

# **PERFORMANCE EVALUATION IN A TRADITIONAL COST SYSTEM: A CASE STUDY**

Leslie Kren, University of Wisconsin-Milwaukee

Barbara L. Kren, Marquette University

## **CASE DESCRIPTION**

*This case provides an integrated discussion of several cost and management accounting topics in a realistic setting, including cost behavior, incremental decision making, performance evaluation, and output variances. The case is flexible so it can be used over one 75-minute class session cost or managerial accounting course or expanded to two class sessions for a more in-depth discussion with optional questions, as described in the teaching notes. For a first course in cost or management accounting, this case can be used as a capstone near the end of the term. In an advanced course in cost or management accounting, the case can be used early in the term to review these topics before moving on to more advanced topics.*

**JEL:** M410

**KEYWORDS:** Performance Evaluation, Cost Variances, Decision Making, Cost systems

## **CASE INFORMATION**

**D**uring January, 2018, Janice Reardon, President of Voyager Tents Inc. (VTI), met with Charlie Anderson, Executive Vice President, to discuss the performance of the management team. At issue today was the plant manager, Gail Hammond. Reardon and Anderson preferred to evaluate Hammond's performance on objective measures with an emphasis on achievement of budget targets. Neither manager had sufficient first-hand knowledge of Hammond's control of the production process to enable a subjective evaluation of her performance based on her effort and the appropriateness of her decisions.

### Company Background

James A. Alfred founded VTI in 1890 using his military experience to design a tent for the leisure market. He successfully directed the company for over 40 very prosperous years. By the 1980s, camping as an outdoor social activity was in full stride in North America and VTI expanded and modernized their facilities to keep up with growing demand for tents. The company is now lead by an ownership team with a long history at VTI. Some members of the ownership team began as summer help in the factory and in distribution departments. Their dedication to building and maintaining a company with honesty and integrity has earned them the trust and respect of the industry. Their knowledge and leadership the industry is well-known.

Located in Michigan's upper peninsula, VTI operates in a state-of-the-art 240,000 square foot factory that includes a 10,000 square foot steelworks facility to ensure continuous quality control over all product components. VTI provides many local job opportunities and remains committed to supporting the neighboring communities. VTI has shown excellent growth and profitability over the past several years producing and selling a very successful tent model called the BackCountry, which sold for \$20.00 wholesale. Plans to expand the line were on the drawing board, but at this time, only one model was sold.

Business was highly seasonal for VTI, with over half of sales occurring from mid-August to mid-November. Budgeted sales for the year were \$40.0 million with a standard full-cost gross margin of 33.0 percent. Management had decided that even though sales were seasonal, production would be level throughout the year to stabilize employment. Current production was at full capacity, using one shift per day, five days per week. Sales exceeded expectations this year and had almost resulted in orders being rejected due to insufficient inventory. In fact, by year-end, only 44,000 units (at a cost of \$672,000) were left in stock. There were no work-in-process inventories at the beginning or end of the year.

### Budgeting

The budgeting process began in late September and by mid-December the management team presented a complete budget to the Board of Directors for the next year. Reardon typically made the budget presentation and focused on quarterly sales, production cost estimates, and capital spending proposals. Following a question-and-answer period with Reardon and some discussion, the Board authorized the budget. The firm's progress against the budget was monitored at subsequent Board meetings. At the January meeting, the Board also voted on management bonuses and pay raises for the prior year and validated officer promotions. The Board typically followed Reardon's recommendations.

### Production Manager

Hammond had been with VTI just over a year and this was the first time she has been evaluated for a bonus. Reardon and Anderson admired Hammond and felt that she was an innovative manager who had improved the production process. One improvement, introduced at the beginning of the third quarter, resulted in a reduction in the average material content of each tent from 5.0 lbs. to 4.5 lbs. This provided a substantial cost savings and an improvement in the perceived performance of the gear in the field.

In evaluating Hammond's performance, Reardon and Anderson felt that some adjustment was necessary because 2017 had been a turbulent year. The factory had closed due to the "Great Blizzard" which had caused a partial roof collapse under the weight of three feet of snow. In all, the factory remained closed for 20 working days in February and March. Employees did general maintenance during this period and received half pay.

To make up for lost production, a four-hour Saturday shift was soon added. Additional overtime was also required in the fourth quarter when the sales department managed to gain a \$750,000 order from a catalog sales company in October for an extra 50,000 units. To accommodate this and other orders, overtime was increased for six weeks to 16 hours per week. Employees were paid time-and-a-half for all overtime hours. Sales for 2017 were 2,094,000 units and there were no finished units in ending inventory.

