

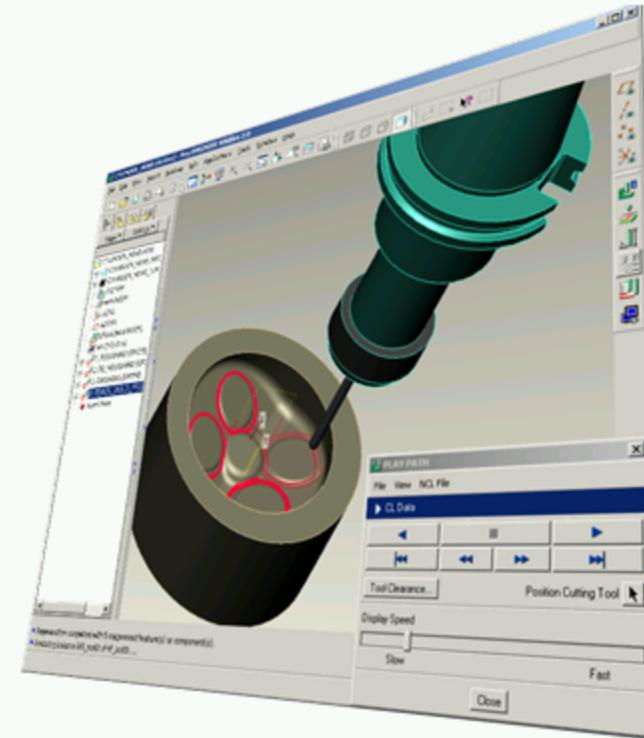
Solid Tooling for Pro/NC



Solid Tooling in Pro/NC

Agenda

- Key Issues
- Creating Solid Tools
- Using and Maintaining Solid Tools
- Next Steps
- Questions



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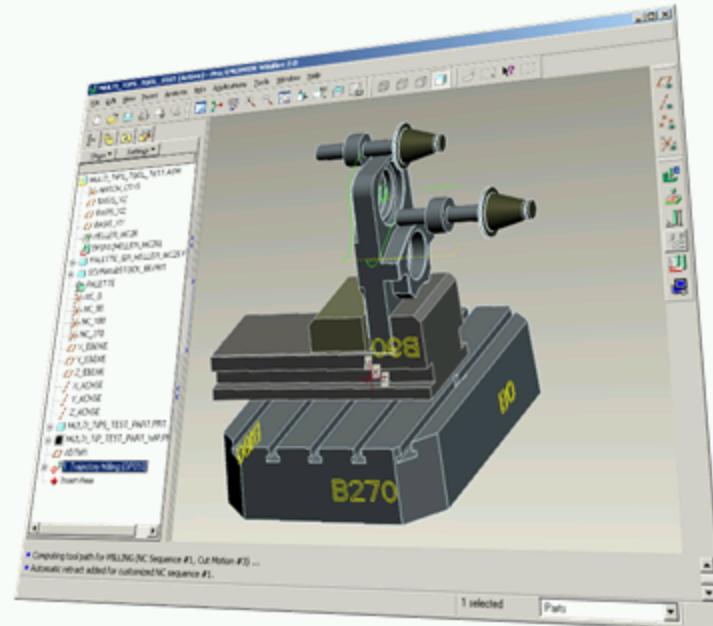
Solid Tooling in Pro/NC



Solid Tooling in Pro/NC – Key Issues

Why?

- Machining Simulation
- Gouge Checking
- Complex Tooling
- Eye Candy – Impress the customer
- New in WF2 – Shaded solid tool display during playback

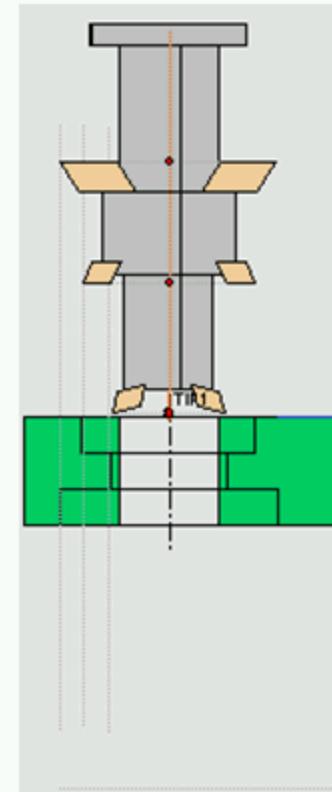




Solid Tooling in Pro/NC – Creating Solid Tools

The Basics

- Pro/E Model of Tool
- Pro/E Model of Holder (optional)
- Appropriate Parameters:
 - Cutter Diameter
 - Length
 - ...
- Coordinate System for Drive Point



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Solid Tooling in Pro/NC – Creating Solid Tools



