LaserDotter – A new MOP for CamBam
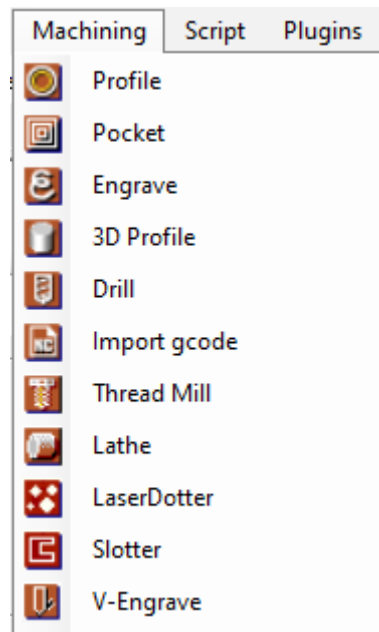
[Vers:1.2]

Purpose

This new MOP is intended for the task of laser engraving lots of small dots that might represent an image that has been processed to a set of small circular dots with depths, or diameters, matching the grey-scale level in the image.

Vers 1.2 includes the option (for Pointlists only) to create small "dots" at the X,Y,Z-value so that the G-Code file can then be process by the LaserConvert plugin to transform the Z-values into Speed (power) values for the laser. In this case the "dot" is drawn with a set laser power on the basis that the dot will be larger/darker as the power increases to emulate the required grey-scale.

Installation

The supplied DLL file should be copied into the CamBam plugins folder, and CamBam restarted.

The new MOP option should then appear in the tool strip as: , and in the Machining menu

Operation

This MOP *only* operates on a subset of Entity types:

- PointList:
  - Each point in the PointList is assumed to have its X,Y values sets its location in the X,Y plane, and the
  - Z value set to be the value of the diameter of the engraved dot at that point.
  - If the DotMode parameter is set to true then small dots are generated at the required depth so that the Z-value can be transformed (using the LaserConvert plugin) into a laser power level.
- Circle:

- o Each circle is centred at the required X,Y point
- o The diameter of the Circle is set to the diameter of the required dot at that point
- Polyline (& PolyRectangle):
  - o The Polylines that represent approximations to Circles.
  - o The Polyline centroid (X,Y) defines the centre of the engraved dot.
  - o The diameter of the engraved dot is taken as the average of the X and Y-extents of the Polyline.

PointLists might be generated from an image in various ways, a most convenient way is to use the Cambam Semitone plugin (URL: https://cambamcnc.com/forum/index.php?topic=6927.0).

Other software tools (e.g. https://www.evilmadscientist.com/2012/stipplegen2) may generate Circles or Polylines (vectors that approximate circular dots) from images, that can be exported as SVG or DXF files. DXF files might represent the circular dots as Polylines, Lines or even Splines. It would be judicious to Join all of these Entities together to form a minimal set of Polylines. The Polylines do not have to be Closed

One or more items can be defined and selected, then the MOP created. The key MOP parameters to be set are:

- **Clearance Plane**: Default is set, though a small +ve value is generally suitable for laser engraving (say 0.1 mm).
- **Target Depth**: Default is set -0.1mm, it should be a small -ve value that can be used by the Laser Postprocessor to turn the laser ON/OFF.
- **Feed rate**: the required feed rate.
- **Spindle Speed**: assuming the spindle speed PWM is used to set the laser power
- **Step Over**: Default is set to 1.0, but it could be varied to get required effects.
- **Laser Width**: the width of the laser beam or actual engraved width. This will vary with the laser and the stock material (default is set to 0.2 mm).
- **Dot Mode**: *Only used if the selected entity is a PointList*. If **false** (default), the MOP generates small circles of the required diameter that are then to be "pocketed". If **true**, the MOP generates "dots" at each point at the depth of the Z-value. This G-Code file must then be converted using the **LaserConvert** plugin (https://cambamcnc.com/forum/index.php?topic=8742.0) using the Speed mode to replace the Z-values with a Speed (Power) so that the laser power is varied as a function of the actual Z-value. Each "dot" is then produced using the required laser power level.
- **PostProcessor** (in Machining Parameters): this should be set to match your laser machine setup, to introduce any required commands into the G-Code file to activate and control your laser.

Notes
- It does take some time to produce the cutting paths, for image with some (150x150=22,500) points it takes about 13 mins to compute all the cutting paths on my PC.
- Importing DXF files that contain large numbers of circles or polylines may take some time.
- The estimation of machining time is necessarily only approximate. It assumes an average rapids rate of 1000 mm/min.

Versions

Version	Date	Notes
1.0	20/12/2010	• First version for testing and evaluation
1.1	21/12/2021	• Machining time estimate provided • Cache Conflict warnings removed – always use new values.
1.2	10/2/2021	• Added dotting capability for PointLists