

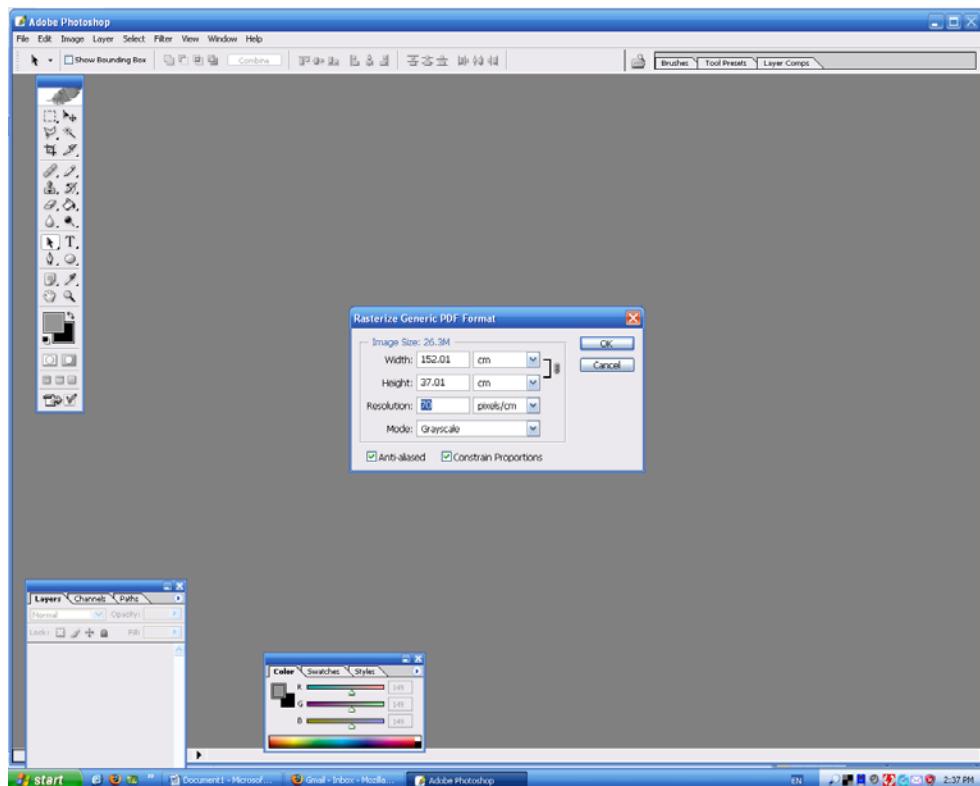
CREATING NEW SHIP DRAWINGS FROM EXISTING IMAGE FILES - PART 1

INTRODUCTION

The aim of this brief tutorial is to show a fast and easy way to convert an image (.bmp .jpeg .pdf etc) to a more accurate drawing using only 2 programmes. I use Photoshop and AutoCAD - there are others to use, and I will give a quick overview of these later. The method described here is accurate and fast, more or less detail can be added as required. Firstly, though, we must decide what the resultant drawing is to be used for. If it is to build a scale model, then a lot of the information on the original drawing will be superfluous. We only want enough information on our new drawing to allow us to proceed with the modelling. More detail can be added later. If, on the other hand, we want to produce a full drawing, then there are additional steps we can take to speed up the process.

