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Moving from a Project to an organizational adoption of Critical Chain Project Management

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Abstract

In the spring of 2013, a strategy was developed with the intent of getting my company's division to adopt Critical Chain Project Management (CCPM) as a way to create a long-term competitive advantage for the site. As part of this strategy, in the summer and fall of 2013, a single pilot project was conducted to identify the changes necessary to successfully execute CCPM in this work environment. While the pilot was successful in identifying the conditions necessary to execute CCPM, afterwards concerns surfaced about whether a piloting approach was a sustainable method for attaining widespread adoption of CCPM at the site or if it could, unintentionally, preclude it. As a result, a series of interviews were conducted with professionals in the Theory of Constraints (TOC) community to gain insight regarding these concerns and to identify proven implementation strategies as well as the education and training sufficient for obtaining organizational adoption of CCPM. This paper synergizes the information obtained from those interviews to identify the strategic, tactical, and execution actions necessary and sufficient to achieve organizational level adoption of CCPM.

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Keywords: Theory of constraints, project management, critical chain, CCPM

1. Introduction

Despite the successful completion of my division's first single Critical Chain pilot project in December 2013, a critical review of the piloting approach as a method for gaining adoption of CCPM at the organizational level revealed some disturbing negative side effects. While it is expected that every pilot project will have some issues/concerns

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stemming from its execution, concerns raised after completion of the pilot called into question whether a "Piloting Implementation Strategy" was sustainable in this environment over the long haul and whether continuing to model this approach could ultimately jeopardize organizational adoption of CCPM at the site. To validate these concerns and determine the proper strategy for gaining organizational level adoption of CCPM, a series of interviews with professionals in the Theory of Constraints (TOC) community were conducted between January 18 and March 10, 2014. These interviews addressed the problems that surfaced as a result of evaluating the "Piloting Implementation Strategy", and identified strategic, tactical, and execution level strategies that have proven effective within both my company and private industry for gaining wide spread acceptance and adoption of CCPM.

2. Literature Review And Hypotheses

2.1. Conflict Cloud, Current Reality Tree and Undesirable Effects

The main difference between traditional project management techniques such as Critical Path Method (CPM) and Critical Chain Project Management, is managing the core project problem, variability. While CPM makes no attempt to deal with variability, the tools used to plan and execute CCPM are specifically designed to manage it. Traditional project management tools, such as CPM, are not capable of managing the variation that is inherent in all projects. There are three basic flaws, or assumptions, built into CPM project planning which makes changes necessary while precluding its ability to manage the associated task schedule variation:

- Task duration estimates are treated as deterministic once they are put in the schedule
- Task duration estimates have an unknown "pad" built into them
- Resource contention exists, thereby forcing resources to multi-task, which has the effect of expanding task durations and jeopardizing product quality

Successful projects satisfy three key objectives:

1) Completing the project within cost,
2) Meeting the product requirements, and
3) Completing on time.

Each of these three is a commitment, yet, due to the inability of project management tools to accommodate variation, project managers are often forced to compromise their original project commitment and accept that they will only be able to achieve two of the three original project objectives. Figure 2-1 is an Evaporating Cloud (EC), which represents the Project Management Core Conflict. This figure shows the inherent conflict associated with planning and executing projects using traditional project management practices and tools. Specifically, this EC describes the conflicting choices that projects executed using traditional methods have because they are insufficient for managing common variations, which are inherent in all projects.

