Version 14 : September 2020

Intermediate Tooling Tutorial

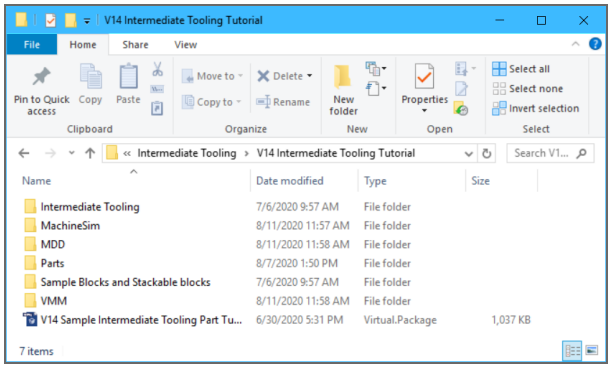
Proprietary Notice

INTERMEDIATE TOOLING TUTORIALS

The easiest and most effective way to learn how to use Intermediate Tooling is to actually create a toolblock and add it to a toolblock library. This is what we will show in this tutorial.

Loading Sample Files

First we must load the files required for this tutorial. In the sample parts folder you will find a folder called V14 Intermediate Tooling tutorial. This folder contains 6 directories, the contents of which will need to be put in the following locations:



1. Copy the contents of the Intermediate Tooling, MachineSim, MDD and VMM folders to the corresponding folders on your system. They will be located here:

   `C:\ProgramData\3D Systems\GibbsCAM\<version>\`

2. Drag the folder Sample Blocks and Stackable blocks to your desktop.
3. Open the Parts folder and drag the file V14 Sample Intermediate Tooling Part.vnc to your desktop.

Intermediate Tooling Preferences

We will now look at the Preferences that can be set for Intermediate Tooling.

Open the File / Preferences dialog and click the Intermediate tooling option.

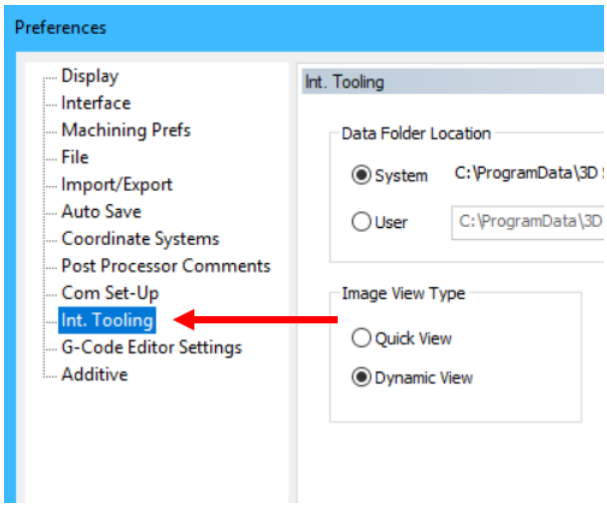


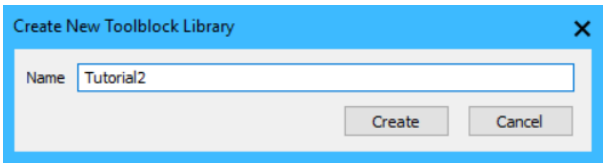
Image View Type can be changed to Quick view if you find that your images are loading too slowly, however Dynamic view enables you to pan around the toolblocks and examine them properly so it is preferable to leave this as the default view.
It is also possible to set up your own location for Intermediate tooling files, simply by clicking the User option for the Data Folder Location and typing your preferred directory location.
This is recommended as it has the advantage that you can always keep the same file location, instead of migrating the files from each software version to the next.

For this tutorial we will be using the default system location for the Intermediate Tooling files.

Creating a new Toolblock library

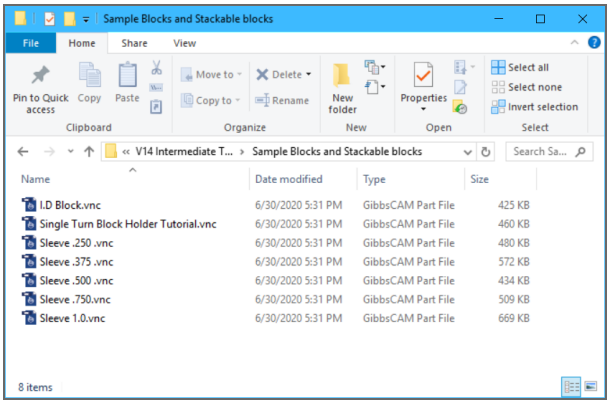
1. Go to Main Menu File>Intermediate Tooling> Toolblock Library and click Create. 

