

Fundamental Logistics of Theory of Constraint

* Dr. Veerta Tantia

** Dr. Kavitha Jayakumar

* Assistant Professor, Department of Commerce, Christ University, Bangalore

** Associate Professor, Department of Commerce, Christ University, Bangalore

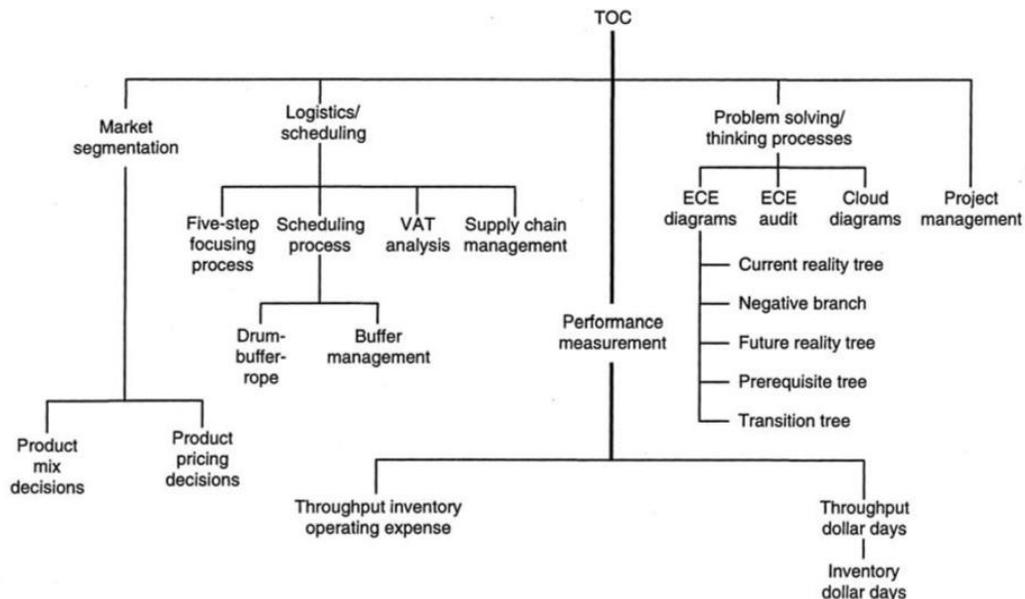
Abstract

Firm's progress towards its profitability lies where delivery of goods and services take place in there minimum through put time. One of the important approaches to achieve this goal is theory of constraints. Theory of constraint (TOC) advocates that existence of constraints in any systems give opportunities for the management for improvement. Dissimilar to conventional thinking, theory of constraint view suggest constraint as a factor determining the performances that are positive to the system. Theory of constraint (TOC) seems to be feasible, as it does not demand costly systems change. It depends on scheduling leased on constraint exit in the system. This paper gives the overview of the scheduling of theory of constraint (TOC) which can be applicable to all the system practice.

Keywords: Buffer Management, Logistics, Theory of Constraints, Throughput Accounting

Introduction

Most of the organizations have few constraints that limit themselves in performing best in the market. TOC suggest managers to focus effectively managing these constraints. Therefore, TOC concentrates on constraints which limits the performance of the organization. TOC system concept was first developed by Eliyanu M Goldrott in 1980 and later on adopted by several organization for their improvement. Proctor and Gamble, General Motor are few companies who adopted. TOC management system normally consists of the following elements which will exhibit in the following diagram.



Source: Adapted from Cox and Spencer, 1998: 16.

Though it's broad application TOC results in several benefits in the form of decreased production, lead time, improved quality of products and services, reduced inventory levels, management of constraint, increase in profitability

Logistic Concept of TOC Management

Following elements form the foundation for implementing the logistic concept of TOC management

1. Five step focusing process
2. V-A -T logical structure analysis
3. Drum- buffer rope scheduling method
4. Buffer management
5. Supply chain management

1. Five step focusing process

Five step focusing process enables the managers to focus on resources with greatest potential to be affected by changes to the system. The five steps, which are involved, are

Step 1:- Firstly, identify the constraints in the system that limits progress towards the goal.

