Horngrens Cost Accounting A Managerial Emphasis (Canadian) 8th edition Datar Solutions Manual

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CHAPTER 2
AN INTRODUCTION TO COST TERMS AND PURPOSES

The Short-Answer Questions, Exercises, and Problems marked with can be found on MyLab: Accounting. Students can practise them as often as they want, and most feature step-by-step guided instructions to help find the right answer. Items marked with have Excel templates available on MyLab for students to use.

SHORT-ANSWER QUESTIONS

2-1 A cost object is anything for which a separate measurement of costs is desired. Examples include a product, a service, a project, a customer, a brand category, an activity, a department, and a program.

2-2 Direct costs of a cost object are related directly to the particular cost object and can be traced to it in an economically feasible way. Indirect costs of a cost object are costs that arise from common costs shared among distinct types of cost objects and cannot be traced to each type of cost object in an economically feasible way.

2-3 When direct costs are traced to a particular cost object, the resources used are unique to the distinct type of cost object and can be accurately assigned to it. When costs of resources shared unequally among distinct types of cost objects are allocated, managers are less certain whether the cost allocation base, a measure of direct resources consumed, accurately measures the benefit or value added to the distinct type of cost object from its share of common resources consumed. Managers prefer to use more accurate costs in their decisions.

2-4 Factors affecting the classification of a cost as direct or indirect include:

1. the materiality of the cost in question
2. available information-gathering technology
3. design of operations
4. the type of costing system in use.

2-5 A cost driver is a variable that causes a change in total cost, measured throughout a specific time. A change in the quantity of a cost driver used results in a change in the level of total costs. For example, the number of tires per vehicle is a driver of the total cost of tires for each vehicle.

2-6 The relevant range is the range over which the changes in the quantity of the cost driver used have a causal relationship with changes in total cost. Relevant range is important to accurately defining cost behaviour as a linear cost function. Linear cost functions are applied when examining cost–volume–profit (CVP) relationships as long as the volume levels are within the relevant range.

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2-7 The usefulness of a unit cost or rate per unit of resource used depends on whether the causal relationship is true, for example, with fully variable costs. The rate per unit for variable costs is computed by dividing some total cost of the resource used (the numerator) by a corresponding quantity of units of a resource used (the denominator). But when total cost is fully or partially fixed it is wrong to use a constant rate per unit. There is no direct causal relationship between a fixed cost, which is constant, and any quantity of any cost object, either input or output. The fixed cost in the numerator is unchanged but the fixed cost rate will vary as the denominator quantity changes.

2-8 Manufacturing companies purchase materials and components and convert them into various finished goods; pharmaceutical, automotive, and textile companies are examples.

Merchandising-sector companies purchase and then sell tangible products without changing their basic form; retailing or distribution companies are examples.

Service-sector companies produce and provide services or intangible products to their customers; for example, service-sector companies provide engineering design, legal advice, and audits.

2-9 Manufacturing companies typically have one or more of the following three types of inventory:

1. Direct materials inventory. Direct materials on site and awaiting use in the production process.
2. Work-in-process inventory. Goods partially converted from direct materials to goods available for sale, but not yet finished. This is also called work in progress (WIP).
3. Finished goods inventory. Goods completed and available for sale but not yet sold.

2-10 No. Service sector companies have no inventories and, hence, no inventoriable costs.

2-11 Overtime premium is the wage rate paid to workers (for both direct labour and indirect labour) in excess of their straight-time wage rates.

Idle time is a sub-classification of indirect labour that represents wages paid for unproductive time caused by lack of orders, machine breakdowns, material shortages, poor scheduling, and the like.

2-12 Either a product or a service cost is the sum of the costs assigned to it for a specific purpose. Purposes for computing a product cost include:

- Pricing and product mix decisions, which should include the costs of all value-chain functions
- Contracting with government agencies, which will be defined by a contract and may include only total costs of the production business function in the value chain
- Preparing GAAP-compliant financial statements for external reporting

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2-13 Financial accountants classify the actual or historical costs of business transactions during a specific time period in a standardized way. The costs are accumulated for only transactions in a specific classification in general ledger accounts. Management accountants are free to reclassify the reliable costs in general ledger accounts by distinguishing and including only those costs that are relevant to identifying and solving a specific cost-management problem.

EXERCISES

2-14 (10 min.) **Terminology.**

1. Conversion costs
2. fixed cost
3. Inventoriable costs
4. Prime costs
5. Period costs
6. variable cost
7. Indirect
8. Relevant cost

2-15 (15 min.) **Inventoriable costs versus period costs.**

1. Spring water purchased for resale by Sobeys—inventoriable cost of a merchandising company. It becomes part of cost of goods sold when the mineral water is sold.
2. Electricity used at a Toyota assembly plant—inventoriable cost of a manufacturing company. It is part of the manufacturing overhead that is included in the manufacturing cost of a truck finished good.
3. Depreciation on Google's computer equipment—period cost of a service company. Google has no inventory of goods for sale and, hence, no inventoriable cost.
4. Electricity for Sobeys store aisles—period cost of a merchandising company. It is a cost that benefits the current period and is not traceable to goods purchased for resale.
5. Depreciation on Toyota's assembly testing equipment—inventoriable cost of a manufacturing company. It is part of the manufacturing overhead that is included in the manufacturing cost of a truck finished good.
6. Salaries of Sobeys marketing personnel—period cost of a merchandising company. It is a cost that is not traceable to goods purchased for resale. It is presumed not to benefit future periods (or at least not to have sufficiently reliable evidence to estimate such future benefits).
7. Water consumed by Google's engineers—period cost of a service company. Google has no inventory of goods for sale and, hence, no inventoriable cost.
8. Salaries of Google's marketing personnel—period cost of a service company. Google has no inventory of goods for sale and, hence, no inventoriable cost.

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2-16 (15–20 min.) **Classification of costs, service sector.**

Cost object: Each individual focus group
Cost variability: With respect to the number of focus groups

There may be some debate over classifications of individual items, especially with regard to cost variability.

Cost Item	D or I	V or F
A	D	V
B	I	F
C	I	V[a]
D	I	F
E	D	V
F	I	F
G	D	V
H	I	V[b]

[a] Some students will note that phone call costs are variable when each call has a separate charge. It may be a fixed cost if Buyer Research has a flat monthly charge for a line, irrespective of the amount of usage.
[b] Gasoline costs are likely to vary with the number of focus groups. However, vehicles likely serve multiple purposes, and detailed records may be required to examine how costs vary with changes in one of the many purposes served.

2-17 (15–20 min.) **Classification of costs, merchandising sector.**

Cost object: DVD section of store
Cost variability: With respect to changes in the number of DVDs sold
There may be some debate over classifications of individual items. Debate about cost variability is more likely.

Cost Item	D or I	V or F
A	D	F
B	I	F
C	D	V
D	I	F
E	I	F
F	I	V or F
G	I	F
H	D	V

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2-18 (15–20 min.) **Classification of costs, manufacturing sector.**

Cost object: Type of car assembled (Corolla or Geo Prism)
Cost variability: With respect to changes in the number of cars assembled

There may be some debate over classifications of individual items. Debate about cost variability is more likely.

Cost Item	D or I	V or F
A	D	V
B	I	F
C	D	F
D	D	F
E	D	V
F	I	V or F
G	D	V
H	I	F

2-19 (10 min.) **Variable costs, fixed costs, total costs.**

Plan A: 100 minutes × \$0.10 = \$10.00
300 minutes × \$0.10 = \$30.00
500 minutes × \$0.10 = \$50.00

Plan B: 100 minutes = \$16.00
300 minutes = \$16.00
500 minutes = \$16.00 + \$10.00 (200 minutes × \$0.05) = \$26.00

Plan C: 100 minutes = \$20.00
300 minutes = \$20.00
500 minutes = \$20.00 + \$0.80 (20 minutes × \$0.04) = \$20.80

If Compo plans to make 100 minutes of long-distance calls each month, she should choose Plan A; for 300 minutes, choose Plan B; for 500 minutes, choose Plan C.

2-20 (10 min.) **Total costs and unit costs.**

1. Total cost, \$4,800. Unit cost per person, \$4,800 ÷ 400 = \$120

2. Total cost, \$4,800. Unit cost per person, \$4,800 ÷ 4,000 = \$1.20

3. The main lesson of this problem is to alert the student early in the course to the desirability of thinking in terms of total costs rather than unit costs wherever feasible. Changes in the number of cost driver units will affect *total* variable costs but not *total* fixed costs. In our example, it would be perilous to use either the \$9.60 or the \$1.20 unit cost to predict the total cost because the total costs are not affected by the attendance. Instead, the student association should use the \$4,800 total cost. Obviously, if the musical group agreed to work for, say, \$4.80 per person, such a unit variable cost could be used to predict the total cost.

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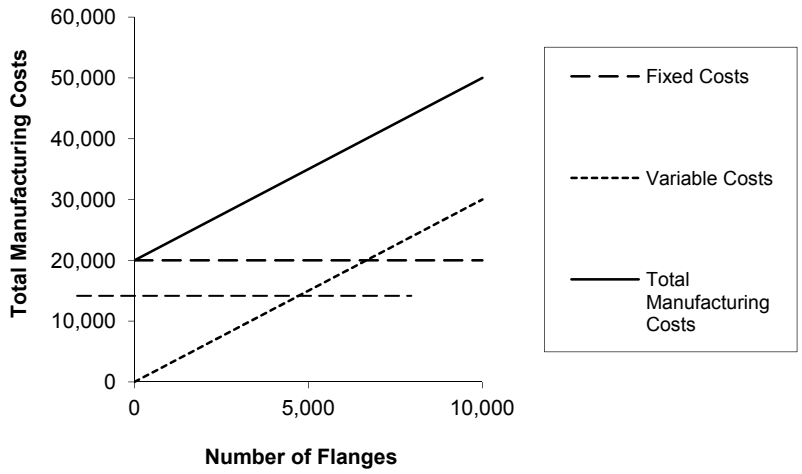
2-21 (15 min.) **Total and unit costs, decision making.**

1.



