

Implementation of Lean Concept in Start-up Engineering Service Provider

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Abstract

Today there are many business opportunities in the engineering industries. These industries will keep growing as the needs of consumers to meet their requirements. This condition will influence tire industry as well, both motorcycle tires and car tires. Tire industries will increase their productions by using additional machines to produce tires. This is an opportunity in the provision of engine installation services provider, especially in tire industry where availability of this provider is very rare. A service provider company needs a management concept to be able to improve quality and profit of company. Lean Manufacturing is an effective concept to improve quality and to increase the profitability in a production process. In the process of manufacturing and engineering can use lean manufacturing concept because this concept can reduce waste from materials, production process and time for job completion. One of lean manufacturing concept is to reduce waste, commonly there are 8 wastes need to be reduced in production process. The 8 wastes are; Defect, over production, Waiting, None utilizes talent, Transport, Inventory, Motion, Excessive process. Engineering service provider company will implement this lean manufacturing concept on determining work shop layout, raw material pre-order stage, production stage, controlling stage until delivery stage all the action must suitable with engineering service provider company, and by implementing this concept to get more profit by producing product with optimum production cost and also will get trust from customer to make repeat order. Every company requires a proper management concept and also continuous improvement on its production process to get quality product and company profit so their business will sustain in the future.

Keywords: Lean Manufacturing, Waste, and Control

Received: 3 October 2017; Accepted: 19 January 2018

1. INTRODUCTION

The future company is a business service provider of tire machine installation and engineering contractor. The company is located in Tangerang, Indonesia. The company will implement the system in its production process that will be able to improve the quality of its products and as a result it will also increase the company profit. The Company will implement lean management to control the waste occurring in the production line. By controlling all forms of waste, the company expects to obtain a quality product and optimal production costs. Harliwantib [1] Identified that there are seven wastes; waste over production, defect, unnecessary inventory, inappropriate processing, excessive transportation, waiting, unnecessary motion. All those wastes will give significant influence to the company service to fulfil customer satisfaction. Danang Triagus Setiyawan, Sudjito Soeparman, Rudy Soenoko [2] after improving to reduce 7 wastes (defect, waiting, inventory and over production, transportation and unnecessary motion, inappropriate processing,

environment health and safety, underutilized people) will reduce production time 14% and reduce lead time process 13.7%.

2. LEAN MANAGEMENT ON ENGINEERING SERVICE PROVIDER COMPANY

Lean Manufacturing also known as Lean Enterprise, Lean Production, or simply called "Lean" is a production practice methodology that focuses on use and empowerment of resources to create value for customers (see Fig.1).



Fig 1. The 8 Wastes, Source: Grey Campus

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 DOI: 10.27512/sjppi-ukm/ses/a19012018

The trick is to remove waste that occurs in process so that process runs more effectively and efficiently and with better quality output. Many experts and practitioners using DOWNTIME abbreviation to make easy to remember about the 8 types of waste that produced in production process, in the manufacturing industry commonly there are 8 types of waste need to be reduced even to be eliminated.

Defect, defective or in need of repair or manufacture of replacement goods due to the return process, resulting in much effort and wasted time in the presence of defective products and this is a waste. The service provider company will strictly control its products by making detailed planning and detail starting from material preparation and material suitability. This can be done by making the right Bill of Quantity, both in quantity and quality of material, which can be proved by the attachment of a certificate concerning the material of the supplier. Control is also done during the production process it is necessary to obtain results in accordance with the specifications and avoid errors that can cause rework. By doing some control activities as above it is expected to suppress the number of defects generated from the production process. Proper handling of waste caused by defect material is expected to still provide economic value to the waste, if the goods produced cannot be used such as: (1) Iron waste will be collected at a location and can be recovered or sold to used iron collectors because metal waste still has economic value, (2) Plastic waste will be collected and disposed of in a separate landfill, (3) Waste oil or oil in certain amounts have economic value and can be sold to oil collectors

