

INDUSTRIAL MANAGEMENT

- RAS_601_20200403



STANDARD TIME CALCULATIONS

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

$$\text{Standard time} = \text{Basic time} \times 100 / 100 - \text{Allowance in percentage}$$

$$\text{Basic time} = \text{observed time} \times \text{observed rating of operator} / \text{standard rating}$$

** Basic time is also called as Normal Time*



EXAMPLE:

Average observed time = 4.0 minutes

Worker rating = 85%

Allowance factor = 13%

Normal time = (Average observed time) x (Rating factor)

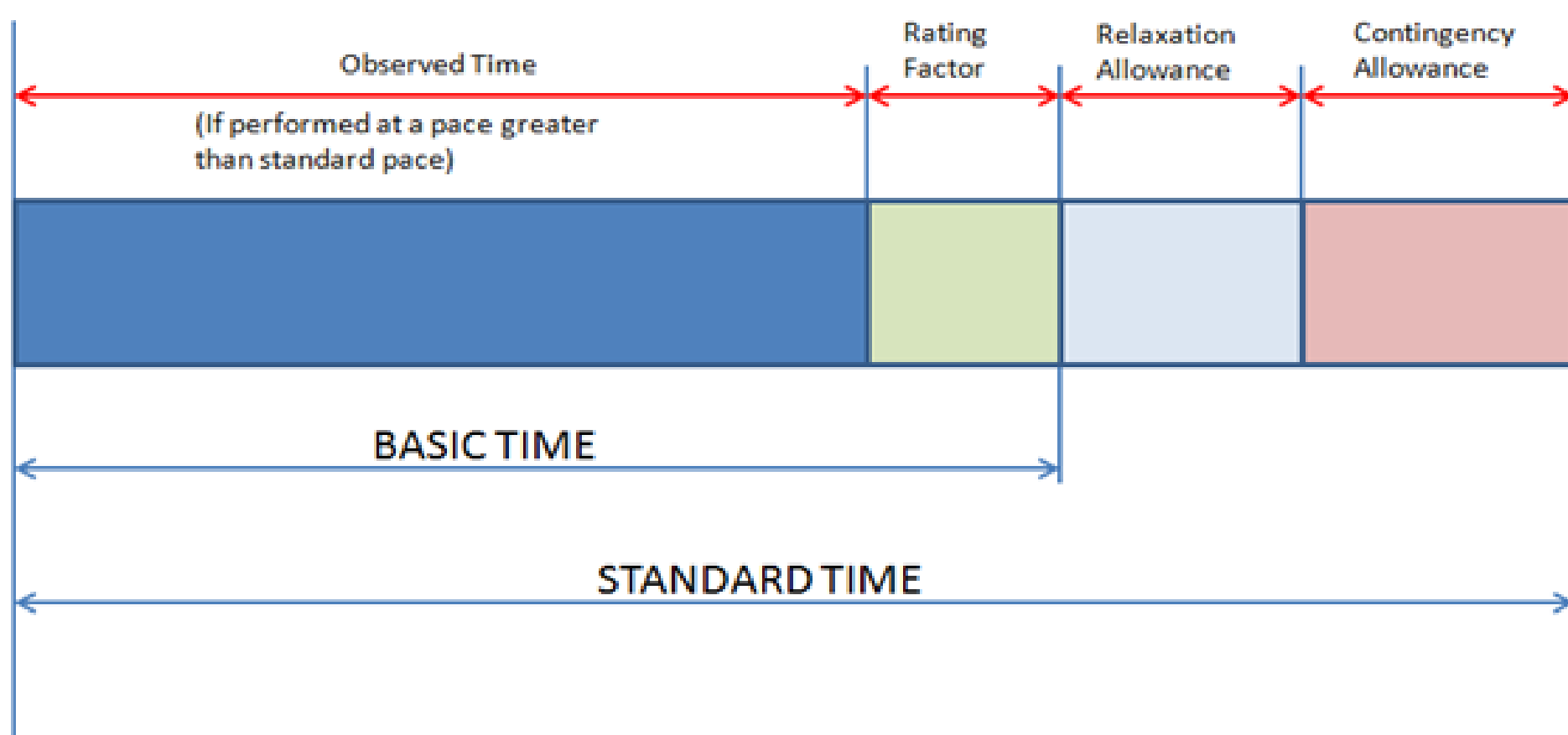
$$= (4.0)(.85)$$

$$= 3.4 \text{ minutes}$$

$$\text{Standard time} = \frac{\text{Normal time}}{1 - \text{Allowance factor}} = \frac{3.4}{1 - .13} = \frac{3.4}{.87}$$

$$= 3.9 \text{ minutes}$$





PRACTICE THIS QUESTION:

Element	t (min)	RF
1	2.51	1.10
2	5.29	1.15
3	4.21	1.10
4	3.57	1.05

- Compute the standard time for this job using an allowance factor of 20 percent.



