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## Theory of Constraints

All about Goldratt's Theory of Constraints, applications, stories, successes and challenges, and open dialogue on this powerful methodology for improving almost any kind of system. Particular focus on applications in Project Management, Manufacturing and Distribution.

FRIDAY, JULY 27, 2007

### Multi-Tasking: Why projects take so long and still go late

In most project environments multi-tasking is a way of life. This seemingly harmless activity, often celebrated as a desirable skill, is one of the biggest culprits in late projects, long project durations, and low project output. At the same time it is one of the least understood factors in managing projects.

For companies where projects are of strategic importance, the stakes are very high. Whether it is delivering their product or service, bringing new products to market, or expanding/ upgrading their operations with new facilities, systems, or capabilities, the financial impact of being able to reduce project durations and costs, increase the volume of completed projects, or simply deliver more projects on-time is enormous. So understanding how this often overlooked practice of multi-tasking is of critical importance to most companies.

### Multi-tasking and project performance

Multi-tasking is the act of stopping a task before it is completed and shifting to something else; in software development the term “thrashing” is often used to describe this practice. When a task is stopped and started there is the immediate effect of a loss of efficiency. Each time a person has to re-start a task, time is required to become re-familiarized with the work and get re-set in where he was in the process. It is very much like the physical set-ups done on a machine in production. Each time you tear down a machine to do another task, you have to set it up to run the part again.

While the loss in efficiency is not insignificant, especially in “knowledge work,” it is far from the most important reason multi-tasking is so damaging. What happens when a task is interrupted mid-stream is that its completion is delayed. Most people in project management will readily agree that it is not important when a task finishes, it

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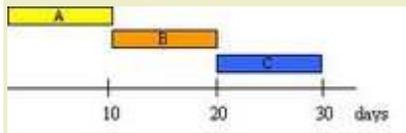
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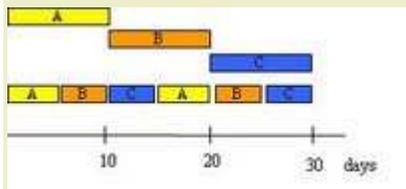
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is important when the project finishes. The diagram below shows three tasks a given resource must do, related to three different projects, and when they are expected to finish: Task A after 10 days, B after 20, and C after 30.



But if the resource has to stop and start the task even just once in the process, the actual completion times of the tasks quickly extends, as shown below. Task A now finishes only after 20 days instead of 10, task B at 25 days rather than at 20 days, and task C may still finish on-time at 30 days, without considering the impact of the loss in efficiency.



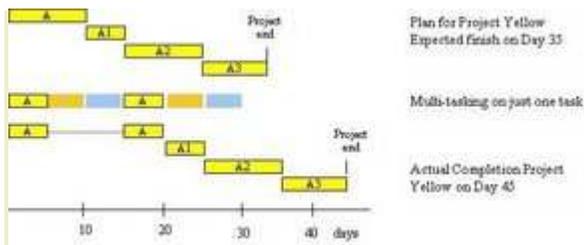
The delays on tasks A and B immediately translates into are delays on the downstream tasks in those projects, who now can only start at Day 20 and 25 respectively. The impact on project A is illustrated below. Even in a very small project like this one with just four tasks, and with only one instance of multi-tasking, the project is delivered almost 30% late. It's not hard to see how the more likely scenario of having several or many instances of multi-tasking during a project can cause the delays to accumulate considerably and lengthen project durations considerably.

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In many companies the impact of multi-tasking is obscured by the fact that in spite of its prevalence most projects still finish on time. While this reliability is nice, it masks the even more significant opportunity to cut project durations substantially. If projects are being delivered on or close to schedule, and multi-tasking is occurring, it can only mean that the task estimates used in the plan are significantly inflated. In other words, we are planning for the lost time due to multi-tasking, as this is the only way that the time losses could be recovered. In such cases, reducing the multi-tasking offers enormous potential to cut planned project durations substantially, without eroding delivery performance. These companies are in a great position to reap the benefits of delivering more projects faster.

For years we have put the project managers, executives, and teams through a simple project simulation game using beads, first with multi-tasking, and then a second time, blocking it. The results are nearly always that the time to complete each of the two projects is cut in half, enabling them to double the output, and cut individual durations in half, simply by eliminating multi-tasking. And the same happens when companies drive out the multi-tasking in their own projects.

Is Multi-tasking really so prevalent?

Given the substantial negative impact on durations and project volume, it makes sense to explore just how common multi-tasking is. Since multi-tasking is difficult to see or measure precisely, we need to look at some other things to answer this question. The first issue is to understand the opportunity to multi-task. The way to see if your organization has the “opportunity” to do bad multi-tasking is ask how many jobs/ tasks an individual has on their desk at any given point in time. If there is more than one task that could be worked on a person’s desk then there is the opportunity for multi-tasking. When we ask managers how many tasks are on any given persons desk at one time, the not surprising answer is usually more than five.

