

KZN Clothing and Textile Cluster Manufacturing Competitiveness Newsletter

Vol. 1, No. 3. February 2006

Contents

Focus Article: Driving change through Just-In-Time production	2
The Eddels Experience.....	6
Manufacturing Competitiveness News.....	9

After the successful completion of a 5-month pilot project, the KZN Clothing and Textile Cluster (KZN CTC) was formally established in August 2005. The KZN CTC is dedicated to facilitating firm-level upgrading in the KwaZulu-Natal clothing and textile manufacturing industries. This commitment is embraced within each of its three programmes: Human Resource Development, Stakeholder Interface and Manufacturing Competitiveness.

Manufacturing Competitiveness is one of the KZN CTC's cornerstones with a focus on driving firm level change through its benchmarking programme. In support of the benchmarking programme, and in an effort to propagate best practice knowledge throughout the regional clothing and textile industries, the Manufacturing Competitiveness programme incorporates a large array of information and knowledge sharing activities. One of these is the programme's quarterly best practice workshop series, which runs through 2005-7. Given the critical role that these workshops should play in empowering firms with knowledge to effect positive change within their own organisations, the KZN CTC considered it important to reflect on some of the main issues raised during these sessions and to incorporate them into a newsletter series that follows the content of the best practice workshops. As such, this, the third Manufacturing Competitiveness newsletter of the series, attempts to capture, and give voice to, some of the key findings arising out of the 3rd Best Practices workshop 'JIT in support of World Class Manufacturing: A case study of Eddels'.

Finally, the newsletter also contains a short News Brief on the progress of the KZN CTC's Manufacturing Competitiveness programme, which ensures members are fully up-to-date with regards to its progress.

If you have any queries regarding this newsletter, please e-mail Ms. Jeanne Esselaar (Jeanne@bmanalysts.com). Enjoy the read!

Focus article...

Driving change through Just-In-Time production

Introduction

The first Manufacturing Competitiveness newsletter of the KZN Clothing and Textile Cluster (KZN CTC), which focused on Total Quality Management (TQM), defined lean production as "*the ability of a firm to delight its customers through Just-In-Time Production, Total Quality Management and Continuous Improvement.*" These three characteristics of lean production were highlighted as the cornerstones of World Class Manufacturing (WCM).

In keeping with the three cornerstones of lean production, the third quarterly best practice workshop of the KZN CTC focused on Just-In-Time Production. The workshop, hosted by Eddels Footwear, in Pietermaritzburg, on the 1st of February 2006, highlighted to firms that Just-In-Time Production (JIT), Total Quality Management, and Continuous Improvement are all elements of an overriding philosophy with each being inter-dependent on the others for its success or failure.

To ensure that important concepts and insights arising from the JIT workshop at Eddels are not lost, this newsletter aims to capture some of the central elements of JIT and its importance to lean production. The first section of the newsletter therefore provides a detailed definition of JIT, whilst the second section examines firms' adherence to Just-In-time Production by using data from B&M Analysts' clothing and textile database. Section 3 looks at Eddels as a case-study for implementing JIT, examining the lessons that can be learned from the firm. One of the key lessons from the Eddels workshop was that implementation of JIT relies heavily on the mindset of those within the firm as it requires

changing the fundamental manner in which a firm does business. Subsequently, motivating the labour force to partake in JIT was a major challenge Eddels faced.

1. What is Just-In-Time production (JIT)?¹

When one drops what one is doing to take care of a walk-in-client, one is reacting to a pull system. The fundamental difference between a pull and a push system is that a pull system instigates production as a reaction to current demand, whereas push creates production in anticipation for future demand. A fast-food outlet is a good example of a pull system whereas catering for an unspecified number of clients would represent a push system. So, what does either method then have to do with JIT? JIT production is a system which optimises the flow of materials through the plant, arranging for materials to arrive at each stage of manufacturing Just-In-Time to be processed and moved onto the following stage².