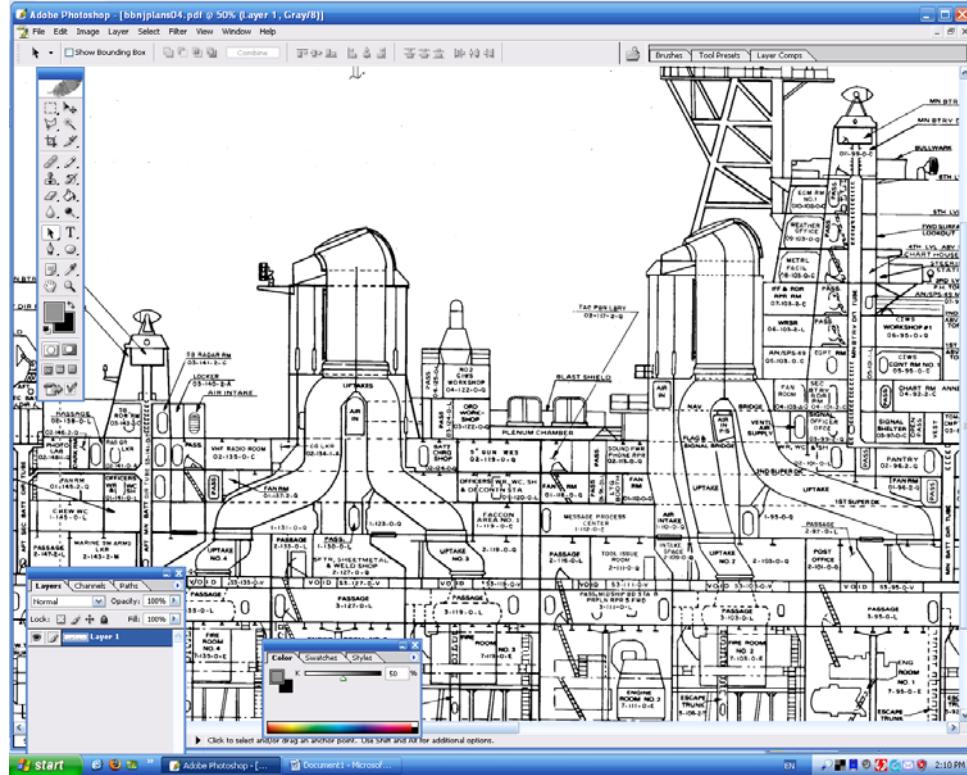
1 Prepare image for insertion into CAD package

Using Photoshop, import the image using the resolution deemed best for purpose – if using for hull lines, select **50 to 70 pixels /cm**, for all other uses 40 to 50 will do. The higher the number, the larger the resultant file size. (On modern fast computers with good graphics cards this is less of a problem than it was just a few years ago.)

