# RAS_601_2020/03/31 DAY-4

## UNIT-3

# WORK STUDY

### INDUSTRIAL MANAGEMENT (RAS 601)

### ME/CS/IT/EN/EC

# WORK MEASUREMENT

- Work measurement refers to the estimation of standard time for an activity, that is the time allowed for completing one piece of job by using the prescribed method. Standard time can be defined as the time taken by an average experienced worker for the job with provisions for delays beyond the worker's control.

## WORK MEASUREMENT OBJECTIVES

- Comparing alternative methods
- Assessing the correct initial manning
- Realistic costing
- Delivery date of goods
- Cost reduction & cost control
- Training new employees
- Find ineffective time in a process
- Evaluate worker's performance
- Facilitate operations scheduling
- Establish wage incentive schemes

# WORK MEASUREMENT

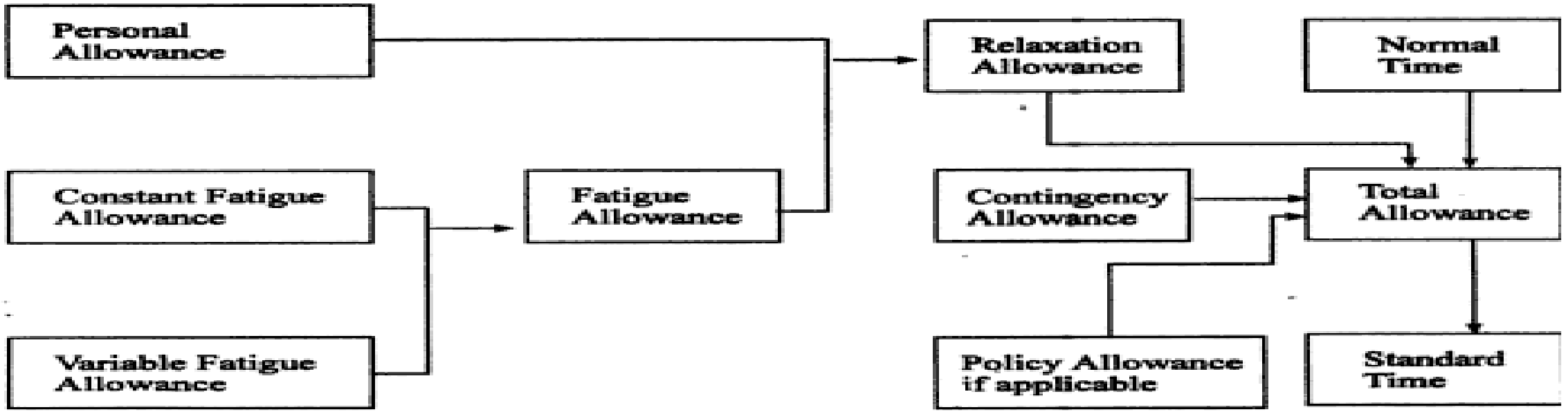
Work measurement is a technique to establish the time for a qualified worker to carry out a specified job at a definite level of performance.

Standard time can be expressed in minutes or hours. A realistic formula of calculating the standard time is as under;

Standard time = Basic time × 100/100- Allowance in percentage

**Basic time = observed time × observed rating of operator/ standard rating**

## *Allowances*



# WORK MEASUREMENT TECHNIQUES

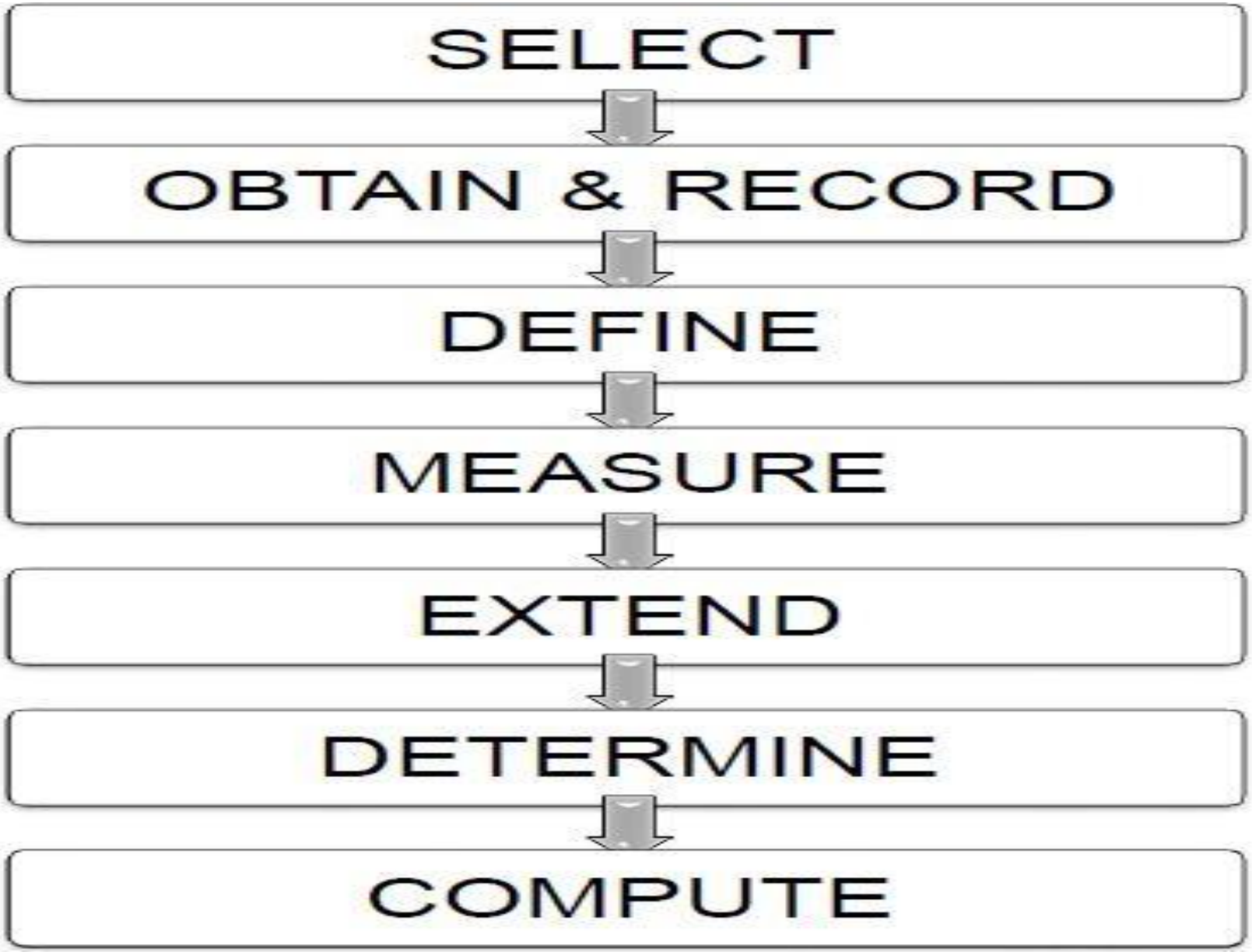
For repetitive work (short work cycle) or non-repetitive work;