Reardon and Anderson started with the summary budget and actual cost report shown in table 1. Reardon also called the inventory control department and requested the data on direct material inventory. He received the information shown in table 2. Finally, Anderson called payroll and requested data on labor cost and received the information shown in table 3. Hammond was responsible for negotiating all labor contracts. Both tables 2 and 3 show actual, period-end, data. Once this data was received, Reardon and Anderson settled down to work.

Table 1: Budget and Actual Cost Report for 2017 (All Amounts in Thousands)

	Quarterly Budget	Actual Results				
		Q1	Q2	Q3	Q4	2017
variable cost						
direct material (DM)	\$1,800	\$1,410	\$1,775	\$2,190	\$1,880	\$7,255
direct labor (DL)	3,850	4,010	4,480	4,350	5,045	17,885
indirect labor	300	250	558	572	950	2,330
office supplies	75	50	100	50	90	290
power-factory	375	270	420	410	450	1,550
sales and distrib.	250	220	210	320	120	870
fixed cost						
factory maint	300	130	120	500	280	1,030
sales and distrib.	750	850	600	450	275	2,175
depr-factory	700	700	700	700	700	2,800
misc. office	250	252	231	260	260	1,003
total cost	<u>\$8,650</u>	<u>\$8,142</u>	<u>\$9,194</u>	<u>\$9,802</u>	<u>\$10,050</u>	<u>\$37,188</u>
units produced	500	350	550	550	600	2,050

This table shows the budget and actual cost and unit output for the year. The first column shows the quarterly budget for the year and the following columns show the actual results for each quarter. Direct material is budgeted at 5.0 lbs. per unit and direct labor hours (DLH) is budgeted at 0.962 DLH per unit.

Table 2: Direct Material Inventory for the Year (All Amounts in Thousands)

	Weight in Pounds	Total Cost
beginning inventory	718	\$500
purchased	10,000	7,255
issued to work in process	<u>9,570</u>	<u>6,891</u>
ending inventory	1,148	\$864

This table shows direct material inventory balances, purchases, and the direct material issued to work in process.

Table 3: Direct Labor for the Year (All Amounts in Thousands, Except Headcount)

	Average	Regular Time		Overtime	
	Headcount	Hours	Cost	Hours	Cost
quarter 1 (13 weeks)	960	494	\$4,010	0	\$0
quarter 2 (13 weeks)	970	552	4,480	52	212
quarter 3 (13 weeks)	980	559	4,350	54	208
quarter 4 (13 weeks)	990	645	5,045	135	490
total		<u>2,250</u>	<u>\$17,885</u>	<u>241</u>	<u>\$910</u>

This table shows direct labor headcount, hours, and cost for the year. Quarter 1 includes 153,000 hours at half pay when factory was closed. Overtime hours are included in regular time hours.

During a break, Reardon remarked to Anderson, “Clearly some of this information is not relevant to Hammond.”

“I agree.”

“There is one thing that is bothering me,” said Reardon.

“What is that?”

“Hammond made a comment about those special catalog sales we made in October. She thinks we lost money on the deal because we sold them below cost.”

“Well, did you explain to her about contribution analysis? asked Anderson. As long as we sold above variable cost, income would increase since fixed cost is unchanged.”

“I did. She said she knew all about that but she was sure we lost money anyway. Unfortunately, we haven't had a chance to discuss it further.”

## QUESTIONS

Executive managers at Voyager Tents, Inc. (VTI) are evaluating the performance of the company's production manager. Information is available on output and cost control. Some of the events occurring during the year are controllable by the manager and are relevant to her performance and some are not. Use your understanding of decision rights and performance expectations. You will need to calculate production variances and assign responsibility for them.

1-Prepare a cost of goods manufactured statement and a GAAP income statement for VTI for the year, in good form. Use actual cost (not applied) in the statements.

2-How useful are these GAAP reports for managers to make decisions about the company and evaluate managers' performance (i.e., to address the questions that follow)? If you do not find these GAAP reports useful, then who should find value from these reports?

3-Was the special catalog sale made to the catalog company profitable?

4-Should the production manager, Hammond, be held responsible for the special catalog sale?

5-How would you evaluate the performance of the production manager in 2017? Be prepared to meet with her to explain the positive and negative aspects of her performance. Discuss the factors out of her control as well as the factors she could control. Be specific. The manager will expect that you have calculations ready to support your performance evaluation. Consider both the short-term and the long-term. Variances should be calculated. In your evaluation, it's useful to separate 'other factors', such as the catalog sale and the storm.

6-Comment on Reardon and Anderson's goal to evaluate the manager's performance on objective measures, with an emphasis on achievement of budget targets. What other approach could be taken?