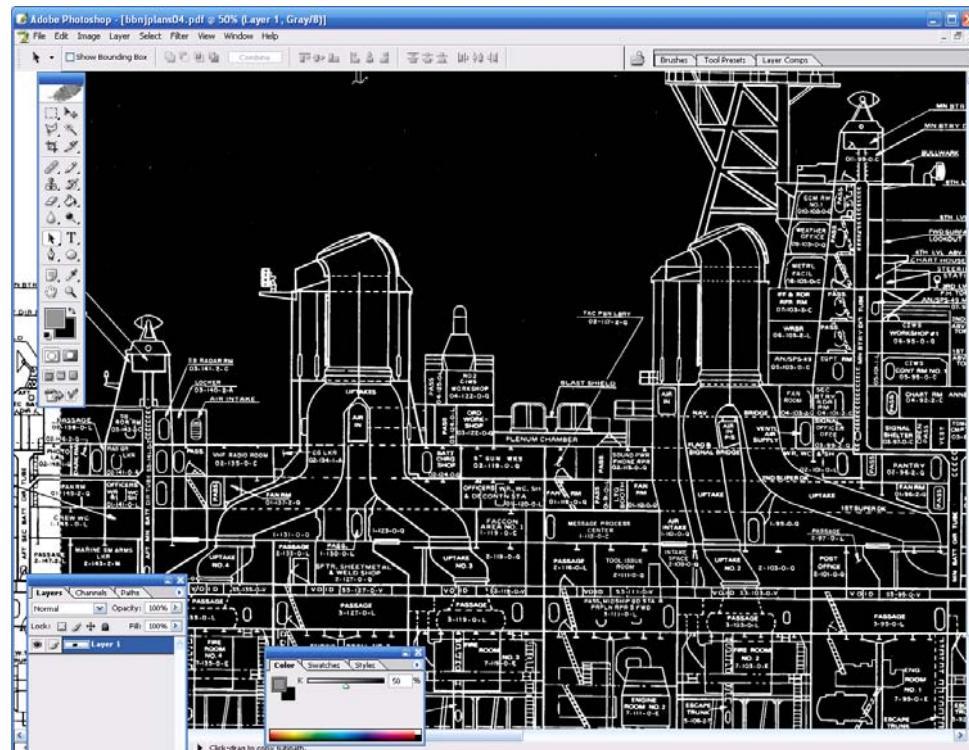


When the image is opened, inspect it very carefully to see quality of the lines and text. They should all be easy to read and clear. Do not bother with scaling, centering or squareness at this stage. Crop the image to show only the part that will be required for our new drawing. If needed, use Photoshop to despeckle and clean the

image up, though there is no point in spending a lot of time on this. If the original image was very "dusty" it might be easier to rescan it using duotone settings (if available) on your scanner. Make sure the image is easy to understand. A bit of careful work here will save time later on. The example below shows a corrected .pdf image.

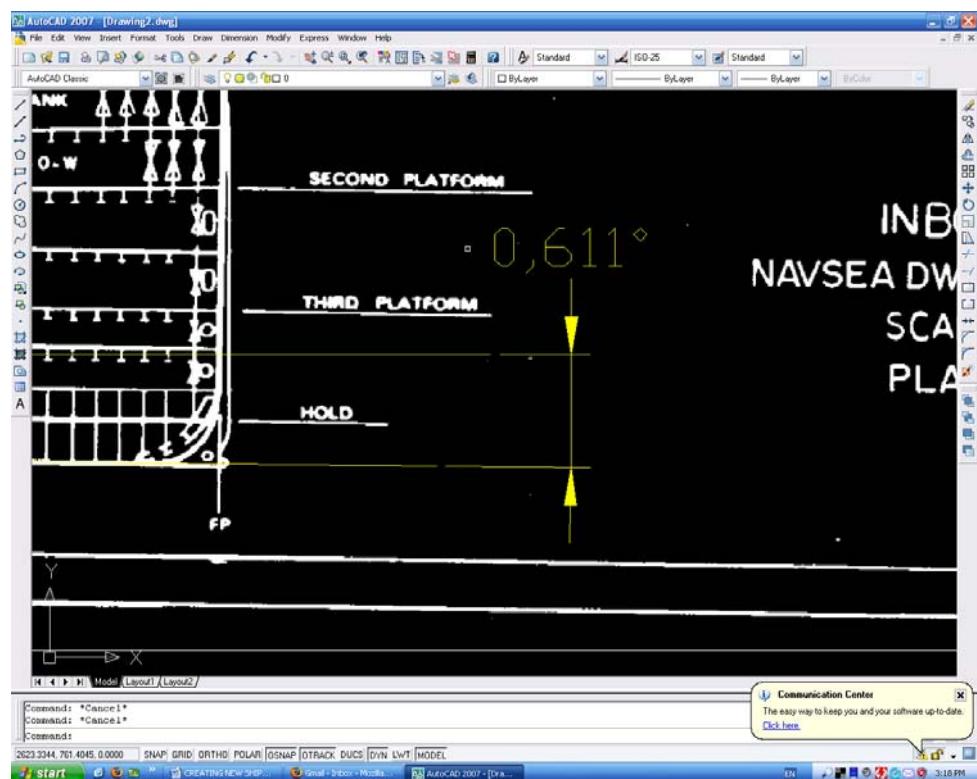


Next, we **invert** the image – (this changes black to white and vice versa). This will make the images easier to use in AutoCAD as we will add many reference lines and use the line colour to identify them. Have a final look at the image – it should look like that shown below – then **save** (usually in .pdf format, though AutoCAD can import other file types).



