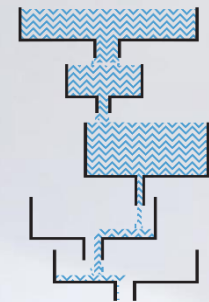


# **How TOC thinking can and should be connected with Lean and Six Sigma thinking?**

**Philip Marris, Marris Consulting, France**  
**Helsinki, 9<sup>th</sup> of March, 2017**

**Marris**  
Consulting



# Philip Marris

**Theory Of Constraints expert.**

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

**Lean expert.**

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

**>25 years of experience helping over 150 companies in all industrial sectors.**

**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)

+33 (0) 1 71 19 90 40



# The growing pertinence of the Theory of Constraints

- The world continues to change more and more 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.



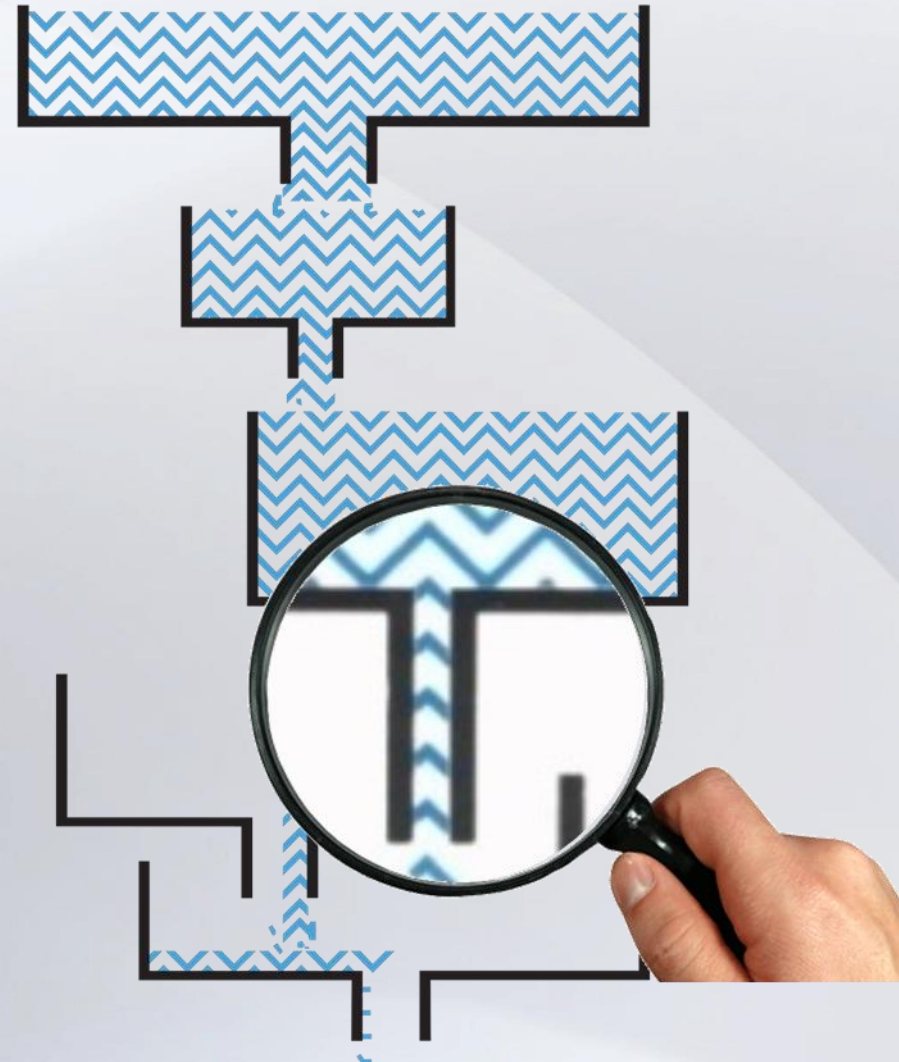
# Can anyone remember what we are fighting about!?





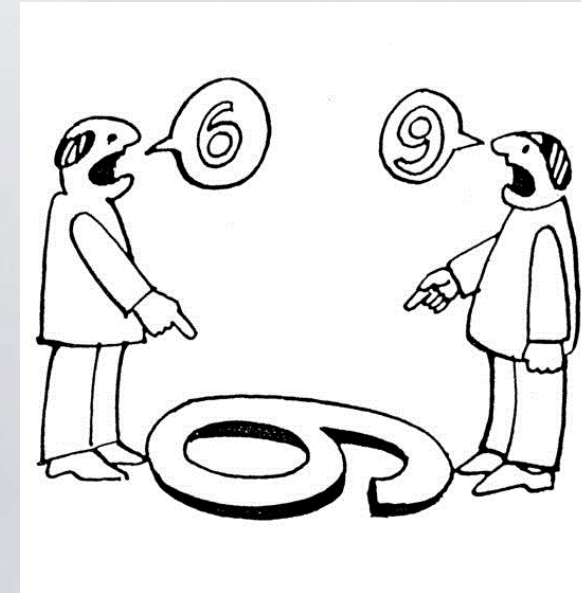
# The (very simple) combined approach:

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



# 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 and headcount reductions using Japanese words.
  - Bad TOC is a closed mind-set rejecting other people's ideas or attempting to claim that any good idea is just disguised TOC.
  - Bad Six Sigma is a herd of people with judo belts producing very few results.



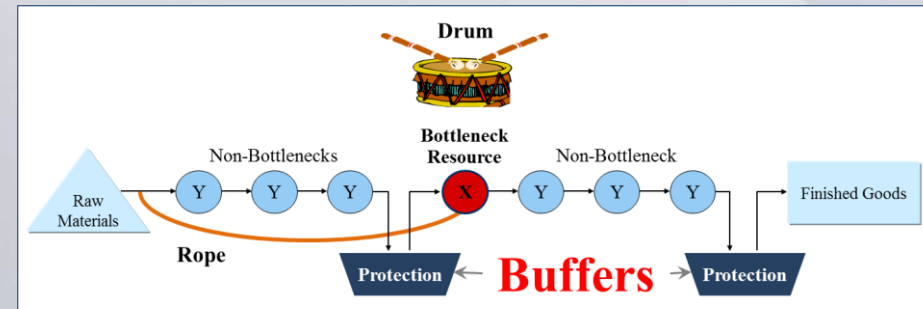
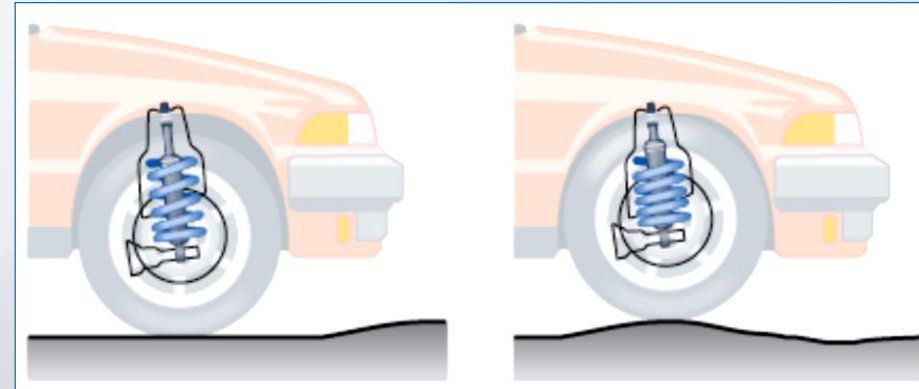
# What they share:

- To be obsessed with improving the flow



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

- **Lean** and Six Sigma consider that you can eliminate variability...
  - Hence a **"zero stock" logic**
- ...while **TOC** considers that you cannot totally eradicate variability and you must therefore protect the organisation against it
  - Hence a **buffer logic**





# Case study #1

## 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 >100%
- Lean: To improve "right first time" throughout operations
- Six Sigma: to better master the critical welding operation.



