

Composite Process Chart: A New Method Study

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ABSTRACT

“Productivity” – has been a buzz word over the last few decades. As is defined, it indicates the effectiveness of the utilization of the available resources. It affects each and every sphere of industry, may it be a small scale or a humongous company, may it be a purely manufacturing or a purely service sector company and what not. As a result many productivity improvement tools has been evolved during the course of time . Work study, one such tool which has been practiced since ancient times as an art, has now developed as a scientific practice to improve productivity. Work study basically consists of method study and time study. Method study employs various kinds of charts and other tools in order to improve the way of working, which leads to improvement in productivity. One such tool is the Operation Process Chart (OPC). Conventionally, an OPC, gives the practitioner an overall idea of the basic operations and inspections carried out during the process. It is a widely used tool, but still lacks to convey some pivotal information. This paper describes such limitations and provides a new approach that eliminates the current limitations and adds numerous advantages to the conventional OPC.

Keywords — productivity, work study, time study, method study, operation process chart, flow process chart.

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I. INTRODUCTION

Almost every industry today has all the required resources to produce what they want, however they want. But only a few know how to produce more efficiently and effectively. The efficiency and the effectivity of the production is measured by a very frequently used term in this 21st century,

“Productivity”.

Productivity may be defined as follows: Productivity = Output/Input

This definition applies in an enterprise, a sector of economic activity or the economy as a whole. The term "productivity" can be used to assess or measure the extent to which a certain output can be extracted from a given input (Kanawaty, 1992) [1]. Productivity has been generally defined as the ratio of an extent of output to the unit of all of the resources used to produce this output. Operational efficiency is used as an indicator that reveals the level of effectiveness in using production resources such as raw materials and supplies, manpower, land, building, machine,

equipment's and energy. As is known, the production process uses other production inputs besides manpower. Hence, knowing efficiency levels of other inputs, which determines relationship between these inputs and production, as well as manpower, and observing trends of these inputs under various conditions and replacing one or several of these inputs by changing their qualities and quantities enable businesses to achieve the maximum level of production through the optimum input combination (Dogan, 1989) [4]. The economic growth of a country is usually measured by its increase in production or the gross domestic product (GDP), which comes from two sources: a larger quantity of production factors used (inputs) and/or an increase in productivity. Productivity is therefore considered to be a component of growth (Galarneau and Dumas, 1993) [5]. Work study then 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. The relation between productivity and work studies is thus obvious. If work

study results in cutting down the time of performing a certain activity by 20 per cent, merely as a result of rearranging the sequence or simplifying the method of operation and without additional expenditure, then productivity will go up by a corresponding value, that is by 25 per cent. To appreciate how work study acts to cut down costs and reduce the time of a certain activity, it is necessary to examine more closely what that time consists of (Kanawaty, 1992). With a plethora of tools and methods to measure, enhance and analyze the productivity and quality of a production, this paper provides a new study to improve it in the initial stage. The fundamental methods used to study the human work in all its contexts and which lead systematically to the investigation of all the factors which influence the efficiency of the situation being reviewed in order to seek improvements falls under "work study". In simpler terms, the work study investigates the work done in an organization and it aims at finding the best and most efficient way of using available resources i.e. men, material, money and machinery. Every organization attempts to manufacture a product in the minimum possible time. The time required to manufacture an item depends upon the manufacturing procedure; and one phase of work study is known as "method study", which aims at finding the best possible manufacturing procedure which involves, least time and does not cause fatigue to the workers. Method study can be defined as the systematic investigation (i.e., recording and critical examination) of the existing methods of doing a job in order to install and easy, rapid, efficient, effective and less fatiguing procedure for doing the same job at lower costs. This is generally done by eliminating the unnecessary motions involved in a certain procedure or by changing the sequence of operation or the operation itself. Method study is used in a wide variety of fields ranging from industries, marketing, army, hospitality, hospitals, transports, household and many more [2]. Symbols convey a message much faster than the common spoken language. In method study, generally charts are used as symbols because symbols produce a better picture and quick understanding of the facts. The following are the five basic symbols used to record different types of events: (right side figure 2). Method study records the data in the form of charts, diagrams and models. In this paper, the outline process chart is scrutinized. The outline process chart surveys and records an overall picture of the process and states only the main events sequence wise. It considers only (main) operations and inspections. The outline process chart is basically the beginning of a detailed analysis. Hence, the importance of the outline process is well established as the production process begins with the development of the outline process chart. So, the outline process chart needs to be detailed, precise and elaborate. It should convey all the germane information. One chief drawback of the outline process chart is that it excludes the other 3 symbols namely transport, delay and storage. Another drawback is that it does not include the distance travelled by a job or service or work from the origin to destination. In this paper we propose a new method study process chart that will eliminate all the previous occurring drawbacks.

