



QUALITY IMPROVEMENT BY IMPLEMENTING KAIZEN ACTIVITIES IN TEXTILE MANUFACTURING COMPANY

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by

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APPROVAL

This report is submitted to the Faculty of Manufacturing Engineering of Universiti Teknikal Malaysia Melaka as a partial fulfilment of the requirement for Degree of Manufacturing Engineering (Engineering Materials) (Hons). The member of the supervisory committee are as follow:

.....
(Associate Prof. Dr. Effendi bin Mohamad)

ABSTRAK

Kaizen ialah satu strategi yang biasa digunakan untuk meningkatkan produksi dan kualiti bagi sesuatu produk. Ianya merupakan salah satu daripada alat terkandung di dalam Lean Manufacturing Tools (LMT) yang biasa digunakan di dalam industry. Tujuan utama dalam menjalankan projek ini adalah untuk meningkatkan kualiti product. Projek ini dijalankan di sebuah syarikat pembuatan tekstil di Tanjung Kling Melaka. Syarikat tersebut menghasilkan produk yang dinamakan snap fastener yang mengandungi dua bahagian iaitu stud dan soket. Proses utama yang digunakan untuk menghasilkan produk ini adalah melalui stamping. Projek ini dijalankan di jabatan snap fastener. Terdapat dua proses berbeza dalam pembuatan stud dan soket. Untuk stud, proses stamping dan rolling digunakan manakala untuk soket terdiri daripada proses pre-stamping untuk mewujudkan bentuk produk, cutting, wire insert dan folding. Masalah utama ialah pada produk yang bersaiz 6mm, 7mm dan 8mm. Produk dalam saiz ini mengalami masalah kelonggaran diantara stud dan socket. Hal ini menyebabkan kualiti produk merosot dan mengurangkan kepuasan pelanggan. Objektif untuk projek ini adalah untuk mengenalpasti, menganalisa dan seterusnya mengatasi masalah tersebut dengan menggunakan Kaizen aktiviti. Seterusnya punca masalah dikenal pasti dengan mengumpul maklumat daripada stud dan soket untuk di analisa. Masalah utama dikenal pasti dan akan melalui proses perbincangan dengan individu yang bertugas. Berdasarkan analisis, punca berlakunya kelonggaran pada produk yang saiz lebih kecil adalah disebabkan penggunaan rolling proses. Semasa rolling proses dijalankan, tinggi stud semakin bertambah dan menyebabkan terjadinya ruang dan kelonggaran pada produk. Keputusan untuk menggunakan rolling proses dibuat disebabkan ketebalan bahan yang digunakan amat nipis dan merosakkan acuan apabila ia koyak. Berdasarkan maklumat yang diperolehi, keluaran produk tidak mencapai tahap kelulusan iaitu sebanyak 90%. Jabatan tersebut menghasilkan banyak masalah, paling kerap ialah rauang longgar antara stud dan soket. Spesifikasi stud telah dikurangkan sebanyak 0.5mm. oleh itu, apabila stud menjalani proses rolling, peningkatan tinggi tidak akan mengakibatkan masalah kelonggaran. Berdasarkan maklumat selepas melaksanakan Kaizen, perarusan kelulusan telah meningkat sebanyak 14.14%. Selain itu, syarikat tersebut juga dapat menjimatkan sebanyak RM 2.81 per kg produk selepas pelaksanaan Kaizen. Akhir sekali, untuk mengatasi masalah pada masa hadapan, penyelenggaraan secara mencegah diperkenalkan beserta 5S. Senarai semakan sebanyak setiap dua jam diperkenalkan untuk memerhati dan menilai kecekapan mesin dan produk. Untuk meningkatkan produk kualiti, KA teknik harus dijalankan secara menerus oleh syarikat.

