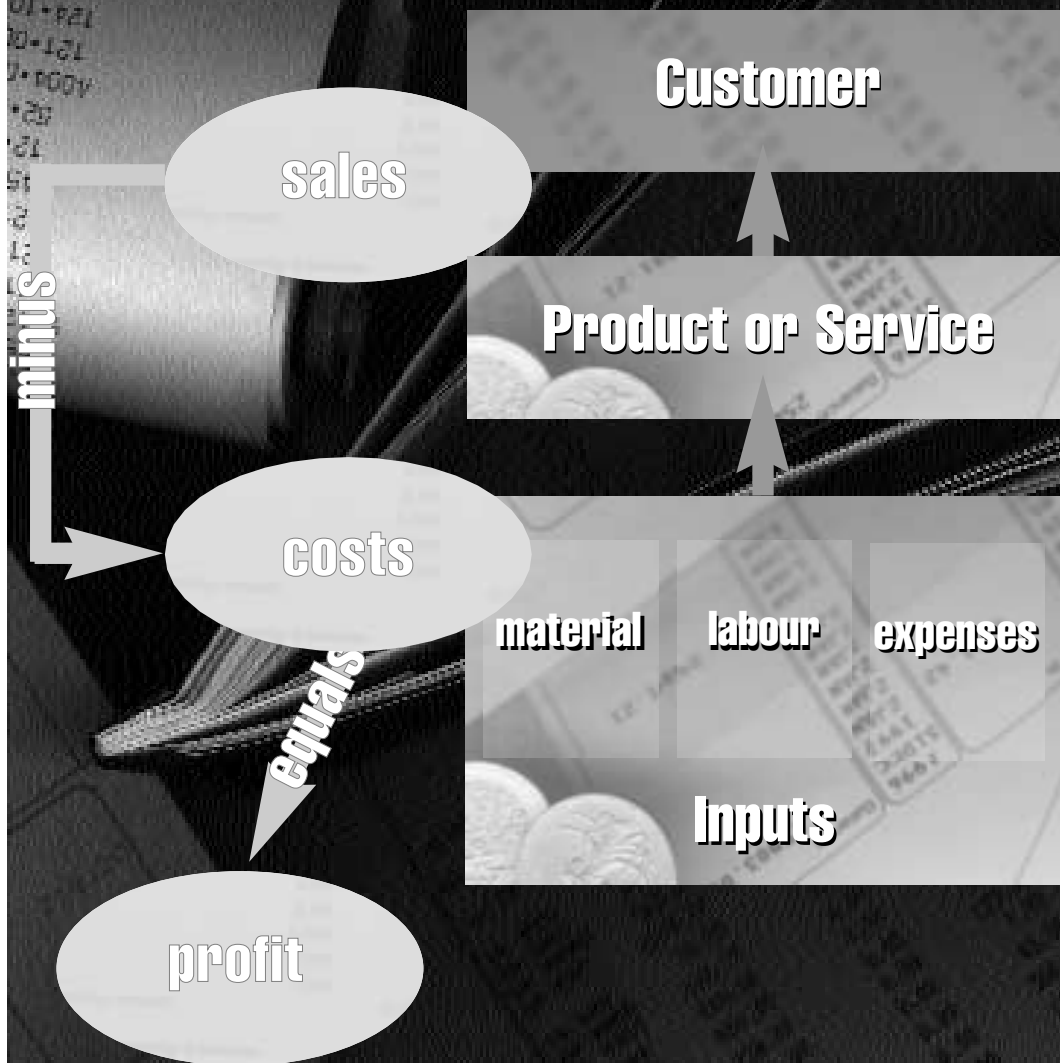


Section 4

costing

In this section we turn our attention to management accounting. We see how costing systems and methods assist with the financial decision making, planning and control of the business.



9

INTRODUCTION TO COST AND COSTING SYSTEMS

this chapter covers ...

- *the role of costing in assessing performance and in decision making*
- *cost units and cost centres*
- *the categories into which costs can be classified*
- *the difference between direct and indirect costs*
- *the main costing systems and their purposes*

INTRODUCTION

Management accounting is concerned with providing the management of a business with financial recommendations, based on costing information, in order to enable day-to-day decisions and longer-term plans to be made. This is different from much of what we have studied so far, which has been concerned with financial transactions and statements that have *already taken place*. Management accounting uses information from past transactions as an aid to financial decision making, planning and control *for the future*.

The management of a business needs information from which to work. It needs to know accurate costs of individual products or services, together with the total costs of running the business: such information is found from the costing records. The use of costing information to make decisions is of great importance in enabling businesses to maximise profits and public sector organisations to provide value for money services. To this end, many businesses have specialist costing sections: the information provided by the costing system will enable managers to assess performance and make decisions which will affect what the business does in the future, such as:

- to manufacture more of one product than another
- to provide one service in preference to another
- to reduce costs
- to review selling prices
- to manufacture a new product, or provide a new service
- to close one department or division of the business

In later chapters we shall see how cost accounting is used in decision making and in the budgeting process; before this, though, we need to look at certain techniques of cost accounting, including the *classification of costs* and *costing systems*. Costing and its use in decision making and the budgeting process applies equally to manufacturing businesses and those which provide a service:

- “at what point do we break-even?” is applicable to manufacturing a product as well as to ticket sales at a swimming pool
- “shall we close down X?” is applicable to a manufacturer looking at production lines as well as to a large store considering the financial viability of different departments

