Guidelines for Refining a Costing System

There are three main guidelines for refining a costing system. In the following sections, we delve more deeply into each in the context of the Plastim example.

1. **Direct-cost tracing.** Identify as many direct costs as is economically feasible. This guideline aims to reduce the amount of costs classified as indirect, thereby minimizing the extent to which costs have to be allocated, rather than traced.
2. **Indirect-cost pools.** Expand the number of indirect-cost pools until each pool is more homogeneous. All costs in a *homogeneous cost pool* have the same or a similar cause-and-effect (or benefits-received) relationship with a single cost driver that is used as the cost-allocation base. Consider, for example, a single indirect-cost pool containing both indirect machining costs and indirect distribution costs that are allocated to products using machine-hours. This pool is not homogeneous because machine-hours are a cost driver of machining costs but not of distribution costs, which has a different cost driver, number of shipments. If, instead, machining costs and distribution costs are separated into two indirect-cost pools (with machine-hours as the cost-allocation base for the machining cost pool and number of shipments as the cost-allocation base for the distribution cost pool), each indirect-cost pool would become homogeneous.
3. **Cost-allocation bases.** As we describe later in the chapter, whenever possible, use the cost driver (the cause of indirect costs) as the cost-allocation base for each homogenous indirect-cost pool (the effect).

Decision Point

How do managers refine a costing system?

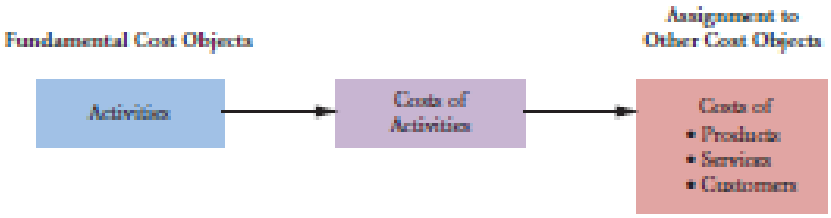
Learning Objective 3

Distinguish between simple and activity-based costing systems

. . . unlike simple systems, ABC systems calculate costs of individual activities to cost products

Activity-Based Costing Systems

One of the best tools for refining a costing system is activity-based costing. **Activity-based costing** (ABC) refines a costing system by identifying individual activities as the fundamental cost objects. An **activity** is an event, task, or unit of work with a specified purpose—for example, designing products, setting up machines, operating machines, and distributing products. More informally, activities are verbs; they are things that a firm does. To help make strategic decisions, ABC systems identify activities in all functions of the value chain, calculate costs of individual activities, and assign costs to cost objects such as products and services on the basis of the mix of activities needed to produce each product or service.[2]



Plastim's ABC System

After reviewing its simple costing system and the potential miscosting of product costs, Plastim decides to implement an ABC system. Direct material costs and direct manufacturing labor costs can be traced to products easily, so the ABC system focuses on refining the assignment of indirect costs to departments, processes, products, or other cost objects. Plastim's ABC system identifies various activities that help explain why Plastim incurs the costs it currently classifies as indirect in its simple costing system. In other words, it breaks up the current indirect cost pool into finer pools of costs related to various activities. To identify these activities, Plastim organizes a team comprised of managers from design, manufacturing, distribution, accounting, and administration.

[2] For more details on ABC systems, see R. Cooper and R. S. Kaplan, *The Design of Cost Management Systems* (Upper Saddle River, NJ: Prentice Hall, 1999); G. Cokins, *Activity-Based Cost Management: An Executive's Guide* (Hoboken, NJ: John Wiley & Sons, 2001); and R. S. Kaplan and S. Anderson, *Time-Driven Activity-Based Costing: A Simpler and More Powerful Path to Higher Profits* (Boston: Harvard Business School Press, 2007).

Defining activities is not a simple matter. The team evaluates hundreds of tasks performed at Plastim before choosing the activities that form the basis of its ABC system. For example, it decides if maintenance of molding machines, operations of molding machines, and process control should each be regarded as a separate activity or should be combined into a single activity. An activity-based costing system with many activities becomes overly detailed and unwieldy to operate. An activity-based costing system with too few activities may not be refined enough to measure cause-and-effect relationships between cost drivers and various indirect costs. Plastim's team focuses on activities that account for a sizable fraction of indirect costs and combines activities that have the same cost driver into a single activity. For example, the team decides to combine maintenance of molding machines, operations of molding machines, and process control into a single activity—molding machine operations—because all these activities have the same cost driver: molding machine-hours.