## REFERENCES

Bowhill, B. and Lee, B. (2002) "The Incompatibility of Standard Costing systems and Modern Manufacturing: Insight or Unproven Dogma?" *The Journal of Applied Accounting Research*, vol. 6, p. 1-24.

Cheatham, C. and Cheatham, L. (1996) "Redesigning Cost Systems: Is Standard Costing Obsolete?" *Accounting Horizons*, vol. 10(4), p. 23-31.

Clinton, B. and White, L. (2012) "Roles and Practices in Management Accounting," *Management Accounting*, vol. 94(5), p. 37-43.

Fry, T., and Fiedler K. (2011) "A Tutorial on Managerial Cost Accounting: Living with Variances," *Production and Inventory Management Journal*, vol. 47(1), p. 21-32.

Hansen, D. and Mowen, M. (2018) *Cornerstones of Cost Management*. South-Western Cengage Learning.

Kimmel, P. and Kren, L. and Schadeewald, M. (1995) "The Effect of Risk on the Use of Outcome-Contingent Incentives," *Managerial Finance*. vol. 21(3), p. 36-51.

Kren, L. (2012) "Do Objective Outcomes Provide the Best Measure of Management Performance?" *Journal of Performance Management*. vol. 24(3), p.25-36.

Zoysa, A. and Siriyama H. (2007) "Standard Costing in Japanese Firms: Reexamination of its Significance in the New Manufacturing Environment," *Industrial Management and Data Systems*, vol. 107(2), p. 271-283.

# PERFORMANCE EVALUATION IN A TRADITIONAL COST SYSTEM: A CASE STUDY

## TEACHING NOTES

Leslie Kren, University of Wisconsin-Milwaukee

Barbara L. Kren, Marquette University

## CASE DESCRIPTION

This case provides an integrated discussion of several cost and management accounting topics in a realistic setting, including cost behavior, incremental decision making, performance evaluation, and output variances. The case is flexible so it can be used over one 75-minute class session cost or managerial accounting course or expanded to two class sessions for a more in-depth discussion with optional questions, as described in the teaching notes. This case can be used successfully at the undergrad and graduate levels. For a first course in cost or management accounting, it can be used as a capstone near the end of the term. In an advanced course in cost or management accounting, the case can be used early in the term to review these topics before moving on to more advanced topics.

## SOLUTIONS

**Question 1:** Prepare a cost of goods manufactured statement and a GAAP income statement for VTI for 2017, in good form. Use actual cost (not applied) in the statements.

**Solution 1:** At this point, most students will understand that the cost of nonproductive direct labor cost should probably not be reported as direct labor for GAAP statements and will include the cost in production overhead. Some students, however, will realize that the GAAP disposition of the nonproductive labor cost depends on what the workers were doing. If they were working in the factory, doing tasks such as repairs, or other maintenance, then nonproductive direct labor cost would be included in production overhead. If the workers were doing nonproduction (non factory) tasks, then it would be a period cost.

An interesting question that generates active class discussion at this point is whether senior managers would prefer that the cost of nonproductive time be listed in cost of goods sold or in operating expenses (sales and administrative). In general, senior managers prefer to put as much cost into manufacturing as possible, since administrative cost appears inconsistent with 'lean' operations and it's easier to justify higher production cost to board members. Thus, most senior managers would prefer that the nonproductive time be included in production cost (overhead). For responsibility accounting (internal reporting), it's irrelevant since GAAP cost categories are not relevant for internal purposes (decision support and performance evaluation).

The cost of Goods Manufactured statement is shown in table 4. The assumption in the statement is that the nonproductive time was spent on production-related tasks. The adjustment for the actual cost of nonproductive time is \$621,000, calculated as nonproductive hours times the actual pay rate in quarter 1 times 0.5,  $(153,000 * (4,010,000 / 494,000) * 0.5)$ . The cost system would then charge regular hours to direct labor and overtime hours to overhead. The cost system would directly-trace direct labor to production and assign the overhead according to the overhead rates and the cost driver (direct labor hours) in the routing (plan production sequence). Note that manufacturing cost and cost of goods manufactured are not the same. The former is current period cost and the latter is the cost transferred to finished goods inventory from work in process.

