



MAKING THE CONNECTION

INTEGRATIVE EXERCISES

Part 2 Chapters 5–10

Beauville Furniture Corporation produces sofas, recliners, and lounge chairs. Beauville is located in a medium-sized community in the southeastern part of the United States. It is a major employer in the community. In fact, the economic well-being of the community is tied very strongly to Beauville. Beauville operates a sawmill, a fabric plant, and a furniture plant in the same community.

The sawmill buys logs from independent producers. The sawmill then processes the logs into four grades of lumber: firsts and seconds, No. 1 common, No. 2 common, and No. 3 common. All costs incurred in the mill are common to the four grades of lumber. All four grades of lumber are used by the furniture plant. The mill transfers everything it produces to the furniture plant, and the grades are transferred at cost. Trucks are used to move the lumber from the mill to the furniture plant. Although no outside sales exist, the mill could sell to external customers, and the selling prices of the four grades are known.

The fabric plant is responsible for producing the fabric that is used by the furniture plant. To produce three totally different fabrics (identified by fabric ID codes FB60, FB70, and FB80, respectively), the plant has three separate production operations—one for each fabric. Thus, production of all three fabrics occurs at the same time in different locations in the plant. Each fabric's production operation has two processes: the weaving and pattern process and the coloring and bolting process. In the weaving and pattern process, yarn is used to create yards of fabric with different designs. In the next process, the fabric is dyed, cut into 25-yard sections, and wrapped around cardboard rods to form 25-yard bolts. The bolts are transported by forklift to the furniture plant's Receiving Department. All of the output of the fabric plant is used by the furniture plant (to produce the sofas and chairs). For accounting purposes, the fabric is transferred at cost to the furniture plant.

The furniture plant produces orders for customers on a special-order basis. The customers specify the quantity, style, fabric, lumber grade, and pattern. Typically, jobs are large (involving at least 500 units). The plant has two production departments: Cutting and Assembly. In the Cutting Department, the fabric and wooden frame components are sized and cut. Other components are purchased from external suppliers and are removed from stores as needed for assembly. After the fabric and wooden components are finished for the entire job, they are moved to the Assembly Department. The Assembly Department takes the individual components and assembles the sofas (or chairs).

Beauville Furniture has been in business for over two decades and has a good reputation. However, during the past five years, Beauville experienced eroding profits and declining sales. Bids were increasingly lost (even aggressive bids) on the more popular models. Yet, the company was winning bids on some of the more-difficult-to-produce items. Lance Hays, the owner and manager, was frustrated. He simply couldn't understand how some of his competitors could sell for such low prices. On a common sofa job involving 500 units, Beauville's bids were running \$25 per unit, or \$12,500 per job more than the winning bids (on average). Yet, on the more difficult items, Beauville's bids were running about \$60 per unit less than the next closest bid. Gisela Berling, vice president of finance, was assigned the task of preparing a cost analysis of the company's product lines. Lance wanted to know if the company's costs were excessive. Perhaps the company was being wasteful, and it was simply costing more to produce furniture than it was costing its competitors.

Gisela prepared herself by reading recent literature on cost management and product costing and attending several conferences that explored the same issues. She then reviewed the costing procedures of the company's mill and two plants and did a preliminary assessment of their soundness. The production costs of the mill were common to all lumber grades and were assigned using the physical units method. Since the output and production costs were fairly uniform throughout the year, the mill used an actual costing system. Although Gisela had no difficulty with actual costing, she decided to

explore the effects of using the sales-value-at-split-off method. Thus, cost and production data for the mill were gathered so that an analysis could be conducted. The two plants used normal costing systems. The fabric plant used process costing, and the furniture plant used job-order costing. Both plants used plantwide overhead rates based on direct labor hours. Based on her initial reviews, she concluded that the costing procedures for the fabric plant were satisfactory. Essentially, there was no evidence of product diversity. A statistical analysis revealed that about 90 percent of the variability in the plant's overhead cost could be explained by direct labor hours. Thus, the use of a plantwide overhead rate based on direct labor hours seemed justified. What did concern her, though, was the material waste that she observed in the plant. Maybe a standard cost system would be useful for increasing the overall cost efficiency of the plant. Consequently, as part of her report to Lance, she decided to include a description of the fabric plant's costing procedures—at least for one of the fabric types. She also decided to develop a standard cost sheet for the chosen fabric. The furniture plant, however, was a more difficult matter. Product diversity was present and could be causing some distortions in product costs. Furthermore, statistical analysis revealed that only about 40 percent of the variability in overhead cost was explained by the direct labor hours. She decided that additional analysis was needed so that a sound product costing method could be recommended. One possibility would be to increase the number of overhead rates. Thus, she decided to include departmental data so that the effect of moving to departmental rates could be assessed. Finally, she also wanted to explore the possibility of converting the sawmill and fabric plant into profit centers and changing the existing transfer pricing policy.

