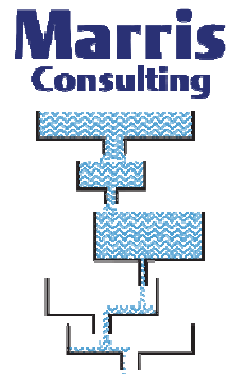




Going faster and further using TLS,  
the combination of  
the Theory of Constraints, Lean & Six Sigma



Saint Petersburg, 25<sup>th</sup> of May 2017  
Version 1.0

# Table of contents

---

- Introduction
- Theory of Constraints
- Lean Manufacturing
- Six Sigma
- Case studies / Examples
- Conclusion
- Appendices
  - The main books to understand TLS
  - Useful internet links

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## Philip Marris

- **Theory Of Constraints** expert.

31 years of TOC experience. Started working with the founder Eliyahu Goldratt in 1986.

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- **Lean** expert.

33 years of experience in Lean. Assists some of the Leanest organizations in the world.

**Marris Consulting**

- >25 years of experience helping over 200 companies in all industrial sectors.

**Marris Consulting**

- Founder and CEO of Marris Consulting based in Paris, France. Founded in 2004.

Motto: *Factories, People & Results*



[contact@marris-consulting.com](mailto:contact@marris-consulting.com)

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We are honoured to have been able to help...



# TLS: Theory Of Constraints + Lean + Six Sigma

## Combining the best of each approach

---

### ■ Theory Of Constraints (TOC)

- Focus on improving the system constraints
- Boost the return on investment and success of Lean & Six Sigma programs
- Increase profits by increasing sales rather than by cutting costs

### ■ Lean Manufacturing / Toyota Way

- By far the most widespread approach in industry
- Focus on eliminating waste
- A multi-dimensional approach: management, Just-In-Time, 5S, Lean Engineering, ...

### ■ Six Sigma

- Reduce process variability to 3.4 defects per million occurrences
- Mostly implemented using certified experts Green Belts, Black Belts, ...
- Best known component: the DMAIC process (Define, Measure, Analyse, Improve, Control)

### ■ TLS: TOC + Lean + Six Sigma

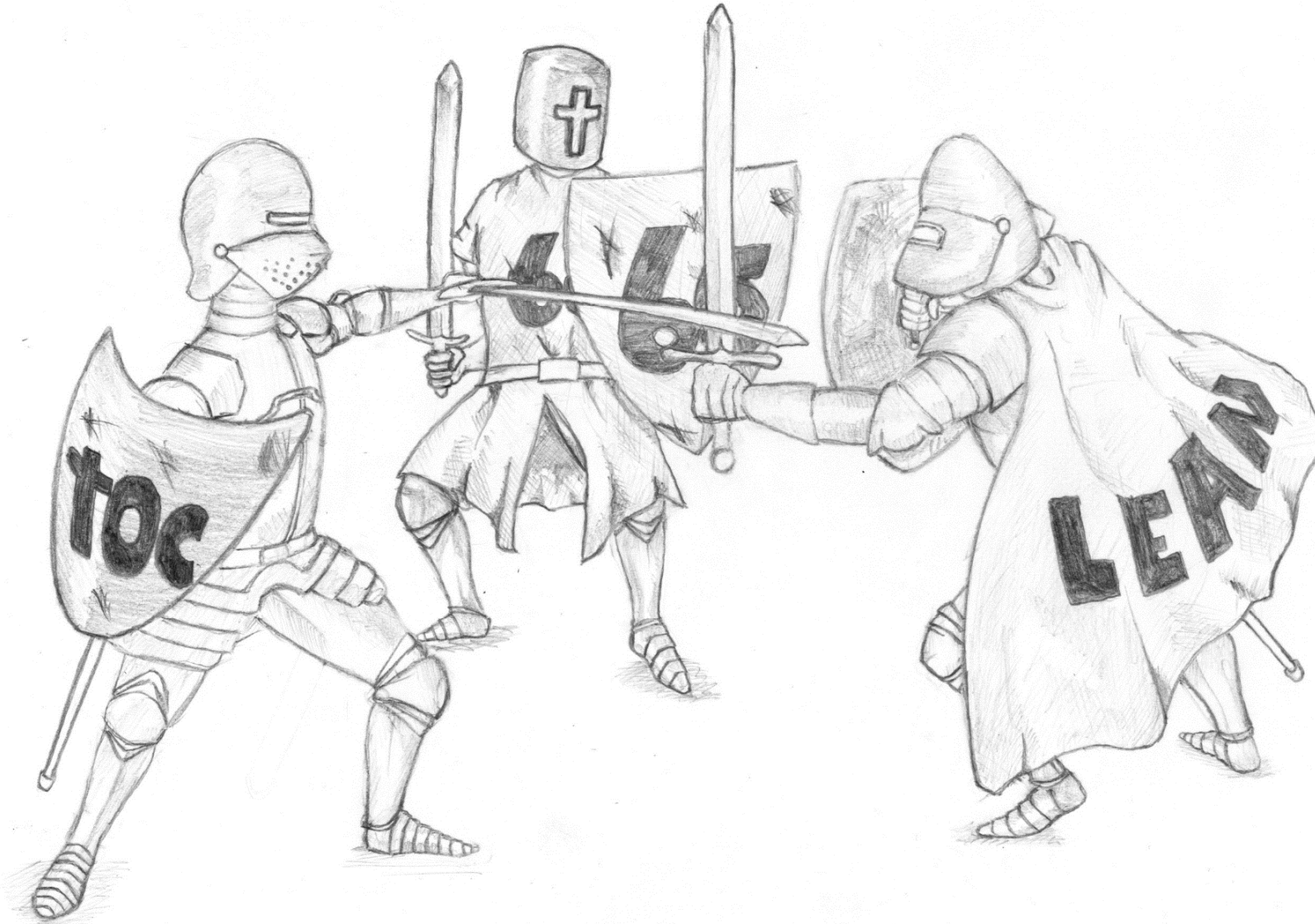
- Emerged in 2006

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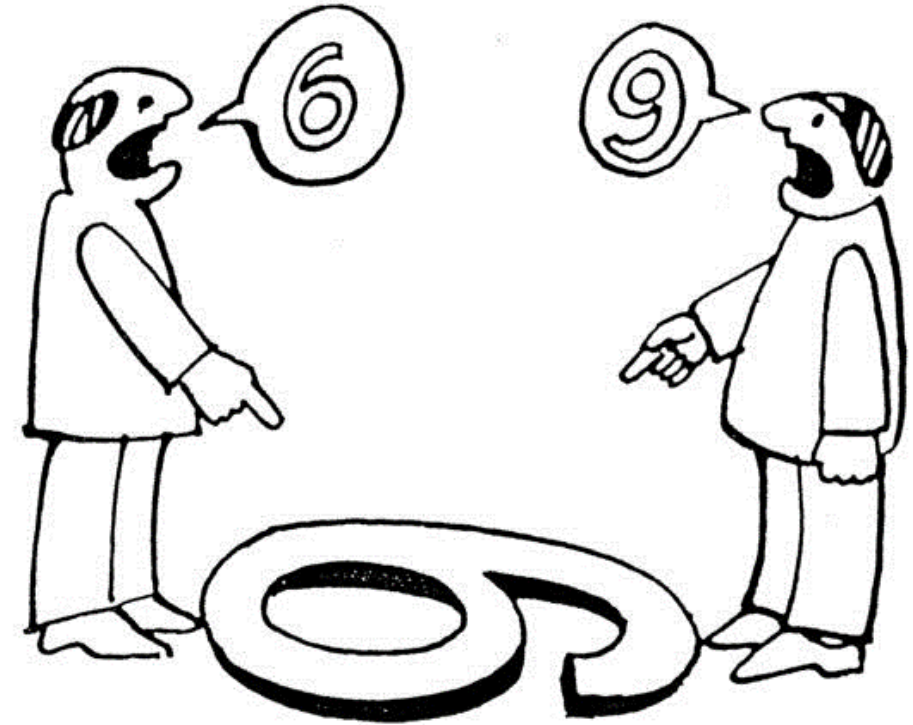
# Can anyone remember what we are fighting about!?

© Marris Con



## What the fight might have been caused by:

- Differences in **vocabulary**.
- Turf wars between experts.
- Confusion between the **good** and the **bad** implementations of the different approaches:
  - Bad Lean is down-sizing using Japanese words.
  - Bad TOC is a closed mind-set rejecting other people's ideas or claim that any good idea is just disguised TOC.
  - Bad Six Sigma is a herd of people with judo belts producing very few results.



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# What they share: To be obsessed with improving the flow

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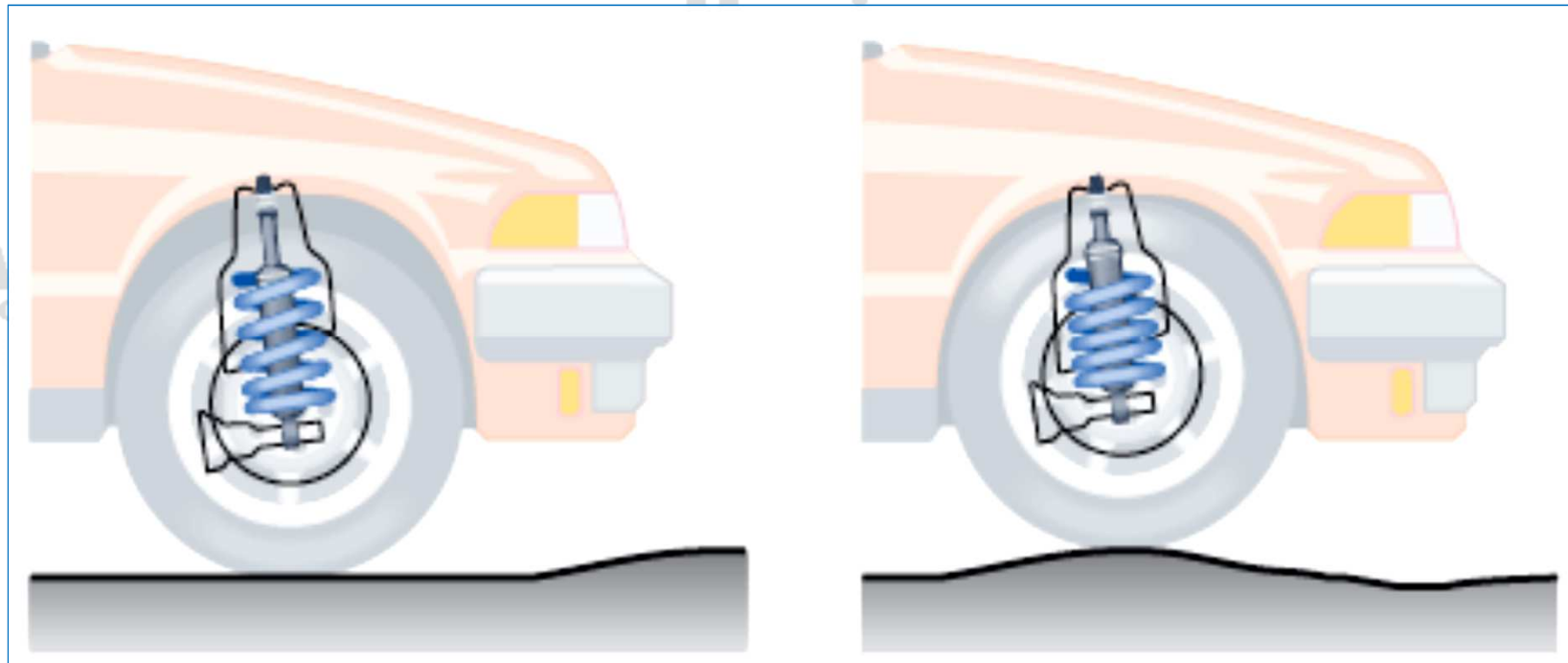


## The only significant difference is their attitude to **variability**

- Lean and Six Sigma consider that you can eliminate variability
  - Hence a **"zero stock" logic**
- TOC considers that you cannot totally eradicate variability
  - Hence a **buffer logic**

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# Table of contents

---

- Introduction
- Theory of Constraints
- Lean Manufacturing
- Six Sigma
- Case studies / Examples
- Conclusion
- Appendices
  - The main books to understand TLS
  - Useful internet links

