DEVELOPMENT OF STANDARD TIME IN REPACKING OPERATION

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UNIVERSITI TEKNIKAL MALAYSIA MELAKA
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DEVELOPMENT OF STANDARD TIME IN REPACKING OPERATION

This report is submitted in accordance with requirement of the University Teknikal Malaysia Melaka (UTeM) for Bachelor Degree of Manufacturing Engineering (Manufacturing Management) (Hons.)

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 (Manufacturing Management) (Hons). The member of the supervisory committee is as follow:

…….....

(Assoc. Prof. Ir. Dr. Puvanasvaran A/L A. Perumal)

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ABSTRAK

Kajian ini telah dijalankan di operasi pembungkusan semula untuk meningkatkan produktiviti dengan menentukan langkah yang paling berkesan. Masalah utama kajian ini adalah varians masa yang diperlukan untuk setiap proses. Antara sebab-sebab yang membawa kepada masalah ini ialah tidak ada masa standard dan ketidakcekapan pekerja semasa menjalankan tugas mereka. Kajian ini disiasat dan dicari untuk tujuan kajian kerja dan kajian gerakan. kajian masa telah digunakan untuk menentukan masa standard sebelum dan selepas penambahbaikan, dan kajian gerakan itu digunakan untuk menentukan langkah berkesan yang merupakan pemudahan proses. peningkatan produktiviti dari segi output yang dihasilkan menunjukkan peningkatan, selepas pelaksanaan proses dipermudahkan. Secara keseluruhan, pertumbuhan output adalah 33.7% selepas pelaksanaan penyelesaian dengan pengiraan manual. Terhad kajian ini adalah mengenai pengumpulan data di mana data dikumpulkan hanya dalam peralihan pagi. Selain itu, pengumpulan data lebih adil dikehendaki membuat data yang boleh dipercayai.

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ABSTRACT

This study was carried out in repacking operation to increase the productivity by increasing the output by developing the standard time and determining the most efficient step. The main problem of this study is a wide variance of the time required for each process. Some of the reasons that led to this problem is no standard time implemented and inefficiency of workers when performing their job. This study investigated and searched for possible solution in order to achieve the objective using some tools from work study which are time study and motion study. Time study was used to determine the standard time before and after improvement, and motion study was used to determine the efficient step which is a simplification of the process. Productivity improvement in term of output generated shows an increase, after implementation of simplified process. Overall, the output growth was 33.7% after implementation of the solution by manual calculation. The limited of this study is regarding the data collection whereby data was collected only in morning shift. Besides, more fair data collection is required to make data reliable.

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DEDICATION

This paper is dedicated to all my family, especially for my beloved father and mother those who are giving me the reason to stand. Not forget it is also dedicated to you, the source of my strength.

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First and foremost, all praises to Allah SWT because of his blessing and his permission, this final year project can be done without any significant problems.

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LIST OF ABBREVIATIONS

FMCG	-	Fast Moving Consumer Goods
MTM	-	Methods Time Measurements
NT	-	Normal Time
PMTS	-	Predetermined Motion Time Study
SIMO	-	Simultaneous Motion
SOP	-	Standard Operating Procedures
ST	-	Standard Time

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LIST OF SYMBOLS

n	-	Number of Cycles
z	-	Number of standard deviations from the mean in a normal distribution reflecting a level of statistical confidence
s	-	Sample Standard Deviation from Sample Time Study
a	-	The Degree of Error from The True Mean of The Distribution
$\bar{x}$	-	The Average Job Cycle Time from The Sample Time Study

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CHAPTER 1
INTRODUCTION

This chapter will explicate the overview and the purpose of this study. In this chapter also included by background of study, followed by the problem statement which triggered this study, objective which is intended to be accomplished, and last is scope of this study which is going to be conducted.

1.1 Background

Standard time is an amount of time needed by qualified worker, to finish definite job using proper processes and tools, with time allowances for personal fatigue, and delays that cannot be dodged (Zandin, 2001).

