Chapter 4

DIRECT LABOUR

INTRODUCTION

◢ Labour cost remains one of the most important elements of cost even today, that requires close attention of management. The proportion of labour cost in some industries is as high 50% of the total cost of production. Looking to the importance a labour cost, many American, Japanese, Korean and European companies are establishing their automobile plants in India to save labour cost, as labour is very cheap in India.

◢ Similarly many foreign companies get their computer work done in India to save labour cost. (This is called outsourcing). Perhaps it is more difficult to control labour cost than even the material cost due to a number of reasons.

◢ Material being an inanimate thing can be controlled and even stored when not required. Workers are however, human beings having their own likes and dislikes. Secondly, labour is a perishable commodity and cannot be stored. It has to be utilized as soon as it is available.

DIRECT LABOUR AND INDIRECT LABOUR

⬗ Labour is classified into two categories: Direct and Indirect. Workers who are directly engaged in production and whose wages can be identified with the particular jobs or cost units, constitute direct labour. Wages paid to them are called Direct wages. In other words, wages which can be identified with and allocated to cost centres or cost units is direct wages.

⬗ Other employees, who only assist the production work and whose wages cannot be allocated directly to jobs or cost units, fall in the category of indirect labour. For example, salary of foremen, supervisor, etc. are included in indirect wages. Such indirect wages are part of factory overheads.

DIRECT LABOUR AND INDIRECT LABOUR

4 The definition of direct and indirect wages by the *English Institute of Cost and Management Accountants* will be of interest to students:

– **Direct Wages (Direct Labour Cost)**: Wages (labour cost) which can be identified with and allocated to, cost centres or cost units.

– **Indirect Wages (Indirect Labour Cost)**: Wages (labour cost) which cannot be allocated but which can be apportioned to or absorbed by, cost centres or cost units.

4 The labour cost depends upon two important facts: (1) Time devoted by the workers and (2) Rate of wages at which they are paid.

Difference between Direct and Indirect Wages :

	Direct Wages		Indirect Wages
(1)	Wages paid to those who are directly connected with production in any job, process, department or unit are called direct wages e.g. wages paid to tailors in a garment factory.	(1)	Wages paid to those who are not directly but only indirectly connected with production of any job, process or unit are called indirect wages. e.g. wages paid to supervisor or foreman.
(2)	Direct wages can be easily identified with a particular job or unit of production.	(2)	Indirect wages, cannot be attributed directly to any job, process or unit of production.
(3)	Only one job, process, department or unit gets the benefit of direct wages and so it can be directly charged to that job or process.	(3)	The benefit of indirect wages is available to more than one job, process or unit of production. it has to be apportioned over them.
(4)	Direct wages is a part of prime cost.	(4)	Indirect wages is a part of factory overheads
(5)	The direct worker, makes the physical changes in items produced like size, colour, structure, quality by himself directly.	(5)	The indirect worker, does not make such physical changes but simply helps in doing it.

TIME RECORDING

4 Recording of time has two different aspects, viz. Time Keeping and Time Booking.

– In strict sense, *Time keeping* refers to recording of the workers' time of arrival and departure, i.e., the total time that the worker has spent in factory. Some form of time keeping is essential for disciplinary purposes. Whether he is paid on the basis of time or on the basis of the quantum of work that he has put in, it is necessary that he should be punctual or else he would create disturbance to others. Secondly, if workers are paid on time basis it is necessary to have a record of their timings in order to calculate their wages, overtime and so on.

– *Time booking* is another aspect of time recording and refers to the recording of time that the worker spends on various jobs. This is done with help of job cards in which the time of starting work on each job by the worker and the time of finishing it are recorded Time booking helps the management in checking idle time of workers. Secondly allocation of overheads on the basis of time is possible.

TIME KEEPING SYSTEMS

⬚ Time-keeping system may be (1) Manual or (2) Mechanical.

A. Manual System:
   I. Daily Muster Roll
   II. Disc Method

B. Mechanical System:
   I. Time Recording Clocks
   II. Dial Time Recorders

TIME BOOKING CARDS

wages due to

TIME CARD

No. _____ Week ending _____

Name _____ Department _____

Day	Forenoon		Afternoon		Hours	
	In	Out	In	Out	Regular	Overtime
Mondy						
Tuesday						
Wednesday						
Thursday						
Friday						
Saturday						
Sunday						

