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Method Study and Time Study in Textile and Apparel Industry

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Abstract

Method study is more of a systematic approach to job than a set of techniques for improvement of processes and procedures. The philosophy of method study is that there is always a better way of doing a job and the tools of method study are designed to systematically arrive at this better way of doing a job. It is a means of developing and applying easier, more effective methods and reducing costs. Method study is defined as the study of work for a job to achieve process improvement, improve layout, improve design, better working environment and reducing fatigue. Foe higher productivity in textile and apparel industry method study is very important. By periodical checking the new method and its effects management can ensure that overall efficiency is improving rather than deteriorating. By using motion study and the principles of motion economy the task is redesigned to more effective and less time consuming. The aim of time study is to establish a time for a qualified worker to perform specified work under stated conditions and at a defined rate of working.

Keywords*: - Method Study, Time Study, Work Measurement, Motion Economy, Qualified Worker, Process Management.*

INTRODUCTION

Method study is defined as the study of a method or process of doing a job to get improvement in the process layout, design, working environment and reducing the fatigue. Objectives of the method study are stated as: improvement in method study and processes, improvement in the equipment and design of a plant, lay out improvement, to improve upon men, machine and materials, improving the standards of safety and to develop better

working environment. These steps are logical procedures which could be applied by any specialist for any work study. But in practice these steps are not so simple and straight forward. With the introduction of new improved method may bring some new problems and in such cases the process of examination, development and next steps are to be repeated as and when necessary **[01].**

The method study is the process to do a job in a systematic manner with critical severity for making the job more effective or in a more efficient manner and ultimately to achieve improvement in productivity. This method can be followed for all types of activity at all levels in an organization. It is used to find out a better alternative for doing a job. It may be used to reduce the cost also. The following procedures are applied in any method study operation: selection of the work which can be studied with economic advantage; recording of all facts about the job; examination of the facts critically; developing a record of improved method under the existing conditions for better options; evaluation of different alternatives; defining method, layout, procedure, etc; installation of improved method and finally maintaining the improved method through verification at regular order **[02].**

Foe garment industry method study is regarded as the study or analysis of the existing, searching the problems with the method and to establish the best alternative way for smooth production, reduction in waste and increase in profitability. Usually six normal steps are followed in the method study and which are: selection, recording, examination, developing, installation and maintaining. To understand the basic things a method study, one has to know the following: importance of method study; objects of method study; what method study is?; steps in method study; application of method study in garment industry and relation between method study and industrial engineering **[03].**

An overview of on the method study in apparel industry states that method study is defined as the systematic recording and critical examination of the existing method and to propose ways of doing work, as a means of developing and applying more easier, effective method and reducing costs. The basic symbols in method study operations are discussed as: **Operation** which indicates main steps in a process, method or procedure. Usually the part

material or product concern is modified or changed during the operation; **Inspection** indicates about the inspection and checking of quality or quantity; **Transport** indicates the movement of working materials or equipment from place to place; **Delay** indicates the delay sequence of the events or works; **Storage** means permanent storage or hold; two more symbols are used for **combined activities** for operation and quality checking and other one for quality checking and the operation. These systems are used in method study for procedure and process follow charts **[04].**

Pre-requisites of method study improvement in apparel industry to describe through method study are described as: systematic and continuous production flow; specific standards; financial strength; specialization; and managerial cooperation. Steps of method study are discussed as follows: Method study is the systematic and scientific analysis of department or section, layout of machines, transportation of goods or materials and movement of employees for development of the method. Motion is the systematic scientific analysis of the movement of employees, movement of different parts of human beings and movement of machines for developing the motion. Micro-motion is the details and scientific analysis of arms of the employees for developing the speed of the arms' movement of the employees **[05].**

