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Lean Thoughts

Looking for the next evolution of lean?

TOC - DBR

Something old can be new again … TOC has been around for many years and is an excellent bed-mate for your Lean Enterprise. As a refresher we are providing a quick overview of TOC … but this time read the article from the perspective of how your administration processes operate …

Dr Eliyahu Goldratt first brought public recognition to the Theory of Constraints (TOC) with his business novel *The Goal*, first published in 1984. Several revised editions, three subsequent business novels extending the original ideas, and well over two million copies later, TOC and its primary implementation methodology known as Drum-Buffer-Rope (DBR) can be found in numerous manufacturing companies around the world. DBR offers a methodology for managing work flow through the plant that greatly reduces work-in-process and increases throughput (the ability to get more work through the plant) while dramatically improving on-time shipment.

TOC is based on the idea that there is a point (one resource) within a complex process (like a manufacturing plant) that determines the overall throughput of that process. Control and manage that constraining resource or bottleneck and you can maximize the throughput of the entire plant. TOC is implemented in practice by following five simple steps:

1. **IDENTIFY the constraint(s)**: This is usually pretty easy; just look for the piles of WIP and/or ask the plant supervisor where the biggest bottleneck is.

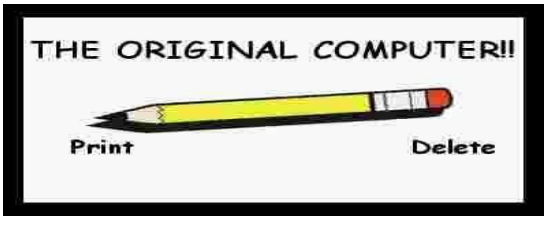
2. **Decide how to EXPLOIT the constraint**: Maximize the amount of work that flows through the constraint, but also make sure that there is a smooth flow of work coming into this process so it never has to wait for work.

3. **SUBORDINATE everything else to the constraint**: One of the main principles of TOC, and probably the most difficult to accept and follow, is that efficiency at other resources does not matter. There is no point in up-stream processes producing more work than will flow through the constraint, and downstream processes won't have more than that to do. If you are not already familiar with TOC, read *The Goal* or search out other references to explain how this all works.

4. **ELEVATE the constraint**: Increase the capacity of the constraint by offloading some of the work, subcontracting, buying more capacity, or adding a shift.

5. **GO BACK to step 1 and repeat for continuous improvement**: Chances are good that the elevating the constraint will bring it to the point where it is no longer the bottleneck. Identify the new constraint and apply the remaining steps as before to exploit, subordinate, and elevate.

TOC can be counterintuitive so it takes some study, and some thought, to understand how it works and why it works. Nevertheless, many companies are using TOC with great success. In addition to *The Goal*, there are many other books explaining TOC as well as seminars, conferences, and the Constraint Management special interest group of APICS.



Where Lean Thoughts can become Reality

"Unless you try to do something beyond what you have already mastered, you will never grow."

Ronald. E. Osborn

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Lean Thoughts

TOC – DBR *continued*

Drum-Buffer-Rope (DBR) is the mechanism for implementing TOC in the plant. DBR, as the name implies, includes three simple elements that form the control "system." The capacity constrained resource or bottleneck sets the pace for the plant. No matter what goes on elsewhere, product cannot be produced faster than it goes through the bottleneck. In DBR parlance, the constraining resource is the "drum" that sets the tempo for the plant. The release of work and the activities of all other non-constrained resources should be coordinated with the constraint to make sure that it always has enough work (and not too much) so that it can operate most efficiently.

The "rope" is the connection from the constraint to the release of new work to the plant. Companies should only release work at the same rate that the constraint can produce, which helps them maintain control over lead times and WIP inventory levels. Since the primary objective is to keep the constraint busily producing product, and sometimes work doesn't flow quite as it should (machine breakdowns, material shortages, manning problems, etc.), it is desirable to establish and manage a "buffer" in front of the constraint to insure that it never runs dry.

DBR is a very non-traditional approach to releasing and managing the flow of work through the plant, so implementing DBR in the presence of traditional ERP can be problematic. In particular, traditional production release and control, and traditional financially oriented metrics do not support the DBR way of doing business. For example, ERP will have you release work according to a schedule, based on a plan, often tied to a forecast. DBR releases work according to the overall capacity of the plant as controlled by the capacity of the constraint and scheduled to meet customer shipment objectives (pull). DBR is not concerned with efficiency or utilization at non-constraint resource; traditional ERP metrics encourage overproduction and high inventory in pursuit of these measurements. The DBR way of doing things is much more in line with the Lean philosophy, but does not require complete re-arrangement of the plant and does not assume continuous (cell or line) production.

Remember that DBR, like Lean manufacturing itself, is a lot more about attitude, approach, and process than about software. The software helps reinforce new procedures, disciplines, and measurements that are taking the place of the old ways of doing things.

The Theory of Intelligence

As explained by Cliff from Cheers …

"Well you see, Norm, it's like this ... . . A herd of buffalo can only move as fast as the slowest buffalo. And when the herd is hunted, it is the slowest and weakest ones at the back that are killed first. This natural selection is good for the herd as a whole, because the general speed and health of the whole group keeps improving by the regular killing of the weakest members. In much the same way, the human brain can only operate as fast as the slowest brain cells. Now, as we know, excessive intake of alcohol kills brain cells. But naturally, it attacks the slowest and weakest brain cells first. In this way, regular consumption of beer eliminates the weaker brain cells, making the brain a faster and more efficient machine. And that, Norm, is why you always feel smarter after a few beers."

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