Total Wages _____

Less : Deductions _____
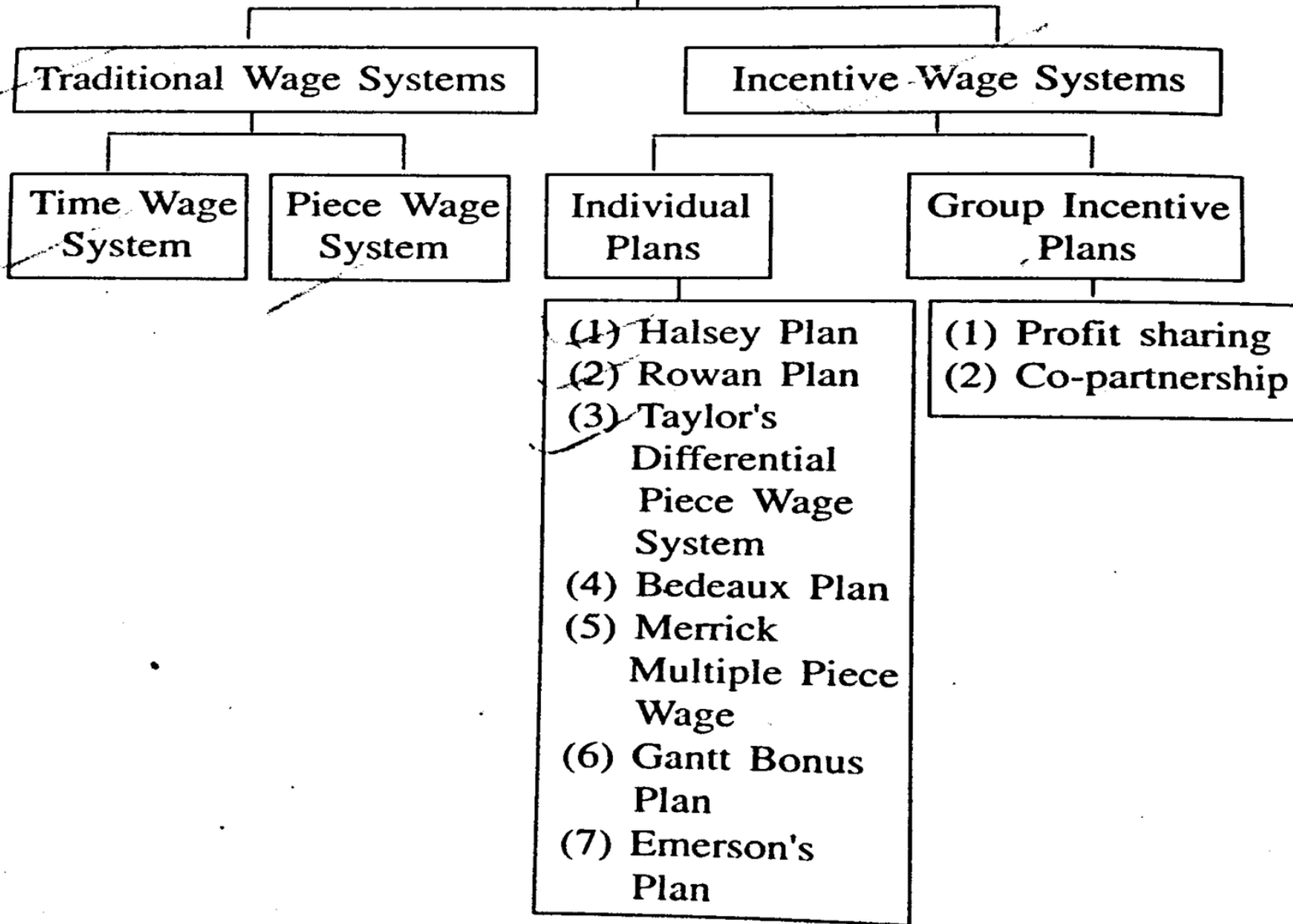
Net Amount Payable _____ Signed_____

JOB CARDS

JOB CARD

Worker's Name _____ Department _____

Worker's No. _____ Week ending _____

Day	Job No.	Brief Description	Time		Time (Hours)	Amount (Rs.)
			Start	Finish		
Total						

Foreman _____ Wages Abstract prepared by _____

Difference between Time Card and Job Card :

Time Card	Job Card
(1) Time card is separately prepared for each worker for recording time of his arrival and departure in the factory. There are as many time cards as there are workers.	(1) Job card is separalety prepared for each job There are as many job cards as the number of jobs.
(2) On time card, not only the time of his arrival and departure is recorded, but even the time devoted by worker to various jobs is also recorded.	(2) On job card, the time given by various worker on a particular job is recorded.
(3) It is possible to know the total time during which worker was present from the time cards and calculate his wages.	(3) From the job card, it is possible to know the exact time which a job has taken to complete. So the total direct wages of that job can be determined.

WAGE SYSTEMS

Traditional Wage Systems

- Time Wage System
- Piece Wage System

Incentive Wage Systems

Individual Plans

(1) Halsey Plan
(2) Rowan Plan
(3) Taylor's Differential Piece Wage System
(4) Bedeaux Plan
(5) Merrick Multiple Piece Wage
(6) Gantt Bonus Plan
(7) Emerson's Plan

Group Incentive Plans

(1) Profit sharing
(2) Co-partnership

Time Wage System

4 A system in which a worker is paid on the basis of time devoted by the worker is known as Time Wage System, i.e., time is the basis of payment here, The rate may be so much per hour, day, week, fortnight or a month. The worker is guaranteed a definite sum of money for a definite period of time.

4 **Time Wage = Time Taken × Wage Rate**

$$E = T \times R$$

Where, E = Earnings, T = Time Taken, R = Rate per hour

4 The system is suitable in following cases: (i) Where the quality of ultimate product is more important, (ii) where the rate of production is more dependent on machines rather than on workers, (iii) where it is not possible to measure the work put in by the worker, e.g., a teacher, (iv) where the work is irregular and of different types, (v) where the worker is untrained or is an apprentice.

ADVANTAGES OF TIME WAGE SYSTEM

- It is simple to understand and easy to calculate the amount of wages payable to a worker.

- Quality of work is maintained, as the worker is not in a hurry to increase his output.

- As the worker is not hard pressed for time, he looks after, proper maintenance of machinery and keeps it in a good condition.

- The worker is protected against sudden reduction in his income as in the case of piece rate.

- Trade unions favour the system as calculations are simple.

- As the worker is assured of a fixed income, he can adjust his expenditure to his income and maintain his standard of living.

- There would be no jealousy among workers as all are paid equally, on the basis of time.

- In cases where it is not possible to measure the output of a worker, time wage is the only method that can be used.

DISADVANTAGES OF TIME WAGE SYSTEM

- The system gives little or no recognition to the efficiency of workers. No distinction is made between efficient and inefficient workers.

- Strict supervision becomes inevitable, as the worker is not interested in increasing his output. This would raise the overhead costs.

- Wages remain fixed whereas the speed of worker is not constant. Hence, wages per unit of output will vary considerably. This would come in the way of fixing selling price on the basis of cost of production.

- No definite standard of promotion can be laid down. The effect of this system is definitely demoralizing.