2 Insert image to CAD package

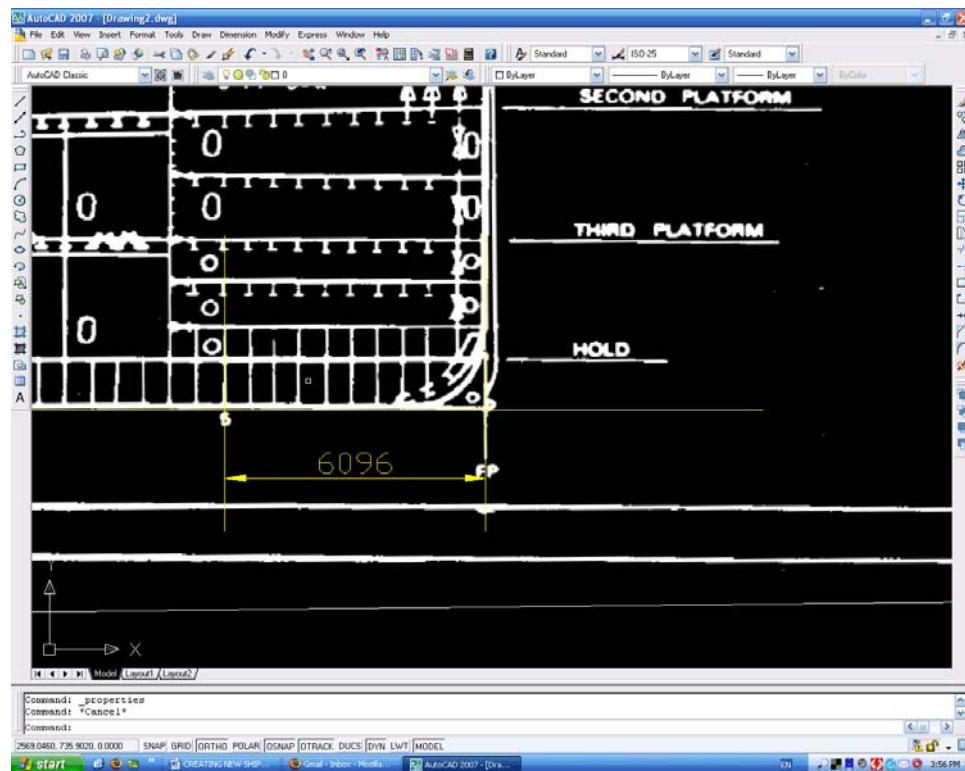
Open AutoCAD and insert the file using **insert, raster image reference**. Leave **insertion point, scale** and **rotation** at the default settings. When the image is inserted, **zoom** to extents and right click on image and select **draw order, send to back**. This ensures that all the new lines we draw will be visible over top of the inserted image. Next, we will rotate and scale the image. Draw an ortho **line** the length of the image along the base, waterline or wherever it is easy to see. Then draw another **line** closely following (over) a long line on the image. **Dimension** the angle between the two lines. On the example below, the image is rotated 0.611° anticlockwise off centre. **Rotate** the image by that amount to bring it back to being square.



We now have an aligned image, but not to scale. We now need to do a bit of easy maths. Using the **DI** command, (or draw an overlaying line), measure the distance between 2 known points. I always try to use station lines. Use the longest known line on the image where possible. In the example below, the station lines are at 4'-0" centres, so by drawing a line from the FP to the AP, (a real life distance of 215 stations) we know that the corresponding length of the line should be $215 \times 4 = 860$ feet. The measured AutoCAD line we drew is 1319.3006 units long. I use millimetres, so the line should be $860 \times 12 \times 25.4$ long, which is 262128 mm.

