Marris Consulting celebrates its 15th anniversary with **15 examples of TOC + Lean** implementations

Webinar

Paris, Monday 6th of April 2020

Version 1.0

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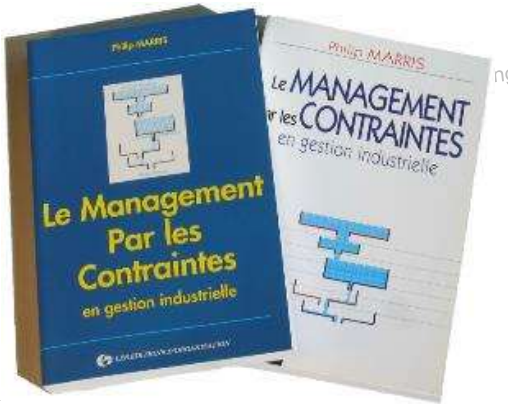
Organization of the webinar

- Presentation : 60 minutes
- Followed by a Question & Answer session: 30 minutes
- You can ask questions and make written comments throughout the webinar using the "Q. and A." feature at the bottom of the screen (mouse over).
- Presentation material can be downloaded. The link to a PDF download will be proposed at the end of this webinar. A PDF will also be posted on our website.
- There will be surveys during the webinar.
- The webinar is managed by 2 people:
  - **Philip Marris the "speaker"**
  - And **a webinar manager whose role is**:
    - To read the written questions as the webinar progresses
    - To manage the question and answer session (choice of questions, opening / closing the microphone, etc...)

Philip Marris:
CEO, Marris Consulting

- English…and European,
- Bilingual & bicultural English/French.
- Consultant (sorry).
- Started using Lean in industry in 1984.
- Has been implementing TOC since 1986, when he worked with Eli Goldratt, the founder of Theory Of Constraints/TOC).
- Implementation of TOC and Lean (sometimes also Six Sigma) in more than 260 companies around the world.
- Author of the French reference book on TOC in production: *Le Management Par les Contraintes.*
- Founder in 2005 of Marris Consulting.



Marris Consulting, a consulting firm specialized in operational excellence and project management

- Founded in 2005 by Philip Marris and based in Paris.
- 12 consultants and its network of partners.
- More than 40 conferences and training sessions per year on operational performance, Theory of Constraints, Lean, project management by the Critical Chain ...
- Over 300 videos of customer testimonials, educational presentations, expert interviews, etc.

Experience of more than 260 business transformations worldwide

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70% reduction in lead times at an aeronautical equipment manufacturer

See videos on YouTube

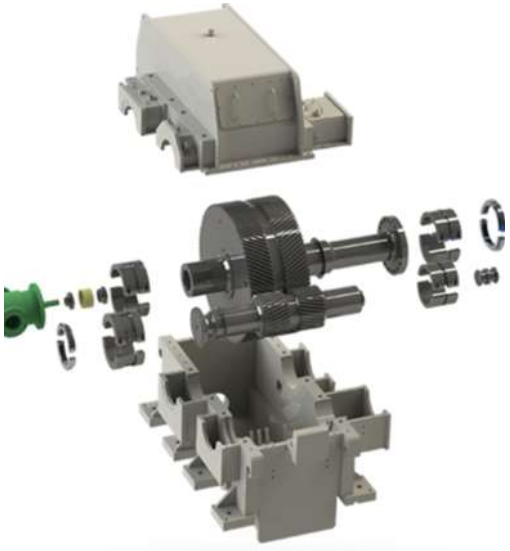
- A 400 person factory. Part of Safran, 95K employees.
- With a due date performance chronically below 50%, the factory was losing money. The managers had no credible plan to rectify the situation.
- The General Manager had read *The Goal* and decided to apply the Theory Of Constraints in two main steps:
  1. Increase the bottleneck output: quality control
  2. Reduce work in progress with the "2 for 1" rule
- Results in less than 3 months:
  - 30% increase in mechanical workshop production and more than 90% reduction in assembly delays because of mechanical parts,
  - Reduction in production lead time, lead time dropped from 9 months to 5 months (and later to 2 months),
  - Production WIP reduced by 1,2 M€,
  - OTD increased from 50% to 85%.

SAFRAN ELECTRONICS & DEFENSE

See video on YouTube

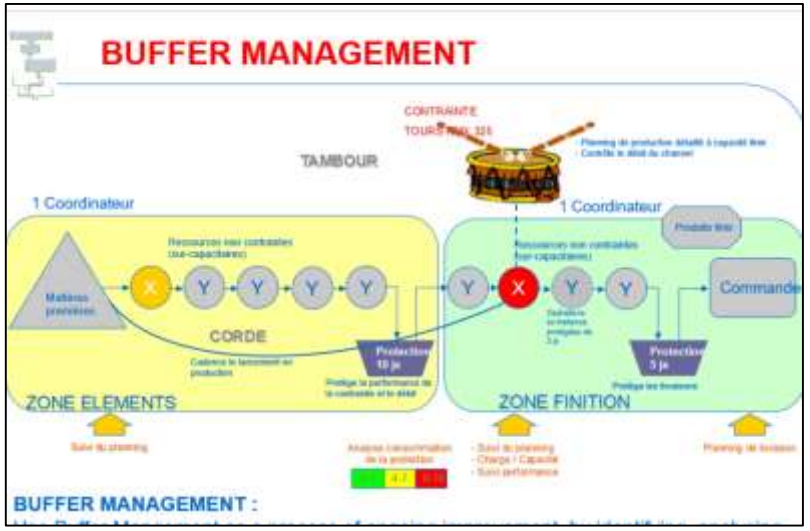
Design lead times divided by 10 and throughput tripled within 3 months. *Start finishing and stop starting.*

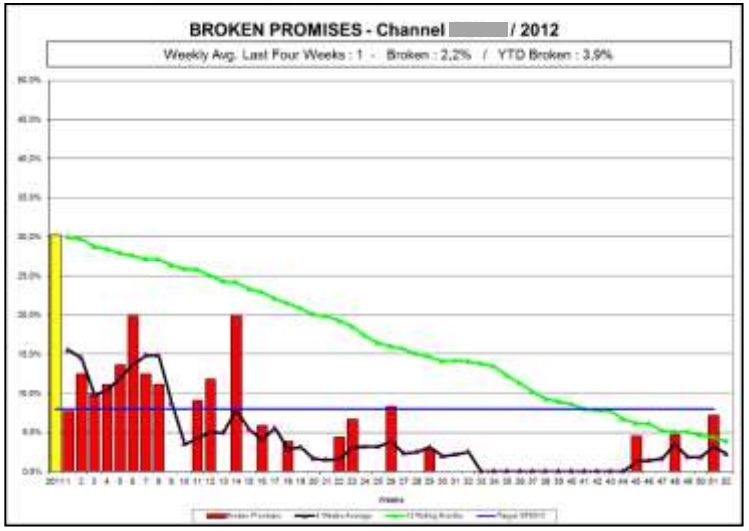
- A factory part of very big >300,000 person industry leader.
- In an ETO & MTO company that manufactures gearboxes for Oil & Gas industry, each order constitutes a new project and requires specific development.
- The bottleneck of the company was the Design Office, i.e. 15 people out of more than 300. It was a mad house (a normal design office!?). Excessive **multitasking** (switching >50 times per day). Reduced the WIP by starvation: ***Start finishing and stop starting***.
- Critical Chain Project Management was implemented to better plan the project, and portfolio staggering was implemented using the Designer Office as pacing resource.
- Results:
  - -75% of WIP in Design Office in 8 months (-50% in 4 months),
  - **+ 100% productivity in Design Office,**
  - -50% of production WIP in production,
  - -40% on the manufacturing lead time,
  - >60% decrease in overall lead time (overall time = design + manufacturing).



