Transforming productivity

Theory of Constraints/Critical Chain Project Management

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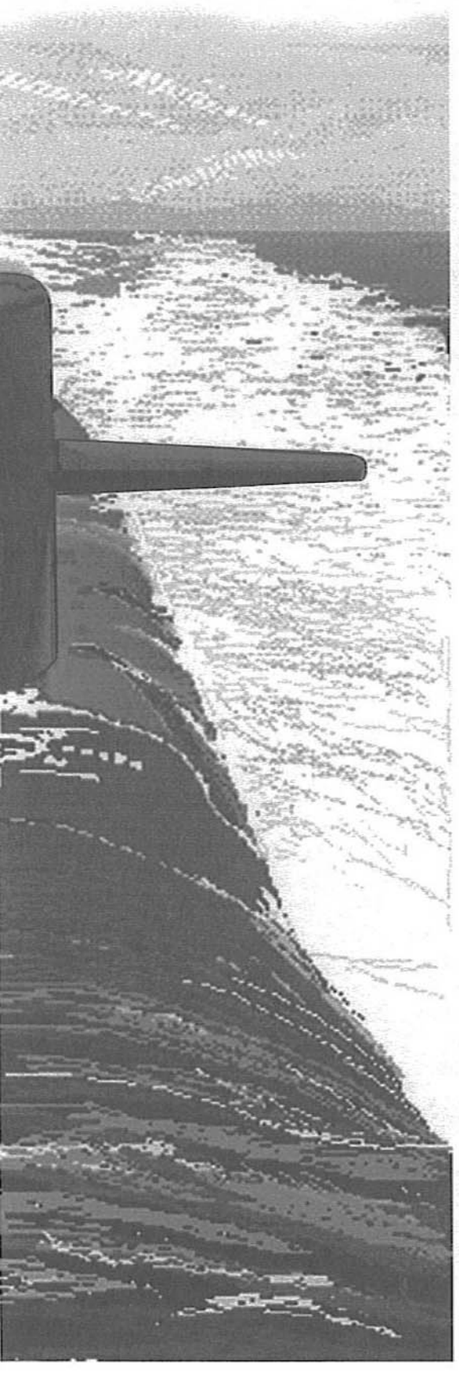

NAVSEA has embarked on a plan to utilize a "Theory of Constraints" (TOC) project management methodology called Critical Chain Project Management (CCPM) for all naval shipyards. The goal of the initiative is to reduce the cost of scheduled availabilities to recapitalize the fleet, support surge capacity, and support a "One Shipyard" initiative. CCPM is intended to reduce total cost by increasing the throughput of each shipyard. This article explains the fundamentals of TOC/CCPM and Portsmouth Naval Shipyard's transformation plan.

The Theory of Constraints was first introduced by Eliyahu Goldratt in his book, The Goal, in 1984. A five step process (shown below) is introduced to improve overall productivity:

A five step process

1. Identify the constraint – the bottleneck to a process;
2. Decide how to exploit the constraint, e.g., work two shifts;
3. Subordinate everything else – use helping hands from other trades;
4. Elevate the system's constraint – hire more workers, cross train, restructure;
5. Go back to step 1.

This methodology intentionally challenges the status quo. Previously it was thought that if every task was optimized individually, the optimum efficiency for the Shipyard would be achieved. Instead TOC focuses on the optimum synchronization of all resources by finding and clearing log jams in the process.

An example

An example from the first CCPM pilot availability at Portsmouth Naval Shipyard (NR-1) can be used to illustrate this method. Electrical work was noted to be backlogged for switchboard energization. Production work in this space was identified as the constraint. The constraint was elevated by assigning electrical personnel in this space 24 hours a day, seven days a week. Other resources were subordinated to those working in the area to ensure that work never stopped. The priority of the work was elevated by bringing in another foreman and more skilled workers.