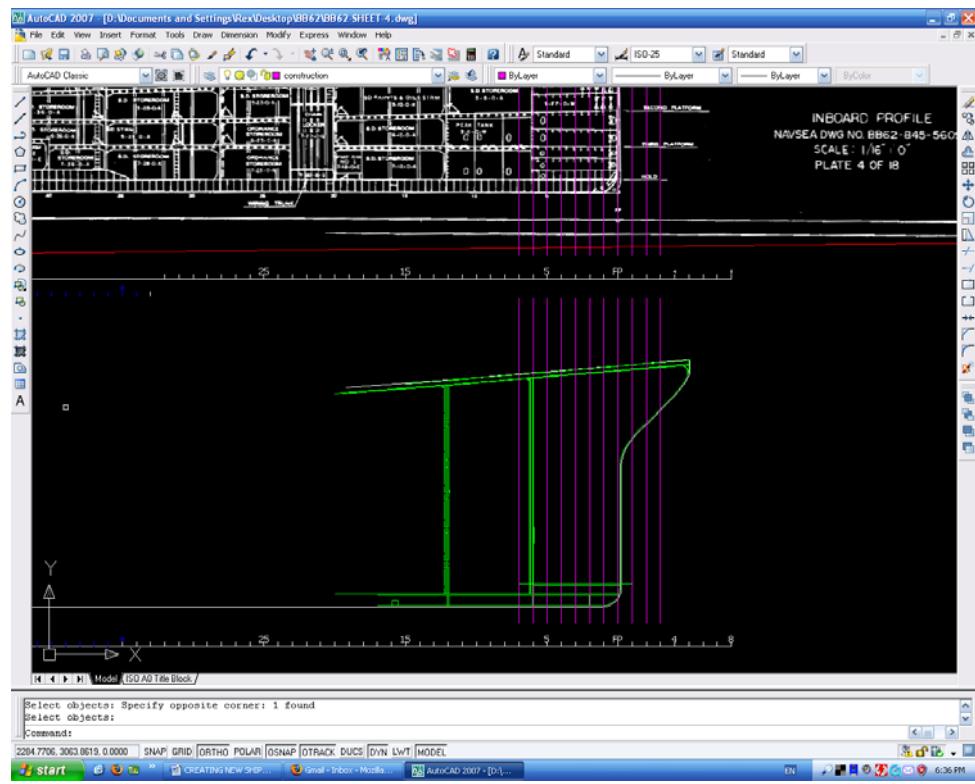
We therefore need to **scale** up the image by a factor of $262128 \div 1319.3006$, which is 198.687. The original drawing was drawn at a scale of 1/16" to 1' -0", so the printing and scanning process has changed the original drawing from 1:192 to

1:199 scales, which is quite a difference. After scaling up, we now have an image that is 1:1 (life size) to the real ship and square to the model space. As a final check, **dimension** a smaller known distance, in the example below I have dimensioned between the FP and Station no. 5, a distance in real life of $5 \times 4' - 0"$ (or 6096mm). We now need to **move** the image to a known point. I always use the bottom left hand corner of the image and move it to the 0, 0, 0 point in AutoCAD model space. At this stage I always **save** the drawing as "xxx alignment.dwg" and use a copy for my actual work.