The variable cost is $1 per flange for materials, and $2 per flange ($20 per hour divided by 10 flanges per hour) for direct manufacturing labour.

The inventoriable (manufacturing) cost per unit for 5,000 flanges is
$3 × 5,000 + $20,000 = $35,000.
Average (unit) cost = $35,000 ÷ 5,000 units = $7 per unit.

This is below Fred's selling price of $8.25 per flange. However, in order to make a profit, Graham's Glassworks also needs to cover the period (non-manufacturing) costs of $10,000, or $10,000 ÷ 5,000 = $2 per unit.

Thus, total costs, both inventoriable (manufacturing) and period (non-manufacturing), for the flanges is $7 + $2 = $9. Graham's Glassworks cannot sell below Fred's price of $8.25 and still make a profit on the flanges.

Alternatively,
At Fred's price of $8.25 per flange:

Revenue	$8.25 × 5,000 =	$41,250
Variable costs	$3.00 × 5,000 =	15,000
Fixed costs		30,000
Operating loss		$(3,750)

Graham's Glassworks cannot sell below $8.25 per flange and make a profit. At Fred's price of $8.25 per flange, the company has an operating loss of $3,750.

2. If Graham's Glassworks produces 10,000 units, the total inventoriable cost will be:
$3 × 10,000 + $20,000 = $50,000.

Average (unit) inventoriable (manufacturing) cost will be $50,000 ÷ 10,000 units
= $5 per flange

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Unit total cost including both inventoriable and period costs will be ($50,000 + $10,000) ÷ 10,000 = $6 per flange, and Graham's Glassworks will be able to sell the flanges for less than Fred and still make a profit.

Alternatively,
At Fred's price of $8.25 per flange:

Revenue	$8.25 × 10,000 =	$82,500
Variable costs	$3.00 × 10,000 =	30,000
Fixed costs		30,000
Operating income		$22,500

Graham's Glassworks can sell at a price below $8.25 per flange and still make a profit. The company earns operating income of $22,500 at a price of $8.25 per flange. The company will earn operating income as long as the price exceeds $6.00 per flange.

The reason the unit cost decreases significantly is that inventoriable (manufacturing) fixed costs and fixed period (nonmanufacturing) costs remain the same regardless of the number of units produced. So, as Graham's Glassworks produces more units, fixed costs are spread over more units, and cost per unit decreases. This means that if you use unit costs to make decisions about pricing, and which product to produce, you must be aware that the unit cost only applies to a particular level of output.

2-22 (20 min.) **Computing and interpreting manufacturing unit costs.**

1. (in millions)

	Supreme	Deluxe	Regular	Total
Direct materials cost	$ 84.00	$ 54.00	$ 62.00	$200.00
Direct manuf. labour costs	14.00	28.00	8.00	50.00
Indirect manuf. costs	42.00	84.00	24.00	150.00
Total manuf. costs	$140.00	$166.00	$ 94.00	$400.00
Fixed costs allocated at a rate of $20M ÷ $50M (direct mfg. labour) equal to $0.40 per dir. manuf. labour dollar (0.40 × $14; 28; 8)	5.60	11.20	3.20	20.00
Variable costs	$134.40	$154.80	$ 90.80	$380.00
Kilograms produced (millions)	90	120	100	
Cost per kg (Total manuf. costs ÷ kilograms produced)	$1.5556	$1.3833	$0.9400	
Variable manuf. cost per kilogram: (Variable manuf. costs ÷ kilograms produced)	$1.4933	$1.2900	$0.9080	

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2. (in millions)

	Supreme	Deluxe	Regular	Total
Based on total manuf. cost per kilogram ($1.5556 ×120; $1.3833 ×160; $0.94 ×180)	$186.67	$221.33	$169.20	$577.20
Correct total manuf. costs based on variable manuf. costs plus fixed costs equal				
Variable costs ($1.4933 ×120; $1.29 ×160; $0.908 ×180)	$179.20	$206.40	$163.44	$549.04
Fixed costs				20.00
Total costs				$569.04

The total manufacturing cost per unit in requirement 1 includes $20 million of indirect manufacturing costs that are fixed irrespective of changes in the volume of output per month, while the remaining variable indirect manufacturing costs change with the production volume. Given the kilogram volume changes for June 2015, the use of total manufacturing cost per kilogram from the past month at a different kilogram volume level (both in aggregate and at the individual product level) will yield incorrect estimates of total costs of $600.53 million in June 2015 relative to the correct total manufacturing costs of $591.44 million calculated using variable manufacturing cost per kilogram times units produced plus the fixed costs of $20 million.

2-23 (15–20 min.) **Variable costs and fixed costs.**

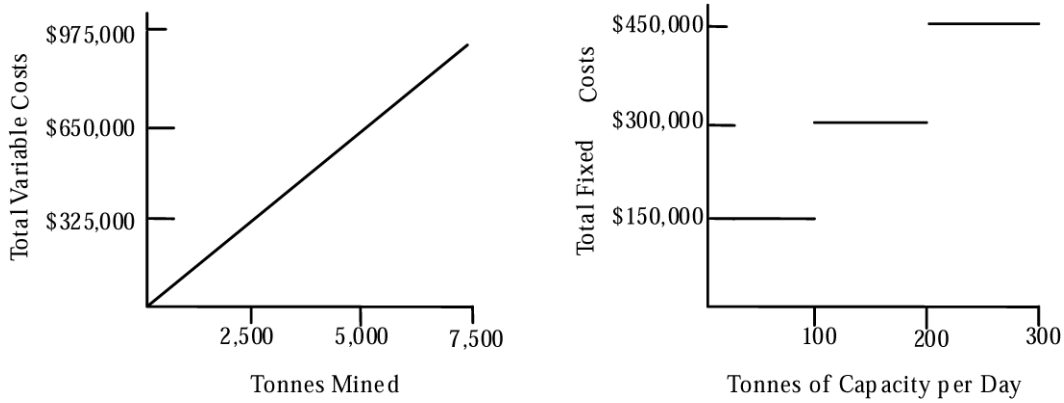
1. Variable cost per tonne of beach sand mined

Subcontractor	$ 80 per tonne
Government tax	50 per tonne
Total	$130 per tonne

Fixed costs per month

0 to 100 tonnes of capacity per day	=	$150,000
101 to 200 tonnes of capacity per day	=	$300,000
201 to 300 tonnes of capacity per day	=	$450,000

2.



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The concept of relevant range is potentially relevant for both graphs. However, the question does not place restrictions on the unit variable costs. The relevant range for the total fixed costs is from 0 to 100 tonnes; 101 to 200 tonnes; 201 to 300 tonnes, and so on. Within these ranges, the total fixed costs do not change in total.

3.

Tonnes Mined per Day (1)	Tonnes Mined per Month (2) = (1) × 25	Fixed Unit Cost per Tonne (3) = FC ÷ (2)	Variable Unit Cost per Tonne (4)	Total Unit Cost per Tonne (5) = (3) + (4)
(a) 180	4,500	$300,000 ÷ 4,500 = $66.67	$130	$196.67
(b) 220	5,500	$450,000 ÷ 5,500 = $81.82	$130	$211.82

The unit cost for 220 tonnes mined per day is $211.82, while for 180 tonnes it is only $196.67. This difference is caused by the fixed cost increment from 101 to 200 tonnes being spread over an increment of 80 tonnes, while the fixed cost increment from 201 to 300 tonnes is spread over an increment of only 20 tonnes.

2-24 (20 min.) **Variable costs, fixed costs, relevant range.**

1. Since the production capacity is 5,000 jaw breakers per month, the current annual relevant range of output is 0 to 60,000 jaw breakers (5,000 jaw breakers × 12 months).

2. Current annual fixed manufacturing costs within the relevant range are $1,000 × 12 = $12,000 for rent and other overhead costs, plus $6,000 ÷ 10 = $600 for depreciation, totaling $12,600.

   The variable costs, the materials, are 10 cents per jaw breaker, or $3,600 (= $0.10 per jaw breaker × 3,000 jaw breakers per month × 12 months) for the year.

3. If demand changes from 3,000 to 6,000, Yumball will need a second machine. Assuming the company buys a second machine identical to the first machine, it will increase capacity from 5,000 jaw breakers per month to 10,000. The annual relevant range will be between 0 and 120,000 jaw breakers (10,000 jaw breakers × 12 months).

   Assume the second machine costs $6,000 and is depreciated using straight-line depreciation over 10 years and zero residual value, just like the first machine. This will add $600 of depreciation per year.

   Fixed costs for next year will increase to $13,200. Total fixed costs for next year equal $600 (depreciation on first machine) + $600 (depreciation on second machine) + $12,000 (rent and other fixed overhead costs).

   The variable cost per jaw breaker next year will be 90% × $0.10 = $0.09. Total variable costs equal $0.09 per jaw breaker × 72,000 jaw breakers = $6,480.