CASE STUDY



S & T MANUFACTURING COMPANY

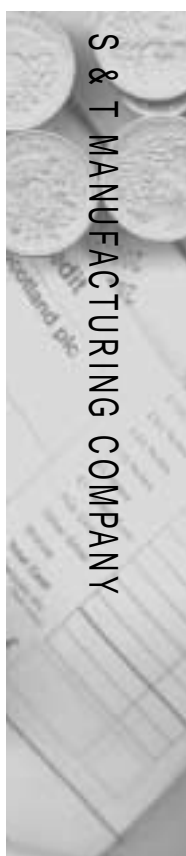
This Case Study shows how a basic understanding of cost accounting enables the management of a business to have better information about its activities.

situation

The following information is given for S & T Manufacturing Company, a two-product (S and T) company, for the year 1996:

			£	£
Sales:	S			100,000
	T			<u>200,000</u>
				300,000
Less:	Cost of materials	S	50,000	
		T	95,000	
	Labour costs	S	40,000	
		T	50,000	
	*Overheads	S	20,000	
		T	<u>30,000</u>	
				<u>285,000</u>
Profit				<u><u>15,000</u></u>

* Overheads include factory rent, depreciation of machinery, and other costs.



How would you present this information in a way which will be of more use to the management of the business? What conclusions do you draw for this business?

solution

The information is best presented in a way which analyses the profit of each product of S&T Manufacturing Company:

	S £	T £	Total £
Cost of materials	50,000	95,000	145,000
Labour costs	40,000	50,000	90,000
Overheads	<u>20,000</u>	<u>30,000</u>	<u>50,000</u>
Cost of sales	<u>110,000</u>	<u>175,000</u>	<u>285,000</u>
Sales	100,000	200,000	300,000
Less Cost of sales	<u>110,000</u>	<u>175,000</u>	<u>285,000</u>
Profit/(Loss)	<u>(10,000)</u>	<u>25,000</u>	<u>15,000</u>

On the basis of this information, product S should be discontinued because it is making a loss. However, this may be a simplistic solution, and other factors will have to be considered, eg sales of product T may be linked to sales of S; the overheads of T are likely to increase if S is discontinued.

This Case Study brings out two important functions of costing:

- to find out the costs (in this case of each product)
- to give responsibility to someone for those costs (here for the manager of product S to investigate the reasons for the loss of £10,000)

COST UNITS AND COST CENTRES

Before we begin our study of costing we need to understand the terms: cost units and cost centres.

Cost units are units of output to which costs can be charged.

A cost unit can be

- *either* a unit of production from a factory such as a car, a television, an item of furniture
- *or* a unit of service, such as a passenger-mile on a bus, a transaction on a bank statement, an attendance at a swimming pool, a call unit on a telephone

Care should be taken in choosing the appropriate cost unit. Within a business – particularly in the service industry – there may well be several cost units that can be used. For example, in an hotel the cost units in the restaurant will be meals; for the rooms, the cost units will be guest nights.

Cost centres are sections of a business to which costs can be charged

A cost centre in a manufacturing business, for example, is a department of a factory, a particular stage in the production process, or even a whole factory. In a college, examples of cost centres are the teaching departments, or particular sections of departments such as the school or college administrative office. In a hospital, examples of cost centres are the hospital wards, operating theatres, specialist sections such as the X-ray department, pathology department.

The structure of the cost centres will vary according to the information needs of different levels of management. For example, in a large company, the chief executive, the factory manager, and the supervisor each have different information needs from the cost centres: the supervisor requires detailed information, the manager needs a less-detailed report, while the chief executive requires an overall summary.

CLASSIFICATION OF COSTS

Within any business, whether it manufactures a product or provides a service, there are certain costs involved at various stages to produce the units of output. The diagram which follows (fig 9.1) shows the costs of a manufacturing business which are incurred by the three main sections of the business, ie the factory, the warehouse, the office.

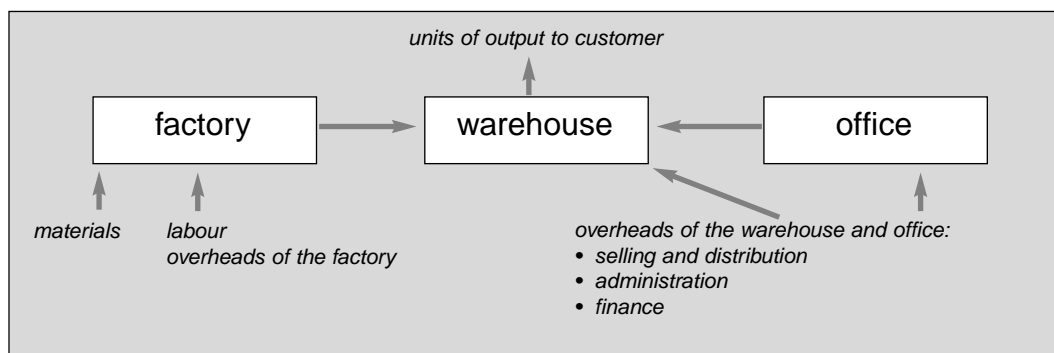


Fig 9.1 Costs incurred in a manufacturing business

Note that although the above diagram shows the costs of a manufacturing business, it can be adapted easily to fit non-manufacturing organisations, such as a shop, a hospital, a school or college, a church, a club. While the units of output of these organisations differ from those of a manufacturer,

nevertheless they still incur costs at various stages of the 'production' process.

