CAD-CAM SOFTWARE PROBLEM WHEN DRAWING THREE-DIMENSIONAL SCULPTURES SURFACES

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Abstract

This paper presents software CAM (Computer Aided Machining) process oriented and geometry-oriented CAM software. There are a total of several thousand software capable of generating numerical control machining trajectories.These include AlphaCAM, which is used for the production of different types of components, from simple to complex 5-axis. In AlphaCAM development focus was on providing productivity, safety and flexibility.

Key words: sculptures surfaces, cad-cam, drawing, AlphaCAM.

INTRODUCTION

Current software approaches can be grouped into two categories: software CAM (Computer Aided Machining) process oriented and geometry-oriented CAM software. The first category takes into account aspects such as process efficiency tools and processing, optimization and control of complex processes of change tool.

Geometry-oriented CAM systems take into account the geometry of complex geometries such as processing, handling of large CAD models or routing process conditions by geometric conditions. In the future, however, it is expected that advances in hardware to reduce the differences between these two types of systems. As new features are added to these systems will evolve toward each other, but will maintain the fundamental procedural or geometric. Therefore, no one can express the overall quality of a particular software, but only effective in specific cases requiring or certain capabilities of the software.

MATERIAL AND METHOD

There are a total of several thousand software capable of generating numerical control machining trajectories (Sebe, 2004).

Fig. 1. Processing balsa

LICOM AlphaCAM is a complete CAD/CAM for Microsoft Windows. By offering total integration with other systems and connect to any CNC machine, the solution LICOM AlphaCAM CAD/CAM total (www.delcam.ro, www.artcam.com/industries/woodworking/index.html, http://www.artcam.com/, www.heidenhain.de).

AlphaCAM

AlphaCAM is the core program of the full range of programs designed for the woodworking industry. AlphaCAM is used for the production of different types of components, from simple to complex 5-axis. In AlphaCAM development focus was on providing productivity, safety and flexibility.

AlphaDOOR is a new program that module AlphaCAM door. Allows door manufacturers to benefit from the most sophisticated CAD-CAM use on Microsoft Windows. AlphaCAM seamlessly integrates with any production control software and all kinds of machinery.

Fig. 2. Example 1 AlphaCAM program

Fig. 3. Example 2 AlphaCAM program

AlphaSTAIR

For many, the production scale was considered a dark art. This is because the required skills and knowledge passed down from generation to generation. Launching the latest product from LICOM AlphaSTAIR program has totally changed this view. AlphaSTAIR offers companies a complete know-how of the product, making it possible to design, cost calculation, quotation and production using a single program, the philosophy spirit LICOM, easy to use and completely (www.delcam.ro, www.artcam.com/industries/woodworking/index.html, http://www.artcam.com/, www.heidenhain.de).

Fig. 4. Example 3 AlphaCAM program

RESULTS AND DISCUSSION

Cycles SL

SL cycles allow processing of complex contours. The outline can be decomposed in contour (maximum 12), islands and pockets may form a sub.

Each sub is defined in a subprogram. In these subprograms are allowed coordinate transformations, but advances F and M functions are ignored. NCC recognizes a pocket if the tool path falls within the contour, for example, if contour processing occurs clockwise beam correction G42 (Ganea, Ganea, 2000; Warkentin et al., 2001).

Similarly, an island is recognized if the tool path falls outside the contour, for example, if contour processing occurs clockwise beam correction G41 (Marciniak, 1991).

The work plan must be defined in the first block, which contains the coordinates of subprogram and the subprogram must not contain tool axis coordinates. The tool will bypass the islands from a safe distance. Thus, a surface can be increased by adding pocket to another pocket, or can be minimized by adding an island (Vickers et al., 1993).

Cycle G37 is used to define complex contours, obtained by the reunion, intersection or difference of simple contours, the latter being defined as sub.