Solid Tooling in Pro/NC – Creating Solid Tools

The Pro/E Model of Tool

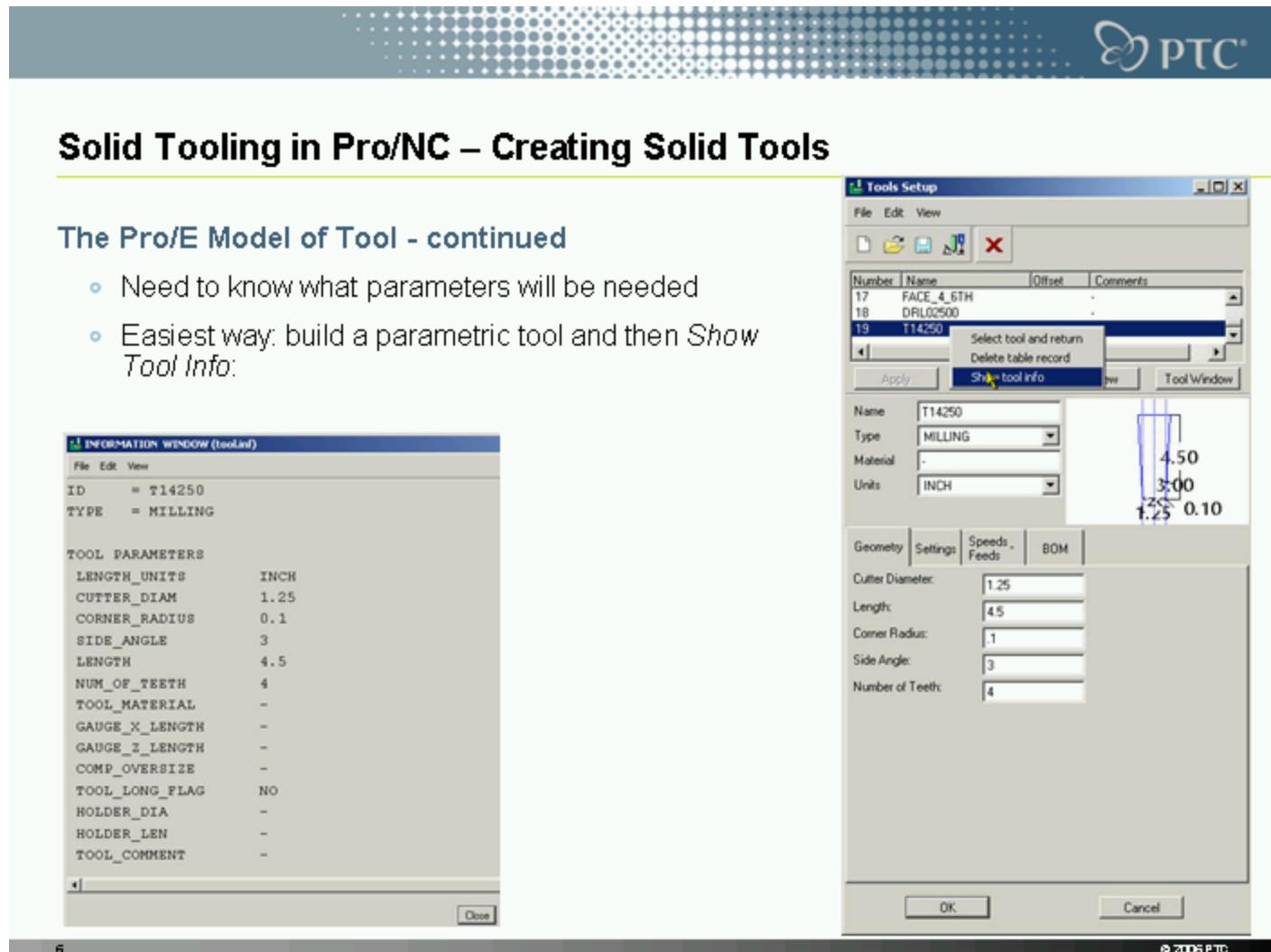
- As complex or as simple as desired.
- Flutes, colors, etc.
- Family Tables are usually a good tool for construction and retrieval, but optional.
- Name them anything that makes sense to you.



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Solid Tooling in Pro/NC – Creating Solid Tools

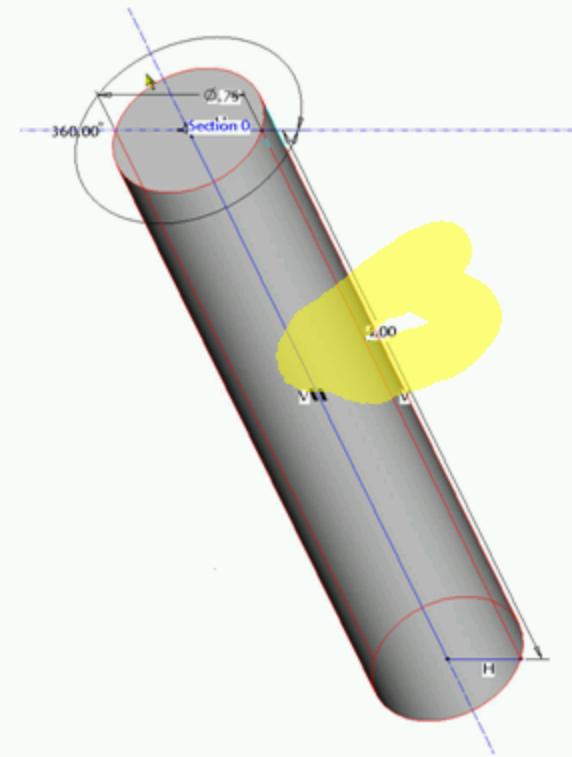


Solid Tooling in Pro/NC – Creating Solid Tools

Solid Tooling in Pro/NC – Creating Solid Tools

The Pro/E Model of Tool - continued

- These parameters need to be called out in the tool part model in order for them to be transferred to Pro/NC
- Can be done by editing the feature dimensions:
 - Changing $d12$ to be *length*; or
- Adding part level parameters:
 - Length = 4.000*