2. Name this new Toolblock library `Tutorial2`.

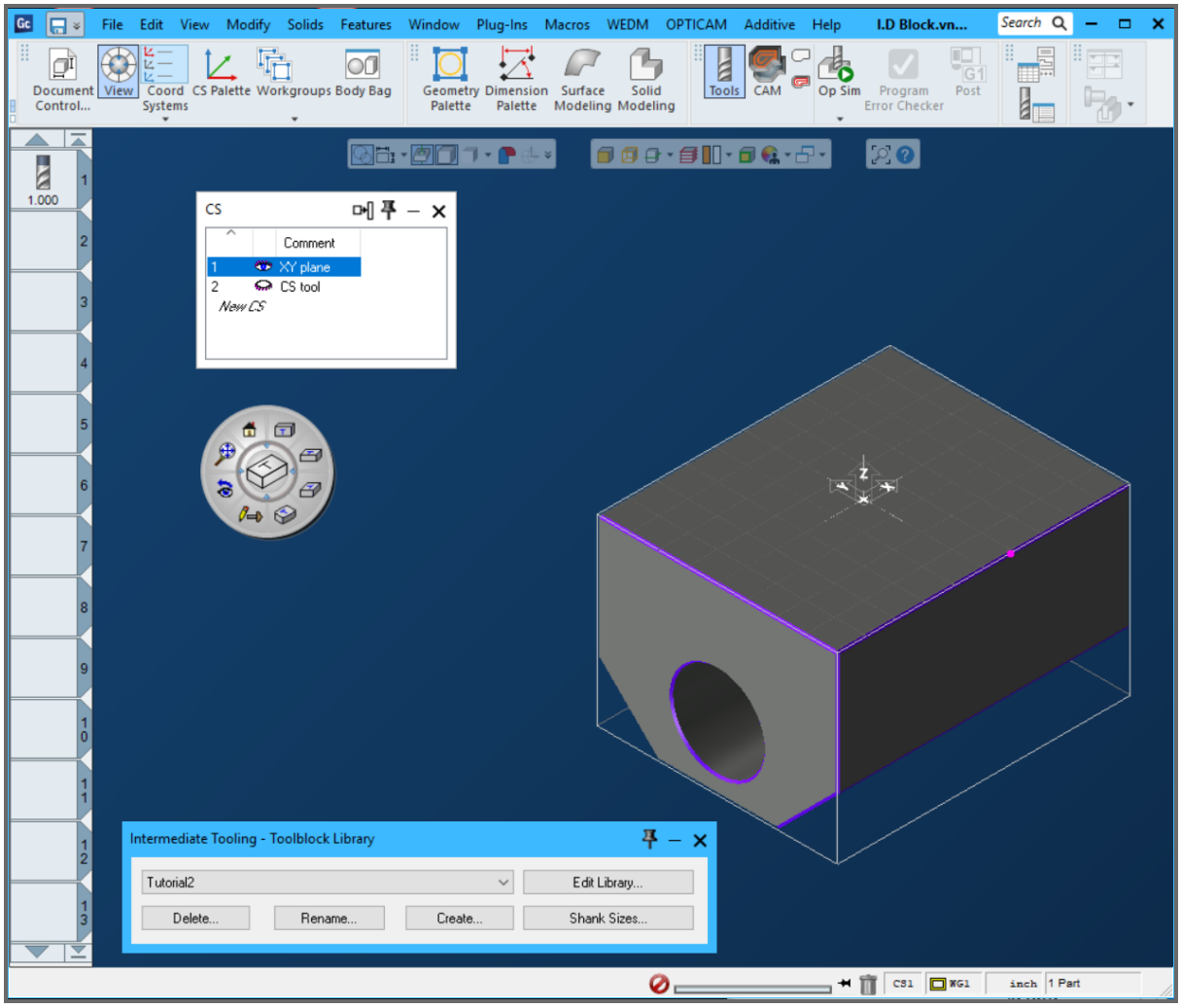


Now we will add a toolblock to the Library.

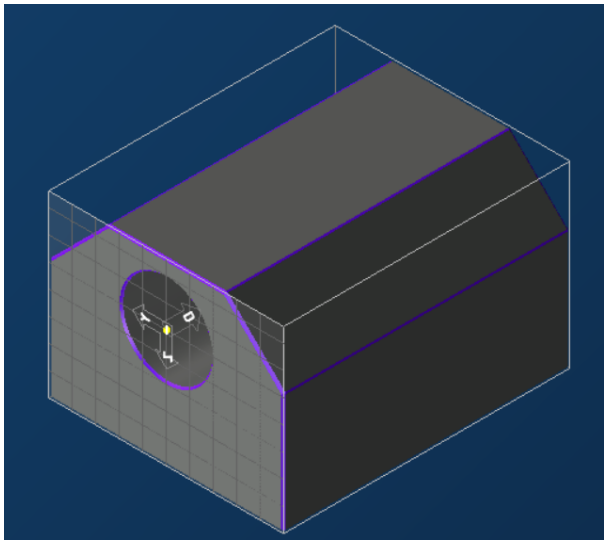
3. Open the Sample Blocks and Stackable blocks folder on your desktop and drag the first file, I,D Block.vnc into your Gibbs Workspace.



4. Examine the part. Open the CS list, you will note that there are two coordinate systems. CS1 which will always represents the root coordinate system of the toolblock. CS1 defines the attachment point to the machine, with Z- facing the turret.

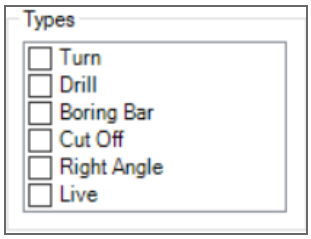


CS2 represents the tool attachment point, with the negative depth axis showing the direction the tool will stick out. (A greater negative value would make the tool stick out more.)



In the Intermediate Tooling dialog, click Edit Library. The Toolblock Data dialog opens. You are presented with a set of options. These options can be valuable to sort large toolblock libraries. Care must however be taken, as checking a particular tool or fitting type will exclude this toolblock from being available with any of the other tool or fitting types.

Types

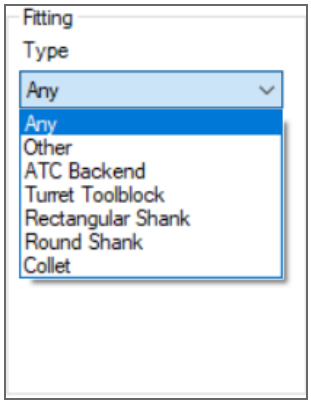


5. We will leave the Types options blank which will allow us to use this toolblock for any tool.

Fitting Type

Much like the Types option, you can also filter the blocks as to which fitting they can be attached to.

ATC Backend and Collet come with a library of standard fittings. For the other options you supply the Height and Width specifications.



6. Again, we will leave this as Any to enable the block to be used with any tool.

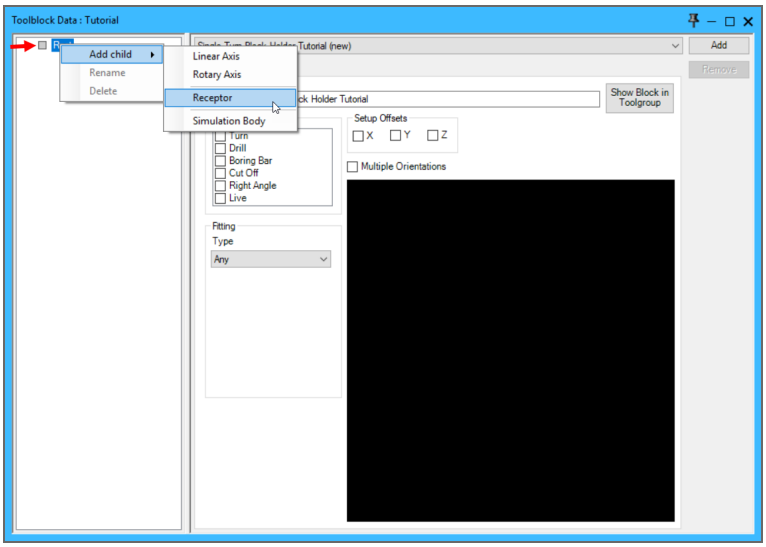
Setup Offsets

If this toolblock has fittings which allow it to be attached to the turret with offsetting, this is where you specify which axis(es) can be adjusted. The actual offset amount is specified within Tool setup Data within the Tool dialog.

Similarly, if the toolblock can be used in Multiple Orientations, checking this enables you to specify how many orientations. Again locations are set up within the Tool dialog.

