

Using Critical Chain to boost business jet Maintenance Repair & Overhaul (MRO)

Presented by: Fernando Bertrand – Philip Marris

Date: 16th July 2017



Activity of Embraer Executive Jets at Le Bourget (#1/2)

Phenom
100/300



Legacy
450/500
/600/650



Lineage
1000



Activity of Embraer Executive Jets at Le Bourget (#2/2)

- Maintenance support for Embraer Executive fleet for the Europe Middle-East Africa – EMEA – zone.
- Maintenance teams :
 - 2 shifts, 5 days/week,
 - A 40N/40OFF maintenance team dedicated to Line and AOG (Aircraft On Ground) to ensure a 24h/7 service.
- The Hangar is fully booked for the whole year.
- Customer Service is mandatory for Lines et AOG.



Difficulties in bringing visibility on check progress...

- Planning before and during the check is not efficient (notably for the Check-C* maintenance).
- Only 40 % of parts are delivered on time.
- Customers validation for additional work comes in late.
- Technicians don't know their daily priority.
- The visibility given to the teams about check progress is erroneous.
- Management of the hangar's "slots" is not robust nor reliable.
- The amount of Line maintenance and AOG impacts teams working in the hangar.

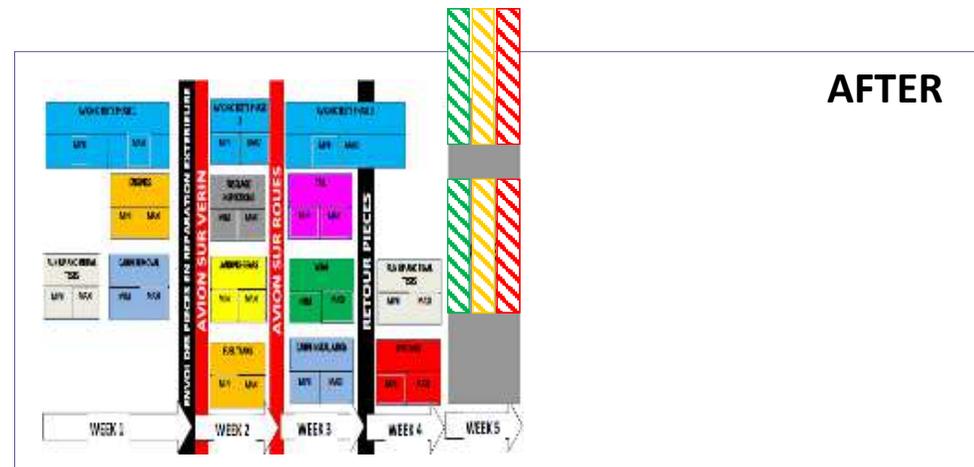
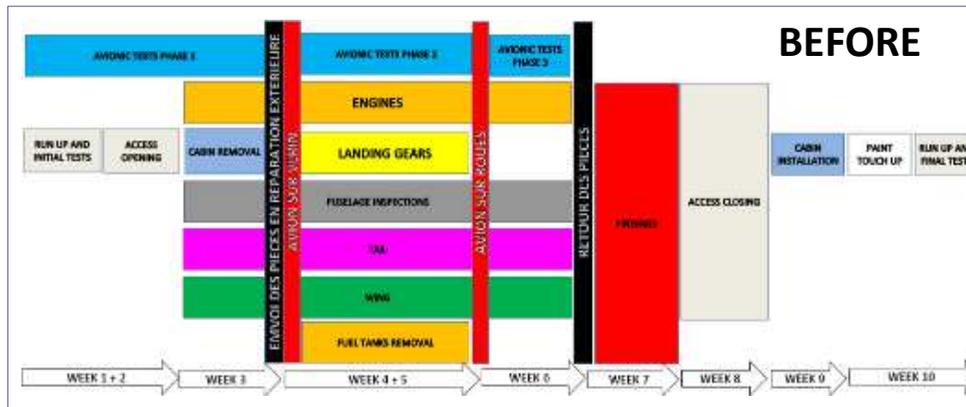
*Check-C = Major maintenance intervention after 8 years of use



The first step is to build a macro-schedule for a achieving a check in 5 weeks

- Construction of a macro-schedule with short-term objectives, example: Jacking – Day 5.
- Analysis of previous Check-C :
 - Priority is given to aircraft areas that generate the most "findings".
 - Supply of the most recurring parts.
- Definition of a mini/maxi number of resources per area.
- Training of all employees on Critical Chain.