The team identifies the following seven activities by developing a flowchart of all the steps and processes needed to design, manufacture, and distribute S3 and CL5 lenses.

a. Design products and processes
b. Set up molding machines to ensure that the molds are properly held in place and parts are properly aligned before manufacturing starts
c. Operate molding machines to manufacture lenses
d. Clean and maintain the molds after lenses are manufactured
e. Prepare batches of finished lenses for shipment
f. Distribute lenses to customers
g. Administer and manage all processes at Plastim

These activity descriptions form the basis of the activity-based costing system—sometimes called an *activity list* or *activity dictionary*. Compiling the list of tasks, however, is only the first step in implementing activity-based costing systems. Plastim must also identify the cost of each activity and the related cost driver. To do so, Plastim uses the three guidelines for refining a costing system described on page 146.

1. **Direct-cost tracing.** Plastim's ABC system subdivides the single indirect cost pool into seven smaller cost pools related to the different activities. The costs in the cleaning and maintenance activity cost pool (item d) consist of salaries and wages paid to workers who clean the mold. These costs are direct costs, because they can be economically traced to a specific mold and lens.

2. **Indirect-cost pools.** The remaining six activity cost pools are indirect cost pools. Unlike the single indirect cost pool of Plastim's simple costing system, each of the activity-related cost pools is homogeneous. That is, each activity cost pool includes only those narrow and focused set of costs that have the same cost driver. For example, the distribution cost pool includes only those costs (such as wages of truck drivers) that, over time, increase as the cost driver of distribution costs, cubic feet of packages delivered, increases. In the simple costing system, all indirect costs were lumped together and the cost-allocation base, direct manufacturing labor-hours, was not a cost driver of the indirect costs.

   Determining costs of activity pools requires assigning and reassigning costs accumulated in support departments, such as human resources and information systems, to each of the activity cost pools on the basis of how various activities use support department resources. This is commonly referred to as *first-stage allocation*, a topic which we discuss in detail in Chapters 14 and 15. We focus here on the *second-stage allocation*, the allocation of costs of activity cost pools to products.

3. **Cost-allocation bases.** For each activity cost pool, the cost driver is used (whenever possible) as the cost-allocation base. To identify cost drivers, Plastim's managers consider various alternatives and use their knowledge of operations to choose among them. For example, Plastim's managers choose setup-hours rather than the number of setups as the cost driver of setup costs, because Plastim's managers believe that more complex setups take more time and are more costly. Over time, Plastim's managers can use data to test their beliefs. (Chapter 10 discusses several methods to estimate the relationship between a cost driver and costs.)

The logic of ABC systems is twofold. First, structuring activity cost pools more finely with cost drivers for each activity cost pool as the cost-allocation base leads to more accurate costing of activities. Second, allocating these costs to products by measuring the cost-allocation bases of different activities used by different products leads to more accurate product costs. We illustrate this logic by focusing on the setup activity at Plastim.

Setting up molding machines frequently entails trial runs, fine-tuning, and adjustments. Improper setups cause quality problems such as scratches on the surface of the lens. The resources needed for each setup depend on the complexity of the manufacturing operation. Complex lenses require more setup resources (setup-hours) per setup than simple lenses. Furthermore, complex lenses can be produced only in small batches because the molds for complex lenses need to be cleaned more often than molds for simple lenses. Thus, relative to simple lenses, complex lenses not only use more setup-hours per setup, but they also require more frequent setups.

Setup data for the simple S3 lens and the complex CL5 lens are as follows:

		Simple S3 Lens	Complex CL5 Lens	Total
1	Quantity of lenses produced	60,000	15,000	
2	Number of lenses produced per batch	240	50	
3 = (1) ÷ (2)	Number of batches	250	300	
4	Setup time per batch	2 hours	5 hours	
5 = (3) × (4)	Total setup-hours	500 hours	1,500 hours	2,000 hours

Of the $2,385,000 in the total indirect-cost pool, Plastim identifies the total costs of setups (consisting mainly of depreciation on setup equipment and allocated costs of process engineers, quality engineers, and supervisors) to be $300,000. Recall that in its simple costing system, Plastim uses direct manufacturing labor-hours to allocate all indirect costs to products. The following table compares how setup costs allocated to simple and complex lenses will be different if Plastim allocates setup costs to lenses based on setup-hours rather than direct manufacturing labor-hours. Of the $60 total rate per direct manufacturing labor-hour (p. 143), the setup cost per direct manufacturing labor-hour amounts to $7.54717 ($300,000 ÷ 39,750 total direct manufacturing labor-hours). The setup cost per setup-hour equals $150 ($300,000 ÷ 2,000 total setup-hours).

