10 STANDARD COSTING: A MANAGERIAL CONTROL TOOL

DISCUSSION QUESTIONS

1. Standard costs are essentially budgeted amounts on a per-unit basis. Unit standards serve as inputs in building budgets.

2. Unit standards are used to build flexible budgets. Unit standards for variable costs are the variable cost component of a flexible budgeting formula.

3. Historical experience is often a poor choice for establishing standards because the historical amounts may include more inefficiency than is desired.

4. Ideal standards are perfection standards, representing the best possible outcomes. Currently attainable standards are standards that are challenging but allow some waste. Currently attainable standards are often chosen because many feel they tend to motivate rather than frustrate.

5. Standard costing systems improve planning and control and facilitate product costing.

6. By identifying standards and assessing deviations from the standards, managers can locate areas where change or corrective behavior is needed.

7. Actual costing assigns actual manufacturing costs to products. Normal costing assigns actual prime costs and budgeted overhead costs to products. Standard costing assigns budgeted manufacturing costs to products.

8. A standard cost sheet presents the standard quantity and price for each input and uses this information to calculate the unit standard cost.

9. Managers generally tend to have more control over the quantity of an input used rather than the price paid per unit of input.

10. A standard cost variance should be investigated if the variance is material and if the benefit of investigating and correcting the deviation is greater than the cost.

11. Control limits indicate how large a variance must be before it is judged to be material and the process is out of control. Control limits are usually set by judgment although statistical approaches are occasionally used.

12. MPV is often computed at the point of purchase rather than issuance because it provides control information sooner.

13. Disagree. A materials usage variance can be caused by factors beyond the control of the production manager, e.g., purchase of a lower (or higher) quality of material than normal.

14. Disagree. Using higher priced workers to perform lower skilled tasks is an example of an event that will create a rate variance that is controllable.

15. Some possible causes of an unfavorable labor efficiency variance are inefficient labor, machine downtime, and poor-quality materials.

16. A kaizen standard is the planned improvement for the coming period. Usually, kaizen focuses on costs in the manufacturing section of the value chain. Kaizen costing is "continuous improvement" costing. Continous improvement is achieved by setting kaizen standards for each period.

17. Target costing is a cost management method that is used to reduce costs to a level that reflects a product's functions and market demands and management's return requirements. Costs are reduced by such actions as working with suppliers to reduce the cost of parts and improving (redesigning) the processes that will be used.

MULTIPLE-CHOICE EXERCISES

10-1. **a**

10-2. **e**

10-3. **c**

10-4. **d**

10-5. **b**

10-6. **c**

10-7. **d**

10-8. **c**

10-9. **d**

10-10. **a**

10-11. **b**

10-12. **d**

10-13. **b**

10-14. **c**

10-15. **e**

10-16. **a**

10-17. **d**

10-18. **e**

10-19. **b**

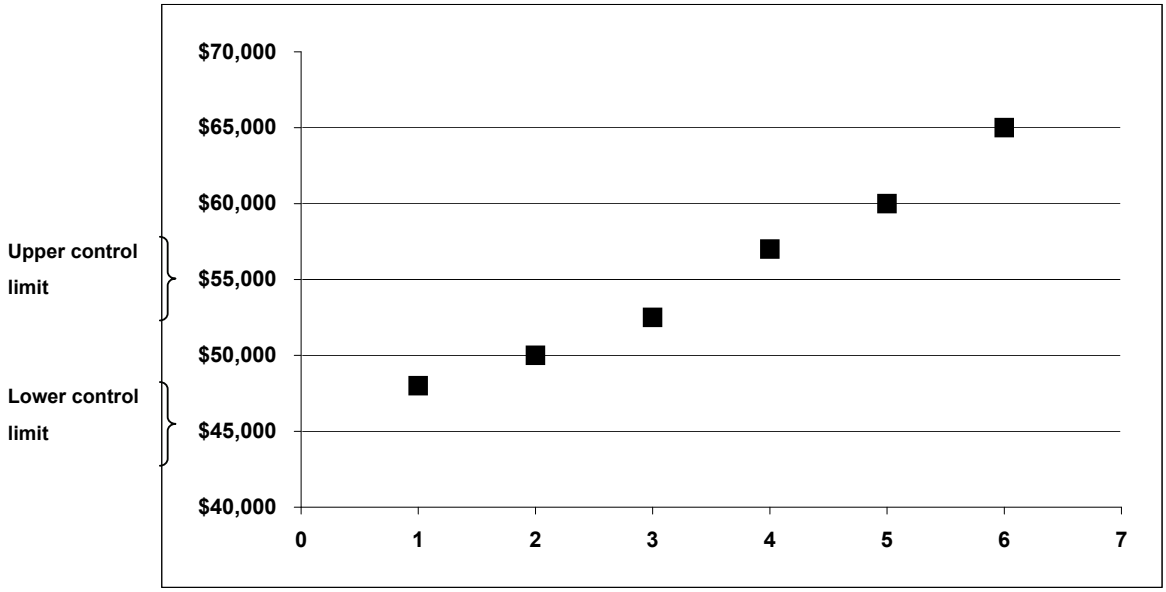
CORNERSTONE EXERCISES

CE 10-20

1. **Oats allowed:** SQ = Unit quantity standard × Actual output
   = 16 × 700,000
   = 11,200,000 ounces

2. **Hours allowed:** SH = Unit quantity standard × Actual output
   = 0.04 × 700,000
   = 28,000 hours

CE 10-21



The variances that exceed the upper limit of $55,000 should be investigated. The graph clearly signals some type of process instability.