Table 4: GAAP Cost of Goods Manufactured Statement

VTI Cost of Goods Manufactured (All Amounts in Thousands) 2017	
direct materials used	\$6,891
direct labor (\$17,885,000-\$621,000)	17,264
overhead:	
indirect labor (\$2,330,000+\$621,000)	2,951
power-factory	1,550
factory maint	1,030
depreciation-factory	<u>2,800</u>
manufacturing cost	\$32,486
begin work in process	0
end work in process	0
cost of goods manufactured	<u>\$32,486</u>

*This is a GAAP cost of goods manufactured schedule for the year. The assumption is that the nonproductive time was used for production related tasks so it is included in overhead. The actual cost of nonproductive time is \$621,000, calculated as nonproductive hours times the actual pay rate in quarter 1 times 0.5, (153,000\*(4,010,000/494,000)\*0.5).*

A GAAP income statement is shown in table 5. There were 2,044,000 regular units sold, calculated as actual unit sales units less the units in the special catalog sale (2,094,000 units-50,000 units). The sales revenue is then \$41,630,000, calculated as revenue from regular units sold plus special catalog sale revenue (2,044,000 units\*\$20.00 per unit + \$750,000).

Table 5: GAAP Income Statement

VTI Income Statement (All Amounts in Thousands) 2017	
sales	\$41,630
begin finished goods inventory	\$672
cost of good manufactured	32,486
available for sale	<u>\$33,158</u>
end finished goods inventory	0
cost of goods sold	<u>33,158</u>
gross margin	\$8,472
office supplies	290
sales and distrib.	3,045
miscellaneous office	1,003
income before tax	<u>\$4,134</u>

*Table 5 shows a GAAP income statement. There were 2,044,000 regular units sold, calculated as actual unit sales less the units in the special catalog sale (2,094,000 units-50,000 units). The sales revenue is then \$41,630,000, calculated as revenue from regular units sold plus revenue from the special catalog sale (2,044,000 units\*\$20.00+\$750,000).*

**Question 2:** How useful are these GAAP reports for managers to make decisions about the company and evaluate managers' performance (i.e., to address the questions that follow)? If you do not find these GAAP reports useful, then who should find value from these reports?

**Solution 2:** Most students will realize that the GAAP reports are not useful to evaluate the special catalog sale and to evaluate Hammond's performance. This question provides an opportunity for a discussion about the relative objectives of GAAP and responsibility accounting reporting. GAAP is intended for investors to allow estimates of firm value (stock price which is the market's estimate of future cash flow). Thus,

GAAP reports provide little value for managers who need information for decision support and performance evaluation.

GAAP reporting is functional, because cost categories in the statement are shown by function. That is, production cost is separated from sales and administrative cost (period cost). For GAAP, production cost includes direct material, traced through the bill of materials, direct labor, traced through the routing (plan production sequence), and overhead (all production cost not directly traced). GAAP functional cost categories are not useful for internal purposes (decision support and performance evaluation) since all cost required to get output to customers is relevant, included sales and administrative cost. Another point to discuss here is related to allocated cost. Arbitrary allocations are required for GAAP because GAAP requires full absorption cost for inventory valuation. However, allocations should be avoided for responsibility accounting (internal reporting). Only cause and effect cost drivers should be used to assign cost to output (or any cost object) for responsibility accounting.

**Question 3:** Was the special catalog sale made to the catalog company profitable?

**Solution 3:** Most students will have no trouble evaluating the profitability of the sale using budget data. This calculation is shown below in table 6. This analysis shows that the sale was profitable. However, it's important to understand that, even based on budget data, the sale was profitable only if we assume there is excess capacity available because then fixed cost is not relevant since it won't change. Moreover, the actual results at the time of the sale differed considerably from the budget. Thus, two issues need to be considered for an analysis of the profitability of the special catalog sale. First, we need to know whether there was excess capacity was available in the budget to evaluate whether we should have accepted this sale based on budget data (before we knew there would be a storm). Second, we need to evaluate the special catalog sale given the actual costs incurred at the time of the sale. Actual costs differed considerably from the budget.

Table 6: Evaluation of Special Catalog Sale Based on Budget Data (All Amounts in Thousands, Except Per Unit Cost)

	Total (50,000 Units)	Per Unit	Per Unit Cost Based on Quarterly Budget
incremental revenue	\$750,000	\$15.00	
variable cost			
direct materials	180,000	\$3.60	\$1,800/500 units
direct labor	385,000	7.70	\$3,850/500 units
indirect labor	30,000	0.60	\$300/500 units
power - factory	37,500	0.75	\$375/500 units
office supplies	7,500	0.15	\$75/500 units
sales and distrib	<u>25,000</u>	<u>0.50</u>	\$250/500 units
incremental income	<u>\$85,000</u>	<u>\$1.70</u>	

*Table to calculate incremental income from special catalog sale based on original budget cost. The table shows that the sale was profitable based on the original budget, assuming that there was excess capacity available.*

The excess capacity available in the budget is calculated in table 7. This shows that VTI's excess capacity in the budget is very limited. Thus, the sale was very risky, even based on the budget (before the storm). Selling their limited excess capacity at marginal cost is a risky decision. Students can now be asked about the value of the excess capacity. Most students will argue that it would have been more valuable as a buffer against uncertainty, which VTI ultimately needed, or to meet potential increases in full price sales.



