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NX Post Configurator

006 – DEF, Tcl and UDE editor II

Content

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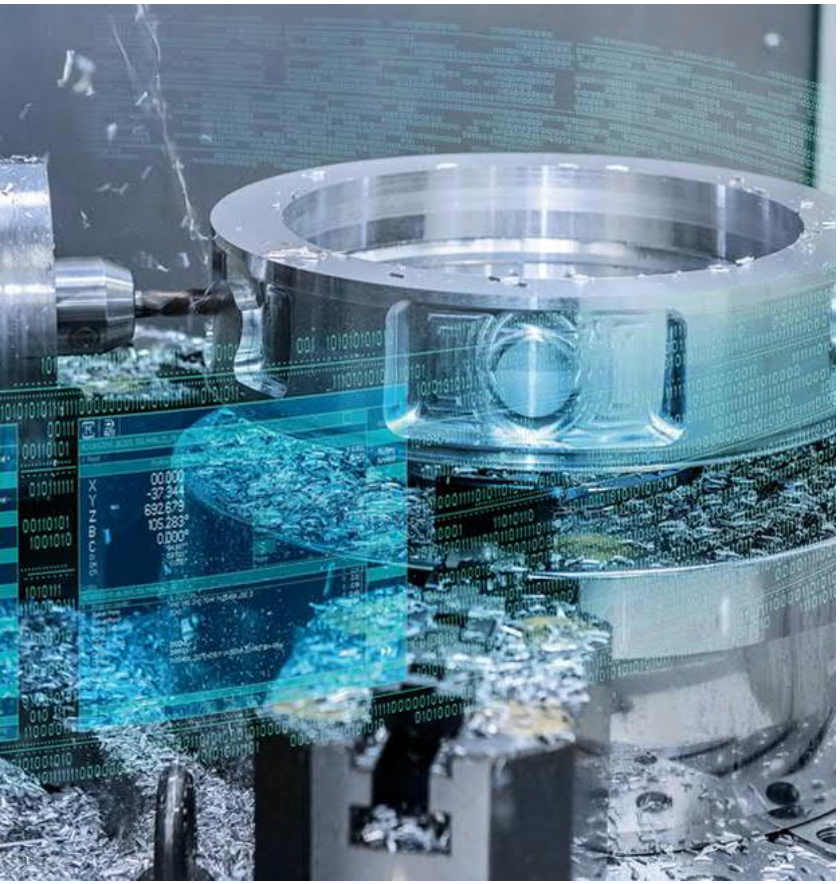

- **Sample Workflow DEF**
- **Sample Workflow TCL**
- **Sample Workflow UDE**
- **DEF:**
  - Find existing block templates to use
  - Customize existing block templates
  - Create new block templates
- **TCL:**
  - Place the block templates using the Inspect Tool.
- **Final Task Create Custom Program Header**

Machine tool settings – Add HSC setting 1/3

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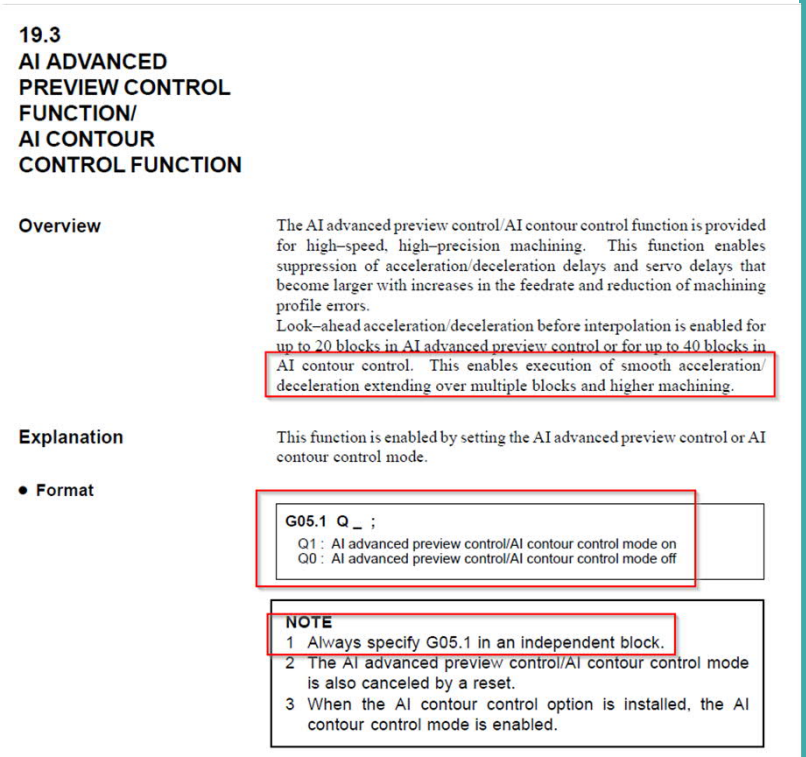


19.3
AI ADVANCED
PREVIEW CONTROL
FUNCTION/
AI CONTOUR
CONTROL FUNCTION

Overview

The AI advanced preview control/AI contour control function is provided for high–speed, high–precision machining. This function enables suppression of acceleration/deceleration delays and servo delays that become larger with increases in the feedrate and reduction of machining profile errors.
Look–ahead acceleration/deceleration before interpolation is enabled for up to 20 blocks in AI advanced preview control or for up to 40 blocks in AI contour control. This enables execution of smooth acceleration/deceleration extending over multiple blocks and higher machining.