Objectives of the method study for textile and apparel industry have been pointed out by another author in the following manner. According to them the major aims of method study are related to:- better design of plant, equipment and buildings ; less fatigue on workers by avoiding unnecessary movements of man power; better working conditions and environment for workers; to have more effective utilization of materials, machines, man power and money; better quality; efficient and fast material handling equipment; leads to standardization, rationalisation , simplification and specialisation ; efficient planning of the section; streamlining of working procedures; greater job assistance; higher earning; improve layout of factory and office; higher standard of safety and health; to improve the flow of work; effective material handling; efficient process and procedure; to improve better utilization of resources; to get maximum output; to improve administration; waste reduction; and standardization and rationalisation. All of the aims are obtained through different steps involved in the method study **[06].**

Critical examination of various facts in method study is the most important stage in the method study. It is used to critically examine the current method by seeking answers to the following questions:- the purpose of each element; the place; the sequence; and the person.

Another important phase in the method study is the development of the most practical, economical and effective method. This stage is used to develop a new and better method of executing the task by taking into account the results of the critical examination. The new method is developed by a combination of entirely eliminating some activities, combining some parts, changing the sequence of some activities and by simplifying the content of others **[07].**

According to the author **[08],** method study is more of a systematic approach to job design than a set technique. It is defined as the systematic recording with critical examination of the prevailing and proposed methods for doing job/work. It is also known as method engineering. To achieve high productivity with improved quality may be one of the objectives for garment industry. Through method study analysis, better way of doing the same work can be possible and also to reduce costs can be done.

In the garment industry, productivity depends on several factors. One of such factors is the time and motion study. For making shipment in time it is very important to set a fixed target in the sewing section. In the sewing section, the whole work is completed by several operations through various jobs and so without any fixed target it is not possible to reach the goal. Therefore, for this purpose only time and motion study is essential. Time study originally has been evolved from the work of Taylor and was the origin of work measurement technique. Work measurement technique for recording the time and rate of working for the elements within a specific condition and the data so as to determine the time necessary for carrying out a job at a defined level of performance. Motion study is the technique of analysing the body movements employed by the operator while doing a task in order to eliminate or reduce ineffective motions and provide effective movements. The principles of motion economy helps the task to redesign from the motion study and ultimately facilitates effective time utilization to perform the work **[09]**

Time study is defined as the technique of measurement of work for recording the time of performing certain work under specified conditions and to analyse the data to obtain the necessary time for an operator to carry out the job at a defined rate of performance. In time study method, work measurement aims to set the basic times for performing a specified work and ultimately to find out the standard time of performing the work. The main purpose is to establish a time for a qualified worker to perform the specified work under stated conditions and at a defined rate of working. This is done by any qualified practitioner to observe the work, record and time calculation and simultaneously rating the pace of working **[10].**

According to the author **[11],** time study measures the maximum necessary time required to do the job. It is the most important technique of work measurement. Time study is that technique to determine as accurately as possible from a limited number of observations and it is required to carry out a given activity at a defined level of performance. Objectives of the time study are:--to determine standard time in which operation can be performed efficiently; to determine scheduling and planning; to calculate fair production per hour; to help to the motion study of the job; the standard data is used in time and to achieve a uniform flow of work.

There are a few points to be observed in relation to the approach in time study to the worker and the job the worker is doing. Firstly it is required to be sure that the job has studied by method study. Supervisors and workers representatives should be told about the reasons for the study where it is done first time. The worker selected for the study should be a competent steady person with an average rate of working. The worker selected should be asked to work at his/her normal pace explaining any problems that may arise during the time the study is taken. Workers should be allowed sufficient time to settle down to new methods. When making the study the observer should take a position when he can observe the whole of the job being performed. The observer should take a comfortable standing position for the duration of the observation **[12].**

In garment manufacturing number of operations are carried out by different operators and in different operations. All these activities need to be performed in synchronized, planned and timely to achieve different activities. Different types of practices and methods are applied in industries to improve productivity and

time study is one of the most effective tools used by all garment industry for improving productivity. Garment industries are always trying to improve production and the quality of the garments to sustain the continuous competitive market. The sustainability and profitability of garment industry is governed by different activities of the industry. The observations in time study elaborate the time taken and improvement in the production of the garment industry **[12].**

