

Part 4

FINANCIAL MANAGEMENT AND STRATEGIC PLANNING

It is increasingly recognised that the role of management accounting requires an understanding of financial management and strategic planning. Financial management, for many small businesses, means controlling costs to maximise profits and then converting those profits to cash as efficiently as possible. Working capital soaks up cash, so control of inventory and debtors (credit customers) is very important. A company should also take care of its liabilities to trade suppliers (accounts payable) in order to balance the outflow of cash with the need to maintain the confidence of suppliers in the company's ability to pay. Chapter 18 explains basic aspects of financial management of cash flow and working capital. It also sets out the main features of a business plan for a small or medium-sized enterprise. The importance of financial management as a strand of management accounting is evidenced in the change of title of the CIMA monthly magazine from *Management Accounting* to *Financial Management* and in the changing editorial content of the magazine which is targeted at practitioners.

Strategic management accounting means paying attention to the activities of competitors rather than focusing solely on the organisation itself. Chapter 19 provides an introduction to strategic management accounting and to other techniques by which management accounting can help managers plan and control the activities of an organisation.

Part 4 FINANCIAL MANAGEMENT AND STRATEGIC PLANNING

LEVEL 2

Chapter 18
Financial management:
working capital and business plans

Chapter 19
Business strategy and
management accounting

Chapter 18

Financial management: working capital and business plans

Real world case 18.1

This case study shows a typical situation in which management accounting can be helpful. Read the case study now but only attempt the discussion points after you have finished studying the chapter. The company distributes natural healthcare products.

Commenting on the results and the outlook, David Suddens, Non-executive Chairman said: 'Last year was a very challenging one for the Company. We have since made a number of difficult decisions in order to maintain Bank support and improve the performance and potential of the business. Good progress has been made in the implementation of our turnaround plan, including debt reduction through the disposal of non-core assets and better working capital management.'

Source: Ransom (Wm) & Son, Replacement Preliminary Results, 24 December 2008, Regulatory News Service.



Discussion points

- 1 How could a distribution company improve its working capital management?
- 2 What kind of bank support is needed to cover working capital requirements?

Contents

18.1	Introduction	462
18.2	Current assets	462
18.2.1	Inventories (stocks)	462
18.2.2	Receivables (debtors) and prepayments	463
18.2.3	Cash	464
18.3	Current liabilities	464
18.3.1	Bank borrowing	464
18.3.2	Trade payable (creditors)	465
18.3.3	Accrual of liabilities	466
18.4	The working capital cycle	466
18.4.1	Describing the working capital cycle	467
18.4.2	Measuring working capital	468
18.4.3	Calculating the working capital cycle	468
18.4.4	Overtrading	468
18.5	Planning and controlling inventory (stock)	470
18.5.1	Describing the process	470
18.5.2	Economic order quantity	472
18.5.3	The just-in-time approach	474
18.5.4	Backflush accounting	475
18.6	Business plans	475
18.7	What the researchers have found	476
18.7.1	Small businesses	476
18.7.2	Working capital cycle	477
18.7.3	Types of business	477
18.7.4	The banker's perspective	477
18.7.5	Just-in-time production	477
18.8	Summary	478

Learning outcomes

After studying this chapter you should be able to:

- Define working capital.
- Explain the management of current assets.
- Explain the management of current liabilities.
- Explain and calculate the working capital cycle.
- Explain the planning and control of inventory.
- Explain the main contents of a business plan.
- Describe and discuss examples of research into management of working capital.

18.1 Introduction

Management accounting seeks to help planning and control. One area where planning and control are important, especially for small businesses, is the financial management of **working capital**. Working capital is the amount of finance which a business must provide to finance the **current assets** of a business, to the extent that these are not covered by **current liabilities**. It is calculated by deducting current liabilities from current assets. If the non-cash current assets (inventories and debtors) are allowed to rise to excessive levels, the business may find it has insufficient cash to meet its day-to-day needs. If the current liabilities (such as trade creditors and bank overdraft) are allowed to grow to excessive levels, the business may find itself unable to meet these obligations as they fall due.

The management of working capital involves **controlling** and **planning** levels of inventory, **debtors** and **creditors**, to allow an efficient flow of cash into and out of the entity. This chapter explains some of the main features of working capital management.

Definitions

Current assets are assets held for conversion into cash in the normal course of trading, usually within one year. They include cash, debtors (credit customers) and inventory (stocks).

Current liabilities are liabilities that fall due for payment within one year. They include bank overdrafts, trade creditors (suppliers) and unpaid expenses (accruals).

Working capital is the amount of finance which a business must provide to finance the current assets of a business, to the extent that these are not covered by current liabilities. It is calculated by deducting current liabilities from current assets.

18.2 Current assets

This section defines and explains the main categories of current assets.

18.2.1 Inventories (stocks)

There are three main categories of inventory: finished goods, **work-in-progress** and raw materials.

Finished goods

The future economic benefit expected from finished goods is that they will be sold to customers for a price which exceeds the cost of purchase or manufacture, so making a profit. There is some risk attached to holding inventories of finished goods because they may become out of date, or may not sell for the expected selling price.

Work-in-progress

During the course of production the asset of finished goods is gradually being created. The expected future benefit of that activity is gradually building up as the work moves towards completion.

The risks attached to work-in-progress are often greater than those attached to finished goods because there is the risk of non-completion to add to all the risks faced when the goods are completed and awaiting sale.

Raw materials

Raw materials are expected to create a benefit by being used in the manufacture of goods for sale. There is a risk that the value of the raw materials may fall because commodity prices fluctuate in the markets. There is also a risk of the raw materials deteriorating or becoming unsuitable for use because production processes change.

Stockholding period

A simple calculation allows us to estimate the average period for which inventory (stock) is held. The stockholding period is calculated in days:

For raw materials:

$$\frac{\text{Average inventory (stock) of raw materials}}{\text{Cost of raw materials used in production}} \times 365$$

For finished goods:

$$\frac{\text{Average inventory (stock) of finished goods}}{\text{Cost of goods sold}} \times 365$$

The average inventory may be calculated as the average of the inventory levels at the start and end of the period.

Managing inventory (stock) levels

Section 18.5 contains a detailed discussion of the approach to planning and controlling inventory.

18.2.2 Receivables (debtors) and prepayments

Receivables (debtors)

Debtors are those customers or clients who owe money to a business. Usually the largest amount shown under this heading relates to customers buying goods on credit. These are the trade receivables (**trade debtors**). Additionally, the business may have lent money to another enterprise to help that enterprise in its activities. There may be loans to employees to cover removal and relocation expenses or advances on salaries. The business may be due to receive a refund of overpaid tax.

Trade receivables (debtors) represent an expectation of benefit when the customer pays. There is a risk that the customer will not pay. The risk of non-payment is dealt with by reducing the reported value of the asset by an estimate for doubtful debts.

