Faculty of Manufacturing Engineering

5S IMPLEMENTATION IN WAREHOUSE FOR MANUFACTURE OF PLASTIC BOTTLES FACTORY

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5S IMPLEMENTATION IN WAREHOUSE FOR MANUFACTURE OF PLASTIC BOTTLES FACTORY

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DECLARATION

I declare that this report entitle “5S Implementation in Warehouse for Manufacture of Plastic Bottles Factory” is the result of my own research except as cited in the reference. The report has not been accepted for any degree and is not concurrently submitted in the candidature of any other degree.

Signature :.....

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APPROVAL

I hereby declare that I have read this report and in my opinion, this report is sufficient in terms of scope and quality as a fulfillment for the award of Master of Manufacturing Engineering (Manufacturing Systems).

Signature :.....

Supervisor Name :.....

Date :.....

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DEDICATION

I dedicate this work to my mother Hu Youk Yien and my sister Lee Wee Ling, who has encouraged me throughout the entire course and whose encouragement has made sure that I give it all it takes to finish that which I have started. Thank you.

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ABSTRACT

5S is one of the most potent lean manufacturing tools, and the foundation of successful implementation is 5S. 5S is a simple tool for organizing your workplace in a clean, efficient, and safe way to increase productivity, visualize management, and ensure the introduction of standardization. In Hon Chuan Malaysia, their warehouse have not implement warehouse management. Their warehouse is messy and dirty. Due to this situation, the employees need to waste a lot of time for materials or finished goods. Besides that, when customer comes factory to visit or audit, this situation will give the customer a wrong impression. In addition, when the finished goods or materials is too much, there has no enough space for storage. The employees will put the finished goods and materials on the gangway. Otherwise, many finished goods and materials were stored for a long period in the warehouse until expired. For those items, it will be scrapped or disposed of. This project aims to implement 5S to keep the warehouse in a clean, efficient and safe manner with the objectives; 1) to study the 5S tools and techniques; 2) proposed the suitable 5S tools and techniques to be applied in the warehouse; 3) implement 5S tools and techniques in the warehouse. Therefore, 5S can make the warehouse clean and neat, eliminate waste in the warehouse, and improving company image.

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ABSTRAK

5S adalah salah satu peralatan lean yang paling kuat dan asas pelaksanaan yang berjaya ialah 5S. 5S adalah alat mudah untuk menganjurkan tempat kerja anda dengan cara yang bersih, cekap dan selamat untuk meningkatkan produktiviti, menggambarkan pengurusan dan memastikan pengenalan piawaian. Di Hon Chuan Malaysia, gudang mereka tidak melaksanakan pengurusan gudang. Gudang mereka adalah kemas dan kotor. Kerana keadaan ini, para pekerja perlu membuang banyak masa untuk bahan atau barang jadi. Selain itu, apabila pelanggan datang ke kilang untuk melawat atau audit, keadaan ini akan memberi kesan buruk kepada pelanggan. Di samping itu, apabila barangan siap atau bahan terlalu banyak, tidak ada ruang yang cukup untuk penyimpanan. Para pekerja akan meletakkan barangan siap dan bahan di gangway. Jika tidak, banyak barangan siap dan bahan telah disimpan untuk tempoh yang panjang di gudang sehingga tamat tempoh. Bagi barangan tersebut, ia akan dibatalkan atau dilupuskan. Tujuan projek ini adalah untuk melaksanakan 5S untuk menjaga gudang dalam cara yang bersih, cekap dan selamat dengan objektif; 1) untuk mengkaji alat dan teknik 5S; 2) mencadangkan alat dan teknik 5S yang sesuai untuk digunakan di gudang; 3) melaksanakan alat dan teknik 5S di gudang. Oleh itu, 5S boleh menjadikan gudang bersih dan kemas, menghapuskan sisa dalam gudang, dan meningkatkan imej syarikat.

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CHAPTER 1

INTRODUCTION

This chapter will briefly introduce waste, lean manufacturing, and 5S, the background of the study, problem statement, aim, objective, and scope.

