Minimize the Work In Progress in Production Lines End to Enhance the Efficiency for Beneficial Production Outcome in Apparel Industries

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ABSTRACT

MAS Linea Aqua is the leading swimwear manufacturer in Sri Lankan garments industry which is having a great combination and passionate of style architecting with modern innovations and improvements with following a long path successive way. The best way to get the competitive advantages above other industries in the field is to enhance the efficiently of the processors carried out by the company which can be used as an instrument to reduce operating costs and wastes of the company. With the intention of achieving the competitive advantages in the garment industry it's essential to enhance the efficiency of the processors and reduce the costs incurred in the company. In this study, Work In Progress in the processes of production lines end identified as a major cost and waste to a garment factory. That implies that in order to reduce the costs the efficiency of the processes in production lines end in the MAS Linea Aqua should be improved. The ultimate target of this research study is to find out the problems and issues which are prevailing in the current processes in production lines end, find out the root causes of the issues and give them feasible solutions with the intention of enhancing the efficiency and beneficial outcome with the intention of achieving their targets.

KEYWORDS: Competitive Advantages, Efficiency, Garments Industry, MAS Linea Aqua, Root Causes

INTRODUCTION

MAS Linea Aqua is a joint venture between Speedo International (UK), Brandot International (US) & MAS Holdings. With an annual production of over 12 million garments, manufacturing facility is the first of its kind in Sri Lanka and it has become one of the leading manufacturers of swimwear in the region.

In less than a decade, Linea Aqua has taken innovation to new heights with new steps and propelled Sri Lanka to the fore in performance, fashion and leisure swimwear.

It is commencing operations since 2001 and it is based just forty five minutes away from the capital of Colombo, at Giridara, Hanwella.

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The factory has grown into a state-of-the-art manufacturing facility with employing over 2,600 staff & delivering world-class products.

With the morale of the relationships of International superior global products' brands, Linea Aqua has taken the Sri Lanka into a higher standard of international performance wear crafting products that challenge the unexpected, pushing innovation to the extreme. These products rooted in the company's passion for sports as well as leisure swimwear while remixing and improving iconic designs with new technologies.

As a garment industry production process of the company takes the most important role of the factory. The production process is much complex and need to flow according to a correct and efficient manner to help keep running the factory. The production process has included wastes and costs in many types such as valuable space wastes, time consuming unnecessarily, less responsibilities etc. These kinds of issues have been caused to backward the company with limiting its improvements. Although the company has

achieved its most of the targets, due to these kinds of issues, some processes have gain inefficiencies and therefore the company could not be able to achieve the maximum production outcome due to the unnecessary costs are included.

Research Objectives

The ultimate objective of the research is to gain the efficiency of production outcome with providing effective solutions to minimize the Work In Progress in the production-line-end.

In addition, the research outcomes will be provided about uncovered wastages, insufficient resources, and failures of the process activities and also the process operations that should be improved for gain the performances to enhance the productivity of the factory. These findings will be provided a great benefit to the factory to be the cost effective and prevailing issues of the production process.

LITERATURE REVIEW

JIT has a direct impact on the inventory levels. By using this technique, it is possible to reduce the inventory levels and avoid the problems identified in the research study.

JIT means getting the right quantity of goods at the right place and the right time. All waste must be eliminated- because of they are non value added items. JIT is built on simplicity and it is easy to get understand for all. It focuses on improving every operation defined by the Kaizen study. In addition, it is necessary to install simple visible control systems which can identify the processes and operations to prevent overlapping them each others.

Pull scheduling reduces the over production. Only the required amount is produced in every stage. This will also allow the system to work with virtually no WIP. Altogether this makes a manufacturing system with very high flexibility and minimized wastes.

METHODOLOGY

Since the Linea Aqua is a swimwear manufacturer, it has to precede their production process considering with the international standards. In that situation, it is much necessary to concern about the maximum utilization of the resources. Most of wastages have been reduced by using the MAS Operating system in the factory, it was able to identify that there are some hidden cases which have an influenced on to minimize the effective results of usages of those MOS techniques. That would be a undefined barrier for the company for their way to the goal of be the best swimwear manufacturer, that they should concern more but their attention were not good enough.

The research was designed to identify and point out the issues that occur in the production process in the factory and cause with increasing the Work In Progress at the production line end and to provide feasible solutions to get recovered with these issues for reach the best results of the factory achievements.

DATA COLLECTION AND ANALYSIS

The primary data collection, all involved people for the production process such as Industrial Engineers, members of MOS core team, Production Executives, Job-Trainers, Accepted Quality Level checkers, In-line Quality Controllers, Packers of production lines and Finish Goods Collectors were concerned. In here, with valuable comments that made by them, experiences with modern techniques use for the process activities and examine daily incidences that help to point out and identify possible issue can be occurred to increase the Work In Progress were taken as the primary data which are related with the research rationale.

In secondary data collection, I considered the past data records regarding with time leads for process activities, software system outputs, details of the factory publications, and summarized details of the production process failures.

The past data records were included with leading times taken for process activities of the production lines end which are caused to the increment of the Work In Progress in the production lines end.

The research data is also included with a data collection of a time-study which provides the great help for identifying practical issues and problems.