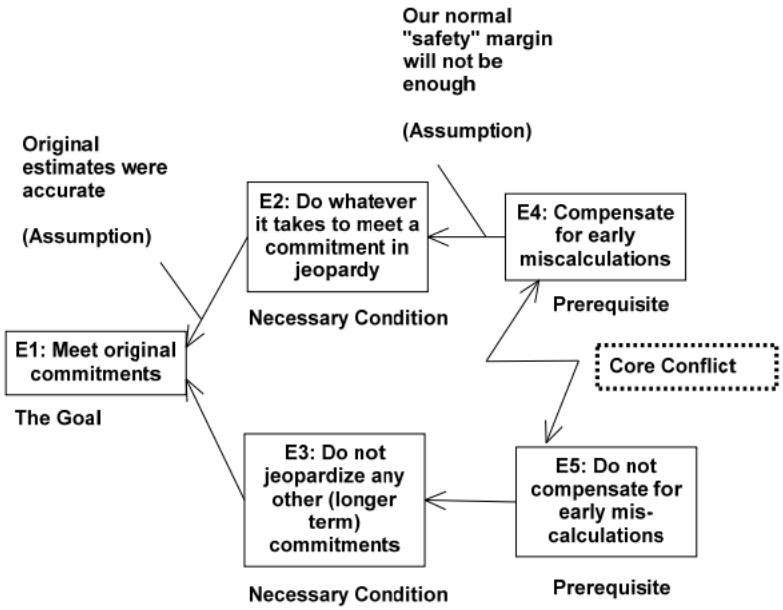

Fig. 2-1, Project Management Core Conflict Cloud.

The PM Core Conflict Cloud shown in Figure 2-1 leads to a number of undesirable effects (UDEs), which are then reflected in the environment as shown by the Current Reality Tree (Figures 2-2 through 2-4). Table 2-1, below, lists some of the most crippling UDE's created by this conflict and their primary cause:

Table 2-1, CRT Undesirable Effects and Primary Cause

Undesirable Effects	Primary Cause
Availability of resources is impossible to judge Sometimes workers are over-committed and must work "equal priority" tasks concurrently (multi-tasking) Workers give worse case estimates	Rewards/Measurements - Employees are measured on how busy they are, and whether they meet their "commitment" dates.