# Case study #3

## Making hamburgers

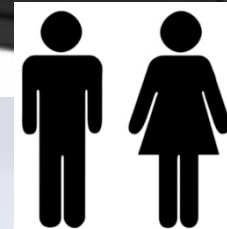
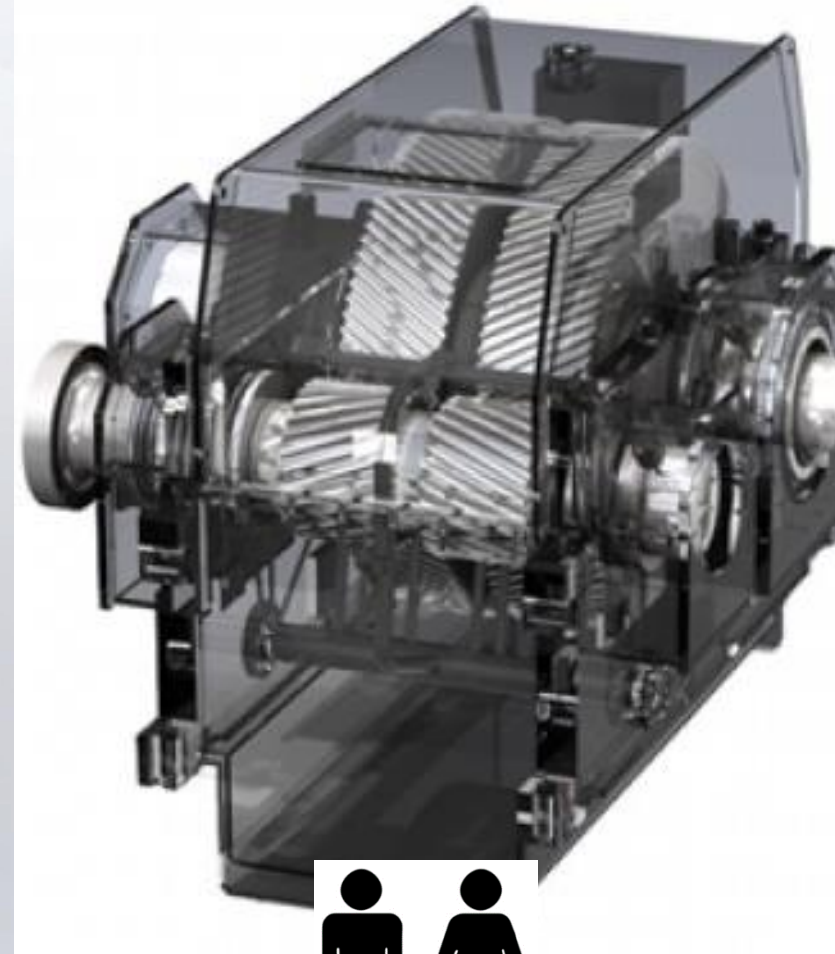
- Analysis: TOC &/or Lean?
  - Full kitting in the kitchen
  - Mistake prevention
- Initial solution: Lean
- Building the future:  
TOC + Lean
  - TOC: choosing the best constraint and deciding on the excess capacity of the rest of the resources
  - Lean: designing new facilities where products flow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



# Case study #2

## Making big gearboxes

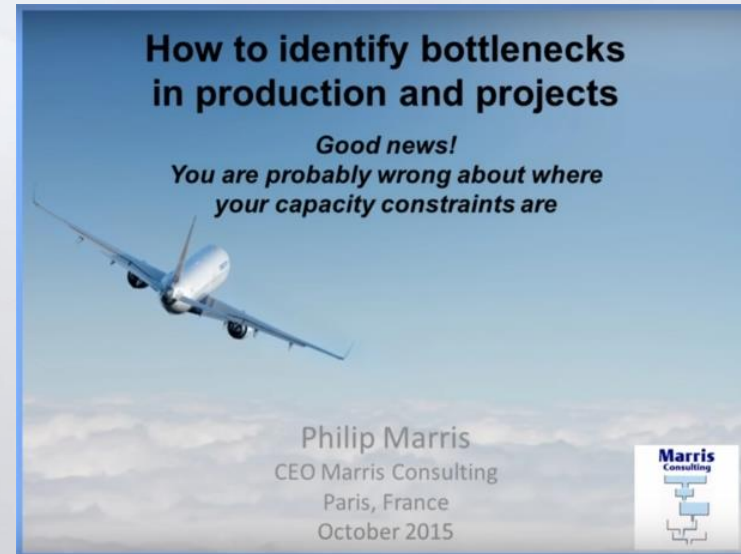
- TOC analysis: The Design Office is the capacity constraint (13 out of 500 people)
- TOC initial solution:  
Critical Chain +  
+ WIP reduction  
= Stop multitasking  
= Throughput increase >130%
- Lean to reduce quality issues.





# Warning: Don't make a mistake when identifying your constraint

- In our experience there is an 75% probability that you are wrong about where your bottleneck is.
- Beware if the bottleneck is too good to be true. "My big and beautiful bottleneck".
- Beware of your ERPs blind spots.
- Your analysis is probably out of date.
- Forget the data and look for the big queues.



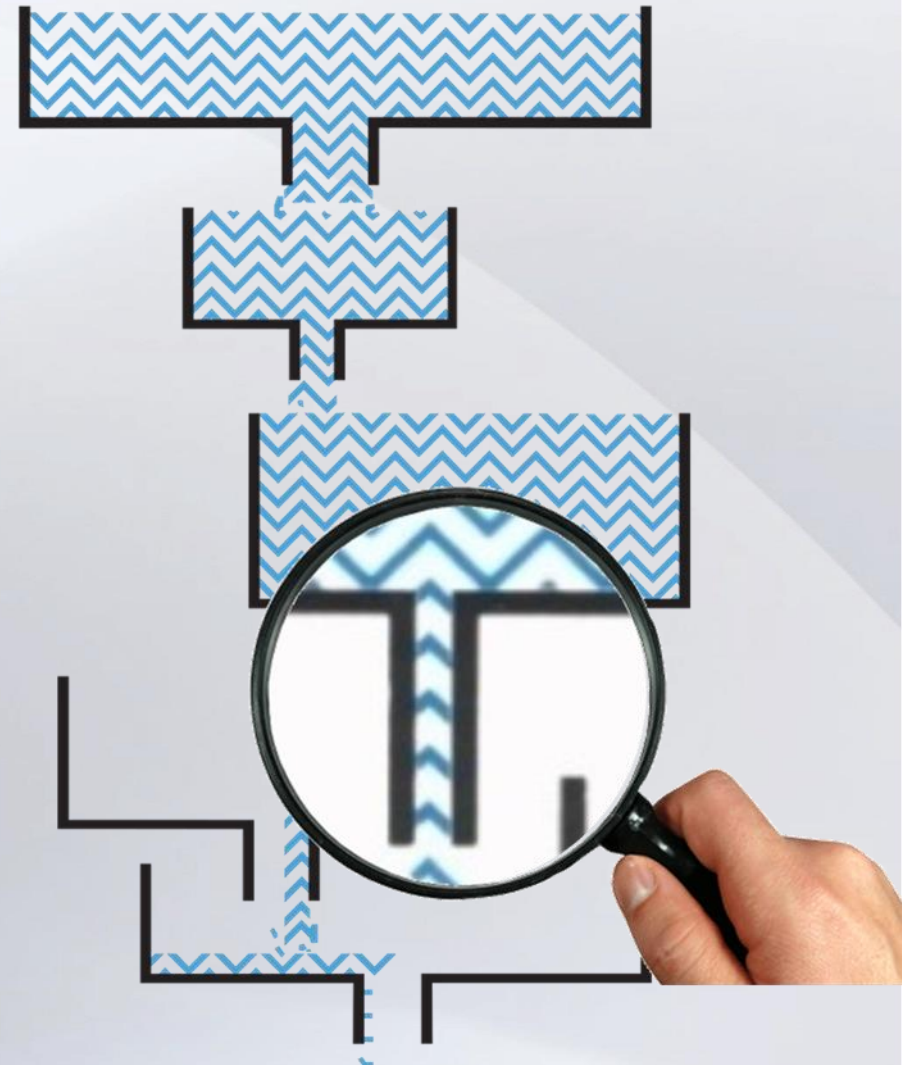
(En) How to identify bottlenecks in  
production and projects  
25 minute video

Marris Consulting YouTube Channel  
<https://youtu.be/uIXqO86OfpU>



# Warning: Focussing is not easy!

- Using "TLS" you will identify what you should concentrate on. That will be the easy part.
- The difficult part of being focused is learning not to do what you should not do.