In addition, raising problems varying according to nature of the problem and they depends on the situation. Therefore it has to use interview method to gather comments. In here, most of the cases are not pre determined. Therefore it has to perform unstructured interviews to gather these comments.

With regarding to the data analysis, the data of time differences between process activities will be graphically illustrated. Since these data correlated with contingence time durations of process activities, it is possible to perform a descriptive analysis for these data.

Data collected from time-study for particular operations for packers in production lines end provide direct identifications of necessary improvements for particular operations as well as time- wasting activities.

On the other hand text data with respect to the comments from unstructured interviews will be used to conclude particular solutions for raising problems in the present as well as in future.

Since the research is about to find feasible solutions for reduce the Work In Progress in production lines end, it is obvious to reduce the lead times of the particular operations in production lines end. Therefore these time durations can be studied from the graphical representations by considering their patterns, trends, means, variations and normality.

RESULTS AND DISCUSSION

The AQL checkers of the Quality department check a randomized sample from each carton around 33% from the carton quantity whether the sample is included with total accepted quality level or not. If they found any defects from the sample with a considerable percentage, they consider that particular garments in the carton should be re-checked. In here, production line should ready these garments to recheck the accepted quality level after correcting damages. The time duration that they need to fix the damages causes to increase the Work In Progress in the production line end as well as inside the production line because of ongoing processes has been continued until the errors were identified.

Table 1: Weekly Average Data for WIP increment due to defects

Month	Week	Time (min)
July	2nd week	95
	3rd week	133
	4th week	104
August	1st week	109
	2nd week	101
	3rd week	92
	4th week	96
September	1st week	90
	2nd week	125
	3rd week	124
	4th week	130
October	1st week	111
	2nd week	122
	3rd week	240
	4th week	119

"More than three cartons in the production line end" also means that there is an increment of Work In Progress in production lines end.

Due to issues raised from departments which are involving with the production, it is obviously causes to increase the Work In Progress in production lines end.

Work In Progress in production lines end also depends on the efficiencies of process activities perform by packers. With the purpose of identification of inefficient activities and time wastes occur due to packers, time studies were conducted.

Table 2: Time-study for Packers - Victoria's Secret Brand

Activity	Time(min)	Percentage
Prepare 30 gmts pack	18.86	21%
Paste hygine sticker	18.78	21%
Taging hang tag	18.70	21%
waiting no work	21.37	24%
counting gmts	4.29	5%
prepare audits	6.80	7%
Discussons	1.21	1%

Table 3: Time-study for Packers - Abercrombie & Fitch Brand

Activity	Time(min)	Percentage
Prepare a gmts pack	84.42	43%
Paste hygine sticker & tapes	17.00	9%
Tacking cards	56.34	29%
Waiting no work	4.84	2%
Counting gmts	9.86	5%
Writing in dockets & files	3.97	2%
Discussons	7.03	4%
Cleaning	1.11	0.50%
Prepare tack cards	4.04	2%
Prepare to check AQL	4.33	2%
Checking operations	0.12	0.50%

Considering the time study for VS garment style, it has included less operation activities than the A & F garment style.

CONCLUSION

VS packer takes the highest percentage for waiting without a work. It is highly affected to the increment of the WIP in production lines end because of since this was a thirty pieces pack, the packer could not be able to complete the packing task until fulfill the packing required quantity by the production line. Therefore, the packer has to wait until the fulfillment of garments with keeping the rest of products in production line end as a WIP.

In this case, there is a special incidence that caused to increase this packing time which is the packer has packed the garments incorrect methods such as,

- Incorrect label attached
- Packing materials were not used properly
- Carton filled with different sizes of garments
- Incorrect folding methods for garments etc.

Therefore, this packer had to spend extra time to have a training session among the ongoing process, re-pack these incorrect garments and count garments to check the quantities etc. This extra time is highly affected on increment of the WIP in production line end due to the line outcome does not depend on the packer's operation as it is true in wise versa.

Considering the departmental issues, there are nine departments have been involved to the violation of the Finish Goods process rule of no more than three cartons in production lines. In here, still production department has issues with the percentage of 41% since the Merchandising department has been increased it's percentage up to 38%.

According to the suggestions from unstructured interviews, the followings are the categorized details of raised issues which were influenced to increase the WIP in production lines end.

- Garments construction issues.
- Inappropriate methods use.
- Fabric damages and colour shading problems.
- Communication errors due to technical issues.
- Departmental issues.

According to the descriptive analysis, in the month of April processes have been taken nearly 60 minutes of total. From the beginning of May they have been reduced to 33 minutes of average and then continue until the beginning of the month of July around 40 minutes. This type of time reduction can be occurred with gaining huge problems such cases have occurred in here

due to the influenced on two reasons such that,

− Less responsibility of the corresponding parties.
− Large amount of work load available

There are particular solutions that can be made with considering the conclusions such as,

− Increase the number of AQL checkers.
− Gain the efficiency of packers and FG Collectors.
− Check the garment construction in by using new methods.
− More time-study activities to identify feasible operation methods and where the processes should be improved.
− Projects improvements necessary to Supplier Development and Finish Goods Collection.

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