In manufacturing, standard time is greatly needed due to many processes contained therein, for transform raw materials into the final product. Standard time is used for several interests, for example, in staffing, the number of workers needed is determined based on time required to perform work. For line balancing, optimum work flow depending on processing time at each workstation. In terms of Material Requirement Planning (MRP), the system will operate properly with accurate time standards. Time standard also used to compare expected performance with actual performance for wage payment. To allocate production cost to specific products and assess worker's performance, time standard also used.

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For Fast Moving Consumer Goods (FMCG) company, which is a company that manufactures products that can be sold with cheap price and quick, and its products generally daily needs. FMCG company uses mass production system. This system is justified by very large volume of production. The machines are arranged in a line or product layout. Product and process standardization must exist and all outputs will follow the same path. So, the implementation of standard time will be very useful for FMCG company.

1.2 Problem Statement

FMCG Company is identified by its ability to give the customer the products that are highly demanded. This means that the types of products in this industry are surrounding customers every single day. Then, FMCG Company is required to deliver its product without any defects and ship its products on schedule.

In order to fulfill the requirement, FMCG Company needs a standard time for its process sequence. Without standard time, is hard for FMCG Company to determine the time required for workers to do a certain job. Workers will do their job without standardization. FMCG Company definitely has a big number of workers with many different ways of performing the job in terms of pace and method. Workers will perform their job based on what they feel correct without considering time required for them to finish their job, and they may lengthen the cycle time. This case will lead the company cannot maximize the performance of its workers and the reduction of productivity due to wide variation in how workers perform their job, and the worst case is the company cannot fulfill the demand caused by low productivity and performance of workers which not maximum.

In repacking operation, there are several processes involved. Repacking operation is where raw materials in sacks are moved into totebin through dumping station. Based on the observation that has been done previously, there is a wide variance of the

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time required for each process. Some of the reasons that led to this problem is no standard time implemented and inefficiency of workers when performing their job.

By the inefficiency of workers, time available cannot be maximized in order to perform the job. Hence, this problem causes a wide variance of the time required for each process as in Figure 1.1 below. Hereafter, workers also cause the reduction of number of raw material that can be repackaged and ended with the decrease of productivity.

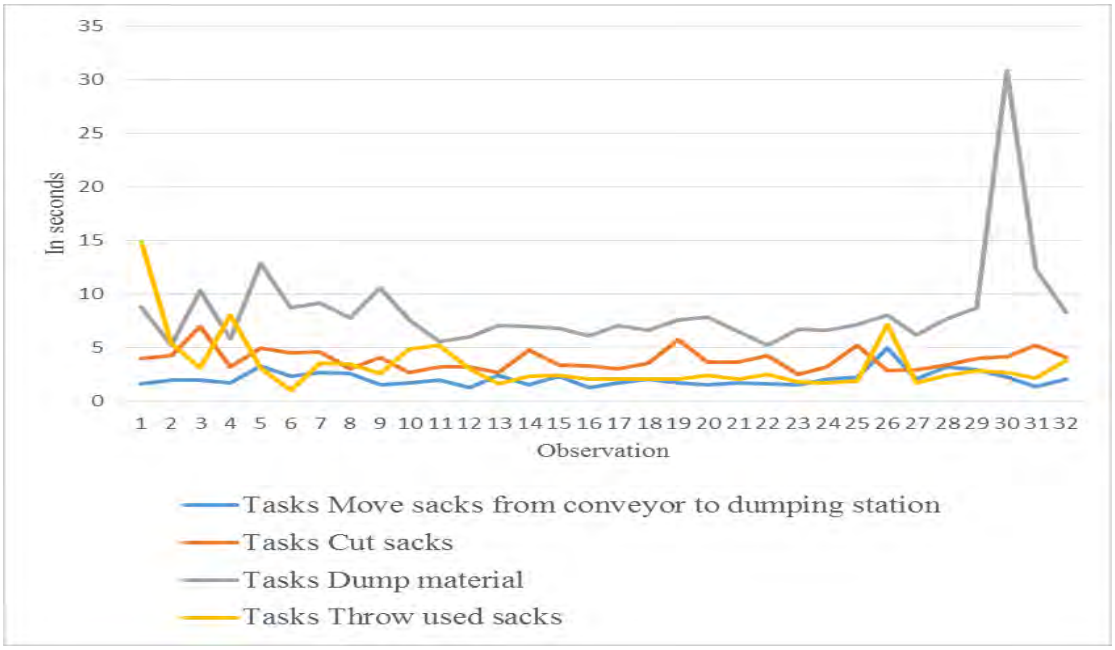

Figure 1.1: Line Graph of Non-standardize Time of Repacking Processes

1.3 Objective

Objectives of this study are:

a) To identify current standard time by conducting time study in repacking operation.

b) To determine efficient step for repacking operation.

c) To improve productivity using standard time approach for repacking operation.

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1.4 Scope

This study is caried out in repacking operation at mixing and grinding department. This study focused on how the standard time is implemented, how the standard work is determined, and finally how to improve the productivity based on standard time approach. The standard time will be implemented using time study method with 95% accuracy, and the standard work will be implemented using method study or motion study. For productivity improvement, the productivity will be calculated based on the new output of repacking operation after the implementation of standard time and previous output of repacking operation before the implementation of standard time. Furthermore, the time taken for each process will be recorded in the morning shift.

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CHAPTER 2
LITERATURE REVIEW

This chapter will explicate substantive finding, the current knowledge, and methodological contributions to this study through summary of a scholarly composition and journals. Studies that had been done by experts, contain general definition, previous case study, research and historical data. This chapter will also have a role as a point of reference in order to support the result and discussion.

2.1 Work Study

Reddy *et. al.* (2016) defined work study as a logical investigation method intended to decide the ideal approach to executing the repetitive task and to quantify the time spent by an average laborer to finish a given task in a settled working environment. As well as Patel *et. al.* (2015) defined work study as the logical research including work techniques with the target of distinguishing the most ideal method for doing a work. Raut and Desmukh (2014) also stated work study as an administration benefit in view of those systems, especially method study, and work measurement, which are utilized as a part of the examination of human work in every one of its unique situations, and which influence the proficiency and economy of the circumstance being audited, so as to influence change. According to Kumar and Suresh (2008) work study is a nonspecific term for the individual's systems, method study and work measurement which would be used inside that examination for human share empowers the larger part its specific circumstances. Besides which lead productively with. The examination of each and every one of factors which impact the viability What's more economy of the conditions constantly. Checked on, so as ought to

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effect change. Kanawaty (1992) also stated work study aims at examining the way an activity is being carried out, simplifying or modifying the method of operation to reduce unnecessary or excess work, or the wasteful use of resources, and setting up a time standard for performing that activity.

Kumar and Suresh (2008) again stated that work study may be a method for upgrading the processing effectiveness (productivity) by elimination of unnecessary tasks and wastes. It may be a strategy on identify non-value adding operations toward examination of every last one of variables influencing the employment. It will be the main exact and precise system situated method on build time standard. It will be setting off should help. Those benefit concerning illustration as reserve funds will begin instantly. Furthermore proceed with all around the existence of the item. Pal and Rajoria (2015) also stated that work study leads to higher productivity.

