

Leonardo's Sketchpad

Adventures in Art-To-Part Productivity



Code Red Finds a Million Bucks

All the hot shots at Code Red Parts Manufacturing Co. were hunkered down in the conference room. Mr. Biggs said no-one leaves until they figure out how to cut costs by a million dollars. And forget about raising prices.

Leonardo was there too—going nuts—sketching away while everybody else laid out complicated plans. Add a third shift. Land more full production work. Buy a multi-spindle machining center. Longer shifts with fewer people. Get vendors to charge less. Pay fewer vendors more but they do it right the first time. And on and on and on.

The conference table and walls were buried in charts, graphs, and spread sheets. This was going to take weeks.

“You’ve been really quiet DeNardo?” said the Boss. “Do you have any ideas?”

Leonardo looked up from his sketchpad. “Just one. Run all our CNCs at least 10% faster. That will save lots of money and let us put off buying additional equipment.

“You can’t do that,” Said the manufacturing VP. “The CNCs are maxed out.”

“Already did,” said Leonardo. “Last month I benchmarked the WonderCutter X and then used Feed Rate Optimization on all the CAM programs. You think it was fast before? Now it’s screaming.”

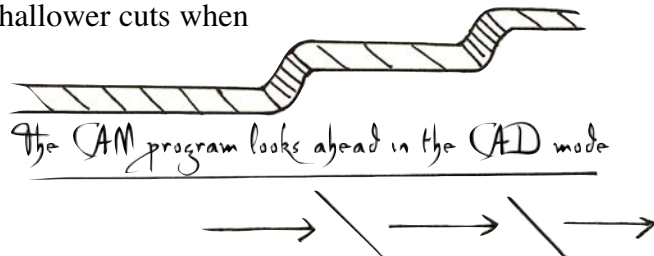
“Well that’s fine for a high speed machining center,” said the Veep, “but . . .”

“Sometimes you can’t find the forest because all the trees are in the way. Then again, maybe what you’re really looking for are the trees and they’re right in your face so you lose sight of them.”

– Eddie Miller,
Assistant Custom Gizmo Manager.

Before he could complete the sentence Leonardo said. “Then I did nearly the same thing for the old workhorse CNCs in the Custom Gizmo manufacturing cell— only I didn’t have time to benchmark them yet. But they’re all running faster now. Leonardo got up at the white board and showed them how feed rate optimization works.

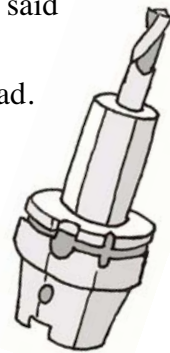
The CAM program actually looks ahead in the CAD model to see where it will need to slow down or take shallower cuts when



a corner comes. This allows the tool to run a lot faster in the straightaways and more effectively on the turns. It also improves tool wear and reduces breakage. It’s a high tech thing, so people tend to overlook it for their older CNCs.