# Please forget the label "TLS"!

- TLS = TOC + Lean + Six Sigma
- Yet another acronym / label!
- I don't recommend it even though I am one of its creators!
- Just keep an open, curious mind-set and build your own solution.

Thank you for your time.

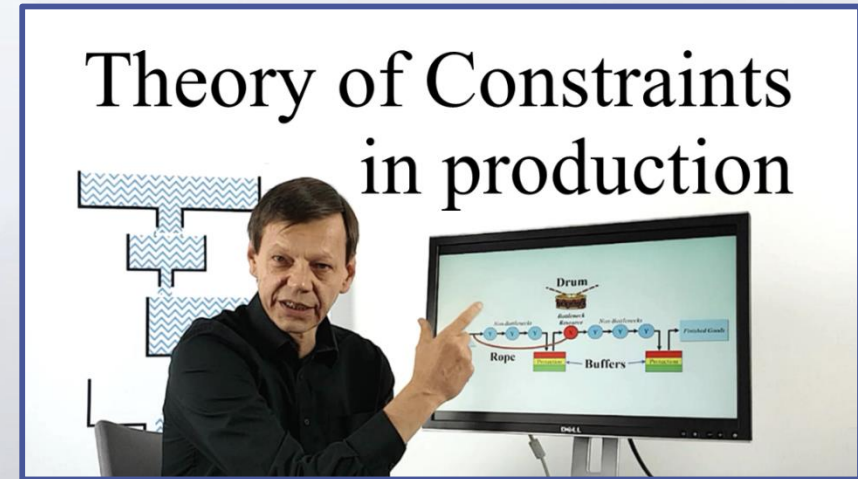
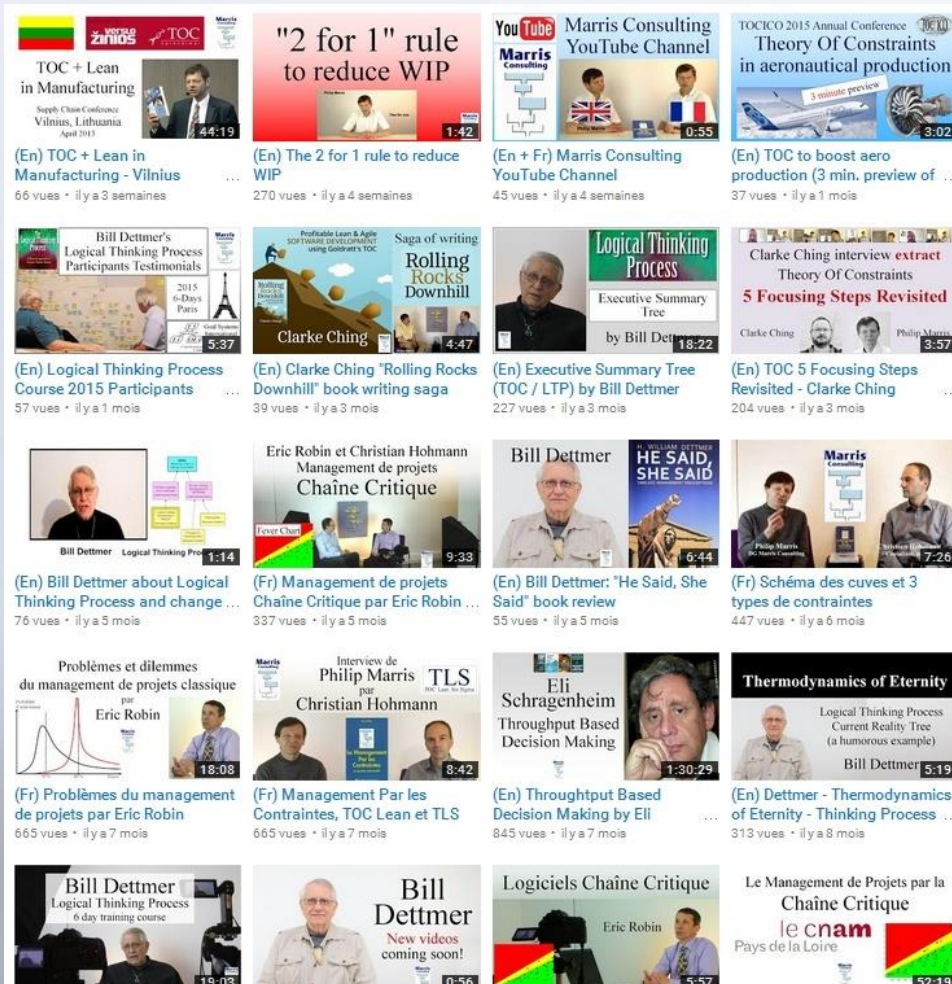
Any questions?

P.S. Do have a look at the appendices to this presentation.

# Appendices



A video website: Marris Consulting's YouTube Channel  
<https://www.youtube.com/user/marrisconsulting/videos>



(En) Theory of Constraints in production - 5 min. summary



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).

To facilitate viewing and video selection use the playlists:

- English videos
- Critical Chain videos
- Etc.

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 »

The combination of Lean, Six Sigma and Theory Of Constraints. How to build your own system by choosing what works for you.

**TLS - TOC, Lean & Six Sigma**  
The combination of Lean, Six Sigma and Theory Of Constraints. How to build your own system by choosing what works for you.  
This is YOUR COMMUNITY: PLEASE SUBMIT your links using the SUGGEST BUTTON below.  
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Manage 658 Views Filter Share Suggestions

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**Focus and Leverage blog by Bob Sproull (recommended)**  
From focusandleverage.blogspot.fr - August 13, 1:49 PM  
My blog is focused primarily on the Theory of Constraints and how to use it to maximize the profitability of any company. I also discuss why integrating TOC with Lean and Six Sigma is the most dynamic improvement methodology available today.

Comment  
Philip Marris's comment, August 14, 3:45 PM  
Highly recommended. Bob Sproull is among other things co-author of the best selling TLS novel Epiphany.

Write a comment...

Scooped by Philip Marris

**Standing on the Shoulder of Giants video by Eli Goldratt**  
Standing on the Shoulder of Giants by Eliyahu M. Goldratt  
From www.youtube.com - Today, 11:28 AM  
7 minutes - Standing on the Shoulder of Giants by Eliyahu M. Goldratt - YouTube

Comment  
Write a comment...

Show 1 reaction

Scooped by Philip Marris

**Dr. Deming Performing the Red Bead Experiment - 2 min. video**  
Dr. Deming Performing the Red Bead Experiment

Scooped by Philip Marris

**Toyota, a growth model: employee growth over 75 years**

A permanent news website dedicated to Theory of Constraints

**Theory Of Constraints**  
Management approach developed by Eliyahu Goldratt: identification and leverage of system constraint(s) + Thinking Processes. This is YOUR COMMUNITY: PLEASE SUBMIT your links by logging in and using the SUGGEST BUTTON below.  
Curated by Philip Marris

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**One of the best TOC websites in the world by Kelvyn Youngman**

From [www.tbmf.co.nz](http://www.tbmf.co.nz) - August 1, 8:30 PM

Kelvyn Youngman has done the organizational world an invaluable – no, indispensable – service with this web site. This is the first comprehensive, truly system-level look at the Theory of Constraints – and probably the only one anywhere. H. William Dettmer, recognized Expert in TOC, author of 4 bestselling TOC books.

