

# Chestnut Pens



## Depth Mill Program Help

### Introduction

This help file is intended to explain the behaviour of the Chestnut Pens Depth Mill Program.

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## Program Overview

The program creates a low relief depth milled version of a bitmap file, wrapping the file around a cylinder or part cylinder and converting it to one of four formats. In three of the formats (DXF, STL & Wavefront OBJ) a 3D model of the height mapped cylinder is created. In the fourth format, a G Code output of the file is created to enable a 4 axis CNC machine to mill the depth map onto the cylinder.

## How To Use the Program

When you open the program you see the following window:

The screenshot shows the 'Depth Mill Program' window. It contains the following fields and buttons:

- Depth Map Picture File:** A text box with a 'Browse' button to its right.
- New DXF File (extension is changed for other file formats):** A text box with a 'Browse' button to its right.
- Wrapping Information:**
  - Location of Image on Wrapped Surface:**
    - Bottom Left X (mm):** A text box with the value '0.0'.
    - Angle Picture is wrapped (Degrees):** A text box with the value '360'.
    - Length of Image in X Axis (mm):** A text box with the value '42'.
- Work Information:**
  - Rotary Axis Name:** A dropdown menu with 'A' selected.
  - Z Value of nominal work surface (mm):** A text box with the value '7.5'.
  - Max Depth of Cut (mm):** A text box with the value '2.5'.
  - Feed Rate (mm/min):** A text box with the value '200'.
  - Clearance Height (mm):** A text box with the value '10'.
  - G Code Header:** A text box.
  - G Code Footer:** A text box with the value 'M2'.
- Buttons:** 'Create DXF', 'Create OBJ', 'Create STL', 'Create NC', 'Close', and 'Help'.

## File Names

Use the 'Browse' button to the right of the 'Depth Map Picture File' edit box, and search for the file you wish to use as a depth map. When you open a file, a suggested filename is made for the 'New DXF File', which is the old filename with 'Depth Mill' tacked on to the end. If this default name is not what you want for the output name, please edit it or use the lower 'Browse' button. If the bitmap opens successfully, the four 'Create \*\*\*' buttons will be enabled. The depth map file must be a Windows BMP file. The brighter the pixel, the deeper the cut that is made – basically this is a circular implementation of the Lithophane program I wrote earlier.

**Note:** The program will not let you overwrite any files when it runs, so please be aware of this.

Now, assuming we have loaded a bitmap file, it's time to go further:

Depth Mill Program

Depth Map Picture File  
 C:\www\Pens\Pen Making\cnc\Test\DV2 Head4.bmp

New DXF File (extension is changed for other file formats)  
 C:\www\Pens\Pen Making\cnc\Test\DV2 Head4 Depth Mill.dxf

Picture loaded and is = 168W x 189H Pixels

Wrapping Information

Location of Image on Wrapped Surface

Bottom Left X (mm)  Angle Picture is wrapped (Degrees)

Length of Image in X Axis (mm)

Work Information

Rotary Axis Name

Z Value of nominal work surface (mm)  Max Depth of Cut (mm)

Feed Rate (mm/min)  Clearance Height (mm)

G Code Header

G Code Footer

#### Location of Image on Wrapped Surface

This information tells the program how large the image is on the cylindrical surface and how far around it's to be wrapped. Try to ensure that the pixels machine roughly an even size in the X and A directions.

#### Work Information

The work can, at the moment, only be wrapped around the A axis. The A Axis is assumed in the program to be at Y = 0, Z = 0.

The Z Value of Nominal Work Surface defines the radius of the work.

The Max Depth of Cut (mm) specifies the maximum depth of cut, which corresponds to the brightest pixel in the bitmap.

The remaining data inputs only concern G Code output, with the feedrate being defined, the clearance height at either end of the work and the header/footer code. The header/footer data are shared between this program and any other Chestnut Pens G Code programs.

Now you have all the information you need to create the output needed.

**Output Information****DXF Output**

The output is of type 3D Face on Layer 'Chestnut'.