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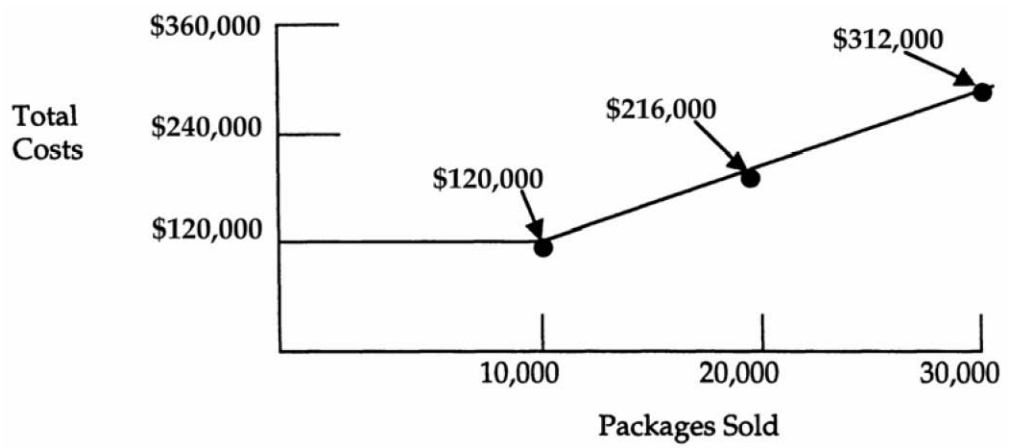
2-25 (20 min.) **Using unit costs for making decisions.**

1. (a) $120,000 ÷ 2,000 = $60.00 per package
   (b) $120,000 ÷ 6,000 = $20.00 per package
   (c) $120,000 ÷ 10,000 = $12.00 per package
   (d) [$120,000 + (10,000 × $9.60)] ÷ 20,000 = $216,000 ÷ 20,000 = $10.80 per package

   The unit cost to ECG decreases on a per-unit basis due to the first $120,000 payment being a fixed cost. The $9.60 amount per package beyond 10,000 units is a variable cost. The cost function is:



2. ECG should not use any of the unit costs in requirement 1 when predicting total costs. Up to 10,000 units, the total cost is a fixed amount.

   Beyond 10,000 units, the total cost is a combination of a fixed amount plus a per-unit (beyond 10,000 unit) variable amount. The total costs at different volume levels cannot be predicted by using the unit cost at a specific volume level. The total cost should be predicted by combining the total fixed costs and total variable costs rather than by multiplying a unit cost amount by the predicted number of packages sold.

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2-26 (20 min.) **Computing cost of goods manufactured and cost of goods sold.**

Schedules: Cost of Goods Manufactured and Cost of Goods Sold

Schedule of Cost of Goods Manufactured
For the Year Ended December 31, 2019
(in thousands)

Direct materials used		$104,400
Direct manufacturing labour costs		40,800
Indirect manufacturing costs:		
Property tax on plant building	$ 3,800	
Plant utilities	20,400	
Depreciation of plant building	10,800	
Depreciation of plant equipment	13,200	
Plant repairs and maintenance	19,200	
Indirect manufacturing labour costs	27,600	
Indirect materials used	13,200	
Miscellaneous plant overhead	5,800	114,000
Manufacturing costs incurred during 2019		259,200
Add beginning work in process inventory, Jan. 1, 2019		24,000
Total manufacturing costs to account for		283,200
Deduct ending work in process inventory, Dec. 31, 2019		31,200
Cost of goods manufactured		$252,000

Schedule of Cost of Goods Sold
For the Year Ended December 31, 2019
(in thousands)

Beginning finished goods, Jan. 1, 2019	$ 32,400
Cost of goods manufactured (above)	250,800
Cost of goods available for sale	283,200
Ending finished goods, Dec. 31, 2019	40,800
Cost of goods sold	$242,400

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2-27 (20 min.) **Statement of comprehensive income and schedule of cost of goods manufactured**

Howell Corporation
Statement of Comprehensive Income
For the Year Ended December 31, 2019
(in millions)

Revenue		$1,140
Cost of goods sold:		
Beginning finished goods, Jan. 1, 2019	$ 84	
Cost of goods manufactured (below)	774	
Cost of goods available for sale	858	
Ending finished goods, Dec. 31, 2019	66	792
Gross margin		348
Marketing, distribution, and customer-service costs		288
Operating income		$ 60

Howell Corporation
Schedule of Cost of Goods Manufactured
For the Year Ended December 31, 2019
(in millions)

Direct materials costs:		
Beginning inventory, Jan. 1, 2019	$ 18	
Purchases of direct materials	390	
Cost of direct materials available for use	408	
Ending inventory, Dec. 31, 2019	24	
Direct materials used		$384
Direct manufacturing labour costs		120
Indirect manufacturing costs:		
Indirect manufacturing labour	72	
Plant supplies used	12	
Plant utilities	36	
Depreciation—plant, building, and equipment	96	
Plant supervisory salaries	6	
Miscellaneous plant overhead	42	264
Manufacturing costs incurred during 2019		768
Add beginning work in process inventory, Jan. 1, 2019		12
Total manufacturing costs to account for		780
Deduct ending work in process, Dec. 31, 2019		6
Cost of goods manufactured		$774

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2-28 (20–25 min.) **Computing cost of goods manufactured and cost of goods sold.**

Schedule of Cost of Goods Manufactured
For the Year Ended December 31, 2019
(in thousands)

Direct materials used		$ 106,800
Direct manufacturing labour costs		38,400
Indirect manufacturing costs:		
Property tax on plant building	$ 4,200	
Plant utilities	20,400	
Depreciation of plant building	14,700	
Depreciation of plant equipment	14,700	
Plant repairs and maintenance	19,200	
Indirect manufacturing labour costs	27,600	
Indirect materials used	14,200	
Miscellaneous plant overhead	5,200	120,200
Manufacturing costs incurred during 2019		265,400
Add beginning work-in-process inventory, Jan. 1, 2019		25,000
Total manufacturing costs to account for		290,400
Deduct ending work-in-process inventory, Dec. 31, 2019		32,200
Cost of goods manufactured		$258,200

Schedule of Cost of Goods Sold
For the Year Ended December 31, 2019
(in thousands)

Beginning finished goods, Jan. 1, 2019	$ 37,400
Cost of goods manufactured (above)	258,200
Cost of goods available for sale	295,600
Ending finished goods, Dec. 31, 2019	44,800
Cost of goods sold	$250,800

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2-29 (20 min.) **Computing cost of goods purchased and cost of sales.**

(a)

Marvin Department Store
Schedule of Cost of Goods Purchased
For the Year Ended December 31, 2019
(in thousands)

Purchases		$155,000
Add transportation-in		7,000
		162,000
Deduct:		
Purchase return and allowances	$4,000	
Purchase discounts	6,000	10,000
Cost of goods purchased		$152,000

(b)

Marvin Department Store
Schedule of Cost Sales
For the Year Ended December 31, 2019
(in thousands)

Beginning merchandise inventory, Jan. 1, 2019	$ 27,000
Cost of goods purchased (above)	152,000
Cost of goods available for sale	179,000
Ending merchandise inventory, Dec. 31, 2019	34,000
Cost of sales	$145,000

2-30 (10–15 min.) **Cost drivers and functions.**

1.

Function	**Representative Cost Driver**
1. Accounting	Number of transactions processed
2. Human resources	Number of employees
3. Data processing	Hours of computer processing unit (CPU)
4. Research and development	Number of research scientists
5. Purchasing	Number of purchase orders
6. Distribution	Number of deliveries made
7. Billing	Number of invoices sent

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2.

Function	Representative Cost Driver
1. Accounting	Number of journal entries made
2. Human resources	Salaries and wages of employees
3. Data processing	Number of computer transactions
4. Research and development	Number of new products being developed
5. Purchasing	Number of different types of materials purchased
6. Distribution	Distance traveled to make deliveries
7. Billing	Number of credit sales transactions

PROBLEMS

2-31 (20 min.) **Labour cost, overtime, and idle time.**

1. (a) Total cost of hours worked at regular rates

42 hours × 12 per hour	$ 504.00
42 hours × 12 per hour	504.00
43 hours × 12 per hour	516.00
40 hours × 12 per hour	480.00
	2,004.00
Minus idle time (5.2 hours × $12 per hour)	62.40
Direct manufacturing labour costs	$1,941.60

(b) Idle time = 5.2 hours × 12 per hour = $62.40

(c) Overtime and holiday premium.

Week 1: Overtime (42–40) hours × Premium, $6 per hour	$ 12.00
Week 2: Overtime (42–40) hours × Premium, $6 per hour	12.00
Week 3: Overtime (43–40) hours × Premium, $6 per hour	18.00
Week 4: Holiday 8 hours × Premium, $12 per hour	96.00
Total overtime and holiday premium	$138.00

(d) Total earnings in May

Direct manufacturing labour costs	$1,941.60
Idle time	62.40
Overtime and holiday premium	138.00
Total earnings	$2,142.00

2. Idle time caused by equipment breakdowns and scheduling mix-ups is an indirect cost of the jobs because it is not related to a specific job.

Overtime premium caused by the heavy overall volume of work is also an indirect cost because it is not related to a particular job that happened to be worked on during the overtime hours. If, however, the overtime is the result of a demanding "rush job," the overtime premium is a direct cost of that job.

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2-32 (30 min.) Direct costs versus indirect costs

1.

	Westec	La Electricidad	BBC
Revenue	$514	$982	$580
Direct materials	300	492	324
Direct manuf. labour	48	120	72
Indirect manufacturing	96	240	144
Total manuf. costs	444	852	540
Gross margin	$ 70	$130	$ 40
Gross margin percentage	13.6%	13.2%	6.9%

2. The BBC job is the only one with overtime charges. The charge is $24 (= 2 hours × $12 per hour overtime rate). The exclusion of this $24 from direct manufacturing labour costs will also affect indirect manufacturing labour costs allocated (at the 200% rate) to the BBC job. The revised gross margin is:

	BBC
Revenue	$ 580
Direct materials	324
Direct manuf, labour	48
Indirect manufacturing	96
Total manuf, costs	468
Gross margin	$ 112
Gross margin percentage	19.3%

The sizable increase in gross margin for BBC is due to $72 of costs being excluded—the $24 of overtime premium plus the $48 of indirect manufacturing costs allocated using the 200% rate.

3. The main pro of charging BBC the $36 per hour labour rate is that this is the actual labour cost. The BBC job was, in fact, done in overtime hours.

The main con is that it penalizes the BBC job for a factor unrelated to its manufacture. The job was brought in one week ago, and there was much flexibility when it could be scheduled. It was done in overtime due to the Westec job being a rushed one.

A preferable approach is to assign all jobs with no special "rush" requirements the same labour cost per hour. This means that differences in job scheduling will not affect job profitability. Jobs that have a "rush" requirement ("hot-hot") are given an extra expediting cost to reflect any additional costs the expedition requires.