Over Production Makes the product ahead of time or creates products that are larger than the customer needs. Early or larger production will result in wastage of storage, labor and transport due to excess inventory (either physical or queuing information). In anticipation of this then the service provider company will make the order goods based on the number of orders requested by the customer. This is not only in terms of products produced, but also in terms controlling to the usage of raw materials used for production, so company can control number of raw material that ordered for production process. This usually occurs in the manufacture of products that use materials like sheet plate or pipes form. Therefore, company will conduct controlling process by calculating the material needs with special care for making product using raw plate form by making the layout of the product on the material so company can determine material needs with certainty, or create isometric drawing for products that using pipe form as a raw material.

Waiting, Waiting means time wasted not doing anything or time does not add value due to a previous process, process being done or subsequent process of interruption, such as: running out of material resulting in the production process stalled, machine breakdown, or bottleneck capacity. To reduce the potential loss caused by the time wasted, the service provider company will do several ways including: (1) Conducting routine maintenance program on production machines, (2) Ensuring delivery time and material availability by

establishing cooperation contract with the material suppliers, company can do this action after receiving the Bill of Quantity so that company can guarantee the availability of materials during the execution of the work, (3) Increasing the service time of the production process starting from the preparation of the tender, the implementation of the work, until the product warranty period.

Non-Utilize Talent, a company that does not empower or involve highly talented employees in the business process, this means including waste because it eliminates the time, ideas, skills, increase, and learning opportunities of these employees.

Engineering service company will place employee that work on workshop to produce the product based on their competences (welder, fitter, Helper etc.) and also for number of employee in accordance with the quality of their work. This is to increase the efficiency and effectiveness of workers, means the number of employees that work at the location of the installation of the machine should be accordance the type of the machine, whether it requires a number of workers a lot or a less and also the competence required whether a mechanic, electric or welder. Company will also provide training to employees to improve their skills and increase employee insight. Training can come from within the company or from a particular institution.

Transportation, in-process transport of goods in a process even in close proximity, and moving material / components / finished goods into or out of storage or from one process to another, the transportation is waste because it takes time, energy, and mind, even cost that does not give an added value. To address this, the service provider company will do some activities to reduce inappropriate transportation activities. They are both in the transportation environment work as well as transportation delivery of finished products to the customer by: (1) Company will arrange work-shop layout according to where the flow of production process will be suitable with the process of the product will run in the same direction from the taking of materials, workmanship, to the location of storage that will facilitate the process of transport / delivery of finished goods, (2) Delivery can use the services of a third party or use employees of the company itself in certain cases. This is to avoid handling of product in unsafe way. Third parties sometimes are less aware of the characteristics of products produced by the company. If handling is not in appropriate way in delivering it, it will threaten the safety of both human and goods brought. There are several types of products and the company must deliver it to the customer.

The company produce these products on the work shop and the delivery them by using existing employees of the company itself. This is to avoid improper handling if delivery process done by expedition or logistic company due to expedition or logistic company sometimes will treat the product with improper handling, if the handling is not appropriate in delivery process it will threaten the safety of both human and goods brought. Some products also have a special requirement in the delivery in order to be in the customer in good condition. Company must also consider

some aspects in delivery of finished goods such as: (1) Cost Efficiency, path and timing for delivery, for delivery must use a path that can provide cost efficiency, the selection of paths that are not congested traffic and easy access and for the time selection of delivery time must not in a rush hour of traffic such as night or early morning, (2) Media delivery, if necessary company must use special media to ensure the goods arrive on the destination place safely and in good condition. Third party such as logistics company or company's product as per requirement can provide such special media (3) Guarantees on the quality and quantity of products shipped, service provider company will guarantee the product both quality and quantity, where if the shipped product is not suitable for delivery then the service provider company will be solely responsible for the condition.