Macro-schedule for achieving a check in 5 weeks



The macro-schedule is modeled with a more detailed schedule according to Critical Chain rules

- Schedule for the aircraft is created in MS-Project (with an add-on for Critical Chain) in line with the macro-schedule.
- Reduction of the number of work cards thanks to work "packages" (from 1,200 cards to 170 packages).
- Schedule adjustment with aggressive durations and a protection for the whole project through a final buffer.

(../..)



The macro-schedule is modeled with a more detailed schedule according to Critical Chain rules

- Establishment of a “findings buffer” to model the load due to the discovery of defects during the check.
- Ensure that the schedule respects the basic principles of Critical Chain.
- Analyze and optimize the Critical Chain to ensure a 5-week check.



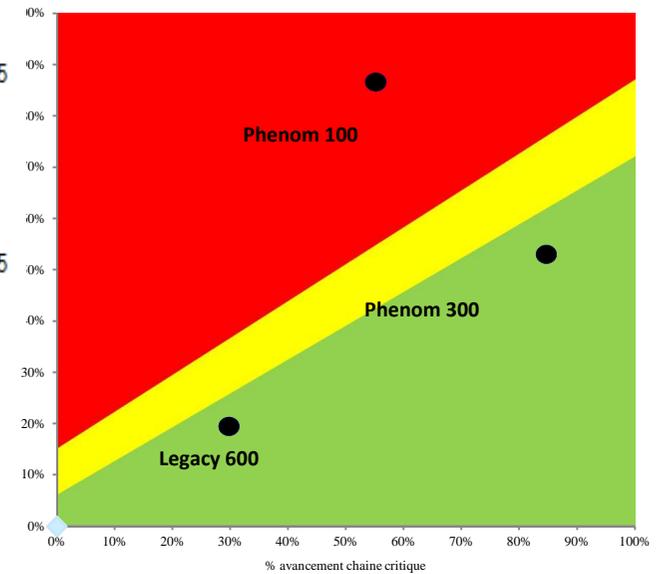
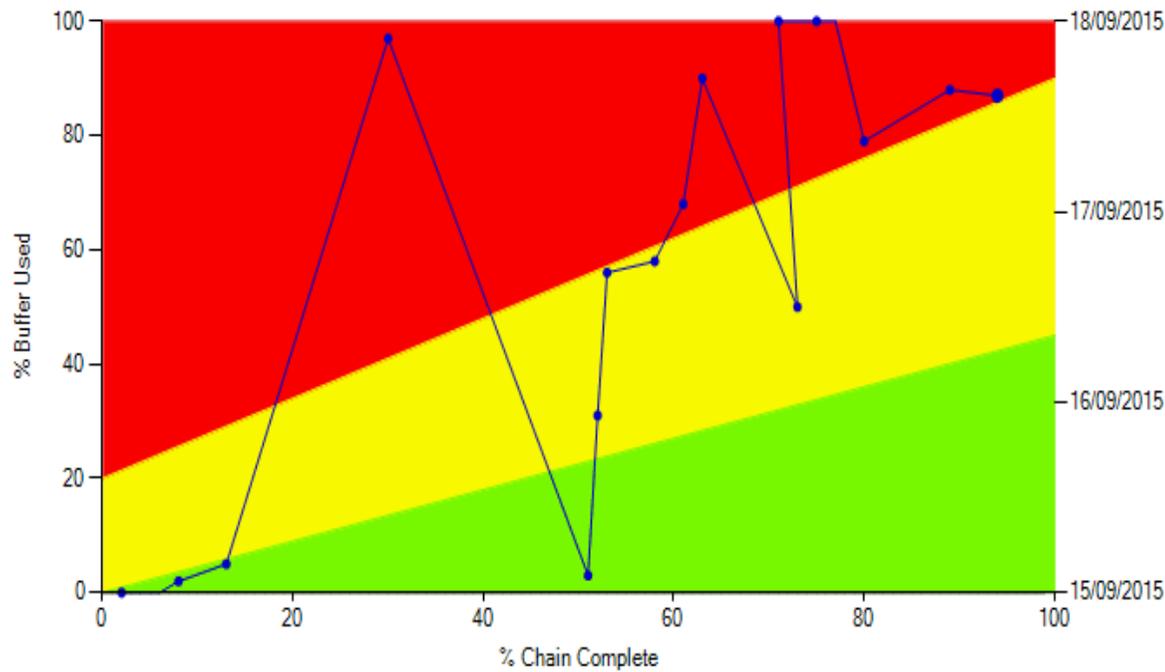
During project execution, new behaviors have been implemented