- Time study (stop watch technique)
- Work sampling
- Synthetic data
- Analytical estimating
- Predetermined Motion Time Study(PMTS)

**Note** - Time study & Work sampling involve direct observation while remaining are data-based & analytical in nature

| Techniques | Applications | Unit of measurements |
|---|---|---|
| Time study | Short cycle repetitive jobs. Widely used for direct work | Centi-minute (0.01 min) |
| Work sampling | Long cycle jobs | Minutes |
| Synthetic data | Short cycle repetitive jobs | Centi-minute |
| Analytical estimating | Short cycle non-repetitive jobs | Minutes |
| MTM | Manual operation confined to one work centre | TMU (1 TMU = 0.006min) |

# TIME STUDY PROCEDURE



# TIME STUDY – BASIC STEPS

**a**. Obtaining and recording all available information about the job, operator and the surrounding conditions likely to affect the execution of the work

**b**. Recording the complete description of the method, breaking down the operation into 'elements'

**c**. Measuring with a stopwatch and recording the time taken by the operator to perform each element of the operation

**d**. Assessing the rating

**e**. Extending observed time to 'basic times'

**f**. Determining the allowances to be made over and above the basic time for the operation

**g**. Determining the 'standard time' for the operation

# TIME STUDY EQUIPMENT

- *There are two methods of timing using a stop watch. They are:*
- *Fly back or Snap back method*
- *Continuous or Cumulative method*

# PRINCIPLES OF MOTION ECONOMY

- These principles can be considered under three different groups;
- Those related to the use of the **human body**
- Those related to the **workplace arrangement**
- Those related to the **design of tools & equipment**

# PRINCIPLES OF MOTION ECONOMY

- *Both **hands should begin and end** their basic divisions of activity simultaneously & should not be idle at the same instant, except during the rest periods*
- ***Momentum** should be employed to assist the worker wherever possible, and it should be reduced to a minimum if it must be overcome by muscular effort*

# PRINCIPLES OF MOTION ECONOMY

- ***Continuous curved motions*** *should be preferred to straight line motions involving sudden and sharp changes in the direction*
- ***Work that can be done by the feet*** *should be arranged so that it is done together with work being done by the hands*
- ***Twisting motions*** *should be performed with the elbows bent*
- ***Principles related to the arrangement & conditions of workplace:*** *Fixed locations should be provided for all tools and materials so as to permit the best sequence and* ***eliminate***
- ***search and select*** *Gravity bins and drop delivery should be used to*
- ***reduce reach and move times*** *Use may be made of* ***ejectors for removing*** *finished parts*
- ***Work table height*** *should permit work by the operator in alternately sitting and standing posture*
- *Glare-free* ***adequate illumination****, proper* ***ventilation*** *and proper* ***temperature*** *should be provided*

# PRINCIPLES OF MOTION ECONOMY

***Principles related to the design of tools and equipment:***

- *Use **colour, shape or size coding** to maximize speed and minimize error in finding controls*
- *Use simple on/off, either/or **indicators** whenever possible All levers, handles, wheels and other control devices should be **readily***
- ***accessible** to the operator and should be designed so as to give the best possible mechanical advantage*
- *Use **quick acting fixture** to hold the part/material upon which the work is being performed*
- *Use **stop guides** to reduce the control necessary in positioning motions*
- ***Operating, set-up and emergency controls** should be grouped according to the function*

# PRINCIPLE OF MOTION ECONOMY