



Lecture 1: Self-study exercises

(Adopted by Horngren, C.T., Bhimani, A., Datar, S.M. and Foster, G. (2012).
Management and cost accounting. Prentice Hall, 5th eds.)

2.12. Total costs and unit costs

George Mathenge is well-known motivational speaker. The Europe Speaker's Bureau (ESB) wants Mathenge to be the sole speaker at an all-day seminar. Mathenge's agent offers ESB the choice of three possible fee arrangements:

- o Schedule 1: € 8000 fee
- o Schedule 2: € 20 per person + € 2000 fixed fee
- o Schedule 3: € 50 per person

Each attendee will be charged a € 200 fee for the all-day seminar.

Required:

- 1 What is ESB's fixed cost and variable cost for hiring Mathenge under each alternative schedule?
- 2 For each schedule, calculate the total cost and unit cost per seminar attendee if (a) 50 attend, (b) 200 attend, and (c) 500 attend. Comment on the results.

Suggested Solution

1			Fixed costs		Variable costs
	Schedule 1		€ 8000		-
	Schedule 2		€ 2000		€ 20 per person
	Schedule 3		-		€ 50 per person
2		50 people		200 people	500 people
	<i>Schedule 1</i>				
	Total costs	€ 8 000		€ 8 000	€ 8 000
	Unit costs	160		40	16
	<i>Schedule 2</i>				
	Total costs	€ 3 000*		€ 6 000†	€ 12 000‡
	Unit costs	60		30	24
	<i>Schedule 3</i>				
	Total costs	€ 2 500		€ 10 000	€ 25 000
	Unit costs	50		50	50
	* (€20 x 50) + €2000.				
	† (€20 x 200) + €2000.				
	‡ (€20 x 500) + €2000.				

Schedule 1 has €8000 fixed costs: as the attendance increases, the unit cost decreases. Schedule 2 has both a fixed cost component (€2000) and a variable cost component (€20); the spreading of the €2000 amount over more units as attendance increases causes the unit cost to decrease. Schedule 3 has only a variable cost component; there is no change in unit cost as attendance increases.



2.24 Variable costs and fixed costs.

Lutukka Oy owns the rights to extract minerals from beach sands in Enare Lappmark. Lutukka has costs in three areas:

- Payment to a mining subcontractor who charges €80 per tonne of beach sand mined and returned to the beach (after being processed on the mainland to extract three minerals: ilmenite, rutile and zircon).
- Payment of a government mining and environmental tax of €50 per tonne of beach sand mined.
- Payment to a barge operator. This operator charges € 150 000 per month to transport each batch of beach sand – up to 100 tonnes per batch per day – to the mainland and then return to Enare Lappmark (that is, 0-100 tonnes per day = €150 000 per month: 101-200 tonnes = €300 000 per month, and so on). Each barge operates 25 days per month. The € 150 000 monthly charge must be paid even if less than 100 tonnes is transported on any day and even if Lutukka requires fewer than 25 days of barge transportation in that month.

Lutukka is currently mining 180 tonnes of beach minerals per day for 25 days per month.

Required:

- What is the variable cost per tonne of beach sand mined? What is the fixed cost to Lutukka per month?
- Plot one graph of the variable costs and another graph of the fixed costs of Lutukka. Is the concept of relevant range applicable to your plots?
- What is the unit costs per tonne of beach sand mined (a) if 180 tonnes are mined each day, or (b) if 220 tonnes are mined each day? Explain the difference in the unit-cost figures.