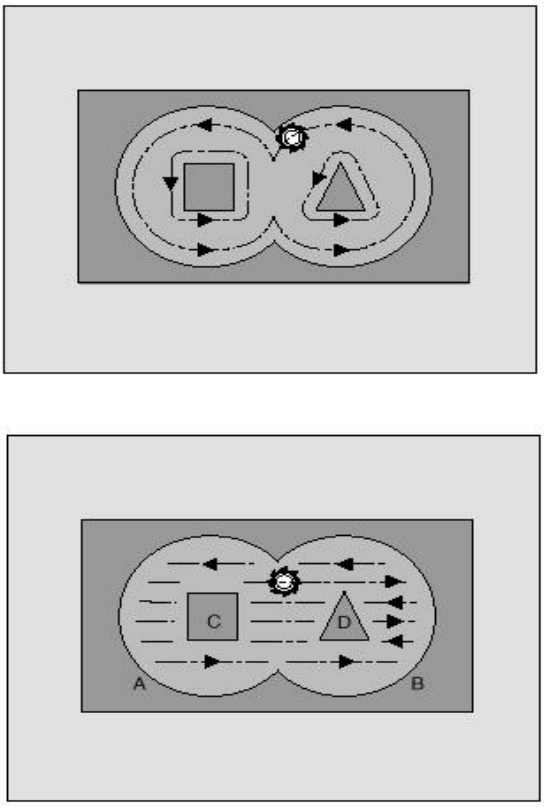

Fig. 5. G57 roughing cycle of complex shapes pockets

Cycle G57 is used for roughing pocket (complex) tool enters the material first, roughing outline, then moves parallel to the axis or at an angle, roughing inside pocket.

Cycles G58 and G59 are used to finish the contour pocket in clockwise direction G58 and G59 in the trigonometric direction (Ganea, 2010, Ganea, 2009).

The category SL cycles come and cycles G120-G124, similar to those described above but with an additional control surface quality obtained (Ganea, 2010).

Cycle G126 allows the processing of open contours, where the starting point is different from the last. It provides processing advantages over using positioning blocks: CNC monitors the operation preventing subtaierile, can be made more passes, roughing, finishing, which increases processing speed (Ganea, 2001).

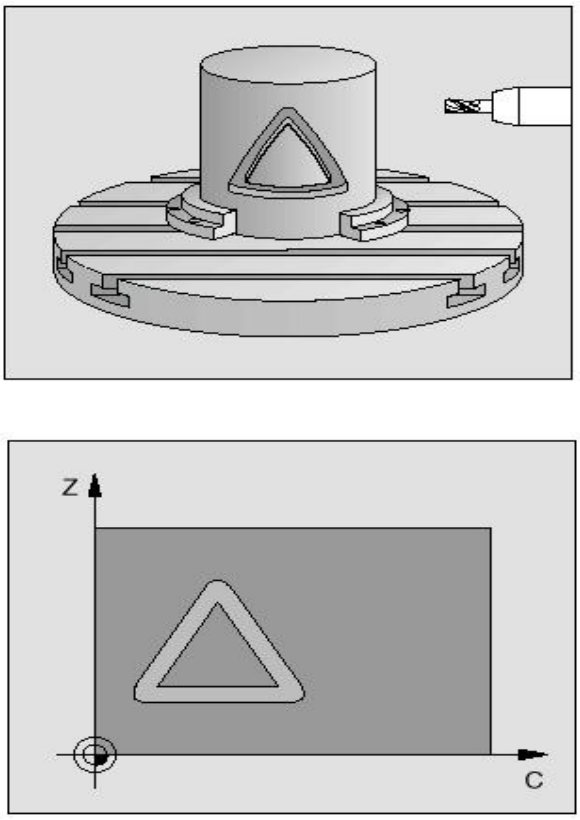

Fig. 6. Cycle G127: processing of cylindrical surfaces

Cycle G127 allows programming a contour in two dimensions and then winding it on a cylindrical surface for processing (if the machine allows). The contour is defined as a sub-program using G37. It will contain

details of a linear axis and a rotation, but all can be entered in mm. The tool must be perpendicular to the axis of rotation and the cycle does not work on a tilted working plane (Ganea, 2003).