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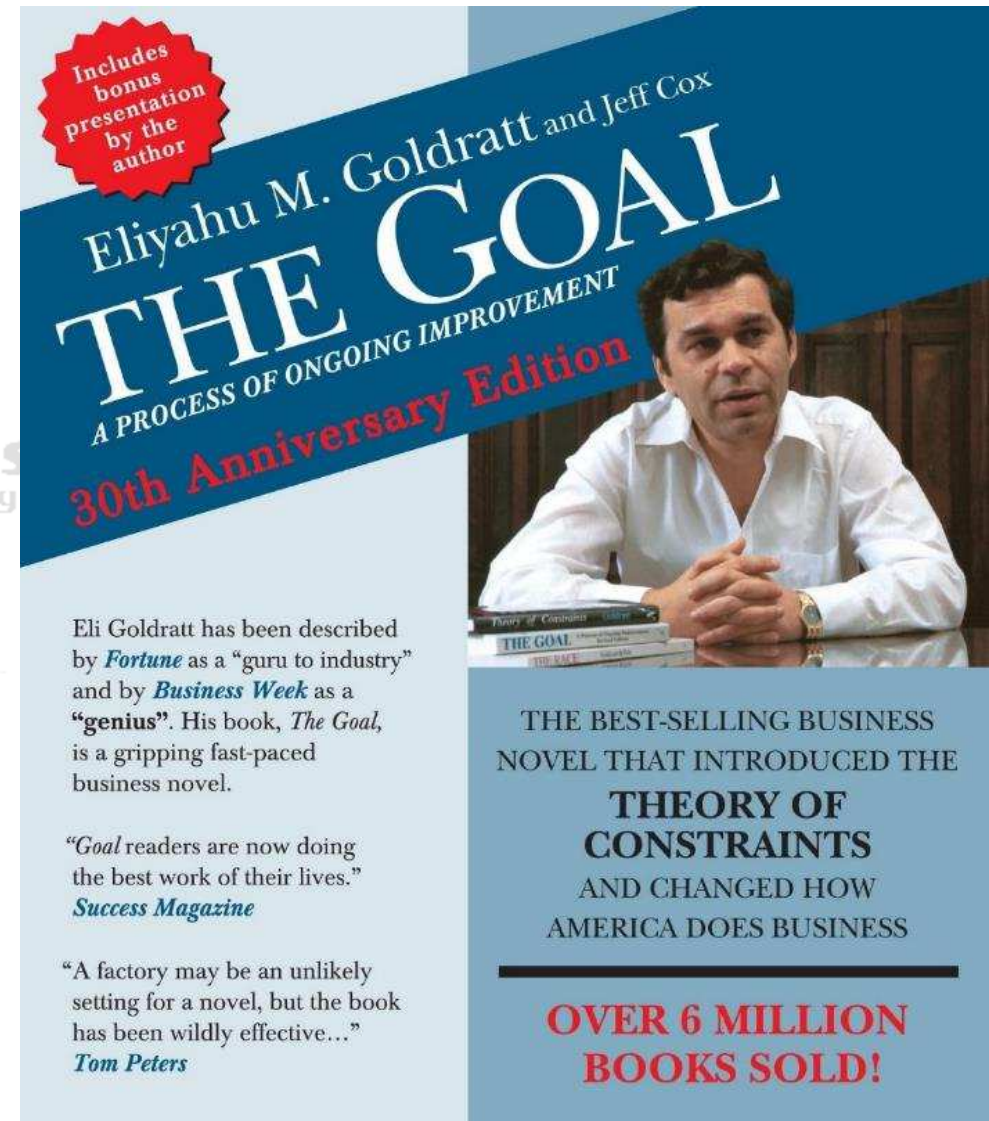
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# The Theory Of Constraints gained its global recognition because of the bestselling “business thriller” *The Goal* by Eliyahu Goldratt

- Written by Eliyahu Goldratt the founder of TOC.  
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- Over 6 million copies sold in 29 languages.
- Mandatory reading in most universities / MBAs /...
- Still perfectly pertinent after 30 years.

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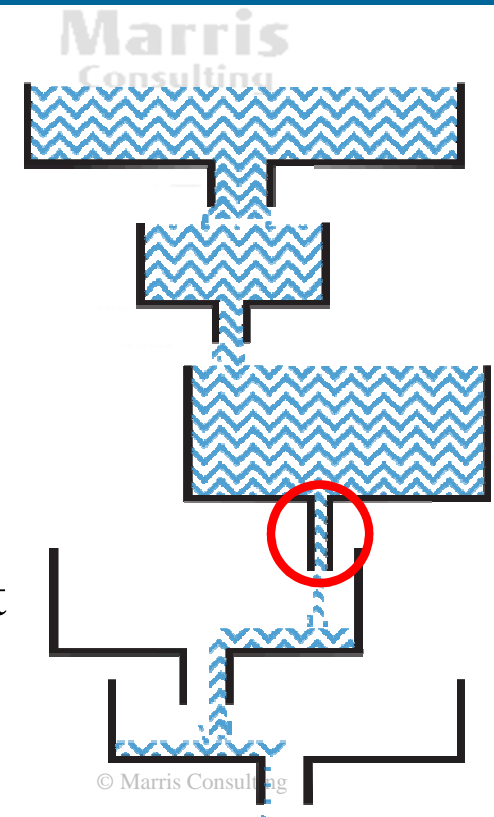


# Focus on improving the system constraints that determine the overall performance

*It is no longer possible to distribute work equitably:  
organizations are necessarily unbalanced*

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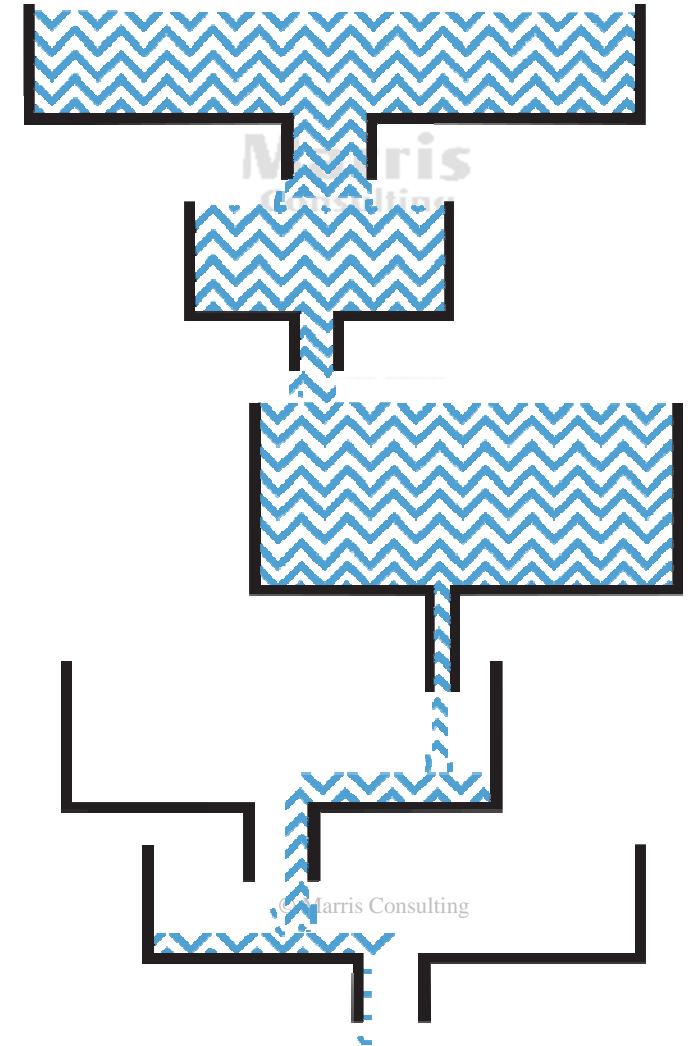
- Companies (factories, engineering departments ...) and other organizations inevitably have unbalanced capacities.
- Annual budgets pretend to balance organizations but they don't succeed.
- There is always a constraint somewhere in the system.
- One hour lost on that constraint (the bottleneck) = one hour lost for the system = one hour of lost sales.
- One hour gained on a non-bottleneck is an illusion. A non-constraint must only work according to the constraint's requirements.
- A dual view is mandatory: different rules for constraints and non-constraints.



*The sum of local optimums is not equal to the global optimum*

# The Theory of Constraints is more and more pertinent

- The world continues to change increasingly rapidly: technology, emerging competitors, macro-economics, ...
- ...and yet the speed with which an organization can increase or decrease its capacities / capabilities has not increased correspondingly.
- As a result organizations are more and more unbalanced:
  - Capacity constraints are clearly present
  - The quantity of excess capacities on the non-constraints (80% - 95% of the resources) is increasing year by year.

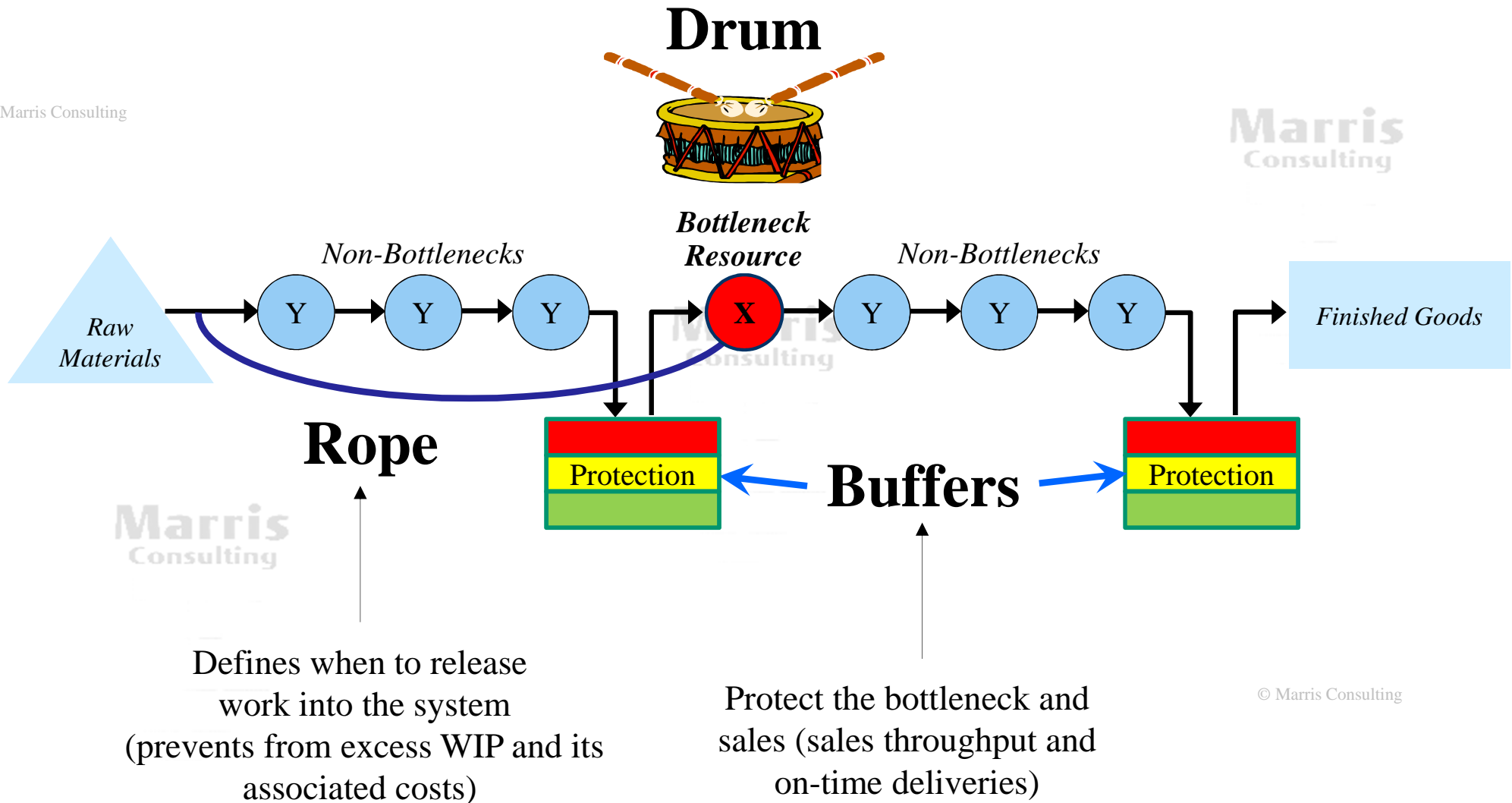




# Control the product flow with the Drum Buffer Rope (DBR) mechanism

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## The 5 steps of TOC's continuous improvement process

1. IDENTIFY the system's constraint(s).

Easy to do in production  
but not in projects

2. Decide how to EXPLOIT the system's constraint

Without investments  
in \$ or in time

3. SUBORDINATE everything else to the above decision.

The most  
difficult step

4. ELEVATE the system's constraint

With investments  
in \$ or in time

5. WARNING!!!!

Or choose the "best"  
constraint of the system

If in the previous steps a constraint has been eliminated,  
go back to step 1,  
but do not allow INERTIA to become the system's constraint.

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# Table of contents

---

- Introduction
- Theory of Constraints
- Lean Manufacturing
- Six Sigma
- Case studies / Examples
- Conclusion
- Appendices
  - The main books to understand TLS
  - Useful internet links

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# The origins of Lean

- Lean manufacturing is attributed to the Toyota Motor Company.
- In the 1950's Toyota developed the Toyota Production System or TPS which is generally acknowledged to be the basis of Lean.
- Today Lean is used in all sorts of organizations throughout the world.