ABSTRACT

Kaizen is a strategy that normally uses to improve the productivity and quality of an event. It is one of the Lean Manufacturing tools (LMT) that always been uses in manufacturing industry. The purpose of this project conducted is to improve the quality of the products and increase the productivity of the product. This project was conducted in textile manufacturing company located in Tanjung Kling Malacca. The company produce snap fastener which is consist of two different parts that is socket and stud. The major process include in producing this product is stamping process. The main problem in the production is defects products. There are two different process in producing socket and stud for the snap fastener. For stud, the process consist stamping and blanking process. But for the socket, there is more process need to be done. First, producing of preparation-stamping, this preparation-stamping is done by stamping process. The purpose is to construct initial shape. The secondary process is including wire insertion, blanking and folding. The main problem for this product is the product that in smaller size which is 6mm, 7mm, 8mm and 9 mm. This small product are producing loose gap between the stud and the socket. This is cause the quality of the product decrease and not achieves the customer's satisfactions. The objective of the project is to analyze, observe and eliminate the loosed gap in smaller size snap fastener and improve its production. For the loosed gap problem for the smaller product, every process including in producing the product is identified and observed. Data is collected for both stud and socket from early process to final product to identify the root cause of the problems. The data collected is analyze by using several tools such as brainstorming 5-whys analysis, Ishikawa diagram, cause and effect matrix and FMEA. Based on the analysis, the cause of producing loosed gap is caused by secondary process which is rolling process that increased the height of the stud. The origin of the used of rolling process is because the process of producing neck for small stud can't be done with stamping process. The small and thin sheet will easily broke and stuck in the mold cause the mold need to be rework and increasing the lead time. Based on the data obtained, the weekly outputs for the products are not achieving the target for 90% passing rate. The focuses for eliminating loose gap defects are by rework and reducing the dies height. Since the rolling process cannot be eliminate, rework the dies is the best solution. The stud specification is reduced by reducing dies 0.5mm of original height. Hence, when the stud undergoes rolling and necking process, the increase of the height will not exceed the product specification. Based on the data after Kaizen implementation, the weekly percentage of passes increase by 14.14% compare to before implementation. Besides, based on the cost analysis, the company saved up to RM 2.81 per kg after the implementation. Finally, to ensure the improvement and prevent others problem in the future, the preventive maintenance and 5S is proposed. Checklist schedule for every two hours period is implement in the production to monitors the condition of the machine and the output. To improve the quality of the product, the KA technique needs to be performed continuously from time to time by the company.

DEDICATION

This project is especially dedicated to my beloved family,
supervisor,
lecturers and fellow friends,
for all their guidance and moral supports throughout my life.

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CHAPTER 1

INTRODUCTION

This chapter will start with briefing and explanation on the field of the industry which this project is conducted. The company selected is a textile manufacturing company which is located in Tanjung Kling, Malacca, Malaysia. This project will focus on one product, which is snap fastener. This chapter will describe the problems related in the production of snap fastener. The project is focus only in selected area which is snap fastener department. Furthermore, this chapter will provide the objective and scope for this project.

1.1 Research Background

This project focusses on improving quality and the production of products by implementing Kaizen and uses of Kaizen method. Nhlabathi and Kholopane (2013) states that, Kaizen is a method which is uses to improve work process by eliminating waste within the organisation. It also achieve the elimination of waste by guiding workers with the right tools and process for making improvement and make changes. Panizzolo (1998) explain that, by continuing using Kaizen method, an organization can improve their amount of material produce within the same amount of resource.

From the other research which is apply Kaizen method for improvement of process or organization. Liker and Convis (2011) states that there is two type of Kaizen which is maintenance and improvement. Maintenance Kaizen is focus on unexpected matters such as machine broke down, changes, and variations. The purpose is to bring the system back on standard. Next is improvement Kaizen which is focus on improving technique, process or

organization. This project will focus on improvement Kaizen to solving the problems in snapfastener department.

Many research as example Gao and Low (2013), Wittenberg *et al* (2013) are using Kaizen approach to overcome problem which is related to production and improvement of organization. The research explain the important of Kaizen, implementation of Kaizen and the result of the improvement. Thus promote understanding of Kaizen and its role in conducting this project.

