**Theory of Constraints**

Constraint management is another improvement method that was originally introduced by Eli Goldratt in the book “The Goal” in the mid 1980s. This is a powerful tool to use on its own, but when combined with some of the concepts in lean, like set-up reductions, stopping overproduction, etc. it is wonderful at providing fast payback for dedicated users.

**Basic Constraint Concept**

Constraints are key leverage points in a process that control the entire process flow, generally because they have more demand placed on the resource (usually a skill set or a machine) that that resource can *currently* provide. It is like the bottleneck in an hourglass, or the weak link in a chain. Until that part of a process is improved, the process will not yield any real improvements in throughput.

So, the key in constraint management is to find the constraint in your process and make improvements to increase its output. Simple things like reducing changeover times, maintaining the equipment properly, not producing more than what is needed in the near term, properly prepping jobs so they can be run efficiently, forcing out quality issues can be done to improve productive capacity.

**Most Constraints Are Created**

Very infrequently are constraints real, rather they are the result of mismanagement of the resource or bad metrics overstating performance at the resource. Most traditional metrics used drive bad throughput results at a constraint.

A simple example is measuring machine run time by using the cost accounting time tracking system. Because someone is logged into a job does not mean the machine is effectively producing. One printing company I worked with used their costing system to get utilization numbers and told me the constraint machine was producing 80% of the time. Another 12% was set up time, so they were only losing 8%, which isn’t too bad. But the 80% was the time the operator was logged into the job. Just through general observation I knew that machine was not running that much. So, I had the plant manager and the operator track the actual machine run time. It was 21%. Like running the machine one day per week.

**Process to Improve the Constraint’s Output**

In The Goal, there is a five-step process, as follows:

1. Identify the constraint
2. Do quick fixes to increase its production
3. Subordinate operating decisions to optimize this machine/skill over others (that can outproduce it)
4. Make significant changes to improve output of the constraint
5. Repeat the process

This five-step process *almost* works. Many companies make improvements but as they are doing so, the constraint seems to move to another location as WIP moves through the facility. To avoid “constraint chasing” you need to *select* where you want the constraint to be in your process. While you do step 1 above, you may debate that there is more than one constraint. You have to decide which is the “better choice”. Here are a few hints that can help you choose:

1. It is an expensive machine or a difficult to attain skill
2. It is closer to the beginning of the process
3. It is difficult to outsource and meet the delivery and/or quality goals of the company

One last comment. Constraints can be divided into two areas of the company. The incoming information flow (customer service/sales through pre-press) and the printing, cutting, gluing, kitting part of the company. It is perfectly acceptable to have one in each part of the company. But not more than one.

More to follow on constraints management in the next articles.

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**About the Author:** Bob Krausert is the owner of STRATE***X***, a Twin Cities based firm that works nationwide. Bob is the author of the book, ***Extreme Lean***, published in 2018. Bob has worked with over 60 printing companies, mostly mid-sized companies, but also with larger companies like Jostens and Banta, now part of RR Donnelly. During his career, Bob has trained over 12,000 people at both public and private events. Bob has been working with PIM since 2010, periodically providing educational seminars for its members. Bob can be reached at [stratexlean20@gmail.com](mailto:stratexlean20@gmail.com) or by phone at 612-743-8706. If you would like to have a specific question or topic covered in one of the articles, feel free to make the suggestion!