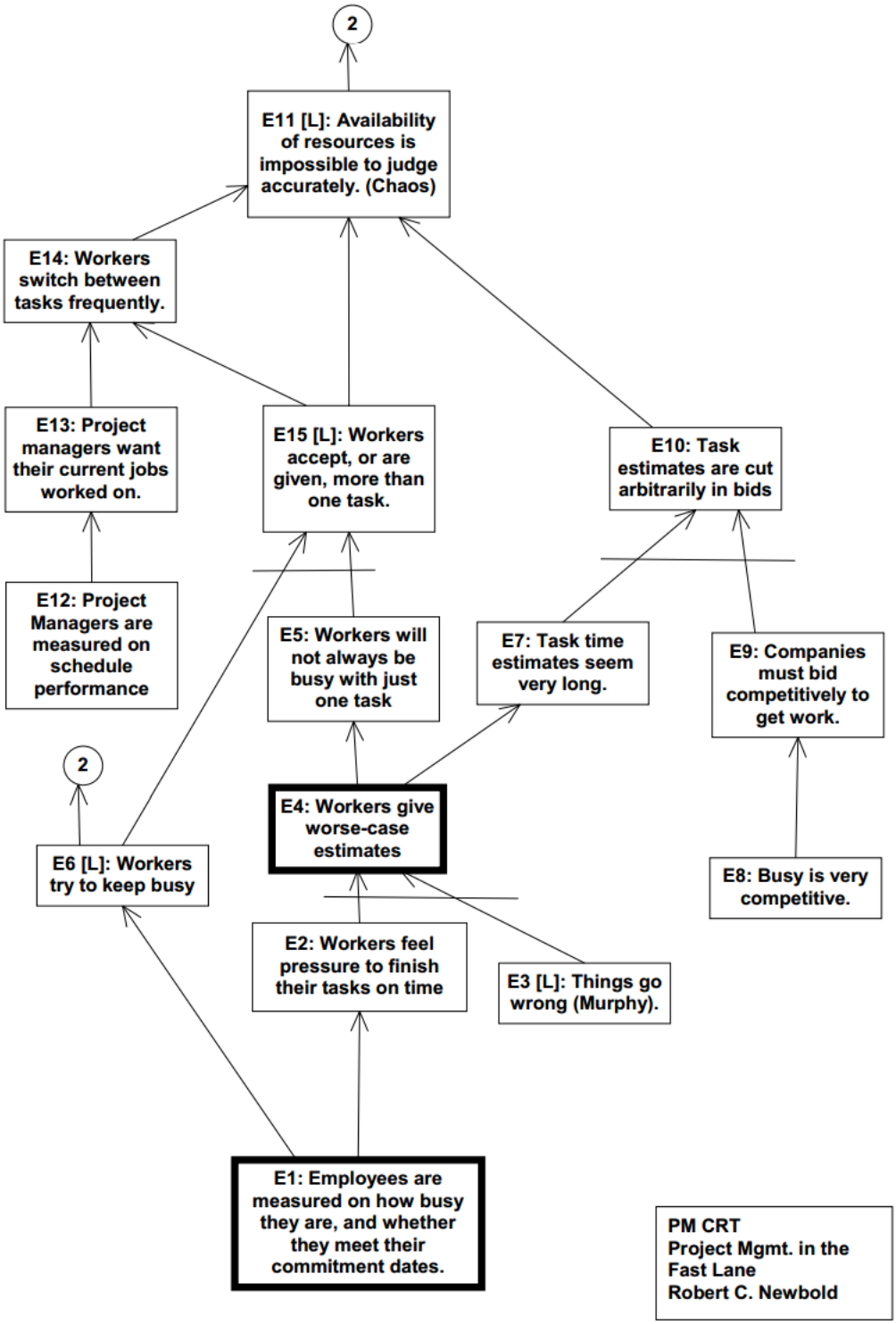

Fig. 2-2, Projects Current Reality Tree.

