CH2404 Process Economics

Unit – I

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Work Study

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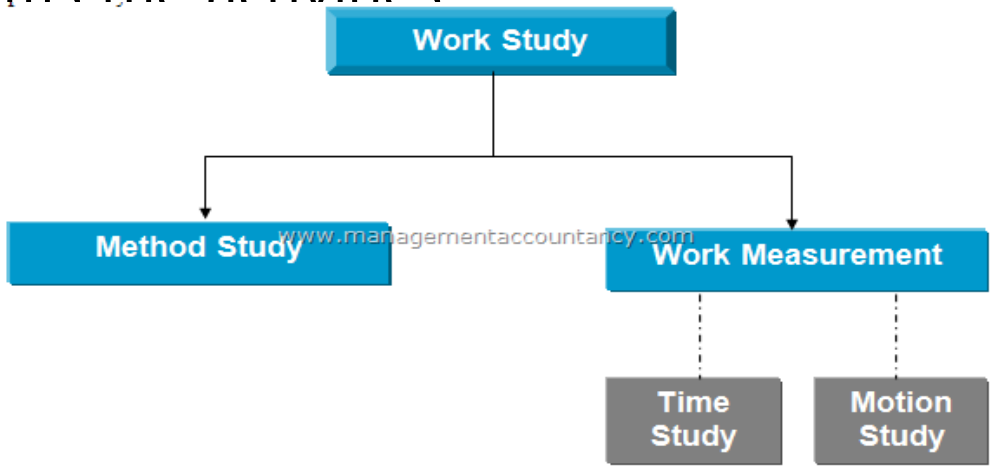
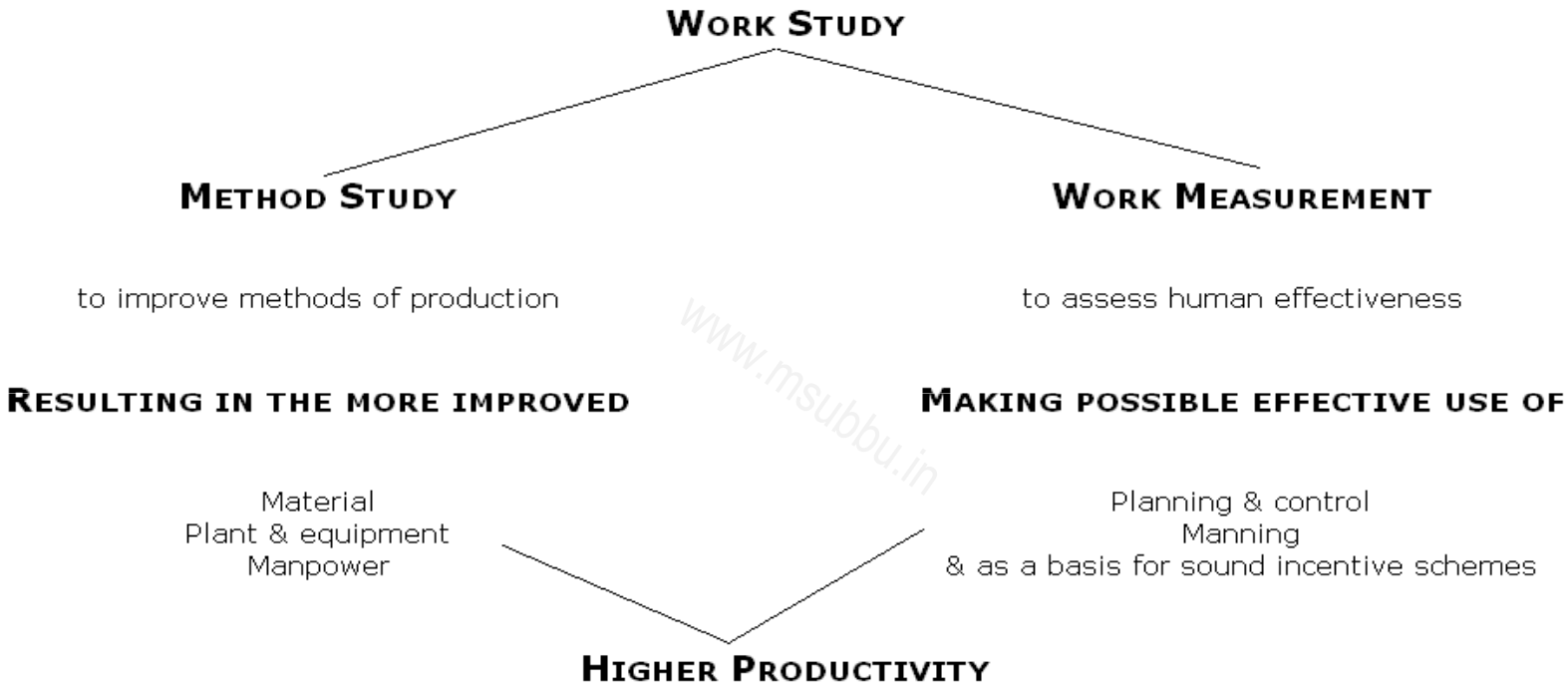
Introduction