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**Taiichi Ohno**

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# The 7 possible sources of waste: the 7 *Mudas*

**Rework**

**Over Production**

**Unnecessary movement**

**Unnecessary transport**

**Waiting**

**Excess stocks**

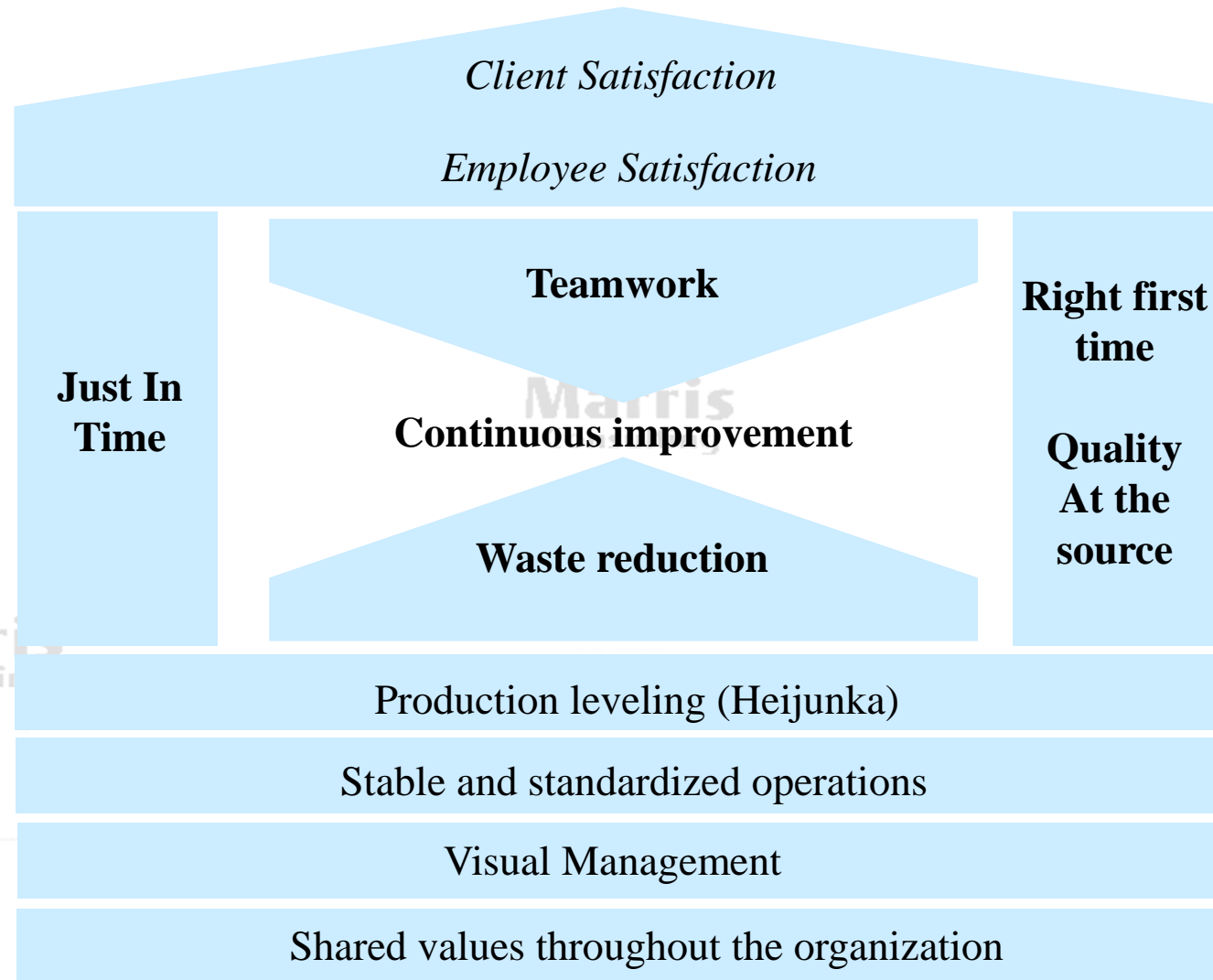
**Excess work**



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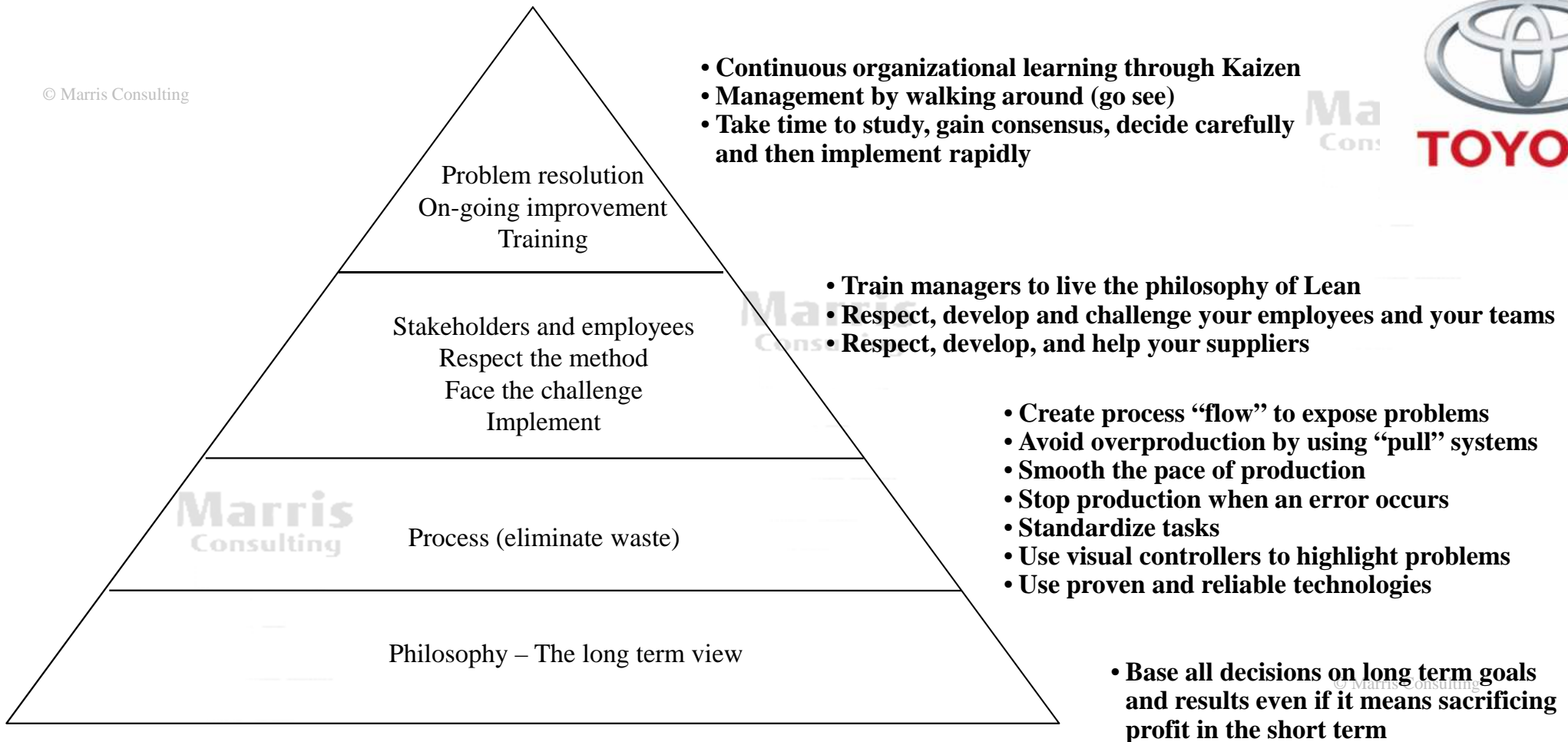


# The TPS (Toyota Production System) “house”



# Lean: more of a management system than just a manufacturing system

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Source: *Toyota Way* by Jeffrey Liker

# Table of contents

---

- Introduction
- Theory of Constraints
- Lean Manufacturing
- Six Sigma
- Case studies / Examples
- Conclusion
- Appendices
  - The main books to understand TLS
  - Useful internet links

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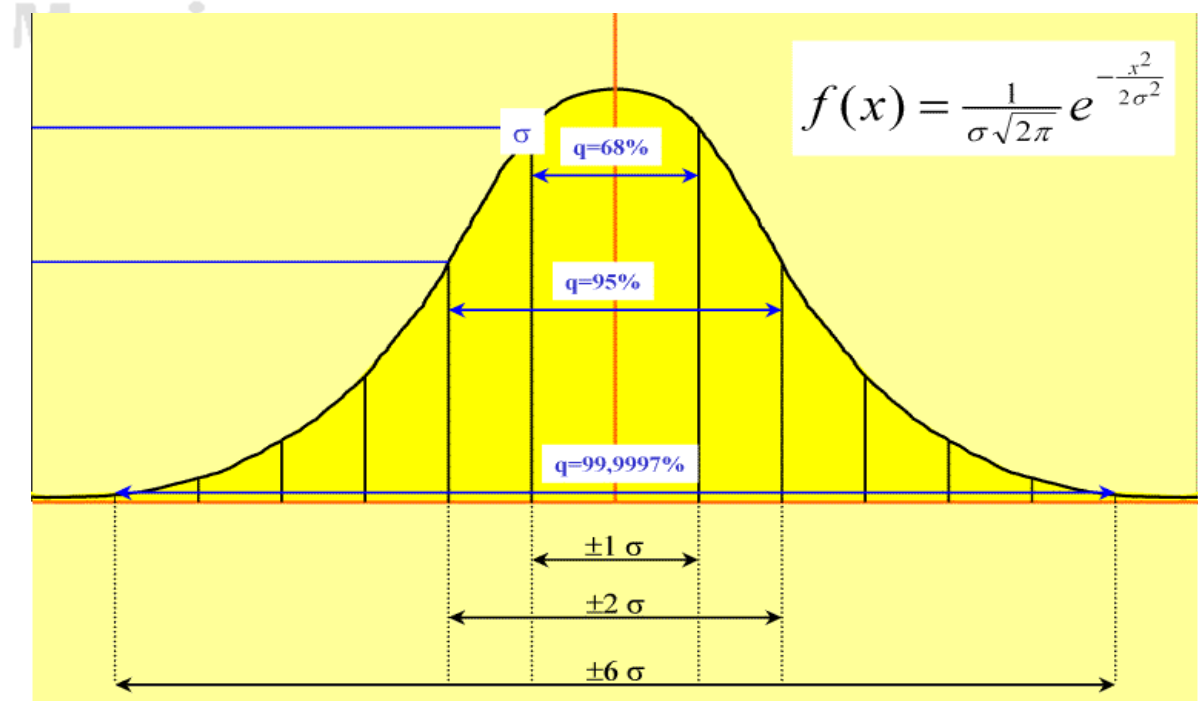
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## Six Sigma is comprised of 3 elements

- Reduce process variability to less than 3.4 defects per million occurrences.
- Six Sigma = 6 standard deviations
- A system of certification of experts: Green Belt, ... Master Black Belt.
- A process improvement cycle: DMAIC: Define, Measure, Analyse, Improve and Control

6σ



# DMAIC: Process of on-going improvement

## Define, Measure, Analyse, Innovate/Improve, Control

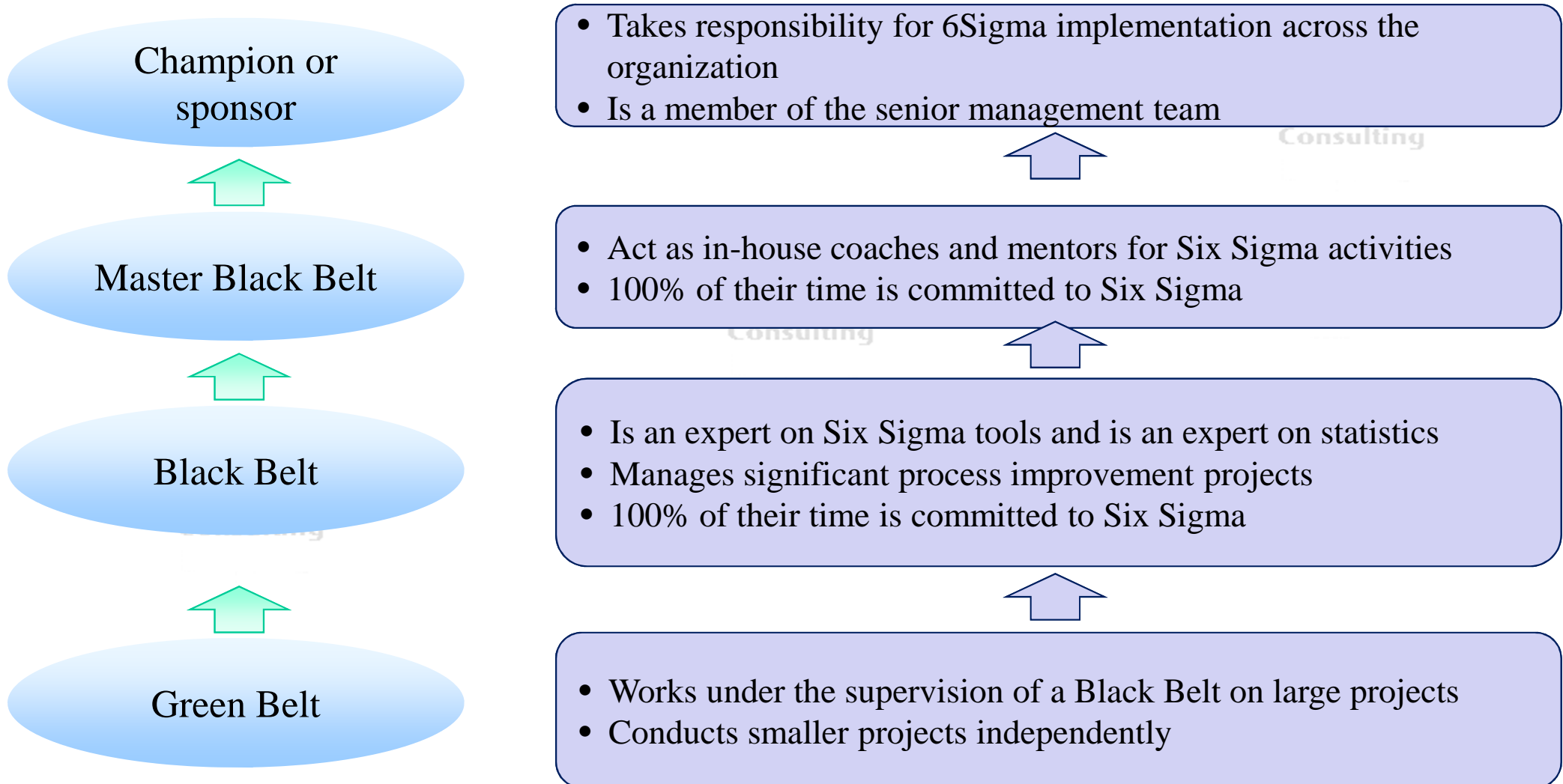
- Define: All stakeholders agree on the problem and the objective of a solution.
- Measure: Measure key elements of the process to establish a baseline and gain an understanding of the process.
- Analyse: Analyse the data and verify that the cause and effect relationship has been established.
- Improve: develop and present logical, documented plans for resolving the problem based on the data.
- Control: Monitor the new process to be sure the problem does not reoccur.



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# Six Sigma Belts (Levels of expertise)



# The history of Six Sigma

- Motorola developed Six Sigma in 1986.
- The method became well known in the 1990's when, under the leadership of Jack Welch, General Electric successfully applied it.
- Many large American companies soon followed suit.
- Today, Six Sigma and Lean are used in combination and referred to as **Lean Six Sigma** or LSS.

