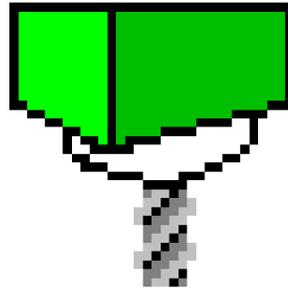


## Surfcam CNC-Milling Software

File import, Milling Path creation, export to Precis 3-Axis CNC-Mill

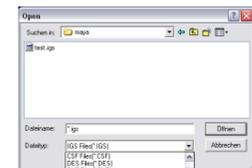


# SURFCAM 2001

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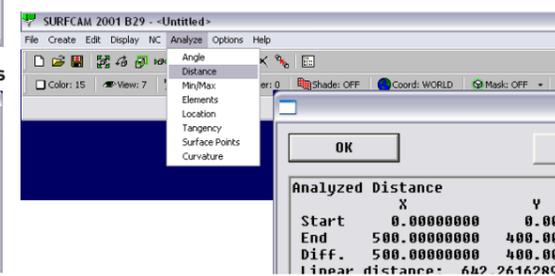
## 1. Import and analyze Data

1. File - Open, choose file type, then directory



2. verify size of model

- Analyze - Distance
- make sure the geometry is properly located, (within positive X / Y space) if not, use:
- Edit - Transform - Move** and the appropriate transformation



3. organise file onto layers



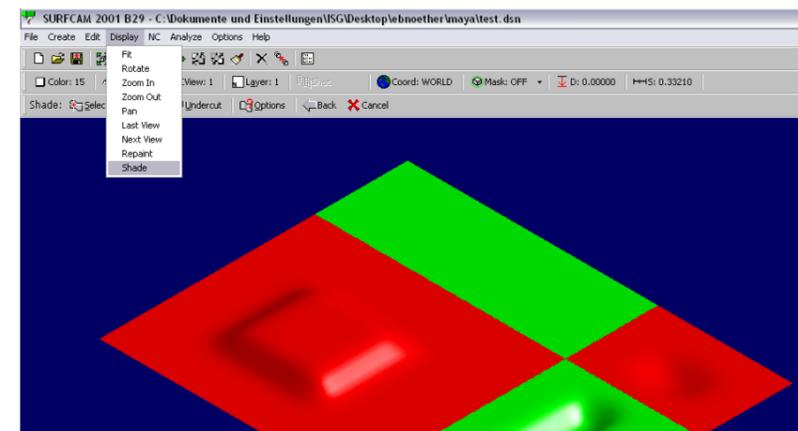
4. Viewport

To change the view onto your model, use the view port. Note that "View" is the view YOU have onto the model while "CView" is MACHINE's view - if want to do any job modification, make sure that "CView" is set to "1" (top view), so that the machine looks at the geometry in plan (from top down), just like the mill does in reality.



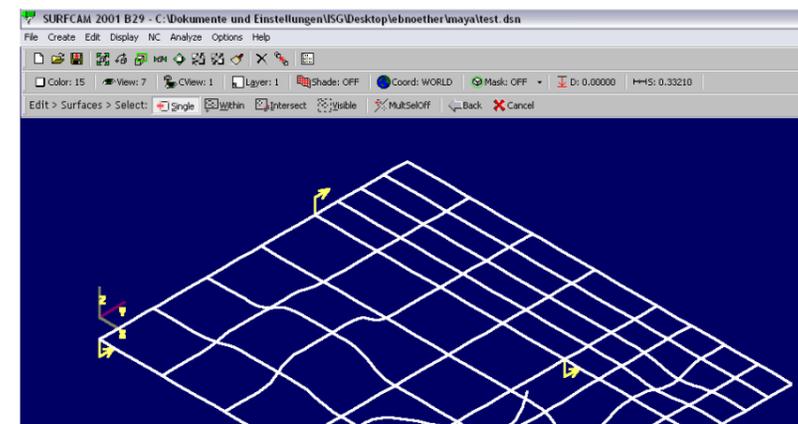
## 2. Verify Data

1. check direction of surfaces: Display - Shade - Undercut all surfaces shaded red face the wrong way (face normal pointing down)