Customers (trade debtors) customers collection period

The customers collection period is calculated in days:

$$\frac{\text{Average trade receivables}}{\text{Credit sales}} \times 365$$

Managing trade receivables

A business which sells on credit has to manage its trade receivables. The business sells on credit in order to attract business but it must then ensure that the cash is collected as efficiently as possible. Key issues to watch are:

- Choose customers carefully and only allow credit after checking for creditworthiness.
- On the invoice sent to the customer, state the conditions for payment date and any penalties for late payment.
- Offer discounts for early payment (but balance the cost of discount against the benefit of early cash).

- Ensure that invoices are sent out as soon as the goods are despatched.
- Maintain an 'aged accounts receivable' analysis and send reminder letters as soon as key dates are reached.
- Cut off credit facilities if the customer exceeds a specified payment period.
- Arrange with a debt collection agency to have late debts pursued for collection.

Activity 18.1

Write down two types of business that sell goods on credit and two types of business that sell only for cash. What explanations might be given for these different strategies?

Prepayments

Prepayments are amounts of expenses paid in advance. Insurance premiums, rent of buildings, lease charges on a vehicle and road fund licences for the delivery vans and lorries are all examples of items which have to be paid for in advance. At the balance sheet date some part of the future benefit may remain. This is recognised as the prepayment. Take the example of an insurance premium of £240 paid on 1 October to cover a twelve-month period. At the company's year end of 31 December, three months' benefit has expired but nine months' benefit remains. The balance sheet therefore reports a prepayment of £180.

18.2.3 Cash

Cash may be used to buy fixed assets or to contribute to the working capital cycle so that the business earns a profit. In the meantime cash which is surplus to immediate requirements should be deposited in such a way that it is earning interest. Where a company has substantial cash balances there should be indications in the profit and loss account that investment income has been earned, to provide a benefit to the business.

Investments held as current assets are usually highly marketable and readily convertible into cash.

18.3 Current liabilities

The most significant current liabilities for most companies are bank borrowing and **trade payables (creditors)**. Both of these are essential sources of finance for small companies and are an important aspect, if not essential, for larger companies. In addition most companies have some unpaid expenses at the balance sheet date. These are recorded as expenses in the profit and loss account and as **accrued liabilities** in the balance sheet.

18.3.1 Bank borrowing

Banks provide short-term finance to companies in the form of an overdraft on a current account. The advantage of an overdraft is its flexibility. When the cash needs of the company increase with seasonal factors, the company can continue to write cheques and watch the overdraft increase. When the goods and services are sold and cash begins to flow in, the company should be able to watch the overdraft decrease again. The most obvious example of a company which operates in this pattern is farming. The farmer uses the overdraft to finance the acquisition of seed for arable farming or feeding through the winter for stock farming and to cover the period when the crops or animals are growing and maturing. The overdraft is reduced when the crops or the animals are sold.

The major disadvantage of an overdraft is that it is repayable on demand. The farmer whose crop fails because of bad weather knows the problem of being unable to repay the overdraft. Having overdraft financing increases the worries of the company. The other disadvantage is that the interest payable on overdrafts is variable. When interest rates increase, the cost of the overdraft increases. Furthermore, for small companies there are often complaints that the rate of interest charged is high compared with that available to larger companies. The banks answer that the rates charged reflect relative risk and it is their experience that small companies are more risky.

18.3.2 Trade payables (creditors)

It is a strong feature of many industries that one enterprise is willing to supply goods to another in advance of being paid. Most suppliers will state terms of payment (e.g. the invoice must be paid within 30 days) and some will offer a discount for prompt payment. In the UK, it has not been traditional to charge interest on overdue accounts but this practice is growing as companies realise there is a high cost to themselves of not collecting cash from their customers.

Trade payables (creditors) rarely have any security for payment of the amount due to them so that if their customer fails to pay they must wait in the queue with other suppliers and hope for a share of some distribution. They are described as **unsecured creditors**. Some suppliers will include in the contract a condition that the goods remain the property of the supplier should the customer fail to pay. This is called **retention of title** and will be noted in the balance sheet of a company which has bought goods on these terms. Retention of title may offer some protection to the unpaid supplier but requires very prompt action to recover identifiable goods in the event of difficulty.

Some suppliers send goods to a customer on a *sale-or-return* basis. If there are no conditions to prevent return then the goods will not appear as stock in the balance sheet of the customer and there will be no indication of a liability. This practice is particularly common in the motor industry where manufacturers send cars to showrooms for sale or return within a specified period of time.

Suppliers send **invoices** to the customer showing the amount due for payment. These invoices are used in the customer's accounts department as the source of information for liabilities. At the end of the month, the suppliers send **statements** as a reminder of unpaid invoices. Statements are useful as additional evidence of liabilities to suppliers.

Supplier (trade creditor) payment period

The creditors payment period is calculated in days:

$$\frac{\text{Average trade payables}}{\text{Credit purchases}} \times 365$$

Managing trade (payables)

A business which buys on credit has to manage its trade payables. The business buys on credit in order to finance its holding of inventory, but it must then ensure that payments are made in sufficient time to maintain a good reputation with the supplier and to avoid penalties for late payment. Key issues to watch are:

- Maintain an 'aged accounts payable' analysis and make payments in time to avoid any liabilities exceeding the period stated by the supplier (particularly where there may be penalties).
- Watch for discounts allowed for early payment and check whether the cost of losing the discount exceeds the benefit of interest saved on the bank overdraft.
- Plan ahead for major purchases and ensure the cash flow will be available.
- Plan ahead for seasonal fluctuations in cash outflows for expense items.

Activity 18.2

Write down two types of business that buy goods on credit and two types of business that buy only for cash. What explanations might be given for these different strategies?

18.3.3 Accrual of liabilities

At the balance sheet date there will be obligations of the enterprise to pay for goods or services received but which are not contained in the accounting records because no document has been received from the supplier of the goods or service. It is essential that all obligations are included at the balance sheet date because these obligations fall under the definition of liabilities even although the demand for payment has not been received. The process of including in the balance sheet all obligations at the end of the period is called the **accrual** of liabilities.

Activity 18.3

Write down two types of expense that might be unpaid at the accounting date and so recorded as accruals.

Real world case 18.2

As Jon said, our cash and cost results have been excellent. Going forward, we will generate consistent cash flows by closely managing operating expenses, capital spending and of course working capital. At the same time, we'll offset higher operating costs. We'll continue to increase prices where necessary to cover rising commodity costs. We'll also implement ongoing savings projects and drive up capacity in material utilization, to drive down energy and logistics costs, and to steadily improve organizational productivity.

Source: Procter & Gamble Company Analyst Meeting – Final, 11 December 2008, Voxant FD (Fair Disclosure) Wire. Copyright 2008 by ASC Partners, LLC.

Discussion points

- 1 This is a manufacturing company. How would it manage working capital?
- 2 How will an improvement in material utilization help with the management of working capital?

