

# 5S Application and Semi-Finished Products Inventory Monitoring to Create Clean Work Area in PT Asta Kriya

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**Abstract**—PT Asta Kriya is one of the SMEs engaged in Indonesian traditional handicraft souvenirs making and established under the assistance of Yayasan Darma Bhakti Astra (YDBA). This research is conducted at PT Asta Kriya using business coaching method, where the author will discuss and observe the production process in PT Asta Kriya. Problems that occur at PT Asta Kriya, based on the results of discussions with the owner and direct observation, are not well-organized work area and the occurrence of the build-up of semi-finished products in the work area. If these conditions continue to happen, then the potential waste will pile up in the work area of PT Asta Kriya. These problems arise because of the absence of a system that regulates the layout of the work area and lack of supervision of semi-finished products inventory. Implementation of the 5S concept in PT Asta Kriya work area uses qualitative method by comparing differences before and after implementation. From the results of the 5S implementation in this business coaching, work area of PT Asta Kriya looks more organized with the sorting of unused items, the classification of semi-finished products, and the provision of floor marking in the work area. Supervision of semi-finished products is done by making a stock card for semi-finished products to supervise inbound and outbound activities of the product.

**Index Terms**—5S, semi-finished products monitoring, work area

## I. INTRODUCTION

The core business of PT Asta Kriya is to produce souvenirs for their customers. The work area at PT Asta Kriya consists of production sections in accordance with the flow of the production process. The lack of supervision and awareness from the management of PT Asta Kriya caused an inefficient production process. After direct observation in the field, it was found that the work area at PT Asta Kriya was not well organized. Work tools were not in place and semi-finished products were stacked and not placed according to their type. For information, semi-finished products are intermediate products used in the production of final products. If semi-finished product is not regulated properly, there might be a waste in the production process at PT Asta Kriya. The absence of a system that regulates the supply of semi-finished products is also an obstacle for well-regulated activity of inbound and outbound logistics in the work area.

The messy work area conditions and the semi-finished product build-up made Mr. Ade Kresna wish to change the look of current work area into a better one. Mr. Ade Kresna also wanted to improve supervision of semi-finished products. In daily production process at PT Asta Kriya, semi-finished products made for customer supplies or orders were not properly monitored. It caused waste of raw materials and stacks of semi-finished products in the work area. To address this issue, work area can be arranged using 5S concept. Structuring the work area to avoid waste is one of the Kaizen pillars, namely, housekeeping. Kaizen has three pillars that cover its philosophy: housekeeping, waste management, and standardization. Housekeeping, also known as gamba in Japanese, is basically managing the work area which aims for change. One way to implement the housekeeping pillar is to implement the 5S concept [1].

Kaizen concept was first implemented by Imai in 1986 to increase efficiency, productivity, and competitive value of Toyota. Since then, Kaizen has been part of the manufacturing system in Japanese companies and has contributed greatly to the success of manufacturing companies [2]. This 5S concept is suitable to be applied at PT Asta Kriya to improve the environment in the work area and to prevent potential waste in their production processes. Semi-finished product supervision systems can also be applied using the 5S concept which has a philosophy of continuous improvement.

Implementation of 5S at PT Asta Kriya is expected to increase productivity and efficiency of the production process in their business. 5S is a system of continuous improvement that aims to reduce waste, clean work area, and increase worker productivity [3].

## II. LITERATURE REVIEW

### A. Business Canvas Model

### B. SWOT Analysis

Based on the SWOT analysis, TOWS matrix is made to enhance the strategy considering relationship between strengths, weaknesses, opportunities, and threats. TOWS matrix helps to

<b>KEY PARTNERSHIPS</b>	<b>KEY ATIVITIES</b>	<b>VALUE PROPOSITIONS</b>	<b>CUSTOMER RELATIONSHIPS</b>	<b>CUSTOMER SEGMENTATIONS</b>
<ul style="list-style-type: none"> <li>• Artisan</li> <li>• Supplier</li> </ul>	<ul style="list-style-type: none"> <li>• Customer order</li> <li>• Production process</li> <li>• Delivery</li> <li>• Marketing</li> </ul>	<ul style="list-style-type: none"> <li>• Provide customized souvenir</li> <li>• Good quality souvenir with continuous innovation</li> <li>• Premium price with good quality</li> </ul>	<ul style="list-style-type: none"> <li>• Co-creation with customers of PT Asta Kriya</li> </ul>	<ul style="list-style-type: none"> <li>• PT Asta Kriya has segmented market, which are companies that need good quality souvenir for their event</li> </ul>
	<b>KEY RESOURCES</b>		<b>CHANNELS</b>	
	<ul style="list-style-type: none"> <li>• Human resource</li> <li>• Workshop gallery</li> <li>• Production machine</li> </ul>		<ul style="list-style-type: none"> <li>• Sales Force</li> </ul>	
<b>COST STRUCTURES</b>		<b>REVENUE STREAMS</b>		
<ul style="list-style-type: none"> <li>• Fixed cost: employee salary</li> <li>• Variable cost: raw material, electricity, transportation</li> </ul>		<ul style="list-style-type: none"> <li>• Payment from customers</li> </ul>		

Fig. 1. Business model canvas.

