AUTODESK **UNIVERSITY** 2015

MFG12196-L

PowerMILL Hands on – Multi Axis Machining

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Learning Objectives

- Learn to use the "Dynamic Machine Control" in the virtual PowerMILL environment
- Using the "Tool-Axis Control" form to initiate steps toward Multiaxis continuous toolpathing
- How to fine-tune toolpaths using advanced multi-axis toolpathing editing
- Let's put it all together in order to post process a safe, optimized and successful toolpath.

Description

PowerMILL is the industry leading 3, 4 & 5 axis machining solution, learn how to take solid, surface and triangle models and quickly produce toolpaths to drive multi axis milling machines.

Your AU Experts

Gordon Maxwell has been employed as an application engineer at Delcam for the past 13 years. During this time he has been involved in all aspects of Delcam's range of manufacturing solutions and services. Covering fields as varied as reverse-engineering, design, and computer-aided machining through to inspection has enabled him to be involved in all areas of the manufacturing cycle. Prior to working at Delcam, Gordon's professional roles have all been relevant to computer numerical control (CNC), CAD/CAM, and the use of machine tools to manufacture parts. These roles have taken him from his country of birth, South Africa, to the United Kingdom, the Netherlands, Canada, and the United States

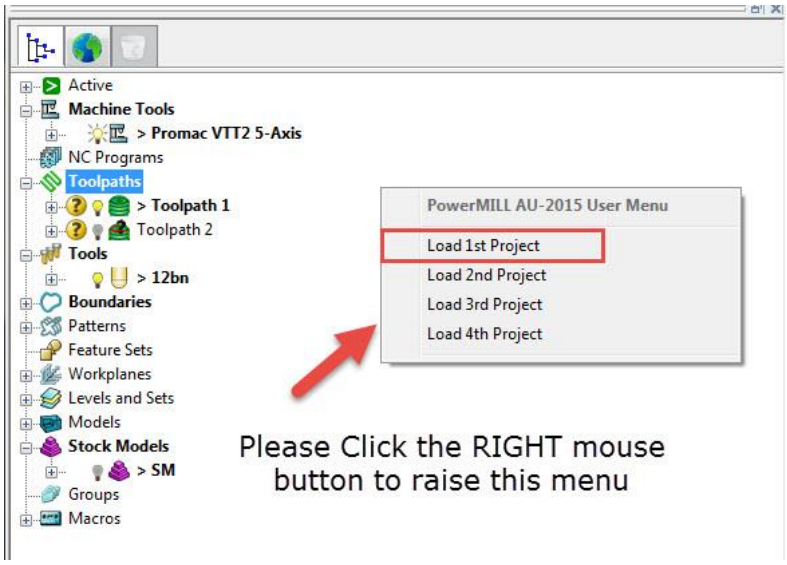
Learn to use the "Dynamic Machine Control" in the Virtual environment

Toolpath safety is probably the most important factor when considering toolpath creation for Multi-axis machines. To this end it is vital that the virtual environment matches the actual environment. These machines are expensive, as are the in-process parts to be machined.

Toolpath Optimization would be the next critical ability to be considered. Short, rigid tool definitions allow higher RPM's, feedrates, longer tool-life and importantly, surface finishes.

In this project we will be simulating the 2 pre-created toolpaths and then using the virtual controls to ensure toolpath safety and optimization.

To Load the correct PowerMILL project, please RIGHT MOUSE BUTTON click in the WHITE AREA of the PowerMILL Explorer to the left of the screen.