In other words one can think of JIT as a series of objectives that emphasise the importance of lead-time management, the incremental reductions of lead times, and the removal of waste as necessary, to reduce the lead times in manufacturing. Waste results from any activity that adds cost without adding value. JIT presumes that to achieve such reductions in lead times the system should deliver to every operator (in any conversion process) what they need just as it is needed. In this way it saves money which would be tied up in downstream inventories while protecting against longer lead times. Shorter lead times mean improved responsiveness and flexibility.

JIT aims at preventing the delays and confusion connected to the build up of materials. In that light it also saves costs that would have been incurred in storage, transporting, and managing unnecessary buffer stocks. Since JIT encourages the reduction of inventory levels, existing production problems are rapidly exposed. Lower inventory levels facilitate the rapid feed-back of any production line faults that may exist.

To make use of an analogy, wouldn't it be wonderful if when you went to the rugby, instead of cramming in with thousands of other people through the turnstiles, the ticket clearly indicated a precise time for arriving at the turnstile so everyone entered one after another in a continuous line. Would it still be necessary to have 20 turnstiles on each side of the stadium to achieve the same objective?

There are a number of ways to orchestrate the flow of materials through the plant. One is to arrange for suppliers to deliver as need dictates; there are also floor layouts, as well as kanban systems. Kanban systems are systems which confine materials to flow sequentially along predictable paths as they are required.

Kanban systems are often one of the prescribed JIT techniques. If one sets up a production system that works like a bucket brigade, one is in essence setting up a JIT system. That is, everyone in the chain takes the same amount of time to pass the bucket, and as a result the system operates without any buckets waiting between the people. If the output end of the chain slows down, then the speed at which the buckets are passed also slows. However, if the output end speeds up so too will the bucket speed increase

¹ It is important to note that a large amount of the content of this article is derived from Uday Karmarkar's article entitled, "Getting Control of Just-in-Time" published in the Harvard Business Review (1989).

² P. Gibson, G Greenhalgh and R Kerr, (1995) "Manufacturing Management: Principles and Concepts", p:169

until it is limited by the slowest member. Likewise, it can be seen that the production team disciplines its actions according to customer's needs –which is the basis of a pull system.



When kanban works like a bucket brigade, it is inherently a JIT system.

A kanban system links inventory control to the rate of production. A fixed number of signals (such as production and move cards) pull the stock through the plant in line with the production rate. By making the current work commitment of the cell immediately obvious to both workers within the cell and those outside the work cell, production cards are able to regulate the work load assigned to the work station. Move cards, on the other hand, regulate the movement of inventory between the sequential work stations. Thus the number of available cards in a kanban system dictates the flow of stock to and from each stage of manufacturing. By creating a balanced flow of stock the bullwhip effect³ is removed.

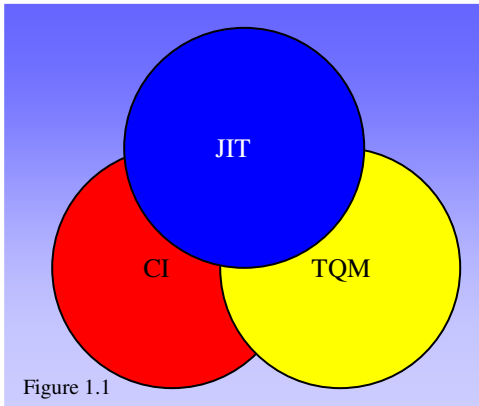


Figure 1.1

There are numerous ways in which the three pillars of World Class Manufacturing - JIT, Continuous Improvement (CI) and Total Quality Management (TQM), interact with one another. While JIT aims primarily to achieve the ideal of no buffers before each stage of manufacturing, it simultaneously creates a culture of continuous improvement, where everyone is able to contribute in small and incremental ways to improvement within the firm.

JIT also interacts with the philosophy of TQM by revealing problem areas within the production line which require improvement. If either CI or TQM are only partially implemented within the workplace it will limit the firm's ability to reduce inventory levels and lead times (the principle objectives of JIT). Lastly, it should be noted that while CI and TQM can be incorporated into the existing operating structure of a firm, JIT challenges the existing systems that firms use making it the hardest element of WCM to implement.

