Chapter 3 - Employee Cost and Direct Expenses

Questions:

1.   Which is better plan out of Halsey 50 percent bonus scheme and Rowan bonus scheme for an efficient worker? In which situation the worker get same bonus in both schemes?

2.   Calculate the earnings of a worker under (i) Halsey Plan and (ii) Rowan Plan from the following particulars:
        (1) Hourly rate of wages guaranteed 0.50 paise per hour.
        (2) Standard time for producing one dozen articles – 3 hours.
        (3) Actual time taken by the worker to produce 20 dozen articles - 48 hours.

3.   The finishing shop of company employs 60 direct workers. Each worker is paid Rs. 400 as wages per week of 40 hours. When necessary , overtime is worked upto a maximum of 15 hours per week per worker at time rate plus one-half premium .The current output on an average is 6 units per man hour which may be regarded as standard output .If bonus scheme is introduced, it is expected that the output will increase to 8 units per man hour. The workers will, if necessary, continue to work Overtime upto the specified limit although no premium on incentives will be paid.
        The company is considering introduction of either Halsey Scheme or Rowan Scheme of wage Incentive system. The budgeted weekly output is 19,200 units. The selling price is Rs. 11 per unit and the direct material Cost is Rs. 8 per unit. The variable overheads amount to Rs. 0.50 per direct labour hour and the fixed overhead is Rs. 9,000 per week.
        Prepare a Statement to show the effect on the company's weekly profit of the proposal to introduce (a) Halsey Scheme, and (b) Rowan scheme.

4.   A skilled worker in XYZ Ltd. is paid a guaranteed wage rate of Rs 30 per hour. The standard time per unit for a particular product is 4 hours. P, a machineman, has been paid wages under the Rowan Incentive Plan and he had earned an effective hourly rate of Rs 37.50 on the manufacture of that particular product.
     What could have been his total earnings and effective hourly rate, had he been put on Halsey incentive Scheme (50%)?

5.   ZED Limited is working by employing 50 skilled workers. It is considered the introduction of incentive scheme-either Halsey Scheme (with 50% bonus) or Rowan scheme of wage payment for increasing the labour productivity to cope up the increasing demand for the product by 40%. It is believed that proposed incentive scheme could bring about an average 20% increase over the present earnings of the workers; if could act as sufficient incentive for them to produce more.
        Because of assurance, the increase in productivity has been observed as revealed by the figures for the month of April, 2004.
     Hourly rate of wages (guaranteed)   Rs. 30
     Average time for producing one unit by one worker at the previous

Performance (This may be taken as time allowed)   1.975 hours
Number of working days in the month   24
Number of working hours per day of each worker   8
Actual production during the month   6,120 units

Required:
i.   Calculate the effective rate of earnings under the Halsey scheme and the Rowan scheme.
ii.   Calculate the savings to the ZED limited in terms of direct labour cost per piece.
iii.   Advice ZED limited about the selection of the scheme to fulfil his assurance.

6.   A Company is undecided as to what kind of wage scheme should be introduced. The following particulars have been compiled in respect of three systems, which are under consideration of the management:

	Workers		
	A	B	C
Actual hours worked in a week	38	40	34
Hourly rate of wages	Rs. 6	Rs. 5	Rs. 7.20
Production in units:			
Product P	21	-	60
Product Q	36	-	135
Product R	46	25	-

Standard time allowed per unit of each product is:

	P	Q	R
Minutes	12	18	30

For the purpose of piece rate, each minute is valued at Rs. 0.10.
You are required to calculate the wages of each worker under:
i.   Guaranteed hourly rates basis
ii.   Piece work earnings basis, but guaranteed at 75% of basic pay (guaranteed hourly rate) if his earnings are less that 50% of basic pay.
iii.   Premium bonus basis where the worker receives bonus based on Rowan scheme.

7.   Two workmen, A and B, produce the same product using the same material. A is paid bonus according to Halsey plan, while B is paid bonus according to Rowan Plan. The time allowed to manufacture the product is 100 hours. A has taken 60 hours and B has taken 80 hours to complete the product. The normal hourly rate of wages of workman A is Rs. 25 per hour. The total earnings of both the workers are same. Calculate normal hourly rate of wages of workman B.