7. We will leave these options blank also.

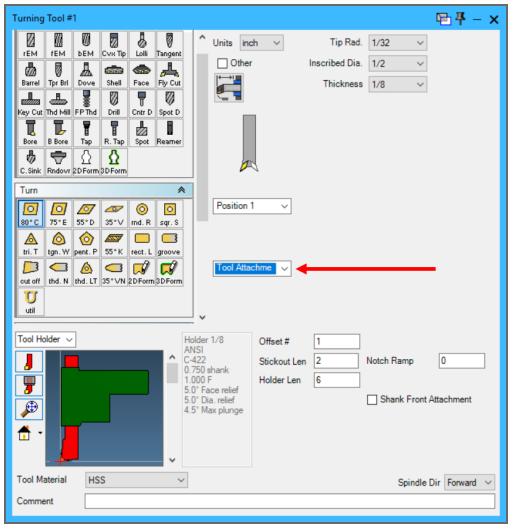
We must now enter the attachment details for the block, which is set up much like a “tree” structure in the panel down the left side of the dialog.



8. Right-click Root and choose Add Child, then Receptor (Tool attachment)

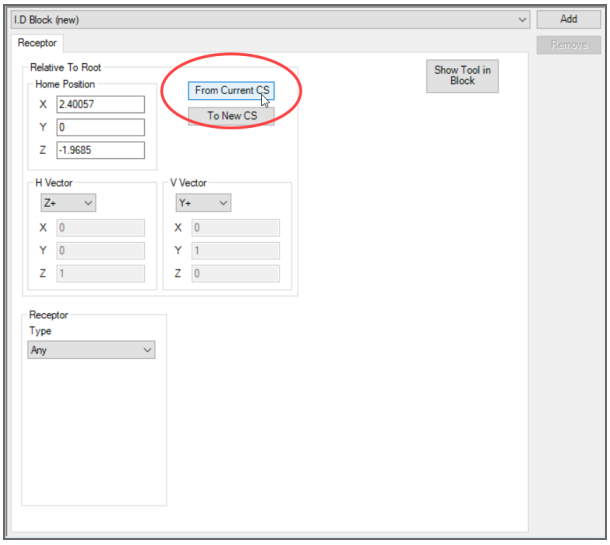
9. You will be prompted to add a label for the node. Type `Tool attachment`.

(This label will appear in the Tool Position dropdown of a Tool dialog as shown in the illustration below.)



We will now specify the attachment point on the block.

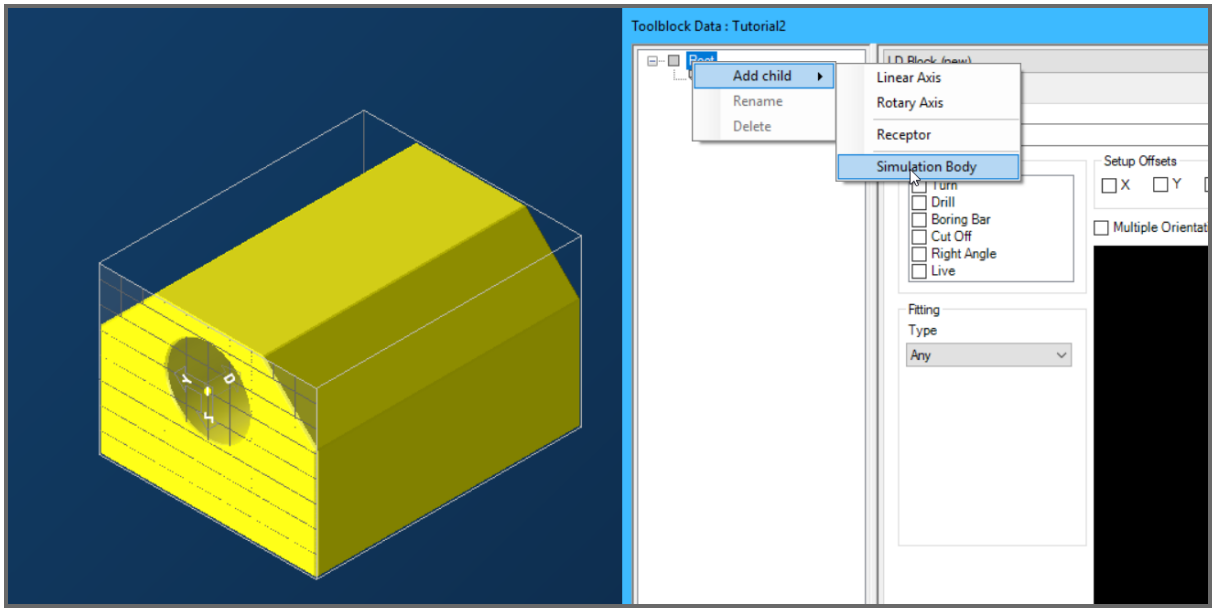
10. Ensure the CS selected is CS2 (the attachment CS) and click the option From Current CS.



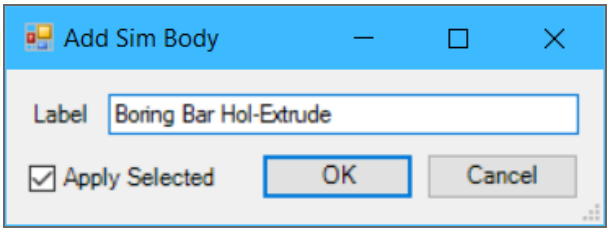
We can define the Receptor (Tool attachment) type here if you wish to sort and filter the receptors. Again, care must be taken with this as you may filter out valid options by mistake. We will keep this as Any.

We must now select a body to be displayed in simulation.

11. Select the part (it will turn yellow) and in the dialog right-click the Root node and choose Add child/Simulation Body.

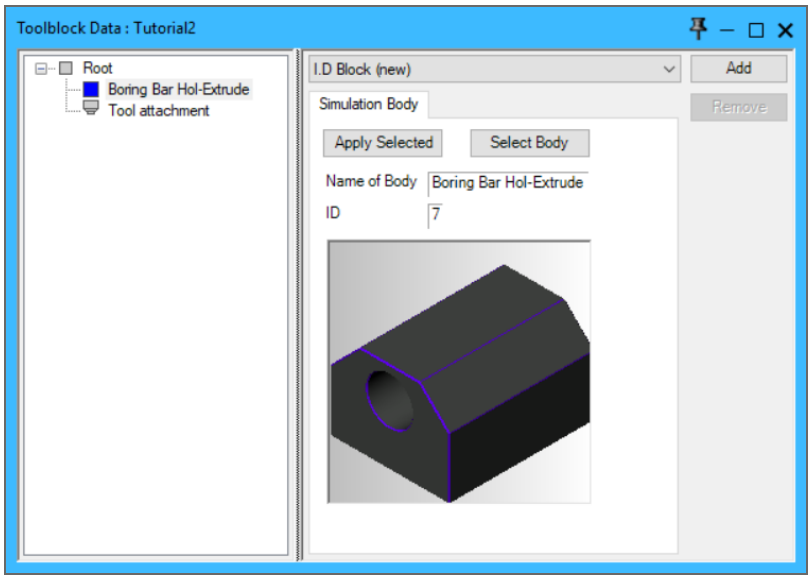


The Body Property name of the toolblock appears by default. Note that the checkbox Apply Selected is already checked. You can accept this label name, or choose your own, however it will only be visible in the Attachment Assembly dialog within intermediate tooling, not anywhere else.



