Section NO. (12)

Analysis of differences (variances) of direct cost

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Example (1): **For each of the following independent cases, fill in the missing amounts in the table:**

Case	Direct Labor Rate Variance	Direct Labor Efficiency Variance	Direct Labor Total Variance
A	$ 750 UF	$ 1,200 F	??
B	$ 2,000 F	??	$ 3,500 UF
C	$ 1,000 F	??	$ 1,800 F
D	??	$ 500 U	$ 2,500 UF
E	??	$1,100 F	$ 1,950 UF
F	$ 650 UF	$ 1,150 UF	??

Solution

Case	Direct Labor Rate Variance	Direct Labor Efficiency Variance	Direct Labor Total Variance
A	$ 750 UF	$ 1,200 F	$ 450 F
B	$ 2,000 F	$ 5,500 UF	$ 3,500 UF
C	$ 1,000 F	$ 800 F	$ 1,800 F
D	$ 2,000 UF	$ 500 UF	$ 2,500 UF
E	$ 3,050 UF	$1,100 F	$ 1,950 UF
F	$ 650 UF	$ 1,150 UF	$ 1,800 UF

Example (2): Calculating Unknown Values for Direct Materials and Direct Labor Variance:

	Direct Materials	Direct Labor
Standard Quantity per unit produced	2.5 kg.	1.10 hr.
Standard price	$4.20 per kg.	$16 per hr.
Actual Quantity per unit produced	2.4 kg.	1.20 hr.
Actual price	$4.10 per kg.	$15.5 per hr
Actual number of units produced and sold	2,500 units.	
Direct material Price variance	???	
Direct material Quantity variance	???	
Direct material total variance	???	
Direct labor rate variance		???
Direct labor efficiency variance		???
Direct labor total variance		???

Frist: direct material:

AP = 4.10 per kg.
AQ = 2.4 × 2,500 = 6,000 kg.
SP = 4.20 per kg.
SQ = 2.5 × 2,500 = 6,250 kg.

DM - Price Variance = (SP – AP) × AQ
= (4.20 – 4.10) × 6,000
= 0.10 × 6,000
= $ 600 F

DM - Quantity Variance = (SQ – AQ) × SP
= (6,250 – 6,000) × 4.20
= 250 × 4.20
= 1,050 F

DM - Total Variance = Price Variance + Quantity Variance
= 600 F + 1,050 F
= 1,650 F

Second: Direct Labor:

AR = $15.50 per hour.
AH = 1.20 × 2,500 = 3,000 hours.
SR = $16.00 per hour.
SH = 1.10 × 2,500 = 2,750 hours.

DL - Rate Variance = (SR – AR) × AH
= (16 – 15.50) × 3,000
= 0.50 × 3,000
= $ 1,500 F

DL - Efficiency Variance = (SH – AH) × SR
= (2,750 – 3000) × 16
= - 250 × 16
= $ 4,000 U.

DL - total Variance = Rate Variance + Efficiency Variance
= 1,500 F + 4,000 U
= $ 2,500 U.

	Direct Materials	Direct Labor
Standard Quantity per unit produced	2.5 kg.	1.10 hr.
Standard price	$4.20 per kg.	$16 per hr.
Actual Quantity per unit produced	2.4 kg.	1.20 hr.
Actual price	$4.10 per kg.	$15.5 per hr
Actual number of units produced and sold	2,500 units.	
Direct material Price variance	$ 600 F	
Direct material Quantity variance	1,050 F	
Direct material total variance	1,650 F	
Direct labor rate variance		$ 1,500 F
Direct labor efficiency variance		$ 4,000 U
Direct labor total variance		$ 2,500 U

Example (3): O'Shea company uses standard costing system when developing its flexible budget amounts. In April 2024, 2,000 finished units were produced. The following information relates to its direct manufacturing material cost:

- Direct materials used were 4,400 kilograms (kg).
- The standard direct materials input allowed for on output units is 2 kilograms at $15 per kilogram.
- O'Shea purchased 5,000 kilograms of materials at $16.50 per kilogram, a total of $82,500.

Required:

1- Calculate Direct material price variance.
2- Calculate Direct material Quantity variance.
3- Calculate Direct material Net price variance.
4- Calculate Direct material mixed price variance.

Solution

AP = $16.50 per kg.
AQ used = 4,400 kg.
AQ purchased = 5,000 kg.
SP = $15 per kg.
SQ = 2 kg × 2,000 unit = 4,000 kg.

1- DM - Price Variance = (SP – AP) × AQ purchased
= (15 – 16.5) × 5,000
= 1.50 × 5,000
= $ 7,500 U

2- DM - Quantity Variance = (SQ – AQ used) × SP
= (4,000 – 4,400) × 15
= 400 × 15
= 6,000 U.