- At the end of each shift, the planner and the team leader prepare the work cards for the following team.
- Independently from their status, at the end of the shift, all the work cards are handed over to the team leader, so they can be rescheduled.
- In order to keep a low work-in-progress, the planner only give new work cards when he gets closed work cards.

(../..)



During project execution, new behaviors have been implemented



Deployment of Visual Management to facilitate the monitoring of daily activities

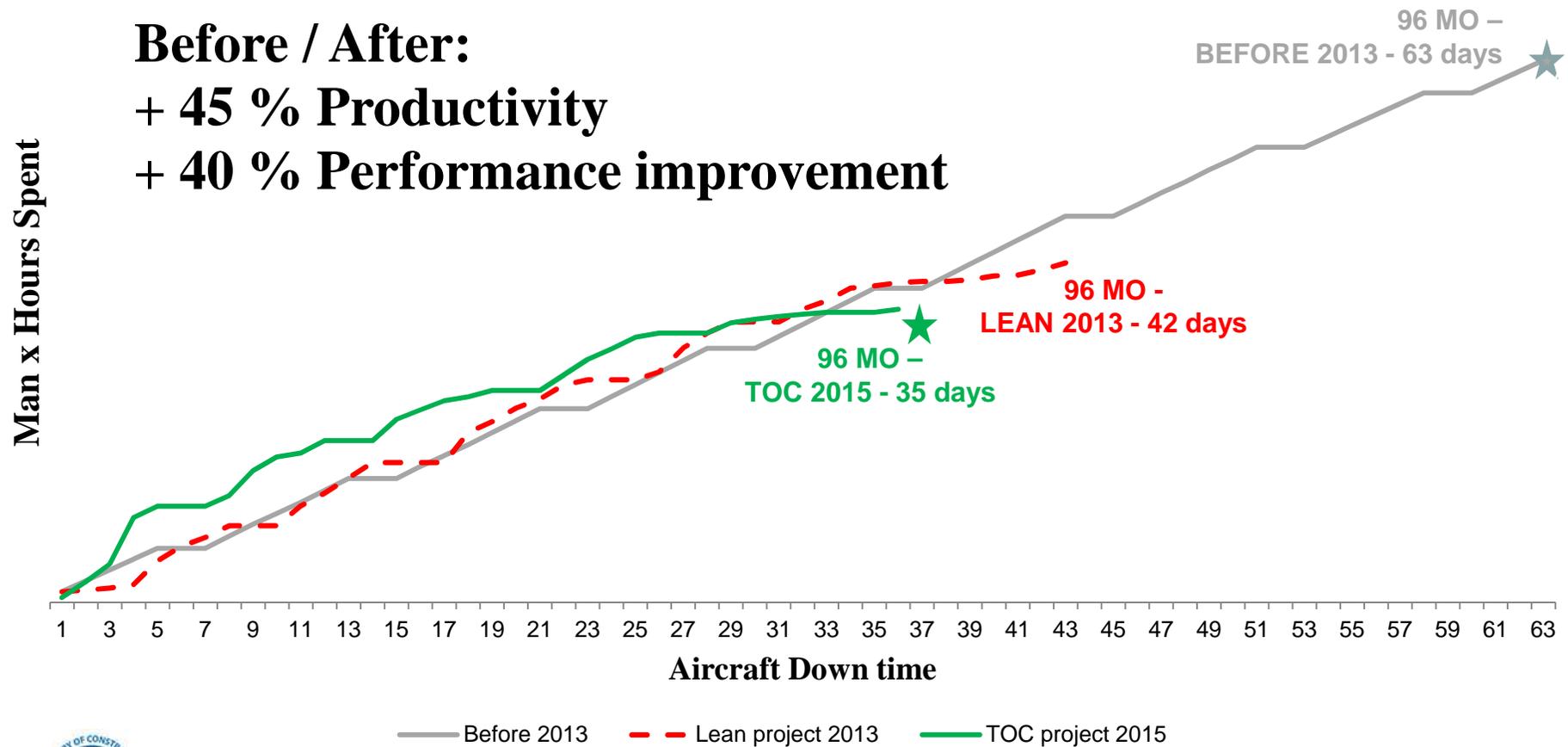
- Modification of the “control room” to optimize the monitoring of the check as well as the monitoring of couple of checks simultaneously.