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# Table of contents

---

- Introduction
- Theory of Constraints
- Lean Manufacturing
- Six Sigma
- Case studies / Examples
- Conclusion
- Appendices
  - The main books to understand TLS
  - Useful internet links

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# Case study #1

## Making hamburgers

- Analysis: TOC &/or Lean?
  - Full kitting in the kitchen
  - Mistake prevention
- Initial solution: Lean
- Building the future: TOC + Lean
  - TOC: choosing the best constraint and deciding on the excess capacity of the rest of the resources
  - Lean: designing new facilities where products flow better

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## Case study #2

### Making rockets

- TOC: The constraint is welding the reservoir (10 out of 350 people)
- TOC: To increase Throughput we used Critical Chain in production (Mascot)  
= Throughput increase >50%
- Lean: To improve "right first time" throughout operations
- Six Sigma: to better master the critical welding operation.



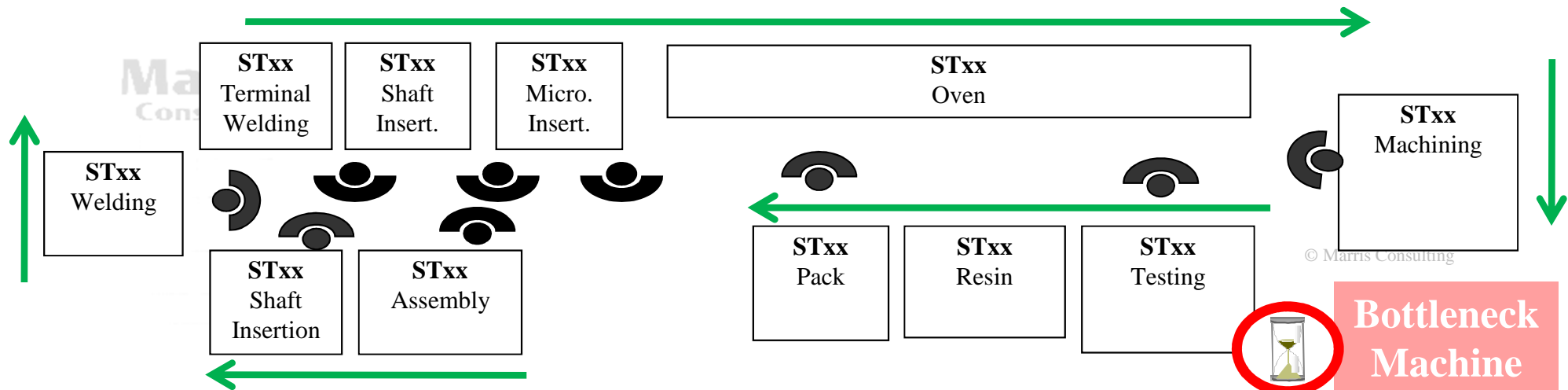
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# Case study #3

## Making car alternators

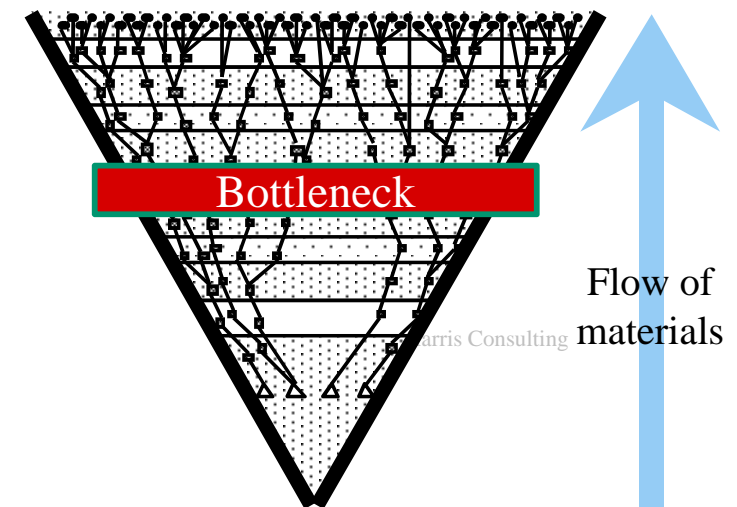
- Case: A worldwide supplier of automotive components already very Lean
- Challenging “one piece flow” by providing a buffer of a dozen pieces in front of the bottleneck in order to protect this resource from minor perturbations (3 minutes or less) in the upstream processes.
- Results: >15% improvement in total output of the line in less than one hour.



## Case study #4

### Making big steel sheets

- A steel plate factory with more than 2,000 workers.
- Capacity constraint was the heat treatment ovens, not the rolling mill as they thought.
- Focused improvement on the constraint:
  - SMED (set up) process,
  - Six Sigma to increase capacity
- The Drum-Buffer-Rope method reduced the WIP (Work In Progress) dramatically.
- Improved their throughput and sales by >20%



# Case study #5

## Making big gearboxes

- TOC analysis: The Design Office is the capacity constraint (13 out of 500 people)

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- TOC initial solution:  
Critical Chain  
+ WIP reduction  
= Stop multitasking  
= Throughput increase >130%  
= Lead time reduction >80%
- Lean to reduce quality issues.

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# Table of contents

---

- Introduction
- Theory of Constraints
- Lean Manufacturing
- Six Sigma
- Case studies / Examples
- Conclusion
- Appendices
  - The main books to understand TLS
  - Useful internet links

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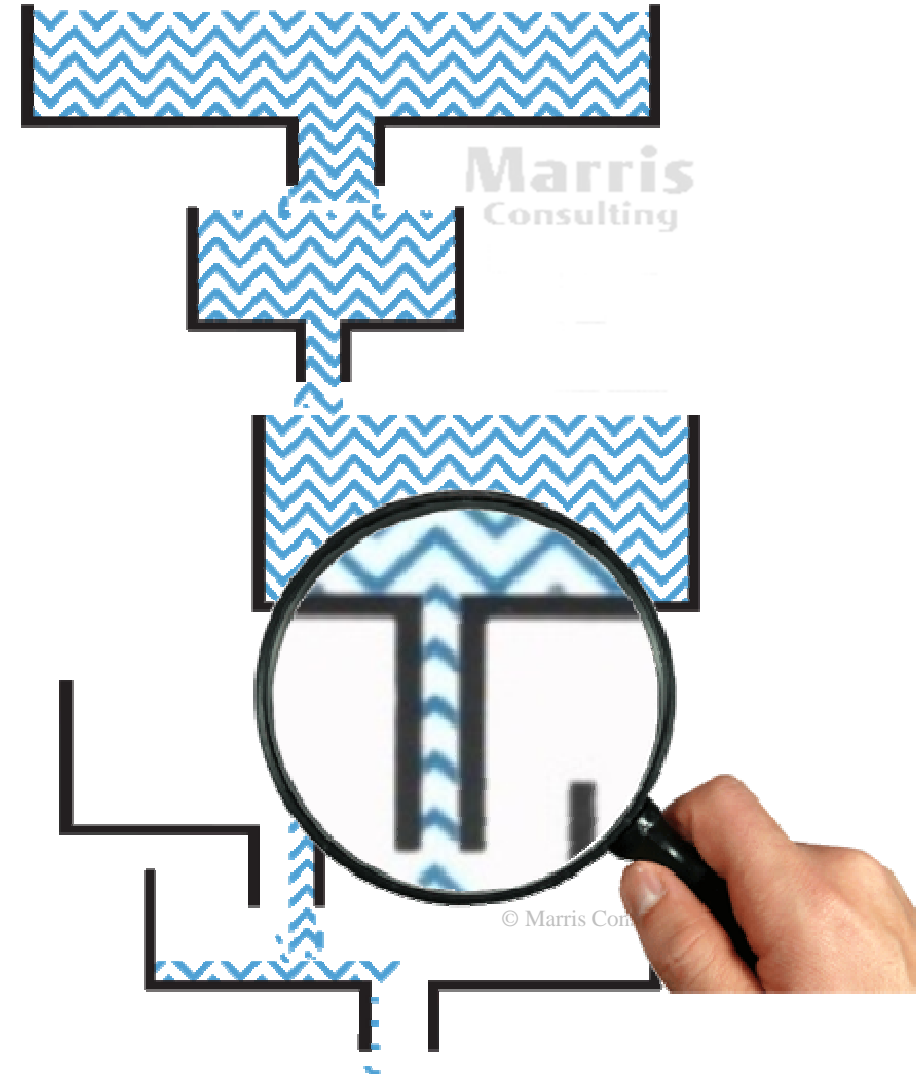
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## The (very simple) combined approach:

- Use TOC to identify the constraint and therefore where to focus
- Use Lean, Six Sigma, common sense or method XYZ to improve the performance



# TLS: Theory Of Constraints + Lean + Six Sigma

## Combining the best of each approach

---

### ■ Theory Of Constraints

- Focus on improving the system's constraint

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- Boost the return on investment and success of Lean & Six Sigma programs

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### ■ Lean Manufacturing / Toyota Way

- By far the most widespread approach in industry
- A multi-dimensional approach: management, Just-In-Time, 5S, Lean Engineering, ...

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### ■ Six Sigma

- Reduce process variability
- When it is pertinent (important and complex problems) use Design Of Experiments, etc.

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### ■ And integrate any other approach or idea that seems pertinent to you

- DDMRP, TRIZ, Agile, etc.

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Thank you for your time.  
Any questions?

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Going faster and further  
using TLS, the combination of  
the Theory of Constraints, Lean & Six Sigma



Saint Petersburg, 25<sup>th</sup> of May 2017  
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# Table of contents

---

- Introduction
- Theory of Constraints
- Lean Manufacturing
- Six Sigma
- Case studies / Examples
- Conclusion
- Appendices

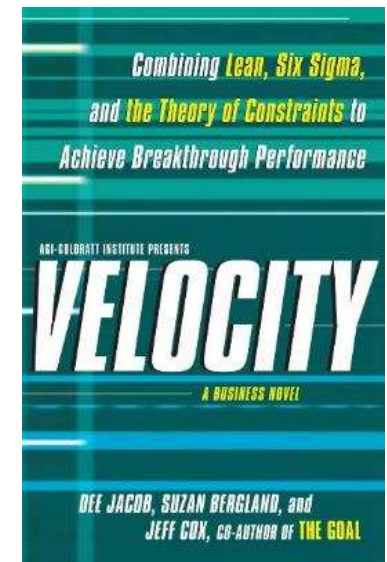
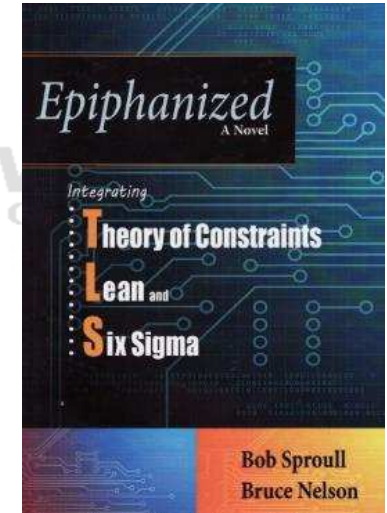
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## TLS books: 2 business novels

- *Epiphanized* by Bob Sproull & Bruce Nelson (2012)
  - While taking the form of a novel to get the ideas across there are also 1100 pages of technical material which explain in detail the principles of TLS, Throughput Accounting, the Thinking Processes, the Replenishment Model, DBR (Drum – Buffer – Rope), Critical Chain Project Management, etc.
- *Velocity* by D. Jacob, S. Bergland & J. Cox (2010)
  - A business novel which describes how to combine the three approaches. This novel lays out an interesting case of a double bottleneck. During the course of the novel the actors solve both a managerial constraint as well as a production constraint.



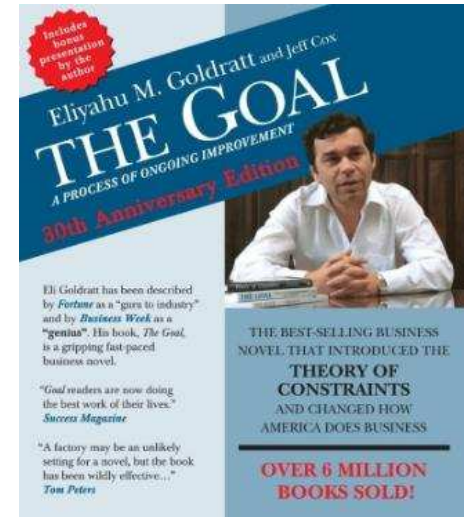
## Theory of Constraints books:

- *The Goal* by Eliyahu Goldratt

- The classic "must read" of the Theory of Constraints. Should read it at least every 10 years.

