

# GLOBAL SOLUTIONS

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## Casting for Customers at Forest City Gear.

**Helical gear shaping with mechanical helical guides is standard operating procedure at most gear shops, despite the added expense and long lead times required to make the guides. Not so at Forest City Gear, where helical gears now cost much less to make and are available even in lots of one in just a few days.**

*Owner Fred Young, indulging in his other passion*



**F**aced with a global manufacturing slowdown that has temporarily put the brakes on Forest City Gear's enviable record of sales growth, owner Fred Young takes drastic measures.

**He buys more new machines.** In fact, it's what Mr. Young does routinely regardless of business conditions. Most years, he pours some 25-40% of his Roscoe, IL based precision job shop's gross sales revenue back into new equipment. He claims his shop is the most modern of its kind in the world -- a "gearmaker's candy store", where the average age of his machines is five years or less.

Anything older likely has a "For Sale" sign on it. (Mr. Young invites customers and competitors alike into his facility, completely confident that his investment strategy is unlikely to be copied.)

Take a walk down one of Forest City Gear's spotless aisles with Mr. Young and you come away a believer. From a single Martian "Rover" vehicle part being hobbled to quality levels of AGMA Class 12, to batches of thousands of production parts, Forest City Gear's investment in new equipment gives his company, says Mr. Young, a decided competitive edge in any parallel-axis or worm gear project up to 450mm diameter.

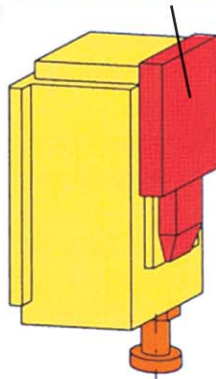
"It's obvious, at least to me, that new technology is the shortest path to greater reliability, versatility, quality and, above all, productivity," he says. "There are those that are slaves to the bean counters who won't buy new machines because they reason that, 'Why buy, when I can only get \$35-40/hour on my equipment?' Never waking up to the fact that new machines are 3-4 times faster, so you're really getting \$125-150/hour!"

Those that can't do the math need only know that Mr. Young's annual profits are as high as 70% of gross sales.

### Eliminate guides, and business shapes up.

Forest City Gear's latest new machine acquisition is a Gleason® GP 300 ES CNC Shaping Machine that, according to Mr. Young, is providing such excellent results that he's now considering buying an even larger version. Gear shaping is a vital capability for job shops like Forest City Gear because it gives them the ability to handle jobs that can't be hobbled efficiently, like spur gears with narrow face widths, gears with close shoulders, and the majority of internal gears. But many of these gears are helical, requiring that an additional rotary motion be superimposed on the cutting stroke to produce the necessary righthand or lefthand helix angle in the gear. Traditionally, and even on Mr. Young's most modern CNC gear shapers, this motion is created by a mechanical guide that must be manufactured with both lead and "hand" identical to that of the shaper cutter being used to produce a particular helix angle.

**Electronic helical guide**



Thus, each new helical gear requires the production of a new mechanical guide, a process that can take upwards of 20 weeks and cost as much as \$12,000 for each new guide! Then there's the hour or more required to change guides, the inability to make even the slightest lead changes, the impossibility of processing gears with different leads in a single setup, and so on.

Since taking delivery of the GP 300 ES, however, Forest City Gear has eliminated all of these problems, and opened the door to many new gear shaping opportunities. For example, the company was able to win an order for just eight prototype automotive helical pinions, shape them to an AGMA Class 11 quality level, and have them back in the customer's hands just two days after receiving the blanks.

They also bailed out a competitor that had mistakenly ordered the wrong hand of guide for a particular helical gear application. Forest City Gear turned it around in days, saving their rival thousands in replacement guide costs and taking weeks off delivery.

Then there was the customer that needed an internal, 24 pitch 230 tooth gear ground to AGMA Class 12. Mr. Young convinced the customer that they could save thousands of dollars by instead shaping it on the GP 300 ES. Accuracies were met, and an original order for five or six gears soon turned into one for 20 to 30.






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**Win the order, shape them to  
AGMA Class II quality, and  
have them back in two days.**

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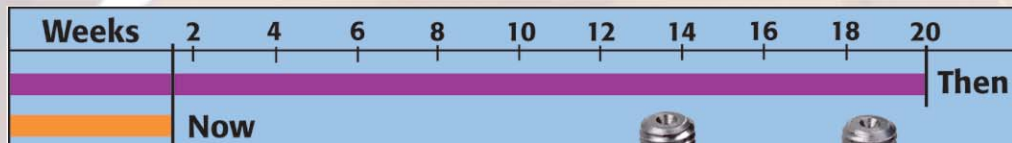
**Benefits to users like Forest City Gear are numerous and far-reaching:**

- Elimination of the lengthy leadtimes, and cost, required to purchase mechanical guides.
- No time-consuming and, in some cases, difficult changeover of guides.
- Electronic helical guide enables lead angle corrections to be made from one part to the next. Lead angle errors that result from the “unwinding” or straightening effect often caused by heat treat, for example, can be compensated for.
- Even helix angles over 45°, i.e. extremely small leads for external or internal gears, can be produced.
- Using tandem tools, even gears with different helix angles/directions can be produced in a single setup.
- Actual shaping cycle times using the electronic helical guide are virtually identical to its mechanical counterpart.

**‘Soft’ vs. hard guides.**

The GP 300 ES is the only gear shaper that offers an infinitely variable guide capability without the use of any additional mechanical components such as gear drives. It features a totally new shaping head design with a backlash-free direct drive for the cutter spindle. Under CNC control and with the appropriate software, the additional “twisting” motion to produce a helical gear is superimposed electronically on the cutter spindle as it rotates. All gear cutting, tooling and part parameters (including the helix angle to be shaped) are simply entered into a user-friendly dialog program, and the CNC controller calculates all the necessary machine data/ settings automatically.

**Cutting delivery from weeks to just days...**



**Forest City Gear can finish small lots of automotive pinion gears like these in just a few days from receiving the blanks, and to the highest quality levels.**



**“We buy them with the fruitcake.”**

Fred Young knows that these benefits will quickly pay back the slight premium he paid for the GP 300 ES versus a conventional CNC shaping machine—probably in just five different gear applications or less. Not that he’s too concerned about the short term.

“We buy the whole fruitcake, machines with all the bells and whistles,” he says. “A lot of companies go with a cheaper machine thinking they’ve saved \$100,000. But what does 100K mean spread over the useful life of a machine? It’s pretty inconsequential, especially since I’m buying a better machine for the long term benefits of technology, service, support and quality. Those that are driven by simply price/cost will certainly lose in the long run. Just look at what we’re doing with the GP 300 ES.”

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**“Those that are driven by only price/cost will lose in the long run.”**

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