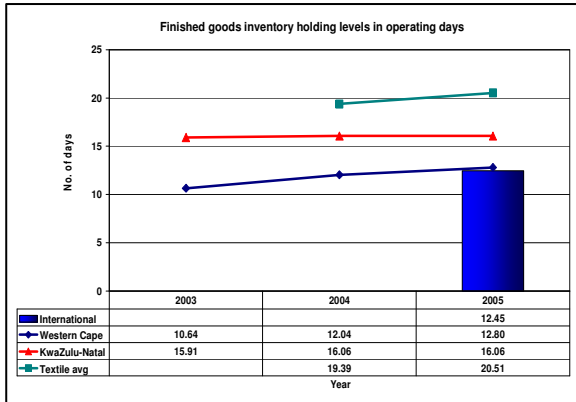
³ The bullwhip effect is the demand order variability in supply chains which are amplified as they move upstream. In other words, when there are multiple levels to the supply chain - supplier, manufacturer, distributor, customer and user - the further up the chain, the less predictable the order quantities and the greater the accumulation of stock kept by firms.

2. Evidence of JIT in SA clothing and textile firms

This section examines KZN clothing and textile firms' adherence to JIT using data from B&M Analysts' benchmarking programme that straddles both the Cape Clothing Cluster and the KZN Clothing and Textiles Cluster⁴. There are a number of indicators that can be used to measure the implementation of JIT, most notably: inventory holding (finished goods, work in progress and raw materials), lead times and operational reliability.

2.1. Inventory Holding

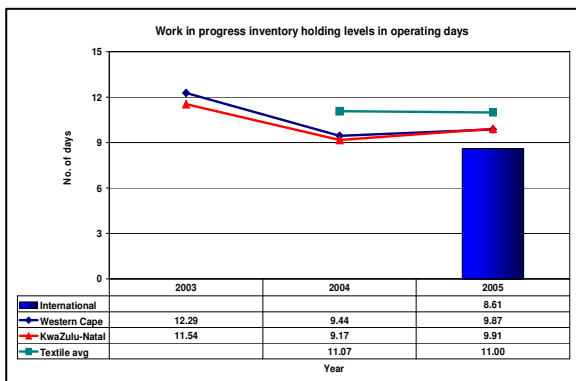
Looking at the levels of inventory held it can be seen that there is limited adherence by KZN firms to JIT principles. It can be seen from the graph below that KZN textile firms



hold onto the highest levels of FG (20.5 operating days), followed by KZN clothing firms (16.1 days), whilst international clothing firms hold onto FG for only 12.5 days. FG inventory is the most expensive inventory to hold as it has the most value added to it. The level of FG that firms have in stock indicates the mismatch between the firm's production and customers' demand. FG inventory runs the risk of becoming redundant since there is no guarantee that the stock being held is the correct inventory. While it may be

necessary to have some levels of FG as inventory to buffer against uneven consumer demand, this must be minimised to eliminate waste due to overproduction. Finally FG also has the most important bullwhip effect.

With regards to WIP inventory levels, the KZN textile firms are again the weakest performers with 11 days of WIP held. KZN clothing firms have registered an increase in the number of days WIP that they hold, from 9.2 days to nearly 10 days.

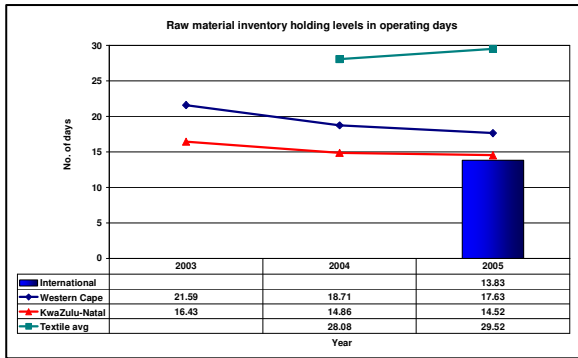


The international clothing firms are again the strongest performers with 8.6 days. High WIP levels are likely to arise from firms following mass production approaches, which are indicative of the following wastes: overproduction, poor flow of materials through the plant, excessive distances travelled, poor quality, and high overall

costs.

⁴ Note: B&M Analysts' textile database currently comprises of only 5 firms who participated in a pilot benchmarking programme.