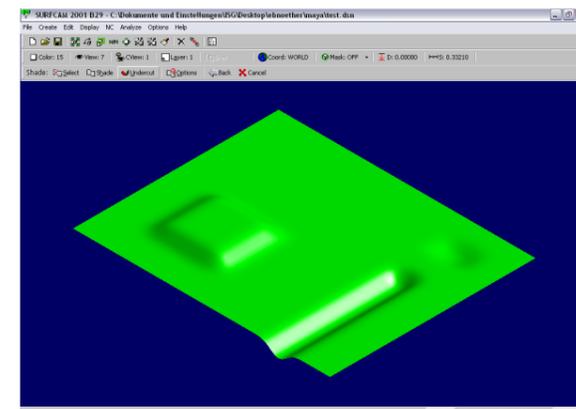


2. to change direction of surfaces: Edit - Surfaces

- Arrow: displays the surface vector
- Side: flips the direction of the surface
- Direction: toggles between U / V direction of surface



3. re-check direction of surfaces



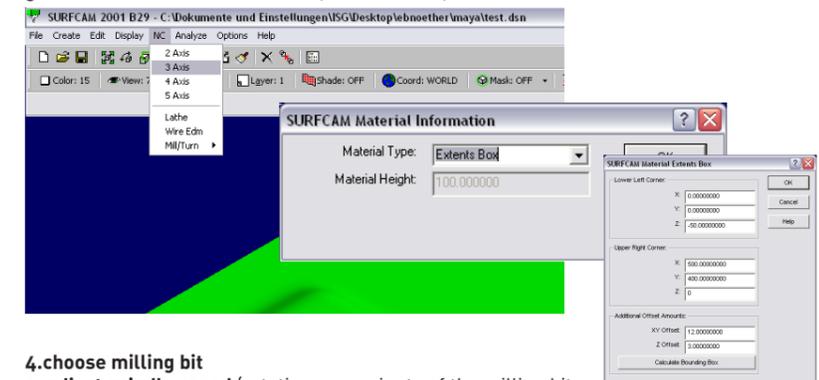
... now, SAVE THE FILE - Surfcam does not have an "UNDO"-Option !

## 3. RoughCut

A rough cut is used to rapidly remove most of the material which is not needed.

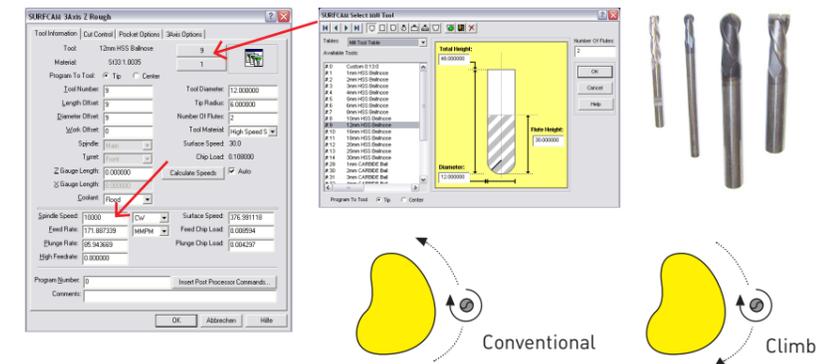
1. NC - 3-Axis - Z Rough

- 2. Select the surfaces to rough (Visible)
- 3. Define the size of the material (block of foam)



4. choose milling bit

5. adjust spindle speed (rotations per minute of the milling bit, 10'000 is good for foam)

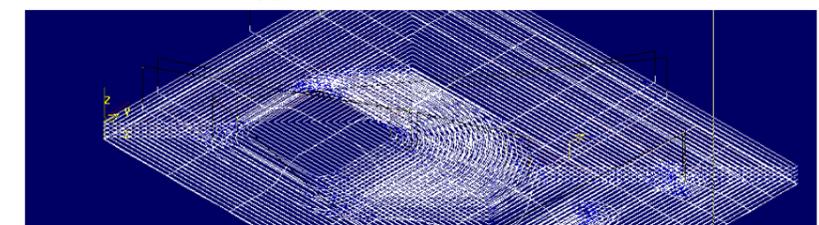


Conventional      Climb

6. more parameters:

- Cutting Method:**
  - Conventional: a contour is milled counter-clockwise
  - Climb: a contour is milled clockwise
- Stock to Leave:** amount of material which is not removed
- Rapid Plane:** height the mill moves to when changing position: make sure it is **higher** than the top surface of your material / block of foam !
- Surface Tolerance:** can be set to 0.25, makes generation of toolpaths faster
- Z / XY Step Size:** distance of the milling paths to one another, use Z-Step Size = Bit-Radius for wood, use Z-Step Size = Bit-Diameter for foam. - Example: 12mm Bit, Z-Step Size in foam: 12mm