A 70% to 96% improvement in the due date performance within a world leader in ball bearings sector

- The Channel (Autonomous Production Unit) Manager attended a Marris Consulting "TOC in production" 2 day training session with the aim of building an action plan to reduce the number of « Broken promises » and thus increase the due date performance.
- After 6 months of implementation, without any assistance from Marris Consulting, there were significant results:
  - Improvement from 70% to 96% of on time delivery (and at one time 26 weeks without an overdue order),
  - Production WIP reduction by 46%,
  - 24% increase in overall productivity of the production line

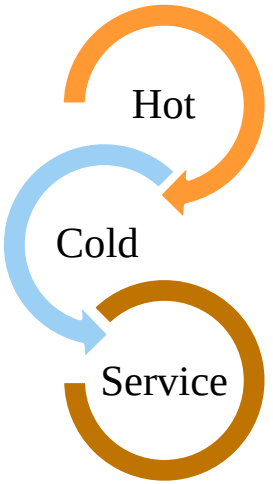




World leader in fast food: service times divided by 2,5 and profitability boosted

- A new worldwide restaurant model has increased service times and costs.
- After a one (long) day diagnostic the “bad” bottleneck is identified: the “assembly” of the different elements of a customer order
- A 13 point action plan is proposed.
  - "Bad" bottleneck eliminated by implementation of full-kitting in order to keep the order complete from customer order to delivery
  - Stop local performance indicators and focus on measuring the global performance.
  - Decide which is the best constraint / control point.
  - Better scheduling of the cooking (meat & fries).
  - Training in flow management.
  - Brief / Debrief reformatted.
  - Redefinition of the manager's role.
  - Etc.

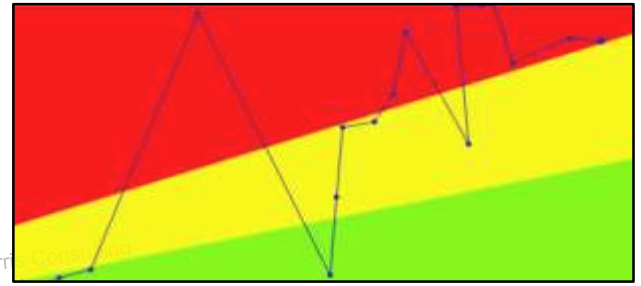
Push or pull flow?



Results

- **60% reduction in service times**
- **Big increase in $ performance**
- **Customers returns divided by 7**
- **“Materials” losses divided by 10**

Business jet maintenance at Embraer: Fixing planes twice as fast with Critical Chain



- Critical Chain was implemented along with:
  - Better sequencing of tasks
  - Focus on the Critical Chain sequence
  - Stop starting an start finishing (again)
  - Critical parts availability
  - Reduction in multitasking, etc.
- After 9 weeks: « Check C » maintenance downtimes went from 10 weeks to 5 weeks
- Portfolio Fever Chart deployment for all the large maintenance checks
- Implementation of aircraft « Pipelining »
- 45% increase in labor productivity

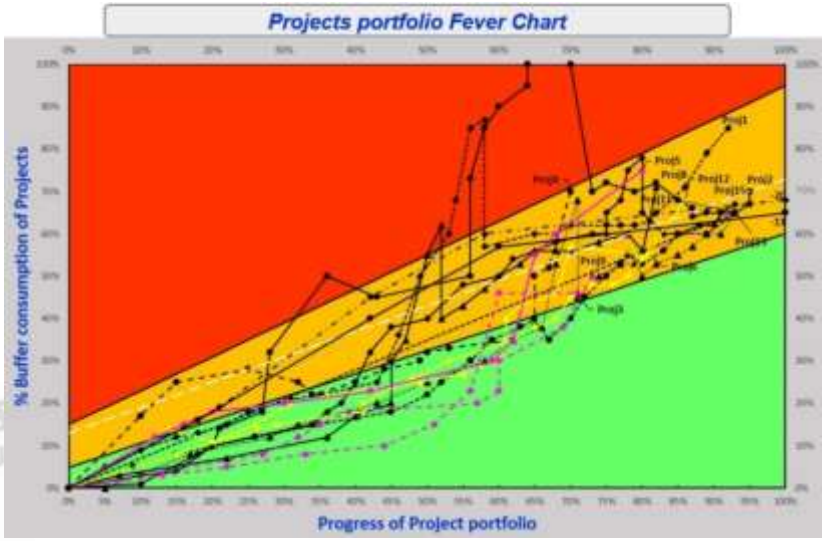
One of the "Big Pharma" doubles its productivity essentially thanks to Lean and common sense

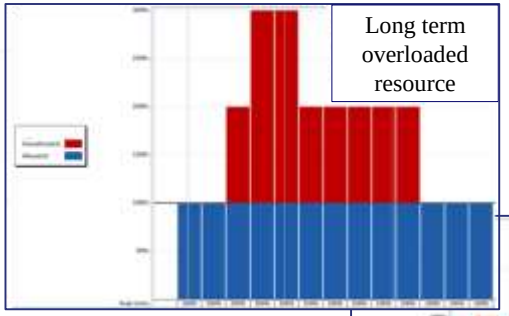
- Productivity and throughput doubled in 4 months in the Disunited-Kingdom.
- They had misjudged the impact of generic drugs on the sales of one of their iconic products. Production capacity reduced too much. Losses were over £500 million/month.
- OEEs were low (<20%) and there were a lot of stoppages so identifying the bottleneck was impossible. So lots of "Lean" actions, especially a transformation in the quality and quantity of collaborative work between production and maintenance teams.
- TOC's Logical Thinking Process was used to implement "Process SMED" ("Goal Tree" – Reduce set up times).

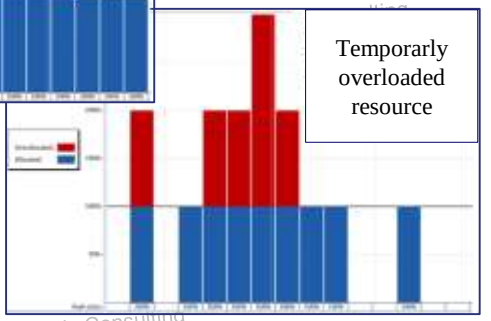
98,7% on time finishing in aeronautical new products development (a world record?)

See videos on YouTube

- In Aerosud, a South African 700 people company, TOC in production had already been successfully implemented, but the development of new products also needed to be improved.
- After an unsuccessful attempt, the management decided to try again to implement Critical Chain Project Management (CCPM):
  - Scheduling projects the Critical Chain way
  - Critical Chain monitoring via Fever Charts
  - Identification of the portfolio constraint thanks to the analysis of resource load profiles
  - Staggering of projects according to the constraint availability
  - Implementation of corrective actions identified thanks to the Pareto of buffer consumptions
  - Dynamic arbitration using the Portfolio Fever Chart
- Generalization of the approach to all their projects: ERP, new building …