**18.4 The working capital cycle**

A business needs current assets (inventory, debtors and cash) to enable it to carry out day-to-day operations smoothly. Some short-term finance for current assets is provided by suppliers who give credit by allowing time to pay, but that is not usually sufficient. Some short-term finance for current assets is provided by short-term bank loans but, in most cases, there still remains an excess of current assets over current liabilities. *Working capital* is the amount of long-term finance the business has to provide in order to keep current assets working for the business.

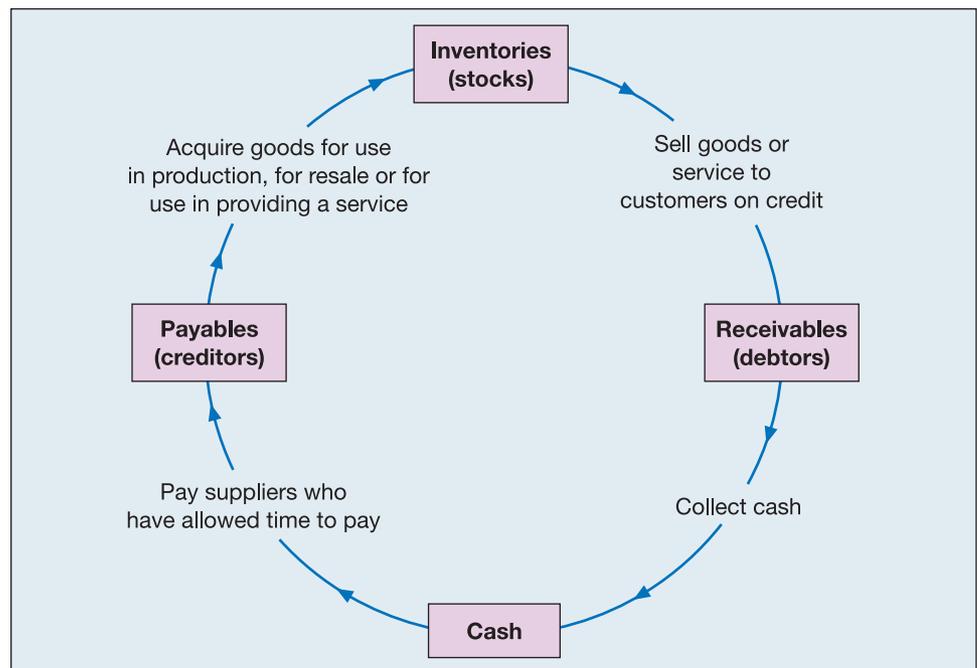
The working capital cycle of a business is the sequence of transactions and events, involving current assets and current liabilities, through which the business makes a profit.

18.4.1 Describing the working capital cycle

Figure 18.1 shows how the working capital cycle begins when suppliers allow the business to obtain goods on credit terms, but do not insist on immediate payment. While they are waiting for payment, they are called creditors. The goods obtained by the business are used in production, held for resale or used in providing a service. While the goods acquired are held by the business they are called the inventory (stock) of the business. Any products manufactured from these goods and held for resale are also part of the stock of the business. The resulting product or service is sold to customers who may pay immediately in cash or may be allowed time to pay. If they are allowed time to pay, they become debtors of the business. Debtors eventually pay and the business obtains cash. Cash is a general term which includes money held in notes and coins on the business premises and also money held in the bank. Cash held in the bank will be in an account such as a current account which allows immediate access. Finally, the cash may be used to pay the suppliers who, as creditors, have been waiting patiently for payment. They in turn supply more goods to the business and the cycle begins again.

Figure 18.1

The working capital cycle for a manufacturing or service business



Working capital is calculated as *current assets minus current liabilities*. If the working capital is low, then the business has a close match between current assets and current liabilities but may risk not being able to pay its liabilities as they fall due. Not all the current assets are instantly available in cash (particularly the stocks of unsold goods) and an impatient supplier or bank manager may decide to cause difficulties if cash is not available when payment of a liability is due. On the other hand, if current assets are very much greater than current liabilities, then the business has a large amount of finance tied up in the current assets when perhaps that finance would be better employed in the acquisition of more fixed assets to expand the profit-making capacity of the operations.

18.4.2 Measuring working capital

There are two main ratios for measuring working capital.

Current ratio

$$\frac{\text{Current assets}}{\text{Current liabilities}}$$

The current ratio measures the relative level of current assets compared with current liabilities. It indicates the extent to which all current liabilities are covered by all current assets. If the ratio is greater than 1:1, the entity can meet all of its current liabilities out of current assets. Many companies operate with this ratio in the region from 1:1 to 1.5:1. If the ratio is higher than this, the current liabilities are very safely covered. However, if the ratio is very much higher than 2:1, there could be questions about holding excessive levels of inventory and debtors, with a possible risk of outdated inventory and slow-paying customers.

Liquid ratio

$$\frac{\text{Current assets minus inventory}}{\text{Current liabilities}}$$

The liquid ratio is a measure of solvency. On the top line of the ratio the inventory is removed to leave the liquid assets of debtors and cash. These are available to pay current liabilities in an immediate crisis. Inventory will take longer to sell. It is fairly unlikely that all trade creditors will demand payment at the same time and so many companies operate with this ratio in the region from 0.75:1 to 0.9:1. If the ratio is higher than 1:1 then the current liabilities are safely covered, although there could be a concern that excessive levels of debtors and cash are held. If the ratio is lower than 0.75:1 then suppliers might become worried and demand payment, so forcing a crisis.

18.4.3 Calculating the working capital cycle

The ratios tell us how well the current liabilities are covered but they do not give any sense of the timing of cash flows. The calculations of time periods set out in sections 18.2 and 18.3 can now be brought together to calculate the working capital cycle as in Exhibit 18.1.

Exhibit 18.1

Working capital cycle in days

Number of days for which inventory is held (stockholding period)	xx
<i>Plus</i>	
Number of days taken by credit customers to pay (customer collection period)	xx
<i>Minus</i>	
Number of days taken to pay suppliers (suppliers payment period)	(xx)
<i>Equals</i>	
Number of days for which long-term financing is needed from shareholders or lenders	xx

18.4.4 Overtrading

Overtrading is the name given to the situation where an entity is expanding its sales rapidly, but is not managing its cash flow. When a business is expanding and sales are

increasing, there will be correspondingly higher levels of inventory and debtors. These need to be financed. If the business reaches its overdraft limit and has no access to other sources of funding, it may have insufficient cash to pay suppliers and pay wages. It is very frustrating for an enterprising business person, who has been focusing on expanding business in a time of strong demand for the product, to find that the business is on the verge of collapse. The message is that cash flow has to be managed, by preparing and monitoring monthly cash budgets as described in Chapter 13.

Real world case 18.3

The CFO Magazine in the USA publishes information to help chief finance officers (finance directors) in companies. The following information is extracted from its annual Working Capital Survey.