PIECE WAGE SYSTEM

◈ The system that removes the basic defect of time wage system and gives recognition to the efficiency of the worker is the Piece Wage System. The worker is paid on the basis of amount of work or number of units turned out by him. The rate of wages per unit of output is fixed in advance.

◈ **Piece Wage = Time Allowed × Rate Per Hour**

$$E = TA \times R$$

Where, E = Earnings, TA = Time Allowed, R = Rate per hour

◈ The system is particularly suited when (i) the output can be measured, (ii) when speed is more important consideration than quality, and (iii) when the continuous and uninterrupted supply of work is assured.

ADVANTAGES OF PIECE WAGE SYSTEM

- There is an incentive to work more, as the worker gets more wages for large output.

- The cost of supervision is reduced, as the system encourages voluntary efforts. This would in turn reduce overhead charges.

- The cost of production can be calculated more accurately, because the cost of labour per unit is fixed.

- Method of production and quality of product are improved. This is because the workers demand materials free from defects. They take every care to keep the machinery in proper condition.

- It attracts better workers to the firm.

- Satisfied employees would not leave the firm and labour turnover rate is reduced.

- Hard and regular work put in results in increased production as well as efficiency.

- The total cost per unit is reduced as the fixed overhead charges are spread over larger number of units produced.

DISADVANTAGES OF PIECE WAGE SYSTEM

- In order to get maximum output, the worker neglects quality.
- As there is not guaranteed day wage, fresh workers have to suffer.
- In his anxiety to produce more, the worker overstrains himself which affects his health.
- Strict supervision is needed to control quality, which is sacrificed by the worker in hurry to produce more.
- As there is an incentive to work hard, the worker tries to raise his production. The employer thinks that the workers are earning too much and will reduce rate of wages. This leads to conflict between employers and employees.
- Different workers earn different amounts of wages. This leads to dissatisfaction among inefficient workers and there would be conflict among workers.
- Detailed records of individual worker's daily output and his total earnings have to be maintained. This involves elaborate calculations and much clerical work will increase administration cost.

Comparison between Time Rate and Piece Rate System

Time Rate System	Piece Rate System
(1) Under this system earnings of a worker are calculated on the basis of time spent on the job	(1) In this system earnings of a worker are calculated on the basis of number of units produced.
(2) In this system, minimum guaranteed time rate is paid to every worker.	(2) Under this system, no guarantee of minimum payment to every worker.
(3) Under time rate system, remunerations are not directly linked with productivity.	(3) Remuneration of workers directly linked with productivity.
(4) Under this system emphasis is on high quality of work.	(4) Under piece rate system there is no consideration for the quality of work.
(5) Under time rate system, strict supervision is essential.	(5) In this system, close supervision is not required.
(6) This method may lead to trade unions to support it.	(6) Under this method the attitude of trade unions is not to co-operate with the schemes.
(7) More idle time arises in time rate systems.	(7) Compared with time rate system there is no change of idle time in piece rate schemes.

Example – 1

Standard time for a job in a factory is 8 hours. A worker is paid at ₹ 10 per hour. Actual time taken is 6 hours. Calculate the wages payable to the worker on: (1) Time basis and (2) Piece basis.

Solution

Here, Time Taken = 6 hours

Time Allowed = 8 hours and

Rate per hour = ₹ 10

(1) Time Wages = Time taken × Rate per hour

= 6 hours × ₹ 10 per hour

= **₹ 60**

(2) Piece Wages = Time allowed × Rate per hour

= 8 hours × ₹ 10 per hour

= **₹ 80**

Example – 2

A workman takes 9 hours to complete a job on daily wages and 6 hours on a scheme of payment by results. His day rate is 25 paise an hour. The material cost of the product is ₹ 4 and the factory overheads are recovered at 150% of the total direct wages. Calculate the factory cost of the product under (1) Time basis and (2) Piece basis.

Solution

Here, Time Taken = 6 hours

Time Allowed = 9 hours and

Rate per hour = ₹ 0.25

(1) Time Wages = Time taken × Rate per hour

= 6 hours × ₹ 0.25 per hour

= **₹ 1.50**

(2) Piece Wages = Time allowed × Rate per hour

= 9 hours × ₹ 0.25 per hour

= **₹ 2.25**

Solution (Cont.)

Now, we have to find factory cost of the product.

		Time basis (₹)		Piece basis (₹)
(1) Material		4.00		4.000
(2) Direct Wages		1.50		2.250
(3) Factory O/h	$(1.50 \times 150\%)$	2.25	$(2.25 \times 150\%)$	3.375
(150% of Direct wages)				
So, Factory Cost		**7.75**		**9.625**

Example

A worker is allowed 9 hours to complete a job on time wages. He completes the job in 6 hours on piece wages. His time wage is ₹ 2 per hour.

Material cost of a product is ₹ 10 and factory overheads are recovered at 100% of the total direct wages. Calculate the factory cost of the product under:

(1) Time wage plan and (2) Piece wage plan

Solution

Here, Time Taken = 6 hours

Time Allowed = 9 hours and

Rate per hour = ₹ 2

(1) Time Wages = Time taken × Rate per hour

= 6 hours × ₹ 2 per hour

= **₹ 12**

(2) Piece Wages = Time allowed × Rate per hour

= 9 hours × ₹ 2 per hour

= **₹ 18**

Solution (Cont.)

Now, we have to find factory cost of the product.

		Time basis (₹)		Piece basis (₹)
(1) Material		10.00		10.00
(2) Direct Wages		12.00		18.00
(3) Factory O/h	$(12 \times 100\%)$	12.00	$(18 \times 100\%)$	18.00
(100% of Direct wages)				
So, Factory Cost		**34.00**		**46.00**

INCENTIVE WAGE SYSTEM

There are some demerits of both time wage and piece wage systems. Hence, industrialists have been constantly striving to evolve a system which may combine the good points of both. The incentive wage plans blend the desirable features of both and at the same time avoid their demerits. They encourage the workers to increase their output and at the same time guarantee a minimum day wage.

