Construction Management transformed by Critical Chain Project Management

A case of implementation at Método Engenharia
Key Points and Achievements of the CCPM implementation at Método Engenharia:

• Nine construction contracts of Triple A enterprises for private companies managed with CCPM during the implementation and four more projects managed with CCPM after the implementation until now.

• Projects involving more than 800 Million Dollars, managed with CCPM until now.

• 16 months of implementation from 2012 to 2014.

• A higher level of Método Engenharia customer’s satisfaction about time, scope and cost.

• A cultural changing that permits Método Engenharia to apply the CCPM by themselves in their projects after implementation.
Agenda

1. Constructions on the pipeline which were tackled during the implementation
2. Changes needed and future state intended
3. Transformation accomplished
4. Lessons learned
1. Constructions on the pipeline which were tackled during the implementation

Construction Management transformed by the Critical Chain Project Management
A strategically situated hotel, between Barra da Tijuca beach and the Marapendi lagoon with 436 rooms distributed in 6 type floors, a ground floor with three restaurants, leisure area, two big convention centers, mezzanine with nine meeting rooms, a business center, SPA and fitness center on the 1st basement totals 84,200m² built area. It is in the process of LEED certification. Concept architecture project: ARCADIA (Spanish office). Executive project: Arq & Urb. Architecture internal design project: Yabu Pushelberg, Patricia Anastassiadis e Studio Arthur Casas.
The hospital complex expansion contemplates the construction of three new buildings: Blocks E, F, G and their interconnections, including interconnections with the existing blocks. It has 72,100 m² total built area. The project is in the process of LEED certification Gold. The construction, executed with the hospital in operation, has the challenge to respect the limitations imposed by the customer and by the legislation in force in São Paulo, as well as respect the complexity of the installation systems, and the high standard finishing. Architecture project: L+M Gets.
The biggest multi-use venture constructed in the Northern region features 11 anchor stores, 255 satellite stores, five mega-stores and 2800 parking spots, totalizing 105,000m² built area. It conquered AQUA sustainable certification. Architecture project: Paulo Baruki.
The mall and commercial tower are located on Paulista Avenue, a landmark of the city of São Paulo. It is composed of seven basements, ground floor, five shopping floors, with respective mezzanines, office tower from the 7th to the 20th floor, heliport, and a 21-meter-high lobby, totalizing 124,511m² built area. It is in the process for LEED certification Gold. Architecture project: Aflalo & Gasperini.
2. Changes needed and intended future state

Construction Management transformed by the Critical Chain Project Management
What to change?

What needed to be changed?

In customer satisfaction
• Hard to evaluate the impact of changes in terms of time, scope and cost

In planning
• Low level of involvement of the task managers in the planning phase
• Short time dedicated to planning
• A deterministic planning that quickly lost the usability, because of the common project variations

What was the intended future state?

• Achieving higher level of customer satisfaction in time, scope and cost
• Greater integration between planners, task managers and project manager during the planning
• Enough time dedicated to planning and replanning when necessary
• Lean plan with buffers that absorbs the common project variations
What to change? Cont.

What needed to be changed?

In execution
• Priorities defined by the managers’ intuition, with ineffective schedule management
• Excessive multitasking throughout the execution
• Status about time measured by the S curve without the information about what is impacting more
• Less involvement of the Project Managers in updates and management meetings

In culture
• Effective changes in management culture

What was the intended future state?

• Identification of the real status of the tasks in terms of buffer impact, setting priorities and anticipation of possible problems
• Less multitasking throughout the execution
• Qualified Information about project status by the fever chart and the impact of all tasks in buffers
• High involvement of the Project Managers in updates and management meetings

And still...
• Generation of scenarios for decision-making.
• Alerts to set up triggers for decision making, before it is too late
• Metodo’s staff, working with the roles of CCPM, and doing the new way, in new projects, by themselves
3. Transformation accomplished

Construction Management transformed by the Critical Chain Project Management
How was the transformation accomplished?

1. Processes design
2. Training
   a. Introduction to staff
   b. Workshop
3. Planning and schedules
   a. War room
   b. Team involvement
   c. Task Managers role
   d. Lean planning
   e. Project buffer
4. Execution management
   a. Update schedules weekly
   b. Identify priorities
   c. Revise and reinforce CCPM concepts
   d. Re-plan the execution – three week plan
5. Improve the processes after implementation
6. A change in the culture
   a. Weekly reports to the board
   b. Staff familiar with CCPM
   c. Short, medium and long term planning
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LEAN PLANNING

SEQUENCE – Limited WIP

Task list

Buffer Status

Priority 1
Priority 2
Priority 3

EXECUTION MANAGEMENT
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How was the transformation accomplished?

- **Field data**
  - C1
  - C2
  - C3
  - Cn
  - ... Sub-contractors

- **Main control**
  - Remaining time?

- **Planning**
  - Update schedule

- **Analysis / Decision making**
  - ON-LINE

- **Task manager**
  - Directions to production

- **Managers**
  - Priorities
    - ON-LINE
    - 1
    - 2
    - 3

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How was the transformation accomplished?

PROJECT

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LOCAL : Aumento de estaca raiz na área externa
Sequencia executiva da área externa
Estrutura metálica das escadas 5, 6 e 7

DEVIATION ANALYSIS

Aumento de estaca raiz na área externa
Sequencia executiva da área externa

ENTREGA SUBSTANCIAL (30/05/15)
How was the transformation accomplished?

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How was the transformation accomplished?

### Farol do PCP

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How was the transformation accomplished?

- Long Term Planning
- Medium Term Planning
- Short Term Planning

EVA + CCPM

Management Schedule

Production Schedule

Weekly Schedule
4. Lessons learned

Construction Management transformed by the Critical Chain Project Management
What were the lessons learned?

• Level of scheduling detail based on the short, medium and long term
  – Progressive waves planning
  – Lean Constructions

• Level of resource detail in the medium term scheduling are based on the quantity of teams
  – (All executing teams are from subcontractors with delivery driven contracts)

• Evaluate adherence of each construction project, to the CCPM rules, in a quantitative way and make a comparison with the results of project status, supporting the change management
Questions?
About Presenters

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Resume:
Civil Engineer from São Paulo University and Businesses Administrator from Getulio Vargas Foundation, PMP certified. Manager of PMO – Project Management Office – responsible for all Planning and Control professionals and methodologies, and responsible for the CCPM implementation at the Metodo construction projects.

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MBA Project Management from Fundação Instituto de Administração, Production Engineering from Universidade Paulista, Certified PMP with ten years of experience in Project Management in the areas of construction, industrial maintenance, consultancy, business management and IT. Currently a Partner and Project Management Consultant at Goldratt Associates Brasil where has applied tools of TOC - Theory of Constraints including the CCPM - Critical Chain Project Management.