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4. The incentive payments would be:

	5% of Revenue	Incentive
Westec	0.05 × $504	$ 25.20
La Electricidad	0.05 × 984	49.20
BBC	0.05 × 580	29.00
		$103.40

	20% of Gross Margin	Incentive
Westec	0.20 × $60	$12.00
La Electricidad	0.20 × 132	26.40
BBC	0.20 × 112*	22.40
		$60.80

*Assumes that OT is not material, so the 200% indirect cost allocation rate will remain. Alternatively, calculate BBC (0.20 × $36 = $7.20).

DMI prefers jobs that produce high gross margins rather than high gross revenue. The 20% incentive better aligns the sales representative's incentive with that of DMI.

DMI should define how revenue and costs are to be measured so that ambiguities are reduced. The revenue and cost rules should be known in advance. If a rushed job is requested by a customer, the salesperson should know the rush-job charge so that he or she knows the consequences of accepting the request.

A fairer incentive for the salespeople would be 5% of revenue, minus a penalty for any discounts given to the customer in order to gain or win the contract. Too large a percentage of the gross margin is attributed in measurement to the performance of the manufacturing and purchasing groups. The salespeople should not be penalized for deficiencies in the other groups.

2-33 (30 min.) **Comprehensive problem on unit costs, product costs.**

1. If 2 kilograms of direct materials are used to make each unit of finished product, 100,000 units × 2 kg, or 200,000 kg, were used at $0.70 per kilogram of direct materials ($140,000 ÷ 200,000 kg). (The direct materials costs of $140,000 are direct materials used, not purchased.) Therefore, the ending inventory of direct materials is 2,000 kg × $0.70 = $1,400

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2.

	Manufacturing Costs for 100,000 units		
	Variable	Fixed	Total
Direct materials costs	$140,000	$ –	$140,000
Direct manufacturing labour costs	30,000	–	30,000
Plant energy costs	5,000	–	5,000
Indirect manufacturing labour costs	10,000	16,000	26,000
Other indirect manufacturing costs	8,000	24,000	32,000
Cost of goods manufactured	$193,000	$40,000	$233,000

Average unit manufacturing cost: $233,000 ÷ 100,000 units = $2.33 per unit
Finished goods inventory in units: $20,970 (given) ÷ $2.33 per unit = 9,000 units

3. Units sold in 2019 = Beginning inventory + Production – Ending inventory
= 0 + 100,000 – 9,000 = 91,000 units
Selling price per unit in 2019: $436,800 ÷ 91,000 = $4.80 per unit

4.

Revenue (91,000 units sold × $4.80)		$436,800
Cost of units sold:		
Beginning finished goods, Jan. 1, 2019	$ 0	
Cost of goods manufactured	233,000	
Cost of goods available for sale	233,000	
Ending finished goods, Dec. 31, 2019	20,970	212,030
Gross margin		224,770
Operating costs:		
Marketing, distribution, and customer-service costs	162,850	
Administrative costs	50,000	212,850
Operating income		$ 11,920

Note: Although not required, the full set of unit variable costs are:

Direct materials costs	$1.40	= $1.93 per unit manuf'd (100,000)
Direct manufacturing labour costs	0.30	
Plant energy costs	0.05	
Indirect manufacturing labour costs	0.10	
Other indirect manufacturing costs	0.08	
Marketing, distribution, and customer-service costs	1.35	per unit sold (91,000)

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2-34 (30 min.) **Budgeted income statement of comprehensive income (continuation of 2-33).**

1.

Target ending finished goods, Dec. 31, 2020	12,000 units
Forecasted sales for 2020	122,000 units
Total finished goods required in 2020	134,000 units
Beginning finished goods, Jan. 1, 2020	9,000 units
Finished goods production required in 2020	125,000 units

2.

Revenue (122,000 units sold × $4.80)		$585,600
Cost of units sold:		
Beginning finished goods, Jan. 1, 2020	$ 20,970	
Cost of goods manufactured	281,250[a]	
Cost of goods available for sale	302,220	
Ending finished goods, Dec. 31, 2020	27,000[c]	275,220
Gross margin		310,380
Operating costs:		
Marketing, distn., and customer-service costs	204,700	
Administrative costs	50,000	254,700[d]
Operating income		$ 55,680

Supporting Computations

a) Manufacturing Costs for 125,000 Units

	Variable	Fixed	Total
Direct materials costs	$175,000[b]	$ –	$175,000
Direct manufacturing labour costs	37,500	–	37,500
Plant energy costs	6,250	–	6,250
Indirect manufacturing labour costs	12,500	16,000	28,500
Other indirect manufacturing costs	10,000	24,000	34,000
Cost of goods manufactured	$241,250	$40,000	$281,250

b) Direct materials costs = 250,000 kg × $0.70/kg = $175,000.

c) The average unit manufacturing costs in 2019 is $281,250 ÷ 125,000 units = $2.25. Finished goods, December 31, 2019 = 12,000 × $2.25 = $27,000.

d)

Variable mktg., distn., and customer-service costs, 122,000 × $1.35	$164,700	
Fixed marketing, distribution., and customer-service costs		40,000
Fixed administrative costs		50,000
		$254,700w

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2-35 (30–40 min.) **Cost of goods manufactured.**

1.

Canseco Company
Statement of Comprehensive Income
For the Year Ended December 31, 2019
(in thousands)

Direct materials costs:		
Beginning inventory, Jan. 1, 2019	$22,000	
Purchases of direct materials	75,000	
Cost of direct materials available for use	97,000	
Ending inventory, Dec. 31, 2019	26,000	
Direct materials used		$ 71,000
Direct manufacturing labour costs		25,000
Indirect manufacturing costs:		
Indirect manufacturing labour costs	$15,000	
Plant insurance	9,000	
Depreciation—plant building and equipment	11,000	
Repairs and maintenance—plant	4,000	39,000
Manufacturing costs incurred during 2019		135,000
Add beginning work in process inventory, Jan. 1, 2019		21,000
Total manufacturing costs to account for		156,000
Deduct ending work in process inventory, Dec. 31, 2019		20,000
Cost of goods manufactured		$136,000

2.

Canseco Company
Income Statement
For the Year Ended December 31, 2019
(in thousands)

Revenue		$300,000
Cost of goods sold:		
Beginning finished goods, Jan. 1, 2019	$ 18,000	
Cost of goods manufactured (Requirement 1)	136,000	
Cost of goods available for sale	154,000	
Ending finished goods, Dec. 31, 2019	23,000	131,000
Gross margin		$169,000
Operating costs:		
Marketing, distribution, and customer-service	$ 93,000	
General and administrative	29,000	122,000
Operating income		$ 47,000

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2-36 (30 min.) **Flow of inventoriable costs.**

			(in millions)
1.	Direct materials inventory, Aug. 1, 2019		$ 90
	Direct materials purchased		360
	Direct materials available		450
	Deduct direct materials used		375
	Direct materials inventory, Aug. 31, 2019		$ 75
2.	Total manufacturing overhead costs		$480
	Subtract: Variable manufacturing overhead costs		250
	Fixed manufacturing overhead costs		$230
3.	Total manufacturing costs		$1,600
	Deduct:		
	Direct materials used	$375	
	Manufacturing overhead	480	855
	Direct manufacturing labour costs		$ 745
4.	Work-in-process inventory, Aug. 1, 2019		$ 200
	Total manufacturing costs		1,600
			1,800
	Deduct cost of goods manufactured (moved into FG)		1,650
	Work-in-process inventory Aug. 31, 2019		$ 150
5.	Finished goods inventory Aug. 1, 2019		$ 200
	Cost of goods manufactured (moved from WIP)		1,650
	Goods available for sale		$1,850
6.	Goods available for sale in August (from req. 5)		$1,850
	Deduct cost of goods sold		1,700
	Finished goods inventory, Aug. 31, 2019		$ 150

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2-37 (25–30 min.) **Statement of comprehensive income and schedule of cost of goods manufactured.**

Powell Corporation
Income Statement
For the Year Ended December 31, 2019
(in millions)

Revenue		$1,140
Cost of goods sold:		
Beginning finished goods, Jan. 1, 2019	$ 70	
Cost of goods manufactured (below)	762	
Cost of goods available for sale	832	
Ending finished goods, Dec. 31, 2019	55	777
Gross margin		363
Marketing, distribution, and customer-service costs		288
Operating income		$ 75

Powell Corporation
Schedule of Cost of Goods Manufactured
For the Year Ended December 31, 2019
(in millions)

Direct materials costs:		
Beginning inventory, Jan. 1, 2019	$ 15	
Purchases of direct materials	390	
Cost of direct materials available for use	405	
Ending inventory, Dec. 31, 2019	20	
Direct materials used		$385
Direct manufacturing labour costs		120
Indirect manufacturing costs:		
Indirect manufacturing labour	60	
Plant supplies used	12	
Plant utilities	36	
Depreciation—plant, building, and equipment	96	
Plant supervisory salaries	6	
Miscellaneous plant overhead	42	252
Manufacturing costs incurred during 2019		757
Add beginning work in process inventory, Jan. 1, 2019		10
Total manufacturing costs to account for		767
Deduct ending work in process, Dec. 31, 2019		5
Cost of goods manufactured		$762

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2-38 (15–20 min.) **Interpretation of statements (continuation of 2-37).**

1. The schedule of costs of goods manufactured in 2-37 can become a schedule of cost of goods manufactured and sold simply by including the beginning and ending finished goods inventory figures in the supporting schedule, rather than directly in the body of the income statement. Note that *cost of goods manufactured* refers to the cost of goods brought to completion (finished) during the accounting period, whether they were started before or during the current accounting period. Some of the manufacturing costs incurred are held back as costs of the ending work in process; similarly, the costs of the beginning work in process inventory become a part of the cost of goods manufactured for 2019.

