

# Prime safety limited essay



**ASSIGN  
BUSTER**

The Organization experimented by designing a cell to assess the potential improvements and obstacles in implementing the modular concept. This case provides an opportunity to learn the changes in operations and to evaluate whether the conversion to modular manufacturing is appropriate for SSL. Key. Fords: Production options, modular manufacturing small batch size, training and multitasking, performance measurement On 30 June 2008, MA.

Gauss, General Manager Clothing Division, Prime Safety Limited (SSL), Karachi, was reviewing a report on the results of a modular manufacturing trial at SSL.

This trial had been initiated and managed by Waist Shaft, a recently hired senior manager. Apart from the results, the report noted that the average customer order size at SSL had been dropping for some time and by the summer of June 2008, 65 per cent of the orders were for less than 1 , OHO pieces. The report concluded that in order to manage production of smaller-sized orders, Sol's usual chain production process might no longer be feasible. It proposed that in order to attain desired flexibility in producing small-size orders, SSL should look at a modular production process as an alternative.

Modular and cellular are the two terms used interchangeably in the industry with modular being the popular term. This case study was prepared by doctoral candidate Muhammad Okay under the supervision of Assistant Professor Kumara All Chat at Lahore University of Management Sciences, to serve as a basis for class discussion rather than to illustrate either effective or ineffective handling of an administrative situation. While M. A. Gauss had

seen modular manufacturing practices applied to small order quantities in garment factories abroad, he was unsure if the conversion to modular manufacturing was appropriate for SSL.

**COMPANY BACKGROUND** Prime Safety Limited, a subsidiary of the Shabby Group of Companies was established in 1997 as a glove manufacturer. In 2001, one of the garment units of the Shabby Group in Dublin was closed down and all its machines and equipments were transported and stored at SSL. Coincidentally, at the same time, one of Sol's reputed glove customers demanded safety garments as well. This opportunity encouraged SSL to establish a clothing division in 2002.

Not only did SSL already have the necessary machines that had been lying idle but some of the experienced employees from the Dublin factory were still working at SSL.

Initially, the organization began its clothing division with one sewing assembly line of thirty machines and an annual revenue of LOS\$ 300, 000. Within six months, another assembly line of thirty machines was added and revenue increased to ISIS 900, 000. SSL already had a sales office in the UK for its gloves division, which was now also utilized to fetch orders for the clothing division. This led to an increase in the orders from existing customers who now began to order work-wear garments from SSL.

In 2004, the clothing division was separated and moved to an independent facility and the number of machines was increased to ninety (see Exhibit 1 for details). PRODUCTS SSL had established itself as a manufacturer of a diverse range of corporate, industrial and protective clothing, ranging from standard

work-wear to highly technical clothing such as high visibility and fire retardant suits (see Exhibit 2). This specialized range of protective clothing required sophisticated fabrics. For example, corporate wear required fabric which was durable, resistant and tough yet comfortable.

Similarly, food industry clothing required some special finishes to ensure durable laundering properties. SSL imported these specialized fabrics mainly from China and Thailand, among others.

Sol's customers in Europe demanded varying styles with order quantities ranging between 50-5, 000 pieces (see Exhibit 3). From 2006 onwards, there was an increase 56 KUMARA ALL CHAT AND MUHAMMAD OKAY ASIAN JOURNAL OF MANAGEMENT CASES, 7(1), 2010: 55-72 in the order quantities of less than 500 pieces. SSL believed that customers with shorter quantities were more loyal and had more repeat orders as compared to others.

This encouraged SSL to focus on these short-order quantities to get a consistent flow of work.

**OPERATIONS** The SSL clothing division was situated in the Karachi Export Processing Zone (KEEP). It had 410 employees with a monthly production capacity of 50, 000 pieces. The planning and production cycle was divided into five steps (see Exhibit 4). Fabric Suppliers A majority of Sol's customers shared aggregate demand forecast in advance, allowing SSL to order the Geiger fabric before an order was placed to get the fabric weaved.

