



2015 TOCICO International Conference – Cape Town, South Africa

How to identify bottlenecks in production and projects

Good news!

***You are probably wrong about where
your capacity constraints are***

Philip Marris

CEO Marris Consulting - Paris, France

TOCICO 2015 International Conference
Cape Town, South Africa

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Abstract

How to identify bottlenecks in production and projects

Philip Marris

2015 TOCICO International Conference – Cape Town, South Africa

Good news!

You are probably wrong about where your capacity constraints are

We have observed a new situation that has emerged over the past 10 years. In today's factories or R&D departments, 8 times out of 10, the capacity constraint is in the wrong place.

Furthermore, to make matters worse, management is wrong about where its constraint really is. So they over-utilize non-bottleneck resources thereby increasing WIP and lead times and they under exploit the bottleneck because they have not recognized its existence which results in limited throughput.

We will attempt to describe what has led to the development of this situation. This state of affairs can be viewed as regrettable...or as an extraordinary opportunity for 8 companies out of 10.

It means that the majority of organizations can transform their performance very easily, very quickly in both their production and their new product development. All they have to do is properly implement the Theory Of Constraints.

Several recent cases will be presented and an attempt will be made to identify the common root causes of this situation.

Content

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- Introduction
- A few examples
- Lessons learned
- Conclusion

- Annexes

Introduction

Philip Marris

CEO – Marris Consulting, Paris, France

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- Theory Of Constraints specialist. 29 years of TOC experience. Started working with the founder Eliyahu Goldratt in 1986.
- Consultant (warning!)
- >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.
- Author of numerous articles on TOC. Gives over 10 conferences a year worldwide.
- Author of a very boring French textbook about TOC in manufacturing *Le Management Par les Contraintes*.
- >15 years of experience in major consulting firms.



Theory Of Constraints marketing & awareness activities

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- 5 Permanent news websites
(www.Scoopit.com)
 - Theory Of Constraints (English & French)
 - Critical Chain in (English & French)
 - TLS: TOC + Lean + Six Sigma
- >80 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.

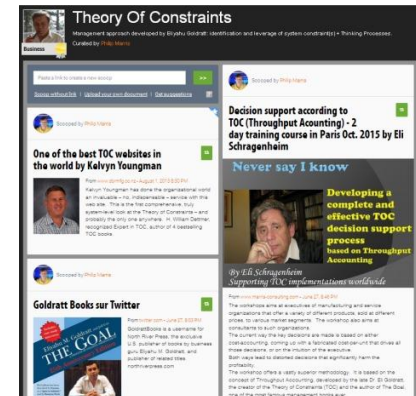
Scoop.it!

YouTube

LinkedIn

twitter

facebook



Production and projects only

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- In this presentation we are only going to discuss capacity constraints in production or in projects.
- We will not cover other types of constraints: in Sales and Marketing, in Purchasing, in Distribution or the issue of "Management Attention".

80% of companies don't know where their capacity constraint is

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- 10 years ago 50% of the companies we worked with knew where their bottlenecks were before starting to implement the Theory Of Constraints.
- Over the past 10 years (2005 to 2015) we have found that in 8 cases out of 10 the organization is initially mistaken as to where its capacity constraint is.

A few examples of mistakes in identifying bottlenecks

My impressive rolling mill

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- A steel manufacturer world leader.
- A 2,900 person factory with a steel mill, a rolling mill, heat treatment and finishing operations.
- They thought it was their big impressive rare sophisticated rolling mill.
- In fact it was their 6 (boring) heat treatment furnaces.