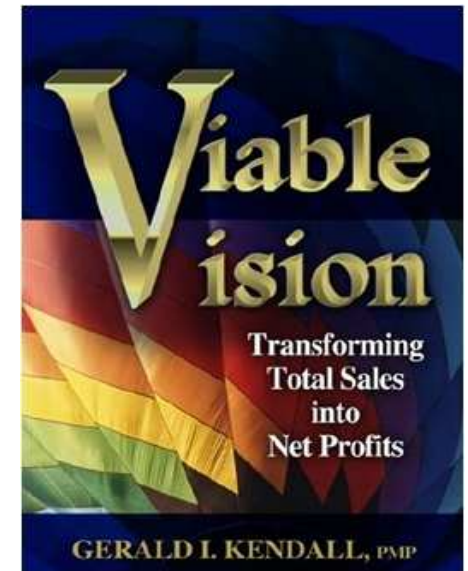
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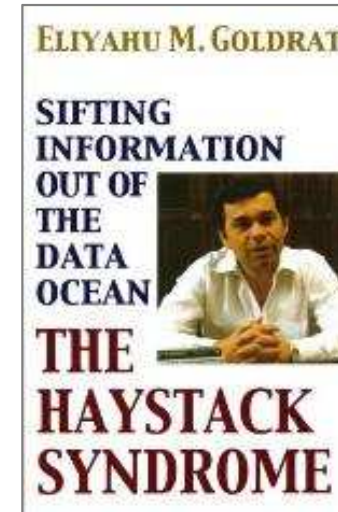
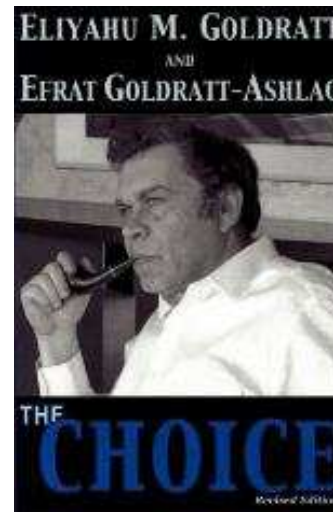
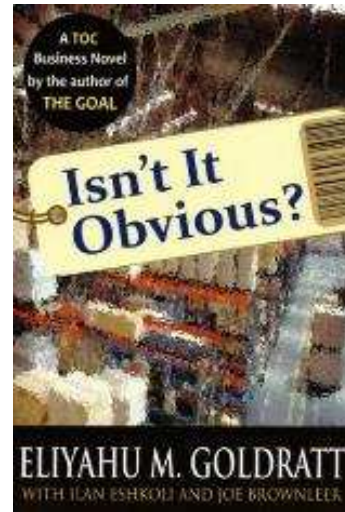
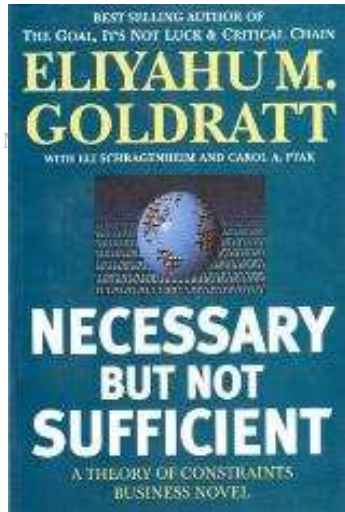


- *Viable Vision* by Gerald Kendall

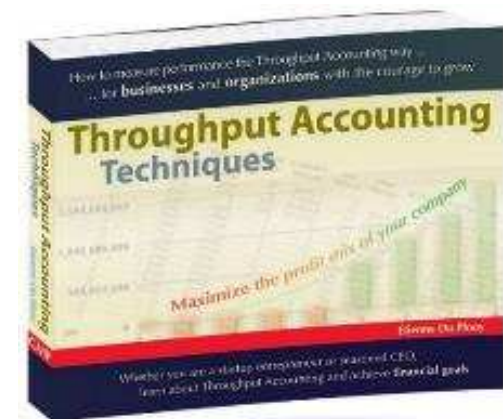
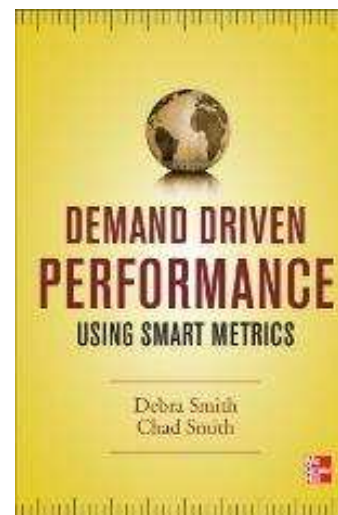
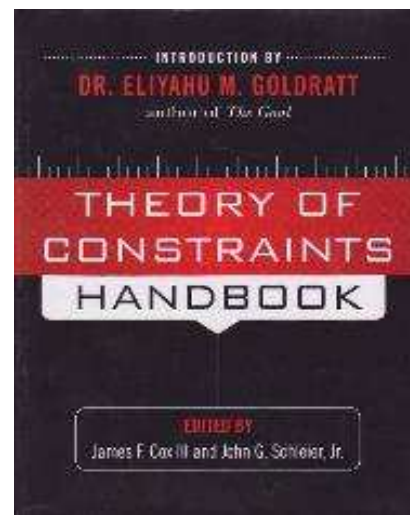
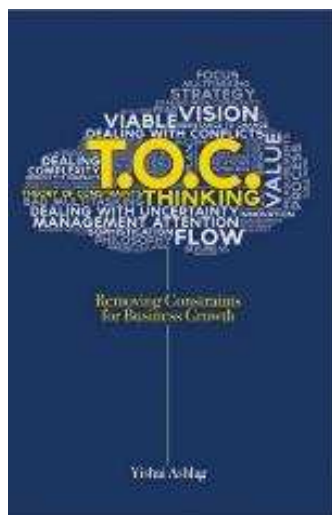
- An good executive summary that presents many aspects of TOC: Critical Chain Project Management, the Thinking Processes, Mafia offers, Replenishment, etc.



## Other ToC books

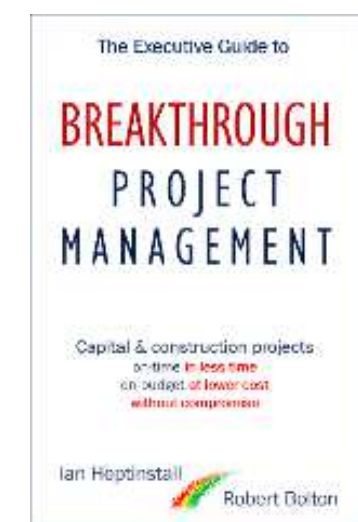
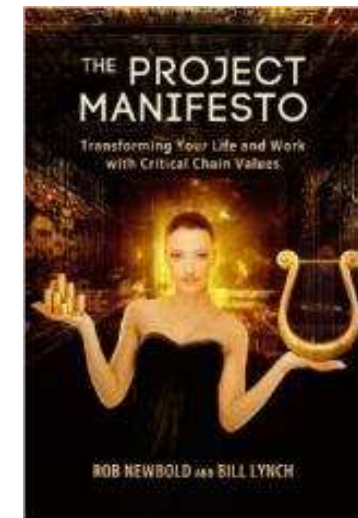
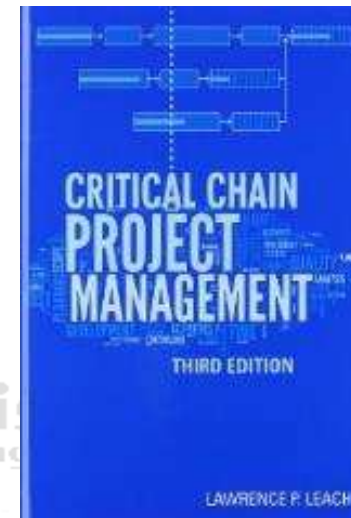
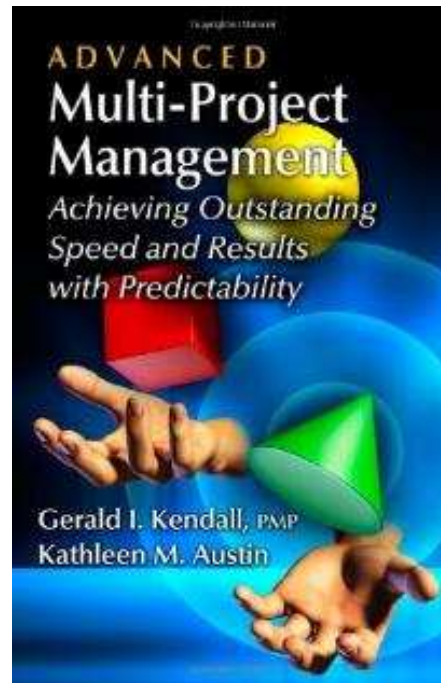
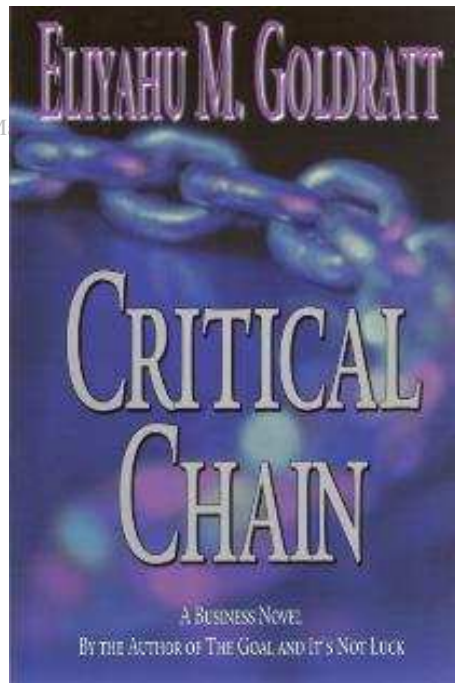


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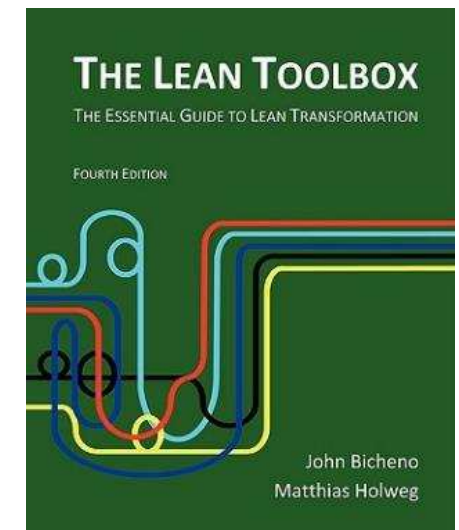
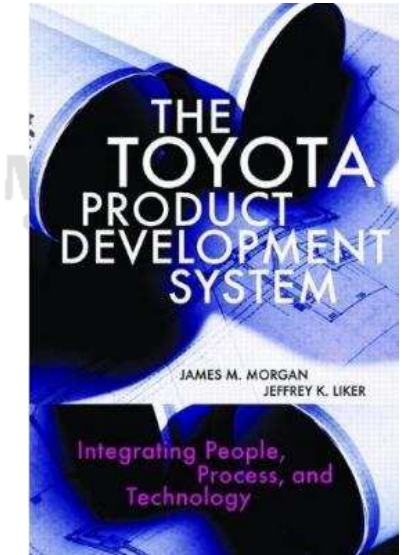
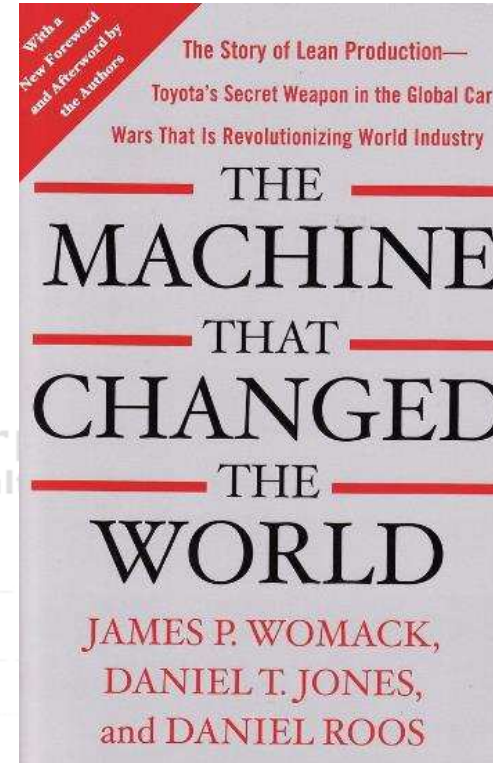
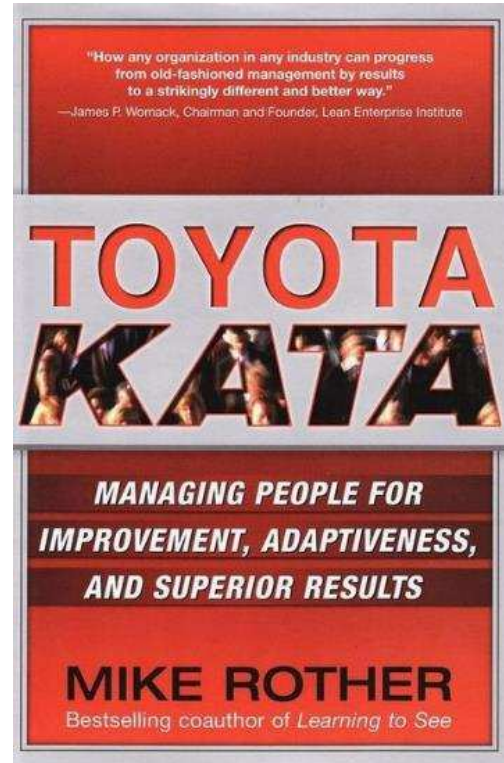
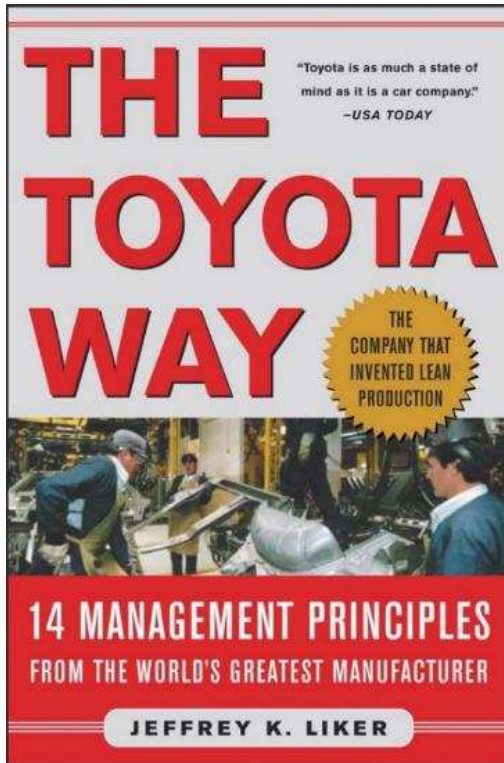




