

## **5S TRAINING IN INFINEON TECHNOLOGIES (KULIM) SDN. BHD**

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### **ABSTRACT**

This study aims to explore how a manufacturing company trains their employees in 5S and to identify the effect of 5S training for employees. Qualitative approach and single-case study are chosen in this study. The information was collected through interview from Infineon Technologies (Kulim) Sdn. Bhd. The researcher had done an in-depth interviewed with production engineers and worker in the company. In Infineon Technologies, 5S training conducted by lecture, in-house training and practical training test certification. The impacts of 5S training can be divided into two elements: employees and organization. Employees will get benefits from 5S training such as employee's attitude changed into positive, value of cleaning, improved employee's satisfaction, and less wastage and scrap at the workplace. Meanwhile, the organization will get benefits from 5S training such as employees helped removed or eliminated unnecessary equipment or materials, employees will know systematizing of organization, ease in work flow, zero defects, zero waste, zero incidences or accidents, zero un-scheduled breakdowns, zero delays and zero complaints. This study was limited to the employees from the production department. Hence, the researcher expects to expand the sample size in future research.

Keywords: lean manufacturing, lean training, 5S training, semiconductor industry, Malaysia

### **INTRODUCTION**

In recent years, most of the companies are implementing lean manufacturing. Lean manufacturing (LM) is a management philosophy. It is based on the Toyota Production System that struggles to shorten the time, which between the order from the customer and the consignment of the final product of the company with less of waste (Modi & Thakkar, 2014). Furthermore, the goal of LM is reducing waste. The objective of LM is to increase work value by reducing seven different categories of waste (Chauhan & Singh, 2012). There are three basic wastes in production such as Muri, Muda and Mura. The waste is divided into seven categories, for instance, overproduction, waiting, inventory, defects, transport, over processing, and movement (Apreutesei, Suciu, & Arvinte, 2010). There are many lean tools and practices in the world. These tools and practices are helping the companies improve their operations and not only eliminate wastes. The lean tools are kaizen or continuous improvement, 5S, just-in-time (JIT), visual management, andon, value stream mapping, gemba, Single Minute Exchange of Die (SMED), poka yoke, cellular layout, Total Productive Maintenance (TPM), kanban, jidoka and

hoshin kanri (Modi & Thakkar, 2014).

Lean training program is important for manufacturing companies. Manufacturing companies must emphasize on the development of human resources continuously and consistently. The lean training program can be accomplished for better working environment and to enhance efficiency among the employees.

5S training has recommended a company as it is very crucial in the implementation of the LM. All of the employees should participate this 5S training program that conducted by the lean department. The importance of discipline and standardization is taught in this training for the employees. It could become the key elements when it starts implement. In short, the training program that conducted in the company could give benefits to employees and the company itself (Juhari, Abidin, & Omar, 2011).

### **Problem statement**

Managers and employees are worried about the issue of poor performance (Ghodrati & Zulkifli, 2013). Training is a type of activity where can match in organizational, industrial, and individual development. The company should conduct a proper training on the concepts and principles of lean, and objectives of lean, could give benefits about lean manufacturing for the company and employees. Lean training is aimed on changing liability of a crucial mass of employees. The other purpose of lean training is purposed at practicing, focused on easy and simple applied tools. The organization needs to continuously put effort on the importance of lean training that could keep moving towards cultural change among the employees (Martínez-Jurado, Moyano-Fuentes, & Gómez, 2013).

5S is one of the lean training conducted by companies for their employees. The 5S training can be divided into two which are internal training and external training (Juhari et al., 2011). The examples for internal training are from other experienced individuals, having committed to the project, sharing the job and rotation of tasks and individual guidance in the 5S. Meanwhile, external training is when the companies send their employees to outside seminars and workshops which related with 5S (Muniz Jr., Batista, Batista Jr., & Loureiro, 2013). This study would like to show that lean training for employees can help to create a good performance and increase productivity in the company.

The objectives of this study are to explore how a manufacturing company trains their employees in 5S and to identify the effect of 5S training for employees.

