How Critical Chain Enhances Critical Path

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Critical Chain assumes a good critical path network that has been effectively resource leveled. Starting from that point, Critical Chain enhances the ability to optimize the schedule and set the stage for improved project monitoring and control.

Many people look at Critical Chain only from a mechanical point of view. To be successful in implementing Critical Chain, there is a major cultural change required, with full support and understanding from the top management team. These requirements are more fully explained in two books by Gerald Kendall, *Advanced Project Portfolio Management and the PMO, J. Ross Publishing, 2003* and *Viable Vision, North River Press*, to be published in late Spring 2004.

Following are specific ways that the Critical Chain Approach works and adds value.

1. Using the Critical Chain approach, team members are asked to dedicate themselves to a project task, to complete it as quickly as possible and to periodically (typically weekly) report how many days are remaining. Task due dates are not given nor monitored. When planning a project, task times are estimated much closer to how long the task will take with dedicated resources, rather than elapsed times assuming the organization's current practice of assigning resources to work on several tasks at once. This also significantly reduces behaviors called "student syndrome" and "Parkinson's Law", described in Eli Goldratt's book entitled *Critical Chain*, published by North River Press.
2. Bad multitasking (multitasking that extends the duration of a collection of projects without compensating benefit) is significantly reduced, permanently. The reduction of bad multitasking goes hand in hand with reducing task estimates to dedicated elapsed times and having people complete tasks before starting new ones, as much as possible.
3. In executing a project, people are not measured and are not held accountable for completing their tasks on time. Managing tasks by due dates is not done. People are asked to pass on their outputs to the next resource as quickly as possible. Use of intermediate due dates is limited. This is called the "relay runner work ethic."
4. By taking resource dependency, as well as logical task dependency into account, the longest sequence of dependent tasks can be seen more clearly. This longest sequence, the Critical Chain, may *cross* logical paths in the network.
5. Buffers are a key part of the schedule and how it is managed. The ability to increase the certainty of project completion dates is closely related to the use of buffers and trends during execution. The use of buffers, strategically placed in the plan, allows the planner to clearly accommodate all common cause variations (variations in duration that predictably occur because they are part of the system within which projects are performed). Buffer types include Project buffers, Feeding buffers, Resource buffers, Drum buffers and Strategic Resource buffers. These are described in a chapter on Critical Chain contributed by Gerald Kendall to Dr. Harold Kerzner's text, *Project Management – A System's Approach, 8th edition*, published by John Wiley & Sons.

6. Critical Path uses a concept of slack time or float to determine how much flexibility there is in non-critical path tasks. Critical Chain Approach groups tasks on each non-critical (or feeding) path entering into the critical chain and "protects" the critical chain with a Feeding Buffer. The feeding buffer is equivalent to a schedule contingency reserve that is local to a part of the project. The Critical Chain Approach is explicit and systematic about the use of Feeding buffers throughout the task network. Further, buffers are formally monitored and trends are tracked rigorously during execution.
7. This buffering allows for non-critical tasks to be scheduled at their latest possible start times to discourage costly early investment of work in process. This also significantly reduces behaviors called "student syndrome" and "Parkinson's Law". Early starts are discouraged unless there is a major strategic reason for doing so.
8. Often, the Critical Path changes during execution because there is no buffer to absorb the variation in task times. If implemented correctly, the Critical Chain plan and the Critical Chain itself do not change throughout the life of the project, because the buffers absorb the uncertainties in task duration.
9. Critical Chain recognizes that there are multi-project environments in which projects have resource-based interdependencies. In other words, projects share a common resource pool, for at least some tasks.
10. The Critical Chain Approach identifies the strategic resource (called a Drum Resource) across a collection of projects. When overloaded or not available, this resource is the one most likely to impact the project duration of all projects.
11. The staggered introduction of projects into the system is used to improve the flow of projects, to increase the predictability in each project outcome and to increase the effectiveness of critical resources by minimizing the effect of bad multitasking. A shorter project cycle time and an increase of the number of projects that can be pushed through the system without increasing resources result from staggering the release of new projects.
12. Similar to vertical traceability in Critical Path, the Critical Chain plan and detailed schedules are linked entities. Any logic at the detailed levels must be reflected in the summary level(s).
13. The benefits of Critical Chain will be secured permanently for the organization with the implementation of a performance measurement system, policies and education that are in keeping with the Critical Chain Approach.

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