Having identified costs for each main section of a business, we can now *classify the costs*. This can be done in three ways:

- by element
- by function
- by nature

classification of costs by element

The diagram in fig 9.1 shows that there are three elements of cost:

- materials, ie the cost of goods used
- labour, ie the cost of employees' wages and salaries
- expenses, ie other costs, mainly the overheads

Each of the cost elements can be categorised between:

- direct costs – those costs that can be identified directly with each unit of output
- indirect costs – all other costs, ie those that cannot be identified directly with each unit of output

Thus the cost elements for a manufacturing business can be shown as:

MATERIALS	direct	materials from which the finished product is made
	indirect	other materials used in the factory, eg grease for machines, cleaning materials, etc
LABOUR	direct	wages paid to those who work the machinery on the production line or who are involved in assembly of the product
	indirect	wages and salaries paid to those who are not directly involved in production, eg supervisors, maintenance staff, etc
EXPENSES	direct	expenses which can be attributed to units of production, eg royalties payable to the designer of a product, special items bought in for a particular product
	indirect	other expenses, such as rent, rates, telephone, lighting, heating, which cannot be attributed directly to production

Note that the *indirect* costs of materials, labour and expenses form the *overheads* of the business:

$$\text{indirect materials} + \text{indirect labour} + \text{indirect expenses} = \text{overheads}$$

classification of costs by function

Each section of a business, eg factory, warehouse, office, retail outlet, performs a *function*. Thus, for example, the office provides an administrative function. In carrying out these functions, costs are incurred and can be classified by function. For a manufacturing business the main functions are:

- factory, or production
- selling and distribution
- administration
- finance

Other functions can be added to suit the needs of a particular business. For example, a company might spend large sums of money in researching and developing new products – the costs incurred by this function will be classified under the research and development heading.

Non-manufacturing organisations – such as a hospital or a college – will use some of the same functions listed above, and will add other, specialist, functions. Both direct and indirect costs can be classified by function. It is important to note that, when costs are classified by function, they are the same costs used in classifying by element, but are presented in a different way.

classification of costs by nature

It is important in cost accounting to appreciate the nature of costs – in particular to appreciate that not all costs increase or decrease directly in line with increases or decreases in output. By nature, costs are:

- fixed, or
- variable, or
- semi-variable

Fig 9.2 shows the differences between these.

We shall see in Chapter 11 “Cost behaviour and break-even analysis” how a knowledge of the nature of costs helps with decision making.

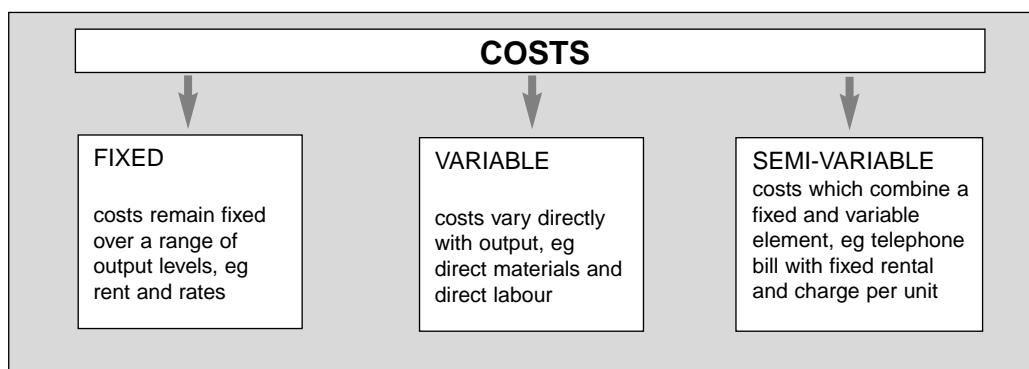


Fig 9.2 Classifying costs by nature

reasons for classifying costs

The question might be asked, “Why classify costs in three ways?” The answer is that we can see the same business from three different viewpoints – this will help management to run the business better:

- **by element**
looking for the high cost elements in order to make savings, eg labour costs might be identified as being too high
- **by function**
looking at the different departments to see which are the high-spending departments – perhaps savings can be made
- **by nature**
identifying the costs as being fixed, variable, or semi-variable; this will help with decision making – the business might be able to alter the balance between fixed and variable costs in order to increase profits

CALCULATING THE COST OF GOODS AND SERVICES

Using the principles of costing will help the owner of a business to calculate the cost of a product – whether goods or services. Only when the cost of producing each unit of output is known, can a business make decisions about the selling price.

The steps towards calculating the cost of goods and services are:

- **identify the unit of output**
The cost units for a particular business must be identified. As we have seen earlier, these are the units of output to which costs can be charged.

Only by recovering costs through the sale of output can a business make a profit.

- ***calculate the number of units of output for a particular time period***

Once the unit of output is identified, the business is then able to calculate how many units can be produced or provided in a given time period, such as a day, week, month, quarter or year. For example, a garage will work out how many hours of mechanics' time are available, or a car manufacturer will calculate how many cars it can produce in a year.

- ***calculate the direct costs for a particular time period***

Having established the number of units of output for a particular time period, the next task is to calculate the direct costs for that time period. As we have seen earlier in this chapter, the direct costs comprise:

<i>direct materials</i>	identifiable with the product
<i>direct labour</i>	the wages paid to those who make the product
<i>direct expenses</i>	attributable to the product

The amounts of the three direct costs are added together to give the total direct costs of the output for the time period:

$$\textit{direct materials} + \textit{direct labour} + \textit{direct expenses}$$

- ***calculate the indirect costs for a particular time period***

The indirect costs, or overheads, of the product or service must be calculated for the particular time period. Indirect costs comprise:

<i>indirect materials</i>	materials used that are not attributed directly to production
<i>indirect labour</i>	wages and salaries paid to those who are not directly involved in production
<i>indirect expenses</i>	expenses of the business not attributed directly to production

Once the indirect costs have been calculated, we must then ensure that their total cost is charged to the cost of the units of output for a particular time period. Only by including indirect costs in the total cost of the output can a business recover their cost from the sales made.

The amounts of the indirect costs are added together to give the total indirect costs (overheads) for the time period.

