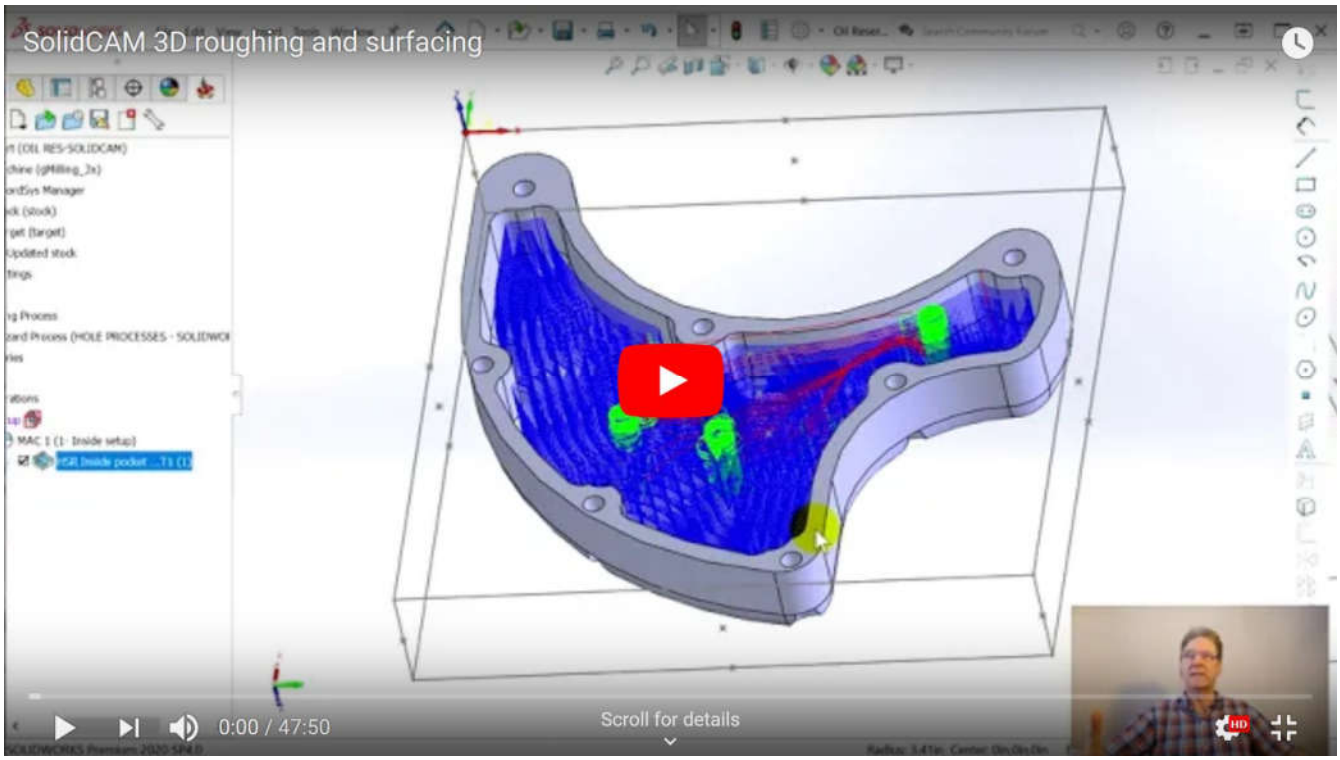
RAKO STUDIOS

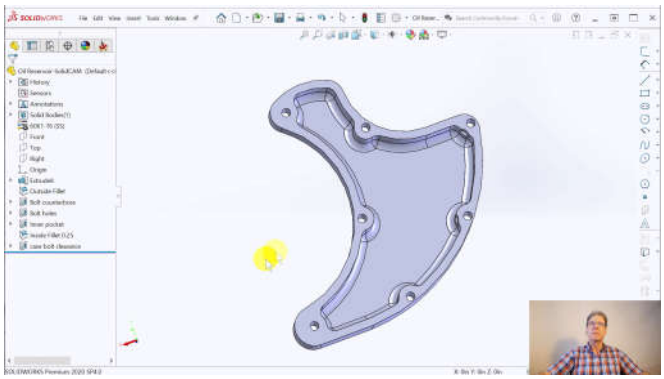
SolidCAM 3D roughing and surfacing

SolidCAM has two surface toolpaths in the base package. 3D roughing, 3D machining, and 3D iMachining are extra cost.



Original file here.
Completed file here.
SolidCAM does 3D milling but most of the operations are in extra-cost modules from the approximately $5k base package. If you get high-speed surfacing, 3D roughing, 3D machining, and 3D iMachining (adaptive toolpaths), then the cost is well over $10k. Each of the four modules is around $2k, but you do usually get a discount depending on the time of year. To their credit, they do include two surface operations, constant-Z and level, in the base package. Still, in the base package you won't be able to do any radial 3D or other swoopy toolpaths where all three axis of your mill are moving at the same time.

