An Introduction to TOC

(including a simplified production environment example)

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Today's discussion

- What is TOC?
- A simplified example of how TOC fits in a production environment
- Systems thinking
- The need to FOCUS improvement efforts
- The concept of Buffers and Buffer Management
- Simplified measurements (decision support aids)
- Results to be expected
- Why chasing efficiencies is counter-productive
- The continuous improvement trio: TOC, Lean and Six Sigma

What is the Theory Of Constraints?

"The core idea in the

Theory of Constraints

is that every real system

such as a profit-making enterprise

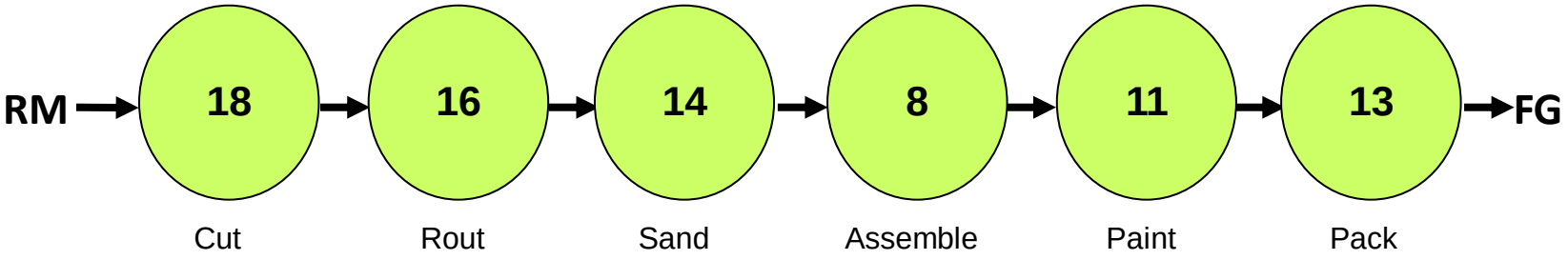
must have at least one constraint."

Otherwise you'll make infinite profit!

A Simplified Production Line

A very basic picture frame manufacturing operation

Production capacity per resource in frames per day



Can't meet market demand?

Increase production!

What would you do?

Finding the Focal Point

Before we jump into improvement efforts, we need to answer the following question:

What is the Goal of a profit driven enterprise?

To make money now, and even more, in the future!

What is limiting the performance of the enterprise vs that goal?

Let's look at our production line in slide 4 again

Constraints

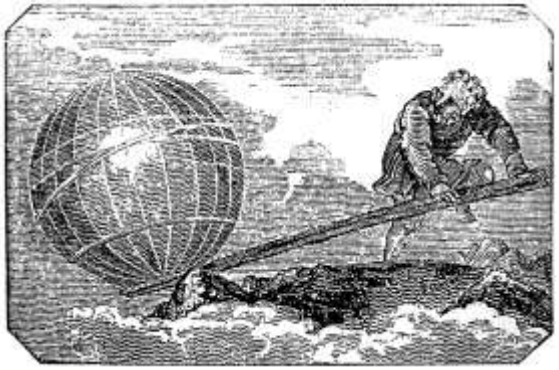
"There really is no choice in the matter. Either YOU manage the constraints or THEY manage you.

The constraints will determine the output of the system whether they are acknowledged and managed or not."

Source: Noreen, Smith, and Mackey, The Theory of Constraints and its Implications for Management Accounting (North River Press, 1995)

Physics in Business??

- *"Give me a lever, (a leverage point) and a place to stand and I will move the earth…"*
  - **Archimedes, 200 BC**



The constraint is the leverage point - where the biggest effect can be achieved from the least effort

But a business is complex!

- Many variables to focus on and
- Most of the variables are outside of our direct control (clients changing their minds, unreliable employees & vendors, raw material quality/delivery, etc)
- Resource variation and resource dependency is a reality

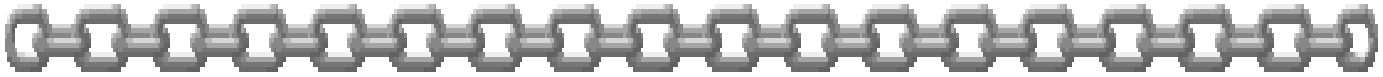
All these lead to longer lead times, poor quality, rework, increased costs, excessive WIP, missed due dates, expediting, less cash, poor profitability, missed sales, etc.

Easy/cheap/quick to fix??

