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MANUFACTURING STRATEGIES IN CAM SYSTEMS

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Abstract: *The goal of this paper is to explain the reasons of importance of manufacturing strategies. High-level theoretical knowledge in this field allows an efficient improve of possibilities of its CAD/CAM integration. Real use of this knowledge, that is right choice of the manufacturing strategies with the use of computer aided system is the condition for raising manufacturing productivity by shortening manufacturing times and minimizing tool wear.*
Keywords: *CAD/CAM systems, manufacturing strategies, final strategies, residual manufacturing.*

1. INTRODUCTION

Currently the CAD/CAM systems are practically inherent part of mechanical industry. More often they represent element necessary for effective running of production, technological preparation of production and construction. By so-called 3D machining, for example procedures for manufacturing of hollows, dies or model devices, CAD/CAM systems use is self-evident. Serial manufacturing of hard-shape components, or theirs complicated contours would be impossible without their use. The use level of these systems and techniques is various and depends mainly on big companies entrenched in the region. [4]

Need of CAD/CAM systems use and integration is clearly raised by effort of shortening the innovation cycle, that is casual attribute of competitive background. As the price of man's work and the sophistication of produced components are rising, companies are evidently trying to increase production efficiency. Besides investments in quality and precise CNC machines one of the ways to reach this objective is minimal part's manufacturing time by minimal tool wear. From these reasons an importance is evident for solving the ways of tool movement on workpiece, that is manufacturing strategy. From the view of production possibilities, the most natural and common way of manufacturing of hard-shaped volumes is milling. [1],[5]

2. MANUFACTURING STRATEGIES

Manufacturing strategy represents the way of tool movement over the manufactured surface, more accurate the mill movement while in drive. According to removed material's volume two main categories of manufacturing strategies can be recognized:

- Rough milling strategies
- Finishing milling strategies

Main goal of rough milling strategy is to remove the largest possible volume of material while counting with additional material left for finishing. Movement of the mill is usually realized in the planes of certain shape, what transform this method into 2D manufacturing. Most common are raster milling and equidistant surface's removal. [2]

Finishing milling strategies serve for finishing, that is manufacturing with the goal of removal the residual material that is left after the use of rough milling or some other technology. After use of finishing milling strategy the component should have desired shape, dimensions and surface's roughness. Last trend in development of sophisticated manufacturing strategies is to keep the tool out of drive as much as possible, what leads into manufacturing maximum number of surfaces. [2]

3. MANUFACTURINF STRATEGIES SUPPORT IN CAM SYSTEMS

Finishing strategies used in computer aided manufacturing can be divided into two categories:

- primary finishing strategies
- finishing strategies of residual manufacturing

In primary finishing strategies the whole part manufacturing shoul be performed. Typical strategies are raster milling, spiral milling, pattern milling, constant height milling, rotary milling, 3D offset milling, point projection, line projection, surface projection. Names of these strategies can be different depending on CAD/CAM system used. [3]

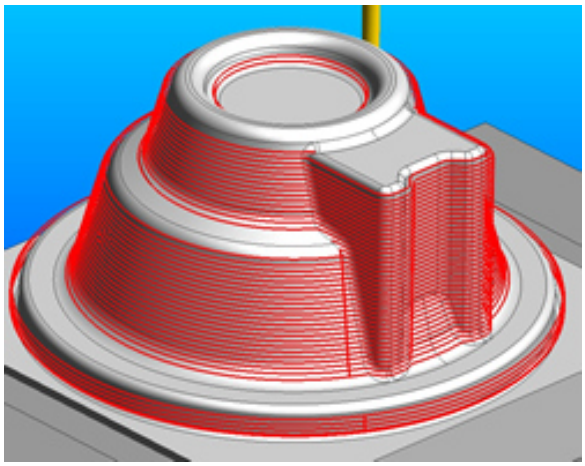

Fig.1 – Primary finishing strategies [6]

Main goal of finishing strategies is to perform only the manufacturing of details (surfaces, shapes), where material is left after previous manufacturing. Typical is material removal from edges and rounds. Selected tool is thiner of course. Most common strategies are radial milling, pen mill, multipen mill, orthogonal and lengthwise corner milling, automatic corner and profile milling. [3]

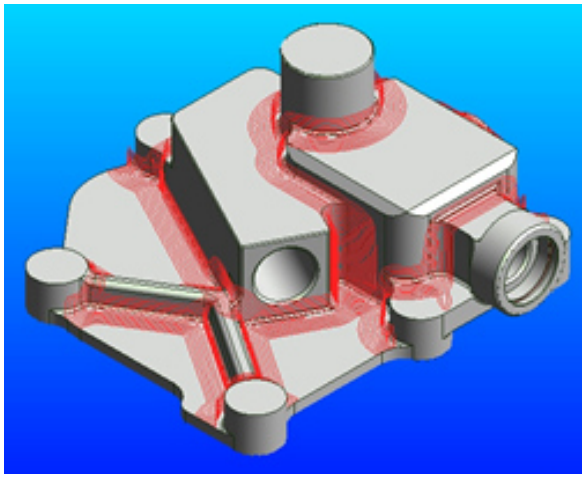

Fig.2 – Finishing strategies of residual manufacturing [6]

Choice and use of the strategy should reflect an effort of tool saving and manufacturing times shortening while keeping the quality of manufactured surfaces, what in final leads to increase of efficiency and productivity of manufacturing.

4. CONCLUSION

Manufacturing by suitable strategy greatly affect the quality of manufactured surface and manufacturing time while holding the other conditions of high efficiency and productivity in mechanical engineering. Currently the trend is not only to use classical suitable strategies but to research the possibilities of their combination and development. Main condition of succes in this area is huge support of manufacturing strategies matters in the background of computer aided manufacturing. [3],[4]

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