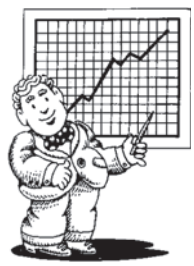
Creating a Die Factory System

by Gary Gathen

The DFS, or Die Factory System concept, is the result of twenty years of studying and applying several manufacturing improvement methodologies. It can be defined as a system-wide approach to the application of best practices and techniques for manufacturing tools and dies. The system will work for any one-off product such as dies, molds, fixtures, weld cells and the like, where a single tool or set of tools are made but millions of parts can be made from them. Until now these shops have tried various improvement programs and ideas—a new CNC machine with all the options, some make-or-buy decisions, a process reengineering project, and so on, but nothing that tied everything together as a total system. Until now.



The Theory of Constraints, TOC, thinking first got me started in finding a way to achieve what, in 1986 sounded impossible: reducing cost and delivery timing by 50% each in the tool and die shop I managed. This target was set by me to increase profits which had begun declining the previous four years. *The Goal,* by Eli Goldratt, was my introduction to improvement whereby bottlenecks or constraints are broken to enable increased throughput. Goldratt's other books followed regularly thereafter and I studied them all. Constraints in a tool and die shop move from place to place during the die making "season" according to the work load.

Constraints

At first the constraint is an external one—sales. It can be broken by obtaining purchase orders. If you can't fill up with jobs, there is no hope to improve cost and timing. Once the orders come in, the constraint moves internally to the engineering and design area, then to the small machine department, the boring mills, and finally to the tryout presses. The constraints will move whether you break the constraints or not.

Then, in 1991 a landmark book, *The Machine That Changed the World,* was published. It resulted from a five-year study by a group of MIT academics who traveled the world, studying nearly every auto manufacturer to find the best, and moreover, find out how they became that way. Toyota was found to be the best through the use of their Toyota Production System, TPS, which is that "Machine." The roots of *The Goal* and *The Machine* lie in the works of those who came before—Henry Ford, W. Edwards Deming, and others. Womack, et ai, authors of *The Machine ...* coined the term "Lean" to Americanize TPS.

Resources

Since that time hundreds of books have followed by the MIT group and many others, but unfortunately none about Lean for the tool and die industry. The Society of Manufacturing Engineers, SME, suggested that I organize and chair a technical group called Lean Tool and Die Making within the Forming and Fabricating Community of SME. It was quite active for the first two years until interest waned in late 2006. It will be resurrected shortly with a focus on the DFS—what it is, how it works, what the advantages are, and especially how to achieve it.

Creating a DFS is a lengthy process, probably taking three to five years, but significant progress can be made in as little as six to twelve months. The cost savings the first year can often provide funding for the entire project. It is simple, but by no means is it easy ... or inexpensive. The results will be enormous, however, so it needs to be done, and soon. This article can merely give some points on the first steps to be taken because the scope of the implementation process is so far-reaching.

Culture

The first and most important step in creating any Lean manufacturing system is establishing the company culture. Everyone, from CEO to managers to designers and shop floor people to the janitor must be on board with the program. Not just going along with it, but totally committed to making the shop Lean. If the top executive is not wholly behind the Lean Journey, as it is called, Lean will be difficult, if not impossible to achieve. The design and build folks will be able to embrace the Lean program. The most difficult to get buy-in from are the middle managers, and if any of them resists, their people may well follow suit. It is natural for people to resist change because it requires learning and doing new things and remembering to keep doing them a new way. But the managers often feel that they're being viewed as inept because they've been doing everything "wrong." They need to understand that operations have been conducted in the traditional way—the same as other shops—but new things have come along that can improve costs and timing for the survival of the company.

Education and Training

A number of teams must be set up which will attack all the various initiatives that comprise the Die Factory System, and they must learn as much as possible about the Lean concepts, help finding ways to adapt them to tool and die, first and then adapt to their own shop. SME has a large number of videos, books, white papers and technical articles on Lean manufacturing, but remember that it is all focused on the high volume, low mix producing companies.

Visuals

The visual factory is an integral part of Lean operations so be sure to use graphics wherever possible. We use Value Stream Maps, Pareto charts, process maps, Gantt charts, shadow boards, and standard work instruction sheets, to name a few excellent one. An example of 5S, or housekeeping and organization, is the use of labels on shelves and in drawers, signs in work areas, and so on.

If you begin with the suggestions above you will quickly have a grasp of Lean basics. However, if you decide to take the Lean Journey, you will save substantial time and money by hiring a Lean consultant who is an expert in your specific tool and die field, i.e., sheet metal dies, molds or fixtures. They can help you avoid many mistakes and deliver the savings much more quickly. That kind of help is a cost, but is well worth it.

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