12. Click OK.

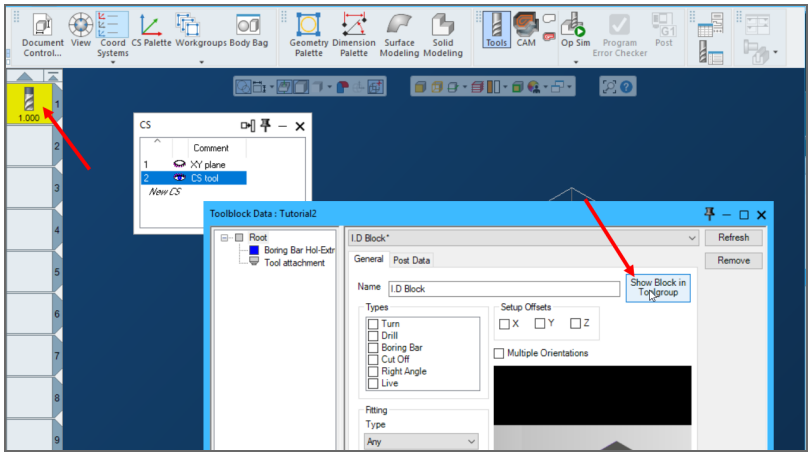
The Toolblock Data dialog will now look as follows.



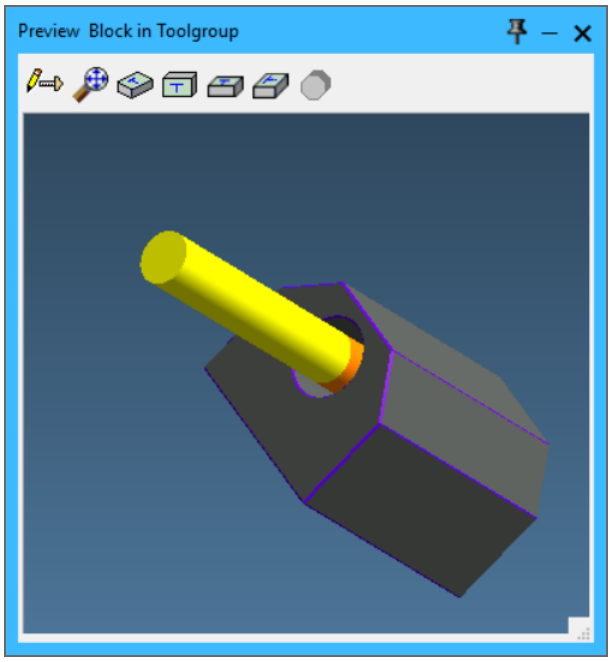
13. Click the Add button in the top right corner of the dialog to add the Toolblock to the library.

14. Now we should check that we have created the toolblock correctly.

15. Select a tool from the toollist, then click the option Show Block in Toolgroup.

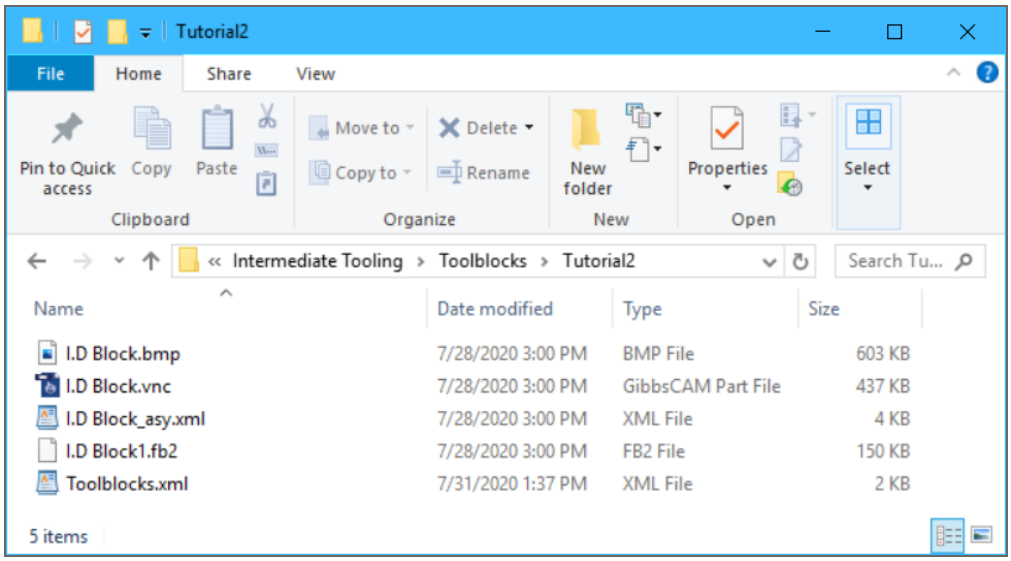


The Preview Toolgroup dialog opens, showing the tool correctly protruding from the holder.



Close this preview and the toolblock data dialog, but leave the Intermediate Tooling Library dialog open, we will be adding more toolblocks.

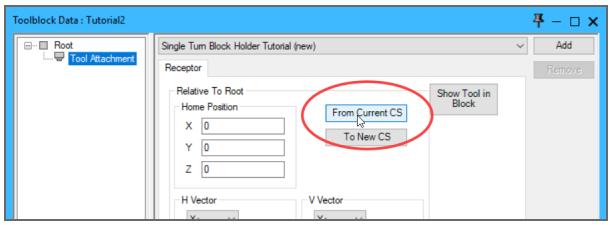
1. Open file Single Block Tool Holder Tutorial.vnc. You will be prompted to save changes in the previous file.
2. Click No, as the required files will already have been saved in the Intermediate Tooling directory when you added the block to the library. Check your Intermediate tooling directory. You should see the following files.



3. In the Intermediate Tooling dialog click Edit library.
4. Right-click the Root node, select Add child then Receptor and label it `Tool Attachment`.
5. Click OK.

6. Open the Coordinate system dialog and ensure the Tool Position CS is selected (CS2).

7. Now click From Current CS in the Receptor tab.

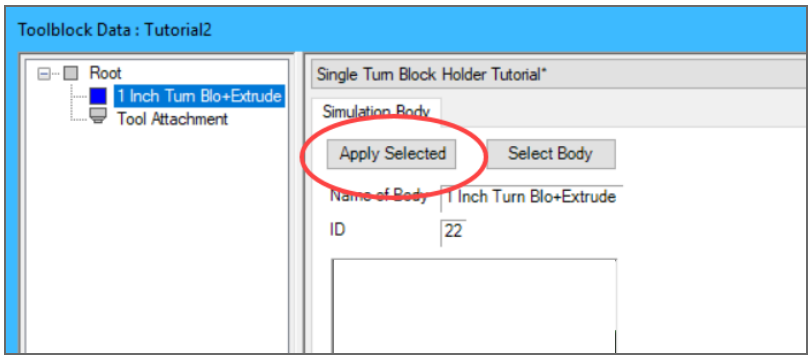


The coordinates are automatically loaded from the current CS (CS2).