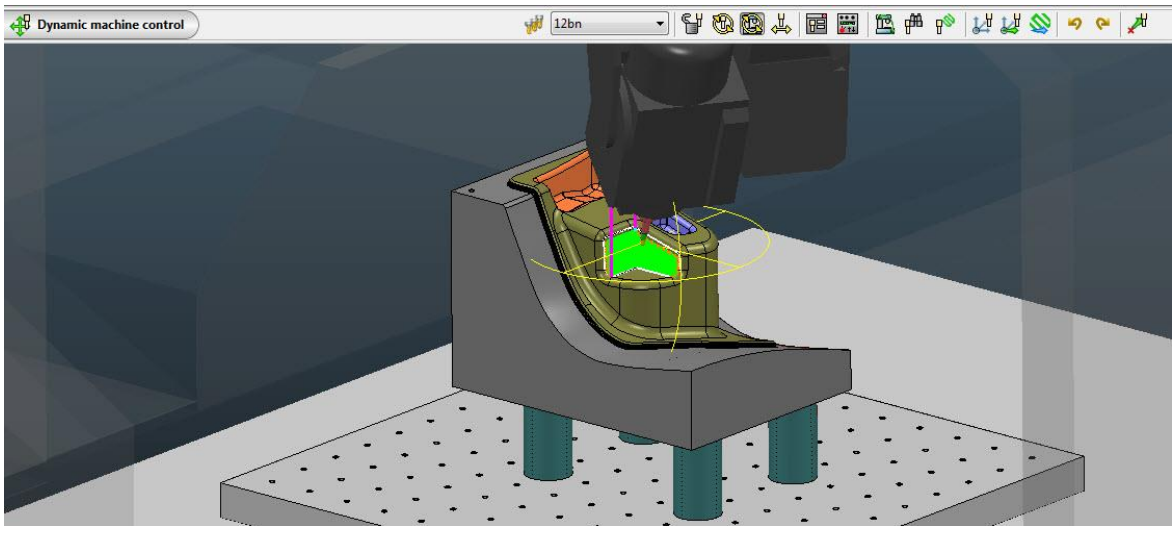


FIGURE 1: DYNAMIC MACHINE CONTROL

Using the “Tool-Axis Control” Form to initiate steps toward Multiaxis continuous toolpathing

Toolpaths are, by default, created ‘down’ the Z-axis of the active workplane. This workflow matches conventional CNC milling tools and makes sense to CAM programmers. Continuous toolpaths generally have a variable tool-axis that need to be defined through the use of POINTS, LINES, CURVES or other means. In the next project we will take a look at 2 methods to create a continuous 5-axis toolpaths where the tool orientation constantly changes relative to the active workplane.