The characteristics of such systems are as follows: (1) A standard task is set to be completed within a standard time allowed. If a worker reaches the target, he is paid some bonus in addition to wages. (2) The bonus paid to him is in proportion to the extra production of the worker. (3) If a worker is not able to complete the work in standard time, he gets minimum day wage. (4) The benefit of extra production is shared by both the employers and employees. (5) The systems are generally named after the persons who have desired them.

ESSENTIALS OF A GOOD INCENTIVE PLAN

- It must guarantee a minimum wage to a worker, irrespective of his quantum of work.
- The complicated system fails to achieve its objective. Hence it must be a simple one so that the worker can understand it and calculate his own wages.
- The wages earned by a worker must be in proportion to the quantity of work done by him.
- The extra benefit to the worker must be made available to him immediately after the work is completed.
- The task fixed for the worker to be achieved must be scientifically fixed.
- The system should not be expensive, i.e. the cost increase should not exceed the benefit available to the employer.
- The system should be just and equitable. The worker should not suffer when due to the fault of management or machine, he is not able to achieve the targeted production.
- The system once introduced must be stable and must be tried for sufficiently long time.
- An efficient worker should get returns for his efficiency and extra efforts.
- The system should lead itself to the modern control systems, so that it may help implementation of standard costing and budgetary control.

HALSEY PLAN

⬧ In this plan day-wage is guaranteed. A worker is paid at an hourly rate, for all the time during which he is working irrespective of the fact whether he completes the task or not. The standard output is first determined by the management which is based on past experience. If a worker completes his work in less than the standard time, he gets the wages for the hours worked and also a certain proportion of the time saved as measured by the hourly rate.

⬧ Mr. Halsey said that 50% bonus may be paid if the task is a difficult one and has been scientifically set. But 30% is enough when the standard is based on past experience only. This plan is also called Weir system in England because it was first used in England in Weir Engineering Works, Cotheart. The acceptance of the plan is voluntary for each worker.

MERITS OF HALSEY PLAN

- It is easy to introduce because standard time can be set only from the past experience.

- Day wage is guaranteed whether task is finished or not.

- There is no fear of cutting the wage rate because advantage from time saved is shared even by the employer.

- There is no overstrain because the worker is not compelled to work fast.

DEMERITS OF HALSEY PLAN

- The standard task set is not based upon scientific study but is based on simply past experience. Thus it does not give equal opportunity to all workers to earn bonus. The task should be set after careful time and motion study.

- The scheme of dividing benefit of time saved is not fair. The employer has no right to share the extra efforts of a worker.

- The premium is calculated on each job separately. Hence the workers can work fast on certain jobs to get premium and in some other jobs he may work slowly because the day wage is guaranteed.

CALCULATION OF WAGES

$$E = T \times R + \frac{50}{100} (TS \times R)$$

Where, E = Earnings

T = Time Taken

R = Rate per hour

TS = Time saved

Or **Total Wages = Wages for Actual Time Taken + Bonus**

Where, Bonus = **½** × Wage of time saved

ROWAN PLAN

🗏 To remove the defects of Halsey Plan, James Rowan suggested another plan. All the points of Halsey Plan were kept intact except the method of calculating premium. Standard time is based on past experience. A day wage is guaranteed to all workers irrespective of the fact whether he finished the task or not. The rules of remuneration under the plan are as follows:

– The wages of time taken shall be increased by the same percentage as that by which the time set for the job has been reduced.'

– If the worker reduced time by 25%, then the wages are increased by 25%.

CALCULATION OF WAGES

Total wages = Wages for Actual Time Taken + Bonus

Where, Bonus = Actual Wages × Time Saved / Time Allowed

$$= W \times \frac{TS}{TA}$$

OR

$$E = (T \times R) + (W \times \frac{TS}{TA})$$

MERITS OF ROWAN PLAN

- Under the Rowan Plan the workers are benefitted in the initial stages whereas Halsey Plan is less liberal in the beginning.

- The majority of workers are of average ability and it is not possible for them to save more than two or three hours in a day and large number of workers are benefitted under the Rowan Scheme.

- The remuneration is self-limiting under the scheme.

- The maximum the worker can earn under the Rowan plan is double the guaranteed wage which is humanly impossible. Thus it offers protection to the employers against premium on account of the standard task being set too low.

DEMERITS OF ROWAN PLAN

⬚ The system of calculating premium is very complicated.

⬚ The ordinary worker finds it difficult to understand it. Thus the system is losing popularity among employees.

TAYLOR'S DIFFERENTIAL PIECE RATE SYSTEM

4 This system was introduced by Dr. F. W. Taylor, the man who is regarded as the father of scientific management. The underlying principle is to pay a low piece rate for low production and higher piece rate for more production. By careful time and motion studies, he was able to find out the best method of doing any work and the minimum time required for doing it and was thus able to arrive at the time normally required by a worker for doing a given piece of work.

4 He was thus able to get a standard task based upon scientific studies. To encourage the efficient workers he is paid a higher piece rate. If he fails to attain the standard he gets lower piece rate.

4 Suppose, the standard task for a day is 10 units. The piece rate for that output or more may be ₹ 1 per unit and for production below the standard, the rate is only 75 paisa per units. Thus a worker producing 12 units gets ₹ 12.00. But the worker producing 8 units gets only ₹ 6.00.

Example – 3

Standard task during the day is fixed at 15 units. If a worker produces 15 units or more, he gets wages ₹ 1.20 per unit and a worker who produces less, is paid at ₹ 1.00 per unit. If A produces 20 units and B produces 14 units, what would they get under Taylor's Differential Piece-Wage Plan?