Now we must add a simulation body.

8. Click the part body to select it, then right-click the Root node in the Toolblock Data dialog. Select Add child, then Simulation body. The Add Sim Body dialog appears. Accept the label (the name is taken from the Body Properties). Apply selected is already checked, so just click OK.

If you forgot to select the body you will need to type in a label name (which will only be visible in the toolblock Data dialog), click OK to close the label dialog. Now click the body to select it. You will then be able to select Apply Selected as shown below.

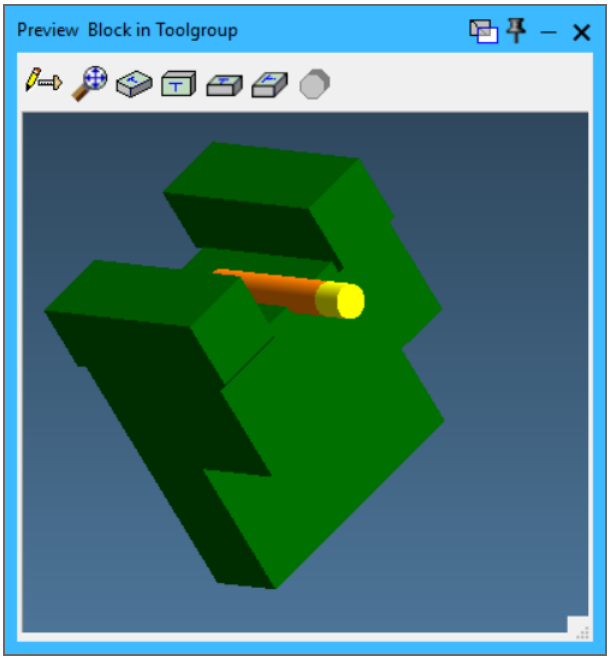


9. Click Add in the top right of the dialog to add the Toolblock to the library.

Now we should check a tool can be correctly inserted in the block.

10. Click Tool #1 in the toolist to select it, then in the Toolblock Data dialog, click Show Block in Toolgroup.

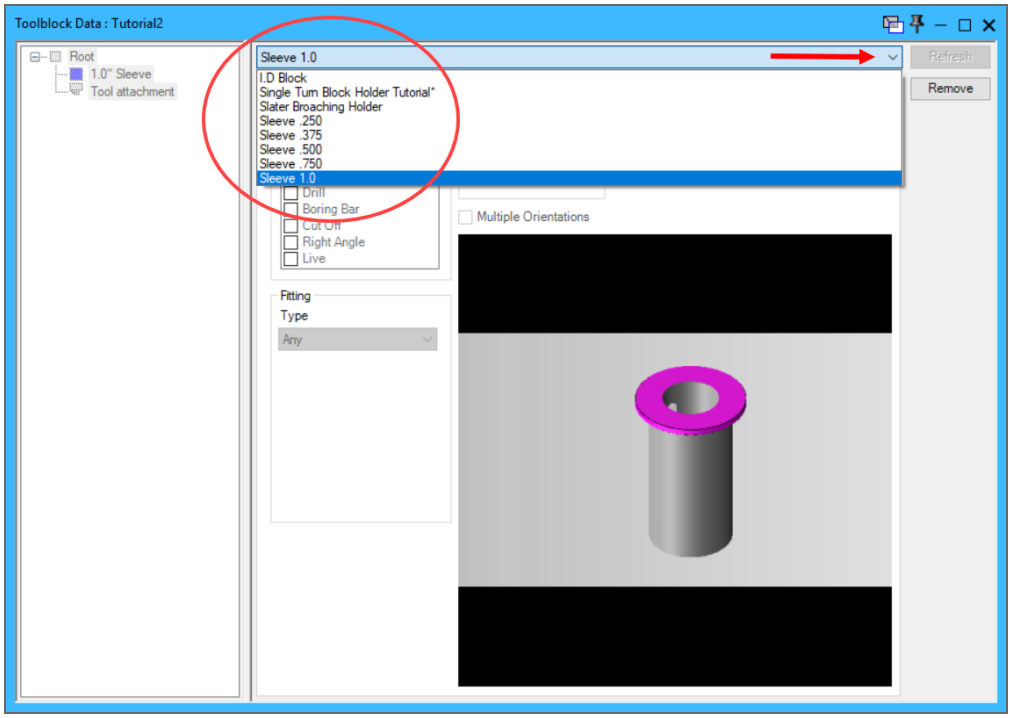
The tool looks correct.



11. Close the Toolblock Data dialog, leaving the Intermediate Tooling dialog open.

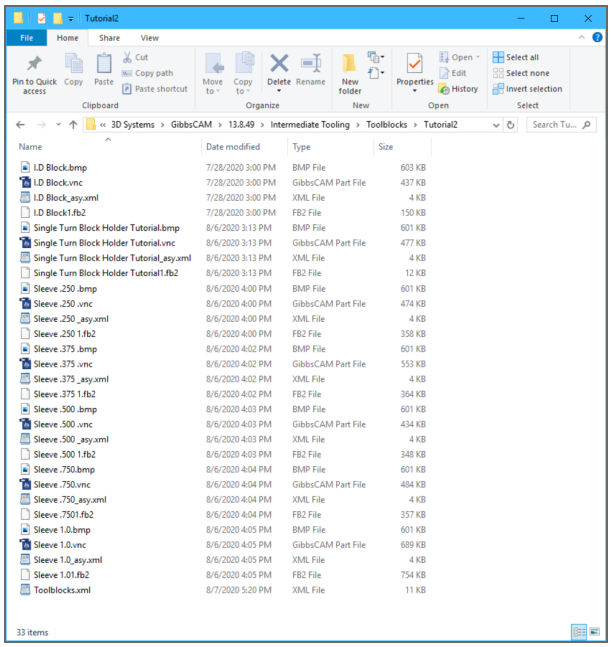
The next five toolblock files to be added are sleeves of varying sizes which will be used (stacked) in conjunction with the previous holders to actually hold the tools. They are added in exactly the same way as the previous files. You will notice the flanges are different colors to enable easy identification.