The procedure to conduct a method study is:

- 1 — *SELECT* the work to be studied and define its boundaries.
- 2 — *RECORD* the relevant facts about the job by direct observation and collect such additional data as may be needed from appropriate sources.
- 3 — *EXAMINE* the way the job is being performed and challenge its purpose, place, sequence and method of performance.
- 4 — *DEVELOP* the most practical, economic and effective method, drawing on the contributions of those concerned.
- 5 — *EVALUATE* different alternatives to developing a new improved method comparing the cost-effectiveness of the selected new method with the current method of performance.
- 6 — *DEFINE* the new method, as a result, in a clear manner and present it to those concerned, i.e. management, supervisors and workers.
- 7 — *INSTALL* the new method as a standard practice and train the persons involved in applying it.
- 8 — *MAINTAIN* the new method and introduce control procedures to prevent a drifting back to the previous method of work.

Fig. 1 Procedure to conduct Method Study (et.al Kanawty G.[1])

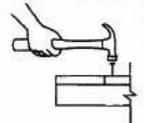
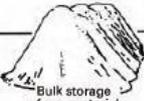
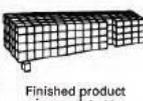
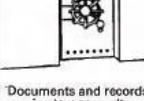
| ACTIVITY | EXAMPLE | | |
|---|--|---|---|
| OPERATION  A large circle indicates an operation, such as |  Drive nail |  Drill hole |  Type letter |
| TRANSPORT  An arrow indicates transport, such as |  Move material by truck |  Move material by hoist or elevator |  Move material by carrying (messenger) |
| INSPECTION  A square indicates an inspection, such as |  Examine material for quality or quantity |  Read steam gauge on boiler |  Examine printed form for information |
| DELAY  The letter D indicates a delay, such as |  Material in truck or on floor at bench waiting to be processed |  Employee waiting for elevator |  Papers waiting to be filed |
| STORAGE  A triangle indicates a storage, such as |  Bulk storage of raw material |  Finished product in warehouse |  Documents and records in storage vault |

Fig. 2 Symbols used in Method Study (et.al Kanawty G. [1])

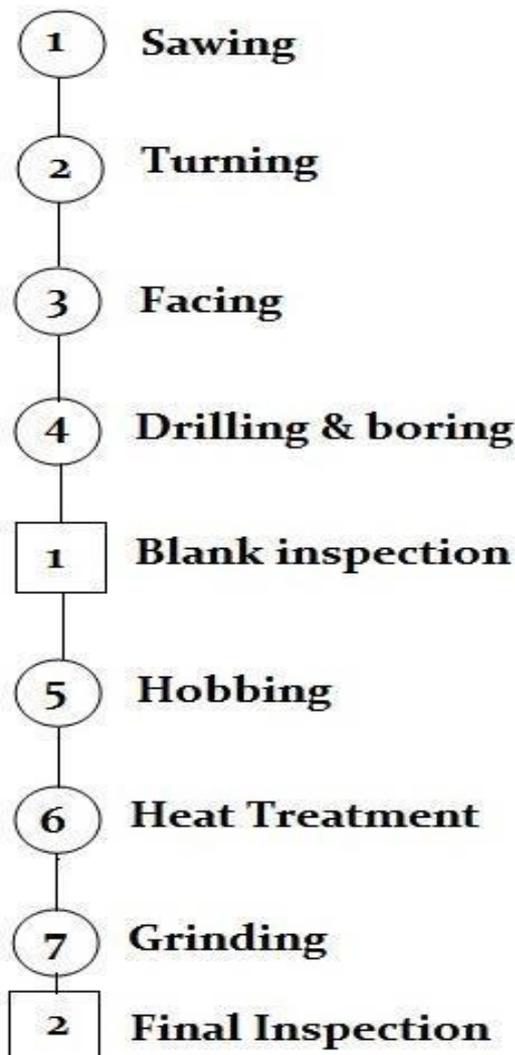
II. CONVENTIONAL OUTLINE PROCESS CHART (O.P.C)

