CHAPTER 15

Allocation of
Support Department Costs,
Common Costs,
and Revenues

CHAPTER 15 LEARNING OBJECTIVES

1. Distinguish the single-rate method from the dual-rate method

2. Understand how the choice between allocation based on budgeted and actual rates and between budgeted and actual usage can affect the incentives of division managers

3. Allocate multiple supporting-department costs using the direct method, the step-down method and the reciprocal method

ALLOCATING COSTS OF A SUPPORTING DEPARTMENT TO OPERATING DEPARTMENTS

⊙ How a company allocates its overhead and internal support costs – costs related to marketing, advertising and other internal services – among its various production departments or projects can have a big impact on how profitable those departments or projects are.

⊙ Operating (production) department—directly adds value to a product or service.

⊙ Support (service) department—provides the services that assist other internal departments (operating departments and other support departments) in the company.

ALLOCATING COSTS OF A SUPPORTING DEPARTMENT TO OPERATING DEPARTMENTS, CONCLUDED

- Managers face two questions when allocating the costs of a support department to operating departments or divisions:

  1. Should fixed costs of a support departments be allocated to operating divisions?

  2. If fixed costs are allocated, should variable and fixed costs of the support department be allocated in the same way?

TWO METHODS TO ALLOCATE SUPPORT DEPARTMENT COSTS: SINGLE RATE

- Single-rate method—does not distinguish between fixed and variable costs. It allocates costs in each cost pool using the same rate per unit of a single allocation base.

  - A support department would be an example of a cost-pool.

METHODS TO ALLOCATE SUPPORT DEPARTMENT COSTS: DUAL-RATE METHOD

- Dual-rate method—partitions the cost of each support department into two pools, a variable-cost pool and a fixed-cost pool, and
- allocates each pool using a different cost-allocation base.

ALLOCATION BASES

- Under either method, allocation of support costs can be based on one of the three following scenarios:
    1. Budgeted overhead rate and budgeted hours
    2. Budgeted overhead rate and actual hours
    3. Actual overhead rate and actual hours.
- When using either method, managers can allocate support-department costs to operating divisions based on either a budgeted rate or the eventual actual cost rate.
- The latter approach is neither preferred nor widely used; we will illustrate using budgeted rates.

ADVANTAGES AND DISADVANTAGES: SINGLE-RATE METHOD

Advantage #1: Less costly to implement.

Advantage #2: Offers user departments some operational control over the charges they bear.

Disadvantage #1: May lead operating department managers to make sub-optimal decisions that are in their own best interest but may be inefficient for the organization as a whole.

ADVANTAGES AND DISADVANTAGES: DUAL-RATE METHOD

Advantage #1: Guides department managers to make decisions that benefit both the organization as a whole and each department.

Advantage #2: Allocating fixed costs based on budgeted usage helps user departments with both short-run and long-run planning because user departments know the costs allocated to them in advance.

ADVANTAGES AND DISADVANTAGES: DUAL-RATE METHOD, CONCLUDED

Disadvantage #1: Requires managers to distinguish variable costs from fixed costs, which is often a challenging task.

Disadvantage #2: Does not indicate to operating managers the cost of fixed support department resources used because fixed costs are allocated to operating departments based on budgeted rather than actual usage.

Disadvantage #3: Allocating fixed costs on the basis of budgeted long-run usage may tempt some managers to under-estimate their planned usage.

EXAMPLE: SINGLE-RATE METHOD, BUDGETED VERSUS ACTUAL COSTS AND QUANTITIES

- Chocolat Inc. is a producer of premium chocolate based in Palo Alto. The company has a separate division for each of its two products: dark chocolate and milk chocolate. Chocolat purchases ingredients from Wisconsin for its dark chocolate division and from Louisiana for its milk chocolate division. Both locations are the same distance from Chocolat's Palo Alto plant.

- Chocolat Inc. operates a fleet of trucks as a cost center that charges the divisions for variable costs (drivers and fuel) and fixed costs (vehicle depreciation, insurance, and registration fees) of operating the fleet. Each division is evaluated on the basis of its operating income. For 2013, the trucking fleet had a practical capacity of 50 round-trips between the Palo Alto plant and the two suppliers. It recorded the following information:

	A	B	C
		Budgeted	**Actual**
1			
2	Costs of truck fleet	$115,000	$96,750
3	Number of round-trips for dark chocolate division (Palo Alto plant—Wisconsin)	30	30
4	Number of round-trips for milk chocolate division (Palo Alto plant—Louisiana)	20	15

- Using the single-rate method, allocate costs to the dark chocolate division and the milk chocolate division in these three ways.

- Calculate the budgeted rate per round-trip and allocate costs based on round-trips budgeted for each division.