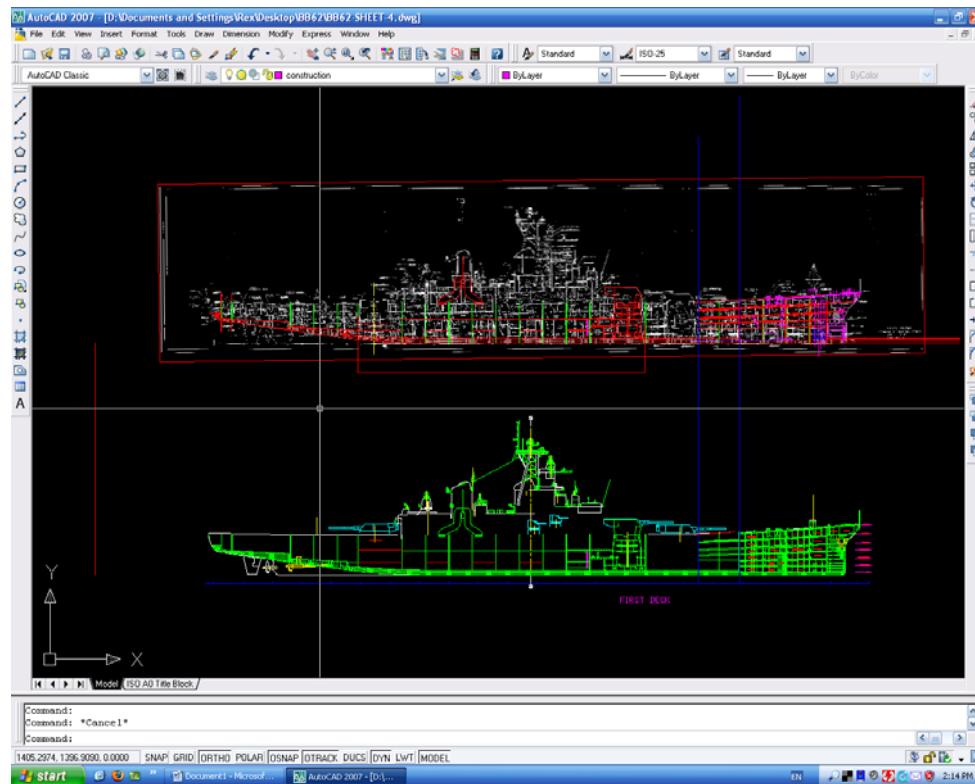


3 Draw Reference Lines

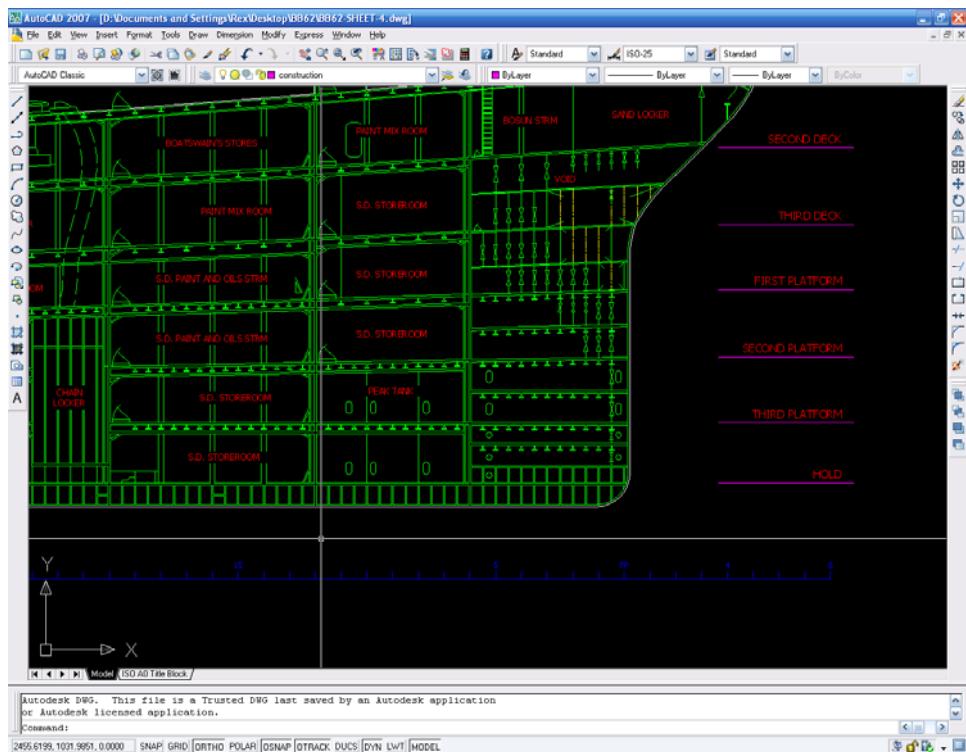
We can now start transferring lines from the original image to a new CAD image. I start this process by drawing all the station line positions just below the bottom of the image, and numbering them. Convert this to a **block** then draw a vertical line down the left hand side of the model space, this need to be long enough to let us copy from the top image to our new lower image. Copy the station line block to the new lower image using **from** and **to**.



