Abstract submission
Guidelines for the abstract

To submit the abstract, please use enclosed template. Please follow the given guideline for each part inside the template. Use Times New Roman. For example the title is bold, 12 Pt. and centered.

The figures, tables, … are centered. Please don't change the spacing and the margins.
Include full name of authors, institutions, postal and e-mail addresses.

Contact information:

Main author: Lars Blomqvist, Linnæus University, 351 95 Växjö, SWEDEN

E-mail: lars.blomqvist@lnu.se

Abstract

Title: Contact free measurement of complex shapes in the wood industry

Authors: Lars Blomqvist, Jimmy Johansson, Dick Sandberg

After completion, please send this page and the abstract to:
parviz.navi@bfh.ch

Contact free measurement of complex shapes in the wood industry

Lars Blomqvist[1], Jimmy Johansson[1], Dick Sandberg[1]

[1]Linnæus University
351 95 Växjö
SWEDEN
Jimmy.johansson@lnu.se

Abstract

There is an increasing need to update and correct information about product geometry in the wood manufacturing industry. Changes in machinery or personnel can be the cause of that need. Manual measurement takes time and different ways of digitizing the geometry of the products have therefore been developed. In this study, two methods have been tested together in order to determine the position of a product in relation to the processing machine, and to optically scan the product geometry. The aim was to identify and evaluate methods to digitize product geometry into a CAD-model for the wood industry. The seat shell measured was fitted in the CNC-machine where the processing later would be performed, figure 1.

Figure 1: The seat shell used in the study.

The form of a seat shell changes when it is fitted into a machine. Therefore this seat shell was measured when fitted, since the result should be used for future processing. One of the methods, 3D-coordinate measurement, gave the coordinates of pre-placed markers used to determine the position of the product in relation to the machine. Measuring points were indicated by placing markers in the form of circular stickers on the seat shell and the machine. Reference objects were placed around both seat shell and machine. Photographs were taken from different angles and associated software distinguished the coordinates of all the markers. The second method, optical scanning, is chosen to get surface coordinates, i.e. a very large number of object points over the surface. Through associated software, information from

the two methods resulted in a surface model, from which contour lines then were obtained. It was required, however, to adjust certain coordinates manually in order to avoid getting uneven contour lines. The processing of the contour lines was based on assumptions made from the surface model. Furthermore, some parts of the model were obscured during the scanning, which resulted in lack of information. Therefore, the final contour model was supplemented with a surface, figure 2. From this surface it is possible to obtain the angle needed for the contouring [1]. The two methods used have resulted in a CAD model, figure 2, which will be the basis for future contouring of the seat shell in a CNC-machine. The CAD model has information in the form of directing lines describing the machine's x-, y- and z-axis. This helps to position the model into the CAM program.
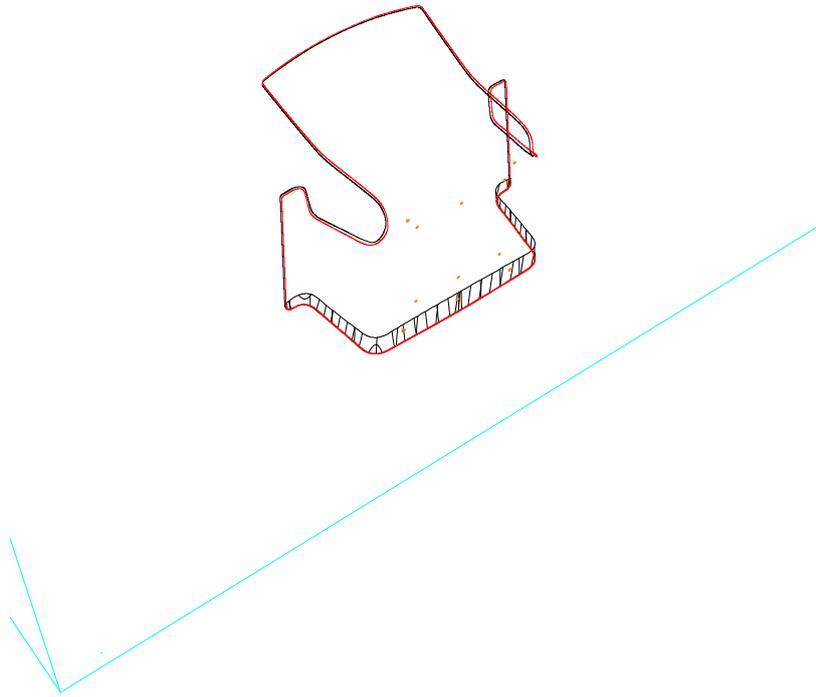

Figure 2: Processed seat shell with lines describing the machine's x-, y- and z-axis.

Changes over time, directly into machine code, have caused the seat shells to become asymmetrical. Therefore it was now necessary to determine the exact shape of the seat shell to obtain a perfect fit to connecting parts. The methodology used here has made it possible to create a CAD-model from the physical model. Based on the experience from this methodology, it would be recommended to continue by creating of a tool that minimizes the need for after processing, i.e. the adjustment of certain coordinates manually.

References

[1]   Capture 3D (2010), http://www.capture3d.com/, 2010/10/29.