There is also the problem that these 3D operation dialog boxes are all different from 2D and different from each other. If you are not a daily user, it is easy to get turned around. A chamfer is a drop down on the right of the dialog in a 2D chamfer, and a check box on the right in a 3D chamfer dialog box. Clicking either opens a new tab that you may or may not notice. 3D chamfer is in the base package. The interesting thing is most every CAM company uses a third-party software from ModuleWorks in order to generate 3D toolpaths. BobCAD tries to keep the dialog boxes looking the same, but SolidCAM seems to make a whole new structure to deal with the front-end to the ModuleWorks kernel.



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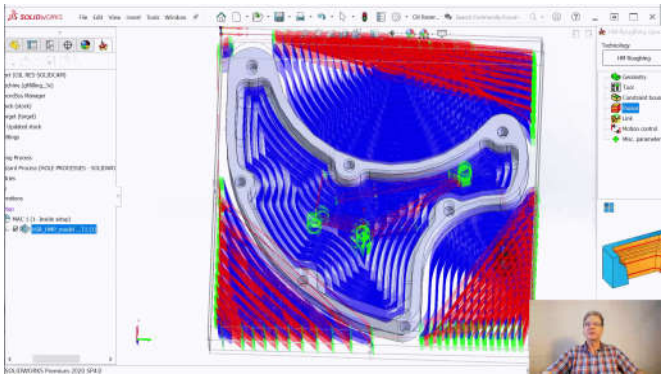
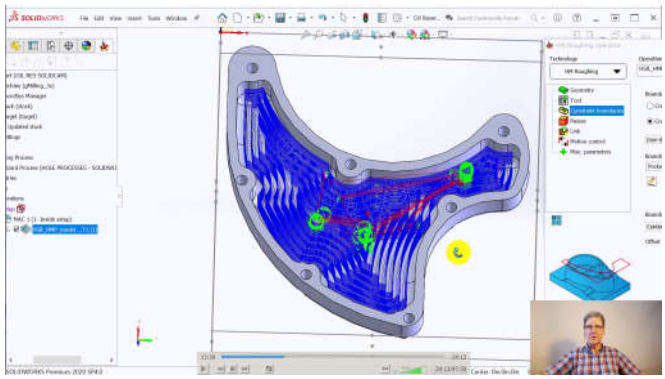
I took a part I designed for my aftermarket Sportster engine to try out SolidCAM 3D. I designed the part so most of it can be done in 2D. The big pocket above could be done with two 2D pockets, a deep one to get most of the way down, and a shallow one to get down to the flat floor of the pocket.

Rather than this, I used the HSR (high-speed roughing) module to hog out the pocket. Rather then selecting edges or faces, the geometry is just the whole solid model.



The first crack has the roughing do the whole stock profile. It is pretty simple to go from "automatic" boundary selection to "user defined". Then just make the inner edge of the pocket be a boundary and things clean up. This will limit the toolpaths to the inside of the part the way you intend. All this power comes a price, both for the module and for the time to compute and to simulate the toolpaths. Because of this, I would use the dual 3D pocket method. 3D roughing does makes sense for sloped walls.



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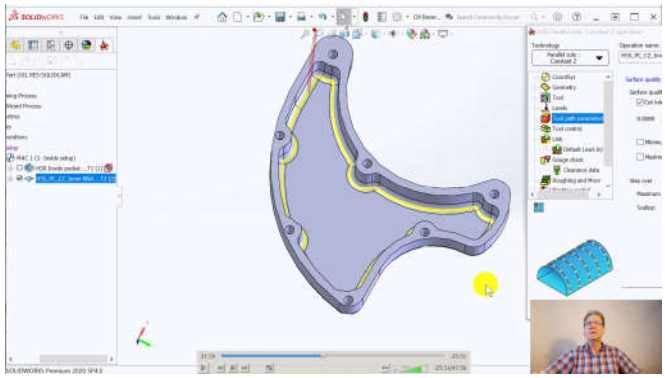
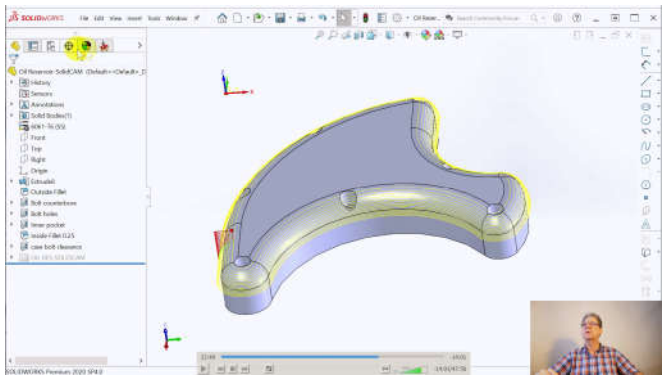
With the HSR limited to just the pocket, the machining time goes way down. There are still "staircases" down at the bottom that have to be cleaned up.



HSS (high-speed surfacing with a ball mill can carve out those 1/4-inch fillets at the base of the pocket.



Similarly, HSS is used to carve the 1/2-inch fillet on the outside of the part. I felt it was better to carve the inside of the part first, since the stresses removed from the stock might make the part warp a little. That is also why I cut the gasket surface after doing the pocket.