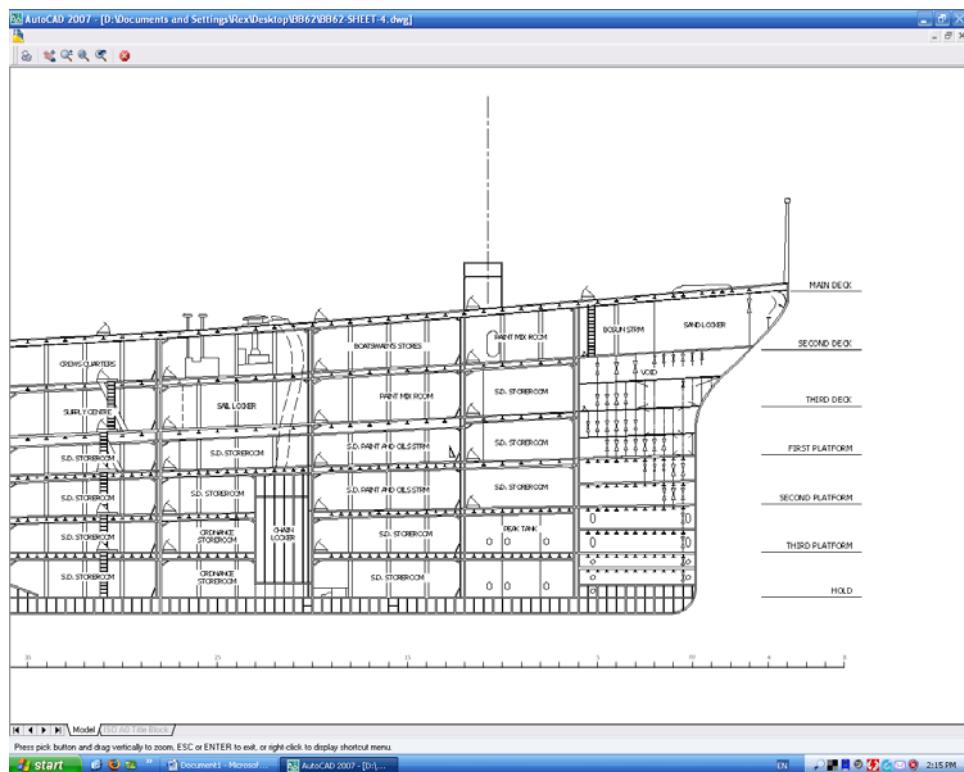
The purple lines in the example above illustrate this. It is then just a simple matter to overdraw the required lines on the inserted image and then copy them down to the new drawing. For hull lines, use of the **spline** command helps with curves. Below is a partly completed drawing illustrating the steps above.



How much information is transferred across will determine the complexity of the drawing. And here is a close up view of the work in progress



Finally, a close up of the printed version. With care and good draughting skills, the new drawing will be as good as the original, and a lot clearer to read. Remember that you are drawing in 1:1 scale, and that as the drawing is reduced for printing it can become too cluttered if you are not careful. The time taken using this method is considerably shorter than other methods that I have tried over the years, and there are added benefits which I will explain in later parts.



In the Part 2 I will guide you through generating a drawing of hull lines, which will introduce some tricks to help those of you who want the lines for a scratch built POF model.

As a matter of interest, the ship is BB62 – USS New Jersey, as at 1982.