

Ripken Products: A Case For Learning Activity-Based Costing

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ABSTRACT

This case enables cost accounting students to understand two important and related topics: design flaws inherent in traditional absorption costing systems and the fundamentals of activity-based costing (ABC). The focused approach requires only one class session to cover both topics. Ripken Products, a fictional manufacturer, uses absorption costing to cost its products. The company allocates manufacturing overhead using a budgeted manufacturing overhead rate based on direct labor cost. The company president decides to discontinue a product with a reported zero gross profit. A student intern suggests that the company could improve the accuracy of its costing for individual products if it assigned manufacturing overhead using activity-based costing. Students learn to calculate product costs using ABC, and then they explore reasons for significant differences between ABC costs and the company's reported costs. Students discover the logical flaws of allocating overhead costs arbitrarily using traditional absorption costing methods. They also learn why assigning overhead costs based on traceable consumption of resources leads to more accurate product costing.

Keywords: Activity-Based Costing; Product Costing; Absorption Costing; Cost Allocation; Cost Assignment

RIPKEN PRODUCTS

"For years, I have been telling you that your cost accounting system is broken. I have had it with your numbers, Ed. I never trusted them. You will be sorry that you made this decision, Paul. Now I must get back to my people on the plant floor." With these words, Production V.P., Rick Dempsey stormed out of the weekly Thursday meeting of the Ripken Products senior management team.

*A*t the meeting, owner and CEO Paul Richards announced the decision to eliminate the *Delete* product from the company's product line. Since its founding six years earlier, Ripken Products manufactured all of its four products in its Towson, Maryland plant. After assessing profitability of each product based upon the analysis prepared by company controller, Ed Murray, Richards decided to eliminate its *Delete* product two days earlier. He announced his decision at the meeting with the company's five senior managers:

- Ed Murray, Controller
- Rick Dempsey, VP of Production
- L. Rod Hendricks, VP of Marketing
- Jim Palmer, VP of Human Resources
- Ruth George, Sales Manager

Ripken Products produces four chemical eradicators: *Abolish*, *Banish*, *Cancel*, and *Delete*. Within the company, they are referred to as products A, B, C, & D. The company uses normal absorption costing to account for its manufacturing costs. Ripken's costing system charges manufacturing overhead costs to these products using direct labor dollars as an allocation base. The company's 2013 manufacturing budget included the following amounts:

- direct material costs of \$900,000
- direct labor costs of \$840,000
- manufacturing overhead of \$1,680,000

Based upon its estimated 2013 manufacturing costs, the company's *budgeted manufacturing overhead rate* for 2013 was \$2.00 of manufacturing overhead per \$1.00 of direct labor, (or simply "2.00") as calculated below.

$$\text{Budgeted Mfg. Overhead Rate} = \frac{\text{Estimated Manufacturing Overhead for 2013}}{\text{Estimated Direct Labor Cost for 2013}} = \frac{\$1,680,000}{\$840,000} = 2.00$$

Table 1 presents the company's 2013 budgeted manufacturing costs, by product and in total. To allocate the total budgeted manufacturing overhead of \$1,680,000 to individual products, the direct labor cost for each product is multiplied by 2.00.

Table 1: 2013 Estimated Manufacturing Costs (using absorption costing)

	A	B	C	D	Total
Direct Material Cost	\$90,000	\$90,000	\$180,000	\$540,000	\$900,000
Direct Labor Cost	84,000	84,000	168,000	504,000	840,000
Manufacturing Overhead	168,000	168,000	336,000	1,008,000	1,680,000
Total Manufacturing Cost	\$342,000	\$342,000	\$684,000	\$2,052,000	\$3,420,000
Units Produced	342,000	342,000	684,000	684,000	
Cost per Unit	\$1.00/unit	\$1.00/unit	\$1.00/unit	\$3.00/unit	

The company's 2013 pro forma income statement is presented in Table 2. There was no inventory on December 31, 2012 and it plans to have no inventory of any product on December 31, 2013.