My key research experts

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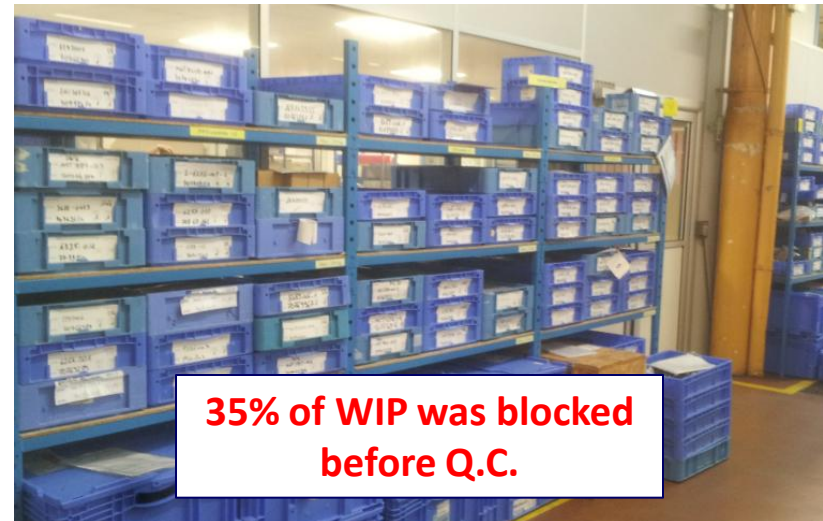
- A 280 person R&D Department of a leading Animal Health Pharmaceutical firm.
- They thought that the constraint was their 19 key experts (research scientists).
- In fact it was their Industrialization Department because of an outsourcing decision 3 years previously. This had tripled the workload on these 9 people.
- So the new drugs developed were all waiting for this department to define how and where they were going to be produced.



What is not in SAP doesn't exist

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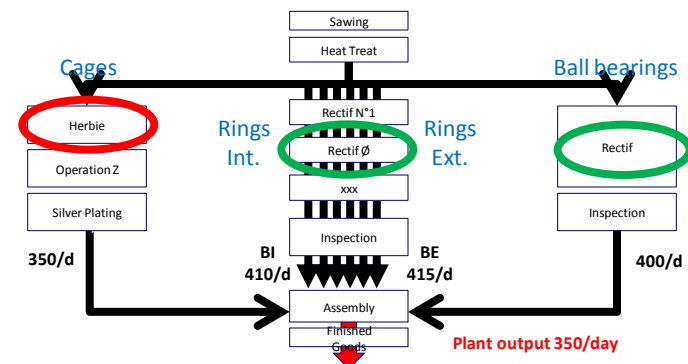
- A 400 person factory making Flight Control Systems for airplanes.
- They thought that their 5 most expensive machines were the constraint.
- In fact it was their Quality Control.
- But their ERP/MRP system could not see this because these operations were "indirect" and did not have any kind of capacity management.
- This is a sad case because the huge pile of WIP before the constraint was hiding in plain sight.



My expensive core skills

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- 700 person factory. Aeronautical sophisticated bearings for plane engines, helicopter rotors, etc
- 2 mistaken identification of constraints:
 - Firstly a set of machines that suffered spikes in demand for very urgent work due to internal quality problems but had a low monthly load.
 - Secondly their expensive milling machines
 - In fact it was another machine of secondary importance



A constraint hidden in 30 different places

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- Another steel making factory of 2,200 people making thick metal sheets with a lot of WIP and many overdue orders.
- And yet, following a downturn the whole plant was only loaded to 50% of its capacity.
- In fact, due to simplistic cost cutting, the constraint was the 16 people who did manual testing of the metal sheets at various stages in production.
- Difficult to spot because the queue of work was spread out in over 30 locations.



How to create a huge constraint in 14 factories with one decision

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- A leading Automotive Original Equipment Manufacturer producing alternators in 14 big factories around the world.
- Implemented a purchasing decision to replace very expensive rare earth metal magnets by cheaper normal ones.
- This mean that one of the operations in each of the 70 production lines concerned suddenly had twice as much work (milling the slot in which these magnets were inserted).
- Impact: -50% Throughput in the entire division...



Lessons learned

My big and beautiful bottleneck

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*The only difference between an adult and a child
is the price of his toys*

- We find that management often falls into the trap of wishful thinking. They convince themselves that their most expensive machines are the bottlenecks (since this is a sensible / good situation).

Beware of your ERPs blind spots

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- Production systems have more and more operations that are considered as “indirect”.
- They are not managed in the ERP as an operation with a predefined time per part using an identified resources with a quantified capacity.
- For example: Quality control or quality documentation operations that are now significant in work load and widespread in contemporary industry (aeronautical, food, pharmacy, steel, etc.).
- Unfortunately when the constraint concerns indirect labor the overload on the resources and the accumulation of Work In Progress are likely to go unnoticed. The ERP system will not see them.
- The performance – the “productivity” – of these operations is rarely monitored correctly by management. So the constraint does not receive the appropriate management attention. This is good news because managerial attention (pressure) can probably increase performance by >50%.