The next way to check is to ask people how often they get interrupted or asked to work on something else that is

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“hot”, “urgent”, or “important”. In most companies one need not even ask this as “constantly shifting priorities” is usually one of people’s biggest complaints in projects. Every meeting that shifts or alters the priorities of projects, or adds new important things for someone to do, is a source of multi-tasking. How often does it happen in your organization?

Another way to look at it is to recognize that in most organizations where multiple projects are being done simultaneously, the resources who do the work on a project have to serve multiple, different project managers. For these project managers what is most important tends to be their projects. As a result they typically create pressure on resources to do their work first, institutionalizing multi-tasking. And when the multi-tasking starts to creep in, it initiates a negative spiral that only increases the pressure to multi-task. If one resource starts the multi-tasking, it delays the completion of their tasks, putting some projects behind. This increases the pressure on project managers and executives to adjust priorities to compensate, which in turn creates more, bad multi-tasking. It’s not hard to see how this spiral quickly becomes the reality we see in many organizations where managers at all levels are quickly pulled into managing work priorities across the organization on a daily basis.

On top of it, many resources who work on projects also support daily operational functions like QA/ QC, production, engineering, customer service. This support role means that they are frequently presented with unexpected, usually urgent things to do which readily drive more multi-tasking. The result is that in the majority of companies there is the opportunity and the pressure to create a significant amount of bad multi-tasking.

If it’s so bad, why do we do it?

Our experience with hundreds of companies is that there are three central reasons organizations find themselves in the trap of multi-tasking:

1. Lack of understanding of the impact of multi-tasking
2. Incorrect assumptions
3. The desire to do a good job

The simple fact is that most people and organizations do not understand how damaging multi-tasking is. Our clients who see the impact illustrated in the bead exercise, mentioned earlier, are stunned and amazed that

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eliminating the practice results in a doubling of output and a halving of the project durations, with no other improvements. Once people do start to understand how damaging the practice is they become much more conscious of it, and start to change their behavior and the behavior of their organization.

But understanding is not enough. The drivers of multi-tasking are built into the processes, measurements, and systems most companies manage their projects. We strive hard to keep people busy all of the time, to maximize the output of all of our resources and be efficient. Performance measures on project managers and executives motivate them to focus on delivering individual projects, without understanding of the impact of their actions on the rest of the pipeline. Conventional scheduling and pipelining tools pay no attention to these factors and routinely overload resources making multi-tasking nearly inevitable.

The second reason is 'incorrect assumptions.' Chief among these is the belief that "the earlier you start a project, the earlier it will finish." While this is probably a valid statement in a single project environment where resources do not need to work on multiple projects, starting new projects earlier only increases the work in process in a multi-project environment and with it the likelihood of multi-tasking. People will get out of a building during a fire alarm much faster if they don't all rush at the door at once. Though it seems counter-intuitive, projects will finish earlier and we will get more of them done, if we start them later.

Again here the obstacle for companies in applying these principles is that these erroneous assumptions are built into the processes, measures, and systems we use to manage projects. The pressure from upper management and sales to add more projects or start them earlier can make it virtually impossible for managers below to cope with the pressure to multi-task. Conventional software, nearly all of which is based on Critical Path methodology, fail to provide managers with a way to accurately evaluate task priorities across projects. Critical Path can identify which tasks have priority over others within a given project, but it breaks down when considering tasks on different projects. How many times does it happen that someone works on an urgent task, only to learn later that it ended up sitting a downstream step waiting on something else, or because the priorities shifted again?

The final reason for the pervasiveness of multi-tasking is that people want to do a good job. People multi-task in response to a perceived need of the organization: an urgent job, a hot task, a breakdown, a customer complaint,

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etc. Shifting to work urgent, pressing jobs gives people a chance to be heroes, to save the day, or put out the fire. In fact if you have multi-tasking in your organization, it is an almost sure sign that you have people who care about and are working hard to do a good job for the organization. It is essential to help people to realize the impact of multi-tasking, so they shift their belief of what it means “to do a good job.” But this must be backed by the needed process, measurement, and system changes or their efforts will be overwhelmed by these other forces.

### Reducing Bad Multi-tasking

The impact on project performance from reducing multi-tasking is profound. Without so many interruptions and delays on individual tasks the work flows much more quickly and smoothly. Without adding resources or working people any harder, more projects get completed, faster. And without the constant pressure to re-prioritize work, and with more projects tracking on-time, the organizational climate improves dramatically. With these improvements follow the business results companies in project environments are universally seeking. The typical results we have seen companies achieve are:

On-time completions to 95+%

Project durations cut by 1/3 or more

Project output 25%-100%

To learn more about how to reduce multi-tasking and start to put your organization on a path to these kinds of results, read “More projects, faster, with less resources: Critical Chain Project Management.” This article is available free of charge on <http://www.tocc.com/>, or you can have it emailed to you by requesting it by name from [info@tocc.com](mailto:info@tocc.com).

About TOC Center, Inc. The TOC Center works with clients across the full spectrum of project environments to help them create and implement sustainable processes for delivering more projects, faster with the same

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