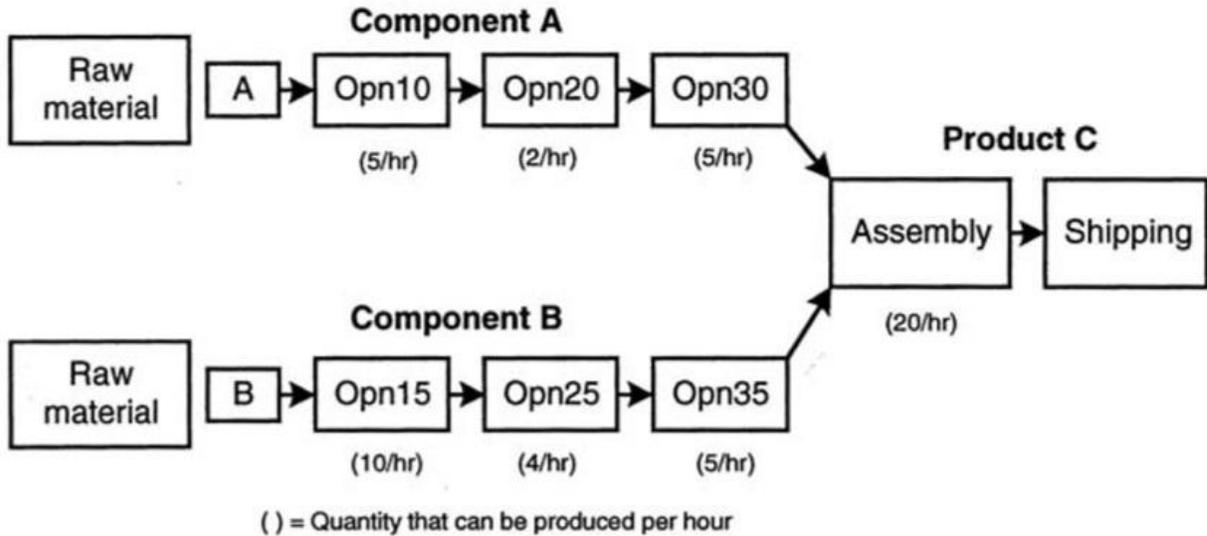
Step 2:- Decide a strategy for primary constraint that supports system. Here they focus on taking advantage of existing capacity of the constraint which is general wasted example:- selling the wrong products.

Step 3:- After the system policies, procedures, resources to support the above decisions

Step 4:- Change the status of original resource that will increase the overall output of the constraining activity example- buying a second machine or implementing new technology.