Consistent with the WIP and FG findings the graph below shows that KZN textile firms hold the largest levels of RM whilst also experiencing deteriorating performance of 1.4 days from 2004 to 2005. Like FG, high levels of raw material (RM) inventory increases the firm's risk of holding redundant stock, while incurring unnecessary costs and reducing cash flow at firms. High levels of RM could also indicate a lack of supply chain partnerships between firms and their suppliers.



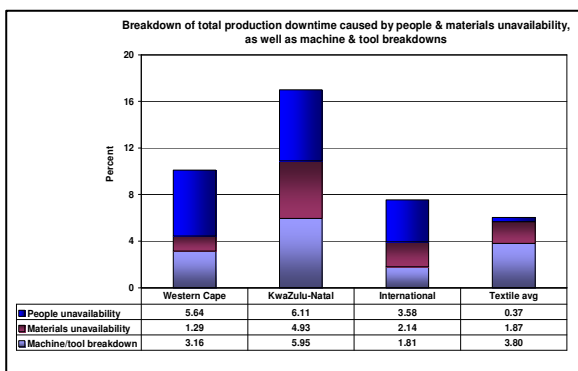
2.2 Lead times

In addition to excessive inventory holding, the lead time indicators in the adjacent graph show that if KZN clothing firms have no RM in stock it takes them 125 days to deliver to their customers domestically, while the Cape clothing firms are able to deliver to domestic customers in only 65 days (from no RM in stock). In fact, the Cape clothing firms are able to deliver to international customers (122 days) in a shorter period of time than it takes the KZN firms to deliver to their domestic customers. It is imperative that these long lead times be reduced as the longer it takes to deliver a product the more inflexible a firm is in respect of responding to changing customer demands. Short lead times provide local firms with a competitive advantage over imports. This is a concerning finding as supplying to domestic customers is an opportunity that is presently being lost.



2.3. Reliability

At approximately 6%, the KZN textile firms are the strongest performers with regards to production downtime due to breakdowns, people, and materials unavailability. In contrast, the KZN clothing firms' average production downtime is nearly three times greater than the textile average at 17%. The KZN clothing firms are also outperformed by both the international and Western Cape clothing firms. Moreover, despite KZN clothing firms holding nearly 15 operating days of RM inventory and 9.9 days of WIP, these firms have the greatest amount of downtime due to materials unavailability (4.93%), contributing 29% to their total downtime figure. This suggests that not only are these firms holding high levels of RM and WIP which is very costly, but that firms are holding stock that is not necessarily required.



If one considers the graphs presented here, there is much that KZN clothing and textile firms could benefit from by implementing a JIT system. Lead times amongst the KZN

firms are far from optimal and high inventory levels are being held at a great cost to these firms. Reducing inventory levels and lead times through the implementation of a JIT system will therefore certainly aid firms in improving their competitive position.

3. The Eddels' experience

The third quarterly best practice workshop was held at Eddels Shoes in Pietermaritzburg. The Eddels Managing Director, John Comley, began his introduction to the company by highlighting their reason for implementing JIT. It began with the question, if it takes 90 minutes to make a pair of shoes, why does it take 21 days for that same pair of shoes to come out of the factory from raw materials? This question highlighted to the Eddels' team that their production system was inflexible and costly.

The NVA problem

The principle reason for this was identified as the amount of non-value added (NVA) time the pair of shoes spent on the firm's production lines. Consequently Eddels focused on reducing the NVA time inventory spent on the production line. The biggest bottlenecks they found were not a result of the machinery they had, but rather as a result of the systems used, and the skills Eddels relied on.

The value of measurement

Over 17 years Eddels have enhanced the systems they use to govern stock flow and developed the skills of their work-force. Measurement has been a core component of this change for the simple reason that without measurement one cannot manage. Fundamental to this is that measurement allows you to gauge if new systems have led to improvement within the plant (and if so by how much) and where other areas of improvement potentially lie. Providing such information gives a factual basis for communication between the parties concerned.