Explanation

This function is enabled by setting the AI advanced preview control or AI contour control mode.

- **Format**

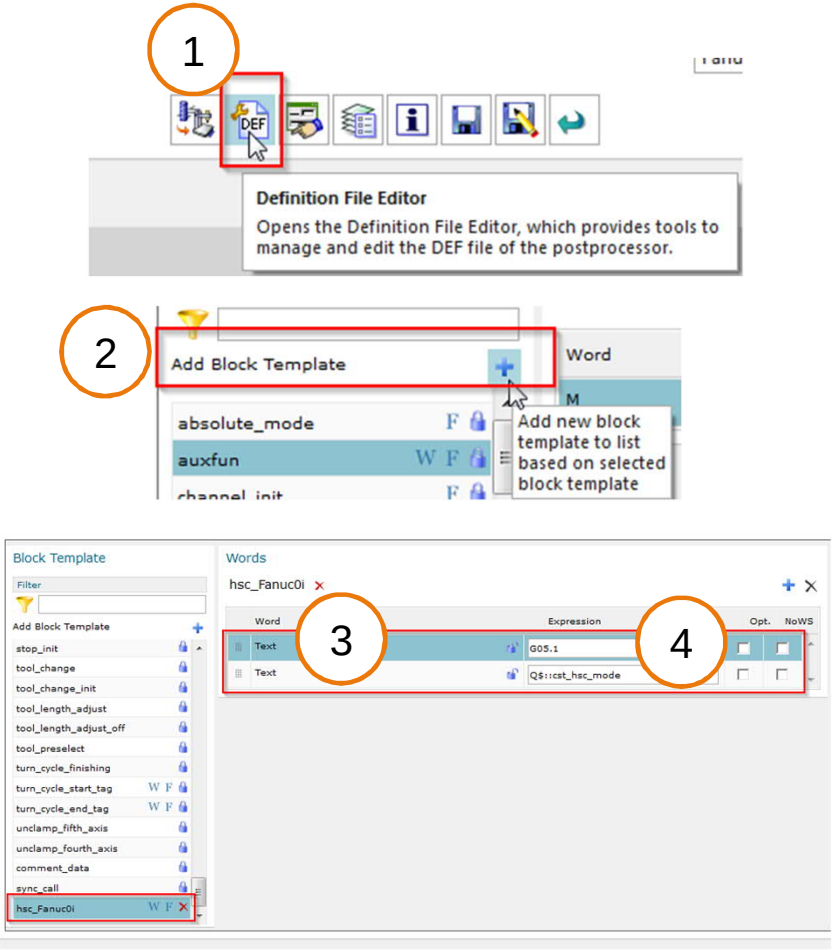
G05.1 Q _ ;
Q1 : AI advanced preview control/AI contour control mode on
Q0 : AI advanced preview control/AI contour control mode off

NOTE
1 Always specify G05.1 in an independent block.
2 The AI advanced preview control/AI contour control mode is also canceled by a reset.
3 When the AI contour control option is installed, the AI contour control mode is enabled.

This sample shows how you can define new Blocktemplates and call it with less effort in Tcl.

- The G05.1 is a high speed setting to improve quality of surfaces
- The output is in the initial move of a path and canceled at the end of a path
- Also it‘s possible to set this with an UDE to give user more flexibility to use this or create a property for this setting

Machine tool settings – Add HSC setting 2/3



1. Open the Definition File Editor
2. Add a new Blocktemplate, e.g. hsc_Fanuc0i
3. Create new address for G and Q-address or to simplify here use Text-address
4. The Q should be a string and expression which is defined on Tcl side in a moment ($::cst_hsc_mode)
5. Save the modifications

Machine tool settings – Add HSC setting 3/3

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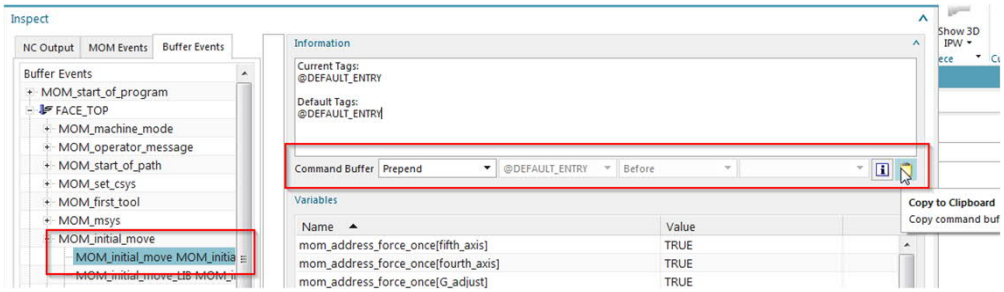

