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Constraints

Key Learning Points

1. Define Constraints and describe how to identify them.
2. Explain how to resolve constraints.
3. Utilize the Theory of Constraints to improve flow by managing constraints.

What are Constraints?

A constraint is any event or limiting factor which stops a system from achieving the goal performance or throughput.

Constraints can come in many forms including:

- Equipment: capacity or speed, capability, downtime
- Labor: supply, skills
- Policy: mandated wait times or review periods, formal meetings
- Information: speed, accuracy
- Suppliers: reliability, quality
- Dummy Constraints: access to printers, macros, software, databases

Theory of Constraints

The theory of constraints was conceived by Dr. Eliyahu M. Goldratt, and introduced to the masses through his 1984 novel "*The Goal*."

The Theory of Constraints is a methodology for identifying the most limiting factor (or constraint) that stands in the way of achieving a goal, and then systematically improving that constraint until it is no longer the limiting factor.

Since it's introduction, the Theory of Constraints has become a best practice for management.

Core Concept

The core concept of the Theory of Constraints is that every process has a single constraint and that total process throughput can only be improved when the constraint is improved. A very important corollary to this is that spending time optimizing non-constraints will not provide significant benefits; only improvements to the constraint will further the goal (achieving more profit).

Policy Constraints

The most common form of constraint is the policy constraint. Policy constraints come from organizational policies which are often long-established, and widely-accepted, and can be difficult to overcome.

When dealing with policy constraints, ask:

- What needs to be changed?
- What should it be changed to?
- What actions will cause the change?

Bottleneck

A bottleneck is a resource with capacity less than or equal to demand. A process can technically have more than one bottleneck, but only one constraint. Since we are concerned with the throughput of the entire system, we concentrate on the slowest bottleneck. The limiting factor that stops us from achieving the desired throughput.

Dealing With Constraints

1. Identify the Constraint

Identify the current constraint (the single part of the process that limits the rate at which the goal is achieved).

- Look for large accumulations of WIP.
- Look for areas where expeditors are frequently involved.
- Review performance data and find out where the longest cycle times are.
- Ask operators and employees where they think demand is not being kept up with.

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2. Decide How to Exploit the Constraint

Make quick improvements to the throughput of the constraint using existing resources (i.e. make the most of what you have).

- Create a suitably sized inventory buffer in front of the constraint to ensure the process can keep operating even if the upstream process stops.
- Check quality before the constraint so you only process good parts or information.
- Ensure the constraint is continuously scheduled for operation.
- Maintain the process outside of regular constraint operation time.
- Offload some work from the constraints process.

3. Subordinate All Else to The Decisions

Review all other activities in the process to ensure they are aligned with and truly support the needs of the constraint.

- Upstream steps have excess capacity that ensure that the constraint buffer is continuously filled so the constraint is never starved by the upstream process.
- Downstream processes have excess capacity that ensures that outputs from the constraint is continually processed, so the constraint is not blocked.

4. Elevate the Performance of the Constraint

If the constraint still exists (i.e. it has not moved), consider what further actions can be taken to eliminate it from being the constraint. Normally, actions are continued at this step until the constraint has been "broken" (until it has moved somewhere else). In some cases, capital investment may be required.

- Use performance data to identify the largest sources of lost productive time.
- Target the largest sources of lost productive time, one by one, through projects.
- Implement ongoing process reviews to identify tactical actions that will improve constraint performance.
- Evaluate the constraint for potential design updates and or upgrades.
- Purchase additional equipment to supplement the constraint.

5. Move to the Next Constraint and Go Back To Step 1

The Five Focusing Steps are a continuous improvement cycle. Therefore, once a constraint is resolved the next constraint should immediately be addressed. This step is a reminder to never become complacent – aggressively improve the current constraint…and then immediately move on to the next constraint.

Notes:

- If the constraint has been broken, recognize that there is a new constraint.
- If the constraint has not been broken, recognize more work is required and a fresh look needs to be taken.

When to Think About Constraints

Organizations can employ Theory of Constraints for any process that is regularly performed and is comprised of individual process steps. The five steps work equally well for processes performed several times per day and processes that take weeks to complete.

Think about constraints in:

- Manufacturing throughput
- Distribution centers
- Service centers
- Emergency rooms
- Maintenance
- Facilities
- Contract review
- Document approval

Pitfalls to Avoid

- Policy constraints can be supported by significant establishment pushback. Be sure to get organizational buy-in to your changes to forego pockets of resistance.
- Be sure to use actual process data in evaluating your constraints and proving the effectiveness of your improvements.
- Consider risks inherent in your changes. Some side-effects are acceptable, like adding work to one resource to free a constraining resource. Safety, quality and customer relations must be preserved.

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