2. The sales manager's salary would be charged as a marketing cost as incurred by both manufacturing and merchandising companies. It is basically an operating cost that appears below the gross margin line on an income statement. In contrast, an assembler's wages would be assigned to the products worked on. Thus, the wages cost would be charged to Work in Process and would not be expensed until the product is transferred through Finished Goods Inventory to Cost of Goods Sold as the product is sold.

3. The direct–indirect distinction can be resolved only with respect to a particular cost object. For example, in defense contracting, the cost object may be defined as a contract. Then, a plant supervisor's salary may be charged directly and wholly to that single contract.

4. | | | | | |
| --- | --- | --- | --- | --- |
| Direct materials used | = | $385,000,000 ÷ 1,000,000 units | = | $385 per unit |
| Depreciation | = | $ 96,000,000 ÷ 1,000,000 units | = | $96 per unit |

5. Direct materials unit cost would be unchanged at $385. Depreciation unit cost would be $96,000,000 ÷ 1,200,000 = $80 per unit. Total direct materials costs would rise by 20% to $462,000,000 (= $385 per unit × 1,200,000 units), whereas total depreciation would be unaffected at $96,000,000.

6. Unit costs are averages, and they must be interpreted with caution. The $385 direct materials unit cost is valid for predicting total costs because direct materials is a variable cost; total direct materials costs indeed change as output levels change. However, fixed costs like depreciation must be interpreted quite differently from variable costs. A common error in cost analysis is to regard all unit costs as one—as if all the total costs to which they are related are variable costs. Changes in output levels (the denominator) will affect total variable costs, but not total fixed costs. Graphs of the two costs may clarify this point; it is safer to think in terms of total costs rather than in terms of unit costs.

2-39 (30 min.) **Prime costs version conversion costs.**

1. Prime costs are: purchases of direct materials; direct manufacturing labour.

   Conversion costs are: plant utilities; indirect manufacturing labour; depreciation—plant, building, and equipment; miscellaneous manufacturing overhead; marketing, distribution, and customer service costs; plant supplies used; property taxes on plant

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2.

Chan Corporation
Statement of Comprehensive Income
For the Year Ended December 31, 2019
(in millions)

Revenue		$420.00
Cost of goods sold:		
Beginning finished goods, Jan. 1, 2019	$ 48.00	
Cost of goods manufactured (below)	244.80	
Cost of goods available for sale	292.80	
Ending finished goods, Dec. 31, 2019	14.40	278.40
Gross margin		141.60
Marketing, distribution, and customer-service costs		108.00
Operating income		$ 33.60

Chan Corporation
Schedule of Cost of Goods Manufactured
For the Year Ended December 31, 2019
(in millions)

Direct material costs:		
Beginning inventory, Jan. 1, 2019	$ 36.00	
Direct materials purchased	96.00	
Cost of direct materials available for use	132.00	
Ending inventory, Dec. 31, 2019	6.00	
Direct materials used		$126.00
Direct manufacturing labour costs		48.00
Indirect manufacturing costs:		
Plant supplies used	7.20	
Property taxes on plant	1.20	
Plant utilities	6.00	
Indirect manufacturing labour costs	24.00	
Depreciation—plant, building, and equipment	10.80	
Miscellaneous manufacturing overhead costs	12.00	61.20
Manufacturing costs incurred during 2019		235.20
Add beginning work in process inventory, Jan. 1, 2019		12.00
Total manufacturing costs to account for		247.20
Deduct ending work in process inventory, Dec. 31, 2019		2.40
Cost of goods manufactured (to income statement)		$244.80

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2-40 Statement of comprehensive income.

1.

Beagle-grove Company
Statement of Comprehensive Income
For the Year Ended December 31, 2019

Revenue		$1,360,000
Cost of goods sold:		
Beginning finished goods, Jan. 1, 2019	$ 100,000	
Cost of goods manufactured (see below)	960,000	
Cost of goods available for sale	1,060,000	
Ending finished goods, Dec. 31, 2019	150,000	910,000
Gross margin		$ 450,000
Operating costs:		
Marketing and promotion	$ 60,000	
Marketing salaries	100,000	
Shipping costs	70,000	
Customer-service costs	100,000	330,000
Operating income		$ 120,000

Foxwood Company
Schedule of Cost of Goods Manufactured
For the Year Ended December 31, 2019

Direct material costs:		
Beginning inventory, Jan. 1, 2019	$ 40,000	
Direct materials purchased during 2019	460,000	
Cost of direct materials available for use	500,000	
Ending inventory, Dec. 31, 2019	50,000	
Direct materials used		$450,000 (V)
Direct manufacturing labour costs		300,000 (V)
Indirect manufacturing costs:		
Sandpaper	2,000 (V)	
Materials–handling costs	70,000 (V)	
Lubricants and coolants	5,000 (V)	
Miscellaneous indirect manufacturing labour	40,000 (V)	
Plant leasing costs	54,000 (F)	
Depreciation—plant equipment	36,000 (F)	
Property taxes on plant equipment	4,000 (F)	
Fire and casualty insurance on plant equipment	3,000 (F)	214,000

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Manufacturing costs incurred during 2019	964,000
Add beginning work in process inventory, Jan. 1, 2019	10,000
Total manufacturing costs to account for	974,000
Deduct ending work in process inventory, Dec. 31, 2019	14,000
Cost of goods manufactured (to income statement)	$960,000

2. Direct materials unit cost = Direct materials used ÷ Units produced
   = $450,000 ÷ 900,000 = $0.50

   Plant leasing unit cost = Plant leasing costs ÷ Units produced
   = $54,000 ÷ 900,000 = $0.06

3. The direct materials costs are variable, so they would increase in total from $450,000 to $500,000 (= 1,000,000 × $0.50). However, their unit costs would be unaffected: $500,000 ÷ 1,000,000 units = $0.50.

   In contrast, the plant leasing costs of $54,000 are fixed, so they would not increase in total. However, if the plant leasing costs were assigned to units produced, the unit costs would decline from $0.060 to $0.054: $54,000 ÷ 1,000,000 = $0.054.

4. The explanation would begin with the answer to requirement 3. As a consultant, you should stress that unitizing (averaging) of costs that have different behaviour patterns can be misleading. A common error is to assume that a total unit cost, which is often a sum of variable unit costs and fixed unit costs, is an indicator that total costs change in a wholly variable way as the level of production output changes. You must be especially wary about unit fixed costs. Too often, unit fixed costs are erroneously regarded as being indistinguishable from unit variable costs.

5. DML is 33% (= $300,000 ÷ $910,000) of total COGS. This is a material amount based on the normal financial accounting guideline that suggests materiality thresholds of 5% to 10%. Because DML is material it should be classified as a prime rather than a conversion cost. Total conversion costs are $214,000; this is less than the DML. To include DML in the conversion cost would distort the relationship between the contribution to costs made by direct and those made by indirect costs. This would misrepresent the material and efficient causes of the cost of each output unit.

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2-41 (10 min.) **Inventory decision, opportunity costs.**

1. Unit cost, orders of 20,000 $9.00
   Unit cost, order of 240,000 (0.96 × $9.00) $8.64

   Alternatives under consideration:
   (a) Buy 240,000 units at start of year.
   (b) Buy 20,000 units at start of each month.

   Average investment in inventory:

(a) (240,000 × $8.64) ÷ 2	$1,036,800
(b) (20,000 × $9.00) ÷ 2	90,000
Difference in average investment	$ 946,800

   Opportunity cost of interest forgone from 240,000-unit purchase at start of year
   = $946,800 × 0.10 = $94,680

2. No. The $94,680 is an opportunity cost rather than an incremental or outlay cost. No actual transaction records the $94,680 as an entry in the accounting system.

3. The following table presents the two alternatives:

	Alternative A: Purchase 240,000 spark plugs at beginning of year (1)	**Alternative B: Purchase 20,000 spark plugs at beginning of each month (2)**	**Difference (3) = (1) – (2)**
Annual purchase-order costs (1 × $200; 12 × $200)	$ 200	$ 2,400	$ (2,200)
Annual purchase (incremental) costs (240,000 × $8.64; 240,000 × $9)	2,073,600	2,160,000	(86,400)
Annual interest income that could be earned if investment in inventory were invested (opportunity cost) (10% × $1,036,800; 10% × $90,000)	103,680	9,000	94,680
Relevant costs	$2,177,480	$2,171,400	$ 6,080

   Column (3) indicates that purchasing 20,000 spark plugs at the beginning of each month is preferred relative to purchasing 240,000 spark plugs at the beginning of the year because the opportunity cost of holding larger inventory exceeds the lower purchasing and ordering costs. If other incremental benefits of holding lower inventory such as lower insurance, materials handling, storage, obsolescence, and breakage costs were considered, the costs under Alternative A would have been higher, and Alternative B would be preferred even more.

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COLLABORATIVE LEARNING CASES

2-42 (20–25 min.) **Finding unknown balances.**

Let G = given, I = inferred

		CASE 1		CASE 2	
Step 1:	Use gross margin formula				
	Revenue	$32,000	G	$31,800	G
	Cost of goods sold	**A** 20,700	I	20,000	G
	Gross margin	$11,300	G	**C** $11,800	I
Step 2:	Use schedule of cost of goods manufactured formula				
	Direct materials used	$ 8,000	G	$12,000	G
	Direct manufacturing labour costs	3,000	G	5,000	G
	Indirect manufacturing costs	7,000	G	**D** 6,500	I
	Manufacturing costs incurred	18,000	I	23,500	I
	Add beginning work in process, Jan. 1, 2018	0	G	800	G
	Total manufacturing costs to account for	18,000	I	24,300	I
	Deduct ending work in process, Dec. 31, 2018	0	G	3,000	G
	Cost of goods manufactured	$18,000	I	$21,300	I
Step 3:	Use cost of goods sold formula				
	Beginning finished goods inventory, Jan. 1, 2018	$ 4,000	G	4,000	G
	Cost of goods manufactured	18,000	I	21,300	I
	Cost of goods available for sale	22,000	I	25,300	I
	Ending finished goods inventory, Dec. 31, 2018	**B** 1,300	I	5,300	G
	Cost of goods sold	$20,700	I	$20,000	G

For case 1, do steps 1, 2, and 3 in order.
For case 2, do steps 1, 3, and then 2.

