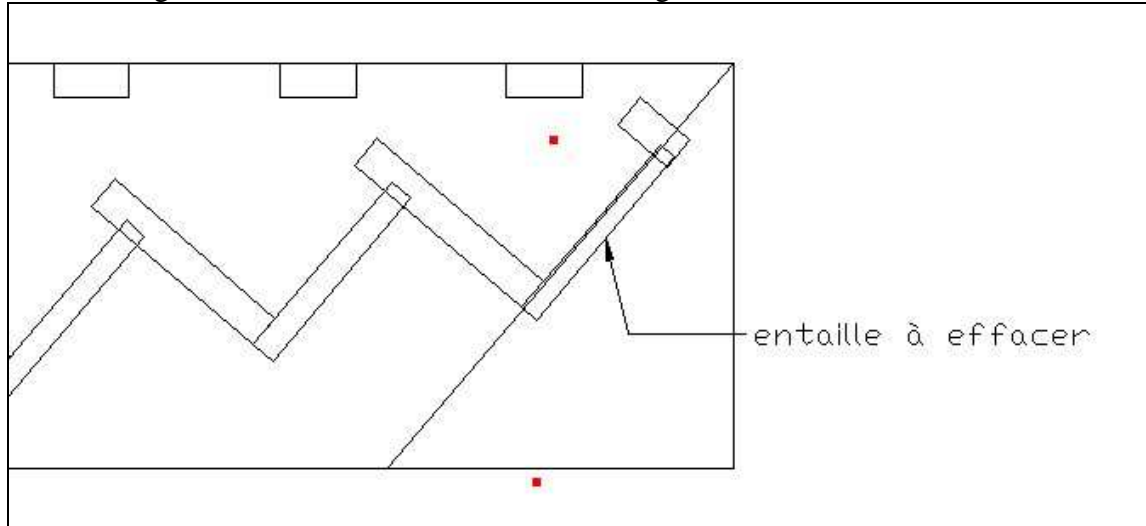
If the risers are stopped at the newel post the recess in the string is no longer necessary. The drawing below shows the risers stopped at the newel post:



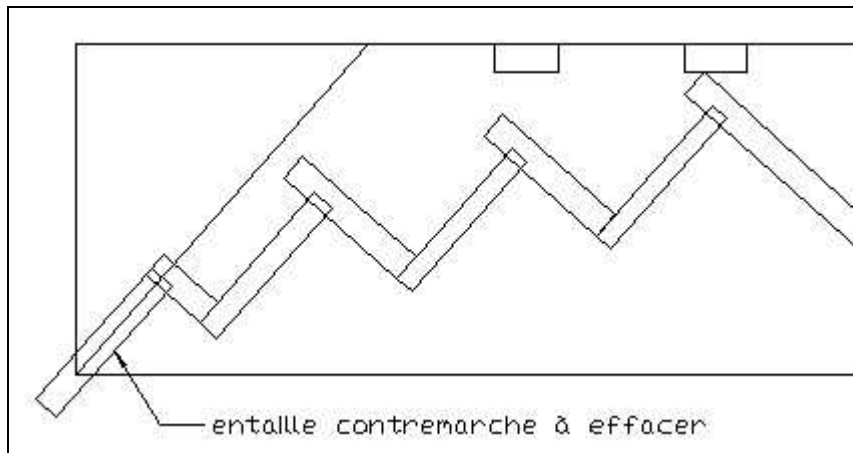
Although here I have modified the plan drawing the important point is to edit the 2D parts.

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You should erase the housing for the riser from the string boards and shorten the risers. When you're machining parts manually it's easy to mark out the risers by putting them into or up against the finished step and mark off the length and angles from the step. The drawings below show where to edit the 2 string boards.



Lower flight string



Upper flight string

Joints between cut strings and newel posts

StairDesigner is not very good at drawing the assembly details between cut strings and newel posts. As you can see in the 3D drawing below the cut string just goes through the newel post and there is no joint marked up in any of the DXF files.

The only way to deal with this is to mark the joints up manually. You have to take the distance of the joint from the nearest step nosing and edit the end of the cut string accordingly.