Table 2: 2013 Pro Forma Income Statement

	A	B	C	D	Total
Sales	\$410,400	\$376,200	\$957,600	\$2,052,000	\$3,796,200
Cost of Goods Sold	342,000	342,000	684,000	2,052,000	3,420,000
Gross Profit	\$68,400	\$34,200	\$273,600	0	\$376,200
Operating Expenses					320,000
Profit Before Taxes					\$56,200

Because of constraints on the AB-19 machine, the company can produce a total of 684,000 units of *Abolish* and *Banish*, in any combination. For example, the company can produce 683,000 *Abolish* units and 1,000 *Banish* units. Similarly, the CD-25 machine can produce a total of 1,368,000 *Cancel and Delete* units. Because of this and because the prices of all products are determined by "the market," L. Rod Hendricks, Marketing VP, had been advocating for elimination of products *Banish* and *Delete*.

In conversations with Controller Ed Murray over the years, Rick Dempsey had expressed his dissatisfaction with the timeliness, usefulness and accuracy of the Accounting Department's *monthly manufacturing control reports*. In recent months, Dempsey used almost no information in these reports to make decisions regarding managing production in the plant. In prior conversations, Murray explained that the monthly reports reflected traditional costing practices that were described in the three *Cost Accounting* text books that he gave to Dempsey in 2011. During several contentious debates, Murray reminded Dempsey that he was both a Certified Public Accountant (C.P.A.) and a Certified Management Accountant (C.M.A.).

Upon returning to the production office, Dempsey discussed the details of the meeting with production supervisor, Paul Blair, and production student intern, Robin Brooks. Brooks told them of a discussion that she had two weeks earlier with Ed Murray. Brooks said that she suggested to Murray that basing product costs on activity-based cost drivers would result in more reliable cost data than that provided by the company's traditional costing system. She said that Murray showed little interest in this method, commonly referred to as *activity-based costing* (ABC), and the conversation ended abruptly when Murray asked to be excused.

Rick Dempsey asked Robin Brooks to explain ABC to him, and Robin took the next hour to do so. At the end of the discussion, he asked her to calculate product costs for the four products using ABC. When she estimated that it would take her about two weeks to complete the assignment, Dempsey asked if they could work together to do the work within three days. She agreed to work overtime to try to meet the deadline.

One day later, Robin Brooks presented Rick Dempsey with the information in Table 3. The table identifies the six manufacturing overhead categories and their associated costs. Together, they comprise total budgeted manufacturing overhead costs for 2013.

Table 3: Estimated Manufacturing Overhead (2013)

Purchasing	\$72,000
Machine setups for production runs	92,500
Material movements	36,000
Machine depreciation	840,000
Facility rent	480,000
Other manufacturing overhead	159,500
Total	\$1,680,000

Working together over the next two days, Dempsey and Brooks compiled and organized the information in Tables 4 & 5 regarding the company’s transactions and cost drivers

Table 4: Transactions by Product (2013 Estimates)

Activity	A	B	C	D	Total
POs Written	180	18	126	36	360
# of production run setups	148	37	74	111	370
Material movements	600	120	360	120	1,200
Machine hours	10,500	3,500	28,000	28,000	70,000
Work cell size in sq. feet	6,400	3,200	16,000	6,400	32,000

Table 5: Cost per Transaction Calculations (2013 Estimates)

Overhead Cost Pool	Total Cost	# Transactions	Cost per Transaction
Purchasing	\$72,000 /	360	= \$ 200 per P.O.
Machine Setups	92,500 /	370	= \$ 250 per setup
Material Movements	36,000 /	1,200	= \$ 30 per move
Machine Cost	840,000 /	70,000	= \$ 12 per mach. hr.
Facility Rent	480,000 /	32,000	= \$ 15 per square ft.
Other Manufacturing Overhead *.	159,500 /	70,000	= \$ 2.2786 per mach. hr.

*Other Manufacturing Overhead represents various overhead costs for which the cost-per-transaction is too expensive to determine. Robin thought it best to allocate these costs (9.5% of total overhead) on a machine-hour basis.