- The objective of Work Study is to standardize the activities performed and improve the efficiency of the workers thereby improving productivity.

- Work study is a combination of two techniques Method Study and Work Measurement. While Method Study is an examination of the methods used in carrying out an activity, Work Measurement involves a Time and Motion Study of the worker who performs the activities





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Work Study

Assumptions in work study:

1. There is always more than one method to do a task or a job.
2. Solving problem through scientific methods is better than other method, and
3. Work can be measured in time unit.

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Major advantages of work study:

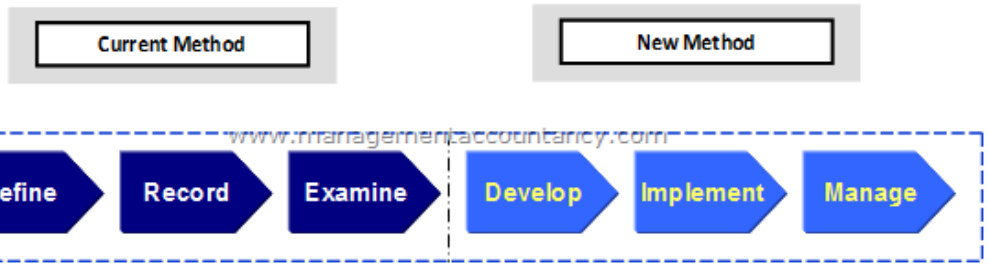
1. Higher productive efficiency.
2. Create better employee-employer relations.
3. Provide better service to customers.
4. Provide better working conditions to the employee and employer.

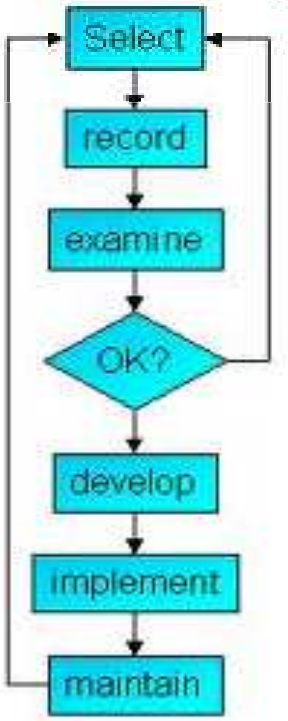
Method Study

- Method study is the process of subjecting work to systematic, critical scrutiny to make it more effective and/or more efficient. It is one of the keys to achieving productivity improvement.

- It was originally designed for the analysis and improvement of repetitive manual work but it can be used for all types of activity at all levels of an organisation.

- The process is often seen as a linear, described by its main steps of:
  - Select (the work to be studied);
  - Record (all relevant information about that work);
  - Examine (the recorded information);
  - Develop (an improved way of doing things);
  - Install (the new method as standard practice);
  - Maintain (the new standard proactive).

