



SNS COLLEGE OF ENGINEERING

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Approved by AICTE, New Delhi & Affiliated to Anna University, Chennai**

DEPARTMENT OF MANAGEMENT STUDIES

COURSE NAME : 19BA204 OPERATION MANAGEMENT

I YEAR / II SEMESTER

UNIT 3 - PRODUCT DESIGN AND WORK SYSTEMS



Work Study

“Work study is a generic term for those techniques, method study and work measurement which are used in the examination of human work in all its contexts. And which lead systematically to the investigation of all the factors which affect the efficiency and economy of the situation being reviewed, in order to effect improvement.”



Main Objectives of Work Study

- ✓ The main objective of work study is to improve productivity of men, machines and materials.
- ✓ The aim of work study is to determine the best method of performing each operation and to eliminate wastage so that production increases with less fatigue.
- ✓ The work study is also used in determining the standard time that a qualified worker should take to perform the operation when working at a normal place.





Objectives of Work Study

1. Increased efficiency,
2. Better product quality,
3. To choose the fastest method to do a job,
4. To improve the working process,
5. Less fatigue to operators and workers,
6. Effective labour control,
7. Effective utilisation of resources,
8. To decide equipment requirements,
9. To pay fair wages,
10. To aid in calculating exact delivery,
11. To formulate realistic labour budgeting, and
12. To decide the required manpower to do a job.

Procedure of Work Study

1. To standardise the method of doing a work,
2. To minimise the unit cost of production,
3. To determine the standard time for doing a task,
4. To minimise the material movement, and operators movement,
5. To eliminate unnecessary human movements,
6. To utilise facilities such as man, machine and materials most effectively, and
7. To a systematic investigation of all factors.