Your analysis is probably out of date

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- Organizations tend to be 1 to 3 years late in their analysis.
- So to help find the real bottlenecks ask yourself what has changed over the past 5 years:
 - **New quality requirements**
 - Regrettable cost cutting initiatives
 - New technology
 - New machines
 - New strategy
 - New raw materials or new components
 - New management with new rules
 - New competitor
 - New relementation

Capacity constraints in projects

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- Important note:
 - Our experience is only in New Product Development , MRO (Maintenance Repair and Overall) or .I.T. development projects. So our point of view might not be relevant to other types of projects such as in building and construction.
 - We consider that there are 2 types of constraints in multi-project management:
 - The Critical Chain of each project (the constraint of each project)
 - The capacity constraint of the portfolio (a resource).
It is this second kind of constraint that we are analyzing in this presentation.

Capacity constraints in projects

(continued)

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- In project environments the data regarding task durations and workloads are necessarily difficult to estimate.
- They are either very erroneous or simply non-existent; the organization does not even attempt to calculate workloads apart from a very approximate annual budget.
- This has always been the case but the increasingly significant changes in New Product Development portfolios are destroying the historical equilibrium (the "nearly balanced" system).

Capacity constraints in projects

(continued)

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- Companies are trying to develop today's product portfolio with yesterday's resource pool.
- Typically in New Product Development we have very regularly found that the new competencies, or the areas in which the amount of work per product has increased very significantly, are understaffed.
- Examples: electronics, regulatory, software development, quality management ...

Conclusion

Quick tips

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- Forget the data and look for the big queues
- Beware if the bottleneck is too good to be true
- When you have a hypothesis for the location of a bottleneck **TEST IT**. Normally everything should make sense.
 - If the bottleneck produces 15% more then the organization should produce 15% more (often with a lag).
 - Late or overdue things waiting in front of the bottleneck.
 - Etc.

Good news!

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- In our experience there is an 80% probability that you are wrong about where your bottleneck is...
- ...and that is very good news for you!

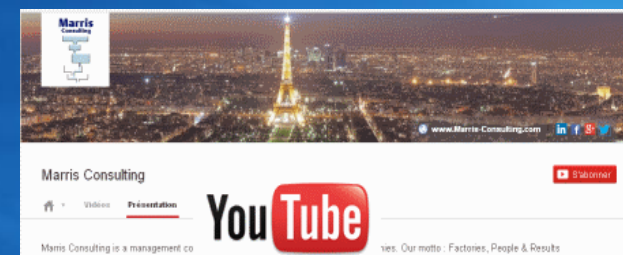
Thank you for your valuable time

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Any questions?

Annexes

Marris Consulting's YouTube Channel (name: marrisconsulting)