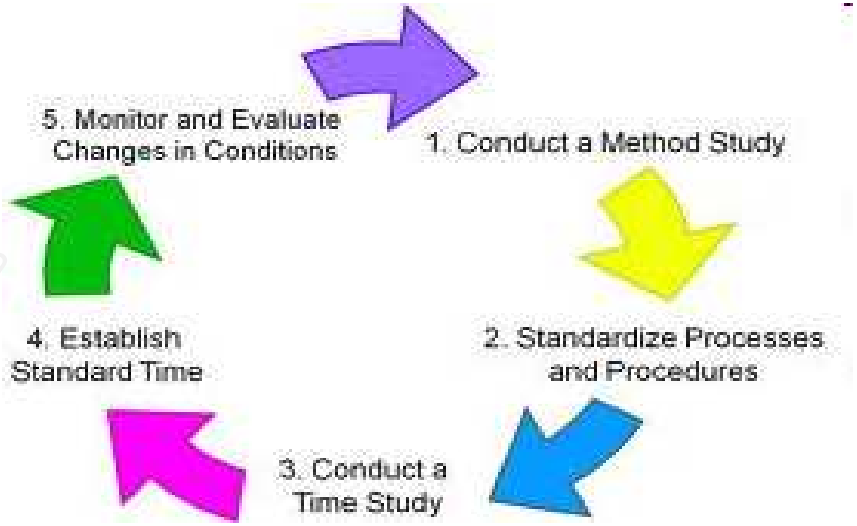




Work Measurement

- Work measurement determines the time taken by a qualified worker in completing a standardized activity (that was improved after method study). In other words, it aims at determining the effective time in completing an activity after eliminating wasteful time.

- The process involves two techniques
  a) **Time Study**
  b) **Motion Study**
  Historically the two studies are discussed individually, today they generally are discussed as one.