Table 7: Calculation of Excess Capacity Available in the Original Budget

hours available (50 weeks*40 DLH per week*about 960 workers)	1,920,000	DLH at capacity
units at capacity (1,920,00 DLH/0.962 DLH per Unit)	<u>1,995,000</u>	units at capacity
budget sales	2,000,000	
excess production capacity in units (approximate)	5,000	
from beginning finished goods inventory	<u>44,000</u>	
units available (excess capacity)	<u>49,000</u>	

*This table shows the calculation for excess capacity available in the budget for the year. This table shows that VTI had very limited excess capacity in the budget. The sale was very risky, even based on the budget before the storm.*

The second issue to evaluate the special catalog sale and the obvious follow-up question is whether the sale was profitable given the actual results at the time of the special catalog sale. Most students have a difficult time with this question. When confronted with the question of whether the sale was profitable given the actual results, student's first reaction is typically to calculate the average cost of fourth quarter production to compare to the incremental revenue from the sale. However, to evaluate the profitability of the sale, we need to consider the costs that were incremental only for the order. Five adjustments to the plan/budget are needed to adjust for the conditions present when the order was accepted.

- 1-Direct material per unit dropped from 5 lb. to 4.5 lbs.
- 2-Material cost was rising during the year (see table 2).
- 3-Low labor efficiency in quarter 4 (likely due to new employees).
- 4-Labor rates are running below standard (likely due to new employees).
- 5-Most important, all marginal labor hours for this order are on overtime. 48,100 labor hours were needed (50,000 units\*0.962) and 135,000 hours of overtime were worked in Q4.

The first two adjustments in the list above are related to the incremental direct material cost. There were two offsetting factors in quarter 4. Less direct material was used per unit but at rising unit cost. Direct material cost calculations show that unit costs for material were rising through the year so a fair estimate of incremental cost per pound of material was the closing balance cost (FIFO value) of \$0.75 per lb. (\$1,148,000/864,000 lbs.). In addition, Hammond's innovation to reduce material in output had been implemented by the time of the special catalog sale so 4.5 lbs. of material was used in each unit (compared to 5.0 lbs. in the budget).

The final three adjustments in the above list are related to direct labor. Efficiency of direct labor was down in the fourth quarter. Dividing direct labor hours per unit by units of output shows that each unit required 1.075 hours (646,000/600,000), compared to 0.962 hours per unit in the budget. In contrast, direct labor cost per hour decreased from the budget. Dividing direct labor cost by hours worked shows that cost per hour was \$7.8217 (\$5,045,000/645,000) compared to \$8.00 per hour in the budget. In addition, direct labor cost for the order were all on overtime so labor cost must be multiplied by 1.5.

After these calculations, we can determine the incremental variable cost per unit in quarter 4. This is shown in table 8. Direct labor and direct material cost is adjusted as calculated above and other variable cost is shown at budget. Note that the incremental cost is significantly higher than the budget incremental cost and higher than the average cost of output in the fourth quarter. Thus, after adjusting quarter 4 for the actual events, the special catalog sale was a loser at the margin. Moreover, there is no evidence that long term benefits will accrue from the special catalog sale.

Table 8: Evaluation of Special Catalog Sale Based on Actual Incremental Cost of Output

	Total (50,000 Units)	Per Unit	
incremental revenue	\$750,000	\$15.00	
variable cost			
direct material	169,000	\$3.38	\$0.75 per unit*4.5 lb.
direct labor	630,500	12.61	1.075 hours per unit*\$7.8217 per hour*1.5
indirect labor	30,000	0.60	\$300,000/500,000 units
power - factory	37,500	0.75	\$375,000/500,000 units
office supplies	7,500	0.15	\$75,000/500,000 units
sales and distrib	<u>25,000</u>	<u>0.50</u>	\$250,000/500,000 units
incremental income	<u>\$-149,500</u>	<u>\$-2.99</u>	

*This table shows calculations for the incremental income from the special catalog order based on the incremental cost given the actual events in quarter 4. The incremental cost of material was the closing inventory balance cost (FIFO value) of \$0.75 per lb. At the time of the special catalog sale, 4.5 lbs. of material was used in each unit (compared to 5.0 lbs. in the budget). For direct labor, efficiency of direct labor was down in the fourth quarter to 1.075 hours (compared to 0.962 hours per unit in the budget) and direct labor cost per hour decreased to \$7.8217 (compared to \$8.00 per hour in the budget). Since direct labor hours for the special catalog order were all on overtime, the hourly cost of labor is multiplied by 1.5.*

**Question 4:** Should Hammond be held responsible for the special catalog sale?

**Solution 4:** The answer is probably yes, for two reasons. First, she is at least partially responsible for the loss since she controls production cost. More importantly, if she is not held responsible, it is likely that this will happen again. The lesson from this sale is that production and sales must communicate and work together. If Hammond is held responsible this time, she will be motivated to better communicate with the sales department to avoid similar future problems.