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2-43 (20–25 min.) **Labour-cost ethics, governance.**

1. No. The direct manufacturing labour costs are not 20% or greater of total manufacturing costs. Direct manufacturing labour costs are $410,000 which are 16.4% of total manufacturing costs, $410,000 ÷ $2,500,000 = 16.4%.

2. Buyoung Kim can ask the controller to reclassify at least two of the costs that are currently reported as indirect manufacturing costs to direct manufacturing labour costs. The most logical are the fringe benefits and some of the overtime costs, particularly if it can be argued that some of the overtime was directly caused by jobs. The fringe benefits are logical because they are not only the largest, but can be argued to be a part of normal cost of manufacturing labour. Fringe benefits related to direct manufacturing labour costs together with some of the overtime premium could bring the total direct manufacturing labour cost over the minimum $500,000.

   Justification for reclassifying vacation and sick time is similar to that of fringe benefits—that it is a normal cost of labour since it is part of and can be traced to the direct manufacturing labourer's payment. It is harder to justify reclassifying idle time, since it is difficult to identify a specific job that the idle time relates to. Idle time is also the smallest cost item.

3. The controller should not reclassify overhead costs as direct manufacturing labour costs just so the firm can reap tax benefits, particularly if the changes would violate the company's policy of computing direct manufacturing labour costs. The idea of cost classification is to allow internal (and external) decision making by clarifying what each cost item represents. Also, if costs in only the Costa Melon plant are reclassified, it will be harder for XKY to evaluate the Costa Melon plant, when compared to XKY's other plants. Nevertheless, some of the arguments presented in requirement 2 can be justified and could prompt a reevaluation of XKY's direct manufacturing labour classifications.

2-44 (30 min.) **Classifying costs for managerial decisions.**

1. The three factors that Diamond should consider in pricing decisions are:

   Customers. The major customers ("guests" to Diamond) of the Galaxy are business travellers who predominantly stay on a Sunday-through-Thursday basis. Diamond should consider these issues:

   (a) Will some of the $180/$216-a-night customers staying Sunday through Thursday transfer their business to Friday or Saturday for reduced rates? If a sizable number of these customers can transfer their business to Friday or Saturday nights, Diamond should be reluctant to make sizable weekend price discounts.

   (b) Will a new set of customers be attracted to the Galaxy with a reduced weekend rate, people who would not be attracted at the $180/$216-a-night rates?

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(c) How will seasonality affect the business? Will there be more tourists, and therefore less need for a discount, at certain times of the year?

The business customers of Galaxy likely will understand cost–volume–profit relationships for hotels and not be offended at different rates for different days of the week. "Off-peak" pricing is an accepted convention in many industries (such as in telecommunications and airlines).

Competitors. Many prestige hotels already offer sizable price discounts on weekends. Moreover, cuts of up to 50% are the nominal price discounts. The additional items included in weekend packages (such as breakfast or a bottle of champagne) add to the effective price discount.

Costs. The variable costs of servicing each room are only $24 a night per single occupancy and $26.40 a night per double occupancy. Any room rate above these amounts will make a positive contribution to Galaxy's operating income.

It is an accepted convention that weekend rates at Vancouver's prestige hotels will be lowered on Friday and Saturday nights. Diamond may want to offer moderate price reductions and add other discounted items in the weekend package. The approach may help maintain the policy of treating guests as "royalty."

A Finnish student commented that hotels in Finland provide customers who have a high volume of business in peak periods with complimentary rooms in the off-peak period.

2. The customers, competitors, and cost factors that apply to setting the rates for Grey Cup weekend include:

Customers. The likely customers can be classified as:

(a) long-term Galaxy hotel customers, and

(b) other customers.

Charging the market rate (even if it is $360 a night) is not likely to alienate other customers. Diamond's problem lies with long-term customers. He may want to offer preferred reservations or "normal" weekday ($180/$216-a-night) rates to his regular customers on Grey Cup weekend.

Competitors. Several four-star prestige hotels are already advertising $360 a night rates. Thus, Galaxy will not be viewed as the first to adopt an "aggressive price-gouging" approach.

Hotels often increase their rates because of increased demand even when costs do not increase. It is unlikely that the Galaxy chain would be singled out for negative publicity from such a policy, especially if it made an effort to give preferential bookings and rates to its regular customers.

Costs. The variable costs of servicing each room are the same as in the answer to requirement 1.

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2-45 (30 min.) **Cost analysis, litigation risk, governance.**

1. Reasons for Savage not wanting Nash to include the potential litigation costs include:
   (a) Genuine belief that the product has no risk of future litigation. Note that she asserts "she has total confidence in her medical research team."
   (b) Concern that the uncertainties about litigation are sufficiently high to make any numerical estimate "meaningless."
   (c) Concern that inclusion of future litigation costs would cause the board of directors to vote against the project. Savage may be "overly committed" to the project and wants to avoid showing information that prompts questions she prefers not be raised.
   (d) Avoid "smoking gun" memos being included in the project evaluation file. Savage may believe that if subsequent litigation occurs, the plaintiffs will "inappropriately" use a litigation cost line item as "proof" FY "knew the product had health problems" that were known to management at the outset.

2.

	No litigation	With litigation
Unit cost to FY	$144.00	$276.00
Physician price	172.80	331.20
Patient's price	432.00	432.00
FY's margin	28.80	55.20
Physician's margin	259.20	100.80

The selling price would be $828 (= $276 × 3) to maintain the triple-the-cost target.
The percentage decrease is: 61.11% [= (259.20 – 100.80) / 259.20].

Since each treatment is planned to cost patients $432, the new selling price of $331.20 will drop the doctors' margin to only $100.80 from the planned margin of $259.20. This would probably result in the doctors not having much incentive to promote the product. In fact, it may be quite possible that the doctors may not attempt to prescribe the treatment at such low margin because of their own exposure to liability.

3. Nash has already registered his concern to Savage. The difficulty is that Savage asked Nash not to include the possible litigation in his presentation. If there is no record of this presentation, then Nash may have several concerns.
   (a) He may be accused at a later stage of not anticipating the costs of litigation. If litigation does occur, some people will try to distance themselves from the problems. It may be to Nash's advantage to have a record of his early concerns. (Although plaintiffs may make Nash's life very difficult if they get access to Nash's files.) Nash may want to keep some record of his presentation to Savage.
   (b) He may be portrayed as not being a "team player" if he continues his objections. Savage may have to silence his concerns if he decides to stay at FY.
   (c) He may have difficult ethical objections with Savage's behaviour. If he thinks she is acting unethically, his main options are to speak to her first (at least one time), speak to her supervisor (probably chairman of the company), or, as a final resort, resign.

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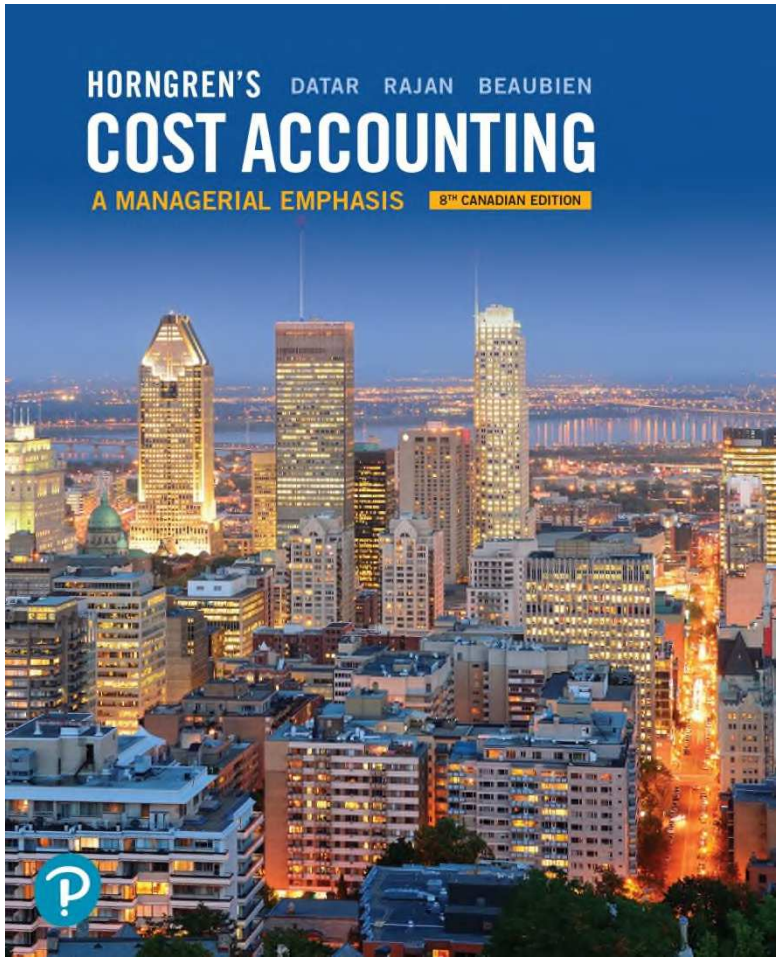
Horngren's Cost Accounting: A Managerial Emphasis

Eighth Canadian Edition



Chapter 2

An Introduction to Cost Terms and Purposes

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Learning Objectives (1 of 2)

1. Identify and distinguish between two manufacturing cost classification systems (direct and indirect, prime and conversion)
2. Differentiate fixed from variable cost behaviour and explain the relationship of cost behaviour to direct and indirect cost classifications.
3. Interpret unitized fixed costs appropriately when making cost management decisions.

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Learning Objectives (2 of 2)

4. Apply cost information to produce a GAAP-compliant statement of comprehensive income showing proper cost of goods sold and a statement of financial position showing proper inventory valuation.