CE 10-22

Actual Costs	Budgeted Costs	Total Variance
AQ × AP	SQ × SP	(AQ × AP) – (SQ × SP)
1,250,000 × $0.09	300,000 × 4.5 × $0.08	$112,500 – $108,000
$112,500	$108,000	$4,500 U

CE 10-23

MPV = (AP – SP)AQ
= ($0.09 – $0.08)1,250,000 oz. = $12,500 U

MUV = (AQ – SQ)SP
= (1,250,000 – 1,350,000)$0.08 = $8,000 F

AP × AQ	SP × AQ	SP × SQ
$0.09 × 1,250,000	$0.08 × 1,250,000	$0.08 × 1,350,000
$112,500	$100,000	$108,000
	$12,500 U	$8,000 F
	Price	Usage

CE 10-24

Actual Costs	Budgeted Costs	Total Variance
AH × AR	SH × SR	(AH × AP) – (SH × SR)
14,000 hrs. × $9.00	500,000 × 0.025 × $8.50	$126,000 – $106,250
$126,000	$106,250	$19,750 U

CE 10-25

LRV = (AR – SR)AH
= ($9.00 – $8.50)14,000 = $7,000 U

LEV = (AH – SH)SR
= (14,000 – 12,500)$8.50 = $12,750 U

AR × AH	SR × AH	SR × SH
$9.00 × 14,000	$8.50 × 14,000	$8.50 × 12,500
$126,000	$119,000	$106,250
	$7,000 U	$12,750 U
	Price	Usage

EXERCISES

E 10-26

1. **SH = 5 × 7,500 = 37,500 hours**

2. **SQ = 1 × 7,500 = 7,500 kits**
   SQ = 1 × 7,500 = 7,500 cabinets

3. **SH = Unit labor standard × Units produced**
   Units Produced = SH/Unit labor standard
   = 3,750 hrs./5 hrs. per unit
   = 750 units

E 10-27

1. **Cases needing investigation:**

   Week 2: Exceeds the 10% rule.

   Week 4: Exceeds the $12,000 rule and the 10% rule.

   Week 5: Exceeds the 10% rule.

2. **The purchasing agent is responsible. Corrective action would require a return to the purchase of the higher-quality material normally used.**

3. **Production engineering is responsible. If the relationship is expected to persist, then the new labor method should be adopted and standards for materials and labor need to be revised.**

E 10-28

1. **Materials: $12 × 40,000 = $480,000**
   Labor: $9 × 40,000 = $360,000

2.

	Actual Cost*	Budgeted Cost	Variance
Materials	$450,000	$480,000	$30,000 F
Labor	$425,000	$360,000	$65,000 U

***$3.60 × 125,000; $12.50 × 34,000**

3. **Yes, the labor variances exceed the budget by more than 10 percent and the absolute dollar amount of the materials variance is also large enough to merit investigation, especially since the materials and labor variances can be interconnected. If there is an underlying ongoing cause, the company could continue losing money without corrective action.**

E 10-29

1. MPV = (AP – SP)AQ
= ($3.60 – $4.00)125,000 = $50,000 F
MUV = (AQ – SQ)SP
= (125,000 – 120,000)$4 = $20,000 U

AP × AQ	SP × AQ	SP × SQ
$3.60 × 125,000	$4.00 × 125,000	$4.00 × 120,000
$450,000	$500,000	$480,000
	$50,000 F	$20,000 U
	Price	Usage

Total variance = $50,000 F + $20,000 U = $30,000 F

2. The suggestion of the purchasing manager is premature. A favorable materials price can produce an effect on both materials usage and labor variances. For example, if the quality of the materials is much lower, more waste and more rework can take place which may more than offset the favorable materials price variance.

E 10-30

1. LRV = (AR – SR)AH
= ($12.50 – $12.00)34,000 = $17,000 U
LEV = (AH – SH)SR
= (34,000 – 30,000)$12 = $48,000 U

AR × AH	SR × AH	SR × SH
$12.50 × 34,000	$12.00 × 34,000	$12.00 × 30,000
$425,000	$408,000	$360,000
	$17,000 U	$48,000 U
	Rate	Efficiency

Total variance = $17,000 U + $48,000 U = $65,000 F

2. The feedback from the production manager pinpoints the cause of the variances. The favorable materials variance is apparently due to the purchase of a much lower quality of leather strips which are causing the unfavorable materials usage, labor rate, and labor efficiency variances. The corrective action needed is to return to suppliers that provide the quality corresponding to the price standard. With the correctly purchased quality of materials, the process should return to a more efficient operating state.

E 10-31

1. MPV = (AP – SP)AQ
= ($0.045 – $0.050)2,650,000 = $13,250 F

2. MUV = (AQ – SQ)SP
= (2,650,000 – 2,560,000)$0.05 = $4,500 U

***SQ = 128 × 20,000 = 2,560,000**

3.

$$\begin{aligned} \text{MUV} &= (\text{AQ} - \text{SQ})\text{SP} \\ \$4{,}000 &= [2{,}000{,}000 - 128(\text{Quantity produced})] \times \$0.05 \\ 80{,}000 &= 2{,}000{,}000 - 128(\text{Quantity produced}) \\ 128(\text{Quantity produced}) &= 1{,}920{,}000 \\ \text{Quantity produced} &= 15{,}000 \text{ gallons} \end{aligned}$$

$$\begin{aligned} \text{MPV} &= (\text{AP} - \text{SP})\text{AQ} \\ \$20{,}000 &= (\text{AP} - \$0.05)2{,}000{,}000 \\ \$20{,}000 &= 2{,}000{,}000\text{AP} - \$100{,}000 \\ \$120{,}000 &= 2{,}000{,}000\text{AP} \\ \text{AP} &= \$0.06 \end{aligned}$$