- Calculate the budgeted rate per round-trip and allocate costs based on actual round-trips used by each division.

- Calculate the actual rate per round-trip and allocate costs based on actual round-trips used by each division.

- Describe the advantages and disadvantages of using each of the three methods in requirement 1. Would you encourage Chocolat Inc. to use one of these methods? Explain and indicate any assumptions you made.

1. a. Budgeted rate = $\dfrac{\text{Budgeted indirect costs}}{\text{Budgeted trips}}$ = $115,000/50 trips = $2,300 per round-trip

Indirect costs allocated to Dark C. Division = $2,300 per round-trip $\times$ 30 budgeted round trips
= $69,000

Indirect costs allocated to Milk C. Division = $2,300 per round-trip $\times$ 20 budgeted round trips =
$46,000

b. Budgeted rate = $2,300 per round-trip

Indirect costs allocated to Dark C. Division = $2,300 per round-trip $\times$ 30 actual round trips
= $69,000

Indirect costs allocated to Milk C. Division = $2,300 per round-trip $\times$ 15 actual round trips
= $34,500

c. Actual rate = $\dfrac{\text{Actual indirect costs}}{\text{Actual trips}}$ = $96,750/ 45 trips = $2,150 per round-trip

Indirect costs allocated to Dark C. Division = $2,150 per round-trip $\times$ 30 actual round trips
= $64,500

Indirect costs allocated to Milk C. Division = $2,150 per round-trip $\times$ 15 actual round trips
= $32,250

DUAL-RATE METHOD, BUDGETED VERSUS ACTUAL COSTS, AND PRACTICAL CAPACITY VERSUS ACTUAL QUANTITIES

⦿ Chocolat Inc. decides to examine the effect of using the dual-rate method for allocating truck costs to each round-trip. At the start of 2013, the budgeted costs were as follows:

Variable cost per round-trip	$ 1,350
Fixed costs	$47,500

The actual results for the 45 round-trips made in 2013 were as follows:

Variable costs	$58,500
Fixed costs	38,250
	$96,750

Assume all other information to be the same as in Previous Example.

- Required:

- Using the dual-rate method, what are the costs allocated to the dark chocolate division and the milk chocolate division when (a) variable costs are allocated using the budgeted rate per round-trip and actual round-trips used by each division and when (b) fixed costs are allocated based on the budgeted rate per round-trip and round-trips budgeted for each division?

- From the viewpoint of the dark chocolate division, what are the effects of using the dual-rate method rather than the single-rate method?

SOLUTION

1. Charges with dual rate method.

    Variable indirect cost rate   = $1,350 per trip

    Fixed indirect cost rate   = $47,500 budgeted costs/ 50 round trips budgeted
                                              = $950 per trip

    Dark Chocolate Division
         Variable indirect costs, $1,350 × 30 $40,500
         Fixed indirect costs, $950 × 30   28,500
                                                          $69,000

    Milk Chocolate Division
         Variable indirect costs, $1,350 × 15 $20,250
         Fixed indirect costs, $950 × 20   19,000
                                                          $39,250

- The dual rate changes how the fixed indirect cost component is treated. By using budgeted trips made, the Dark Chocolate Division is unaffected by changes from its own budgeted usage or that of other divisions. When budgeted rates and actual trips are used for allocation (see requirement 1.b. of example (1), the Dark Chocolate Division is assigned the same $28,500 for fixed costs as under the dual-rate method because it made the same number of trips as budgeted. However, note that the Milk Chocolate Division is allocated $19,000 in fixed trucking costs under the dual-rate system, compared to $950 × 15 actual trips = $14,250 when actual trips are used for allocation. As such, the Dark Chocolate Division is not made to appear disproportionately more expensive than the Milk Chocolate Division simply because the latter did not make the number of trips it budgeted at the start of the year.