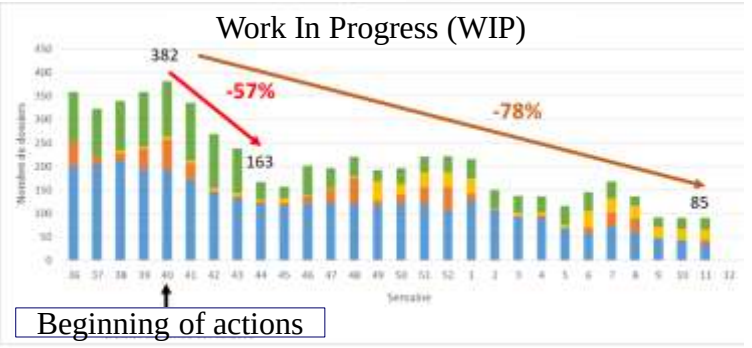


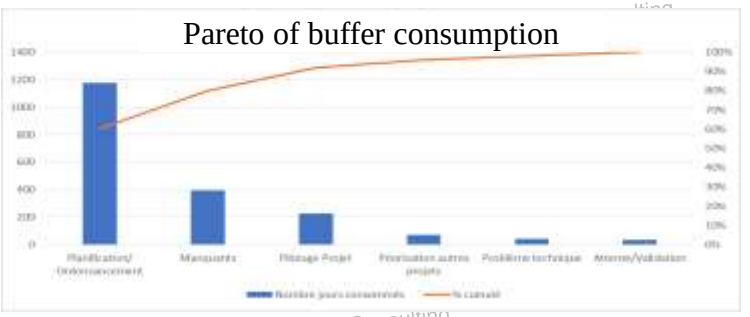
TOC "5 Focusing Steps" & CCPM principles to triple the flow of new product development in the luxury industry

- Identification of the "bad" bottleneck during a 2-day diagnosis: the creation of the Bill Of Materials.
- Full-kit principle implementation, skills development in the bottleneck team and site management focused on the bottleneck performance.
- Identification of the new bottleneck and repeat improvement process. Steps 1, 2 & 5 of TOC's "Five Focusing Steps. 3 such loops in 18 months. Current bottleneck is maybe "the best bottleneck".
- Critical Chain deployment on all new product development.
- WIP reduction
  - **-60% in 4 weeks**
  - **-80% in 23 weeks**
- Throughput and productivity:
  - **>+150% so far and still increasing**

The 5 Focusing Steps of the Theory Of Constraints
or the Process Of On-Going Improvement (POOGI)

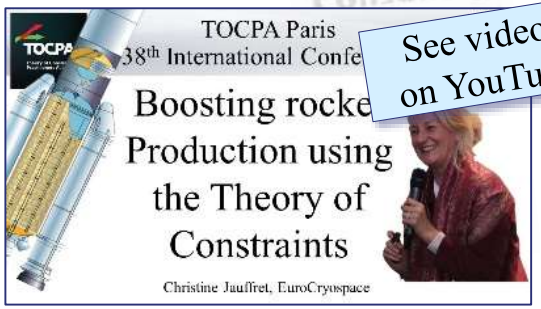
1. **IDENTIFY** the system's constraint(s).
2. Decide how to **EXPLOIT** the system's constraint(s).
3. **SUBORDINATE** everything else to the above decision.
4. **ELEVATE** the system's constraint(s).
5. WARNING!!!! If in the previous steps a constraint has been broken, **go back to step 1**, but do not allow INERTIA to cause a system's constraint.

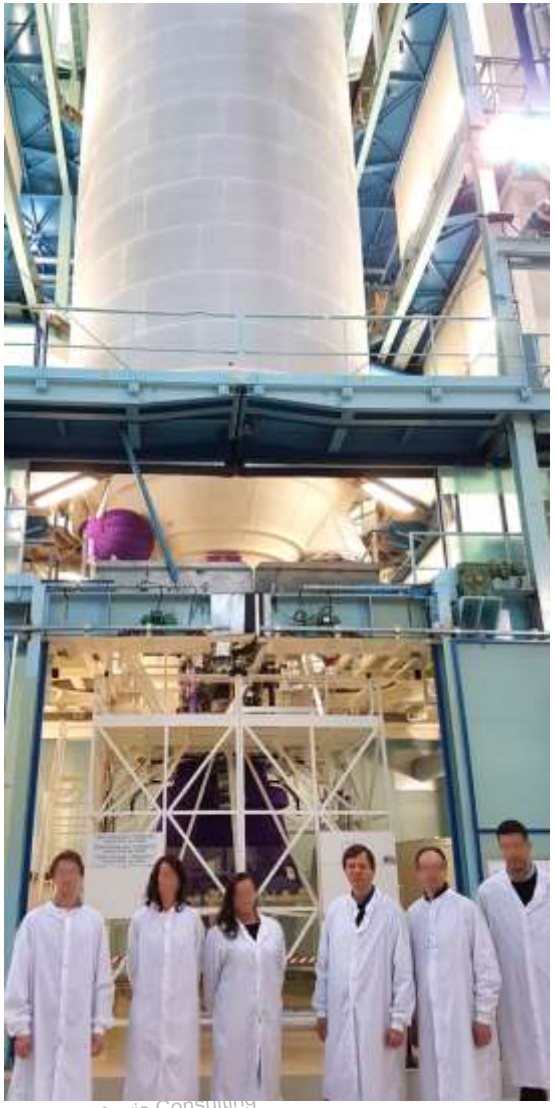




A 25% increase in the Ariane 5 rocket tanks production throughput and productivity in one month

- In 2017, the production site of the Ariane 5 rocket tanks needed to increase its production capacity from 6 tanks per year, to meet an increased market demand of 8 tanks per year.
- Actions implemented:
  - Identification of the production bottleneck: the welding machine
  - Implementation of the Critical Chain principles on the welding process and use of a mascot to physically follow the Critical Chain
  - Scheduling of the welding process in 22 days plus 5 days of buffer instead of the 38 days average previous performance
  - Monitoring of production using a Fever Chart
  - Identification of the next bottleneck and eliminated it. Repeated the process several times.

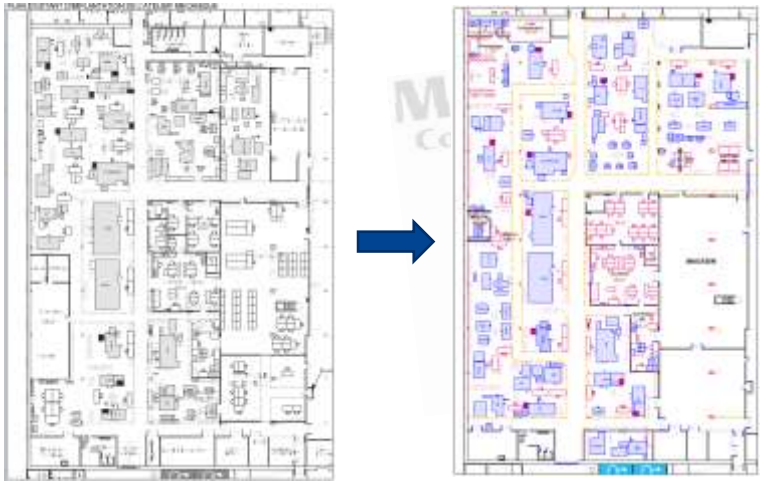


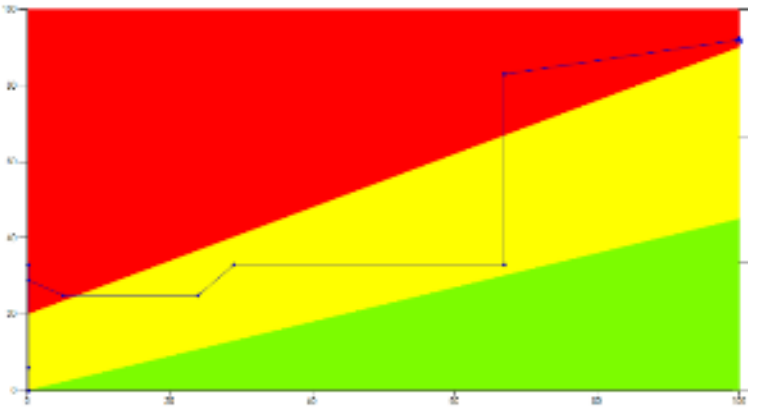


When a Maintenance Manager discovers Critical Chain Project Management

See videos on YouTube

- Goal: to completely reorganize the workshop in order to simplify production flows. Move 45 machines weighing between 300 kg and 10 Tons
- The estimated project duration went from 8 weeks to 2 weeks thanks to Critical Chain scheduling
  - 3 months of preparation with dozens of optimization simulations. Example: more cherry pickers.
  - The civil works done if possible in advance. Examples: moved the toilets & some concrete foundations
  - Quantification of the investment to meet the deadline
  - Etc.
- Day-to-day monitoring of the project progress via the Fever Chart
  - Immediate alerts on drift and estimate of the impact on the end date of the project