## **LITERATURE REVIEW**

### **Lean manufacturing**

Lean manufacturing (LM) is a kind of classified approach. This approach is to identify and eliminate waste through continuously improve, pull system of the customer in pursuit of finish (Bon & Rahman, 2009). According to Karim and Kazi (2013), lean philosophy is based on lean principles. The lean principles have three different principles. The first principle is identification of value. The second principle is eliminating waste and the third principle is generation of smooth flow in manufacturing process. In 1996, lean often defined in terms of the five lean principles of

Womack and Jones (Olesen, Powell, Hvolby, & Fraser, 2015). These five lean principles concluded as below:

- (i) Exactly specify value by specific product
- (ii) Identifying value stream for each product
- (iii) Value flow without disturbance
- (iv) Customer pull value from the manufacturer
- (v) Maintain perfection

**Waste**

Waste can be divided into seven categories which are wastes are overproduction, waiting, transportation, inventory, defects, over processing and movement. Table 1 shows seven wastes and definitions.

Table 1: Seven wastes.

Type of waste	Definition
Overproduction	Supplied products needlessly more than demanded or too early producing products before customers needed (Gupta, Acharya, & Patwardhan, 2013).
Inventory	Unnecessary of storage goods which will increase the cost (Gupta et al., 2013).
Waiting	Waiting is waste because workers or machines are delaying or idle time (Gupta et al., 2013).
Movement	Unnecessary movement of operators (Apreutesei et al., 2010).
Transportation	Parts that moving around (Apreutesei et al., 2010).
Defects	Errors when producing the products and the results are scraps or redo (Gupta et al., 2013).
Over processing	Unnecessary complex or does not add value of product in manufacturing process (Gupta et al., 2013).

**5S**

5S came from five Japanese words which are Seiri, Seiton, Seiso, Seiketsu and Shitsuke (Bayo-Moriones, Bello-Pintado, & Merino-Diaz de Cerio, 2010; Carvalho, Lopes, & Gomes, 2013; Gapp, Fisher, & Kaoru, 2008). The objectives of 5S practice in the organization are including embedded values of organization, orderliness, purgation, calibration and discipline in the plant in its actual configuration. It is also normally will be the first lean method that implemented by companies (Bayo-Moriones et al., 2010).

**Training in lean manufacturing**

Training was a type of process which workers can get capabilities to help their organizations to achieve their goals. It also took part of improving the skills of a worker for doing an extraordinary work (Ghosh, Joshi, Satyawadi, Mukherjee, & Ranjan, 2011).

Martínez-Jurado, Moyano-Fuentes and Gómez (2013) found that training focused on the changing manner of employees. The study emphasized the importance of on-job training, highlighted about learning tools which are simple and easy to apply. Furthermore, this kind of training is very important for employees to be easier to carry out the first lean tools. So, it needs

expand based on different level.

### **Training in 5S**

5S trains management of the organization to plan, organize and implement 5S activities in carefully. 5S was to achieve a good working environment, improved safety, supported responsible workflow, increased productivity, and employee satisfaction (Leino, Heinonen, & Kiurula, 2014).

It is a simple and easy learning activity that can be formed in any department of the company. After the employees attending through all of the steps in 5S training program, so they can work together for finishing a project. This training program will open their minds on waste. They can involve in the decision making process and tests them to find solutions to the problems. This training will not only force the company to learn techniques from successful implement a project, but it will teach the employees about the value of discipline and standardization.

Next, company can enquires to consultation agencies who could have conducted courses about national productivity and standards boards before. Ramdass (2015) stated that to implement 5S system in a company, it is necessary to identify persons in charge of 5S system in each department. Efforts that decentralize will let each effort more focused on the certain areas.

Furthermore, this 5S training program should include into the orientation plans for new employees, but other employees should continue to practice in their workplace. All of the employees should be encouraged to recognize their own problems and make their own solutions for continuous improvement in self-sustaining progress. The management should always conduct meetings to let avenues for employees to discuss their practices and indicate their results. They should exchange ideas and information during the meeting and it could keep everybody fresh in mind (Ramdass, 2015).

5S can be trained in in-house which is called in-house training program. This type of training program was to introduce 5S concepts and to facilitate important of 5S principles and practices to continually improve cleanness in the workplace, surroundings, health and safety in an organization (Leino et al., 2014; O'hEocha, 2000). Moreover, 5S training should concentrate on the responsibility of individuals in their workplace. They should prepare for changing their attitudes and practices encourage others to change. All levels of employees will involve in the audit process. In short, there were good perceptions of the employees have attended the 5S training.