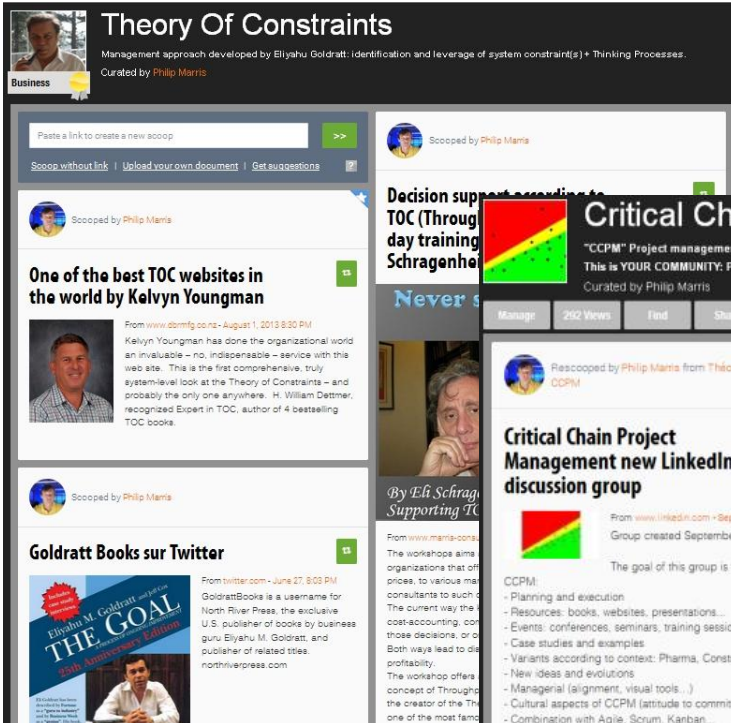


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<p>Unleashing the potential of Throughput Accounting Workshop by Schragenheim</p> <p>(En) Throughput Accounting Workshop by Schragenheim Oct...</p> <p>63 vues • il y a 2 semaines</p>	<p>TOC + Lean in Manufacturing Vilnius, Lithuania April 2013</p> <p>(En) TOC + Lean in Manufacturing - Vilnius</p> <p>66 vues • il y a 3 semaines</p>	<p>"2 for 1" rule to reduce WIP</p> <p>(En) The 2 for 1 rule to reduce WIP</p> <p>270 vues • il y a 4 semaines</p>	<p>Marris Consulting YouTube Channel</p> <p>(En + Fr) Marris Consulting YouTube Channel</p> <p>45 vues • il y a 4 semaines</p>	<p>TOCICO 2015 Annual Conference Theory Of Constraints in aeronautical production</p> <p>(En) TOC to boost aero production (3 min. preview of ...</p> <p>37 vues • il y a 1 mois</p>	<p>TOCICO 2015 Annual Conference Theory Of Constraints in aeronautical production</p> <p>(En) TOC to boost aero production (30 sec. preview of ...</p> <p>12 vues • il y a 1 mois</p>
<p>European 6-Day Training Logical Thinking Process</p> <p>(En) Logical Thinking Process: 6-Day training in Paris</p> <p>42 vues • il y a 1 mois</p>	<p>Bill Dettmer's Logical Thinking Process Participants Testimonials</p> <p>(En) Logical Thinking Process Course 2015 Participants</p> <p>57 vues • il y a 1 mois</p>	<p>Clarke Ching Rolling Rocks Downhill</p> <p>(En) Clarke Ching "Rolling Rocks Downhill" book writing saga</p> <p>39 vues • il y a 3 mois</p>	<p>Logical Thinking Process Executive Summary Tree by Bill Dettmer</p> <p>(En) Executive Summary Tree (TOC / LTP) by Bill Dettmer</p> <p>227 vues • il y a 3 mois</p>	<p>Clarke Ching interview extract Theory Of Constraints 5 Focusing Steps Revisited</p> <p>(En) TOC 5 Focusing Steps Revisited - Clarke Ching</p> <p>204 vues • il y a 3 mois</p>	<p>Logical Thinking Process 2014 course Intro. to 2014 video sessions</p> <p>(En) Bill Dettmer introduction to Dec. 2014 Paris video session:</p> <p>54 vues • il y a 5 mois</p>
<p>European 6-Day Training Course - June 2015 Logical Thinking Process</p> <p>(En) Logical Thinking Process training course June 2015 by ...</p> <p>106 vues • il y a 5 mois</p>	<p>Bill Dettmer Logical Thinking Process</p> <p>(En) Bill Dettmer about Logical Thinking Process and change ...</p> <p>76 vues • il y a 5 mois</p>	<p>Eric Robin et Christian Hohmann Management de projets Chaîne Critique</p> <p>(Fr) Management de projets Chaîne Critique par Eric Robin ...</p> <p>337 vues • il y a 5 mois</p>	<p>Bill Dettmer HE SAID, SHE SAID</p> <p>(En) Bill Dettmer: "He Said, She Said" book review</p> <p>55 vues • il y a 5 mois</p>	<p>Philip Marris and Bill Dettmer discussing constraints</p> <p>(Fr) Schéma des cuves et 3 types de contraintes</p> <p>447 vues • il y a 6 mois</p>	<p>Bill Dettmer and Philip Marris discussing Theory of Constraints</p> <p>(En) Theory of..., Thinking Processes and Policy</p> <p>239 vues • il y a 6 mois</p>
<p>Formations Théorie des Contraintes pour booster vos démarches Lean</p> <p>(Fr) Formation Théorie des Contraintes + Lean</p> <p>208 vues • il y a 6 mois</p>	<p>Problèmes et dilemmes du management de projets classique par Eric Robin</p> <p>(Fr) Problèmes du management de projets par Eric Robin</p> <p>665 vues • il y a 7 mois</p>	<p>Interview de Philip Marris par Christian Hohmann</p> <p>(Fr) Management Par les Contraintes, TOC Lean et TLS</p> <p>665 vues • il y a 7 mois</p>	<p>Eli Schragenheim Throughput Based Decision Making</p> <p>(En) Throughput Based Decision Making by Eli</p> <p>845 vues • il y a 7 mois</p>	<p>Thermodynamics of Eternity Logical Thinking Process Current Reality Tree (a humorous example) Bill Dettmer</p> <p>(En) Dettmer - Thermodynamics of Eternity - Thinking Process ...</p> <p>313 vues • il y a 8 mois</p>	<p>Logical Thinking Process A Systems Approach to Complex Problem Solving Erik Mano</p> <p>(En) Erik Mano - Logical Thinking Process</p> <p>304 vues • il y a 8 mois</p>
<p>Bill Dettmer video series Coming soon on your screens</p> <p>0:33</p>	<p>Bill Dettmer Logical Thinking Process 6 day training course</p> <p>19:03</p>	<p>Bill Dettmer New videos coming soon!</p> <p>0:56</p>	<p>Logiciels Chaîne Critique Eric Robin</p> <p>5:57</p>	<p>Le Management de Projets par la Chaîne Critique le cnam Pays de la Loire</p> <p>52:19</p>	<p>Le Management de Projets par la Chaîne Critique le cnam Questions & Réponses</p> <p>17:03</p>

