

LEAN MANUFACTURING, VSM3

EXERCISE 1

Shirts Spa is a well-known company in the fashion industry. It produces and packages both tailored and catalog shirts. In the requested analysis, take into account only the family of shirts of white color.

The standard shirts available in the catalog are 30 different variants. The tailored shirts instead are highly customized based on customer's requirements. Therefore their range is almost endless.

The demand of Shirts Spa is equal to 1,500 shirts per day. Out of them, 80% (1200 shirts) are catalog shirts while the remaining 300 per day are customized. On average in a week (5 working days) are required 6000 catalog shirts and 1500 tailored shirts.

Shirts Spa works on 2 shifts of 7.5 hours each and its production process consist of 5 production stages.

At the cutting stage, catalog shirts are cut in 5 different available sizes (extra small, small, medium, large and extra-large). The tailored shirts instead are cut exactly on customer's shape, so they have their own shapes that require specific setup. Theoretically each tailored shirt may need its own setup: however, according to the production manager usually every week 100 setups are enough to produce all the requested tailored shirts.

In the collar and cuffs insertion stage, first the collar (which can be of 3 different types) and then cuffs (which can be of 2 different types) are sew on the shirt. Here, a setup is required every time you change the size of the shirt on which you put cuffs and collars.

The finishing stage consists in removing extra fabric left over from cutting phase and in controlling the quality of the shirts. This stage is shared with other product families.

Downstream of the finishing, there is the buttons insertion stage, where buttons are sewn on shirts. Each shirt requires 10 buttons.

At last, the packaging stage proceeds to iron and package shirts.

Downstream of the packaging, there is the shipment department.

The productive stages are all conducted by 1 operator assigned to the specific activity, except the finishing stage and the closing and packaging stage, where there are 2 workers.

	C/T	C/O	Uptime	Downstream stocks	Dedicated
Cutting	30 sec/piece	10 min	90%	20000 shirts	100%
Collar and cuffs insertion	8 sec. (sew collar) 20 sec (sew 2 cuffs)	5 min	100%	16000 shirts	100%
Finishing	28 sec/piece	0 min	95%	10000 shirts	50%
Buttons insertion	3 sec (1 button)	0 min	100%	15000 shirts	100%
Packaging	35 sec (1 package)	15 min (to switch from packaging tailored shirts to packaging catalog shirts)	100%	50000 shirts	60%

The agreement with customers for the shirts in the catalog is that the customer orders on a regular basis every day all 30 different variants as long as the company puts them in delivery as soon as the order arrives. For this reason, once Shirts Spa receives the order from the customer, it immediately proceed to execute the order and to arrange shipment. The company then delivers immediately after receiving the order, even several times a day, to the shops that placed the order.

Differently, orders for tailored shirts arrive daily from customers and the company estimates a delivery time equal to 1 month (4 weeks). In particular, the company collects orders for a week (Monday to Friday) and then the following Monday releases all these orders in production. In this way the company is able to better organize itself to aggregate production batches within the production system. For all orders coming in at week 1, the deadline for delivery is the end of week 4. The shipping of tailored shirts occurs once every day (at the end of the day) directly to the customer's home.

Lean Management, Value Stream Mapping

The Production Planning produces a weekly production plan, which includes both orders for tailored shirts and for the replenishment of catalog shirts stocks (every week the production planning receives data of catalog shirts consumption from the shipping). The production plan indicates what needs to be produced in the week at each stage.

Shirts Spa sends to the supplier once every 3 months the order of fabric that will be worked on in the next quarter, in order to exploit quantity discounts offered by the supplier. However, the supplier delivers the stock amount deferred in 6 different times, once every two weeks. In the raw material warehouse, there is a quantity of fabric sufficient to produce approximately 30000 shirts.

Q1: Draw the current state map of the company, in all components: material flow, information flow, and timeline.

Q2: Lately, Shirts Spa is having problem in its liquidity. For this reason, the board of directors ask to reduce the fixed capital for catalog shirts at an overall maximum of 525k€. Considering the value of each catalog shirt equal to 25€, propose the improvements for the system without structurally modifying technical data of the system and having a coherent EPE among different stages.