DIRECT METHOD

- Allocates support costs only to operating departments.
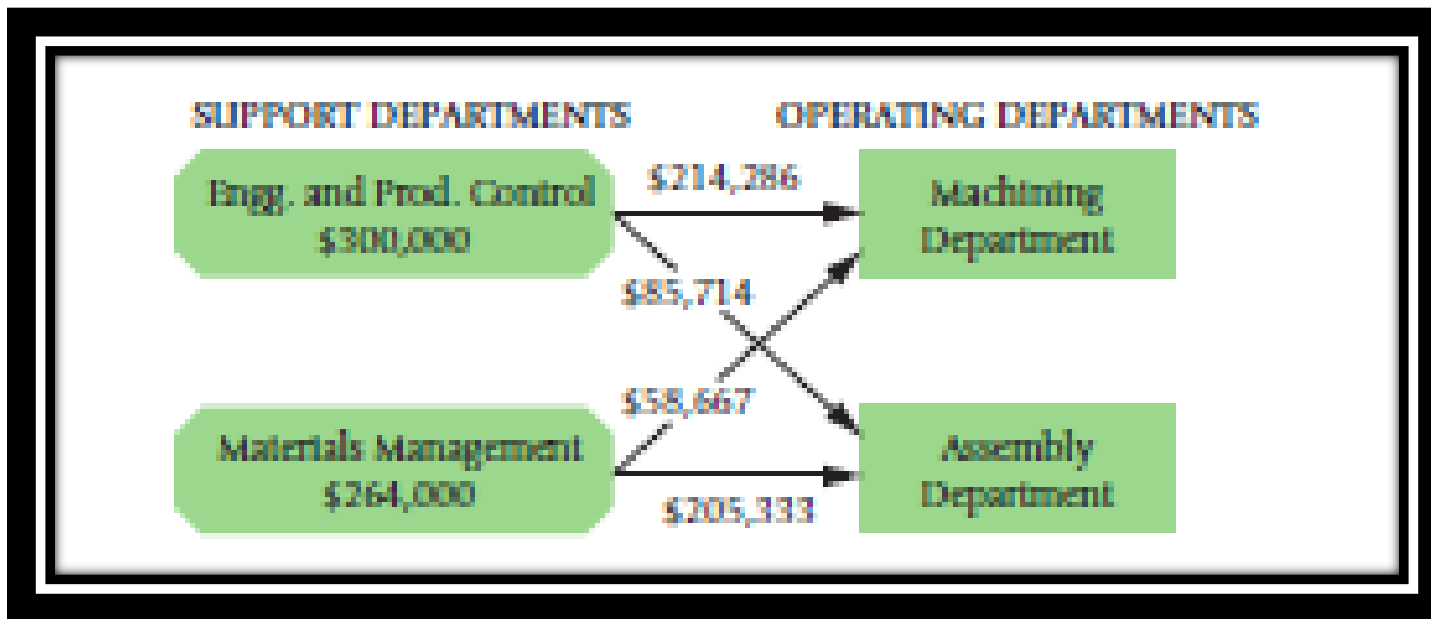- Direct method does not allocate support-department costs to other support departments.

METHODS OF ALLOCATING SUPPORT COSTS TO PRODUCTION DEPARTMENTS

1. Direct-allocates support-department costs directly to operating departments.

2. Step-down-partially allocates support-department costs to other support departments.

3. Reciprocal-fully allocates support-department costs to other support departments.

DATA USED IN COST ALLOCATION EXAMPLES

	A	B	C	D	E	F	G
1		SUPPORT DEPARTMENTS			OPERATING DEPARTMENTS		
2		Engineering and Production Control	Materials Management		Machining	Assembly	Total
3	Budgeted overhead costs						
4	before any interdepartment cost allocations	$300,000	$264,000		$329,000	$227,000	$1,120,000
5	Support work furnished:						
6	By Engineering and Production Control						
7	Budgeted engineering salaries	—	$36,000		$60,000	$24,000	$120,000
8	Percentage	—	30%		50%	20%	100%
9	By Materials Management						
10	Budgeted material-handling labor-hours	400	—		800	2,800	4,000
11	Percentage	10%	—		20%	70%	100%

DIRECT ALLOCATION METHOD ILLUSTRATED

DIRECT ALLOCATION METHOD EXAMPLE

	A	B	C	D	E	F	G
1		SUPPORT DEPARTMENTS			OPERATING DEPARTMENTS		
2		Engineering and Production Control	Materials Management		Machining	Assembly	Total
3	Budgeted overhead costs						
4	before any interdepartment cost allocations	$300,000	$264,000		$329,000	$227,000	$1,120,000
5	Allocation of Engg. And Prod. Control (5/7, 2/7)[a]	(300,000)			214,286	85,714	
6	Allocation of Materials Management (2/9, 7/9)[b]		(264,000)		58,667	205,333	
7							
8	Total budgeted overhead of operating departments	$ 0	$ 0		$601,953	$518,047	$1,120,000
9							
10	[a] Base is ($60,000 + $24,000), or $84,000; $60,000 + $84,000 = 5/7; $24,000 + $84,000 = 2/7.						
11	[b] Base is (800 + 2,800), or 3,600 hours; 800 + 3,600 = 2/9; 2,800 + 3,600 = 7/9.						

STEP-DOWN METHOD

- Also called the sequential allocation method
- Allocates support-department costs to other support departments and to operating. departments in a sequential manner that partially recognizes the mutual services provided among all support departments.