5. Explain cost identification, classification, and management systems and their use within the decision framework.

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Basic Cost Terminology (1 of 2)

- Cost
  - A resource sacrificed or foregone to achieve a specific objective usually measured as a monetary amount paid
  - To answer the question “What does it cost?” requires knowing what “it” is and what problem the cost information will be applied to
- Cost Object
  - Any “object” such as a product, machine, service, or process for which cost information is accumulated

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Basic Cost Terminology (2 of 2)

- Cost Accumulation
  - Collection of cost data in an organized way
  - Management Accountants refer to accumulated costs as Cost Pools
- Cost Assignment
  - Systematically links an actual cost pool to a distinct cost object

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Direct and Indirect Costs

- Direct Costs
  - Can be traced to a cost object in a cost-effective way, using manual or electronic documentation
  - Example: cost of tires in the manufacture of an automobile
- Indirect Costs
  - Cannot be traced to a cost object in a cost-effective way because the benefits from the use of the resources are shared among diverse cost objects
  - Example: cost of electricity to run the factory

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Direct Cost Examples

- Direct Material costs (DM)
  - Acquisition costs of all materials that become part of the cost object *and* ***can be traced*** *to the cost object in an economically feasible way*
  - Example: raw materials, parts, freight-in, sales taxes, customs duties
- Direct Manufacturing Labour costs (DML)
  - Compensation of manufacturing labour *that* ***can be traced*** *to a cost object in an economically feasible way*
  - Example: wages of assembly line workers

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Indirect Cost Examples

- Indirect manufacturing costs (MOH)
  - Manufacturing costs related to the cost object that ***cannot be traced*** *to the cost object in an economically feasible way*
  - Example: depreciation, maintenance supplies, supervisor's salaries
  - Also referred to as manufacturing overhead costs or factory overhead costs

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Prime and Conversion Costs

- Prime Costs
  - Direct manufacturing costs
- Conversion costs
  - All manufacturing costs other than DM required to covert DM to finished goods

$$\text{Prime costs} = \text{DM} + \text{DML}$$

$$\text{Conversion costs} = \text{DML} + \text{MOH}$$

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Fixed and Variable Costs

- Variable costs (VC)
  - Change in total in proportion to changes in output within a relevant range (cost per unit is constant)
  - Constant on a per unit basis
- Fixed costs (FC)
  - Constant in total within a relevant range of output
  - Change on a per unit basis as level of activity or volume changes

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Cost Behaviour Summarized

	Total Dollars	Cost per Unit
Variable Costs	Change in proportion with output **More output = More cost**	Unchanged in relation to output
Fixed Costs	Unchanged in relation to output	Change inversely with output **More output = lower cost per unit**

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Cost Behaviour Visualized

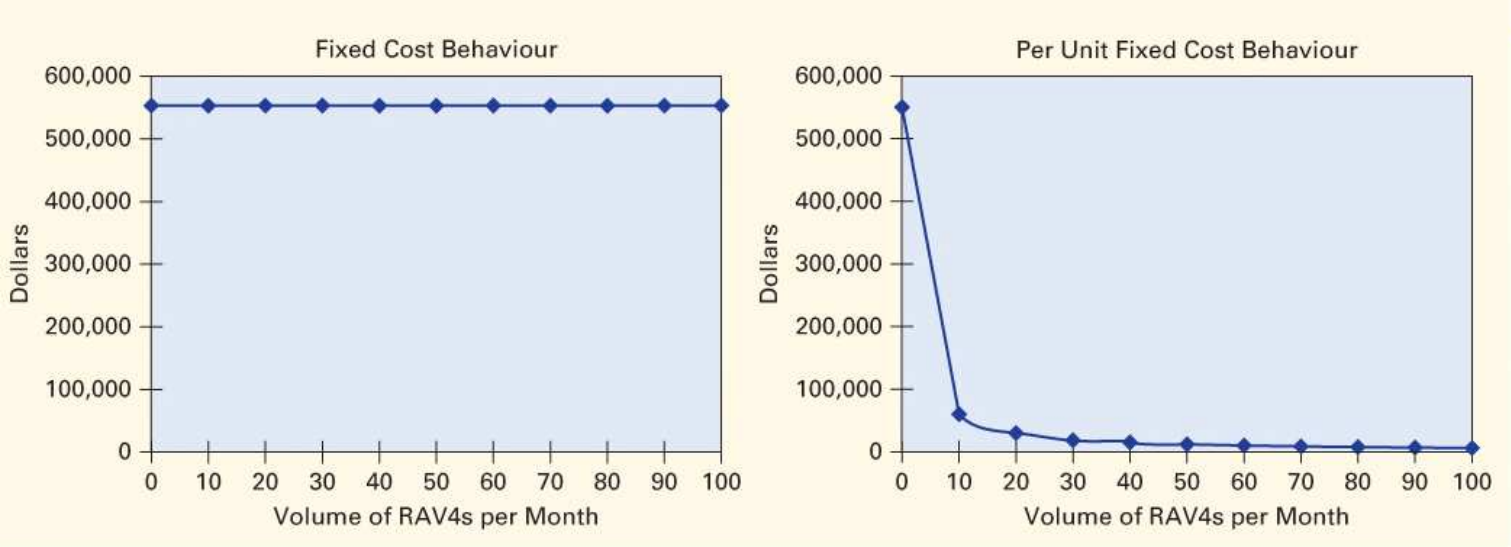

Exhibit 2-3 Cost Behaviour of Monthly Fixed Costs

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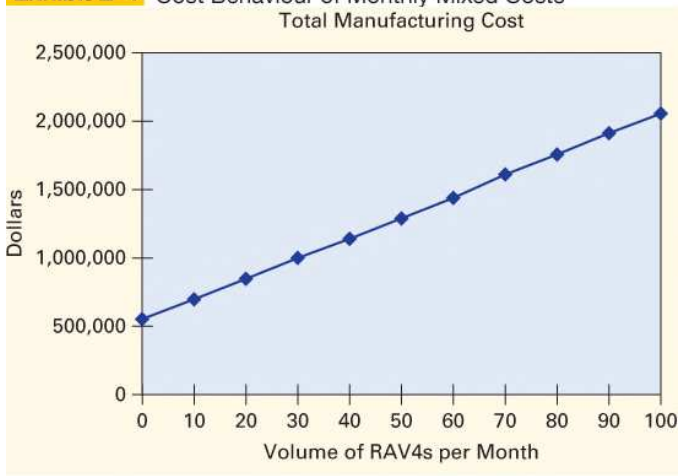
Exhibit 2-4 Cost Behaviour of Monthly Mixed Costs



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Multiple Classification of Costs Visualized

Cost-Behavior Pattern	Assignment of Costs to Cost Object: Direct Costs	Assignment of Costs to Cost Object: Indirect Costs
Variable Costs	• Cost object: BMW X5s produced Example: Tires used in assembly of automobile	• Cost object: BMW X5s produced Example: Power costs at Spartanburg plant. Power usage is metered only to the plant, where multiple products are assembled.
Fixed Costs	• Cost object: BMW X5s produced Example: Salary of supervisor on BMW X5 assembly line	• Cost object: BMW X5s produced Example: Annual lease costs at Spartanburg plant. Lease is for whole plant, where multiple products are produced.

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Total Costs and Unit Costs

- Decision makers should think in terms of relevant costs (rather than unit costs)
  - The higher the quantity produced by a capital asset (a FC) the lower the average FC per unit
  - However total fixed cost (FC) is constant
- As a general rule, first calculate total costs, then calculate a unit cost (if it is needed for a particular decision)

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Period and Inventoriable Costs

- Period Costs
  - Little evidence of future benefit (not considered an asset), therefore expensed in the period incurred
  - Are all the costs on the income statement other than cost of goods sold
- Inventoriable (Product) Costs
  - The accumulation of all costs to manufacture or purchase inventory for resale
  - Inventoriable costs become cost of goods sold on the Statement of Comprehensive Income

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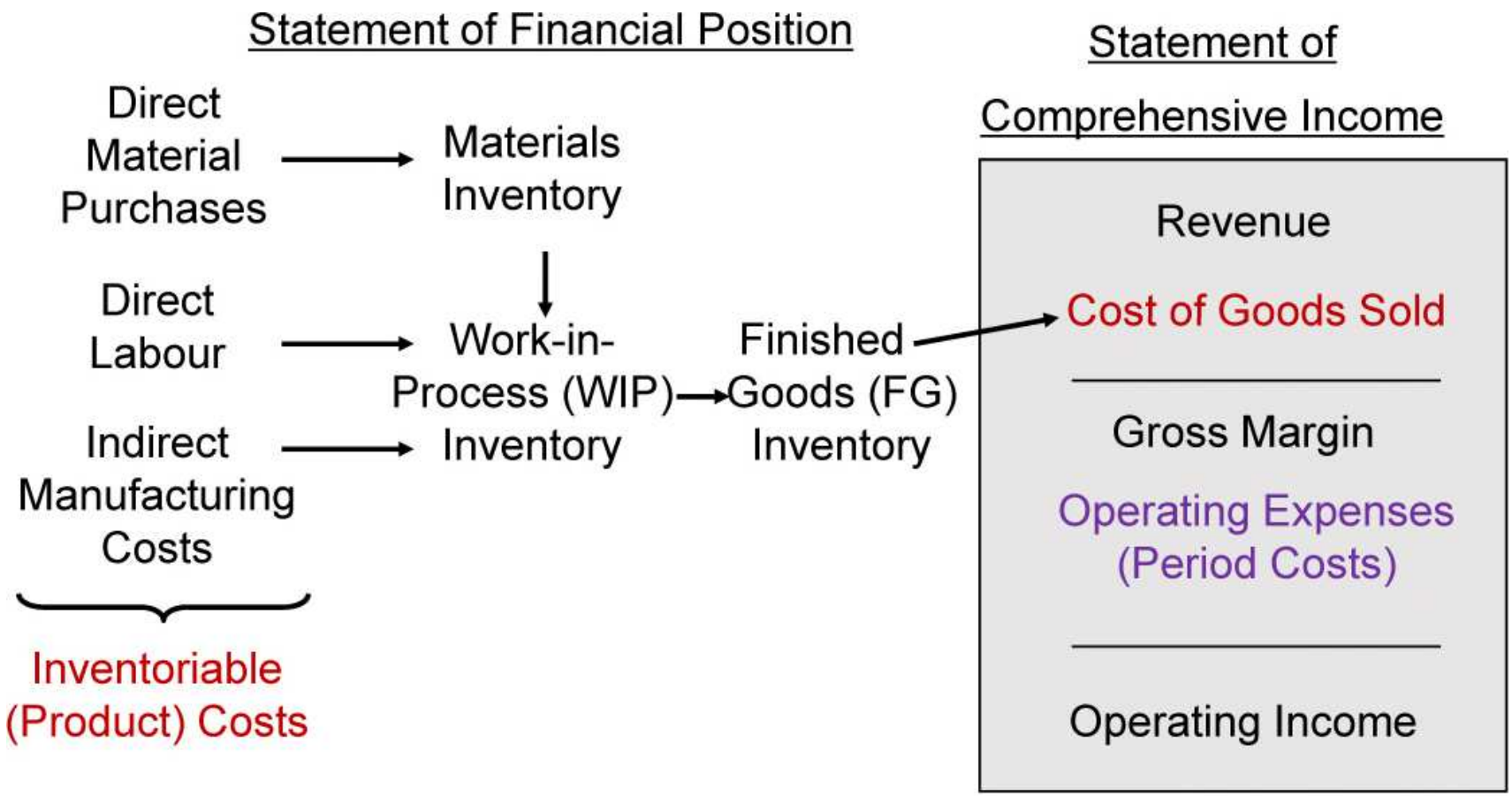
Costs in a Manufacturing Company