Rescooped by Philip Marris from TLS - TOC, Lean & Six Sigma

**Standing on the Shoulder of Giants video by Eli Goldratt**

Standing on the Shoulder of Giants by Eliyahu M. Goldratt

From [www.youtube.com](http://www.youtube.com) - October 5, 8:01 PM

7 minutes - Standing on the Shoulder of Giants by Eliyahu M. Goldratt - YouTube

Scooped by Philip Marris

**Theory of Constraints UK | LinkedIn group**

From [www.linkedin.com](http://www.linkedin.com) - October 5, 3:19 PM

The purpose of this group is for UK industry leaders to exchange ideas, tips and experiences of applying Goldratt's Theory of Constraints.

Rescooped by Philip Marris from TLS - TOC, Lean & Six Sigma

**What's Wrong with Supply Chain Metrics? By Debra and Chad Smith - 7 page article**

1 / 7

**Goldratt's Dice Game for iPad \$2.59**

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



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

Manage 292 Views Find Share Suggestions 18

Rescoped by Philip Marris from Théorie des Contraintes (ToC) & CCPM

**Critical Chain Project Management new LinkedIn discussion group**

From [www.linkedin.com](http://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: PMI, 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 Maison

Philip Marris's 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.bpr.com](http://www.bpr.com) - October 6, 3:01 PM

Mr. Mitsuo Hitomi, 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. Hitomi 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>



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

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.

**TLS - TOC Lean & Six Sigma** 1,936 members

**Discussions** Promotions Jobs Search Manage

**What is the Unrefusable Offer for TLS (or any of its constituents?)** Manager's Choice  
 Henry Fitzhugh Camp  
 Managing Member at TOC Equity Partners  
 I'll define an Unrefusable or "Mafia" Offer as one that causes a person to whom it is offered to want to say YES every time. A person...  
 Like (4) • Unfollow • June 25, 2012

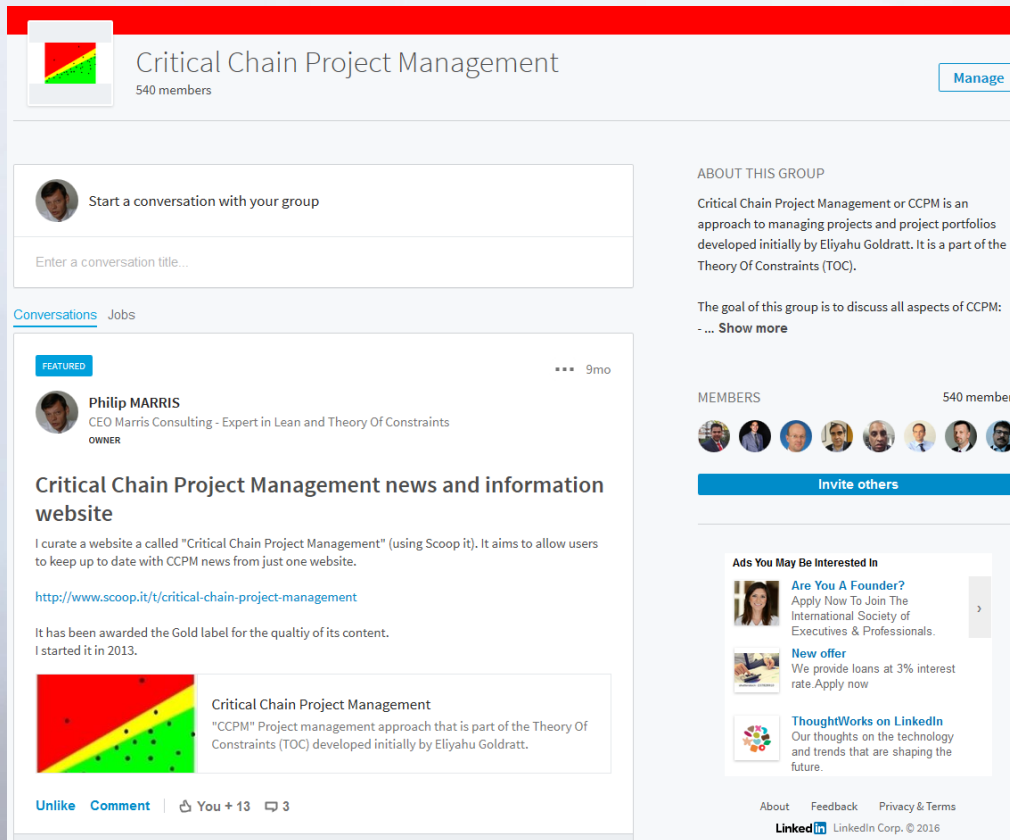
**Top Influencers in this Group**  
 Philip MARRIS  
 Founder, Owner and CEO at MARRIS Consulting  
[See all members](#)

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 Part-Time EMBA in London  
 MBA designed for Working-Professionals.Limited seats available for Sep 2013

**Latest Activity**  
 Joanna Malas has joined the group. 1 hour ago  
 Paul Merino, The Time Hunter @SEUILS likes this comment by Philip MARRIS New Scoop.it! topic: "TLS - TOC Lean Six Sigma": I have been adding more posts. The latest is the "Standing on the shoulder of giants" 7 minute video by Eli

**"TOC+Lean" and CCPM - 2 European Seminars in English in Paris Sept. 2013**  
 Philip MARRIS  
 Founder, Owner and CEO at MARRIS Consulting  
 5th and 6th of September 2013. 2 one day seminars by Philip Marris and Christoph Lenhartz  
 Day 1 - "Turbocharge your Lean Program with the Theory Of Constraints"  
 Day 2 - "Turbocharge your Projects with the Theory Of Constraints"  
 For details of ...  
[Training and Seminars](#) marris-consulting.com  
 Like (5) • Comment (14) • Follow • 1 month ago  
 Paul Merino, The Time Hunter @SEUILS, Ad Vermeulen and 3 others like this  
 See all 14 comments

## A LinkedIn Discussion group dedicated to Critical Chain Project Management



**Critical Chain Project Management**  
540 members

Start a conversation with your group

Enter a conversation title...

**ABOUT THIS GROUP**

Critical Chain Project Management or CCPM is an approach to managing projects and project portfolios developed initially by Eliyahu Goldratt. It is a part of the Theory Of Constraints (TOC).

The goal of this group is to discuss all aspects of CCPM: - ... [Show more](#)

**MEMBERS**  
540 members

[Invite others](#)

**FEATURED**

**Philip MARRIS**  
CEO Marris Consulting - Expert in Lean and Theory Of Constraints  
OWNER

**Critical Chain Project Management news and information website**

I curate a website a called "Critical Chain Project Management" (using Scoop it). It aims to allow users to keep up to date with CCPM news from just one website.

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

It has been awarded the Gold label for the quality of its content. I started it in 2013.

**Critical Chain Project Management**  
"CCPM" Project management approach that is part of the Theory Of Constraints (TOC) developed initially by Eliyahu Goldratt.

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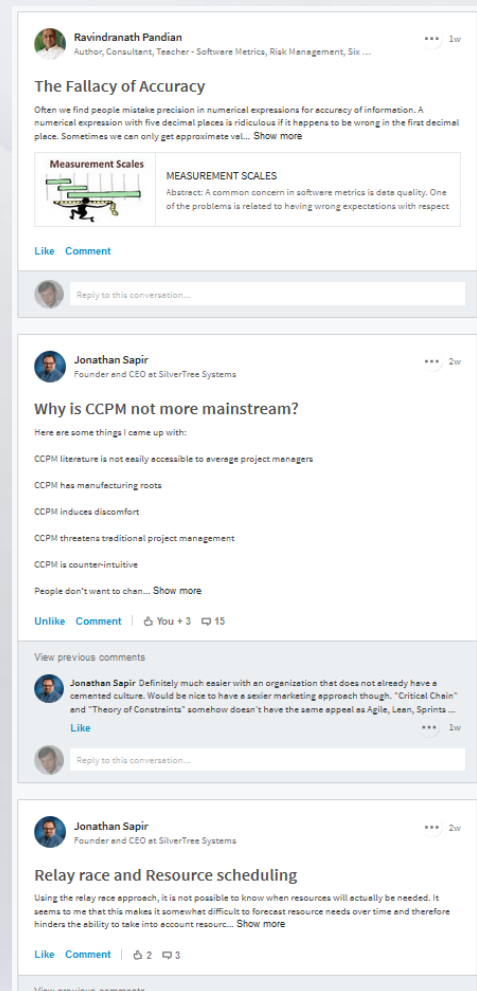
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Our thoughts on the technology and trends that are shaping the future.