ABOUT METHOD STUDY:

Method study can be defined as the systematic approach for a job design, systematic recording and critical examination of the present and the proposed method of doing an work. Essentially it is used for finding for finding better ways of performing any work. For garment industry it is done to improve productivity with cost reduction. Objectives of the method study may be stated as to improvement in processes and procedures in the design and equipment, layout, in the men, machinery and materials. Economy in the human effort and reduction in the unnecessary fatigue, improvement in safety standards and better working environment are also the important objectives of the method study **[01].**

The eight steps in method study are as select, record, examine, develop, evaluate, define, install and maintain. Work selected for any method is regarded as the identified problem area which is identified through systematic review from available data, normal monitoring or control processes, change in many management policy, practice, technology or location and it is carried out for any urgent requirement. Recording means gathering of sufficient data which will be used for evaluation and examination. Out of various techniques available for recording the choice depends on the type of investigation, the type of work to be studied and on the level of details. Type of technique may be related to charts and diagrams which are supported by photographic or video recording or by some computer based techniques. Examination is the manner of performing the job and challenges its purpose, place, sequence and way of performing job out of various alternative method of performance. In order to develop a new way of performing job out of various alternatives is the process of evaluation. The cost benefit analysis is observed between existing and proposed method. Define means a new method to the management and other higher officials. Develop aims to identify possible actions for management

and to subject these to evaluation in order to develop a preferred solution. The install phase is very important. Making real change demands careful planning and handling of the people involved in the situation under review. They may need reassuring, retraining and supporting through the acquisition of new skills. Install in some cases will require a parallel running of old and new systems. Sometimes, it is necessary to check that the new method is working, that is being properly followed, and that it has brought about the desired results. This is the maintain phase.

Gilbreth developed the graphical method of recording in order to make the presentation of the facts clearly without any ambiguity and to enable of grasp them quickly and clearly. It was suggested that use of symbols was more meaningful than of written description. Method study symbols are Operation, Inspection, Transportation, Delay and Storage. An operation takes place when any object intentionally changes in one or more of its characteristics, which indicates the main steps in a process, method or procedure. Examples of operations are like turning, drilling, chemical reaction, welding, loading, unloading, taking direction, getting information from seniors, etc. Inspection means checking and comparing with standards for quality and quantity. Example are such as visual observation on finish items, checking of dimensions, measurement of items, etc. Movement of workers, materials and equipment from one place to another is known as transportation. Examples of transportation are like shifting of materials from one machine to another, materials feed and delivery in achiness, workers travelling to bring tools, etc. Delay means when the intermediate performance of the next planned thing does not take place. Workers waiting at different stations, waiting between consecutive operations, etc are example of delay. Storage takes place when the object is kept in an authorized custody and is protected against unauthorized removal.

METHOD STUDY IN APPAREL INDUSTRY:

For garment industry the method study is regarded as the study of work for any job to achieve process improvement, improvement in the layout, design, for better working, and reducing fatigue. There are some pre-requisites for method study improvement systematic and continuous production flow needs continuous production for long time which are designed in the following manner:-

Systematic and continuous production flow needs continuous production for long time then it is possible to do proper analysis by taking sufficient time for improving method. **Specific standards** means for modification of existing method or to develop new method, analysis is needed standard materials, process, machine, working atmosphere, etc. **Financial strength** is related to different types of research analysis for development of method for which sufficient amount of money is required. In **Specialization,** expert or experienced technologists are needed for doing the method analysis. **Managerial co-operation** means co-operation is needed from the management as well as managers of different departments. Some important steps are necessary for method study. **Method** is for systematic and scientific analysis of the department/section, layout of the machines, transportation of goods or materials and movement of employees for developing the method. **Motion** is the systematic and scientific analysis of the movement of employees, movement of different parts of human being, and movement of machines for developing the motion. **Micro**

motion is the details and scientific analysis of arms of the operators/employees for delivering the speed of arms movement of the employee.