Suggested Solution

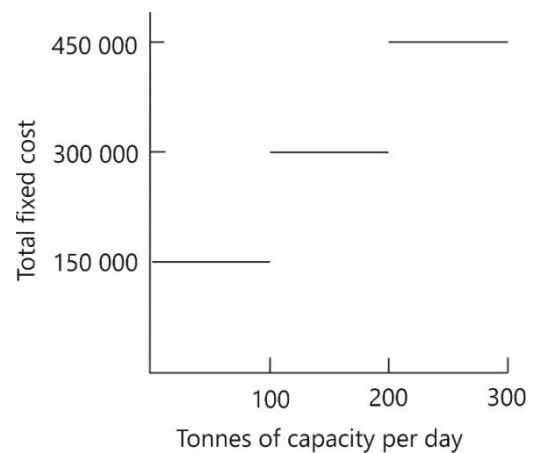
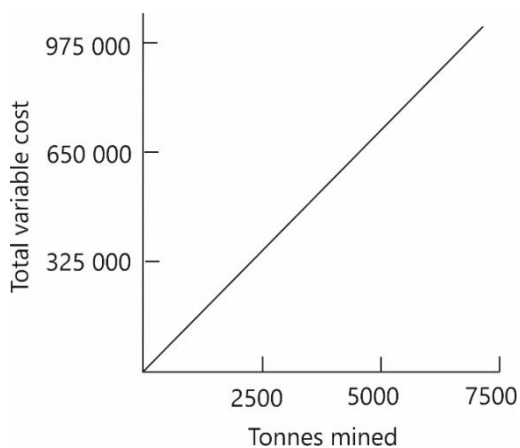
- Variable cost per tonne of beach sand mined:

Subcontractor	€80
Government tax	50
Total	€130

Fixed costs per month:

- 0-100 tonnes of capacity per day = € 150 000
- 101-200 tonnes of capacity per day = € 300 000
- 201-300 tonnes of capacity per day = € 450 000

-



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 ranges for the total fixed costs are



from 0 to 100 tonnes from 101 to 200 tonnes from 201 to 300 tonnes and so on. Within these ranges, the fixed costs do not change in total.

Tonnes mined per day (1)	Tonnes mined per month (2)=(1)x25	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	€ 300000 ÷ 4 500 = €66.67	€130	€196.67
b 220	5 500	€450000 ÷ 5 500 =€81.82	€130	€211.82

3. 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 only over an increment of 20 tonnes.

3.17 Job costing, normal and actual costing.

Idergard AB assembles residential homes. It uses a job-costing system with two direct-cost categories (direct materials and direct labour) and one indirect-cost pool (assembly support). Direct labour-hours is the allocation base for assembly support costs. In December 2009, Peterson budgets 2010 assembly support costs to be SKr 8 000 000 and 2010 direct labour-hours to be 160 000. At the end of 2010, Idergard is comparing the costs of several jobs that were started and completed in 2010.

Construction period	Mora model February-June 2010	Solna model May-October 2010
Direct materials	SKr 106 450	SKr 127 604
Direct labour	SKr 36 276	SKr 41 410
Direct labour-hours	900	1 010

Direct materials and direct labour are paid for on a contract basis. The costs of each are known when direct materials are used or direct labour-hours are worked. The 2010 actual assembly support costs were SKr 6 888 000 while the actual direct labour-hours were 164 000.

Required:

- Calculate the (a) budgeted and (b) actual indirect-cost rates. Why do they differ?
- What is the job cost of the Mora model and the Solna model using (a) normal costing and (b) actual costing?
- Why might Idergard Construction prefer normal costing over actual costing?

Suggested Solution

1.

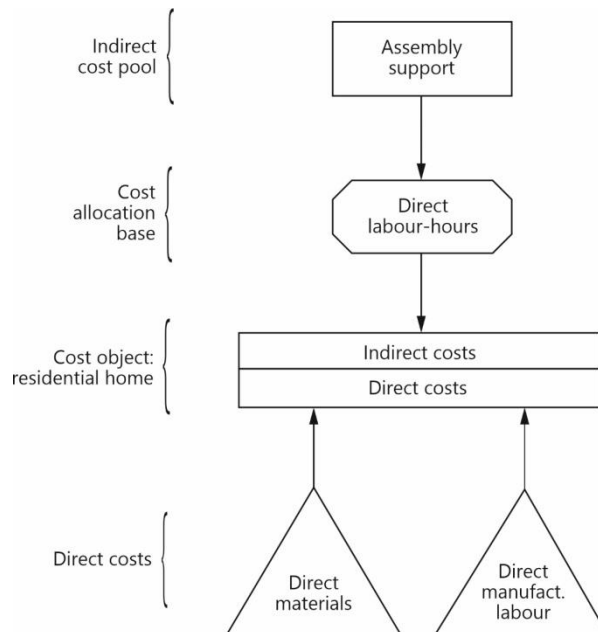
$$\begin{aligned} \text{Budgeted indirect cost rate} &= \frac{\text{Budgeted indirect costs}}{\text{Budgeted direct labour - hours}} = \frac{\text{SKr } 8\,000\,000}{160\,000 \text{ hours}} \\ &= \text{SKr } 50 \text{ per direct labour - hour} \\ \text{Actual indirect cost rate} &= \frac{\text{Actual indirect costs}}{\text{Actual direct labour - hours}} = \frac{\text{SKr } 6\,888\,000}{164\,000 \text{ hours}} \\ &= \text{SKr } 42 \text{ per direct labour - hour} \end{aligned}$$