Monitoring parts is more peaceful

- The impact of vagaries (parts delivery, internal or external intervention,...) is easily visible on the Fever Chart.
 - Indeed, Critical Chain allows simulation of the corrective actions effects on aircraft delivery date.
- Managers don't need to have details for all activities. Only aircrafts in the Fever Chart's Red Zone should be considered.
- During the check, the progress and remaining work is much clearer and shared with everyone.

Downtime has been reduced ...



...and some phenomena have disappeared

- Late deliveries
- Lack of visibility on aircraft release dates
- Important workload for planners
- Constantly changing priorities
- Forced multitasking
- Stress caused by work environment





Thank you for your valuable time

2017 TOCICO International Conference

Any questions?





Annexes



Marris Consulting's YouTube Channel (name: marrisconsulting)

2017 TOCICO International Conference



(En) Throughput Accounting Workshop by Schragenheim Oct...
63 vues • il y a 2 semaines



(En) TOC + Lean in Manufacturing - Vilnius ...
66 vues • il y a 3 semaines



(En) The 2 for 1 rule to reduce WIP
270 vues • il y a 4 semaines



(En + Fr) Marris Consulting YouTube Channel
45 vues • il y a 4 semaines



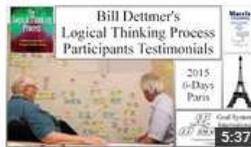
(En) TOC to boost aero production (3 min. preview of ...
37 vues • il y a 1 mois



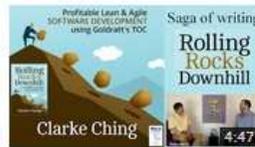
(En) TOC to boost aero production (30 sec. preview of ...
12 vues • il y a 1 mois



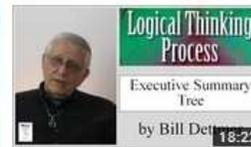
(En) Logical Thinking Process: 6-Day training in Paris
42 vues • il y a 1 mois



(En) Logical Thinking Process Course 2015 Participants ...
57 vues • il y a 1 mois



(En) Clarke Ching "Rolling Rocks Downhill" book writing saga
39 vues • il y a 3 mois



(En) Executive Summary Tree (TOC / LTP) by Bill Dettmer
227 vues • il y a 3 mois



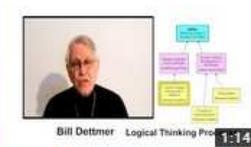
(En) TOC 5 Focusing Steps Revisited - Clarke Ching ...
204 vues • il y a 3 mois



(En) Bill Dettmer introduction to Dec. 2014 Paris video session:
54 vues • il y a 5 mois



(En) Logical Thinking Process training course June 2015 by ...
106 vues • il y a 5 mois



(En) Bill Dettmer about Logical Thinking Process and change ...
76 vues • il y a 5 mois



(Fr) Management de projets Chaîne Critique par Eric Robin ...
337 vues • il y a 5 mois