# Critical Chain books



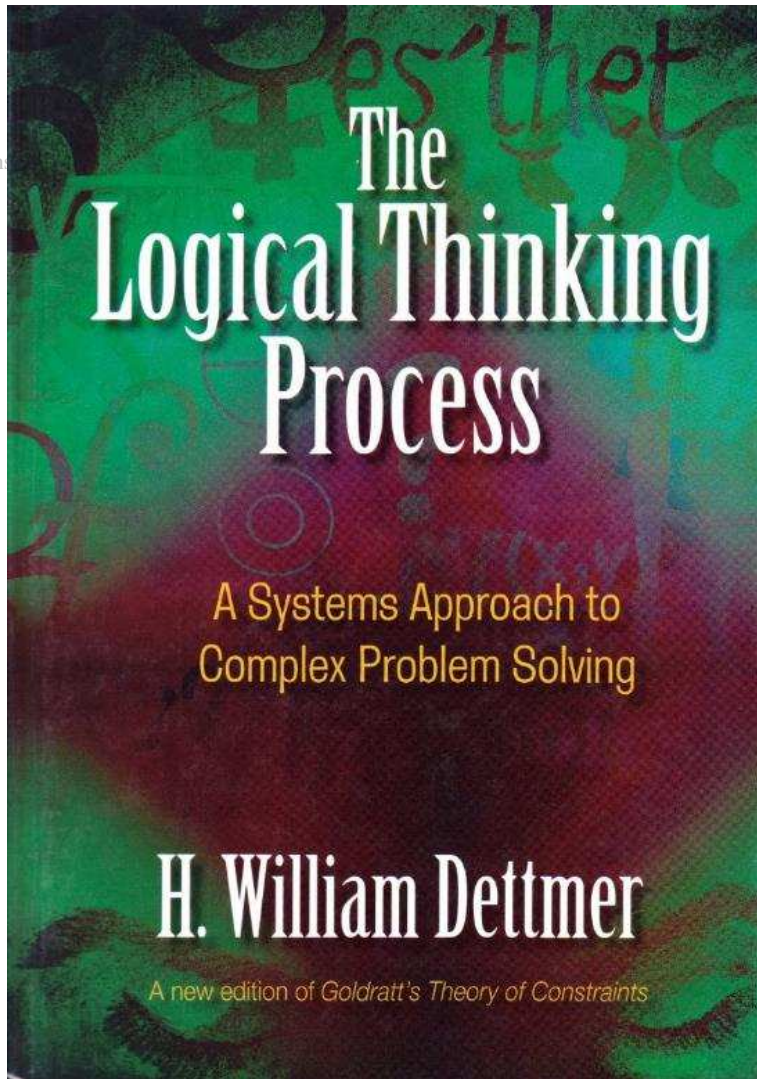
## Lean books



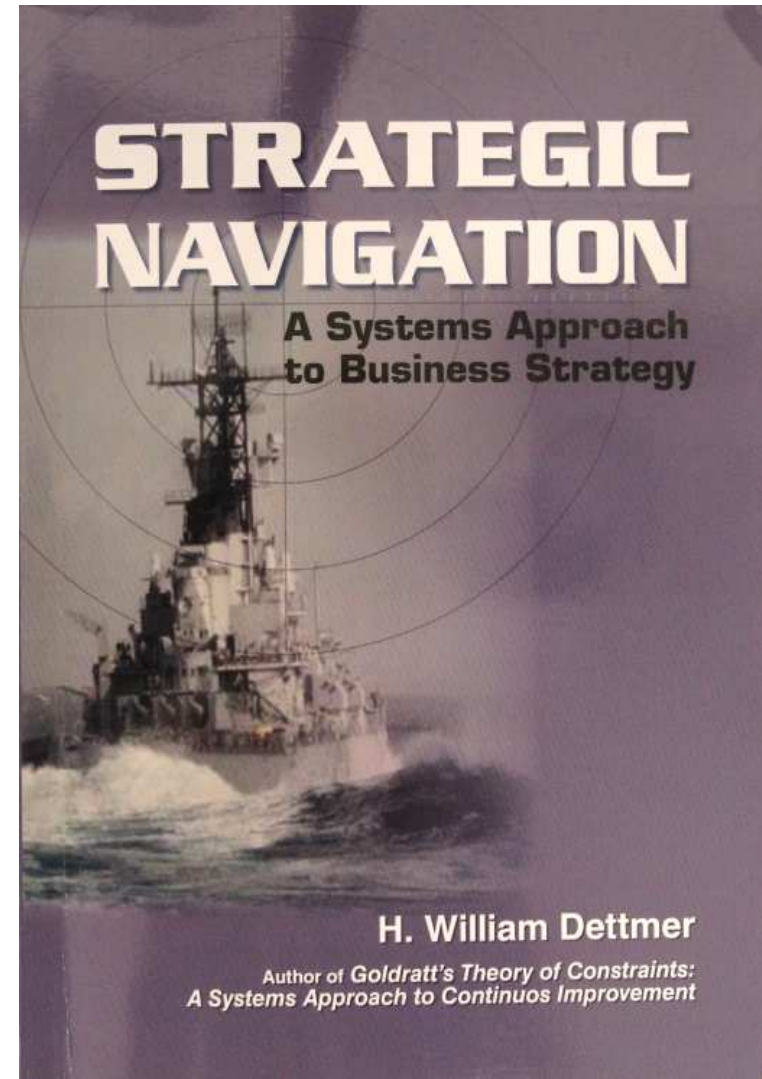


# Logical Thinking Process and Thinking Processes books

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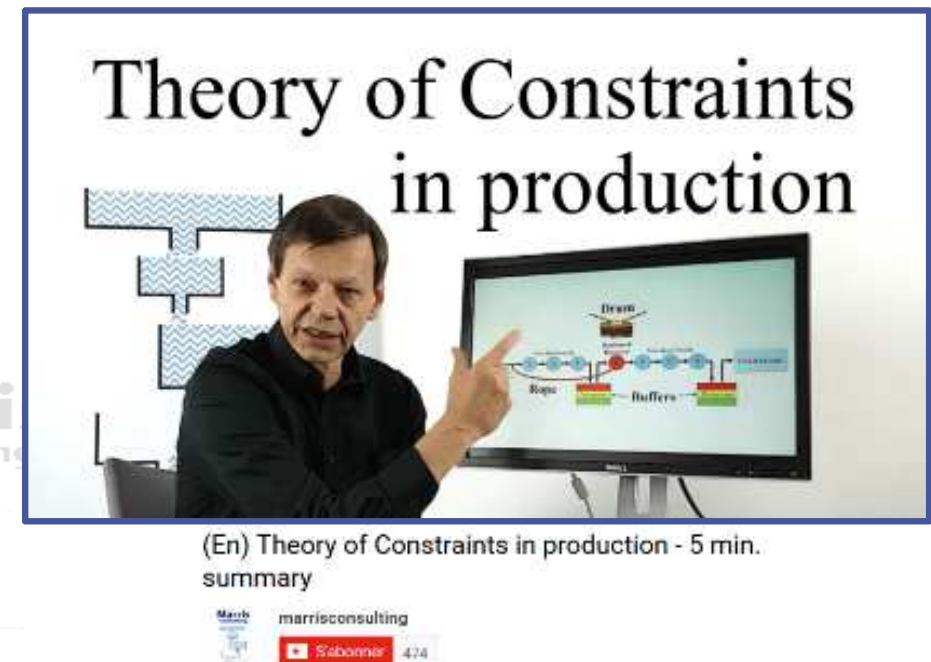
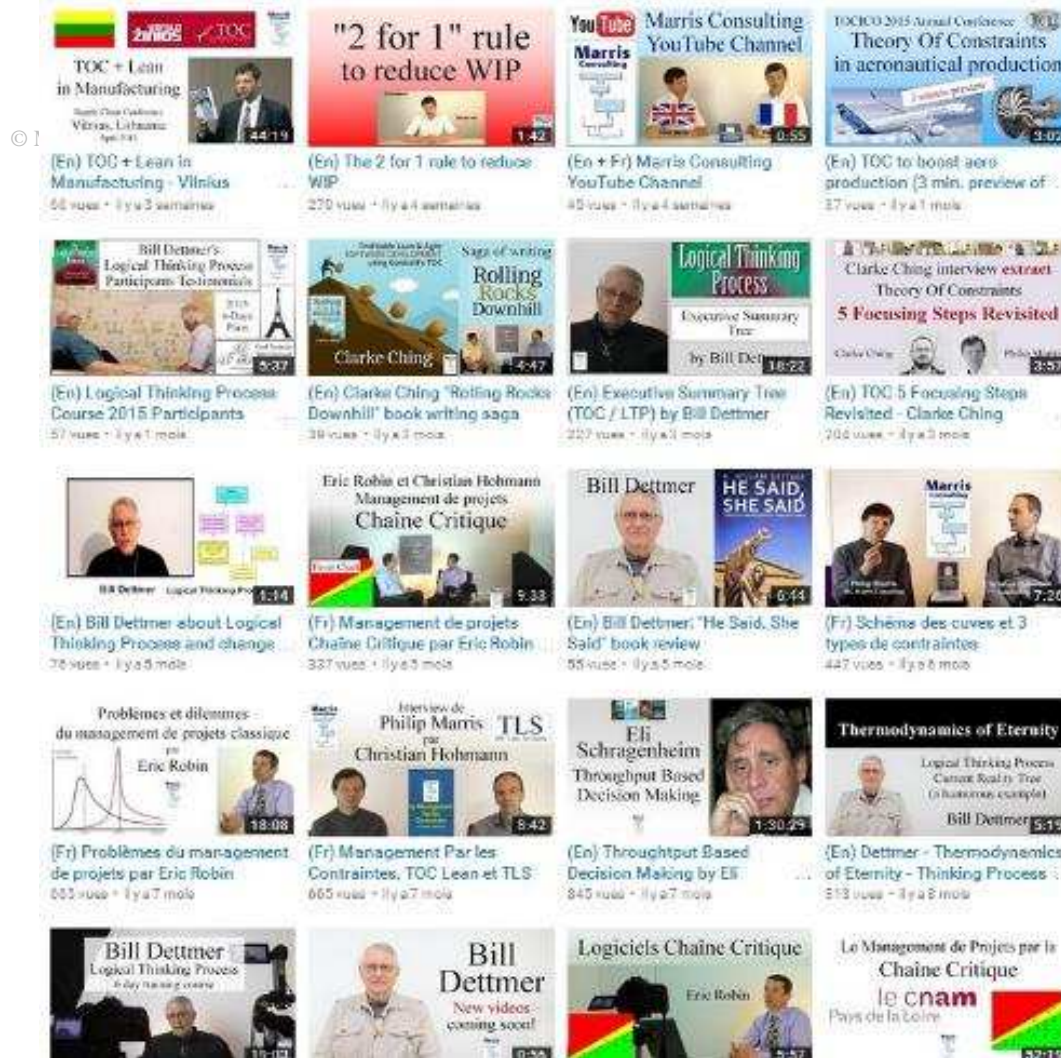
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# A video website: Marris Consulting's YouTube Channel

<https://www.youtube.com/user/marrisconsulting>



A brief 5 minute summary of how one applies the Theory of Constraints in a production environment. It covers: the axiom of the unbalanced plant, the existence of bottleneck, the Drum – Buffer – Rope flow control mechanism and the improvement strategy (the 5 focusing steps).

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# Useful web link: an information website dedicated to TLS To get the latest news and use the best web sources when surfing

[www.scoop.it/t/tls-toc-lean-six-sigma](http://www.scoop.it/t/tls-toc-lean-six-sigma)

Topic « TLS – TOC, Lean Six Sigma »

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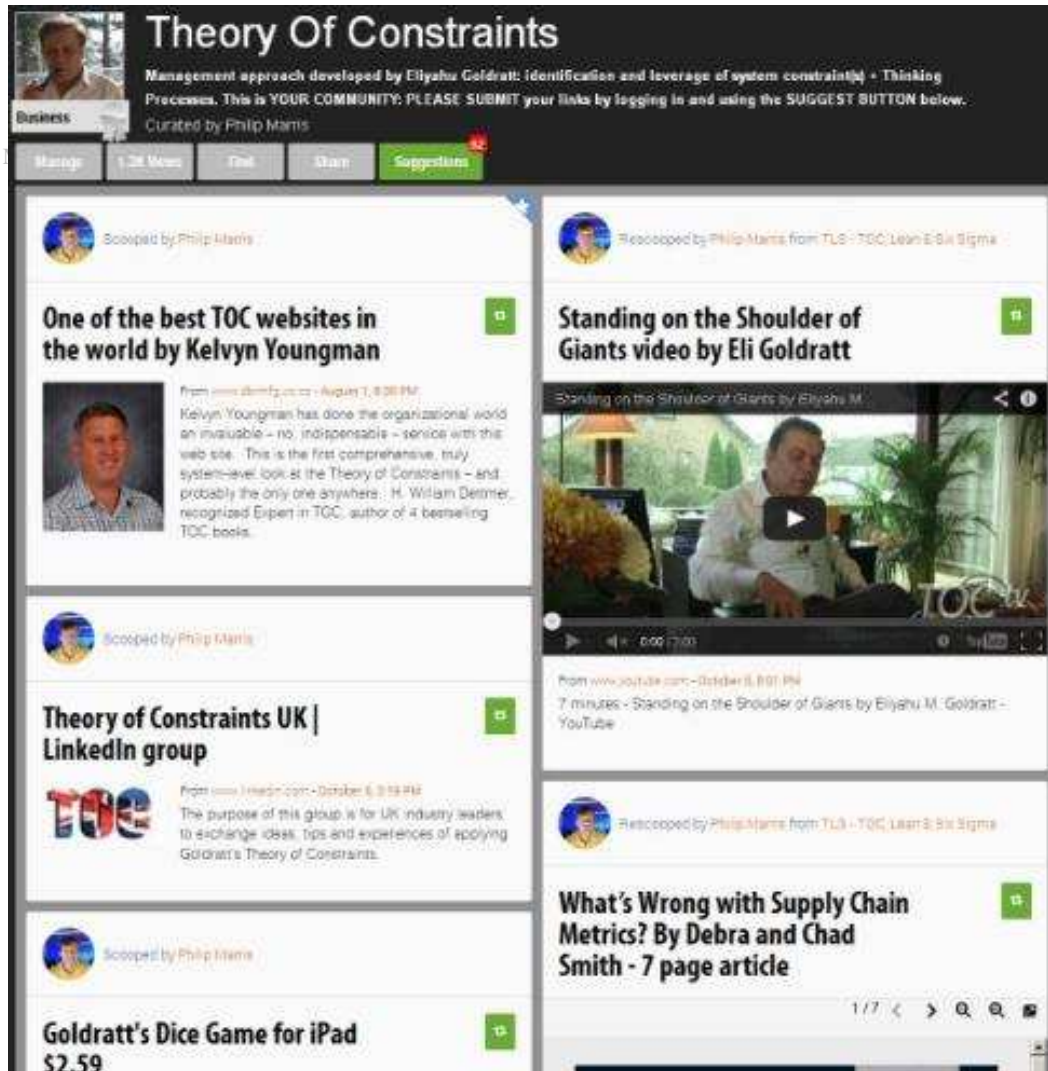
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# A permanent news website dedicated to Theory of Constraints



<http://www.scoop.it/t/theory-of-constraints-by-philip-marris>

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# A permanent news website dedicated to CCPM

**Critical Chain Project Management**

"CCPM" Project management approach that is part of the Theory Of Constraints (TOC) developed initially by Eliyahu Goldratt. This is YOUR COMMUNITY. PLEASE SUBMIT your links by logging in and using the SUGGEST BUTTON below.