	Simple S3 Lens	Complex CL5 Lens	Total
Setup cost allocated using direct manufacturing labor-hours:			
$7.54717 × 30,000; $7.54717 × 9,750	$226,415	$ 73,585	$300,000
Setup cost allocated using setup-hours:			
$150 × 500; $150 × 1,500	$ 75,000	$225,000	$300,000

As we have already discussed when presenting guidelines 2 and 3, setup-hours, not direct manufacturing labor-hours, are the cost driver of setup costs.. The CL5 lens uses substantially more setup-hours than the S3 lens (1,500 hours ÷ 2,000 hours = 75% of the total setup-hours) because the CL5 requires a greater number of setups (batches) and each setup is more challenging and requires more setup-hours.

The ABC system therefore allocates substantially more setup costs to CL5 than to S3. When direct manufacturing labor-hours rather than setup-hours are used to allocate setup costs in the simple costing system, it is the S3 lens that is allocated a very large share of the setup costs because the S3 lens uses a larger proportion of direct manufacturing labor-hours (30,000 ÷ 39,750 = 75.47%). As a result, the simple costing system overcosts the S3 lens with regard to setup costs.

Decision Point

What is the difference between the design of a simple costing system and an activity-based costing (ABC) system?

Note that setup-hours are related to batches (or groups) of lenses made, not the number of individual lenses. Activity-based costing attempts to identify the most relevant cause-and-effect relationship for each activity pool, without restricting the cost driver to only units of output or variables related to units of output (such as direct manufacturing labor-hours). As our discussion of setups illustrates, limiting cost-allocation bases in this manner weakens the cause-and-effect relationship between the cost-allocation base and the costs in a cost pool.

Cost Hierarchies

Learning Objective 4

Describe a four-part cost hierarchy

. . . a four-part cost hierarchy is used to categorize costs based on different types of cost drivers—for example, costs that vary with each unit of a product versus costs that vary with each batch of products

A **cost hierarchy** categorizes various activity cost pools on the basis of the different types of cost drivers, or cost-allocation bases, or different degrees of difficulty in determining cause-and-effect (or benefits-received) relationships. ABC systems commonly use a cost hierarchy with four levels—output unit-level costs, batch-level costs, product-sustaining costs, and facility-sustaining costs—to identify cost-allocation bases that are cost drivers of the activity cost pools.

Output unit-level costs are the costs of activities performed on each individual unit of a product or service. Machine operations costs (such as the cost of energy, machine depreciation, and repair) related to the activity of running the automated molding machines are output unit-level costs. They are output unit-level costs because, over time, the cost of this activity increases with additional units of output produced (or machine-hours used). Plastim's ABC system uses molding machine-hours—an output-unit level cost-allocation base—to allocate machine operations costs to products.

Batch-level costs are the costs of activities related to a group of units of a product or service rather than each individual unit of product or service. In the Plastim example, setup costs are batch-level costs because, over time, the cost of this setup activity increases with setup-hours needed to produce batches (groups) of lenses. As described in the table on page 148, the S3 lens requires 500 setup-hours (2 setup-hours per batch × 250 batches). The CL5 lens requires 1,500 setup-hours (5 setup-hours per batch × 300 batches). The total setup costs allocated to S3 and CL5 depend on the total setup-hours required by each type of lens, not on the number of units of S3 and CL5 produced. (Setup costs being a batch-level cost cannot be avoided by producing one less unit of S3 or CL5.) Plastim's ABC system uses setup-hours—a batch-level cost-allocation base—to allocate setup costs to products. Other examples of batch-level costs are material-handling and quality-inspection costs associated with batches (not the quantities) of products produced, and costs of placing purchase orders, receiving materials, and paying invoices related to the number of purchase orders placed rather than the quantity or value of materials purchased.

