

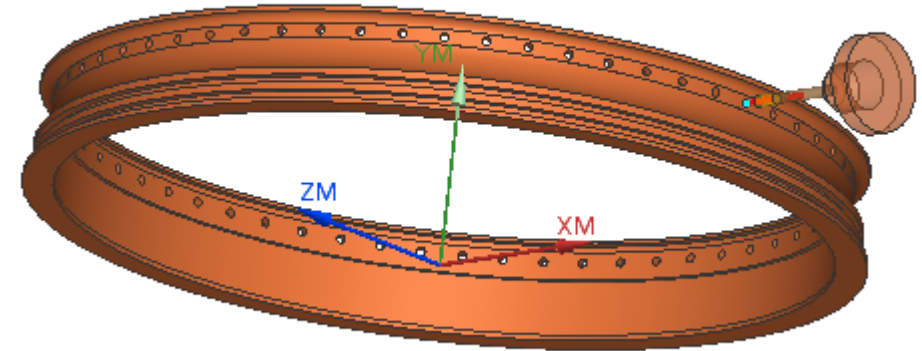
Loop of Macros for Repeated Operations

CAM Automation accelerates Manufacturing

Presented
by
James

NX CAD/CAM Automation Service

Email: Support@nxcadcam.com | Website: www.nxcadcam.com



ABOUT NCCAS

NCCAS (NX CAD/CAM Automation Service) is a group of NX CAD/CAM experts, who have many years' experience in NX CAD/CAM software customization/Implementation/Support, as well as hands-on engineering background in Aerospace, Precision Mold, Oil & Gas, Medical equipment and Semiconductor industries.

We provide complete CAD/CAM solutions for our customers all over the world with excellent customer service. Our services include: NX CAD/CAM system Consulting and Support, NX CAD/CAM Automation tools development, NX Postprocessor development for Lathe and 3~9 Axis CNC machines, Vericut Support, Complicated NC programming and machining, CAD/CAM System technical support, etc.

NX CAD/CAM Automation – ***Accelerating the Design for Manufacturing!***

Nothing is impossible, we can automate whatever you want!

Please feel free to contact us for any question.



Agenda

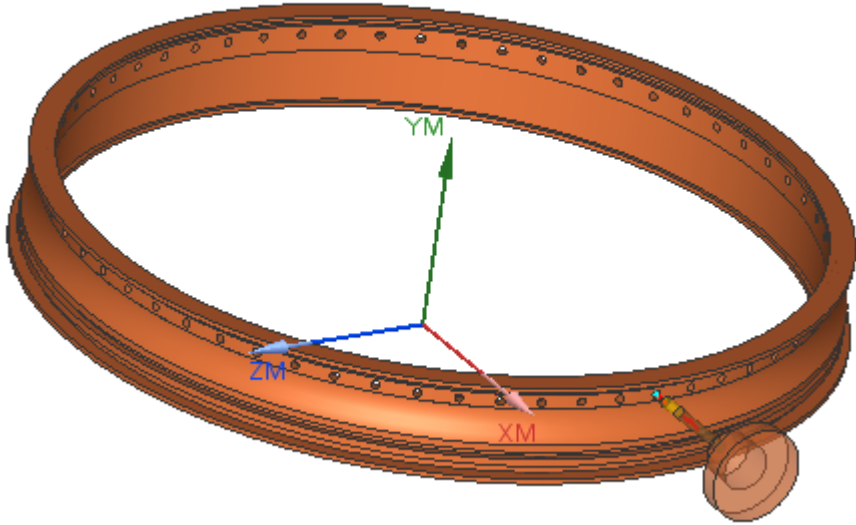
We have done lots of NX postprocessor customizations for many different kinds of special machining applications, we'd like to share our experience and knowledges with everyone. If you are interested in any topics or if you have any kind of customization request, please feel free to contact us.

We listed 10 topics below that we are going to share, I am planning to post one topic per week, but I am sorry if there is any delay, because I have limited time to make the document.

