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Class Level: Fourth

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Advanced Cost Accounting/1

Chapter (3)

Direct Labor costs variances analysis

تحليل أنحرافات تكلفة العمل المباشر

Labor Cost Variance :-

Amount paid to employees for their labor is generally known as employee or labor cost. In this chapter labor cost is used to denote employees cost. Labor (employee) cost variance is **the difference between actual labor cost and standard labor cost.**

Mathematically it can be written as

$$\text{Labor Cost Variance(LCV)} = [\text{Actual Cost } \mathbf{AC} - \text{Standard Cost } \mathbf{SC}]$$

Or

$$\text{LCV} = (\mathbf{AR} \times \mathbf{AH}) - (\mathbf{SR} \times \mathbf{SH})$$

(The difference between the **Actual Labor Cost** and the **Standard Labor Cost** incurred for the production achieved)

note:-

AR :- Actual rate paid for hour

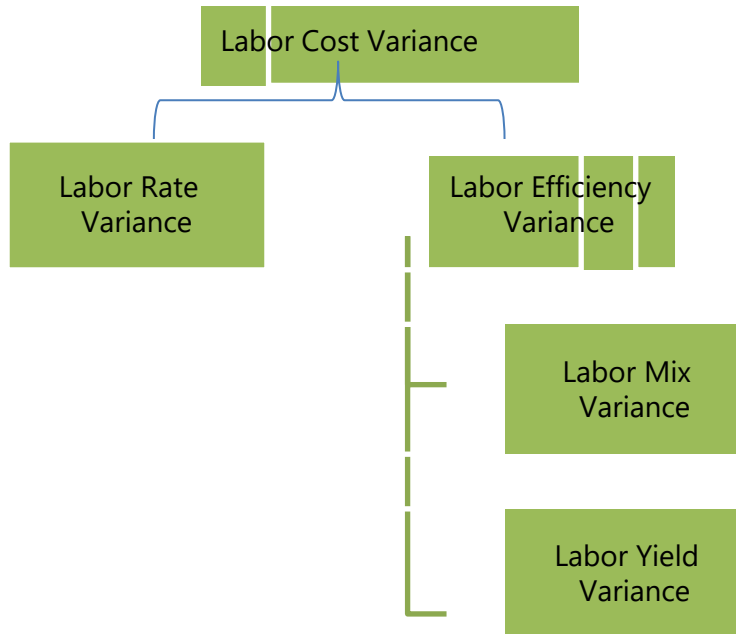
SR:- standard rate

AH:-Actual hours worked

SH:- standard hours

Reasons for variance: Difference in labor cost arises either due to difference in the actual labor rate from the standard rate or difference in numbers of hours worked from standard hours. Labor cost variance can be divided into two parts namely:-

- 1- Labor Rate Variance
- 2- Labor Efficiency Variance and



(A) Labor Rate Variance:

*Labor rate variance arises due to **difference in actual rate paid from standard rate**. It is very similar to material price variance. It is calculated as below:*

Labor Rate Variance = [Actual Cost - Standard Cost of Actual Time]

Or

$$= \{ \text{Actual Rate (AR)} - \text{Std. Rate (SR)} \} \times \text{Actual Hours (AH*)}$$

Or

$$[(AR \times AH) - (SR \times AH)]$$

OR

$$= (AR - SR) \times AH$$

(The difference between the **Actual Rate** per hour and **Standard Rate** per hour for the Actual Hours paid)

(B) Labor Efficiency Variance:

Labor efficiency variance arises due to deviation in the Actual working hours from the standard working hours.

Labor Efficiency Variance =
[Standard Cost of Actual Time - Standard Cost of Standard Time for Actual Production]

Or

{ Actual Hours (**AH**) - Std. Hours (**SH**) } x Std. Rate (**SR**)

OR

(AH – SH) x SR

(The difference between the *actual Hours worked and Hours specified for actual production* at Standard Rate).

Responsibility for labor efficiency variance: *Efficiency variance may arise due to ability of the workers, inappropriate team of workers, inefficiency of production manager or foreman etc. However, production manager or foreman can be held responsible for the adverse variance which otherwise can be controlled.*

Labor efficiency variance is further divided into the following variances:

- (a) *Labor Mix Variance or Gang variance*
- (b) *Labor Yield Variance (or Labor Revised-efficiency Variance)*

Verification of formulae:

$$\text{Labor Cost Variance} = \text{Labor Rate Variance} + \text{Labor Efficiency Variance}$$

ILLUSTRATION 1:

The standard and actual figures of a firm are as under

Standard time (Hours) for produce one unit	1 hours
Standard rate per hour	\$5
Actual time(hours) taken	900 hours
Actual wages paid(as a total)	\$ 3,600
Actual units produced	1,000 unit

CALCULATE the labor costs variances.

