Improvement of Automotive Parts Production Process Case Study: S. PD Press and Part CO., LTD

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Abstract

The objective of this project is to study how to work and to reduce errors and time of work in socket body manufacturing process, the automotive parts production process, number S-040. The factory case study found that the time of production in each step is high. In which the students study the process and analyze the process using the fishbone diagram to analyze to find ways to improve work procedures after that, work methods are improved to be standardized and reduced waste in the production process. By using process flow charts, work instruction. The result of the improvement shows that it can reduce the production time in each step by 7.16%.

Keywords: Process improvement, Process, Work instruction

1. Introduction

At present, the economy in the auto parts manufacturing industry is highly competitive. This is because each manufacturer needs to produce products that respond to customer needs as quickly as possible and as possible. Therefore, the production process must be improved. To achieve goals and minimize the excess time in the production process as much as possible.

S. PD Press and Parts Company Limited that studied is a company that conducts the business of making electrodes for cars and motorcycles. And all kinds of steel works Are experiencing delays and needing to improve on the improvement of production processes to reduce waste time. And errors in the production process arising from the work of the employee and procedures for the wrong operation which resulted in an operation error. So the solution by choosing a method for analyzing the production line, work study, which reduces errors. And reduce the time occurring in the production line.

2. Methodology

In this study for methodology of research following:

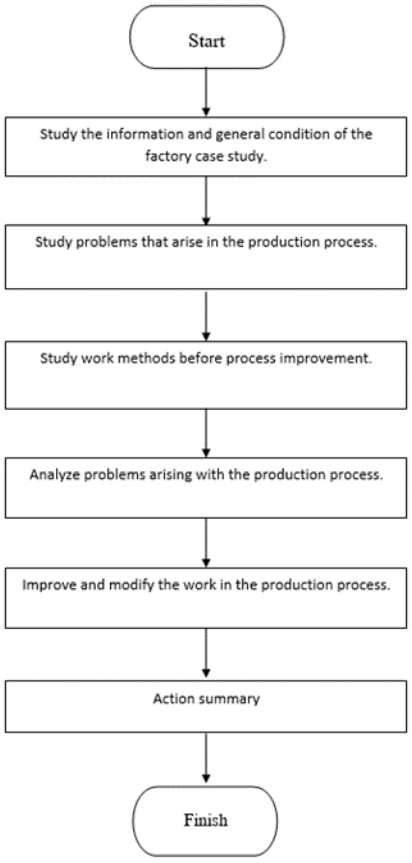

Fig. 1 Research Methodology

3. Improvement

3.1 Study general information and work processes of the company.

From the problems that the factory, the case studies have chosen, are the problems that do not have a clear working method and there is a wasteful working method. 4M Waste analysis: Man, Machine, Material, and Method.

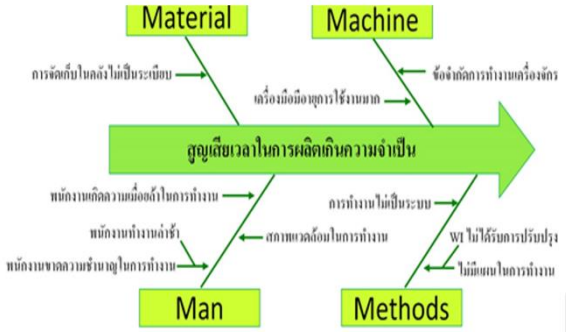

Fig. 2 Cause and Effect Diagram.

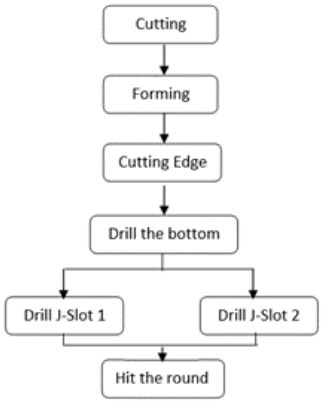

Fig. 3 Show before socket body flow process chart.

ชิ้นส่วน	พนักงาน (คน)	เวลา (วินาที)	สัญลักษณ์	ขั้นตอนการทำงาน
SOCKET BODY S-040	A1	3.6		OP1 : การตัดให้เป็นรูปถ้วย
	B2	4.3		OP2 : การขึ้นรูปถ้วย
	C3	3.5		OP3 : การตัดปาก
	D4	3.0		OP4 : การเจาะก้น
	E5	1.6		OP5 : การเจาะเขี้ยว J-Slot1
	F6	3.5		OP6 : การเจาะเขี้ยว J-Slot2
	G7	3.8		OP7 : การดัดให้ได้ทรงกลม
	H8	-		ส่งไปแผนก QC

Fig. 4 Show operation process chart.