12. Click the dropdown arrow on the right of the toolblock title. The seven toolholders should appear as shown below.



13. You have now added all the toolblocks and can close the Intermediate Tooling dialog. 

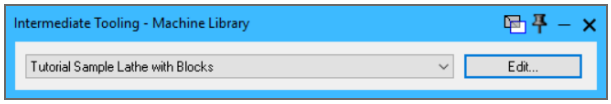
14. If you'd like to check, your Toolblock directory will look as follows:



Adding the toolblock library to the Machine data file

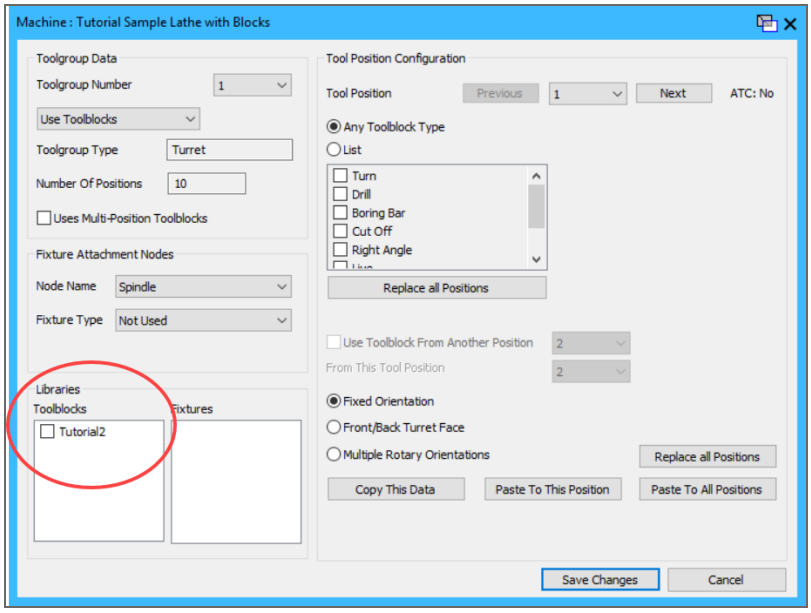
In order to use the toolblock library with our machine we have to open the Machine data file and add the library to it.

1. Go to File / Machine Data. 



2. Click Edit.

3. Check the Libraries Toolblocks option for Tutorial2, our toolblock file.



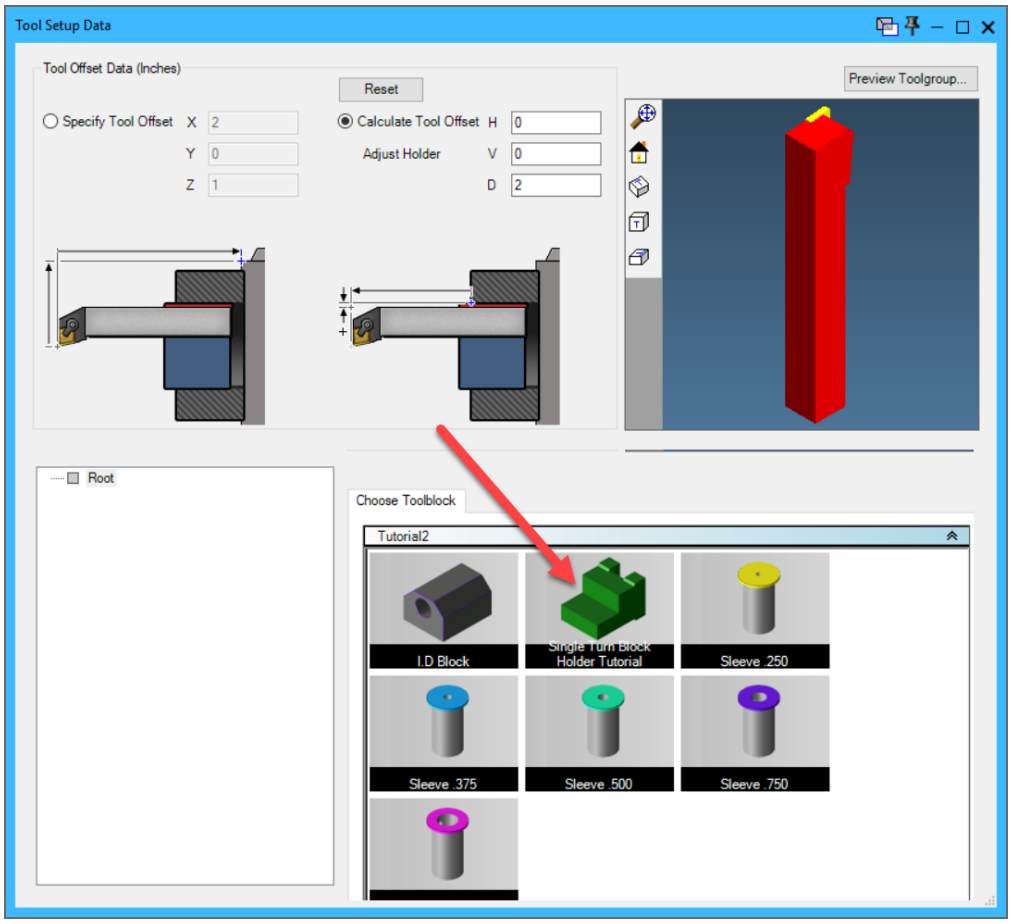
Adding toolblocks to tools

We are now ready to add our new toolblocks to our tools.

1. Open file V14 Sample Intermediate Tooling Part.vnc. The part has eight tools and nine operations already defined.

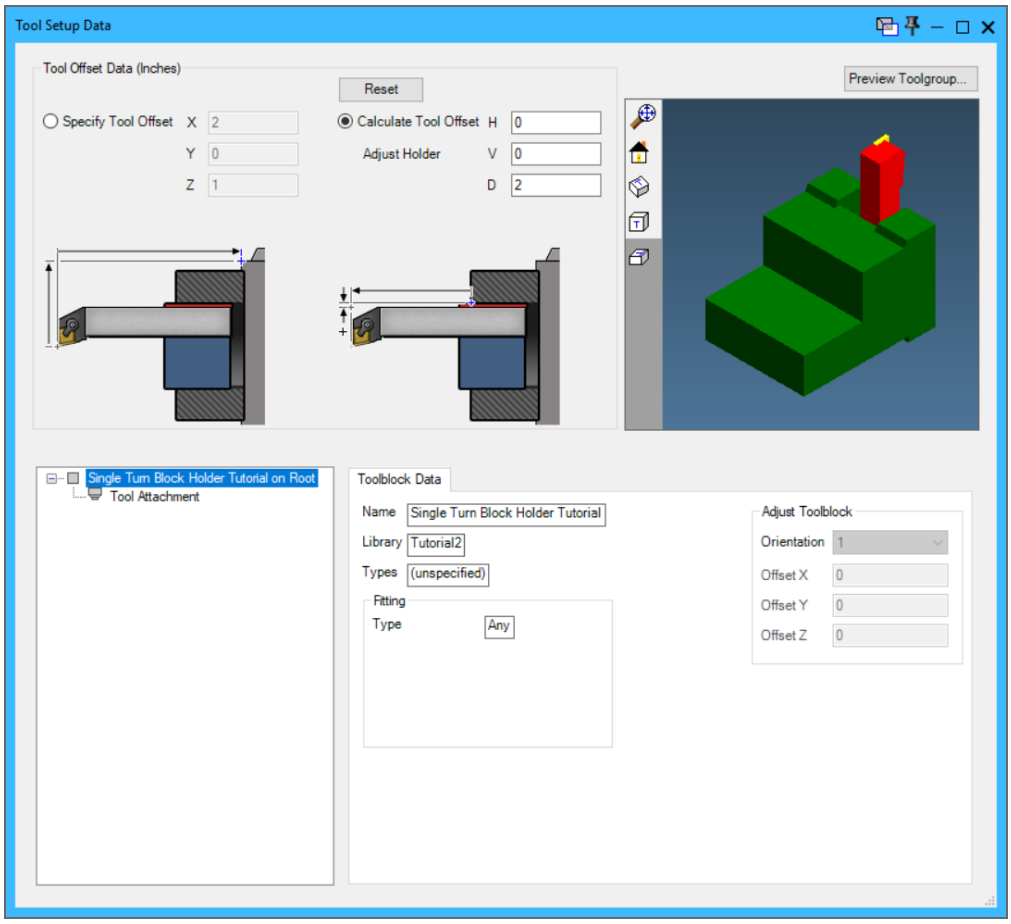
2. Open Tool #1 (Lathe tool) and click the Tool setup button.