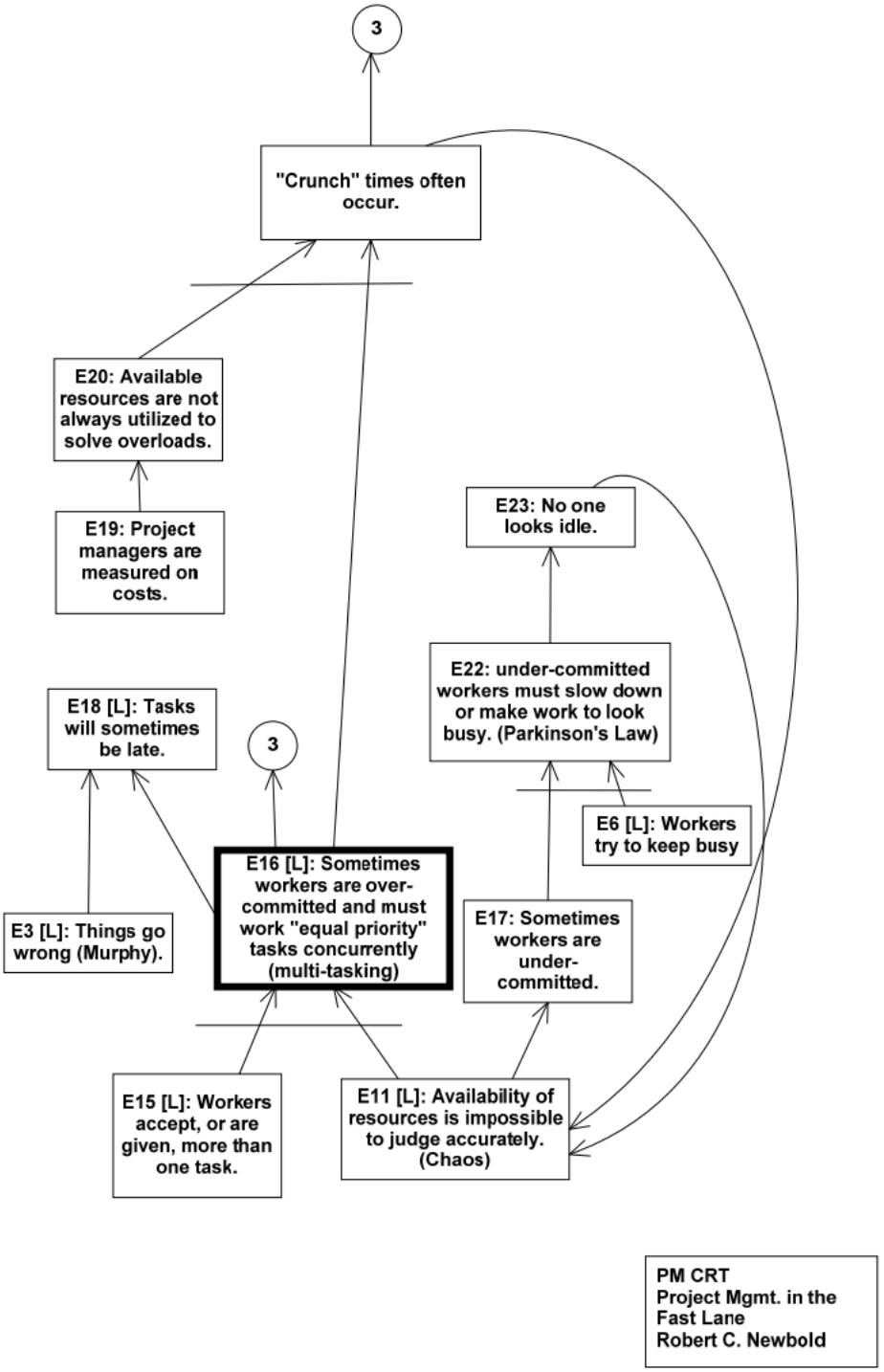

Fig. 2-3, Projects Current Reality Tree.