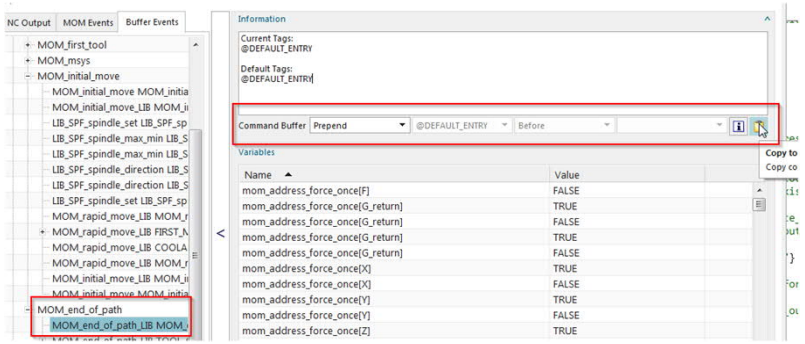


```
LIB_GE_command_buffer_edit_prepend MOM_initial_move MOM_initial_move_ENTRY_start {SetHSC 1} HSC_On
LIB_GE_command_buffer_edit_prepend MOM_end_of_path_LIB MOM_end_of_path_LIB_ENTRY_start {SetHSC 0} HSC_Off

#-------------------------------------------------------------
proc AdditionalheaderInformation {} {
#-------------------------------------------------------------
MOM_output_text "(Postprocessor-version: [LibraryInformation library_version])"
}

#-------------------------------------------------------------
proc SetHSC {arg} {
#-------------------------------------------------------------
set ::cst_hsc_mode $arg
MOM_do_template hsc_Fanuc0i
}
```

1. Run postprocess with inspect Tool
2. Copy command buffer in initial move to service file
3. Copy command buffer in end of path to service file
4. Create custom procedure which execute the Blocktemplate
5. Call the command both command buffer with argument 0/1

```
N18 M98P1000
N20 T01
N22 G54
N24 G49
N26 G0 G53 G90 Z300.
N28 G05.1 Q1
N30 S2228 M3
N32 G17 X-79.599 Y42.
N34 G43 Z50. H1
N36 Z3.
N38 G1 Z0. F1203.
...
N90 X56.
N92 X79.599
N94 Z3.
N96 G0 Z50.
N98 G05.1 Q0
N100 M5
N102 G49
N104 G53 Z300.
```

Content

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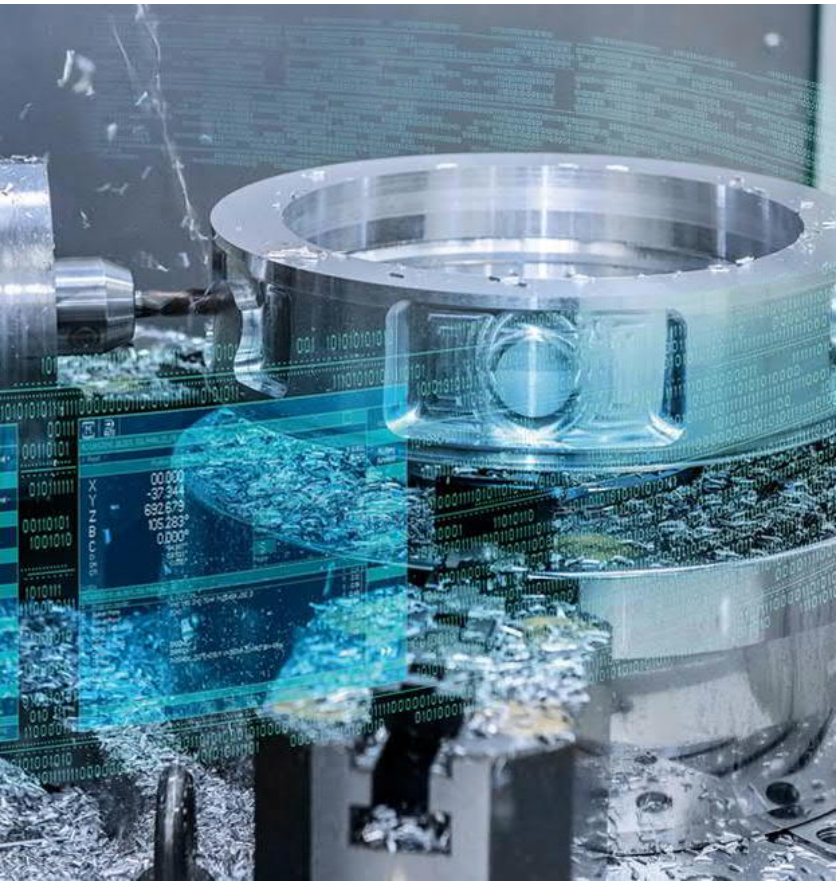

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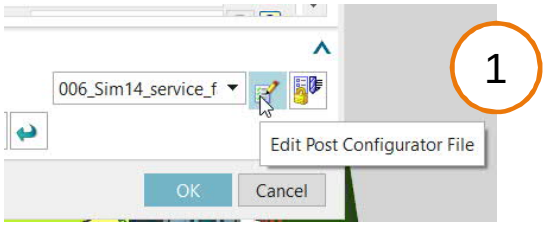
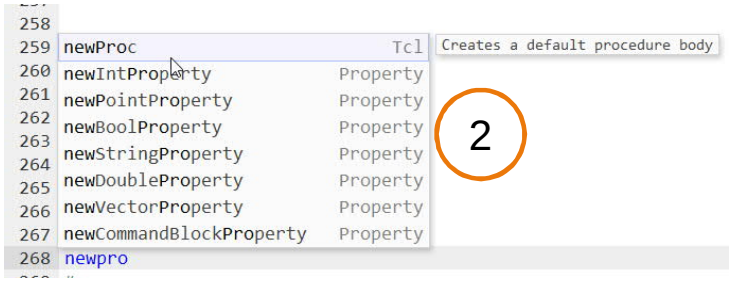
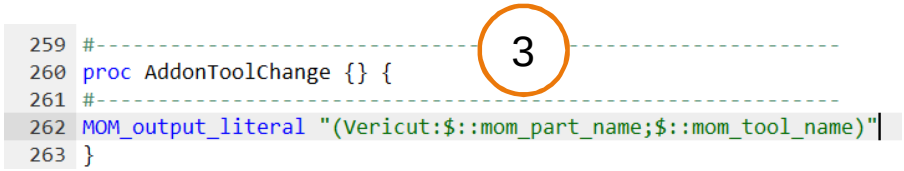
Tcl – add custom procedure 1/2