As they reviewed this information at 5:30 on Thursday evening, Dempsey and Brooks expressed their mutual concerns about the unit product costs in Table 2. Each felt that there were distortions in the company’s unit production costs of \$1.00 for A, B, and C, and \$3.00 for D. They decided to work for another two hours in order to see if they could identify the ABC unit costs for these four products by using the information that they compiled over the last three days.

Dempsey and Brooks decided to *assign* manufacturing overhead to products based upon the activities that cause those overhead costs. They began by erasing the overhead allocations in Table 1, because they were made without consideration of the activities that cause these costs. They made no changes to direct materials and direct labor costs, because these “direct” costs are the same for either traditional costing or ABC. They realized that assigning manufacturing overhead in Table 6, based on the calculations in Tables 3, 4, & 5, would leave them with only simple calculations to determine ABC “Cost per unit” amounts for each product. They continued their work with a feeling of anticipation, wondering whether their suspicions of significant costing distortions would be substantiated.

Realizing that they had to redistribute the \$1,680,000 of total manufacturing overhead cost to the four products, Dempsey and Brooks put aside Table 6 until they were able to reassign these costs.

Table 6: 2013 Estimated Manufacturing Costs (using Activity-based Costing [ABC])

	A	B	C	D	Total
Direct Material Cost Direct	\$90,000	\$90,000	\$180,000	\$540,000	\$900,000
Labor Cost	84,000	84,000	168,000	504,000	840,000
Manufacturing Overhead					1,680,000
Total Manufacturing Cost					\$3,420,000
Units Produced	342,000	342,000	684,000	684,000	
Total Mfg. Cost per Unit					

Robin handed a copy of Table 7 to Rick Dempsey and kept a copy for herself. They agreed that he would assign the costs for *purchasing, machine setups, and material movements*, and that she would do the same for the other three cost pools. They were enthusiastic regarding this endeavor.

Table 7: Manufacturing Overhead Cost Assignment for 2013 (Using ABC)

Overhead Cost Pool	Cost per Activity	A	B	C	D	Total
Purchasing	200					\$72,000
Machine Setups	250					92,500
Material Movements	30					36,000
Machine Cost	12					840,000
Facility Rent	15					480,000
Other Manuf. Overhead	2.2786					159,500
Total Manuf. Overhead						\$1,680,000

Required:

1. Complete Table 7 to determine *total manufacturing overhead* by product using ABC.
2. Complete Table 6 to determine *total manufacturing cost* by product using ABC.
3. Identify which products are profitable if the company used ABC. Based on your answer, do you agree with the decision to discontinue the *Delete* product?
4. How would you advise Rick Dempsey to explain this information to CEO Paul Richards, Controller Ed Murray, and other members of the senior management team? Explain what activity-based costing is, and a brief explanation regarding how ABC improves the accuracy of reported cost of individual products compared to Ripken's absorption costing system.

AUTHOR INFORMATION

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TEACHING NOTE

Course and Audience

This case is appropriate for an undergraduate or graduate *cost accounting* or *managerial accounting* course. The author uses it during the course transition from traditional absorption costing (and its perils) to ABC concepts and practices.

After covering traditional management accounting topics in the first 70% of the course, the author devotes the remainder of the course to challenging conventional thinking regarding traditional managerial cost accounting and exposing its pitfalls. He explains to students that he expects them to be agents of change and innovation in their professional careers. The author introduces this second phase of the course with a discussion of Ford Worthy's "Accounting Bores You, Wake Up!" followed by the *Ripken Products* case.

Students must realize the importance of reading the case and attempting to solve it before coming to class. If they do so, this focused case minimizes the amount of class time required to explain both the pitfalls of absorption costing and ABC fundamentals.

The author uses the class questions to guide class discussion. Others may prefer to ask students to answer some or all of the questions as a written assignment to be turned in for grading. The discussion format works well when the professor uses student responses to complete the Table 7 worksheet on a whiteboard, transparency, or computer projection.

The author also uses the case in seminars and workshops for accountants, managers, and other professionals.