This question can lead to an optional discussion of the "controllability principle", often cited in text books, which suggests that managers should be held responsible only for factors they can control (Hansen and Mowen, 2018). However, strict adherence to the controllability principle leads to 2 problems. First, if managers are not held responsible, they will do little to mitigate the effects of uncontrollable factors even when able to do so. The classic example is the manager of a Florida marina who realizes that his or her performance evaluation will not be affected by a hurricane that is 'uncontrollable'. Thus, the manager does little prior to the storm. However, if the manager realizes that he or she will be held responsible, he or she would pull on rain gear and work to mitigate storm damage to the marina. Furthermore, since 'uncontrollable' factors tend to be subjective, performance discussions can lead to subordinates arguing about factors they could not control, and the performance evaluation discussion can devolve into a litany of excuses, preventing the superior from effectively focusing on the subordinate's job performance.

**Question 5:** How would you evaluate the performance of the production manager in 2017? Be prepared to meet with her and explain the positives and negatives in her performance. Discuss the factors out of her control as well as the factors she could control. Be specific. The manager will expect that you have calculations to support your evaluation.

**Solution 5:** This is an opportunity to evaluate performance in a traditional cost system. This approach to performance evaluation has been criticized in the literature (Cheatham and Cheatham, 1996), however, Clinton and White (2012) find that the vast majority of firms continue to use traditional standard cost accounting systems. Similar results about the prevalence of standard cost systems have been reported in prior literature (Fry and Fiedler, 2011) and echoed in surveys of Asian firms (Zoysa and Siriyama, 2007). For example, a field study by Bowhill and Lee (2002) finds that manufacturing innovations are not accompanied by wholesale cost system changes. Thus, predictions of the demise of the standard cost system have not materialized and it continues as the dominant cost management system in manufacturing firms.

To evaluate the production manager, students easily recognize that she is not responsible for period cost (sales and administrative cost). Students will also recognize that a simple comparison to the static (original) budget is not appropriate. Because the original budget is based on the budget cost driver which differs from the actual cost driver that occurred. For performance evaluation, we need a performance report to compare the flexible budget to actual results. The flexible budget is calculated by adjusting the original budget for the actual cost driver (direct labor hours (DLH)). Besides preparing a flexible budget, the following four additional factors must be considered to evaluate Hammond's performance.

- 1-Planned production was exceeded by 50,0000 units.
- 2-There were two unplanned events, the February blizzard, and the special catalog sale.
- 3-We need to separate the effects of material reduction of 5.0 to 4.5 lbs. per unit from efficiency of material usage.
- 4-Hammond is charged for material purchases, not usage. This is an optional factor that some instructors may decide to be too 'tricky' and leave out of the case. However, I have found that it can be used positively as a reminder to students about the importance of paying attention to details in accounting.

Begin by evaluating prime cost variances. For direct material variances, it is necessary to adjust for the value of material savings in quarter 3 and quarter 4. Hammond's material savings provided a 10.0% (5.0-4.5)/5.0)) savings in material. This leads to a cost savings of \$414,000, which can be calculated as units in third and fourth quarters times budget cost per unit times the 10.0% saving (1,150,000 units\*3.60\*10.0%). Hammond is thus responsible for a \$414,000 annual annuity for the future.

The direct material price variance (DMPV) on purchases and the direct material quantity variance on issuance can be calculated as shown in table 9. Note that the standard quantity issued must be adjusted for the material savings. The adjusted standard quantity of direct material is 9,675,000 lbs., which is the standard quantity less direct material saved in quarter 3 and quarter 4, calculated as (2,050,000 actual units for the year\*5.0 lb. per unit)-(1,150,000 units in quarter 3 and quarter 4\*0.5 lbs.). The favorable DMQV suggests that Hammond may have experimented with methods to reduce material content throughout the year and/or purchase of higher quality materials (as suggested by the DMPV).