For those who rejoiced when the New York Yankees faltered at the start of this season or thought 2003 surely had to be Lance Armstrong's last Tour de France win, here's some exciting news: Dell Computer's working capital performance has slipped. Well, sort of. The undisputed champion saw its overall working capital grow by two days – putting it still at a mind-blowing negative 30 days in CFO's annual survey, conducted by Purchase, New York-based REL Consultancy Group, Which, of course, leaves even Dell's best



competitors trailing behind like the Boston Red Sox. Indeed, despite a deterioration in receivables collection [days taken by credit customers to pay], Dell once again shaved its days inventory outstanding by 9 per cent to three days (four by Dell's slightly different reckoning). That's so low that chief accounting officer Robert W. Davis says the company now thinks of inventory in dollars rather than days.

The CFO survey calculates the working capital in days for 67 industry sectors. Two examples are:

Auto parts and suppliers

Number of days for which inventory is held (stockholding period)	31
Number of days taken by credit customers to pay (debtors collection period)	55
Number of days taken to pay suppliers (creditors payment period)	(43)
Number of days for which long-term financing is needed from shareholders or lenders	43

Home construction

Number of days for which inventory is held (stockholding period)	181
Number of days taken by credit customers to pay (debtors collection period)	19
Number of days taken to pay suppliers (creditors payment period)	(32)
Number of days for which long term financing is needed from shareholders or lenders	168

Source: *CFO Magazine*, 'The 2004 Working Capital Survey', www.cfo.com.

Discussion points

- 1 What do these figures tell us about the autoparts industry compared with the home construction industry?
- 2 Dell Computers assembles computers to customers' orders received on the internet. How does the company's operation help it to keep down its inventory holding period?

Brown (2001) describes the ways in which overtrading arises when there is too much focus on marketing, perhaps with low profit margins, leading to a lack of sufficient cash flow. He points out that marketing managers seek to maximise sales and foster total awareness of the brand. However, if this happens through low pricing or through investing in expensive promotions, the business may run out of cash. Margins are too low and investments are not earning an adequate return. On the other hand, excessive prudence may lead to short-term boosts to profits through keeping prices high and avoiding investment. At the same time, the long-term prospects are neglected and the sales fall. Brown says that investors are looking at the long-term growth potential, sustainable margins and the amount of investment needed to maintain market performance.

18.5 Planning and controlling inventory (stock)

Many organisations hold inventory as part of their business operations. Some are manufacturing businesses and so need to buy in raw materials, convert the raw materials to work-in-progress and then hold inventories of finished goods awaiting sale to customers. Others are service businesses which hold inventories of materials to be used in providing a service. Retail stores buy goods to sell in their shops; restaurants buy food to cook in their kitchens; government departments buy stationery to use in their office activities. They are all holding inventory and in the process are incurring costs.

18.5.1 Describing the process

Costs of holding inventory can be divided into the costs of inventory levels that are too high ('overstocking') and the costs of inventory levels that are too low ('understocking'). These are summarised in Exhibit 18.2.

Exhibit 18.2

Costs of holding inventory

Inventory levels too high

If inventory levels are too high, there will be excessive costs of storage. These include:

- interest charges on finance used to support the inventory levels until used or sold;
- costs of space used for storage, including rent, heating, lighting;
- equipment costs, such as storage racks, bins, temperature controlled cases;
- personnel cost, such as storekeeping, security and cleaning;
- insurance;
- risk of deterioration and obsolescence as inventory becomes out of date.

Inventory levels too low

If inventory levels are too low, the organisation may run out of supplies for its needs. This leads to:

- wages being paid for idle time;
- disruption of business activity;
- loss of profit through lost sales;
- cancelled customers' orders because of delayed delivery;
- penalty payments claimed by customers due to delay;
- increased costs of finding replacement supplies in an emergency.

The costs of holding inventory, and the risks of shortages from having inadequate inventory, might lead an organisation to decide on a policy of frequent regular orders of smaller amounts, calculated to match expected demand. Again there are costs to consider in the frequent number of orders required. **Costs of ordering inventory** are summarised in Exhibit 18.3.

Exhibit 18.3 Costs of ordering

The administrative costs related to buying and receiving materials will increase with the frequency of ordering. Such costs include:

- increased costs of clerical staff for placing orders, checking deliveries and paying invoices;
- increased administrative oversight and checking;
- increased stationery, phone calls, faxes, emails;
- increased inward transport costs.

Inventory control is based on planning for four levels of control:

- maximum level
- minimum level
- re-order level
- re-order quantity.

The *maximum level* is the uppermost level that the buying department should not exceed. Above this point the holding costs become unacceptable, perhaps because more warehouse staff have to be recruited or more storage space has to be rented. The *minimum level* is the lowest level that allows the activity of the organisation to be maintained. It is also called the **buffer stock** and can be thought of as a kind of safety cushion. As soon as the inventory level touches this lower level it should bounce up again with another incoming order of materials.

The **re-order level** is the point at which the buying department places its order for replacement materials. This will be a level that is higher than the minimum level because time will be required for the new order to arrive, and during that time the levels of inventory will fall further. This delay between order date and delivery date is called the lead time. The re-order level will depend on:

- the rate of consumption
- and the lead time.

The re-order quantity is the quantity to be ordered when the re-order level is reached. If this quantity is specified in advance, the buying department knows how much to order as soon as the re-order level is reached. The re-order quantity should be set after considering:

- the rate of consumption of materials
- the cost of holding compared to the cost of purchasing
- the availability of bulk discounts
- transport costs
- risks of obsolescence and deterioration.

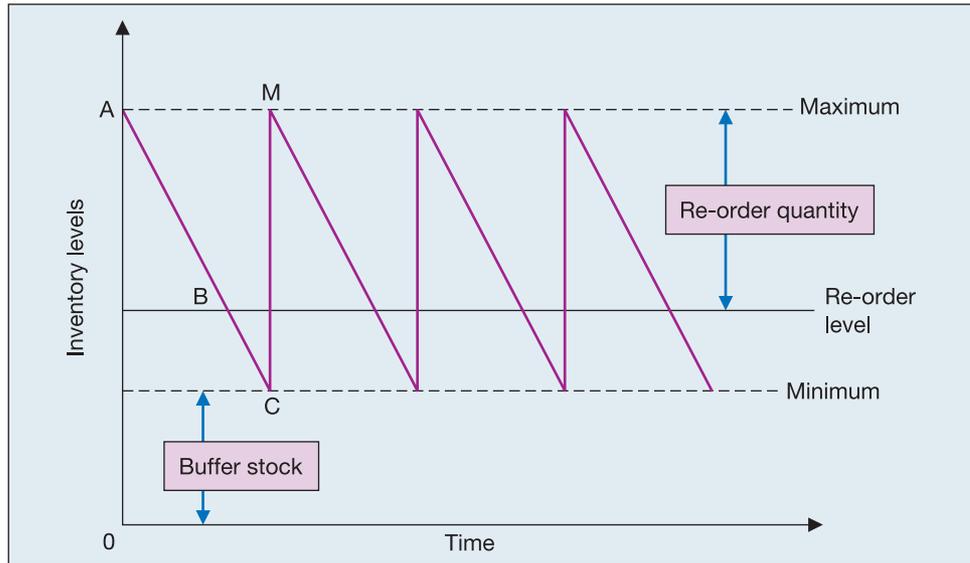
The average inventory (average stock) held in any period is the average of the starting and closing levels, if a uniform pattern of usage is assumed,

$$\frac{\text{opening inventory} + \text{closing inventory}}{2}$$

If the opening inventory is zero, then the average is half of the closing inventory.