<p><b>STRENGTHS</b></p> <ul style="list-style-type: none"> <li>- Ready-to-use souvenir for the customer of PT Asta Kriya</li> <li>- Innovation in using raw material to produce good quality products</li> <li>- Loyal customer of PT Asta Kriya products</li> </ul>	<p><b>WEAKNESSES</b></p> <ul style="list-style-type: none"> <li>- Lack of monitoring system in production process</li> <li>- Unorganized work area</li> <li>- Build-up of semi finished products inventory</li> </ul>
<p><b>OPPORTUNITIES</b></p> <ul style="list-style-type: none"> <li>- There are few competitors in market segment so that market penetration can be maximized</li> <li>- There is opportunity in export market of handicraft products</li> </ul>	<p><b>THREATS</b></p> <ul style="list-style-type: none"> <li>- Threats from modern souvenir products</li> <li>- Craftsmen who cannot fulfill special order requests from customer of PT Asta Kriya</li> </ul>

Fig. 2. SWOT analysis.

identify relationship between four factors systematically and to establish the strategy based on that relationship [4].

From the matrix above, WO strategy is chosen because it fits PT Asta Kriya problem. Internal improvement is needed for potential external program in the future.

**C. Weighted Pareto Gap**

From Pareto gap analysis, the focus of this business coaching is to implement 5S concept and to create semi-finished product monitoring.

**D. 5S Concept**

One of the tools from the Kaizen concept is 5S culture. 5S is one of important steps that must be done in order to improve lean production culture [5]. 5S is a technique that helps to tidy up the work area. By using a systematic method, a safe, clean and more organized work area can be created. This technique is done by removing unused items and seeing the changes that occur [6].

The steps of 5S are as follows:

- Sort (*Seiri*)

The first step is to remove all excess goods that are not

<b>STRENGTHS</b>	<ul style="list-style-type: none"> <li>- Ready-to-use souvenir for the customer of PT AstaKriya</li> <li>- Innovation in raw material to produce good quality products</li> <li>- Loyal customer of PT AstaKriya products</li> </ul>	<b>WEAKNESSES</b>	<ul style="list-style-type: none"> <li>- Lack of monitoring system in production process</li> <li>- Unorganized work area</li> <li>- Build-up of semi finished products inventory</li> </ul>		
<b>OPPORTUNITIES</b>	<ul style="list-style-type: none"> <li>- There are few competitors in market segment of the company so market penetration can be maximized</li> <li>- There is opportunity in export market of handicraft products</li> </ul>	<b>SO (MAXI-MAXI)</b>	<ul style="list-style-type: none"> <li>- Open export market segmentation</li> <li>- Products differentiation</li> <li>- Development on product machine</li> </ul>	<b>WO (MINI-MAXI)</b>	<ul style="list-style-type: none"> <li>- Improve work area and increase monitoring of production process to maximize production capacity</li> </ul>
<b>THREATS</b>	<ul style="list-style-type: none"> <li>- Threats from modern souvenir products</li> <li>- Craftsmen who cannot fulfill special order requests from customer of PT AstaKriya</li> </ul>	<b>ST (MAXI-MINI)</b>	<ul style="list-style-type: none"> <li>- Improve marketing program.</li> <li>- Training and sharing knowledge to craftsmen of PT Asta Kriya.</li> </ul>	<b>WT (MINI-MINI)</b>	<ul style="list-style-type: none"> <li>- Find other craftsmen who have skill in making traditional and modern arts</li> </ul>

Fig. 3. TOWS matrix.

TABLE I  
WEIGHTED PARETO GAP

No	Gap	Value	Weight	Value x Weight	%	% Cumulative
1	5S application	80	3	240	26.7	26.7
2	Semi-finished product monitoring	100	4	400	44.4	71.1
3	Marketing program	70	27	140	15.6	86.7
4	SOPs	60	2	120	13.3	100
				900	100	

needed in the next process from the work area. Red tags are given to items that are not needed. These items are moved to a place outside the work area. Items that are not needed at all are discarded (Gupta and Jain (2014)).

- Set in order (*Seiton*)

The second S focuses on effective storage and sharing [7]. Activities on this second S include labeling each item, using colors for identification, giving names and numbers to anything, painting floors, and using shelves and boards for work tools [8].