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Solid Tooling in Pro/NC – Creating Solid Tools

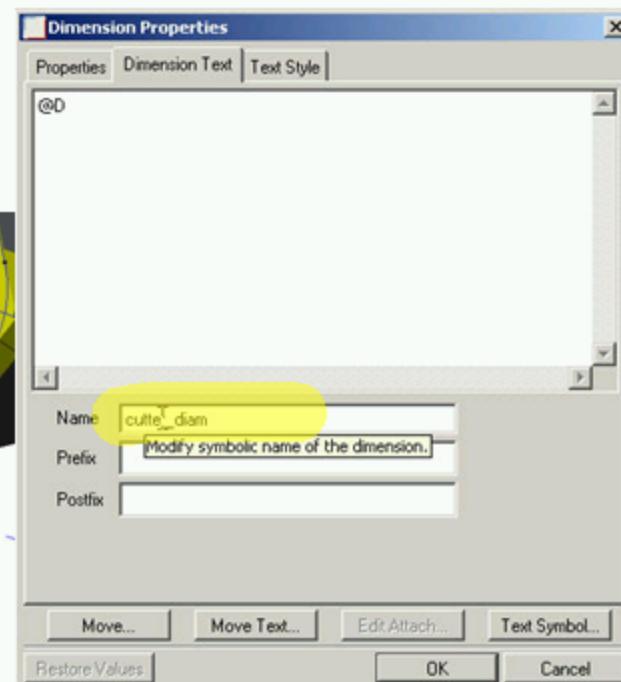
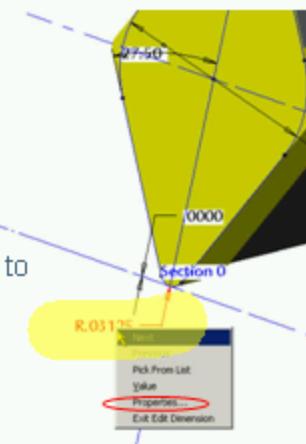


Solid Tooling in Pro/NC – Creating Solid Tools

The Pro/E Model of Tool - continued

- Editing the feature dimensions:

- Highlight Feature
- Edit
- Click on dimension tag
- Properties
- Dimension Text tab
- Name
- Change from default (d5) to appropriate parameter (cutter_diam)



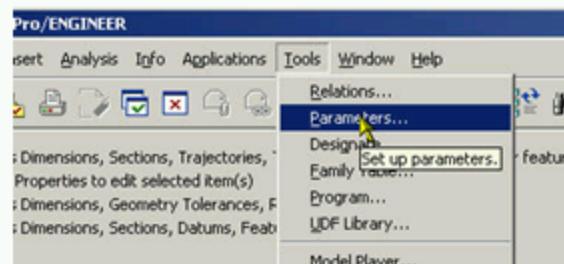
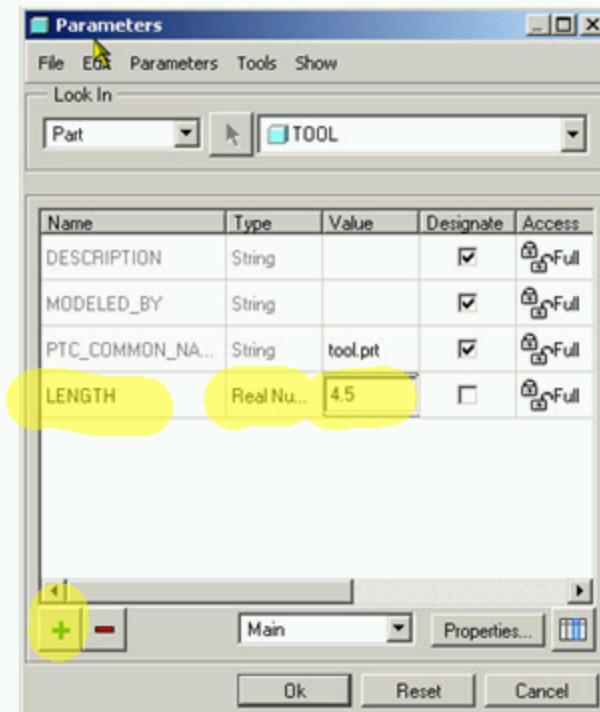
Solid Tooling in Pro/NC – Creating Solid Tools



Solid Tooling in Pro/NC – Creating Solid Tools

The Pro/E Model of Tool - continued

- Adding part level parameters:
 - Tools/Parameters
 - Add
 - Name, Real Number, Value
 - LENGTH, Real Number, 4.5000



