

KAIZEN IMPLEMENTATION IN CUTTING AND SEWING PRODUCTION TO IMPROVE THE PRODUCTIVITY AND EFFICIENCY IN APPAREL MANUFACTURING INDUSTRY

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Abstract- Kaizen, a Japanese philosophy of continuous improvement, is a globally recognized approach to enhancing productivity, efficiency, and quality. It involves making small, incremental improvements regularly, involving everyone in an organization. This mindset emphasizes waste elimination and constant improvement, spanning various industries. Kaizen is a significant tool in lean manufacturing, promoting ongoing enhancements in performance, cost, and quality, with everyone from top management to frontline workers actively engaged in the process. This approach is gaining traction in textile and apparel manufacturing, combining work and process improvement while controlling costs.

Keywords: Kaizen Implementation, Productivity and Efficiency, Time study

I. INTRODUCTION

In the fast-paced world of apparel manufacturing, staying competitive means continuously finding ways to enhance productivity and efficiency. One powerful approach gaining traction is Kaizen—a Japanese philosophy of continuous improvement. Specifically applied to the cutting and sewing stages of production, Kaizen offers a systematic method for driving positive change. This introduction will explore how Kaizen principles can be leveraged to significantly boost productivity and efficiency within the apparel manufacturing industry, ensuring it remains at the forefront of global production standards.

CUTTING

This department is responsible for cutting of fabrics and feeding sewing department with cuttings. Cutting department's capacity is planned as per daily feeding requirement to the sewing lines. Cutting department set up with cutting department head, cutters, spreaders, quality checkers, and helpers for sorting, ply numbering and bundling.

SEWING

Main jobs of the sewing department are stitching of garment. In the sewing floor, various types of production systems and line layout are used. Factories either work in an assembly line or group system. Major tasks of this department are as follows but not limited to these only.

II. OBJECTIVES OF THE STUDY

The study's objective is to evaluate the extent to which the kaizen is implemented in the organization. The study helps the garment industry to make further benefits like the following,

- To make continuous improvement in product and process quality by identifying values.
- To eliminate Muda or Waste.
- To lower rejection/defects and cost.
- To further increase Productivity.
- To promote Innovation.
- To increase worker's morale and accountability through effective participation.

III. METHODOLOGY

RESEARCH DESIGN:

In order to determine the feasibility of implementing Kaizen in an garments manufacturing industry, it is necessary to use the success factors required for the implementation of the continuous improvement system in enterprises that indicate the level of feasibility of the method. The survey obtains primary data from production department and it uses online resources.

EXPLORATORY DESIGN:

Exploratory research focuses on gathering data using an informal or unstructured format in order to comprehend it. It is frequently used to categories issues or possibilities; it is not meant to offer definitive data from which one may choose a specific course of action.

PRIMARY DATA

Primary data are first-hand, unprocessed information that has been gathered especially for the current study issue. Primary data are unedited, uncooked, and have not yet been given any kind of illuminating interpretation. Primary data sources often result from some kind of exploratory, descriptive, or informal inquiry.

TOOLS USED:

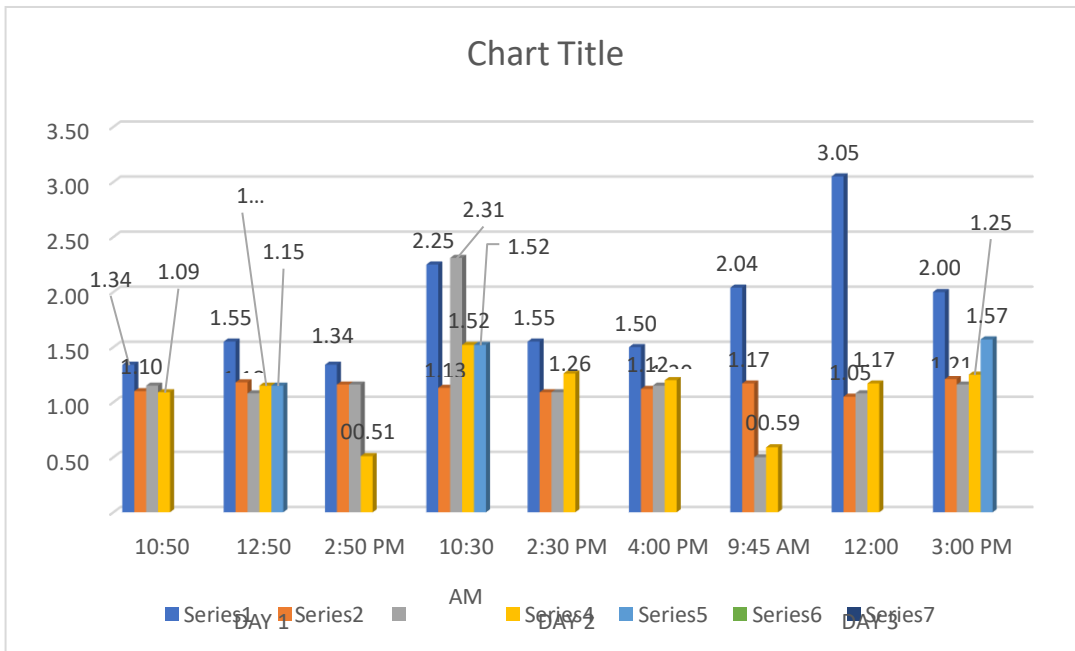
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IV. DATA ANALYSIS AND INTERPRETATION

This section analyses and compares survey results from respondents of the company. The main objective is to compare responses of the employees about the extent to which they have implemented Kaizen into their organization and their thoughts on the use Kaizen philosophy.

1.TIME STUDY ON CPL BITTING OVERLACK

CPL BITTING OVERLACK						
DAYS	TIMING	propina (T1)	Annu (T2)	Allish T3	Sanjitha (T4)	Jasim (T5)
DAY 1	10:50 AM	1.34	1.10	1.15	1.09	
	12:50 PM	1.55	1.18	1.08	1.15	1.15
	2:50 PM	1.34	1.16	1.16	00.51	
DAY 2	10:30 AM	2.25	1.13	2.31	1.52	1.52
	2:30 PM	1.55	1.09	1.09	1.26	
	4:00 PM	1.50	1.12	1.15	1.20	
DAY 3	9:45 AM	2.04	1.17	00.50	00.59	
	12:00 PM	3.05	1.05	1.08	1.17	
	3:00 PM	2.00	1.21	1.16	1.25	1.57



INTERPRETATION:

- Time study on biting overlack of four employees
- Find the average time of each employee
- Find the overlacking efficiency of each employee

SUGGESTION:

- Increase the communication between employees
- Keep report analysis of each employee’s hour by hour
- The report must be monitor by cutting manager

2.TIME STUDY ON TWO NUMBERING MACHINE

Time Study

Crew Neck-5 parts	Numbering Machine withSticker	Numbering Machine withInk
No working Hours	8	8
Cycle time for one garment	5.97	4.2
Capacity Per Hour	603	857
Capacity per Day	4824	6857
Cap in stickers	19296	0
Cost of one Machine	7000	7649
Cost of sticker	0.068	0
Cost of Ink	40	800
Monthly Wage per Operator	9516	9516
Wages/day	366	366
Cost per piece	11.500	2.10
no of pieces per garment	5	5
cost for one garment	57	10
Avg cost of garments per day	460	84
Avg cost of garments permonth	11960	2181

INTERPRETATION:

- Time study on two numbering machines
- Calculate and find efficiency of both numbering machine

SUGGESTION:

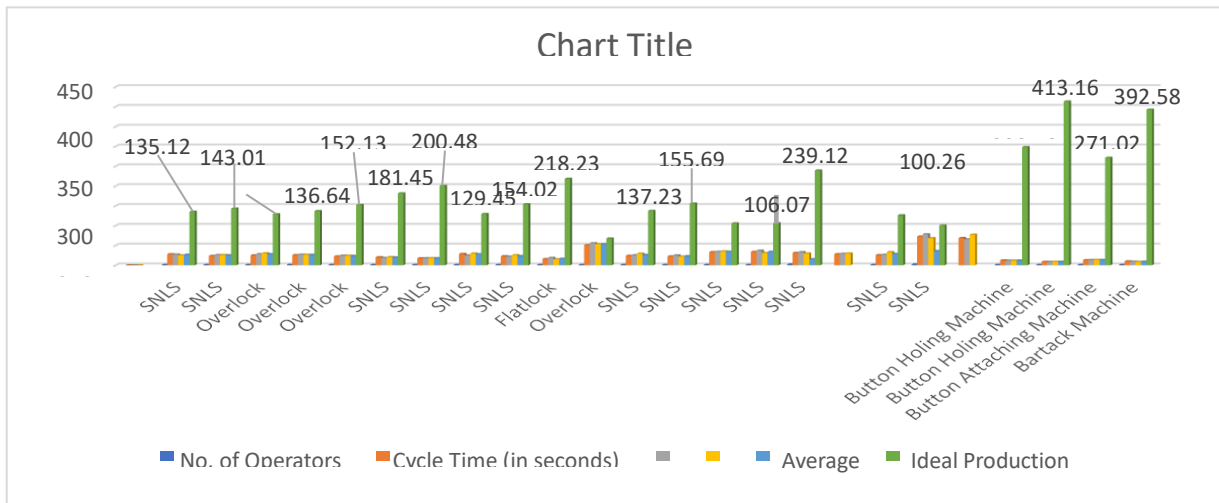
- After analysis of both the machine
- Number machine with ink is lesser cost than numbering machine with sticker
- And also, analysis of time study numbering machine with ink take less time and high efficiency

3.TIME STUDY ON SEWING PROCESS:**LINE-8:**

LINE - 08									
S. No.	Operation	Machine Type	No. of Operators	Cycle Time (in seconds)			Average	Ideal Production Capacity per hour	
				CT-1	CT-2	CT-3			
1	Brand and size label attach	SNLS	1	27.75	26.95	25.23	26.64	135.12	
2	Patch Attach to Back	SNLS	1	23.64	26.03	25.85	25.17	143.01	
3	Shoulder Attach	Overlock	1	25.04	28.38	30.42	27.95	128.82	
4	Sleeve rib attach	Overlock	1	25.65	26.83	26.56	26.35	136.64	
5	Sleeve Attach to garment	Overlock	1	22.35	24.44	24.20	23.66	152.13	
6	Placket Attach and Slitting	SNLS	1	20.27	18.58	20.67	19.84	181.45	
7	Placket fold and top stitch	SNLS	1	17.79	17.91	18.17	17.96	200.48	
8	Placket fold and top stitch (2)	SNLS	1	28.69	25.14	29.60	27.81	129.45	
9	Placket Finishing	SNLS	1	22.82	21.70	25.60	23.37	154.02	
10	Botton Hem	Flatlock	1	15.73	18.69	15.07	16.50	218.23	
11	Sleeve and side seam join	Overlock	1	51.03	55.61	53.37	53.34	67.50	
12	Sleeve Rib Finishing	SNLS	1	24.00	25.39	29.31	26.23	137.23	
13	Side seam bottom slit secure	SNLS	1	22.48	25.02	21.87	23.12	155.69	
14	Side seam botton slit attach	SNLS	1	33.19	34.08	35.05	34.11	105.55	
15	Side seam bottom slit finishing	SNLS	1	33.81	37.08	30.93	33.94	106.07	
16	Collar Attach	SNLS	2	31.26	33.17	29.78	15.06	239.12	
				27.82	29.01	29.62			
17	Tape attach to collar	SNLS	1	25.67	26.67	33.26	28.53	126.17	
18	Collar finshing	SNLS	2	72.68	78.19	68.43	35.91	100.26	
				68.79	65.62	77.16			
19	Button Holing (Placket)	Button Machine	Holing	1	12.43	11.70	12.09	12.07	298.18
20	Button Holing (Collar)	Button Machine	Holing	1	8.79	8.46	8.89	8.71	413.16
21	Button Attach	Button Machine	Attaching	1	12.95	13.38	13.52	13.28	271.02
22	Bartack	Bartack Machine		1	9.72	9.05	8.74	9.17	392.58
					Total Time Taken (in seconds)			528.72	
					Total Time Taken (in minutes)			8.81	