The Tool setup dialog appears, displaying all the toolblocks we set up earlier on in the tutorial.



We will now add the Single turn block to this tool.

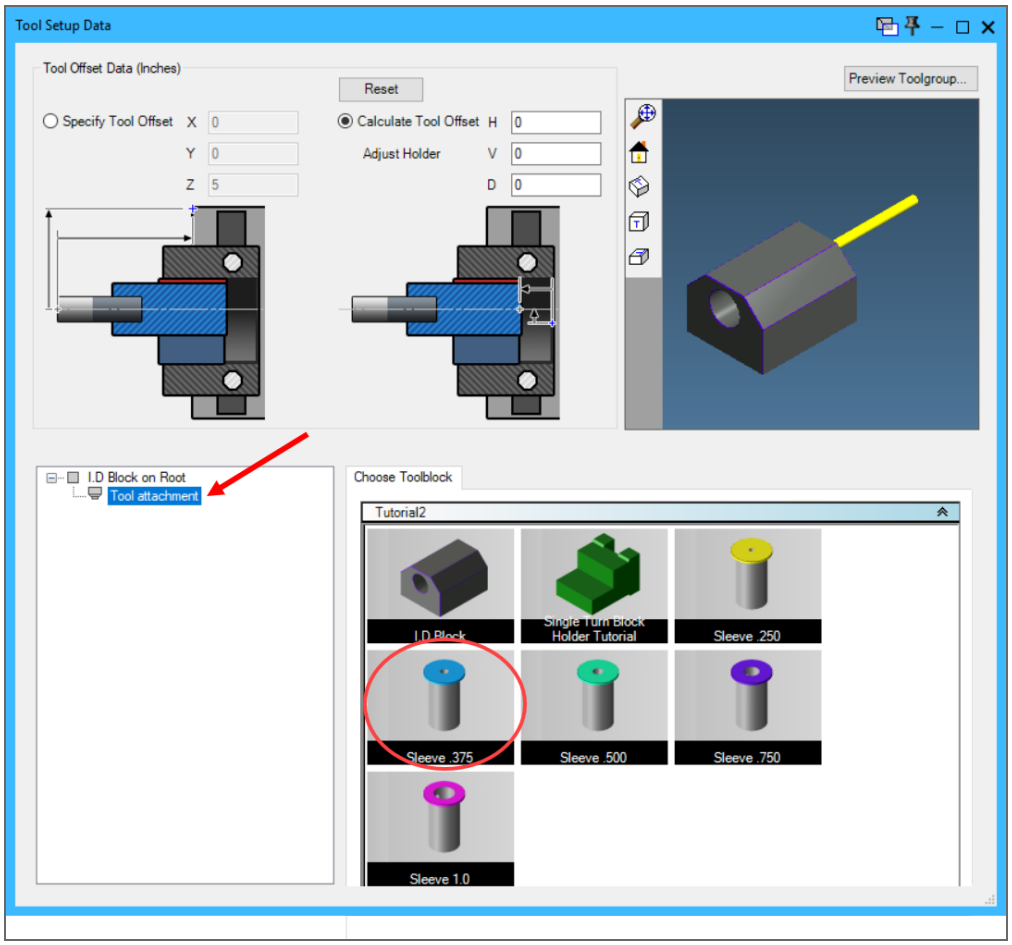
3. Simply click the block displayed in the toolblock section as shown above. The block appears in the setup dialog.



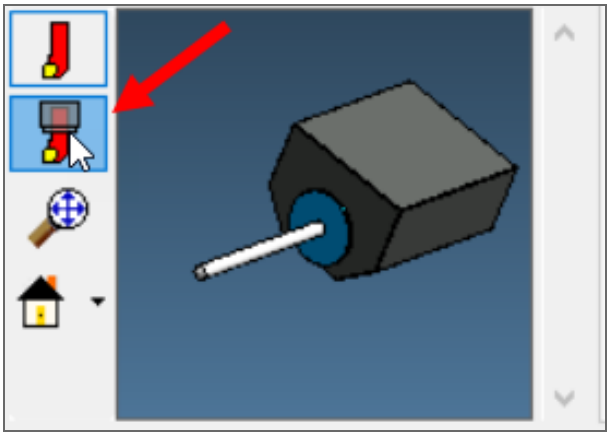
4. Close the tool dialog and open Tool #3 (Drill). Click the Tool Setup icon.

We will add a toolblock and sleeve to this tool.

5. Click the ID Block to add it.
6. Now click the Tool Attachment node as shown below and click the Blue sleeve (which is the correct size for this particular tool).



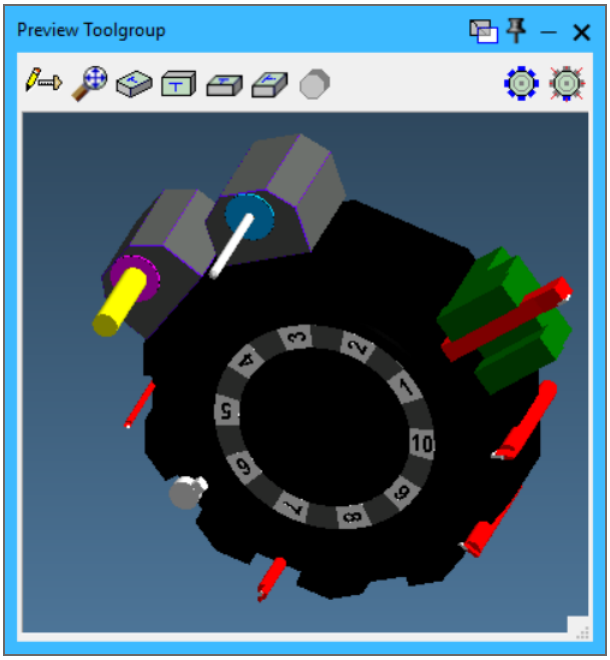
7. Close the Tool Setup Data dialog. Now look at the tool dialog. If you look at the tool pane at the bottom you will notice the Toolblock view icon. Click this to view the tool displayed within the toolblock. Close the tool dialog.