8.   Standard time for a job is 90 hours. The hourly rate of guaranteed wages is Rs. 50. Because of the saving in time a worker A gets an effective hourly rate of wages of Rs. 60 under Rowan premium bonus system. For the same saving in time, calculate the hourly rate of wages a worker B will get under Halsey premium bonus system assuring 40% to worker.

9.   A skilled worker is paid a guaranteed wage rate of Rs. 150.00 per hour. The standard time allowed for a job is 50 hours. He gets an effective hourly rate of wages of Rs. 180.00 under Rowan incentive plan due to saving in time. For the same saving in time, calculate the hourly rate of wages he will get, if he is placed under Halsey premium scheme (50%).

Answers:

- Rowan Bonus Scheme pays more bonus if the time saved is below the 50 percent of time allowed and if the time saved is more than 50 percent of time allowed then Halsey bonus scheme pays more bonus.
- Normally, time saved by a worker is not more than 50 percent of time allowed.
- Therefore, the Rowan bonus scheme is better for an efficient worker. When the time saved is equal to 50 percent of time allowed then both plans pay same bonus to a worker.

Bonus under **Halsey Plan**

= Standard wage rate × 50 / 100 × Time saved………….. (i)

Bonus under **Rowan Plan**

= Standard wage rate × $\dfrac{\text{Time taken}}{\text{Time allowed}}$× Time Saved………(ii)

Bonus under Halsey Plan will be equal to the

Bonus under Rowan Plan when the following condition holds good

= Standard wage rate × 50/ 100 × Time Saved

= Standard wage rate × $\dfrac{\text{Time taken}}{\text{Time allowed}}$× Time Saved

Or $\dfrac{1}{2}$ = $\dfrac{\text{Time taken}}{\text{Time allowed}}$

Or Time taken = $\dfrac{1}{2}$ of time allowed

Hence, when the time taken is 50% of the time allowed, the bonus under

Halsey and Rowan Plans is equal.

Q.2 Ans:

- a) Wage Rate per hour   =Re.0.50
- b) Standard time allowed per dozen   =3 hours
- c) Actual production   = 20 dozens
- d) Standard time allowed for 20 dozens [B × C] = 60 hours
- e) Actual time taken to produce 20 dozens   =48 hours
- f) Time saved [D – E]   =12 hours
  Earnings = Normal wages + Bonus

Under Halsey   = (Actual Time taken × Time Rate) + (50 % of time saved × Time Rate)

$$= (48 \text{ hours} \times 0.50) + (50\% \times 12 \times 0.50)$$

$$= 24 + 3 \quad = \text{Rs. } 27.00$$

Under Rowan = (Actual Time taken × time Rate) +

$$\left(\text{Time Saved } \times \frac{\text{Time taken}}{\text{Time allowed}} \times \text{Time Rate}\right)$$

$$= (48 \text{ hours} \times 0.50) + \left(12 \times \frac{48}{60} \times 0.50\right)$$

$$= 24 + 4.80$$

$$= \text{Rs. } 28.80$$

Q.3 Ans:

Calculation of total wages under the present scheme

Wage rate per hour per worker = $\frac{\text{Rs.400}}{40 \text{ hrs.}}$ = Rs. 10/hours.

Overtime Rate hrs. /workers = Normal rate/hr. + 50%

$$= \text{Rs. } 10 + 50\%$$

$$= \text{Rs.15/per hour}$$

Average current output/hour = 6 units

∴ Hours to be worked for budgeted weekly output of 19,200 units

$$= \frac{19{,}200 \text{ units}}{6 \text{ units}} = 3{,}200 \text{ hours per man hour}$$

Total normal hours available in a week

$$= \text{No of workers} \times \text{Hours per week}$$

$$= 60 \text{ workers} \times 40 \text{ hours}$$

$$= 2{,}400 \text{ hours}$$

Overtime hour required to be worked

= Total hours to be worked – total normal hours available

= 3,200 hrs. – 2,400 hrs. = 800 hrs.

Total wages	(Rs.)
Normal wages for total hrs. Worked (3,200 hrs. × 10)	32,000
Add: Overtime premium (W.N.1) (Rs. 5 × 800 hrs.)	4,000
	36,000

Total wages under the proposed scheme:

Time allowed: For 6 units = 1 hours

$\therefore$ For 19,200 units $= \dfrac{19,200}{6\ units} = 3{,}200$ hrs.