2.

	Mora model	Solna model
a Normal costing		
Direct costs		
Direct materials	Skr 106 450	Skr 127 604
Direct labour	<u>36 276</u>	<u>41 410</u>
	<u>142 726</u>	<u>169 014</u>
Indirect costs		
Assembly support (SKr 50 x 900; 1010)	<u>45 000</u>	<u>50 500</u>
	<u>45 000</u>	<u>50 500</u>
Total costs	<u>Skr 187 726</u>	<u>Skr 219 514</u>
b Actual costing		
Direct costs		
Direct materials	Skr 106 450	Skr 127 604
Direct labour	<u>36 276</u>	<u>41 410</u>
	<u>142 726</u>	<u>169 014</u>
Indirect costs		
Assembly support (SKr 42 x 900; 1010)	<u>37 800</u>	<u>42 420</u>
	<u>37 800</u>	<u>42 420</u>
Total costs	<u>Skr 180 526</u>	<u>Skr 211 434</u>

Normal costing enables Idergard to report a job cost as soon as the job is completed, assuming that both the direct materials and direct labour costs are known at the time of use/work. Once the 900 direct labour-hours are known for the Mora model (June 2011), Idergard can calculate the SKr 187 726 cost figure using normal costing. In contrast, Idergard has to wait until the December 2011 year-end to calculate the SKr 180 526 cost figure using actual costing.

3.





3.20 Job costing, engineering consulting firm

Soluciones SA, an engineering consulting firm, specialized in analyzing the structural causes of major building catastrophes. Its job-costing system in 2011 had a single direct-cost category (professional labour) and a single indirect-cost pool (general support). The allocation base for indirect costs is professional labour-costs. Actual costs for 2011 were:

Direct costs	
Professional labour	€100 million
Indirect costs	
General support	190 million
Total costs	€290 million

The following costs were included in the general support indirect-cost pool:

Technical specialists' costs	€8 million
Telephone/fax machine	6 million
Computer time	37 million
Photocopying	4 million
Total costs	€55 million

The firm's data-processing capabilities now make it feasible to trace these costs to individual jobs. The managing partner is considering whether more costs than just professional labour should be traced to each job as a direct cost. In this way, the firm would be better able to justify billings to clients.

In late 2011, arrangements were made to expand the number of direct-cost categories and to trace them to seven client engagements. Two of the case records showed the following:

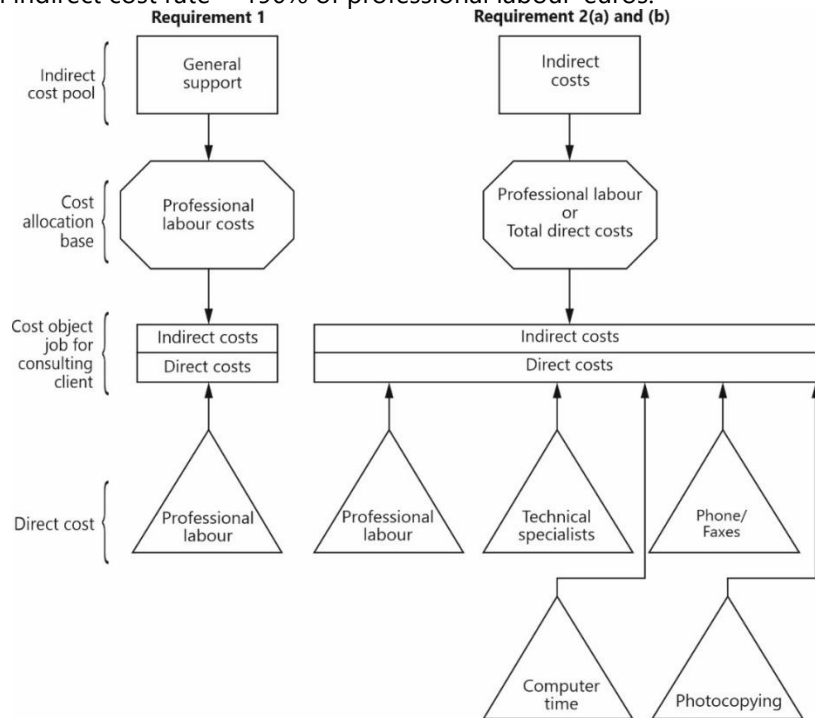
	Client case 304	Client case 308
Professional labour	€20 000	€20 000
Technical specialists' costs	2 000	6 000
Telephone/fax machine	1 000	2 000
Computer time	2 000	4 000
Photocopying	1 000	2 000
Total direct costs	€26 000	€34 000

Required:

- Present an overview diagram of the 2011 job-costing system. What was the actual indirect-cost rate per professional labour-euro?
- Assume that the €55 million of costs included in the 2011 general-support indirect-cost pool were reclassified as direct costs. The result is a system with five direct-cost categories. Calculate the revised indirect-cost rate as a percentage of:
 - Professional labour-costs
 - Total direct costs.
- Calculate the total costs of jobs 304 and 308 using:
 - The 2011 costing system with a single direct-cost category and a single indirect-cost pool (professional labour-costs as the allocation base)
 - A costing system with five direct-cost categories and a single indirect-cost pool (professional labour-costs as the allocation base)
 - A costing system with five direct-cost categories and a single indirect-cost pool (total direct costs as the allocation base).
- Assume that clients are billed at 120% of total job costs (that is, a mark-up on cost of 20%). Calculate the billings in requirement 3 for jobs 304 and 308 for the (a), (b) and (c) costing systems.
- Which method of job costing in requirement 3 do you favour? Explain.

Suggested Solution

1 Actual indirect cost rate = 190% of professional labour-euros.



2. a Actual indirect costs rate = 135% of professional labour-euros
 b Actual indirect cost rate = 87,1% of total direct costs.

	Client 304	Client 308
3. a Direct costs	€ 20 000	€20 000
Indirect costs, 190% x €20 000	<u>38 000</u>	<u>38 000</u>
Total costs	<u>€ 58 000</u>	<u>€58 000</u>
b Direct costs	€ 26 000	€34 000
Indirect costs 135% x €20 000	<u>27 000</u>	<u>27 000</u>
Total costs	<u>€ 53 000</u>	<u>€61 000</u>
c Direct costs	€ 26 000	€34 000
Indirect costs 87.1% x direct costs	<u>22 646</u>	<u>29 614</u>
Total costs	<u>€ 48 646</u>	<u>€63 614</u>

	Client 304	Client 308
4. a Total costs	€58 000	€58 000
Billings, 120% x total costs	69 600	69 600
b Total costs	€53 000	€61 000
Billings, 120% x total costs	63 600	73 200
c Total costs	€48 646	€63 614
Billings, 120% x total costs	58 375	76 337

5.

These guidelines for costing system refinement are:

- (i) *Direct cost tracing.* Costing systems (b) and (c) increase the percentage of total costs that are directly traced to the cost object. Other things being equal, (b) or (c) is preferred to (a).
- (ii) *Indirect cost pools.* Costing systems (b) and (c) have the same single indirect costs pool and hence this guideline does not assist in choosing between them.
- (iii) *Cost allocation bases.* Analysis could be made of whether professional labour costs or this analysis may lead to more than one indirect cost pool being selected. That is, costing system (b) and (c) may be further refined.