According to the author **[06]**, the following are the important objectives of method study. Method study is carried out for better design of plant, equipment and buildings. It reduces the fatigue of the workers by avoiding unnecessary movements of man power. It helps to improve working conditions and environment of work places. It is studied for more effective utilization of men, machine and materials to improve quality with efficient and fast material handling equipment. Method study leads to standardization, rationalization, simplification and specialization with efficient planning of the section and streamlining of working procedures. It creates greater satisfaction, higher earnings, and improve layout of the factories, offices, and improve standards of safety and health. It also improves the flow of work with efficient process and procedure with proper utilization of resources. Maximum out put is aimed and also to get improved administration.

Systematic analysis of the method study, steps can be done in the following ways. In the selection of work to be studied, most operations consist of discrete jobs or

activities. The first stage is to select those jobs to be studied that will give the best returns for the time spent. In the recording of all relevant facts of the current method, method study uses formal techniques to record the sequence of activities, the time relationship between tasks, the movement of materials and the movement of staff. There are many techniques used in the method study. In the critical examination of facts, which is the most important stage in method study, the usual procedure is to critically examine the current method by seeking answers to the questions. The questions are like, the purpose of each movement, the place, the sequence, the person and the means. In the development of the practical, economical and effective method of executing the task by taking into account the results of the critical examination. Installation of a new method involves project managing means the changes involved. Maintenance of new method and periodic checking deals with monitoring of how effective the new method is and personnel has adopted is very important **[07].**

Flow chart of method study in garment industry is essentially used for finding better ways of doing work. It is also a technique for cost reduction in garment manufacturing. Flow chart of method study in garment follow the usual steps involving select, record, examine, delivery, evaluate, define, install and maintain **[08].** Selection of work is made which can be studied with economic advantage. All facts about the operation are to be recorded. Examination is to be done on the facts critically seeking alternatives, simplification manner, eliminating and combining or changing. Through the process of development the best method is selected. Different alternatives are compared with cost effectiveness in the evaluation process. Method, procedure, layout, equipment, working condition, materials, quality, etc are defined. In the installation stage, the improved method, planning and implementation are worked out. In the maintenance stage, verification at regular order is done to see that the improved method is in use.

THE STUDY IN GARMENT SECTOR:

A work measurement technique for recording the and rate of working for the elements within specific conditions and for analysing the data so as to determine the time necessary for carrying out a job at a defined level of performance. Motion study is a technique of analysing the body motions employed in doing a task in order to eliminate or reduce ineffective

movements and facilitates effective movements. Bu using motion study and the principles of motion economy the task is redesigned to be more effective and less time consuming **[09].**

Standard Minute Value (SMV) is defined as the standard time to complete a given task using best possible method at a standard level of performance. In the study to estimate SMV, garments are analysed with SMV varied for any item on the basis of the work content or number of operations, length of seams, fabric types, stitching accuracy required, sewing technology used, etc. In the estimation of standard time, certain allowances are added. The reason of adding allowances is that during the study of standard time, productive time is considered only. But actually, during the actual work, some types of rests are required (allowances) for personal needs by the workers. Therefore to get the standard time, a proper allowance must be added consisting the conditions. Different types of allowances are interference allowance, relaxation allowance, machine allowance, process allowance and special allowance.

Machine allowances include thread cone or tube change, thread and needle breaking time, adjusting tension, small problem in the machine. Relaxation and fatigue allowances are provided to the workers to recover from the effect of doing the work, and to allow personal needs. Where one worker is attending more than one machine, the interference is the time for which one or more machines remain idle. This allowance is called interference allowance. Process allowance is given to a worker when enforced idleness occurs during a process. This includes no-work, power failure, faulty material and faulty tool or equipment. Special allowances are decided by the matter of the management. Contingency allowances are expresses as a percentage of the basic time.