## **METHODOLOGY**

### **Research design**

Qualitative approach was used in this research. In this research, single-case study will be chosen. The information will be collected through interview from a manufacturing company. Technique for the interview was an in-depth interview. The research objectives are more in the exploration and description. Case study approach chose because can understand the problem deeply and gain new information from the interview.

The study was conducted at Infineon Technologies (Kulim) Sdn. Bhd. This manufacturing company was selected because they conducted lean training, especially 5S training for their employees. Infineon Technologies (Kulim) Sdn. Bhd. was located at Kulim, Kedah. The number of respondents for top management was two representatives and one representative of workers. One of the respondents was cleanroom staff engineer and another respondent was defect density engineer. The worker that interviewed by the researcher was operator from this company. Thus, total respondents for this research were three persons.

Face-to-face interview conducted in this research. The purpose of this research interview is to explore the views of management about the training in 5S for employees. Training activities of this company conducted will be taking notes in this study. The more details about employees after taking lean training and 5S training will be recorded. Direct questions were asked at the interview. So, the interview questions were open-ended questions and in English. Identifying the place or company to carry out this research is not easy. Most of the companies have their own policy. So, it is hard to find at the beginning. The company which given a green light to carry out this study is Infineon Technologies (Kulim) Sdn. Bhd.

Method of data analysis for this research is to explore and describe all of the information from this interview. This research is using concept analysis, which is data will be analyses of verbal communication with interviewee in a systematic way. Thus, all of the data for each interview question will be analysis.

## **FINDINGS**

### **Background of company**

Infineon Technologies (Kulim) Sdn. Bhd. in Kedah was started on 17 January, 2005. It is a multinational company which has local and foreign staffs. It was the first Front-end Fab in Asia. It employs 1800 employees in Kulim, Kedah. The Kulim plant has added a building-shell which can include a new 12,000 square meter fab facility with the potential to double production capacity. Total investment of this company is around RM4 billion. This company is positioned as the manufacturing competence centre of semiconductors.

5S training has been chosen for employees because 5S can simplify everything. After implementing 5S in Infineon Technologies, there were without a waste of time, material, tools and equipment. There were also can eliminated errors, defects and unstable factors. This company is a semiconductor manufacturer and it needs to implement a 5S system because it needs to maintain cleanness of cleanroom.

### **Lean training in Infineon Technologies**

Lean training that provided by the company to employees are important. This training will change manners of the employees. It teaches about ways to increase efficiency and reduce waste for the company. Lean trainings conducted by this company can be divided into two types which are internally and externally. The type of lean training conducted were literacy training, interpersonal skills training, technical training, Six-sigma training, problem-solving training, 5S training and diversity or sensitivity training.

The purpose for conducting internal lean training were employee motivation, less cost compare to

external lean training, and improve effectiveness. There were many types of internal trainings for employees such as induction, on-the-job training, coaching, in-house courses and mentoring. Internal trainings were conducted in-house included 5S training, literacy training, technical training, Six-sigma training and diversity or sensitivity training.

External training was company seeks outside expertise. The company also has invited external trainers for some of the lean trainings. The examples of external trainings for the company were problem-solving training, interpersonal skills training, technical training and Six-sigma training. The benefits of external training were improved efficiency and training costs in better control.

Lean trainings will give benefits to employees such as customer satisfaction, customer loyalty, improve the bottom line, employee satisfaction and better partnerships. Figure 1 represents lean training for employees.



Figure 1: Lean training for employees.

## **Training in 5S**

### *5S training methods*

Infineon Technologies has provided 5S training for its employees. All of the internal and external employees, business partners and vendors must participate 5S training that conducted by the company. This 5S training was a compulsory training that all of the employees required to attend. The company trained their employees in 5S by using lecture, in-house training and practical training test certification.