**STL Output**

An text STL file is created, with end closures being created in order to close out the shaped surface.

**Wavefront OBJ Output**

The cylindrical surface is group 'cylinder' and uses material 'cylindermaterial'. The surface is texture mapped. The end caps are group 'ends', using material 'endmaterial'. The ends are not texture mapped.

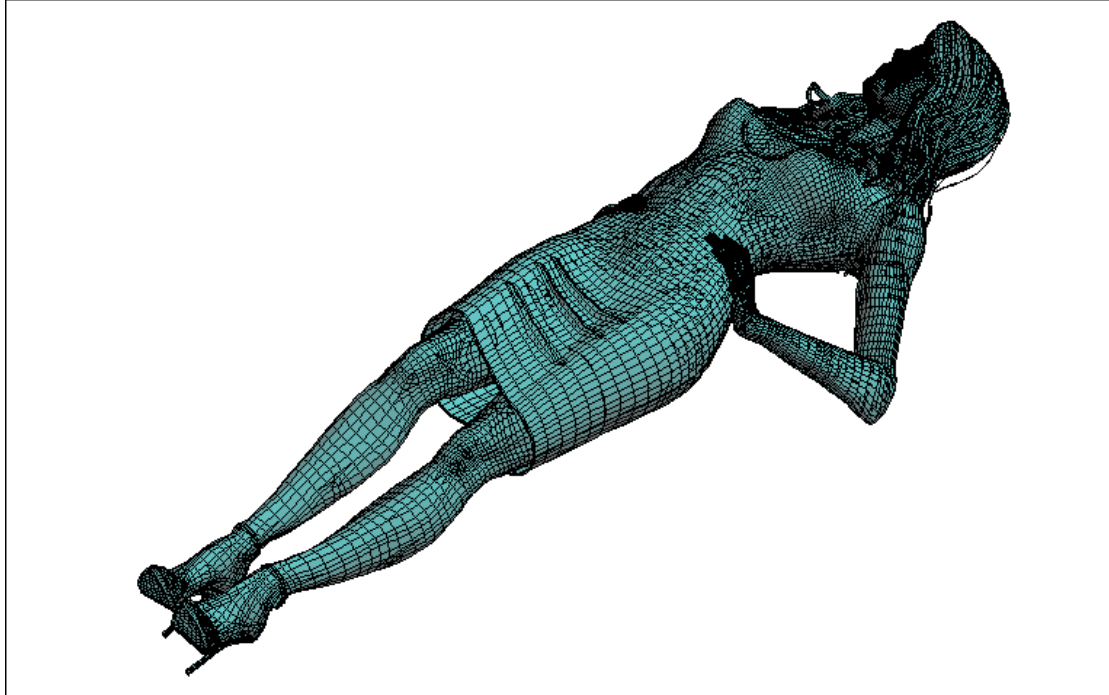
**G Code (NC) Output**

This output is aimed at Mach 3, and uses absolute millimetre co-ordinates only.