Critical Chain Project Management

Critical Chain Project Management moves the TOC theory forward with the focus that managing resources among multiple projects is necessary to implement TOC. This theory integrates resource limitations into traditional critical path management (CPM). The Shipyard's current scheduling system (PSS) utilizes a CPM system that does not integrate the resource limitations. By contrast, Theory of Constraints and Critical Chain Project Management puts forward more than a scheduling resource management system. Its goal is to improve efficiency by reducing delays and achieving "relay racer mentality" with the critical chain work.

One Shipyard

All four shipyards have purchased CCPM scheduling software call "Concerto" to perform the production tasks of a submarine availability. This tool will eventually be integrated into other shipyard systems such as the Advanced Industrial Management (AIM) System and the Performance Measurement and Control (PMC) System.

The NR-1 project team has identified many constructive CCPM improvements necessary for further implementation at the Shipyard. Following NR-1, Norfolk Naval Shipyard was the first shipyard to manage a large overhaul using CCPM and has built many written guidelines for the process. The USS BOISE (SSN 764) DMP project team has streamlined weekly meetings with management focused on only the most critical tasks.

The recent completion of USS LOUISVILLE (SSN 724) at Pearl Harbor Naval Shipyard used CCPM to reduce overtime and increase work accomplished. PNS will carry the lessons learned from these projects implementing CCPM on USS MONTPELIER (SSN 765). Following MONTPELIER, USS PITTSBURGH (SSN 720) will be executed in CCPM. The Shipyard has established a goal to shift over all project management to CCPM next spring.

COMNAVSEA sends . . .

All Hands,

As you are well aware NAVSEA and our Navy are in the midst of a journey of transformation. To ensure we are all moving together, you will soon be seeing progressively more detailed information on our lines of business and the NAVSEA wide initiatives of technical authority, warfare center workload assignment, and shipyard productivity. To reach everyone of you we will use visual, electronic and hard copy communications.

It is imperative everyone understands this information. The alignment assessment we did in November 2003 showed your overwhelming desire to support NAVSEA's transformation. It also revealed areas of needed communication and a strong interest by the team to understand more about the changes taking place.

The CNO has visited us three times since September 2003 to discuss how we run our business. He likes what he's heard and looks forward to hearing more details when he visits again. This is good news—it reinforces we are aligned with his priorities and our journey is the right one.

I urge you to help us move forward by taking the time to read the information provided over the coming months. Talk to your leadership about why it's important to you.

Your continued commitment to our Navy has made a real difference and will ensure our success in supporting a challenging Global War on Terror and in building our 21st Century Navy.

Vice Admiral P.M. Balisle
Commander, Naval Sea Systems Command

CAPTAIN'S CORNER—
Continued from Page 3

• Safety requirements for Hot Work, Gas Free Engineering, Fall Protection, staging, etc. should be identical among the nuclear shipyards so workers do not need to be retrained as they travel to support the Fleet. Many of our employees have experienced the confusion and frustration working in another shipyard with different safety rules and regulations. When it comes to safety, we simply all must be on the same page.

• Basic work processes should be standardized from shipyard to shipyard. Examples include welding processes, Subsafe requirements, testing processes, etc. Wherever we have different processes among the shipyards, we waste the valuable time of skilled workers to learn a new process. This area offers a great opportunity for the exchange of ideas and the export of best and most efficient practices across the six nuclear shipyards for maximum efficiency.

In summary, the One Nuclear Shipyard strategy is focused on keeping our valuable, highly skilled employees working efficiently regardless of where the Navy needs the work performed. From an employee's standpoint, the strategy reduces redundant, unnecessary training, and allows workers to get their job completed more efficiently and return home from TAD travel sooner. From the Navy's standpoint, costs are reduced, and critical work is performed smartly and more efficiently in shorter durations. Simply stated, the One Nuclear Shipyard strategy is a Win-Win for our workforce and the Fleet. Stay Safe and Keep Charging.

Captain K. M. McCoy
Shipyard Commander