E 10-32

1. LRV = (AR – SR)AH
= ($9.50 – $10.00)360,000 = $180,000 F

2. LEV = (AH – SH)SR
= (360,000 – 330,000)$10.00 = $300,000 U

***SH = 0.50 × 660,000 = 330,000**

E 10-33

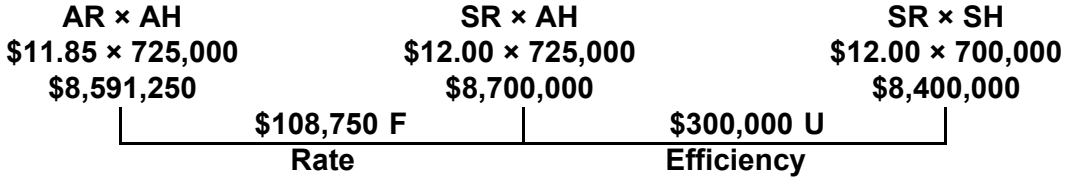
MPV = (AP – SP)AQ
= ($5.10 – $5.00)1,860,000
= $186,000 U

MUV = (AQ – SQ)SP
= (1,850,000 – 2,100,000)$5.00
= $1,250,000 F

***Note*: There is no 3-pronged analysis for materials because materials purchased is different from the materials issued. (Materials purchased is used for MPV and materials issued for MUV.)**

2. LRV = (AR – SR)AH
= ($11.85 – $12.00)725,000
= $108,750 F

LEV = (AH – SH)SR
= (725,000 – 700,000)$12.00
= $300,000 U



E 10-34

1. **Tom purchased the large quantity to obtain a lower price so that the price standard could be met. In all likelihood, given the reaction of Jackie Iverson, encouraging the use of quantity discounts was not an objective of setting price standards. Usually, material price standards are to encourage the purchasing agent to search for sources that will supply the quantity and quality of material desired at the lowest price.**
2. **It sounds like the price standard may be out of date. Revising the price standard and implementing a policy concerning quantity purchases would likely prevent this behavior from reoccurring.**
3. **Tom apparently acted in his own self-interest when making the purchase. He surely must have known that the quantity approach was not the objective. Yet the reward structure suggests that there is considerable emphasis placed on meeting standards. His behavior, in part, was induced by the reward system of the company. Probably he should be retained with some additional training concerning the goals of the company and a change in emphasis and policy to help encourage the desired behavior.**

E 10-35

Materials:

AP × AQ	SP × AQ	SP × SQ
	$0.95 × 79,500	$0.95 × 72,000
$63,000	$75,525	$68,400
	$12,525 F	$7,125 U
	Price	Usage

Labor:

AR × AH	SR × AH	SR × SH
	$7.40 × 22,450	$7.40 × 22,500
$153,000	$166,130	$166,500
	$13,130 F	$370 F
	Rate	Efficiency

E 10-36

Journal

	Date		Account & Explanation	Debit	Credit
1.			Materials	75,525	
			MPV		12,525
			Accounts Payable		63,000
2.			Work in Process	68,400	
			MUV	7,125	
			Materials		75,525
3.			Work in Process	166,500	
			LRV		13,130
			LEV		370
			Accrued Payroll		153,000
4.			MPV	12,525	
			LRV	13,130	
			LEV	370	
			MUV		7,125
			Cost of Goods Sold		18,900

E 10-37

1. MPV = (AP – SP)AQ
= ($8.35 – $8.25)38,000 = $3,800 U

MUV = (AQ – SQ)SP
= (37,500 – 38,400)$8.25 = $7,425 F

(The 3-pronged variance diagram is not shown because MPV is for materials purchased and not materials issued, and the two differ.)

2.

Journal				
Date		**Account & Explanation**	**Debit**	**Credit**
		Materials	313,500	
		MPV	3,800	
		Accounts Payable		317,300
		Work in Process	316,800	
		MUV		7,425
		Materials		309,375

E 10-38

1. LRV = (AR – SR)AH
= ($9.80 – $9.65)25,040 = $3,756 U

LEV = (AH – SH)SR
= (25,040 – 25,600)$9.65 = $5,404 F

AR × AH	SR × AH	SR × SH
$9.80 × 25,040	$9.65 × 25,040	$9.65 × 25,600
$245,392	$241,636	$247,040
	$3,756 U	$5,404 F
	Rate	Efficiency

2.

Journal				
Date		**Account & Explanation**	**Debit**	**Credit**
		Work in Process	247,040	
		LRV	3,756	
		LEV		5,404
		Accrued Payroll		245,392

PROBLEMS

P 10-39

1. **a. The managers of each cost center should be involved in setting standards. They understand the actual conditions and are the primary source for information on quantity used and wages paid. The newly designated materials purchasing manager is the information source for material prices. Since this is a new position, that individual may not have much information to share, and Annette should go directly to those that did the purchasing in the past. The accounting department, in conjunction with Production, should be able to develop standards and should provide information about past prices and usage.**

   b. Standards should be attainable; they should include an allowance for waste, breakdowns, etc. Market prices for materials as well as labor (unions) should be a consideration for setting standards. Labor prices should include fringe benefits, and material prices should include freight, taxes, etc.