When a formal order with the exact color and finishing requirements was received, SSL shared this information with the fabric supplier to get the

fabric dyed/printed and finished as per customer acquirement and shipped to SSL.

These select groups of fabric suppliers needed up to thirty days to deliver the ordered material. Accessories Once the customer order was placed, SSL arranged the trims (zips, buttons and embellishments, if any) for the order. Except zippers, all other trims were procured locally.

It took up to a month to arrange all the trims. Cutting After laying the multiple layers of fabric on a cutting table and marking the top layer with the help of a proper pattern, manually operated high-speed cutters were used to cut multiple pieces from the layers. It usually took a week for the material to be cut.

Sewing, Ironing and Packing Workers assembled cut pieces and attached accessories such as zips and buttons. After that the garments were pressed and packed as per customer requirements. 2 Raw fabric, I. E.

, UN-dyed.

## PRODUCTION OPTIONS AT PRIME SAFETY LIMITED 57 MANUFACTURING

PRACTICES IN SEWING The sewing department at SSL employed the traditional chain system where each product that was to be manufactured was broken down into different operations. The machines were arranged as per the operations in each style (see Exhibit 5 for a typical layout for production of combat trousers). SSL followed a hybrid system of material flow.

Cut parts in bundled form were transported to the sewing room and given to the operators scheduled to complete the operation.

The operations in a particular garment were divided into three sections-? parts, presumably and final assembly. Materials flowing in the parts operations were in bundle form. An operator was expected to perform the same operation on all the parts in the bundle and set it aside or put it in a bin for the next operation. Bundle routing identified the basic operations sequence of production and the work centers where the operations were to be performed. In sub-assembly and assembly operations, SSL modified the progressive bundle system with its experience of short- order quantities.

At each operation, workers placed each completed piece in the bin of the next operator. This modification improved the throughput time. The advantage with this system was that each worker repeatedly performed a single, repetitive task on each garment in a batch of identical items, thereby developing expertise and rhythm that resulted in high levels of speed and productivity. Workers in the sewing department were regular salaried staff with a female ratio of 90 per cent. This was against the industry norms because a majority of the garment units were working with contract labor with a female ratio of less than 30 per cent.

Workers had no formal training and acquired skills on-the-job.

These skills were based on conventional working practices. The workers were graded in three categories according to their skills. Grade 3 operator with basic machinist skills was the lowest machine operator grade while Grade 1 was the most skilled (see Table 1). Different salary brackets were defined for

these grades to acknowledge the skill diversity. In Table 1 Proportion of Operators with Specific Skills Operator Grade Proportion of Operators Grade 1 Grade 2 Grade 3 10% 30-35 % 55-60 % Source: Company documents. 8

KUMARA ALL CHAT AND MUHAMMAD OKAY ASIAN JOURNAL OF MANAGEMENT CASES, 2010: 55-72 addition to this, SSL was also providing transportation and subsidized dining facility to the workers.

MODULAR MANUFACTURING AT SSL In March 2007, SSL hired a senior manager, Waist Shaft to look after the operations of the clothing division. He was a business graduate with some consulting experience. Gauss told Waist: You have experience of seeing garment operations in a number of units. I want you to view our operations critically.

The competitive pressures are increasing and we are facing stiff competition from China.

What changes can we make in our operations to meet this competition?

Waist spent two weeks studying the operations and interviewing different employees for insights on various issues. At the end of this exercise, he submitted his orientation report to the senior management. One of the significant changes that he suggested was converting the sewing floor from the traditional chain system to the modular manufacturing system.

The increasing number of small-order sizes mitigated the advantage of employing a chain system because by the time the workers started acquiring the rhythm, the order was completed and a new style was begun, which had similar operations but varying work content. Style change on an average took usually six to eight hours for basic products.

During this period, the old style was eliminated from the assembly line and gradually replaced with the newer style. Output during this time period remained less than the target (see Exhibit 6 for statistics on the traditional system).

In addition, sewing an average garment took twenty-five minutes of actual labor, while it took around nine hours to pass through the sewing room. These discrepancies led Waist to think about alternate manufacturing practices. He decided to run a modular manufacturing trial to assess potential gains.