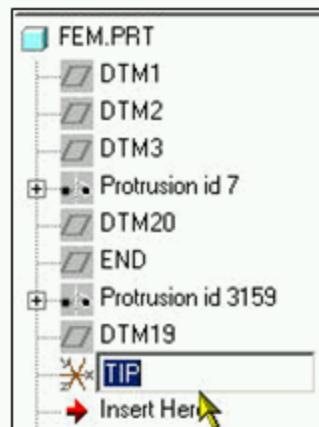
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Solid Tooling in Pro/NC – Creating Solid Tools

The Pro/E Model of Tool - continued

- Add a Coordinate System feature at the appropriate tool tip location
- Z axis positive along the tool axis
- Rename the feature "TIP"



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Solid Tooling in Pro/NC – Creating Solid Tools

The Pro/E Model of Holder

- Optional
- Construct part model of holder
- Assemble components into assembly
- This assembly is now the tool model used in Pro/NC
- Family Table
- Add parameter VERICUT_TYPE set to HOLDER.

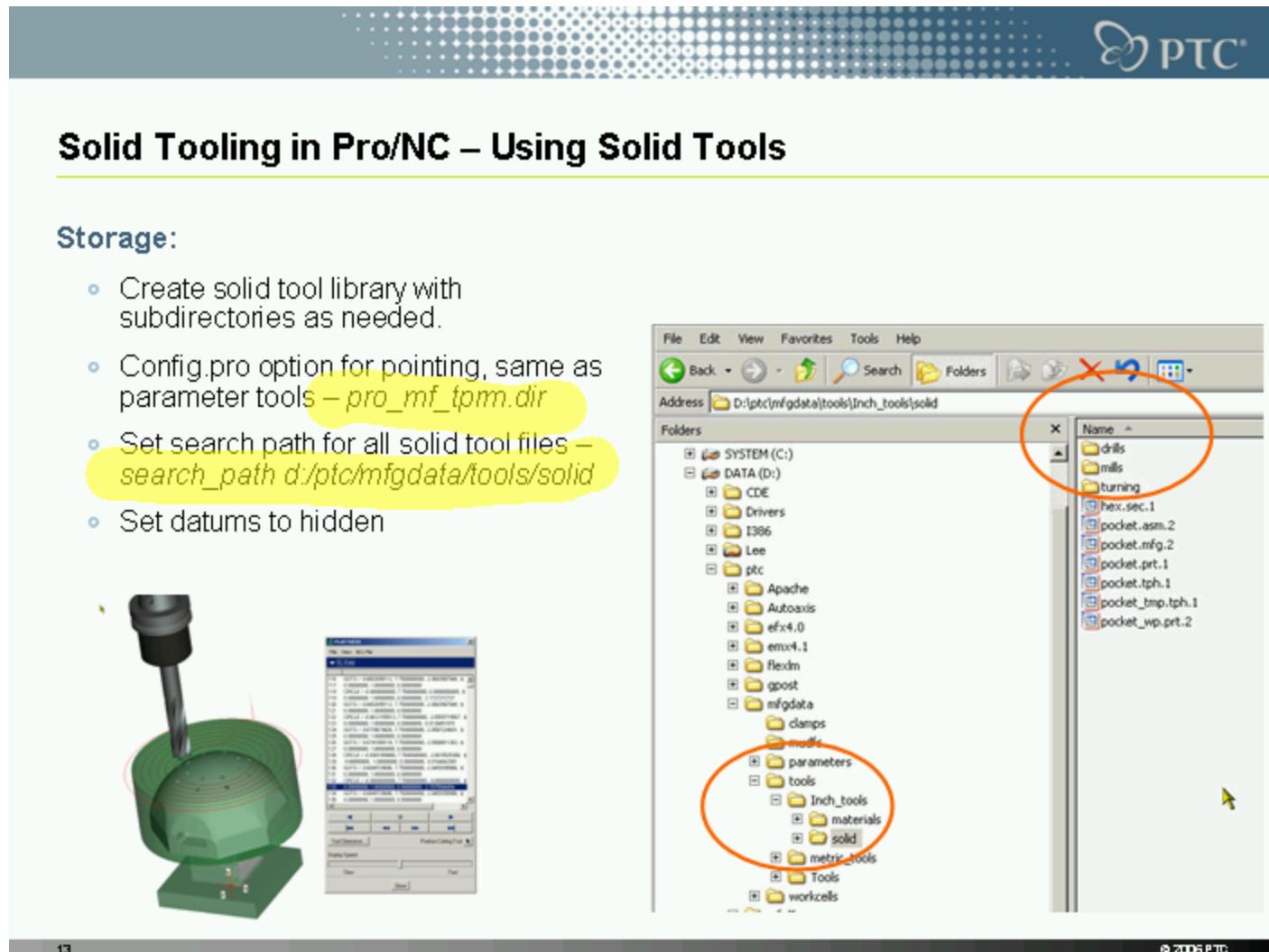


Solid Tooling in Pro/NC – Creating Solid Tools

The Pro/E Model of Holder - Continued

- Important:
 - If an assembly is used as a tool model, the system will search the assembly first, and then all the component parts in the same order as they were assembled (that is, the first component will be searched first), for the tool parameters and origin data.
 - Once a parameter is set, all values for the same parameter found later will be ignored. In other words, the top-level assembly parameters take precedence over component parameters, and after that the precedence is determined by the order of assembly.
 - If, after all components are searched, some of the tool parameters are missing, an error message will appear and you will be asked to select another tool.