- Shine (*Seiso*)

The third S focuses on cleanliness. Daily hygiene must be maintained to create a better work area. This third S guarantees the comfort and security of the work area [7]. A clean and tidy work area acts as a motivating factor for employees. Every employee enjoys their work in a clean and healthy place that increases self-confidence [8].

- Standardize (*Seiketsu*)

To build standards, employees have a very important role. Every employee knows their respective roles and responsibilities which are carried out regularly. The best work practices are carried out and different ways are found to ensure that everyone does their individual activities in their workplace [8].

- Sustain (*Shitsuke*)

The last S is the hardest thing to do. Discipline must be maintained. Guidance must be given routinely to employees, and there should be a reward system to motivate employees. The system can be in the form of financial or formal certificates (Gupta and Jain (2014)).

The application of 5S will result in a significant reduction of materials and places needed for production operations. 5S keeps the flow of activity smooth and efficient. Successful 5S implementation will improve the work area and encourage



Fig. 4. Example of stock card placement in semi-finished products shelf.

employees to increase their productivity and reduce waste and in-process inventory [3].

### III. RESEARCH METHODOLOGY

In conducting business coaching, a framework is needed as activity guide in this study. The framework includes data collection for the final activity in this business coaching. It aims to get results in the form of an action plan. First method of data collection is interview with founder and employee of PT Asta Kriya. Second method is direct observation in work area of PT Asta Kriya. The last method is discussion with founder of PT Asta Kriya about the problem occurring in PT Asta Kriya.

Based on the analysis in previous chapter, this research will focus on 5S implementation and monitoring inventory of semi finished products. 5S concept will be implemented in work area of PT Asta Kriya and monitoring of semi finished products inventory will be using stock card.

### IV. RESULTS

5S implementation in PT Asta Kriya was conducted in work area and the goal was to create clean and organize work area. Semi-finished products in work area are categorized and labeled based on type and size. Floor marking is made to keep shelves, machine, and tools in order.

Stock card is used to monitor the activities of semi-finished products. Inbound and outbound products are recorded using this stock card.

### V. DISCUSSION

#### A. Socialization and Seiri Implementation

The first stage of 5S implementation was to socialize the 5S concept to all employees of PT Asta Kriya. This socialization aims to increase employees' awareness of the importance of implementing 5S in their work area which aims to create clean and orderly working conditions. When the author socialized 5S, almost all employees of PT Asta Kriya did not know the function of 5S that would be applied. A system that regulates semi-finished product placement and awareness to keep the product and stuffs in place are still lacking. This condition has an impact on the messy work area and the accumulation of semi-finished products in the work area.

After socialization was carried out, the next stage was the process of selecting items that are still used and unused in the production area of PT Asta Kriya. It aims to discard unused goods that fill the work area and make the work area messy. Items that are still in use are categorized according to the frequency of their use and placed in appropriate places and labeled. At this stage, PT Asta Kriya employees assisted to sort out items that are still used and not used in the work area.



Fig. 5. Stack up of semi-finished products.

For items whose functions are unknown, they are temporarily placed in the red-tag area and given a red label. The red-tag area serves as a temporary storage area before it is decided whether the item remains stored or will be disposed.

This stage focuses on the selection of used and unused items. For unused items, the first step is to collect them in one place and then dispose of them. Strong commitment from PT Asta Kriya's management is needed to dispose of items that are not needed in the work area in order to create a clean and well-organized work area. The author then discussed with Mr. Ade Kresna, as the owner of PT Asta Kriya, to help choosing items that would be disposed of and items that could be reused.

### B. Seiton Implementation

The second stage is to categorize semi-finished products by name and placed them into shelves to be labeled. Previously, these semi-finished products were scattered everywhere and there was no marking on the item, thus making the work area messy and creating potential waste. Waste here can occur because when employees make a product, they do not see the supply of the semi-finished product and cause a build-up of semi-finished products and waste of raw materials.

The first implementation at this stage is to categorize semi-finished products in the work area. In this categorization process, the author was assisted by PT Asta Kriya employees to help identifying the types of semi-finished products in the work area. All semi-finished products were collected and sorted according to size and type. At this stage, there was difficulty in placing the semi-finished product due to the limited number of shelves available at PT Asta Kriya. The author discussed with Mr. Ade Kresna regarding this issue, and Mr. Ade Kresna could help by providing shelves for semi-finished product placement. Semi-finished products were placed on the shelf alphabetically and adjusted to the number

of products at that time. Semi-finished products in large bulk were placed on certain shelves to facilitate storage.

After semi-finished products were categorized and labeled on a shelf, the next step was to mark off the floor to classify the production area. Marking was done on the goods rack, work table, and cutting machine in the production area. A yellow label is mark for the work area and a red label is mark for the red-tag area. The provision of yellow floor marking aims to provide limits to things that potentially can make people trip, fall, or "stuck between them" [9].

