8TH WORKSHOP ON SURFACE ENGINEERING

02.06.2019 to 08.06.2019, Koszalin University of Technology, Poland

I-machining advantages and opportunities

S. Scaticailov[1], A. But[2], [1]Technical University of Moldova, [2]Polytechnic University of Timisoara

SUMMARY

Modern technologies give to the CAM engineers more opportunities and benefits. The paper present the real results obtain using the i-machining strategies from SOLID CAM software. Was underline the modality how was implement and the time comparison between the classical CAM milling strategies versus the i-machining strategies adapt on real part.

INTRODUCTION

▪When we start to create a NC technology,we will make an analysis of the input data's (materials, technical drawing, the characteristics of the CNC machine-tools, cutting tools, fixtures), in relation to the final goal: accuracy, functionality, time of manufacturing, costs.

▪After that, we will define the technological process: defining the fixtures of the raw part, the operationsand the technological phases, the cutting tools parameters, the control systems.

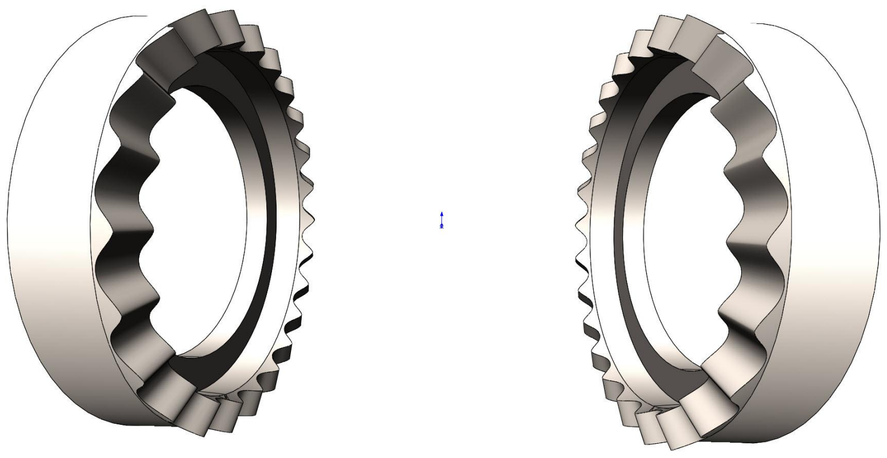


Fig. 1. The part what was manufacturing

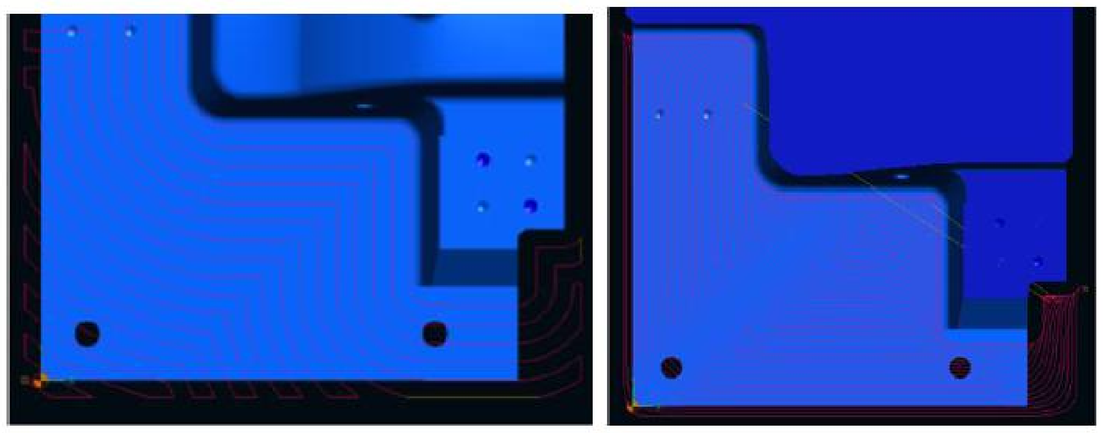
▪In the conventional strategies, tool contact width plays a significant role in the feed rate of the components to be milled. Full-width cuts often cannot be avoided despite constant stepover relative to the component. The contact load on the tool during material removal increases, especially at edges and on inside contours.

▪Contour parallel strategy

▪Toolpath calculation with the contour parallel strategy can create discontinuous (kinked) toolpaths with critical loads on the tool. (Fig. 2.a)

▪Adaptive strategy

The adaptive strategy attempts to specifically correct these discontinuous paths and to achieve maximum tool utilization in material removal using the specified maximum contact. (Fig. 2.b) The adaptive strategy was specially developed to achieve the greatest tool utilization in material removal without critical loads. This strategy calculates optimum values for a smooth path that does not exceed the previously specified value of parameter R Maximum contact. In particular, complete wrapping of the tool is avoided. This enables utilization of the entire cutting-edge length of the tool without exceeding the loading limits.



a) b)