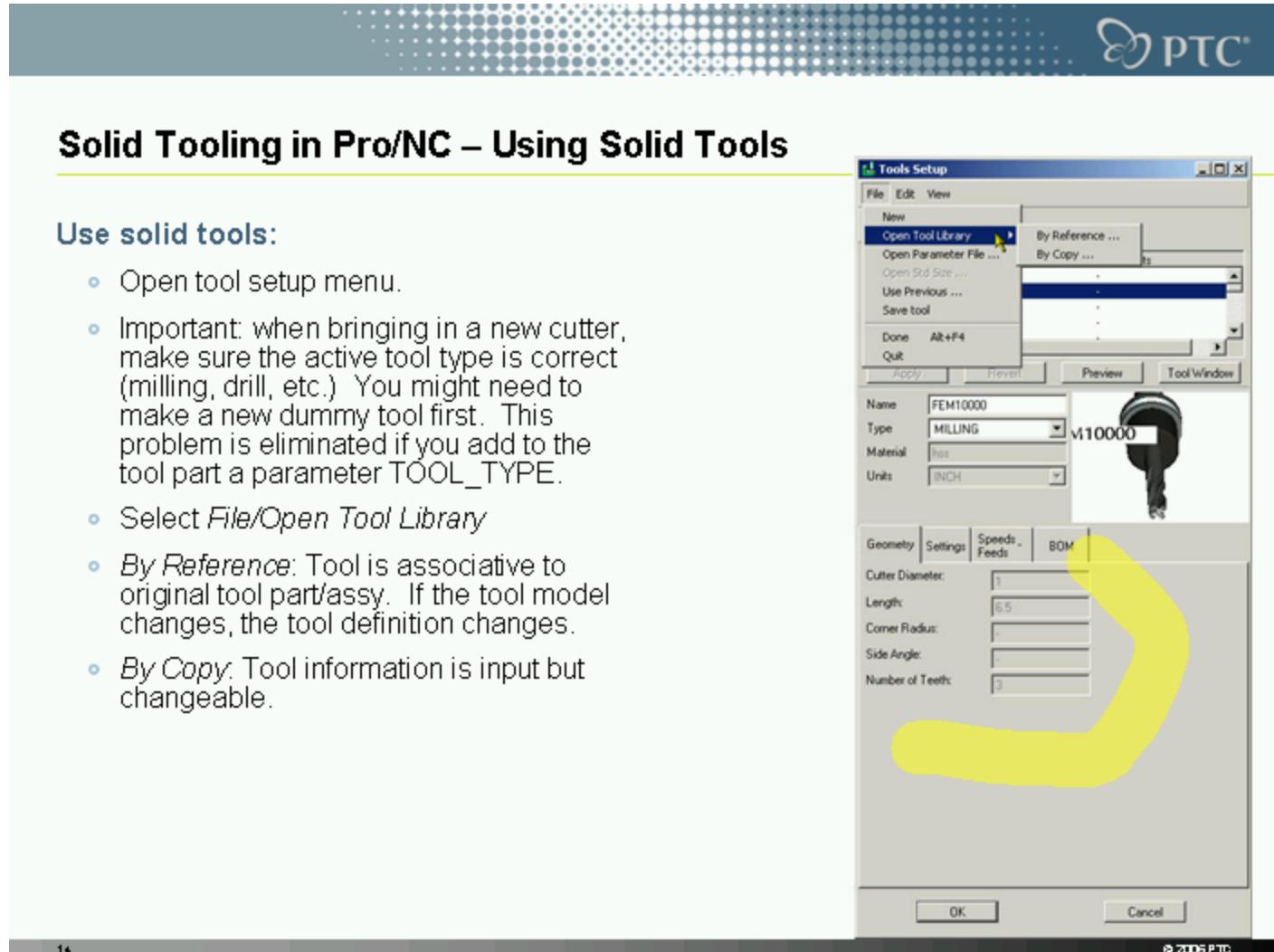
The slide features a title 'Solid Tooling in Pro/NC – Using Solid Tools' at the top, followed by a section titled 'Storage:' with a list of instructions. A screenshot of a 3D model of a green workpiece being machined is shown next to a screenshot of a Windows file explorer window displaying a folder structure for tool storage.

Storage:

- Create solid tool library with subdirectories as needed.
- Config.pro option for pointing, same as parameter tools – *pro_mfg_tpm.dir*
- Set search path for all solid tool files – *search_path d:/ptc/mfgdata/tools/solid*
- Set datums to hidden

Solid Tooling in Pro/NC – Using Solid Tools

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Solid Tooling in Pro/NC – Using Solid Tools

Use solid tools:

- Open tool setup menu.
- Important: when bringing in a new cutter, make sure the active tool type is correct (milling, drill, etc.) You might need to make a new dummy tool first. This problem is eliminated if you add to the tool part a parameter TOOL_TYPE.
- Select *File/Open Tool Library*
- *By Reference*: Tool is associative to original tool part/assy. If the tool model changes, the tool definition changes.
- *By Copy*: Tool information is input but changeable.