[3] It is often valuable to obtain a "bird's-eye" view of a whole process or activity before embarking on a detailed study. This can be obtained by using an outline process chart

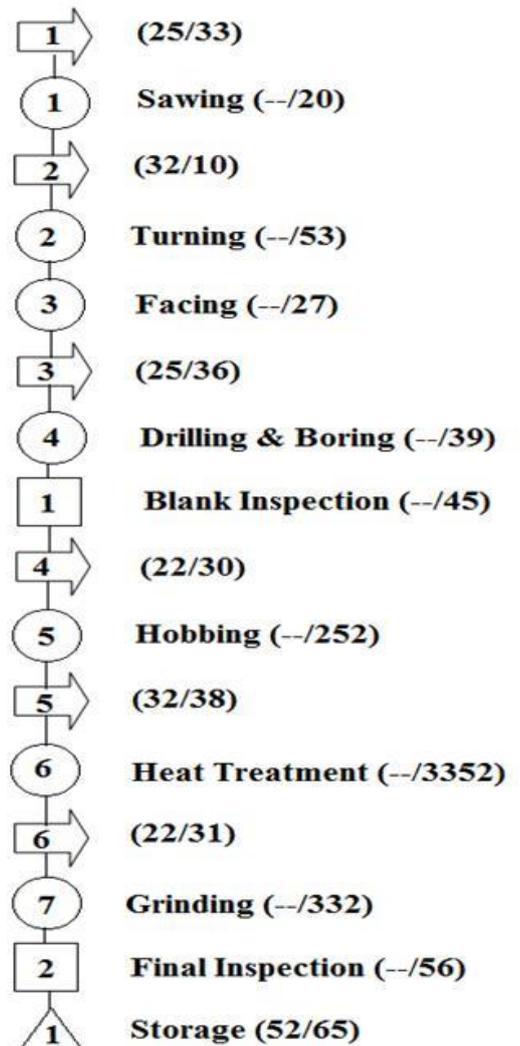
chart. An outline process chart is a process chart giving an overall picture by recording in sequence only the main operations and inspections. In an outline process chart, only the principal operations carried out and the inspections made to ensure their effectiveness are recorded, irrespective of who does them and where they are performed. In preparing such a chart, only the symbols for "operation" and "inspection" are necessary. In addition to the information given by the symbols and their sequence, a brief note of the nature of each operation or inspection is made beside the symbol, and the time allowed for it (where known) is also added. An example of an outline process chart is given in figure 3. In order that the reader may obtain a firm grasp of the principals involved, the assembly represented on the chart is shown in a sketch (figure 4) and the operations charted are given in some detail below. But it fails to add up the symbols and the other processes that come in the picture while actually manufacturing the product, which ensures a new set of problems altogether.



Fig. 4 Gear (for example)



III. COMPOSITE PROCESS CHART



To defy the limitations of the current outline process chart, the figure 5 adds numerous advantages to it. The chart is now completely pragmatic and can be used for all the manufacturing methods. In the new O.P.C, the brackets are modified as to be: (Distance travelled/Time). Distance travelled can be measured in meters, kilo meters or miles. Time is to be respectively noted as in seconds, minutes or hours. For better denotation, the syntax (HH:MM:SS) can be incorporated.

IV. CONCLUSION

From the work established in this paper, the advantages of the composite process chart are:

- The activities such as transportation, delay and storage which were not shown on the previous outline process chart can be now incorporated.
- It displays the distance travelled during transportation.
- Not only can it display the distance travelled but it can also show the time taken to perform an activity.
- The outline process chart which was just an overview of the process, now is a detailed pictorial view of the flow of process.
- The need to introduce a flow process chart is eliminated as the information can now be meticulously obtained from this new outline process chart.
- The chart is simple and effective and any unskilled worker can understand it.

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