Learning Objectives

This case enables students to learn the following points:

- Traditional absorption costing can trigger dysfunctional decisions.
- ABC is a costing system that assigns costs to products (or other cost objects) based on traceable consumption of resources.
- ABC provides new insights regarding product costs and product profitability.
- ABC *cost assignment* is an improvement on traditional costing that *arbitrarily allocates* overhead costs to products.
- ABC challenges conventional wisdom that manufacturing overhead costs are always "indirect" costs.
- They will learn methods of calculating ABC costs.

Answer Guide and Solution Handout

The first three case questions are:

- Complete Table 7 to determine *total manufacturing overhead* by product using ABC.
- Complete Table 6 to determine *total manufacturing cost* by product using ABC.
- Identify which products are profitable if the company used ABC. Based on your answer, do you agree with the decision to discontinue the *Delete* product?

Solutions to these three questions are presented on the following page. The author presents Table 7 from the case on the white board before class. Acting as class secretary during class, he asks students to provide amounts for columns A through D - one line at a time. During the discussion, some unprepared students may ask how the numbers were derived.

During class discussion of Questions 1, 2, and 3, the author informs the students that he will distribute the *Solution Handout for Questions 1, 2, and 3* on the following page at the conclusion of Question 3 coverage. This guides students to focus on the discussion, rather than transcription of the numbers.

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SOLUTION HANDOUT FOR QUESTIONS 1, 2, & 3

Question 1:

Table 7: (completed): Worksheet for Question 1
 Manufacturing Overhead Cost Assignment for 2013 (using Activity-based Costing [ABC])

Overhead Cost Pool	Cost per Activity	A	B	C	D	Total
Purchasing	200	36,000	3,600	25,200	7,200	\$72,000
Machine Setups	250	37,000	9,250	18,500	27,750	92,500
Material Movements	30	18,000	3,600	10,800	3,600	36,000
Machine Cost	12	126,000	42,000	336,000	336,000	840,000
Facility Rent	15	96,000	48,000	240,000	96,000	480,000
Other Mfg. Overhead	2.2786	23,925	7,975	63,800	63,800	159,500
Total Budgeted O'head		\$ 336,925	\$114,425	\$694,300	\$534,350	\$1,680,000

Question 2:

Table 8: 2013 Estimated Manufacturing Costs (using ABC)

	A	B	C	D	Total
Direct Material Cost	\$90,000	\$90,000	\$180,000	\$540,000	\$900,000
Direct Labor Cost	84,000	84,000	168,000	504,000	840,000
Manufacturing Overhead	336,925	114,425	694,300	534,350	1,680,000
Total Manufacturing Cost	\$510,925	\$288,425	\$1,042,300	\$1,578,350	\$3,420,000
Units Produced	342,000	342,000	684,000	684,000	
Cost per Unit (ABC)	\$1.4939	\$0.8433	\$1.5238	\$2.3075	
Cost per unit (traditional)	\$1.00	\$1.00	\$1.00	\$3.00	
Selling price (from case)	\$1.20	\$1.10	\$1.40	\$3.00	
Gross profit per unit (ABC)	(\$0.2939)	\$0.1567	(\$0.1238)	\$0.6925	← A & C are negative
Gross profit per unit (traditional)	\$0.20	\$0.10	\$0.40	\$0.00	

Question 3:

Table 9: 2013 Pro Forma Income Statement (using ABC)
 (Compare to Case Table 2)

	A	B	C	D	Total
Sales	\$410,400	\$376,200	\$957,600	\$2,052,000	\$3,796,200
Cost of Goods Sold	510,925	288,425	1,042,300	1,578,350	3,420,000
Gross Profit	(\$100,525)	\$87,775	(\$84,700)	\$473,650	\$376,200
Operating Expenses					320,000
Profit Before Taxes					\$56,200

Using ABC, Product D (Delete) is the Ripken's most profitable product. It should not be discontinued. The only other profitable product is Product B (Banish). Product A and Product C are not profitable.