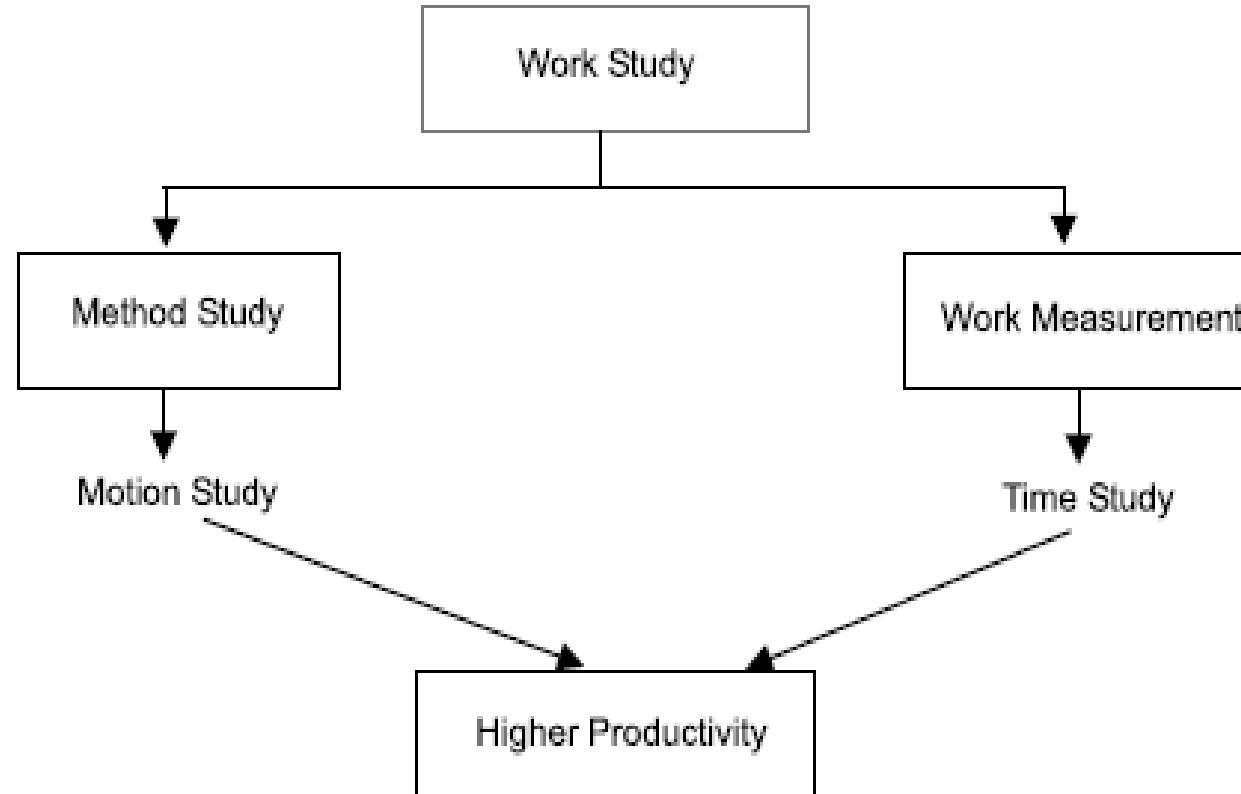


Advantages of Work Study



1. Work study ensures higher productivity,
2. Better working conditions with less fatigue,
3. Higher wages to workers,
4. Uniform production flow,
5. Job satisfaction and job security to workers,
6. Reduction in unit cost of production,
7. Quality products to consumers,
8. Fast delivery schedule,
9. Harmonious employer-employee relation, and
10. Better service to customers.

Framework of work study



Motion study

Motion study is part of method study where analysis of the motion of an operator or work will be studied

Principles of Motion study

- Use of the human body.
- Arrangement of workplace.
- Design of tools and equipment.



USES OF HUMAN BODY

- The two hands should begin and complete their movements at the same time.
- The two hands should not be idle at the same time except during periods of rest.
- Motions of the arms should be made simultaneously.
- Hand and body motions should be made at the lowest classification at which it is possible to do the work satisfactorily.
- Momentum should be employed to help the worker, but should be reduced to a minimum whenever it has to be overcome by muscular effort.
- Continuous curved movements are to be preferred to straight line motions involving sudden and changes in directions.
- 'Ballistic' (i.e., free swinging) movements are faster, easier and more accurate than restricted or controlled movements.
- Rhythm is essential to the smooth and automatic performance of a repetitive operation. The work should be arranged to permit easy and natural rhythm wherever possible.
- Work should be arranged so that eye movements are confined to a comfortable area, without the need for frequent changes of focus.

ARRANGEMENT OF THE WORKPLACE

- Definite and fixed stations should be provided for all tools and materials to permit habit formation.
- Tools and materials should be pre-positioned to reduce searching.
- Gravity fed, bins and containers should be used to deliver the materials as close to the point of use as possible.
- Tools, materials and controls should be located within a maximum working area and as near to the worker as possible.
- Materials and tools should be arranged to permit the best sequence of motions.
- ‘Drop deliveries’ or ejectors should be used wherever possible, so that the operative does not have to use his hands to dispose of finished parts.
- Provision should be made for adequate lightning, and a chair of type and height to permit good posture should be provided. The height of the workplace and seat should be arranged to allow alternate standing and seating.



DESIGN OF TOOLS AND EQUIPMENTS

- The color of the workplace should contrast with that of work and thus reduce eye fatigue.
- The hands should be relieved of all work of 'holding' the work piece where this can be done by a jig or fixture or foot operated device.
- Two or more tools should be combined where possible.
- Where each finger performs some specific movement, as in typewriting, the load should be distributed in accordance with the inherent capacities of the fingers.
- Handles such as those used on screw drivers and cranks should be designed to permit maximum surface of the hand to come in contact with the handle.
- Levers, cross bars and wheel bars should be in such position that operator can manipulate them with least body change and with greatest mechanical advantage.

Method study

Method study enables the industrial engineer to subject each operation to systematic analysis. The main purpose of method study is to eliminate the unnecessary operations and to achieve the best method of performing the operation. Method study is also called methods engineering or work design.

The method study man should have:

- The desire and determination to produce results.
- Ability to achieve results.
- An understanding of the human factors involved.

Method study

Method study scope lies in improving work methods through process and operation analysis, such as:

- Manufacturing operations and their sequence.
- Workmen.
- Materials, tools and gauges.
- Layout of physical facilities and work station design.
- Movement of men and material handling.
- Work environment.