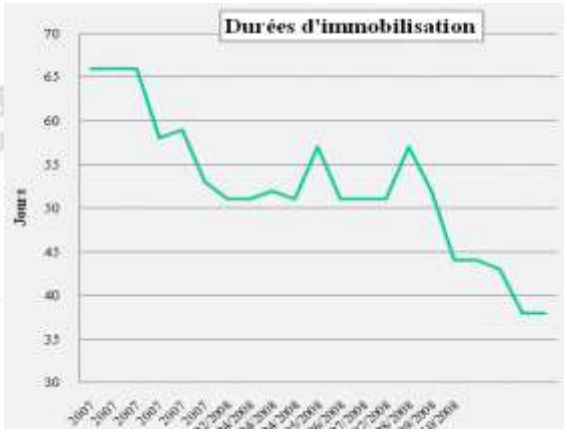




Total relocation of the factory's machines in 6,5 days instead of 8 weeks

TGVs (French high-speed trains) renovated twice as fast

- Reduction of renovation downtimes of the TGV trains (10 to 12 cars + locomotives) from >70 days to 38 days.
- 20% reduction in hours required to perform renovations.
- +30% of productivity in PRM renovation workshops (PRM = Pièces Réparables du Matériel= Repairable Equipment Parts).
- A win-win situation for unions & direction



Article currently only available in French

Le Technicentre TGV rénove deux fois plus vite

LE PROBLÈME

Livrer à l'heure des rames de TGV pour inaugurer la ligne TGV-Est européenne en juin 2007.

LA SOLUTION

Réorganisation des ateliers.
Mise en place d'un système de planification, de management visuel.
Redistribution des responsabilités des managers de proximité.
Création de fonctions d'animateur d'îlots de production.
Développement d'une démarche de progrès continu.

LE RÉSULTAT

Livraison dans les temps des rames.
Durée d'immobilisation d'une rame divisée presque par deux. Elle est passée de 70 jours à 38.
Participation accrue des opérateurs : nombre d'idées proposées et mises en œuvre multipliées par quatre.
Amélioration des conditions de travail.
Capacité à travailler sur trois modèles de TGV différents en même temps.

L'ENTREPRISE

Technicentre industriel de Bischheim (Bas-Rhin)
Activité Rénovation de rames de TGV
Chiffre d'affaires 150 millions d'euros
Effectif 1001

■ **«Production artisanale».** C'est ainsi que Philippe Deschamps, le directeur du Technicentre industriel de Bischheim, dans la banlieue de Strasbourg, qualifie la manière dont travaillait son site il y a seulement trois ans. A l'époque, en 2007, pour désosser les rames de TGV (8 à 10 voitures plus deux motrices) et entièrement les rénover, il les immobilisait pendant soixante-dix jours. Un délai trop long qui mettait en danger la nouvelle ligne TGV-Est, qui a été ouverte le 10 juin 2007.
Pour livrer à l'heure les rames, le Technicentre alsacien s'est lancé dans une démarche d'amélioration continue, développée avec l'aide d'une équipe de consultants extérieurs. Le cabinet Marris Consulting avait été sollicité, fin 2006, pour établir un diagnostic d'urgence. «Première chose, se souvient Philippe Marris, le fondateur du cabinet, nous avons traqué les temps d'attente et revu l'organisation des ateliers.» Aujourd'hui, elle suit une logique produit et non plus métier.

UNE PYRAMIDE DE PILOTAGE

Des équipes autonomes ont été constituées en regroupant plusieurs métiers (câbleur, électricien, monteur, etc.). Chacune se retrouve embarquée dans un même wagon pour y effectuer, en même temps, des tâches de nature différente. Auparavant, chacun des métiers intervenaient les uns à la suite des autres. «Pour les opérations de peinture par exemple, les opérateurs attendaient d'avoir toutes les pièces correspondant à une même couleur pour commencer leur travail. Cela retardait la phase de montage», se souvient Bruno Maggioli, le directeur industriel.
Une pyramide de pilotage a également été mise en place. Il s'agit d'un système de planification qui permet à la fois d'affecter les ressources aux bons postes et d'évaluer les besoins en formation à trois-quatre ans. On peut ainsi s'assurer qu'un chaudronnier n'est pas programmé pour travailler sur deux rames en même temps et prévoir de développer des compétences dans l'aluminium et non plus l'acier pour l'arrivée de nouvelles rames.

DES INDICATEURS DE SUIVI PLACÉS DANS LES ATELIERS

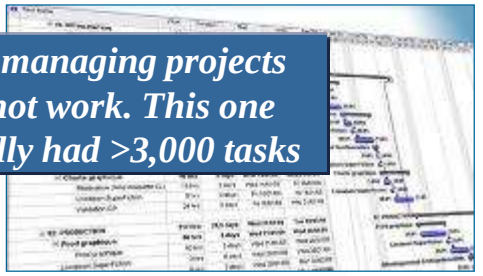
Au quotidien, un système de management visuel a été installé. De grands panneaux placés dans les ateliers précisent qui doit réaliser quelle tâche, quels objectifs atteindre et affichent des indicateurs de suivi. Des carnets à souche sont également disponibles pour noter - et compter facilement - les idées d'amélioration proposées par les opérateurs eux-mêmes. Entre 600 et 700 propositions effectivement appliquées ont été dénombrées cette année.
Le résultat est là. Le temps pour rénover une rame a quasiment été divisé par deux. Il faut trente-huit jours pour remettre à neuf les TGV de 220 mètres. ■ CAROLE LEMBEZAT

Mise à plat. Trois ans après le début de la réorganisation, le résultat est là. Il ne faut plus que trente-huit jours pour remettre à neuf les TGV de 220 mètres.

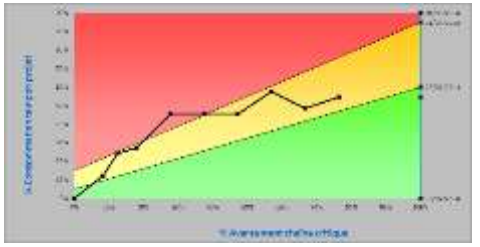
Article Usine Nouvelle

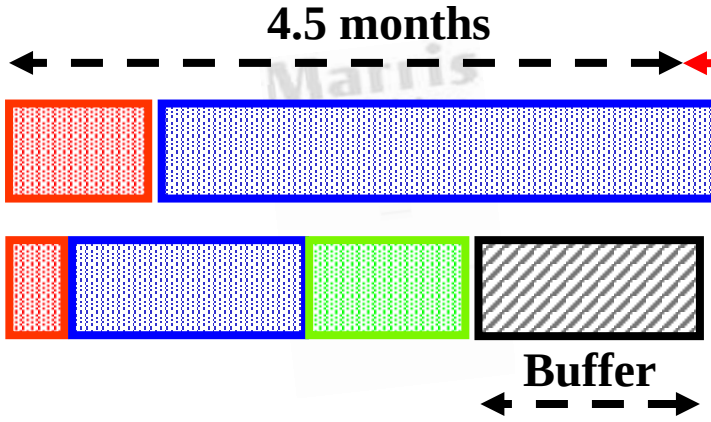
Save a strategic satellite project for the European space leader by finishing twice as fast

- One of the main players in the design and production of satellites. Over 5,000 people.
- Meeting the committed delivery date of a very important satellite seemed impossible a few months before the end of the project.
- The cost of a delay would be more than 100 million €.
- A first Critical Chain planning ended at the end of December.
- After optimization the deadline of end of July deadline was met...with 1 day to spare.