Product-sustaining costs (service-sustaining costs) are the costs of activities undertaken to support individual products or services regardless of the number of units or batches in which the units are produced. In the Plastim example, design costs are product-sustaining costs. Over time, design costs depend largely on the time designers spend on designing and modifying the product, the mold, and the process. These design costs are a function of the complexity of the mold, measured by the number of parts in the mold multiplied by the area (in square feet) over which the molten plastic must flow (12 parts × 2.5 square feet, or 30 parts-square feet for the S3 lens, and 14 parts × 5 square feet, or 70 parts-square feet for the CL5 lens). As a result, the total design costs allocated to S3 and CL5 depend on the complexity of the mold, regardless of the number of units or batches of production. Design costs cannot be avoided by producing fewer units or running fewer batches. Plastim's ABC system uses parts-square feet—a product-sustaining cost-allocation base—to allocate design costs to products. Other examples of product-sustaining costs are product research and development costs, costs of making engineering changes, and marketing costs to launch new products.

Facility-sustaining costs are the costs of activities that cannot be traced to individual products or services but that support the organization as a whole. In the Plastim example, the general administration costs (including top management compensation, rent, and building security) are facility-sustaining costs. It is usually difficult to find a good cause-and-effect relationship between these costs and the cost-allocation base. This lack of a cause-and-effect relationship causes some companies not to allocate these costs to products and instead to deduct them as a separate lump-sum amount from operating income. Other companies, such as Plastim, allocate facility-sustaining costs to products on some basis—for example, direct manufacturing labor-hours—because management believes all costs should be allocated to products. Allocating all costs to products or services becomes important when management wants to set selling prices on the basis of an amount of cost that includes all costs.

Decision Point

What is a cost hierarchy?

Implementing Activity-Based Costing

Learning Objective 5

Cost products or services using activity-based costing

. . . use cost rates for different activities to compute indirect costs of a product

Now that you understand the basic concepts of ABC, let's use it to refine Plastim's simple costing system, compare it to alternative costing systems, and examine what managers look for when deciding whether or not to develop ABC systems.

Implementing ABC at Plastim

In order to apply ABC to Plastim's costing system, we follow the seven-step approach to costing and the three guidelines for refining costing systems (increasing direct-cost tracing, creating homogeneous indirect-cost pools, and identifying cost-allocation bases that have cause-and-effect relationships with costs in the cost pool). Exhibit 5-3 shows an overview of Plastim's ABC system. Use this exhibit as a guide as you study the following steps, each of which is marked in Exhibit 5-3.

Step 1: Identify the Products That Are the Chosen Cost Objects. The cost objects are the 60,000 S3 and the 15,000 CL5 lenses that Plastim will produce in 2011. Plastim's goal is to first calculate the total costs and then the per-unit cost of designing, manufacturing, and distributing these lenses.

Step 2: Identify the Direct Costs of the Products. Plastim identifies as direct costs of the lenses: direct material costs, direct manufacturing labor costs, and mold cleaning and maintenance costs because these costs can be economically traced to a specific lens or mold.

Exhibit 5-5 shows the direct and indirect costs for the S3 and CL5 lenses using the ABC system. The direct costs calculations appear on lines 6, 7, 8, and 9 of Exhibit 5-5. Plastim classifies all other costs as indirect costs, as we will see in Exhibit 5-4.

Step 3: Select the Activities and Cost-Allocation Bases to Use for Allocating Indirect Costs to the Products. Following guidelines 2 and 3 for refining a costing system, Plastim identifies six activities—(a) design, (b) molding machine setups, (c) machine operations, (d) shipment setup, (e) distribution, and (f) administration—for allocating indirect costs to products. Exhibit 5-4, column 2, shows the cost hierarchy category, and column 4