- **calculate the total cost of a unit of output**

Once the direct and indirect costs for a time period are known, the total cost of a unit of output can be calculated, as follows:

$$\frac{\text{direct costs} + \text{indirect costs}}{\text{units of output}} = \text{total costs of a unit}$$

The total cost is also referred to as the *absorption cost* – because it absorbs, or includes, both the direct costs and the indirect costs. Once total cost is known, the business can use the information to help it make pricing and other decisions – these topics are covered fully later in the book.

- **calculate the cost – a summary**

The process of calculating the cost of output is illustrated in fig 9.3 below.

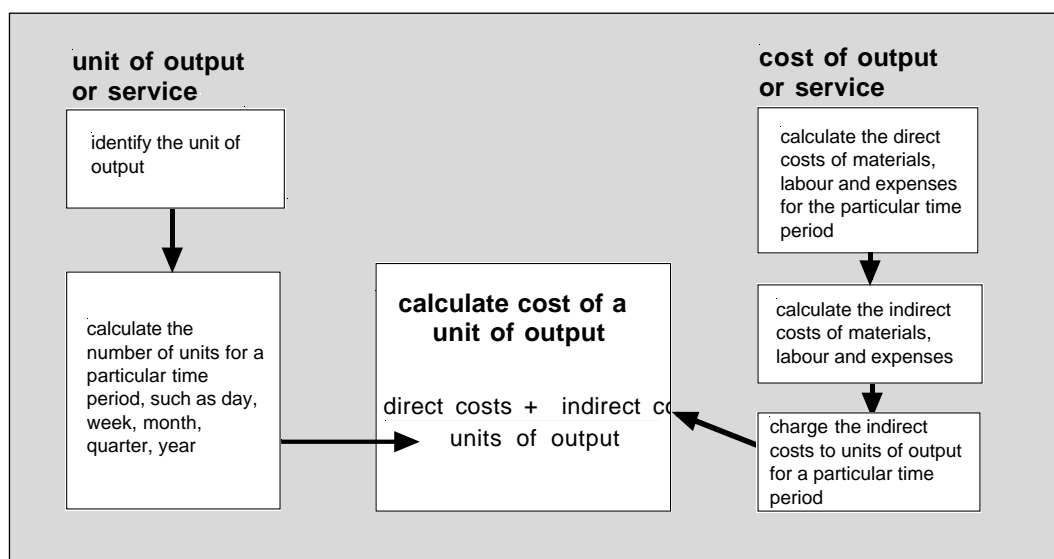


Fig 9.3 Calculating the cost of a unit of output

TOTAL COST STATEMENT

The total cost statement brings together all the costs involved in producing the output of a business. It can be prepared on the basis of:

- a single cost unit, eg the cost of making one car in a car factory
- a batch, eg the cost of making 1,000 'limited edition' cars

- the whole factory, eg the cost of all the car factory's output for a given time period

The total cost statement is prepared as follows:

		£
	Direct materials	x
<i>add</i>	Direct labour	x
<i>add</i>	Direct expenses	x
<i>equals</i>	PRIME COST	<u>x</u>
<i>add</i>	Factory overheads	x
<i>equals</i>	PRODUCTION COST	<u>x</u>
<i>add</i>	Selling and distribution costs	x
<i>add</i>	Administration costs	x
<i>add</i>	Finance costs	x
<i>equals</i>	TOTAL COST	<u><u>x</u></u>

Note that:

- *prime cost* is the direct cost of manufacturing products, before the addition of factory overheads
- *production cost* is the factory cost of manufacturing the products, ie prime cost plus factory overheads
- *total cost* is production cost plus office overheads; note that total cost plus profit of the business equals the selling price of the products

The cost structure above is especially appropriate for a manufacturing business; indeed a separate *manufacturing account* – which shows costs through to production cost - is prepared prior to the profit and loss account. Production cost is used as the basis for valuing stocks of finished goods.

By taking total cost away from sales revenue we can create a profit statement. This shows the profitability of the business after all costs have been taken into account. The profit statement is:

		£
	Sales	x
<i>less</i>	Total cost	x
<i>equals</i>	PROFIT	<u>x</u>

COSTING SYSTEMS

The main costing systems used by the management accountant include:

- absorption costing
- marginal costing
- activity based costing
- standard costing

Fig 9.4 below, shows the purpose of each of these costing systems. The use of each costing system is dependent on the information needs of the business:

- do we require a figure for profit? (use absorption costing)
- why are the overheads so high for the production line making ‘Product X’? (use activity based costing)
- can we afford to sell 1,000 units each month to Megastores Limited at a discount of 20 per cent? (use marginal costing)
- how much will it cost us to make ‘Product Y’ next month? (use standard costing)