Table 9: Direct Material Price Variance (DMPV) and Direct Material Quantity Variance (DMQV)

<b>Panel A: DMPV = Actual Quantity Purchased*(Actual Price-Standard Price)</b>	
actual price*actual quantity purchased (\$7,255,000/10,000,000 lbs.)*10,000,000 lbs. \$0.7255 per unit*10,000,000 lbs.	\$7,255,000
standard price*actual quantity purchased \$0.7200 per unit*10,000,000 lbs.	<u>7,200,000</u>
DMPV	<u>\$55,000</u>
<b>Panel B: DMQV = Standard Price*(Actual Quantity Issued-Standard Quantity Issued)</b>	
standard price*actual quantity issued \$0.7200 per unit*9,570,000 lbs.	\$6,890,400
SP*adjusted SQ issued \$0.7200 per unit*9,675,000 lbs.	<u>6,966,000</u>
DMQV	<u>\$75,600</u>

*This table shows the direct material price variance (DMPV) on purchases and the direct material quantity variance on issuance. The standard quantity issued must be adjusted for the material savings in quarter 3 and quarter 4. The adjusted standard quantity of direct material is 9,675,000 lbs., which is the standard quantity less direct material saved in quarter 3 and quarter 4, calculated as (2,050,000 actual units for the year\*5.0 lb. per unit)-(1,150,000 units in quarter 3 and quarter 4\*0.5 lbs.).*

The direct labor rate variance (DLRV) and the direct labor efficiency variance (DLEV) can be calculated as shown in table 10. It is necessary to adjust for the cost of blizzard and unplanned overtime. The cost of

overtime following the blizzard was \$612,000 (153,000 direct labor hours\*\$4.00 per hour). The cost of the unplanned overtime was \$910,000 (shown in the last line and last column of table 3). The calculations show two offsetting variances. Unfavorable labor efficiency may reflect fatigue from heavy overtime in quarter 3 and quarter 4 and labor rate may reflect hire of new, presumably less skilled, workers in quarter 3 and quarter 4.

Next is the calculation for overhead (OHD) variances. The overhead variances are shown in the overhead performance report in table 11. Budget, actual, and allowed (standard) labor hours must be calculated. Budget direct labor hours (DLH) were 1,924,000, which is budget units times budget labor hours per unit (2,000,000 units\*0.962 DLH per unit). Actual direct labor hours were 2,097,000, which is actual recorded hours less un-productive hours (2,250,000 DLH-153,000 DLH). Finally, standard hours (allowed) were 1,972,100, which is actual units produced times standard hours per unit (2,050,000 units\*0.962 DLH per unit). For indirect labor in overhead, the overtime premium for nonproductive hours must be added, \$2,942,000 (2,330,000+(153,000\*4.00)). Calculations for each flexible budget item are shown below the performance report in table 11.

Table 10: Direct Labor Variances, Showing Direct Labor Rate Variance (DLRV) and direct Labor Efficiency Variance (DLEV)

<b>Panel A:</b>		
DLRV	= actual direct labor hours (DLH)*(standard rate-actual rate)	
	= (actual DLH*standard rate) - (actual DLH*actual rate)	
productive DLH at standard		
((2,250,000 DLH-153,000 DLH)*\$8.00)	\$16,776,000	
plus overtime premium at standard		
(241,000 DLH*\$4.00)	<u>964,000</u>	
total standard DLH	\$17,740,000	(actual DLH*standard rate)
actual DLH less nonproductive DLH		
(17,885,000 DLH-(153,000 DLH*\$4.00))	17,273,000	(actual DLH*actual rate)
rate variance	<u>\$467,000</u>	F
<b>Panel B:</b>		
DLEV = standard rate*(actual DLH - standard DLH)		
recorded DLH (table 3)	2,250,000	
less: nonproductive DLH	<u>-153,000</u>	
actual productive DLH	2,097,000	
DLH allowed	-1,972,000	
(2,050 units*0.962 budget DLH per unit)		
DLEV in hours	125,000	U
DLEV (\$8.00 budget rate*125 hours)	<u>\$1,000,000</u>	U

*This table shows the calculation for direct labor rate and efficiency variances.*

Overhead variances show large indirect labor variance due to the overtime hours plus nonproductive time. Not much in fixed OHD variances. Some repairs and maintenance were not done, which could be a problem in the long run, but the factory was very busy in quarter 3 and quarter 4. At this point, most students will agree that Hammond did a credible job under difficult conditions. Hammond produced the output needed to meet demand. In fact, she exceeded the original budget of 2 million units by 50,000 units in a year when the roof fell in (literally). Production variances show adequate operating efficiency in the short-term under difficult conditions.