Time taken: 8 units need 1 hour

$\therefore$ 19,200 units need $= \dfrac{19,200}{8} = 2{,}400$ hours

$\therefore$ Time saved = Time allowed – Time taken

= 3,200 – 2,400

= 800 hrs.

Under Halsey Normal wages + Bonus:

Total wages = (Time taken × Time rate) + (50% × time saved × Time Rate)

= (2,400 × 10) + (50% × 800 × 10)

= 24,000 + 4,000 = Rs. 28,000/-

Under Rowan

Total wages = Normal wages + Bonus

$= $ (Time taken × Time Rate) + (Time Saved $\times \dfrac{\text{Time taken}}{\text{Time allowed}} \times$ Time rate)

$= (2{,}400 \times 10) + (800 \times \dfrac{2,400}{3,200} \times 10)$

= 24,000 + 6,000 = Rs. 30,000

Statement of Profit

Particulars	Present scheme	Halsey scheme	Rowan scheme
Sales Value @ Rs. 11/unit on 19,200 units Less:	2,11,200	2,11,200	2,11,200
Direct materials consumed @ Rs. 8 per unit on 19,200 units	(1,53,600)	(1,53,600)	(1,53,600)
Direct Labour cost (Refer above workings)	(36,000)	(28,000)	(30,000)
Valuable O/H @ 0.5 per direct Labour hours (Refers W. N. – 2)	(1,600)	(1,200)	(1,200)
	20,000	28,400	26,400
Less: Fixed overheads	(9,000)	(9,000)	(9,000)
Weekly Profit	11,000	19,400	17,400

Working Notes:

1. Overtime Premium rate = Overtime rate – Normal rate

= Rs. 15 – Rs. 10

= Rs. 5/-

2. Variable overheads are given as absorption rates which are absorbed on the basis of Direct Labours Hours worked.

Hence, **Under Present Scheme** - Direct Labour Hours worked were 3,200

Hrs. (including overtime)

∴ Overheads = 3,200 hours × 0.5 = Rs. 1,600/-

Under Halsey & Rowan Scheme – Direct Labour hours worked were 2,400 hrs. (& rest 800 hrs. were saved & not worked). So for 2,400 hrs. Worked = 2,400 × 0.5 = Rs. 1,200

Q.4 Ans:

On the basis of information provided in the problem the 'P' has manufactured single unit of that particular product for which the time allowed is 4 hours.

Hence, time allowed = 4 hours.

Let, Time taken be 'X'

∴ Time saved = Time allowed – Time taken

= 4 hours – X

Time Rate per Hours = Rs. 30 per Hour

Effective Hourly Rate $= \dfrac{\text{Total wages as per Rowan plan}}{\text{Time taken (worked)}}$

Or Rs. $37.50 = \dfrac{(\text{Time taken} \times \text{Time Rate}) + \left(\text{Time saved} \times \frac{\text{Time taken}}{\text{Time allowed}} \times \text{Time Rate}\right)}{\text{Time taken}}$

Or, $37.50 = \dfrac{(X \times 30) + \left[(4-X) \times \frac{X}{4} \times 30\right]}{X}$

$37.50 x = 30x + \dfrac{120x - 30x^2}{0.4}$

$= 37.50x = 30x + 30x - 75x^2$

$= 37.50x - 30x - 30x + 7.5x^2 = 0$

$= 7.5x^2 - 22.5x = 0$

$= 7.5x (x - 3) = 0$

Either $= 7.5x = 0$ or $x – 3 = 0$

If $7.5x = 0$, then $x = 0$

Or if $x - 3 = 0$, then $x = 3$

∴ Time taken $= x = 3$ hours

Time saved $= 4 – x = 4 - 3$

$= 1$ hour

Under Halsey: Total earnings = Normal Wages + Bonus

= (Time taken × Time Rate) + (50% time saved × time rate)

= (3 hour × Rs. 30) + (50% × 1 ×30)

= Rs. 90 + 15 = Rs. 105

Effective hourly rate $= \dfrac{\text{Total earnings}}{\text{Time taken (worked)}} = \dfrac{\text{Rs.105}}{3 \text{ hrs}} = $ Rs. 35 per hour

<u>Q.5 Ans:</u>

Working Notes:
1. Computation of time saved (in hours) per month:
   $=$ Standard production time of 6,120 units – actual time taken by the workers
   = (6,120 units × 1.975 hrs. – 24 days × 8 hrs. /day × 50 skilled workers)
   = 12,087 hrs. – 9,600 hrs.
   = 2,487 hours
2. Computation of bonus for time saved (in hours) under Halsey & Rowan Plan:

Time saved hours (Refer W.M. -1)	$= 2487$ hrs.
Wage rate per hour	$=$ Rs. 30
Bonus under Halsey Scheme	$= ½ × 2,487$ hrs. × Rs. 30/-
	$=$ Rs. 37,305/-
Bonus under Rowan scheme	$=$ time Saved $\times \frac{\text{Time Taken}}{\text{Time allowed}} \times$ Rate per hour
	$= \frac{2{,}487\ \text{hrs.}}{12{,}087\ \text{hrs.}} \times 9{,}600$ hrs. × Rs. 30
	$=$ Rs. 59, 258, 38

(i) Computation of effective rate of earning under the Halsey & Rowan scheme

Total earning (under Halsey) = Time wages + Bonus	
(W.N.-2)	= 24 days × 8 hrs × 50 skilled worker × Rs. 30 + 37,305
	= Rs. 2, 88,000 + Rs. 37,305
	= Rs. 3, 25,305.
Total earing (under Rowan scheme)	
	= Time wages + Bonus
(W.N.-2)	= Rs. 2, 88,000 + Rs. 59, 258.38
	= Rs. 3, 47, 258.38
Effective rate earnings / hour (Under Halsey plan) (Rs. 3, 47,258.38/9,600 hrs.)	Rs. 33.89
Effective rate of earning/ hour (Under Rowan plan) (Rs. 3, 47, 258.38/9,600 hrs.)	Rs. 36, 17

(ii) Saving to the ZED Ltd. in terms of direct labours cost/unit

	Rs.
Direct labour cost (per unit) under times wages system (1.975 times per unit × Rs. 30)	59.25
Direct labour cost (per unit) under Halsey Plan (Rs. 3, 25,305/6120 units)	53.15
Direct labour cost (per unit) under Rowan plan (Rs. 3, 47,258.38/6120 units)	56.74
Savings of direct labour cost under Halsey plan (Rs. 59.25 – 53.15)	Rs. 6.10
Rowan Plan (Rs. 59.25 – 56.74)	Rs. 2.51

(iii) **Advised to ZED Ltd:**
(Regarding selection of the scheme to fulfill assurance
Halsey scheme brings more saving to the management of ZED Ltd.,
Over the present earning of Rs. 2, 88,000 but the other scheme i.e.
Rowan fulfill the promise of 20% increase over the present earrings of Rs. 2, 88,000 by
paying 20.58% in the form of Bonus. Hence, Rowan Plan should be adopted.

<u>Q.6 Ans:</u>

(i) Computation of wages under Guaranteed Hourly Rate basis

Particulars	Workers		
	A	B	C
A. Actual hours worked (hrs.)	38	40	34
B. Hourly rate of wages (Rs.)	6	5	7.20
C Wages [A × B] (Rs.)	228.8	200.00	244.80

(ii) Computation of wages of each worker under piece work earnings basis:

		Worker A		Worker B		Worker C	
Pro duct (A)	Piece Rate / Unit (W.N.1) (B)	Units (C)	Wages (D) = B × C	Unis (E)	Wages (F) = B × E	Units (G)	Wages (H) = B×G
P	1.20	21	25.20	-	-	60	72
Q	1.80	36	64.80	-	-	135	243
R	3.00	46	138.00	25	75	-	-

Since, each workers has been guaranteed at 75% at basic pay, if his earnings are less than 50% of basic pay, therefore, workers A & C will be paid the wages as computed viz. Rs. 228 & 315 respectively. The computed wages of worker B is Rs. 75 which is less than 50% of his basic pay viz Rs. 100, therefore he would be paid 75% × 200 = Rs. 150/-.

Working Notes:
1. Piece rate per unit:

Product (A)	Standard Time /Unit. In min.(B)	Piece rate min. (C)	Piece rate unit (D) = B × C
P	12	0.10	1.20
Q	18	0.10	1.80
R	30	0.10	3.00

2. Time allowed to each worker:
Worker A=21 units × 12 min. + 36 units × 18 min. + 46 units × 30 min.
= 2,280 min. = 38 hrs.
Worker B = 25 units × 30 min.
= 750 min. = 12.5 hrs.
Worker C = 60 units × 12 min. + 135 units × 18 min.

$= 720$ min. $+ 2430$min.