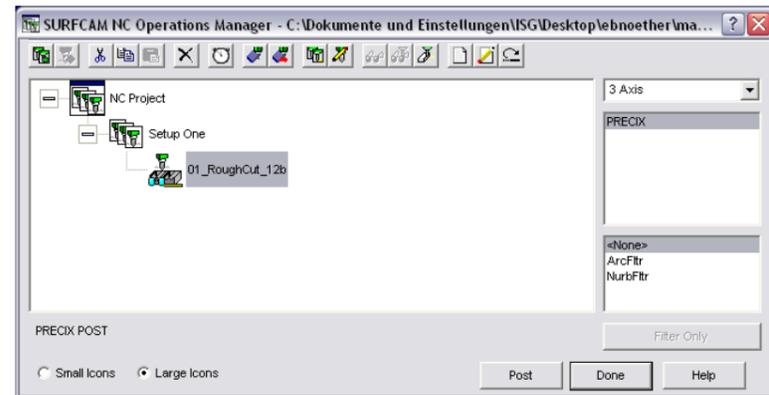
7. watch the toolpath being generated



### 3. RoughCut (cont'd)



- in the Operations Manager, **rename** the toolpath indicating
  - the order in which it is milled (01 ... 99)
  - what type of cut it is (RoughCut)
  - which tool / milling bit is being used (12b = Ballnose Cutter, 12mm diameter)



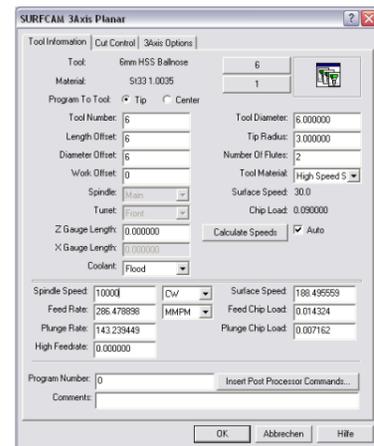
9. **SAVE !**

### 4. Fine Cut (Planar)

- NC - 3-Axis - Planar**, choose surfaces to cut



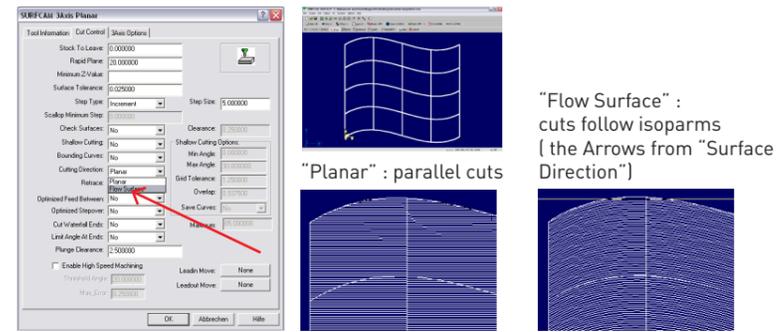
- set tool and spindle speed
- set "Stock To Leave", "Step Size" and "Rapid Plane"
  - make sure the rapid plane is well above the material block !
  - remember the "Rapid Plane" Setting, you'll need it later (when setting up the mill).



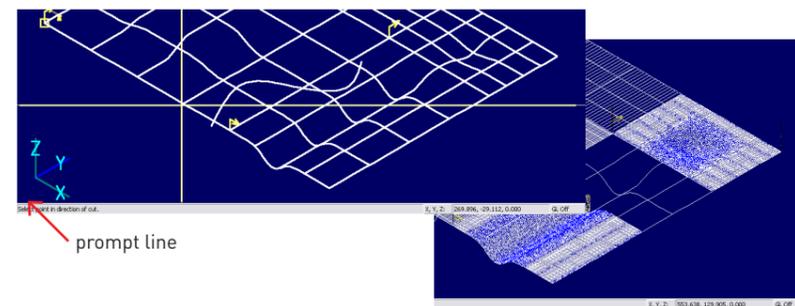
examples of textures with different "Step Size" settings

### 4. Fine Cut (cont'd)

#### 3b. Planar vs. Flow Surface



- for a **planar cut**: set direction of cut (follow directions of the prompt line)



#### 5. Special - Bounding Curves

To only machine part of your (larger) surface: draw a closed Polyline/Spline above your geometry which acts as a boundary. In the dialog box, set "Bounding Curves" to "Yes", you will then be prompted to select the curve.