3 permanent news websites dedicated to the Theory Of Constraints, CCPM and TLS

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Theory Of Constraints
Management approach developed by Eliyahu Goldratt: identification and leverage of system constraint(s) + Thinking Processes.
Curated by Philip Marris

Paste a link to create a new scoop >>

Scoop without link | Upload your own document | Get suggestions

Scooped by Philip Marris

One of the best TOC websites in the world by Kelvin Youngman

From www.dorffg.co.nz - August 1, 2013 8:30 PM

Kelvin 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.

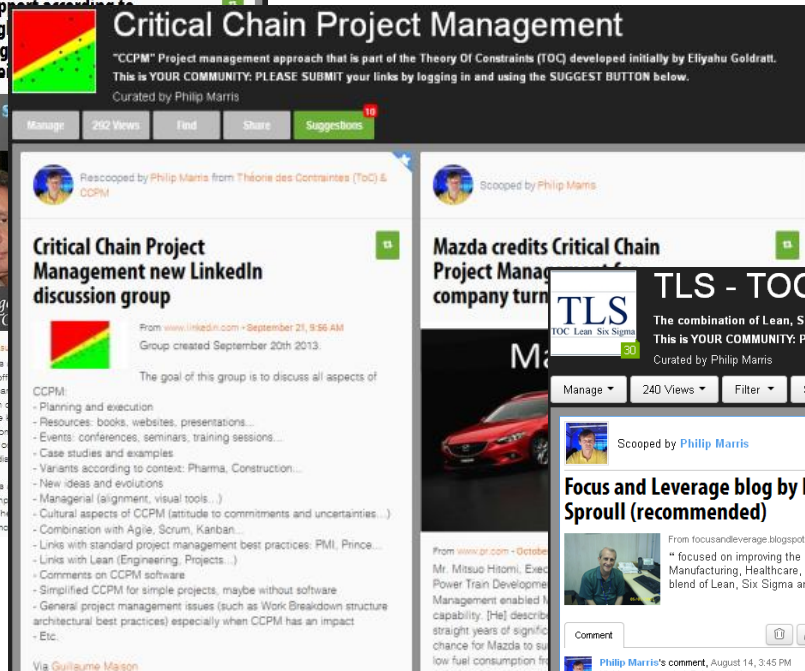
Scooped by Philip Marris

Goldratt Books sur Twitter

From twitter.com - June 27, 8:03 PM

GoldrattBooks is a username for North River Press, the exclusive U.S. publisher of books by business guru Eliyahu M. Goldratt, and publisher of related titles.

www.scoop.it/t/theory-of-constraints-by-philip-marris
www.scoop.it/t/critical-chain-project-management
www.scoop.it/t/tls-toc-lean-six-sigma