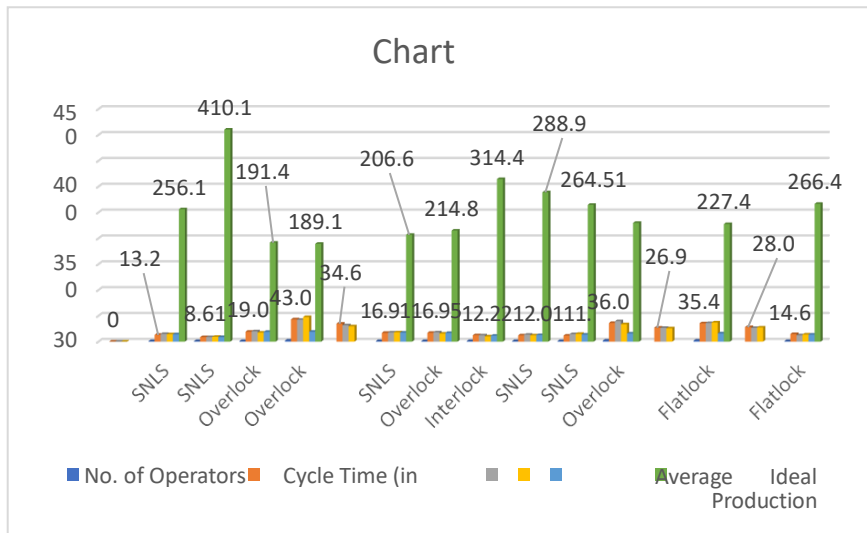
Preparatory Operations									
S. No.	Operation	Machine Type	No. of Operators	Cycle Time (in seconds)			Average	Ideal Production Capacity per hour	
				CT-1	CT-2	CT-3			
1	Automatic Placket Attach	Auto Welt	1	28.01	29.04	26.51	27.85	129.25	
2	Collar Stand and Collar Join-1	SNLS	1	24.66	28.53	23.13	25.44	141.51	
3	Collar Stand and Collar Join-2	SNLS	1	27.74	33.47	35.66	32.29	111.49	
4	Trimming and Securing Collar end	SNLS	1	36.55	39.47	35.42	37.15	96.91	
5	Collar Finishing	SNLS	1	21.59	24.11	26.13	23.94	150.36	
6	Collar Marking	Manual	1	33.43	36.23	34.99	34.88	103.20	
					Total Time Taken (in minutes)			181.56	

				seconds)	
				Total Time Taken (in minutes)	3.03



LINE – 06:

LINE - 06								
S. No.	Operation	Machine Type	No. of Operators	Cycle Time (in seconds)			Average	Ideal Production Capacity per hour
				CT-1	CT-2	CT-3		
1	Wash Care Label Attach	SNLS	1	13.28	14.71	14.18	14.06	256.11
2	Flag Label Attach	SNLS	1	8.61	8.59	9.13	8.78	410.18
3	Shoulder Attach	Overlock	1	19.05	19.88	17.47	18.80	191.49
4	Sleeve Attach	Overlock	2	43.00	42.21	47.48	19.03	189.15
				34.67	31.54	29.49		
5	Neck Rib Prep	SNLS	1	16.91	17.48	17.87	17.42	206.66
6	Neck Rib Attach	Overlock	1	16.95	17.81	15.52	16.76	214.80
7	Collar Binding	Interlock	1	12.22	12.09	10.04	11.45	314.41
8	Loop Attach	SNLS	1	12.01	13.31	12.06	12.46	288.92
9	Binding Close	SNLS	1	11.58	14.28	14.97	13.61	264.51
10	Side Seam Close	Overlock	2	36.06	39.40	33.57	15.68	229.67
				26.92	26.49	25.66		
11	Sleeve Hem	Flatlock	2	35.42	35.82	37.01	15.83	227.43
				28.05	26.35	27.30		
12	Bottom Hem	Flatlock	1	14.68	12.18	13.67	13.51	266.47
				Total Time Taken (in seconds)			177.38	
				Total Time Taken (in minutes)			2.96	