1. Open the Tcl editor
2. Create a new procedure, named „AddonToolChange“, use snippet functionality
3. Output a NC line as a comment in the procedure (customer need this for external simulation): (Vericut:Partname;Toolname)
4. Save the modifications

Tcl – add custom procedure 2/2

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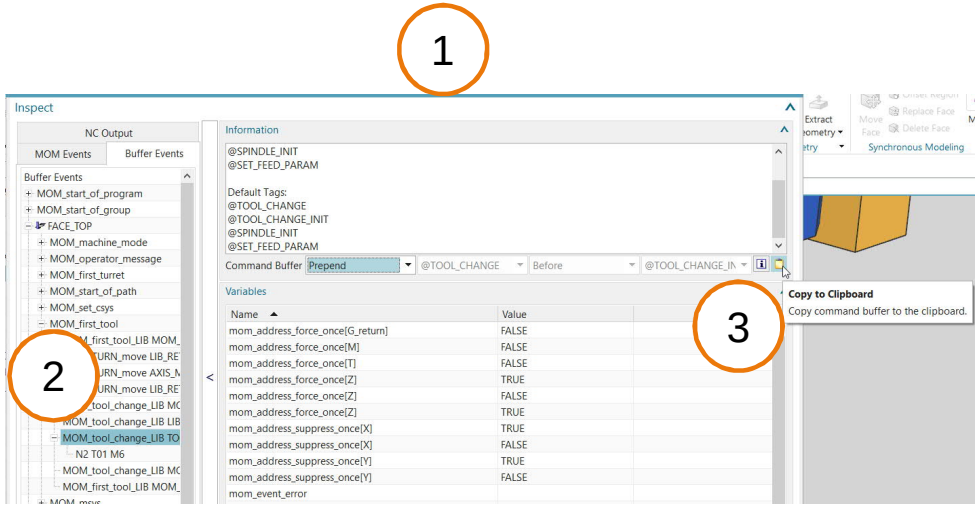
Ingenuity for life




```
57
58 LIB_GE_command_buffer_edit_append MOM_tool_change_LIB TOOL_CHANGE AddonToolChange _myAddOn
59
60 #-------------------------------------------------------------
61 proc AddonToolChange {} {
```

4

1. Run the post processor with the Inspect Toool to identfy the Buffer
2. Select the MOM_tool_change Buffer and select prepend option
3. Copy to clipboard and insert into service file
4. Call the custom procedure with an unique Tag and run the post process

```
-------------------------------------------------------|
| The output line is longer than allowed (Max: 80 / Current: 103):
|
|   Befor: N72 (Vericut:F:\NX
12.0\mach\samples\nc_simulation_samples\sim14_mill_5ax_cam_fanuc_in.prt;UGT0203_005)
|
|   After: N72 (Vericut:F:\NX 12.0\mach\samples\nc_simulation_samples\sim14_mill_5ax_cam_fa
|
|-------------------------------------------------------------------------------------------
-------------------------------------------------------|
| {{The output line is longer than allowed (Max: 80 / Current: 102):} { Befor: N3 (Vericut:F:\NX
12.0\mach\samples\nc_simulation_samples\sim14_mill_5ax_cam      |
|===========================================================================================
=======================================================|


%
O0001
G17 G20 G94 G90

(FACE_TOP , TOOL : UGT0202_001)

N1 G0 G53 Z0.
N2 T01 M6
N3 (Vericut:F:\NX 12.0\mach\samples\nc_simulation_samples\sim14_mill_5ax_cam_fan
N4 G54
N5 G68.2 X0. Y0. Z0. I0. J0. K0.
```