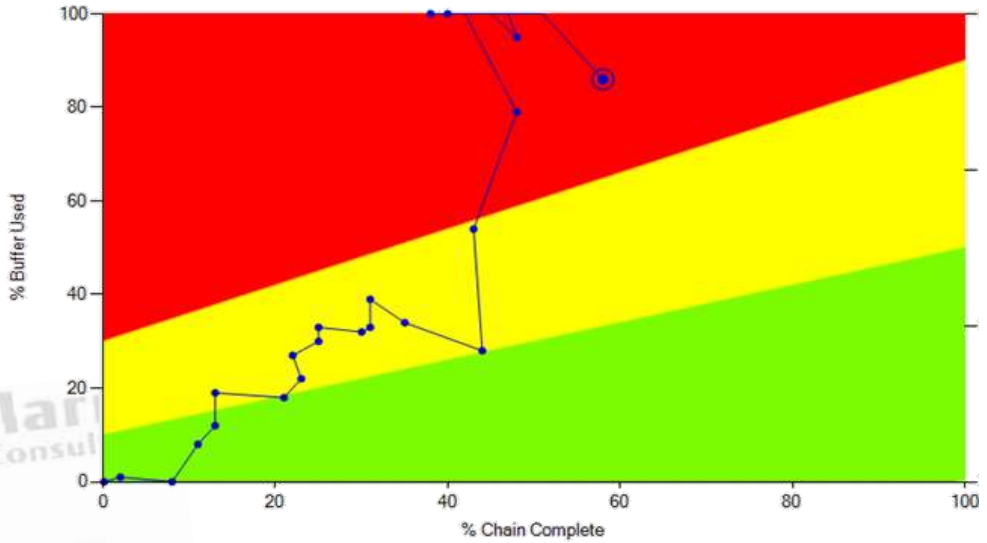
Micro managing projects does not work. This one originally had >3,000 tasks

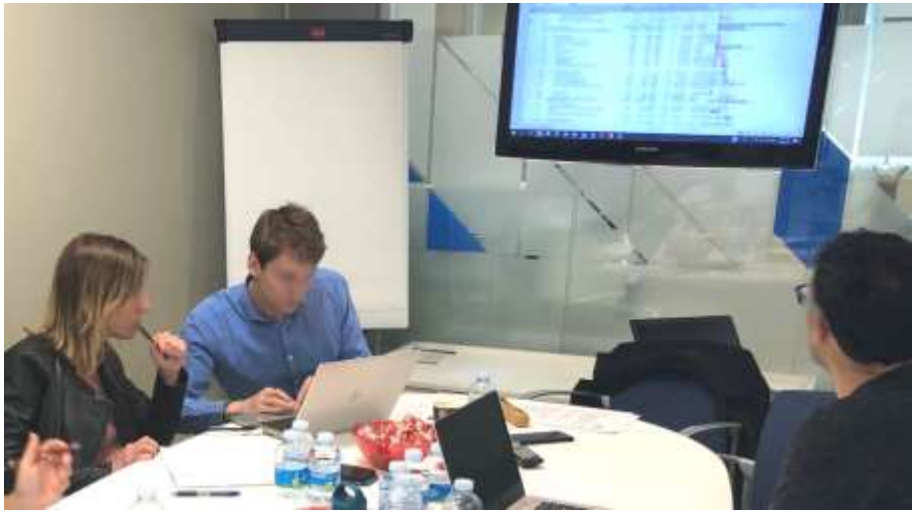




How to develop machines for diagnosing respiratory infections more quickly?

- The syndromic approach is a new method for simultaneously finding in a single test all the microorganisms most frequently responsible for an infection.
- In order to speed up the development of these machines, management decided to implement Critical Chain (in March 2019).

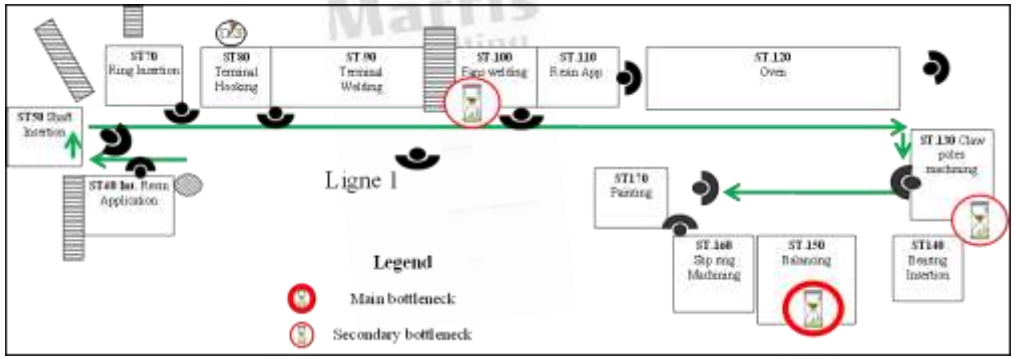




- Identification of the project Critical Chain, optimization of the schedule and anticipation of all possible activities,
- Acceleration of the product development,
- Risk management.
- The machine was very quickly upgraded to identify Covid-19 at the beginning of 2020.

A 17% increase in Throughput in 15 minutes in one of the "Leanest" automotive OEMs in the world

- A 1,000 person factory in the Mexican desert.
- >120 factories worldwide. One of the first companies to start its Lean journey at the end of the 1970s. Its xPS (equivalent to Toyota Production System) is over 30 years old now.
- Their factory in Mexico had a demand substantially higher than its capacity. GM NBOH.
- TOC focus was applied to BN. The problem was the size of a shoe box.
- 17% throughput and productivity increase in 15 minutes and >30% in 9 months.

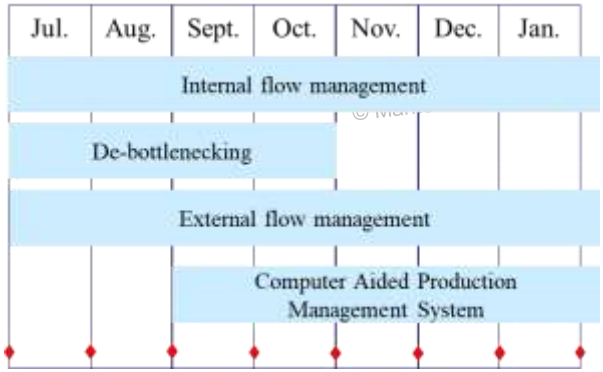


A gold mine that wants to inject TOC into its Lean Six Sigma culture and move to "TLS" (TOC + Lean + Six Sigma)

- Diagnosis of a gold mine employing 2,5000 people in Africa.
- Implementation of Critical Chain on:
  - Planned plant shutdowns,
  - Maintenance of trucks, drills, and other mobile equipment,
  - Large CAPEX project to upgrade a critical part of the process.
- Identification of the bottleneck: in the mine or the factory?
- Modification of the improvement strategy: more projects to increase Throughput and fewer projects aimed at reducing costs.
- *Currently on-going assignment, with remote assistance.*

Doing diagnostics and action plans in 1 or 2 days thanks to the focus of the Theory Of Constraints

- A few examples among hundreds of our diagnostics:
  - Fast food: a (long) day to build a 13 key points action plan to divide service times by 2.
  - Aeronautical equipment manufacturer, plant of 400 people: 3 hours to find the bottleneck…the quality control.
  - A leader in the luxury industry: bottleneck in the technical specifications teams detected in 6 hours.
  - A 400 person steel sheet factory : transformation plan established in 2 days
  - World leader in vacuum pumps: 2 days to identify the bottleneck…the Test Lab
  - Factory of 300 people of industrial valves: transformation plan built in 2 days
  - Potato chips production plant: bottleneck and action plan in 2 days.
  - Etc.
- Quite often, the implementation of the proposed action plan is carried out without the assistance of Marris Consulting.