1.1 Introduction

Waste can be defined as any activity that uses resources but has no value to customers. This is why the customer refused to pay. The seven wastes of manufacturing stimuli are production, waiting, rejection, excessive movement, more processing, excess inventory, and excessive transportation. (James P. Womack & Daniel T. Jones, 2016).

Lean manufacturing is a systematic approach to eliminating or reducing waste in design, manufacturing, distribution, and customer service processes. Lean manufacturing is based on the principles and workflow of the Toyota Production System (TPS). Lean manufacturing has many tools and technologies, such as Kanban, TPM, 5S, Poka-Yoke, Instant (JIT), Kaizen, VSM, etcetera.

5S is one of the most potent lean production tools, and the basis for successful implementation is 5S. 5S is a simple tool for organizing one's workplace in a clean, efficient, and secure way to increase productivity, portray management, and ensure the introduction of standards. In addition to standardization work, 5S also provides a highly visual workshop by implementing lean tools to provide a stable foundation for building all other improvements. One of the most essential elements of 5S is that problems will appear soon.

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5S is a team management process that must be implemented by people working in areas where the 5S principles apply. (T Earley, accessed by 2018).

1.2 Background

Hon Chuan Malaysia Sdn. Bhd. is a manufacturer of plastic bottle factory. Top management of Hon Chuan Malaysia try to provide the employees work in a better working environment, so that can make the employees feel pleasant and more efficient to do this job.

In Hon Chuan Malaysia, their warehouse haven't implement warehouse management. Their warehouse is messy and dirty. Due to this situation, the employees need to waste a lot of time for materials or finished goods. Besides that, when customer comes factory to visit or audit, this situation will give the customer a wrong impression. In addition, when the finished goods or materials is too much, there has no enough space for storage. The employees will put the finished goods and materials on the gangway. Otherwise, many finished goods and materials were stored for a long period in the warehouse until expired. For those items, it will be scrapped or disposed of.

Because above reason, many employees will not work in Hon Chuan Malaysia for a long time, even foreign workers also like this. In order to change this bad situation, top managements was decided to implement the 5S in the factory.

1.3 Problem Statement

In recent years, there are still have many traditional factories or SMEs that not implemented 5S. According to Hung Lin, Chi (2011), In Taiwan, a small traditional industrial enterprise has many workers working in an unpleasant, dirty, and clumsy environment, often filled with unused materials. Therefore, it is difficult to find the items

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needed for the job. There are several issues when running a project with a scheduled date. For the above reasons, many workers are reluctant to work long-term and the relationship with workers working in the Wancheng manufacturing plant. In order to change this unfortunate situation, it decided to implement the 5S system at the factory.

Currently, in Hon Chuan Malaysia, their warehouse is messy and dirty. It will be caused the employees to need to waste much time to find the materials or finished goods. This will happened because there has no standard place to put these things.

Besides that, when customer come to factory visit or audit, this situation also will give the customer a wrong impression due to many rubbish were litter on the floor. This happens because employees are lack of knowledge and training in 5S, and employees is no habits to throw the rubbish into the dustbin.

In addition, when the finished goods or materials is too much, there has no enough space for storage. Due to no enough space, employees will put the materials or finished goods on the gangway. This will happened because there have a lot of unnecessary items in the warehouse.

Otherwise, many finished goods were stored for an extended period in the warehouse until expired. For those expired finished goods will be scrapped and disposed of. It will minimize company profits. This will happens because they are no implement first in, first-out (FIFO) concepts.

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Figure 1.3.1 Stretch film and paper litter on the floor.

Figure 1.3.2 The finished goods put at gangway or put at the wrong place.

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Figure 1.3.3 Untidiness in the materials area and finished goods area.

1.4 Aim

This project aims to implement the 5S to keep the warehouse in a clean, efficient, and safe manner in Hon Chuan Malaysia.

1.5 Objectives

The objectives of the project are:

i. To investigate existing 5S tools or techniques that have the potential to be applied to the warehouse to ensure its cleanliness, efficiency, and safety.

ii. To propose specific 5S tools and techniques to be applied in the warehouse.

iii. To implement 5S tools and techniques in the warehouse.

