IMPLEMENTATION OF LEAN TOOLS (KAIZEN AND 5S) IN STAINLESS STEEL JAPANESE COMPANY THROUGH INNOVATION

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Abstract. Innovation can be made from small thing in our routine. Seiri (sort), Seiton (set in order), Seiso (shine), Seiketsu (standardize), and Shitsuke (sustain) is 5 Japanese words which is a systematic technique that is closely related to efficiency. Kaizen has been widely recognized in the world as continuous improvement through small steps which impact economically for the company. These systems help management to manage the workplace, improve disciplinary, decrease waste and increase productivity. Mory Industries Inc. is one of the Japanese-owned stainless steel manufacturing company that upholds quality control which contribute significantly to the implementation of Kaizen and 5S. This study explores innovation of Kaizen implementation which refers to 5S that applied on the production floor and also the office in a concrete way. Direct observation will be carried out as the basis of the methodology of this study. Without any record detail activity of 5S that should be done by the workers, but each worker has already implemented as a habit in their daily work. Every year, Mory Industries Inc. always improves some workplace through Kaizen technique in order to increase efficiency.

Keywords: 5S, efficiency, innovation, kaizen, quality.

INTRODUCTION

Gomez and Perez 2012 defines that lean is a systematic systems that produce value through innovation, eliminate several wastes in different aspects of every organization's business processes. This tools can increase value not only for company who manage products but also for services business process. The purpose of lean is to make a cost reduction, eliminate waste and employee empowerment as quickly as it can. There are several methods for lean which support into that goal, such as Kaizen and also 5S.

Kaizen technique has been known throughout the world as the best method to improve the performance of the company due to the use of least cost. This technique has been known to unite the employees of the company because it may improve communication between them. By looking at the global phenomenon, the competition between companies is very strict, so every company will need their unique value. Using Kaizen technique, it can change the quality of service to clients. This kaizen technique has also known which can improve the economy of the company through small steps (Titu, et al., 2010).

In general, the main problem of Kaizen implementation is the lack of authorization from top management to all employees of the company. Fears over the impact will arise, too many changes for the business or never-ending studies from the team. The primary key of Kaizen technique is to focus on the process. To focus on the purpose of each division is the easiest way to implement Kaizen and

then it will minimize the risk which would arise (Khan, 2011).

5S is a one of innovation concept that derived from the Japanese words seiri (sort), seiton (set in order), seiso (shine), seiketsu (standardize) and shitsuke (sustain). Most companies generally apply that technique to manage the workplace. Application of 5S technique in Japan starting from manufacturing sector which then extends to the industrial sector and service sector (Ohno, 1988). 5S technique has been practiced in Japan for a long time. In general, Japanese practitioners consider 5S for their work because it is useful to not only improving their physical environment, but also can improve the Total Quality Management (TQM) process. 5S can be applied into all activities in our life. Many daily problems can be solved by practicing 5S technique (Ho, 1999).

In the traditional sense of the Japanese, 5S technique has some differences in the elements. Several organizations in Japan were run 3S principles while the other companies apply the principles of 6S. This variation depends on the maturity level of the company as well as 5S characteristics of the industry. Besides, the differences may occur due to changes in the organizational goals of the 5S. The quality is the main objective of the 5S practice for most Japanese manufacture companies. (Gapp, et al., 2008).

LITERATURE REVIEW

Kaizen is a Japanese term that means continuous improvement. Derived from two basic words, ‘Kai’ is continuous and 'Zen' is an improvement. Some other people translate 'Kai' is a change and 'Zen' is good. Dr. W. Edwards Deming is the creator of the Kaizen concept besides statisticians Americans who visited Japan in the following years of World War II that developed this concept. Deming's concept is a point of the revival of the Japanese economy. At that time, American Businesses have less interest with this concept, but at the end of 1970s, Americans aware of the power of this concept because of Japan's exports have a significant impact on the economy (Khan, 2011).

In general, Kaizen is a useful concept to facilitate the work become easier and make improvement. If it starts from one person who make continuous improvements and spread to the other people, then this will affect to the company which will improve continuously as well. Kaizen is an umbrella concept and also the element to the other concepts (Imai, 1997).