Solution

Here, Standard task = 15 units

    A produces = 20 units and

    B produces = 14 units

    Rate per unit for 15 units or more = ₹ 1.20

    Rate per unit for less than 15 units = ₹ 1.00

    Wages = No. of units produces × Rate per unit

        For worker A = 20 units × ₹ 1.20 per unit

        = ₹ 24

        For worker B = 14 units × ₹ 1.00 per unit

        = ₹ 14

Example

Compute the total wages of two workers X and Y from the following data:

(1) Standard time = 100 units per hour

(2) Ordinary Time Rate = ₹ 4 per hour

(3) Differential Piece Rate = 80% of rate for production below standard

= 120% of piece rate for production at or above standard

On a working day of 8 hours, X produced 750 and Y 1,000 units.

Solution

Here, Standard task = 100 units per hour, For 8 hours a day = 800 units

X produces = 750 units and Y produces = 1,000 units

Now, Rate per hour = ₹ 4.00, so rate per unit $= \dfrac{Rate\ Per\ hour}{Units\ per\ hour} = \dfrac{4}{100} = ₹\ 0.04$

Rate per unit for 800 units or more = ₹ 0.048 (0.04 × 120%)

Rate per unit for less than 800 units = ₹ 0.032 (0.04 × 80%)

Wages = No. of units produces × Rate per unit

For worker X = 750 units × ₹ 0.032 per unit

= ₹ 24

For worker Y = 1,000 units × ₹ 0.048 per unit

= ₹ 48

Example – 19

Mira, Pinky and Raju three are labourers in a factory. Standard Time

allowed for a job is 25 hours. Wage rate per hour is ₹ 40. To finish the

job Mira takes 15 hours, Pinky takes 20 hours and Raju takes 25 hours.

What wages will have to be paid to each one as per the following

methods: (1) Piece Wage System, (2) Halsey Wages System and (3)

Rowan Wages System

Solution

Here, Time Allowed = 25 hours

Time Taken by Mira = 15 hours, Pinky = 20 hours and Raju = 25 hours

Rate per hour = ₹ 40

Time Saved = Time Allowed – Time Taken

Mira = 10 (25 – 15) hours, Pinky = 5 (25 – 20) hours and Raju = 0 (25 – 25) hours

(1) Piece Wages = Time allowed × Rate per hour

= 25 hours × ₹ 40 per hour

= **₹ 1,000**

Here, time allowed are same for all workers. So, as per piece wage system Wages of each worker is **₹ 1,000.**

Solution (Cont.)

(2) Wages as per Halsey Plan = (T × R) + 50% (TS × R)

For Mira = (15 hours × ₹ 40) + 50 % (10 hours × ₹ 40)

= ₹ 600 + 50 % (₹ 400)

= **₹ 800**

For Pinky = (20 hours × ₹ 40) + 50 % (5 hours × ₹ 40)

= ₹ 800 + 50 % (₹ 200)

= **₹ 900**

For Raju = (25 hours × ₹ 40) + 50 % (0 hours × ₹ 40)

= **₹ 1,000**

Solution (Cont.)

(3) Wages as per Rowan Plan = $(T \times R) + (W \times \frac{TS}{TA})$

For Mira = $(15 \text{ hours} \times ₹ 40) + (W \times \frac{10}{25})$

= ₹ 600 + (₹ 600 × 0.4)

= ₹ 600 + ₹ 240   = **₹ 840**

For Pinky = $(20 \text{ hours} \times ₹ 40) + (W \times \frac{5}{25})$

= ₹ 800 + (₹ 800 × 0.2)

= ₹ 800 + ₹ 160   = **₹ 960**

For Raju = $(25 \text{ hours} \times ₹ 40) + (W \times \frac{00}{25})$

= ₹ 1,000 + NIL   = **₹ 1,000**

Example – 4 (A)

The following particulars apply to a job Standard time 50 hours, time taken 40 hours, material cost of a product is ₹ 150. Factory cost ₹ 300.

Factory overheads are recovered at ₹ 1.50 per hour of actual time taken. Calculate direct wages and rate of wage per hour under Halsey Plan.

Solution

Here, Factory cost are given so from that we can find out Direct wages.

	₹
(1) Material	150
(2) Direct Wages	90
(3) Factory O/h (1.50 ₹ × 40 hours taken)	60
Factory Cost	**300**

Solution (Cont.)

Now, from the total wages we can find wage rate per hour by using Halsey Plan.

Wages as per Halsey Plan = $(T \times R) + 50\% (TS \times R)$

$₹ 90 \qquad = (40 \text{ hours} \times R) + 50\% (10 \text{ hours} \times R)$

$90 \qquad = 40 R + 50\% (10 R)$

$90 \qquad = 40 R + 5 R$

$90 \qquad = 45 R$

So, R = ₹ 2 per hour

Ans.: Wages under Halsey Plan is ₹ 90 and Wage rate per hour is ₹ 2.

Example – 4 (B)

The standard time for a particular job is 40 hours and actual time taken is 30 hours. Basic wage rate is ₹ 8 and dearness allowance is ₹ 2 per hour. Calculate total wages and effective rate of wage per hour under Rowan plan. Bonus is calculated on basic plus D.A. rate of wage per hour.

Solution

Here, Time Allowed = 40 hours, Time taken = 30 hours

Rate per hour = ₹ 8 basic + ₹ 2 D.A. = ₹ 10

Time Saved = TA – T $\quad$ = 40 – 30 $\quad$ = 10 hours

Wages as per Rowan Plan = (T × R) + (W × $\frac{TS}{TA}$)

$\qquad$ = (30 hours × ₹ 10) + (W × $\frac{10}{40}$)

$\qquad$ = ₹ 300 + (₹ 300 × 0.25)

$\qquad$ = ₹ 300 + ₹ 75 $\qquad$ = **₹ 375**

Effective Wage rate per hour = Total wages ÷ Time Taken

$\qquad$ = ₹ 375 ÷ 30 hours $\qquad$ = **₹ 12.5 per hour**

Example

Find out total incomes of Jay under following circumstances:

(1) Rowan Premium Plan.