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The Flow of Inventoriable Costs

- 4 Steps of create a Statement of Comprehensive Income for a manufacturing company:
  1. Cost of direct materials used
  2. Total manufacturing costs incurred
  3. Cost of Goods Manufactured
  4. Cost of Goods Sold

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Cost of Goods Manufactured

Exhibit 2-8 Tech1 Statement of Comprehensive Income

File Edit View Insert Format Tools Data Window Help

		A	B	C	D
	1	**PANEL A: COST OF GOODS MANUFACTURED (COGM)**			
	2	**Tech1**			
	3	**Schedule of Cost of Goods Manufactured***			
	4	**For the Year Ended December 31 (in $ thousands)**			
STEP 1	5	Direct materials:			
	6	Beginning inventory January 1	$11,000		
	7	Purchases of direct materials	73,000		
	8	Cost of direct materials available for use	84,000		
	9	Ending inventory December 31	(8,000)		
	10	Direct materials used		$ 76,000	
STEP 2	11	Direct manufacturing labour		9,000	
	12	Manufacturing overhead:			
	13	Indirect manufacturing labour	7,000		
	14	Supplies	2,000		
	15	Utilities	5,000		
	16	Depreciation on manufacturing plant	2,000		
	17	Manufacturing equipment lease costs	3,000		
	18	Miscellaneous	1,000		
	19	Total manufacturing overhead		20,000	
STEP 3	20	Manufacturing costs incurred		105,000	
	21	Beginning work-in-process inventory January 1		6,000	
	22	Total manufacturing costs to account for		111,000	
	23	Ending work-in-process inventory December 31		(7,000)	
	24	Cost of goods manufactured (COGM transferred to statement of comprehensive income)		$ 104,000	

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Multiple-Step Income Statement

Exhibit 2-8 Tech1 Statement of Comprehensive Income (continued)

	25			
	26	**PANEL B: STATEMENT OF COMPREHENSIVE INCOME**		
	27	**Tech1**		
	28	**Statement of Comprehensive Income**		
	29	**For the Year Ended December 31 (in $ thousands)**		
	30	Revenue		$210,000
STEP 4	31	Cost of goods sold:		
	32	Beginning finished goodsinventory January 1	$22,000	
	33	Cost of goods manufactured (COGM: see Panel A)	104,000	
	34	Cost of goods available for sale (COGAS)	126,000	
	35	Ending finished goods inventory December 31	(18,000)	
	36	Cost of goods sold (COGS)		108,000
	37	Gross margin		102,000
	38	Operating expenses:		
	39	R&D, Design, Marketing, Distribution, Customer Service	(70,000)	
	40	Total operating expenses		(70,000)
	41	Operating income		$ 32,000
	42			

**Note*: This schedule can become a Schedule of Cost of Goods Manufactured and Sold simply by including the beginning and ending finished goods inventory figures in the supporting schedule rather than in the body of the statement of comprehensive income.

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Measuring and Classifying Costs Requires Judgement

- Definition and classification of costs depends on the decision, the cost object and the company
- Measuring Labour Costs
  - Direct manufacturing labour costs can be traced to individual products
  - Many ways to classify indirect labour (factory office staff, factory security, rework, overtime, idle time, manager's salary, health care)

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Overtime Premiums and Idle Time

- Overtime premiums and idle time are usually considered indirect costs or overhead costs (they are not related to a particular product)
  - Overtime Premiums are the wage rate paid in excess of the straight wage rates
  - Idle Time is the wages paid for unproductive time caused by lack of orders, machine or computer breakdowns, poor scheduling, etc.

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Decision Framework and Flexibility of Costing Methods

- Different decisions often require different measures of product cost
- Use the 5-step decision-making process to classify costs depending on the decision:
  1. Identify the problem
  2. Obtain information
  3. Predict the future
  4. Decide among alternatives
  5. Implement decision, evaluate performance, learn

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Different Costs for Different Purposes

- A product cost is the sum of costs assigned to a product for a specific purpose, such as:
  - To identify and manage cost-control problems
  - For product pricing and product emphasis
  - For contracting with government agencies
  - For Financial Statements

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Different Product Costs for Different Purposes

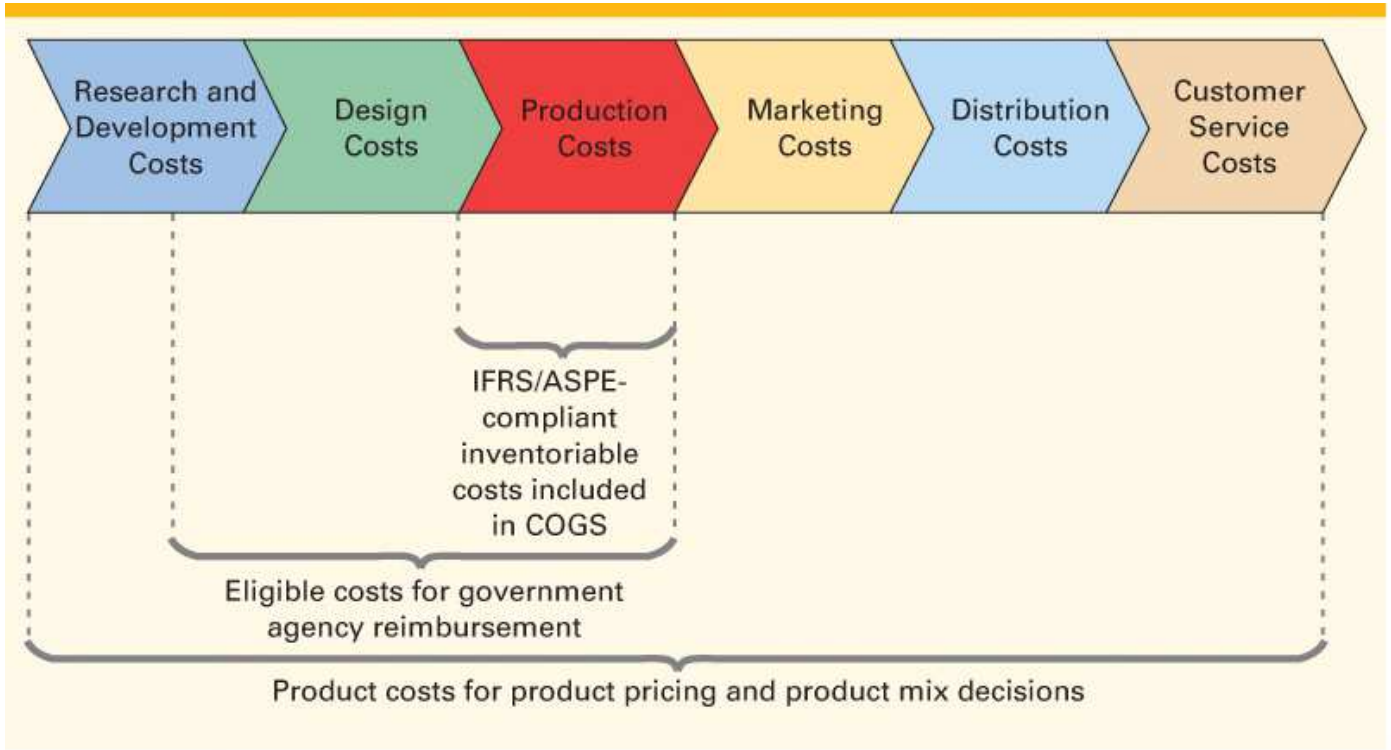

Exhibit 2-10 Different Product Costs for Different Purposes

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Different Cost Classification Systems

1. **Business function**
   a. Research and development
   b. Design of products, services, or processes
   c. Production
   d. Marketing
   e. Distribution
   f. Customer service
2. **Assignment to a cost object**
   a. Direct cost
   b. Indirect cost
3. **Behaviour pattern in relation to the level of activity or volume**
   a. Variable cost
   b. Fixed costs
4. **Aggregate or average**
   a. Total cost
   b. Unit cost
5. **Assets or expenses**
   a. Inventoriable (product) cost
   b. Period cost

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