Content

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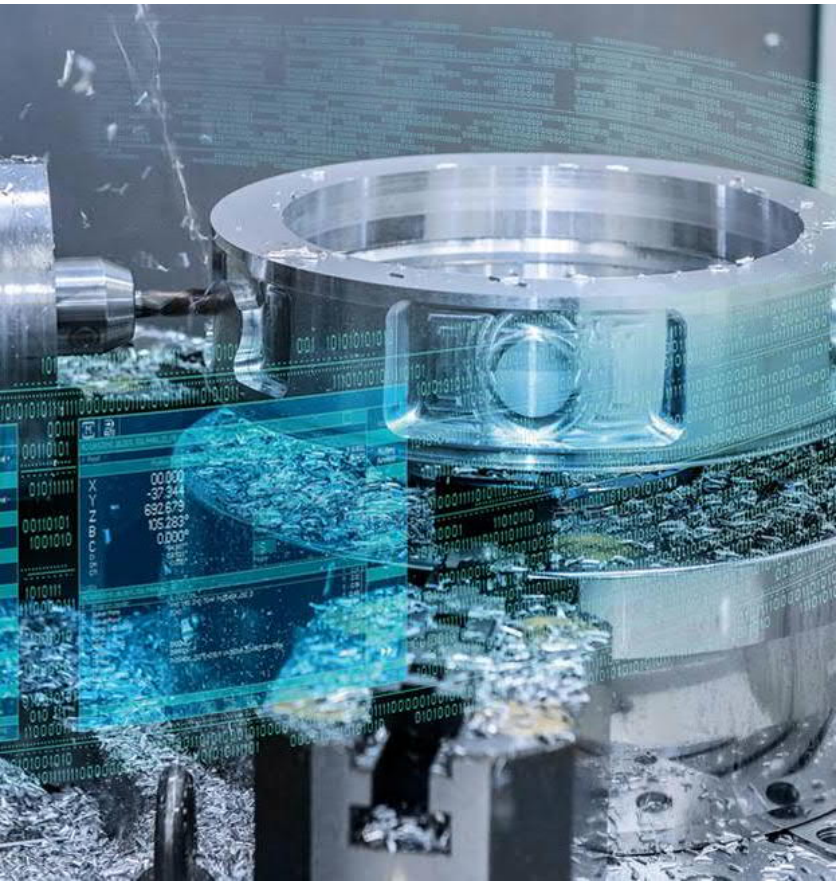

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Sample Workflow UDE 1/2

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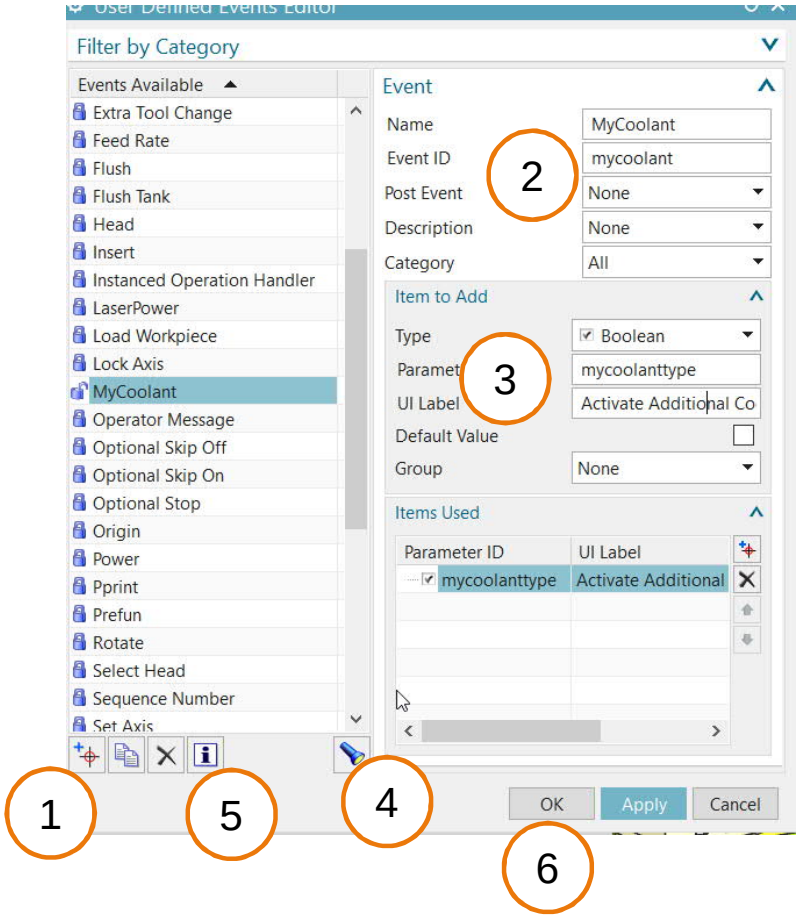

1. Add a new event
2. Add event ID and name
3. Add a parameter, e.g. bool
4. Use preview to validate UI
5. Use Information button to get automatically the Eventhandler
6. Save the modifications

Sample Workflow UDE 2/2

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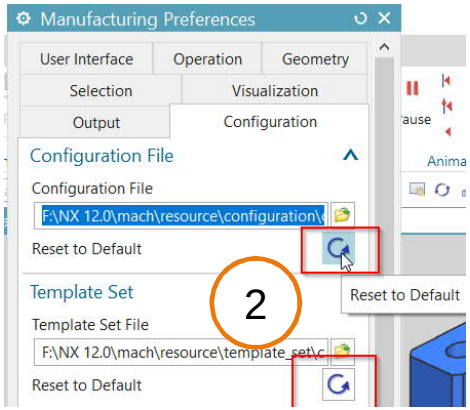
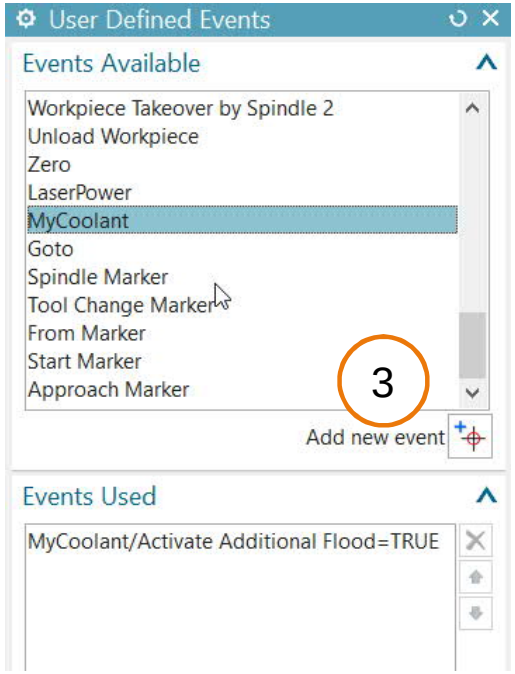
```
258 proc MOM_My_Coolant { } {
    global mom_additional_flood

    #Put your UDE Handler Tcl here

MOM_output_literal "--->coolant"
}
```