(2) 40% Bonus under Halsey Premium Plan

    a) Rate per hour 60 paise

    b) Standard time of preparing 1 dozen units 2 hours.

Actual time taken for preparing 25 dozen units 40 hours.

If a price of material is ₹ 20 and factory overhead is recovered at 150% of direct

wages, calculate factory cost also.

Solution

Here, Time Allowed = 1 dozen unit 2 hours, So for 25 dozen units 50 hours,

Time taken = 40 hours

Rate per hour = ₹ 0.60

Time Saved = TA – T $\quad\quad$ = 50 – 40 $\quad\quad$ = 10 hours

Wages as per Rowan Plan = $(T \times R) + (W \times \dfrac{TS}{TA})$

$\quad\quad\quad\quad$ = $(40 \text{ hours} \times ₹\, 0.60) + (W \times \dfrac{10}{50})$

$\quad\quad\quad\quad$ = ₹ 24 + (₹ 24 × 0.2)

$\quad\quad\quad\quad$ = ₹ 24 + ₹ 4.80

$\quad\quad\quad\quad$ = **₹ 28.80**

Solution (Cont.)

Wages as per Halsey Plan = $(T \times R) + 40\% (TS \times R)$

$= (40 \text{ hours} \times 0.60) + 40\% (10 \text{ hours} \times 0.60)$

$= ₹ 24 + 40\% (₹ 6)$

$= ₹ 24 + ₹ 2.40$

$= ₹ 26.40$

Solution (Cont.)

Now, we have to find factory cost of the product.

	Rowan Plan (₹)		Halsey Plan (₹)
(1) Material	20.00		20.00
(2) Direct Wages	28.80		26.40
(3) Factory O/h $(28.80 \times 150\%)$	43.20	$(26.40 \times 150\%)$	39.60
(150% of Direct wages)			
So, Factory Cost	**92.00**		**86.00**

Example – 5

Calculate the normal and overtime wages payable to a workman from the following data:

Days	**Hours worked**
Monday	8 hours
Tuesday	10 hours
Wednesday	9 hours
Thursday	11 hours
Friday	9 hours
Saturday	4 hours
	51 hours

Normal working hours	8 hours per day
Normal rate	₹ 0.50 per hour
Overtime rate	upto 9 hours in a day, at single rate and over 9 hours in a day at double rate
OR	upto 48 hours in a week, at single rate and over 48 hours at double rate, whichever is beneficial to the workman.

Solution

Calculation of Normal and Overtime Hours

Days	Actual Hours worked	Normal Working Hours	Overtime Hours	
			Single Rate	**Double Rate**
Monday	8	8	--	--
Tuesday	10	8	1	1
Wednesday	9	8	1	--
Thursday	11	8	1	2
Friday	9	8	1	--
Saturday	4	4	--	--
Total	**51**	**44**	**4**	**3**

Solution (Cont.)

Normal Wages = Normal Working Hours × Normal rate per hour

= 44 hours × ₹ 0.50   = ₹ 22.00

Overtime wages = At single rate 4 hours × ₹ 0.50   = ₹ 2.00

At double rate 3 hours × ₹ 1.00   = ₹ 3.00

Total Wages   **= ₹ 27.00**

OR

Wages under second alternative:

Normal Wages for 48 hours = 48 hours × ₹ 0.50   = ₹ 24.00

Overtime wages for 3 hours = 3 hours × ₹ 1.00   = ₹ 3.00

Total Wages   **= ₹ 27.00**

Here, under both alternatives workers gets ₹ 27.00 wages.

Example – 6

From the following information of a factory, find out the amount of net wages payable in cash and also find out the cost of wages for March, 2017.

(1) Salary per month   ₹ 60,000

(2) Dearness allowances   125% of salary

(3) Total amount deposited to P.F.   ₹ 12,000

(4) Total amount deposited to E.S.I.   ₹ 4,500

(5) Expenses on amenities to employees   ₹ 4,000

(6) House rent recovered from 25 employees at the rate of ₹ 200 per month.

      Employer's contribution to P.F. is at equal rate with employee's contribution, while the ratio of employer's and employee's share into the contribution to E.S.I. is 2 : 1.

Solution

Statement Showing Net wages payable in Cash

Particulars	₹
(1) Salary	60,000
(2) Dearness allowance (125% of basic) (60,000 × 125%)	75,000
Total wages	1,35,000
Less: Deductions	
(1) Employee's Contribution to P.F. (12,000 × ½)	6,000
(2) Employee's Contribution to E.S.I. (4,500 × ⅓)	1,500
(3) Recovery of House rent (200 × 25)	5,000
Net Wages payable in Cash	**1,22,500**

Solution (Cont.)

Statement Showing Total cost of wages

Particulars	₹
(1) Salary	60,000
(2) Dearness allowance (125% of basic) $(60,000 \times 125\%)$	75,000
(3) Employer's Contribution to P.F. $(12,000 \times \frac{1}{2})$	6,000
(4) Employer's Contribution to E.S.I. $(4,500 \times \frac{2}{3})$	3,000
(5) Expenses on amenities to employees	4,000
Total cost of Wages	**1,48,000**

Example – 43 (A)

Jay has taken 40 hours to complete a job. The wage rate per hour is ₹ 8. If he has received ₹ 384 as total wages according to Rowan Plan, what would be the amounts of wages earned by him according to Halsey Plan and Piece wage plan?

