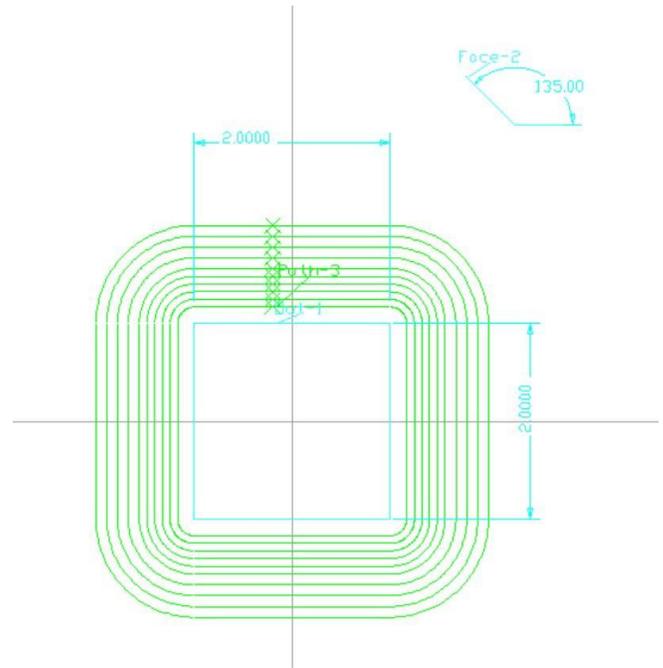




Use of the Sweep utility:

The Sweep command is for attaching a cross-section (Face) around the top view (Plan). The top view (X & Y) can be an open or closed shape. The system will generate multiple passes around the plan contour, generating a swept surface that is defined by the cross-section.



This paper will cover the subject three sections.

- A) The example: This part
- B) The Explanation: How it's interpreted
- C) The Parameters: What's important

In this example, we will cut a simple 2" square with a 45 deg sweep. Don't worry about flat bottom, on the Face-2, that will be explained later.

This utility will simply attach the cross section around the top view, offsetting for the ballnose or corner-radius endmill. It can only use the information it is given and will not assume anything. See the pics below for an explanation of why a single 45 deg line is usually not enough information.

<p>In this pic, we are showing the relationship of the tool tangency as viewed from the side. The green bullseye shows the start and end tangency. The yellow bullseye shows the point the coordinates are generated from.</p> <p>At the top, without a line representing the top surface, it will drive the tangency point to the line. Same for the bottom. If you would like a skim pass at the top or have a bottom, make sure to include the top surface and the floor.</p>		<p>In this pic, we are showing the relationship of the tool tangency as viewed from the side. Notice how the horizontal line, representing the bottom of our Z-axis depth, forces the tool to stop short of reaching the tangency point at the end of the 45deg line. At the top, a line representing the top surface will make sure to include that surface as well.</p>	
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Tips for Sweep command

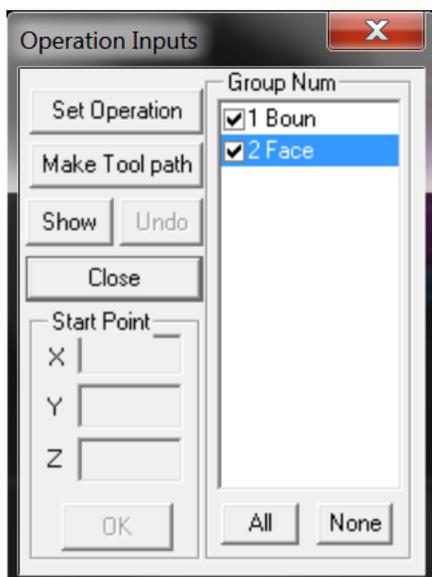
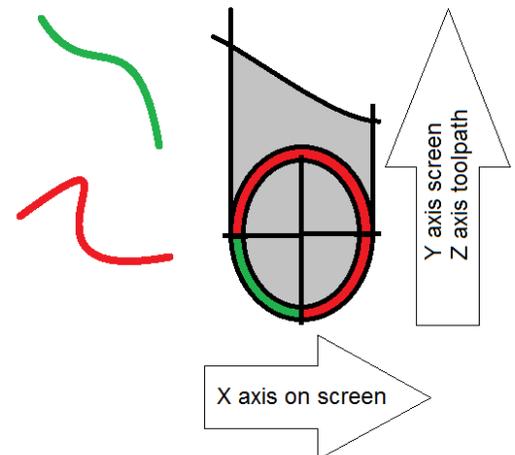
This is a simple example, but the cross section may be very complex.

The top view group could be a, Outline, Pocket Boundary. The toolpath will differ depending on the group:

- 1) Outline group; The shape must be close (same start & end). The toolpath will be on the outside and the clockwise or counter-CW will be determined by the tool side parameter of the tool page.
- 2) Pocket group; The shape must be close (same start & end). The toolpath will be on the inside and the clockwise or counter-CW will be determined by the tool side parameter of the tool page.
- 3) Boundary group; The shape can be open (different start & end). The toolpath will be on the right side or left determined by the tool side parameter of the tool page.
- 4) The top XY group must be numerical lower the face group. i.e Outline-3 and Face-4

The cross-section contour, normally a Face group may be defined anywhere on the screen. When sweeping, it will be relocated so that its Y values are translated to Z values and its X value represents a radial offset distance from the plan contour. The highest Y value, of the face, is where the Z-axis starts.

All points on the face, must be able to contact an imaginary ballnose endmill from 6:00 to 9:00. This graphic shows an acceptable range. Green is good, red is bad.



A ball-nosed tool is normally used with this operation. The tool path shows the path of the tip of the tool, not the center of the ball-nose. A corner-radius endmill may also be used.

After the groups have been defined and [Sweep cross section] selected from the Mill operation menu, this dialog menu will appear. Select both the groups. You may hit the [Show] button to make sure you have the desired groups.

Tips for Sweep command

With the sweep operation, most of the commands are used the same as any operation. Some are used a little different. The operation parameters are used as follows.

- 1) Total Stock: This is the amount of stock to remove at each Z level.
- 2) Step: this is the desired X/Y step at each Z level.
- 3) Finish Stock: The amount of stock to leave on the overall part.
- 4) Cap Radii: 'On' if you want to cut an arc, at sharp corner, rather than a sharp over cut.
- 5) The CDC is generally ignored since offsetting would have to be perpendicular to the surface and the control doesn't have enough smarts.
- 6) Max Cusp: This determines how many Z level passes are desired. Smaller numbers will place the passes closer together. The result is a smoother finish, but larger G-code file.

