Theory of Constraints - Case Study

NILPETER INDIA

Indian arm of Nilpeter Global, located in Chennai, India

STRATEGY & SYSTEMS CONSULTING

ENABLING FLOW, UNLOCKING VALUE

BUSINESS

- Nilpeter is a world leader in narrow web printing solutions. It designs & manufactures narrow web flexographic printing machines as per customer specific requirements
- Nilpeter India caters to both Indian and International Markets
- 100+ Sub-Assemblies, 2000+ Components goes into making a typical label printing machine
- Sources components and sub-assemblies from large network of domestic and international suppliers
- Sub-Assemblies and Final Machine Assembly done in-house

CHALLENGES

- High backlog of customer orders
- High manufacturing lead time – typically 4 months from the receipt of a customer order
- Low due date performance - < 20%
- High inventory (RM + WIP) levels – approx. 6 months of inventory
- Low effective capacity utilization
- High levels of firefighting to complete and dispatch the customer orders
- Scope for higher productivity & throughput

Partnering with Strategy & Systems Consulting and Project "LEAP"

Nilpeter India (NIPL) approached Strategy & Systems Consulting (S&S) www.strategyandsystems.com to overcome the above-mentioned challenges and improve its sales and profitability.

S&S experts visited NIPL's manufacturing plant and collected relevant data in order to analyze the current reality at NIPL. A core senior executive team was formed within NIPL to improve the business results; NIPL's team titled the improvement initiative as 'Project LEAP'. S&S experts trained the PROJECT LEAP members on the fundamental concepts of Theory of Constraints (TOC) and evolved few strategic directions for improvement with the underlying theme of 'What to Change? 'What to Change to? & 'How to cause the Change?'.

Below mentioned business solutions and processes were evolved based on NIPL's unique business environment and were implemented within a duration of 4 months in two phases. S&S's FLOW, a TOC software, was implemented to support the Project LEAP initiative, FLOW seamlessly connects with NIPL's ERP on a daily basis to provide the ground level support for the procurement & manufacturing team to implement the TOC based processes.

Consumption based Pull Replenishment

Timely availability of parts and sub-assemblies is the foundation for a smooth flow in assembly operations. During the phase 1 of the improvement initiative, a TOC guided component replenishment process was proposed to ensure high availability of components and sub-assemblies. Unique processes were designed after analyzing the individual component's consumption behavior:

1. Pull replenishment processes were implemented for the repetitive and fast-moving components. A strategic buffer was built and sustained through replenishments based on actual consumption (issues to assembly stages). Due to frequent & timely replenishments the parts availability for the production stages went up to 96% within two months and the production delays were eliminated.
2. For stranger components (with infrequent consumption behavior), a TOC guided make-to- order replenishment process was initiated which ensured timely delivery of parts from suppliers.
3. Vendors were identified and trained to align with the new TOC guided replenishment processes and on methods to deal with component priorities.

Full Kitting

Every stage of production requires a range of parts (as per bill of materials) to commence and complete the assembly stage. 'Full kit' processes were designed to ensure synchronous parts availability and timely start of assembly stages – it is important to commence the production and to complete it without waiting for matching components. (Waiting for components elongate the manufacturing lead time and reduces plant throughput). In order to accomplish a high 'Full kit' performance at various assembly stages, following processes were implemented:

1. Full kit managers were identified with appropriate roles/responsibilities well defined.
2. Full kit managers meet twice in a week to review the customer order wise component requirement and evaluate the full kit levels. The cross functional team (from procurement, stores & production) takes appropriate actions to ensure full kit performance – part shortages are identified in advance (weeks ahead of actual assembly start) and appropriate actions are undertaken to ensure timely part delivery. Full kit performance % is contiguously evaluated for ongoing improvement.
3. Periodic full kit meetings supported by the TOC replenishment processes improved the full kit performance to 92% in a very short span of time (in less than 2 months).

TOC's FLOW Solution for Production

NIPL builds machines that are customized to customer requirements, however 70% of the components are common across customer orders. As the nature of production is neither completely repetitive nor unique to every customer order, a novel production planning and execution system was evolved based on the principles of TOC to dynamically track the production stage completion (of individual customer order) and validate the progress of the work relative to its order due date. Potential customer order delays are proactively identified in advance and catch up/recovery plans are being undertaken swiftly.

1. The LEAP project team meet once in a week to review the progress of customer orders using a FEVER CHART and validate the progress of the orders in the shop floor. A TOC guided color coded (BLACK, RED, YELLOW & GREEN) priority system were devised to prioritize (BLACK & RED being high priority) the customer orders in the shop floor. Proactive steps would be undertaken by the team to recover the potential delays in the progress of work. 'Delay days' & 'Due date performance' as a measure were initiated to stimulate the right human behavior and inculcate a progressive shop floor culture.
2. The FEVER CHARTS are being displayed at all production BAYS for comprehensive shop floor awareness regarding the progress of every customer order and to ensure comprehensive visibility.
3. Due to the above-mentioned processes in production, the due date performance improved drastically, and the delay days were minimized significantly. The plant throughput improved by 30% within 3 months of introducing the TOC processes.

Results

Component Inventory ↑ 20%

Component Availability ↑ 96%

Full Kit Percentage ↑ 92%

Machine Lead Time ↓ 33%

Order Delay Days ↓ 60%

Average Machine Output/Month ↑ 60%

Due Date Performance ↑ 75%

Customer Speak

Mr. Alan Barretto
MD Nilpeter India Pvt Ltd

Q: How do you intend to use the concepts of theory of constraints (TOC) in shaping your company's future growth?

AB: The idea is to grow profits while increasing capacity and turnover. This means working on improving throughput and efficiency. A good grounding in TOC concepts coupled with the Flow software and MIS, gives us the tools to stay lean and achieve our stated goals.

Q: How was your experience of leading the TOC initiative in your company?

AB: The role was one of facilitation. I believe that people will appreciate something if they see it for themselves. Introducing the consultants and allowing their work to speak for itself went a long way in the success of this initiative.

Q: What kind of obstacles did you foresee in embracing the changes proposed?

AB: The main obstacle I anticipated was one of resistance from within. But this was unfounded because of the steps taken by the consultants. By means of workshops and presentations, our team was first made to understand the concepts and then with that appreciation they moved ahead with the implementation. Frequent reviews also helped in keeping the project on track.

Q: How helpful were your consultants in supporting your TOC journey?

AB: Mr Prabhakar and Mr Rajagopalan were very helpful and patient in dealing with our team. They went to great lengths to explain the foundation principles to everyone before embarking on the study and implementation.

Q: Would you be happy to share your TOC experience?

AB: Yes.

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