Multi-tasking: the importance of educating and training

Multi-tasking is another area where firms can reduce NVA time, since less time is spent between production line work-stations. To facilitate multi-tasking Eddels began educating its employees so as to change both their mind-set and skills-set. Through training and courses, such as finance for non-financial managers, employees began to understand the importance of a multi-skilled labour force and the skills differential was gradually overcome. Additionally, using money as a short term motivator, Eddels implemented incentive programmes and gains-share schemes for groups of employees who could make improvements on various aspects of the production line which resulted in large overall improvements in productivity. These payment incentives have also seen other positive spin-offs, such as lower absenteeism (below 2%) and improved labour retention.

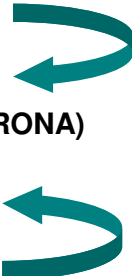
Enhanced Information and Communication Technology

Furthermore, to reduce the distance between Eddels and its retailers, Eddels has linked into the retailers electronic systems, and is thus able to monitor shoe sales and respond according to actual demand for its products (reducing the bullwhip effect). This enables the firm to respond according to customer requirements whilst also offering customers a proposition based on rapid store times rather than lower cost products.

Financial Implications

The Eddels’ model is based on the persuasive argument that financially, increasing the number of stock turns increases the return on net assets secured by customers. This is shown below:

- Sales – Cost of Sales (COS) = **Gross Margin**
- Gross margin – Expenses = **Profit Before Interest and Tax (PBIT)**
- PBIT – Interest = **Profit Before Tax (PBT)**

$$\frac{\text{PBT}}{\text{Net Assets}} = \text{Return on Net Assets (RONA)}$$


- Total Assets – (Creditors + Liabilities) = **Net Assets**
- Fixed Assets + Current Assets = **Total Assets**
- Debtors + Inventories + Cash = **Current Assets**

$$\frac{\text{Sales}}{\text{Net Assets}} = \text{Asset Spin (Activity Ratio)} \quad \frac{\text{PBT}}{\text{Sales}} = \text{Net Margin (Profitability Ratio)}$$

Asset Spin × Net Margin = RONA

Table 3.1: Example of two different stock holding policies

Chain 1		Chain 2	
Cost of sales	R100	Cost of sales	R100
Mark up	141%	Mark up	75%
Margin	59%	Margin	43%
Selling price	R241	Selling price	R175
+ VAT	R275	+ VAT	R200
Stock turn	2.5 ×	Stock turn	7.0 ×
Gross profit from every R100 of inventory bought:		Gross profit from every R100 of inventory bought:	
R141 × 2.5 = R353		R75 × 7 = R525	
Stock holding per R100 of purchases = R40		Stock holding per R100 of purchases = R14	

Based on Eddels' calculations, a major RONA advantage can be gained by retailers when purchasing from local manufacturers composed of rapidly replenishing their stocks on a JIT basis, even if costs are not aligned with cheaper imported products.

A simpler example of credit chains in Table 3.1 above clearly shows that increased stock turns can improve profitability thus supporting the Eddels argument. By implementing a JIT system firms can offer their customers more flexibility and reliability with shorter lead times that will enable them to increase their stock turns and thus their overall profitability. This provides retailers with an incentive to source more locally.

Eddels' short lead times means that retailers are able to place smaller, more frequent orders resulting in lower stock holding levels, fewer markdowns, little to no redundant stock, timeous style changes, and faster stock turns. Quick response delivery from Eddels also gives rise to fewer size stock-outs, and therefore increased sales opportunity and a reduction in the loss of sales, optimal size curve stocking, and improved stock utilization. A reduction in non-value added expenses and risk ensures a decline in bureaucracy, administration, excise, freight, forwarding and clearing expenses, reduced transport costs, and the elimination of exchange rate risk.