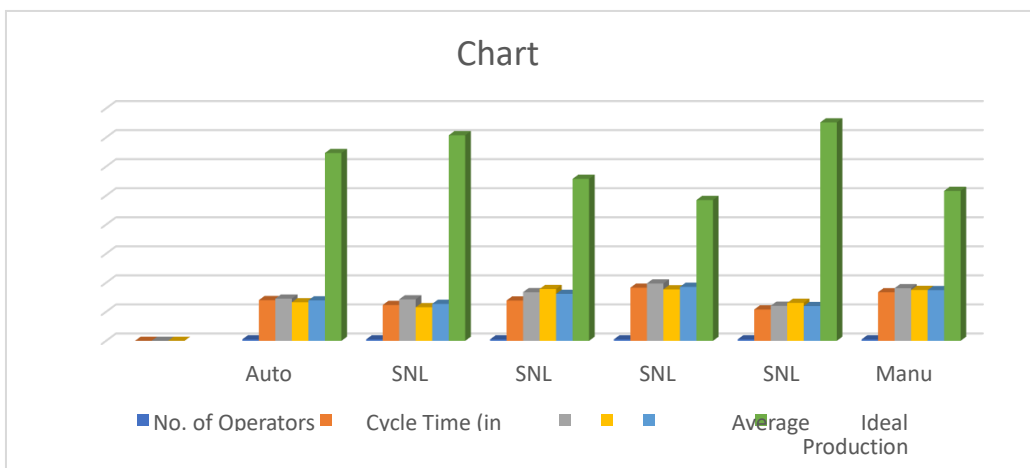


INTERPRETATION:

- Time study on sewing process of line 6&8.
- Find average time and efficiency for one hour.

SUGGESTION:

- To increase sewing line
- Report must be monitor by sewing manager
- Efficiency based of monthly reward to the sewing line members



RECOMMENDATIONS

- Involve employees at all levels: To successfully implement Kaizen, it is important to involve employees at all levels of the organization in the process.
- Start with a time study: Conduct a time study to identify areas for improvement in the cutting and sewing department.
- Use data to drive decisions: Collect and analyze data on the production process to identify areas for improvement.
- Provide training: Proper training is crucial to ensure that employees have the skills and knowledge to participate effectively in the Kaizen process.
- Foster a culture of continuous improvement: Kaizen is a continuous improvement process, and it is important to foster a culture that supports ongoing improvement.
- Address limitations: It is important to be aware of potential limitations of Kaizen implementation, such as resistance to change or inadequate training, and actively work to address them.

CONCLUSION

Finally, applying Kaizen in the cutting and sewing sector through time analysis can have a substantial impact on the manufacturing process. Kaizen can help to eliminate waste, enhance efficiency, and raise production by focusing on modest, incremental improvements in the time it takes to accomplish different operations. To successfully implement Kaizen in the cutting and sewing department through time study, staff at all levels of the organization must be involved. This will help to guarantee that everyone is dedicated to and invested in the continuous improvement process. Furthermore, any limits of Kaizen implementation, such as resistance to change or insufficient training, must be addressed. The cutting and sewing department may maximise the effectiveness

of the Kaizen process by identifying these restrictions and actively working to overcome them. Overall, by applying Kaizen in the cutting and sewing department through time study, organisations can accomplish continuous improvement in their manufacturing process, resulting in greater efficiency, higher quality, and more customer happiness. The time study can assist in identifying areas for improvement as well as allowing for continual monitoring of the effectiveness of Kaizen implementation.

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