Curated by Philip Marris

Home All News Feed About Suggest

Rescoped by Philip Marris from Theory of Constraints (TOC) & CCPM

### Critical Chain Project Management new LinkedIn discussion group

From [www.linkedin.com](https://www.linkedin.com) • September 21, 9:56 AM  
Group created September 20th 2013

The goal of this group is to discuss all aspects of CCPM.

- Planning and execution
- Resources: books, websites, presentations...
- Events: conferences, seminars, training sessions...
- Case studies and examples
- Variants according to context: Pharma, Construction...
- New ideas and evolutions
- Managerial (alignment, visual tools...)
- Cultural aspects of CCPM (attitude to commitments and uncertainties...)
- Combination with Agile, Scrum, Kanban...
- Links with standard project management best practices: PMB, Prince...
- Links with Lean (Engineering, Projects...)
- Comments on CCPM software
- Simplified CCPM for simple projects, maybe without software
- General project management issues (such as Work Breakdown structure architectural best practices) especially when CCPM has an impact
- Etc.

Via Guillaume Mazon

Philip Marris insight:  
I am the administrator of both this webpage you are reading and the LinkedIn group. My goal is that these 2 entities reinforce each other. News and minor/quick/simple comments here and in depth discussions in the LinkedIn discussion group.

### Mazda credits Critical Chain Project Management for company turnaround

Made by TOC

From [www.gp.com](http://www.gp.com) • October 5, 2:51 PM

Mr. Mitsuo Homi, Executive Officer from the Mazda Motor Corporation Power Train Development Division presented [...] how Critical Chain Project Management enabled Mazda to quickly develop their innovative SkyActiv capability. [He] described the crisis faced by Mazda [...] surviving four straight years of significant financial losses. Mr. Homi described the last chance for Mazda to survive by developing technology that would achieve low fuel consumption from an internal combustion engine that would rival a hybrid engine, no compromise in the driving pleasure, and affordable for all customers. The product development cycle had to be cut in half for Mazda to survive. Starting with Critical Chain Project management education in 2007, the momentum grew within the company for holistic project management until the development project duration was cut by half. [...]

Rami Goldratt, CEO of Goldratt Consulting, said: "Mazda gives the world another great example of the power of TOC to generate results previously thought not possible - financially, operationally, and at least as importantly, in the growth and harmony of the people themselves." Mazda has won 73 awards for its SKYACTIV technology as of 20 January 2013 including Japan

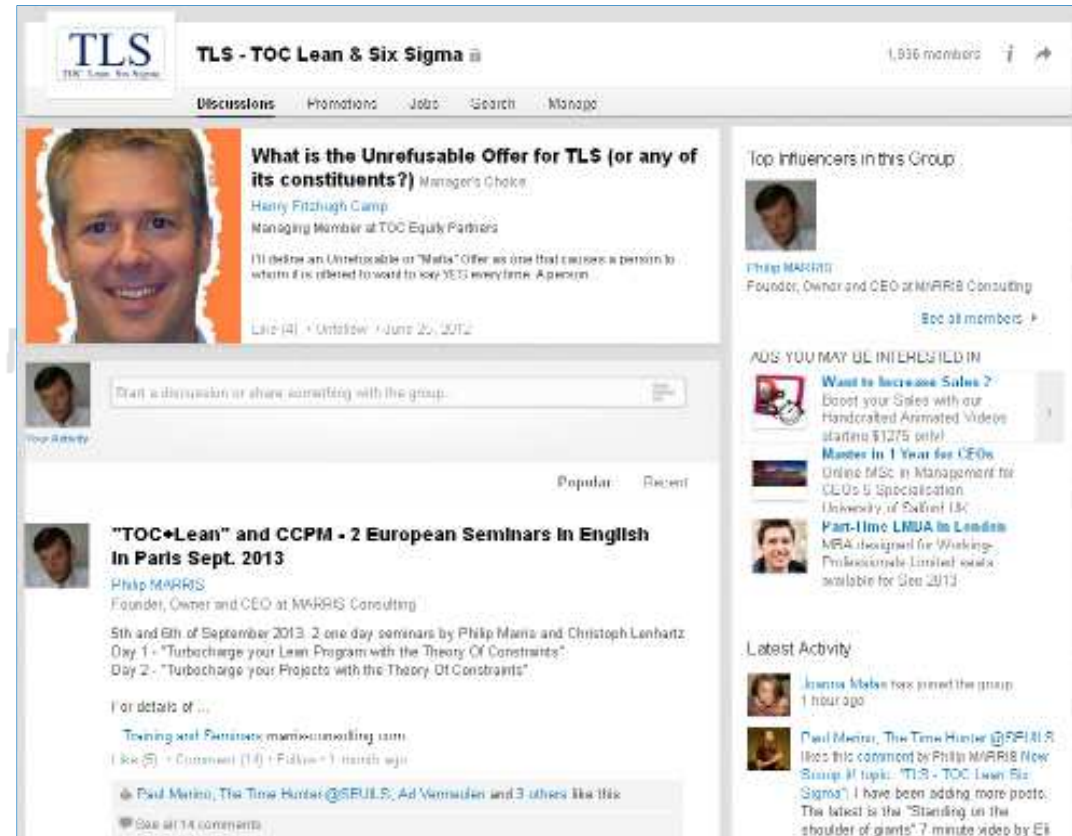
<http://www.scoop.it/t/critical-chain-project-management>

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# A LinkedIn Discussion group dedicated to TLS – TOC Lean Six Sigma

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On [www.linkedin.com](http://www.linkedin.com):  
Group: TLS – TOC Lean Six Sigma  
The oldest and most established  
LinkedIn group on the topic of TLS.  
Almost all of the world's experts of  
TLS are members of this group.



# A LinkedIn Discussion group dedicated to Critical Chain Project Management

© Marris Con

The screenshot shows the LinkedIn group page for 'Critical Chain Project Management'. The group has 547 members. The page features a header with the group name and a 'Manage' button. Below the header, there is a section for 'ABOUT THIS GROUP' which describes the group's focus on Critical Chain Project Management (CCPM) as an approach to managing projects and project portfolios, developed initially by Eliyahu Goldratt. It also states that the group's goal is to discuss all aspects of CCPM. A 'MEMBERS' section shows a list of group members and an 'invite others' button. On the left, there is a post by Philip MARRIS, CEO of Marris Consulting, titled 'Critical Chain Project Management news and information website'. The post includes a link to the website and a description of its purpose. The website's logo, which is a red and green triangle, is also visible.

<https://www.linkedin.com/groups/5183858>

Beware there are several with similar names. This one is named: *Critical Chain Project Management*

The screenshot shows a LinkedIn post by Jonathan Sapir, titled 'The Fallacy of Accuracy'. The post discusses the fallacy of accuracy in project management, stating that the most accurate estimate is the one that is most likely to be wrong. It also mentions that the fallacy of accuracy is a common mistake in project management. The post includes a diagram showing a project timeline with a red line indicating the actual path and a green line indicating the planned path. The post has 1 like and 1 comment.



# Victoria University Wellington New Zealand – TOC Database

<http://www.victoria.ac.nz/som/research/theory-of-constraints>

The screenshot shows the Victoria University Wellington School of Management website. The navigation bar includes Home, About Us, Study, Research, and Centre for Labour, Employment and Work. The main content area is titled 'Theory of Constraints: A Research Database' and features a sidebar with links to Working Papers, Research Seminars Series, Research Reports, Masters Grants, Working Capital, Theory of Constraints, Background, and Contact Us. The main text area includes a welcome message and information about the database's history and content.

## Theory of Constraints: A Research Database



Welcome to the Theory of Constraints (TOC) online resource, which aims to support collaboration between researchers and practitioners in the field.

### About the Theory of Constraints database

A database of TOC articles, books and conference papers was started back in 1996, with our first bibliography published in 2000.

We have recently searched the literature and updated our records and have now assembled over 4000 articles, books, and conference papers, on all areas of TOC. The database here contains journal articles and conference papers, to complement the listing of TOC books compiled by Prof. Jim Cox, which is available on the TOCICO website.

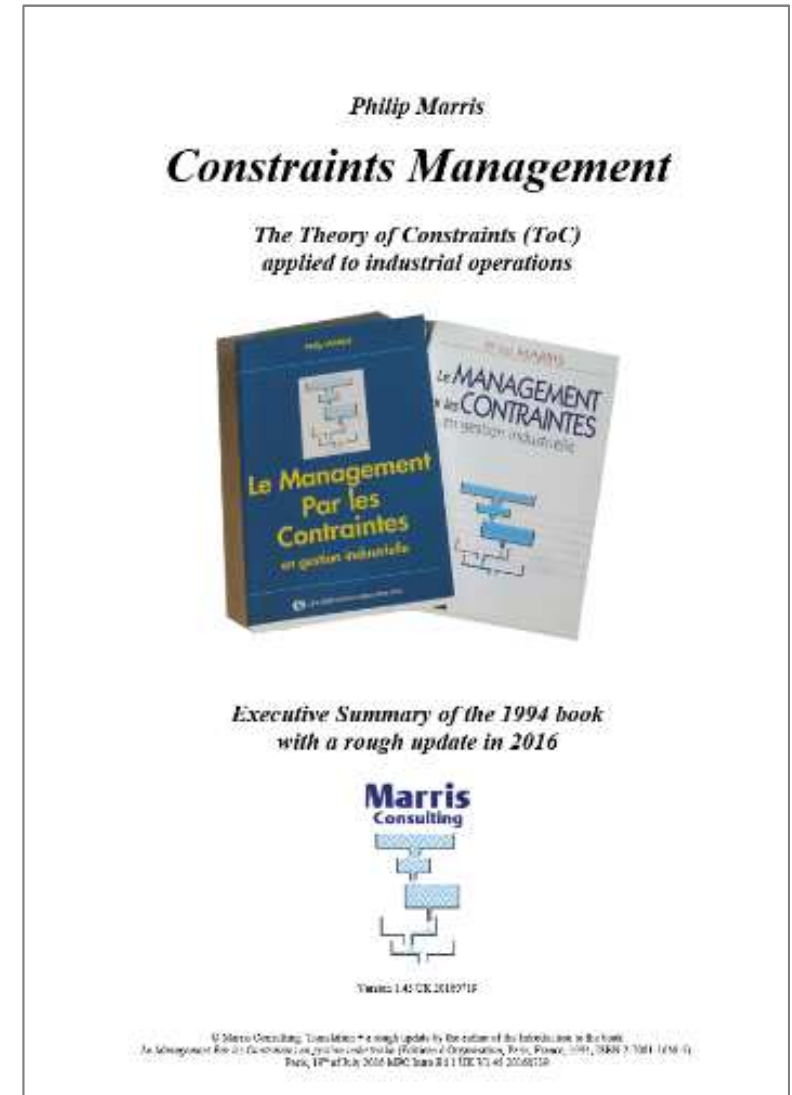
This evolving database will be published via regularly updated spreadsheets that build on the great work done to date, and available as a downloadable resource for researchers and practitioners alike.