2. **Once the standards are set, actual results can be compared with the standards and variances can be calculated. Of course, the variances themselves are only indicators of potential problems. The underlying causes of the variances must be determined to decide whether or not corrective action is needed. For this reason, responsibility for the variances will be assigned to those with the most information about them. The variances that will most likely be calculated are:**

   Materials Purchase Price Variance—responsibility for this variance lies with the supervisor who was designated the materials purchasing manager. This individual can explain why materials prices were or were not equal to the standard amounts.

   Materials Usage Variance—responsibility for this variance lies with the manager in charge of the Production Department. This individual knows how much was produced and whether or not the amount of materials used equaled the standard.

   Labor Rate Variance—responsibility for this variance lies with the manager in charge of the Production Department. Again, this individual knows whether or not the wage rate used equaled the standard.

   Labor Usage Variance—responsibility for this variance lies with the manager in charge of the Production Department. This individual knows how much was produced and whether or not the amount of labor used equaled the standard.

P 10-40

1. Materials:

AP × AQ	SP × AQ	SP × SQ
$3.55 × 69,000	$3.50 × 69,000	$3.50 × 72,000
$3,450 U		$10,500 F
Price		Usage

The new process saves 0.25 × 6,000 × $3.50 = $5,250. Thus, the net savings attributable to the higher-quality material are ($10,500 – $5,250) – $3,450 = $1,800. Keep the higher-quality material!

2. Labor for new process:

AR × AH	SR × AH	SR × SH
$118,800	$11 × 10,800	$11.00 × 10,200
$0		$6,600 U
Rate		Efficiency

The new process gains $1,800 in materials (see Requirement 1) but loses $6,600 from the labor effect, giving a net loss of $4,800. If this pattern is expected to persist, then the new process should be abandoned.

3. Labor for new process, one week later:

AR × AH	SR × AH	SR × SH
$99,000	$11 × 9,000	$11 × 10,200
$0		$13,200 F
Rate		Efficiency

If this is the pattern, then the new process should be continued. It will save $959,400 per year ($18,450 × 52 weeks). The weekly savings of $15,000 is the materials savings of $1,800, plus labor savings of $13,200.

P 10-41

1. Granite:

MPV = Actual cost – (AQ × SP)
= $79,048 – (1,640 × $50) = $2,952 F

MUV = (AQ – SQ)SP
= (1,640 – 1,600)$50 = $2,000 U

Glue:

MPV = Actual cost – (AQ × SP)
= $2,560 – (16,000 × $0.15) = $160 U

MUV = (AQ – SQ)SP
= (16,000 – 16,000)$0.15 = $0

P 10-41 (Continued)

2. Cutting Labor:

LRV = (AR – SR)AH
= ($15 – $15)180 = $0

LEV = (AH – SH)SR
= (180 – 160)$15 = $300 U

Installation Labor:

LRV = (AR – SR)AH
= ($25 – $25)390 = $0

LEV = (AH – SH)SR
= (390 – 400)$25 = $250 F

3. It would probably not be worthwhile for Charlene to establish standards for every different type of installation. Tom and Tony have a small enough operation that they can mentally decide whether or not another type of installation (e.g., one with multiple sink cuts) will be more expensive than the typical one.

P 10-42

1.

	Standard Price	Standard Usage	Standard Cost*
Direct materials	$ 4	25.000	$100.00
Direct labor	15	0.768	11.52
Variable overhead	8	0.768	6.14
Fixed overhead	12	0.768	9.22
Standard cost per unit			$126.88

*Rounded

2. There would be unfavorable labor efficiency variances for the first 320 units because the standard hours are much lower than the actual hours at this level. Actual hours would be approximately 409.60 (320 × 1.28), and standard hours would be 245.76 (320 × 0.768). Thus, the labor efficiency variance would be:

LEV = (AH – SH)SR
= (409.60 – 245.76)$15
= $2,457.60 U

P 10-42 (Continued)

3. The cumulative average time per unit is an *average*. For example, the first 40 units take an average of 2.5 hours per unit. The second 40 take an average of 1.5 hours per unit [(80 × 2) – (40 × 2.5)/40] = 1.5, and therefore, the average for the first 80 is 2.0 per unit. Thus, as more units are produced the cumulative average time per unit will decrease. The standard should be 0.768 hour per unit as this is the average time taken per unit once efficiency is achieved:
(1.024 × 640) – (1.28 × 320)/(640 – 320) = 0.768

P 10-43

1. Normal delivery:

	Standard Price	Standard Usage	Standard Cost
Direct materials	$10.00	9.00 lbs.	$ 90.00
Direct labor	16.00	2.5 hrs.	40.00
Variable overhead	30.00	2.5 hrs.	75.00
Fixed overhead	40.00	2.5 hrs.	100.00
Unit cost			$305.00

Cesarean delivery:

	Standard Price	Standard Usage	Standard Cost
Direct materials	$10.00	21.00 lbs.	$210.00
Direct labor	16.00	5 hrs.	80.00
Variable overhead	30.00	5 hrs.	150.00
Fixed overhead	40.00	5 hrs.	200.00
Unit cost			$640.00

2. MPV = (AP – SP)AQ
MPV (Normal) = ($9.50 – $10.00)35,000 = $17,500 F
MPV (Cesarean) = ($9.50 – $10.00)165,000 = $82,500 F

