ISSUES ABOUT PROCESSING OF THE WOOD CARVING SURFACES IN 5 AXIS CNC

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Abstract

The novelty of the field, how to address the problem, development and iterative trials, using a car recently created retrofitted enough in the software, collaboration with other institutions, all make this work to fall within advanced research, combined with advanced engineering. Using computeraided manufacturing is a step forward in designing competitive processes technically and economically. The trial design is considered as an activity based on inference, intuition, experience and creativity. Through information technology means it is possible to gradual transfer the experience, deduction and induction from design engineer CAD system, becoming an intelligent system.

Key words: sculptures surfaces, wood, CAD-CAM, CNC Fanuc

INTRODUCTION

This paper addresses a new technological level in CNC computeraided machine tools, namely one entitled "Five Axis Machining" from the perspective of woodworking, referring to the technological perspective on extension of current technology to the wood towards the concept of 5-axis simultaneous generating (Ganea, 2010).

The concept of "processing 5 axis", the newest are and most advanced machine tools concept in field version must be promoted for use in 5 axis CNC machine tools by small and medium firms (Ganea et al., 2000, Ganea, 2010, Lustun et al., 2014).

Drawing programs for CNC machining parts with complex surfaces, dimensional would be extremely difficult without the above techniques (Marciniak, 1991, Yoshimi, 2008, Jain, 1989).

Products CAD / CAM provides the opportunity to draw up programs for the processing equipment on the market. These software packages allow trajectory generation tool center and a complex simulation of the machining process in which movements can be tracked mobile machine elements required in the manufacturing process (Derecichei et al., 2013, Lustun et al., 2014).

MATERIAL AND METHOD

Experimental research of this paper were conducted in the laboratory of the University of Oradea, in 2014, the machining center TMA-AL-550

(5-axis simultaneous), flexible cell component described below (Ganea, 2010, Derecichei et al., 2014).

TMA AL 550 car manufactured in Italy in 1990 was modernized and extended to 5-axis machining center simultaneous and integrated into a flexible manufacturing cell robotic (Lucaci et al., 2014, Lucaci et al., 2015).

TMA AL flexible cell 550 of the computer integrated manufacturing laboratory of the University of Oradea, Faculty of Engineering and Technology Management suite is an achievement of the University of Oradea, fully retrofitting, fig.1 (Ganea, 2010).



Fig. 1. Flexible cell TMA AL 550

RESULTS AND DISSCUSIONS

Presentation of technological equipment

Roughing operations wooden blank is performed in 3 axis CNC and finishing operations are obtained with the use of 5-axis simultaneous CNC (Lucaci et al., 2013).

After obtaining post-processing program Siemens NX 7.5, which runs on AL 550 TMA- Fanuc 30i car, we can proceed to transfer the program to the memory stick's on CNC equipment (Derecichei et al. 2014).

In fig. 2 shows sequences of CAD software:

*X -271.8895 *X -18.1384 *Y 8.3396 *Y 17.1105 *Z -68.2814 *Z 263.7809 *B 58.8733 *B 58.8733 *C 116.0120 *C 116.0120 MACHINE DISTANCE TO GO *X -463.6085 *X 0.0000 *Y -272.0044 *Y -0.2725 *Z -187.8714 *Z 1.4571 *B 58.8733 *B -0.6563 *C 116.0120 *C 0.1870	PROGRAM
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Fig. 2. Sequences runtime software

Fanuc 30i CNC in equipment and related programs were implemented so that gradually, as the car is running various papers, make database software of the machine (Catia, 2014, Derecichei et al., 2013).

Sequences during processing

It drafted the procedure CAM, simulation technological steps, going through phases of roughing, finishing and CNC 5-axis simultaneous processing (Derecichei L. et al., 2015).

CAM program over overlapping model, a simulation was performed in real time and at scale 1: 1 the entire processing (SprutCam 8, 2014).

In a 2nd variant was developed postprocessing CAM software and then as a result of post-processing program part (function G) to drive TMA-AL-550 / Fanuc 30i using the second soft CAM (Siemens NX 7.5, 2014).

Model car, CAM technology, post processing were applied in making concrete milling machine blank wooden TMA-AL-550 in Advanced Manufacturing Systems Laboratory at the University of Oradea.

In fig. 3, 4, 5, 6 presents the sequences of the workpiece during processing.



Fig. 3. Sequences during processing (finishing 5-axis)



Fig. 4. Sequences during processing (finishing 5-axis)



Fig. 5. Sequences during processing (finishing 5-axis)



Fig. 6. Sequences during processing (finishing 5-axis)

The paper was selected processing model "panda", as it has several "fins" and must take into account that they do not break the CNC 5 - axis

simultaneous processing (Derecichei et al., 2014).

The ribs are temporary technological components to reinforce breakables piece during processing and after finishing processing is eliminated either by machine or manually.

CAD - CAM technology easily enables these consolidations rib.

The approach to the problem, iterative development and testing, the use of a car retrofitted recently created enough in the software, collaboration with other institutions, all make this part of work to do advanced research, combined with advanced engineering.

From the perspective of future research, in technological terms, extension 5 - axis processing can apply to more delicate cases:

- Artwork damaged wooden scanned, repaired virtual restoration;

- The processing of furniture is a quantum leap from using processing method 3 axis CNC 5 axis CNC.

CONCLUSIONS

In the woodworking field CNC watermark used in surface processing normally ornamental carving is done by hand or by copying milling machines, in which case it is necessary to creating the templates. Artwork, restored wooden items can be modified with advanced CAD-CAM procedures in cyberspace and will later be processed into simultaneous 5axis CNC.

Integrating this technology is performed in workshops with advanced technology for both wood and metal, because the investment cost. The quality of the parts obtained by milling, including the wood is high and outperforms the current manual processing.

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