Stair Part Shapes

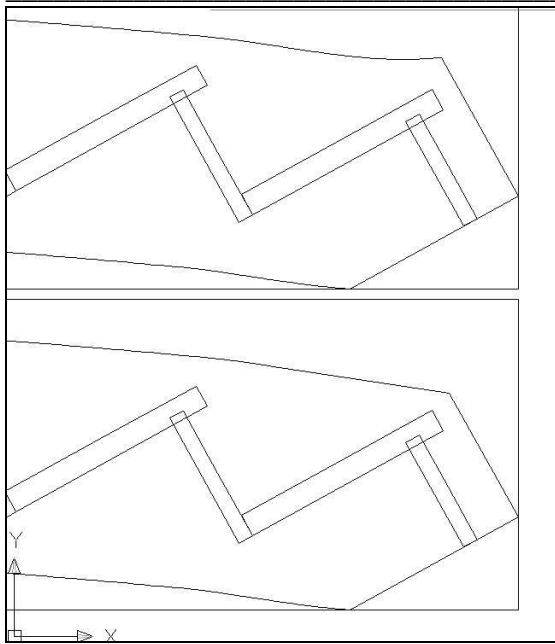
StairDesigner will automatically draw the stair components and calculate the shape of the strings and hand rails according to the position of the steps.

With straight steps there is rarely any need to edit the drawings but with curved strings and hand rails it happens that the curve can be significantly improved by manual editing. Luckily editing the string contour is fairly easy. The string outline is actually a polyline, to edit it, first explode it into separate lines. Note that the curves are actually small straight segments, the number of segments is defined by the "smoothing factor" parameter in the "string parameters" dialog box.

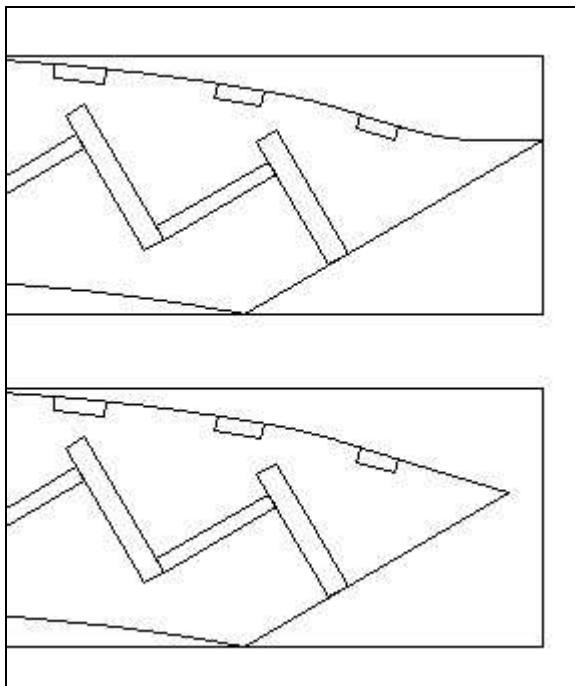
Below are 2 examples of a string board outlines edited:

The first example shows the shape given to the starting curve of a string by StairDesigner and a manual edit to give the shape a smoother flow.

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This drawing shows the shape drawn by StairDesigner at the upper assembly point of a curved string and the manual edit:



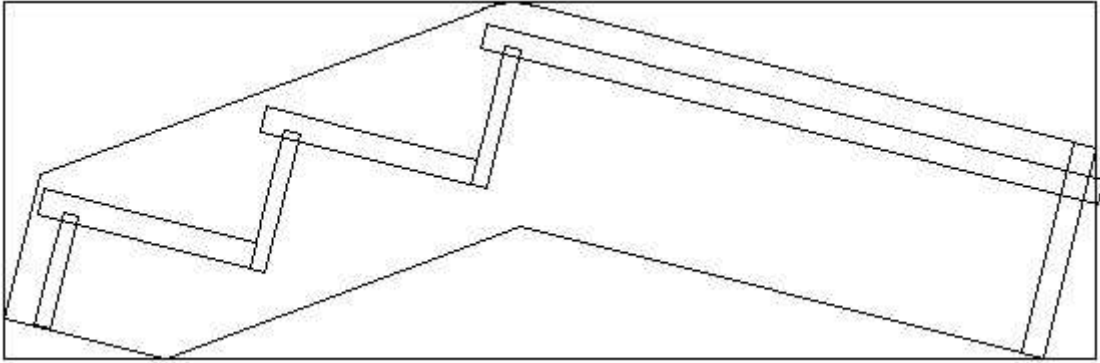
Editig shapes to optimize waste and off cuts

StairDesigner can often calculate strings as one piece where as in real life it would be easier to use an assembly of 2 or more parts.