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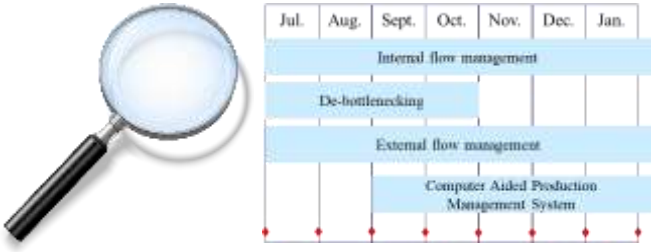
You can boost your improvement process now

- Due to the Covid-19 context we have transformed all of our services into online services.
- Benefit from our many sessions and exceptional pricing offers.
- Our next free webinars:
  - 9th of April 2020, webinar Critical Chain in French
  - New webinars are currently being programmed for the following weeks

- Our next online training sessions:
  - 14th-17th of April, TOC in Production in English, in 8 hours over 4 days
  - 21st-24th of April, Critical Chain in French, in 8 hours over 4 days
  - TOC in Production in French (being programmed in April or May 2020)
  - Critical Chain in English (being programmed in April or May 2020)
  - Etc. More being prepared. Stay tuned.

- "Remote" Diagnosis and action plan



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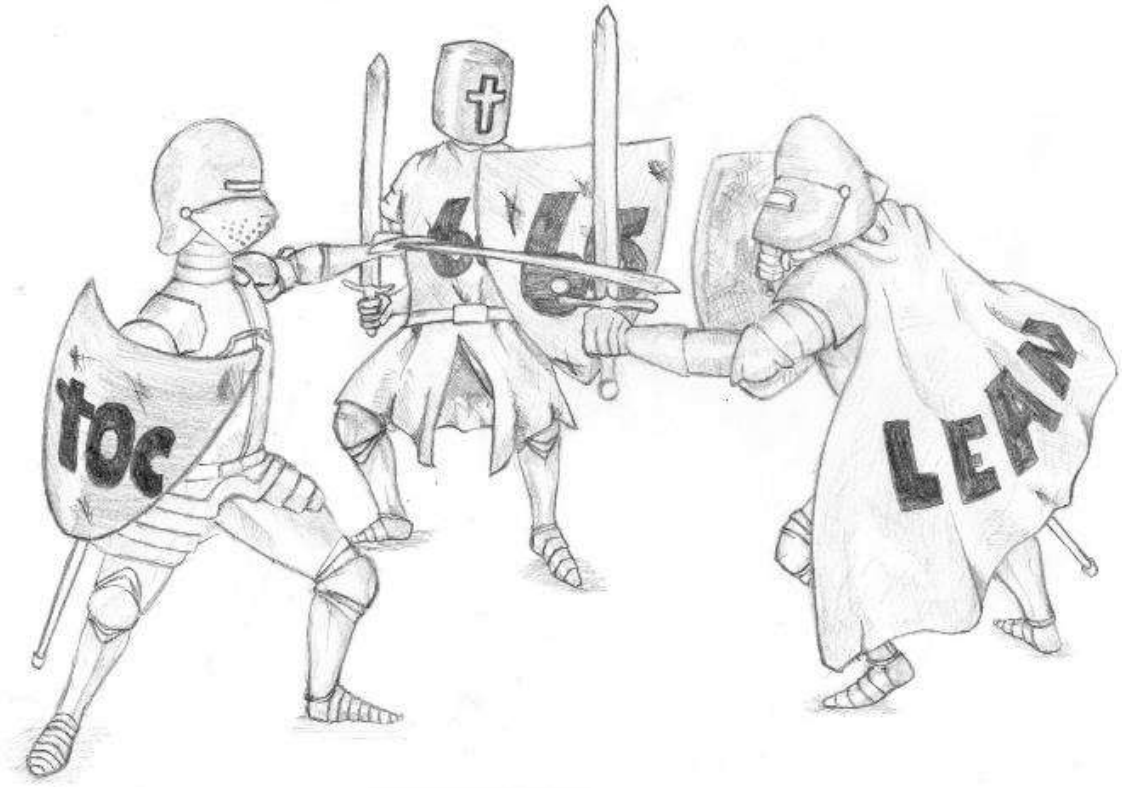
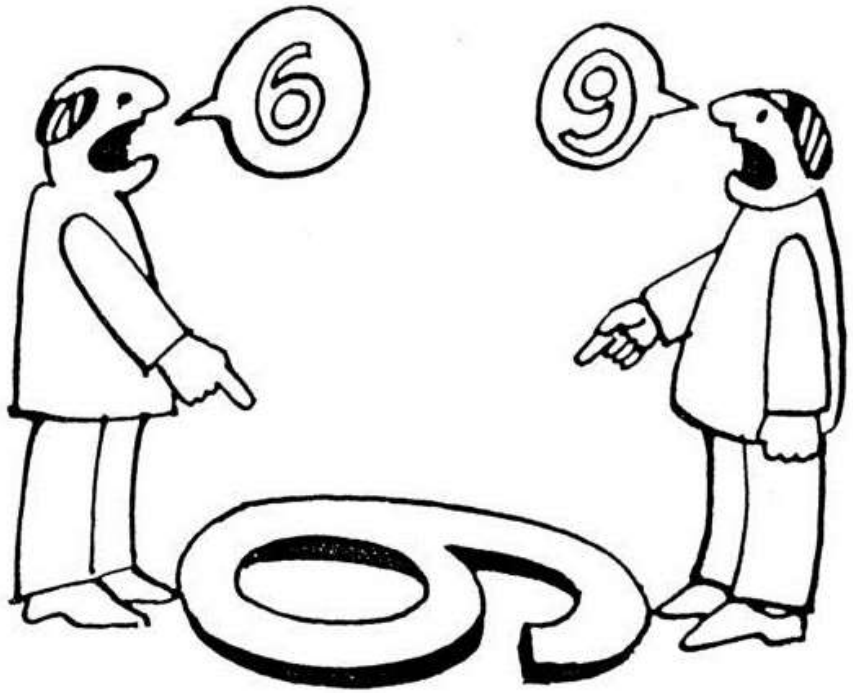
Thank you

