

CONVENTIONAL BATCH & QUEUE -

Traditionally we had a very functional layout, where all machines and operations of the same type were clustered in one area in a department and where work meandered through with difficult routings and huge levels of wip. It was also fraught with traditional ills. Took away the responsibility of decision making from the people and left them feeling unimportant and demotivated. Our industry viewed labour as an 'input cost' and this was perpetuated by management's attitude towards them.

- People were only practically skilled and even then not fully because of the functional, clustered layouts that determined specialized, segmented work stations.
- All control was in management's court, enforced by job descriptions and disciplinary codes and management's autocratic approach.
- People were treated like robots, in the sense that they waited for the next order or command and then disciplined if these orders weren't effectively executed. This proved to be difficult to manage.
- As time went on management invested in technology at the expense of empowerment and education, dehumanizing labour further by introducing computer controlled, motorized tracks and conveyor systems into the industry.
- This created a very strained and volatile environment. People became rebellious, absenteeism went up dramatically, quality was compromised and people worked at a level they could get away with and no more.
- As a result, management needed to find ways to police and control an uncommitted workforce. E.g.:- video cameras in factories and in passages leading to toilets, more supervision to monitor workers individual performances and management tactics to achieve fear driven results.

Cycle times were filled with non value activities, broken processes that promoted unnecessary hand – offs and the need for indirect labour resulted in long through – put times and expensive logistics. This was difficult to control and required a multiple management structure to help combat the instabilities and variances.

FTC - In 1996 I was fortunate enough to be involved in spear heading a project called FTC (Fight the Competition). We acquired empty factory space across the road from the main factory and set up our first sequential flow line for cutting & closing. This was an essential time of experimentation and we had the freedom to develop, test and try new ideas constantly.

With the flood of imports coming into South Africa we battled with diminishing runs as customers moved to China. With more variety and ever shrinking volumes, the new linear

sequential flow lines were becoming less suitable and proved restrictive and inflexible. Style changeovers took too long and constraints were difficult to manage.

In Eli Goldratt's book "The Goal", he talks about the inefficiencies of linear segmented work stations. He mentions that the longer the sequence and the more segmented the line, the more inter dependency you'll have as the work moves from one operator to the next. This increases the fluctuations within a sequential process and causes a concertina effect, which puts undue pressure on operators only to be followed by gaps of no work. The pace of the line is determined by the slowest operation and the inefficiencies are baked into the process.

Linking and ratcheting of operations and people within a module creates an urgency and momentum that is more effective and efficient. In a cell the team's objective is to think in terms of flow rather than focusing on a single operation or 'job'. In other words, operators should be allowed to handle multiple processes within takt time, whether it's one, two or three and a bits worth of work. The less stages or jobs there are the less starting and finishing there is, with fewer hand over's. This approach tightens the sequence and integrates the process reducing people, WIP and lead times. It also reduces the chances of rejects and rework.

LSD THE PEOPLE- In 1998 we moved back into the factory and I opened a training room called LSD (Latest systems development).

We took groups of 15 – 20 people out of the main factory and put them through 3 – 4 months of intensive training. We trained 4 people at a time that had been assigned to cells for four to five hours a day, getting their minds around the new system, as well as dealing with the social dynamics. In these sessions, the groups chose team captains and daily interface meetings were held.

In changing individual employee's behaviors and actions we had to develop the kind of management understanding, belief in our people and commitment that would encourage them to lift their expectations of themselves and others. The traditional methods of compliance, control, constraint and contract, stifle collaboration and learning and makes it very difficult to unveil personal initiative, self-confidence, commitment and passion. Basically, we had to move on from delegation and control to coaching, helping and guiding teams into a more trusting, transparent relationship. I believe that to truly mobilize people to change something current into something that will give their company the competitive edge & winning formula, a culture of involvement and real trust has to be built. This stimulates 'valuable human asset' to be more motivated, creative and willing to use their unique knowledge and individual capabilities.

LSD MODULAR- We implemented cells with controlled kanbans and set them up around the slowest operation. This created a natural pace for that operation, which improved its output. Monitored how operators received work and how they positioned themselves to perform as ergonomically as possible. Once the cell members had gotten over their orientation stage, it became necessary to analyze the constraints in the cell to see how the team could further improve their output. This was done by finding ways to speed up machine cycle times, monitoring how operators received work and how they positioned themselves to perform the task as ergonomically as possible. The operations were balanced by timing each work element, joining the quicker ones together and giving members other tasks. As operators in the cells became multi-skilled and more output-oriented, they began to understand the benefits of continuous flow. A limit was initially set on how many pairs of shoes were allowed between workstations but the teams did away with these buffers and instead, pulled pieces through the cell to achieve optimum output, creating extra capacity. This available capacity allowed for more generic tasks to become integrated into other operations and liberated semi-skilled labour to become more skilled and to open their own cells. This continuous hiving off from parent cells and forming new ones was aptly named 'Divide & Prosper'. These changes, although isolated, had made considerable improvements in throughput times and labour efficiencies and had also encouraged an attitude of maturity and willingness. They were able to use their own judgment, which created a sense of responsibility and achievement, making them realize the integral role they played in the organization. As time passed, the teams grew in strength and maturity and reached levels of performance that would otherwise seem impossible to achieve. These team building aspects negated the need for supervisors of sections and only required team leaders to audit cells in order to improve standards and to coach members to reach these new standards. The longer people work together in a self directed team, the more attuned they become to one another's skills and abilities and the better equipped they are to handle the constraints in the process.