(En) Bill Dettmer: "He Said, She Said" book review
55 vues • il y a 5 mois



(Fr) Schéma des cuves et 3 types de contraintes
447 vues • il y a 6 mois



(En) Theory of... Thinking Processes and Policy ...
239 vues • il y a 6 mois



(Fr) Formation Théorie des Contraintes + Lean
208 vues • il y a 6 mois



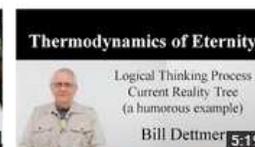
(Fr) Problèmes du management de projets par Eric Robin
665 vues • il y a 7 mois



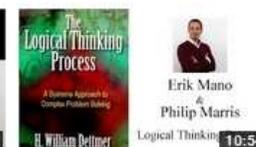
(Fr) Management Par les Contraintes, TOC Lean et TLS
665 vues • il y a 7 mois



(En) Throughput Based Decision Making by Eli ...
845 vues • il y a 7 mois



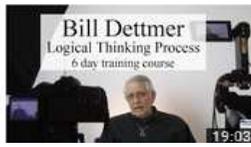
(En) Dettmer - Thermodynamics of Eternity - Thinking Process ...
313 vues • il y a 8 mois



(En) Erik Mano - Logical Thinking Process
304 vues • il y a 8 mois



Coming soon on your screens
0:33



Bill Dettmer Logical Thinking Process 6 day training course
19:03



Bill Dettmer New videos coming soon!
0:56



Logiciels Chaîne Critique
Eric Robin
5:57



Le Management de Projets par la Chaîne Critique
le cnam Pays de la Loire
52:19



Le Management de Projets par la Chaîne Critique
le cnam Pays de la Loire
Questions & Réponses
17:03



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

2017 TOCICO International Conference

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

Business

Paste a link to create a new scoop: >>>

Scoop without link | Upload your own document | Get suggestions

Scopied by Philip Marris

Decision support TOC (Through day training Schragenhe

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

From www.scoop.int - August 1, 2013 9:30 PM

Kelvyn Youngman has done the organizational world an invaluable - no, indispensable - service with the use of this. This is the first comprehensive, truly systematic 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.

By [Eli Schrag](#)
Supporting P...

Goldratt Books sur Twitter

From twitter.com - June 27, 9:03 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: northriverpress.com

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

Message | 292 Views | Find | Share | Suggestions 10

Rescopied 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

- 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 Maizon

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.
Curated by Philip Marris

Manage | 240 Views | Filter | Share | Suggestions 10

Scopied 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 | Like | Retweet | Share

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 EyeKevinnized

Write a comment...

Scopied by Philip Marris

Kudos to the quality aurus -



Philip Marris : Biography

2017 TOCICO International Conference

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.

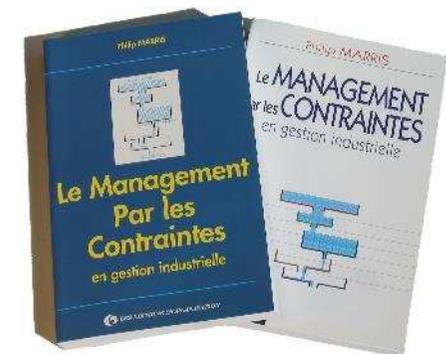
He has designed, sold and executed over 150 transformation projects.

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 32 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.



Marris Consulting : Paris, France

2017 TOCICO International Conference

- Marris Consulting has conducted over 150 engagements over the past 10 years, transforming industrial enterprises in France and around the world.
- The firm is recognized as an expert in TOC & Lean Manufacturing.
- 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



Marris Consulting

Over 150 assignments in over 10 years

2017 TOCICO International Conference





Marris Consulting : Paris, France

2017 TOCICO International Conference



Factories, People & Results

Tour Maine Montparnasse

27ème étage

33, avenue du Maine

Paris 75755 Cedex 15

France

Tel. +33 (0) 1 71 19 90 40

www.marris-consulting.com

**Marris
Consulting**