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

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



**Ravindranath Pandian**  
Author, Consultant, Teacher - Software Metrics, Risk Management, Six ...  
1w

**The Fallacy of Accuracy**

Often we find people mistake precision in numerical expressions for accuracy of information. A numerical expression with five decimal places is ridiculous if it happens to be wrong in the first decimal place. Sometimes we can only get approximate val... [Show more](#)

**Measurement Scales**

**MEASUREMENT SCALES**  
Abstract: A common concern in software metrics is data quality. One of the problems is related to having wrong expectations with respect

[Like](#) [Comment](#)

Reply to this conversation...

**Jonathan Sapir**  
Founder and CEO at SilverTree Systems  
2w

**Why is CCPM not more mainstream?**

Here are some things I came up with:

- CCPM literature is not easily accessible to average project managers
- CCPM has manufacturing roots
- CCPM induces discomfort
- CCPM threatens traditional project management
- CCPM is counterintuitive

People don't want to chan... [Show more](#)

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**Jonathan Sapir**  
Definitely much easier with an organization that does not already have a cemented culture. Would be nice to have a sales/marketing approach though. "Critical Chain" and "Theory of Constraints" somehow doesn't have the same appeal as Agile, Lean, Sprints ...  
1w

[Like](#)

Reply to this conversation...

**Jonathan Sapir**  
Founder and CEO at SilverTree Systems  
2w

**Relay race and Resource scheduling**

Using the relay race approach, it is not possible to know when resources will actually be needed. It seems to me that this makes it somewhat difficult to forecast resource needs over time and therefore hinders the ability to take into account resource... [Show more](#)

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# TOCICO CCPM Portal (Theory Of Constraints International Certification Organization) [https://tocico.site-ym.com/?page=project\\_portal](https://tocico.site-ym.com/?page=project_portal)



What is TOC? Success Stories Membership Education Certification TOC Store Goldratt Foundation



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## Welcome to the TOC in Project Management Portal

Success Stories » Project Management Portal



We're excited to provide free access to 6 of the 87 (and growing) Theory of Constraints (TOC) project management presentations ranging from a workshop presenting the basics of critical chain project management (CCPM) to its use in information technology and software development projects, to and implementations in the Lithuanian government Department of Economy, in a pharmaceutical research and development corporation and in a massive maintenance, repair and overhaul center for a large airline. These selections illustrate the universal use of CCPM across industries and across geographically separated and

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ABOUT THIS VIDEO: In the first session of the TOCICO Conference of CC and PCEM given us very promising results: our CCPM in 2008 was 80%. As we took on more projects and more complex projects we found a number of other process improvements. Finally, then the team (right) were necessary to maximize a high DOP. Using the TP in our own organization to understand the problems and driving and implement solutions, we have been able to consistently improve our performance. In the last three years this has resulted in 95%+ due date performance on our TP projects.

Anderson, B. J. (2004). TOC software engineering solution with lean & agile solutions. TOCICO International Conference: 2nd Annual Worldwide Gathering of TOC Professionals, Miami, FL, Goldratt Marketing Group.

This presentation seeks to explain the TOC solution of critical chain project management (CCPM) for use in modern software engineering. Key learning points include: 1. How to use lean buffer rope (DBR) with software engineering; 2. How to use throughput accounting (TA) with software engineering; 3. Understanding useful variation in software engineering; 4. Providing a TOC model maturity model for software organizations; 5. Identifying what is fundamentally wrong with the DBR model and TOC/TA; 6. The importance of a TOC software solution with an engine, timing, and Toyota Production System (TPS) principles and lean thinking. Specific to software: 1. Benefits of applying DBR, CCPM and TA to software development; 2. Contrast of the TOC approach with traditional approaches; 3. Benefits of using lean concepts in lean diagrams for the DBR solution.

Rachelskaya, M. (2012). Implementing CCPM solution in Lithuania. Fundamentals of Management of Enterprise Resource Management. TOCICO International Conference: 10th Annual Worldwide Gathering of TOC Professionals, Chicago, IL, Theory of Constraints International Certification Organization.

The Quarterly Fund at the Department of Enterprise Resource Management under the Lithuanian Ministry of Economy, was created to ensure order payments of delayed or unpaid solutions to the solution of strategic companies. Therefore this fund plays a very important social role – puts off after a given time his job. The fund gives money which the company owed to that person. So it is very important to ensure the application processing time to be as fast as possible. At the beginning of 2009 Quarterly Fund faced some new challenges including a handling of applications for funds and long processing times, a drastic increase in bureaucracy and new applications (more than double), and a reduction of government spending (not possible to increase in 2009).

Kuchelshvili, R., et al. (2012). Implementation of CCPM in the Pharmaceutical Industry. TOCICO International Conference: 10th Annual Worldwide Gathering of TOC Professionals, Chicago, IL, Theory of Constraints International Certification Organization.

In this paper, I take you through the journey of CCPM implementation in our company (Dr. Rado's Laboratories Limited). Critical Chain Project Management (CCPM) is implemented as part of "Value Stream Mapping" initiated in 2008 with the help of Goldratt Consulting LLC. During the initial implementation, it was found that many projects are under development and there are always some projects on hold due to resource unavailability / changes in business priorities. Some products are under development for years together with delayed efforts. Many projects are stuck during execution due to "bottleneck" resources. "Bottleneck" issues: • Due date performance and cycle time are not measured nor original nor due and original due date is not continually adjusted overtime. • Throughput is measured and adjusted to the end of the financial year. After going through the TOC Critical Chain methodology with senior executives of the organization, the team was determined to take up the plan to: To implement and implement a procedure for managing the product development. • To significantly improve and manage the due date performance (DOP), cycle time and productivity performance. GC has customized the project management strategy & metrics (SMT) was a guideline for the implementation in Critical Chain and PCEM. CCPM implementation is done in a phased manner with the support of a dedicated facilitator team from Dr. Rado's and GC consultants. Learning of each phase implementation is used in subsequent phase implementation.

Adams, G. (2008). Delta Air Lines: Meeting challenges in engine maintenance. TOCICO International Conference: 4th Annual Worldwide Gathering of TOC Professionals, Las Vegas, NE, Goldratt Marketing Group.

In 2002, Delta Air Lines faced the challenges: Prior to its merger with North West Airlines, Delta was a \$17 billion sales revenue airline with approximately 30,000 employees. After merger in 2003 Delta was a \$27 billion top line revenue airline with the same number of employees, routes, and overhead (O&M) expenses. As part of the business plan, engine maintenance was required to reduce cost and increase safety, in the same time, increase productivity. In 2002 the CEO had received \$71 million and in 2003 the revenue was \$475. The requirement for survival along with the TOC of Constraints—more specifically, among

# Victoria University Wellington New Zealand – TOC Database

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

TE WHARE WĀNANGA O TE ĀPOKO O TE IKA A MĀUI  
**VICTORIA UNIVERSITY OF WELLINGTON**

**SCHOOL OF MANAGEMENT**


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You are here: [Home](#) > [Research](#) > [Theory of Constraints](#)

## Theory of Constraints: A Research Database

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- Research Seminars Series
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### 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
<a href="#">Critical Chain Project Management (CCPM)</a> (updated April 2016)	6 MB	Excel spreadsheet
<a href="#">Thinking Processes</a> (updated April 2016)	5,967 KB	Excel