With the cooperation of the cost accounting manager for the mill and each plant's controller, she gathered the following data for last year:

Sawmill:

Joint manufacturing costs: \$900,000

Grade	Quantity Produced (board feet)	Price at Split-Off (per 1,000 board foot)
Firsts and seconds	1,500,000	\$300
No. 1 common	3,000,000	225
No. 2 common	1,875,000	140
No. 3 common	<u>1,125,000</u>	100
Total	<u>7,500,000</u>	

Fabric Plant:

Budgeted overhead: \$1,200,000 (50% fixed)
 Practical volume (direct labor hours): 120,000 hours
 Actual overhead: \$1,150,000 (50% fixed)
 Actual hours worked:

	Weaving and Pattern	Coloring and Bolting	Total
Fabric FB60	20,000	12,000	32,000
Fabric FB70	28,000	14,000	42,000
Fabric FB80	<u>26,000</u>	<u>18,000</u>	<u>44,000</u>
Total	<u>74,000</u>	<u>44,000</u>	<u>118,000</u>

Departmental data on Fabric FB70 (actual costs and actual outcomes):

	Weaving and Pattern	Coloring and Bolting
Beginning inventories:		
Units*	20,000	400
Costs:		
Transferred in	\$0	\$100,000

	Weaving and Pattern	Coloring and Bolting
Materials	\$80,000	\$8,000
Labor	\$18,000	\$6,600
Overhead	\$22,000	\$9,000
Current production:		
Units started	80,000	?
Units transferred out	80,000	3,200
Costs:		
Transferred in	\$0	?
Materials	\$320,000	\$82,000
Labor	\$208,000	\$99,400
Overhead	?	?
Percentage completion:		
Beginning inventory	30%	40%
Ending inventory	40%	50%

*Units are measured in yards for the Weaving and Pattern Department and in bolts for the Coloring and Bolting Department. Note: With the exception of the cardboard bolt rods, materials are added at the beginning of each process. The cost of the rods is relatively insignificant and is included in overhead.

Proposed standard cost sheet for Fabric FB70 (for the Coloring and Bolting Department only):

Transferred-in materials (25 yards @ \$10)	\$250.00
Other materials (100 ounces @ \$0.20)	20.00
Labor (3.1 hours @ \$8)	24.80
Fixed overhead (3.1 hours @ \$5)	15.50
Variable overhead (3.1 hours @ \$5)	15.50
Standard cost per unit	<u>\$325.80</u>

Furniture Plant:

Departmental data (budgeted):

	Service Departments				Producing Departments	
	Receiving	Power	Maintenance	General Factory	Cutting	Assembly
Overhead	\$450,000	\$600,000	\$300,000	\$525,000	\$750,000	\$375,000
Machine hours	—	—	—	—	60,000	15,000
Receiving orders	—	—	—	—	13,500	9,000
Square feet	1,000	5,000	4,000	—	15,000	10,000
Direct labor hours	—	—	—	—	50,000	200,000

After some discussion with the furniture plant controller, Gisela decided to use machine hours to calculate the overhead rate for the Cutting Department and direct labor hours for the Assembly Department rate (the Cutting Department was more automated than the Assembly Department). As part of her report, she wanted to compare the effects of plantwide rates and departmental rates on the cost of jobs. She wanted to know if overhead costing could be the source of the pricing problems the company was experiencing.

