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The Theory of Constraints in Project Management



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SETPOINT.

Setpoint provides industrial automation equipment customized for specific manufacturing processes.

The Theory of Constraints in Project Management

Setpoint excels in managing projects to completion because of their strict adherence to the Theory of Constraints. This theory, as set forth by Dr. Eliyahu Goldratt (*The Goal*), asserts that one constraint in any organization can limit the performance of the entire system. Dr. Goldratt explains that until you know the constraints and leverage points of a project, you can only produce as much as the bottleneck of that project can handle.

Robert Newbold addresses the need for changes in traditional project management techniques in his book *Project Management in the Fast Lane: Applying the Theory of Constraints*. Newbold begins by questioning the manner in which organizations have been determining project completion times for many years. In traditional management, timelines are created by guessing at how long a process would take without having the data to back it up. The theory of constraints method encourages organizations to record the time required for each task, enabling the organization to use an accurate lead time for future projects.

For example, if a company estimates that the milling of a certain part takes two hours, but tracking shows that the part can actually be milled in one hour; this data can be used to better predict the time needed for similar tasks in the future. Newbold also theorizes that placing start and end times on a project becomes a self-fulfilling prophesy. That is, a project that is allotted two weeks will take two weeks to complete, regardless of whether or not it could have been completed in one week.

Newbold suggests breaking a project down into a critical chain. By doing so, it

becomes evident which processes are “critical” to the completion and which processes can be done concurrently and then fed into the chain at the required time. The average completion times for each stage of the project can then be determined, as well as the completion time for potential bottlenecks. Traditional management would add extra “padding” to each task to ensure completion in the necessary amount of time. The theory of constraints method uses the average times and adds “buffers” only to the points of the project where bottlenecks may occur, as well as a “project buffer” at the end of the timeline to ensure timely delivery to the customer.

The theory of constraints and critical chain are used to set up a timeline for a project or process. Newbold introduces a five-step improvement process to increase the speed of throughput by reducing overall project timelines and consequently increasing profits. This process works well for high volume, low variety processes:

1. *Identify the bottlenecks*, also referred to as “leverage points”
2. *Exploit the leverage points*
3. *Subordinate everything else to the leverage point*
4. *Elevate the leverage point*. Take significant action to get more out of the leverage point
5. Before making any major changes, *evaluate whether the leverage point will stay the same with the proposed changes or if no changes should be made*

Another critical step is to reduce the amount of work in process (WIP) that a company has at any given time. Less WIP and fewer inventories will result in shorter lead times, lower overhead, and greater client satisfaction. Reducing batch sizes between the critical chain tasks is one way to reduce WIP and increase efficiency. A project manager can delay costs by reducing WIP through

not purchasing materials until they are needed. There is no need to order the material and have it in stock 4 weeks before it is needed.

The theory of constraints method states that critical employees or processes should be kept constantly busy by being fed from the other sources as needed. However, the other resources should not have to be busy at all times, as long as they are ready to accept the work needed to keep the bottleneck fed at all times. These lag times should be accepted as part of the overall health of the company.

This is one of the largest obstacles to the theory of constraints because workers feel the need to always appear busy in order to protect their jobs from downsizing. This need to be busy often leads to extended times on tasks, because workers worry that there will be nothing to do when the task is finished so they stretch it out over a longer period of time. Newbold asserts that downsizing should only be used as a last resort in cost management. Changing the mindset of both management and workers is necessary to the success of a theory of constraints implementation. As long as the leverage point is busy the other points along the chain that feed the bottleneck do not have to be.

The other points along the chain need to be ready to accept the work as it comes, but they do not need to produce extra 2" widgets when there isn't an order just to stay busy. All other parts of the chain work together to keep the leverage point busy. One example that illustrates this concept is that of the racecar and pit crew. The racecar is like the bottleneck and the pit crew is the feeding and resource chain. Although the pit crew must work quickly and thoroughly when the car stops at the pits, they are not expected to be exerting the same level of work when the car is out on the track. The pit crew does not fear that their jobs will be eliminated as soon as the car is back on the track, because their services will be needed again and again.

Overall, the idea is to finish projects as early as possible and keep the critical chain moving at optimum speed. Ideally, following Newbold's ideas would result

in the following:

- Increased throughput
- Lower work in process and inventory
- Shorter quoted lead times
- More accurate delivery dates
- Greater overall customer satisfaction

Setpoint has first hand experience that these changes will consequently lead to greater efficiency and profitability of the company. The biggest challenge to implementing the theory of constraints methodology is getting the entire organization to “buy in” to it and work together to reach their goal. The theory of constraints process is critical to the success of any organization. Through identifying the bottleneck in your process, you will be able to better manage your product lines, increase efficiency, and lower production costs.

Key Points:

- *While the Theory of Constraints works great for high volume, low variety industries, there are important lessons every industry can learn.*
- *As long as the leverage point is busy, don't worry about other points being idle, this is part of optimizing of your resources.*
- *Break down the processes of your critical chain, identify the bottleneck, and make sure the schedule is set up so the bottleneck does not have to sit and wait.*

Setpoint is the leader in lean automation equipment from concept to functioning completion. Following the Toyota Production System, Setpoint has successfully created custom solutions for a broad variety of industries for over 18 years.