Exhibit 5-3 Overview of Plastim's Activity-Based Costing System

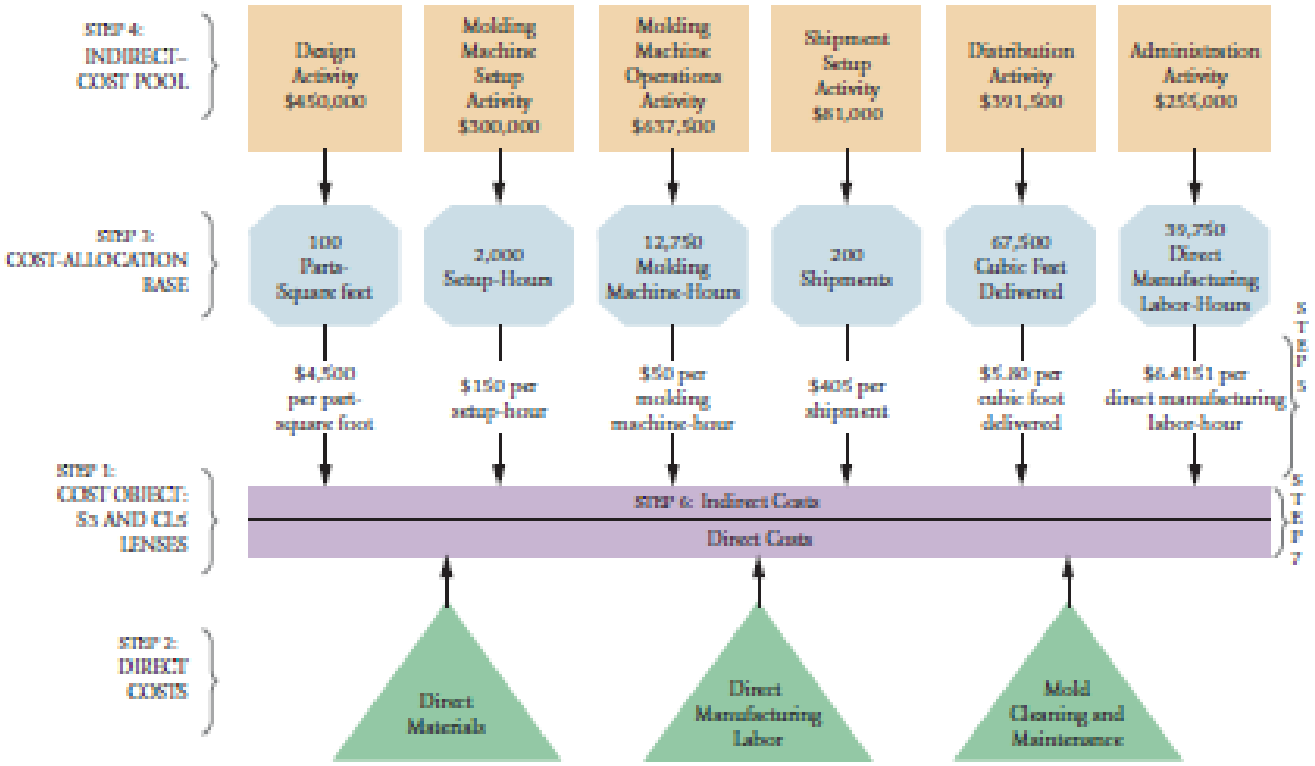


Exhibit 5-4 Activity-Cost Rates for Indirect-Cost Pools

	A	B	C	D	E	F	G	H
1			(Step 4)	(Step 3)		(Step 5)		
2	Activity	Cost Hierarchy Category	Total Budgeted Indirect Costs	Budgeted Quantity of Cost-Allocation Base		Budgeted Indirect Cost Rate		Cause-and-Effect Relationship Between Allocation Base and Activity Cost
3	(1)	(2)	(3)	(4)		(5) = (3) ÷ (4)		(6)
4	Design	Product-sustaining	$450,000	100	parts-square feet	$ 4,500	per parts-square foot	Design Department indirect costs increase with more complex molds (more parts, larger surface area).
5	Setup molding machines	Batch-level	$300,000	2,000	setup-hours	$ 150	per setup-hour	Indirect setup costs increase with setup-hours.
6	Machine operations	Output unit-level	$637,500	12,750	molding machine-hours	$ 50	per molding machine-hour	Indirect costs of operating molding machines increases with molding machine-hours.
7	Shipment setup	Batch-level	$ 81,000	200	shipments	$ 405	per shipment	Shipping costs incurred to prepare batches for shipment increase with the number of shipments.
8	Distribution	Output-unit-level	$391,500	67,500	cubic feet delivered	$ 5.80	per cubic foot delivered	Distribution costs increase with the cubic feet of packages delivered.
9	Administration	Facility sustaining	$255,000	39,750	direct manuf. labor-hours	$6.4151	per direct manuf. labor-hour	The demand for administrative resources increases with direct manufacturing labor-hours.

shows the cost-allocation base and the budgeted quantity of the cost-allocation base for each activity described in column 1.