3- Net Price Variance = (SP – AP) × SQ
= (15 – 16.5) × 4,000
= 1.50 × 4,000
= $ 6,000 U

4- Mixed Price Variance = (SQ - AQ purchased) × (AP - SP)
= (4,000 – 5,000) × (16.5 – 15)
= 1,000 × 1.5
= 1,500 U

Example (4): For each of the following independent cases, fill in missing amounts:

	Casey Co.	Kevin Inc	Jess Co	Valerie, Inc
Units produced	**2,000**	**??**	**120**	**1,500**
Standard hours per unit	**3.5**	**0.9**	**??**	**??**
Standard hours	**??**	**900**	**300**	**??**
Standard rate per hour	**$14.5**	**$??**	**$10.50**	**$7**
Actual hours worked	**6,800**	**975**	**??**	**4,900**
Actual rate per hour	**$??**	**$??**	**$??**	**$??**
Actual labor cost	**$??**	**$??**	**$3,090**	**$31,850**
Direct labor Rate Variance	**$1,700 F**	**$975 F**	**$150 UF**	**$??**
Direct labor Efficiency Variance	**$??**	**$ 765 UF**	**$??**	**$ 2,800 UF**

Frist: Casey Co:

SH = Units produced × Standard hours per unit

= 2,000 × 3.5

= 7,000 hours.

Efficiency Variance = (SH – AH) × SR

= (7,000 – 6,800) × 14.5

= $2,900 F.

Total DL-Variance = Efficiency variance + Rate variance

= 1,700 F + 2,900 F

= $4,600 F.

DL-Variance = SC – AC

4,600 = (7,000 × 14.5) – AC

4,600 = 101,500 – AC

AC = 101,500 – 4,600

AC = $96,900

AC = AH × AR

96,900 = 6,800 × AR

AR = 96,900 ÷ 6,800

AR = 14.25

Second: Kevin Inc:

Units produced = Standard hours ÷ Standard hours per unit

= 900 ÷ 0.9

= 1,000 unit.

Efficiency Variance = (SH – AH) × SR
- 765 = (900 – 975) × SR
- 765 = - 75 × SR
SR = 765 ÷ 75
SR = $10.2

Total DL-Variance = Efficiency variance + Rate variance
= 975 F + 765 UF
= $210 F.

DL-Variance = SC – AC
210 = (900 × 10.2) – AC
210 = 9,180 – AC
AC = 9,180 – 210
AC = $8,970

AC = AH × AR
8,970 = 975 × AR
AR = 8,970 ÷ 975
AR = 9.2

Third: Jess Co:

Standard hours per unit = Standard hours ÷ Units produced
= 300 ÷ 120
= 2.5 hours per unit.

DL-Variance = SC – AC
= (300 × 10.5) – 3,090
= 3,150 – 3,090
= $60 F.

Efficiency variance = DL Variance – Rate Variance
= $60 F - $150 UF
= $210 F.

Efficiency variance = (SH – AH) × SR
210 = (300 – AH) × 10.5 **÷ 10.5**
20 = 300 – AH
AH = 300 -20
AH = 280 hours.

AR = AC ÷ AH
= 3,090 ÷ 280
= $11.036

Fourth: Valerie, Inc

AR = AC ÷ AH
= 31,850 ÷ 4,900
= $6.5

Rate variance = (SR -AR) × AH
= (7 – 6.5) × 4,900
= 2,450 F.

DL-Variance = Efficiency Variance + Rate Variance
= 2,800 UF – 2,450 F
= $350 UF.

DL-Variance = SC – AC
- 350 = SC – 31,850
SC = 31,850 – 350
SC = $31,500

SH = SC ÷ Standard rate per hour
= $31,500 ÷ 7
= 4,500 hours.

Standard hours per unit = Standard hours ÷ Units produced
= 4,500 ÷ 1,500
= 3 hours per unit

	Casey Co.	Kevin Inc	Jess Co	Valerie, Inc
United produced	**2,000**	**1,000**	**120**	**1,500**
Standard hours per unit	**3.5**	**0.9**	**2.5**	**3**
Standard hours	**7,000**	**900**	**300**	**4,500**
Standard rate per hour	**$14.5**	**10.2**	**$10.50**	**$7**
Actual hours worked	**6,800**	**975**	**280**	**4,900**
Actual rate per hour	**$14.25**	**$9.2**	**$11.036**	**$6.5**
Actual labor cost	**$96,900**	**$8,970**	**$3,090**	**$31,850**
Direct labor rate variance	**$1,700 F**	**$975 F**	**$150 UF**	**$2,450**
Direct labor efficiency variance	**$2,900 F**	**$ 765 UF**	**$ 210 F**	**$ 2,800 UF**