1.2 Problem Statement

The main problem that occurs in snap fastener production is poor quality of product. The company produces a lot of defect product estimated 340 units in two hours period especially for snap fastener with size 6mm, 7mm and 8 mm, refer to table 1-1, 1-2, and 1-3. This smaller size of snap fastener is diagnosed with problem such as loosed gap, no wire inserted on socket, neck tear, dented product and wire not in correct position.



Figure 1-1 : Example of normal product.

Figure 1.1: shown the normal products before plating process with no defects. The product will be observed for any defects before continue with the washing and plating process.

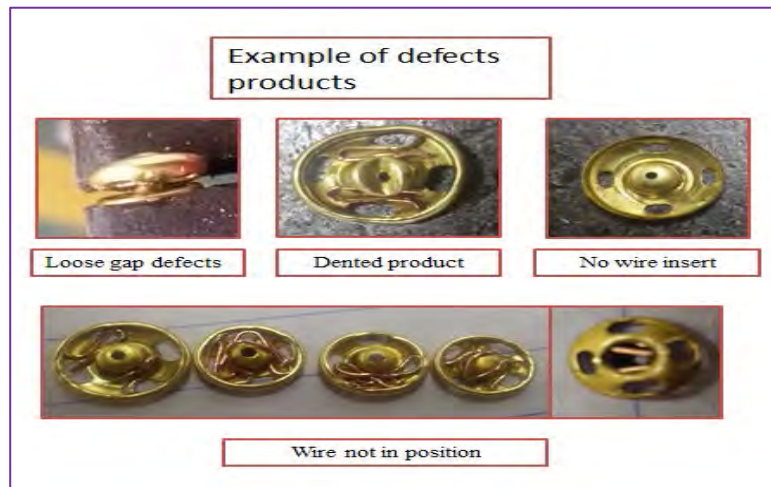


Figure 1-2: Examples of product with defects.

Figure 1-2: shown that the condition of products with defects. This problem occurs in producing the product with smaller size which is size 6, 7 and 8 mm. The defects cause the quality of the product drops. A lot of rejections for this product, the product also need to be rework and sorting to discard the defects product. To overcome this problem, the company, decide to improve the quality of the products by implementing Kaizen Activities in the production.

Table 1-1 : Table of defects of products on every machine in two hour period.

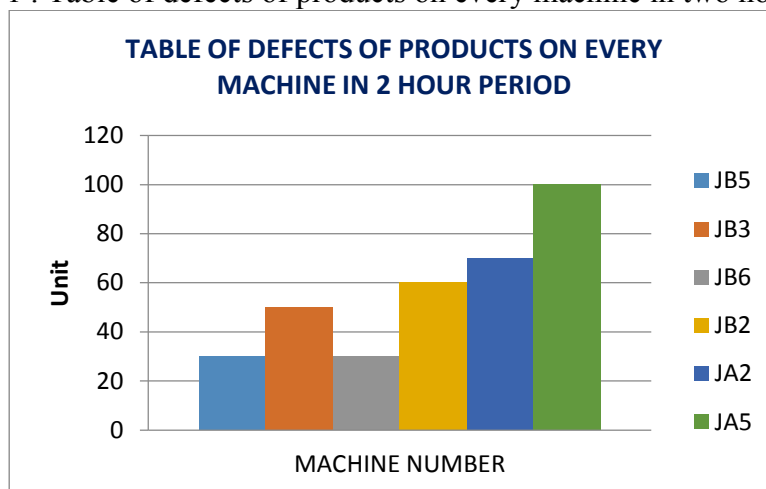
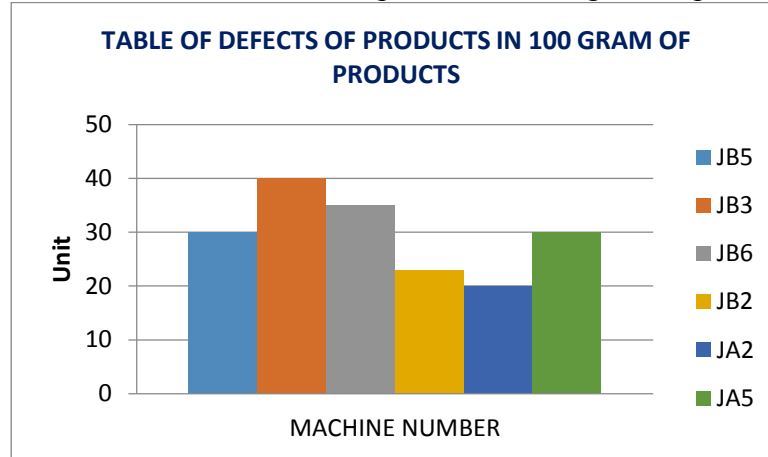