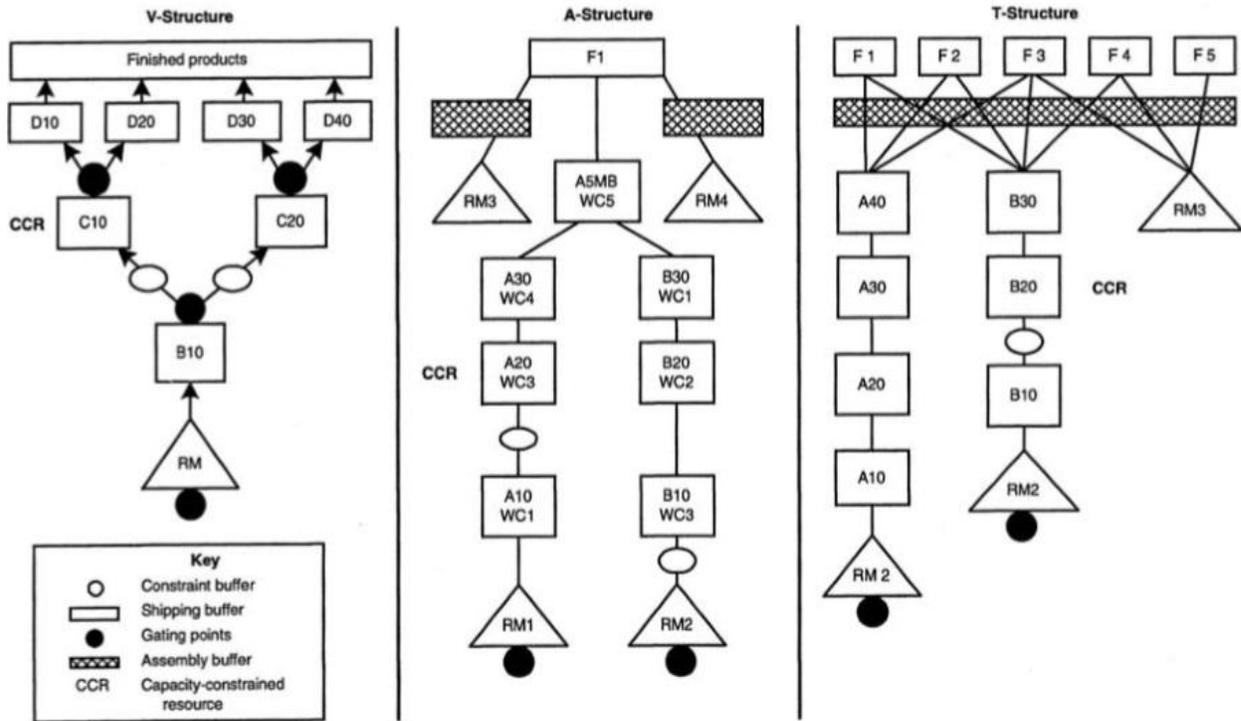
Step 5:- Go back to step 1 review it and do not allow previous decisions taken in previous steps. Final step is designed to build the (2 to 4) to become constraint concept of continuous improvement in TOC. Without last step an organization might stop its efforts once the constraints have been optimized. In TOC, the goal towards superior system performance never ends.

Thus, five focusing steps enable manager to focus on constraints, which are imperative for the firm's performance. Diagram below helps in identifying the system constraint.



Source: Adapted from Cox and Spencer, 1998: 9.

2. V-A-T Logical Product Structure Analysis: V-A-T analysis supports the opinion that organization has interaction of both product and process. In a system view there are generally three categories of production structure or shapes that emerges i.e V shape, A shape, T shape. 'V shape' represents a fixed flow product structure in which product variation occurs. These divergent processes rely on small number of materials to provide a variety of products and services to the market. Constraint is not overcome by rerouting. 'A structure' represents a structure in which number of raw material are processed and assembled into a few finished parts. 'T structure' is most common where number of common parts or related products flow across a limited set of workstation. So, in V-A-T key constraints are observed and management identify optimal throughput given in organization. So this structure provides for the effective application of terms and condition logic within a broad range of potential system and situations.