Work Sampling

Work sampling, also called 'Activity Sampling' or 'Ratio Delay Study',

Work sampling is a fact finding tool and has the following two main objectives:

1. To measure activities and delays while a man is working and percentage of that he is not working. It means a fair day's work
2. Under certain circumstances, to measure manual tasks that is to establish time standards for an operation.

Theory of Work Sampling:

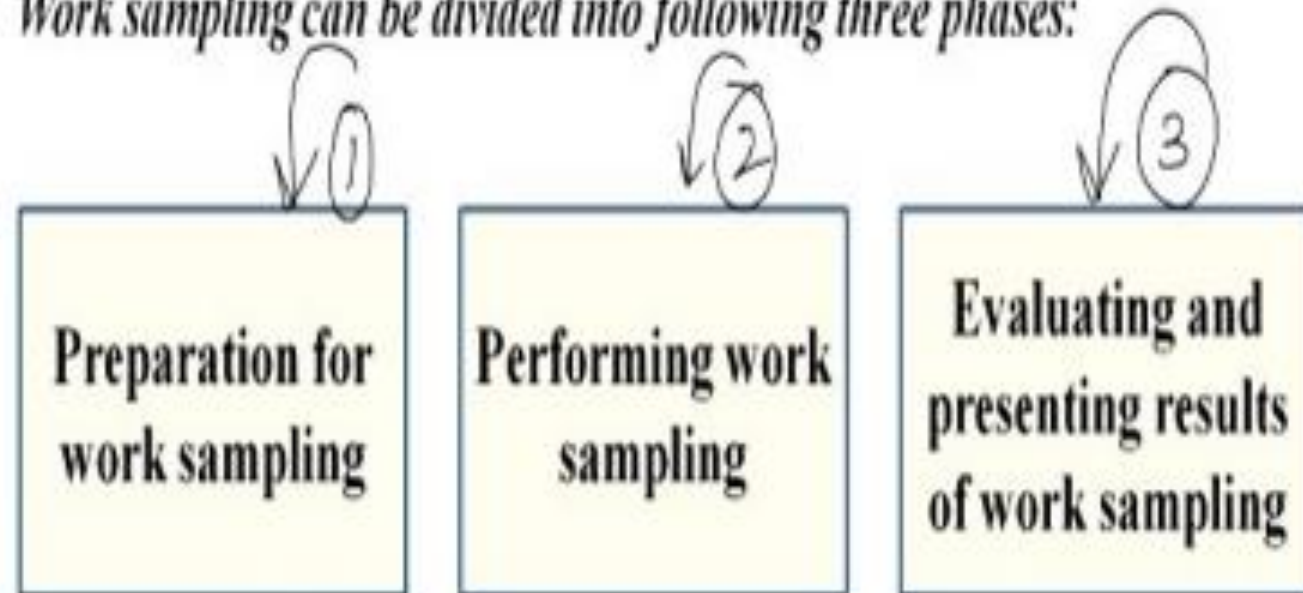
It states that the percentage of observations recorded on an operation in any state is a reliable estimate of the percentage time the operation is in that state, provided, "sufficient number of observations are taken at random". Here particular stress should be paid on the words "random" and "sufficient number of observations".

In this method, error is likely to occur but the error tends to diminish as the number of samples increases.



Procedure for Conducting Work Sampling

Work sampling can be divided into following three phases:



Preparation for Work Sampling

- **Statement of the main objective of the study.**
- Obtain the **approval of the supervisor** of the department in which work sampling is to be performed.
- **Establish quantitative measure of activity.**
- **Selection of training of personnel.**
- **Making a detailed plan for taking observations.**



Performing Work Sampling

- Describing and classifying the elements to be studied in details.
- Design the observation form
- Determine the number of days or shifts required for the study.
- Develop properly randomized times of observations
- Observing activity and recording data
- Summarizing the data at the end of each day



Evaluating and Presenting Results

- Evaluate the validity and reliability of data
- Presenting and analyzing data
- Planning for future studies