STEP-DOWN ALLOCATION METHOD ILLUSTRATED

SUPPORT DEPARTMENTS

OPERATING DEPARTMENTS

Engg. & Prod. Control
$300,000

$150,000 → Machining Department

$90,000

$60,000

$78,667

Materials Management
$264,000 + $90,000
=$354,000

$275,333 → Assembly Department

STEP-DOWN ALLOCATION METHOD EXAMPLE

	A	B	C	D	E	F	G
1		SUPPORT DEPARTMENTS			OPERATING DEPARTMENTS		
2		Engineering and Production Control	Materials Management		Machining	Assembly	Total
3	Budgeted overhead costs before any						
4	interdepartment cost allocations	$300,000	$264,000		$329,000	$227,000	$1,120,000
5	Allocation of Engg. And Prod. Control (3/10, 5/10, 2/10)[a]	(300,000)	90,000		150,000	60,000	
6			354,000				
7	Allocation of Materials Management (2/9, 7/9)[b]		(354,000)		78,667	275,333	
8							
9	Total budgeted overhead of operating departments	$ 0	$ 0		$557,667	$562,333	$1,120,000
10							
11	[a] Base is ($36,000 + $60,000 + $24,000), or $120,000 ; $36,000 ÷ $120,000 = 3/10; $60,000 ÷ $120,000 = 5/10; $24,000 ÷ $120,000 = 2/10.						
12	[b] Base is (800 + 2,800), or 3,600 hours; 800 ÷ 3,600 = 2/9; 2,800 ÷ 3,600 = 7/9.						

RECIPROCAL METHOD

- Allocates support-department costs to operating departments by fully recognizing the mutual services provided among all support departments.
- Reciprocal method fully incorporates interdepartmental relationships into the support-department cost allocation.
- Also known as the matrix method.

RECIPROCAL ALLOCATION METHOD (REPEATED ITERATIONS) EXAMPLE

		A	B	C	D	E	F	G
			Engineering and Production Control	Materials Management		Machining Department	Assembly Department	Total
3		Budgeted overhead costs before any						
4		interdepartment cost allocations	$300,000	$264,000		$329,000	$227,000	$1,120,000
5		1st Allocation of Engg. And Prod. Control (3/10,5/10,2/10)[a]	($300,000)	90,000		150,000	60,000	
6				$354,000				
7		1st Allocation of Materials Management (1/10,2/10,7/10)[b]	35,400	(354,000)		70,800	247,800	
8		2nd Allocation of Engg. And Prod. Control (3/10,5/10,2/10)[a]	(35,400)	10,620		17,700	7,080	
9		2nd Allocation of Materials Management (1/10,2/10,7/10)[b]	1,062	(10,620)		2,124	7,434	
10		3rd Allocation of Engg. And Prod. Control (3/10,5/10,2/10)[a]	(1,062)	319		531	212	
11		3rd Allocation of Materials Management (1/10,2/10,7/10)[b]	32	(319)		64	223	
12		4th Allocation of Engg. And Prod. Control (3/10,5/10,2/10)[a]	(32)	10		16	6	
13		4th Allocation of Materials Management (1/10,2/10,7/10)[b]	1	(10)		2	7	
14		5th Allocation of Engg. And Prod. Control (3/10,5/10,2/10)[a]	(1)	0		1	0	
15								
16		Total budgeted overhead of operating departments	$ 0	$ 0		$570,237	$549,763	$1,120,000
17								
18		Total support department amounts allocated and reallocated (the numbers in parentheses in the first two columns):						
19		Engineering and production Control: $300,000 + $35,400 + $1,062 + $32 + $1 = $336,495						
20		Materials Management: $354,000 + $10,620 + $319 + $10 = $364,949						
21								
22		[a]Base is $36,000 + $60,000 + $24,000 = $120,000; $36,000 + $120,000 = 3/10; $60,000 + $120,000 = 5/10; $24,000 + $120,000 = 2/10						
23		[b]Base is 400 + 800 + 2,800 = 4,000 labor-hours; 400 + 4,000 = 1/10; 800 + 4,000 = 2/10; 2,800 + 4,000 = 7/10						

RECIPROCAL ALLOCATION METHOD (LINEAR EQUATIONS)

The reciprocal method can also be implemented by formulating and solving linear equations. This requires three steps:
1. Express Support Department Costs and Reciprocal Relationships in the form of linear equations.
2. Solve the set of linear equations to obtain the complete reciprocated costs of each support department.
3. Allocate the complete reciprocated costs of each support department to all other departments on the basis of the usage percentages.

OVERVIEW OF METHODS

- Differences among the three methods' allocations increase as the magnitude of the reciprocal allocations increases and as the differences across operating departments' usage of each support department's services increase.

- Reciprocal is conceptually the most precise because it considers the mutual services provided among all support departments.

- Direct and step-down are simple to compute and understand.

- Direct method is widely used but as computing power to perform repeated iterations increases, more companies find the reciprocal method easier to implement.