FROM OLD to NEW - We implemented cells throughout all six departments: - Cutting, Closing (stitching), Molding, Assembly, Sole Preparation and Making & Finishing. This ensured few delays and limited movement, therefore speeding up production and reducing the amount of WIP in and around the work areas. By integrating operations, and multi-tasking the workforce, we were able to achieve flow within departments, which eliminated the wasted time queuing in batches.

In our industry the Stitching department has always been considered the most expensive area and is often outsourced to CMT operations, but it became our most profitable department. Traditionally these departments ran between 50 – 80% efficiency and were sectionalized into clicking, pre-closing, blocking, closing, final closing - with each of these sections having to be supervised. Once we integrated all these sections and departments into one, formed work cells and multi skilled the people, we now averaged between 110% - 140% in the cells - this is

unsupervised and un-incentivized. Previously the lead time was around 15 - 18 days but we managed to reduce this to around 2 - 3 hours.

Further downstream the process was broken up into four stages, namely: molding, assembly, making and finishing. On the conventional sequential track system, output reached 900 pairs per day with 50 people – effectively producing 17 pairs/head - in just one cell after the changeover; we are now producing 65 pairs per hour with 22 people, resulting in around 550 pairs per day per cell with potential to improve. The “pairs produced per head” figure has increased to 25 pairs. Also through - put has improved dramatically in this area - from 3 – 4 days to around 2 hours, guaranteeing our customers improved flexibility, reliability, and shorter lead times.

PRODUCTION STRATEGY - Although our production lead time had reduced from around a month to a week, I still believed that we had only achieved point efficiency. We still had three completely separate departments and it was still difficult to bring together the various components required for assembling a pair. This created a large build-up of work-in-progress between stages in the plant, causing bottlenecks. We formulated a production strategy deployment plan which helped guide us in determining what we needed to do to overcome these problems.

These observations led us to the next stage - which was to move towards a vertically integrated pull system. Eddels had a massive product variation, with close to 800 variations and around 130 different elements of work performed on one shoe - we needed to simplify the business without too many side effects. I came across a formula recommended by the LEI, to conduct a style to volume ratio analysis and the results were quite astounding. This exercise proved that only 5% of the product range accounted for 50% of the sales volume. We needed to set up a repetitive cycle for these products, which we called “Core styles”. The remaining 50% of the volume was analyzed and split into groups and methods of standardization were used to establish product families. Some were moved into the “Core styles” without interfering with the flow. What really surprised us was that in the last stream, 30% of the product variation accounted for only 1.4% of the volume and we all agreed that this demanded a huge amount of money, time and effort. We were able to reduce our number of styles without affecting our sales volume. This in turn would reduce our amortization costs, save on overhead expenses and simplify the managing of the factory.

We realized that we had two very distinct sides to the business: one high volume with very similar products, and the other low volume with high product variation - running through the same plant undermining quick response and profitability. For our independent low volume orders, we set up small units on our premises. We then offered these units to individuals who had been affected by prior retrenchments, but had the ability and willingness to run their own

business units. These units have variable hours governed by weekly demand, their own wage dispensations and utilize our resources and utilities.

In the more focused “Core stream” we drew up value stream maps, continuous flow project A3’s and job element and work station A3’s which aided in process improvements, creating space and moving all departments together under one roof. This made it possible for each production point to signal its needs to the previous production operation or simultaneously when running parallel, helping to create stability and consistency and to level the production in the stream. This is far more stable than trying to ‘push’ in and co ordinate multiple schedules sent to each department from a centralized planning point.

We now needed to achieve a fixed production schedule. This was done by collecting past call off figures, examining the trends over a given period and establishing weekly averages. This made it a lot more possible to make the same styles, in a similar sequence, in the near same volume, on the same equipment, every week.

We set up integrated value streams with fixed quantity kanbans in the form of six 1 hour trolleys in order to achieve “economies of repetition” - resulting in less fire fighting, less waste, delivery of materials and components to match the cycle, lower stock levels. The people also found the system less stressful, more visual and more exciting. This allowed us to simplify the running of an unfocused factory.

As a result we successfully achieved:

- Reduction in floor space
- Increase in productivity
- Reduction in W.I.P
- Reduction in cycle time
- Reduction in overtime worked
- Reduction in inventory
- Improvement in throughput and
- Improvement in delivery.

And most importantly, a happier more involved and willing work force.