Picture 1. Kaizen Umbrella Concept - Left and Kaizen Constituent - Right (Imai, 1997)

In recent years 5S is a technique used in Japanese companies in order to increase human productivity and this technique was introduced by Takashi Osada in the early 1980s (Rahman, et al., 2010). 5S technique is a model that has been proven to arrange and also maintain the production operations (Kimball, 2003). Do not use 5S because all parties use this philosophy, 5S's were not a fashion trend. When a company wants to use 5S, the leaders of these companies need to know how this technique will be used and also to understand overview of the 5S itself.

Table 1. 5S Overview (Chi, 2011)

Japanese	English	Meaning
Seiri	Sort	Keep away the whole rubbish and unrelated materials from the workplace.
Seiton	Set in Order	Arrange everything needed in the workplace in right place to capture and storage things easier.
Seiso	Shine	Maintain cleanliness of work, any person acting as a janitor

Lanjutan Tabel 1

Japanese	English	Meaning
Seiketsu	Standardize	Making the standardization to keep the workplace or things clean and standardize.
Shitsuke	Sustain	5S practice on a regular basis as a gesture of commitment.

Implementation of 5S can solve some problems that are not visible which should still be noted. Here are important benefits of the implementation of 5S: (1) Orderliness (seiri and seiton) = Maximize the effectiveness and efficiency by reducing workload and people through a process of simplification. (2) Cleaning (Seiso and Seiketsu) = Maximize effectiveness by contributing to a healthy life, safety and welfare as well as transparency in the work. (3) Discipline (Shitsuke) = Increase morality through training and education which affect to the quality of work and life in accordance with the standard.

In Japan, the practice of 5S are often integrated with a technique of Kaizen (change for the better) (Kodama, 1959) and method me - de - miru (visual). The system was integrated into a me – de - miru kanri which is a visual control system.

Some companies think that implementation of 5S takes a long time in terms of cleanup workplace. It is noticeable that the company does not want to keep the work environment clean and tidy. According to Chi 2011 there were 3 effects of 5S, those are: more structured process of the workplace, making the working environment clean and also the clear methods for management. If the implementation of 5S has done properly, it will make the company's business run smoothly and all employees will be happy to get a better environment.

Another study analyzed the innovation performance of some companies that implemented Lean Tools and found that the most successful companies were those who already used extended Lean principles into their schedule of innovation and had used it to breakthrough innovation and change their organizational culture towards continuous innovation (Gomez and Perez, 2012).

METHODOLOGY

Mory Industries Inc. is a Japanese manufacturing company established in 1929 with its first product of bicycle parts. Until in 1959 this industry developed and began to be welded stainless steel tube industry. Mory Industries Inc. expand its business to the other countries recently, those are Indonesia and Thailand. The objective of establishing PT. Mory Industries Indonesia is to supply stainless steel pipes into the automobile parts market which highly developed in Indonesia. PT. Mory Industries Indonesia stands in late 2012 and starts production by the end of 2013, so it is still heavily depend on Japanese management itself (Mory, 2006).

Mory Industries Inc. sell stainless steel product in various type like tube, flat bars, round bars, angle bars, etc. Besides, the business still evolves in terms of selling stock construction materials product especially in steel. Many companies are avoiding the fabrication using stainless steel as a raw material, because it is very challenging. See this great opportunity, Mory Industries Inc. vigorously conduct research on fabrication technology. As a result Mory Industries Inc. successfully develops its business and expands its market and also reminds it into higher value

products (Mory, 2006). To maintain the company's performance, Mory Industries Inc. implements kaizen technique to the entire workplace.

The purpose of this study was to describe the implementation of Kaizen in terms of 5S at Mory Industries Inc. not only at factory but also at the office. This company is a Japanese manufacturing company, 5S and also Kaizen preferred in generally use in manufacturing companies. In addition, quality control is an important point of the business in this company especially in innovation area.
Information that used in the final results was obtained from direct observation in the field, personal assistance from managers and workers, data analysis from their files. Quality control department manager and human resource department manager are some of the instructors in this study.

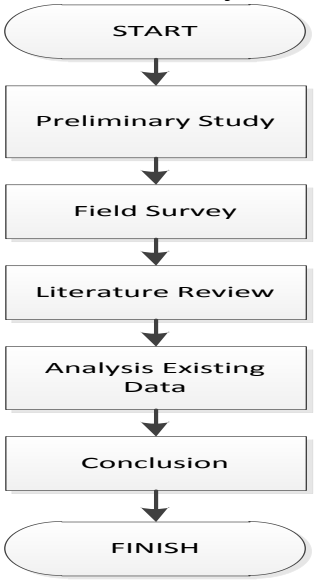

Figure 2. Research Methodology Flow

Preliminary studies carried out for 2 weeks to find out the details of the company`s profile from the products that they produced until the process to make these products. This study carried out with a direct observation of the situation at the factory and the office and also analyzes the files of before and after Kaizen implementation through 5S innovation. It contacted into related division named quality control division, to perform the calculation of the cost impact to the company through Kaizen and 5S.