SOLUTION

(a) Actual rate per hour: $\$3,600/900 \text{ hours} = \4

(b) Standard hours allowed for actual production = $1 \text{ hrs./unit} \times 1,000 \text{ unit} = 1,000 \text{ hrs.}$

Variances

(1) **total labor cost variance LCV** = $(AR \times AH) - (SR \times SH)$
= $(\$4 \times 900 \text{ hrs.}) - (\$5 \times 1,000 \text{ hrs.})$
= $\$3,600 - \$5,000 = -\$1,400 \text{ F}$

(2) **Labor Rate variance LRV** = $(\text{Actual rate} - \text{standard rate}) \times \text{actual hours}$
= $(AR - SR) \times AH$
= $(\$4 - \$5) \times 900 \text{ hrs.} = -\900 (F)

(3) **Efficiency variance LEV** = $(\text{Actual hours} - \text{standard hours}) \times \text{std. rate}$
= $(AH - SH) \times SR$
= $(900 \text{ hrs.} - 1,000 \text{ hrs.}) \times \$5 = -\$500 \text{ (F)}$

ILLUSTRATION 2 :-

At Jerry's Ice Cream, the **actual** data for the year are as follows:

<i>Sales volume</i>	<i>210,000 units</i>
<i>Direct labor hours worked</i>	<i>18,900 hours</i>
<i>Direct labor Rate per hour</i>	<i>\$15 per hour</i>

the standard rate for Jerry's is \$13 per direct labor hour and the standard direct labor hours is 0.10 per unit

Required :- CALCULATE :

(a) *Labor Cost Variance LCV* (b) *Labor Rate Variance LRV*

(c) *Labor Efficiency Variance LEV.*

SOLUTION:

Direct Labor Rate Variance Calculation

How is the labor rate variance calculated?

the labor rate variance is the difference between the actual hours worked at the actual rate and the actual hours worked at the standard rate:

Key Equation

Labor rate variance (LRV) = (AH × AR) – (AH × SR)

Labor rate variance (LRV) = (AH × AR) – (AH × SR)
= (18,900 × \$15) – (18,900 × \$13) = \$37,800 unfavorable

Alternative Calculation. Because we are holding the actual hours constant and evaluating the difference between actual rate and standard rate, the labor rate variance calculation can be simplified as follows:

Key Equation

$$\text{Labor rate variance (LRV)} = (\text{AR} - \text{SR}) \times \text{AH}$$

$$\text{Labor rate variance (LRV)} = (\text{AR} - \text{SR}) \times \text{AH} = (\$15 - \$13) \times 18,900 = +\$37,800 \text{ unfavorable}$$

As with direct materials variances, **all positive variances are unfavorable, and all negative variances are favorable.** The labor rate variance calculation presented previously shows the actual rate paid for labor was \$15 per hour and the standard rate was \$13. This results in an unfavorable variance since the actual rate was higher than the standard (expected, budgeted) rate.

Direct Labor Efficiency Variance Calculation

How is the labor efficiency variance calculated?

the labor efficiency variance is the difference between the actual hours worked at the standard rate and the standard hours at the standard rate:

Key Equation

$$\text{Labor efficiency variance (LEV)} = (\text{AH} \times \text{SR}) - (\text{SH} \times \text{SR})$$

$$\begin{aligned} \text{Labor efficiency variance} &= (\text{AH} \times \text{SR}) - (\text{SH} \times \text{SR}) = (18,900 \times \$13) - (21,000 \times \$13) \\ &= - (\$27,300) \text{ favorable} \end{aligned}$$

The 21,000 standard hours are the hours allowed given actual production. For Jerry's Ice Cream, the standard allows for 0.10 labor hours per unit of production. Thus the 21,000 standard hours (SH) is 0.10 hours per unit \times 210,000 units produced.

Alternative Calculation. Because we are holding the standard rate constant and evaluating the difference between actual hours worked and standard hours, the labor efficiency variance calculation can be simplified as follows:

Key Equation

Labor efficiency variance (LEV) = (AH – SH) × SR

Labor efficiency variance = (AH – SH) × SR = (18,900 – 21,000) × \$13 = (\$27,300) favorable

The labor efficiency variance calculation presented previously shows that 18,900 in actual hours worked is lower than the 21,000 budgeted hours. Clearly, this is favorable since the actual hours worked was lower than the standard (or expected ,budgeted) hours.

Note: AH = Actual hours of direct labor. AR = Actual rate incurred for direct labor. SR = Standard rate for direct labor. SH = Standard hours of direct labor for actual level of activity.