In the discussion of Hammond's performance, a difficult question that typically generates a lot of student interest and participation is: What are the characteristics of a good manager? Most students have only a vague idea about this question. At the minimum, we expect managers to achieve short term goals. For Hammond, in the short term, we expected her to produce output to meet demand and to operate efficiently.

Short-term efficiency was evaluated with production cost variances. However, the characteristics of a good manager are elusive concepts to most students. Fundamentally, managers need to demonstrate innovation. Innovation is the essential characteristic that distinguishes management quality. Good managers develop ways to improve task efficiency. They must ensure that tasks done today are done more efficiently (better) than the tasks were done yesterday.

Table 11: Overhead Performance Report with Overhead Variances for the Year

VTI Overhead Performance Report (All Amounts in thousands) 2017							
	Actual (1)	Flex Budget (2)	Spending Variance (1-2)		Applied (3)	Efficiency/Volume Variance (2-3)	
indirect labor (IL)	\$2,942	\$1,308	\$1,634	U	\$1,230	\$78	U
power	1,550	1,635	85	F	1,537	98	U
VOHD	<u>\$4,492</u>	<u>\$2,943</u>	<u>\$1,549</u>	U	<u>\$2,767</u>	<u>\$176</u>	U
maintenance	1,030	1,200	170	F	\$1,230	\$30	F
depreciation	<u>2,800</u>	<u>2,800</u>	--	-	<u>2,869</u>	<u>69</u>	F
FOHD	<u>\$3,830</u>	<u>\$4,000</u>	<u>\$170</u>	F	<u>\$4,099</u>	<u>\$99</u>	F

*flexible budget (indirect labor) = budget rate for indirect labor \* actual cost driver (DLH)*

*= (4 quarters \* 300,000)/1,924,000 DLH \* 2,097,000 DLH*

*= 0.6237 \* 2,097,000*

*= 1,307,899*

*flexible budget (power) = budget rate for power \* actual cost driver (DLH)*

*= (4 quarters \* \$375,000)/1,924,000 DLH \* 2,097,000 DLH*

*= 0.7796 \* 2,097,000*

*= 1,634,821*

*applied cost (indirect labor) = budget rate \* standard hours (DLH)*

*= 0.6237 \* 1,972,100*

*= 1,229,999*

*applied cost (power) = budget rate \* standard hours (DLH)*

*= 0.7796 \* 1,972,100 DLH*

*= 1,537,449*

*applied cost (maint) = budget rate \* standard hours (DLH)*

*= (4 quarters \* 300,000)/1,924,000 DLH \* 1,972,000 DLH*

*= 0.6237 \* 1,972,100*

*= 1,230,000*

*applied cost (depr) = budget rate \* standard hours (DLH)*

*= (4 quarters \* \$700,000)/1,924,000 \* 1,972,100 DLH*

*= 1.455 \* 1,972,100*

*= 2,869,406*

*This table shows an overhead performance report for 2017. Variances shown are fixed and variable overhead spending, variable overhead efficiency, and fixed overhead volume. The table show flexible budget calculations for each line item and the (standard) applied cost for each line item.*

**Question 6:** Comment on Reardon and Anderson’s goal to evaluate the manager's performance on objective measures, with an emphasis on achievement of budget targets. What other approach could be taken?

**Solution 6:** This is another topic that generates active student interest. It can be an optional discussion focused on Reardon and Anderson's intent to evaluate Hammond based on 'objective' factors rather than subjectively. The question is whether objective evaluation, with a strict emphasis on achievement of outcome goals, should be used rather than an alternative approach of subjective evaluation based on effort and appropriateness of Hammond's decisions. This discussion can lead to well-known agency theory results about the role of information in performance evaluation (see, for example, Kren, 2012).

The class could discuss the relative costs of subjective and objective control. For subjective control, a sophisticated and costly information system and a flatter organizational structure are needed so superiors can monitor and evaluate subordinates' options and actions. In contrast, objective control requires little evaluative information. Either outcome targets are met and rewards are offered or targets are missed and rewards are withheld. However, the cost of objective control is risk transfer to subordinates. The risk of an uncertain environment will motivate overly cautious decision making in subordinates, who are inherently risk averse relative to owners who are able to diversify risk in the capital market (Kimmel et al., 1995).

## **BIOGRAPHY**

Leslie Kren is an associate professor in the Lubar School of Business at the University of Wisconsin-Milwaukee. He may be reached at Sheldon B. Lubar School of Business, 3202 N. Maryland, Milwaukee, WI 53201.

Barbara L. Kren is an instructor at Marquette University. She may be reached at Marquette University, 1250 W Wisconsin Ave, Milwaukee, WI 53233.