Every employee must attend 5S lecture or classroom at least once. After the lecture, our in-house experts will give employees training on how to implement 5S in the company and how to standardize it. It was a kind of learn-do method to train employees know more details in 5S knowledge. A practical training test certification will be conducted after the training. Besides that, course contents of 5S training done by the company. The course contents were included introduction to 5S, types of waste in the workplace, 5S principles, exercises, methods of implementation, auditing 5S areas, presentations and examination. In the 5S training program, they will have group discussions, case studies, and the opportunity to network with others who face similar challenges. The English language will be used for this 5S training. Courseware and workbook will be provided during the training. Certification will be given after employees completed this training.

Employees will get rewarded and recognition after they pass the 5S examination. Monetary

awards, gift cards, and gifts are all common rewards that are given to employees. Some informal recognition is the ways winners recognize employees. Employees will be recognized by module internally and contribute to individual key performance indicator (KPI).

Moreover, the company has its own auditors to audit 5S. It was a way to sustain 5S efforts in company and it also used as a part of the roadmap for improvement. There were two types of auditors such as internal auditors and external auditors. Internal auditors were the company cleanroom staff engineer. External auditors were coming from outside and mostly were Japanese. The auditors were audited on time to time.

### **Effects of training in 5S**

In Infineon Technologies, every new employee must attend 5S training and it was compulsory to them before the conformation. Employees who did not attend this 5S training might do not know what 5S is and how to implement it. This training will be provided by Infineon Technologies and did not hire any consultation company to give a lecture. This 5S training was done internally.

There were some good effects after employees attended the 5S training. The first benefit was the employee's attitude will be changed into positive after they attended this 5S training. Their discipline has been improved. The respondent said that employee's attitude and working climate has been changed into positive. Another benefit was value of cleaning. Every employee was involved in cleaning. For instance, they need to clean their own computer in an office or cleanroom. Moreover, employees have been trained to keep the good things and eliminate bad things. New employees also have a less habituated outlook at things. For instance, they can be more confident in sort through and sort out things after they attended 5S training.

Employee satisfaction will be increased after they attended 5S training. Self-esteem improves when they better understand the workings of the company. Employees were able to work to the best of their ability if they satisfaction increase. The reason was they did not have to face any disruptions or accidents in the workplace. Another good improvement of employees after attended 5S training was less wastage and scrap at the workplace. Through this kind of lean practice, no wastes and scraps produced at the workplace. Employees have been trained to identify and eliminate waste.

Worker of Infineon Technologies felt that this concept taught about the importance of systemize processes and cleaning. She has learned to sort things in a systematic whether at workplace or home after the 5S training. She said that, she did not know about the concept of 5S before she attended 5S training. After she attended 5S training, this training exceeded her expectations because she found the very personal guidance very helpful. This training is a good way to understand the principles of 5S and get some practical experiences.

## **CONCLUSION**

The research has shown Infineon Technologies (Kulim) Sdn. Bhd. trains its employees in 5S and the effects of 5S training for employees. The company trained their employees in 5S by using lecture, in-house training and practical training test certification. Besides that, the company has its own auditors to audit 5S. The goal of 5S audit is to achieve zero deficiencies regularly for the

company. So, the company has always conducted lean trainings which including 5S training to improve skills of employees and standardized 5S implementation. There were some good effects after employees attended the 5S training. The first benefit was the employee's attitude will be changed into positive after they attended this 5S training. Another benefit was value of cleaning. Employee satisfaction will be increased after they attended 5S training. Another good improvement of employees after attended 5S training was less wastage and scrap at the workplace. Organization also get benefits from the 5S training such as employees helped removed or eliminated unnecessary equipment or materials, employees will know systematizing of organization, ease in work flow, zero defects, zero waste, zero incidences or accidents, zero un-scheduled breakdowns, zero delays and zero complaints.

This research has limitations which included researcher only interviewed employees from the production department of the company and chosen only one company for this study. Therefore, recommendations for the company and this study are needed. The recommendations were provided for the company included continuous improve cleaning, modify 5S implementation, more 5S training for other departments in the company, and role of mentor mentees during 5S training. For the future research, the researcher expected that expand the sample size of the study. The recommendation for the future research is to collect data of 5S training from various companies that in different kind of industry sectors. Qualitative and quantitative methods can be mixed in the study. Lastly, future study can do a comparison between different companies which also conducted 5S training to employees.

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