Problem 11-18 (45 minutes)

1. Direct materials price and quantity variances:

   Materials price variance = AQ (AP – SP)
   64,000 feet ($8.55 per foot – $8.45 per foot) = $6,400 U

   Materials quantity variance = SP (AQ – SQ)
   $8.45 per foot (64,000 feet – 60,000 feet*) = $33,800 U

   *30,000 units × 2 feet per unit = 60,000 feet

2. Direct labor rate and efficiency variances:

   Labor rate variance = AH (AR – SR)
   43,500 DLHs ($15.80 per DLH – $16.00 per DLH) = $8,700 F

   Labor efficiency variance = SR (AH – SH)
   $16.00 per DLH (43,500 DLHs – 42,000 DLHs*) = $24,000 U

   *30,000 units × 1.4 DLHs per unit = 42,000 DLHs

3. a. Variable overhead spending and efficiency variances:

Actual Hours of Input, at the Actual Rate (AH × AR)	Actual Hours of Input, at the Standard Rate (AH × SR)	Standard Hours Allowed for Output, at the Standard Rate (SH × SR)
$108,000	43,500 DLHs × $2.50 per DLH = $108,750	42,000 DLHs × $2.50 per DLH = $105,000

Spending Variance, $750 F | Efficiency Variance, $3,750 U

Alternative solution:

Variable overhead spending variance = (AH × AR) – (AH × SR)
($108,000) – (43,500 DLHs × $2.50 per DLH) = $750 F

Variable overhead efficiency variance = SR (AH – SH)
$2.50 per DLH (43,500 DLHs – 42,000 DLHs) = $3,750 U

Problem 11-18 (continued)

b. Fixed overhead budget and volume variances:

Actual Fixed Overhead Cost	Budgeted Fixed Overhead Cost	Fixed Overhead Cost Applied to Work in Process
\$211,800	\$210,000*	42,000 DLHs × \$6 per DLH = \$252,000

Budget Variance, \$1,800 U	Volume Variance, \$42,000 F

*As originally budgeted. This figure can also be expressed as: 35,000 denominator DLHs × \$6 per DLH = \$210,000.

Alternative solution:

Budget variance:

$$\text{Budget variance} = \text{Actual fixed overhead cost} - \text{Budgeted fixed overhead cost}$$

= \$211,800 - \$210,000

= \$1,800 U

Volume variance:

Volume variance = Fixed portion of the predetermined overhead rate × (Denominator hours − Standard hours allowed)

= \$6.00 per DLH (35,000 DLHs − 42,000 DLHs)

= \$42,000 F

Problem 11-18 (continued)

4. The total of the variances would be:

Direct materials variances:	
Price variance	$ 6,400 U
Quantity variance	33,800 U
Direct labor variances:	
Rate variance	8,700 F
Efficiency variance	24,000 U
Variable manufacturing overhead variances:	
Spending variance	750 F
Efficiency variance	3,750 U
Fixed manufacturing overhead variances:	
Budget variance	1,800 U
Volume variance	42,000 F
Total variance	$18,300 U

Note that the total of the variances agrees with the $18,300 variance mentioned by the president.

It appears that not everyone should be given a bonus for good cost control. The materials quantity variance and the labor efficiency variance are 6.7% and 3.6%, respectively, of the standard cost allowed and thus would warrant investigation.

The company's large unfavorable variances (for materials quantity and labor efficiency) do not show up more clearly because they are offset for the most part by the favorable volume variance. This favorable volume variance is a result of the company operating at an activity level that is well above the denominator activity level used to set predetermined overhead rates. (The company operated at an activity level of 42,000 standard hours; the denominator activity level set at the beginning of the year was 35,000 hours.) As a result of the large favorable volume variance, the unfavorable quantity and efficiency variances have been concealed in a small "net" figure. The large favorable volume variance may have been achieved by building up inventories.