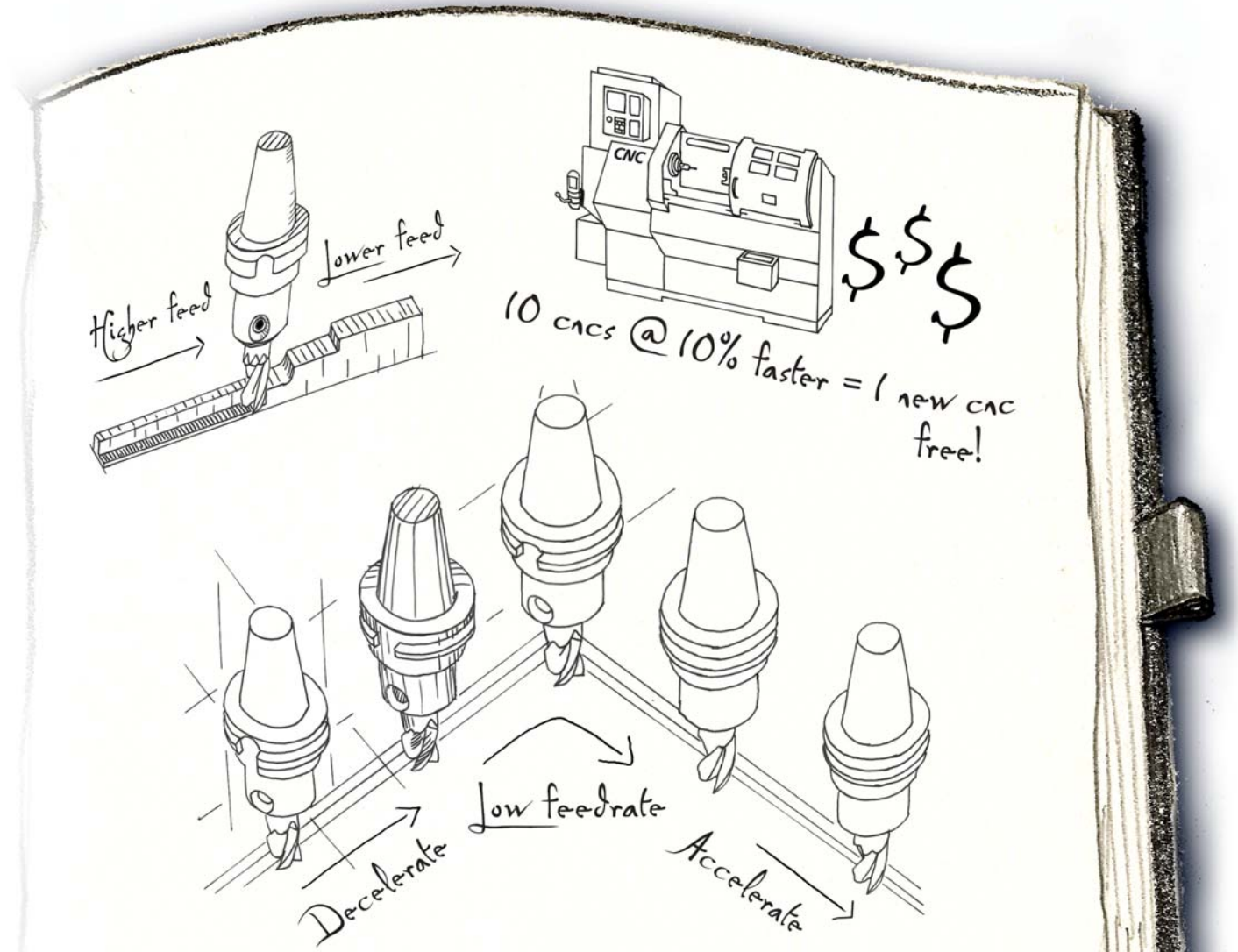
Soon the meeting was over. The boss said, “You guys have come up with some really interesting ideas. Work out the details and we’ll talk about them next month. We’ll also meet next week to discuss the progress you’ve made ramping up your CNCs.

These final words were uttered with a smile and the cheery determination of a man now convinced there is gold buried in his back yard.



Leonardo's Crib Notes: Feed Rate Optimization

- Most CNCs can run 10%-30% faster
- Also reduces tool wear
- Not just high speed CNCs!!!
- Go even faster if you benchmark machines
- Off-line:
 - Software breaks parts into segments
 - Figures optimal feed rate for amount of material removed
- Keeps consistent load on tool
- Faster on straightaways
- Reduces speed on curves and steps
- Rapid moves when tool is just “Cutting Air”
- Fast / Easy / Safe / Big \$\$\$ payback



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Contributors to this article include Ben Mund, Marketing Manager, Mastercam, ben.mund@mastercam.com; Rob Fabiano, Leonardo illustrator, rfabiano1@cox.net; and Joel Cassola, writer, jocas@cox.net.