8. Close the tool dialog and open Tool #4 (Drill). Click the Tool Setup icon.

9. Click ID Block to add this to the tool.
10. Now click Tool attachment node in the tree display and then click the pink sleeve to add it to the ID Block. This is the correct size sleeve for this drill.

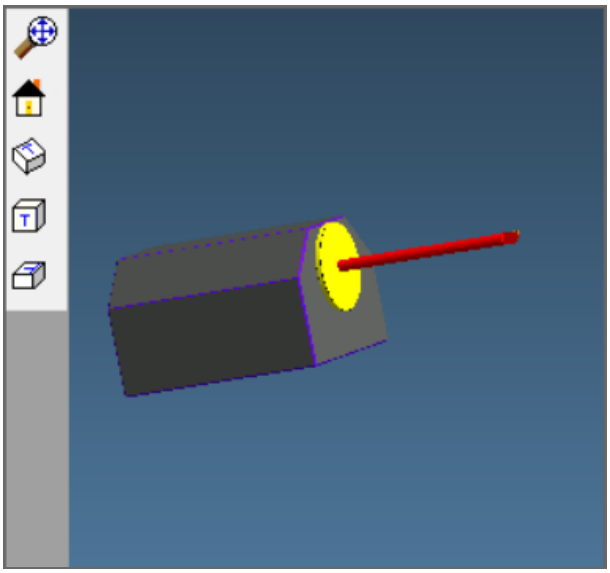
11. Click Preview Toolgroup in the Tool Setup Data dialog to ensure all is correct.



12. Close the Tool Setup Data dialog and the Tool dialog.

13. Open Lathe Tool #5 and click the Tool Setup button.

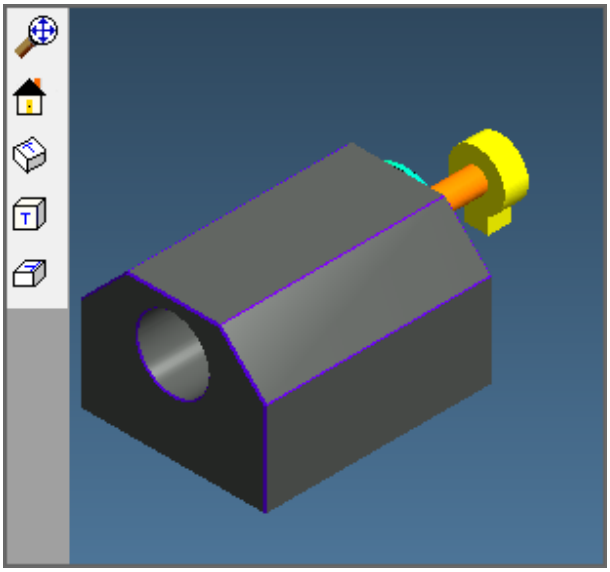
14. Add the ID Block to this, click Tool attachment, then the yellow sleeve. Your preview screen should look as shown.



15. Close Tool Setup dialog and Tool #5 dialog.

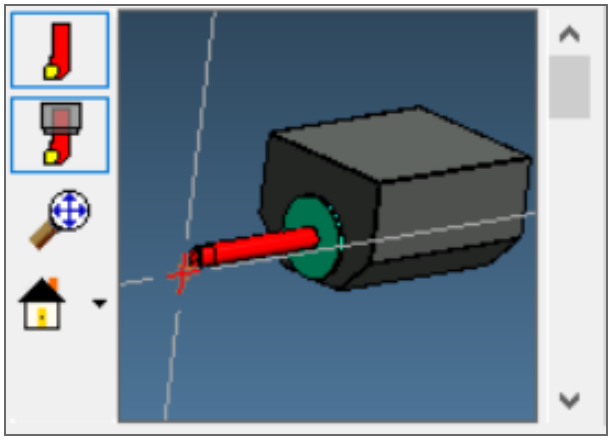
16. Open Tool #6, the broaching tool, and click the Tool Setup button.

17. Add the ID Block to this, click Tool attachment, then the green sleeve. Your preview screen should look as shown.



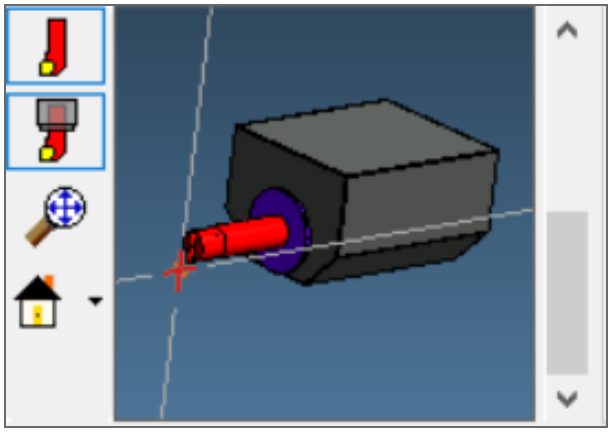
18. Close Tool #6 dialog and open Tool #7.

19. Add an ID Block to this, then add the green Sleeve to it.



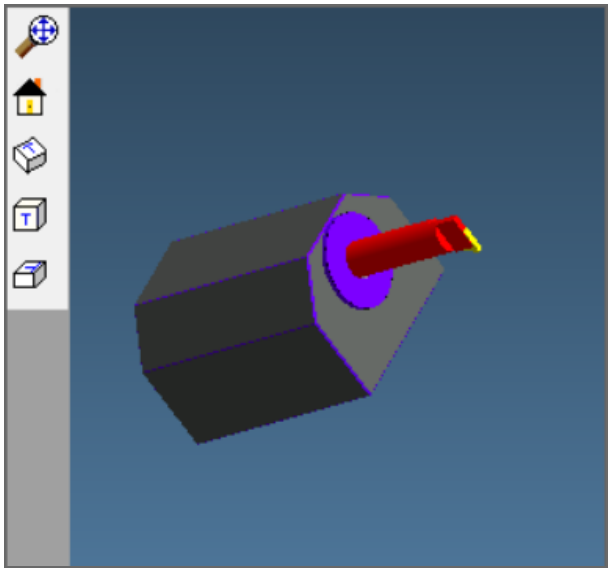
20. Close Tool #7 dialog and open Tool #9.

21. Add an ID Block to this, then add the purple Sleeve.



22. Close Tool #9 dialog and open Tool #10.

23. Add an ID Block to this, then add the purple Sleeve.



24. We have now set up all the toolblocks we require for this part. Go to Machine Simulation and run it.