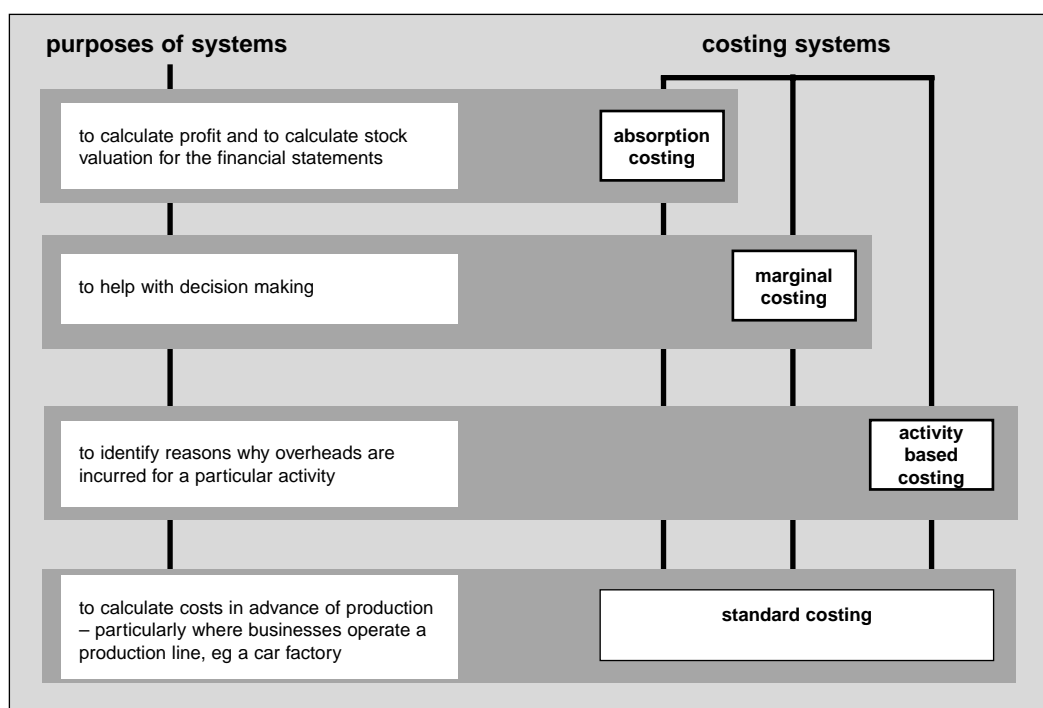


Fig 9.4 Costing systems and their purposes

Note that absorption costing, marginal costing, and activity based costing are all systems that can be used in conjunction with standard costing, if required. The remainder of this chapter considers each costing system in more detail.

ABSORPTION COSTING

Absorption costing absorbs the total costs of the whole business into each cost unit. Absorption costing answers the question, "What does it cost to make one unit of output?"

The absorption cost of a unit of output is made up of the following costs:

		£
	direct materials	x
<i>add</i>	direct labour	x
<i>add</i>	direct expenses	x
<i>add</i>	overheads (fixed and variable)	<u>x</u>
<i>equals</i>	ABSORPTION COST	<u><u>x</u></u>

Notes:

- The overheads of a business comprise both the factory and the office costs of indirect materials, indirect labour, and indirect expenses.
- Under some circumstances, absorption costing includes only production costs, ie it excludes all costs beyond production, such as selling and distribution costs, administration costs, and finance costs.

Example

The Wyvern Bike Company makes 100 bikes each week, and its costs are as follows:

Weekly costs for producing 100 bikes	
	£
direct materials (£20 per bike)	2,000
direct labour (£25 per bike)	<u>2,500</u>
PRIME COST	4,500
overheads (fixed)	<u>3,500</u>
TOTAL COST	<u><u>8,000</u></u>

Notes:

- there are no direct expenses incurred by the company
- the selling price of each bike is £100, which gives a profit statement of:

	£
selling price (100 bikes x £100)	10,000
<i>less</i> total cost	<u>8,000</u>
<i>equals</i> PROFIT	<u><u>2,000</u></u>

The absorption cost of producing one bike is:

$$\frac{\text{total cost (direct and indirect costs)}}{\text{units of output}} = \frac{\text{£8,000}}{100 \text{ bikes}} = \text{£80 per bike}$$

As the above example shows, each cost unit bears an equal proportion of the costs of the overheads of the business. Because of its simplicity, absorption costing is a widely used system which tells us how much it costs to make one unit of output. It works well where the cost units are identical, eg 100 identical bikes, but is less appropriate where some of the cost units differ in quality, eg 100 bikes, of which 75 are standard models and 25 are handbuilt to the customers' specifications. It also ignores the effect of changes in the level of output on the cost structure. For example, if the bike manufacturer reduces output to 50 bikes a week:

- will direct materials remain at £20 per bike? (buying materials in smaller quantities might mean higher prices)
- will direct labour still be £25 per bike? (with lower production, the workforce may not be able to specialise in certain jobs, and may be less efficient)
- will the overheads remain fixed at £3,500? (perhaps smaller premises can be used and the factory rent reduced)

MARGINAL COSTING

Marginal costing is the cost of producing one extra unit of output

As seen earlier in this chapter costs, by nature, are:

- *fixed*, ie they do not vary with changes in the number of units of output produced

or

- *variable*, ie they vary in line with the amount of activity, eg number of units produced

or

- *semi-variable*, ie they combine both a fixed and a variable element

For most purposes, marginal costing is not concerned with fixed costs (such as the rent of a factory); instead, it is concerned with variable costs – direct materials, direct labour, direct expenses, and variable factory overheads – which increase as production increases. For most decision making, the marginal cost of a unit of production is, therefore, the prime cost of making one more unit.

Example

Continuing with the example of the Wyvern Bike Company, the marginal cost per unit is:

	£
direct materials	20 per bike
direct labour	<u>25</u> per bike
MARGINAL COST	<u>45</u> per bike

It therefore costs £45 to produce one extra bike.

Knowing the marginal cost of a unit enables the management of a business to focus their attention on the *contribution* provided by each unit. The contribution is the amount of money coming in to the business from sales after marginal costs have been paid.