In garment industry, motion study is carried out for the objectives of improvement, planning/scheduling, and safety. Operators use their body for different operations and spend their maximum time. Body movements are grouped in knuckle, wrist, elbow, and shoulder. Conditions of time study are related to: the practitioner must be fully qualified to carry out time study, the person performing the task must be fully trained and experienced in the work, the work must be clearly defined and the method of doing the work must be effective and the working conditions must be clearly defined. The equipment used in

the time study are, stop watch, clip board, time study format, pencil, eraser, and calculator. In the time study format, the whole work/task is divided into various elements according to the motion sequences of the operation. For example in garment manufacturing, in the operation 'collar run stitch' task elements are pick up panel to sew first seam, turn collar to sew second seam, turn collar to sew third seam, check work and dispose and wait for the next piece **[10].**

Elements used in the time study are, planning, and scheduling, production scheduling, manufacturing companies and hiring part time jobs. Stop watch is the element used in the time study. Two types of stop watches are used. These are fly back and continuous types. These watches can be used in the following time scale, such as seconds, decimal minutes and decimal hours **[11].**

THE STUDY IN INDUSTRIAL ENGINEERING:

Time study is based on direct observation. Any trained person watches the job and records data as the job is being observed over a number of cycles. Selection of the job is related to the following conditions: The to be done is a new one and not previously done. A change in method or materials of working has been made and for which new time standard is required. When any complaint is received from the workers side, it is carried out. In case of any bottle neck which causes holding up subsequent operations or previous operations, it is applied. For introduction of any incentive standard time is required. Any idle machine can cause excessive time loss and for which time study is carried out **[12].**

In the case of the start of a time study job, there are number of points to be observed in relation to the approach to the worker and the job the worker is doing. Rating is a technique used to assess the speed and effectiveness of an operator. Various important matters like the considerations of speed of movement, effort, effectiveness, etc taken into account for calculation of rating. Rating is related to subjective and relies on the observer's skill. Element is defined as a specified job selected for convenient of observation. Elements should easily be identified. All break points can be recognized by a sound or by a change of direction of a hand or arm. Element should be as small as can be conveniently timed by the observer. Manual elements should be separated from machine elements. Short elements should be next to long elements.

Improving productivity of garment industry with time study has been worked out by the authors [13]. The observations of time study elaborate the time taken and improvement in the production of the garment industry. It is proposed that if a necessary and proper action s) is taken against the particular point (s) improvement will take place. The results of work measurement is for analyzing the so as to find out time necessary for carrying out a job at a defined level of performance. Time study is the field of industrial engineering in which productivity of the manufacturers is assured to find out the scope for improvement. Time study elaborates on manufacturing process of doing some way to do something, the time required to complete the task, and the way to measure production rates around the globe demand product at possible price. The author has specified different ways to state effective business environment by efficiently managing the lead time required for the manufacturing of products. Different type of allowances is allowed in apparel production floor. Lost time is recorded to show management a reason for low production in a particular day or low efficiency. The supply chain management plays an important role in garment design to be selected by the manufacturer depends on the requirement from the industry.

CONCLUSION

The success of any method study project is realized when actual change is made on the change that meets originally specified terms and of reference for the project. The philosophy of method study is that there is always a better way of doing a job and the tools of method study are designed to systematically arrive at better way of doing a job. In method study, motion is the systematic and scientific analysis of movement of the different parts of human being and movement of the machine for developing motion. Critical examination of the facts is done for the current method by seeking various questions. In time and motion study, total time needed for any particular product or garment can be estimated. The aim of the study is to establish a time for a qualified worker to perform specified work under stated conditions and at a defined rate of working. Rating is subjective and relies on the skill of the observer carrying out the exercise.

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