Solid Tooling in Pro/NC – Using Solid Tools

Use solid tools: continued

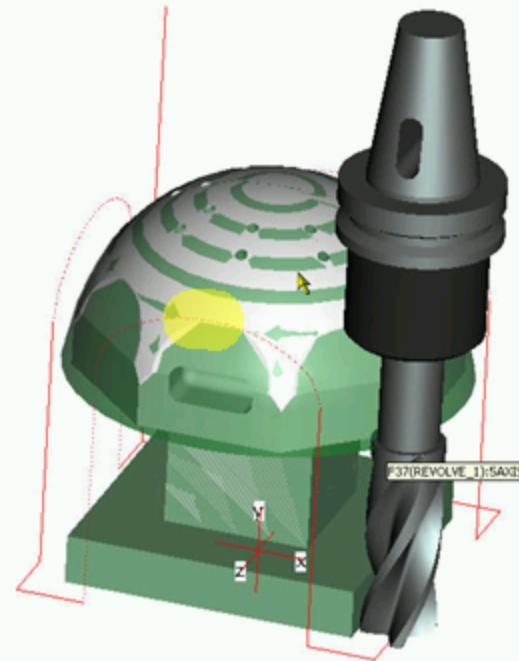
- Create tool path as normal.
 - Play toolpath. Screen play shows tool in shaded mode.
 - Note: during *Customize*, tool shown is simply parameter tool. Complete toolpath, select *Screen Play* and solid tool is shown.



Solid Tooling in Pro/NC – Using Solid Tools

Use solid tools: continued

- Gouge Avoidance.
- During toolpath calculation, only tool parameters are used, not actual tool definition.
- Tool holder is degouged only according to sequence parameters HOLDER_LENGTH and HOLDER_DIAMETER, not actual holder definition.
- Position tool during Screen Play to observe any problems.

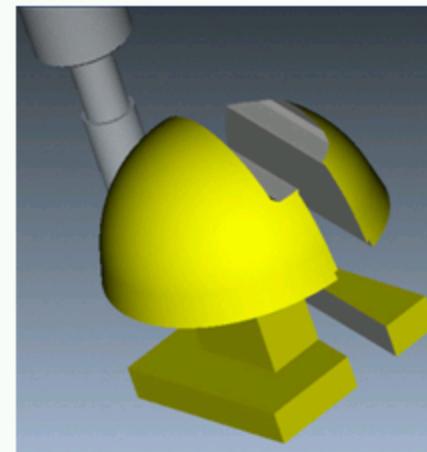
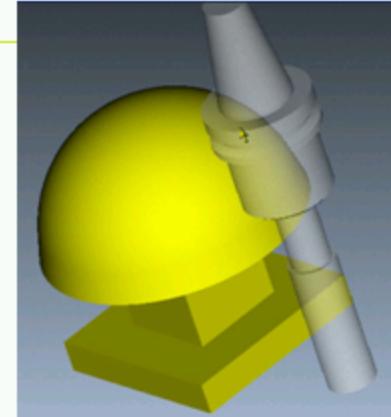




Solid Tooling in Pro/NC – Using Solid Tools

Use solid tools: continued

- Vericut uses solid tools.
- For milling, uses rotational envelope.
- For turning, uses tool profile.



The screenshot displays the Pro/NC software interface. On the left, the 'Tools Setup' dialog box is open, showing a list of tools and their details. A specific tool, 'LH_80DEG_X500', is selected. The right side of the screen shows the 'INFORMATION WINDOW (toolInfo)' which provides detailed parameters for the selected tool. To the right of the window, a 3D model of a workpiece and a green cylindrical tool is shown, along with a 2D cross-sectional view of the tool's profile.

INFORMATION WINDOW (toolInfo)

ID	= LH_80DEG_X500
TYPE	= TURNING
MODEL	= LH_80DEG_X500.PRT
USAGE	= BY COPY
TOOL PARAMETERS	
LENGTH_UNITS	INCH
NOSE_RADIUS	0.03125
SIDE_ANGLE	100
END_ANGLE	0
TOOL_WIDTH	1
SIDE_WIDTH	1.25
LENGTH	6
TOOL_MATERIAL	-
GAUGE_X_LENGTH	-
GAUGE_Z_LENGTH	-
COMP_OVERSIZE	-
HOLDER_TYPE	LEFT_HAND
TOOL_COMMENT	-