Table 1: Show before socket body process time.

ขั้นตอนการทำงาน	เวลาการทำงานก่อนการปรับปรุง (วินาที)										เฉลี่ย
	1	2	3	4	5	6	7	8	9	10	
1. การตัดถ้วย	04.09	02.04	02.14	01.90	02.31	02.28	02.13	02.10	01.77	02.02	2.278
2. การขึ้นรูปถ้วย	02.83	02.96	02.55	02.33	03.14	02.62	03.11	02.17	02.66	02.54	2.691
3. การตัดปาก	02.56	02.00	02.10	02.02	02.13	01.86	02.06	02.59	02.03	02.13	2.148
4. การเจาะก้น	03.57	01.59	01.66	01.49	01.96	01.76	01.66	01.74	02.43	02.20	2.006
5. การเจาะเขี้ยว J – Slot 1	02.29	01.28	01.89	01.33	01.53	01.37	01.40	01.23	02.54	01.62	1.648
6. การเจาะเขี้ยว J – Slot 2	03.95	01.75	03.30	01.94	03.13	02.66	01.93	02.03	02.94	02.64	2.627
7. การดึกลม	01.99	02.13	04.08	02.04	02.60	03.31	02.18	02.23	02.43	03.40	2.639

Fig. 5 Factory Environment.

Fig. 6 Factory Environment.

3.2 Analyze data to find causes and problems from work processes.

3.2.1 Analyze problems and the cause from the work process of the company.

The company's information current working conditions found that the company has various problems as follows: The results from the analysis of the fishbone diagram It was found that most of the reasons were due to the lack of expertise of employees. Most of the new hires will come to work in the process. Thus, causing frequent errors in operation. When analyzing the problem, it was found that the problem occurred in the process as follows: There is a cause and effect diagram to help find the cause of the problem. Therefore, it has

been revised in the work process. To provide employees with the correct operational guidelines.

From studying problems in each step of the production process It was found that employees did not have a clear work method, causing frequent work errors. And most of them will be new employees who come to work in this production process. And the machine in use may not match the pattern in production. It also has a very long service life. Causing the product to fail from the aforementioned problems, the cause is analyzed with the following tools.

1. Fish Bone Diagram from brainstorming to find the cause. It comes from 4 main reasons: people, machines, raw materials and processes in order to find the cause that causes problems and find it for further analysis.
2. Work Instruction Manual, an analysis of the cause by considering the working process in each process that affects the workpiece or product. That can be done correctly according to the steps in the operation manual or not

3.3 Conduct an analysis, implement solutions

3.3.1 Improve the operation and Work Instruction of the company

From the analysis of the problems found that when the design department. Therefore, the operation has been improved as follows. Introduce ECRS concept to operation process and find standard time for each step and then train employees can follow the work process and make the least mistakes. In the operation manual to sets the workflow, warnings, active devices. And working time that can be best achieved in production.

For identify a timing form for each step. And Design an operation manual It is designed to be timed into the form and cautions.

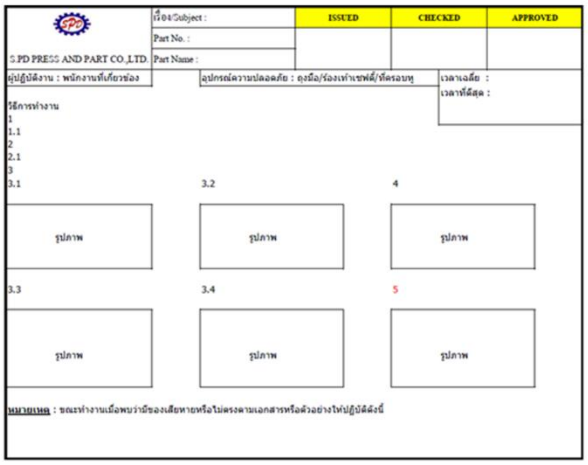

Fig. 7 Show Work Instruction form.

3.3.2 Design work instruction to control operations

From the analysis of the problems found in many operations There are many parties who do not know the work that the customer ordered. Therefore, the design and development of documents by using the principles of WI are as follows 7 forms, such as:

Fig. 8 Show future Work Instruction

Table 2: Show after socket body process time record.