Solution

Here, Time taken = 40 hours, Rate per hour = ₹ 8

Wages as per Rowan plan = ₹ 384

Time Allowed = (?),   Time Saved = (?)

Wages as per Rowan Plan = $(T \times R) + (W \times \frac{TS}{TA})$

₹ 384 $= (40 \text{ hours} \times ₹ 8) + (W \times \frac{TS}{TA})$

₹ 384 $= ₹ 320 + (₹ 320 \times \frac{TS}{TA})$

₹ 384 − ₹ 320 $= ₹ 320 \times \frac{TS}{TA}$

$$\frac{64}{320} = \frac{TS}{TA},$$

$$\text{So, } \frac{TS}{TA} = \frac{1}{5}$$

Solution (Cont.)

Now, Time Allowed = 5, Time Saved = 1

Here, Time Taken = 40 hours.

Time Taken = Time Allowed – Time Saved = 5 – 1 = 4.

So, when time taken = 4, it is 40 hours

if time allowed = 5, then it is **50 hours** and time saved = 1, so it is **10 hours**.

(1) Piece Wage Plan = Time Allowed × Wage rate per hour

= 50 hours × ₹ 8 = **₹ 400**

(2) Halsey Plan = (T × R) + 50% (TS × R)

= (40 hours × ₹ 8) + 50% (10 hours × ₹ 8)

= ₹ 320 + 50% (₹ 80)

= ₹ 320 + ₹ 40 = **₹ 360**

Labour Turnover

➢ Labourers leave the firm due to a variety of reasons. They may be dismissed or retrenched. The rate of such displacement of labour is known as labour turnover. In short, labour turnover is measured as the ratio of the number of the workers leaving firm in a period to the average number on the payroll. If 150 workers leave the firm in a year and average number of workers on roll is 1,500, then the labour turnover is 10% per annum. It is rate of instability.

➢ The higher this rate, the greater will be labour cost. New workers are to be recruited, training is to be imparted to them and additional loss in the form of extra wastage by untrained workers in the beginning has to be borne by the firm. Hence, the firm should try to keep the labour turnover rate to the minimum. A study of the reasons for labour turnover must be undertaken, which will enable the management to reduce the labour turnover rate.

Effects of Labour Turnover

➢ From the viewpoint of worker, it is harmful as it reduces his efficiency and income both.

➢ High rate of labour turnover is harmful to the employer in many ways. New employees are generally less efficient. Hence both quantity and quality of production decline.

➢ Recruitment of new employees entails certain expenses.

➢ High rate of labour turnover suggests that human wealth of the country is not being utilized properly.

Methods of Computing Labour Turnover Rate

➢ **Separation Method:** Under this method, labour turnover is computed by dividing the total number of workers who left by the average number of workers on the payroll.

➢ **Labour Turnover Rate** $= \dfrac{\textit{Number of separations in a period}}{\textit{Average number on roll in a period}} \times \textbf{100}$

Where, Average number $= \dfrac{Number\ in\ beggining + Number\ at\ end}{2}$

➢ It must be noted that all workers leaving weather voluntarily due to better prospects or marriage or due to dissatisfaction with wages or superiors or dismissed or retrenched by the firm must be included. Even those who retire due to age or are laid off due to lack of work must also be included.

Methods of Computing Labour Turnover Rate

➤ **Replacement Method:** It is the percentage of new replacements during a given period to the average number of workers on payroll. This method takes into account the replacement, irrespective of the number of workers who have left. Secondly, if new workers are recruited due to the expansion, they are not to be included.

➤ **Labour Turnover Rate** $= \dfrac{\textit{Number of Replacements in a period}}{\textit{Average number on roll in a period}} \times \textbf{100}$

Methods of Computing Labour Turnover Rate

➢ **Joint or Flux Method:** It is a combined method in which the total number of workers who have left the firm (i.e., separations) and number of workers who have joined the firm (i.e., replacements) are compared with the average number on payroll.

➢ **Labour Turnover Rate** $= \dfrac{No.of\ Separations\ +\ No.of\ Replacements}{Average\ number\ on\ roll\ in\ a\ period} \times \mathbf{100}$

Equivalent Annual Rate of Labour Turnover

➤ **It is the rate of labour turnover for a month or a part of it compared to the annual rate. It is computed as follows:**

➤ **EAR** $= \dfrac{\textit{Labour Turnover Rate}}{\textit{No. of days in a month}} \times \textbf{365}$

46 (B) From the following information of Naman Ltd. calculate Labour Turnover Rate on the basis of –

(1) Separation Method
(2) Replacement Method
(3) Flux method.

No. of workers at the beginning of the year	7,600
No. of workers at the end of the year	8,400
No. of workers resigned during the year	80
No. of workers retired during the year	320
No. of workers newly appointed during the year	1,500

(of which 300 workers were taken under the expansion plan).

[Guj. Uni., S.Y., Nov. 2019]

Solution

Labour Turnover Rate

(1) By Separation Method $= \dfrac{Number\ of\ Separations\ in\ a\ period}{Average\ number\ on\ roll\ in\ a\ period} \times 100$

$$= \frac{400}{8,000} \times 100 \qquad\qquad = \mathbf{5\%}$$

Where, No. of Separations = No. of workers resigned + retired + dismissed

$$= 80 + 320 \qquad\qquad = \mathbf{400}$$

Average workers $= \dfrac{Workers\ at\ beginning + Workers\ at\ the\ end}{2}$

$$= \frac{7,600 + 8,400}{2}$$

$$= \mathbf{8,000}$$

Solution (Cont.)

