



TenStep Supplemental Paper

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Time is Precious

Strive to eliminate non-value adding activities to save precious time!

Key Learnings:

- Recognize the importance of time in the business world
- Review the need for predictability of various operations
- Recognize key steps in the Value-Added Flow Analysis (VAFA) method
- Recognize the common mistakes while doing Value-Added Flow Analysis (VAFA)
- Review the impact of JIT tools on cycle time reduction
- Recognize the importance of administrative process improvement to reduce cycle times

The old saying 'time is precious' is now 'time is money' keeping in mind today's business environments. Time is the most powerful competitive weapon that a company possesses in today's business world.

Most manufacturing companies are striving to reduce cycle times of production, administrative and delivery processes. This is being done to be flexible to handle fast changing markets and respond faster to customers.

Companies in the US and Canada that have worked to reduce total manufacturing cycle time by 75 percent have doubled productivity. They have even reduced the break-even point by 20 percent. Their growth rate has increased by three times the industry average. With right strategies and 100 percent efforts, the benefits of cycle time reduction can be visible in less than six months.

One of the initial steps to reduce cycle time is to shift manufacturing processes out of made-to-forecast mode to made-to-order mode. While doing so, care should be taken that customers do not have to wait longer between placing orders and delivery.

The other issues that have to be handled while reducing cycle times fall into three basic categories as impact of:

1. Predictability
2. Flow
3. Partnerships

- 1. Predictability:** Predictability helps a company to smooth out flow, an important aspect in reducing cycle times successfully. It is concerned with three areas, of which two are internal to operations. They are the predictability of a process and that of time. The third is the predictability of supply of raw materials/components required by the process.

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The predictability of a process depends on product yield and equipment uptime. Say product yield varies widely from part to part or even from time to time. Then a company cannot implement changes/modifications or any such action to reduce cycle times without an adverse impact on customers. It is also important that equipment be predictable and dependable to reduce cycle times.

Predictability of time is another important aspect. Companies should understand how quickly and frequently raw materials/components are obtained from suppliers and products manufactured while planning cycle time reduction.

Once predictability of these two internal operations is stable, a company can also create a stable, predictable relationship with suppliers.

- 2. Flow:** Flow has the same definition as Just-In-Time – *producing the minimum necessary units at the latest possible time eliminating waste, including inventories.* Eliminating waste as per JIT philosophy includes eliminating anything except the absolute minimum required to add value to a product. This applies to resources of material, machines and manpower.

When implemented well, JIT's chief benefit is cycle time reduction.

- 3. Partnerships:** To achieve cycle reduction time, it is important for companies to create collaborative partnerships for manufacturing on different lines. Manufacturing should collaborate with suppliers of raw materials/components, with customers and with administrative functions. This helps to increase predictability and smooth the flow.

In conventional manufacturing, companies aimed to produce the maximum number of units to keep machines working and to minimize set-ups. Another purpose was to make products well in advance. Production was carried out irrespective of the huge WIP and finished goods inventory. In fact, JIT emphasizes the need to reduce quantities to balance flow, eliminate wasted activities and cut cycle times.

It has been observed in many companies across various industries that 5-15 percent of steps in a process actually add value. This percentage sounds even pathetic when we look at the time consumed by the value added steps. Often this is a mere one percent and the other 99 percent of time is spent in various forms of waiting.

The next step to remove time out of a process is to map the current process using the Value-Added Flow Analysis (VAFA) method. This is a step-by-step analysis of what is currently done and which of the steps actually adds value to the product. The aim is to identify the biggest chunks of non-value adding time.

When doing a VAFA, it is imperative to start from when the materials/ components enter a plant. The focus should be on a single piece, and every activity that happens to it is recorded. Where does it move, where does it wait, for what, how long and what happens to it next? The questions should be put to those who actually perform the process and not the supervisors or floor managers. It is not the best or worst case that has to be recorded, but the 'normal and typical' time every activity takes.

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Say a batch of 50 parts moves in one lot and then undergoes a one-minute machining process for each part. The batch moves again in lots of 50 to the next activity. The one piece being observed undergoes value-addition for one minute and then waits for 49 minutes for the others. The same piece is observed until it becomes a finished item and goes out of the plant.