Objectives of Method study

Method study is essentially concerned with finding better ways of doing things. It adds value and increases the efficiency by eliminating unnecessary operations, avoidable delays and other forms of waste. The improvement in efficiency is achieved through:

- Improved layout and design of workplace.
- Improved and efficient work procedures.
- Effective utilization of men, machines and materials.
- Improved design or specification of the final product.

Scope of Method Study

The scope of method study is not restricted to only manufacturing industries. Method study techniques can be applied effectively in service sector as well. It can be applied in offices, hospitals, banks and other service organizations. The areas to which method study can be applied successfully in manufacturing are:

- To improve work methods and procedures.
- To determine the best sequence of doing work.
- To smoothen material flow with minimum of back tracking and to improve layout.
- To improve the working conditions and hence to improve labor efficiency.
- To reduce monotony in the work.
- To improve plant utilization and material utilization.
- Elimination of waste and unproductive operations.
- To reduce the manufacturing costs through reducing cycle time of operations.

Selection of the Job for Method Study

Cost is the main criteria for selection of a job, process and department for methods analysis. To carry out the method study, a job is selected such that the proposed method achieves one or more of the following results:

- Improvement in quality with lesser scrap.
- Increased production through better utilization of resources.
- Elimination of unnecessary operations and movements.
- Improved layout leading to smooth flow of material and a balanced production line.
- Improved working conditions.

Work measurement

Work measurement is also called by the name ‘time study’. Work measurement is absolutely essential for both the planning and control of operations. Without measurement data, we cannot determine the capacity of facilities or it is not possible to quote delivery dates or costs. We are not in a position to determine the rate of production and also labor utilization and efficiency. It may not be possible to introduce incentive schemes and standard costs for budget control.



Objectives of Work Measurement

The use of work measurement as a basis for incentives is only a small part of its total application. The objectives of work measurement are to provide a sound basis for:

- Comparing alternative methods.
- Assessing the correct initial manning (manpower requirement planning).
- Planning and control.
- Realistic costing.
- Financial incentive schemes.
- Delivery date of goods.
- Cost reduction and cost control.
- Identifying substandard workers.
- Training new employees.

For the purpose of work measurement, work can be regarded as:

Repetitive work: The type of work in which the main operation or group of operations repeat continuously during the time spent at the job. These apply to work cycles of extremely short duration.

Non-repetitive work: It includes some type of maintenance and construction work, where the work cycle itself is hardly ever repeated identically.

Productivity (Operations)

Productivity is the quantitative relation between what we produce and we use as a resource to produce them, i.e., arithmetic ratio of amount produced (output) to the amount of resources (input). Productivity can be expressed as:

$$\text{Productivity} = \frac{\text{Output}}{\text{Input}}$$

Productivity refers to the efficiency of the production system. It is the concept that guides the management of production system. It is an indicator to how well the factors of production (land, capital, labor and energy) are utilized.



Measuring productivity (Capacity and Demand)

- ✓ The Simple Productivity Output Formula Strategy
- ✓ The 360 Degree Feedback Strategy
- ✓ Time Tracking & Project Management Software
- ✓ The Monitor Social Media Strategy
- ✓ The Profit = Productivity Strategy
- ✓ The Daily Check-In Strategy
- ✓ The Service With a Smile Strategy



Methods of Improving Productivity

The following factors can lead to the improvement in productivity:

- Training programs for labour
- Incentives in contract for good performance
- Enough tools in working place and proper planning
- Optimizing site facilities
- Availability of resources
- Competition between crews, areas or shifts
- Good supervision and optimum manpower
- Short interval scheduling
- Innovative materials and equipment
- Time lapse film analysis for critical activities
- Cost reporting and work sampling of critical activities

WAYS TO IMPROVE PRODUCTIVITY

- 1. PRODUCT DEVELOPMENT**
- 2. SPECIALISATION AND STANDARDISATION**
- 3. MARKET, CONSUMER AND PRODUCT RESEARCH**
- 4. VALUE ANALYSIS**
- 5. PROCESS PLANNING AND RESEARCH**
- 6. METHOD STUDY**
- 7. SAFETY**
- 8. OPERATOR TRAINING**
- 9. PRODUCTION PLANNING AND CONTROL**
- 10. MATERIAL CONTROL**



THANK YOU