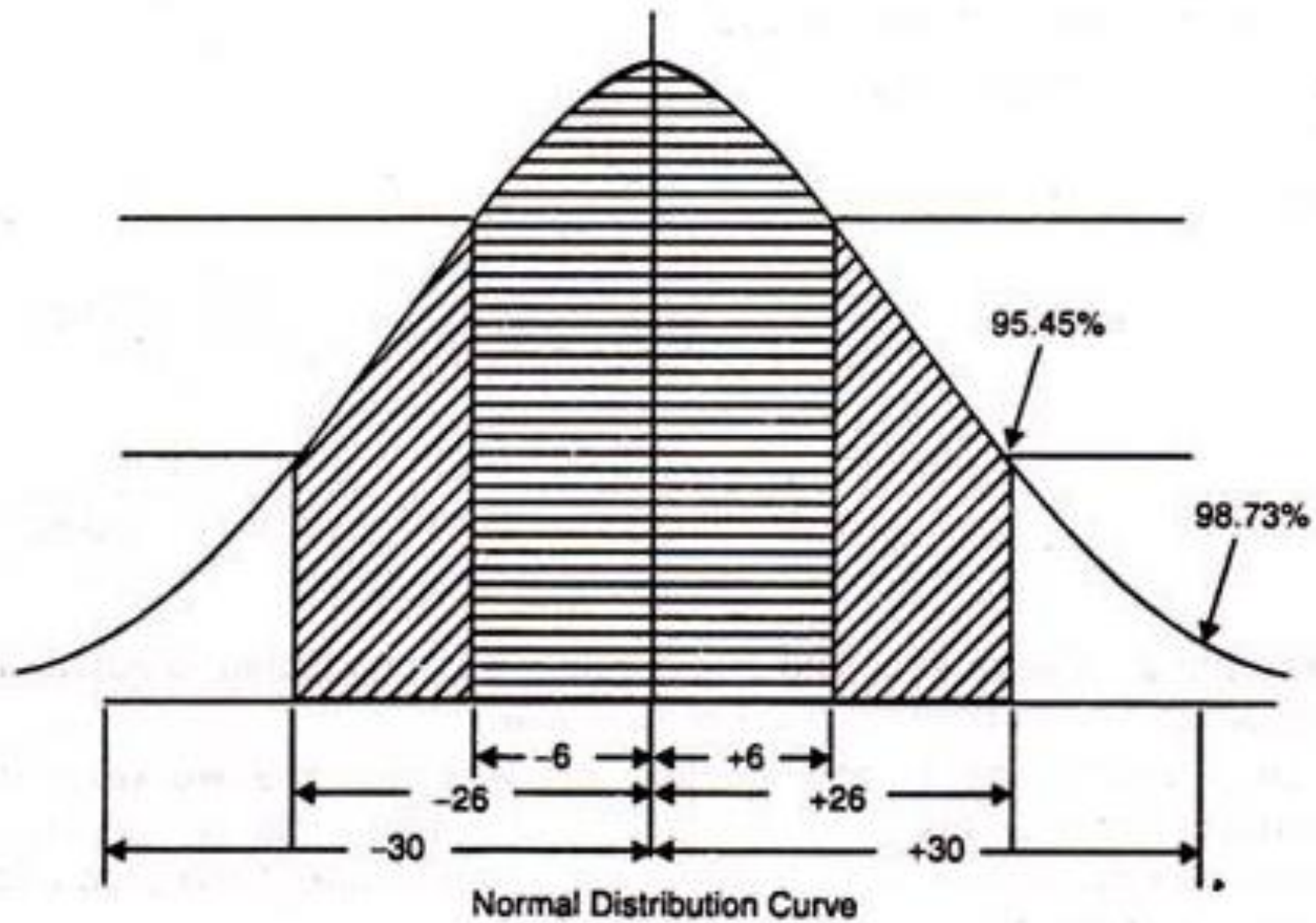
CONFIDENCE LEVEL

The results obtained by work sampling technique differ considerably from the results actually achieved by continuous recording of time. The accuracy of result depends upon the number of observations and *the limits of confidence level* because the sampling procedure used involves certain degree of error. So it is important to decide, what level of confidence is desired the final “Work Sampling” results.

The most common confidence level is 95%. The area under the curve at 2 sigma or two standard deviations is 95.45%, which is rounded off to 95%. This means that the probability is that 95% of the time the random observations will represent the facts and 5% of the time they will not.

For many cases, an accuracy of + 5% is considered satisfactory. This is sometimes referred as the standard error in percentage.





THANK YOU