NX Postprocessor Customization for –

- 1. Loop of Macros for Repeated Operations, skipped operation, insert-checking operation. ←**
2. Create your own UDE for special output for G68, Gun drill, Rotary table, etc.
3. Main MCS to Local MCS transform calculation with rotary table.
4. How to switch between Mill and Turn Post by operation type, without using Head UDE.
5. How to retrieve tool gage offset data from Vericut tool data file and output into tape file.
6. Advance NX Post builder technics, tips, programming skills, Knowledge sharing.
7. Example of NX CAM Automation and Postprocessing Automation.
8. Research and study on Swiss Type machine, millturn, multi-channel, multi-axis.
9. L-Head attachment for 5-Axis mill-turn amchine, special output make it easy.
10. Some common customizations: program header, tool list, auto-naming file...

Project Introduction and request analysis



Machining Application and Requests :

- This part has 60 holes equally distributed, some part may have up to 200 holes.
- Need to stop and check the Inserts or change the inserts after drilling a number of holes.
- Need to restart at any number of holes if program was rewind.
- Need to skip some holes if necessary.
- The CNC machine has limited memory, the NC file could not exceed the specified size.
- Program on one hole and for all

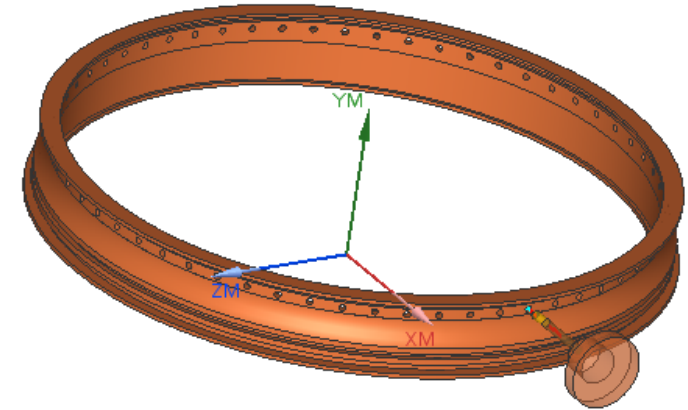
Operation Navigator - Program Order

Name
NC_PROGRAM
Unused Items
✓ 115702
✓ STD_DRILLING_X60

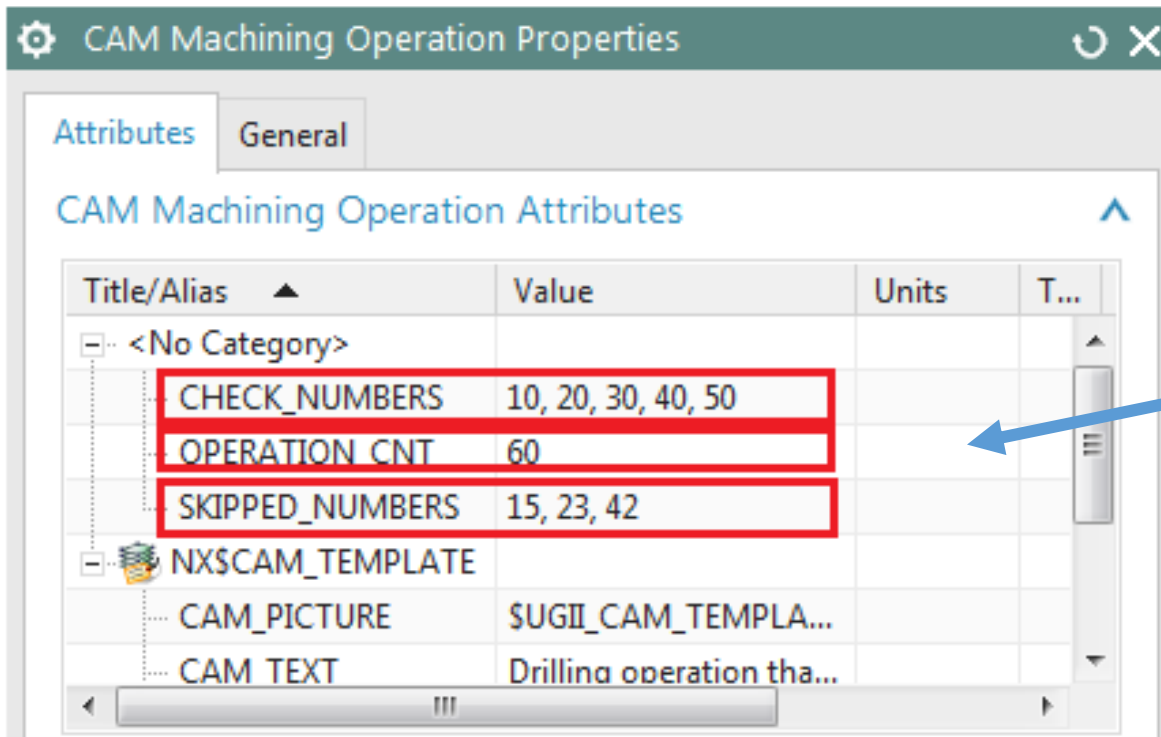
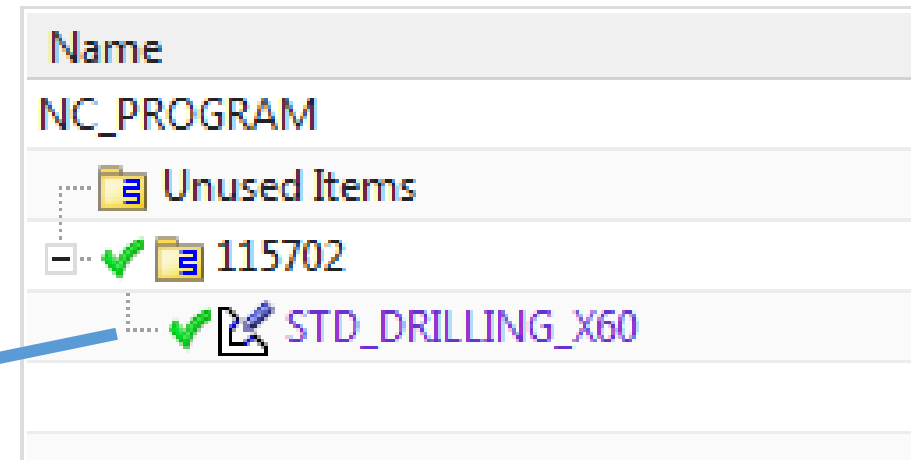
Project Solutions

There are many solutions, such as sub-program, manual indexing, etc. Here we are going to customize the postprocessor to output the loop of macros. The postprocessor will take care of everything, and the CAM programmer need to do the following.

1. Create a single operation on the first hole.
2. Add attributes on the operation, as shown below (Highlight the operation, right click, go to properties).



Operation Navigator - Program Order



Sample Output

Program Header

```
%  
MSG(" PROGRAM NUMBER           1157702 ")  
MSG(" PROCESSED AT      04/21/16   22:42:15 ")  
MSG(" THIS PART IS PROGRAMMED IN METRIC. ")  
MSG(" POST      SIEMENS   840D   LOOP MACROS")  
MSG(" ")  
MSG(" ***** TOTAL 60 POSITIONS ***** ")  
MSG(" R20-LOOP_CNT      R30-HOLE_COUNT ")  
MSG(" R40-LOOP_START    R50-INDEX START ")  
N10 G17 G71 G40  
N15 G90 G94  
N20 G0 G54  
N25 T23 D23  
N30 R20 = 0  
N35 R30 = 0  
N40 R40 = 55  
N45 R50 = 8000  
N50 GOTOF "N"<<R50
```