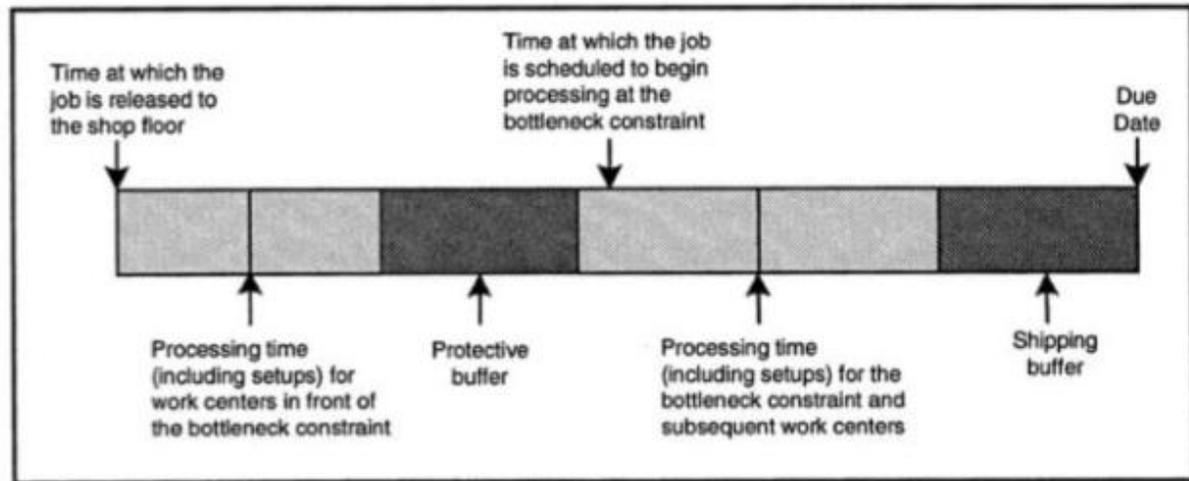


Source: Adapted from Cox and Spencer, 1998: 127.

3. Drum-Buffer Rope Scheduling Method: Incorporating of inevitable department events and statistical fluctuations of the system in developing a schedule for the organization. So in drum buffer rope scheduling determines the relationships among resources to create smooth flow of product by resolving conflicts. It gives improvised scheduling that tries to reduce the disturbance to the minimum and therefore helps in smooth production flow. In this method three elements are drum, buffer and rope. Every time the primary constraints is identified and then exploited leads throughput to increase and non-value added activity is removed.

Drum helps to create a master production schedule to utilize the maximum time of constraints. To schedule the constraints an attempt is made to place the start and stop time of each order (sale) is met on due date and no conflict exist between orders to occupy same space at same time. After primary constraints scheduling is done, resources should be utilized for secondary constraint schedules.

Buffer is time mechanism, which is equal to processing time, set up time, estimated protective time where things might go wrong and helps in deciding lead-time for product for gating the operation and rope synchronizes other resources and includes release schedule for all gating operations. Therefore, drum buffer rope is a technique for developing a schedule that will maximize and manage the productivity of the organization.



Source: Noreen, et al., 1995: 33.

4. Buffer Management: In buffer management non constrained resources are schedules to ensure that they are engaged on right time at right job in right quantity to meet constrained resources schedule.

5. Supply Chain Management: - The ultimate aim is to maximize the profitability of the whole system by using constraint as per the flow of material and value from beginning to end. Leveraging the concept of primary constraints across to supply chain ensure that the system wide limiting factors serve as a basis for development of integrated scheduling and planning. Gains in the firm of reduction in supply chain inventories, on time delivery, enhanced value creation by customers Improved profitability, improved competitive position etc can be expected from extending Theory of constraint concept to supply chain.

Conclusion

Constraints location does not affect internal flow cannot move faster than the bottle neck allow, in the same manner the entire supply chain cannot delivery more than the slowest operation in the system. So in this paper focus was made on scheduling aspects of the theory of constraints that focuses on smooth flow of materials and services in TOC. Once the constraints are identified all non-constraints that helps the organization to optimize the total system of resources.

References:

- 1) Albright, T. & Lam, M. (2006). Managerial accounting and continuous improvement initiatives: a retrospective and framework. *Journal of Managerial Issues*, Vol 18, No 2, pp. 157-174.
- 2) Andrade, M., Pessanha Filho, R., Espozel, A., Maia, L. & Qassim, R. (1999). Activity-based costing for production learning. *International Journal of Production Economics*, Vol 62, No 3, pp. 175-180.
- 3) Argyris, C. & Kaplan, R. S. (1994). Implementing new knowledge: the case of activity-based costing. *Accounting Horizons*, Vol 8, No 3, pp. 83-105