Management's time is severely limited – *"we don't have time for a multitude of improvement programmes!"*

Chain Analogy

Let's imagine the organisation as being composed of many links



A chain is only as strong as its weakest link

The TOC approach simplifies complexity

1. Focus improvement efforts where they will have the greatest immediate impact on the bottom line
2. Monitor and Control the system by way of a combination of buffers and buffer management
3. Simple, common measures track performance
4. Process of ongoing improvement

Buffers, buffer management

- Buffers
  - prevent local variability at a part to be transferred to the system
- Buffer management
  - manage flow
  - set priorities according to buffer status

TOC global measurements

- **Throughput (T)** – all the money coming into the company less the money paid to its suppliers
- **Inventory/Investment (I)** – all the money tied up in the company in tangible assets
- **Operating expense (OE)** – all the money going out of the company, i.e. money required to turn Investment into Throughput

Linking TOC measurements with the traditional

- Net Profit (business, not product) = ΣT - ΣOE
- ROI = Net Profit / I
- Cash Flow = ΔT- ΔOE / ΔI
- Productivity = T / OE
- Investment Turns = T / I

The TOC Process of Ongoing Improvement

1. Identify the constraint (leverage point)

2. Exploit the constraint (get more out of the constraint now without additional investment)

3. Subordinate all other operations to the necessity to exploit the constraint (non-constraints support the constraint)

4. If, after 2 and 3 above, more capacity is required to meet market demand, evaluate ways to Elevate (increase capacity at) the constraint.

5. Go back to 1, but beware of inertia in the identification of the constraints (do not allow inertia to cause a system constraint).

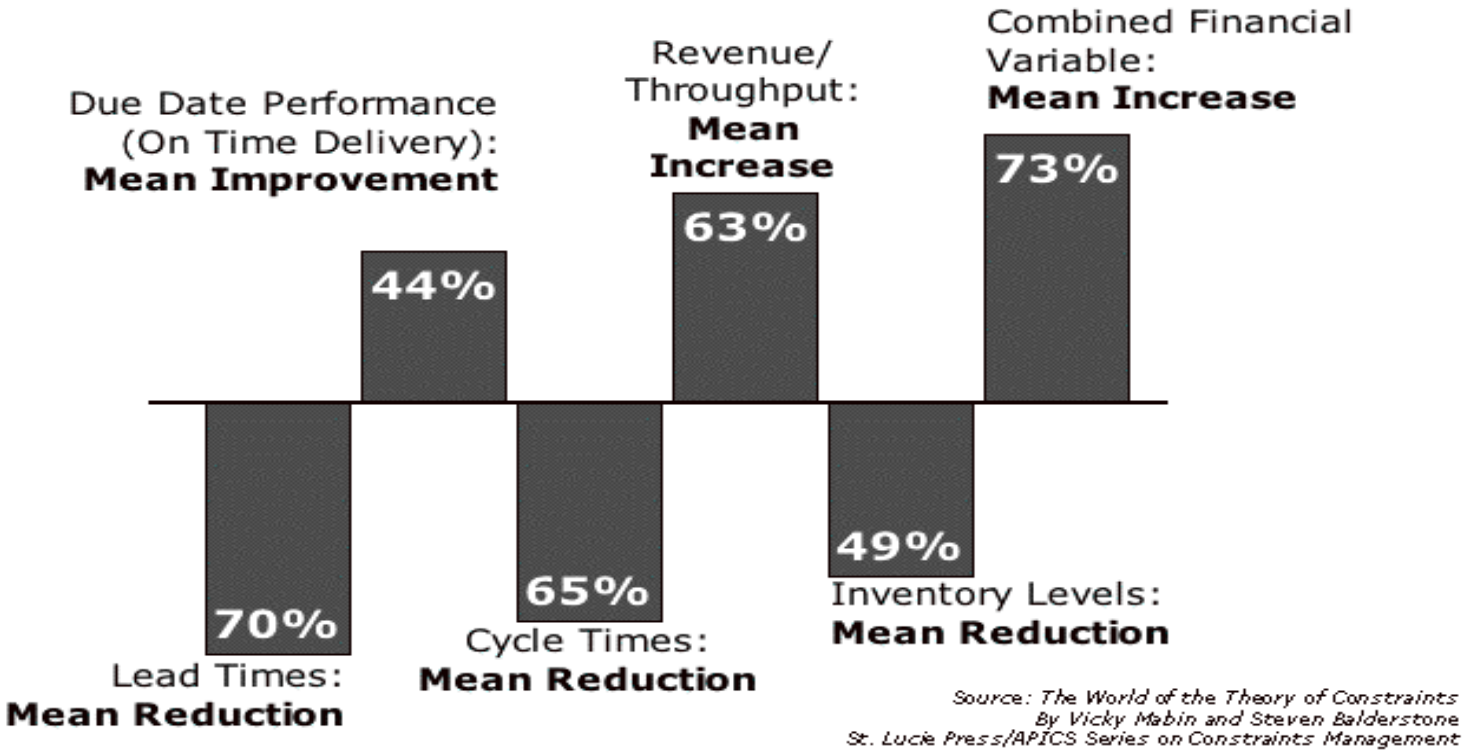
TOC Summary

1. Identify the company's goal
2. The company is more than the sum of its parts
3. Identify the constraint(s) - that which is holding the company back from achieving goal performance (identify the constraint/s)

The constraint is the focus/leverage point for improvements

Typical results

Summary of an independent study . . . 82 companies who have implemented TOC



Source: The World of the Theory of Constraints
By Vicky Mabin and Steven Balderstone
St. Lucie Press/APICS Series on Constraints Management