$= 31, 50$ min. $= 52.50$ hrs.

(iii) Computation of wages of each worker under Premium Bonus basis
(Where each workers receives bonus based on Rowan Plan)

Worker	Time allowed (Refer W.N.2) (Hrs.)	Time taken (hrs.)	Wage saved (hrs.)	Wage rate per hour (Rs.)	Earnings (Rs.)	Bonus (Rs.)	Total of earnings & Bonus (b)
A	38.00	38.00	-	6.00	228.00	-	228.00
B	12.50	40.00	-	5.00	200.00	-	200.00
C	52.50	34.00	18.50	7.20	244.80	86.26	331.06

Q.7 Ans:

		A	B
(i)	Time Allowed (Hours)	100	100
	Time Taken (Hours)	60	80
	Time Saved (Hours)	40	20

Let the rate of wages of the
Worker B is Rs. × per hour

	A	B
Normal Wages	1440	$(80 \times x)$
(Time taken × Hourly rate of wages)	(60×24)	$(80 \times x)$
Bonus	480	16 X
	$(50\% \times 40 \times 24)^*$	$\times (80 \times X)^{**}$
	1920	96x

According to the problem

Total earnings of $\quad$ A = Total earnings of B

$$1920 = 96 \times \left(\frac{20}{100}\right)$$

$$X = \frac{1920}{96} = Rs. 20$$

Therefore, hourly rate of wages of the worker is Rs. 20 per hour.

* $\quad$ Bonus = Time Saved × 50% × Wage Rate

** Bonus $= \frac{\text{Time taken}}{\text{Time Allowed}} \times$ Time Saved × Wage Rate

Q.8 Ans:

(i) $\quad$ Increase in Hourly Rate of Wages (Rowan Plan) is (Rs. 60 – Rs.50) = Rs. 10

This is equivalent to

$\frac{\text{Time saved}}{\text{Standard Time}} \times$ Hourly rate

Or, $10 = \frac{\text{Time saved}}{\text{Standard Time}} \times 50$

Or, $\frac{\text{Time saved}}{90} \times 50 = 10$

$\therefore$ Time Saved $= \frac{900}{50} = 18$ Hours

Actual Time Taken = (90 – 18) = 72 Hours

Effective Hourly Rate under Halsey System Time saved = 18 Hours
Bonus @ 40% = 18 × 40% × 50 = Rs. 360
Total wages = (50 × 72 + 360) = 3,960
Effective Hourly Rate = 3,960÷ 72 Hours = Rs. 55

<u>**Q.8 Ans:**</u>

Increase in hourly rate of wages under
Rowan plan is Rs. 30, i.e., (Rs. 180 – Rs. 150)

This is equal to $\frac{\text{Time saved}}{\text{Time allowed}} \times$ Rate per hour

Or $\qquad \frac{\text{Time saved}}{\text{Time allowed}} \times$ Rs. 150 = Rs. 30

Or $\qquad \frac{\text{Time saved}}{\text{50 hours}} \times$ Rs. 150 = Rs. 30

Therefore, Time saved = 10 hours and time taken is 40 hours i.e.
$\qquad\qquad\qquad$ (50 hours – 10 hours)

Effective Hourly Rate under Halsey System:

Time saved $\qquad\qquad$ = 10 hours
Bonus @ 50% $\qquad\qquad$ = 10 hours × 50% × Rs. 150 = Rs. 750
Total wages $\qquad\qquad$ = (Rs. 150 × 40 hours + Rs. 750) = Rs. 6,750
Effective hourly rate $\qquad$ = Rs. 6,750 ÷ 40 hours
$\qquad\qquad\qquad\qquad\qquad$ = Rs. 168.75

Working Note:
Effective Hourly rate =

$$\frac{\text{Time taken} \times \text{Rate per hour} + \frac{\text{Time taken}}{\text{Time allowed}} \times \text{Time saved} \times \text{Rate per hour}}{\text{Time taken}}$$

Or, Rs. 180

$$\frac{\text{Time taken} \times \text{Rate per hour}}{\text{Time taken}} + \frac{\frac{\text{Time taken}}{\text{Time allowed}} \times \text{Time saved} \times \text{Rate per hour}}{\text{Time taken}}$$

Or, Rs. 180 – Rs. 150 = $\frac{\text{Time taken}}{\text{Time allowed}} \times$ Rs. 150