CNC Software, Inc.

Introducing...

Hastercam_®

X5 Mill Enhancements

Presenter: Teaching Systems Inc.

Dynamic Mill





2D Dynamic now split into two toolpaths:



Core Mill: for open areas



Area Mill: for closed boundaries

- Dynamic Core Mill
 - Approaches
 from outside in
 - Maintains
 climb cutting
 motion



- Dynamic Area
 Mill
 - Multiple entry methods
 - Maintains
 climb cutting
 motion



Traditional Pocket vs Dynamic Area





Traditional Pocket vs Dynamic Core



Material used: Stainless Steel AISI 1045

2D Dynamic Toolpaths New 2D Dynamic Contour mm

- Dynamic
 Contour
 - Contour and restmilling in one operation
 - Designed to remove material on walls, accounting for heavy material in corners



 Radius of tool – Defines previous tool radius 0.19 Radius of tool that shaped the stock 0.05 Toolpath radius that shaped the stock 0.001 Stock thickness



- Stock thickness
 - Defines previous stock to leave
 - -.001 is minimum allowed**

Dynamic Contour Mastercam's Dynamic Contour



- Dynamic Restmill
 - User defines previous operation(s) or previous tool diameter

Compute remaining stock from:	
 All previous operations All groups One other operation 	 B Machine Group-1 Image: Image: Image:
O Roughing Tool	
Diameter: 40.0	
Corner radius: 0.0	



- Dynamic Restmill
 - Identifies areas that larger tools miss
 - Uses dynamic
 motion to remove
 material with
 smaller tool
 - No wasted tool motion



Island facing in 2D HST toolpaths

- Island Facing:
 - -When used in conjunction with depth cuts, a full pass is made at the island depth:

0

Island Facing:

–When used without depth cuts, full depth is cut first, and island(s) are faced last:



- Dynamic toolpath Benefits:
 - -Improved usability
 - Cycle times reduced by 30% or more compared to traditional cutting techniques
 - -Full flute utilization for longer tool life
 - -Machines only where material exists
 - Consistent chip load allows for maximum feedrate/material removal



- Dynamic toolpath benefits:
 - -Smaller tools can be used:
 - Less carbide, less expensive
 - -Fewer tools can be used
 - Because of toolpath efficiency, a smaller diameter tool can yield faster cycle times than using a larger and then progressively smaller tools
 - More consistent spindle load, easier on the machine

- Island Facing is now in:
 - Rest Mill and
 Dynamic Rest Mill
 - Area Mill and
 Dynamic Area Mill
 - Core Mill and
 Dynamic Core Mill





New 3D OptiRough Toolpath



 New 3D strategy for fast material removal











- Large stepdown
 - Uses dynamic motion
 - Removes bulk of material

- Smaller stepup
 - Continues to utilize flute length
 - Removes only remaining stock

- User controls:
 - Stepdown and optional stepup distance
 - -Choice to mill vertical walls
 - Core motion for core-shaped parts
 - Micro lift distance and feed rate if desired

Cutting method		Climb.			
Stepover	30.0	%	0.3		
Stepdown	100.0	%	1.0		
🗹 Stepup	10.0	%	0.1		
Toolpath radius	20.0	%	0.2		
Mill vertical walls Use core mill passes					
Gap size					
O Distance			7.87		
			787.0		
Motion < Gap size, micro lift					
Micro lift distance			0.0		
Back feedrate			300.0		

- Vertical walls:
 - When unchecked, stepup will ignore vertical walls
 - Material removed only on nonvertical walls
 - No wasted cut motion



• Core Mill:

 Check "Use core mill passes" on parts that allow entry from outside of material





Finishing

www.mastercam.com



OptiRough toolpath benefits:



X5 OptiRough Distance traveled: 26,874 Inches X4 Area Clearance Distance traveled: 44,459 Inches



- OptiRough toolpath benefits:
 - –Less distance travelled = less time to cut
 - Maximum flute length utilization improves tool performance and life
 - Smaller tools yield greater removal rates than old large-to-small tool stepdown approach
 - Up to 70% improvements in cycle times reported

New 3D Hybrid Toolpath

 Uses Scallop motion on shallow areas



 Uses Constant Z motion on steep areas

- User defines:
 - -Steep stepdown
 - -Limiting angle
 - -Shallow stepover
- Toolpath automatically transitions based on these settings



- Hybrid toolpath
 - -1 toolpath
 - –18 minutes to cut

- Waterline and Scallop toolpaths
 - -2 toolpaths
 - -23 minutes to cut

- Hybrid toolpath benefits:
 - -What used to take multiple toolpaths can now be done with one
 - Blending is more gradual and automatic, resulting in better surface finishes
 - Takes the guesswork out of manually merging old Shallow and Steep toolpaths
 - -Improved cut order

CNC Software, Inc.

Introducing...

Nastercam_®

X5 Mill Enhancements FBM



- Tapered wall support
 - Tapered wall roughing and finishing
 - Matches wall taper with tool taper angle



- Toolpaths created
 - Flat tool roughs taper
 - Taper tool finishes taper



- Linking parent operation to Solid
 - Parent FBM
 operation now
 recognizes
 model change



- Linking parent operation to Solid
 - Parent operation is marked dirty
 - Feature detect is also marked dirty
 - Re-detect and regen is implied





- 4-axis output support
 - Simplifies
 rotary axis drill
 programming
 - Requires 4- or
 5-axis machine
 definition



Feature Based Machining

Thank you!

Questions?