Start and End of Operation

```
MSG(" ")  
MSG("***** START OF LOOP *****")  
MSG(" ")  
N55 LOOP_1_START:  
N60 G17 G71 G40 G90 G94  
N65 G0 G54  
N70 T23 D23  
N75 S0 M3  
N80 M0  
N85 AROT Y90.  
N90 S0 M3  
N95 G0 Z406.4 M8  
N100 G90 X0.0 Y118.354 D23  
N105 G17 G94 F254.  
N110 MCALL CYCLE82(467.229,391.029,5.08,371.979,,2  
N115 X0.0 Y118.354  
N120 MCALL  
N125 TRANS X0 Y0 Z0  
N130 R30 = R30 + 1  
N135 IF (R30==60)  
N140 R30 = 0  
N145 R50 = 8000  
N150 ENDIF  
N155 GOTOF "N"<<R50  
N160 R30 = R30 + 1  
N165 IF (R30==60)  
N170 R30 = 0  
N175 R50 = 8000  
N180 ENDIF  
N185 GOTOF "N"<<R50  
MSG("***** END OF LOOP *****")
```

Sample Output

Start of Indexing

```
MSG(" ")
MSG("***** START OF INDEXING *****")
MSG(" ")
MSG(" ")
N8000 R20 = R20 + 1
N8005 CASE (R20) OF 1 GOTOF TOOL2001  DEFAULT GOTOF PROGRAM_END
TOOL2001: R40=55
        GOTOF TOOL2002
TOOL2002: MSG(" ")
        MSG(" FOR THE POSITIONING NUMBER  1 ")
        MSG(" ROTATE TABLE TO   90.000  DEGREE")
N8010 G0 B=DC(90.000)
N8015 G4 F5
N8020 R50 = 8030
N8025 GOTOB "N"<<R40
        MSG(" FOR THE POSITIONING NUMBER  2 ")
        MSG(" ROTATE TABLE TO   96.000  DEGREE")
N8030 G0 B=DC(96.000)
N8035 G4 F5
N8040 R50 = 8050
N8045 GOTOB "N"<<R40
        MSG(" FOR THE POSITIONING NUMBER  3 ")
        MSG(" ROTATE TABLE TO  102.000  DEGREE")
N8050 G0 B=DC(102.000)
N8055 G4 F5
N8060 R50 = 8070
N8065 GOTOB "N"<<R40
```

.....

Skip during indexing

```
MSG(" FOR THE POSITIONING NUMBER  15 ")
MSG(" ROTATE TABLE TO   174.000  DEGREE")
N8290 MSG(" SKIP: G0 B=DC(174.000) ")
N8295 MSG(" SKIP: G4 F5 ")
N8300 MSG(" SKIP: R50 = 8310")
N8305 MSG(" SKIP: GOTOB "N"<<R40")
MSG(" FOR THE POSITIONING NUMBER  16 ")
MSG(" ROTATE TABLE TO   180.000  DEGREE")
N8310 G0 B=DC(180.000)
N8315 G4 F5
N8320 R50 = 8330
N8325 GOTOB "N"<<R40
MSG(" FOR THE POSITIONING NUMBER  17 ")
MSG(" ROTATE TABLE TO   186.000  DEGREE")
N8330 G0 B=DC(186.000)
N8335 G4 F5
N8340 R50 = 8350
N8345 GOTOB "N"<<R40
```

End of indexing

```
N9185 GOTOB "N"<<R40
MSG(" FOR THE POSITIONING NUMBER  60 ")
MSG(" ROTATE TABLE TO   84.000  DEGREE")
N9190 G0 B=DC(84.000)
N9195 G4 F5
N9200 R50 = 9210
N9205 GOTOB "N"<<R40
MSG(" ")
MSG("***** END OF INDEXING *****")
MSG(" ")
N9210 PROGRAM_END:
N9215 M9
N9220 M5
N9225 M1
N9230 T0 D0
N9235 G0G53Z0.
N9240 G0X-850.Y350.
N9245 M0
N9250 M30
```

§

Summary

- The sample code above is tested and approved for Siemens 840D Control. We can customize for different control system. Sample operations here only.
- We can add more attributes for Insert checking, Inspection, start angle, etc.
- The operation could be drilling, tapping, boring, it could also be pocket milling, slot milling or any other operation equally distributed on the cylindrical surface.
- You can also have multiple operations in the same loop.
- We can do whatever customization you want.

Please contact us if you are interested in the application, we can provide more information. If you have any other special application request, please feel free to contact us, we will provide you the best solution.

THANK YOU



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