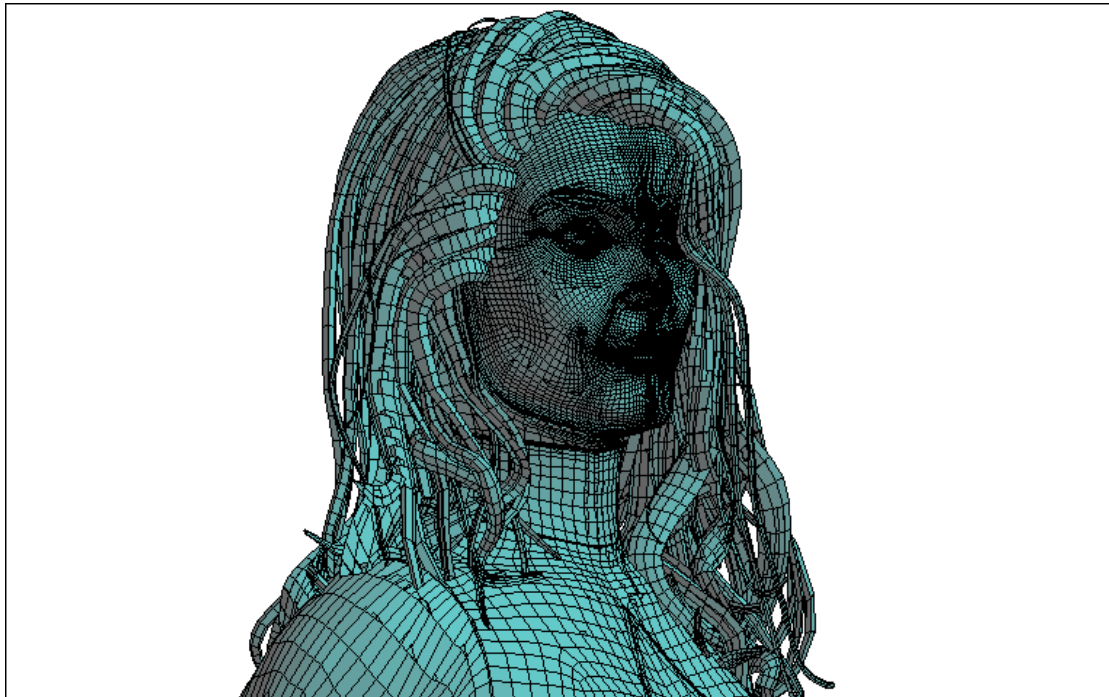
**Example**

This example uses only software available for nothing either on the web or on the Chestnut Pens Website.

First of all, create a height map. The height map can be created straight in a graphics package or from a complex mode in the Modelling Studio available on the Chestnut Pens web site. Here I'll use a model I happened to have from my figure animation interest. The figure is Glamorous Vicky 3. When loaded as an obj file into the Modelling Studio, the figure is thus:



Now to concentrate on the face:



To obtain a depth map, select:

View|Display Options|Elements|Show Edges (To switch element edges off) then

View|Colours|Elements|Depth Shaded

View|Colours|Elements|Element Colour and select black instead of teal for the fill colour.

Finally, switch off the black border to the window by making it white, by

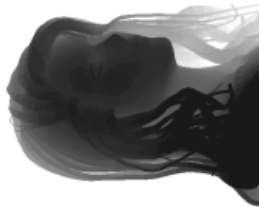
View|Colours|Image Border and select white.

The resulting depth map can be copied to clipboard by right clicking over the image and select 'Copy Model Image'.

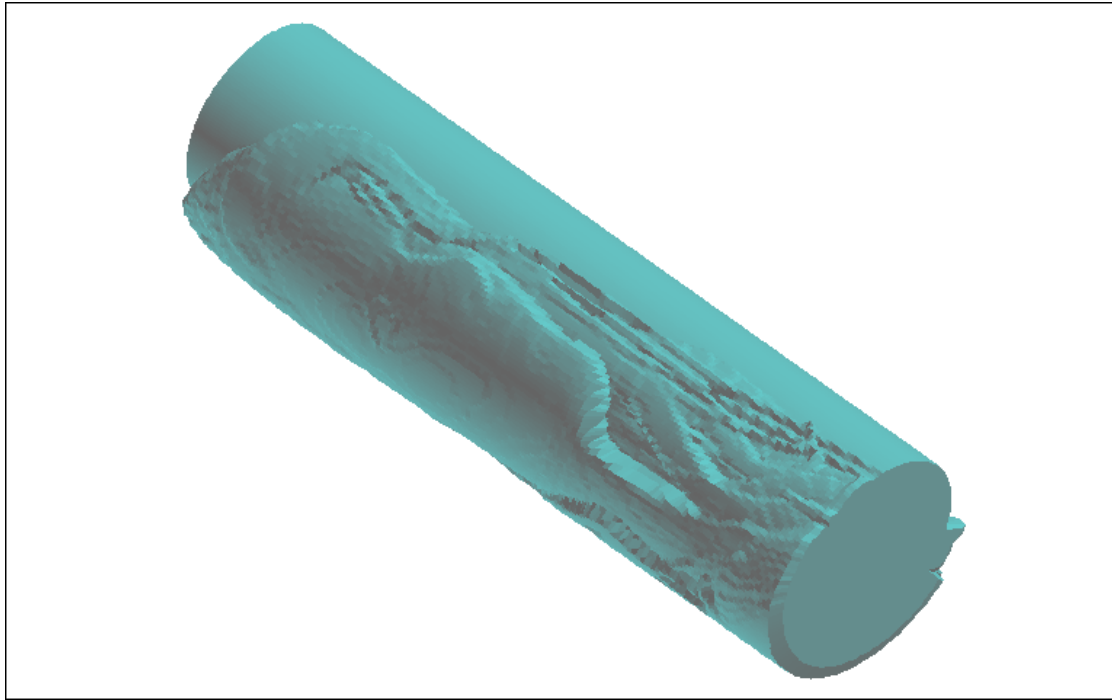
This will then give a depth map like this:



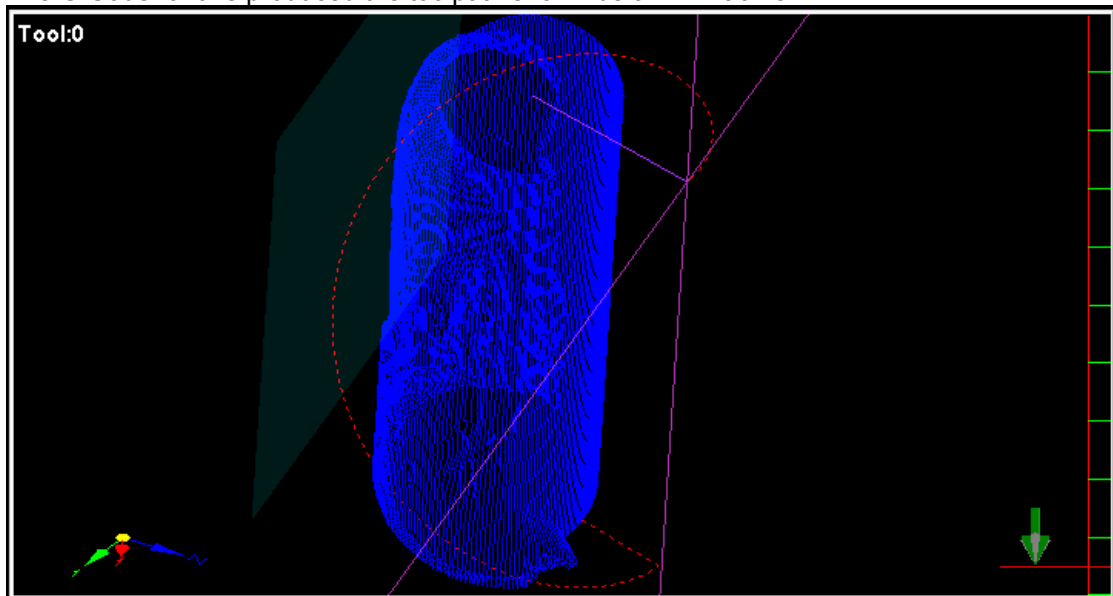
This image can be manipulated to increase contrast and cropped in a graphics package like GIMP. Finally, the axis has to be horizontal across the picture, so this picture was rotated by 90 degrees anticlockwise to get the final image:



This image was then used to create the following STL model (opened in the Modelling Studio) using the settings shown on page 3:



The G Code for this produced the toolpath shown below in Mach 3:



So now, you have a low relief depth milled version of the 3D model.

### **Problems/ Suggestions**

If you have problems with the program, or suggestions, please send them in an e-mail to:

[richardandtracy@yahoo.com](mailto:richardandtracy@yahoo.com)

Mark the subject line with something sensible to do with the program, otherwise they'll get deleted unread.