Questions & Answers





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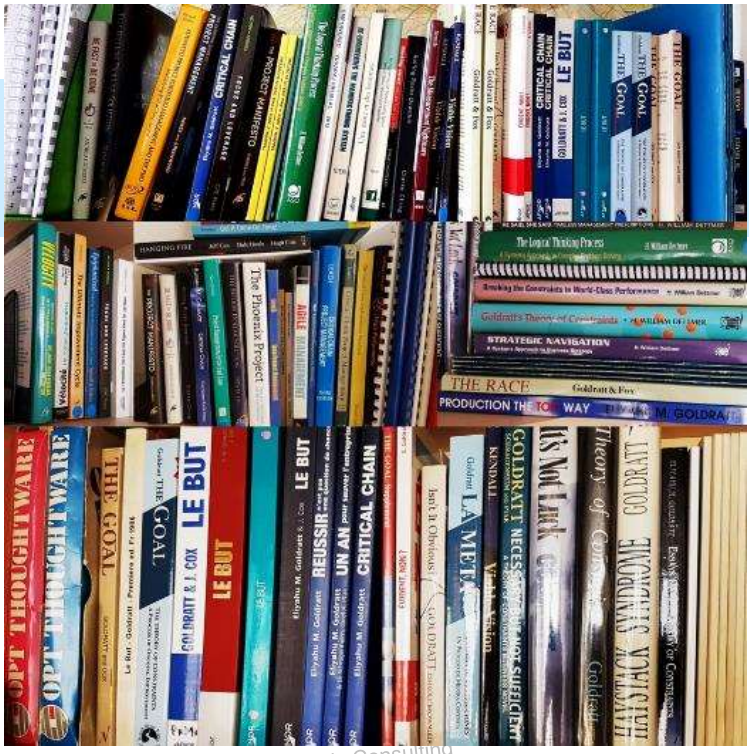
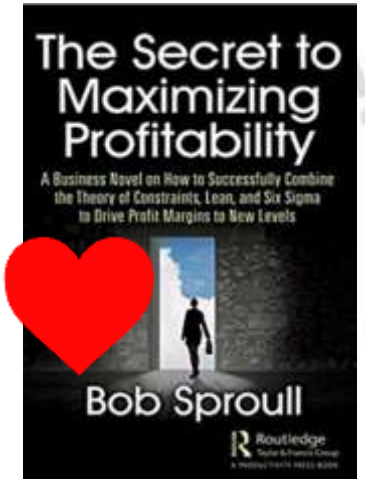
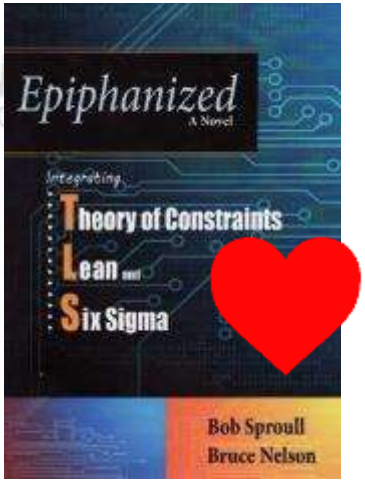


Books about TLS (ToC + Lean + Six Sigma)

- *Epiphanized* & *Focus and Leverage*
  by Bob Sproull & Bruce Nelson
  - Recent books.
  - *Epiphanized* is a novel but includes 110 appendices pages that explain: TLS, Throughput Accounting, the Thinking Processes, the « Replenishment Model, le Drum – Buffer – Rope, Critical Chain Project Management, etc.
  - *The Secret to Maximizing Profitability*. The latest book (2019), the most accomplished.

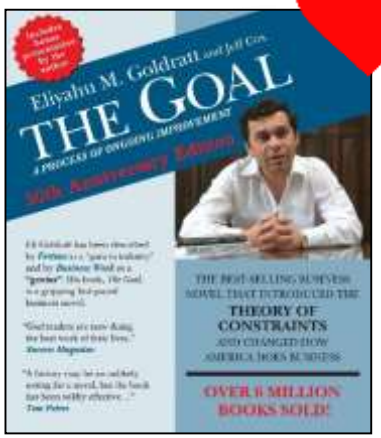




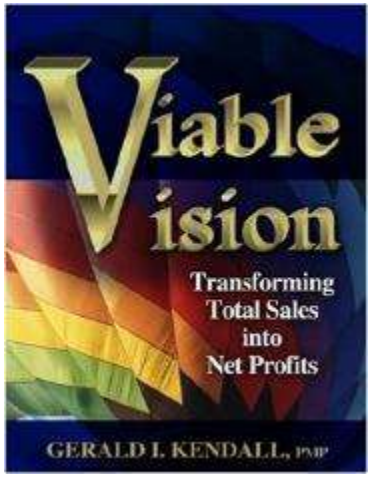
- *Velocity* by D. Jacob, S. Bergland et J. Cox
  - A novel that describes how to combine the 3 approaches. Interesting especially because the book describes the case of a double constraint: in an administrative process and in the production.

Books about Theory Of Constraints (TOC)

- *The Goal* by Eliyahu Goldratt
  - Over 7 million copies sold in 31 languages. Mandatory reading in most universities / MBA / ... Written by Eliyahu Goldratt the founding father of the "ToC" approach. The first to use the format of the novel to explain a management approach. Voted one of the 25 most influential books of modern times by Time Magazine in September.
  - A must read.

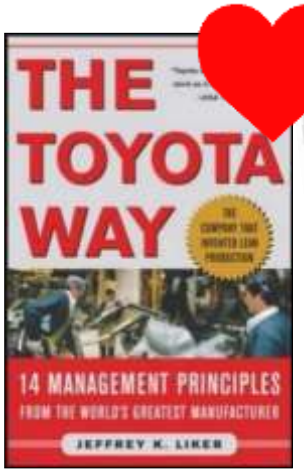


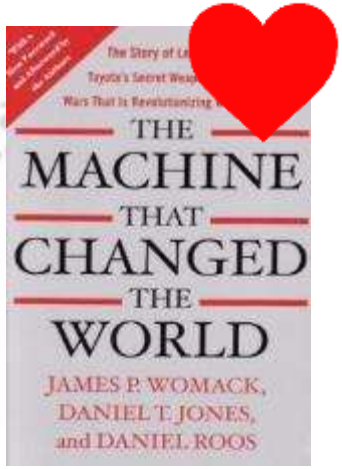
- *Viable Vision* by Gerald Kendall
  - A good « executive summary » that presents all the component of the Theory Of Constraints, including some aspects that should not be treated in the book: the « Thinking Processes », the « Mafia offers », « Replenishment », etc.

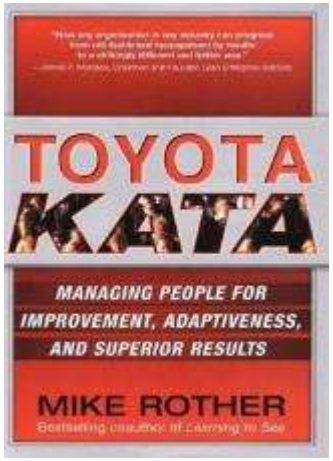


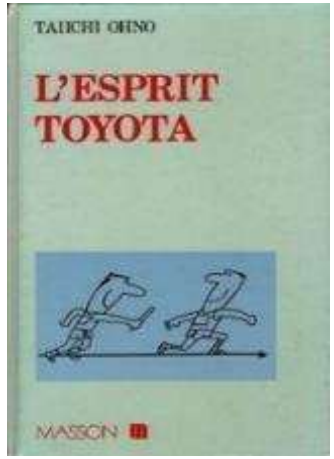
Books about Lean Manufacturing

- *The Toyota Way* by Jeffrey Liker
  - The reference book today in the world about the Toyota Way. Well written and recent. It describes the Toyota approach. For those who want to go further, the author also wrote “Toyota Culture”, “Toyota Talent”, …, “…Field book ”, “ …Continuous Improvement ”, …
- *The machine that changed the world* by J. P. Womack, D. T. Jones and D. Roos
  - Despite its age (1990), it is still really interesting to read it, and read it again, because it includes a lot of comparative data between Europe, USA and Japan. The word “Lean” was first used in this book.
- *Toyota Kata* by Mike Rother
  - Very appreciated by connoisseurs of Lean which allows to go beyond the fundamentals.
- *Toyota Spirit* by Taiichi Ohno
  - This book is no longer available for sale (originally published in 1990) but it marks the beginning of the dissemination of the practices and "philosophy" of Toyota Motor Company in France. It is written by Taiichi Ohno, one of the founders of the Lean movement.