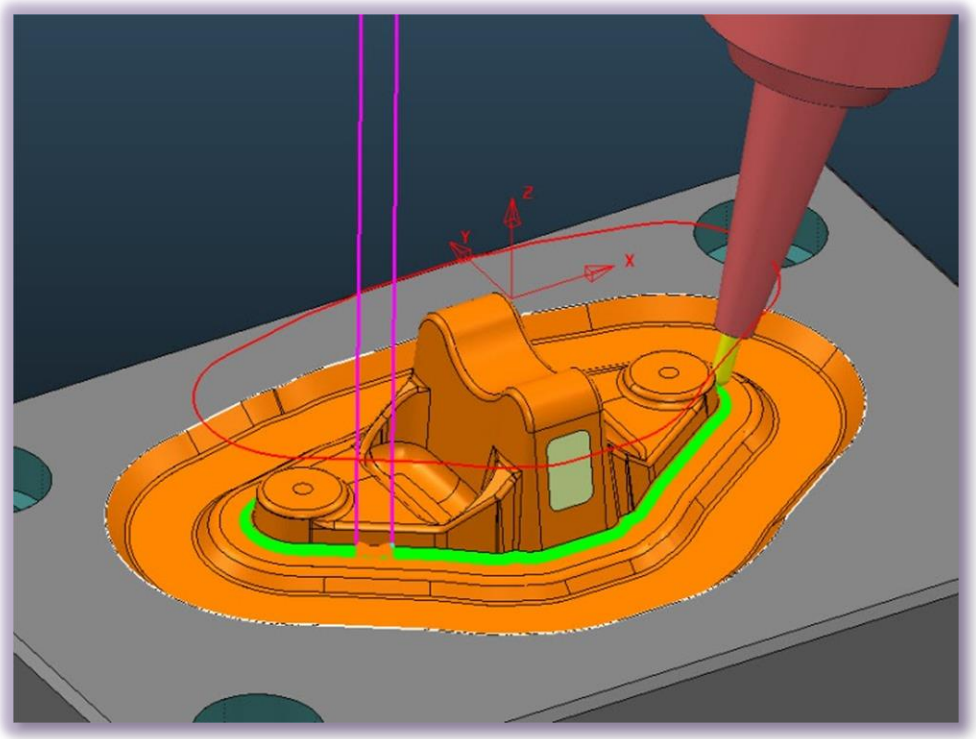


FIGURE 2: TOOL-AXIS ORIENTATIONS FOR MULTIAXIS TOOL VECTORS

How to fine-tune toolpaths using advanced multi-axis toolpath editing

Advanced control is the best friend of the multi-axis programmer. In the next project we will be using TOOL-AXIS EDITING to ensure that we achieve the desired tool vector in critical part areas

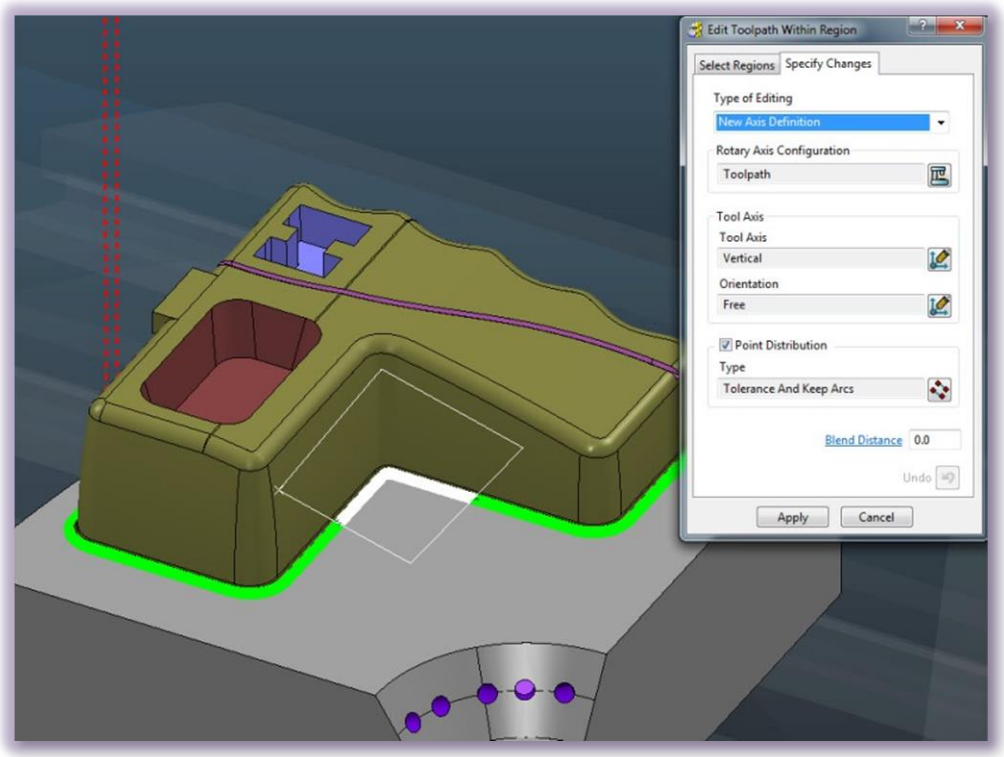


FIGURE 3: TOOL-AXIS EDITING

Let's put it all together in order to post process a safe, optimized and successful toolpath.

In order to simulate the entire machining process, we not only need to consider the individual toolpaths but also the transition moves that join the END POINTS of one toolpath to the START POINT of subsequent toolpaths. The TOOL, SHANK, HOLDER and MACHINE (including any ancillary equipment) needs to be considered in the safety check.