Reference Type	Year	Title	Author	Publication	Abstract	URL
A+ Journal	2016	Zhang, Jueqiang; Song, Xuefei; Diaz, 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)	Elb, 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 Controllability in Residential Projects	Arashpour, Mehdi; Wakefield, Ron; Blismas, Nick; Abbasi, Zhang, Jueqiang; Song, Xuefei; Chen, Hongyu; Shi, Rui	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">http://ascelibrary.org/doi</a>
A Journal	2015	Optimisation of critical chain sequencing based on activities' information flow interactions	Zhang, Jueqiang; Song, Xuefei; Chen, Hongyu; Shi, Rui	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	Hinkeldey, Johannes; Deckers, Rob; Kreutzfeld, 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; Ishiyanto, Fati	International Journal of Management 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, Jueqiang; Shi, Rui; Diaz, 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-paui">http://www.palgrave-paui</a>
A Journal	2015	Project management for uncertainty with multiple objectives: optimisation of time, cost and reliability	Jeang, 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/j">http://dx.doi.org/10.1080/j</a>
B Journal	2015	Improving performance in project-based management: synthesizing strategic theories	Kareusa, Cullen; David, W. Parker	International Journal of Productivity and Performance Management		<a href="http://dx.doi.org/10.1108/1">http://dx.doi.org/10.1108/1</a>
Other Journals	2014	A decomposition heuristics based on multi-bottleneck machines for large-scale job shop scheduling problems	Zhai, Yingdi; Liu, Changjun; Chu, Wei; Guo, Ruliang; Liu,	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.jiem.org/index">http://www.jiem.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.hqescdost.co">http://web.hqescdost.co</a>
Other Journals	2014	Software Project Management: Theory of Constraints, Risk Management, and Performance Evaluation	Asseman, Antoine; Akraik, Nada Ashgar; Salim, Marium; 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/p">http://dx.doi.org/10.1002/p</a>
Other Journals	2014	Critical Chain Method in Traditional Project and Portfolio Management Situations	Amantamuli, 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.igi-global.com">http://www.igi-global.com</a>
Other Journals	2014	Theory of Constraints and Its Application in a Specific Company	Lafont, Jakub; Shokolev, Jasomir; Others,	Acta Universitatis Agriculturae et Silviculturae Mendelianae Brunensis	This article analyses the possibilities of the practical utilization of Critical Chain Project Management methodology. One study analysed 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-xiao; Wang, Xu; Ge, Xiao-kang; 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; Ciurapica, Filippo Emanuele; Marzotto,	International Journal of Project Organisation and Management	Product development projects, like many other types of projects, 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.inderscienceo">http://www.inderscienceo</a>
Conference	2014	The TILS (TM) model Integration of Theory of Constraints, Lean Manufacturing and Six Sigma: A	Nayana, Carlos I. M.; Cebal, Marcelo G	Proceedings of the 2014 International 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)
- TOCICO conference – ToC + Lean + Six Sigma or TLS – What is it? (see [www.marris-consulting.com](http://www.marris-consulting.com))

Theory of Constraints  
**TOC ICO**  
International  
Certification Organization

TOCICO 2013 Conference

# TOC + Lean + Six Sigma or TLS

## What is it?

### Is it a threat or an opportunity for TOC?


Presented by: Philip MARRIS  
Date: Thursday 6<sup>th</sup> of June 2013 in Frankfurt, Germany.

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Philip Marris

## Constraints Management

*The Theory of Constraints (ToC)  
applied to industrial operations*



Executive Summary of the 1994 book  
with a rough update in 2016

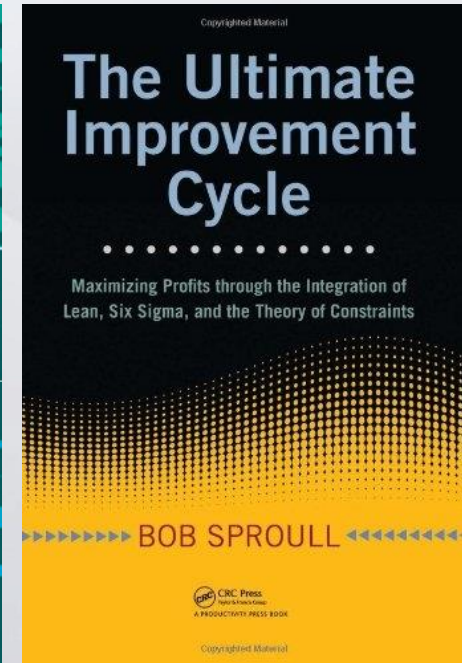
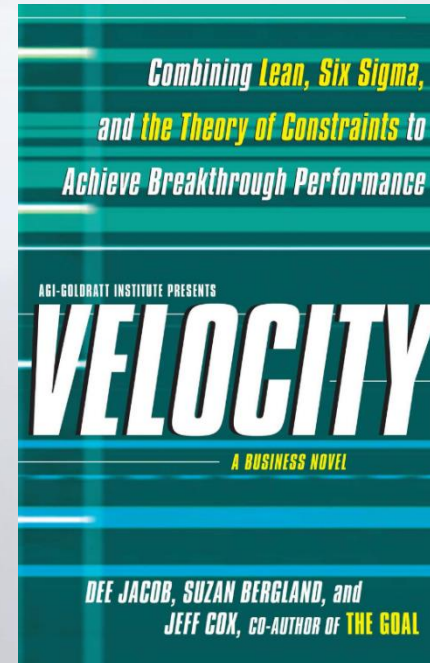
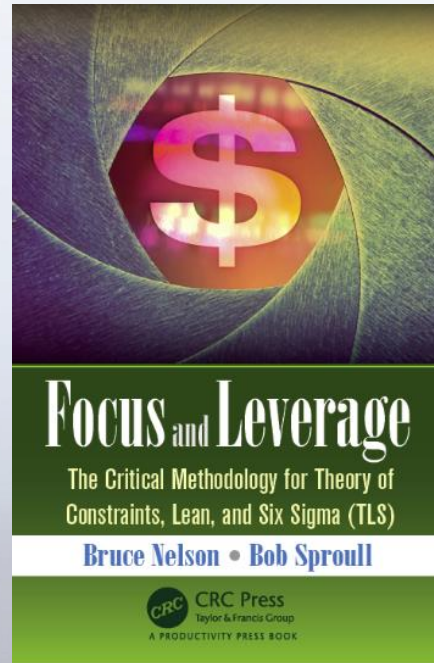
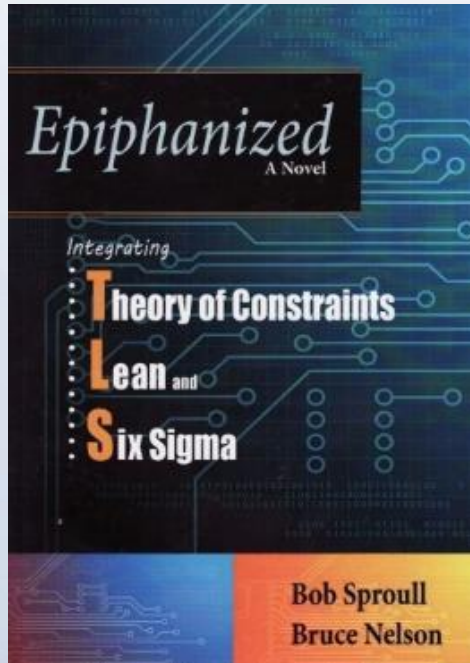
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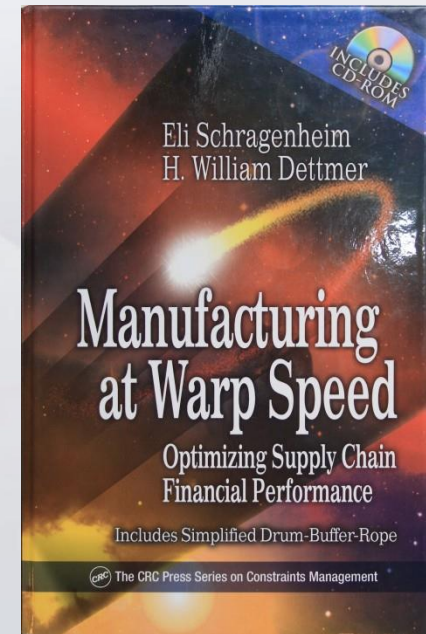
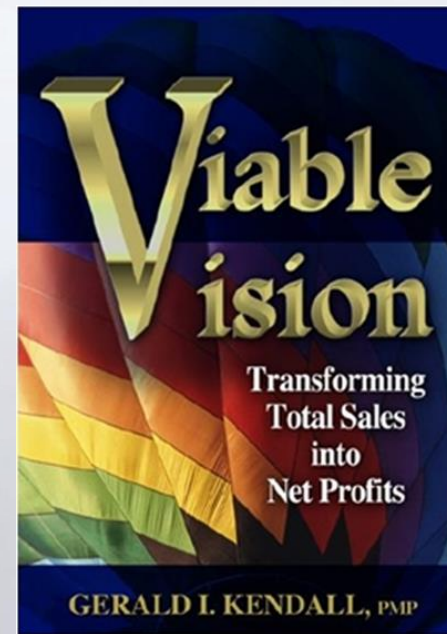
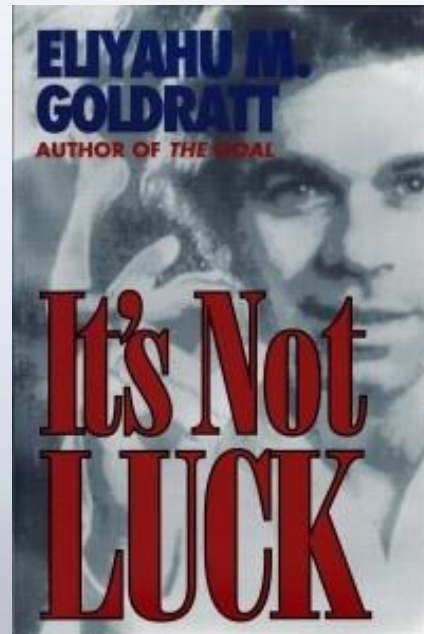
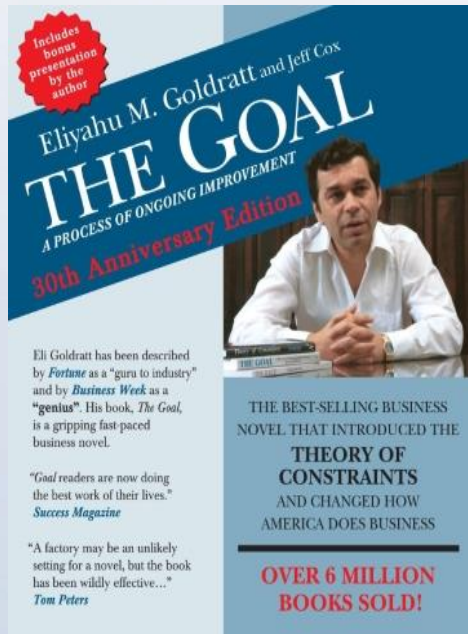
© Marris Consulting. Translation + a rough update by the author of the Introduction to the book  
Le Management Par les Contraintes en gestion industrielle (Editions d'Organisation, Paris, France, 1994, ISBN 2-7081-1666-5).  
Paris, 15<sup>th</sup> of July 2016 MPC Intro Ed 1 UK V1.45 20160719