RESULTS AND DISCUSSION

Kaizen through 5S technique has been applied in Mory Industries Inc. since the beginning of company establishment until today. They divided the type of Kaizen into 10 types, those are path distance, capture distance, weight reduction, difference directions, zigzag reduction, and mental load reduction, straight line to take the product, uniform placement, additional job reduction and packaging reduction.

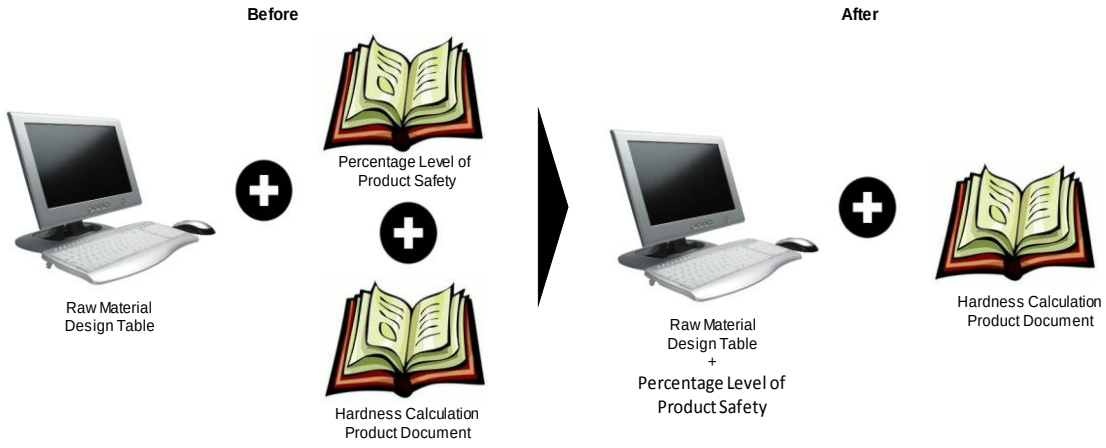

Figure 3. Database Storage System - Seiri

This improvement included into reduction additional work type of kaizen and refers to 5S - Seiri which is taking a fresh look at the workplace and identifying unnecessary items. Beforehand, the workers using 3 separate documents and it improves into combination 2 documents into the same database.

Figure 4. Map Warehouse Tools - Seiton

Special warehouse tools map between the closets to facilitate workers pick the require tools. Beforehand there was no map so that the worker confused to find the tool and they need extra time than today. This improvement included into path distance Kaizen type and also 5S – Seiton which is arranging the things in the right place.

Figure 5. Cleaning Tools - Seiso

Changes direction of the location of finish products make easier to clean the area. This is happen because of most waste falls automatically into the trash, so the effort to clean small waste is not too big. This improvement included in the path distance, capture distance, zigzag reduction type of Kaizen and also 5S - Seiso which is maintaining the workplace clean.

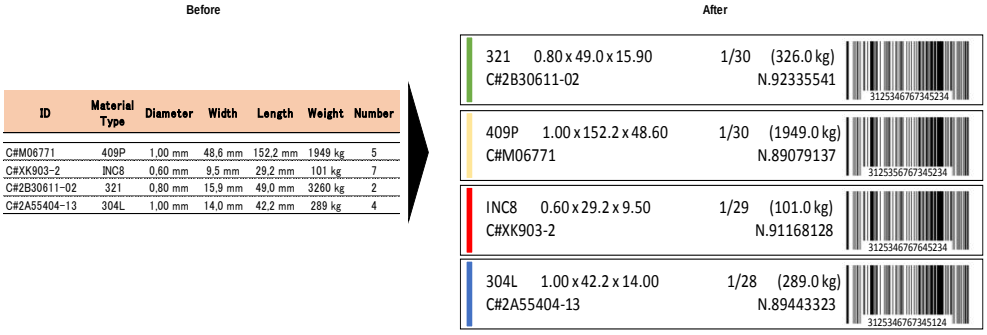

Figure 6. Barcode System - Seiketsu

Color system in the barcode is one improvement which included in the uniform placement type of Kaizen and also refers to 5S - Seiketsu which is making standardization to the things, besides it also including into visual management. This improvement has been applied for about 20 years at Mory Industries Inc. Before barcode system, they classify the material using manual record. Every day the factory team reported to IT department to recap the data. After doing this color barcode system, it facilitates the sales team and the factory team to determine the number of product in real time as well as reducing search time for such particular type of material by simply looking at the color of the barcode.