Labour Turnover Rate

(2) By Replacement Method $= \dfrac{Number\ of\ Replacements\ in\ a\ period}{Average\ number\ on\ roll\ in\ a\ period} \times 100$

$$= \dfrac{1,200}{8,000} \times 100 \qquad\qquad = \mathbf{15\%}$$

Where, No. of Replacements = No. of newly appointed – Workers under expansion

$$= 1,500 - 300 \qquad\qquad = \mathbf{1,200}$$

Average workers $= \dfrac{Workers\ at\ beginning + Workers\ at\ the\ end}{2}$

$$= \dfrac{7,600 + 8,400}{2}$$

$$= \mathbf{8,000}$$

Solution (Cont.)

(3) By Flux Method $= \dfrac{No.\,of\ Separation + No.\,of\ Replacements}{Average\ number\ on\ roll\ in\ a\ period} \times 100$

$$= \frac{80 + 320 + 1{,}200}{8{,}000} \times 100$$

$$= \frac{1{,}600}{8{,}000} \times 100$$

$$= \mathbf{20\%}$$

11. The following information is extracted from the record of Bharat & Company Ltd. for the month of March :

Number of employee at the beginning of the month	950
Number of employees at the end of the month	1,050
Number of employees resigned	10
Number of employees discharged	30
Number of employees replaced in the vacancies	20
Number of employees appointed due to expansion scheme	120

Calculate the labour turnover rate and equivalent annual rate under different methods.

Solution

Labour Turnover Rate

(1) By Separation Method $= \dfrac{Number\ of\ Separations\ in\ a\ period}{Average\ number\ on\ roll\ in\ a\ period} \times 100$

$$= \frac{40}{1,000} \times 100 \qquad\qquad = \mathbf{4\%}$$

Where, No. of Separations = No. of workers resigned + discharged

$$= 10 + 30 \qquad\qquad = \mathbf{40}$$

Average workers $= \dfrac{Workers\ at\ beginning + Workers\ at\ the\ end}{2}$

$$= \frac{950 + 1,050}{2}$$

$$= \mathbf{1,000}$$

Solution (Cont.)

Labour Turnover Rate

(2) By Replacement Method $= \dfrac{Number\ of\ Replacements\ in\ a\ period}{Average\ number\ on\ roll\ in\ a\ period} \times 100$

$$= \dfrac{20}{1,000} \times 100$$

$$= \mathbf{2\%}$$

(3) By Flux Method $= \dfrac{No.of\ Separation + No.of\ Replacements}{Average\ number\ on\ roll\ in\ a\ period} \times 100$

$$= \dfrac{10+30+20}{1,000} \times 100$$

$$= \mathbf{6\%}$$

Solution (Cont.)

Equivalent Annual Rate

$$\text{EAR} = \frac{\textit{Labour Turnover Rate}}{\textit{No.of Days in a month}} \times 365$$

(1) By Separation Method $= \frac{4}{31} \times 365$

$$= \textbf{47.10\%}$$

(2) By Replacement Method $= \frac{2}{31} \times 365$

$$= \textbf{23.55\%}$$

(3) By Flux Method $= \frac{6}{31} \times 365$

$$= \textbf{70.65\%}$$

9 Particulars regarding the DGP Co. are as under :

No. of employees at the beginning of the year	508
No. of employees at the end of the year	492
No. of. employees resigned during the year	8
No. of. employees dismissed during the year	?
No of. employees replaced during the year	17

Labour turnover rate as per flux method is 10% Find out the number of employees dismissed during the year. [Sau. Uni., T.Y., April, 1993]

Solution

(1) By Flux Method $= \frac{Number\ of\ Separations + Number\ of\ Replacements}{Average\ number\ on\ roll\ in\ a\ period} \times 100$

$10 \quad = \frac{No.of\ Separation + 17}{500} \times 100$

No. of Separation $= (\frac{500 \times 10}{100}) - 17 \qquad = 50 - 17 \qquad = \mathbf{33}$

Where, Average no. on roll $= \frac{Workers\ at\ beginnig + Workers\ at\ the\ end}{2}$

$= \frac{508 + 492}{2} \qquad\qquad = \mathbf{500}$

➢ No. of Separations = No. of workers resigned + dismissed

$33 \qquad = 8 + $ Dismissed

So, No. of workers dismissed $= 33 - 8 \qquad\qquad = \mathbf{25}$

Example – 10

The number of workers in Shyam Ltd. was 765 on 1st January, 2020. The number of workers left the factory were 105 upto 30th June, 2020 and new employees recruited were 75. Between 1st July, 2020 and 31st December, 2020, 90 workers left the factory and 80 workers were recruited (out of which 14 workers were recruited due to expansion scheme).

Calculate labour turnover rate by replacement method for first six months and by separation method for the remaining six months.

Solution

Labour Turnover Rate (For first six months)

(1) By Replacement Method $= \dfrac{Number\ of\ Replacements\ in\ a\ period}{Average\ number\ on\ roll\ in\ a\ period} \times 100$

$$= \dfrac{75}{750} \times 100 \qquad\qquad = \mathbf{10\%}$$

Where, Average no. on roll $= \dfrac{Workers\ at\ beginnig + Workers\ at\ the\ end}{2}$

$$= \dfrac{765 + 735}{2} \qquad\qquad = \mathbf{750}$$

Number of workers at the end = Workers at beginning – left + recruited

$$= 765 - 105 + 75 \qquad = \mathbf{735}$$

Solution (Cont.)

Labour Turnover Rate (For last six months)

(2) By Separation Method $= \dfrac{Number\ of\ Separations\ in\ a\ period}{Average\ number\ on\ roll\ in\ a\ period} \times 100$

$$= \frac{90}{730} \times 100 \qquad\qquad = \mathbf{12.33\%}$$

Where, Average no. on roll $= \dfrac{Workers\ at\ beginnig + Workers\ at\ the\ end}{2}$

$$= \frac{735 + 725}{2} \qquad\qquad = \mathbf{730}$$

Number of workers at the end = Workers at beginning – left + recruited

$$= 735 - 90 + 80 \qquad\qquad = \mathbf{725}$$