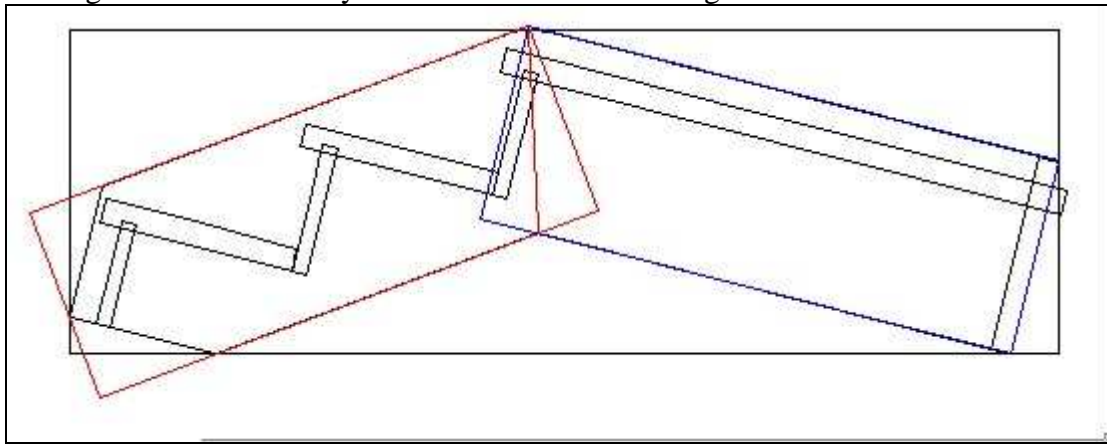
In the example below the string board is drawn in one piece that includes both the rising string and the horizontal string. This requires a very wide board and could be sometimes

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easier to make in 2 parts.



Here the StairDesigner drawing is edited to make the string by assembly of 2 different boards jointed together. In this way the boards are narrower and the string under the landing can be made in any convenient width according to available stock.



Things that StairDesigner just doesn't draw

There are some things that StairDesigner doesn't draw or calculate well.

The above example of cut strings and newels is certainly an example of one of the limits of this software.

Here are some of the others that I have come across.

Balusters or spindles on a cut string

On cut strings StairDesigner draws the balusters at fixed distances from the step nosing, when you put a starting newel post back from the nose of the first step StairDesigner continues to draw balusters in front of the post.

The screen capture below shows the extra balusters

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In this case it's simple to just erase the extra balusters in your CADD software.

Some elements are just not drawn by StairDesigner

Here is a list of elements that StairDesigner doesn't draw that you will have to draw up in an external CADD program:

- Curved risers
- Mitered risers and cut strings
- Volutes
- Boxed newel details
- Goose necks
- Handrail Easing
- Level balustrades on landings
- Mouldings and various ornaments

Using DXF files

Once you've got the DXF files optimised for your job you have to use them for mark up and machining. Here you have 3 options:

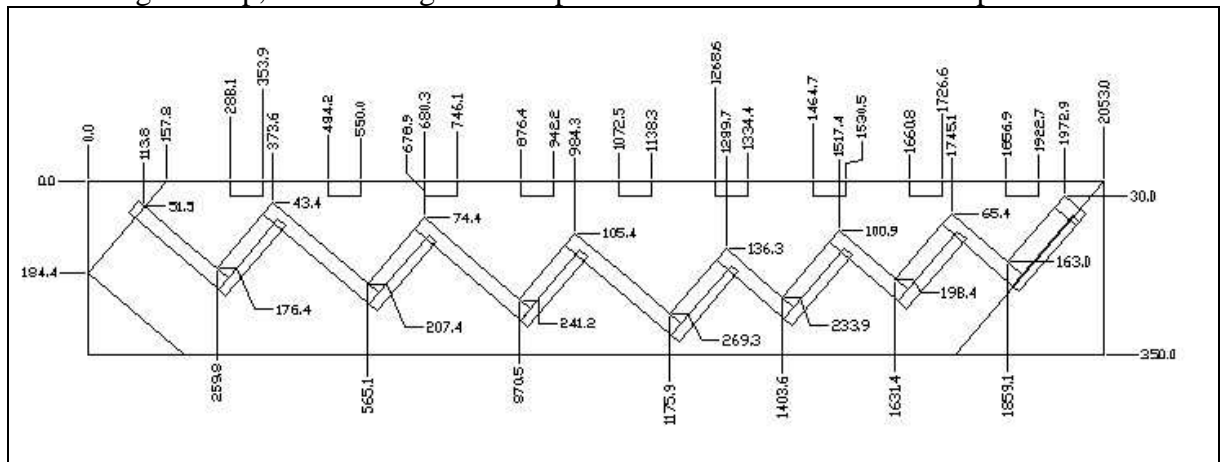
- 1) Add complementary dimensions to the 2D DXF files to mark up the wood by hand
- 2) Print out full size templates of each part that you can glue onto the wood
- 3) Input the DXF files into a CAM program to write machine code for a CNC router.

