

Work Study

A work study is a study of existing practices and conditions in a workplace. The aim of a work study is to improve these practices and conditions in order to increase the productivity of individual workers and, as a result, the plant efficiency. There are two main elements to a work study:

- 1) Method Study
- 2) Work Measurement

Method Study:

A method study is carried out to improve methods of assembly/manufacture by reducing cycle times OR/and operator effort, i.e. by minimising labour costs. The stages of a method study are:

- 1) Select work to be studied:
 - ➔ (A) Labour intensive work
 - (B) High demand work
 - (C) Bottleneck areas
 - (D) Dangerous/Unpleasant work
- 2) Record existing methods
- 3) Critically analyse existing methods
- 4) Develop improvements to these methods
- 5) Implement and maintain improved methods

Method Study Techniques:

- 1) Indicating the process sequence:
 - ➔ Simple process charts
 - ➔ Process flow charts (man/material/equipment)
 - ➔ 2-Handed charts
 - ➔ Micro motion study

Method Study Techniques (contd.)

2) Indicating the movement:

- Process flow diagrams (supplement flow charts)
- Travel charts
- Photographic techniques

3) Indicating the time relationships:

- Multiple activity charts
- Simo charts
- Predetermined motion time study

Method Study Advantages

- Provides a universal standard
- Method standards are already in place before time standards are applied
- Makes personnel training easier

Work Measurement/Time Study

- This focuses on determining the amount of time a job should take under normal conditions
- Work measurement consists of the following aspects:

1) Time Study:

- A task is broken into its element tasks
- Each task is timed & a subjective rating applied
- A ^{basic} standard time is then calculated based on a standard rate
- A standard time is established from basic time and certain allowances

Work Measurement (Contd.)

→ The allowances affecting standard time:

- ① Relaxation allowance
- ② Process allowance
- ③ Special allowance

→ The final allowed time is the sum of the standard time and policy allowances

2) Synthesis:

→ The job time is established by summing all the calculated element task times

3) Predetermined Method Time Study:

→ Same as synthesis but for a shorter time period.

4) Analytical Estimation:

→ The comparison of similar jobs by experience.

Advantage of Work Measurement:

Work measurement allows one to detect the task or tasks delaying an overall job.

Other elements of work study:

A work study may also examine:

→ Payment and incentives for:

- ① Direct workers
- ② Indirect workers

→ Working conditions -

- ① Physical environment
- ② Ergonomics

Types of Layout of Facilities

Facility layout is dependent on the type of production. The types of layout are:

Flow/Line Layout

- Used in flow/mass production scenarios
- Flow of materials/work pieces is unidirectional
- Facility is arranged in the sequence required for completion of the product
- Equipment is generally specialised
- Product range is small but production quantity is large
- Highly efficient

Advantages of Flow Layout

- ① Lower stock - Production quantity of each machine is matched \rightarrow excessive W.I. or raw materials not required
- ② Reduced handling
- ③ Work simplified by mechanisation
- ④ Easier production control - Delays & shortages are easily spotted, ordering of materials is simplified
- ⑤ Greater utilisation of machinery & space

Disadvantages of Flow Layout

- ① Not flexible as to volume & range of products
- ② Costly to set up
- ③ Volume of production must be large to make it flexible
- ④ Requires exact initial process planning & plant layout

Process Layout / Layout by Function

- Used in batch production and jobbing shops
- Similar machines are kept together & the products are routed through different machines

Advantages of Process Layout

- ① Better utilisation of machines - different items can be made on the same machine.
- ② Flexibility - Changes in quantity and types of components can be made at minimum cost
- ③ Effect of breakdowns is minimised
- ④ Specialization - Labour will be skilled in a particular process → better supervision & quality of product
- ⑤ Simpler provision of services
- ⑥ Better utilisation of machines & labour if properly scheduled.

Disadvantages of Process Layout

- ① High work in progress
- ② High through put times
- ③ Large amount of materials handling
- ④ Requires significant production planning & control
- ⑤ Low machine utilisation if poorly scheduled

Cell Layout | Layout by Product

- Miniature of line layout
- General purpose machinery
- Used in manufacture of components of similar nature
- Small product range but large batches
- High throughput
- More flexible than line production
- Payment of supervision difficult due to frequent mixing of skills of operations.
- WIP minimised
- Machine utilisation is high.

FMS

- Automated version of cell layout
- Computer controls the movement of parts between various processes
- Enhances the flexibility of cell layout
- Reduced handling

Fixed Position Layout

- Used in the production of large/heavy items that are difficult to move, e.g. ships
- Requires necessary resources to be mobile so they can be taken to the job site
- Crowded work area can cause problems with storage of material handling
- Requires excellent administrative co-ordination of control processes