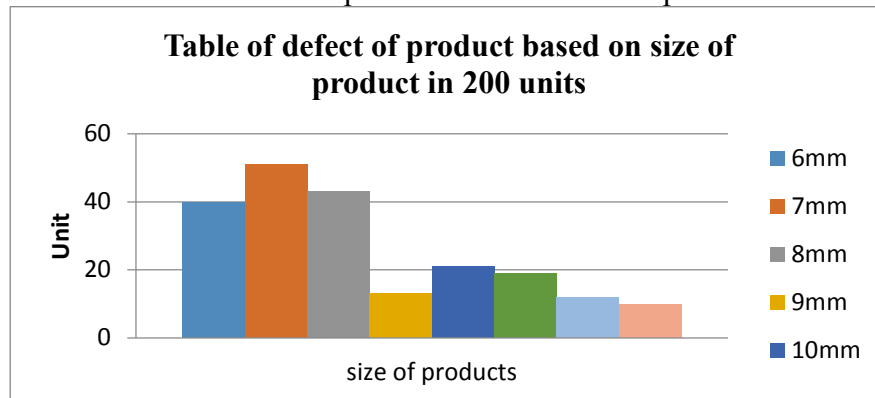
Table 1-1 shown the amount of defects produce by every machine in two hour period. The result is illustrate the machine efficiency.

Table 1-2 : Table of defects of products in 100 gram of products.



The purpose of this table is to measure the machine efficiency, by collecting data in 100 gram of the output form every machine. Based on the data, the machine produces a lot of defects product in 100 gram sample.

Table 1-3 : Table of defect of product based on size of products in 200 units.



The table illustrates the defects produce in every size of products. Based on the result, size 6mm, 7mm and 8mm produce highest defects compare to others.

1.3 Objectives

The objectives for this project are:

- a) To identify the most frequent defects in snap fastener production.
- b) To analyze problem and find the root cause for the defects.
- c) To propose solutions by implementing through Kaizen Activities (KA) evaluate the result and further the continuations improvement.

1.4 Scope of Study

This project covers the manufacturing process of snap fastener which is from primary stamping to wire insertion, cutting, folding and plating. This project only conducts in snap fastener department. The main problem is reducing quality of snap fastener with size 6mm, 7mm and 8mm. This size of snap fastener produces loosed gap which is reduce the quality of the products and most of them need to be discard. The problem will be solve by implementing KA. The process of implementing KA will be conduct to improve the quality of the products. At the end of the project, the solutions for solving both problems will be proposed.

1.5 Rational of Research

The rational of research as follows:

- a) Research on improving products quality by implementing Kaizen methods. In this research is focuses on how to implementing Kaizen to reduce the product defects and improve product quality.
- b) Study the process flow in production of snap fastener to identify the root cause. Research purpose is to find any problems which related to the products defect and quality. Use Lean Manufacturing tools which is Kaizen to eliminate the root cause.
- c) Study of the root cause of the defect and try to eliminate them by implementing Kaizen activities. Briefing of implementing Kaizen method to the production process, in order to improve and get a better result.