When delivering products, the engineering service provider company need to pay attention for several things such as; (1) cost efficiency associated with heavy traffic time, (2) the path to the delivery location, must consider traffic, (3) media used for delivery, (4) If necessary delivery process will be guaranteed by insurance company. Inventory, Excess Inventory (both raw material inventory, processed goods and finished goods) leads to long lead time (long time from order to delivery of customer to customer), transportation cost and expired goods storage, damaged goods, excessive inventory, hiding problems of production imbalances, delivery delays from suppliers, defective products, and so on. In order to suppress the potential losses caused by the storage mismanagement, several actions in the goods storage need to be done. They are (1) Number of job orders, number of jobs determines the material storage system, if the number of jobs and goods stored a lot then need a storage alternative such as save the work location, save the location of suppliers, or work-shop location, (2) Material type, the material characteristics specifying a special storage system such as temperature or open-air storage to avoid material damage, (3) Storage capacity, material storage capacity determines the amount of material delivery so as not to seize its storage location.

Motion, Any movement that employees do during the work or material movement does not adds value to the component is a waste, such as reaching, finding, or accumulating components or tools, etc., in addition, running is also a waste. Paying attention to the location of work tools often used by workers to be in the worker's comfort zone so that they are easy to get, as well as the placement of machine tool knobs, to be an easy-to-reach location but not to interfere with work activities. In planning the production floor, the company will take into account the required floor area of production. The calculated aspect is as follows:

(1) Workshop layout using flow production layout, (2) Work shop area includes fabrication area, assembling, finishing and warehouse of finished goods and (3) For raw material storage located outside production area. Equipment needed for material handling in production area include trolley, hand pallet, forklift, crane in workshop area using sliding type starting from fabrication area to finished good warehouse area. The use of material handling equipment is classified by type, weight and distance of material to be moved or removed. Production personnel consist of workshop workers, experts if required who are technicians from a vendor of a particular tool, manager and director. A supervisor will lead each production line and each supervisor will supervise 5 to 8 workers (situational) where the worker can be a contract employee with the necessary skills. Strategy of Workshop / Office Layout, The layout of the workshop use the layout where resources or similar processes are collected in one location or located in an adjacent location. This is because it will be easier in the flow of production process, thus the use of the layout can be optimized by workers with different activities and different locations such as the fabrication, assembling, finishing and storage. Placement of each facility in the workshop is used Activity Relationship Chart (ARC) to indicate whether or not the relevance between each facility is planned and the reason for the relevance of several factors that must be considered include: (1) Room efficiency, (2) Efficiency of activities include space and time between personnel and machines, (3) Security guard.

In the process of determining the correct location to place a part, must consider the flow of process of raw material receipt and also the flow of product manufacturing process of the company. This is necessary to obtain efficiency of processing time. Strategy of Workshop / Office Layout, The companies use functional layout---the layout where resources or similar processes will be gathered in one location or located in an adjacent location. Thus the flow of production processes will be easier so that workers with different activities and different locations such as the fabrication, assembling, finishing and storage can optimize the layout usage. Placing each facility in a workshop using Activity Relationship Chart (ARC) to indicate whether or not the closeness between each facility is planned and the reason for its relevance should consider several factors including: (1) Room efficiency, (2) Efficiency of activity includes space and time between personnel and machinery and (3) Security custody. In the process of placing the location of a part must also consider the flow of both the process of acceptance of raw materials as well as the flow of product manufacturing process of the company. This is necessary to obtain process time efficiency.

defects acceptable to the customer standard as well as any costs that can be minimized, which ultimately can increase profits.

Increase productivity, a lot of evidence that companies implement Lean Management method can increase company productivity. The reasons are the production process will be more efficient, concise, and faster (due to no disturbed process), in terms of production process costs are also relatively smaller due to the minimum of defective products.

Work culture, with the continuous implementation of Lean Management especially when implementing to reduce wastes (DOWNTIME) concept, will gradually change the work culture in engineering service provider company, due to the Lean management approach of employees, especially operators, and will cultivate discipline by following Standardize Operating Procedure (SOP), Work Instructions, and supporting regulations others before, during, and after work.

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