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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, JUNE 15, 2007

### [TOC Stories #2: "Blue Light" creating capacity for nothing](#)

This is one of my favorite stories from all of my years in applying TOC. I use it frequently in my consulting work and again it's totally true. In fact I've told it enough times that I finally came across someone who was in the room who said he used to work at that company and he validated in 100%. And if you were to go into one of the dozens of places where I've told this story, you are likely to find that they still talk about "Blue Light."

It illustrates for me the essence of Theory of Constraints as a process for exposing and challenging assumptions that block us from seeing better solutions. Our assumptions cause us to accept things as facts, often without checking them, and limit us to looking for a solution within a false frame that prevents us from seeing a simple way out. If you are familiar with the brain teaser of the nine dots, arranged in a grid 3x3, where you have to connect all the dots with 4 straight lines and without lifting your pen from the paper, you know what I mean. (I think most are familiar with this but if not let me know and I will post it.) I hope you enjoy the story of "Blue Light".

I was very young and had only been in consulting for a year or so when a company asked me to see if I could help them with a capacity problem in one of their plants. So one day I went to meet with the plant manager, it's never fun to be sent into "help" a plant by corporate, so I knew it might be difficult.

The plant produces heavy metal bumpers for semi-trucks, and they had a major bottleneck in their welding department. Orders were backed up, and they were running at capacity around the clock seven days a week. The space in the plant was already tight, and they had plans to expand the building to add room for 3 more welding bays, doubling the current capacity.

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The plant manager informed me early on that they were running at 93% efficiency in the department, basically telling me there was no room for me to help them improve. It was my experience that there was **always at least 25% more capacity** that could be exposed in any plant. Moreover, I was young and brash enough to tell this 30-year manufacturing veteran this and that sight unseen it was true in his operation too. He must have thought my math skills were pretty bad because he reiterated that they were already at 93% efficiency, so this wasn't possible.

I wasn't fazed and finally convinced him to take me out to at least look at the welding operation, since I had driven out to see them. Whenever I go out to look at an operation I had made the habit of formulating in my mind a simple picture or image of "what good looks like." In other words, what you would expect to see if an operation really was working to its maximum performance capability. As I am a completely non-technical person the image I put in my head as we walked onto the shop-floor was "blue light".

I was pretty sure that if the welding torch wasn't turned on, emitting its funky blue light, that the welders couldn't be welding anything. So I decided to look first for how much of the time there was blue light coming from each of the three welding stations. (Yes I know that even this is not yet the indicator of optimal performance, but as you will see, it was way more than good enough in this case.)

When we got to the welding area we watched for a few minutes quietly. The first thing I saw was one welder turning off his torch, taking off his protective gear and walking over to his buddy in the next booth. He waited until he got his attention and then he too stopped and took off his gear. Together they went back to the first guy's booth and lifted the heavy finished bumper off the welding table and onto a pallet, and then put a new unwelded one from the queue onto the welding table. The other welder went back to his booth.

I then watched the first welder begin to peel the protective plastic coating off the bumper in the places he had to weld. It took a good bit of time picking with his fingernails to get it done. Then he grabbed the parts and clamped the onto the bumper, put on his gear and welder for no more than 30 seconds. before he was done. I looked at my watch, we had been there almost 5 minutes and he had welded for 30 seconds of it.

Meanwhile another welder had just returned to his empty booth pushing a trolley, which he used to jack up and

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move his finished pallet to the next operation. He returned after several more minutes and consulted his schedule to see what job was next for him to do. Of course it turned out to be the skid of bumpers located against the wall blocked in by two other skids he had to move. After finding the right skid he moved the two other pallets out, got his to his booth and then moved the other two back out of the aisle. All this time zero blue light.

He disappeared again with the trolley to go and get the parts he had to weld onto the bumpers from the store room, returning only several minutes later with them. Meanwhile the other two welders had repeated several times over the two-man bumper lifting dance described above. Just from this casual observation I estimated that the "blue light time" couldn't have been more than 10% and was probably far lower.

As I watched all I could think about was "wow, did I sand bag this guy" (meaning the plant manager), I told him 25% more capacity. I missed it by one or two ZEROES! Just about then the plant manager turned to me and said something I have never forgotten. He said, "you see, they're busy all of the time!" And he was right, the guys were working all of the time and working steadily and hard at that.

What amazed me is how the two of us could be looking at exactly the same things and see it entirely different. He had in his head an assumption of what good looked like that was based on the people being busy, whereas I looked at it from the perspective of the operation and the work it did, the blue light. His perspective totally blocked him from seeing any solution other than adding people, which was going to require him to invest in expanding the plant and worse still take months to implement during which they would anger more customers and lose hundreds of thousands in potential profits.

To make an already long story a little shorter, we ultimately brought them to implement a very simple solution. They had a summer worker in another department (a non-constraint area of course) who knew nothing about welding, that they moved into the department to be the "helper" for the welders. We gave him a simple image to know if he was doing a good job. We told him we wanted to see more and more blue light from the welders' torches. His job was to lift bumpers with the welder, move pallets of bumpers around, stage the next jobs for each welder, and get all of the parts they needed ready for them. If he had extra time after this (which it turned out he did) he was to peel the plastic for the welder, and do anything else that would generate more blue light

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time.

In less than three weeks they had totally cleared the area of work-in-process. This big backlog shipped out along with the on-going flow that was coming to welding, producing a record shipping month. I don't know how much capacity was actually created but it was more than enough to break the bottleneck, and if more had been needed it could have been generated just as easily.

What limits us as individuals and as organizations are the assumptions we hold, and are failure to recognize them as just that "assumptions" and not facts.

Posted by kevinffox at 3:29 PM

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