Once this is done, a company will find that reducing cycle times is a process of eliminating different forms of waits. The larger waits require solving problems of imbalances in work allocation, scheduling, bottlenecks, quality and decision-making. The smaller and frequent waits require reducing lot sizes and movement quantities.

Before we move further, let us consider some common mistakes companies make when doing a Value Added Flow Analysis.

Trying to do VAFA without the process actually being performed

Often, companies have short deadlines to present a savings plan to the management. In such situations, if the process is long, there is not enough time to get a complete picture. Consequently, information is entered based on past experience and predictions without 'seeing' the product move through the entire process.

This is against the principles of lean. If a process is mapped without observing inventory from its entry to its exit from the shop-floor, it's just a process map; it will not be a value map. Moreover, chances to observe and record wastes are lost.

Here's a simple instance to prove this. A manufacturing company had a packaging process requiring about five-minutes for wrapping a standard pallet of material. However, the actual process consumed more than 20 minutes. The management, in its eagerness to generate cash savings, blamed the shop-floor employees for the delay. In order to prove themselves right, they went to the shop-floor to observe the operation.

It was noticed only then that packaging employees had to attend to several phone calls during their work. This was a part of their daily activities, which the management had not accounted for previously.

Overlooking shared resources

Often, the same resources are required by different product families and hence shared. Equipment, instruments, assembly lines and even personnel are included here. So while doing VAFA, it is important to account for the right resources being used. Any mistake could impact vital calculations like cycle time.

Mixing product families

Some product families have several sub-assembly processes and the main VAFA stream has many branches. Many a time, if product families are not identified correctly, the trail leads to the wrong processing path resulting in confusion.

Inaccurate accounting of time



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It has been observed that travel times between process steps are often not recorded accurately in VAFA. Apart from changeovers and set ups, long travel distances are also causes for inventory build-up. Since the aim is to identify all factors causing inventory build-up, travel times have to be included in lead-time calculations.

However, these mistakes are committed more during the initial VAFA initiatives. With experience, companies become more alert and eliminate them.

Moving further, we now look at the Just-In-Time tools that help reduce cycle time. They include:

Drumbeat

This combines the rate of production and the frequency of production. It is an indication of how fast equipment is producing and how often a particular product is being manufactured. To achieve a perfect drumbeat, production pace has to be at precisely the rate required by the customer- not more, not less. This applies to each operation, every piece of equipment and every line.

The customer here could be either the next operation or the ultimate paying customer in the marketplace. Moreover, in a perfect drumbeat, every product will be manufactured as frequently (and in minimal quantities) as desired by the customer. This however, necessitates many more set-ups and companies should focus on minimizing set up times to the maximum possible extent.

Set up reductions

Companies need to analyze setup times closely and check for wasted activities like waiting for tools, operators, raw materials/ parts from either external or internal suppliers. This requires collaborative relationships with suppliers and elimination of functional barriers within a company.

Overlapping operations

Companies should dedicate equipment to one product or product family partly or fully. This enables it to perform several operations in the least time. It is possible to achieve perfect flow when equipment is arranged in the order in which operations are performed. All non-value added activities and wait times disappear when perfect flow is achieved.

Linking operations

Though overlapping operations help to achieve one-piece flow, it is not always possible for certain product families with large sub-assemblies. Batches are essential in such cases, but the best way out is to link operations via a pull system.

In a pull system, every operation pulls the required product from the previous operation only when the need arises. This logic applies right from the beginning at the shipping dock.



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This is a reversal of the conventional mode where products were made to a forecast and pushed from one operation to the next. All this was done irrespective of huge inventories and WIP lots.

Linking operations greatly reduces waiting time created by improper scheduling, decision-making or bottlenecks.

Expanding horizons

JIT concepts can also be applied to administrative processes directly affecting customer response times like invoice preparation and order processing.

Manufacturing has quality issues like rework and scrap. Now in administration, aren't proofing, checking and management approval simple forms of quality checks? When many orders or purchase requisitions have missing or wrong information, does it not result in rework?

Think of data waiting to be processed or waiting for other data before it can be used. Just as in manufacturing, all these amount to WIP inventory in administration.

Hence it is not enough for manufacturing companies to restructure flow on the shop - floor while working on cycle time reduction. For best results, it is essential to focus on streamlining administrative processes between customers and suppliers, within and outside the company.