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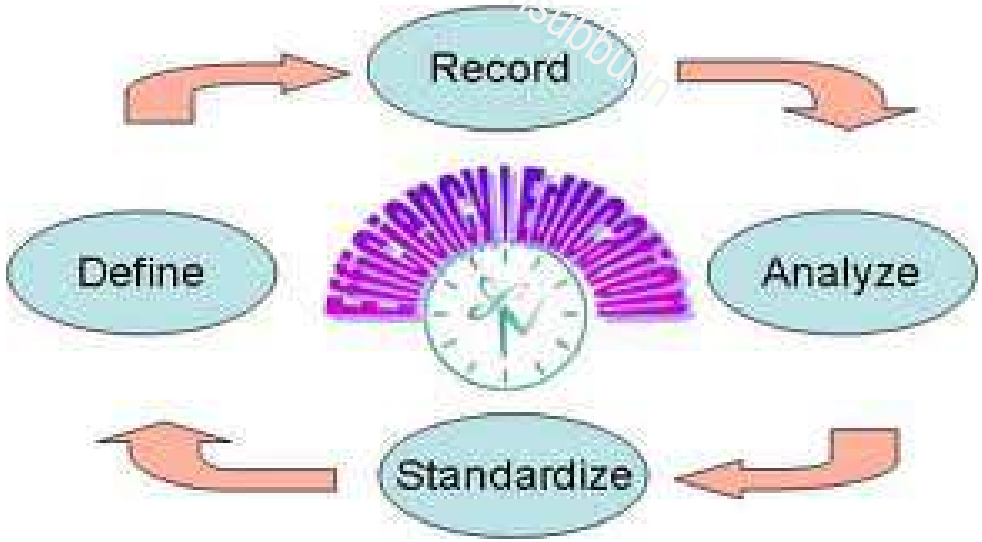
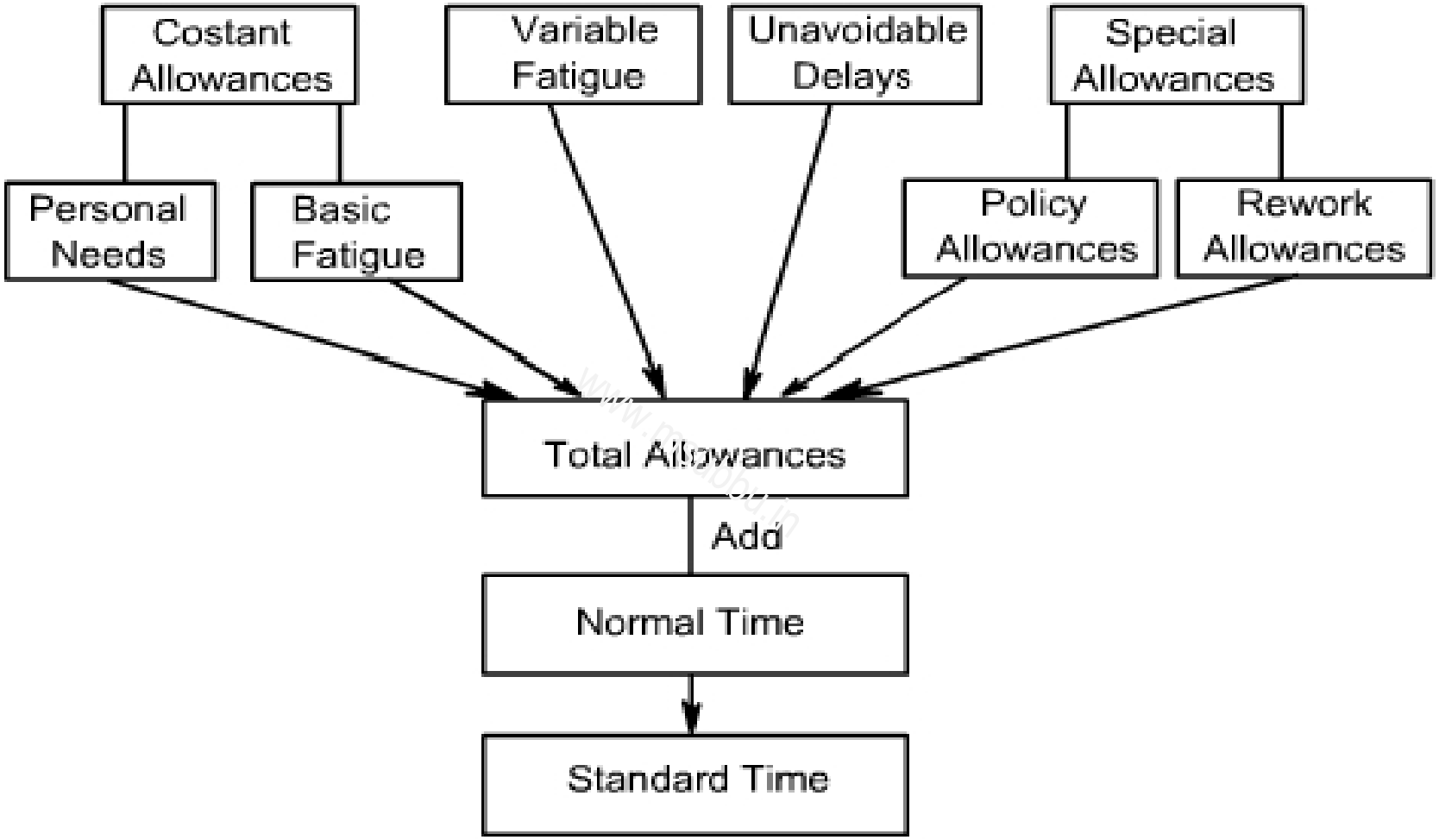
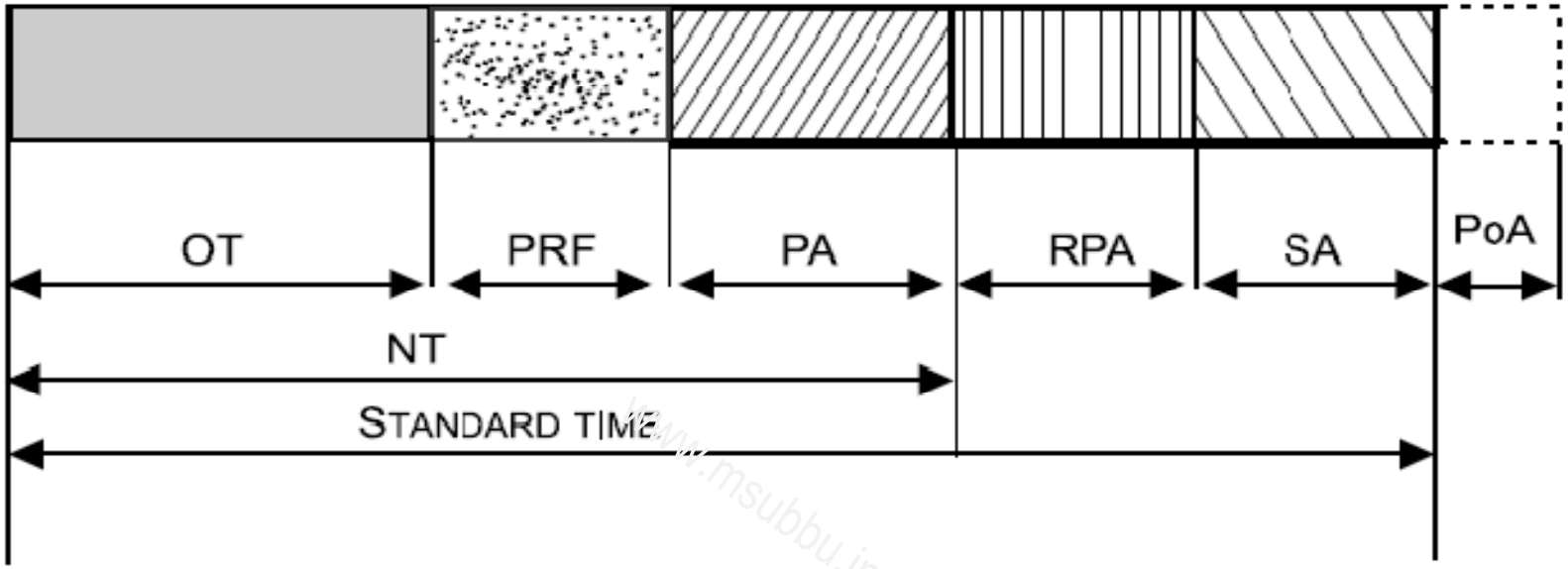
- Historically, time and motion study were used in the manufacturing industry to evolve pay scales with the thought that money was the only motivation for work.