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 Feed Share Suggestions

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

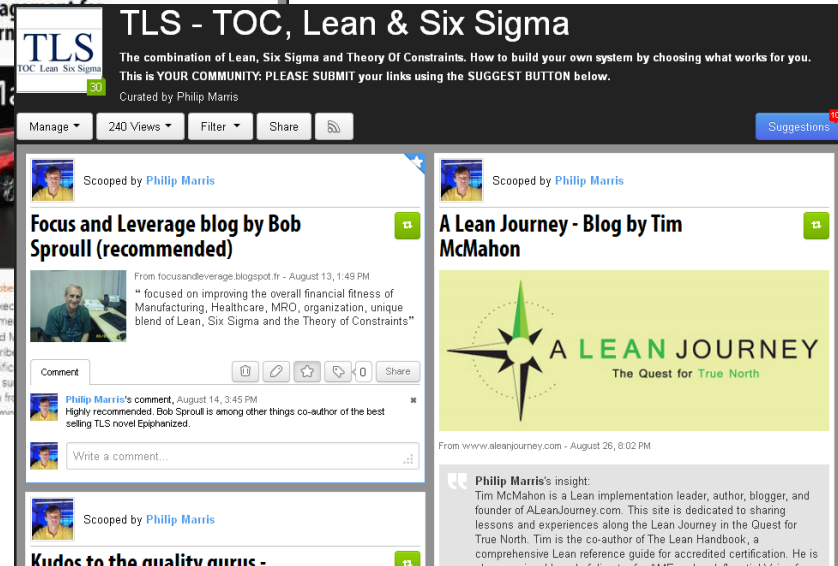
Critical Chain Project Management new LinkedIn discussion group

From 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...
- 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



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 240 Views Filter Share Suggestions

Scooped by Philip Marris

Focus and Leverage blog by Bob Sproull (recommended)

From focusandleverage.blogspot.fr - August 13, 1:49 PM

"focused on improving the overall financial fitness of Manufacturing, Healthcare, MRO, organization, unique blend of Lean, Six Sigma and the Theory of Constraints"

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

Kudos to the quality aurus -

Scooped by Philip Marris

A Lean Journey - Blog by Tim McMahon

From www.aleanjourney.com - August 26, 8:02 PM

Philip Marris's insight:
Tim McMahon is a Lean implementation leader, author, blogger, and founder of ALeanJourney.com. This site is dedicated to sharing lessons and experiences along the Lean Journey in the Quest for True North. Tim is the co-author of The Lean Handbook, a comprehensive Lean reference guide for accredited certification. He is also a frequent speaker at SME and as a facilitator for the

Philip Marris

Biography

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Philip Marris is CEO of Marris Consulting, a management consultancy focused on industrial operations based in Paris, France. Over 80% of the firm's projects are based on the Theory Of Constraints.

He is the author of the French reference book *Le management par les contraintes en gestion industrielle*. He is involved in the “TOC + Lean” movement and founder of the LinkedIn “TLS - TOC Lean & Six Sigma” group and 5 Scoop It TOC related information websites.

He has designed, sold and executed over 150 transformation projects.

He is a member of the board of the TOCICO French regional group and is active in increasing the awareness of TOC worldwide.

He started his TOC journey in 1986 when he joined Creative Output France and had the honor and pleasure of working with Eli Goldratt and Issi Pazgal.

Philip Marris was for many years in charge of Manufacturing Operations in large consulting firms.

He has over 29 years of experience in industry and in consulting. Philip Marris started his career as a production engineer in the steel industry. He is English and is bilingual and bi-cultural. He lives in Paris, France.



Abstract

How to identify bottlenecks in production and projects

Philip Marris

2015 TOCICO International Conference – Cape Town, South Africa

Good news! You are probably wrong about where your capacity constraints are

In today's factories and research and development departments, 8 times out of 10, the capacity bottleneck is in the wrong place. And, to make matters worse, the company, often surrendering to wishful thinking, mistakenly believes that it is elsewhere. This is our experience based on the last 10 years of our 30 years experience of TOC in production and projects.

Many years ago, let's say prior to 2000, organizations that had accepted the precept of the Theory Of Constraints that their system contained a constraint, tended to have correctly identified them. In our experience this is no longer true of the majority of companies.