MUV = (AQ – SQ)SP
MUV (Normal) = [35,000 – (9 × 4,000)]$10 = $10,000 F
MUV (Cesarean) = [165,000 – (21 × 8,000)]$10 = $30,000 F

3. LRV = (AR – SR)AH
LRV (Normal) = ($11.45* – $16.00)10,200 = $46,410 F
LRV (Cesarean) = ($11.45* – $16.00)40,500 = $184,275 F

LEV = (AH – SH)SR
LEV (Normal) = [10,200 – (2.5 × 4,000)]$16 = $3,200 U
LEV (Cesarean) = [40,500 – (5 × 8,000)]$16 = $8,000 U

***Rounded**

P 10-43 (Continued)

4. **Yes. Computations are shown below.**

   MUV = (200,000 – 36,000 – 168,000)$10 = $40,000 F
   LEV = (50,700 – 50,000)$16 = $11,200 U

5. **Answers will vary.**

P 10-44

1. **Liquid standard = 4.5 × 250,000 × $0.40 = $450,000**

   Upper control limit (UCL): $495,000 or $470,000; lesser = $470,000
   Lower control limit (LCL): $405,000 or $430,000; greater = $430,000

   Bottle standard = 250,000 × $0.05 = $12,500

   UCL: $13,750
   LCL: $11,250

   Direct labor standard = 0.2 × 250,000 × $15.00 = $750,000

   UCL: $825,000 or $770,000; lesser = $770,000
   LCL: $675,000 or $730,000; greater = $730,000

2. **Total liquid variance = $567,000 – $450,000 = $117,000 U**

   MPV = ($0.42 – $0.40)1,350,000 = $27,000 U
   MUV = (1,350,000 – 1,125,000)$0.40 = $90,000 U

   The liquid variances would be investigated as the total variance exceeds $20,000, as does each individual variance.

   Total bottle variance = $12,000 – $12,500 = $500 F

   MPV = ($0.048 – $0.05)250,000 = $500 F
   MUV = (250,000 – 250,000)$0.05 = $0

   The bottle variances would not be investigated as the total variance is within the accepted limits.

3. **Total labor variance = $733,000 – $750,000 = $17,000 F**

   LRV = ($15.19* – $15.00)48,250 = $9,168 U
   LEV = (48,250 – 50,000)$15.00 = 26,250 F

   The total variance is within the limits. However, the labor efficiency variance is greater than $20,000 and should be investigated.

***Rounded**

P 10-45

1. April (UCL = Upper control limit, and LCL = Lower control limit)

Materials:

Price standard: $0.25 × 723,000 = $180,750

UCL: 0.08 × $180,750 = $14,460
LCL: ($14,460)

Quantity standard: 8 × 90,000 × $0.25 = $180,000

UCL: 0.08 × $180,000 = $14,400
LCL: ($14,400)

Labor:

Price standard: $7.50 × 36,000 = $270,000

UCL: 0.08 × $270,000 = $21,600
LCL: ($21,600)

Quantity standard: 0.4 × 90,000 × $7.50 = $270,000

UCL: 0.08 × $270,000 = $21,600
LCL: ($21,600)

May

Materials:

Price standard: $0.25 × 870,000 = $217,500
UCL: 0.08 × $217,500 = $17,400
LCL: ($17,400)

Quantity standard: 8 × 100,000 × $0.25 = $200,000

UCL: 0.08 × $200,000 = $16,000
LCL: ($16,000)

Labor:

Price standard: $7.50 × 44,000 = $330,000
UCL: 0.08 × $330,000 = $26,400
LCL: ($26,400)

Quantity standard: 0.4 × 100,000 × $7.50 = $300,000

UCL: 0.08 × $300,000 = $24,000
LCL: ($24,000)

P 10-45 (Continued)

June

Materials:

Price standard: $0.25 × 885,000 = $221,250
UCL: 0.08 × $221,250 = $17,700
LCL: ($17,700)

Quantity standard: 8 × 110,000 × $0.25 = $220,000
UCL: 0.08 × $220,000 = $17,600
LCL: ($17,600)

Labor:

Price standard: $7.50 × 46,000 = $345,000
UCL: 0.08 × $345,000 = $27,600
LCL: ($27,600)

Quantity standard: 0.4 × 110,000 × $7.50 = $330,000
UCL: 0.08 × $330,000 = $26,400
LCL: ($26,400)

2.

			Limit		Actual**	
April						
MPV = ($0.2614* – $0.25)723,000 =	$8,242 U	±	$14,460		4.6	%
MUV = (723,000 – 720,000)$0.25 =	$750 U	±	14,400		0.4	
LRV = ($7.50 – $7.50)36,000 =	$0	±	21,600		0.0	
LEV = (36,000 – 36,000)$7.50 =	$0	±	21,600		0.0	
May						
MPV = ($0.2506* – $0.25)870,000 =	$522 U	±	17,400		0.2	%
MUV = (870,000 – 800,000)$0.25 =	$17,500 U	±	16,000	***	8.8	
LRV = ($7.341* – $7.50)44,000 =	$6,996 F	±	26,400		(2.1)	
LEV = (44,000 – 40,000)$7.50 =	$30,000 U	±	24,000	***	10.0	
June						
MPV = ($0.2599* – $0.25)885,000 =	$8,762 U	±	17,700		4.0	%
MUV = (885,000 – 880,000)$0.25 =	$1,250 U	±	17,600		0.6	
LRV = ($7.826* – $7.50)46,000 =	$14,996 U	±	27,600		4.3	
LEV = (46,000 – 44,000)$7.50 =	$15,000 U	±	26,400		4.5	