To assess the effect of the different overhead assignment procedures, Gisela decided to examine two prospective jobs. One job, Job A500, could produce 500 sofas, using a frequently requested style and Fabric FB70. Bids on this type of job were being lost more frequently to competitors. The second job, Job B75, would produce 75 specially designed recliners. This job involved a new design and was more difficult for the workers to build. It involved some special cutting requirements and an unfamiliar

assembly. Recently, the company seemed to be winning more bids on jobs of this type. To compute the costs of the two jobs, Gisela assembled the following information on the two jobs:

Job A500:

Direct materials:	
Fabric FB70	180 bolts @ \$350
Lumber (No. 1 common)	20,000 board feet @ \$0.12
Other components	\$26,600
Direct labor:	
Cutting Department	400 hours @ \$10
Assembly Department	1,600 hours @ \$8.75
Machine time:	
Cutting Department	350 machine hours
Assembly Department	50 machine hours

Job B75:

Direct materials:	
Fabric FB70	26 yards @ \$350
Lumber (first and seconds)	2,200 board feet @ \$0.12
Other components	\$3,236
Direct labor:	
Cutting Department	70 hours @ \$10
Assembly Department	240 hours @ \$8.75
Machine time:	
Cutting Department	90 machine hours
Assembly Department	15 machine hours

Required

- Allocate the joint manufacturing costs to each grade, and calculate the cost per board foot for each grade: (a) using the physical units method of allocation, and (b) using the sales-value-at-split-off method. Which method should the mill use? Explain. What is the effect on the cost of each proposed job if the mill switches to the sales-value-at-split-off method?
- Calculate the plantwide overhead rate for the fabric plant.
- Calculate the amount of under- or overapplied overhead for the fabric plant.
- Using the weighted average method, calculate the cost per bolt for Fabric FB70.
- Assume that the weaving and pattern process is not a separate process for each fabric. Also, assume that the yarn used for each fabric differs significantly in cost. In this case, would process costing be appropriate for the weaving and pattern process? What costing approach would you recommend? Describe your approach in detail.
- In the Coloring and Bolting Department, 400,000 ounces of other materials were used to produce the output of the period. Using the proposed standard cost sheet, calculate the following variances for the Coloring and Bolting Department:
 - Materials price variance (for other materials only)
 - Materials usage variance (for other materials only)
 - Labor rate variance
 - Labor efficiency variance

In calculating the variances, which method did you use to compute the actual output of the period—FIFO or weighted average? Explain.

7. Assume that the standard hours allowed for the actual total output of the fabric plant are 115,000. Calculate the following variances:
 - a. Fixed overhead spending variance
 - b. Fixed overhead volume variance
 - c. Variable overhead spending variance
 - d. Variable overhead efficiency variance
8. Suppose that the fabric plant has 500 bolts of FB70 in beginning finished goods inventory. The current-year plan is to have 1,000 bolts of FB70 in finished goods inventory at the end of the year. This fabric has an external market price of \$400 per bolt. If the fabric plant is set up as a profit center, it could sell 3,000 bolts per year to outside customers and supply 2,000 bolts per year internally to Beauville's furniture plant. If the fabric plant were designated as a profit center, the plant would transfer all goods internally at market price. Using the proposed standard cost sheet (as needed) and any other relevant data, prepare the following for Fabric FB70:
 - a. Sales budget
 - b. Production budget
 - c. Direct labor budget
 - d. Cost of goods sold budget
9. Calculate the following overhead rates for the furniture plant: (1) plantwide rate and (2) departmental rates. Use the direct method for assigning service costs to producing departments.
10. For each of the overhead rates computed in Requirement 9, calculate unit bid prices for Jobs A500 and B75. Assume that the company's aggressive bidding policy is unit cost plus 50 percent. Did departmental overhead rates have any effect on Beauville's winning or losing bids? What recommendation would you make? Explain. Now, adjust the costs and bids for departmental rate bids using the proposed standard costs for the Coloring and Bolting Department. Did this make a difference? What does this tell you?
11. Suppose that the fabric plant is set up as a profit center. Bolts of Fabric FB70 sell for \$400 (or can be bought for \$400 from outside suppliers). The fabric plant and the furniture plant both have excess capacity. Assume that Job A500 is a special order. The fabric and furniture plants have sufficient excess capacity to satisfy the demands of Job A500. What is the minimum transfer price for a bolt of FB70? If the maximum transfer price is \$400, by how much do the fabric plant's profits increase if the two profit centers negotiate a transfer price that splits the joint benefit?