

Summary

Vlisco B.V., settled in Helmond in the Netherlands, is a textile company, who prints cotton fabrics mainly for the African market. From 2004 to 2008 the production volume of Vlisco increased from 12 to 18 million yards with a yearly average piece length of 6,4 yards. The production is expected to grow to about 25 million yards in 4 years with a change in product mix to a lower yearly average piece length.

At the final department of Vlisco, the Making-up Department, the fabric is inspected and made up to pieces of 6 or 12 yards, depends on the order. The making-up machine, cuts and folds the fabric, handles 93,3% of the total production of Vlisco; this means that the making-up machine should be able to handle 23,3 million yards per year to reach the expected production of 2012. Theoretically the making-up machine is able to reach the expected demand, but the current production shows that the expected demand is not reached the current way of working. This means that the making-up machine becomes a bottleneck and that investigation is needed to improvements of the making-up machine to reach the expected production volumes and product mix. Following possibilities are discussed in this report: improvements of the current making-up machine, a new making-up machine and outsourcing (a part of the Making-up Department) to Africa.

Approach

To control the performance of a process a metric is necessary which can be influenced by the particular process; this is called a Key Performance Indicator (KPI). The making-up machine produces pieces of different lengths, but every piece has the same throughput time. The amount of pieces produced within a certain time, called productivity, is therefore the most important KPI at the level of the making-up machine.

A change of the productivity is caused by different losses. These losses are divided in three categories: operational, technical and logistical losses. Operational losses are due to the current way of working, technical losses are effectiveness losses and logistical losses are efficiency losses. According to this categorisation the productivity is divided into: theoretical, operational, net and real productivity.

Current performance and improvements

Theoretically the machine is able to reach a productivity of 1125 pieces per hour. In 2008 the operators of the making-up machine reached an average real productivity of 586 pieces per hour. The difference between these productivities is caused by a time loss of 29,4% of the total production time and by low speed of the operators or multiple operator tasks the counter has to perform. Different organisational and technical improvements can reduce the time loss to 15,9% and a real productivity

of 673 pieces per hour can be reached. Table 1 shows the current and possible performance of the making-up machine.

Table 1 Current performance and target making-up machine 2008

Productivity	CURRENT			POSSIBLE		
	Loss (% of total production time)	sec/piece	pieces/h	pieces/h	sec/piece	Loss (% of total production time)
Theoretical		3,20	1125	1125	3,20	
	operational 33,8%					24,3% operational
Operational		6,14	586	800	4,50	
	technical 19,6%					14,2% technical
Net		7,84	459	684	5,26	
	logistical 9,8%					1,6% logistical
Real		8,70	414	673	5,35	
	Total 63,2%					40,2% Total

During a time study of 25,5 hours 5 of the 11 studied operators reached a speed higher than 800 pieces per hour. It should be possible for all operators to reach this speed by practice and instruction. The most productivity gain is reached by changing the organisation of the operators of the making-up machine (3 in total). Change of the responsibilities as well as training and instruction is necessary to improve the co-operation of the operators and work as a team. The counter (puts fabric into the machine) should have the only responsibility to keep the machine running. The other two operators should give support in such way that the counter can keep producing. For all three operators it is important to understand that in a team every operator has his own responsibilities, but is willing to help the other team members.

Other improvements at the making-up machine are reached by technical and organisational changes. Also organisational changes at the level of the Making-up Department and at the level of the company Vlisco are necessary: full occupation and continuous supply. The quality of the input and the way the input needs to be treated has a negative influence on the operational productivity; investigation of this is necessary to find more improvements.

New machine

When a new machine is developed different issues need to be taken into account, because these issues define the requirements for the new machine. For the making-up machine these issues are found at different levels: the company Vlisco, the Making-up Department and the making-up machine. Most important issue is the strategic decision about the make-up format. For current make-up format the fabric first needs to be plaited at 1 yard and secondly folded in threes. This is a complex and relatively slow process and is determinative for the new machine. A change of the make-up format can result in a less complicated and faster machine. For example rolling the fabric around a core with a circumference of 2/3 yard and squeeze flat results in the same piece size, but with a different format.

Two machines for plaiting and making-up will cost in total about € 5 million. A new machine with a new make-up format will cost about € 1,72 million. These numbers are rough estimates.

Outsourcing

Outsourcing to Africa is discussed on three different levels: market level, process level and location. On market level the products for African and non-African distributors are separated, on process level the production processes are split at three positions and on location level different countries are discussed.

An important issue is the status of the brand Vlisco in Africa. The status of the fabric in Africa depends on the origin of the fabric, the Netherlands, and indicates a certain level of prosperity. When a part of the production process of Vlisco is performed in Africa the customer could get suspicious about the product: can it still be real Dutch wax?

The best choice for outsourcing to Africa is all processes after plaiting in combination with products with all destinations. This option needs an investment of € 2.467.000 and has its break-even point at 1,14 months, but products for non-African countries have an expansion of the throughput time of 3 weeks. The best location would be at the subsidiary companies at Ghana or Ivory Coast if it is possible to declare the area of the factory as a Free Trade Zone to avoid double import duties. Otherwise Togo is the best, because of its low import and export duties and its flexible import regulations in comparison with Nigeria.

Conclusion and recommendations

Improvements of the current machine and organisation around the machine can result in a real productivity of 673 pieces per hour. With the current average piece length of 6,4 yards a yearly production of 23,5 million yards is reached. The average piece length has a big influence on the capacity of the making-up machine. The change in the average piece length (product mix) determines for how long the current machine has enough capacity.

The improvements, resulting in the possible production of Table 1, are all improvements of the current way of working of the making-up machine. More improvements should be possible by changing the current way of working. By keep wondering why some processes happen and why at that particular position in the total process, possible improvements can be found. For example attachment of labels can be done at a different workstation so that it doesn't delay the making-up process. It is recommended to investigate these possible improvements before a decision is made about the development of a new machine or outsourcing. Shortly following steps are recommended:

- 1 Implementation of changes at current making-up machine.
- 2 Investigation of the current way of working to define more improvements.
- 3 Decision about if and when a new machine or outsourcing is necessary.
- 4 Investigation of the possibility of changing the make-up format for a new machine.
- 5 Investigation of the change of status when outsourcing to Africa.