

# FIXING THE TOOL AND DIE CRISIS

By Gary Gathen

LEAN MANUFACTURING PROCESSES ARE POORLY UNDERSTOOD.

LEARN WHAT MUST BE DONE TO TURN THINGS AROUND.

*Editor's Note:* This issue's Spotlight On article focuses on metal fabrication. We contacted Gary Gathen to share his thoughts on how the crisis facing die shops can be alleviated. Gathen is chief engineer at G Corp., a consulting firm specializing in tool and die shop improvement. He also chairs the lean tool and die making technical group for the Society of Manufacturing Engineers.

**>>** What color is your die shop's bottom line? If black, or at least gray, you are a rarity. Most die shops show red numbers. Many have shuttered their plants. Let's face facts — the "good old days" are never coming back. So what are you doing about

it? What can be done to fix the crisis in this industry? Much has been tried but seldom with success enough to have any real impact. Here is a look at where we are, what's been tried, successes and failures, and what we can do about the die industry's critical situation.

The crisis results from fewer new orders. This is due to increased productivity of shops, sharper pencils of estimators, more sharing of parts within platforms, and more in-sourcing of tools and dies by customers. But greater than these is outsourcing to low labor cost countries (LCCs). Competing with one or two dollar per hour labor rates is insurmountable. Or is it?

We have two advantages. We are located in the United States, which means less follow-up and shipping costs. Additionally, we share our customers' culture and language. However, our \$20 to \$30 per hour wages plus fringe benefits far outweighs culture and proximity.

Experience is rapidly being acquired in LCCs. They are perceived to have easier access to capital for large, new plants and state-of-the-art equipment. And some LCCs are said to manipulate currency, which adds to the gap. To top that off, some customers fail to account for the shipping costs (freight, insurance, duty) and time on a boat, follow-up staffing and

the high cost of trying out, finishing or fixing jobs that don't work.

### **FAILED ATTEMPTS**

There is no time to wait for a level playing field. The time is now that shops themselves must find new ways to compete.

In my experience, members in one of Michigan's Tool and Die Recovery Zones view the zones merely as a tax abatement opportunity with minimal short-term results from the required collaboration in the areas of marketing and sales, and process improvement best practices. The ones that do show promise face a lengthy period before significant progress is made since they generally only meet monthly for a few hours.

Keeping their cards close to the vest to protect their perceived trade secrets from local competitors further limits improvement. They must understand that the competition is in LCCs, not here.

The Big Three automakers have developed quality programs, such as GM's Targets For Excellence, Ford's Q1, and Chrysler Group's Pentastar,

which have given way to ISO 9000; then the more stringent QS 9000 series served to turn off shops and engender a "what's next?" attitude. Statistical Process Control (SPC) remains in some places, but Toyota and others have moved to source inspection, which is the only way to achieve zero quality issues. Six Sigma quality results in a few defective parts per million, but a population of several hundred sample parts run for buy-off provide too few parts to be valid. The problem with most of the alphabet soup of initiatives, TPS (lean), 5S, TQM, TOC, SMED and so on, are effective in high volume, low-mix products, not tools and dies. Adapting them to the die-making industry is no easy task but must be done.

Applying some of the various processes at the bottleneck doesn't cut it. Often a local optimization, poorly evaluated, results in a small improvement in one area while increasing costs more in the overall operation.

### **CAUSES OF FAILURES**

Resisting change is the root cause for failing; but by definition,

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**MANY SHOPS HAVE INVESTED MAJOR CAPITAL TO LEARN AND CREATE QS 9000 QUALITY MANUALS BUT SPENT NEARLY ZERO TIME ON THE SINGLE MOST IMPORTANT ELEMENT — CONTINUOUS IMPROVEMENT (KAIZEN) — THUS GAINING LITTLE RETURN ON THAT INVESTMENT.**

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improvement is change for the better. Albert Einstein defined insanity as doing the same thing over and over, expecting a different result. Resistance is found everywhere from top to bottom in a shop because it's human nature to continue doing what is comfortable.

Benefits of adopting new practices are not understood fully. For example, SMED (Single Minute Exchange of Die) seems to many shops as a way to shave a couple hours from the six to eight hours it took a few years ago to set up a new line of dies for draw development, tryout and buy-offs. In fact it can increase throughput for the entire shop, enabling more sales with minimal expense. The SMED method is also applicable to all setups done on every machine.

Shops complied with customer initiatives only because they were required to do so. Many shops have invested major capital to learn and create QS 9000 quality manuals but spent nearly zero time on the single most important element — continuous improvement (Kaizen) — thus gaining little return on that investment. That element should return a multiple of the \$100,000 to \$300,000 it cost to achieve ISO or QS certification.