1.6 Scope

This project will focus on 5S implementation on finished goods and materials in the warehouse of Hon Chuan Malaysia.

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CHAPTER 2

LITERATURE REVIEW

This chapter will review more details in 5S, concepts of 5S, history of 5S, elements of 5S, 5S implementation in manufacturing, 5S implementations in the warehouse, and benefits and barriers in implementations 5S.

2.1 5S

The 5S operational model is a tool for the fat-free philosophy. The 5S concept has been considered a manufacturing base because it helps to establish system stability and operational stability, and can successfully protect and maintain various drives without the need for continuous drive manufacturing (Brady Worldwide Inc., 2008). Sustainable production is often referred to as eco-efficiency, redesign, green technology, cleaner production, and more (Vimal and Vinodh, 2013). 5S can improve hygiene and cleanliness, creating a comfortable and safe working environment. The goal is to increase labor productivity. At the same time, it is not possible to eliminate all reload operations, such as the time required for a search. 5S is an important step towards growing manufacturing. The primary purpose is to provide the right amount of the right "product" to the customer at "the right time." 5S is considered to be an impact on productivity, quality, performance, and continuous improvement of workplace safety (Kumar and Kumar, 2012). Ho (2006) has introduced 5S practices as a starting point for implementing TQM, ISO 9000, ISO 14001

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and OHSAS 18001. 5S has been identified as part of green productivity technology (Johannson, 2006).

The 5S pillars will impact workplace improvements by identifying and eliminating waste associated with the manufacturing system. It comes from five Japanese words – all of which begins with an S, and are translated into English words to give the best explanation. 5S is an acronym for five Japanese words; each word begins with a 'se' or 'shi' sound. They are Se-i-ri, Se-i-to-n, Se-i-so, Se-i-ke-tsu and Shi-tsu-ke. 5S is an efficient TQM tool that can improve the entire organization very effectively (Singh, A. and Ahuja, I.S., 2015).

2.2 Concepts of 5S

5S is Japan's institutional principle and has achieved remarkable results in the industrial and service industries. These results are known as accident prevention in the work environment, reducing delays, and increasing productivity. The main goal of 5S is to avoid losses. Although 5S seems to be easy to understand and implement, the organization has significant problems in implementing it. Managers and executives do not understand the 5S goals. Therefore, unless these principles are fully understood, it is difficult to determine the reasons for the 5S implementation. These principles take the form of five Japanese words, starting with the letter S and then forming the 5S term.

5S is the essential tool for improving operations and an excellent way to help companies reduce waste and increase profits. (Ablanedo-Rosas et al., 2010). The 5S concept comes from Japan. At TPS, 5S is a tool that helps solve problems and can be part of a well-designed lean visualization system. (Hirano, 1995). A visual control system designed to enhance value-added processes (Liker, 2004). 5S aims to improve safety and efficiency in all workplaces and reduce product defects (Dennis and Shook, 2007). Section 2 ISO 13053

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recommends two tools for Lean Manufacturing, 5S, and TPM, which are usually implemented in the Lean Six Sigma project instead of Six Sigma (Chiarini, 2013).

Benefits of successful implementation of 5S include reduced search, improved hygiene, easier identification of defects, reduced travel and mobility, reduced time, reduced safety and accident hazards, increased traffic, reduced errors, improved workplace visual management, and increased space utilization. These advantages increase overall productivity, quality, cost, delivery, safety, and morale.

2.3 History of 5S

Japan has been using 5S as a strategy to achieve business excellence since the Second World War (De Mente, 1994). Osada (1989) introduced the 5S in the early 1980s, significantly improving production performance and environmental services. Since the introduction and acceptance of Japanese companies in Japan, 5S practices have been successful in many Western countries, including the United States. First, 5S is implemented at Toyota Motor Corporation as part of the TPS production system. 5S is also widely used in TQM systems and is known as part of a series of quality plans (Ahmed and Hassan, 2003). 5S has evolved into an effective packaging tool and a system that maintains a pleasant working environment (Ho, 1999a). In this dynamic and technological world, every company now needs a 5S approach to its products and services.