Complementary dimensions for hand mark up

Use this method if you can't get your drawings printed out full size.

StairDesigner automatically prints out a workshop document with all the parts dimensioned. But I find that for some parts like the strings a more practical dimensioning organisation is well worth the time setting up.

For an easy to read an accurate dimensioning system, I suggest using ordinate dimensioning with all the sizes marked up from a known fixed point on the original board. In the example below I've fixed the origin 0,0 on the top left hand side of the board drawn by StairDesigner and added dimensions using the "dimordinate" command in AutoCad. To not have to mark up every detail I have added a line from the step nose parallel to the risers intersecting with the lower step. This enables me to place only 3 dimensions to position a step. The position of the risers are marked out by routing out the step housing, assembling the step, and marking the riser position from its recess in the step



Preparing DXF files for use as full size templates

If you can get your DXF files printed out full size, you can gain time and precision by gluing down the templates onto the wood for marking up.

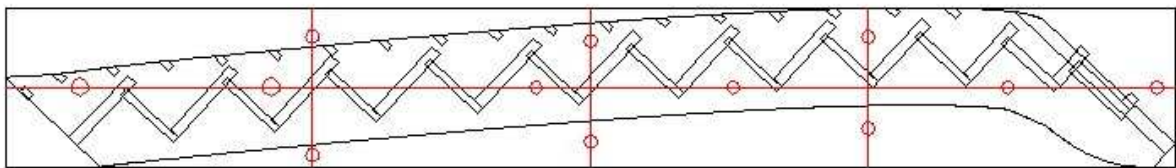
Where as this works very well for short parts like steps, longer parts like strings and handrails need some preparation.

The problem with the longer part is to keep the paper templates straight and true on the board.

To do this I draw on the template a series of straight lines at known distances that help locate the precise position of the template on the board.

The drawing below shows a curved string with the positioning lines marked out in red.

The paper is cut out in the red circles so that I can see the same lines marked on the wood.



The position and distance between the lines is of no importance, you just have to know where they are so as to mark the wood with the same lines. It's usual to mark one line in the middle of the board and crossing lines at 80cm intervals. Using positioning lines like this enable you to print out big templates in several sheets and line up the sheets very precisely.

Printing templates

If you've got a plotter you can print out your own templates. You don't need a big expensive plotter, just one that prints precisely. I use an old AO pen plotter that I picked up from EBAY for 80 euros.

The important thing is that print outs are precise and you have a good print length. In this way you do not have to separate the template into too many small parts. If you buy an old plotter you may have to calibrate it to get good precision.

For precision, use good quality paper that you keep in a dry place. Like wood, paper has an annoying tendency of shrinking and expanding with moisture levels, but much more than wood, so be careful not to let the templates hang around in an unheated workshop.

To avoid these problems you can also use polyester film that doesn't expand or shrink but is more expensive. Another advantage is that, as polyester is transparent, you don't have to cut holes to position the template. What ever you do don't use ordinary tracing paper that has phenomenal play when temperature and humidity changes.

If you don't have a printer you can use the services of a professional printer. In this case make sure that you give him the right file format. Some printers will take DXF files or Autocad file other will need HPGL or another file type.

Gluing the templates onto the wood

To glue the template onto the boards use a spray glue. Spray the glue onto the paper wait a couple of minutes and glue the template.