These ideas are summarised in Figure 18.2. At point A the organisation is holding the maximum inventory level. The materials are then used or sold in a straight-line pattern, down to the re-order point B. At this point an amount is ordered, calculated as the difference between the minimum and maximum levels. The order arrives at point C, when inventories are at the minimum level of inventory stock, and the inventory is replenished up to the level M. The pattern then repeats itself.

Figure 18.2
Controlling inventory levels



18.5.2 Economic order quantity

If inventory is maintained at relatively high levels, the costs of holding inventory are higher but the costs of re-ordering are lower. If inventory is maintained at relatively low levels, the costs of holding inventory are lower but the costs of re-ordering are higher. The aim of inventory planning is to find the most efficient middle ground to minimise the combined costs of holding inventory and re-ordering inventory. A model that minimises the combined cost is called the model to calculate the **economic order quantity (EOQ)**.

Spreadsheet solution

One way of solving this is to prepare a spreadsheet. The spreadsheet for Exhibit 18.4 is shown in panel A of Exhibit 18.5 in increments of order size. From this the minimum total cost appears to be at or near an order quantity of 250. The spreadsheet is then used in shorter increments (panel B) to narrow down the minimum total cost which appears to be at or near an order quantity of 260. This is very easy to do by trial-and-error once you have set up the spreadsheet.

Exhibit 18.4

Information for illustration of economic order quantity

An organisation purchases materials from an external supplier at a cost of £10 per item. All items are identical. The total annual demand for this item is 30,000 units.

The organisation requires a 6 per cent return on investment in assets, which means expecting a return of 60 pence on each item costing £10. Other holding costs are 12 pence per item. The cost of each purchase order is 80 pence.

What is the economic order quantity?

Exhibit 18.5**Spreadsheet for holding cost and ordering cost as order quantity varies**

Panel A Range of order sizes						
Order quantity	50	150	250	350	450	550
Average stock ¹	25	75	125	175	225	275
Number of purchase orders ²	600	200	120	86	67	55
	£	£	£	£	£	£
Annual holding cost @ 72 pence	18	54	90	126	162	198
Annual ordering cost @ 80 pence	<u>480</u>	<u>160</u>	<u>96</u>	<u>69</u>	<u>53</u>	<u>44</u>
Total cost	<u>498</u>	<u>214</u>	<u>186</u>	<u>195</u>	<u>215</u>	<u>242</u>

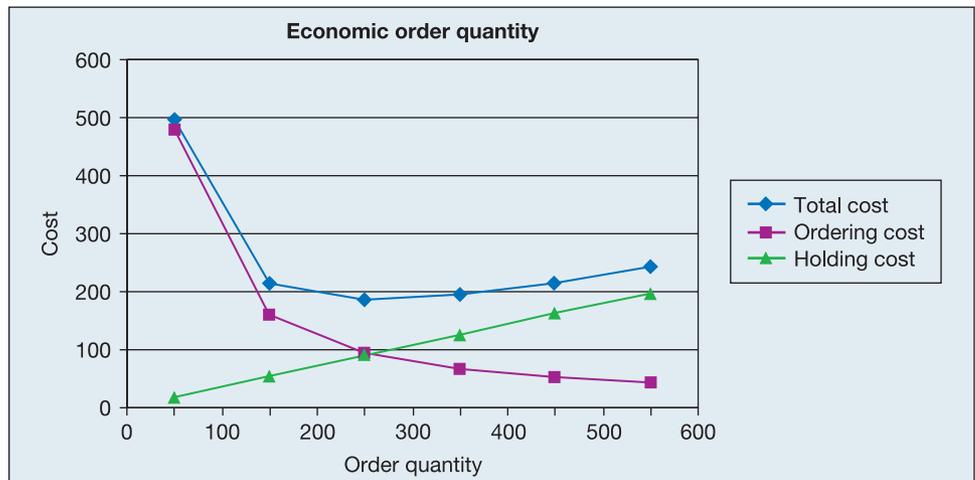
¹ Average stock = order quantity/2. The order quantity is the maximum held. It falls to zero at the point of arrival of the next order so the average stock is half of the order quantity.

² Number of purchase orders = total demand divided by order quantity.

Panel B Spread in order increments of 10, either side of minimum			
Order quantity	250	260	270
Average stock	125	130	135
Number of purchase orders	120	115	111
	£	£	£
Annual holding cost @ 72 pence	90	94	97
Annual ordering cost @ 80 pence	<u>96</u>	<u>92</u>	<u>89</u>
Total cost	<u>186.0</u>	<u>185.9</u>	<u>186.1</u>

Graphical solution

An alternative way of finding the minimum total cost is to draw a graph of the annual holding cost and the annual ordering cost and find the point where they intersect. This point represents the minimum total cost. You will see from Figure 18.3 that the point of intersection is at or near the order quantity 260.

Figure 18.3**Economic order quantity graph****Algebraic solution**

Equations may be written for the cost of holding and the cost of ordering inventory. Adding these gives the total cost. Using differential calculus gives the minimum point on the total cost curve. We need not worry about differential calculus here because the formula is reasonably intuitive.

The cost of holding the average stock for a period =

$$\text{cost of holding one item} \times \frac{\text{number of items}}{2}$$

Call this $C_h \times D/2$

$$\text{The cost of ordering for a period} = \text{cost per order} \times \frac{\text{total demand}}{\text{quantity in one order}}$$

Call this $C_o \times D/q$

Add them together to give total cost = $(C_h \times D/2) + (C_o \times D/q)$

It can be shown by calculus that the minimum total cost occurs where

$$\text{EOQ} = \sqrt{\frac{2 D C_o}{C_h}}$$

Substitute in this equation the data from Exhibit 18.4

$$\text{EOQ} = \sqrt{\frac{2 \times 30,000 \times .80}{.72}}$$

$$\text{EOQ} = 258 \text{ units}$$

So the trial-and-error spreadsheet and the graphical solution were reasonably close with an estimate of 260 units.

Applicability of the EOQ formula

It is unlikely that any business would be able to use the EOQ formula precisely as shown here because it is based on assumptions that are unlikely to apply exactly in the real world.