The contribution in the case of the Wyvern Bike Company is:

	£
selling price of one bike	100
<i>less</i> marginal cost of producing one bike	<u>45</u>
<i>equals</i> CONTRIBUTION per bike	<u>55</u>

The contribution, as its name implies, contributes to the costs of the overheads (running expenses) of the business. Once these are covered, the remainder of contribution is profit. Thus the calculation for the Wyvern Bike Company's weekly production of 100 bikes is:

	£
selling price	10,000
<i>less</i> marginal cost	<u>4,500</u>
<i>equals</i> CONTRIBUTION	5,500
<i>less</i> overheads (fixed)	<u>3,500</u>
<i>equals</i> PROFIT	<u>2,000</u>

Note that absorption costing and marginal costing give two different costs per bike for the Wyvern Bike Company: under absorption costing it is £80 per bike, while marginal costing gives £45. At a level of production of 100 bikes per week, both costing systems show a profit of £2,000. You might say, “What is the difference between the two systems?” Supposing that the owner of the Wyvern Bike Company, as a friend, says to you, “I’ll make one extra bike next week for you, and you can have it at cost price.” Which price do you think you should pay: £80 or £45? The answer is, of course, at the marginal cost of £45. (If you prefer to pay £80, try reworking the cost statement, on the previous page, based on 101 bikes, and then calculate the profit.) Knowing the marginal cost of production helps with management decision making. In Chapter 12, we shall come back to marginal costs and see how they are used in making pricing decisions for ‘special orders’ and in other situations.

ACTIVITY BASED COSTING

Activity based costing (ABC) charges overheads to output on the basis of activities.

Activity based costing is a relatively new costing system which adopts a different approach to charging overheads to output from absorption costing. ABC relates overheads to output, rather than simply charging total overheads for a particular period.

Traditional costing systems usually charge overheads to output on the basis of direct labour hours (or labour cost), or machine hours. For example, for each labour hour – or machine hour – required by the output, £x of overheads is charged through an *overhead absorption rate* (see Chapter 10). While this method may be suitable for industries which are labour intensive, or where production requires the use of heavy machinery, it is not always appropriate for today’s capital intensive, low-labour industries, as the example which follows will show.

Example

A company manufactures two products, X and Y. Product X is produced on a labour-intensive production line, using basic machinery; product Y is produced using the latest ‘state of the art’ computer-controlled machinery, which requires few employees.

The company’s elements of cost are:

direct materials, total	£500,000
– product X	£250,000
– product Y	£250,000
direct labour, total	£250,000
– product X	£200,000
– product Y	£50,000
overheads (fixed), total	£250,000
– a major proportion of these relate to maintenance and depreciation of the computer controlled machinery used to make product Y	

The company uses labour cost as the basis by which to charge overheads to production. Therefore, the overhead will be split between the two products as:

overhead for product X = four-fifths of total overheads of £250,000 = £200,000

overhead for product Y = one-fifth of total overheads of £250,000 = £50,000

Thus, the majority of the overhead is charged to the labour-intensive production line (product X), and relatively little to the capital intensive line (product Y). As a major proportion of the costs relates to product Y, this has the effect of undercosting this product (and overcosting product X). Instead, a more appropriate costing system is needed.

the use of cost drivers

Cost drivers are activities which cause costs to be incurred.

In the example looked at above, the cost driver used to charge overheads to output was – inappropriately – labour costs. Instead of using a cost driver linked to the volume of business (as above), activity based costing uses cost drivers linked to the *way in which business is conducted*: this concept is illustrated in the example which follows:

Example

A company manufactures two products, A and B. Product A is produced in batches of 500 units of output; product B is produced in batches of 100 units of output. Each unit of production – whether A or B – requires one direct labour hour.

Production of each batch of A and B requires the following overheads:

- the machinery to be set-up at a cost of £400 per batch (to cover the engineer's time, test running of the machinery, etc)
- quality inspection at a cost of £200 per batch (to cover the inspector's time, cost of rejects, etc)

In a typical week the company produces 500 units of product A, ie one batch of 500 units, and 500 units of product B, ie five batches of 100 units. Thus the set-up and quality inspection costs for the week will be:

■	■	6 set-ups at £400 each	=	£2,400
■	■	6 quality inspections at £200 each	=	£1,200
■	■	TOTAL		<u>£3,600</u>

Note: each 'box' represents one set-up and one quality inspection

As each unit of output requires one direct labour hour, ie product A 500 hours, product B 500 hours, the overhead costs of set-ups and quality inspection, using traditional costing systems, will be charged to output as follows:

product A	=	£1,800
product B	=	£1,800
TOTAL		<u>£3,600</u>

We can see that this is an incorrect basis on which to charge overheads to output, because product A required just one set-up and one quality inspection, while product B took five set-ups and five quality inspections. By using the system of activity based costing, with set-up and inspection as cost drivers, we can charge overheads as follows:

■	product A		
	1 set-up at £400	=	£400
	1 quality inspection at £200	=	£200
	TOTAL		<u>£600</u>
■	product B		
■	5 set-ups at £400	=	£2,000
■	5 quality inspections at £200	=	£1,000
	TOTAL		<u>£3,000</u>

By using the activity based costing system, there is a more accurate reflection of the cost of demand on the support functions of set-up and quality inspection: it reduces the cost of 500 units of product A by £1,200 (ie £1,800 – £600) and increases the cost of 500 units of product B by £1,200 (ie from £1,800 to £3,000). This may have implications for the viability of product B, and for the selling price of both products.

other cost drivers

Cost drivers must have a close relationship with an activity, which can then be related to output. In the example, we have seen the cost of set-ups and quality inspections used as cost drivers. Examples of other activities and their cost drivers include:

activity	cost driver
• processing orders to suppliers	• number of orders
• processing invoices received from suppliers	• number of invoices
• processing orders to customers	• number of orders
• processing invoices issued to customers	• number of invoices

As has been seen in the example above, by using activity based costing, the emphasis is placed on which activities cause costs. It answers the question why costs are incurred, instead of simply stating the amount of the cost for a given period. By using ABC, the responsibility for the cost is established and so steps can be taken to minimise it for the future.