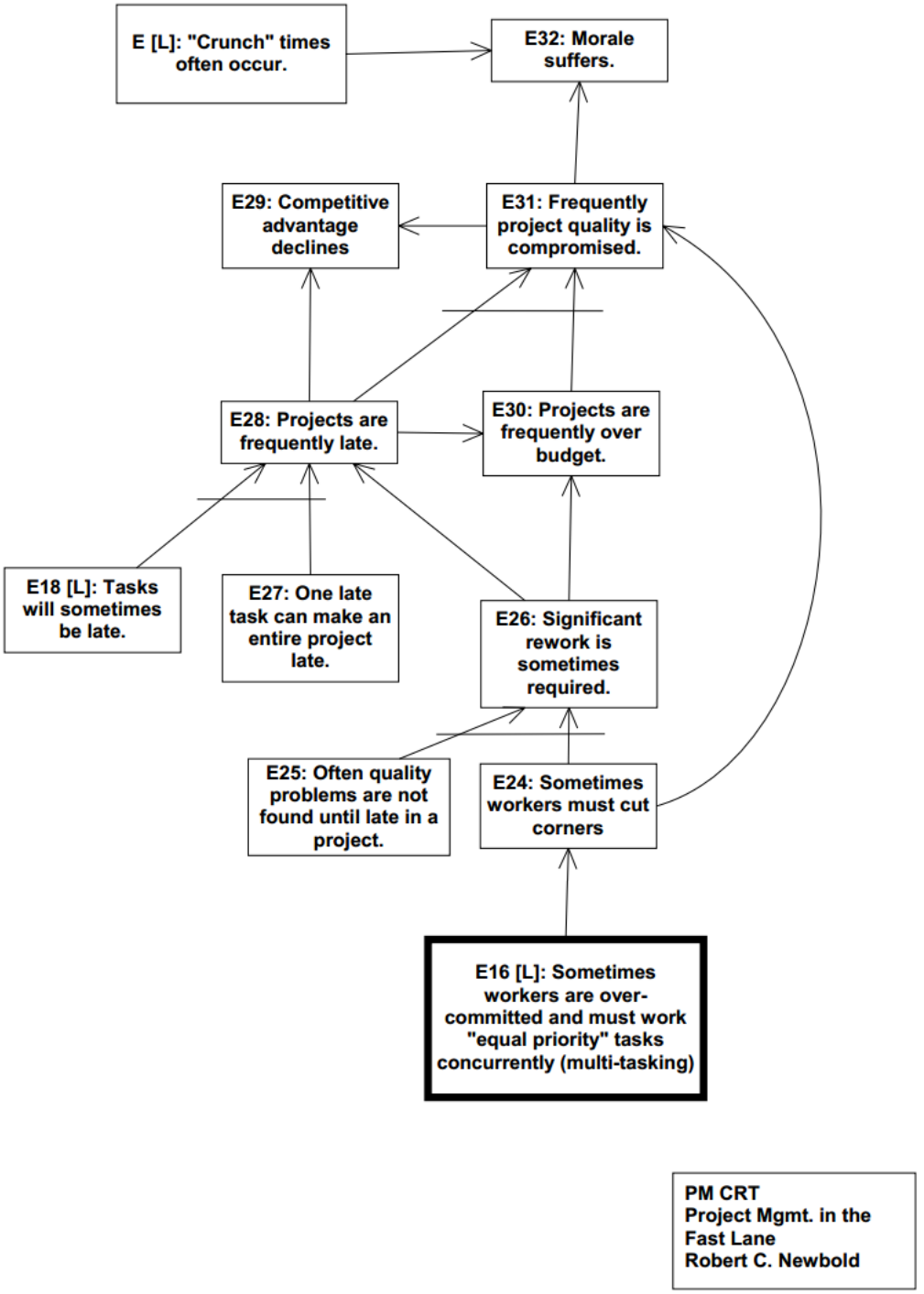

Fig. 2-4, Projects Current Reality Tree.

2.2. Activities to Facilitate an Understanding of CMP Project Undesirable Effects (UDEs)

One of the most effective forms of education involves the use of hands on activities. Appendices B-E to this report include four activities which are intended to educate others on some inherent flaws/characteristics that surface as a result of using traditional project management practices which are mitigated by CCPM. Table 2-2, below, lists the undesirable effects caused by traditional project management practices and the specific activity used to demonstrate its impact on a project.

Table 2-2, Activities and UDE's addressed

Activity	UDE from Traditional PM Practices
Aggregate Dice Game	Padding estimates
Nickel Game	Local vs. global estimates
Numbers, Letters and Shapes	Mental Multi-tasking
The Bead Game	Multi-tasking and worker overload

3. Methodology

3.1. CCPM Implementation Strategies

Designing the implementation strategy for an organization is perhaps the most creative part of adopting CCPM. A number of factors, the most influential one being the environment in which CCPM will operate, drives the implementation strategy. The implementation strategy should be designed to ensure that CCPM planning and execution processes may be achieved within its environment. By doing so, CCPM should be able to achieve its primary goal of finishing projects as soon as possible while simultaneously meeting the customer's quality requirements and staying within their cost constraints. Table 3-1 describes several example CCPM implementation strategies and describes the environment that influenced its design.