ESTABLISHMENT OF THE II DEPARTMENT Following the industry norms of not having scientific ways of measuring capacity and productivity, SSL was also working without a proper Industrial Engineering (II) department. The production manager used his judgment to establish capacity for a PRODUCTION OPTIONS AT PRIME SAFETY LIMITED 59 reticular style.

This capacity was then used for production planning, costing and order booking and set as a target for sewing room operators. The sewing department started working on a particular order as per plan by employing the layout set by the production manager. When Waist discussed the idea of setting up an II department with the production head at SSL, the latter replied: It works well only when you have a long production run where workers perform repetitive tasks and you can standardize the operations. The II department may not be that beneficial when there is a style change every eek.



After consulting with the senior management, Waist started the II department by hiring one industrial engineer. II ACTIVITIES In order to assess the capacities, the first task that the II department did was to conduct time and motion studies on various styles. This helped to assess the potential for improvement. For example, they studied the style of one of the regular products produced at SSL. The current daily target for this product was 175 pieces.

The II department conducted time and motion studies and subsequently suggested some work aids (see Exhibit 7) to reduce he cycle time at different operations.

These changes in workstation layout Were implemented, despite some resistance from the production staff, which improved the sewing room productivity by 40 per cent. This success strengthened the management's confidence in IF. UNDO (GENOME) TRAINING PROGRAMMER In July 2007, SSL opted for a training programmer named GENOME, a joint project of the united Nations Development Programmer (UNDO) and Pakistan Readmes Garments Manufacturers & Exporters Association (PROGRAM), aimed at gender promotion in the garment/clothing sector through skill development.

Kurt Salmon Associates (ASK), a renowned international consulting organization, was hired by GENOME to help in establishing training units in selected garment factories. The consultants were required to train the master trainers of all these factories as well as the workers in scientific methodologies.

In addition to this, consultants were also going to provide 60 KUMARA ALL CHAT AND MUHAMMAD OKAY guidelines in the improvement of any one department of the organization. This could be Industrial Engineering, Sewing Room Production Management, Cutting Room Management or Quality Assurance.

SSL hired four industrial/textile graduates with three months of extensive training from ASK on industrial engineering applications. During this period, these engineers under the guidance Of the consultants set up a fifteen machine training centre at SSL. The objective was to train the workers who had no prior experience of stitching and to retrain the existing operators to improve their skills. Industrial engineers selected the workers by using training aids to check for hand-eye coordination, finger dexterity and color blindness so that the right persons could be selected for the job.

The workers who qualified for the job were trained systematically, moving gradually from basic paper exercises to fabric exercises. At the end, stamina building exercises were conducted to increase productivity. Those workers who attained 70 per cent capacity, qualified for graduation. This process took about two months while it cost approximately CSS\$ 140 a month per trainee, depending upon the operation on which the worker was being trained. SSL opted for acquiring industrial engineering guidelines from ASK.

The ASK consultant evaluated Sol's operations and recommended modular manufacturing for better operational efficiencies.

II personnel were provided guidelines on implementing modular manufacturing. ASK emphasized that skill inventory, product selection, staff

selection and compensation systems were important considerations while implementing modular manufacturing. CELL DESIGN In May 2008, SSI\_ designed its first cell after a lot of deliberations. The main issue was the availability of multi-skilled workers.

There were a few multi- skilled workers already working at SSL, but the production department was not willing to spare them because that could affect the production of the inning orders. Hiring multi-skilled workers for a trial run was expensive and risky.

When I discussed this idea with the production department, the reply was: 3 After a trainee had developed the necessary skills, he started developing his stamina by practicing progressively on a particular task for longer periods. 4 Capacity is an operators potential performance level. It is determined by time study.

During training, the capacity of an operator is compared with his actual output. PRODUCTION OPTIONS AT PRIME SAFETY LIMITED 61 Where are you going to get multi-skilled operators from? Even if you can arrange for them, it will still be an impossible task to manage. For example, if one operator is absent, how will you get another operator with the same skills? When discussed with the sample rooms head, he commented: believe this will not work because when operators perform repetitive tasks they are more productive as compared to working on multiple operations.