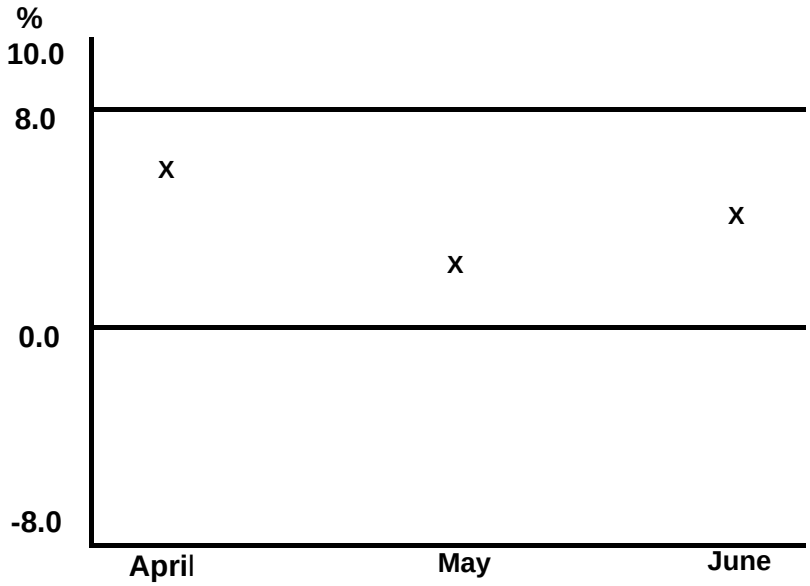
***Rounded**
****The actual deviation divided by the total price or quantity standard.**
*****Investigate May's MUV and LEV.**

P 10-45 (Continued)

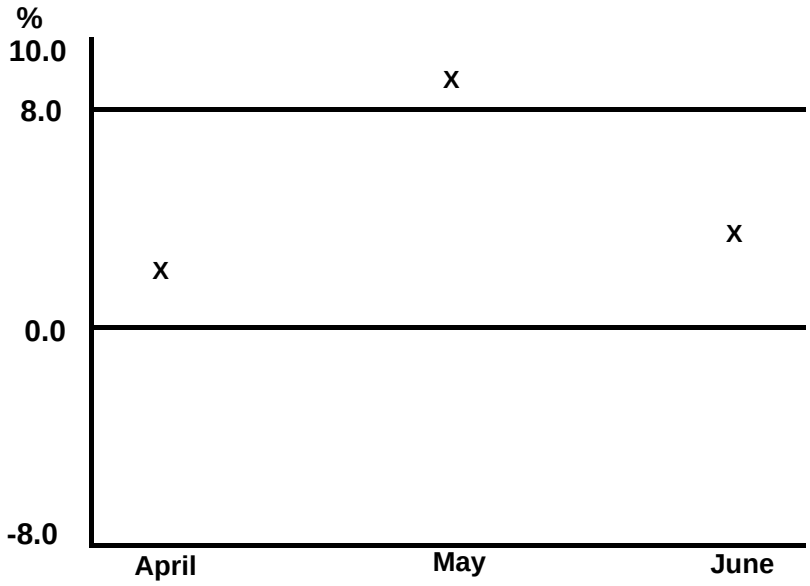
3. Control charts allow us to see when the variances are outside an acceptable range. They may also show a pattern that might help in pinpointing when the problem began.

Control charts: To simplify the presentation, the variances are expressed as a percentage of the total quantity or price standard, and the y-axis is used for variances. These percentages were calculated in Requirement 2.

MPV:

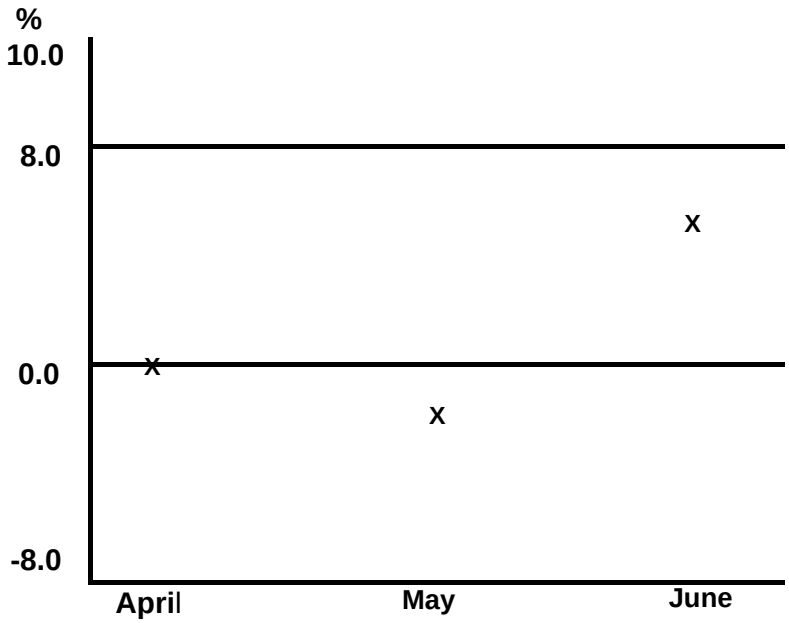


MUV:

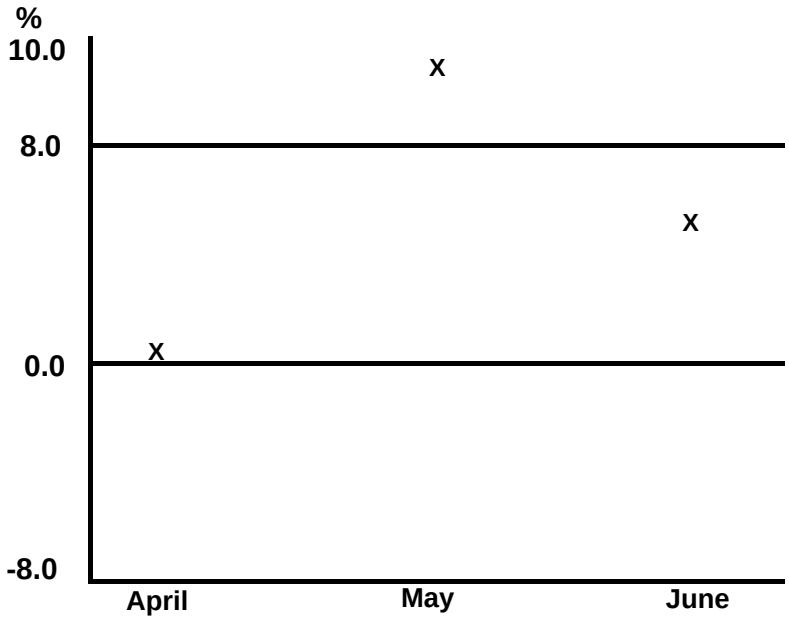


P 10-45 (Continued)

LRV:



LEV:



P 10-46

1. MPV = (AP – SP)AQ
= ($1.55 – $1.50)29,500 = $1,475 U
MUV = (AQ – SQ)SP
= (29,500 – 30,000)$1.50 = $750 F

The overall materials variance is $725 U ($1,475 U – $750 F); therefore, the company should not buy this quality of materials, but should go back to the prior quality.

2. LRV = (AR × AH) – (SR × AH)
= Actual labor cost – (SR × AH)
= $92,000 – ($10 × 7,000) = $22,000 U
LEV = (SR × AH) – (SR × SH)
= ($10 × 7,000) – ($10 × 9,000) = $20,000 F

The overall labor variance is $2,000 U ($22,000 U – $20,000 F). If this pattern is expected to persist, then the new layout should be abandoned.

3. LRV = (AR × AH) – (SR × AH)
= Actual labor cost – (SR × AH)
= $88,000 – ($10 × 8,800) = $0
LEV = (SR × AH) – (SR × SH)
= ($10 × 8,800) – ($10 × 9,000) = $2,000 F

The overall labor variance is $2,000 F ($0 + $2,000 F). If this pattern is the one expected to persist, then the new layout should be continued. It will save $104,000 per year ($2,000 × 52 weeks).

P 10-47

1. MPV = (AQ × AP) – (SP × AQ)
= Actual materials cost – (SP × AQ)
= $74,000 – ($0.90)78,000 = $3,800 U
MUV = (AQ – SQ)SP
= (78,000 – 75,000)($0.90) = $2,700 U

Overall materials variance = $3,800 U + $2,700 U = $6,500 U

2. LRV = (AR × AH) – (SR × AH)
= Actual labor cost – (SR × AH)
= $315,000 – ($14 × 22,500) = $0
LEV = (SR × AH) – (SR × SH)
= ($14 × 22,500) – ($14 × 22,500) = $0

P 10-47 (Continued)

3. The basic advantages offered by a standard costing system include its use in planning, control, and decision making. A standard costing system helps in budgeting since the unit standard costs can be multiplied by the predicted level of production to obtain total costs. Standard costs are used in control to evaluate performance. A comparison of actual costs to standard costs allows management to evaluate the performances of cost centers. Finally, standard costs assist in decision making. For example, having standard costs can make pricing decisions easier.

Standard costing systems also have disadvantages. For example, standards that are set too high (e.g., theoretical or perfect standards) can cause motivation to decrease, as workers believe that they can never achieve the standards. Standards may also stand in the way of continual improvement if they are not updated frequently to adjust for gradual increases in efficiency.

P 10-48

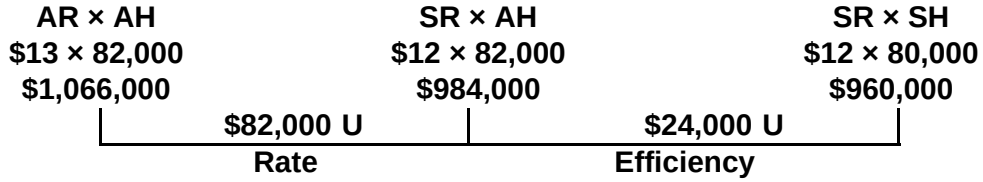
1. MPV = (AP – SP)AQ
= ($4.70 – $5.00)260,000 = $78,000 F

MUV = (AQ – SQ)SP
= (320,000 – 300,000)$5 = $100,000 U

The materials usage variance is viewed as the most controllable because prices for materials are often market-driven and thus not controllable. Responsibility for the variance in this case likely would be assigned to Purchasing. The lower-quality materials are probably the cause of the extra usage.

2. LRV = (AR – SR)AH
= ($13 – $12)82,000 = $82,000 U

LEV = (AH – SH)SR
= (82,000 – 80,000)$12 = $24,000 U



P 10-48 (Continued)

Production is usually responsible for labor efficiency. In this case, efficiency may have been affected by the lower-quality materials, and Purchasing, thus, may have significant responsibility for the outcome. Other possible causes are less demand than expected, poor supervision, lack of proper training, and lack of experience.