Table 3-1, Implementation Strategy Examples

Implementation Strategy	Environmental Limitations / Situation
Prototype + Rolling Project Adoption	Senior leadership actively supported adoption of CCPM, conducted a feasibility study and uncovered the potential risks to the organization. Prototype projects were used to verify that the risk mitigation strategies were effective. Once the prototypes were completed and the risks mitigated, the organization began educating and training the workforce. It began using CCPM for every new project that came into the organization until all of its projects were being managed using CCPM.
Piloting Approach	Support was not attained at the highest levels within the organization and was, therefore, limited to a piloting implementation approach. In this situation, the pilot team members vary from pilot to pilot. Once the pilots are completed, team members return to an environment that does not support CCPM. This leads to a slow and painful CCPM adoption process and one that is heavily influenced by the leadership at lower levels within the organization. The piloting approach continuously has CCPM in jeopardy of being dismissed by the organization. (If the organization's management insists on doing pilots, it is best to obtain up front specific requirements, the pilots must satisfy for the organization to adopt CCPM on a much broader scale.)
Project Resource Segregation	This strategy is used in environments characterized as having both "steady" and "surge" work components. In this situation, resources are segregated into those that will handle the steady, routine projects and those that will handle special cases, or surges. In this way, those working on steady projects will not be interrupted and will, therefore, be able to achieve the full benefits of CCPM. During those times when there are fewer "surges" in the system, these resources work lower priority projects that do not have a precisely defined due date.
Focus on FAST!	This implementation strategy is best used in an environment characterized by a steady stream of small to medium sized projects. With this approach, senior managers are challenged to go as fast as possible and commit to completing a continually increasing number of projects each year using CCPM. For

	example, if a team completed eight CCPM projects last year, they may be challenged to commit to completing twelve this year. The focus with this strategy is on executing the projects as fast as possible.

The information contained in the table above represents real implementation strategies that were mentioned by the TOC professionals interviewed for this report. Be aware that this list is by no means exhaustive, as most organizations using CCPM have a customized implementation plan ideally suited to work as effectively as possible within their unique environment.

3.2. Risk Identification and Mitigation

The environment often imposes risks, which would prevent the successful planning and/or execution of CCPM. Identifying potential risks that exist in the environment will have a direct effect on the design of the organization's CCPM implementation strategy. The mitigations put in place to address these risks can be reflected in the organization's Generic Execution Run Rules and an individual project's Unique Execution Run Rules.

Table 3-2, below, provides an example of project Unique Execution Run Rules along with the risk it is intended to mitigate.

Table 3-2, Unique Execution Run Rules Example

Risk	Unique Execution Run Rules
Unable to mitigate a problem for tasks whose duration is extremely short and could be completed before the next meeting	Employees working on tasks whose duration is shorter than 10 business days in duration, must provide the Project Engineer with a daily status (email, voicemail, etc.) including the following information: – Work activities remaining to satisfy the closure criteria – Estimated duration expected to finish this work – What could hold you up?
Being unaware of work restrictions could delay project completion	Thermal team members will work 4 hours straight each day M-F, without interruption when their project tasks are in work.
Prevent Interruptions and multi-tasking	To minimize the potential for interruptions all team members agree to do the following: • Not answer their office phone • Establish a backup to handle their regular work responsibilities during those periods when working on the CCPM project • Put a notification in their email referring others to their backup • Post a note outside their office requesting they not be disturbed

Table 3-2 provides an example of Generic Execution Run Rules that were compiled from my experience and from conversations with various TOC professionals.

3.3. Education and Training

Once management support has been established, the operational environment identified, and the specific implementation strategy defined, attention can then focus on educating and training the workforce to plan and execute CCPM. Interviews within my company revealed that it was best to separate the type and level of CCPM exposure into two categories: education and training. In this context, education refers to providing the team with an in depth understanding of the philosophy and behavior aspects of CCPM execution, whereas, training consists more of the "how to", desk level instruction type information. Specifically, the depth and breadth of the education and training should vary depending upon the specific role and responsibility of the CCPM team member. While the Project Engineer and the Program and Functional Managers should be exposed to a deeper level of understanding of the philosophy behind CCPM, the team members charged with the daily execution of CCPM should have much more focus on specific execution activities and less on philosophy.

However, regardless of the depth of education and training provided, the first step is to, once again, be sure that the audience can identify their reason for wanting to implement CCPM. Similar to getting buy-in from senior

management, the TOC experts all agreed that until an individual's reason for wanting to execute CCPM is clearly understood, time will be wasted trying to "convince" and "sell" the person on the merits of this project management process. Even when support is obtained from senior management, CCPM adoption cannot be dictated. The workforce based on the benefits they expect to derive from its implementation must accept CCPM. Table 2-3 below lists the most common benefits sited from various individuals and functions in the organization from executing CCPM.