# TLS books

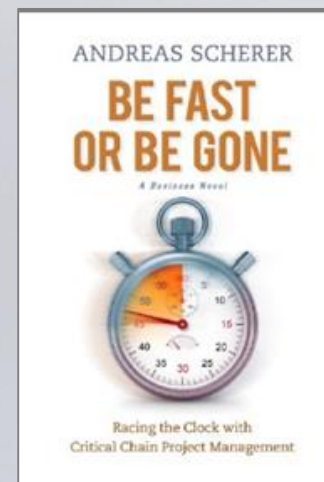
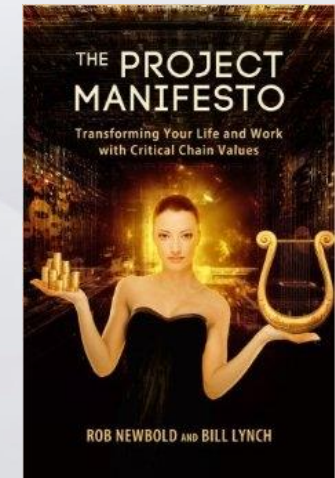
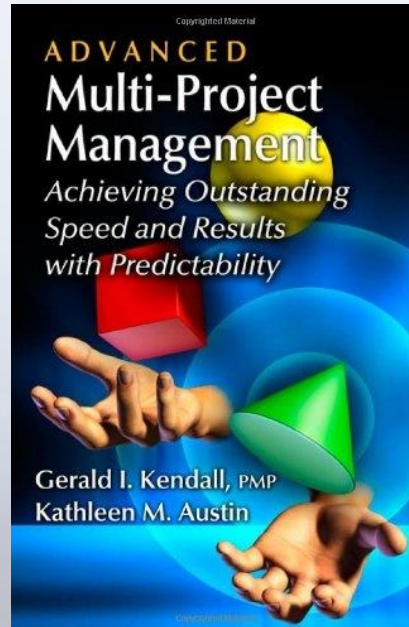
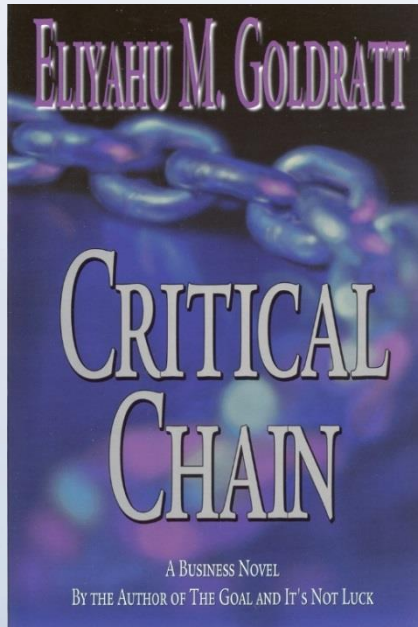


## Theory of Constraints books

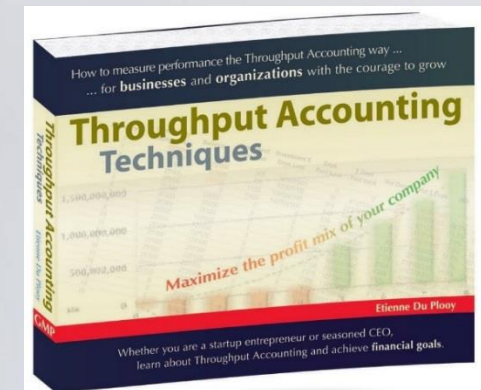
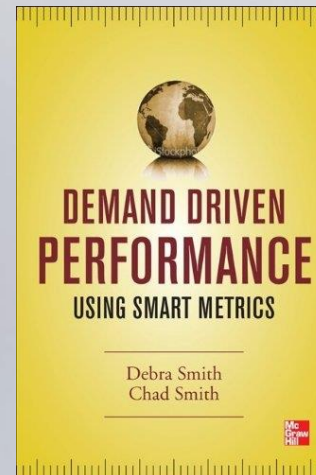
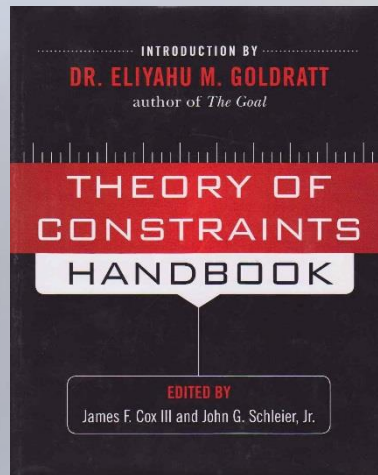
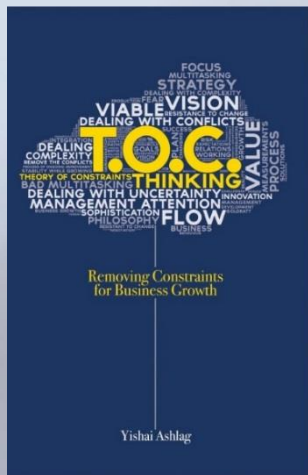
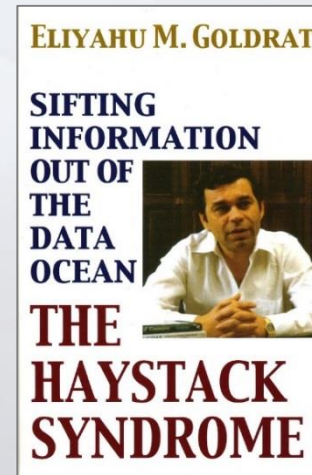
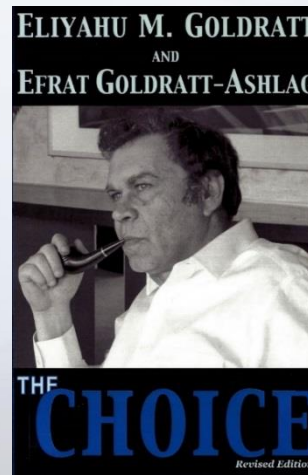
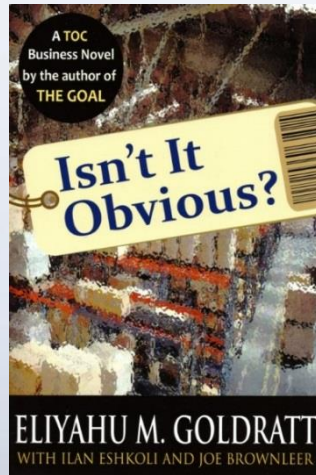
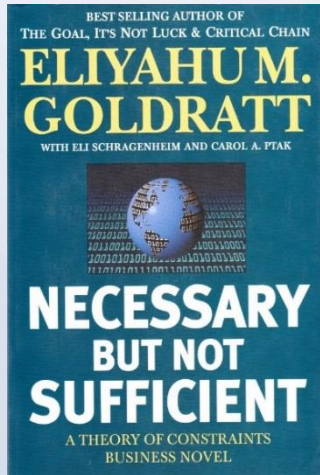