1





1. Copy the Eventhandler to the service file
2. Reset the configuration file
3. Add the UDE to an operation, e.g. FACETOP
4. Run the post process

```
G17 G20 G94 G90

(FACE_TOP , TOOL : UGT0202_001)

N1 G0 G53 Z0.
N2 T01 M6
N3 --->coolant
N4 G54
N5 G68.2 X0. Y0. Z0. I0. J0. K0.
N6 G53.1
```

Content

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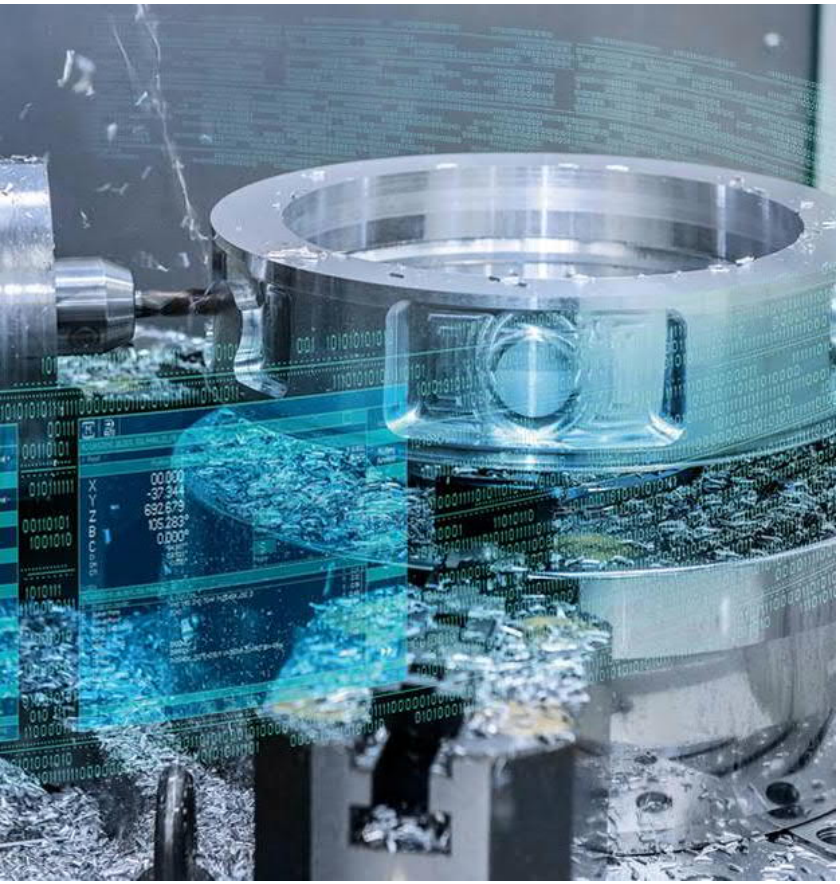
Ingenuity for life



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Hurco Exercise

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- Modify a Fanuc Based post for the creation of a Hurco multi-axis milling machine.
- The exercise will include editing the Definition File and TCL customizations.
- The machine manual has been provided.
  - Hurco 5-Axis Post Notes_Cope 2013.pdf
  - www.hurco.com

Program Header

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- See page 2 of the Hurco document.
- This exercise will show how to modify the current output at the program header to match the desired Hurco G-code.

Program Header:

```
%
:0001
M31     (Rotary Axes Encoder Reset)
M126    (Shortest Angular Traverse)
G0 G20 G40 G80 G54 G90   (Traditional Safety Line)
M140    (Retract Along Tool Vector)
G53  Z0.
G0 X0. Y0. A0 . C0.
```