Holistic approach to improvement initiatives

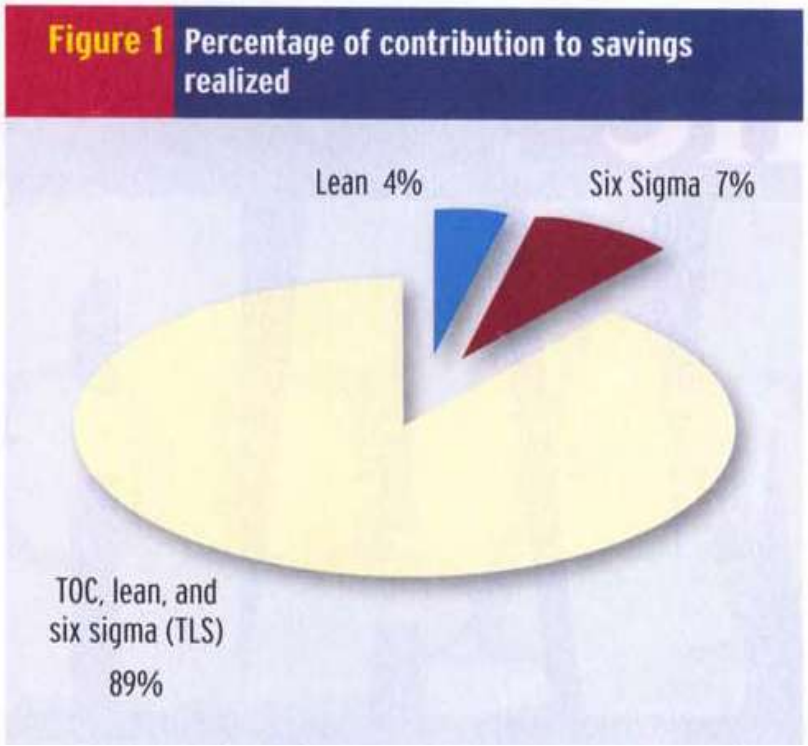
- Understand the entire supply chain and approach any improvement initiatives in the organisation in a holistic manner
- Without consideration for the interdependencies in an organisation cause and effect of localized improvement efforts can play havoc

Holistic view – a business as a system

A sensible approach

1. Start with TOC - to increase throughput (money flow – achieve bottom line results very quickly and without much effort and cost)
2. Then:
   - Lean – to increase effectiveness (remove waste/non-value-added activities)
   - Six Sigma – to increase efficiency (reduce process variability/optimize value-added activities)

Combining TOC, Lean & Six Sigma



Ref footnote: The results of the only scientific double-blind study of its kind undertaken in actual business plants show cost savings as follows:

4% Lean, 7% Six Sigma, 89% TOC with Lean and Six Sigma supplementing.

Results were summarized over 100 improvement projects in 21 plants, 45,000 employees, where:

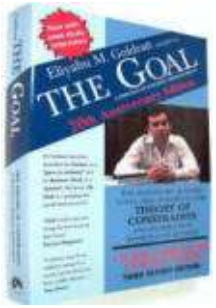
- 11 plants applied Six Sigma
- 4 plants applied Lean
- 6 plants applied TOC, Lean and Six Sigma

This is an interesting result because cost savings are a side benefit of TOC as TOC focuses on increasing Throughput instead of reducing cost in the first place.

Pirasteh, R. and Farah, K. (2006). Continuous Improvement Trio: The top elements of TOC, Lean, and Six Sigma make beautiful music together. Source: APICS magazine, May, 2006 pp. 31-36

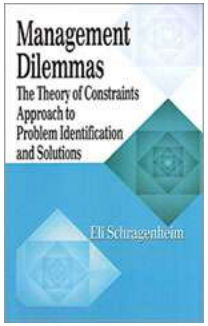
Supplementary reading

- **The Goal – Dr. Eli Goldratt**



- **Management Dilemmas – Eli Schragenheim**

  The TOC Approach to Problem Identification and Solutions



- http://www.dbrmfg.co.nz/ - without doubt the best online TOC manual

TOC community

- **TOCICO –** Theory of Constraints International Certification Organisation. No need to be TOC certified to become a member. Membership gives you free access to loads of info, webinars, etc. Visit **http://www.tocico.org/**

- **TOC Weekly** (email newsletter) **–** subscribe at no cost - visit**:**

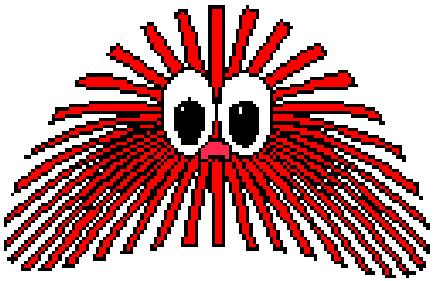
http://www.toc-goldratt.com/tocweekly

A parting note

You are here today because you consider making improvements in your business

Without leadership and commitment, nothing will happen

WHAT IS YOUR NEXT STEP?



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About Alta

Member of TOCICO

TOCICO certified TOC practitioner

Volunteer to disseminate TOC knowledge in NZ on behalf of the International TOC Learning Network

Passionate to see NZ companies have more ambitious productivity targets – why aim for 5% if 30+% is possible!

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