- Average stock may not be exactly half the re-order quantity if the pattern of usage is uneven.
- Costs of holding inventory may not be constant across all levels of inventory.
- Costs of ordering may not be the same for all sizes of order.

However, the EOQ formula is dominated by the demand figure, D , on the top line, and the ratio C_o/C_h . The calculated EOQ will not change a great deal provided the demand is reasonably close to the estimate and the ratio of C_o/C_h does not change greatly from the original estimates.

18.5.3 The just-in-time approach

An entirely different approach to the management of inventory levels is seen in 'just-in-time' manufacturing. This is much more than a method of inventory control, but it has important consequences for managing inventory levels. **Just-in-time purchasing** is a system of contracts with suppliers to deliver goods as closely as possible to the time when they are required for operations. It involves accepting only perfect incoming resources and allowing no deviation from standards. Every activity occurs exactly at the time needed for effective execution, and the activity always happens exactly as planned. Just-in-time purchasing reduces stockholding costs, minimises idle time for production resources and creates a demand-driven business.

In this approach inventory levels become very low or non-existent because deliveries are timed to arrive as they are needed. Inventory planning is not treated as a separate exercise – it is one part of the streamlining of the whole process.

Fiona McTaggart describes her experience of a just-in-time management system.



FIONA: I recently participated in a pilot project involving a leading company manufacturing car engines. There were two shifts planned, one using manual labour and one entirely operated by robots. A just-in-time (JIT) philosophy applied throughout. Each item required for the manufacture of an engine was planned to arrive on the production line at exactly the right time. Delivery from suppliers was similarly timed with care. The computer recording system was designed so that the arrival of the component was recorded and bar coding allowed the cost to be recorded at the same time. There was no need to wait for an invoice to arrive before the cost of the component could be ascertained. Reports on direct costs could therefore be generated simultaneously with reports on physical activity. Dealing with overhead costs was more difficult, but a system was proposed where overhead costs were applied to activities using an activity-based approach and a focus on machine hours as the main measure of use of an activity.

The JIT approach emphasises elimination of waste. The management accounting report for the two shifts had a waste exception report section which allowed rapid identification of departure from accepted waste levels on each shift. Linking the accounting records to the physical activity meant that each shift could be identified separately.

The pilot project was receiving a cautious welcome by the technical managers. They had regarded traditional management accounting as an unavoidable nuisance but they could see that the pilot scheme was bringing the accounting information closer to their perspective of the operation.

Activity 18.4

Write down two benefits and two risks of using just-in-time purchasing. Think of one type of business for which just-in-time purchasing would be useful and one type of business for which it would be unsuitable.

18.5.4 Backflush accounting

The 'just-in-time' approach to managing inventory levels encourages a different approach to costing. You have seen in Chapters 4 and 5 the complexities of using full absorption costing to estimate, in advance, the overhead cost to be allocated to production and to inventory. The costs are then carefully traced through the manufacturing or service process as the goods and services are developed. Would it not be easier to wait until the output is completed and then allocate a measure of standard cost? If the inventory levels are minimised by just-in-time methods then the valuation of inventory is not a major problem. **Backflush accounting** waits until the output is completed and then allocates standard costs to the output. Any differences between standard cost and actual costs will be 'flushed out' at that time.

18.6 Business plans

When the owner of a small business wants to raise finance to develop or expand the business, those who provide finance will ask for a business plan. The business plan will set out at least the following items, some of which you have met in earlier chapters:

- the nature of the business;
- key persons involved in managing the business;
- business goals;
- market for the product or service offered;
- the nature of the product or service offered;

- a description of the business plan for three to five years ahead;
- financial statements (balance sheet and profit and loss account) at the present time;
- the master budget, comprising budgeted cash flows, budgeted balance sheet and budgeted profit and loss account with supporting schedules (see Chapter 13);
- performance measures (financial and non-financial) used to monitor performance (see Chapter 16);
- management accounting information, such as break-even analysis (see Chapter 9) and plans for capital expenditure (see Chapters 11 and 12);
- risk analysis covering operating risk and financial risk.

Many of these items have been covered in this book. In particular, Chapter 13 explains the preparation of cash budgets within the master budget. A bank manager will ask for cash budgets to show the borrowings needed for each month or each quarter of a year. If a business has a strong management accounting system, then the information needed for the business plan will be readily available because it will already be used to support management activities.

Activity 18.5

Look back to Chapter 13 and make sure that you understand how to present cash flows for planning purposes.

18.7 What the researchers have found

18.7.1 Small businesses

Working capital management is particularly important for small businesses which may have limited access to sources of external funding. Howorth and Westhead (2003) mailed a questionnaire to 1,900 companies and received 343 responses. That may seem low but is comparable to the success rate of similar studies. The questionnaire asked: How often do you review each of the following:

- inventory (stock) turnover
- inventory (stock) levels
- inventory (stock) re-order levels
- customer credit periods
- customer discount policy
- bad debts
- doubtful debts
- customer credit risk
- payment period to creditors
- finance of working capital
- use of cash budgeting.

The researchers found that different businesses behaved in different ways, so it was not possible to form a general conclusion about small businesses. Firms that focused on cash management tended to be younger firms with more external finance and possibly with more cash flow problems. Firms that focused on inventory management routines tended also to be younger, but smaller and with less external finance. Firms that focused on credit management had lower profitability, more credit purchases and fewer customers paying on time. It seems that small businesses focus on areas that are key to their particular problems, but do not follow a comprehensive policy of paying attention to all aspects of working capital management.

18.7.2 Working capital cycle

Drickhamer (2004) reported the results of a survey in which respondents were asked to calculate the working capital cycle by adding the days supply of inventory plus outstanding debtors minus the average payment period for materials. Of the responses, 26 per cent had a cycle of less than 30 days, 36 per cent had a cycle of 30–60 days, 20 per cent had a cycle of 60–90 days and 18 per cent had a cycle over 90 days. So there is no clear picture of a 'normal' length of working capital cycle.

18.7.3 Types of business

McCosker (2000) describes and discusses the working capital position of three companies: a football club (Manchester United), a supermarket chain (Tesco) and a travel business (Airtours). He shows that the current ratio of Manchester United is close to 2:1 but the ratios for Tesco and Airtours are much lower than this. He explains that a business such as Tesco, with strong cash flows, can afford to have a much lower current ratio, even to the extent of having current liabilities higher than current assets. Airtours generally receives customers' cash ahead of the date of the holiday so cash flow is strong. The author concludes that the level of the current ratio is very much dependent on the nature of the business.

18.7.4 The banker's perspective

Strischek (2001) writes as a practising banker rather than a researcher. He explains that lenders have a particular interest in sound processes for collecting cash from customers, good inventory controls and discipline over trade credit. He explains some of the simple calculations carried out by bankers, such as calculating the working capital cycle in days and checking on the ratio of net working capital to sales. He points out that efficient management of working capital ensures that bank borrowing is kept to a minimum and the cost of capital is controlled, for the benefit of investors.