Question 4:

How would you advise Rick Dempsey to explain this information to CEO Paul Richards, Controller Ed Murray, and other members of the senior management team? Explain what activity-based costing is, and provide a brief explanation regarding how ABC improves the accuracy of reported cost of individual products compared to an absorption costing system.

Classroom discussion points regarding Question 4 are presented below:

- Content and formats in *Solution Handout for Questions 1, 2, & 3* are useful for communicating relevant information to managers.
- ABC is a costing system that many companies use as an alternative to traditional normal (actual or standard) absorption costing.
- Costing for direct materials and direct labor are treated the same under absorption costing and ABC. The difference between absorption costing and ABC is in the treatment of manufacturing overhead costs.
- Regarding accuracy of reported costs in the question:
 - A company that uses traditional normal costing establishes a companywide cost “pool” for manufacturing overhead, or a single cost pool for each department, and *arbitrarily allocates* those costs arbitrarily and incorrectly to objects (products in the case) using a budgeted manufacturing overhead rate.
 - A company that adopts ABC establishes multiple cost pools, and then *causally assigns* these costs to cost objects (products in the case) based upon traceable consumption of costs (resources), as students do in the Ripken Products case.
- ABC tracing of overhead cost pools to products (or other cost objects) is an acknowledgment that many overhead costs can be assigned to products based on consumption of resources. This is similar to the assignment of direct materials and direct labor, although it is not as accurate.
- The following example enables managers to understand the fundamental errors inherent in traditional normal costing systems. If a machine is leased for the purpose of manufacturing only one product, ABC will assign all of the lease cost to that product only. Normal costing erroneously spreads the lease cost to all products.
- Companies that use normal costing often carry individual product costs to several decimal places. ABC adopters frequently observe that the number to the left of the decimal is wrong for some products in their normal costing calculations.
- The arbitrary allocations in traditional absorption systems can lead to dysfunctional decisions, such as discontinuing Product D (Delete) in this case.
- Companies may use ABC information as the basis for adjusting product selling prices. This may be difficult if customers determine prices in competitive markets.
- Most companies realize that ABC provides *approximations* of costs, and most of them believe that ABC costs are more accurate than normal absorption-based costs.
- Many companies who use ABC for profitability analysis choose to use absorption costing for financial reporting on their income statements and balance sheets. Absorption costing systems require less effort and cost. In addition, they usually provide allocations of *total* manufacturing costs between inventories and cost of goods sold expenses in the financial statements that are not materially different than corresponding ABC amounts.
- Full product costs include both variable and fixed costs. Because costs are not categorized as variable or fixed in this case, contribution margin analysis cannot be performed without additional information.

EXTENSIONS AND LIMITATIONS OF ABC CONCEPTS AND METHODS

Extensions of ABC include:

- Similar to its use in costing products, ABC can be applied to costing services. In addition, some organizations use ABC methods to assign SG&A (selling, general, and administrative) costs.
- In addition to determining profitability of products and product lines, ABC methods can be used to assess customer profitability.

Limitations of absorption costing and ABC include:

- Reported costs in an absorption costing system are unreliable because they are allocated arbitrarily to products, without regard to which products consume/cause the costs.

- Some overhead costs are difficult to assign to products, even in ABC systems. The president's salary and other *business sustaining* costs are common examples. For this reason, users realize that ABC costs are not precise representations.
- ABC systems are commonly expensive to design and implement.

RELEVANT LITERATURE

The facts that a Google search for “absorption costing” yields more than 250,000 results and an “activity-based costing” search generates more than 4,000,000 results confirm that these are two important topics in cost accounting. Two popular cases for introducing ABC are "Destin Brass Products Co." (Bruns, 1997) and “Classic Pen Co.: Developing an ABC Model” (Kaplan, 1998). Two authoritative books covering the advantages of ABC costs compared to traditional absorption costing are *Cost and Effect: Using Integrated Cost Systems to Drive Profitability* (Kaplan & Cooper, 1998) and *Implementing Activity-Based Cost Management: Moving from Analysis to Action* (Kaplan, Cooper, Maisel, Morrissey, & Oehm, 1992).

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