3.22 Overview of general-ledger relationships

Budenmayer BV is a small machine shop that uses highly skilled labour and a job-costing system (using normal costing). The total debits and credits in certain accounts just before year-end are as follows:

	30 December 2011	
	Total debits	Total credits
Materials Control	€100000	€70000
Work-in-Progress Control	320000	305000
Manufacturing Department Overhead Control	85000	—
Finished Goods Control	325000	300000
Cost of Goods Sold	300000	—
Manufacturing Overhead Allocated	—	90000

All materials purchased are for direct materials. Note that 'total debits' in the stock accounts would include beginning stock balances, if any.

The preceding accounts do not include the following:

A The manufacturing labour costs recapitulation for the 31 December working day: direct manufacturing labour, €5000 and indirect manufacturing labour, €1000.

b Miscellaneous manufacturing overhead incurred on 30 December and 31 December: €1000.

Additional information

- ❖ Manufacturing overhead has been allocated as a percentage of direct manufacturing labour costs through 30 December.
- ❖ Direct materials purchased during 2011 were €85 000.
- ❖ There were no returns to suppliers.
- ❖ Direct manufacturing labour costs during 2011 totalled €150000, not including the 31 December working day described previously.

Required

1. Calculate the stock (31 December 2010) of Materials Control, Work-in-Progress Control and Finished Goods Control. Show T-accounts.
2. Prepare all adjusting and closing journal entries for the preceding accounts. Assume that all under- or overallocated manufacturing overhead is closed directly to Cost of Goods Sold.
3. Calculate the ending stock (31 December 2011), after adjustments and closing, of Materials Control, Work-in-Progress Control and Finished Goods Control.

Suggested Solution

1 and 3 An effective approach to this problem is to draw T-accounts and insert all the known figures. Then, working with T-account relationships, solve for the unknown figures (here coded by the letter X for opening stock figures and Y for closing stock figures).

Materials control			
X	15,000	(1)	70,000
Purchases	85,000		
	100,000		70,000
Y	30,000		



Work in progress control			
X	10,000	(4)	305,000
(1) DM	70,000		
(2) DL	150,000		
(3) Overhead	90,000		
	320,000		305,000
(a)	5,000		
(c)	3,000		
Y	23,000		

Finished goods control			
X	20,000	(5)	300,000
(4)	305,000		
	325,000		300,000
Y	25,000		

Cost of goods sold			
(5)	300,000	(d)	6,000

Manufacturing department overhead control			
	85,000	(d)	87,000
(a)	1,000		
(b)	1,000		

Manufacturing overhead allocated			
(d)	93,000	(3)	90,000
		(c)	3,000

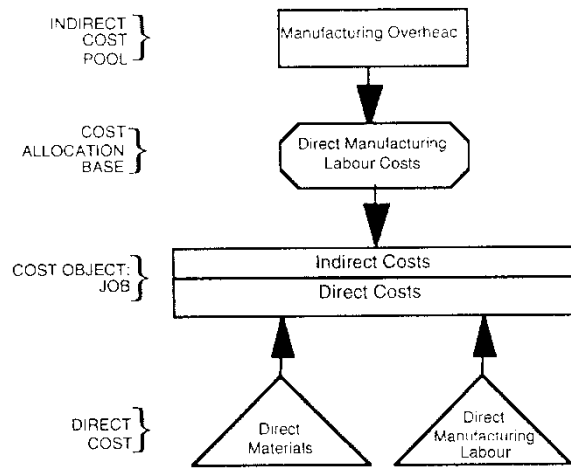
Manufacturing overhead cost rate = €90,000 ÷ €150,000 = 60%

Wages payable control			
		(a)	6,000
Various accounts			
		(b)	1,000

a	Work in progress control	€5,000	
	Manufacturing Department overhead control	1,000	
	Wages payable control		€6,000
	To recognise payroll costs		
b	Manufacturing Department overhead control	€1,000	
	Various accounts		€1,000
	To recognise miscellaneous manufacturing overhead		
c	Work in progress control	€3,000	
	Manufacturing overhead allocated		€3,000
	To allocate manufacturing overhead		
d	Manufacturing overhead allocated	€93,000	
	Manufacturing Department overhead control		€87,000
	To close manufacturing overhead accounts and overallocated overhead to cost of goods sold		



An overview of the product-costing system is:



3 See the answer to 1