Database Categories	File size	File type
Critical Chain Project Management (CCPM) (updated April 2016)	5 MB	Excel spreadsheet
Thinking Processes (updated April 2016)	5,957 KB	Excel

Reference Type	Year	Title	Author	Publication	Abstract	URL
A+ Journal	2016	Zhang, Jinguang; Song, Xue; Díaz, Estrella	European Journal of Operational Research	Project buffer sizing of a critical chain based on comprehensive resource tightness	A buffer sizing method based on comprehensive resource tightness is proposed in order to better reflect the relationships between activities and improve the accuracy of project buffer determination. Physical resource	<a href="http://www.sciencedirect.com">http://www.sciencedirect.com</a>
Book Section	2016	Critical Chain Project Management (CCPM)	Ellis, George	Project Management in Product Development	This chapter presents critical chain project management (CCPM). The chapter starts with an overview of the method and then relates it to the Theory of Constraints, the foundation of the technique: A step-by-step	<a href="http://dx.doi.org/10.1016/b">http://dx.doi.org/10.1016/b</a>
A+ Journal	2015	Quantitative Analysis of Rate-Driven and Due Date-Driven Construction: Production Efficiency, Supervision, and Controlability in Residential Projects	Arashpour, Mehrdad; Wakefield, Ron; Bennis, Nick; Abbasi, Biernus, Nick; Abbasi, Biernus, Nick	Journal of Construction Engineering and Management	Concerns about production efficiency, quality, and affordability in the residential construction indicate there may be benefits in adopting alternative production control strategies to those traditionally used. Reducing adverse	<a href="http://ascelibrary.org/doi/a">http://ascelibrary.org/doi/a</a>
A Journal	2015	Optimization of critical chain sequencing based on activities' information flow interactions	Zhang, Jinguang; Song, Xue; Chen, Hongyu; Shi, Ruixia	International Journal of Production Research	One critique for the classic critical chain sequencing methods is that only resource constraints and logical relationships between activities are considered, while interactions of information flows are ignored. However,	<a href="http://www.tandfonline.co">http://www.tandfonline.co</a>
Other Journals	2015	Productivity of product design and engineering processes	Hickelklyn, Johannes; Dekkers, Rob; Kreutzfeldt, Jochen	International Journal of Operation and Production Management	Purpose – Maintaining and improving productivity of product design and engineering processes has been a paramount challenge for design-driven companies, which are characterised a high degree of development of	<a href="http://dx.doi.org/10.1108/j">http://dx.doi.org/10.1108/j</a>
C Journal	2015	Inclusion of strategic management theories to project management	Parker, David W.; Parsons, Nicholas; Isharyanto, Fitri	International Journal of Managing Projects in Business	Purpose – The purpose of this paper is to explore the benefits of integrating the theory of constraints (TOC), resources-based theory (RBT), resource advantage theory (RAT), with a structured project-based methodology e.g.,	<a href="http://www.emeraldinsigh">http://www.emeraldinsigh</a>
Other Journals	2015	A Model for Continuous Improvement at a South African Minerals Beneficiation Plant	Ras, E.; Visser, Jk	South African Journal Of Industrial Engineering	South Africa has a variety of mineral resources, and several minerals beneficiation plants are currently in operation. These plants must be operated effectively to ensure that the end-users of its products remain internationally	<a href="http://www.scielo.org.za/s">http://www.scielo.org.za/s</a>
A Journal	2015	Dynamic monitoring and control of software project effort based on an effort buffer	Zhang, Jinguang; Shi, Ruixia; Díaz, Estrella	Journal of the Operational Research Society	The improvement to the monitoring and control efficiency of software project effort is a challenge for project management research. We propose to overcome this challenge through the use of a model for the buffer	<a href="http://www.palgrave-jour">http://www.palgrave-jour</a>
A Journal	2015	Project management for uncertainty with multiple objectives: optimization of time, cost and reliability	Jiang, Angus	International Journal of Production Research	This research adopts an approach that uses computer simulation and statistical analysis of uncertain activity time, activity cost, due date and project budget to address quality and the learning process with regard to	<a href="http://dx.doi.org/10.1080/c">http://dx.doi.org/10.1080/c</a>
B Journal	2015	Improving performance in project-based management: synthesizing strategic theories	Karossa, Cullen; David, W. Parker	International Journal of Productivity and Performance Management		<a href="http://dx.doi.org/10.1108/i">http://dx.doi.org/10.1108/i</a>
Other Journals	2014	A decomposition heuristics based on multi-bottleneck machines for large-scale job shop scheduling problems	Zhai, Yingli; Liu, Changjun; Chu, Wei; Guo, Ruifeng; Liu, Guo, Ruifeng	Journal of Industrial Engineering and Management	A decomposition heuristics based on multi-bottleneck machines for large-scale job shop scheduling problems (JSP) is proposed. In the algorithm, a number of sub-problems are constructed by iteratively decomposing the large-	<a href="http://www.jem.org/index">http://www.jem.org/index</a>
Other Journals	2014	COMFRC Addresses Legacy Hornet Readiness	Walters, Andrea	Naval Aviation News	According to PMA-265, 114 aircraft have completed inspections and are designated for service life extensions beyond 8,000 flight hours, with an additional 102 aircraft undergoing high-flight-hour inspections at Fleet	<a href="http://web.h.bscobost.co">http://web.h.bscobost.co</a>
Other Journals	2014	Software Project Management: Theory of Constraints, Risk Management, and Performance Evaluation	Asseman, Antoine; Aloradi, Nada Ashgar; Salim, Marim; Reik,	The Journal of Modern Project Management	Constraints and risks are two critical factors that affect software project performance – more attention needs to be paid to constraints and risks in order to improve performance. In this paper, investigation will take place to	<a href="http://www.journalmoder">http://www.journalmoder</a>
Book Section	2014	Critical Chain Project Management		A Handbook for Construction Planning and Scheduling	Critical Chain Project Management™ (CCPM) is frequently presented as a revolutionary new project management concept, an important breakthrough in the history of project management. CCPM focuses on the uncertainty in	<a href="http://dx.doi.org/10.1002/s">http://dx.doi.org/10.1002/s</a>
Other Journals	2014	Critical Chain Method in Traditional Project and Portfolio Management Situations	Anantatmula, Vital S.; Webb, James B.	International Journal of Information Technology Project Management (IJITPM)	Critical Path (CP) method has been under scrutiny in recent years as the next evolution of project schedule development, the Critical Chain (CC) project management is gaining attention. Advocates of the Critical Chain	<a href="http://www.ag-global.com">http://www.ag-global.com</a>
Other Journals	2014	Theory of Constraints and Its Application in a Specific Company	Linhart, Jakub; Skorkovsky, Jaromir; Others,	Acta Universitatis Agriculturae et Silviculturae Mendelianae Brunensis	This article analyses the possibilities of the practical utilization of Critical Chain Project Management methodology. Our study analyzed key processes related to the implementation and utilization of such a tool in a concrete	<a href="http://acta.mendelu.cz/62">http://acta.mendelu.cz/62</a>
Conference Proceedings	2014	Multi-objective optimization model for multi-project scheduling on critical chain	Wang, Wei-xin; Wang, Xu; Ge, Xian-long; Deng, Lei	Advances in Engineering Software	In this paper, a multi-project scheduling in critical chain problem is addressed. This problem considers the influence of uncertainty factors and different objectives to achieve completion rate on time of the whole projects. This	<a href="http://www.sciencedirect.com">http://www.sciencedirect.com</a>
C Journal	2014	Mitigating behavioral outcomes in a multiproject environment: a modified CCPM model	Agarwal, Anil; Larson, David	Academy of Information and Management Sciences Journal	Organizations continue to struggle in managing projects that lead to successful conclusions. While tools such as PERT and CPM have helped the project management process, they have not produced the level of success as	<a href="http://search.proquest.com">http://search.proquest.com</a>
C Journal	2014	Mitigating Behavioral Outcomes in a Multi-Project Environment: A Modified CCPM Model	Agarwal, Anil; Larson, David	Academy of Information and Management Sciences Journal	Organizations continue to struggle in managing projects that lead to successful conclusions. While tools such as PERT and CPM have helped the project management process, they have not produced the level of success as	<a href="http://search.proquest.com">http://search.proquest.com</a>
C Journal	2014	Critical chain and theory of constraints applied to yachting shipbuilding: a case study	Bevilacqua, Maurizio; Carapica, Filippo Emanuele; Mazzuto,	International Journal of Project Organisation and Management	Product development projects, like many other types of project, often can exceed their planned schedule by 50% to 100%. Often this is attributed to uncertainty or the unforeseen. To compensate for this age-old dilemma,	<a href="http://www.andersciences">http://www.andersciences</a>
Conference	2014	The TLS (TM) model-Integration of Theory of Constraints, Lean Manufacturing and Six Sigma	Navarro, Carlos I. M.; Ceto, Marcelo G	Proceedings of the 2014 Industrial and Systems	Recently the three most applied approaches into the Operations Continuous Improvement are Theory of Constraints (TOC), Lean Manufacturing and Six	<a href="http://search.proquest.com">http://search.proquest.com</a>

## Miscellaneous sources

- Constraints Management book by Philip Marris – Executive summary (contact Marris Consulting)  
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- TOCICO conference – ToC + Lean + Six Sigma or TLS – What is it?  
(see [www.marris-consulting.com](http://www.marris-consulting.com))



# Marris Consulting

## Theory of Constraints marketing & awareness activities

- 5 Permanent news websites (www.Scoopit.com)
  - Theory Of Constraints (English & French)
  - Critical Chain in (English & French)
  - TLS: TOC + Lean + Six Sigma
- >120 Free Videos ("MarrisConsulting" YouTube Channel)
- Discussion Groups (LinkedIn)
  - Critical Chain
  - TLS: TOC, Lean and Six Sigma
- 2 dedicated websites in French
  - TOC in Production & TOC in Projects
- Others:
  - Twitter, Facebook, Viadeo, Etc.

**Scoop.it!**

**You Tube**

**Linked in**

**twitter**

**facebook**





# Philip Marris, Founder and CEO of Marris Consulting

## Business transformation, Theory Of Constraints and Lean expert

30 years of experience, 57 years old, Manufacturing & Supply Chain expert  
Bilingual & bicultural English/French

### COMPETENCIES

- **Transformation programs in industry**
- **Industrial Excellence Expert (manufacturing and product development).**  
Recognized expert in Lean, Six Sigma and Theory Of Constraints. Often combines these ("TLS").
- **Author** of an industrial management bestseller in France: *Le Management Par les Contraintes en gestion industrielle*, Editions d'Organisation [1994, 1996, 2000, 2nd Edition currently underway).

### FORMER POSITIONS

- Cap Gemini Ernst & Young / Bossard Consultant: In charge of Manufacturing Operations for France & Europe (>200 consultants)
- Cap Sogeti Industrie
- Creative Output: collaborated with E. Goldratt author of *The Goal*
- Vallourec: Shop floor foreman, Methods Engineer
- Professor at HEC Management School (Supply Chain & Manufacturing).

### SECTORS / CLIENTS

- Over 150 engagements in industry.
- Aeronautical
- Pharmaceuticals
- Automobile industry: car makers and suppliers
- Process industry: steel, glass, cardboard, extruded plastic
- World leader in ball bearings
- MRO rail and aeronautical
- Packaging: cardboard, steel, plastic
- Electrical power systems: world wide leader
- Furniture manufacturer, Marine engine manufacturer, Armoured vehicles manufacturer, Electronics: printed circuit boards, ...

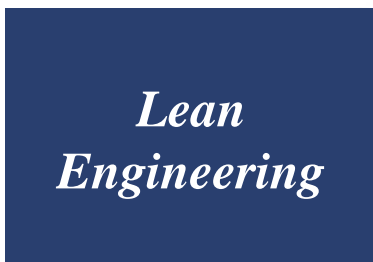
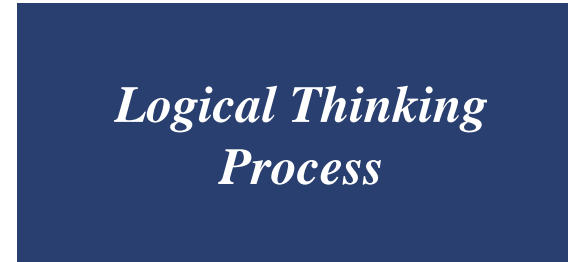
### MISSIONS / RESULTS

- **Production, Operations & Supply Chain (sample):**
  - Worldwide automotive OEM tier 1 supplier: increase in Throughput of 17% in 15 minutes. Savings >\$400M per year. saved relationship with largest customer.
  - Large MRO (Maintenance, Renewal & Overhaul) Division of a major European railway operator (France, 25 000 p.): in one of the main factories (940 p.) reduction of the production lead-times for the renovation of high speed trains from 126 days to 38 days . Further lead-time reductions are underway over 2 years after the end of our assignment.
  - Labour productivity: furniture manufacturer +35% in 6 weeks, M.R.O: 80% in 2 months, manufacturing equipment (assembly) +70%, ...
  - Automotive Supplier (France, 350p.): Increase in the O.E.E. of the bottleneck resource by more than 30%, change from 5x8 shifts to 2x8 while providing the same output.
  - Complete reengineering of the Supply Chain of a steel manufacturer: Long term strategic planning, Sales & Operations Planning, Scheduling. Implementation of TOC/MPC. Increase in 40 points of the due date performance
  - Manufacturer of large machines for cardboard packaging: reduction in the delivery lead-time by over 50% and a reduction in the number of hours of labour per machine of over 30%.
  - Aircraft MRO: reduced durations by over 50% and increased productivity by over 80% in 2 months.
- **R&D & Industrialisation / Engineering / New Product Development (sample):**
  - Aeronautical product industrialisation portfolio: reduced durations and projects finish on time
  - Complete transformation of an Engineering department of 150 people. Reduction in project durations of over 40%. Improvement in productivity of over 25%. Projects completed on time went from less than 30% to over 85%.
  - Several aeronautical product development and industrialisation projects involving up to 500 people per project in up to 6 different simultaneous facilities with budgets up to 20M€ each.
  - New product development and product relooking: reduction of over 45% of average project duration, increase in number of projects completed each year of over 50%.
  - New product portfolio analysis and development strategy
  - Quotation process reengineering: handling speed multiplied by 4.



# Marris Consulting

## hosts over 30 public or internal training sessions every year



We are honoured to have been able to help...





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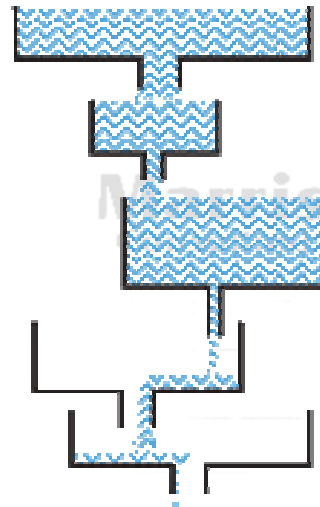
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Tour Maine Montparnasse  
27ème étage  
33, avenue du Maine  
75015 Paris  
France  
Tel. +33 (0) 1 71 19 90 40



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