%

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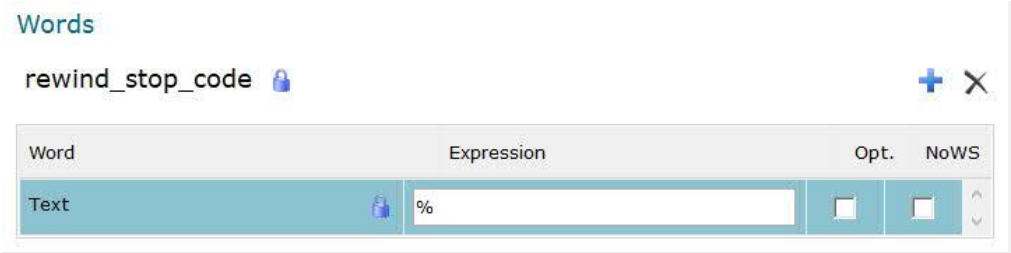
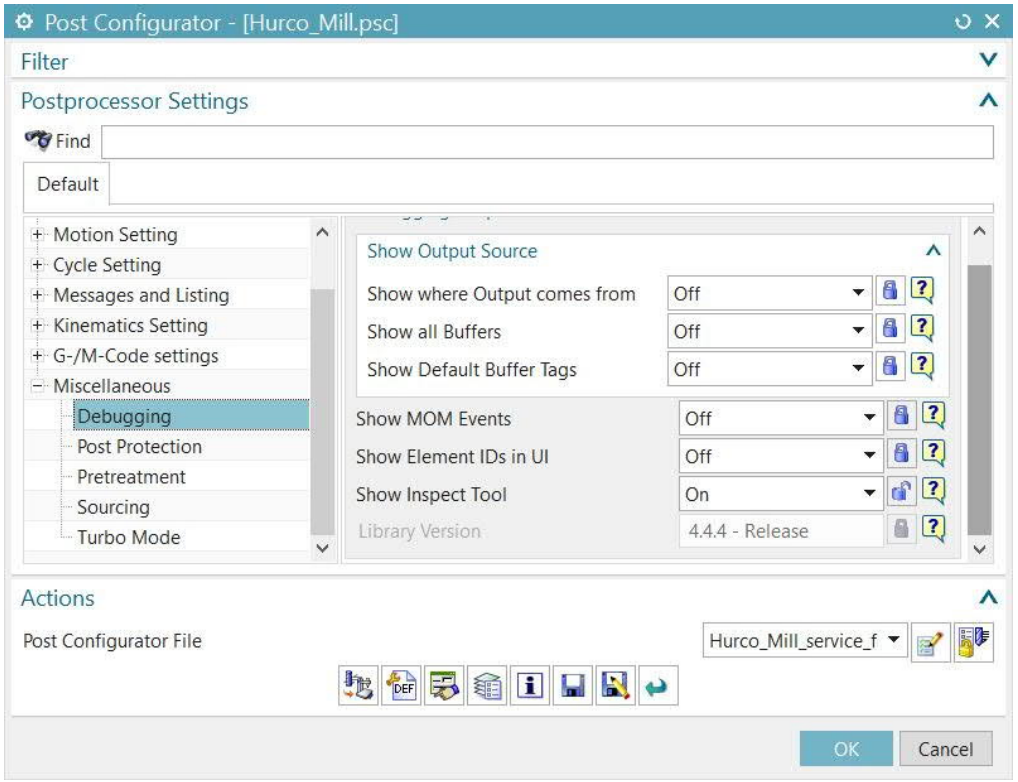
- Test some output.
- The % symbol is missing at the top.
- Open the Definition File Editor.
- Type “rewind” in the filter.
- The rewind_stop_code block template is ready to be placed into the output.
- Select Cancel to exit the Editor.



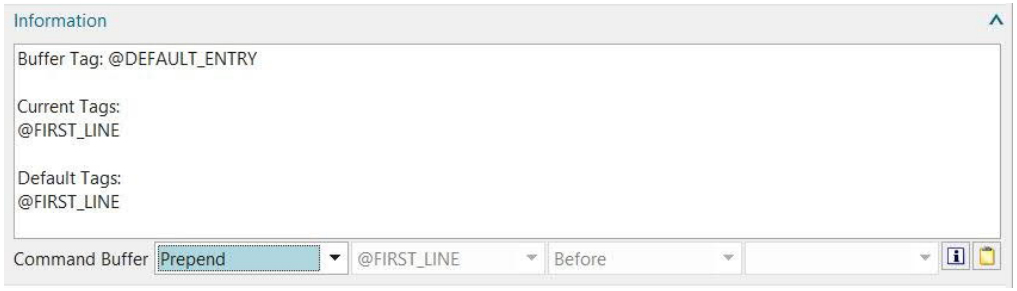
%

- Information from the Inspect Tool is needed to know where to place the block template.
  - Select the Debugging node.
  - Set Show Inspect Tool to On.
  - Post some output again.
  - The Inspect Postprocess Run window will appear along with the Information Window.



%

- Using the three tabs in the window, the desired placement for a block template can be found and the proper command can be copied.
  - Under the NC Output tab select the program number line and see what Mom Event and Buffer ID is listed in the Information group.
    - MOM_start_of_program.
    - LIB_CTRL_nc_header.
  - Find these again under the Buffer Events tab.
- The proper command can be copied to place the % symbol in front of the current output.
  - Select the buffer.
  - Set Command Buffer to Prepend in the Information group.
  - Select the Copy to Clipboard button.
  - Close the dialog.



%

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- The block template and command can now be used to place the % symbol.
  - Select the Edit Post Configurator File button.
  - Paste the copied command at the bottom of the TCL file on a blank line.
- The command exists but more code is needed to call the block template
  - Create a new procedure that turns sequencing off, uses MOM_do_template to call the block template, then turns sequencing back on.
  - Place the name of the new procedure at the <code> placeholder of the pasted command.
  - Create a unique tag name at the <tag> placeholder.
  - Select OK to save the changes and close the file.

```
#-------------------------------------------------------------
proc start_sym {} {
#-------------------------------------------------------------
MOM_set_seq_off
MOM_do_template rewind_stop_code
MOM_set_seq_on
}

LIB_GE_command_buffer_edit_prepend LIB_CTRL_nc_header PROG_NUMBER start_sym _HURCOSTART
```

%

- Test the output again.
- The % symbol is now present.

```
%
O0077
(CREATED BY      : G7DYYX                                  )
(DATE            : 14.01.2019 , 22:39                      )
(PARTNAME        : IDLER ARM_SETUP_1.PRT                   )
N10 G17 G21 G94 G90

(FLOOR_WALL , TOOL : UGTI0212_005)
```