This lengthy list of benefits emphasises the often-significant hidden costs associated with international sourcing. As with Eddels, the critical task confronting local clothing and textile manufacturers is to transform their operations into lean systems capable of taking advantage of those key performance areas where imported products cannot compete, thus affording customers significant benefits, and themselves a long-term competitive advantage. It is, however, also important to recognize that where it is essential that local clothing and textile manufacturers respond to this challenge immediately, it takes substantial effort, dedicated commitment and prolonged time to affect such dramatic change. Eddels has, for example, reduced its product throughput time from 21 days to 3 days, but it was a transformation that took years to shape and is still continuing. Similarly, it was no one initiative that brought the firm to where it is today. It was a complete embracing of lean thinking: that is trimming all waste out of the manufacturing process – from reduced stock holding, to improved human resource management, to reduced manufacturing throughput times, improved flexibility, and numerous other smaller and larger 'hits'. Given the success of Eddels Shoes in embracing the lean philosophy and effecting change in what is a similar environment to the KZN clothing and textile manufacturing industries, the challenge to readers of this article therefore is to begin changing mindsets within their own organizations. As John Comley so effectively stated at the workshop – “excuses do not make you competitive”.

This was apparent during the course of the factory tour of Eddels. Apart from the highly motivated workforce, the flexible layout of the plant was also clearly noticeable. Minimum WIP was for example evident with flow occurring through the plants production cells. The firm's emphasise on flexibility to the customer was therefore supported by a highly flexible operation capable of producing shoes both equally and in-line with customer requirements. Limited FG was moreover evident, with the firm's short lead to customers (only 3 days) based on real production flexibility, rather than false flexibility from extreme stock holding. The firm's operations therefore enabled it to meet the flexibility proposition that it has been advocating to its competitors – true JIT performance.

Thank you note:

The third quarterly best practice workshop of the Manufacturing Competitiveness programme on JIT was a resounding success, with Mr. John Comley providing an excellent insight into Eddels accomplishments with regards to JIT and their pursuit of World Class Manufacturing. The feedback that we received from those in attendance was very positive. As such, on behalf of all KZN Clothing and Textile Cluster members, we would like to extend a warm thank you to Mr. Comley for his willingness to share his valuable insights.

Manufacturing Competitiveness News...**December and January progress report**

In preparation for the frenetic end of year period for firms, the activities under the Manufacturing Competitiveness programme of the KZN CTC for 2005 started to wind down after the 2nd quarterly best practice workshop on Total Quality Management that was held at Webroy in October. However, now that firms have returned from their shut-down period, Cluster activities are again in full swing.

The first Manufacturing Competitiveness activity for 2006 was the 3rd quarterly best practice workshop. This workshop, hosted by Mr John Comley of Eddels Shoes in Pietermaritzburg was a resounding success with excellent feedback received from firms in attendance. This workshop on just-in-time production completed our triangular series of the 3 cornerstones of lean production, namely: continuous improvement, total quality management and just-in-time production.

Beyond the Manufacturing Competitiveness cluster activities, the KZN CTC has also been in the process of completing its 5 pilot textile benchmarking reports, with valuable lessons learnt that will aid in the finalisation of a benchmarking methodology that we believe will be of great value to firms. In addition, B&M Analysts has started with its annual benchmarking programme for all member firms, with benchmarks for the first few months of 2006 already being scheduled. Lastly, to provide operational performance comparisons which are as meaningful as possible, B&M Analysts continues in its efforts to grow its clothing and textile database. In this regard, the Cape Clothing Cluster which has been operating since the beginning of 2005 has incorporated textiles into the Cluster from 2006, which will aid us in growing our South African data. With regards to international clothing and textile data, B&M Analysts already has trips to Mauritius, Madagascar, China, India, Hungary, Columbia and Spain planned for 2006 to collect international benchmarking data.

Upcoming activities

Firms are hopefully prepared for a fresh and energetic start to Cluster activities in 2006. Activities which are currently being planned for under the Manufacturing Competitiveness programme include:

- A repeat of the benchmarking champions training course which will be taking place in Ladysmith on the 23rd of February
- A 2nd expert workshop with Prof. Norman Faull on lean production is being planned for the 2nd week of March,
- A joint Manufacturing Competitiveness training initiative is being investigated,
- The last quarterly best practice workshop will take place in June,
- Benchmarking of clothing and textile firms throughout the remainder of the

- Cluster's financial year will continue to take place, and
- Based on the success of the Manufacturing Excellence Seminar Series which took place in September, this seminar series will be repeated under the Human Resource Development programme in April.