We argue that there are several reasons for this:

- The environment is changing faster and faster: new technology, new products ... Companies will therefore have a tendency to have an obsolete view of the location of their constraints. Their analysis is out of date. The constraint that they believe they have was the constraint 2 or 3 years ago, but it has moved since then.
- Production systems have more and more operations that are considered as "indirect" and therefore are not managed (in the ERP's routings) as an operation with a predefined time per part using an identified resources with a quantified capacity. This is for instance true of quality control or quality documentation operations that are now significant in work load and widespread in contemporary industry (aeronautical, food, pharmacy, steel, etc.). Unfortunately when the constraint concerns indirect labor the overload on the resources and the accumulation of Work In Progress are likely to go unnoticed. The ERP system will not see them. Unfortunately the performance – the "productivity" – of these operations is rarely monitored correctly by management. So the constraint does not receive the appropriate management attention.
- In project environments such as New Product Development (NDP) the data regarding task durations and workloads are necessarily difficult to estimate. In practice they are either very erroneous or simply non-existent; the organization does not even attempt to calculate workloads apart from a very approximate annual budget. This has always been the case but the increasingly significant changes in NPD portfolios are destroying the historical equilibrium. Companies are trying to develop today's product portfolio with yesterday's resource pool. Typically in New Product Development we have very regularly found that the new competencies, or the areas in which the amount of work per product has increased very significantly, are understaffed: electronics, regulatory, software development, quality management ...

So, in our experience of over 100 TOC implementations in production and projects these past 10 years, what we find is that management often no longer knows where their real constraints are, and therefore will focus on the wrong resources. So they over utilize their non-bottleneck resources thereby increasing WIP and lead times and they under exploit their bottlenecks which results in limited Throughput.

We will review several cases to support our point of view:

- A case in aeronautical production where quality control was the unrecognized bottleneck
- An animal health pharmaceutical company that had not realized the impact of their decision, 3 years previously, to subcontract 50% of their production. As a result all their new product development was blocked just before getting to the market.
- A leading steel manufacturer that had not realized that their manual quality control that was repeatedly used all over their plant was their invisible and elusive bottleneck.
- The case of a leading automotive equipment manufacturer that disrupted an entire division of its organization by implementing a purchasing decision regarding rare earth metals.

This situation can be viewed as regrettable. Some may think that these companies were badly managed, but we think that they are in fact the new normal. As we have said, we think this is the case of 8 companies out of 10 today.

But in our opinion, it means that it is an extraordinary opportunity for 8 companies out of 10. It implies that the majority of organizations can increase their performance very easily and very quickly in both their production and their new product development. All they have to do is correctly implement the first 3 steps of TOC's 5 focusing steps: identify the constraint, exploit it and subordinate the system to its real constraints.

Marris Consulting

Over 150 assignments in over 10 years

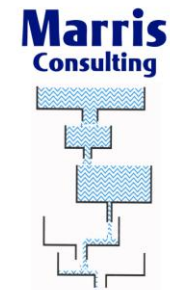
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Marris Consulting

Paris, France

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Factories, People & Results



- Marris Consulting has conducted over 150 engagements over the past 10 years, transforming industrial enterprises in France and around the world.
- Clients: ArcelorMittal, GSK (Glaxo Smith Kline), Valeo, Embraer, Safran, SNCF / French Railways, Veolia, Salzgitter Mannesmann, EADS, Aubert & Duval / Eramet, Autoliv, SKF, ABB, Man, Michelin, Bobst, Banque de France, DSS / Kayserberg Packaging, etc. and over 50 Small & Medium Enterprises.
- The firm is recognized as an expert in TOC & Lean Manufacturing. Philip Marris is the author of the TOC reference book in French: *Le Management Par les Contraintes*. Philip is English and worked with Eli Goldratt in the formative years of TOC.
- Marris Consulting conducts **regular training courses in TOC, TLS, Critical Chain** project Management, and other related areas of practice. The courses are delivered in Paris but can be arranged to be conducted at other sites.
- TOC manufacturing & CCPM websites (in French):
 - www.management-par-les-contraintes.com
 - www.chaine-critique.com
- Founded in 2005, 14 consultants + freelance network

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