Program Number

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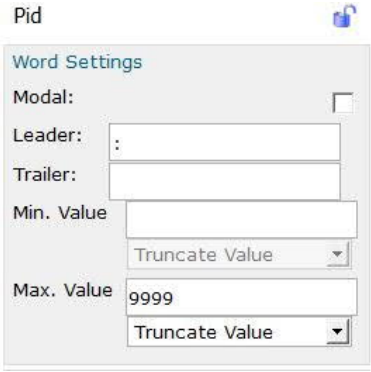
- The default program number has an “O” at the front.
- The Hurco document shows a “:” instead.
  - Edit the Definition File.
  - Type “program” in the filter.
  - Select the header_program block template.
  - Change the Pid word leader to “:”
  - Select OK to save the changes and exit the Editor.
  - Test the output.
  - The program number now looks like the document.



M31

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- The next line shows a M31 (Rotary Axis Encoder Reset) code. This will require a new address in a block template.
  - Edit the Definition File.
  - Select an existing block template that looks similar to the desired output and the + button above the list of templates.
  - Change the expression to a new variable name.
  - Select OK to accept the changes and exit the Editor.

M31

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- Select the Edit Post Configurator File button.
- Create a new global variable named the same as the new expression in the Definition File.
- Create a new procedure that uses MOM_do_template to call the block template.
- Select OK to save the changes and close the file.

```
set ::mom_rot_axis_reset 31

#-------------------------------------------------------------
proc rotary_axis_reset {} {
#-------------------------------------------------------------
MOM_do_template rotary_reset
}
```

M31

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- Post some output and use the Inspect Tool to find a place for the block template and copy the command needed to put it there.
- Paste the code in the TCL file and use the newer procedure in the command along with another unique tag ID.
- If done properly, the M31 should now be visible in the output.

```
%
:0077
(CREATED BY      : G7DYYX                          )
(DATE            : 14.01.2019 , 23:15              )
(PARTNAME        : IDLER ARM_SETUP_1.PRT           )
N10 M31
N12 G17 G21 G94 G90

(FLOOR_WALL , TOOL : UGTI0212_005)
```

Now You Try

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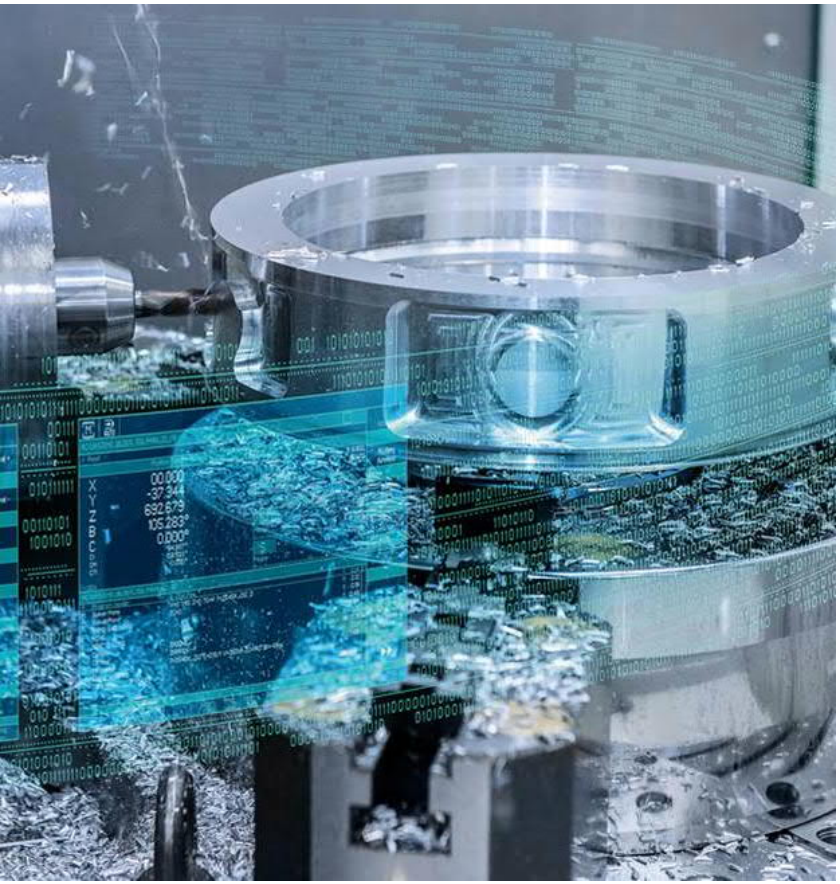
- See if you can place the remaining G and M codes required for the Hurco program header using the Definition File Editor, the Inspect Tool, and custom TCL code.

Program Header:

```
%
:0001
M31     (Rotary Axes Encoder Reset)
M126    (Shortest Angular Traverse)
G0 G20 G40 G80 G54 G90   (Traditional Safety Line)
M140    (Retract Along Tool Vector)
G53  Z0.
G0 X0. Y0. A0 . C0.
```

Content



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Final exercise

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- Create a custom header UDE

- Items (use mom variables):
  - Part name
  - User name
  - Date time
  - Optional drawing number

Optional:
The UDE is shown in top of available events

Q&A

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Thomas Jenensch
Product Portfolio Lead NX CAM Infrastructure
Manufacturing Engineering Software

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