18.7.5 Just-in-time production

Hoque (2000) surveyed companies in New Zealand by using a postal questionnaire. This sampled a set of companies using JIT operations in production and a matching set that did not use JIT operations. The researcher found that managers in organisations operating in a JIT production environment tended to rely relatively less upon a broader set of cost data for managerial activities. Use of an automated manufacturing process did not show significant differences in the use of cost data for managerial activities. The study claimed to provide evidence supporting the contingency theory of management accounting, suggesting that a changing manufacturing environment will influence the design and use of management accounting systems in organisations.

González-Benito (2002) surveyed the use of JIT purchasing over a sample of 152 Spanish auto component manufacturers. JIT purchasing practices were mainly applied to fragile and expensive products. Purchasing policies are also affected by the importance of ensuring continuity of supply and a co-operative relationship with suppliers. The JIT practices were not motivated by a desire to reduce the costs of holding inventory. They were determined more closely by the need for flexibility and the desire to avoid the risk of deterioration of fragile items. The availability of working capital also appeared to be important in using JIT purchasing for expensive items.

Schniederjans and Cao (2001) wrote a mathematical paper comparing the EOQ approach to inventory management with the JIT approach. They suggested that it was important to consider the saving on storage space which is achieved under JIT planning. This makes JIT more cost effective than EOQ in most cases. Although the

mathematical formulae in this paper might make it appear a little daunting, the authors do include some numerical examples and also a table discussing the impact of JIT on a range of cost categories.

18.8 Summary

Key themes in this chapter are:

- **Current assets** are assets held for conversion into cash in the normal course of trading, usually within one year. They include cash, debtors (credit customers) and inventory (stocks).
- **Current liabilities** are liabilities that fall due for payment within one year. They include bank overdrafts, trade creditors (suppliers) and unpaid expenses (accruals).
- **Working capital** is the amount of finance which a business must provide to finance the current assets of a business, to the extent that these are not covered by current liabilities. It is calculated by deducting current liabilities from current assets.

- The stockholding period for raw materials is calculated as:

$$\frac{\text{Average inventory (stock) of raw materials}}{\text{Cost of raw materials used in production}} \times 365$$

- The stockholding period for finished goods is calculated as:

$$\frac{\text{Average inventory (stock) of finished goods}}{\text{Cost of goods sold}} \times 365$$

- The **customers** collection period is calculated in days:

$$\frac{\text{Average trade receivables}}{\text{Credit sales}} \times 365$$

- The **suppliers** payment period is calculated in days:

$$\frac{\text{Average trade payables}}{\text{Credit purchases}} \times 365$$

- The current ratio is calculated as:

$$\frac{\text{Current assets}}{\text{Current liabilities}}$$

- The liquid ratio is calculated as:

$$\frac{\text{Current assets minus inventory}}{\text{Current liabilities}}$$

- The **working capital** cycle calculates the number of days for which long-term financing is needed from shareholders or lenders as being equal to the number of days for which inventory is held (stockholding period) *plus* the number of days taken by credit customers to pay (debtors collection period) *minus* the number of days taken to pay suppliers (creditors payment period).
- Planning and controlling inventory requires consideration of the stock levels to be held, the **costs of holding inventory** (stock), the **costs of ordering inventory** (stock) and the lead time between placing an order and receiving the goods. The calculation of the **economic order quantity** minimises the combined cost of holding and ordering stocks.

References and further reading

- Brown, M. (2001) 'Over-trading and out', *Financial Management*, October: 18.
- CIMA (2001) *Business Basics: Cash-flow Management*. CIMA Publishing, available on www.cimaglobal.com.
- CIMA (undated) *A Practical Guide to Preparing a Business Plan for Smaller and Medium-sized Enterprises*. CIMA Publishing/Finance Wales, available on www.cimaglobal.com.
- Drickhamer, D. (2004) 'Calculating capital costs: supply chain planning', *Industry Week*, January, 253 i1: 51.
- González-Benito, J. (2002) 'Effect of the characteristics of the purchased products in JIT purchasing implementation', *International Journal of Operations and Production Management*, 22(8): 868–86.
- Hoque, A. (2000) 'Just-in-Time production, automation, cost allocation practices and importance of cost information: an empirical investigation in New Zealand-based manufacturing organizations', *British Accounting Review*, 32: 133–59.
- Howorth, C. and Westhead, P. (2003) 'The focus of working capital management in UK small firms', *Management Accounting Research*, 14: 94–111.
- McCosker, P. (2000) 'The importance of working capital', *Management Accounting (UK)* 78(4): 58. (Note that the journal *Management Accounting* is now called *Financial Management*)
- Schniederjans, M.J. and Cao, Q. (2001) 'An alternative analysis of inventory costs of JIT and EOQ purchasing', *International Journal of Physical Distribution and Logistics Management*, 31(2): 109–23.
- Strischeck, D. (2001) 'A banker's perspective on working capital and cash flow management', *Strategic Finance*, October: 38–45.

QUESTIONS

The Questions section of each chapter has three types of question. 'Test your understanding' questions to help you review your reading are in the 'A' series of questions. You will find the answer to these by reading and thinking about the material in the textbook. 'Application' questions to test your ability to apply technical skills are in the 'B' series of questions. Questions requiring you to show skills in 'Problem solving and evaluation' are in the 'C' series of questions. The symbol [S] indicates that a solution is available at the end of the book.

A Test your understanding

- A18.1** Define working capital (section 18.1).
- A18.2** Define current assets and give three examples (section 18.2).
- A18.3** Define current liabilities and give three examples (section 18.3).
- A18.4** Explain how the stockholding period is calculated (section 18.2.1).
- A18.5** Explain how the customers collection period is calculated (section 18.2.2).
- A18.6** Explain how the suppliers payment period is calculated (section 18.3.2).
- A18.7** Explain what is meant by the accrual of liabilities (section 18.3.3).
- A18.8** Describe the working capital cycle (section 18.4.1).
- A18.9** Explain how the current ratio is calculated (section 18.4.2).

- A18.10** Explain how the liquid ratio is calculated (section 18.4.2).
- A18.11** Explain how the working capital cycle is calculated (section 18.4.3).
- A18.12** Explain the meaning of overtrading (section 18.4.4).
- A18.13** What are the costs of holding inventory (section 18.5.1)?
- A18.14** What are the costs of ordering inventory (section 18.5.1)?
- A18.15** How is the economic order quantity calculated (section 18.5.2)?
- A18.16** What is the just-in-time approach to purchasing inventory (section 18.5.3)?
- A18.17** Describe the main contents of a business plan for presenting to a bank providing finance for a small business (section 18.6).
- A18.18** What have researchers found about the frequency of review of working capital in small businesses (section 18.7.1)?
- A18.19** What have researchers found about the length of the working capital cycle in practice (section 18.7.2)?
- A18.20** What have researchers found about the idea that different types of business have different types of working capital (section 18.7.3)?
- A18.21** What are bankers looking for when they evaluate working capital (section 18.7.4)?
- A18.22** What kinds of organisation are likely to use JIT production (section 18.7.5)?