Identifying the cost-allocation bases defines the number of activity pools into which costs must be grouped in an ABC system. For example, rather than define the design activities of product design, process design, and prototyping as separate activities, Plastim defines these three activities together as a combined "design" activity and forms a homogeneous design cost pool. Why? Because the same cost driver, the complexity of the mold, drives costs of each design activity. A second consideration for choosing a cost-allocation base is the availability of reliable data and measures. For example, in its ABC system, Plastim measures mold complexity in terms of the number of parts in the mold and the surface area of the mold (parts-square feet). If these data are difficult to obtain or measure, Plastim may be forced to use some other measure of complexity, such as the amount of material flowing through the mold that may only be weakly related to the cost of the design activity.

Step 4: Identify the Indirect Costs Associated with Each Cost-Allocation Base. In this step, Plastim assigns budgeted indirect costs for 2011 to activities (see Exhibit 5-4, column 3), to the extent possible, on the basis of a cause-and-effect relationship between the cost-allocation base for an activity and the cost. For example, all costs that have a cause-and-effect relationship to cubic feet of packages moved are assigned to the distribution cost pool. Of course, the strength of the cause-and-effect relationship between the cost-allocation base and the cost of an activity varies across cost pools. For example, the cause-and-effect relationship between direct manufacturing labor-hours and administration activity costs is not as strong as the relationship between setup-hours and setup activity costs.

Some costs can be directly identified with a particular activity. For example, cost of materials used when designing products, salaries paid to design engineers, and depreciation of equipment used in the design department are directly identified with the design activity. Other costs need to be allocated across activities. For example, on the basis of interviews or time records, manufacturing engineers and supervisors estimate the time they will spend on design, molding machine setup, and machine operations. The time to be spent on these activities serves as a basis for allocating each manufacturing engineer's and supervisor's salary

Exhibit 5-5 Plastim's Product Costs Using Activity-Based Costing System

	A	B	C	D	E	F	G
1		60,000			15,000		
2		Simple Lenses (S3)			Complex Lenses (CL5)		
3		Total	per Unit		Total	per Unit	Total
4	Cost Description	(1)	(2) = (1) ÷ 60,000		(3)	(4) = (3) ÷ 15,000	(5) = (1) + (3)
5	Direct costs						
6	Direct materials	$1,125,000	$18.75		$ 675,000	$ 45.00	$1,800,000
7	Direct manufacturing labor	600,000	10.00		195,000	13.00	795,000
8	Direct mold cleaning and maintenance costs	120,000	2.00		150,000	10.00	270,000
9	Total direct costs (Step 2)	1,845,000	30.75		1,020,000	68.00	2,865,000
10	Indirect Costs of Activities						
11	Design						
12	S3, 30 parts-sq.ft. × $4,500	135,000	2.25				} 450,000
13	CL5, 70 parts-sq.ft. × $4,500				315,000	21.00	
14	Setup of molding machines						
15	S3, 500 setup-hours × $150	75,000	1.25				} 300,000
16	CL5, 1,500 setup-hours × $150				225,000	15.00	
17	Machine operations						
18	S3, 9,000 molding machine-hours × $50	450,000	7.50				} 637,500
19	CL5, 3,750 molding machine-hours × $50				187,500	12.50	
20	Shipment setup						
21	S3, 100 shipments × $405	40,500	0.67				} 81,000
22	CL5, 100 shipments × $405				40,500	2.70	
23	Distribution						
24	S3, 45,000 cubic feet delivered × $5.80	261,000	4.35				} 391,500
25	CL5, 22,500 cubic feet delivered × $5.80				130,500	8.70	
26	Administration						
27	S3, 30,000 dir. manuf. labor-hours × $6.4151	192,453	3.21				} 255,000
28	CL5, 9,750 dir. manuf. labor-hours × $6.4151				62,547	4.17	
29	Total indirect costs allocated (Step 6)	1,153,953	19.23		961,047	64.07	2,115,000
30	Total Costs (Step 7)	$2,998,953	$49.98		$1,981,047	$132.07	$4,980,000
31							

costs to various activities. Still other costs are allocated to activity-cost pools using allocation bases that measure how these costs support different activities. For example, rent costs are allocated to activity cost pools on the basis of square-feet area used by different activities.