Specific types of tools and processes

This includes the following tools:

- Cylindrical cutter with ball tip;
- Conical cutter with ball tip;
- Thor milling;
- End mills with corner radius of rounding (Ganea M., 2004).

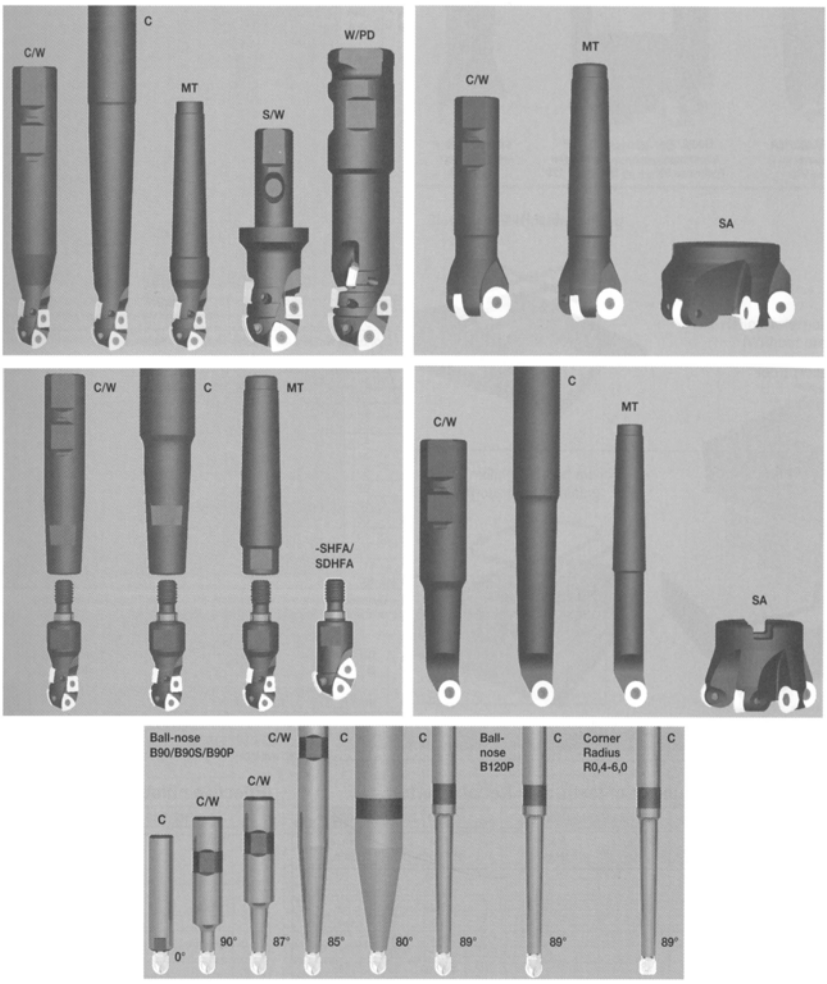

Fig. 7. Different tools milling dimensional surfaces

Dimensional surface treatment processes used are:

- Milling roughing;

- Finishing the contour milling;
- Heat treatment of the surface;
- Correction;
- Superfinish.

CONCLUSIONS

For rough milling and finishing respectively contour tools are reinforced with inserts of hard material, with cooling through the spindle directly to the cutting edges.

If grinding using grinding stones of the same shape as the milling tools (finger or thor), with the same spherical tip radii or Thor, but working at high speeds grinding. Therefore processing head has electrobrosa with specific high speeds grinding.

Superfinish is through processes that vibropolishing, polishing, etc., using appropriate tools, mounted on the main shaft of the same head that is made with the same finishing and surface scanning methods.

The molds for plastic injection necessary roughness sometimes requiring super finishing.

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