## Critical Chain books

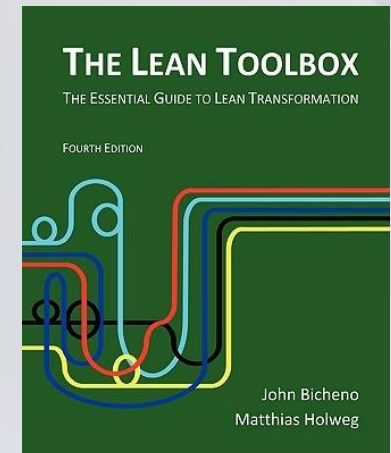
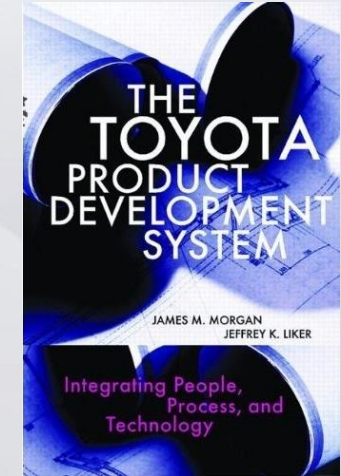
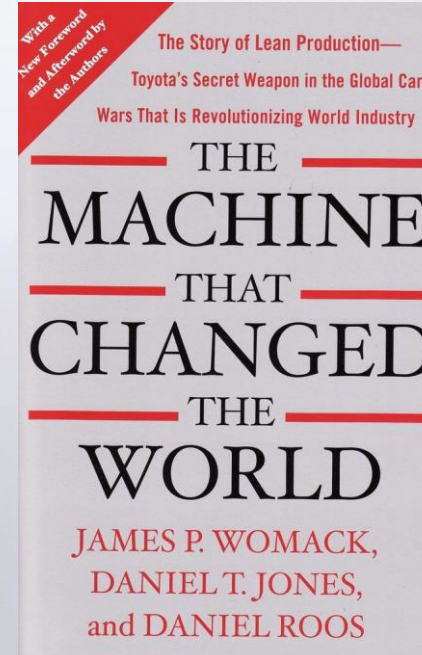
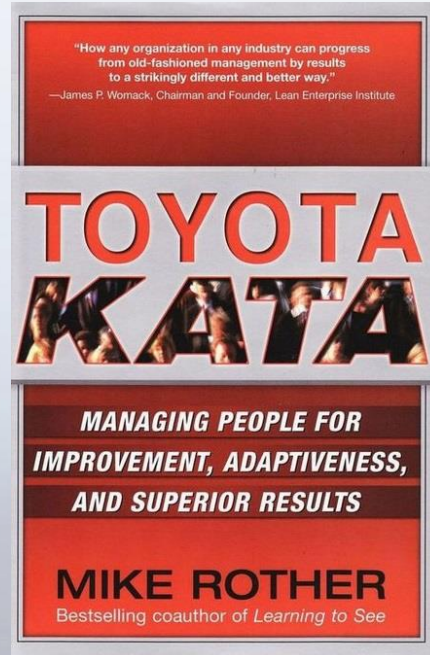
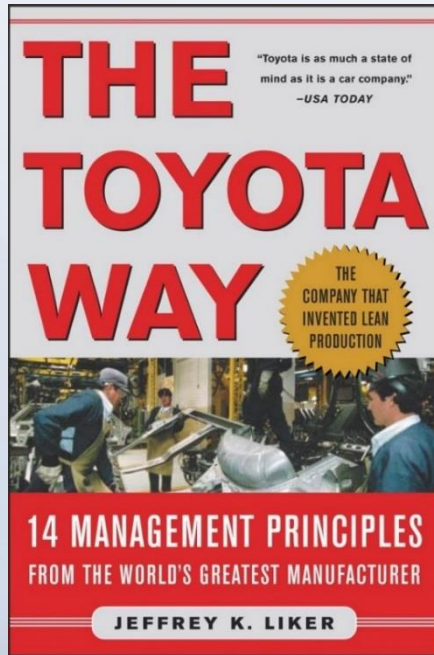


## Other ToC books





## Lean books



# 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 (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.



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





## Philip Marris, Founder and CEO of Marris Consulting

### Business transformation, Theory Of Constraints and Lean expert



30 years of experience, 56 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

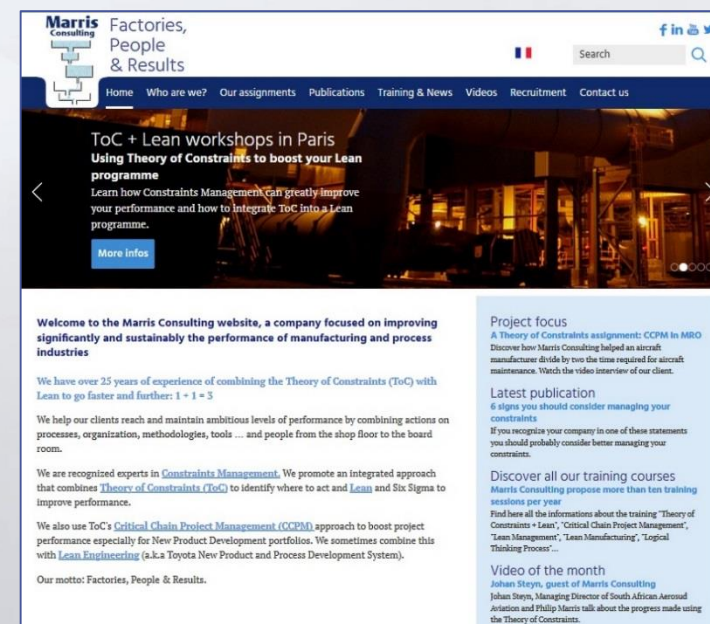
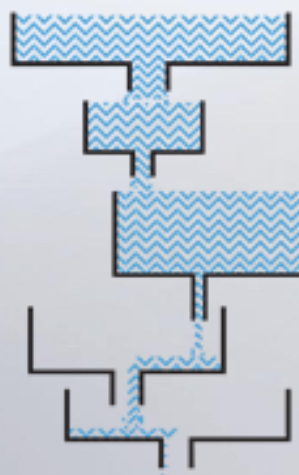
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