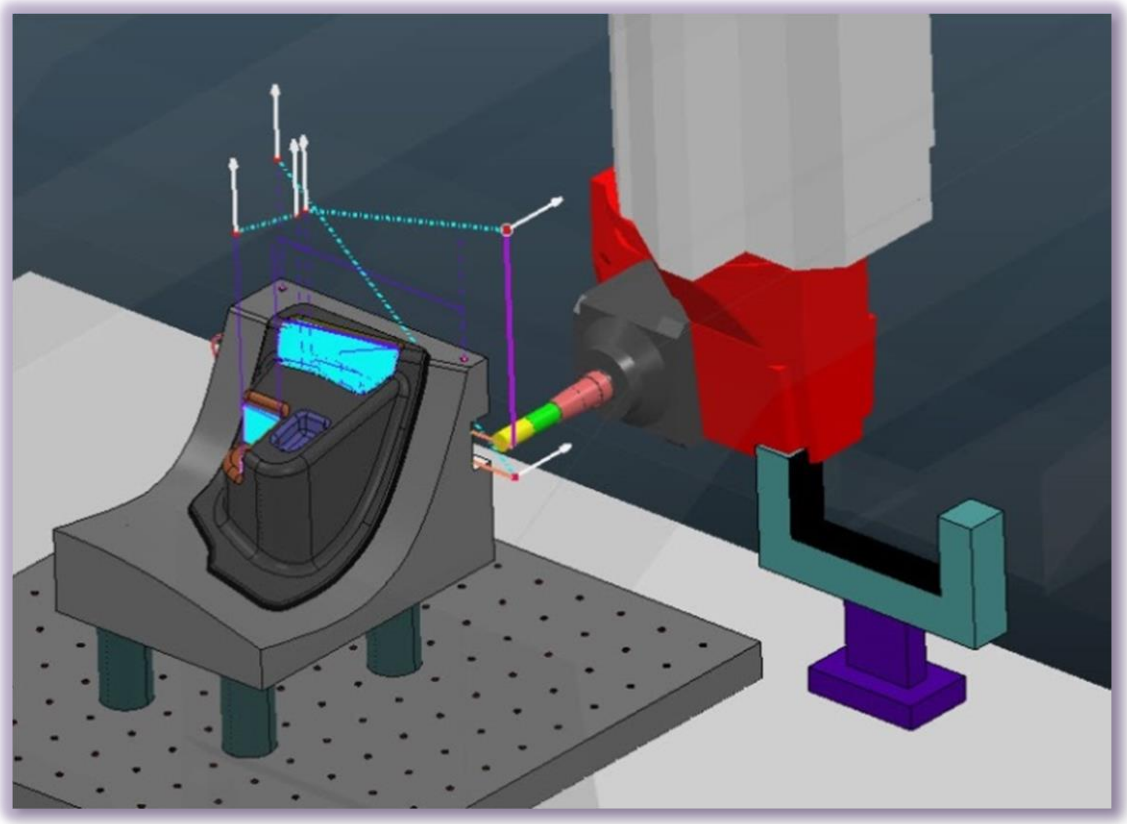


FIGURE 3: NC VERIFICATION

Key to common controls:-

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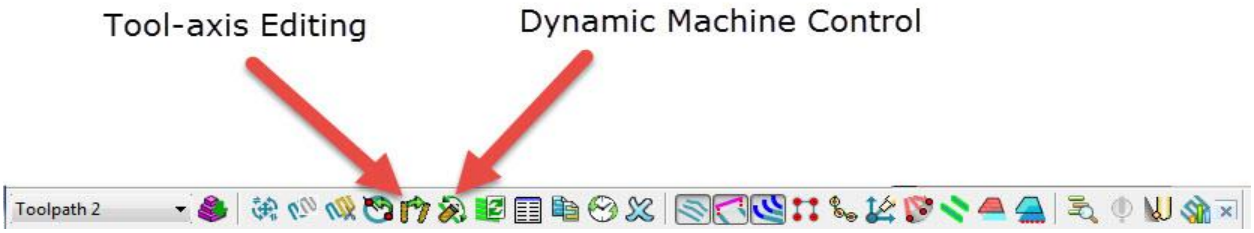

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