The point here is that all costs do not fit neatly into activity categories. Often, costs may first need to be allocated to activities (Stage 1 of the 2-stage cost-allocation model) before the costs of the activities can be allocated to products (Stage 2).

Step 5: Compute the Rate per Unit of Each Cost-Allocation Base. Exhibit 5-4, column 5, summarizes the calculation of the budgeted indirect cost rates using the budgeted quantity of the cost-allocation base from Step 3 and the total budgeted indirect costs of each activity from Step 4.

Step 6: Compute the Indirect Costs Allocated to the Products. Exhibit 5-5 shows total budgeted indirect costs of $1,153,953 allocated to the simple lens and $961,047 allocated to the complex lens. Follow the budgeted indirect cost calculations for each lens in Exhibit 5-5. For each activity, Plastim's operations personnel indicate the total quantity of the cost-allocation base that will be used by each type of lens (recall that Plastim operates at capacity). For example, lines 15 and 16 of Exhibit 5-5 show that of the 2,000 total

setup-hours, the S3 lens is budgeted to use 500 hours and the CL5 lens 1,500 hours. The budgeted indirect cost rate is $150 per setup-hour (Exhibit 5-4, column 5, line 5). Therefore, the total budgeted cost of the setup activity allocated to the S3 lens is $75,000 (500 setup-hours × $150 per setup-hour) and to the CL5 lens is $225,000 (1,500 setup-hours × $150 per setup-hour). Budgeted setup cost per unit equals $1.25 ($75,000 ÷ 60,000 units) for the S3 lens and $15 ($225,000 ÷ 15,000 units) for the CL5 lens.

Step 7: Compute the Total Cost of the Products by Adding All Direct and Indirect Costs Assigned to the Products. Exhibit 5-5 presents the product costs for the simple and complex lenses. The direct costs are calculated in Step 2, and the indirect costs are calculated in Step 6. The ABC system overview in Exhibit 5-3 shows three direct-cost categories and six indirect-cost categories. The budgeted cost of each lens type in Exhibit 5-5 has nine line items, three for direct costs and six for indirect costs. The differences between the ABC product costs of S3 and CL5 calculated in Exhibit 5-5 highlight how each of these products uses different amounts of direct and indirect costs in each activity area.

We emphasize two features of ABC systems. First, these systems identify all costs used by products, whether the costs are variable or fixed in the short run. When making long-run strategic decisions using ABC information, managers want revenues to exceed total costs. Second, recognizing the hierarchy of costs is critical when allocating costs to products. It is easiest to use the cost hierarchy to first calculate the total costs of each product. The per-unit costs can then be derived by dividing total costs by the number of units produced.

Decision Point

How do managers cost products or services using ABC systems?

Comparing Alternative Costing Systems

Exhibit 5-6 compares the simple costing system using a single indirect-cost pool (Exhibit 5-1 and Exhibit 5-2) Plastim had been using and the ABC system (Exhibit 5-3 and Exhibit 5-5). Note three points in Exhibit 5-6, consistent with the guidelines for

Exhibit 5-6
Comparing Alternative Costing Systems

	Simple Costing System Using a Single Indirect-Cost Pool (1)	ABC System (2)	Difference (3) = (2) − (1)
Direct-cost categories	2 Direct materials Direct manufacturing labor	3 Direct materials Direct manufacturing labor Direct mold cleaning and maintenance labor	1
Total direct costs	$2,595,000	$2,865,000	$270,000
Indirect-cost pools	1 Single indirect-cost pool allocated using direct manufacturing labor-hours	6 Design (parts-square feet)[1] Molding machine setup (setup-hours) Machine operations (molding machine-hours) Shipment setup (number of shipments) Distribution (cubic feet delivered) Administration (direct manufacturing labor-hours)	5
Total indirect costs	$2,385,000	$2,115,000	($270,000)
Total costs assigned to simple (S3) lens	$3,525,000	$2,998,953	($526,047)
Cost per unit of simple (S3) lens	$58.75	$49.98	($8.77)
Total costs assigned to complex (CL5) lens	$1,455,000	$1,981,047	$526,047
Cost per unit of complex (CL5) lens	$97.00	$132.07	$35.07

[1]Cost drivers for the various indirect-cost pools are shown in parentheses.