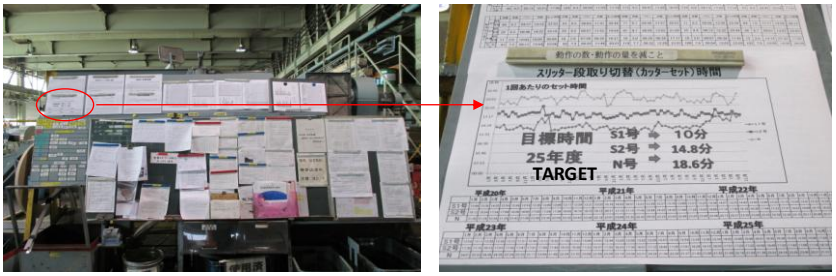

Figure 7. Bulletin Board System - Shitsuke

Bulletin board has been designed to display efficiency machine. The objective was all workers can think together, not only factory workers but also office workers in order to achieve efficiency goal. This situation triggers the workers to apply Kaizen continuously in a discipline way. This improvement included into mental load reduction Kaizen type and also 5S technique - Shitsuke which is disciplinary to implement things. This bulletin board really helps responsible worker of the machine and also will impact to company profit when they already reached the goal.

Mory Industries always convert the changes into money. It can facilitate the factory workers to participate implement the changes which will be made. Mory Industries Inc. has been set some units if they successfully perform reduction.

Table 2. Kaizen Rate (Source: Mory's Database)

Detail		Price	/Unit
General Time Reduction		¥43.00	/minutes
General Weight Reduction		¥3.00	/kg
< 0.9 kg	Path Distance	¥0.86	/meter
	Hand Movement	¥0.65	/meter
>= 0.9 kg	Path Distance	¥0.95	/meter
	Hand Movement	¥0.72	/meter

Here is the detail result for several previous examples which already calculated.

Table 3. Profit Calculation of Kaizen (Source: Mory's QA Data)

Monthly Basis	Seiri	Seiton	Seiso	Seiketsu	Unit
Time Reduction	60	19.6	30	60	Minutes/Month
Path Reduction	0	420	70	500	Meter/Month
Weight Reduction	0	0	0	0	Kg/Month
Total Impact	**¥2,580**	**¥1,204**	**¥1,350**	**¥3,010**	Yen

CONCLUSION

Innovation using lean tools can make the benefit to the company. Kaizen technique assumed to be a practical technique and it requires low cost. The implementation of this technique is a reduction of loss continuously. It does not depend on the investment but relies on the process and performance of the workers. To support the company`s goal and increase company profit, the workers implement Kaizen in the workplace respectively. Kaizen has been implemented since the company established until now and the data were documented each year. The improvements always refer to 5S technique. Even though there was no to do list of 5S in the company, but each workers implement 5S in their work. This is because 5S was also already in their minds. 5S and Kaizen techniques intended for individual practice, long-term improvement program. Profit can only be obtained from sustainable practices, the result come from discipline of work. Mory Industries Inc. always reminds those 2 techniques in several occasion, such as in the morning meetings and also the announcement after morning gymnastics. Several examples of Kaizen which implemented in Mory Industries Inc. that refers to 5S technique were seiri (merging two documents into one database), seiton (change the location of the tools), seiso (change the form of location the production waste), seiketsu (manufacture barcodes and color) and shitsuke (bulletin board of efficiency machine).

Every small innovation which they made always give a financial impact to the company. It can be seen from this study that Mory Industries Inc. always convert the result of Kaizen into money. The objective is to make the worker understand easily the benefit of improvements which have been made. From the five examples above, the cost contribution of each Kaizen through 5S is not too high, but the accumulation of all improvements will impact highly to the company profit. In this case the impact of Kaizen between \1,000 – \3,000 for each improvement, but the accumulation of all will be around \8,000 which is quite enough for the company.

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