TPS/lean is poorly understood by many die makers. It is perceived as chopping heads, and many have done so, cutting 10 percent or 15 percent of the workforce. The challenge is that the remaining staff somehow has to do the work of the departed, but without an organized plan to do so.

### **HOW GOOD ARE YOU?**

Sales of \$125,000 per employee is typical revenue for an average die shop. The number for a very good shop is around \$150,000. To determine your number, count all paychecks issued for the year and divide into total

sales. Everyone, from president to janitor is included. This figure works for most manufacturing companies, not just die shops. Toyota reportedly achieves north of \$330,000.

### **WHAT MUST WE DO?**

Do the math. Calculate the impact on your bottom line if labor cost is cut 50 percent or even 20 percent. Add the amount of additional sales you could do if lead times were cut in half. The value is enormous to shops that can achieve this kind of improvement. And it's possible.

The traditional financial model for shops is  $\text{Cost} + \text{Profit} = \text{Selling Price}$ . Shigeo Shingo, Toyota's co-inventor of the Toyota Production System, has a slightly different equation,  $\text{Selling Price} - \text{Cost} = \text{Profit}$ . Similar, but quite different in that it changes the focus from one of selling your price to the customer in order to achieve the profit desired. Instead, Shingo's model targets cost reduction, which moves dollars from cost directly to profit.

The now obvious answer is that cost must be reduced. This raises the profit dollar for dollar. But how do we do that? Material costs can be reduced in several ways, to a limited extent. So what is left? Labor cost provides the largest opportunity to reduce job cost. Easier said than done, however. Let's look at several ways to cut labor down to competitive levels.

Eliminate hours expended by using CNC equipment and automation. Machine for "assembly only" by machining hard, dry, to zero with volumetric accuracy of a few microns.

Lower wages by employing \$12 to \$15 per hour people to set up, monitor and keep the equipment working. Move skilled people from the shop into engineering and design. Focus their attention on DFM, Design For

Manufacture, and run lights-out, 24/7 wherever you can.

Collaboration with other shops can generate effective ways to increase margins if all are willing to share best practices. Read trade publications, and attend expos such as those run by SME, NTMA, PMA and FMA (these are all found online). Attend seminars, take webinars, podcasts, vodcasts, and read newsletters, blogs and industry reports. There is an enormous amount of information for free or minimal cost. Deciding what to use and finding the time to take it all in is actually a good problem to have, but is still a problem. Unearthing relevant content is the difficult part.

There is no time to waste – it's simple, but not easy, fast or cheap, so don't expect an instant fix. Keep at it. Cost and timing reductions of 25 percent in year one, 15 percent in the second, and another 10 percent in year three. The first year savings can fund all costs for the three years.

Also, consider these points:

- Set initial targets — ABC and P-Q Pareto charts expose opportunities with greatest potential
- Replace handwork (craftsmanship) — CNCs, properly used, enables assemble-only manufacturing
- Engineering/design — Thorough standardization of products, components and processes reaps great rewards
- Shop floor — Scheduling, SMED and 24/7 operation can drastically shorten lead time
- Efficiency/effectiveness – Using OEE (Overall Equipment Effectiveness) reveals eye-opening actual equipment productivity
- Include suppliers — JIT (Just In Time) reduces inventory and aids cash flow

A total system approach will enable combined savings from all team members, impacting your bottom line the most, and eliminate much of the negative aspects of local optima activity that lowers the system productivity. Use the plethora of tools in a structured way. Spaghetti diagrams, for example, expose the waste in the movement of personnel and materials. Value Stream Mapping of

all processes, whether in the office, engineering and design, or the shop floor, reveal the data on delays in the system.

### HOW TO DEVELOP A DFS

Hire a lean expert with broad and deep die making knowledge or develop your own by sending a carefully selected shop man to lean training. Faster results will be obtained from a good consultant, however. The expense will be higher but cost and time savings will occur so much earlier that it can be well worth it. The ideal lean expert would be a journeyman die maker, die designer and engineer with mechanical and industrial degrees and/or experience — a rare combination.

### HOW TO IMPLEMENT

It really depends on your shop. Many factors affect the choice of improvement tools and when and how to best use them. Collaboration is one way, but it will take too long by itself at just a few hours per month, but it can help. The best approach is going solo. Establish a budget, select teams and get started. Funds may be available from SBA, NIST and other agencies, such as state and local governments, plus organizations and foundations via grants and awards. ☒

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*After reviewing where we are, what's been tried, successes and failures and what we can do about the die industry's situation, you may want to review Gathen's previous article for Business Xpansion Journal, published in October 2005, and which is available at [www.bxjonline.com](http://www.bxjonline.com). Contact Gathen for a free white paper on developing the Die Factory System.*

*Gathen is working with a Michigan group seeking collaborators to join it to develop and implement the DFS in a real-world die shop. Contact Gathen for more details.*