1.6 Research Methodology

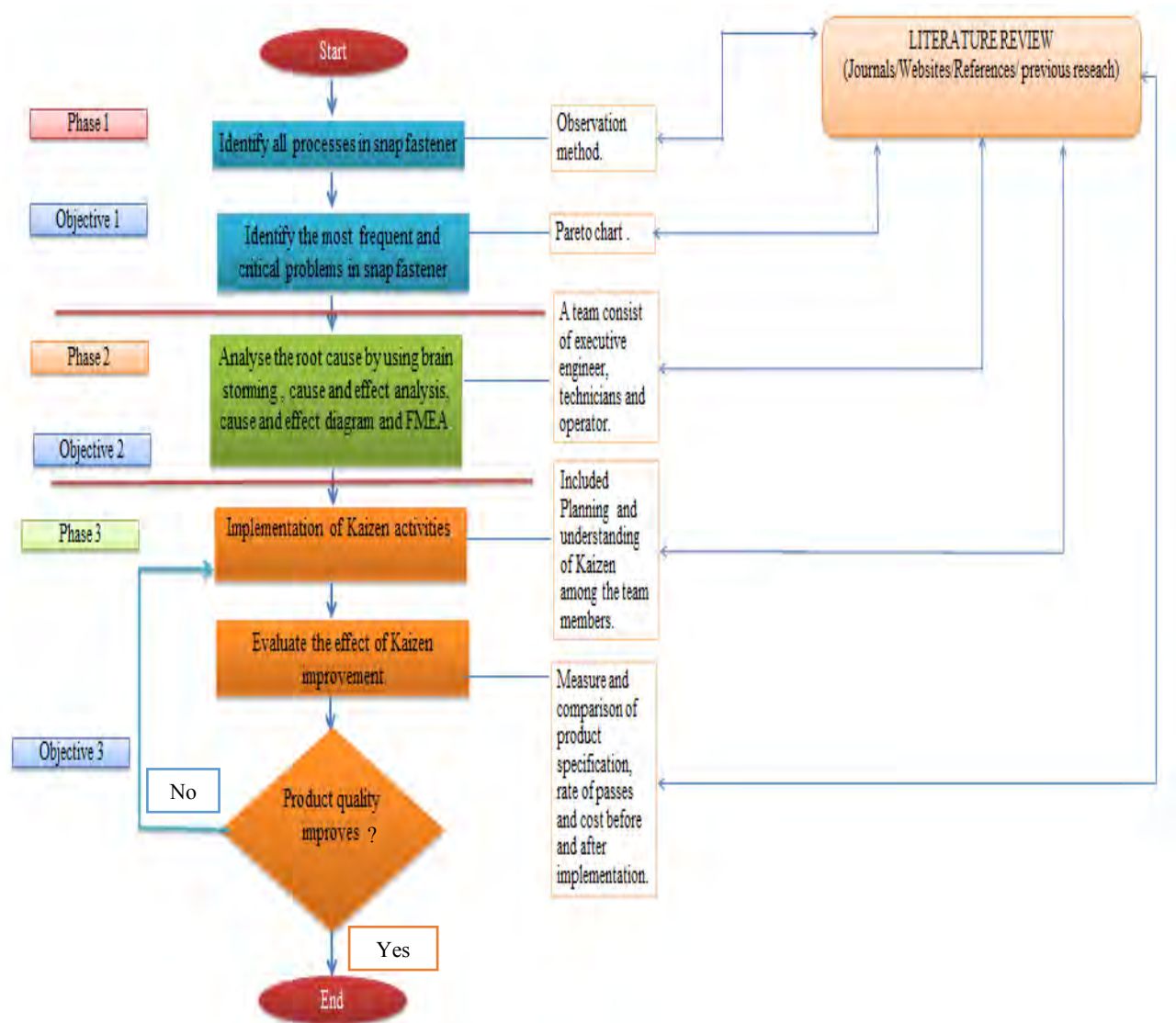


Figure 1-3: Flowchart of general chronology of the project.

The project starts with problems identifications that occur in snap fastener department. The identifications process will involves gathering data, interview and observation process. Then will continue with analyzing the problem by analyzing data collected and brainstorming process. The project will be continued with implementation of Kaizen to overcome the problem and continue for further improvement.