- 4) Atrill, P. & McLaney, E. (2009). Management accounting for decision makers, Prentice Hall
- 5) Bragg, S. M. (2007). Throughput accounting: a guide to constraint management, John Wiley & Sons, New Jersey
- 6) Bryman, A. & Bell, E. (2011). Business research methods, Oxford University Press, New York
- 7) Chenhall, R. H. (2003). Management control systems design within its organizational context: findings from contingency-based research and directions for the future. Accounting, Organizations and Society, Vol 28, No 2-3, pp. 127-168
- 8) Corbett, T. (1998). Throughput accounting North River Press, Great Barrington, MA
- 9) Durden, C. H., Hassel, L. G. & Upton, D. R. (1999). Cost accounting and performance measurement in a just-in-time production environment. Asia pacific journal of management, Vol 16, No 1, pp. 111-125
- 10) Franco-Santos, M., Kennerley, M., Micheli, P., Martinez, V., Mason, S., Marr, B., Gray, D.
- 11) & Neely, A. (2007). Towards a definition of a business performance measurement system. International Journal of Operations and Production Management, Vol 27, No 8, pp. 784-801
- 12) Friedl, G., Küpper, H. U. & Pedell, B. (2005). Relevance Added: Combining ABC with German Cost Accounting. Strategic Finance, Vol 86, No 12, pp. 56-61
- 13) Fullerton, R. R. & Wempe, W. F. (2009). Lean manufacturing, non-financial performance measures, and financial performance. International Journal of Operations & Production Management, Vol 29, No 3, pp. 214-240
- 14) Gerdin, J. (2005). The impact of departmental interdependencies and management accounting system use on subunit performance. European Accounting Review, Vol 14, No 2, pp. 297-327
- 15) Goldratt, E. M. (1990). What is this thing called theory of constraints and how should it be implemented?, North River Press, Great Barrington, MA
- 16) Hughes, S. B. & Paulson Gjerde, K. A. (2003). Do different cost systems make a difference?
- 17) Management Accounting Quarterly, Vol 5, No 1, pp. 22-30
- 18) Huntzinger, J. (2007). Lean cost management, J. Ross, Ft Lauderdale, FL
- 19) Hutchinson, R. (2007). Linking manufacturing strategy to product cost: toward time-based accounting. Management Accounting Quarterly, Vol 9, No 1, pp. 31-42
- 20) Kaplan, R. S. (1983). Measuring manufacturing performance: a new challenge for managerial accounting research. Accounting Review, Vol 58, No 4, pp. 686-705
- 21) Kaplan, R. S. (1984a). The evolution of management accounting. Accounting Review, Vol 59, No 3, pp. 390-418
- 22) Kaplan, R. S. (1984b). Yesterday's accounting undermines production. Harvard Business Review, Vol 62, No 4, pp. 95-102
- 23) Kaplan, R. S. & Anderson, S. R. (2007). Time-driven activity-based costing: a simpler and more powerful path to higher profits, Harvard Business Press

- 24) Krumwiede, K. & Suessmair, A. (2008). A closer look at German Cost Accounting Methods
25) Management Accounting Quarterly, Vol 10, No 1, pp. 37-50
- 26) Liker, J. K. (2004). The Toyota way: 14 management principles from the world's greatest manufacturer, McGraw-Hill, New York.
- 27) Maskell, B. H. (2009). Making the numbers count: the accountant as change agent on the world class team, Productivity Press, New York.
- 28) Maynard, R. (2008). Lean accounting. Financial Management, March, pp. 44-46.
- 29) Mia, L. (2000). Just-in-time manufacturing, management accounting systems and profitability. Accounting and Business Research, Vol 30, No 2, pp. 137-151
- 30) Rowley, J. & Slack, F. (2004). Conducting a literature review. Management Research News, Vol 27, No 6, pp. 31-39.
- 31) Ruhl, J. M. & Bailey, T. A. (1994). Activity-based costing for the total business. CPA Journal, Vol 64, No 2, pp. 34-38
- 32) Sharman, P. A. (2003). Bring on German Cost Accounting. Strategic Finance, Vol 85, No 6, pp. 30-38
- 33) Stenzel, J. (2007). Lean accounting: best practices for sustainable integration, John Wiley & Sons, Inc., Hoboken, NJ
- 34) Voss, C. (2009). Case research in operations management. in Karlsson, C. (Ed.) Researching operations management. Routledge, New York, pp. 162-192
- 35) Yin, R. K. (2009). Case study research: Design and methods, Sage publications, INC