6. **SAVE !**

### 6. Cut

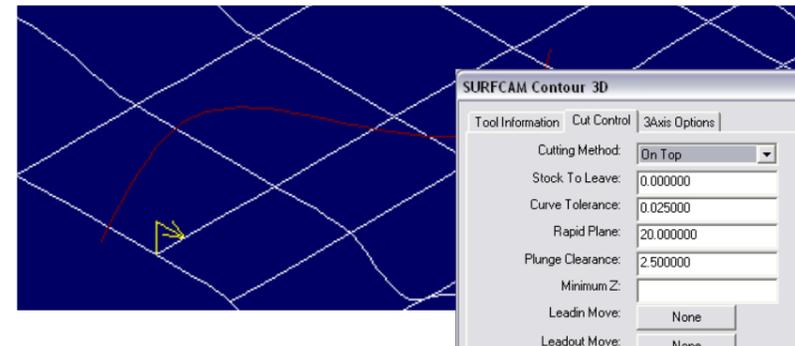
#### 1. NC - 3-Axis - Cut

"Cut" is very similar to "Planar-Flow Surface", it also follows the isoparm direction, but:
 

- with "Cut" you can only select one surface at the time
- it cuts steep geometry more accurately (more controls).

### 7. Contour 3D (Line cutting)

#### 1. NC - 3-Axis - Contour 3D, choose lines to cut

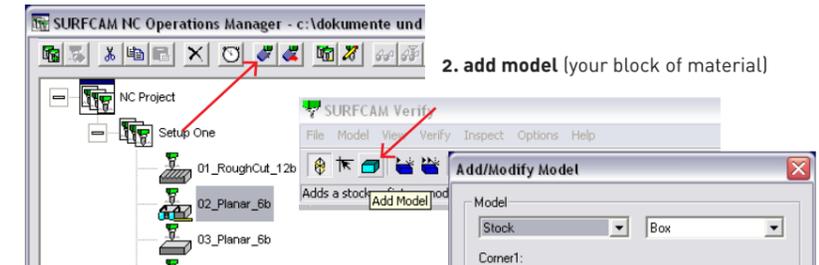


- set "Cutting Method" to "On Top" and the other parameters as fits
- make sure the rapid plane is clear of the top of your material / block.

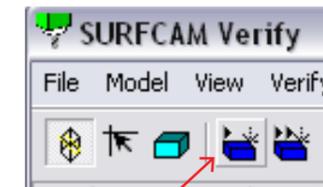
3. **SAVE !**

### 7. Verify Milling Jobs

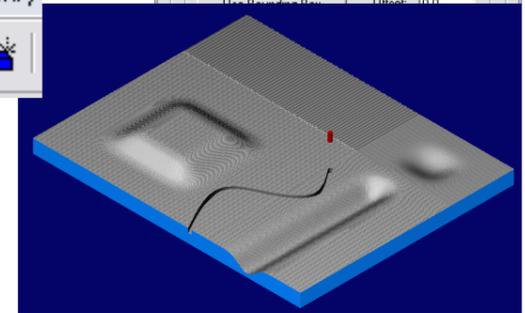
- select job / folder and click "Verify"



- add model (your block of material)

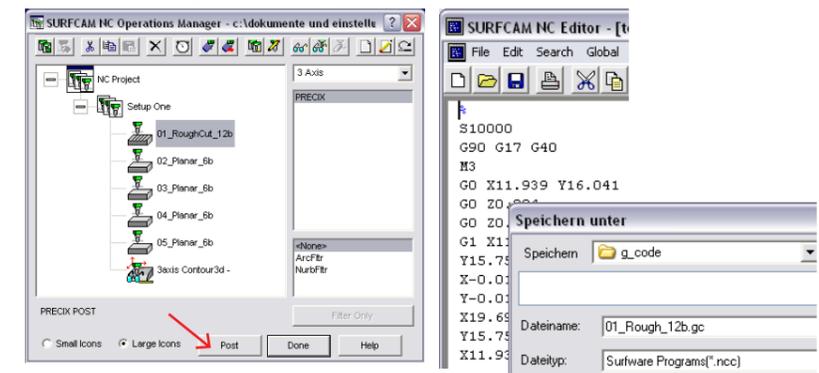


- hit "Play" and check visualized result. Note that for intricate paths the representation is not very accurate.



### 8. Export and send .gc-File to Precix

- in the Operations Manager, choose a job or folder and press "Post"
- save the resulting file as "01\_myjob\_12b.gc" - **important: file ending .gc (G-Code)**



- find precix (the mill's computer) on the network : **IT NEEDS TO BE TURNED ON !**
- upload the .gc file to the students folder on precix (the mill's computer)

