Soluion To Wage Incentive Problems (Source: Textbook)

Problem-1.

In a single-product plant where IMPROSHARE was installed, 411 employees produced 14762 product units over a one-yesr period, and recorded 802000 clock hours. In a given week, 425 employees worked a total of 16150 hours and produced 348 units.

Q1- What would be the hourly value of this output?

Q2- What percentage bonus would each of these 425 workers receive?

Q3- What would be the unit labor cost in hours for this week's production?

Solution: (IMPROSHARE System)

Work hour standard = 802000 / 14762 = 54.33 hrs/unit
Value of output = 348 x 54.33 = 18906.84 hrs.
Gain = 18906.84 -16150 = 2756.84 hrs.
Percentage bonus = (2756.84 / 2) / 16150 = 8.54 %
Unit labor cost in hours = [16150 + (2756.84 / 2)] / 348 = 50.37 Hrs/unit.

Problem-2.

Analysts eastablished a standard time of 0.0125 hours/piece for machining a small component. A setup time of 0.32 hour was also established, as the operator performed the necessary setup work on incentive. Compute the following:

a. **Total time allowed to complete an order of 860 pieces.**
b. **Operator efficiency, if job is completed in an 8-hour day.**
c. **Efficiency of the operator who requires 12 hours to complete the job.**

Solution:

Total time allowed completing an order of 860 pieces:(860 x 0.0125) + 0.32 = 11.07 hrs.
Operator efficiency, if job is completed in an 8 hours-day: 11.07 / 8 = 1.3838
Efficiency of the operator who requires 12 hours to complete the job:11.07 / 12 = 0.9225

Problem-3.

A 'one-for-one' or 100-percent participation plan for incentive payment is in operation. The operator base rate for this class of work is $10.40. The base rate is guaranteed. Compute:

a. **Total earnings for the job at the efficiency determined in problem 2(b).**
b. **Hourly earnings.**
c. **Total earnings for the job, at the efficiency determined in problem 2(c).**
d. **Direct labor cost per piece from (a), excluding setup.**
e. **Direct labor cost per piece from (c), excluding setup.**

Solution: (100% participation plan)

Total earnings for the job at an efficiency of 1.3838: 10.4 x 1.3838 x 8 = $115.13
Hourly earnings = 10.4 x 1.3838 = $14.39/hr.
Total earnings for the job at an efficiency of 0.9225: 10.4 x 12 = $124.8 / lob
Direct Labor cost/piece (completed in 8 hrs.), excluding setup:

Efficiency = (860 x 0.0125) / 8 = 1.3438
Total Earnings = 10.4 x 1.3438 x 8 = $111.8
Direct labor cost= 111.8 / 860 = $0.13 / unit

Direct Labor cost/piece (completed in 12 hrs.), excluding setup: (12 x 10.4) / 860 = $ 0.15 / job

Problem-4.

A rate of 0.42 minute per piece is set for a foreign operation. The operator works on the job for a full 8-hour day and produces 1500 pieces. Use a standard hour plan.

a. **How many standard hours does the operator earn?**
b. **What is the operator's efficiency for the day?**
c. **If the base rate is $9.80 per hour, compute the earnings for the day?**
d. **What is the direct labor cost per piece at this efficiency?**
e. **What would be the proper piece rate (expressed in dollars) for this job, assuming that the time standard is correct?**

Solution: **Operator earns: (1500 x 0.42) / 60 = 10.5 hours.**
Operator's efficiency = 10.5 / 8 = 1.3125
Earnings per day (Base rate is $9.8): 9.8 x 1.3125 x 8 = $102.9
Direct Labor cost/piece: 102.9 / 1500 = $0.0686
Piece rate (T_{std}= 0.42 min/unit) = (9.8 x 0.42) / 60 = $0.0686 / unit

Problem-5.
A 60-40 participation plan is used in a plant (base rate is guaranteed an operator receives 60 percent of proportional gain after exceeding 100 percent). The established time value on a certain job is 0.75 minute, and the base rate is $8.8. What is the direct labor cost per piece when operator efficiency is:
a. 50 percent of standard? **b. 80 percent of standard?**
c. 100 percent of standard? **d. 120 percent of standard?**
e. 160 percent of standard?

Solution: **Standard Output=(8x60)/0.75= 640 Units/Day**

a- 50% of standard:
Total Earnings=8x8.8= $70.4/day
Direct Labor Cost/Piece= 70.4/(640x0.5)= $0.22/piece

b- 80% of standard:
Direct Labor Cost/Piece= 70.4/(640x0.8)= $0.14/piece

c- 100% of standard:
Direct Labor Cost/Piece= 70.4/(640x1)=0.11 $/piece

d- 120% of standard:
Total Earnings = 70.4+ 0.6(8.8x0.2x8)=78.85 $/piece
Direct Labor Cost/Piece=78.85/(640x1.2)=0.10 $/piece

e- 160% of Standard:
Total Earnings = 70.4+ 0.6(8.8x0.6x8)=95.74 $/piece
Direct Labor Cost/Piece=95.74/(640x1.6)=0.09 $/piece