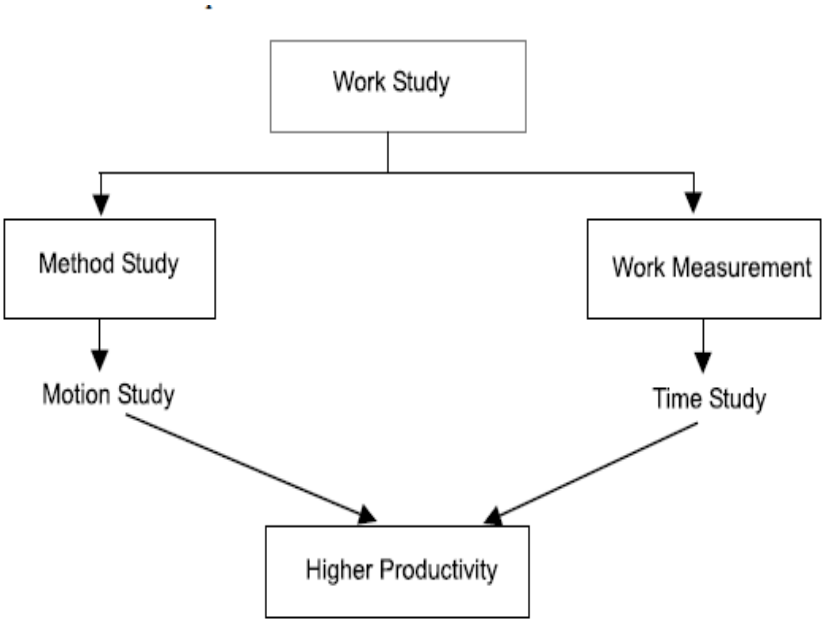

Figure 2.1: Framework of Work Study (Kumar and Suresh, 2008)

Work study is divided into two parts, method study and work measurement. Part of method study is motion study, work measurement is also called by the name 'Time study' (Kumar and Suresh, 2008).

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Advantages of work study:

- It aids to attain the smooth production flow with least interruptions.
- It serves to decrease the cosset of the item by waste elimination also unnecessary movements.
- Finer worker-management relations.
- Meets the conveyance dedication.
- Decrease clinched alongside rejections furthermore scrap also higher use about assets of the organization.
- Aides with accomplish superior working conditions.
- Better work environment design.
- Enhances upon the existing procedure alternately strategies and aides for institutionalization and rearrangement.
- Aides will build the standard time to an operation or vocation which has got provision in labor planning, creation arranging.

2.2 Work Measurement

Eraslan (2009) stated that work measurement studies as of late have concentrated on looking at option methods, adjusting the work constrain, deciding the quantity of machines that an operator can at the same time control, producing arranging and booking, getting the machine and laborer's performance standards and workshop performance assessments and figuring of the immediate cost of workmanship. Work measurement is otherwise called 'time study'. Work measurement is totally basic for orchestrating and control of operations. Without estimation data, we can't choose the point of confinement of workplaces or it is improbable to quote movement dates or costs. We are not in a position to choose the rate of production besides work use and adequacy. It may not be conceivable to present motivating force plans and standard expenses for spending control (Kumar and Suresh, 2008). Yusoff *et. al.* (2012) defined work measurement as “The application of techniques designed to establish the time for a qualified worker to carry out a task at a defined rate of working”.

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2.2.1 Techniques of Work Measurement

Kumar and Suresh (2008) stated that work can be partitioned into two classes, first is repetitive work which can be classified as kind of work in which the principle operation or gathering of operations rehash ceaselessly amid the time spent at the employment. These apply to work cycles of to a great degree brief length. Second is non-repetitive work, it incorporates some sort of upkeep and development work, where the work cycle itself is scarcely ever rehashed indistinguishably. Kanawaty (1992) add that time study and work sampling include coordinate perception and the remaining are information based and investigative in nature. Below are various techniques of work measurement:

- Time study: Work measurement technique for recording the circumstances and rates of working for the components of a predefined work did under indicated conditions and for dissecting the information in order to decide the time essential for doing the occupation at the characterized level of execution. At the end of the day measuring the time through stopwatch is called time study.
- Synthetic data: Work measurement technique for working up the ideal opportunity for an occupation or parts of the employment at a characterized level of execution by totaling component times acquired beforehand from time studies on different employments containing the components concerned or from synthetic data.
- Work sampling: One of techniques in which countless are made over a timeframe of one or gathering of machines, procedures or workers. Every observation records what is going on right then and there and the rate of observations recorded for a specific action, or deferral, is a measure of the rate of time amid which that activities delay happens.
- Predetermined motion time study (PMTS): Work measurement technique whereby times built up for fundamental human movements (ordered by nature of the movement and conditions under which it is made) are utilized to develop the ideal opportunity for work at the characterized level of performance. The most commonly used PMTS is known as Methods Time Measurement (MTM).

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