STANDARD COSTING

Standard costing sets a pre-determined cost for materials, labour and overheads in advance of production.

All businesses need methods of controlling the costs of materials, labour and overheads that go to make up the finished product (we shall see, in later chapters, how budgets can be set and controlled). Imagine a car factory where the cost and amount of materials to make the car is not known; where the hours of work and rates of pay are not known, where the cost of overheads is not known. Under such circumstances, the costs could not be controlled, and it would be impossible to quote a price for the product to a customer. Therefore many businesses establish a standard cost for their output. Thus a standard cost can be calculated for things as diverse as a product manufactured in a factory, a hospital operation, servicing a car, a meal in a restaurant.

The standard cost for units of output is calculated in advance of production and working on the assumption of either an *ideal standard* (ie no poor quality material, no idle time, no machine breakdowns), or an *attainable standard*, which allows for a pre-determined amount of loss or wastage and a given level of efficiency.

Standard costs are set for:

- **materials**

The quantity and quality of each type of material to be used in production, and the price of such materials is pre-determined. Standard materials cost is the expected quantity and quality of materials multiplied by expected material price.

- **labour**

The labour hours required to manufacture a quantity of goods, and the cost of the labour is pre-determined. Standard labour cost is the expected labour hours multiplied by expected wage rates.

- **overheads**

The expected quantity of output within a time period divided into the expected overheads will determine the standard overhead cost.

Once a standard cost has been established, it can be used as a method of cost control through variance analysis (see Chapter 17), and also for making pricing decisions (see Chapter 13). Note that standard costing is used in conjunction with the other costing systems, ie the standard cost is set in advance of production using either absorption costing or marginal costing systems, or activity based costing systems.

setting standards

In standard costing, it is important that care should be taken over the setting of standards. Poorly set standards will be of no help to the management of a business when the figures are used in further analysis.

The main departments within an organisation which can provide information to enable standards to be set are:

- **Purchasing**

The buying department of a business will be able to determine prices, and their expected trends, of materials used.

- **Personnel**

This department will have current wage and salary rates, together with bonus and overtime details, of the various grades of employees; forecasts of changes can also be ascertained.

- **Management services**

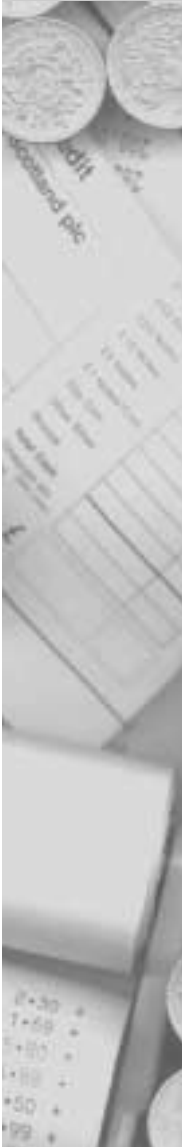
Often called work study, this department will determine the standard

amount of time that each work-task in the production process should take.

- **Production**

This department has overall responsibility for production and will know the quantities of raw materials required for each unit of production, and the value of production will be linked to the overhead costs.

CASE STUDY



AMC ENGINEERING LIMITED

situation

This company manufactures car bumper mouldings. It has been asked by its major customer, Okassa (Japan) Limited to prepare a quotation for mouldings for a new car, which is code-named "OK10". The elements of cost for 100 mouldings have been calculated by AMC Engineering as:

<i>materials:</i>	polycarbonate (of specified quality), 200 kilos at £1.10 per kilo
	matt black finishing material, 10 litres at £5.40 per litre
<i>labour:</i>	10 hours at £5.75 per hour
	3 hours at £8.50 per hour
<i>overheads:</i>	13 hours at £20 per hour

What is the standard cost of producing 100 bumper mouldings?

solution

	£	£
<i>materials</i>		
polycarbonate: 200 kilos at £1.10 per kilo	220.00	
finishing material: 10 litres at £5.40 per litre	<u>54.00</u>	
		274.00
<i>labour</i>		
10 hours at £5.75 per hour	57.50	
3 hours at £8.50 per hour	<u>25.50</u>	
		<u>83.00</u>
		357.00
<i>overheads</i>		
13 hours at £20 per hour		<u>260.00</u>
STANDARD COST		<u><u>617.00</u></u>

This standard cost will then be used by AMC Engineering to help establish the selling price to the customer, ie: standard cost + profit = selling price

Pricing decisions are covered in Chapter 13

CHAPTER SUMMARY

- Costing calculates how much it costs to produce a unit of goods or services.
- Costs can be classified by element, by function and by nature.
- The main elements of cost are
 - materials
 - labour
 - expenses
 Each of these can be direct or indirect.
- Costs can be classified by function, eg factory or production, selling and distribution, administration, finance.
- By nature, costs are fixed, or variable, or semi-variable.
- A total cost statement lists all the direct costs and the overheads involved in producing the output of a business. Sales revenue minus total cost equals profit.
- Costing systems include
 - absorption costing
 - marginal costing
 - activity based costing
 - standard costing

KEY TERMS

cost unit	unit of output to which costs can be charged
cost centre	section of a business to which costs can be charged
unit of output	the output of the business expressed in terms of units
direct costs	those costs that can be identified directly with each unit of output
indirect costs	all other costs, ie those that cannot be identified directly with each unit of output
overheads	the indirect costs of materials, labour and expenses
fixed costs	costs which remain fixed over a range of output levels
variable costs	costs which vary directly with activity
semi-variable costs	costs which combine a fixed and variable element
total cost statement	list of all the direct costs and overheads

