

Tolerance Selection and its Effects on Processing Speed

The information in this tip applies to:

- Prospector (all versions)

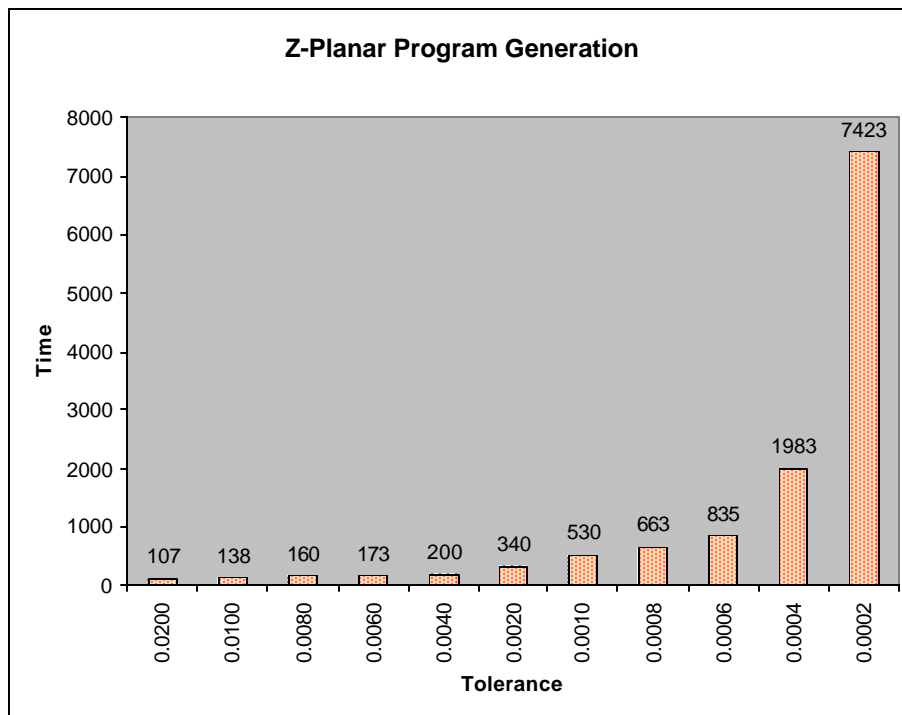
SUMMARY

Tolerance has a major impact on the amount of time it takes Prospector to generate a cutter path. It is possible to significantly increase the performance on your system when generating a cutter path by choosing an appropriate tolerance.

MORE INFORMATION

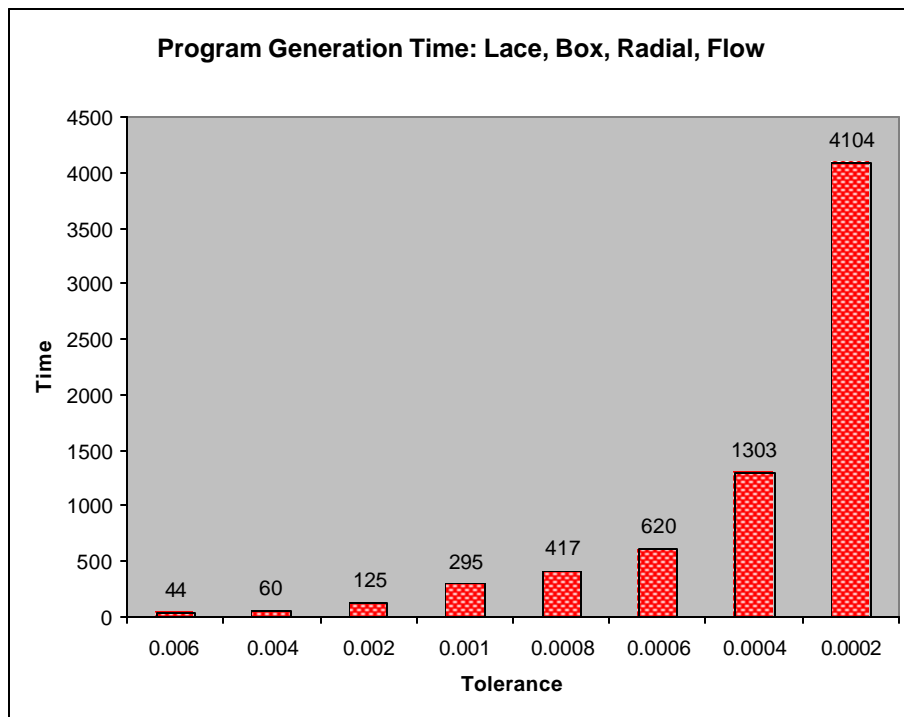
Roughing

For roughing and semi-roughing operations, a loose tolerance can be designated because there will be a relatively large stock allowance. For example, on a roughing job with .075" stock allowance, a tolerance of .02" can probably suffice. Setting the tolerance to such a loose value will not *precisely* leave .075" of constant stock throughout, however since this is a roughing job it is probably alright to not precisely leave this amount of stock, and moreover the benefit in processing time is huge. Taking a look at the chart below, you can see that the processing time will be 5 times faster choosing this roughing tolerance rather than a precise .001" finish tolerance.



Finishing

Producing a good finish is important on every job. Many factors determine the final quality of the finish machining. Cutting tools, the CNC control and the machine tool all factor into the quality equation. On the programming side, the tolerance you specify will be the major factor in producing the level of quality that you expect for a given job. It is important to use an appropriate tolerance that will help produce the results desired. The idea is to use the largest tolerance while still being able to produce the level of finish quality you require. Remember that a tolerance setting that works well for one machine tool may not produce the same quality results on a different machine. Similarly the tools used and different material types machined are both factors that should be taken into consideration when choosing a tolerance. Choosing a very tight tolerance that works well for the worst case scenario (e.g. a CNC/machine that requires a high tolerance to produce a good finish), can seriously effect program generation times. From the chart below, you can see that at a tight tolerance of .0002" for finish lace cuts, selected to produce a very good finish, program generation time will be over 13 times slower than using a .001" tolerance to produce a less precise but still a good finish.



The above chart relates to Lace, Box, Radial, and Flow programs, however, the same considerations hold true for Z-Planar programs. Going back to the first chart, you can see that program generation time is 14 times slower when choosing a .0002" tolerance versus a .001" tolerance for Z-Planar programs.

Using PowerSource Effectively

Tolerances for different machining strategies and machining stages (Rough, SemiRough,...) are established from the PowerSource database. By default, all new programs will use the tolerances defined in the database. Like all settings in PowerSource, it is possible to create rules to assign your own values for tolerances given any machining condition or cutting strategy. It's a good idea to take a close look at the tolerances being used in your Prospector system(s). Some fine-tuning and/or programming of PowerSource rules to establish proper settings could end up saving you a lot of time when generating programs.