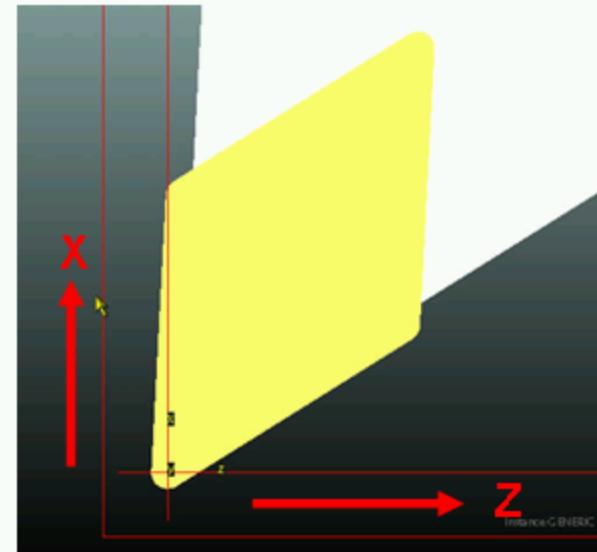
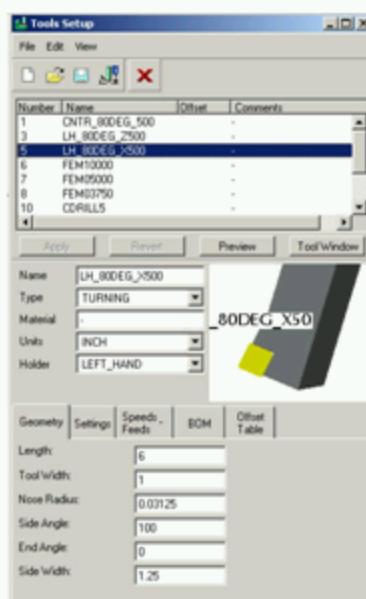
Solid Tooling in Pro/NC – Using Solid Tools



Solid Tooling in Pro/NC – Using Solid Tools

Use solid tools: continued

- TIP coordinate system same as turning operation directions (+x, +z)



A Sharing Slide

The Sharing Frame - Lee Goodwin/PTC



Solid Tooling in Pro/NC – Using Solid Tools

Where can I find existing models?

- Ptc.com.
- Support/Order and License Support

A screenshot of the PTC website. At the top, there's a navigation bar with links for Products, Solutions, Services & Training, Customer Resources, Partners, About PTC, and Support. The Support link is highlighted. A dropdown menu for Support lists several options: Technical Support, Order and License Support (which has a cursor pointing at it), Platform Support, Customer Care, Global Maintenance Support, and Business Asset Summary Tool. The main content area contains a paragraph about PTC's mission to help companies optimize product development. The footer of the page includes a page number '21' and a copyright notice '© 2006 PTC'.

Country / Region United States

Advanced Search

The Product Development Company

Products Solutions Services & Training Customer Resources Partners About PTC Support

Technical Support

Order and License Support

Platform Support

Customer Care

Global Maintenance Support

Business Asset Summary Tool

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Solid Tooling in Pro/NC – Using Solid Tools



Solid Tooling in Pro/NC – Using Solid Tools

Where can I find existing models?

- Order or Download software updates
- Choose Pro/ENGINEER

The screenshot shows a section of the PTC website with two main boxes:

Left Box:

- Update existing contacts & addresses, update language and platform information.
- Order support**
 - [View software update availability](#)
Review all software updates available online.
 - [Order or Download software updates](#)
Request current version of your PTC software.
 - [Track shipments](#)
Track your maintenance and software shipments.

Right Box:

- Order or Download Software Updates**

PTC Technical Support is pleased to provide an electronic avenue to provide an easier avenue for requesting software updates. Using a web browser, software updates can be ordered on CD or electronically downloaded without calling Technical Support.

[Order or Download Software Updates](#)
- Application Notes
 - If multiple PTC products are used simultaneously, [check product compatibility](#).

Solid Tooling in Pro/NC – Using Solid Tools



Solid Tooling in Pro/NC – Using Solid Tools

Where can I find existing models?

- Scroll down or search for "tooling"
- Wildfire Library – tooling.zip

The screenshot shows a software interface for managing library databases. A yellow box highlights the title bar 'WILDFIRE LIBRARY DATABASES'. Below it is a table listing database entries. A 'Find' dialog box is overlaid on the table, with 'tooling' typed into the 'Find what:' field. The table data is as follows:

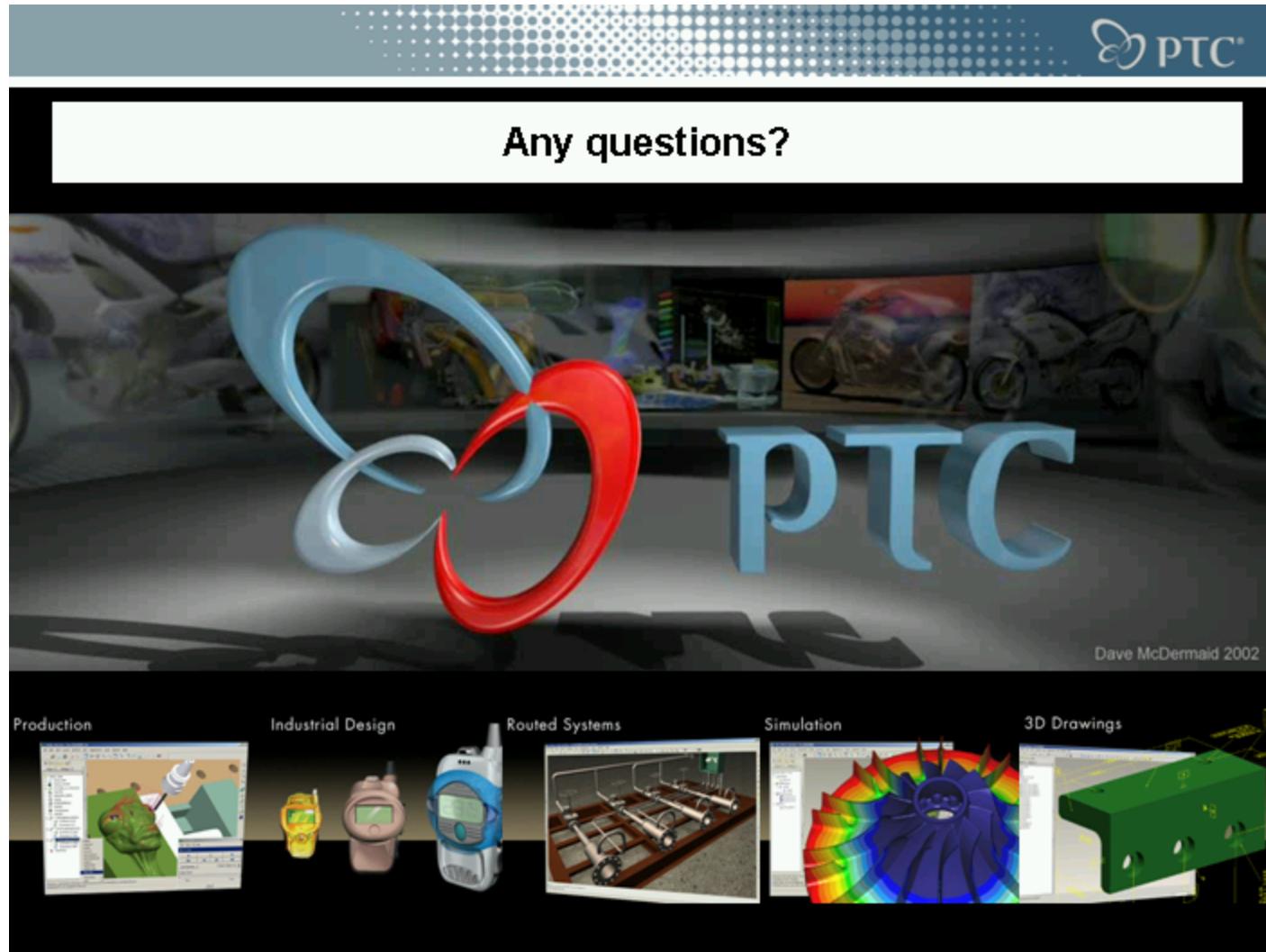
Wildfire	2002490		Not Available
		[FTP] [HTTP] [More Options]	294671089 bytes (281.02 MB)
		MOLD-BASE-tar	
		[FTP] [HTTP] [More Options]	408819200 bytes (389.88 MB)
		MOLD-BASE-zip	
		[FTP] [HTTP] [More Options]	309364647 bytes (295.05 MB)
		PIPE-FITTING-tar	
		[FTP] [HTTP] [More Options]	187049984 bytes (178.38 MB)
		PIPE-FITTING-zip	
		[FTP] [HTTP] [More Options]	89897984 bytes (85.73 MB)
		PIPINO-HEATING-tar	
		[FTP] [HTTP] [More Options]	118593536 bytes (113.10 MB)
		PIPINO-HEATING-zip	
		[FTP] [HTTP] [More Options]	44377618 bytes (42.32 MB)
		TOOLING-tar	
		[FTP] [HTTP] [More Options]	205527552 bytes (196.01 MB)
		TOOLING-zip	
		[FTP] [HTTP] [More Options]	83798518 bytes (79.92 MB)

Solid Tooling in Pro/NC – Using Solid Tools

The slide features three 3D models of solid tooling components: a large hexagonal base plate with a grid of holes, a smaller hexagonal fixture piece, and a cylindrical tool holder with a flange. To the right is a hierarchical file tree for a PTC library:

- └ mfglib
 - └ bin
 - └ fixture_lb
 - └ brackets_plates
 - └ buttons_jacks
 - └ cams
 - └ chuck_jaws
 - └ fixture_bases
 - └ keys_pins
 - └ knobs
 - └ mod_blocks_plates
 - └ nuts_bolts_screws
 - └ step_blocks_clamps
 - └ swivel_screw
 - └ holder_lb
 - └ bt_flange
 - └ morse_taper
 - └ qc_flange
 - └ str_shank
 - └ tapping_systems
 - └ v_flange
 - └ iH86_nt
 - └ install
 - └ ptc_inst
 - └ tools_lb
 - └ isotools
 - └ metric_t
 - └ standard_t
 - └ drills_s
 - └ mills_s
 - └ reamers_s
 - └ taps_s
 - └ turn_s

Solid Tooling in Pro/NC – Using Solid Tools



Any questions?