This stage also regulates the placement of work tools in the work area of PT Asta Kriya. Work tools were placed in the work area by hanging them on the wall provided. The placement setting of work tools aims to make the tools easier to find during the production process. In interviews with several employees prior to the 5S implementation, production employees experienced difficulties to find work tools. This has an impact on employee productivity at work. The placement of work tools is expected to help production employees during the production process.

Board for writing customer orders was put together with work tools. This aims to maximize the use of space in the work area. Because work tools used daily are not too many, the empty space on the wall of the placement of work tools was used to put the blackboard of customer's order.

### C. Seiton Implementation

In *seiso* process, the author was assisted by Asta Kriya's employee to do the cleaning process in the work area after categorization of semi-finished products and floor marking. The process of cleaning work area used a broom and mop.

### D. Seiketsu Implementation

The next stage is the implementation of *seiketsu*. The implementation of the 5S program at this stage also regulates

the activity of inbound and outbound semi-finished products in work area. The supervision process for inventory of semi-finished products was done by using stock cards for each semi-finished product in PT Asta Kriya work area. Semi-finished product supervision process aims to prevent the build-up of product inventory and to prevent waste of raw materials. Before 5S program was implemented in work area, employees of PT Asta Kriya's production department always used new semi-finished products without seeing any supplies in the work area. Semi-finished products that are stacked without labeling make it difficult for production employees to notice. Employee could not see that supply of semi-finished products were actually available in the work area, resulting in a buildup of semi-finished products in the work area. Semi-finished products that accumulate more and more cause the work area to become narrow and not well organized.

In the stock card of semi-finished products, there is a column for the activity of inbound and outbound semi-finished products. It aims to oversee the supply of semi-finished products in the work area. With this stock card, it is expected that when there is an order from customer, PT Asta Kriya employees can see the supply of semi-finished products in the work area to prevent build-up. In addition, the use of HMR raw materials for the production of semi-finished products reduces waste of raw materials and makes production process more effective. Semi-finished product stock cards are placed next to semi-finished product racks to make it easier for employees to find the stock card and adjust the position of semi-finished products on the shelf.

The process of supervising semi-finished product inventory aims to implement poka-yoke system in the production process of PT Asta Kriya. Poka-yoke system is aimed at error proofing in a process [10]. Error prevention here is found in the process of semi-finished products taking in the work area. Before 5S is implemented in the work area, semi-finished products were only stacked without marking or labeling. This condition increased product error in the production process and lead to product defects. After applying 5S and using stock cards to oversee the supply of semi-finished products, errors in taking semi-finished products decrease. Marking the types of semi-finished products and the use of stock cards help PT Asta Kriya employees to take the product correctly.

#### *E. Shitsuke Implementation*

After production work area was marked and cleaned, the next step was the process of maintaining the clean and orderly work area. This process was done by giving re-socialization and appointing one of the employees to be in charge of 5S implementation enforcement. The socialization aims to explain the importance of the 5S program that has been implemented in the work area and explain the importance of employee awareness to maintain the cleanliness of work area. It is intended that the 5S program that has been implemented will continue to run well in PT Asta Kriya work area.

The person in charge of the 5S program enforcement is Mr. Bobby. His duty is to oversee the enforcement of 5S program

that had been implemented in the PT Asta Kriya work area. 5S supervision includes the implementation of cleanliness in the work area, placement of semi-finished products according to place and label, and supervision of stock card filling of semi-finished products in the work area.

In addition, at this stage the author also provided posters related to 5S and photographs before and after 5S implementation in the work area. This action was intended as a reminder for employees in the work area to maintain the cleanliness and tidiness of the work area at PT Asta Kriya. The process of cleaning the work area as a whole is done every week on Saturday which aims to maintain cleanliness of the work area.

In this last stage, the author had problems related to time. The author had not been able to evaluate the implementation of the 5S concept in the work area that has been implemented. Evaluation model that can be applied in this work area is PDCA cycle. PDCA cycle helps the management of PT Asta Kriya in the supervision process which aims to improve the stages that have been done before.

#### VI. CONCLUSION

- The application of 5S program in PT Asta Kriya in order to create clean and well-organized work area is carried out in 5 stages in accordance with the 5S concept. Although the implementation of 5S in the work area cannot be measured quantitatively, the goal of implementing 5S concept in the work area is to make the work area clean and tidy, to arrange work tools in their place, and to categorize semi-finished products in work area.
- The expected continuation of 5S concept implementation in the work area is to keep overseeing semi-finished products in the work area. Supervision of semi-finished products is done by using stock card for each semi-finished product. With semi-finished products stock card, the activity of inbound and outbound semi-finished products in the work area of PT Asta Kriya can be monitored, in hope of preventing product buildup and increasing efficiency of raw materials usage in the production process.

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