B Application

B18.1 [S]

Company A is a wholesaler selling grocery goods to retail stores on credit. Company B is a manufacturing company selling its products to other manufacturers for use in their products.

	A £m	B £m
During year		
Sales	200	200
Cost of sales*	150	150
Gross profit	50	50
At end of year		
Inventory (stock)	12	24
Trade receivables (debtors)	3	13
Trade payables (creditors)	11	11

*Assume cost of sales is equal to purchases, based on constant levels of inventory.

Required

- Calculate the working capital cycle for companies A and B.
- Comment on each answer.

B18.2

The following statement was made in the finance director's report of a company making retail sales:

The increase in cash has resulted from improved trading, the benefits of a working capital reduction of £8m and a reduced level of capital expenditure in the period.

The cash flow statement showed the following information:

	£m
Decrease in inventories	3.0
Decrease in receivables	0.1
Increase in payables	4.9

Required

Explain how the management improved the cash position by managing the working capital.

C Problem solving and evaluation

C18.1

Dallas (UK) Ltd is a wholly owned subsidiary of a US parent and has been set up as a new manufacturing facility in the UK. The projected capital costs and sources of funds are as follows:

Costs

Buildings: £1,500,000 paid at the start of year 1.

Land: leased for 100 years for a single payment of £120,000

Machinery: £500,000 initial payment at the start of year 1 and £50,000 per annum subsequently on the first day of each year.

Financing

Share capital: £600,000

Special area cash grant £520,000 spread evenly over four years.

Long-term loan: £1,000,000 for eight years at 5% with capital repayments of one-quarter in each of the last four years at the end of the year.

Medium-term loan: £500,000 for five years at 8% with repayments in equal instalments at the end of each year. The loan is received at the start of year 1.

Overdraft facility: £1,400,000 (interest assumed constant at 9% on actual usage).

The following details are available from the profit forecasts prepared to support the new factory:

	Year 1	Year 2	Year 3	Year 4	Year 5
	£	£	£	£	£
Sales	2,500,000	2,800,000	6,500,000	9,000,000	12,500,000
Profit (see note 2)	(200,000)	–	150,000	400,000	1,000,000
Inventory, debtors less creditors	500,000	700,000	1,800,000	2,200,000	3,000,000
Manpower levels	100	180	400	480	600

2 Profit is defined as being stated after including depreciation and overdraft interest but before including loan interest, royalties, grants and taxation.

3 The company is eligible for machinery grants at 20% on cost, receivable in the year following expenditure.

4 The company is due to pay the parent 10% of profit, as defined in 2 above, by way of royalties. Payment is made in the year following the profit being earned.

5 The company calculates depreciation on a straight-line basis as follows:

Land – over the length of the lease

Buildings – 50 years

Plant – 10 years.

Notes:

Ignore taxation. No dividend is payable in the first five years.

Required

Prepare calculations to show whether the overdraft facility is adequate to finance the business over its first five years.

C18.2

AB Ltd manufactures units for drills. All units are identical. The following working capital requirements are budgeted:

	<i>At end of Sept Year 6</i> £	<i>At end of Oct Year 6</i> £	<i>At end of Nov Year 6</i> £
Inventory (stock) of raw materials	15,000	17,500	16,000
Inventory (stock) of finished goods	24,000	16,800	18,800
Trade receivables	76,800	87,600	83,400
Cash	<u>1,800</u>	<u>2,300</u>	<u>1,900</u>
	117,600	124,200	120,100
Trade payables for raw materials	<u>(14,500)</u>	<u>(16,500)</u>	<u>(15,500)</u>
Creditors for other expenses	<u>(4,950)</u>	<u>(5,730)</u>	<u>(6,945)</u>
	<u>98,150</u>	<u>101,970</u>	<u>97,655</u>

Budgeted profit and loss accounts are as follows:

	£	£	£	£	£	£
Sales		70,000		80,000		76,000
Manufactured cost of finished goods						
Raw materials	15,000		17,000		19,500	
Labour	9,000		10,200		11,700	
Production overheads	9,000		10,600		13,400	
Depreciation	<u>3,000</u>		<u>3,000</u>		3,000	
	36,000		40,800		47,600	
Adjustment for inventory of finished goods	<u>6,000</u>		<u>7,200</u>		<u>(2,000)</u>	
Cost of goods sold		<u>42,000</u>		<u>48,000</u>		<u>45,600</u>
Gross profit		28,000		32,000		30,400
Administration overheads	6,200		6,000		6,000	
Discounts allowed	<u>800</u>		<u>2,000</u>		<u>1,600</u>	
		<u>7,000</u>		<u>8,000</u>		<u>7,600</u>
Net profit		<u>21,000</u>		<u>24,000</u>		<u>22,800</u>

Notes:

- 1 Each month is assumed to consist of four working weeks.
- 2 Wages are paid one week in arrears.
- 3 70 per cent of production overheads and 100% of administration overheads are paid for as they are incurred. The remaining expense is paid in the following month.

Required

- 1 Prepare a detailed cash budget for each of the months of October and November Year 6.
- 2 Reconcile the projected net profit of the months of October and November respectively with the surplus or deficit shown in the cash budget for each month.

C18.3

The purchasing manager of a manufacturing business knows that its total production requirement for raw materials will be 7,200 units per month. Each unit has a price of £10. The cost of holding stocks of raw materials is £3 per unit per month. The cost of ordering is £9 per order. The purchasing manager has asked for your advice on two situations facing the business.

Situation 1

The supplier has offered 1% discount on the price of each unit of raw material provided at least 100 units are ordered each time an order is placed.

Situation 2

It is expected that when the next order is placed, lead-time may vary due to transport difficulties. To cover this uncertainty it is proposed to hold a buffer stock for one month.

The amount ordered will be 60 units. Demand is linear with respect to time. Assume that there are 30 days in a month.

The range of possible lead-times and the likelihood of occurrence of each are as follows:

Lead-time (days)	0	1	2	3	4	5	6
Probability	.06	.12	.18	.28	.18	.12	.06

The costs of holding stock are expected to remain at £3 per unit per month. The cost of running short of stock is estimated at £20 per unit per day.

- (a) Show that, before considering Situation 1 or Situation 2, the economic order quantity is 60 units and state the assumptions of your calculation.
- (b) In Situation 1:
 - (i) Advise the purchasing manager on whether to accept the supplier's offer.
 - (ii) Calculate the discount rate which would make the purchasing manager indifferent between ordering 60 units and ordering 100 units.
- (c) In Situation 2:

Establish the total cost of holding stock and of running short of stock for buffer levels of 60 units, 40 units, 20 units and zero units respectively, in each case held for one month.

Case studies

Real world cases

Prepare short answers to Case studies **18.1**, **18.2** and **18.3**.