ขั้นตอนการทำงาน	1	2	3	4	5	6	7	8	9	10	เฉลี่ย
1. การตัดถ้วย	02.06	02.18	02.11	02.52	02.26	01.97	01.96	02.06	02.21	01.94	2.127
2. การขึ้นรูปถ้วย	02.20	03.09	02.83	02.28	02.68	02.20	02.79	02.00	02.50	02.46	2.503
3. การตัดปาก	01.99	02.24	02.18	02.39	01.64	01.97	02.26	01.97	02.23	02.01	2.088
4. การเจาะก้น	01.45	01.88	01.40	01.41	01.67	02.00	02.24	01.61	01.72	02.00	1.738
5. การเจาะขึ้วว J – Slot 1	01.47	01.20	01.18	01.53	02.34	01.83	01.58	01.46	01.43	01.48	1.55
6. การเจาะขึ้วว J – Slot 2	01.91	03.71	02.06	03.03	02.21	02.03	01.93	03.02	02.32	01.83	2.045
7. การตีกลม	01.99	02.13	04.08	02.04	02.60	03.31	02.18	02.23	02.43	03.40	2.639

By applying the data from the survey to analyze the cause of the problem for use in conducting data analysis to find methods for solving problems using the principles and theories of Time management with the Quality Control principles in the section of the Check sheet and applying the corrective methods that have been proposed to the company in order for the

company to conduct experiments to be used in real work and observe the changes that have occurred.

4. Result and Discussion

This research found the summary follow:The production data of company was collected to study the socket body automotive parts manufacturing process, number S-040 from September 2019 to April 2020, including the duration of the study. In 8 months, employees found that employees did not have a clear work method, causing frequent work errors. And most of them will be new employees who come to work in this production process. And the machine in use may not match the pattern in production. It also has a very long service life. Causing the product to fail.

The results from the analysis of the fishbone diagram It was found that most of the reasons were due to the lack of expertise of employees. Most of the new hires will come to work in the process. Thus, causing frequent errors in operation Therefore, it has been revised in the work process. To provide employees with the correct operational guidelines.

4.1 Operating results

The results from data analysis and solving problems that to happen: Improving work process efficiency in the by studying the current working conditions, it was found that in the work process, there is a problem in the detail of each step to improve and control operations.

4.1.1 Improve the operation and Work Instruction of the company

The result of the improvement of the activity map when comparing before and after the improvement, with the following details: When the amount of waste is reduced, the operating time will be reduced helps to increase the productivity. Part of all joint meetings when comparing from the processes found that there is waiting in the process representing a percentage equal to 7.16 % from the corrective action which can reduce the waiting time.

4.1.2 Improve the operation and Work Instruction of the company

From using various documents to work with the company. The results can be summarized as follows:

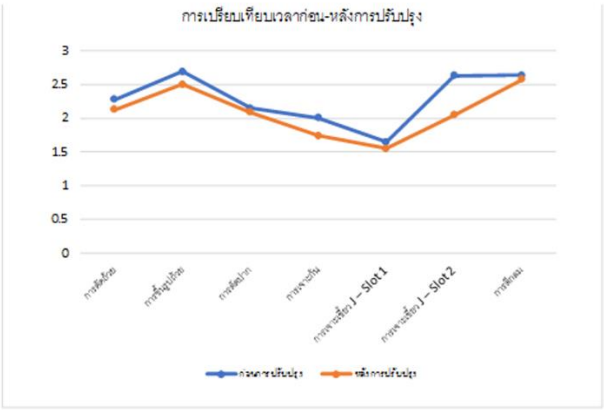

Fig. 7 Show before and after improvement.

It shows that working before each step of improvement is quite time consuming. Because employees do not follow the operating instructions. When improving the work then It was found that the time spent working at each step was reduced. As employees follow the operation manual and become more skilled. Therefore, the time in each production process has been reduced from before the adjustment. By the cup cutting process, the time was reduced by 0.151 seconds, the time of the cup forming process was reduced by 0.188 seconds, J-Slot 1 the mouth cutting process was reduced by 0.06 seconds, the bottom drilling process, the time decreased by 0.268 seconds. Down time 0.098 sec. J-Slot 2 fang drilling procedure decrease time of 0.575 sec. Round forging process 0.069 sec.

5. Conclusion

The result of improving the work process efficiency in the production causing the waste of time in the production process to decrease has improved the work plan according to Project Management principles. The work before each step of the improvement takes quite a lot of time. Because employees do not follow the operating instructions. And when improving the work then It was found that the time spent working at each step was reduced. As employees follow the operation manual and become more skilled. Therefore, the time in each production process has been reduced from before the adjustment. Equivalent to 7.16% and working time that can be best achieved in production.

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