**absorption costing**

involved in producing the output of the business

marginal cost

absorbs the total costs of the whole business into each cost unit

activity based costing

the cost of producing one extra unit of output

cost drivers

charges overheads to output on the basis of activities

standard costing

activities which cause costs to be incurred

a pre-determined cost for materials, labour and overheads in advance of production

ACTIVITIES

- 9.1** Select an organisation – either where you work, or another one with which you are familiar.
- (a) Prepare a diagram, similar to that shown on page 165, identifying the main functions of the organisation and the costs incurred by each section.
 - (b) Describe the cost units and cost centres used by the organisation. Discuss whether or not you consider these to be appropriate.
- 9.2** (a) Why is it important to analyse costs in different ways, eg by element, by function and by nature?
- (b) Classify each of the following costs by nature (ie fixed, or variable, or semi-variable):
- raw materials
 - factory rent
 - telephone
 - direct labour, eg production workers paid on a piecework basis
 - indirect labour, eg supervisors' salaries
 - commission paid to sales staff

Taking the costs in turn, explain to a friend, who is about to set up a furniture manufacturing business, why you have classified each as fixed, or variable, or semi-variable. Answer the comment, "What difference does it make anyway, they are all costs that have to be paid."

9.3 Severn Manufacturing Limited makes chairs for school and college use. The chairs have plastic seats, and tubular steel legs. The firm's management accountant asks you to help her classify the manufacturing costs into:

- direct materials
- indirect materials
- direct labour
- indirect labour
- direct expenses
- indirect expenses

The costs to be classified are:

COST	CLASSIFICATION (write your answer)
Tubular steel Factory supervisor's salary Wages of employee operating the moulding Machine which produces the chair seats Works canteen assistant's wages Rates of factory Power to operate machines Factory heating and lighting Plastic for making chair seats Hire of special machinery for one particular order Cost of oil for the moulding machine Depreciation of factory machinery Depreciation of office equipment	

If you believe alternative classifications exist, argue the case and state if you need further information from the company.

9.4 Eveshore Pottery Limited manufactures a range of 'souvenir' mugs, cups and saucers, plates, etc, which sell well to visitors from abroad who are seeking a memento of 'Olde England'. A number of different costs have been incurred during the last month, and you are asked to classify them into:

- direct materials
- indirect materials
- direct labour
- indirect labour
- direct expenses
- indirect expenses

The costs are:

- (a) cleaning materials for the machines
- (b) wages of factory supervisor
- (c) clay from which the 'pots' are made
- (d) 10p royalties payable to the designer for each 'Eveshore Plate' made
- (e) salary of office clerk
- (f) electricity used to heat the kilns
- (g) rates of factory
- (h) depreciation of office equipment
- (i) wages of production line workers
- (j) salesperson's salary
- (k) interest charged on bank overdraft

If you believe alternative classifications exist, argue the case and state if you need further information from the company.

Of the overhead costs, ie indirect materials, indirect labour, and indirect expenses, you are to indicate which would be classified as:

- factory overheads
- selling and distribution overheads
- administration overheads
- finance overheads

- 9.5** The following figures relate to the accounts of Hughes Limited, a manufacturing business, for the year ended 31 December 1996:

	£
Raw materials used in the factory	118,830
Rent and business rates	16,460
Factory wages	117,315
Factory power	3,825
Factory heat and light	1,185
Factory expenses and maintenance	4,095
Office salaries and wages	69,350
Advertising	11,085
Office expenses	3,930
Depreciation of factory plant and machinery	3,725
Sales revenue	426,350

- (a) Prepare a total cost statement for the year which shows:
- prime cost
 - production cost
 - total cost
- Discuss any assumptions that you make and state if you need further information from the company.
- (b) Prepare a profit statement for the year (on the assumption that all the goods manufactured have been sold).

- 9.6** John Walker Limited manufactures high quality training shoes (trainers). The management of the company is considering next year's production and has asked you to help with certain financial decisions.

The following information is available:

wholesale selling price (per pair)	£40
direct materials (per pair)	£15
direct labour (per pair)	£12
overheads (fixed)	£245,000 per year

The company is planning to manufacture 25,000 pairs of trainers next year.

- (a) calculate the absorption cost per pair of trainers
- (b) calculate the marginal cost per pair of trainers
- (c) prepare a profit statement to show the profit or loss if 25,000 pairs of trainers are sold

9.7 Rowcester Engineering Limited makes engine castings for a major car manufacturer. The castings are made in the foundry and are then sent to the machine shop for machining to the customer's specifications.

As a cost clerk, you have been asked to prepare a standard cost based on production of 100 castings. The following information is available to you:

- materials for 100 castings
 - 550 kg of ordinary steel at £3.50 per kg
 - 200 kg of high tensile steel at £10.00 per kg

- labour for 100 castings
 - 60 hours of foundry-workers' wages at £10.50 per hour
 - 155 hours in the machine shop at £12.75 per hour

- overheads (factory and office)
 - 210 hours at £25 per hour

What is the standard cost of producing 100 castings?

9.8 Mereford Manufacturing Limited makes two products, A and B. Product A is made in batches of 10,000 units, and Product B is made in batches of 1,000 units. Each batch has the following set-up and quality inspection costs:

- set-up £250
- quality inspection £150

Each week, the company produces 50,000 units of A and 50,000 units of B. At present the company charges overheads to output on the basis of labour hours which are 500 hours per week for A and 500 hours for B.

- (a) calculate the overheads charged to A and B each week, on the basis of labour hours
- (b) calculate the overheads charged to A and B each week, using activity based costing with the cost drivers of set-up and quality inspection
- (c) advise the management of Mereford Manufacturing Limited which is the more appropriate method of charging overheads to output