Table 3-3, Benefits Attributed To CCPM by Various Functions

Function	Benefits Attributed To CCPM By Various Functions
Employees	• Increased job satisfaction – self managed teams (no micro-management); able to see contribution to the whole • Simplified reporting, focusing forward • Increased productivity with less stress (no multi-tasking)
Program Management / Project Engineer	• More control to execute project • Focus is on achieving a future state as opposed to reporting on the past. • Buffer Management Reports are a leading measure, supporting early identification of impending problems in time for effective corrective action to take effect • Easier to identify impending problems and mitigate them • Requires less time to manage • More responsibility for project execution and team management
Functional Management	• More available capacity with existing team members (25-50% more!) • More control over resources and team management – facilitates sharing resources across programs • Supports development and execution of a resource prioritization scheme • Ensures the most effective use of the manager's most constrained resources • Fewer fire drills and better tools to manage them (surge capability) • Optimal use of resources – no justification required since employees are always working on the agreed to highest priority projects and tasks
Senior Management	• Provides positive, bottom-line results (typically 25-50% reduction in resources) • Ensures that their resources are being optimally used to support the goals of the organization • Enhances management's ability to quickly identify project status and know where to provide help • Requires less effort to manage than typical project schedules • Finishing projects faster provides an opportunity to increase business volume and profitability • Because it requires a cultural change, CCPM provides barrier to entry and therefore the potential to obtain a long term competitive advantage

The training methods used, and their timing, are also important aspects to consider in educating the workforce on CCPM. As mentioned, the TOC experts I interviewed believe that the most powerful method for training others involves a process whereby a person discovers for themselves the lesson that needs to be understood. Therefore, facilitation sessions involving hands on activities designed to teach a specific aspect of CCPM are an ideal education method. Appendices B-E provide four different hands-on educational simulations designed to show the flaws of traditional project management practices which are overcome by CCPM. In terms of timing, it is important not to overwhelm individuals just learning about CCPM with too much information. For that reason, the TOC experts determined that it is better to give "just-in-time" training to members of the team as they express a need, as more than likely they are then in a better position to use it.

4. Conclusion

There are significant differences between obtaining approval to use Critical Chain Project Management for executing individual projects versus adopting it to achieve organizational resource alignment. In the first case, the organizational benefits achieved are significantly less and shorter lived compared to the synergistic environment created when CCPM is adopted across the enterprise and total organizational resource alignment is achieved.

When CCPM has active support from the highest levels of management within an organization, it possesses the greatest potential for success and reaping the full spectrum of benefits this method offers. In this situation, upper management provides an environment that supports CCPM and its execution, thereby freeing lower level managers and employees from the conflicts associated with not having a clear set of agreed to priorities. While CCPM implementation in this environment may initially require the establishment of Execution Run Rules for executing its projects, over time as the environment of the entire organization changes and embraces CCPM and its principles, it is anticipated they will become less of a necessity.

In those situations where CCPM is not supported by the highest levels of management, the general work environment will continually challenge those in the organization who are attempting to implement CCPM, encouraging them to fall back into the old way of managing the resources of the organization. This situation requires proponents of CCPM to develop implementation strategies that include Execution Run Rules for managing their resources in an attempt to prevent bad multi-tasking and other behaviors, which challenge sustained CCPM execution. This method's success will be limited to the extent that its advocates are able to sustain an environment conducive to CCPM execution. Until CCPM achieves sufficient active upper management support to change the culture of the organization, its survival will continually be in jeopardy and heavily dependent upon the supporting leadership in the organization.

Another necessary condition for successful adoption of CCPM is the willingness of all of its stakeholders. Individuals within the organization must be exposed to CCPM in a way that enables them to discover for themselves the benefits CCPM can provide for them and their organization. Some of the most effective education methods include storytelling, asking questions important to the particular stakeholder, and conducting hands on activities designed to teach some aspect of the CCPM processes.

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