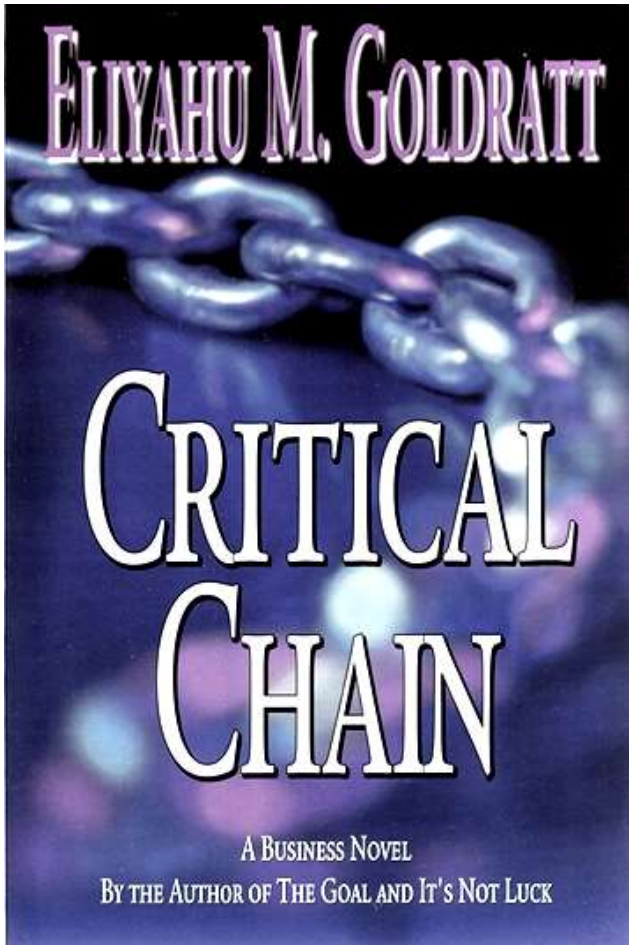




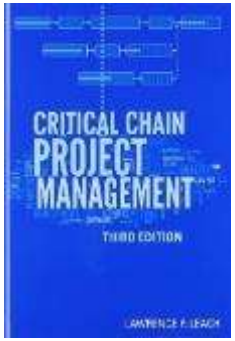
The book that launched Critical Chain Project Management by Eliyahu Goldratt

- This is the original and reference book written by Eliyahu Goldratt who "invented" CCPM

Warning: this book is incomplete since it only covers single project management. It does not deal with project portfolios.

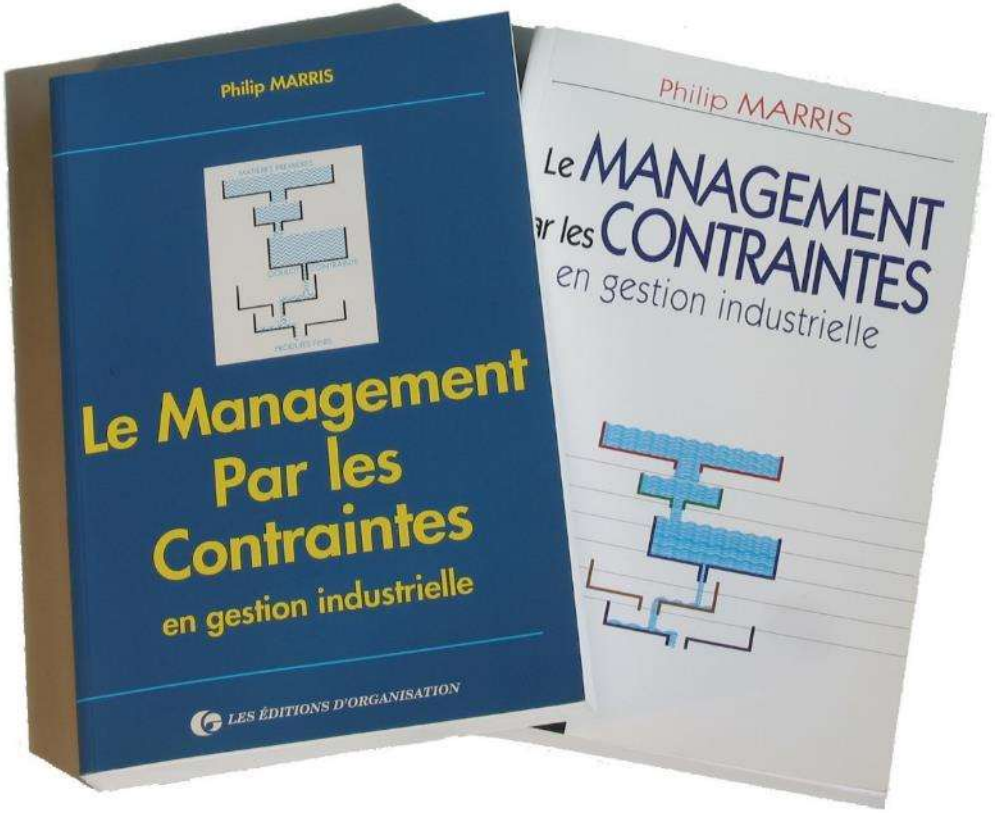


- Scenario
  - An MBA professor gives a project management course in which they "discover" the Critical Chain way. He uses the "Socratic" technique. By addressing a class comprised of many different project environments (building, New Product Development, Software, …) it conveys how generic the solution is.
- It is not Eli Goldratt's best book. For instance part of the book covers the problems of MBAs and higher education.
- Other books, more academic:



Book in French only about Theory Of Constraints in Production by Philip Marris

- *Le Management Par les Contraintes* by Philip Marris
- 1st edition in 1994, 1995, 1998, 2000
- Currently, the manuscript in French of the second edition is sold by Marris Consulting



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Over 300 videos on the Marris Consulting YouTube Channel

Useful web links
To get the latest news about Theory Of Constraints

- 5 permanent news website dedicated to Theory of Constraints (www.Scoopit.com)
  - Theory Of Constraints (French & English)
  - Critical Chain (French & English)
  - TLS: TOC + Lean + Six Sigma (English)
- >300 Videos (Marris Consulting YouTube Channel)
- Discussion groups (LinkedIn)
  - Critical Chain Project Management
  - Theory Of Constraints
  - TLS: TOC, Lean and Six Sigma
  - Logical Thinking Process
- Others:
  - Twitter, Facebook, etc…

Marris Consulting organizes more than 30 inter and intra-company training session per year

Logical Thinking Process

Lean Management

Critical Chain Project Management

Theory Of Constraints

Lean Engineering

Presentation of Marris Consulting

- Marris Consulting, founded in 2005, is a consulting company specializing in improving the operational performance of companies in the industrial world.
- The approach of Marris Consulting is based on the combination of Theory of Constraints (TOC), - and its various applications including Project Management by the Critical Chain -, and Lean and other Six Sigma type methodologies when it helps our customers' issues.
- Marris Consulting has a reputation for its ability to be pertinent in all kinds of industry. We have worked in over 250 companies helping in designing, making, selling and distributing:
  - cars, hamburgers, airplanes, perfume, trains, rockets, industrial equipment, pharmaceuticals, home delivery services, computer chips, chips (food), maintenance / repair / overhaul (MRO) of planes and trains, luxury handbags, corrugated cardboard production, the defense industry, Swiss watches, steel manufacturing, plastics, bank notes, satellites, gold mines
- We are committed, viscerally, to producing results.
  Results that are well beyond our clients' expectations.
  And results that last.
  Better still we incessantly seek to strengthen the process of on-going improvement; we want to see our ex-clients getting better and better many years after we intervened.

- Marris Consulting is based in Paris,
  but operates throughout France, Europe and around the world

How we do it

- We understand that the hardest part of what we do is to change "people". Apart from the pertinent ideas that we must have we must directly and indirectly change individual and collective behavior.
- We work simultaneously at all levels of the company from the front line to the board room.
- We are recognized experts in many different fields: "Lean" (manufacturing/engineering/management/…, the Theory Of Constraints, Six Sigma, Industry 4.0, DDMRP …
- One of our key strengths is that we analyze each of our new client's business & culture and then we mix up the right cocktail of solutions. We never impose a so called industry best practice.
- We like simple solutions. Simple is beautiful.

We are honored to have helped them….

Marris Consulting

Factories, People & Results

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