Fig. 2. Contour parallel strategy and Adaptive strategy

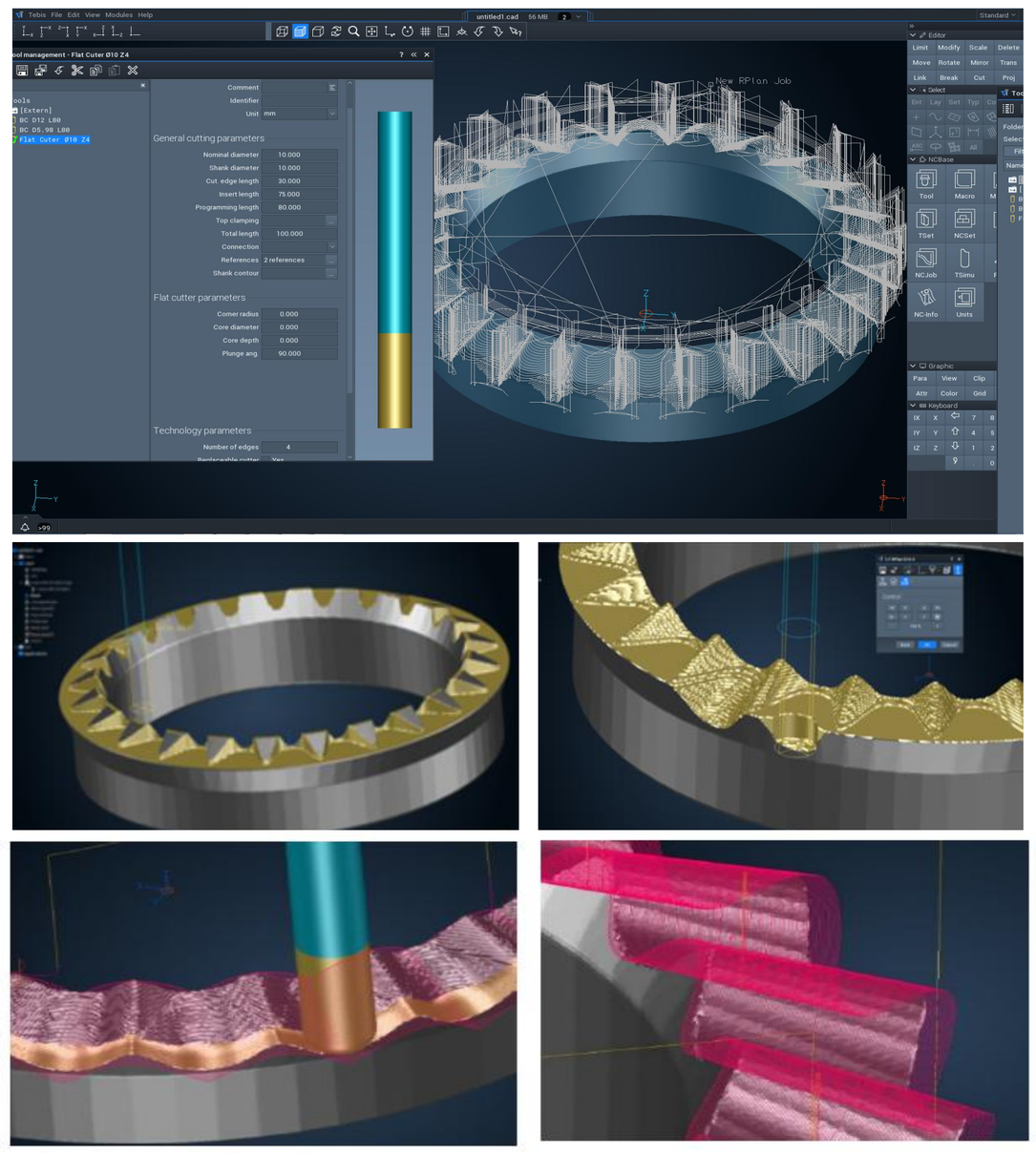


Fig. 3. Implement of the adaptive milling strategy

CONCLUSION

▪The best way to machine a part depends on the specific geometry, the material and the available tools and machines. Technology parameters like cutting data and feed rates must be precisely adjusted to the machining operation.

▪Regarding the test part that was chosen regarding to apply the benefit of CAM applications, was presented a new and interesting modality how to manufacturing one technical complex part what require a CNC milling center in five axis. Made an analyse what CNC machine tools exist and putting in value the capabilities of the CAM software and the impact of the new milling strategies was obtain the optimal manufacturing solution.

LITERATURE

▪BOSTAN, I. *Precessionny'e peredachi s mnogoparny'm zacepleniem:* [monogr.]. Red. S. SUVALOVA. Ch.: Ştiinţa, 1991. 355 p.

▪Antologia invenţiilor: [în 4 vol.]. Vol. 2; *Transmisii Planetare Precesionale* / I.Bostan, V. Dulgheru, S. Mazuru [et. al]. – Ch.: ”Bons Offices” SRL. 2011. -542 p.- ISBN 978-9975-80-283-3.

▪BUT *Adrian Machines and advance sistems of manufacturing*. POLITEHNICA Publishing Timisoara, Romania ISBN 978-973-625-949-4

▪KENNETH R. WRIGHT-CNC MILLING & TURNING-www.cnceducationalservices.comWhat Dynamic Milling Can Do For You,