ILLUSTRATION 3 :-

The following data pertain to the first week of operations during June:

Actual finished goods produced 2,500 units

Materials:-

Actual purchases	1500 kg @ \$3.80/kg
Actual quantity used	1350 kg
Standard materials	(0.5 kg/unit @ \$4.00/kg

Labor:

Actual hours	600 hours @ \$12.10/hour
Standard hours	0.25 hours/unit @ \$12.00/hour

Required :-Compute the material variances and the labor variances.

- **MATERIALS VARIANCES** :- Measures how much material we used against what we should have used.

Standard quantity of DM Allowed for Actual output = 0.5 kg/unit x 2,500 unit = 1,250 kg

Standard Hours of D1 Allowed for Actual output = 0.25 hrs./unit x 2500 unit = 625 hrs.

1. MATERIAL COST VARIANCE (MCV):-

$$\begin{aligned} \text{MCV} &= \text{AC} - \text{SC} = (\text{AP} \times \text{AQ}) - (\text{SP} \times \text{SQ}) \\ &= (3.80 \times 1,350) - (4 \times 1,250) = 5,130 - 5,000 = +130 \text{ U} \end{aligned}$$

2. MATERIAL PRICE VARIANCE (MPV) :-

$$\begin{aligned} \text{MPV} &= [\text{AP} - \text{SP}] \times \text{AQ} \\ &= (3.80 - 4.00) \times 1,350 = -270 \text{ F} \end{aligned}$$

3. MATERIAL QUANTITY VARIANCE (MQV) :-

$$\begin{aligned} \text{MQV} &= [\text{AQ} - \text{SQ}] \times \text{SP} \\ &= (1,350 - 1,250) \times 4 = +400 \text{ U} \end{aligned}$$

CHECK :-

$$\begin{aligned} \text{MCV} &= \text{MPV} + \text{MQV} \\ +130 \text{ U} &= -270 \text{ F} + +400 \text{ U} \\ +130 \text{ U} &= +130 \text{ U} \end{aligned}$$

LABOR VARIANCES :- Measures how much Labor we paid against what we should have paid

1. LABOR COST VARIANCE (LCV):-

$$\begin{aligned} \text{LCV} &= \text{AC} - \text{SC} = (\text{AR} \times \text{AH}) - (\text{SR} \times \text{SH}) \\ \text{LCV} &= (12.10 \times 600) - (12 \times 625) = 7,260 - 7,500 = -240 \text{ F} \end{aligned}$$

2. LABOR RATE VARIANCE (LRV)

$$\begin{aligned} \text{LRV} &= [\text{AR} - \text{SR}] \times \text{AH} \\ &= (12.10 - 12.00) \times 600 = +60 \text{ U} \end{aligned}$$

3. LABOR EFFICIENCY VARIANCE (LEV)

$$\begin{aligned} \text{LEV} &= [\text{AH} - \text{SH}] \times \text{SR} \\ &= (600 - 625) \times 12 = -300 \text{ F} \end{aligned}$$

CHECK :-

$$LCV = LRV + LEV$$

$$- 240 F = + 60 U + - 300 F$$

$$-240F = -240 F$$

Direct labor Variances (Exercises)

1) The standard time (Hours) and rate for one unit component A are given below:-

Standard hours 1.5 per unit @ Standard rate \$ 4 per hour.

The actual data and related information are as under:

Actual production 1000 units.

actual hours worked 15,300 hours, @ actual rate \$ 3.90 per hour.

Required :- Calculate labor cost variance (LCV) ,Labor Rate Variance (LRV), labor efficiency variance (LEV).

2) the standard cost of the product manufactured by Taha Company consists of:

Direct materials (0.25 pounds x \$8 per pound)	\$2.00
Direct labor (0.5 hours x \$7.60 per hour)	3.80

During May, 100,000 units were Actual produced with the following costs:

Direct materials used (24,000 pounds at \$8.40)	\$201,600
Direct labor (50,000 hours at \$7.80)	390,000

Required :- Compute the materials variances, and labor variances.

3)The following data apply to Sara Company for August, when 2,500 units were Actual produced:

standard materials per unit: 6 pounds at \$ 5 per pound

Standard labor per unit: 2 hours at \$11 per hour.

Materials purchased: 24,000 pounds at\$4.80 per pound

Materials used: 16,000 pounds

Direct labor: 5,800 hours at a total cost of \$69,600

Required :- Compute the materials and labor variances.

4)The standard product cost card of a product is shown below.

Direct Materials	(2 feet @\$16 per feet	\$32
Direct labor	(4 hours @ \$6per hour	\$24

Actual data for a month has been ascertained as follows:

- Units of product produced = 900
- Material used = 1,900 feet
- Price per foot = \$15
- Actual hours worked = 3,800
- Actual labor wage rate = \$5.80

Required: Calculate variances for each of the two elements of the production cost.