3. Three variances are potentially affected by material quality:

MPV	**$78,000**	**F**
MUV	**100,000**	**U**
LEV	**24,000**	**U**
Net effect	**$46,000**	**U**

If the variance outcomes are largely attributable to the lower-quality materials, then the company should discontinue using this material.

4.

Journal

Date	Account & Explanation	Debit	Credit
	Materials	1,300,000	
	MPV		78,000
	Accounts Payable		1,222,000
	Work in Process	1,500,000	
	MUV	100,000	
	Materials		1,600,000
	Work in Process	960,000	
	LRV	82,000	
	LEV	24,000	
	Accrued Payroll		1,066,000
	Cost of Goods Sold	206,000	
	MUV		100,000
	LRV		82,000
	LEV		24,000
	MPV	78,000	
	Cost of Goods Sold		78,000

CASES

Case 10-49

1. **By using a standard costing system, Crunchy Chips can increase control of its manufacturing inputs. By developing price and quantity standards for each input, management can compute price and usage variances for each input. Since a standard costing system provides more information, control is enhanced. For example, since managers have the most control over usage of inputs, knowing the usage variances provides specific information about where action is needed. Moreover, by breaking out price variances, which are not as controllable, performance evaluation is improved.**

2. **The engineering standards are ideal standards. The president's concern is probably reflecting doubt that the labor standards can be achieved. If pressure is applied to workers to achieve perfection standards, the outcome is likely to be unsatisfactory. Workers may become frustrated and lower their performance as a consequence. Many firms elect to use currently attainable standards in lieu of ideal standards. The standard suggested by the president is a good starting point. If experience indicates that his standard is too loose, then the standard can be adjusted later on.**

3. **Standard cost sheet (for one box of chips):**

Direct materials		
Potatoes (15.9375 lbs. @ $0.238)*	**$3.7931**	
Cooking oil (49.5 oz. @ $0.04)	**1.9800**	
Bags (15 @ $0.11)	**1.6500**	
Boxes (1 @ $0.52)	**0.5200**	**$7.9431**

***Pounds per box = 15 × 4 × 4.25/16 = 15.9375**

Price per pound = $0.245 less scrap value; scrap per box = 15 bags × (17.0 oz. – 16.3 oz.) = 10.5 oz. Scrap value/oz. = $0.16/16 oz. = $0.01 per oz. Scrap savings per box is $0.01 × 10.5 oz. = $0.105, and the savings per pound of potato is $0.105/15.9375 pounds = $0.007. Thus, the standard price per pound of potato is $0.245 – $0.007 = $0.238.

Case 10-49 (Continued)

Direct labor**		
Potato inspection (0.006 hr. @ $15.20)……	**$0.0912**	
Chip inspection (0.0225 hr. @ $10.30)……	**0.2318**	
Frying monitor (0.0118 hr. @ $14.00)……	**0.1652**	
Boxing (0.0311 hr. @ $11.00) ……	**0.3421**	
Machine operators (0.0118 hr. @ $13.00)…….	**0.1534**	**$0.9837**
Variable overhead ($0.9837 × 1.16)……		**1.1411**
Fixed overhead ($0.9837 × 1.9671)*……**		**1.9351**
Cost per box……		**$12.0030**
Cost per bag $12.0030 / 15 bags		**$0.8002**

**** Number of boxes/year = 8,800,000/15 = 586,667**

Hours/box:

Potato inspection:	**3,200 × 1.1/586,667**
Chip inspection:	**12,000 × 1.1/586,667**
Frying monitor:	**6,300 × 1.1/586,667**
Boxing:	**16,600 × 1.1/586,667**
Machine operators:	**6,300 × 1.1/586,667**

*****($1,135,216/$0.9837)/586,667 = Fixed OH rate based on labor dollars.**

4. MUV = (AQ – SQ*)SP
= (9,500,000 – 9,350,000)$0.238
= $35,700 U

***SQ = 15.9375 × 8,800,000/15 = 9,350,000**

Case 10-50

1. **Pat's decision was wrong and not in the best interests of the company. His concern for his bonus and promotion was apparently more important than his company's reputation for a quality product. Unfortunately, his assessment of personal risk was probably a significant input to the decision to buy the inferior component. All too often, individuals decide to take an unethical course of action based on their assessment of their chances of getting caught. This obviously should not be a factor. What is right should be the driving concern for this type of decision.**

2. **The use of standards to evaluate performance and assess rewards apparently was influential in Pat's decision. He clearly had a desire to receive his annual bonus and wanted to present an impressive performance profile so that he could secure a position at division headquarters. Perhaps altering the factors used for evaluating and rewarding performance and increasing the tenure of managers may decrease this type of behavior. Or perhaps we ought to spend more time emphasizing ethical behavior—maybe the problem isn't so much the systems we use for evaluating and rewarding performance but rather the lack of commitment to ethical decision making.**

3. **Purchasing agents have ethical responsibilities similar to accountants. Integrity is a universally desirable characteristic. Pat and other purchasing agents should refrain from engaging in any activity that would prejudice their abilities to carry out their duties ethically (III 2); refuse any gift, favor (e.g., bonus), or hospitality that would influence their actions; and refrain from either actively or passively subverting the attainment of the organization's legitimate and ethical objectives (III 4). Organizations would be well advised to adopt a set of ethical standards. All employees should understand that certain behaviors are unacceptable.**

4. **Answers will vary.**