2.4 Elements of 5S

5S is a way to organize, order, clean, standardize, and continuously improve the work area. 5S is more than just homework. It is one of the most effective tools for lean manufacturing. 5S design Seiri, Seiton, Seiso, Seiketsu, and Shitsuke are called the five vital

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elements of the overall quality environment (Abdul Aziz et al., 2014). These words are arranged separately during translation, planning, lighting, coordination, and maintenance. 5S is the beginning of a healthy, comfortable, and productive life for everyone at work. At work, 5S is used to organize work, keep it tidy, clean, maintain standardization, and maintain the discipline required to do the job well. (Osada, 1991).

The 5S concept also applies to any department or business: manufacturing, business, and service organization. The four key factors for a fruitful 5S include ongoing commitment and senior management support; education and training; participation of all employees; and continuous implementation of 5S standardization over the long term (Sidhu et al., 2013). Osada (1991) defines 5S as the baseline for a total quality environment.

The meaning of the various 5S terms is as follows:

The first S, Seiri stands for ‘Organization,’ meaning ‘in order - organize them according to specific rules or principles’ (Osada, 1991). This first distinguish between necessary and unnecessary items that effectively create an effective system. This activity helps remove unnecessary items from the workplace and helps to use the space available to your organization effectively. Unnecessary items are either stored off-site or discarded, reducing the risk and reducing clutter.

The second S, Seiton, means "tidy," designed to put things in the right place or the right layout so that people can quickly use or use whatever they need. To this end, priority should be given to the needs and importance of the goods or equipment to maximize positioning. The main question is who, what, why, where, when, and how to ask each item (Imai, 1986). This activity involves ensuring that all items in the workplace are set up so that employees can effectively control operations and help employees plan materials, finished goods, or tools (Brady Worldwide Inc., 2008).

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The third, Seiso, means “clean,” emphasizing self-examination, clearing and creating a perfect workplace. This step includes three main activities, including keeping the workplace clean, maintaining the appearance, and using precautions to keep it clean. Light from work removes dirt, dust, liquids, and other debris. The 5S team can use paint or coated countertops, equipment, floors, and walls to divide the various active areas (Brady Worldwide Inc., 2008). Operators perform proactive self-tests on machine and thread quality, entering each workflow to extend service life and performance, thereby avoiding failures or downtime during operation.

The fourth S, Seiketsu, means "standardization," which is to maintain a person's workplace by repeating Seiri-Seiton-Seiso, making it more efficient and comfortable. In this implementation phase, the team develops standard operating procedures to build better workplace practices. (Osada, 1991). Standardization programs typically focus on consistent use of visual controls at work, as well as developing and promoting standard work orders such as color-coding, flowcharts, checklists, and labels to help strengthen the unified approach across the organization.

Finally, the fifth S, Shitsuke, means "Sustain." It is imperative to understand and implement 5S. Sustainability is designed to sustain its success by completing the 5S program and requires a continuous review process through the 5S program to maintain performance improvement (Patel and Thakkar, 2014).

2.5 5S Implementation in Manufacturing

Soumya R. Purohit and V. Shantha (2015) have presented the method to implement 5S in the manufacturing sector. The 5 steps to implement 5S in the manufacturing sector as below:

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i. Sorting

- Use the red tags methods. It can be done in the following manner: Every person should persistently question himself or herself regarding all the items around his or her workplace.
    i. Is this item needed?
    ii. If it needed, is it needed in this quantity?
    iii. If it needed, is it required very frequently?
- In case, the answer for any above questions is no, then remove the items from the workplace.
- Review the red tags items. The review team would consist of senior members who can take decisions on disposal; it must include personal buying new items. Steps in reviewing include:
    i. First a "purchase ban" on all items red-tagged till inventory lasts.
    ii. Review the item accordingly.
    iii. Keep the item where it is.
    iv. Move the items to a new location.
    v. Store the item away from the work area.
    vi. Hold the item in the local red tag area for evaluation.
    vii. Disposal of the item

ii. Set in order

- Phase 1: Deciding Appropriate location
    - Principles of Storing Jigs, tools, Dies for waste elimination

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