Time Study

- **Frederick Taylor** and his followers developed and refined the time study
- Time study refers to analyzing the data so as to obtain the time necessary for carrying out the job at a defined level of performance.




Costant Allowances
Variable Fatigue
Unavoidable Delays
Special Allowances
Personal Needs
Basic Fatigue
Policy Allowances
Rework Allowances
Total Allowances
Add
Normal Time
Standard Time



OT	–	Observed Time
PRF	–	Performance Rating Factor
NT	–	Normal Time
PA	–	Process Allowances
RPA	–	Rest and Personal Allowances
SA	–	Special Allowances
PoA	–	Policy Allowances

Reasons for selecting a particular job for time study

- The job in question is a new one not previously carried out.
- A change in material or method of working has been made and a new time standard is required.
- A complaint has been received about the time standard for an operation.
- A particular operation appears to be “bottleneck” holding up the subsequent operations and possibly previous operations.
- Standard times are required prior to the introduction of an incentive scheme.

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Rating factor

- This constant is known as the **basic or normal time**:

$$\text{Observed time } x \frac{\text{Rating}}{\text{Standard Rating}} = \text{Basic Time}$$

- So, depending on the rating assigned for the operator, the basic time can either be less than or greater than the observed time.

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Motion Study

- Motion study is a technique of analyzing the body motions employed in doing a task in order to eliminate or reduce ineffective movements and facilitates effective movements.

- By using motion study and the principles of motion economy the task is redesigned to be more effective and less time consuming.

- The **Gilbreths** (Frank Gilbreth and Lillian Gilbreth (1920))pioneered the study of manual motions and developed basic laws of motion economy that are still relevant today. They were also responsible for the development of detailed motion picture studies, termed as **Micro Motion Studies**, which are extremely useful for analyzing highly repetitive manual operations.

- The Gilbreths developed what they called **therbligs** ("therblig" being "Gilbreth" spelled almost backwards), a classification scheme comprising *18 basic hand motions*.