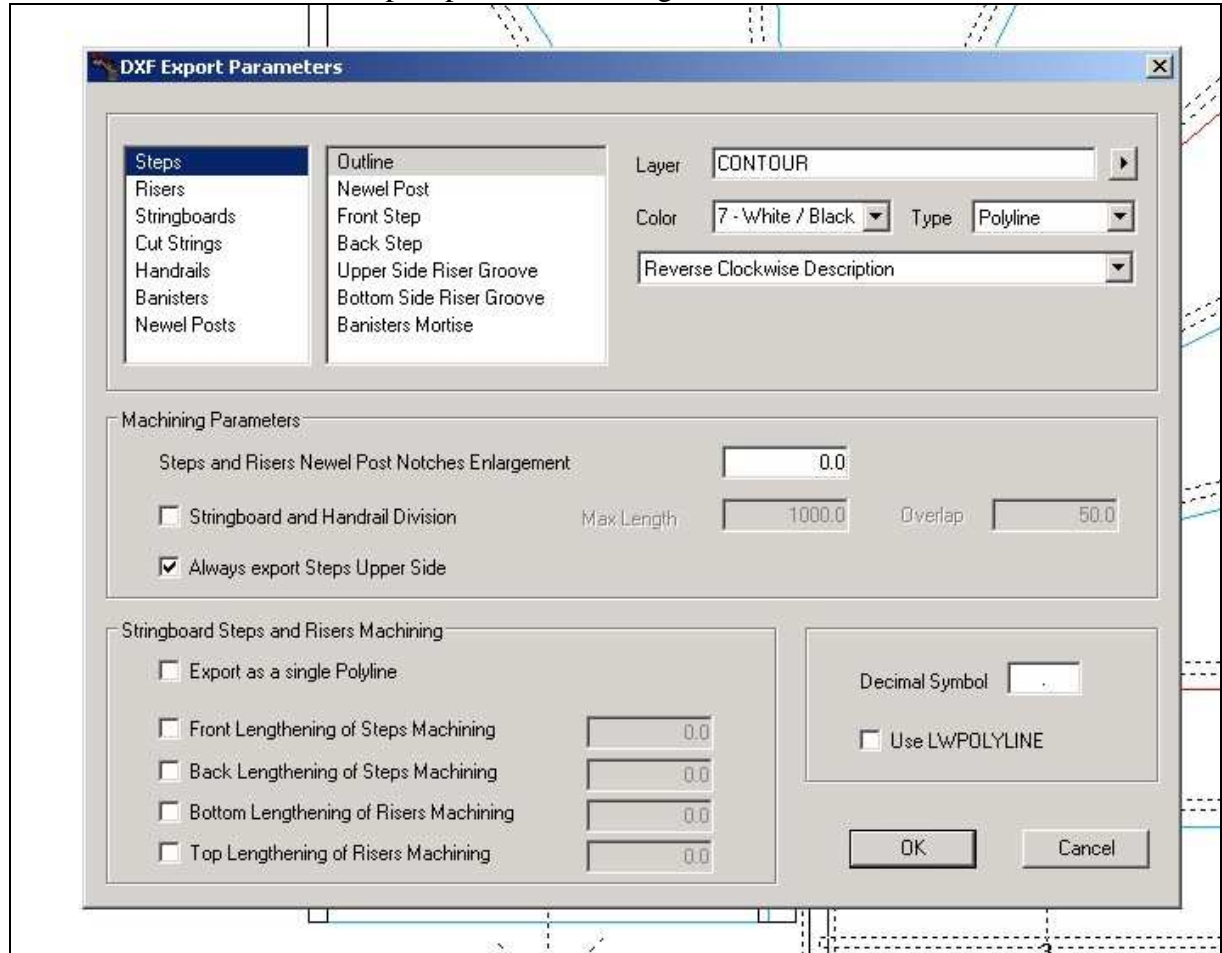
If after machining, if the template is difficult to take off the wood, use a heat gun to just heat up the paper and it will peel off easy.

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Using DXF files with you CNC route.

StairDesigner can organise the DXF output files to optimize them for your CAM program. For each part you can define a special layer colour and line type.

Here is a view of the DXF export parameters dialog box :



Please feel free to contact us for specific parameters to match your CNC system.

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