Secondly, labor cost will rise, as you need to pay more to cell workers while productivity benefits will not be significant. Finally, machine utilization will be reduced because all the machines in the cell will not be working at the same

mime. Therefore, we need to focus on the chain system and try to improve that rather than going for an expensive and difficult option. After considering various alternatives, it was decided to use sample room workers who were multi-skilled and experienced enough to take up this challenge (see Exhibit 8 for skill matrix).

Waist commented on this decision: We also had some very short-order quantities of up to a 100 pieces. The multi-skilled sample room workers produced these orders by working on a batch system or full piece basis as appropriate. This competency of sample errors in terms of their capability to do multiple sewing operations and handle multiple machines led us to select them for the modular trial. The only point of concern was that the sample room workers were not productivity conscious because of their nature of work. The II department reviewed various products and selected the combat trousers to be produced in the cell.

This was a 650-piece order and the skill requirement was of medium complexity. The sample room workers were given training to understand their role while working in cells. The sample supervisor, trained in basic dollar manufacturing concepts, was selected to lead the cell. <sup>5</sup> This department has the most skilled workers because they are the ones who develop the initial product samples for buyer approval before starting actual production.

<sup>6</sup> This is when each operator stitches the whole garment rather than a particular portion of it. <sup>2</sup> KUMARA ALL CHAT AND MUHAMMAD OKAY In consultation with the cell supervisor, the first cell designed by the II

department had eight operators and fourteen sewing machines. Most of the machines had different sewing capabilities and were selected according to the particular operations needed in the production of a combat trouser. In the traditional chain system, each worker was assigned to a specific machine and had to perform a specific operation, but in cell manufacturing, operators had to perform multiple operations which may be on different machines.

Additionally, if a machine broke down, the workers would not sit idle waiting for repairs as was the traditional norm. They would move to another machine within the cell to continue while the mechanic would either repair the machine or replace it.

The bundle size in the cell was seven pieces unlike the chain system in which ACH bundle was of about sixty-five pieces. Also, the throughput time for a garment was dropped to six-and-half hours. In a cell, the bundle was split and passed from operation to operation as individual units.

The first operator would perform the assigned operation on the first piece in the bundle and then place the completed piece next to his/her workstation where it was accessible to the other operator.

The next operator would perform the second operation, and then place the piece beside his/her station and the next operation, and so on. When there was a bottleneck at any operation, the preceding operation, was stopped and the cross-trained operator moved to the subsequent operation in order to clear the congestion further down the line, and continue to put work through the cell.

In this manner, the workers balanced their work to make sure that the batch moved through the cell as quickly as possible. See Exhibit 9 for cell configuration-placement of machines, workers and work flow. TRIAL RESULTS The cell trial was run for six days and it showed a number of improvements over the chain system.

Direct labor had decreased for the same output. Indirect labor such as helpers and quality checkers had also been reduced. In the chain system, there were two to three quality checkers, while in cell manufacturing there was only one quality checker within the line.

Offline quality checking was the norm in cell manufacturing and any defect that was found could be quickly and easily corrected. This improved the quality as there was less work-in-process and quality problems could be identified before the production Of many defected garments.

The labor cost/head rose because this process required multi-skilled operators. However, cell output also increased (see Exhibit 10 for cell statistics). PRODUCTION OPTIONS AT PRIME SAFETY LIMITED 63 There were some issues and drawbacks associated with modular manufacturing.

The most important one was the availability of multi-skilled operators. Although SSL had its own training centre to train the operators in various skills, but whether existing operators would be willing to work in cells was a question mark. Moreover, training a multi-skilled operator was time consuming.

Another important concern was work management in the cell. Unlike the traditional system where each worker was accountable for only his own work, the operators in the cell were accountable for overall cell productivity.

For example, if a worker in the traditional system was assigned to attach collars, he was only responsible for the number of collars attached by him, but in a cell he had the responsibility of the number of garments produced by the cell.